PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF

US$200 MILLION

TO THE

PEOPLE’S REPUBLIC OF CHINA

FOR THE

JITUHUN RAILWAY PROJECT

APRIL 22, 2011

China and Mongolia Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective January 1, 2011)

Currency Unit = RMB
RMB 1.00 = US$0.15
US$1.00 = RMB 6.60

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS
AAA Analytical and Advisory Activities
ASC The Audit Service Center for Foreign Loan and Assistance Projects
AC Alternating Current
CQS Consultants’ Qualifications
CTC Centralized Traffic Control
EA Environmental Assessment
EIA Environmental Impact Assessment
EIRR Economic Internal Rate of Return
EMP Environmental Management Plan
EMU Electric Multiple Unit
FCTIC Foreign Capital and Technical Import Center (MOR)
FIRR Financial Internal Rate of Return
FM Financial Management
GDP Gross Domestic Product
IBRD The International Bank for Reconstruction and Development
ICB International Competitive Bidding
IDA International Development Association
IPP Indigenous Peoples Plan
JRC JiTuHun Railway Company
MOR Ministry of Railways
NCB National Competitive Bidding
NDRC National Development and Reform Commission
NPV Net Present Value
ORAF Operational Risk Assessment Framework
OP/BP Operational Policy/Bank Procedure
PDL Passenger-Dedicated Rail Line
PDO Project Development Objective
Regional Vice President: Mr. James W. Adams, EAPVP
Country Director: Mr. Klaus Rohland, EACCF
Sector Director: Mr. John Roome, EASSD
Sector Managers: Mr. Ede Jorge Ijjasz-Vasquez, EASCs
                Mr. N. Vijay Jagannathan, EASIN
Task Manager: Mr. John Scales, EASCs
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PAD DATA SHEET

People’s Republic of China
JITUHUN Railway Project

PROJECT APPRAISAL DOCUMENT

East Asia and Pacific Region
EASCS

Date: April 22, 2011
Country Director: Klaus Rohland
Sector Managers:
Ede Jorge Ijjasz-Vasquez
N. Vijay Janannathan
Team Leader: John Scales
Project ID: P122321
Lending Instrument: Specific Investment Loan

Sector(s): Railways (100%)
Theme(s): Public expenditure, financial management and procurement (100%)
EA Category: Full Assessment

Project Financing Data:

Proposed terms: The loan will be payable in 25 years, including 5 years of grace period, annuity repayment at six-month LIBOR-based US Dollar plus variable spread, and with all conversion options.

[ X ] Loan     [  ] Credit     [  ] Grant     [  ] Guarantee     [  ] Other:

<table>
<thead>
<tr>
<th>Source</th>
<th>Total Amount (US$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Project Cost:</td>
<td>6,303.00</td>
</tr>
<tr>
<td>Cofinancing:</td>
<td></td>
</tr>
<tr>
<td>Borrower:</td>
<td>6,103.00</td>
</tr>
<tr>
<td>Total Bank Financing:</td>
<td>200.00</td>
</tr>
<tr>
<td>IBRD</td>
<td>200.00</td>
</tr>
<tr>
<td>IDA</td>
<td></td>
</tr>
<tr>
<td>New</td>
<td></td>
</tr>
<tr>
<td>Recommited</td>
<td></td>
</tr>
</tbody>
</table>

Borrower: People’s Republic of China, Represented by Ministry of Finance (MOF)
Responsible Agency: Ministry of Railways, Foreign Capital & Technical Import Center

Contact Person: Mr. Feng Xu
Telephone No.: +86 10 5184 1825
Fax No.: +86 10 5184 1845
Email: xufengcn@163.com

Estimated Disbursements (Bank FY/US$ m)

<table>
<thead>
<tr>
<th>FY</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17</th>
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</thead>
<tbody>
<tr>
<td>Annual</td>
<td>0.75</td>
<td>5.25</td>
<td>50.00</td>
<td>72.00</td>
<td>70.00</td>
<td>2.00</td>
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<tr>
<td>Cumulative</td>
<td>0.75</td>
<td>6.00</td>
<td>56.00</td>
<td>126.00</td>
<td>198.00</td>
<td>200.00</td>
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</table>

**Project Implementation Period:** January 2011 to December 31, 2015 (5 years)
**Expected Effectiveness Date:** August 15, 2011
**Expected Closing Date:** December 31, 2016

Does the project depart from the CAS in content or other significant respects? ○ Yes ● No

If yes, please explain:

Does the project require any exceptions from Bank policies?
Have these been approved/endorsed (as appropriate by Bank management)?
Is approval for any policy exception sought from the Board?
○ Yes ● No
○ Yes ○ No
○ Yes ● No

If yes, please explain:

Does the project meet the Regional criteria for readiness for implementation? ● Yes ○ No

If no, please explain:

**Project development objective:**
The development objective of the proposed project is to respond to existing and anticipated transport demand along the Jilin-Hunchun corridor by providing increased capacity for freight and passengers, and faster travel time and increased frequency of services for passengers.
**Project description:**

Construction of a double-track, electrified, passenger-dedicated high-speed rail line of about 360 km between the cities of Jilin and Hunchun and through the city of Tumen (JiTuHun) in Jilin Province, and the construction of eight new stations, including the upgrading of the rail line between Jilin station and Longtanshan station.

**Safeguard Policies Triggered:**

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<tr>
<th>Policy</th>
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<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Assessment (OP/BP 4.01)</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Natural Habitats (OP/BP 4.04)</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Forests (OP/BP 4.36)</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Pest Management (OP 4.09)</td>
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<td>Physical Cultural Resources (OP/BP 4.11)</td>
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<td>○</td>
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<tr>
<td>Indigenous Peoples (OP/BP 4.10)</td>
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<tr>
<td>Involuntary Resettlement (OP/BP 4.12)</td>
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<td>○</td>
</tr>
<tr>
<td>Safety of Dams (OP/BP 4.37)</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Projects on International Waterways (OP/BP 7.50)</td>
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<td>●</td>
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<tr>
<td>Projects in Disputed Areas (OP/BP 7.60)</td>
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<td>●</td>
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**Conditions and Legal Covenants:**

<table>
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<tr>
<th>Document Reference</th>
<th>Condition Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan Agreement, Schedule 2, Paragraph 4</td>
<td>The Borrower shall, and through the Ministry of Railways as appropriate, implement and cause the Province to implement the Project in accordance with the Safeguards Instruments, all in a manner and substance satisfactory to the Bank, including monitoring on a six monthly basis the implementation of the Safeguard Instruments.</td>
</tr>
<tr>
<td></td>
<td>During implementation</td>
</tr>
</tbody>
</table>
I. Strategic Context

A. Country Context

1. For the last two decades China has made investment in transport infrastructure a centerpiece of its successful strategy for promoting trade and sustaining high economic growth rates. All modes of transport have benefited from massive improvements to the capacity and quality of infrastructure. This infrastructure hosts a burgeoning transport service industry of small, medium and large-sized businesses: freight haulage and forwarding companies; passenger transport services that meet the growing public aspiration for higher personal mobility; and many associated service companies in areas such as logistics, equipment maintenance and tourism.

2. Until recently, the largest part of transport infrastructure investments in China, around three-quarters, was in the road system, while the railway sector attracted only about 17 percent of investments. Ports, airports and inland waterways made up the rest.\(^1\) China is now giving increasing attention to investments in its national railway network, which carries around 29 percent more traffic (in traffic-unit kilometer) than the road system.

3. This increased attention was also evident in China’s November 2008 economic stimulus program. Of the total program funds, nearly half was allocated to transport, with railway construction projects forming over 40 percent of that transport component. As the stimulus package has been subsequently enhanced, the planned investments in railways have been further augmented. While many of the projects brought forward are naturally in the more prosperous areas, some are more regionally focused, reflecting the Government’s desire to spread the benefits of development to more remote parts of the country. The JiTuHun Railway Project, designed to support the ongoing economic development of the Tumen River area, is one such project.

B. Sectoral and Institutional Context

The ChangJiTu Development Plan

4. The Tumen River forms the border between Jilin Province in China and North Korea. The region through which it flows has long been identified as a potentially promising area for international trade and development involving China, Russia, North and South Korea, and Japan. The UN sponsored the Tumen River Development Plan in 1991 and envisioned this area becoming a major international trade zone. Despite early promise, the plan was not backed with sufficient investment to generate the anticipated results.

5. Recently, the Chinese government has renewed its commitment to the economic development of the region under the proposed ChangJiTu plan issued in 2009 and named for the Chinese region stretching from Changchun to Jilin to Tumen. This forms the catchment area of the proposed JiTuHun Railway project. The ChangJiTu plan seeks greater economic and social development through increased international trade and collaboration. Its objective is to create a regionally integrated economy: the urban centers of Jilin and Changchun will be centers for

innovation and research, while border areas (including Hunchun) will develop integrated production, distribution, and border processing zones. This integrated region will support development in automotive, petrochemical, metallurgical, and equipment manufacturing, as well as a modern service sector focused on development R&D, financial, and tourism industries. The plan has set targets for 2020: a per capita GDP of greater than 55,000 RMB/person; a minimum 45 percent tertiary industry share of GDP; greater than 80 percent urbanization; and more than 2 percent of GDP from R&D. The plan proposes substantial population transfers to cities along the proposed railway alignment, notably Hunchun (to increase from today’s 200,000 to more than 1 million by 2020).

6. This ambitious plan is backed by the State Council and the Government of China has already made significant investments in infrastructure. The Plan depends on high quality transport infrastructure between the urban core of Jilin province (Changchun and Jilin) and the Tumen River area (containing Yanji and Hunchun). Major transport infrastructure improvements are already under way. The new Changchun – Tumen Highway is nearly completed and an upgraded border crossing to North Korea at QuanHe has been opened. The Changchun – Jilin high speed rail line is currently under construction. Finally, the proposed JiTuHun railway line will dramatically improve regional accessibility between Jilin and Hunchun and free up additional capacity for freight transport on the existing line.

7. The existing railway line serving the region was opened before the establishment of the People’s Republic of China, when the region was under foreign occupation. It is a mixed passenger-freight single-track line that operates for the most part at a maximum speed of about 100 km/h. Average rail passenger travel time between Jilin and Tumen is seven hours. In 2009, the railroad between the Jilin and Hunchun carried about 5.9 million passengers and 7 million tonnes of freight. The low level of rail service offered by the existing line in combination with relatively poor roadway infrastructure has for many years been a constraint to accessibility in the eastern region of Jilin province. This poor accessibility is thought to contribute to the relatively low GDP per capita in the region of USD $2,641 (2009), which is 30 percent lower than the average for the province as a whole.

