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Report No: PAD367

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$250 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

ZHENGZHOU URBAN RAIL PROJECT

November 24, 2014

Transport and ICT Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective March 24, 2014)

Currency Unit	=	RMB
RMB1.00	=	US$0.161
US$1.00	=	RMB 6.225

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AFC	Automatic Fare Collection	km	Kilometer
BP	Bank Procedures	LVC	Land Value Capture
BRT	Bus Rapid Transit	m	Meter
CUTP	China Urban Transport Partnership	M&E	Monitoring and Evaluation
DA	Designated Account	OP	Operational Policies
DRC	Development and Reform Commission	PAP	Project Affected People
		PDO	Project Development Objective
EA	Environmental Assessment	PLG	Project Leading Group
EIA	Environmental Impact Assessment	PMO	Project Management Office
ESMP	Environmental and Social Management Plan	RAP	Resettlement Action Plan
		RPF	Resettlement Policy Framework
FM	Financial Management	TA	Technical Assistance
FSR	Feasibility Study Report	TOD	Transit Oriented Development
GEF	Global Environment Facility	TOR	Terms of Reference
GRP	Gross Regional Product	URC	Urban Rail Company
HPFD	Henan Provincial Finance Department	URO	Urban Rail Office
		ZM	Zhengzhou Municipality
IBRD	International Bank for Reconstruction and Development	ZMFB	Zhengzhou Municipal Finance Bureau
IDA	International Development Agency	ZMG	Zhengzhou Municipal Government
IPF	Investment Project Financing		

Regional Vice President:	Axel van Trotsenburg
Country Director:	Bert Hofman
Sector Director:	John A. Roome (through June 30, 2014)
Global Practice Senior Director:	Pierre Guislain (from July 1, 2014)
Global Practice Director:	Jose Luis Irigoyen (from July 1, 2014)
Sector Manager:	Abhas Kumar Jha (through June 30, 2014)
Practice Manager:	Michel Kerf (from July 1, 2014)
Task Team Leader:	Gerald Paul Ollivier

CHINA
Zhengzhou Urban Rail Project

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China

CHINA: ZHENGZHOU URBAN RAIL PROJECT (P128919)

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

EASCS

Report No.: PAD367

Basic Information		
Project ID P128919	EA Category A - Full Assessment	Team Leader Gerald Paul Ollivier
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ]	
	Financial Intermediaries [ ]	
	Series of Projects [ ]	
Project Implementation Start Date 01-January-2015	Project Implementation End Date 31-March-2021	
Expected Effectiveness Date 01-June-2015	Expected Closing Date 30-June-2021	
Joint IFC No		

Practice Manager	Senior Global Practice Director	Country Director	Regional Vice President
Michel Kerf	Pierre Guislain	Bert Hofman	Axel van Trotsenburg

Borrower: People's Republic of China			
Responsible Agency: Zhengzhou Finance Bureau			
Contact:	Eryong Ding	Title:	Deputy Director, Zhengzhou Finance Bureau
Telephone No.:	0371-67181196	Email:	hnzzszwb@126.com

Project Financing Data(in USD Million)					
[X]	Loan	[ ]	Grant	[ ]	Guarantee
[ ]	Credit	[ ]	IDA Grant	[ ]	Other

Total Project Cost:	3,089.41	Total Bank Financing:	250.00
Financing Gap:	0.00		

Financing Source	**Amount**

Borrower	2,839.41
International Bank for Reconstruction and Development	250.00
Total	3,089.41

Expected Disbursements (in USD Million)

Fiscal Year	2015	2016	2017	2018	2019	2020	2021		
Annual	1.00	19.00	20.00	80.00	90.00	20.00	20.00		
Cumulative	1.00	20.00	40.00	120.00	210.00	230.00	250.00		

Proposed Development Objective(s)

The proposed project development objective is to improve urban mobility for the population of Zhengzhou along the catchment area of Line 3 from Xin Liu Lu Station to Hang Hai Dong Lu Station.

Components

Component Name	Cost (USD Millions)
Component 1: Construction of Line 3	1,355.87
Component 2: Equipment for Line 3	796.02
Component 3: Design, Construction Management and Technical Assistance	201.87
Component 4: Safeguards and Other Construction Costs	501.30

Institutional Data

Practice Area / Cross Cutting Solution Area

Transport & ICT

Cross Cutting Areas

[ ] Climate Change

[ ] Fragile, Conflict & Violence

[ ] Gender

[ ] Jobs

[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Transportation	Urban Transport	100		100
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes		
Theme (Maximum 5 and total % must equal 100)		
Major theme	Theme	%
Urban development	City-wide Infrastructure and Service Delivery	100
Total		100

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]
Does the project require any waivers of Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [ ]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No [ ]

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04		X
Forests OP/BP 4.36		X
Pest Management OP 4.09		X
Physical Cultural Resources OP/BP 4.11	X	
Indigenous Peoples OP/BP 4.10		X
Involuntary Resettlement OP/BP 4.12	X	
Safety of Dams OP/BP 4.37		X
Projects on International Waterways OP/BP 7.50		X
Projects in Disputed Areas OP/BP 7.60		X

Legal Covenants

Name	Recurrent	Due Date	Frequency
Integration Plan	X		Yearly

Description of Covenant

Project Agreement, Schedule, Section IV. The Project Implementing Entity shall implement, through Zhengzhou Municipality (ZM), the Integration Plan, as approved, or as adjusted when required, in consultation with the Bank.

Conditions

Name	Type
Subsidiary Agreement	Effectiveness

Description of Condition
Loan Agreement, Article V, 5.01. The Subsidiary Agreement has been executed on behalf of ZM and URC in accordance with Section I.A.1 of the Schedule to the Project Agreement.

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Gerald Paul Ollivier	Senior Infrastructure Specialist	Task Team Leader	EASCS
Alejandro Alcala Gerez	Senior Counsel	Legal	LEGES
Holly Krambeck	Transport Economist	Project Finance	EASIN
Hooi Boon Phua	Senior Transport Specialist	Transport Policy and Transport Integration	EASIN
Guoping Yu	Senior Procurement Specialist	Procurement	EASR2
Jun Zeng	Social Development Specialist	Social Safeguards	EASCS
Yiren Feng	Senior Environmental Specialist	Environmental Safeguards	EASCS
Reindert Westra	Senior Urban Transport Specialist	Urban Rail	EASIN
Yi Dong	Senior Financial Management Specialist	Financial Management	EASFM
Haiyan Wang	Senior Finance Officer	Disbursement	CTRLN
Junxue Chu	Senior Finance Officer	Disbursement	CTRLN
Xuan Peng	Program Assistant	Coordination	EACCF
Ruifeng Yuan	Program Assistant	Coordination	EACCF
Yi Yang	Transport Analyst	Urban transport	EASCS
Jingyi Zhang	Junior Professional Associate	Urban rail finance	EASIN
Shomik Raj Mehndiratta	Lead Urban Transport Specialist	Peer Reviewer	LCSTR
Om Prakash Agarwal	Senior Urban Transport Specialist	Peer Reviewer	TWITR
Arturo Ardila Gomez	Lead Urban Transport Specialist	Peer Reviewer	LCSTR
Zhiyu Jerry Chen	Urban Specialist	Peer Reviewer	SASDU

Non Bank Staff

Name	Title	Office Phone	City
Richard Bullock	Railway Economic &		Melbourne

	Financial Evaluation Advisor		
Eric Ho	Urban Transport Modeling Specialist		Washington
Andrew Salzberg	Transport Consultant		Washington
Runze Yu	Transport Consultant		Beijing
Li Qu	Transport Consultant		Beijing

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
China	Henan Province	Zhengzhou		X	

I. STRATEGIC CONTEXT

A. Country Context

1. Over the past three decades, rapid economic development in China, supported by steady urbanization, has lifted more than 500 million people out of poverty. Urbanization created a supportive environment for growth with abundant labor, cheap land and good infrastructure. Urbanized population grew from 30 percent in 1996 to 50 percent in 2010. Such urbanization is anticipated to continue for the next two decades with an expected one billion urban residents in China by 2030. While China has avoided some of the common ills of urbanization, notably slums and urban unemployment, its cities are faced with major environmental challenges and social inequities. China's leadership is well aware of these challenges, and has called for a new model of urbanization to support its development goals and address such emerging challenges.

2. Urbanization in China has been accompanied by deep changes in the overall travel patterns of urban residents. Cities rapidly spread out as a result of increased real estate cost, incentives for cities to convert rural land to urban land in peri-urban areas, and improved road infrastructure. This led to rapid motorization with a 25 percent annual growth in private cars, and a steady decline in the percentage of biking and walking trips. While private cars have supported socioeconomic development and enhanced mobility at an individual level, they have also brought about a range of adverse economic, environmental and social impacts, including increased traffic congestion, air pollution, fossil fuel consumption, greenhouse gas emissions and road accidents. In recent years, the national government and many cities have engaged in a strategic shift in their urban transport investments towards public transport and non-motorized transport, which better address the needs of lower income groups for affordable mobility and accessibility.

B. Sectoral and Institutional Context

3. To support greener mobility and promote more inclusive development, China's State Council adopted public transport as a national policy priority, through a directive on the Prioritization of Urban Public Transport Development dated December 29, 2012. The directive lays out four broad principles: (i) provision of convenient services to users; (ii) provision of integrated and interconnected transport services closely integrated with urban master plans and long term land use; (iii) pursuit of green development with an emphasis on efficient and high capacity rapid transit systems on major corridors; and (iv) determination of solutions that are context sensitive and appropriate.

4. The central government also launched a transit metropolis program to support the implementation of such a policy in a number of pilot cities, including Zhengzhou. Transit metropolis aim to achieve a high mode share of public transport among motorized trips. For larger cities, this entails developing a mass transit system that works as a backbone for public transport. As a result, Chinese cities have been increasingly investing in public transport infrastructure and services, particularly in urban rail. By the end of 2013, 19 Chinese cities were operating urban rail systems with about 2,400 kilometers of track and 31 cities had urban rail construction plans approved. Approximately 5,000 kilometers of urban rail were either in operation or under construction.

5. Henan Province is in central China, and ranks 23 out of 31 provinces (including the four province-level municipalities) in terms of Gross Regional Product (GRP) per capita. Zhengzhou is the capital city of Henan Province and has always been a critical transportation and communication node. By the end of 2013, Zhengzhou covered an area of 1,010 square kilometers with a population of 5.17 million. The urban built-up area reached 373 square kilometers and the urbanization ratio reached 67 percent. In 2013, Zhengzhou's GRP reached RMB620 billion (approximately US$99.6 billion equivalent), a 10 percent increase over the previous year; the average GRP per capita was RMB68,070.

6. **Zhengzhou is rapidly expanding like many other Chinese cities.** According to the Master Plan (2009-2020), the urban built-up area of Zhengzhou is expected to reach 400 square kilometers and the urbanization ratio is expected to reach 80 percent by 2020. In addition to the existing city core, the city has planned to develop seven other functional zones located along the east-west and north-south axes. Significant development, including major residential housing development, is taking place in these zones. This provides an opportunity for low- and middle-income people to own their first apartments in Zhengzhou.

7. **Urbanization has been accompanied by rapid motorization which has consequences for Zhengzhou.** By the end of 2012, total car ownership in Zhengzhou exceeded 684,000, with an average of 155 vehicles per thousand people. Traffic surveys indicated that the share of private car trips among all modes grew from 3.7 percent in 2007 to 7.5 percent in 2010. Public transport accounted for about 13.6 percent of total daily trips – relatively low compared to similar sized cities and GDP, e.g., Changsha (24.5 percent) or Wuhan (23.4 percent). The motorized transport mode share in Zhengzhou in 2010 was still low (about 25 percent) but is growing rapidly. Major corridors in the downtown area are already experiencing severe traffic congestion during peak hours and it is estimated that, by 2015, travel speed in the city center will drop to 13.5 kilometers per hour.

8. **In response, Zhengzhou Municipality (ZM) aims to develop an efficient and sustainable integrated urban transport system** that anticipates the needs arising from its urban development. It has adopted the following strategies to guide urban transport development: (i) public transport priority; (ii) integrated transport and land use development; (iii) seamless multi-modal integration; and (iv) travel demand management. Consequently, specific targets to be achieved by 2020 have been set up, including: (i) public transport mode share to reach 35 to 40 percent among all trips; (ii) single trips of over 95 percent of inhabitants within the downtown area not to exceed 45 minutes; and (iii) urban transport infrastructure investment to account for no less than 3 percent of GDP, with at least half of it invested in public transport.