The Chinese Railway Sector

8. Government policies and railway management actions over the last decades have transformed the railway sector into a vital element of China’s national transport system and facilitated China’s economic growth. In 1949, China had only 22,000 km of poorly maintained and war-damaged railway line. Today, on a railway network of nearly 80,000 route-km², China Railways carries the highest volume of passenger traffic and the second highest volume of freight traffic of any railway in the world. Between 2000 and 2008, traffic grew very rapidly, with passenger traffic growing by 70 percent (in passenger-km) and freight by 82 percent (in tonne-km). The economic downturn has had some impact, with passenger traffic in 2009 up by only 1.3 percent and freight traffic by 0.5 percent compared with the year before. The Ministry of Railways, along with its constituent regional railway authorities and other entities, has created

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2 Despite this rapid development, China’s railway network is still a very sparse network compared to the European Union (about 210,000 route-km) and USA (about 225,000 route-km).
a modern rail system by adopting proven international practices and technologies and adapting them to Chinese circumstances.3

9. The railway sector as a whole in China faces two key challenges. The first is to improve the capacity and quality of infrastructure and services in a railway network that is already the busiest, by a wide margin, of any in the world. The second is to adapt the railway industry to become more commercially responsive to the market economy. Addressing these challenges is key but, as importantly, their answers will also have to reflect the Government of China’s regional policy aims to ensure the benefits of development are shared with the more remote provinces, such as Jilin in the northeast of China where the proposed railway line is located.

10. China’s railway infrastructure development strategy, including this regional development dimension, is embodied in the Government’s Mid- and Long-term Railway Network Plan, which was adopted in 2004 and updated in 2008, and describes railway development up through 2020. The strategy, containing the most ambitious program of railway network development anywhere in the world since the nineteenth century, is ahead of its original implementation schedule. The plan in particular entails the development of the largest high-speed passenger network in the world and the progressive separation of freight traffic, which will use the existing conventional network, from passenger traffic, which will increasingly use the new high-speed network. This will greatly enhance the overall capacity and quality of services and create the conditions for high operational and financial efficiency for each line of business. The railway line between Jilin and Hunchun has been identified as a national priority in the updated Mid- and Long-term Railway Network Plan.

11. In terms of commercialization, China’s rail sector has adopted many structural and organizational reforms. These include the separation and divestment of non-core activities, granting concessions to branch lines, establishing regulations to permit foreign investment, establishing specialist companies for particular freight markets, and establishing joint-ventures with provincial governments and others. The sector has also changed by eliminating an entire layer of management and developing ways to access new sources of funding.

12. The Bank’s involvement in this project, and more broadly in the railway sector, contributes to both pillars of the sector strategy and to setting up one of the most important structuring elements of the Chinese economy of tomorrow. The high-speed railway program is expected to lead to a new model of spatial economic integration in China by contracting economic distances and generating agglomeration benefits. The value added comes from the long-term partnership between China and the Bank, spreading over twenty years in the sector, and combining continuous support to the physical development of the Chinese railway system with a wide range of demand driven analytical and advisory activities that contribute to the railway system’s transformation. With this 14th loan to the Ministry of Railways (MOR), the Bank will have lent over US$3.5 billion in support of China Railway development.

13. The implementation progress and challenges witnessed as part of the physical upgrades of the system will also provide a platform for continued and informed high-level engagement on

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railway and transport policy between the Bank, the Ministry of Railways and the National Development and Reform Commission (NDRC). At project level, this partnership provides the Ministry with timely access to technical advice on the application of safeguard policies, economic evaluations and procurement, which can be applied across its broader Mid- and Long-term Railway Network Plan.

14. Recent technical and analytical assistance provided by the Bank has included topics as diverse as: specification of new traffic management information systems; advice on non-traditional financing sources; advice on handling multiple train operators on the railway network; comparison of the social costs of railways and other modes; railway infrastructure investment policies in selected countries; and research into market-based railway pricing policies and structures. The Asian Development Bank and other donors have also been active in areas of technical co-operation. The Bank has also supported the transfer of lessons learned in China to other countries, most recently in the form of a high level study tour of Indian Railways to China and a review of high-speed rail experience in China and its applicability to other parts of the world.

15. The project will also include assistance to China in quantifying the regional benefits of transport investments based on economic principles that have become known as the New Economic Geography. These benefits arise through the stimulation, over time, of regional economic development associated with the productivity and agglomeration of firms, the working of product and service markets and the working of the labor market. This is particularly relevant for this project, as the far northeast region that will be served by the new railway was historically dominated by state-owned enterprises operating in the heavy industrial sector of the planned economy, and which has since struggled to broaden and diversify its economic base.

C. Higher Level Objectives to which the Project Contributes

16. The Bank’s Country Partnership Strategy (2006-2010) contains five “pillars” (priorities) for the Bank’s support of China’s development. This project contributes to three of these priorities:

Pillar 1. Integrating China into the world economy: The project creates an opportunity to facilitate rail services and travel times between northeast China, North Korea, and Russia (though the international connections themselves are beyond the scope of the proposed Project).

Pillar 2. Reducing poverty, inequality and social exclusion: This project will act as a catalyst for faster economic development of this relatively poor region (Counties in the eastern less developed end of the alignment had a GDP per capita in 2009 of $2,641). The project will support spatial economic integration, spurring and spreading economic development and meet a substantial part of long-distance passenger mobility needs along the corridor. The dramatic improvement in accessibility will reduce regional and social exclusion in this area with a catchment of almost 12 million people.

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4 This has been pioneered by a number of economists who have worked on location and trade theories, such as Fujita (1988), Krugman (1991) and Venables (1996).
Pillar 3. Managing resource scarcity and environmental challenges: The project will enable railways to retain and also attract traffic that would otherwise be carried mainly by road transport, which will save land, use much less energy and emit less greenhouse gases, and be much safer than road transport.5

17. The Government of China has requested that the new CPS for 2011-2015 be coterminous with, and aligned to, its 12th Five Year Plan, covering 2011-2015, which will be available in spring 2011. The objectives of the Project are expected to be consistent with the new CPS.

II. Project Development Objectives

A. PDO

18. The development objective of the proposed project is to respond to existing and anticipated transport demand along the Jilin-Hunchun corridor by providing increased capacity for freight and passengers, and faster travel time and increased frequency of services for passengers.

1. Project Beneficiaries

19. Direct project beneficiaries include the current population and companies located along the catchment area of the new railway line. An estimated 12 million passengers are expected to benefit directly from the sharp improvement in transport services between cities located on the line by 2020. They will also be able to connect to the core high-speed rail network through the railway hub in Changchun. Companies will benefit from the reduction in economic distances. Cities and companies along the corridor will experience new economic opportunities in the form of economic agglomeration. By transferring part of their trips along the corridor to rail transport, the overall population will also benefit from lessened externalities like traffic accident and air pollution in meeting their mobility needs.

2. PDO Level Results Indicators

20. Progress toward meeting the Project Development Objective (PDO) will be measured through the following indicators:

- Increased number of rapid train services (no. of pairs of trains per day)
- Number of rail passengers between Jilin and Hunchun
- Reduced transit time for passengers travelling between Hunchun and Jilin

III. Project Description

A. Project Components

21. The project will construct a double-track, electrified, passenger-dedicated high-speed rail line capable of a maximum speed of 250 km/h of about 360 km between the cities of Jilin and Hunchun in Jilin province including the upgrading of a double line track between Jilin station

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and South Terminal of Longtanshan station. Eight new railway stations will be constructed. The project consists of civil works; acquisition and installation of goods, maintenance equipment, and rolling stock; as well as land acquisition and the resettlement of displaced persons. This line is an extension of the high speed Intercity Changchun-Jilin Railway currently under construction.

22. The proposed Bank loan will finance the procurement of goods associated with the construction of the line and its electrification, signaling, and communication systems as well as operation and maintenance equipment. The loan may also finance technical assistance on policy aspects. The scope of such technical assistance (consultant services, training, and study tours) (if any) will be identified during implementation.

23. The new line will substantially reduce the travel time between Jilin and cities of Yanji, Tumen and Hunchun (see the map in the annex to this document). The travel time between Jilin and Tumen (304 km along the new alignment) will be reduced from about seven hours at present to about two hours. The new line will offer a rapid link between the city of Jilin and Jilin’s far eastern cities of Yanji, Tumen and Hunchun, as well as providing a vital link to the core of the Chinese high-speed rail network via Changchun.

24. The existing mixed-use (freight and passenger) single track railway line between Jilin and Tumen (owned by CR) and Tumen and Hunchun (a local railway) follow an old alignment and are working to capacity. These lines are used for the transport of mainly coal, timber, grain, petroleum, cement and chemical fertilizer. About 10 pairs of passenger trains per day are also operated on these lines. As the majority of passenger trains will transfer to the proposed JiTuHun high speed line, the existing lines will be able to offer additional capacity for anticipated growth of freight traffic. Thus the capacity and service standards of both market segments would be enhanced, enabling railways to compete effectively with passenger services offered by highways.

25. The construction period is estimated to be just over four years with construction planned to begin in late 2011 and completion by December 2015. As of early March 2011 (appraisal), resettlement and construction had not yet begun, however, preparation of bidding documents for Bank-financed procurement, preparation for land acquisition and resettlement, a small amount of land acquisition, and procurement of civil works had begun. As confirmed by the Bank’s task team at appraisal, early project activities, including advance contracting, have been undertaken in accordance with the project documents and relevant Bank policies and procedures.

B. Project Financing

1. Lending Instrument

26. The proposed lending instrument is a Specific Investment Loan (SIL). The project involves the construction of large-scale infrastructure. The loan funds will be disbursed primarily against goods procured mostly through international competitive bidding. For this purpose a Specific Investment Loan is the most appropriate lending instrument. The Borrower has selected a variable-spread US dollar loan with a five-year grace period and a twenty-five year repayment term (including the grace period) corresponding to the type of investment.
2. Project Cost and Financing

27. Total project financing requirements are estimated at US$6.303 billion, inclusive of price and physical contingencies, taxes, and interest during construction. The Ministry of Railways, through the Shenyang Railway Administration, and Jilin Province will finance US$6.103 billion for land acquisition, construction, equipment, project management, consulting services, taxes, and interest during construction through a mix of equity contributions and commercial borrowing, as per the practice of other similar projects. The remaining costs of US$200 million for goods, consultant services and front-end fee for the World Bank loan will be funded by the IBRD loan. Detailed information on costs and financing sources is provided in Table 1 below.

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<thead>
<tr>
<th>Project Components</th>
<th>Project Cost (USD Million)</th>
<th>IBRD financing</th>
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</thead>
<tbody>
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<td></td>
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<td>Amount (USD million)</td>
</tr>
<tr>
<td>1. Civil Works</td>
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</tr>
<tr>
<td>2. Land Acquisition</td>
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</tr>
<tr>
<td>3. Goods and Equipment</td>
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<td>4. Rolling Stock</td>
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<td>5. Consulting Services</td>
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<tr>
<td>6. Other Costs</td>
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</tr>
<tr>
<td><strong>Total Baseline Costs (incl. physical contingencies)</strong></td>
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<tr>
<td>Price Contingencies</td>
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<tr>
<td><strong>Total Project Costs</strong></td>
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<tr>
<td>Interest During Construction</td>
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</tr>
<tr>
<td>Front-End Fee</td>
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<td>0.5</td>
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<tr>
<td><strong>Total Financing Required</strong></td>
<td><strong>6303.0</strong></td>
<td>200.0</td>
</tr>
</tbody>
</table>

C. Lessons Learned and Reflected in the Project Design

28. The Ministry of Railways and the Bank have drawn valuable lessons from preparing and implementing past railway projects and these lessons have been taken into account in the preparation of this project. The project is part of a large and ambitious program with tight deadlines. As such the project needs to have a straightforward design, reflecting the latest policy development—such as the separation of high-speed passenger trains from freight, with strong client ownership and solid cooperation among the respective project participants including the Ministry of Railways, Regional Administration railway staff and provincial and regional authorities. It should be at an advanced stage of readiness, while at the same time exhibiting flexibility in implementation.
29. Recent experience in the Bank’s large railway portfolio indicates that the inclusion of too many components or components with limited client commitment, as was done in the earlier Sixth Railway Project (1993) and Seventh Railway Project (1995), affects implementation negatively because both the client and the Bank have limited resources for effective supervision and implementation. This is particularly true when the size and urgency of one component greatly overshadows lesser components. Building on these experiences, this project was designed as a single component consisting of the construction of the JiTuHun Railway.

30. Recent projects have indicated the need to follow up more closely on reporting requirements. The Ministry of Railways and the Bank team will set up a system to closely monitor the delivery of required reports across the portfolio of activities.

31. The Client’s commitment to the Bank’s safeguard guidelines and procedures is essential. Problems arose with regard to resettlement and environmental issues in the Sixth Railway Project (1993), Seventh Railway Project (1995), Second National Railway Project (2004) and Third National Railway Project (2006). The Chinese Government, however, has since then internalized concern for environmental impacts and resettlement to a far greater degree, and domestic safeguards are converging to the standards required by the international financial institutions. Because provinces now share the project cost by financing, in part or fully, resettlement and land acquisition, the formation by the Ministry of Railways of project companies with the provincial governments to help finance and implement railway projects, has increased the provincial accountability for the appropriate application of social and resettlement practices. Implementation progress in that respect is being monitored closely through independent consultants.

32. The progress of China Railways towards improving business processes and policy reform has been steady and nearly always in a direction that the Bank supports. The Bank’s support in improving the management of China Railways and its business processes has been effective and is being continued. However, it is being done in a manner that separates policy and strategy support from project delivery, thereby avoiding that national policy conditions are embedded in project design, as was the case with the National Railway project.

IV. Implementation

A. Institutional and Implementation Arrangements

33. Institutional and implementation arrangements are identical to those applied in the previous three Bank financed railway projects in China. The Ministry of Railways, through its Foreign Capital and Technical Import Center (FCTIC), will be responsible for: (i) overseeing the project implementation including monitoring, reporting, and compliance with safeguards; (ii) financial management of the World Bank loan, including disbursement and reporting; and (iii) all Bank-financed procurement with the support of an independent procurement company. FCTIC will provide implementation progress reports every half year.

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6 The date in parenthesis refers the year the project was approved by the Bank’s Board.
34. The Ministry of Railways formed a Preparatory Group (PG) for the JiTuHun Passenger Dedicated Railway Line Company on July 3, 2009, staffed primarily by the Ministry of Railways’ regional Shenyang Railway Bureau. The Preparatory Group is tasked with the day-to-day responsibility for the railway line construction. This includes the procurement, management and supervision of all contracts for non-Bank funded civil works, installation of goods and equipment funded by the Bank loan through contractors, coordination with the local government entities responsible for resettlement and land acquisition, transfer of funds for resettlement to local authorities, monitoring of project progress and reporting to the Ministry of Railways on physical progress, safeguards and financial management.

35. A project company, the JiTuHun Passenger Dedicated Railway Line Company (JRC or JiTuHun Railway Company), is expected to be formed for the construction and management of the line as a successor to the Preparatory Group. The controlling share of the company will be held through an investment arm by the Ministry of Railways. The other major shareholder is expected to be the Province of Jilin through a provincial investment body. The percentage of shares will be provisionally defined based on the project cost estimates for construction and land acquisition contributed by the Ministry and the Province respectively, and will be adjusted based on actual equity contributions. Once the JiTuHun Railway Company is formed, it is expected that, as in the past, staff from the Preparatory Group will be transferred to the new company, occupying similar roles and functions. The JRC will then take over all the Preparatory Group’s responsibilities. Because of this, all references in the Bank’s project-related documents to the Preparatory Group will become references to JRC upon its establishment.

36. The establishment of such special purpose entities is common in the railway sector, where the Ministry of Railways oversees over 120 similar companies. Those companies follow well-established directives from the Ministry, which regulate the construction and management of such lines. Similar to previous projects, some of the specific features of this joint venture are yet to be decided, including who will own the rolling stock, how it will be operated and how the interfaces will be managed. Lines operating under such arrangements like Beijing-Tianjin or Wuhan-Guangzhou appear to be operating effectively.

37. The Preparatory Group will monitor the implementation of safeguards with the support of the independent environment and resettlement and land acquisition monitoring consultants. The Bank’s task team will carry out supervision activities together with FCTIC to ensure that implementation proceeds in accordance with agreements reached during project preparation.

B. Results Monitoring and Evaluation

38. In order to achieve the development objective, the project will seek to provide the required number of high-speed passenger train paths on the new line to meet growing passenger demand, while releasing capacity on the existing line to accommodate additional freight traffic. This will substantially improve services for rail passengers and support economic development in the region. These outcomes and results can only be measured after the completion of the project, commissioning, opening of the line, and several years of operation. The performance indicators will be monitored. Intermediate result indicators will capture physical progress in the implementation of the project.
39. The Ministry of Railways collects sufficient data to allow satisfactory reporting and monitoring of the outcomes and results of the project as part of its regular business activities (see Annex 3). The JRC, once established, will also be asked to collect relevant data that will enable monitoring of the above indicators.

C. Sustainability

40. The project’s sustainability comes from its strategic, economic, operational, environmental, social and financial dimensions. The project is part of the Government’s Mid-and Long-term Railway Network Plan to 2020 and as such has been strategically endorsed. The project has a positive economic internal rate of return (EIRR) of 6.2 percent and its economic sustainability will likely even strengthen over time because the value of the main non-financial benefits of the project, such as saved time, are all expected to increase in the future. There are no obvious threats to operational sustainability as the technical requirements for maintaining fast passenger train services are well known and the project will be using established technologies. Railway services also offer a more sustainable approach to meet future mobility needs of China in terms of energy efficiency and greenhouse gas emissions than a road transport alternative.

41. The social sustainability of the project will depend mainly on the affordability of the services it offers. To gauge this, the Ministry of Railways has carried out detailed passenger attitude surveys. These have established a strong willingness to pay a surcharge of 50 percent on high-speed services compared to conventional rail. In addition, even with higher fares on the new services, the cost increase to most passengers will be less because of the substantial time savings. Overall, the project will encourage more passengers to use rail transport. Inter-city railway services in China are used by a people from a range of socio-economic backgrounds, unlike either private cars or airlines, which tend to serve higher income groups. Because of this, the impact of railway improvements tends to be more equitable, and so more socially sustainable.

42. In financial terms, the project will be sustainable if at a network level the transport services are able to earn a positive contribution above long-run marginal costs; if so, they will make a positive financial contribution to the railway’s financial performance and not be an increasing financial drain that might threaten its survival. With the inclusion of revenue from the existing line, the project is expected to be “cash positive” and generate sufficient income for its own maintenance and operations immediately from the opening of the new JiTuHun railway project. The risk that the Ministry of Railways might not be able to maintain the infrastructure after services are implemented therefore seems negligible.

V. Key Risks and Mitigations Measures

43. The Bank’s experience in the transport sector in China, including in the railway sub-sector, is in general satisfactory. The current project design reflects all lessons learned from previous railway projects in terms of design and institutional arrangements. The Bank team benefits from international advisors in railways engineering and management, economic and financial evaluation, and environmental aspects working on both investment lending and analytical and advisory activities (AAA). As a result, the Bank is able to satisfactorily support the delivery of this project by the Ministry of Railways. Based upon the lessons learned from the prior Bank financed railway projects, the macro-economic, financial, policy-related and political
risks of this project not meeting its development objectives are low to moderate. The expected project risks and proposed mitigation measures are discussed in the Operational Risk Assessment Framework in Annex 4.

44. Major risks identified under this project include delays related to the large size of the project, protests related to resettlement, and a lower rate of return than anticipated due to the lower level of traffic demand. While the project is large, the Ministry of Railways has long and extensive experience of supervising complex and large railway projects. Examples are the successful upgrading of the Wuhan-Guangzhou and Hangzhou-Zhuzhou lines, both of which were longer than the JiTuHun railway and also had the additional complexity of being upgraded under traffic. Regarding resettlement, a final Resettlement Plan, compliant with OP 4.12, has been prepared and disclosed. This plan includes detailed internal and external (independent) monitoring arrangements supporting its implementation. The resettlement risk is low considering the magnitude of resettlement, as it is expected to have been mitigated and as such is expected to have limited impact on the project development objective.

45. On traffic demand, the team prepared an independent forecast, which although lower than that of the feasibility study, confirms the rationale for the proposed project.