9. **ZM sees urban rail as the backbone of such an integrated urban transport system**, able to provide efficient and affordable mobility for all residents, especially those that live on the outskirts of the city, as well as to attract passengers with growing expectations in terms of service quality and comfort. By April 2014, the approved urban rail construction plan for Zhengzhou includes 5 lines, totaling 166.94 kilometers and 128 stations. Line 3, proposed and approved in the second round of the Urban Rail Construction Plan (2014-2020) and to be financed under the proposed project, will have 25.2 kilometers with 21 stations, a depot and a

parking yard. It will run through the existing city core and several functional zones that are identified in the master plan to be key areas of development. ZM expects to start the construction of Line 3 in March 2015 and put it in operation in December 2019.

10. **Urban rail will need to be closely integrated with bus services.** By the end of 2011, the Zhengzhou Bus Company (a state-owned enterprise) was operating 238 bus routes with 5,153 buses, including 12 Bus Rapid Transit (BRT) routes[1] with 380 BRT buses. Total daily bus ridership was over 2.5 million. The bus company has launched studies on bus-rail integration which plan for bus route re-organization and bus-rail interchange facility for each urban rail line. In addition, service-oriented guidelines on the integration of multi-modal public transport system in Zhengzhou are being developed (with support from the GEF-China Urban Transport Partnership (CUTP) Project) to optimize transfers between regular bus, BRT and urban rail with respect to physical integration, information service, fare, and ticketing.

11. **ZM is seeking technical and financial support from the Bank to enhance the impact of its investment in Line 3 and learn from it when developing its other urban rail lines.** International experience shows[2] that well integrated transit and land development can create more sustainable urban forms[3], while high quality integration across transport modes is essential for mass transit systems to achieve social and economic impact. The mechanisms to achieve such integration are nonetheless complex, and context specific. ZM looks forward to close cooperation with the Bank, in particular with respect to multi-modal integration and Transit-Oriented Development (TOD) along the Line 3 corridor. These topics require a wide range of expertise and familiarity with both the global and local context. Based on its transport and urban global practice, as well as on a large engagement in urban transport in China, the Bank is well placed to support ZM in achieving this goal and its broader objective to provide fast, convenient, affordable, comfortable and safe mobility for its residents.

C. Higher Level Objectives to which the Project Contributes

12. The Bank's China Country Partnership Strategy (CPS) for FY2013-16, discussed by the Board on November 6, 2012, is aligned with China's 12th Five-Year Plan and focuses on two strategic themes: supporting greener growth and promoting more inclusive development. This project will contribute directly to both themes.

13. The project will support low carbon urban transport[4] by emphasizing better integration of land use planning and urban transport, as well as the use of public transport, biking and walking. It will reduce the dependence on car transport, as shown by a survey of the recently opened Line 1 which indicates that 14 percent of its current users would have used their cars if Line 1 were not available. It will build ZM's capacity to implement TOD along a mass transit corridor in

[1] Zhengzhou's BRT network consists of one trunk route and eleven feeder routes. The trunk route is a full-fledged BRT with exclusive lanes, priority signals, screen doors at the bus stops, etc. The feeder routes partially overlap with the trunk route; in other parts, they run on bus lanes but are not a fully-fledged BRT.
[2] See Transforming Cities with Transit: Transit and Land Use Integration for Sustainable Urban Development (World Bank 2013).
[3] Urban China 2030 (World Bank and Development Research Center; 2014)
[4] In line with recommendations from Sustainable Low Carbon City Development in China (World Bank 2012).

support of China's public transport policies. This will facilitate the city's transformation towards a public transit metropolis with a sustainable urban transport system.

14. The project will also promote more inclusive development in the capital of this Central Province. Public transport, biking and walking are the primary modes of transport of the bottom 40 percent (GEF-CUTP report 2014). An affordable mass rapid transit service will improve accessibility of bikers and pedestrians to stations, foster income growth of the bottom 40 percent and improve the living conditions of vulnerable social groups. A survey conducted on Zhengzhou Line 1, five months after opening, indicated that about 45 percent of metro users were in the bottom 40 percent income group. More than 90 percent of these users were traveling by bus, bike, e-bike or walking before Line 1 opened and now experience faster and safer mobility on Line 1. The project will analyse the level of satisfaction by income groups, including the bottom 40 percent. A case study, combined with an impact analysis of public transport on low-income groups, was undertaken as part of project preparation to develop solutions to improve last mile accessibility at six pilot stations.

15. The project will also contribute to TransFORM, a collaborative transformation and innovation platform between the Ministry of Transport and the Bank, to make transport safer, cleaner and more affordable in China. TransFORM's first event on urban rail took place on December 7, 2012, when practitioners from 16 cities in China shared good practices in alternative analysis, sustainable financing and public transport integration. A second and third event on TOD and Land Value Capture (LVC) took place on November 1, 2013 and September 24, 2014 respectively where both global and domestic innovative practices were introduced. Further events will take place during the life of the project.

II. PROJECT DEVELOPMENT OBJECTIVE(S)

A. PDO

16. The proposed Project Development Objective (PDO) is to improve urban mobility for the population of Zhengzhou along the catchment area of Line 3 from Xin Liu Lu Station to Hang Hai Dong Lu Station.

B. Project Beneficiaries

17. The direct beneficiaries of the Project are the individuals who will live, work or commute along the catchment area that Line 3 will serve (about 913,000 in 2020, including about 467,000 women). Public transport users are likely to experience significant improvements in mobility and accessibility to their jobs and urban services in terms of speed, safety and commuting quality. Zhengzhou residents will benefit as a result of a slowdown in the growth rate in private car use. This will limit the negative local externalities caused by private cars (principally air pollution, congestion and traffic accidents). Businesses in the catchment area will also benefit from improved accessibility.

C. PDO Level Results Indicators

18. Achievement of the PDO will be measured by the following indicators:

(a) Line 3 ridership;

(b) Travel time savings for public transport users on Line 3;

(c) Proportion of urban rail commuters on Line 3 with access to a car; and

(d) Proportion of Line 3 users that rate service as satisfactory or better (gender and income disaggregated).

III. PROJECT DESCRIPTION

A. Project Components

19. The project consists of the following four components:

20. **Component 1: Construction of Line 3.** (Total cost US$1,355.87 million, IBRD loan US$244.68 million). This component includes all construction activities for the Zhengzhou Urban Rail Line 3 (about 25.2 km) which starts at Xin Liu Lu station and ends at Hang Hai Dong Lu station. Line 3 will connect the city center of Zhengzhou with its northwest and southeast development areas. Line 3 includes 21 stations, which will be located underground and connected by tunnels. The Line 3 depot for maintenance and stabling will be located above ground at one end of Line 3 in southeast Zhengzhou, and the parking yard will be located above ground at the other end of Line 3 in northwest Zhengzhou. Six interchange stations to be constructed by December 2019 will provide convenient interchange with other urban rail lines. The Bank loan will support the construction of five stations and five tunnels located at the southeast end of the line.

21. **Component 2: Equipment for Line 3.** (Total cost US$796.02 million, IBRD loan US$0 million). This component includes equipment necessary to the operation of Line 3, such as rolling stock, power supply, control system, signaling system, communication system, monitoring system, fare collection system, safety and security system, ventilation and air conditioning system, water supply, sewerage and fire protection system, and station auxiliary equipment. This component will be financed entirely by local counterpart financing.

22. **Component 3: Design, Construction Management and Technical Assistance.** (Total cost US$201.87 million, IBRD loan US$2.14 million). This component includes: (i) activities for design and preparation of the project; (ii) activities for construction management and quality assurance; and (iii) technical assistance (TA) and capacity building of relevant staff in ZM and the Urban Rail Company (URC). The Bank loan will support the TA and capacity building activities.

23. **Component 4: Safeguards and Other Construction Costs.** (Total cost US$501.3 million, IBRD loan US$0 million). This component will include land acquisition and resettlement costs, construction site preparation (environmental mitigation measures) as well as

other project related construction costs, such as engineering insurance, work safety assurance, inspection and acceptance, and project cost estimation. This component will be financed entirely by local counterpart financing.

B. Project Financing

24. **Lending Instrument.** The proposed lending instrument for this project is Investment Project Financing (IPF). The Borrower has selected a US Dollar denominated, commitment-linked variable spread loan based on six-month LIBOR plus an additional variable spread. It has also selected all available conversion options, level repayment of principal, and a repayment period of 29 years, including a 7-year grace period.

25. **Project Cost and Financing.** The estimated total cost of the Project, including financial costs during construction, is US$3,089.41 million equivalent, to be funded by an IBRD loan of US$250 million and counterpart funds of US$2,839.41 million equivalent. Counterpart funds consist of: (a) government equity, accounting for 42 percent of total construction expenditures; and (b) funds to be secured by the URC, including domestic bank loans, bonds and financial leases, for the remainder.

Table 1. Project Costs and Financing

Project Components	Project costs (US$ million)	IBRD Financing (US$ million)	% Financing
1. Construction of Line 3	1,355.87	244.68	18.0%
2. Equipment for Line 3	796.02	0	0
3. Design, Construction Management and Technical Assistance	201.87	2.14	1.1%
4. Safeguards and other Construction Costs	501.30	0	0
Total Project Costs (including contingencies)	**2,855.05**	**246.82**	**8.6%**
Interest During Implementation	228.57	0	0
Commitment Fee	2.55	2.55	100%
Initial Working Capital	2.60	0	0
Front-End Fees	0.63	0.63	100%
Total Financing Required	**3,089.41**	**250.00**	**8.1%**

C. Lessons Learned and Reflected in the Project Design

26. Project design reflects key lessons learned from international urban rail experience, from TransFORM, and from the Bank's two other on-going urban rail projects in China (Kunming and Nanchang). Key lessons include the following:

(a) Multi-modal integration is critical for an urban rail system to achieve its potential as a mass transit mode. Bus services need to be adjusted to complement rather than compete with rail services, with integrated fare structures and fare media, and coordinated operational schedules. Physical interchange facilities need to be built for bicycles, buses and cars to support such integration, with close attention to pedestrian accessibility. This requires a

multitude of governmental and non-governmental stakeholders [5] with disparate and sometimes conflicting interests to work together. These aspects have been systematically discussed as part of project preparation and guidelines on public transport integration are being developed under the GEF CUTP. Learning from the good practice of the Nanchang Urban Rail Project, ZM and URC prepared the Line 3 Integration Plan in consultation with all concerned agencies. ZM will closely monitor its implementation as part of the project.

(b) TOD and LVC are key mechanisms to achieve long-term sustainability of urban rail projects. Effective mass transit systems need to be coordinated with land use plans and urban designs in support of compact urban growth. Such an approach can bring incremental value to the area around transit stations, which may be captured through tax-based and development-based mechanisms, to support the construction and operation of the transit system. Building on the knowledge and lessons from two recent Bank publications[6] prepared by its Urban Global Practice, the Bank has been engaged in discussions with several Chinese cities to identify the constraints and next steps to implement TOD and LVC in China. ZM will study such aspects in the context of Line 3, through a technical assistance to study property development and commercial development around stations and a technical assistance to study diversified financing model of urban rail.

(c) Demand forecasts for urban rail tend to be optimistic because they assume multi-modal integration and an integrated public transport oriented urban management approach that may not be fully realized in practice[7]. There is a need to ensure that financial and economic forecasts include sensitivity analyses that reflect this *ex-post* finding. In addition to its initial forecast, URC has supported the preparation of independent, updated ridership forecasts (in conjunction with a design institute responsible for the city's comprehensive transport model) that allow for much more refined analysis of critical variables that support metro ridership, including: level of bus and rail integration; changes in fares; pace of land development; and the impact of restrictions on car and motorcycle use in central areas.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

27. Henan Province, through the Henan Provincial Finance Department (HPFD), will sign the Project Agreement and be the Project implementing entity, responsible for managing, coordinating and monitoring the Project implementation. It will delegate most of these responsibilities to ZM, represented by the Zhengzhou Municipal Finance Bureau (ZMFB). Henan Province will enter into a subsidiary agreement to make the proceeds of the loan available to ZM and through ZM to URC. URC will be the final debtor and will be responsible for repaying the subsidiary loan.

[5] Such as municipal agencies with fare-setting authority, urban planning agencies, land and transport management agencies, as well as enterprises such as bus companies, urban rail companies and real estate developers.
[6] Transforming Cities with Transit (World Bank 2013); and Financing Transit with Land Values (World Bank 2014).
[7] Success and Failure in Urban Transport Projects, (Imperial College London 2008).