VI. Appraisal Summary

A. Economic and Financial Analysis

46. The economic evaluation of the JiTuHun line included consideration of the operating savings to the railway, the time savings to passengers and the agglomeration benefits associated with regional economic development as a result of the improved accessibility provided by the line. The benefits are calculated for the 30-year period following project completion, from 2015 to 2045 and the estimated EIRR derived and NPV calculated (using a discount rate of 5%). The estimated NPV, discounted to 2015, is about RMB 10 billion in 2009 prices with an EIRR of 6.2%.

47. The sensitivity of these results was tested against changes in six base case assumptions: The results of these tests are given in Table 2.

<table>
<thead>
<tr>
<th>Test</th>
<th>IRR (%)</th>
<th>NPV (RMB billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Base</td>
<td>6.2</td>
<td>10</td>
</tr>
<tr>
<td>2 Construction costs + 50%</td>
<td>4.4</td>
<td>-7</td>
</tr>
<tr>
<td>3 Exclude agglomeration benefits</td>
<td>4.1</td>
<td>-7</td>
</tr>
<tr>
<td>4 Operator benefits only</td>
<td>1.0</td>
<td>-24</td>
</tr>
</tbody>
</table>

48. The project has a low NPV, reflecting that it is being built as one of the earliest projects associated with the Tumen River Development Plan. However, the EIRR is reasonably stable.

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7 This rate is consistent with the discount rate adopted by most developed countries for the economic evaluation of major infrastructure projects.
against all sensitivity tests. Even if the analysis is restricted to benefits to the operator benefits only, the EIRR is still positive.

49. From a financial point of view, allowing for inflation, the FIRR over 30 years of the project is 4.3%, equivalent to about 2% in real terms. As the cost of debt is 6% nominal, the FIRR for the equity partners is very low and will involve significant financial support in the early years. These projections reflect, as does the financial evaluation, that this project is being constructed considerably ahead of the likely demand as an important component in the Tumen River Development Plan, in the absence of which it is unlikely it would be constructed.

50. Forecast revenues average around double operating costs (excluding depreciation) in the early years of operation, with a cash surplus of about RMB 0.2 billion in 2015 (in RMB current assuming 3% p.a. inflation). This is insufficient to finance the interest payments (at 6.5%) of RMB 0.9 billion for the 50% of the cost raised by the project company from borrowings and this continues until after 2020, when it can begin to consider principal repayments.

51. Much then depends on the repayment profiles that are negotiated with the lending agencies. For example, if the debt is structured as a mortgage, with equal payments over a period of 25 years, the project can finance this from around 2030, leaving a relatively small shortfall in the previous years. Throughout this period the project is notionally loss-making, as it is incurring large depreciation charges but as the operating costs include an allowance for major periodic maintenance, this is unlikely to be a problem for at least 20 years, by which time the project is expected to be financially viable.

B. Technical

52. Various alternatives for the alignment were considered particularly around the urban areas. The selected alignment is appropriate as it is the most direct, connects populated areas, meets the approval of local authorities and avoids most environmentally sensitive areas and those having poor geological condition. The project design institute has consulted urban planning development officials of the cities and counties adjacent to the alignment in selecting sites for the proposed nine new railway stations to be built as part of the project.

53. The railway will have approximately 102 bridges and viaducts and 77 tunnels. About 66 percent of track will be on bridges or through tunnels. This approach is considered appropriate for a high speed passenger dedicated line because the relatively direct routing and extensive use of bridges and tunnels minimizes railway length, allows large radius curves and reduces the need for land acquisition. China Railways have successfully used this approach for the construction of several high speed lines in the past four years. In 2009 alone, the Ministry of Railways built about US$100 billion worth of new high speed railway lines of a similar nature.

54. Current international practice for electrification, signalling, communication, and information systems will be adopted and electric multiple unit (EMU) trains with regenerative brakes will be used. The railway is designed for a relatively modest axle load of 17 tonnes, which is suitable for a passenger-dedicated line. The line will use a ballastless track structure,

8 All these estimates assume the equity partners fund the shortfall in debt service in the early years and assume depreciation will be sufficient to create a tax loss.
which provides a solution to the seasonal frost problem related to subgrade and meets the high reliability and low maintenance requirement for the operation of high-speed trains. In addition, several measures will be adopted for energy conservation to minimize the carbon footprint. Particular attention has been paid to incorporate safety systems in the overall design and that includes a real time safety monitoring system covering wind speed, rain fall, snow depth and foreign matter on track. Use of automatic train protection system, hot box detectors and radio communication system further enhance train safety on this project.

C. Financial Management

55. The Bank loan proceeds, including overseeing the Designated Account, will be managed by FCTIC of MOR. A financial management capacity assessment has been conducted by the Bank and actions to strengthen the Project’s financial management capacity have been agreed with the relevant implementing agencies. The FM assessment has concluded that with the implementation of these proposed actions, the financial management arrangements will satisfy the Bank’s minimum requirements under OP/BP 10.02. Annex 3 provides additional information on financial management.

D. Procurement

56. An assessment of the capacity of FCTIC to implement procurement actions for the project has been carried out and has concluded that FCTIC has adequate experience and capacity. FCTIC has successfully implemented several Bank-financed projects in the past. At the time of appraisal, FCTIC is implementing another four Bank-financed projects with similar procurement arrangements. Risk mitigation measures have been discussed with FCTIC and agreed. The procurement plan for the project was received by the Bank at appraisal. It will be updated annually or as required to reflect project implementation needs. A brief summary of the procurement capacity assessment and project procurement arrangements are provided in Annex 3.

E. Social

57. During project preparation, project stakeholders such as local authorities, civil society, and the affected population were consulted in various ways including TV, newspaper, meetings, and focus groups on land acquisition matters. The local governments were consulted on the alignment and location of stations. All the affected villages have been informed, investigated and consulted. In general, the local population needs and supports the project. Most of the public concerns have been incorporated either in the project design or in the Environmental Management Plan and Resettlement Action Plan. Consultation will be maintained during implementation.

58. An indigenous people screening was conducted early in the preparation of the project. Korean minority villages in Jiaohe County and some villages with Man minorities in Yanji City were identified along the project line. The social assessment, conducted by the Central Minority University, also identified two Korean villages in Jiaohe county located 3.8 km and 4.8 km from the alignment. Based on the above information, it was determined that OP 4.10 was triggered and an Indigenous Peoples Plan was prepared by the Central Minority University, and was integrated into one report with the overall social assessment.
59. This project will benefit and impact 2 cities/prefectures, 10 counties/cities/districts, 30 townships (towns) and 106 villages/communities (100 administrative villages and 6 communities) of Jilin Province. Approximately 17,000 mu of land (approximately 47 mu per km) will be permanently acquired of which 98% is rural collective land. Approximately 638 thousand m² buildings (1,747 m² per km) are expected to be demolished of which 39% is rural housing, 49% is urban housing, and the remainder is enterprises combined with residential, enterprises, and schools. This project does not involve demolition of illegal structures.

60. The project is estimated to affect approximately 19,588 persons, 45% in rural areas, 48% in urban areas and 7% from enterprises and a school. Approximately 12,913 people (33% rural, 67% urban) from 4,221 households (24% rural, 76% urban) will be resettled. The total rural affected consists of 9,475 people from 2,644 households including 4,252 people from 1,029 households to be resettled. The total urban affected consists of 8,661 people from 3,192 households who will be resettled. In addition, the project will affect 1,167 people from 35 factories, mines, and enterprises; 220 people from one school; and 65 persons from 30 single family businesses.

61. A resettlement action plan, acceptable to the Bank, has been prepared by FCTIC, with assistance from Southwestern Jiaotong University and local governments in Jilin Province. The resettlement plan was disclosed in accordance with Bank’s policy. The Resettlement Action Plan includes grievance handling procedures, arrangements for internal and external monitoring, implementation arrangements, and also clarifies financing sources for resettlement. The institutional capacity of the Preparatory Group, with staff from provincial governments, has also been reviewed and is regarded, with training support, to be adequate, for the implementation of the plan.

62. The key social risk relates to potential delays and disruptions caused by resettlement implementation in particular in urban areas. It may happen in case of: (i) poor cooperation among FCTIC, the Preparatory Group and local governments; (ii) low resettlement implementation capacity by the Province; or (iii) resettlement fund shortage due to the late availability of counterpart funds from the relevant municipal governments. This is mitigated by including the Jilin province as a core shareholder in the JiTuHun Railway Company.

F. Environment

63. The project is classified as Category A as per OP4.01 due to its large scale of civil works and anticipated environmental and social impacts, especially during construction. Based on the screening and detailed survey and assessment, the following Bank safeguards policies are triggered: (1) OP4.01 Environmental Assessment; (2) OP4.04 Natural Habitats; and (3) OP4.11 Physical Cultural Resources; (4) OP 4.10 Indigenous Peoples, and (4) OP4.12 Involuntary Resettlement.

64. Accordingly, a full environmental assessment has been jointly conducted by China Railway Science Institute and China Railway Engineering Consulting Group for EIA preparation. The draft environmental safeguards documents have been reviewed and commented on by Bank’s task team environmental specialists, and final EA documents (including a full EIA Report, a stand-alone EMP, and an EA Executive Summary) have incorporated Bank team’s comments and found to be in compliance with Bank’s policy requirement. The EIA adequately
addressed the key environmental issues, i.e. crossing sensitive sites such as nature reserves, cultural resources, water resource protection areas etc.; community impacts such as noise, dust, social disturbance, ecological impact and soil erosion during construction; and noise, safety and community connectivity during operation. A stand-alone Environmental Management Plan (EMP) has been developed based on the findings of the EIA report. The EMP detailed the environmental management and supervision organizations and responsibilities, mitigation measures, capacity training plan, monitoring plan, and budget estimates of EMP implementation. EMP measures to be implemented by the contractors will be incorporated into bidding documents and contracts to ensure effective implementation.

65. Two rounds of public consultations have been conducted according to Bank’s OP4.01 during the preparation of EA documents. A combination of questionnaire survey and public meetings in the townships, village committee and affected villagers’ homes has been implemented during public consultation. Public concerns have been responded to during consultation and lately incorporated either in project design or in the environmental management plan or resettlement plan. Information disclosure of EA preparation has been carried out through local newspapers and through the internet.
Annex 1: Results Framework and Monitoring

CHINA: JITUHUN Railway Project

Results Framework

**Project Development Objective (PDO):** The development objective of the proposed project is to respond to existing and anticipated transport demand along the Jilin-Hunchun corridor by providing increased capacity for freight and passengers, and faster travel time and increased frequency of services for passengers.

<table>
<thead>
<tr>
<th>PDO Level Results Indicators</th>
<th>Core</th>
<th>Unit of Measure</th>
<th>Baseline</th>
<th>Target Values</th>
<th>Frequency</th>
<th>Data Source/Methodology</th>
<th>Responsibility for Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicator One:</strong> Number of train pairs operating per day on the JiTuHun line&lt;sup&gt;10&lt;/sup&gt;</td>
<td>number</td>
<td>8</td>
<td>13</td>
<td>18</td>
<td>21</td>
<td>Annually</td>
<td>Ministry of Railways (MOR)/Project Company Statistics</td>
</tr>
<tr>
<td><strong>Indicator Two:</strong> Number of passengers travelling on the JiTuHun line&lt;sup&gt;11&lt;/sup&gt;</td>
<td>millions</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>13</td>
<td>Annually</td>
<td>MOR/Project Company Statistics</td>
</tr>
<tr>
<td><strong>Indicator Three:</strong> Reduced transit time for passengers travelling between Tumen and Jilin (minutes)</td>
<td>minutes</td>
<td>460</td>
<td>145</td>
<td>145</td>
<td>145</td>
<td>Annually</td>
<td>MOR/Project Company Statistics</td>
</tr>
</tbody>
</table>

**INTERMEDIATE RESULTS**

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</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicator One:</strong> Completion rate of civil works.</td>
<td>%</td>
<td>0</td>
<td>5</td>
<td>40</td>
<td>75</td>
<td>100</td>
<td>Twice yearly</td>
<td>Project progress report</td>
<td>MOR</td>
</tr>
<tr>
<td><strong>Indicator Two:</strong> Delivery of Bank financed goods.</td>
<td>%</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>40</td>
<td>100</td>
<td>Twice yearly</td>
<td>Project progress report</td>
<td>MOR</td>
</tr>
</tbody>
</table>

<sup>9</sup> Taken as first full year of operation

<sup>10</sup> This is defined to be all express (or high speed) trains passing through a ‘screenline’ on the track between Jilin and the first station of the new line (JiaoHe). This will include all trains operating on the new high speed line when it is opened.

<sup>11</sup> This is defined to be all passengers passing through a ‘screenline’ on the track between Jilin and the first station of the new line (JiaoHe). This will capture the majority of the trips on the new line – which are expected to travel at least as far as Jilin/Changchun
Annex 2: Detailed Project Description

CHINA: JITUHUN Railway Project

1. China Railways is in the midst of constructing a high speed passenger dedicated line (PDL) network covering about 16,000 route km to be completed by the year 2020. This network consists of several long distance PDL corridors and a number of Intercity PDLs that connect important cities. The proposed high speed line between Jilin and Hunchun is an extension of the high speed Intercity Changchun-Jilin Railway that is currently under construction that will connect Jilin, the capital and second largest city of Jilin province, with the long distance PDL network at Changchun, the largest city of the province. The proposed line will thus provide a seamless high quality connection between the far eastern cities of Yanji, Tumen and Hunchun located in the Yanbian Korean Autonomous prefecture, close to the international border with Russia and North Korea, with Jilin and to the rest of PDL network via Changchun.

2. The existing mixed-use (freight and passenger) single track railway line between Jilin and Tumen (owned by CR) and Tumen and Hunchun (a local railway) follows an old alignment and is used mainly for the transport of coal, timber and grain moving towards Jilin and petroleum, cement and chemical fertilizer towards Yanji and Hunchun. About 10 pairs of passenger trains are also operated on these lines per day.

3. The proposed project will support the construction of a new double-tracked electrified 360 km long intercity passenger-dedicated rail line capable of maximum speed of 250 km/h, as well as related railway stations including the upgrading of a rail line between Jilin station and Longtangshan station. As most passenger trains will be operated on the proposed new PDL, this project will also facilitate enhancement of rail freight transport capacity on the existing line between northeast China, Russia and North Korea. As a result, the existing line will have additional capacity to accommodate anticipated growth in freight traffic.

4. The new line to be partly financed by the Bank under this project will substantially reduce the travel time between Jilin and cities of Yanji, Tumen and Hunchun. Travel time between Jilin and Tumen (304 km) will be reduced from seven hours at present to about two hours. Because the region experiences significant snow fall in winter time, railway travel is considered safer, more convenient and comfortable than travel by road. Thus the capacity and service standards of both market segments would be enhanced, enabling railways to compete effectively with passenger services offered by highways.

5. The project consists of civil works (including the construction of subgrade, tunnels, bridges, buildings, eight new railway stations acquisition and installation of goods (including communications, signaling, mechanical and electrification equipment), maintenance equipment, and rolling stock. The project also covers land acquisition and the resettlement of displaced persons. The eight new railway stations along the line are located at West Jiaohe City, South Weihu Mountain, Dunhua, South Dashtou, West Antu County, West Yanji City, North Tumen City, and North Hunchun. In total about 60,000 square meters of buildings will be constructed. The existing Jilin station is being modified under the ongoing Changchun-Jilin Intercity PDL and is not included in the project.
6. The total project investment cost is estimated at US$6.303 billion. The Bank loan of US$200 million will finance part of the goods required for the construction of the line; electrification, signaling, and communication systems; operations and maintenance equipment; and the front end fee. The Ministry of Railways (MOR) may also use the Bank loan to support technical assistance. The scope of such technical assistance (consultant services, training, and study tours) (if any) will be identified during project implementation.

7. Various alternatives for the alignment were considered particularly around the urban areas. The alignment being proposed is appropriate as it is the most direct, connects populated areas, meets the approval of local authorities and avoids most environmentally sensitive areas. The project design institute has consulted urban planning development officials of the cities and counties in selecting sites for the proposed nine new railway stations to be built as part of the project.

8. To enable a high operating speed the alignment will be relatively straight with large curves with radii of 3,000m or more. The terrain is relatively flat and has low seismicity, the seismic peak ground acceleration being 0.05g except a few locations having peak ground acceleration of 0.10 g. At such locations suitable precautions shall be taken in the design for safety against earthquake. Multiple criteria were used to select the alignment including avoiding congested areas, soft soil, unfavorable geology, and sites that are environmentally sensitive and of cultural and historic importance.

9. Rail passenger services will be operated with Electrical Multiple Units (EMU). The trains will have 8 or 16 cars with capacity of 600 and 1200 passengers respectively.

10. Detailed project technical information provided below is based on the Feasibility Study Report and subject to adjustments reflecting changes that might arise during project implementation.

11. Technical features:
- Maximum speed: 250 kilometer/hour
- Distance in center line of two tracks: 4.6 meter
- Minimum curve radius: 3,000 meter, may be reduced to 2,800m at difficult locations
- Maximum grade: 20 in 1000, generally 12 per 1000
- Effective length of departure track: 650 meter
- Traction: Electric 25 kilovolt, 50 Hertz, AT System
- Train type: Electric Multiple Units, 8 or 16 cars (409 tonnes and 1000 tonnes)
- Train operation control: Automatic (CTC 2)
- Traffic management control: Integrated Centralized Traffic Control
- Minimum headway between trains: Short run: 4 minutes. Long run: 3 minutes
- Track structure: Ballastless

12. The project design reflects the difficult climatic conditions of this area. The project line passes through a frigid zone with a frozen depth of soil of about 1.7 to 1.9 meter and heavy snow in the winter. Frost prevention and ease of snow removal from the roadbed were therefore important design parameters. Measures taken include limiting the minimum height of the
embankment, improving roadbed filling, using ballastless track, setting a water resistant layer, adapting the subgrade design and effective drainage of surface and underground water. The use of ballastless track also meets the high reliability requirement for the operation of high-speed trains, enables low frequency and low cost of maintenance of tracks and facilitates the erection and use of turnout snow-melting devices. The subgrade includes two layers, with an impermeable fabric layer on the surface. New 60 kg/m rails of 100m length (without bolt holes) shall be used and welded from station to station. Elastic split rail fastening shall be adopted for the ballastless track.

13. The line will have approximately 102 bridges having cumulative length of 77.6 km and 77 tunnels with a cumulative length of 159.4 km. Thus, about 66 percent of the railway shall be on bridges or in tunnels. In all there are 55 major bridges with an average length of 1,180 m. The longest bridge will be at Chao Yang He (CK 264), 3,709m in length. The project has 254 culverts with a cumulative length of 6,983m.

14. Of 77 tunnels, 17 are 3,000 m or more in length. Pingdingshan tunnel with a length of 11.6 km is the longest. The estimated construction period for this tunnel is 30 months. The tunnel will be constructed from locations at two ends as well as two intermediate locations.

15. The line will have electric traction (25 kilovolt single phase AC system) powering trains formed with electric multiple units (EMU). Auto transformer power supply will be adopted. Six new traction transformer sub-stations will be set up and one existing substation at Hadawan will be upgraded. Each will receive power supply from two sources at 220 kilovolt. The traction substations will supply traction power at 27.5 kilovolt. Single phase transformers, with 100 percent standby will be adopted. Table A2.1 illustrates the estimated annual power consumption in 2020 and 2030.

<table>
<thead>
<tr>
<th>Table A2.1: Estimated Power and Annual Electricity Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual electricity consumption</td>
</tr>
<tr>
<td>(ten thousand kWh)</td>
</tr>
<tr>
<td>38,519</td>
</tr>
</tbody>
</table>

16. For the main line, the overhead contact wire will have fully compensated simple chain suspension with a cross section of 150 square millimeters. Catenary wire will have a cross section of 120 square millimeters. The contact wire will generally be placed at a height of 5.3 meters. A 10 kilovolt power distribution system will be set up at several locations along the new railway to supply power for services other than traction.

17. The line will use automatic signaling with centralized traffic control (CTC). CTCS-2 control system will be used for train operational and control. Variable frequency track circuits will be used for train detection. On board ATP signals are to be provided. At station computer based interlocking will be employed. The line’s power dispatch center as well as its CTC center will be located under the Beijing Passenger Special Line system.
18. The communication systems of this project will include a telephone exchange network, a dispatching communication system for railways, data communication network, video conference network, and an emergency communication system. A 24-core optical fiber cable will be laid in ducts on both sides of the railway and an optical fiber monitoring system will be set up. Existing railway telephone switching network will be used and where necessary its capacity expanded. For mobile communication 900 Hz GSM-R digital system will be employed. The whole railway will be equipped with an integrated video monitoring system that is integrated with Beijing video monitoring center. Real time monitoring of important facilities such as stations, communication equipment rooms, traction power supply units, cross railway overpasses, tunnels portals etc. shall be carried out.