28. To provide governance and leadership for project preparation and implementation at the municipal level, a Project Leading Group (PLG) was established by ZM in November 2011. The PLG is composed of leaders from all relevant municipal line agencies. It will meet regularly and on an as-needed basis during project implementation to review project progress and address key issues that arise.

29. During project preparation a Project Management Office (PMO) was established at ZMFB, chaired by the Deputy Director of ZMFB and comprising officials from all relevant municipal agencies. During project implementation the PMO will play a coordination, liaison and supervisory role, while URC will act as the implementing unit and carry out the technical preparation of all project aspects, procurement and construction management of all contracts, financial management of all loan proceeds, implementation of environmental and social safeguards, and project monitoring and evaluation (M&E), in accordance with the Bank's policies and guidelines.

B. Results Monitoring and Evaluation

30. **Annex 1** lists the PDO-level results indicators for the project as well as the intermediate results indicators for each component. Baseline data have been collected and target values have been set up. URC will be primarily responsible for the Monitoring and Evaluation (M&E) of the project, with additional inputs from the bus company. Data to be collected for all indicators are either already embedded in the existing M&E systems of URC and the bus company for construction and operation management, or can be collected readily as part of regular surveys that URC will be conducting to ascertain customer satisfaction. Hence the incremental M&E costs are envisaged to be minimal. The PMO and URC will review the results and take appropriate remedial actions as needed.

C. Sustainability

31. Long-term sustainability of the urban rail system will depend on early consideration of long-term financial resources and coordinated planning among different stakeholders. In general, the overall policy environment to achieve these outcomes is favorable in China. Municipal boundaries cover both urban and suburban areas, limiting fragmentation of metropolitan governance, while local governments have control over key factors such as bus service, urban land development and public transport fares. Moreover, both the national government and the local governments are actively promoting public transport priority.

32. While construction of an urban rail line is a large financial undertaking, ZM is expected to be able to afford the contributions to capital costs and operations that Line 3 will require. Based on the analysis carried out as part of project preparation, even under pessimistic scenario tests for low ridership and high operations and maintenance costs, the required ZM contribution to support the project is not expected to exceed 1.4 percent of ZM's disposable income in any given year during construction or operations. URC may also seek additional sources from the land value increase around stations to fund the construction and operation of Line 3.

33. Social and economic sustainability of Line 3 will be dependent on ensuring reasonable fares and sufficient ridership for Line 3 in the mid-term. The level of fares applied in China and

for Line 1 in Zhengzhou reflects a strong emphasis on fare affordability. Line 3 fares are expected to follow a similar pattern. The use of integrated fares between bus and urban rail, recommended under the CUTP report, would further increase affordability for those who need to transfer multiple times or for those who make chained trips.

34. From a broader sustainability perspective, Line 3 is planned as part of a broad hierarchical public transport system, including other urban rail lines, a BRT system and a bus network. This project will support the integration of Line 3 in this network to provide effective accessibility and mobility. In the longer term and beyond the project, Line 3 will also support sustainable patterns of urban growth and financing mechanisms in Zhengzhou, building on TOD and LVC principles. The project will support exchange of experience with other cities with mass transit system on the development of urban space of high density, mixed use and high quality nearby stations.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Category	Rating
Stakeholder Risk	M
Implementing Agency Risk	
- Capacity	S
- Governance	M
Project Risk	
- Design	S
- Social and Environmental	S
- Program and Donor	L
- Delivery Monitoring and Sustainability	S
Overall Implementation Risk	S

Note: L (Low), M (Moderate), S (Substantial)

B. Overall Risk Rating Explanation

35. The project has been rated Substantial for Overall Implementation Risk due to the following considerations:

(a) This is the PMO and URC's first World Bank infrastructure investment project and when project preparation started they had limited familiarity with the Bank's fiduciary and safeguards policies. Substantial training on Bank's policies has been provided to the PMO/URC during project preparation and this will be continued throughout implementation. Safeguards instruments were prepared by experienced consultants and suitable implementation arrangements have been put in place. External

consultants experienced in World Bank fiduciary and safeguards policies will support the PMO/URC. Project procurement packaging has been kept simple to facilitate implementation. The Bank and ZM will monitor project implementation closely to ensure compliance with financial management (including availability of counterpart funding), procurement, and safeguards aspects, especially in the early stages of implementation.

(b) Urban rail projects are technically complex with many construction risks that require close attention. URC has allocated substantial resources (about US$199 million) for project design, risk management and supervision. The design is being overseen by the designer that successfully designed Line 1. Independent reviewers will review the design, as part of multilevel quality control.

(c) Urban rail projects need to focus on integration and institutional coordination challenges. A well-coordinated Integration Plan has been prepared by ZM as part of project preparation.

(d) URC needs to ensure timely availability of large commercial loans, and set up fare policies that balance affordability and financial sustainability. URC is in negotiations with domestic banks for the necessary funds, following the approval of the Feasibility Study Report (FSR), and received letters of intent from commercial banks at this stage. Experience from Lines 1 and 2 indicates that funding was secured in a timely manner. Project reporting will enable the monitoring of any shortfall in counterpart funding.

(e) The planned schedule, including construction start in March 2015 and starting operation in December 2019, is achievable subject to the timely completion of design.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

Economic Analysis

36. According to the latest ridership estimates[8], Zhengzhou Line 3 is expected to carry approximately 343,500 passengers per weekday in the third year of operation (assumed to be 2022), the majority of who will be former bus passengers. First year traffic is expected to be about 240,000 passengers per weekday. The feasibility study confirmed the suitability of using an urban rail approach, with a corridor traffic density of 19,400 passenger per direction per hour in year three growing to 38,900 in year 10, meeting the nationwide thresholds set for urban rail projects. Numerous alternatives in terms of vertical and horizontal alignment, as well as station locations, were considered as part of the feasibility study. Based on this ridership and growth rates in line with forecasts for urban growth in Zhengzhou, the line is expected to deliver an economic rate of return of approximately 12.6 percent. The results of this economic analysis and sensitivity analysis are presented in the economic analysis report available in the project files.

37. The benefits of Line 3 considered in this analysis fall into three main categories:

[8] *Special Note on Ridership Analysis and Forecast of Metro Line 3*, prepared by Southeast University and Zhengzhou Institute of Planning, Survey and Design; December, 2012.

(a) Change in user benefits for passengers transferring to Line 3 - this is a combination of travel time savings net of any change in fares, together with any changes in interchanges, headways and service frequencies.
(b) Changes in the operating costs of urban transport, i.e., the cost of Line 3 net of the change in the cost of operating the urban bus network, as well as the operating costs of car users who also transfer to transit.
(c) Changes in the external costs of the urban transport system. These have been identified in four groups.
    - Accident benefits due to reduced travel on the surface street network.
    - Congestion benefits for other road users.
    - Pollution benefits from the reduction in car and bus traffic.
    - Greenhouse gas benefits due to the reduction in petroleum-powered vehicles.

38. The above benefits are all quantifiable and were used in the economic analysis. There are, however, a number of non-quantifiable benefits which were not captured in the cost-benefit analysis but are worth noting:

- *Accessibility.* The urban rail will promote interconnection between residential and employment areas and social facilities (hospitals, schools) by lowering the obstacles to travel within the city. Although the economic evaluation quantifies improvement in travel time savings, it does not directly quantify the benefits of this increased accessibility for residents of Zhengzhou. The urban rail system will provide increased access to economic opportunity for all of Zhengzhou's residents, including those of low income. Over time, this accessibility benefit is likely to be capitalized into increased land values near urban rail stations.
- *Compact City Growth*. As described in project documents, one of the primary goals of Zhengzhou's planned urban rail system is to focus urban growth on the upgraded public transport network. Experience elsewhere has demonstrated that this will require a package of measures designed to support the new urban rail network. Over the long term, compact urban growth can substantially reduce the energy intensity and greenhouse gas emissions of urban areas. This is particularly crucial since decisions on urban development made now will be 'locked in' over the long term. These long term secondary impacts are not quantifiable in a traditional cost-benefit analysis.

39. Value added by the Bank comes from supporting Zhengzhou in developing and implementing a project that will not only build an urban rail line, but also help shape the city through this major mass transit investment and increase its efficiency and effectiveness by enhancing accessibility to stations and taking a broader look at urban transport beyond this project. During preparation, the Bank achieved that by sharing actively global experience on multimodal transport integration and on TOD, and by playing a convening role to exchange emerging domestic experiences among cities. At the national level, both the Transport and ICT and the Urban practices were engaged to share global experience[9] in those topics and learn from domestic experience through a series of TransFORM events with over 20 cities. At the Zhengzhou level, the Bank and Zhengzhou undertook detailed analysis of urban mobility and

[9] E.g event on Transforming Cities with Transit: Transit and Land Use Integration for Sustainable Urban Development (World Bank 2013).

accessibility for different income groups and genders and integration across modes through the GEF CUTP project, and undertook the development of a series of open-source tools based on geographic information system and datasets to map out and better understand accessibility.

40. Throughout implementation, the Bank will facilitate the sharing of lessons learned on those topics and their replication in China through TransFORM. The Bank will document lessons through case studies. It will continue its dialogue with cities on TOD, selected as a priority topic under TransFORM and share lessons back to the Global Practices and the corresponding thematic group on TOD.

Financial Analysis

41. During the construction period (2015-2019), ZMG will pay 42 percent of construction costs each year. The largest of these contributions, about RMB1.79 billion, is expected to occur in 2016, which would equal 1.35 percent of expected disposable income in that year. Disposable income is comprised of tax revenue, non-tax revenue, fund income, and income from central government transfers. Remaining construction costs will be primarily supported through domestic loans and the World Bank loan.

42. Operating and maintenance costs, by the fifth year of operations (in nominal terms), are expected to be RMB508 million. Operating revenues (fares, advertising, and retail space) in the same year are expected to be RMB460 million – resulting in a fifth year recovery ratio of 0.91. Operating and maintenance costs, by the tenth year of operations (in nominal terms), are expected to be RMB643 million, while operating revenues in the same year are expected to be RMB 687 million – resulting in a tenth year recovery ratio of 1.07.

43. The present value of the total contribution expected by ZMG to support Project construction, operations, maintenance, replacement, and debt service is RMB14.2 billion, i.e., 0.39 percent of the expected present value of ZMG's disposable income over the same period. A series of scenario tests showed that even under a worst-case scenario, with higher-than expected operations, maintenance, and replacement costs as well as lower than expected ridership, the total disposable income contribution to the Project over the study period would be less than 0.5 percent.

44. In line with almost all metros worldwide, both the infrastructure and rolling stock of the Zhengzhou metro will be primarily financed as a public-sector project. The current project has a cost of over USD3 billion and is designed to be fully integrated with the two existing lines. The size of the project and the potential problems from clearly separating this line from the remainder of the system present significant obstacles to direct private participation through a public private partnership. However, there is significant indirect participation as over 50 percent of the project cost will be provided by commercial bank loans, bonds and leases for which URC will be responsible. URC may also seek additional sources from the land value increase around stations to fund the construction and operation of Line 3.

B. Technical

45. The Bank's focus during project preparation and design was on two key issues:

(a) Identifying and addressing barriers to the development of an effective multi-modal public transport system, with urban rail as the network backbone; and

(b) Reviewing the technical aspects, processes and risks related to the construction of tunnels and stations.

46. **Multi-Modal Integration.** A fundamental barrier to effective multi-modal integration common to many urban rail projects in China is that the scope for urban rail projects does not include associated bicycle, bus, taxi, and car parking facilities, and no institution is usually in charge for such interchange facilities.

47. ZM has put in place institutional arrangements to ensure coordination and integration, and URC and ZM have prepared a Line 3 Integration Plan. The Plan identifies parcels of land for key interchanges (scaled to their respective demand, based on traffic modeling). The design of the station entrances has been adapted to facilitate transfers to and from these facilities. This Plan also includes implementation responsibilities and timetable, as well as funding, construction and operation arrangements. ZM organized consultation with relevant agencies and has incorporated comments received into the revised Plan. Its implementation will be closely monitored.

48. In addition, as part of the ridership analysis described above, URC and the bus company have started analyzing the impacts of Line 3 on bus routes in the corridor. Principles for route restructuring have been outlined in the Integration Plan, and the bus company has launched a specific study on bus route optimization. This topic will remain a priority supported as part of project implementation and will be monitored as part of the results framework.