19. The information system will include a ticketing system, a passenger service information system, an office automation system, a public security management system, a railway construction project management information system, an automatic fire alarm system, an electromechanical equipment monitor system, and a comprehensive maintenance and management information system.

20. Four comprehensive maintenance bases are being established at Beijing, Shanghai, Wuhan and Guangzhou to undertake the management, inspection and maintenance of equipment, electrical operation, communication and signaling equipment of the entire PDL network. The Beijing comprehensive maintenance base will be responsible for maintaining the infrastructure of the JiTuHun line. Integrated maintenance units at West Jiaohe City, Dunhua and West Tumen City stations will carry out routine maintenance of JiTuHun line.

21. The design of the railway includes consideration of energy saving. Energy conservation will be achieved through several measures, including as straight and short as possible an alignment, large curve radii, a high efficiency auto transformer power supply system, use of reactive auto capacitance compensator at traction sub-stations, a compact design of stations, placement of power distribution substations close to load centers, efficient water supply and water heating systems including insulation of water pipes, the use of natural light in building construction, efficient window insulation, use of large-scale integrated circuits for communication equipment and the use of high efficiency energy saving products for the signaling system. The EMU train sets will use AC traction motors and adopt microprocessor control technology to maximize energy efficiency.

22. Particular attention has been paid to incorporate safety systems in the overall design. A real time safety monitoring system will be set up in the train dispatch center. This system covers monitoring of weather conditions including wind speed, rain fall and snow depth and the presence of foreign matter on the track. It will also have the capacity to monitor seismic activity and fire. An automatic train protection signaling system will be adopted as it offers a high degree of safety by automatically regulating the train’s speed to safe levels. Other safety systems include the use of hot box detectors and radio communication systems on trains.

23. The total construction period is estimated as just over four years. Project construction is planned to begin in late 2011 and the line is planned to be completed in December 2015. Commissioning and opening of the line is planned by the end of 2015. As of early March 2011 (appraisal), the JiTuHun Railway Company had not yet received approval to begin physical
works and as such resettlement and construction had not yet begun. However preparation of bidding documents for Bank-financed procurement, preparation for land acquisition and resettlement, a small amount of land acquisition (approximately 1.2 ha or 18 mu and approximately 0.1% of the total planned land acquisition), and procurement of civil works contractors had begun. As confirmed by the Bank’s task team at appraisal, early project activities including advance contracting have been undertaken in accordance with the project documents and relevant Bank policies and procedures.
Annex 3: Implementation Arrangements

CHINA: JITUHUN Railway Project

Project Institutional and Implementation Arrangements

Project Administration Mechanisms

1. This project follows the implementation arrangement model that has already been successfully used for the ShiZheng, NanGuang and GuiGuang railway projects.

2. As with past Bank financed railway projects, the Ministry of Railways (MOR) through its Foreign Capital and Technical Import Center (FCTIC) will be responsible for: (i) overseeing the project implementation including monitoring, reporting, and compliance with safeguards; (ii) financial management of the World Bank loan, including disbursement and reporting; and (iii) all Bank financed procurement with the support of an independent procurement company. FCTIC will provide implementation progress reports every half year. The Bank will also supervise this project closely through half yearly supervision missions.

3. The Ministry of Railways has formed a Preparatory Group (PG) for the JiTuHun Passenger Dedicated Railway Line Company, staffed primarily by the Ministry of Railways’ regional Shenyang Railway Bureau. The Preparatory Group, led by the Shenyang Railway Bureau, is tasked with the day to day responsibility for the railway line construction. This includes the procurement, management and supervision of all contracts for non-Bank funded civil works, installation of goods and equipment funded by the Bank loan through contractors, coordination with the Jilin provincial government and local government entities responsible for resettlement and land acquisition and transfer of funds to that end to local authorities, monitoring of project progress, as well as reporting to the Ministry of Railways on physical progress, safeguards and financial management.

4. The Preparatory Group will manage the procurement of non-Bank funded contracts using the well-defined standards and procedures established by the Ministry of Railways for the construction of such railway lines. Goods procured by FCTIC will be delivered to the Preparatory Group and its contractors for installation. For reporting, FCTIC will draw on inputs from the Preparatory Group.

5. A project company, the JiTuHun Passenger Dedicated Railway Line Company, “JiTuhun Railway Company”, is expected to be formed for the construction and management of the line as a successor to the Preparatory Group. The controlling share of the company will be held through an investment arm by the Ministry of Railways. The other major shareholder is expected to be the Province of Jilin through a provincial investment body. The percentage of shares will be provisionally defined based on the project cost estimates for construction and land acquisition contributed by the Ministry of Railways and the Province respectively, and will be adjusted based on actual equity contributions.

6. The establishment of such special purpose entities is common in the railway sector, where the Ministry of Railways oversees over 120 similar companies. Those companies follow well-established directives from the Ministry, which regulate the construction and management
of such lines. As per previous projects, some of the specific features of this joint venture are yet to be decided, including who will own the rolling stock, how it will be operated and how the interfaces will be managed. Once the JiTuHun Railway Company (JRC) is formed, it is expected that, as in the past, staff from the Preparatory Group will be transferred to the new company, occupying similar roles and functions. The JRC will then take over all the Preparatory Group’s responsibilities. Because of this, all references in the Bank’s project-related documents to the Preparatory Group will become references to JRC upon its establishment.

7. The Preparatory Group will monitor the implementation of safeguards with the support of independent environment and resettlement and land acquisition monitoring consultants. Land acquisition, resettlement and construction may commence shortly after appraisal. The Bank’s task team will carry out supervision activities together with FCTIC to ensure that implementation proceeds in accordance with agreements reached during project preparation.

8. As per other railway projects supported by the Bank, the Ministry of Railways will continue to carry the legal responsibility for implementation, as the main shareholder in JRC, and provide additional support to JRC whenever needed. There is little risk to implementation even if construction starts before the specific company details are settled. When the project company is formed, the Bank will confirm that the project company meets, at a minimum, the capacity of the Preparatory Group currently in place.

9. **Reporting.** The Ministry of Railways will monitor and evaluate the progress of the project on a six-monthly basis. The Ministry, through FCTIC, will prepare by February 15 and August 15 of each year (starting with the first full semester after the signing of the Loan and until completion of the project), a project progress report of the preceding six month period (January through June and July through December), reporting on the overall project progress, on any significant changes or challenges, and on performance indicators. The report will include as annexes the progress report for the Ministry of Railways prepared by the Preparatory Group, the environmental report and the resettlement report.

**Financial Management, Disbursements and Procurement**

**Financial Management**

10. The FM capacity assessment identified the following principal risk: the project financial staff in the Preparatory Group are assigned from Shenyang Railway Bureau, which has not managed a Bank financed project before.

11. Mitigation measures agreed include: a) Bank loan proceeds will be exclusively managed by FCTIC who is familiar with Bank’s operation; b) a Financial Management Manual for all Bank financed railway projects has been developed to standardize the FM and disbursement procedures c) some training will be provided to the project financial staff in the Preparatory Group to furnish them necessary knowledge in managing Bank financed operations.

12. The overall pre-mitigation FM risk has been assessed as “Moderate” and post-mitigation has been assessed as “Low”.
13. **Budgeting.** Counterpart funding represents the vast majority of project funding (over 95 percent). It consists of shareholders’ contributions and domestic loans. Shareholders’ contributions include funds from the Ministry of Railways as well as funds and land from the Shenyang provincial government. The shareholders’ contributions will be reflected as equity contributions in the JiTuHun Railway Company upon its establishment. Domestic loans will be mobilized by the Finance Department of the Ministry of Railways. In accordance with the project implementation plan and construction progress, the Preparatory Group will prepare an annual investment budget. This budget will be reviewed and approved by the Ministry of Railways’ Finance Department and FCTIC. Based on the approved budget, the Preparatory Group and upon its incorporation the JiTuHun Railway Company will receive government appropriations and domestic loans mobilized by the Ministry of Railways. For budget variances arising during execution, necessary authorization and close monitoring should be by the company. Timely and accurate information on variances should be used as the basis for mid-term adjustments.

14. **Flow of Funds.** The Bank loan proceeds will flow from the Bank into a project designated account to be set up at and managed by FCTIC. The loan proceeds will either be disbursed from the Bank to contractors directly based on withdrawal applications, or through the designated account managed by FCTIC.

15. **Accounting and Financial Reporting.** The administration, accounting and reporting of the project will be set up in accordance with Circular #13: “Accounting Regulations for World Bank Financed Projects,” issued in January 2000 by the Ministry of Finance. The standard set of project financial statements has been agreed between the Bank and the Ministry of Finance.

16. Both FCTIC and the Preparatory Group will be managing, monitoring and maintaining respective project accounting records and retaining original supporting documents. The Preparatory Group will prepare the project financial statements on its implemented project activities, which will then be used by FCTIC for preparing consolidated project financial statements (following the format in accordance with the aforementioned Circular #13 agreed with the Ministry of Finance) for annual reporting. As part of the progress report, no later than 45 days following each semester (the due dates will be August 15th and February 15th), the FCTIC will report the usage of loan proceeds in the form and substance satisfactory to the Bank.

17. **Internal Control.** The policy, procedures and regulations applicable to the accounting of the project have already been issued and are in use by the Ministry of Finance and Ministry of Railways. In addition, a financial management manual used for all Bank financed railway projects will be distributed to all project financial staff to enable alignment with the Bank’s financial management and disbursement requirements. The Ministry of Railways has its own internal inspection division. This division will operate as the internal auditor for this project and will conduct compliance and transaction-oriented examinations on a regular basis. A Bank financial management specialist will review these project examination reports.

18. **Audit.** The Audit Service Center for Foreign Loan and Assistance Projects (ASC) of the China National Audit Office (CNAO) will be the auditors for the project. One consolidated annual audit report, encompassing all project related activities, will be issued in the name of ASC and will be due to the Bank within 6 months after the end of each calendar year.
Disbursements

19. **Disbursement Arrangements.** Four disbursement methods will be available for the project: advance, reimbursement, direct payment and special commitment. Supporting documents required for the different disbursement methods will be documented in the Disbursement Letter issued by the Bank. A designated account denominated in US dollar will be opened at a commercial bank acceptable to the Bank and will be managed by FCTIC.

20. The Bank loan would be disbursed against eligible expenditures (including taxes) as in the following table.

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount of the Loan Allocated (in US$ million)</th>
<th>Percentage of Expenditures to be Financed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Goods and Consulting Services</td>
<td>199.5</td>
<td>100%</td>
</tr>
<tr>
<td>2. Front-end Fee</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200.00</strong></td>
<td></td>
</tr>
</tbody>
</table>

Procurement

21. The overall project risk for procurement is assessed as moderate.

22. The key issue and risk concerning procurement for implementation of the project is the possible influence of domestic procurement practice. In view of these risks, the following actions will take place during implementation: (i) provision of training to FCTIC on procurement procedures of Bank financed projects; (ii) where necessary, early procurement reviews by the Bank’s procurement specialist; and (iii) annual field procurement supervision visits to review procurement actions where needed.

23. Procurement for the proposed project would be carried out in accordance with the World Bank’s "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011 and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated January 2011, and the provisions stipulated in the legal agreements. The various items under different expenditure categories are described in general below. For each contract to be financed by the Loan, the different procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame will be agreed between the Borrower and the Bank in the Procurement Plan during appraisal. The Procurement Plan will be updated annually or as required to reflect the actual project implementation needs and improvement in institutional capacity.

24. Only two types of procurement are foreseen:

- **Procurement of Goods.** Goods procured under this project will include: goods for the communication, signaling, and electrification system, operation and maintenance equipment, and rails, beams, bearings, and other materials required for the proposed JiTuHun Railway Project. The procurement will be undertaken using the Bank’s
Sample Bidding Documents for all International Competitive Bidding (ICB) and the Chinese Model Bidding Documents, agreed with or satisfactory to the Bank, for all National Competitive Bidding.

- **Selection of Consultants.** Consultant services provided by firms and individuals for the project will be identified during implementation. Short lists of consultants for services estimated to cost less than US$300,000 or equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Bank’s Consultant Guidelines. Select consultant services may be carried out by universities and government research institutions.

25. **Procurement Plan.** FCTIC has developed a Procurement Plan for project implementation, which provides the basis for the procurement methods. This plan was agreed between the Borrower and the Project Team at appraisal and is available at FCTIC’s office. It will also be available in the project’s database and on the Bank’s external website. The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

**Table A3.3: Details of the Thresholds for Procurement Methods and Prior Review**

### Thresholds for Procurement Methods

<table>
<thead>
<tr>
<th>Description</th>
<th>Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goods</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;=US$500,000 NCB</td>
</tr>
<tr>
<td></td>
<td>&lt;=US$100,000 Shopping</td>
</tr>
<tr>
<td><strong>Consultant Services</strong></td>
<td>&lt;=US$200,000 CQS</td>
</tr>
</tbody>
</table>

### Thresholds for Prior Review

<table>
<thead>
<tr>
<th>Description</th>
<th>Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goods</strong></td>
<td>All ICB</td>
</tr>
<tr>
<td></td>
<td>NCB &gt;=US$500,000 Prior Review</td>
</tr>
<tr>
<td></td>
<td>The first NCB contract irrespective of contract sum Prior Review</td>
</tr>
<tr>
<td><strong>Consultant Services</strong></td>
<td>Consultant firm selection &gt;=US$300,000 Prior Review</td>
</tr>
<tr>
<td></td>
<td>All SSS contracts (either firm or individual) Prior Review</td>
</tr>
<tr>
<td></td>
<td>All individual consultant selection &gt;=US$50,000 Prior Review</td>
</tr>
</tbody>
</table>

NCB=National Competitive Bidding; CQS= Consultants’ Qualifications; SSS=Single Source Selection.
Environmental and Social

26. **Environmental Impacts.** There will be environmental impacts due to the project, especially during construction. The impact mitigation approach employs three primary principles, namely, avoidance, sound engineering and comprehensive mitigation plans. An alternative analysis methodology was used to avoid sensitive areas to the maximum extent possible, including natural reserves, forest parks, cultural relics and water resources protection areas. The remaining adverse impacts after avoidance are assessed in the Environmental Impact Assessment and measures to mitigate and minimize these impacts are included in the Environmental Management Plan. Remaining adverse impacts related to: (i) crossing sensitive sites such as nature reserves, cultural resources, and water resource protection areas; (ii) the use of excavated earth (approximately 3 billion m³); (iii) the construction activities such as blasting, building access roads, and earth works in sensitive areas; (iv) construction-related nuisance such as noise, dust, and soil erosion; and (v) noise, safety and community connectivity during operation are considered manageable.

27. There are a number of environmentally sensitive sites identified in the vicinity of the project corridor during EA preparation, including nine nature reserves, scenic areas and forest parks, three cultural relic sites and five water resource protection areas. Alternatives have been studied and carefully selected to avoid 10 of these sensitive sites. Specific measures have been adopted when the railway will pass through sensitive sites:

- One section of the alignment will pass through the Songhuajiang Three-lake Nature Reserve close to the edge of the reserve but 15 km from the core three lakes area. Along this section, there are mainly farmlands and planted and secondary forests, and active human development including an existing railway, national road G302 and provincial and county roads. There is no endemic or protected wildlife natural habitat within this section.
- The alignment within Antu Mingyue Pine-mushroom Reserve goes along the Buerhadong River Valley, where the existing Chang-Tu railway, national road G302, provincial and county roads and Antu City are also located. The alignment area is mainly farmland and residential built-up area, over 5-10 km from the protected red-pine forests.
- The alignment will cross the river via the planned Mijiang Extra-long Bridge within the Mijiang Salmon Resource Protected Area (an important salmon migratory channel). In order to minimize construction within the river, the bridge will utilize specially designed 48 m spans instead of the typical 32 m spans. In addition, there will be no construction during the salmon migratory season.
- Within the Jinlin City Water Source Protection Area, the alignment will cross the Songhuajiang River (classified as a Class II protection zone) adjacent to an existing railway bridge, about 2km downstream from the water intake.
- Within the Jiaohe City Water Source Protection Area, the alignment goes through the semi-protected terrestrial area (outside of the buffer zone), and five km away from the water source.
- Within the Longtanshan relic site and Maorshan Cemetery, the alignment will traverse through the outer buffer-zone (Construction Control Zone) mainly via tunnel and long
bridges, far away from the core protected zones. The alignment will not affect any known cultural relics and chance-find procedures have been included in the EMP.

28. During the preparation of the environmental assessment, special attention was paid to understanding the impact on tiger habitat. Initial data collection, surveys, and consultation with relevant authorities indicated that several areas in northeast China have the potential to be tiger habitats and, in some cases, designated as priority protected areas. Further field investigation and literature research (Technical Report on the Identification of Potential Tiger Habitat in the Changbaishan Ecosystem, Northeast China 12, January 2010, a joint research by WWF, WCS, Northeast Normal University, KORA and the University of Montana) concluded that: (i) the railway alignment is within a well developed transportation corridor with an existing railway, an expressway, and local roads; (ii) the delineated areas of tiger presence identified in the late 1990s survey are far from the proposed alignment; (iii) given the intensive existing transport infrastructure, human activity and farming as the dominant use of land, the current transport corridor has a near zero possibility of being potential tiger habitat, as supported by three model simulations in the WWF report; and (iv) the project will cause no further fragmentation of potential tiger habitats as there habitats are all already fragmented by transportation corridor which the project will share.

29. In summary, the project impact on sensitive sites has been avoided, minimized and otherwise mitigated through analysis, consultation with relevant authorities, project design, and development of environmental mitigation measures.

30. **Social Impacts.** Given that Yanbian is an autonomous Korean prefecture, indigenous people related measures are integrated directly into design and implementation of engineering work and resettlement in this region. This is described in the social assessment. Two villages outside the Yanbian Korean Autonomous prefecture and located 3.8 km and 4.8 km from the alignment were also found to contain indigenous significant populations of Korean people, and an indigenous peoples plan was prepared for them. The Indigenous Peoples Plan report records the broad support from these groups.

31. A resettlement plan with a resettlement plan framework was prepared. The covers resettlement related activities which are not explicitly defined at preparation stage such as camp sites and access roads.

32. This project will benefit and impact 2 cities/prefectures, 10 counties/cities/districts, 30 townships (towns) and 106 villages/communities (100 administrative villages and 6 communities) of Jilin Province. Approximately 17,000 mu of land (approximately 47 mu per km) will be permanently acquired of which 98% is rural collective land. In addition, about 800 ha (about 12,000 mu) of land is to be temporarily acquired. Approximately 638 thousand m2 buildings (1,747 m2 per km) are expected to be demolished of which 39% is rural housing, 49% is urban housing, and the remainder is enterprises combined with residential, enterprises, and schools. This project does not involve demolition of illegal structures.

33. The project is estimated to affect approximately 19,588 persons, 45% in rural areas, 48% in urban areas and 7% from enterprises and a school. Approximately 12,913 people (33% rural, 67% urban) from 4,221 households (24% rural, 76% urban) will be resettled. The total rural affected consists of 9,475 people from 2,644 households including 4,252 people from 1,029 households to be resettled. The total urban affected consists of 8,661 people from 3,192 households who will be resettled. In addition, the project will affect 1,167 people from 35 factories, mines, and enterprises; 220 people from one school; and 65 persons from 30 single family businesses.

**Key Measures Taken by the Borrower to Address Safeguards Issues**

34. The Ministry of Railways has prepared an Environmental Impact Assessment, an Environmental Management Plan, a Resettlement Action Plan, and an Indigenous People Plan for the project in accordance with the Bank’s safeguard policies.

35. **Environmental Assessment.** Extensive assessment has been conducted for all the potential impacts, based on which a set of mitigation measures have been developed in the project design and EMP. In summary, MOR implemented a three-fold approach to minimize environmental and social impacts. These are:

- **Avoidance.** Alternative analysis has been carefully conducted to avoid the environmental and social sensitive areas to the extent possible, as one of the most important mitigation measures to minimize potential adverse environmental and social impact. The selected alignment led to reduced house and structure demolition, especially in urban areas, and has avoided a number of sensitive sites including nature reserves and cultural heritage sites.

- **Sound Engineering.** The project has been designed with state-of-the art engineering. Bridge-tunnel-bridge schemes are adopted for more than 66% of the whole alignment (about 24% for large and medium bridges and 42% for tunnels) will minimize land acquisition and ecological footprint.