49. ZM has already introduced a multi-use contactless smartcard for small transactions and has put it in use on the bus system and Line 1. This smartcard will also serve as the fare medium on Line 3. On the policy side, an incremental distance-based fare has been introduced on Line 1 after public consultation. The fare starts from RMB2 for the first 6 kilometers and increases by RMB1 for every additional 7 kilometers travelled. Special discounts are provided to kids and primary and middle school students, and free rides are provided to elderly residents aged above 60 on weekends and during non-peak hours on weekdays. A similar fare policy is expected to be applied to Line 3.

50. Most of the station designs will adopt one of a number of standardized designs that have been optimized over time in China. However, there are a few station locations where the passenger profile is unique (such as at Er Qi Square Station) and designs were adjusted to reflect such traffic flows. The stations and their access will be designed to ensure universal accessibility, with barrier-free passage for the disabled in wheelchairs and guidance on sidewalks and in-station for blind people. The provision ratios of male and female bathroom facilities in stations will be reviewed based on projected passenger profile, when the internal layout design of stations is available.

51. **Technical Aspects**. The project's FSR has been prepared by the Beijing Urban Engineering Design and Research Institute, a Chinese design institute with significant experience with urban rail projects in other cities in China. Line 3 will use technology that is compatible

with Line 1 (put into operation in December 2013) and Line 2 (under construction). Its design will be coordinated by the institute that successfully oversaw the design of Line 1 and with design firms with well-established capacity.

52. According to the FSR, the expected project cost, inclusive of contingency and excluding financing charges, is estimated at RMB705 million per kilometer. This estimate is higher than the expected costs of other Bank-supported urban rail projects in China, primarily due to: (a) increase in labor and material costs; (b) use of larger vehicles; (c) higher costs resulting from the application of advanced vibration reduction techniques for tracks; and (d) increased cost of land acquisition.

53. The project entails a major investment in survey and design (US$119.6 million) and multi- level reviews adapted to each project stage (feasibility, general design, preliminary design, and construction design). Designs will be prepared by different design institutes, reviewed by a lead design institute, followed by an independent review. The preliminary designs of the entire line will then be reviewed by experts under the Henan Provincial Development and Reform Commission. Construction of tunnels and underground structures in alluvial soil, of low strength and poor stability, in the strong presence of water in a dense urban setting, entails substantial risks that need to be carefully managed. Such risks were assessed as part of the environmental assessment, drawing on experience in China and abroad. The design reviews will cover structural design and design criteria, structural stability of surrounding buildings, construction techniques and parameters, proposed excavation approach, groundwater management, risk management, passenger safety and contingency plans. Based on these reviews, designs will be modified and mitigation measures introduced to mitigate both geological and engineering risks to an acceptable level. Prior to construction, the design will be finally reviewed and certified by a certified design institute. An independent third party has been hired to assess risks at each construction site and develop mitigation measures. For any site rated above Grade 2, both risks and the mitigation plan are reported to the municipal government for overall control.

54. Construction management, supervision and commissioning have been duly budgeted for (US$79.9 million), drawing on the experience of Lines 1 and 2. A Quality and Safety Committee under the Construction Commission will oversee quality and safety aspects. A Quality and Safety Department in URC will be responsible for construction risks. A risk control consulting company will prepare regular reports on risks and mitigation measures. The Quality and Safety Department will conduct regular and random site checks on the implementation of mitigation measures. A Quality and Safety management information platform will be established to record and analyze construction risks and provide early warning. The system will use a 1,500 Volt DC traction power supply system with overhead catenary collection. The choice of catenary technology over third rail power supply reflects the maturity and wide use of catenary systems in China. In addition, the costs of both the system itself and the train cars compatible to such systems are lower than third rail power supply systems in China.

C. Financial Management

55. Bank loan proceeds, including overseeing the Designated Account, will be managed by the HPFD. A financial management (FM) capacity assessment has been conducted by the Bank and actions to strengthen the project's FM capacity have been agreed with the PMO and URC.

The FM assessment has concluded that with the implementation of these proposed actions, the FM arrangements will satisfy the Bank's requirements under OP/BP 10.02. **Annex 3** provides additional information on FM.

D. Procurement

56. The procurement capacity assessment of the PMO and URC has been conducted by reviewing the project's organization structure and objectives, past experience of the PMO and URC, staff skills, quality and adequacy of supporting and control systems, and legal and regulatory aspects. The PMO and URC have been legally established with two designated procurement staff for the project. The assessment found that the PMO and URC, and their staff, do not have sufficient experience with Bank procurement procedures. Therefore an experienced procurement agent has been hired and a consulting firm will be engaged to support procurement and contract management.

57. During project preparation the Bank conducted a training workshop for staff from the PMO and URC on Bank procurement. Project procurement staff will also attend procurement training courses including on anti-corruption guidelines, organized periodically by the Bank or by other institutions acceptable to the Bank. Procurement activities will be guided by the project procurement manual, which has been finalized after Bank review.

58. The project procurement plan was agreed with the Bank. The procurement plan will be updated throughout the duration of the project at least annually, or as required to reflect project implementation needs and will be submitted to the Bank for review. The initial procurement plan has been published on the Bank's external website; subsequent procurement plans will also be published once the Bank has provided a no objection.

E. Social (including Safeguards)

59. The project is an integral part of the city's public transportation system and is expected to benefit the local communities by enhancing the options for affordable, safe and fast public transportation in the vicinity of the project line. All stations will have a universal accessibility design with barrier-free passage for the disabled in wheelchairs, with at least one elevator per station, and guidance on sidewalks and in stations for blind people.

60. The project will require land acquisition and demolition of a number of structures. About 767 people from 239 families will be affected by the acquisition of 52.4 ha of collectively owned land; about 1,308 people from 449 families will be affected by the demolition of 35,347 m^2 of private houses; and about 1,026 employees from 264 enterprises, institutes and small shops will be affected by the demolition of 66,313 m^2 of structures. Project impacts are detailed in the Resettlement Action Plan (RAP).

61. Women's views and concerns on resettlement were collected and analyzed through public consultation, and were incorporated into the project RAP. During the detailed design stage, the Bank will work continuously with the client to ensure that the design of the project is female friendly and better reflects women's needs.

62. The Zhengzhou PMO has prepared a RAP to address the involuntary resettlement impacts of the project based on relevant Chinese laws, regulations and the World Bank's OP 4.12 on Involuntary Resettlement. A Resettlement Policy Framework (RPF) has also been prepared for components that might change their locations during project implementation. Resettlement planning work included project impact inventory surveys, social economic surveys and consultations over resettlement and livelihood rehabilitation measures.

63. The RAP and the RPF were disclosed to the local people on January 28, 2014; the English versions of the documents were disclosed in the World Bank's Infoshop on January 29, 2014. Re-disclosure took place on May 5, 2014 in country and on May 12 and 13, 2014 in the Infoshop.

F. Environment (including Safeguards)

64. The project is classified as a Category A project as per OP 4.01. Environment Assessment (EA) reports were prepared in accordance with national requirements and the World Bank's OP/BP/GP 4.01. The EA reports include an EA Executive Summary, an Environmental Impact Assessment (EIA), and an Environmental and Social Management Plan (ESMP). These reports have been adjusted to reflect comments by the Bank and are satisfactory.

65. The Project will bring significant positive environmental impacts by promoting mass public transportation, which will help alleviate urban traffic congestion, reduce environmental pollution related to vehicle emissions, and improve the overall quality of life in the Zhengzhou Metropolitan Area.

66. The negative environmental impacts of the project are mainly related to urban construction activities, i.e., disruption of traffic; tunnel construction safety; potential impact on surrounding buildings and proper disposal of spoil material; and dust and noise nuisance during construction. Other impacts during operation include noise and vibration, aesthetics integration, and waste management from rail operation facilities. These environmental and social impacts are thoroughly assessed in the EIA report, and proper preventive and mitigation measures have been developed in the ESMP for the project design, construction and operation phases. The Bank review has concluded that these adverse environmental and social impacts can be adequately avoided, minimized and mitigated with good management practice and mitigation measures in the EIA/ESMP.

67. Two rounds of public consultations, including expert consultations, questionnaires, symposia, and interviews were conducted with the different stakeholders during EA preparation according to requirements of both Chinese legislation and the World Bank's OP 4.01. The availability of EA reports and how to access them was announced in the major local newspaper (DongFangJingBo Newspaper) on July 8, 2013. The EA reports were disclosed on the ZMG website on May 17, 2012 and August 19, 2013 respectively, as well as in the World Bank's Infoshop on January 30, 2014. Re-disclosure took place on May 5, 2014 in country and on May 12 and 13 in the Infoshop.

Annex 1: Results Framework and Monitoring

CHINA: Zhengzhou Urban Rail Project

Project Development Objective (PDO): The PDO is to improve urban mobility for the population of Zhengzhou along the catchment area of Line 3 from Xin Liu Lu Station to Hang Hai Dong Lu Station.

PDO-LEVEL RESULTS INDICATORS

	Core	Unit of Measure	Baseline	Cumulative Target Values**						Frequency	Data Source / Methodology	Responsibility for Data Collection	Description
				2015	2016	2017	2018	2019	2020				
Indicator One: Line 3 ridership	☐	Passenger-trips	0	0	0	0	0	0	240,000	Year 6	Operational statistics	URC	Daily trips per weekday
Indicator Two: Travel time savings for public transport users on Line 3	☐									Year 5&6	Travel time survey	URC and bus company	By bus before vs. by Line 3 after
Sub-Indicator 2.1: from Xin Liu Lu Station to Zhong Zhou Da Dao Station	☐	Minutes	0	0	0	0	0	0	>50	Year 5&6	Travel time survey	URC and bus company	Current time 105’
Sub-Indicator 2.2: from Zhong Xin Lu Station to Er Qi Guang Chang Station	☐	Minutes	0	0	0	0	0	0	>40	Year 5&6	Travel time survey	URC and bus company	Current time 70’
Indicator Three: Proportion of urban rail commuters on Line 3 with access to a car	☐	%	0	0	0	0	0	0	>25	Year 6	Passenger survey	URC	Respondents with access to a car
Indicator Four: Proportion of Line 3 users that rate the service as satisfactory or better	☐	%	0	0	0	0	0	0	>70	Year 6	User satisfaction survey	URC	
Sub-Indicator 4.1: rating by male	☐	%	0	0	0	0	0	0	>70	Year 6	User satisfaction survey	URC	
Sub-Indicator 4.2: rating by female	☐	%	0	0	0	0	0	0	>70	Year 6	User satisfaction survey	URC	
Sub-Indicator 4.3: rating by bottom 40 percent income group	☐	%	0	0	0	0	0	0	>70	Year 6	User satisfaction survey	URC	

INTERMEDIATE RESULTS INDICATORS													
Intermediate Result (Component One): Construction of Line 3													
Indicator One: Percentage of construction of stations (in value of civil works)		%	0	0	40	70	90	100	100	Annually	Project Management Statistics	URC	
Indicator Two: Percentage of completion of tunnels (in value)		%	0	0	0	50	70	100	100	Annually	Project Management Statistics	URC	
Indicator Three: Level of integration (transfer facilities)		%	N/A	N/A	N/A	N/A	90	90	90	Year 6	Detailed architectural plan	URC	Facilities for bus/rail/bike transfer designed and constructed as per integration plan
Indicator Four: Level of integration (bus route reorganization)			No	No	No	No	Plan defined and communicated	Routes Reorganized	Routes Reorganized	Year 5 & 6	Operational plan	Bus company	Bus routes reorganized to reflect Line 3 opening
Indicator Five: Percentage of stations with barrier-free accessibility to the wheel-chair bound and sight impaired		%	O	N/A	N/A	N/A	100	100	100	Year 6	Detailed architectural plan	URC	
Intermediate Result (Component Three): Technical Assistance and Capacity Building													
Indicator Six: Number of TAs completed (cumulative)			0	0	0	0	2	3	3	Annually	Project Management Statistics	URC	

Annex 2: Detailed Project Description

CHINA: Zhengzhou Urban Rail Project

1. The Zhengzhou Urban Rail Project consists of the construction of the Zhengzhou Urban Rail Line 3 (total length about 25.2 km), starting from the Xin Liu Lu Station in the northwest corner of the city, running along Nanyang Road to Erqi Plaza in the city center, then moving east along the West-East Street and Zhengbian Road towards Bo Xue Lu Station, turning south onto Chenyang Road towards Hang Hai Dong Lu Station in the southeast corner of the city. Line 3 includes 21 stations, which will all be located underground and connected by tunnels. The Line 3 depot for maintenance and stabling will be located above ground at one end of Line 3 in southeast Zhengzhou, and the parking yard will be located above ground at the other end of Line 3 in northwest Zhengzhou.

2. The project includes construction of the line; provision of maintenance and stabling facilities for trains; procurement of rolling stock and other equipment such as traction control, signaling, communication, monitoring, and fare collection systems; all other works related to implementation of the line; resettlement and land acquisition; and environmental mitigation measures and relevant technical assistance and capacity building. Line 3 will use technology that is compatible with Line 1 (put into operation in December 2013) and Line 2 (under construction).

3. As part of the preparation of the FSR and EA, the route alignment, station locations and construction method were optimized so as to minimize costs, reduce the need for land acquisition, mitigate construction risks, minimize resettlement, avoid environmental and cultural sensitive sites, reduce disruption of traffic, and increase the accessibility and convenience of public transport transfers. Further optimization will be conducted during preliminary and detailed design stages.

4. The project includes the following four components: (i) construction of Line 3; (ii) equipment for Line 3; (iii) design, construction management and technical assistance; and (iv) safeguards and other construction costs. The total project cost will be US$3,089.41 million, including US$2,839.41 million equivalent of local counterpart financing and a US$250 million IBRD loan. Detailed cost breakdown by component is provided in the table below.

Table 2-1: Project Costs (US$ million)

Project Costs by Component[10]	Project Costs	IBRD Financing	% Financing
Component 1: Construction of Line 3	**1244.54**	**244.68**	**19.7%**
Sub 1.1: Station	592.65	144.88	
Sub 1.2: Tunnel	350.94	99.81	
Sub 1.3: Track	88.55		
Sub 1.4: Depot	202.39		
Sub 1.5: Operation Buildings	10.02		
Component 2: Equipment for Line 3	**730.67**	**0.00**	**0.0%**
Sub 2.1: Rolling Stock	221.20		
Sub 2.2: Communication System	58.82		
Sub 2.3: Signal System	55.63		
Sub 2.4: Power Supply	182.15		
Sub 2.5: Monitoring System (incl. Environment)	38.04		
Sub 2.6: Safety/Security/Civil Air-Defense	28.63		
Sub 2.7: Ventilation/AC	39.29		
Sub 2.8: Water Supply/Sewerage/Fire Protection	26.15		
Sub 2.9: AFC	25.35		
Sub 2.10: Station Auxiliary Equipment	55.39		
Component 3: Design, Construction Management and Technical Assistance	**185.29**	**2.14**	**1.2%**
Sub 3.1: Pre-stage work, Design, Surveys and Revisions	104.22		
Sub 3.2: Construction Management and Supervision	78.93		
Sub 3.3: Technical Assistance	2.14	2.14	
Component 4: Safeguards and Other Construction Costs	**460.14**	**0.00**	**0.0%**
Sub 4.1: Land Acquisition and Resettlement	322.59		
Sub 4.2: Construction Site Preparation	81.67		
Sub 4.3: Other Construction Cost	55.88		
Total Baseline Costs (excluding contingencies)	**2620.64**	**246.82**	**9.4%**
Contingencies	234.41		
Total Project Costs (including contingencies)	**2855.05**	**246.82**	**8.6%**
Interest during Construction	228.57		
Commitment Fee	2.55	2.55	
Initial Working Capital	2.60		
Front End Fee (0.25%)	0.625	0.625	
Total Financing Required	**3089.41**	**250.00**	**8.1%**

[10] This table shows the project costs per component excluding contingencies.

Component 1: Construction of Line 3

5. This component consists of the construction of Line 3 from Xin Liu Lu Station to Hang Hai Dong Lu Station (about 25.2 km), including a total of 21 stations (all underground), one depot, one parking yard, tracks and tunnels. The construction of stations will mainly use the cut-and-cover method and the tunnels will be constructed primarily by shield tunneling method. Stations will be designed to provide convenient interchange with the other lines of the urban rail network and other transport modes.

6. The Bank loan will support the construction of five stations described below and five tunnels in between (Zhong Xing Lu Station is within the scope but is not financed by the Bank since it will be constructed as an interchange station along with the construction of Line 5). These stations are located at the southeast end of the line. The characteristics below are based on the final FSR. They are subject to adjustments during project implementation as the detailed design is optimized.

7. Tong Tai Lu Station. This station is located to the east of the intersection of Tongtai Road and Shangdu Road. It is an underground two-tier island type station. There is a double stop line on the west side of the station on which there will be real estate development. The first underground floor is the station hall and the second underground floor is the platform. The total length of the station is 501 m and the standard segment width is 19.9 m. Ground facilities include a group of cooling towers, three groups of ventilation pavilions, nine entrances/exits and an emergency evacuation tunnel. The area around this station is mainly for commercial, logistic warehouse, and residential use, and includes an Easyhome Mall, Metro Retail Mall, Zhongli International Furniture Mall, and a residential community.

8. Tunnel between Tong Tai Lu Station and Huang He Dong Lu Station. This 911 m tunnel will be constructed using the shield method.

9. Huang He Dong Lu Station. This station is located at the intersection of Huang He Dong Road and Shangdu Road. It is an underground two-tier island type station, and will interchange with the planned Line 13. The total length of the station is 216 m and the standard segment width is 21.9 m. Ground facilities include a group of cooling towers, two groups of ventilation pavilions, four entrances/exits and an emergency evacuation tunnel. The area around this station is mainly for commercial and residential use, and includes the Zhengzhou Fine Ceramic Mall, Fine Sanitary Appliance Mall, and Fine Curtain Mall.

10. Tunnel between Huang He Dong Lu Station and Nong Ye Dong Lu Station. This 803 m tunnel will be constructed using the shield method.

11. Nong Ye Dong Lu Station. This station is located to the east of the intersection of Nong ye dong Road and Shang du Road. It is an underground two-tier island type station. The total length of the station is 206 m and the standard segment width is 19.9 m. Ground facilities include a group of cooling towers, two groups of ventilation pavilions, four entrances/exits and an emergency evacuation tunnel. The area around this station is mainly for commercial, financial

and residential use, and includes the Henan Construction Materials Mall and other buildings under construction.

12. Tunnel between Nong Ye Dong Lu Station and Zhong Xing Lu Station. This 1,102 m tunnel will be constructed using the shield method.

13. Tunnel between Zhong Xing Lu Station and Bo Xue Lu Station. This 1,681 m tunnel will be constructed using the shield method.

14. Bo Xue Lu Station. This station is located at the intersection of Shangdu Road and the planned Boxue Road. It is an underground two-tier island type station, with interchanges with Line 9. The total length of the station is 216 m and the standard segment width is 21.9 m. Ground facilities include a group of cooling towers, two groups of ventilation pavilions, two entrances/exits and an emergency evacuation tunnel. The area around this station is planned mainly for a logistic warehouse, scientific research and design use. The warehouse is under construction.

15. Tunnel between Bo Xue Lu Station and Hang Hai Dong Lu Station. This 2,633 m tunnel will be constructed using the shield method.

16. Hang Hai Dong Lu Station. This station is located at the intersection of Hang hai dong Road and Chenyang Road (Jingkai No.17 Avenue), which is the final destination station of Line 3, Phase 1. It is an underground two-tier island type station. The entrance/exit line which connects with the vehicle segment will be set with the station. The total length of the station is 276 m and the standard segment width is 19.9 m. Ground facilities include a group of cooling towers, two groups of ventilation pavilions, four entrances/exits and an emergency evacuation tunnel.

Component 2: Equipment for Line 3

17. This component includes the equipment necessary to operate Line 3, such as rolling stock, power supply, control system, signaling system, communication system, monitoring system, fare collection system, safety and security system, ventilation and air conditioning system, water supply, sewerage and fire protection system, and station auxiliary equipment. Equipment for Line 3 will be financed entirely by counterpart funding.

18. Line 3 will use a 1,500 Volt DC traction power supply system with overhead catenary collection. The signaling system will use moving block automatic control system with automatic train protection (ATP), automatic train operation (ATO), automatic train supervision (ATS) and computer interlocking (CI) sub-systems. The project will provide an efficient passenger information system. The fare collection system will be an automatic fare collection system (AFC) with contactless tickets.

19. Each train will have a carrying capacity of 1,860 passengers with 6 persons per square meter. The system will be capable of running 30 services an hour in each direction. Based on projected ridership, the service is expected to start with 15 services an hour in each direction,

increasing to 24 services an hour in each direction and 27 services in each direction will use a regenerative braking system which will enable substantial saving in traction power.

Component 3: Design, Construction Management and Technical Assistance

20. **Sub-Component 3.1: Pre-stage Work, Design, Surveys and Revisions.** This component supports all activities required in the preparation phase of the project, including the necessary pre-stage work, research, design, surveys and review of designs for the construction of Line 3. It is financed entirely by local counterpart funding.

21. **Sub-Component 3.2: Construction Management and Supervision.** This component will support activities for construction management and quality assurance, including engineering survey and design, construction design review, construction supervision, bid agency and service fee, and commissioning. It will be financed entirely by local counterpart funding.

22. **Sub-Component 3.3: Technical Assistance and Capacity Building.** This component will support TA and capacity building activities, which include: (i) study on Line 3 property development and commercial development around stations; (ii) study on diversified financing model of urban rail; (iii) project management consulting services during construction; and (iv) project management capacity building. It will be financed entirely by the World Bank loan.

23. Project management consulting services during the construction. This sub-component will provide consulting services to the PMO/URC on project management aspects, such as project progress management, quality control, safety inspection, financing, and contract performance monitoring during the construction.

24. Project management capacity building. This sub-component will organize training, study tours and peer learning activities for ZM and URC staff to enhance their capacity on procurement, financing and contract management.

Component 4: Safeguards and Other Construction Costs

25. This component includes: (i) land acquisition and resettlement; (ii) construction site preparation (environmental mitigation measures), including the provision of water, electricity and access to the construction site and traffic diversion during construction; (iii) other project construction costs such as engineering insurance, work safety assurance, inspection and acceptance, and project cost estimation. This component will be financed entirely by local counterpart funding.

Annex 3: Implementation Arrangements

CHINA: Zhengzhou Urban Rail Project

Project Institutional and Implementation Arrangements

Project administration mechanisms

1. Henan Province, through HPFD, will sign the Project Agreement and will be the Project implementing entity. It will be responsible for managing, coordinating and monitoring the implementation of the project, but will delegate most of these responsibilities to ZM, represented by the ZMFB. Henan Province will enter into a subsidiary agreement to make the proceeds of the loan available to ZM and through ZM to URC. URC will be the final debtor and will repay the subsidiary loan.

2. To provide overall governance and leadership for project preparation and implementation at the municipal level, a PLG was established by ZMG in November 2011. The PLG is composed of leaders from all key municipal line agencies, including Finance Bureau, Development and Reform Commission (DRC), Urban Rail Office (URO),[11] Finance Office of ZMG General Office, Planning Bureau, Transport Commission, Construction Commission, and Land Resources Bureau. The PLG will provide policy guidance and strategic coordination for the project. The PLG will meet regularly (twice a year) to keep track of implementation progress and upon request to resolve any critical issue that arises.

3. During project preparation, a PMO was established under ZMFB, chaired by the Deputy Director of ZMFB and comprising officials from all the above-mentioned relevant municipal agencies, as well as Environment Bureau, Price Bureau, URC and the Bus Company. The PMO was responsible for the preparation of the project. During project implementation, the PMO will play a coordination, liaison and supervisory role, while URC will act as the implementing unit and carry out the technical preparation, procurement and construction management, financial management of loan proceeds, environmental and social safeguards implementation, and project M&E, in accordance with the Bank's policies and guidelines.

4. As part of the construction of Line 3, ZM will carry out the Line 3 Integration Plan, endorsed by ZM, in accordance with the implementation arrangement set forth in the Plan. Implementation of the Integration Plan will be led by the Transport Commission and the URO. Specifically, bus stops, terminals and interchanges would be funded, designed, constructed and operated by the Bus Company. Park-and-Ride facilities, taxi stands, bicycle facilities, pedestrian underpasses and overpasses would be funded by ZM and designed, constructed and operated by

[11] The Urban Rail Office is a governmental agency established under the municipal DRC for applying and preparing Zhengzhou's overall urban rail development program. The Zhengzhou URC is a 100% state-owned enterprise established for preparing and implementing urban rail projects. During the preparation stage, URO was responsible for the preparation of the FSR, EA reports, RAP, RPF and land use plan. URC was responsible for the preparation of the TORs, Procurement Plan, Financial Disbursement Manual, and other project documents. URC will take charge of implementation.

the Traffic Improvement Office. The allocation of associated land would be arranged by the Land Resource Bureau.

Financial Management, Disbursements and Procurement

Financial Management

5. The FM capacity assessment identified the following principal risks: (a) both the PMO and the project implementing unit, the Zhengzhou URC, are new to Bank-financed projects; and (b) the Bank loan comprises only about 8 percent of the total investment, with the remainder to be provided from counterpart funds.

6. Mitigation measures agreed to address the above risks include: (a) FM/disbursement training (formal and ad-hoc) to be provided to the project financial staff by HPFD and the Bank; (b) close monitoring and guidance from HPFD; (c) use of URC's existing FM system in the proposed project; and (d) close monitoring by the Bank of the timely provision of the required counterpart funds. Uniform FM requirements will be applied for both the Bank loan and counterpart funds.

7. Overall, the residual FM risk for the project after mitigation is assessed as Moderate.

8. Budgeting. The project will use URC's existing budget preparation and execution system, which is adequate. The annual project implementation plan, including the funding budget, will be prepared by URC and approved by the PMO. The budget for counterpart funds committed by ZMG will be reviewed and approved by its People's Congress and will be included in its sectoral budget. Based on the approved budget and implementation progress, ZMFB will provide government appropriations to the project. Budget variance analysis will be conducted regularly by URC and necessary actions will be taken to ensure that the project is implemented as planned.

9. Funds Flow. One segregated Designated Account (DA) in US dollars will be opened at a commercial bank acceptable to the Bank and will be managed by HPFD. The ceiling of the DA is documented in the Disbursement Letter.

10. HPFD will be directly responsible for the management, maintenance and reconciliation of the DA activities of the project. Supporting documents required for Bank disbursements will be prepared by URC and submitted to ZMFB and HPFD for approval and verification before sending to the Bank for further disbursement processing. Reimbursed funds from DA will be delivered to URC via ZMFB.

11. The Bank Loan Agreement will be signed between the Bank and the People's Republic of China through the Ministry of Finance (MOF), and on-lending arrangements for the Bank loan will be signed between MOF and Henan Province through HPFD, and then between HPFD and Zhengzhou Municipality through ZMFB. The on-lending arrangement will be signed between ZMFB and URC.

12. Accounting and Financial Reporting. URC's existing accounting system, which is based on "Enterprise Accounting standards" and "Accounting Regulation for State-Owned Construction Enterprises" issued by MOF, is acceptable and can provide the required accounting information. Hence MOF's Circular 13 will not be used in this project. However, in order to facilitate reporting and monitoring, the format and content of financial statements stipulated in Circular 13 will be used for project financial reporting.

13. URC will be responsible for managing, monitoring and maintaining project accounting records. Original supporting documents for project activities will be retained by URC. URC will work together with the PMO and HPFD to prepare the project financial statements, which will then be submitted to the Bank for review and comment on a regular basis. The interim unaudited project financial statements should be prepared and furnished to the Bank by URC no later than 45 days following each semester (the due dates will be August 15 and February 15), in form and substance satisfactory to the Bank.

14. Internal Control. The related accounting policy, procedures and regulations have been issued by MOF and will be followed by URC. Detailed internal control procedures, including segregation of duties, review, approval and reporting procedures, as well as safeguarding of assets, have been established and documented in URC's financial management regulations.

15. Audit. Henan Provincial Audit Office (HPAO) has been identified as the auditor for the project. An annual audit report will be issued by HPAO and will be due to the Bank within 6 months after the end of each calendar year. Following the World Bank's formal receipt of the audited financial statements from the Borrower, the World Bank will make them available to the public in accordance with the World Bank Policy on Access to Information.

Disbursements

16. Four disbursement methods, including advance, reimbursement, direct payment and special commitment, are available for the project. Supporting documents required for Bank disbursement under different disbursement methods are documented in the Disbursement Letter issued by the Bank.

17. One DA in US dollars will be opened at a commercial bank acceptable to the Bank and will be managed by HPFD. The ceiling of the DA is documented in the Disbursement Letter.

18. The Bank loan would be disbursed against eligible expenditures (taxes inclusive) for a few selected contracts identified for Bank financing in the Procurement Plan, as per the following table:

Disbursement Categories	IBRD Loan	
	Allocated Amount (in US$)	Percentage of Expenditures to be financed (inclusive of taxes)
(1) Goods, works, consultants' services, non-consulting services, under components 1, 2 and 3 of the Project	246,825,000	100%
(2) Front-end Fee	625,000	Amount payable pursuant to Section 2.03 of the Loan Agreement in accordance with Section 2.07 (b) of the General Conditions
(3) Commitment Fee	2,550,000	Amount payable pursuant to Section 2.04 of this Agreement in accordance with Section 2.07 (c) of the General Conditions
(4) Interest rate cap of interest rate collar premium	0	Amount due pursuant to Section 2.08 (c) of the Loan Agreement
Total	250,000,000	

19. Contracts expected to be procured in advance of the loan signing date and financed under retroactive financing are included in the Procurement Plan and will be subject to prior review. Retroactive financing of up to US$1 million equivalent would be available for payments made on or after January 1, 2015, for all Eligible Expenditures according to the requirements specified in the Loan Agreement and Project Agreement.

Procurement

20. Mitigation Measures for Procurement Risks. The procurement capacity assessment concluded that the procurement risk is moderate. The PMO and the project implementing unit, Zhengzhou URC, lack Bank project and procurement experience. However they do have adequate capacity and experience in procurement under similar projects using domestic procedures. Key risks include: (i) possible misunderstanding between the PMO/URC and the Bank and delays in processing procurement and non-compliance due to lack of familiarity with the Bank's procurement policies and procedures; (ii) weak contract management; and (iii) poor records management. Measures to enhance the procurement capacity of the PMO and URC and to strengthen procurement and contract management under the project and to mitigate potential procurement risks have been agreed upon as follows:

a. A procurement agent with procurement experience in projects financed by the Bank and other multilateral financing institutions has been hired by URC to assist in procurement of goods, works and non-consulting services under international and national competitive bidding (ICB and NCB).
b. A consulting firm with project management experience in projects financed by the Bank or other multilateral financing institutions will be hired by URC to provide project management and technical support, such as reviewing bidding documents, including designs, technical specifications and bill of quantities (BOQ), etc.; supervising contract management, including progress, quality, variations and other contract issues, and providing guidance and consulting services on financial management and procurement related issues.
c. The PMO and URC will send their procurement staff and other key staff to attend workshops on procurement and contract management under Bank-financed projects, including procurement of goods, works and non-consulting services, as well as selection and employment of consultants.
d. The Bank procurement specialist will continue to provide training on procurement as needed throughout project implementation.
e. The procurement management manual has been prepared to provide guidance to both the PMO and URC on procurement under the project.

21. Procurement for the project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants" dated January 2011 (revised July 2014); "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011 (revised July 2014); and the provisions stipulated in the Legal Agreements.

22. Procurement Plan. The Procurement Plan has been approved by the Bank, and will be available in the PMO and URC, and will also be available in the project's database and in the Bank's external website during project implementation. The Procurement Plan will be updated, reviewed and agreed with the Bank annually, or as required, to reflect project implementation needs.

23. Procurement and Selection Methods and Prior Review Thresholds. The table below indicates the procurement and selection methods and prior review thresholds for goods, non-consulting services, works, and consulting services to be procured by URC under the project.

Thresholds for Procurement Methods and Bank Prior Review

Expenditure Category	Contract Value (US$)	Procurement Method	Bank Prior Review
Goods/IT Systems and Non-Consulting Services	≥ 3 million	ICB	All ICB contracts
	< 3 million	NCB Remarks: Where goods are not normally available from within China, the	First 2 NCB goods contracts irrespective of value and all contracts ≥ US$3 million.

Expenditure Category	Contract Value (US$)	Procurement Method	Bank Prior Review
		method of procurement will be ICB even if the contract value is less than US$3 million.	
	< 100,000	Shopping	None
	N/A	DC	All DC contracts
Works/ Supply & Installation	≥ 25 million	ICB	All ICB contracts
	< 25 million	NCB	First 2 NCB works contracts irrespective of value and all contracts ≥ US$15 million.
	< 200,000	Shopping	None
	N/A	DC	All DC contracts
Consultants	≥ 300,000	QCBS, QBS	Firms: First contract for each selection method and all contracts ≥ US$300,000; Firms: All SSS contracts; Individual Consultant: Only in Exceptional Cases; SSS for individual consultant: ≥ US$20,000
	< 300,000	QCBS, QBS, CQS	
	N/A	SSS	
	N/A	IC	

Notes: ICB: International Competitive Bidding
NCB: National Competitive Bidding
DC: Direct Contracting
QCBS: Quality- and Cost-Based Selection
QBS: Quality-Based Selection
CQS: Selection Based on the Consultants' Qualifications
SSS: Single Source Selection
IC: Individual Consultant selection procedure
NA: Not Applicable

24. Advance Contracting and Retroactive Financing. Retroactive financing of up to US$1 million would be available for eligible expenditures incurred on and after January 1, 2015. The procurement plan sets forth those contracts which are expected to be signed in advance of loan signing, together with the relevant Bank review procedures. Only payments made under such contracts procured in accordance with the applicable Bank procurement/consultant selection procedures will be eligible for reimbursement by the Bank.

Environmental (including safeguards)

25. The project is classified as a Category A project as per OP4.01, due to the scale of tunnel construction, waste disposal and potential environmental and social impacts from construction and operations in the urban context. EA reports were prepared in accordance with relevant national laws, regulations, and technical guidelines and standards applicable to the project, as well as World Bank Safeguards Policies. The EA reports include an EA Executive Summary, an EIA, and an ESMP. These reports have been finalized based on comments from the Bank and are acceptable.

26. Main Environmental Impacts and Mitigation Measures. The EA identified and assessed project benefits and impacts on the natural and social environment and concluded that the project will bring significant net positive environmental benefits through the promotion of mass public

transportation, reduction of traffic congestion and the consequent reduction of vehicle emissions and improvement in the overall quality of life in the Zhengzhou Metropolitan Area.

27. The major environmental issues of the project are mainly related to urban construction activities. These impacts include: disruption of traffic; reduced accessibility to business; reduced non-motorized vehicle/pedestrian access connectivity at metro stations during construction; construction safety, including ground water and geological risk; potential impact on surrounding buildings and physical cultural sites; proper transportation and disposal of spoil material; and dust and noise nuisance during construction. Other impacts during operation include noise and vibration, aesthetics integration, and waste management from rail operation facilities.

28. Physical Cultural Resources OP/BP 4.11. The proposed Line 3 project will pass nearby or pass underneath some cultural relics including, among others, Shang Dynasty City Wall Relics; Erqi Tower; Zhengzhou Wen Temple; and Peng Xiangqian Ancestral Temple. There is a potential risk of impact from tunnel excavation during construction and vibration during operation. Adequate site survey and consultation with the relevant cultural relic bureau was conducted during EA preparation to ensure that all relevant cultural relics along the project line are identified, and the potential impacts were carefully addressed through project design, selection of alignment and construction technologies, good construction management including monitoring of settlement, and other mitigation measures. Procedures for cultural findings will include provisions and procedures stipulated in the Cultural Property Law and will be included in bidding documents and contracts.

29. Sensitive Sites. In addition to physical cultural resources, the EIA identified other sensitive sites such as residential areas and schools and hospitals along the line, that are subject to potential noise, air pollution, vibration and electromagnetic impact during the construction and operation stages. Adequate mitigation measures have been designed.

30. Cumulative Impacts. Cumulative impacts of Line 3 and other related projects that are under construction or will be constructed in the foreseeable future were reviewed and evaluated during EIA preparation. These include Line 1, Line 2, Line 3, Line 4 and Line 5 of the rail network. The major cumulative impacts include cultural relics during the construction phase, and traffic, noise, vibration and odor during the operation phase. Adequate mitigation measures for the cumulative impacts have been recommended in the EIA.

31. Implementation of the Zhengzhou Urban Rail Network combined with the existing BRT will fundamentally improve public transportation in Zhengzhou and will provide people an efficient and comfortable ride. The urban rail network will also greatly increase effective land utilization and provide an alternative to travel by private automobiles and bus transport along the alignment.

32. To enhance environmental benefits of the project, mitigation measures have been integrated into the project design, construction and operation. Environmental and social impacts are thoroughly addressed by the EIA report, and preventive and mitigation measures have been developed in the ESMP. The Bank review has concluded that adverse environmental and social

impacts can be adequately avoided, minimized and mitigated with good management practice and mitigation measures, as developed in the EIA/ESMP.

33. Environmental Aspects during the Project Feasibility Study and Design Phase. During the feasibility study phase, the EA teams worked closely with project planners/owners and the feasibility study teams to compare and evaluate alternatives. The EA identified, evaluated and compared various options for alignment selection, station location selection, and construction method selection. Optimal alternatives were selected to arrive at least cost solutions based on the avoidance of (or least adverse) social and environmental impacts, as well as considerations of engineering technology and costs. A "no project" scenario was also considered as an alternative. Adequate engineering measures have been designed to mitigate expected impacts, including noise barriers, vibration reduction equipment, and intensive greening plans and landscape designs for stations and for the parking/depot site.

34. As a result, the alignment, station locations and construction methods have been optimized so as to reduce land acquisition, decrease construction risks, minimize resettlement, avoid environmental and cultural sensitive sites, reduce disruption of traffic, increase the accessibility and convenience of public transport transfers, improve integration with the overall public transport plan, and reduce construction costs. Further optimization will be conducted during preliminary design and detailed design.

35. Social and Environmental Impact Mitigation Measures during the Construction Phase. Preventive and mitigation measures during the construction phase have been developed in the ESMP to adequately avoid, minimize and mitigate the adverse environmental and social impacts. These measures include but are not limited to: implementation of city procedures for traffic diversion and utility relocation; coordination with the police department; issuing of prior notice through public media; proper fencing of construction sites; setup of temporary access roads; public consultation throughout the construction period to address public concerns and improve construction activities; proper management of wastes; use of low noise equipment and construction technologies; careful scheduling of construction activities near sensitive sites; installation of a temporary noise reduction facility at sensitive sites; restricting night-time construction; and requiring prior public notice, as well as night-time construction permit from city Environmental Protection Bureau, for activities that need continuous construction at night. Other measures include measures to avoid or minimize noise, vibration, air and wastewater impacts, and implementation of Environmental, Health and Safety (EHS) during construction.

36. Impact Mitigation Measures during the Operations Phase. Zhengzhou city has mature institutions and procedures to manage land development to ensure that induced land development from the rail network is in line with the urban master plan and is conducted in an orderly manner with due legal process. For noise-sensitive sites, noise barriers will be installed; ventilation shafts will be installed with low noise equipment and silencers, and will be located at least 15 meters from nearby residential areas. For vibration sensitive sites, vibration-reduction facilities will be installed. Measures for air quality, wastewater and solid wastes have also been formulated.

37. Risk Analysis and Management. The EIA reviewed incidents during metro construction and operation internationally and in China, identified the potential risks for this project and their

potential impact. During the construction phase these include: (i) improper construction methods, causing differential settlement, ground subsidence or upheaval; (ii) inadequate protective measures, causing collapses, roof falls, sand/water gushing, and flooding; and (iii) cutting off drainage by mistake, resulting in building cracks or collapse. The EIA noted that the most difficult and risky parts are the construction of metro stations, due to the poor geologic stability and relatively high water tables in Zhengzhou. For tunnel construction, the risky portions are the crossing segments at three interchange bridges (Bei Huan/Nan Yang Lu, Nan Yang Lu/Jin Shui Lu and Zhong Zhou Da Dao/Shang Du Lu) and two railway lines (Long-Hai Railway, and Shi-Wu High Speed Railway). The detailed description and analysis of the risks of station and tunnel construction are summarized in the EIA. During the operation phase, risks may include arson, terrorist attacks, and mechanical failure caused by improper operation. Risks will be analyzed on a continuous basis during project implementation and future operation.

38. The EIA recommends risk management measures to be taken during the construction phase and the operation phase. Risk management measures during the construction phase include: (i) conducting risk source screening and fine tuning the design prior to construction; (ii) establishing an environmental security classification system; (iii) adopting new construction technologies and processes; (iv) strengthening on-site monitoring and engineering supervision; and (v) preparing construction phase contingency plans. Risk management measures during the operation phase include: (i) preparing contingency plans and conducting simulation exercises; (ii) equipping URC with a state-of-the-art monitoring and alarm system; and (iii) conducting public awareness programs.

39. Environmental and Social Management Plan (ESMP). A stand-alone ESMP has been developed that describes the policies, applicable environmental standards, environmental management organization and responsibilities, mitigation measures, capacity training plan, monitoring plan, and budget estimates for ESMP implementation. ESMP measures will be incorporated into bidding documents and contracts.

40. Environmental management responsibility will be built into the relevant divisions of the overall project management structure, with dedicated management staff. Dedicated environmental staff will also be assigned to Supervision Engineers and Contractors to ensure effective ESMP implementation. A training plan will be implemented prior to and during construction for project management staff, Supervision Engineers and Contractors.

41. A two-tier monitoring program has been developed for the project: daily and regular monitoring to be carried out by contractors and construction supervision companies, and periodic compliance monitoring by professional monitoring stations. Environmental monitoring reports will provide key and timely information, especially on environmental impacts and mitigation, to enable the Borrower and the Bank to evaluate the success of environmental management.

42. Public Consultation and Information Disclosure. Two rounds of public consultation were conducted during EA preparation. The first round was conducted from April to December 2012 through meetings, field interviews and questionnaire surveys among project-affected people, local residential and village committees, schools and hospitals, and through a telephone hotline. The main concerns raised by the public related to resettlement compensation, information

disclosure, disturbance of traffic, night time construction noise, etc. All these concerns were addressed in the RAP and EIA/ESMP.

43. The second round of public consultation was conducted in August 2013 after the draft EIA report had been prepared. During this consultation the key findings of the draft EIA report and the proposed mitigation measures were explained, along with responses to the questions raised during the first round consultation. The majority of those consulted expressed strong support for the project.

44. Information about the project was disclosed as required under both domestic and Bank requirements. The availability of the EA reports, and how to access them, was announced in the major local newspaper (Dong Fang Jing Bo Newspaper) on July 8, 2013. The EA reports were disclosed on the ZMG website (http://www.zzdrc.gov.cn) on May 17, 2012 and August 19, 2013 respectively, as well as in the World Bank's Infoshop on January 30, 2014. The reports were re-disclosed on May 5, 2014 in country and on May 12 and 13, 2014 in the Infoshop.

45. Appropriate grievance handling procedures and arrangements are in place for monitoring ESMP implementation.

46. Bank environmental safeguard requirements will be fully met through the mitigation measures in the design, construction and operation phases, as well as the grievance handling mechanism and M&E arrangements.

Social (including safeguards)

47. Involuntary Resettlement. Based on relevant Chinese laws, regulations and World Bank OP 4.12 on Involuntary Resettlement, Zhengzhou PMO has prepared a RAP to address involuntary resettlement caused by the project. An RPF has also been prepared for components that might change their locations during project implementation. Resettlement planning work included project impact inventory surveys, social economic surveys and consultations over resettlement and livelihood rehabilitation measures. The RAP and RPF were disclosed to the local people on January 28, 2014 and the English versions of the documents were disclosed in the World Bank's Infoshop on January 29, 2014. The reports were re-disclosed on May 5, 2014 in country and on May 12 and 13, 2014 in the Infoshop.

48. Scope of Social Impacts. The project will require land acquisition and demolition of a number of structures. About 767 people from 239 families will be affected by the acquisition of 52.4 ha of collectively owned land; about 1,308 people from 449 families will be affected by the demolition of 35,347 m^2 of private houses; and about 1,026 employees from 264 enterprises, institutes and small shops will be affected by the demolition of 66,313 m^2 of structures.

49. Key principles and considerations in project design and RAP/RPF preparation included:

a. Acquisition of land and other assets and relocation of people will be minimized as much as possible.

b. A socio-economic survey will be conducted to determine baseline conditions, especially of project-affected persons.
c. Compensation for houses or other properties should be determined at full replacement value.
d. Compensation should be provided to all project affected persons, including shop operators and those who lack house registration or other documents, such as business documents and legal documents.
e. Affected persons should be consulted during planning for acquisition of land and other assets, and provision of rehabilitation.
f. Financial and physical resources for resettlement and rehabilitation should be made available when required.
g. Institutional arrangements should be established to ensure effective and timely design, planning, consultation and implementation of the RAP/RPF.
h. Effective and timely supervision, monitoring and evaluation of project implementation will be carried out.

50. Institutional Arrangements. Organizations for project resettlement activities have been set up and their duties have been defined. These organizations are:

- PLG
- PMO
- House expropriation and compensation offices at all districts
- External monitoring agency for resettlement.

51. RAP Implementation Arrangements. A multi-level organization has been established to implement the RAP. An independent monitor will be selected to monitor resettlement implementation and livelihood restoration. The PMO will be responsible for internal monitoring and will provide semi-annual internal monitoring reports to the Bank. Responsibilities of each organization are clearly defined in the RAP.

52. Livelihood Restoration. Cash compensation will be arranged for Project Affected Persons (PAPs) affected by the acquisition of collective land. Land acquisition compensation will include land compensation, a resettlement subsidy, and compensation for standing crops; the Social Security Scheme will also be applied. For PAPs affected by house demolition, the options of cash compensation and a house property exchange scheme have been arranged. Compensation rates for structures and public facilities have been determined based on full replacement costs. The affected enterprises, institutes and shops will be compensated at full replacement cost and will also be compensated for business losses caused by demolition.

53. RAP Budget and Funding. The RAP contains a detailed resettlement cost estimate that covers the basic costs for resettlement, management, contingencies, surveys, design and monitoring. The basic resettlement cost includes compensation for land, standing crops and trees and reconstruction of affected infrastructure. ZM will allocate a budget under its counterpart funding sufficient to conduct resettlement under the project.

54. Public Participation and Gender. PAPs and organizations were informed about the project and its impacts in meetings during the preparation of the RAP. Several rounds of public

consultation exercises were conducted during project preparation. Views and concerns raised by various stakeholders, including PAPs, were collected and analyzed. During consultations, PAPs and other stakeholders raised concerns on critical issues such as long-term livelihood restoration for land loss and business loss for affected shops; and potential damage to existing transport facilities (roads), or potential damage to buildings affected by construction. The PMO discussed proposed solutions with stakeholders during these consultations and an action plan to address these issues has been prepared. Key comments and recommendations received at these meetings have been incorporated in the RAP and the feasibility study. Public participation will continue during RAP implementation. Project information will be provided to PAPs through the internet, television, newspapers, bulletins and posters.

55. Consultations also identified women's needs and concerns. For example, female farmers who will lose land expressed their interest in enrolling in the Social Security Scheme. The Social Security Scheme will be applied in such cases. Women were concerned about potential noise during construction. Noise control measures have been incorporated in the ESMP.

56. Grievance Mechanism. A grievance mechanism was established during the preparation of the RAP. All relevant telephone numbers were disclosed to PAPs. PAPs can dispute any aspect of resettlement. All disputed cases will be recorded. The grievance mechanism has been disclosed to the local people and will be further disseminated through a Resettlement Information Booklet.

57. Monitoring and Evaluation. Both internal and external monitoring of resettlement implementation will be carried out. Resettlement offices will be responsible for internal monitoring. An experienced team will be hired to undertake an independent monitoring of the resettlement program. A RAP Implementation Completion report will also be prepared.

Monitoring & Evaluation

58. Most of the data that need to be collected to monitor results indicators are either already embedded in the existing M&E systems of URC and the bus company, or can be collected readily as part of regular customer surveys that URC will be conducting on its services. Hence, the incremental costs associated with data collection will be minimal. During project implementation, progress monitoring will focus on intermediate results indicators, which capture progress in project implementation.

59. Average weekday ridership on Line 3 after 6 months of operation. Line 3 users will pass through fare gates using an automated fare collection system. Statistics from this system will indicate the number of journeys made on Line 3 on a daily basis. URC will collect and average this data for a few typical weekdays, avoiding holidays, days when there are exceptional events, or when school is out.

60. Travel time savings by public transport along the Line 3 corridor. This indicator measures the difference in travel time (expected wait + travel) during peak periods between selected origin/destination pairs along Line 3 - by bus before the opening of Line 3 and by urban rail after Line 3 opens. Travel time on Line 3 will be measured by monitoring the movement of trains

from the operations control center for a representative period, while the average wait time will be assumed to be half the time interval between two trains. Travel time for buses is less regular and therefore a larger sample will have to be taken. Buses in Zhengzhou are equipped with GPS devices and monitored through an advanced bus operation system. Data on buses running between the selected origin destination pairs will be provided by the bus company.

61. Proportion of urban rail commuters along Line 3 with access to a car. The annual user satisfaction survey described below will include a question to ascertain whether respondents have access to a car. This indicator will measure the extent to which Line 3 has succeeded in attracting car users.

62. Proportion of Line 3 users that rate the service as satisfactory or better. A user satisfaction survey will be conducted by URC annually to obtain feedback from urban rail users, including on the quality of integration with other transport modes. The survey will disaggregate feedback by gender and by income groups.

Annex 4: Operational Risk Assessment Framework (ORAF)

CHINA: Zhengzhou Urban Rail Project

Project Stakeholder Risks						
Stakeholder Risk	**Rating**	**Moderate**				
Risk Description: (a) **ZM.** Focus on constructing the line may weaken emphasis on integration aspects. (b) **Zhengzhou Bus Company.** Operations of the bus company will be significantly affected by the introduction of the urban rail system, with potential for divergence of interest between the bus company and URC.	**Risk Management:** (a) ZM and URC have formulated an integration plan. Interagency consultation has been conducted on the integration plan and adequate resources will be allocated to ensure that the integration plan gets implemented. (b) The Zhengzhou Bus Company is represented in the PMO. It has frequent interactions with URC regarding fare integration and bus route rationalization, and such cooperation will continue during project implementation. It will be kept appraised of project progress and will have an avenue to provide inputs.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Both	In Progress	Implementation	☑		Continuous
Implementing Agency (IA) Risks (including Fiduciary Risks)						
Capacity	**Rating**	**Substantial**				
Risk Description: (a) This will be the first stand-alone Bank infrastructure project implemented by the city. Municipal government staff as well as URC staff had limited familiarity with World Bank procurement, safeguards, and financial management policies when preparation started. Substantial training has been provided to the PMO and URC on Bank policies. (b). Careful inter-agency coordination is needed to achieve the full potential impact of an urban rail project, but is often difficult to establish. An Integration Plan has been prepared to deal with the transfer between different	**Risk Management:** (a) Training on Bank policies will continue to be provided to the PMO and URC. External consultants experienced in World Bank fiduciary and safeguards aspects will be engaged to support the PMO and URC. Procurement packaging has been kept simple to facilitate implementation. The Bank and ZM will also increase monitoring to ensure compliance with financial management (including availability of counterpart funding), procurement, and safeguards guidelines. (b) URC will report on implementation of the Plan and this will be monitored by the Bank and ZM. (c) Availability of adequate counterpart funding, as per the agreed plan, will be monitored carefully by the Bank with ZMG.					

modes and went through consultation. It includes a detailed implementation plan with designated responsible agencies. (c) Sufficient funds need to be available to support the construction of Line 3. URC is in negotiations with domestic banks for the necessary funds, following the approval of the FSR, and received letters of intent from commercial banks at this stage. Experience from Lines 1 and 2 indicates that funding was secured in a timely manner. Project reporting will cover the entire project and will enable the monitoring of any shortfall in counterpart funding.	**Resp:** Both	**Status:** In Progress	**Stage:** Implementation	**Recurrent:** ☑	**Due Date:**	**Frequency:** Continuous

Governance	**Rating**	**Moderate**			
Risk Description: (a) Many policies impact the effectiveness of an urban rail line. A PLG has been established by ZM to oversee the preparation and implementation of the proposed project. It comprises senior officials from relevant municipal agencies.	**Risk Management:** (a) The PLG will meet regularly during project implementation to provide overall guidance and resolve key issues that may arise.					
	Resp: Client	**Status:** In Progress	**Stage:** Implementation	**Recurrent:** ☑	**Due Date:**	**Frequency:** Continuous
	Risk Management: A project disbursement manual and procurement manual were finalized to guide the day-to-day work of all project financial and procurement staff. Training on Bank's fiduciary requirements has been and will continue to be provided to the relevant staff. Also, an annual audit will be conducted as an external monitoring mechanism to safeguard Bank loan proceeds and project assets. Further, all civil work contracts to be financed by the Bank loan will be subject to prior review during implementation.					
	Resp: Bank	**Status:** In Progress	**Stage:** Implementation	**Recurrent:** ☑	**Due Date:**	**Frequency:** Continuous

Project Risks

Design	**Rating**	**Substantial**
Risk Description: (a) The construction of tunnels and stations in soil with low strength and poor stability creates substantial risks	**Risk Management:** (a) ZM has allocated substantial resources to manage project implementation and supervision, drawing on qualified design and supervision firms.	

<table>
<tr><td rowspan="2">during construction.

(b) Station design and multi-modal integration impact the effectiveness of an urban line. URC and the Bank have discussed good international and domestic practice to improve station design and support multi-modal integration as part of preparation. The design of stations has been adjusted where warranted and an Integration Plan for Line 3 has been prepared. ZM has put in place the required institutional mechanism to follow up on these aspects.</td><td colspan="6">(b) The Bank will monitor the implementation of the integration plan during implementation support missions and resolve issues identified through discussions with the PMO, URC, and ZM. Capacity building will be provided to URC and ZM on land use and transport integration around mass transit stations through the technical assistance component.</td></tr>
<tr><td>Resp:
Both</td><td>Status:
In Progress</td><td>Stage:
Implementation</td><td>Recurrent:
☑</td><td>Due Date:</td><td>Frequency:
Continuous</td></tr>
<tr><td>Social and Environmental</td><td>Rating</td><td colspan="5">Substantial</td></tr>
<tr><td rowspan="2">Risk Description:

(a) The project will have substantial environmental and social impacts, typical of such a large infrastructure program in an urban setting (traffic disruption, resettlement, disposal of materials). PMO and URC staff has limited experience with Bank safeguards policies. Social and environmental consultants with extensive Bank project experience were hired by the PMO to prepare the comprehensive EIA, ESMP, RAP, and RPF. The Bank worked closely with the PMO and its consultants and provided further guidance and training, to ensure successful preparation of the RAP and EA reports.</td><td colspan="6">Risk Management:

(a) The Bank will monitor the implementation of safeguards through the implementation arrangements that have been put in place, including internal and external monitoring.</td></tr>
<tr><td>Resp:
Both</td><td>Status:
In Progress</td><td>Stage:
Implementation</td><td>Recurrent:
☑</td><td>Due Date:</td><td>Frequency:
Continuous</td></tr>
<tr><td>Program and Donor</td><td>Rating</td><td colspan="5">Low</td></tr>
<tr><td rowspan="2">Risk Description:

The project does not involve other donors at this point. Although there are other lines, the project is freestanding.</td><td colspan="6">Risk Management:

N/A</td></tr>
<tr><td>Resp:</td><td>Status:</td><td>Stage:
Both</td><td>Recurrent:
☐</td><td>Due Date:</td><td>Frequency:</td></tr>
<tr><td>Delivery Monitoring and Sustainability</td><td>Rating</td><td colspan="5">Substantial</td></tr>
<tr><td rowspan="2">Risk Description:

(a) Urban rail projects are complex and will require close monitoring of delivery, coordination among multiple</td><td colspan="6">Risk Management:

(a) Bank implementation support missions will monitor the effective implementation of contract management and M&E arrangements under the project.</td></tr>
</table>

suppliers and active contract management. The Bank has agreed with ZM on follow up arrangements and reporting to monitor progress in implementation. (b) Long term sustainability of the project depends on enduring political will and a permanent institutional structure that can manage integrated planning and service provision. The Bank has provided guidance to ZM on establishing guiding principles and procedures for accessibility and multi-modal physical and service integration, and has also helped ZM assess future subsidy requirements stemming from the project.	(b) Training and technical assistance incorporated into the project design will help ZM and related municipal entities to promote institutional capacity for integrated transport planning and service provision, as well as financial sustainability. The Bank will work closely with the PMO, URC and ZM during implementation support missions.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Both	In Progress	Implementation	☑		Continuous

Overall Risk		
Overall Implementation Risk:	**Rating**	**Substantial**

Risk Description:

(a) This is the PMO's first engagement with the Bank and it has limited familiarity with the Bank's fiduciary and safeguards policies.
(b) Urban rail projects are technically complex with many construction risks that require close attention.
(c) Urban rail projects need to focus on integration and institutional coordination challenges.
(d) URC needs to ensure timely availability of large commercial loans, and set up of fare policies that balance affordability and financial sustainability.
(e) The planned schedule, including construction, is achievable but is subject to finalizing the preliminary design and starting procurement soon.

Annex 5: Implementation Support Plan

CHINA: Zhengzhou Urban Rail Project

Strategy and Approach for Implementation Support

1. The strategy for implementation support (IS) has been developed based on the nature of the project and its risk profile. It aims at making implementation support to the client more flexible and efficient, and focuses on implementation of the risk mitigation measures defined in the ORAF. The ORAF rates the following risk categories "Substantial": implementing agency capacity; project design; social and environmental safeguards; and delivery monitoring and sustainability.

2. **Implementing Agency Capacity.** The Bank will monitor implementation of project components on a regular basis, as well as the ESMP, RAP, RPF and the agreed procurement and financial management policies and procedures. In addition, it will continue to provide specialized training on procurement, financial management, and social and environmental safeguards as required. All Bank-financed contracts will be reviewed, supervised and monitored by the Bank procurement specialist on a regular basis, as per the project procurement arrangements; URC will be supported by a qualified procurement agent.

3. **Project Design.** The Bank will review the process of design preparation and the process of design certification to mitigate the risks related to the design of Line 3. The Bank will allocate adequate resources during project implementation to review the supervision of the construction of stations, tunnels and tracks and the effectiveness of the risk management system in place.

4. In addition to the construction of the line itself, multi-modal integration and compact urban growth have been identified as the two critical challenges to success. The project includes a capacity building component to enhance the capacity of URC and other relevant agencies to increase ridership and land value. Adequate resources will be allocated to provide substantial guidance on these two topics to the client during implementation. Specifically, the Bank will work closely with ZM to follow up on Line 3 Integration Plan implementation. The Bank will continue its dialogue with ZM on transport policies, TOD and urban design.

5. **Social and Environmental Safeguards.** Implementation of the ESMP, RAP and RPF will be closely supervised by the PMO, URC and experienced external monitoring consultants. The Bank will carry out regular field supervision and provide safeguards training and guidance to the PMO and URC. Adequate resources will be allocated to ESMP/RAP/RPF monitoring.

6. **Procurement Supervision.** In addition to the prior review of procurement to be carried out by the Bank's Beijing office, Bank procurement supervision missions will conduct field visits to carry out annual post review of procurement actions. The post review sampling ratio will be at least one out of five contracts.

7. **Delivery Monitoring and Sustainability.** The Bank will periodically monitor project quality through supervision missions, semi-annual progress reports and results indicators. In order to sustain project impact, capacity building on understanding and maximizing Line 3

ridership will be provided under the project with technical support from the Bank. At the end of the project the Bank will seek to record greenhouse gas emission reduction as a result of the project, drawing on methodologies being developed Bank wide.

Implementation Support Plan

Table A5-1: Primary Focus of Implementation Support

Time	Focus	Skills Needed	Resource Estimate
First 36 months	• Project construction • Capacity development • Procurement • Financial management • Safeguards • Integration • Commercial development	• Technical (engineering/ policy/planning/economics/ urban planning) • Procurement • Financial management • Safeguards	US$100,000 per annum
37-60 months	• Project commissioning • Tariff Policy • Financial management • M&E • Integration	• Technical (policy) • Financial management	US$75,000 per annum

Table A5-2: Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Technical (engineering)	17	10	1 staff: 2 trips + 3 weeks per staff per project year; 2 extra weeks per staff in the first year
Technical (planning)	7	5	1 staff: 1 trip + 1 week per staff per project year; 1 extra week per staff in the first 2 years
Technical (policy)	7	5	1 staff: 1 trip + 1 week per staff per project year; 1 extra week per staff in the first 2 years
Technical (economics)	7	5	1 staff: 1 trip + 1 week per staff per project year; 1 extra week per staff in the first 2 years
Safeguards	12	10	2 staff: 1 trip + 1 week per project year; 1 extra week per staff in the first year
Financial management	6	5	1 staff: 1 trip + 1 week per staff per project year; 1 extra week per staff in the first year
Procurement	4	4	1 staff: 1 trip + 1 week per staff in the first 3 years; 1 extra week per staff in the first year

8. **Location of Staff Expertise.** Team leadership, safeguards, financial management and procurement expertise will be provided by country office-based staff. Technical expertise will be provided by both country office-based as well as headquarters-based staff and specialized consultants.