- **Comprehensive Mitigation Plans.** Detailed environmental design plans (green corridors and landscaping), environmental management plans, resettlement action plans have been prepared in order to minimize and/or compensate unavoidable impacts from the project.

36. **Environmental Management Plan and Implementation Arrangement.** A stand-alone Environmental Management Plan (EMP) has been developed based on the findings of the EIA report. The EMP detailed the environmental management and supervision organizations and responsibilities, mitigation measures, capacity training plan, monitoring plan, and budget estimates of EMP implementation.

37. EMP implementation will be managed by MOR through the Preparatory Group for the to-be established JRC, which is responsible for overall environmental management during project construction. Environmental management responsibility will be built into the project management structure within Preparation Group, with dedicated environmental management staff. The contractors and supervision engineers will need to assign qualified environmental staff to their team to ensure effective implementation of the EMP. Environmental mitigation measures
developed in EMP will be fully incorporated into the bidding documents and contracts of Contractors. Environmental supervision responsibility will be included in contracts with Project Supervision Firms as an integral part of project supervision.

38. The Project Preparatory Group will recruit an independent environmental consultant to conduct independent monitoring on performance of both the contractors and the supervision engineer firms in terms of EMP implementation. It will also provide environmental training to the contractors, environmental supervision engineers and the Preparation Group staff prior to and during construction, and assist the Preparation Group/MOR to prepare semi-annual environmental reports to the Bank.

39. Resettlement. Land compensation rates stipulated in the resettlement action plan are in accordance with the land compensation regulations in effect at the time of appraisal. Rural houses will be compensated according to replacement cost while urban structures will be paid based on professional evaluation in reference with market price. Households will also obtain resettlement allowance and relocation subsides. Compensation for enterprises and shops will base on professional evaluation including economic loss due to the relocation. School compensation will base the budget of the new school design. A restoration plan will stipulate infrastructure compensation in consultation with the affected villages and communities.

40. Rural houses will be restored near the original villages with residential land and public facilities provided by villages. Two new resettlement sites will be provided for 73 relocated households while other households may chose where to be relocated. Urban households may choose to either accept compensation or be provided a house.

41. There are two villages losing more than 10 percent of their total land for which the RAP tabulated has detailed resettlement strategies. For the other villages, the main restoration measures rely on cash compensation in combination with other assistance measures like land readjustment within village group and employment training. Enterprises, shops and school can be restored with the replacement cost.

42. Extensive consultation meetings at the provincial, county, township and village level were conducted, and questionnaires along the line were implemented during the RAP preparation. Project realignment, station location, and resettlement arrangements were planned and designed to reflect the results from the consultation. A grievance procedure from village to central government was designed as part of the RAP. The RAP also covered arrangements on resettlement institution, capacity building, monitoring and reporting.

43. Resettlement will be financed by the provincial government, and the resettlement cost will be reflected as equity and shares in the project company. Local governments will implement resettlement activities.

44. Indigenous Peoples. Given than Yanbian is an autonomous Korean prefecture, indigenous people related measures are integrated directly into design and implementation of the project including resettlement as described in the social assessment. Two villages outside the Yanbian Korean Autonomous prefecture were also found to contain indigenous significant populations of Korean people, and an indigenous peoples plan was prepared for them. The
Indigenous Peoples Plan records the broad support from these groups. The Indigenous Peoples Plan records the broad support from the two village and main measures covering: i) water facilities construction, ii) special assistance to the aged persons in the villages via multi channels fund from the county agencies, iii) promote the development of cultural and tourism resources to increase income, iv) conduct more employee training in the villages.

45. **Grievance handling.** Prior to the project appraisal, contact information for the grievance channel will be disclosed, including contact agencies/persons, telephone numbers. The RAP indicates that any grievance should be rapidly handled through the PG resettlement management system, external monitor, local government system, or even court system.

46. **Consultation.** During the RAP and IPP preparation, public consultations were conducted in accordance with the Bank’s OP4.12 and OP 4.10 respectively. These were supplemented by a combination of opinion surveys and public meetings in the townships, village committee and affected villagers’ homes. Stakeholders such as local authorities, civil society, and the affected population were consulted through TV, newspaper, meetings, and focus groups on land acquisition matters. Local governments were consulted on the alignment and location of stations. All the affected villages are informed, investigated and consulted. The Project obtained particularly broad support from the two Korean people villages. Specific public concerns have been incorporated into project design and the resettlement action plan.

47. **Disclosure.** The EA Summary, EMP, RAP, and IPP have been disclosed in accordance with the Bank’s policy. Information disclosure of EA preparation has been carried out by posting posters and bulletins in townships and villages, local newspapers (Yanbian Daily, Jiangcheng Daily, Jinlin Daily Newspaper) and through the internet (www.rails.com.cn). The draft EIA document was disclosed in local environmental protection bureaus, railway administrative offices, and on internet (www.cec-cn.com.cn) on February 11, 2011, which is accessible to general public. Information disclosure on project land acquisition and resettlement was distributed in the affected villages and communities during the resettlement impact investigation and planning process. The EA Summary and EMP were disclosed on Infoshop on March 7, 2011. The RAP and IPP were disclosed to Infoshop on March 16, 2011.

**Monitoring & Evaluation**

48. The Ministry of Railways collects sufficient data to allow satisfactory monitoring and reporting of the outcomes and results of the project as part of its regular operations. FCTIC will compile data and include them in the semi-annual progress reports. The Preparatory Group will be tasked to collect relevant data to enable monitoring of these indicators. The cost of data collection, monitoring and evaluation will be covered by the administrative budget of the Ministry of Railways and the Preparatory Group. No additional budget is required.

49. Since this is a new line, it is anticipated that most outcomes and results will only be measureable after the completion and commissioning of the project. During project implementation, progress monitoring will focus on intermediate result indicators which capture physical progress in the implementation of the project and impact of the program on employment.
Annex 4: Operational Risk Assessment Framework (ORAF)  
CHINA: JITUHUN Railway Project

Project Development Objective(s)

The development objective of the proposed project is to respond to existing and anticipated transport demand along the Jilin-Hunchun corridor by providing increased capacity for freight and passengers, and faster travel time and increased frequency of services for passengers.

PDO Level Results

<table>
<thead>
<tr>
<th>Indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of train pairs operating per day on the JiTuHun line¹³</td>
</tr>
<tr>
<td>2. Number of passengers travelling on the JiTuHun line¹⁴</td>
</tr>
<tr>
<td>3. Reduced transit time for passengers travelling between Tumen and Jilin</td>
</tr>
</tbody>
</table>

Risk Category | Risk Rating | Risk Description                                                                                     | Proposed Mitigation Measure                                                                                                                                                                                                 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Stakeholder Risks</td>
<td>L</td>
<td>The project entails involuntary resettlement, which could lead to disruptions or delays in implementation.</td>
<td>The review of options for the new rail line layout will seek in particular to minimize the volume of resettlement needed. A Resettlement Action Plan, compliant with OP 4.12, will be prepared and disclosed. This plan will include detailed internal and external (independent) monitoring arrangements supporting its implementation. Training will be provided to the Preparation Group (PG) and local government to strengthen their implementation capacity.</td>
</tr>
<tr>
<td>Implementing Agency Risks</td>
<td>MI</td>
<td>The newly established Preparation Group (PG) fails to execute appropriately the construction of the line.</td>
<td>The experienced FCTIC will implement all Bank funded procurement and manage loan proceeds. The PG will consist of experienced railway staff. The PG will be further expanded to form a project company, as per the practice in China for such new railway lines. Overall project implementation will remain under MOR’s overall responsibility.</td>
</tr>
</tbody>
</table>

¹³ This is defined to be all express (or high speed) trains passing through a ‘screenline’ on the track between Jilin and the first station of the new line (JiaoHe). This will include all trains operating on the new high speed line when it is opened.

¹⁴ This is defined to be all passengers passing through a ‘screenline’ on the track between Jilin and the first station of the new line (JiaoHe). This will capture the majority of the trips on the new line – which are expected to travel at least as far as Jilin/Changchun.
### Project Risks

| • Design | MI | The low temperature environment may create safety risk during the operation of high speed trains. | MOR paid special attention to the potential engineering problems that are likely to arise during construction and maintenance of track and operation of EMU trains in low temperature environment. The Design Institute has developed engineering solutions to the potential problems due to low ambient temperature, including ballast-less tracks. The Harbin-Qiqihaer and Harbin-Beijing railway will be constructed ahead of this project and therefore the experience gained in the earlier projects, including the construction of the Tibetan railways, will benefit the current Project. |
| • Social & Environmental | MI | **Social:** The RAP is not adequately implemented, possibly because of: (i) poor cooperation among FCTIC, the PG and local governments; (ii) low RAP implementation capacity by the province; or (iii) resettlement fund shortage due to late availability of counterpart fund from the local governments. The SA has identified adverse impacts on the indigenous peoples and developed some measures in the Social Assessment and IPP report to address the impacts.  
**Environment:** The major risks of the proposed project includes the adverse impact on the nature reserves in terms of loss of vegetation, potential damage or loss of habitats and migratory channel, and potential damage of cultural resources. Other negative impacts include land acquisition, loss of surface vegetation, soil erosion, soil material disposal, noise and dust nuisance and social  
**Social:** The establishment of the PG and later JRC, as a joint venture between MOR and the project province, provides an incentive to reduce resettlement and land acquisition impact. The PG provides a vehicle to establish sound cooperation between MOR and the local governments, to secure financing and to make the local governments accountable, as shareholders of JRC. In addition the PG and the local governments will receive training and resettlement implementation will be strengthened through independent monitoring. The Social Assessment and IPP Report have addressed the IP impacts with some measures. The report will be conducted in the project implementation stage.  
**Environment:** The preparation of the project entailed the completion of adequate EA, EMP and RAP. Three primary measures have been undertaken by MOR to mitigate the environmental risk during preparation:  
(1) **Avoidance:** Diligent use of alternative analysis to avoid environmentally and socially sensitive areas to the extent possible.  
(2) **Sound Engineering:** Extensive use of bridges and tunnels to avoid or greatly limit the impact on sensitive environmental locations and fertile agricultural land.  
(3) Comprehensive **Environmental Management Plan** has been |
disturbance during construction, and noise, vibration and community severance during operation.

developed which details the environmental management and supervision organizations and responsibilities, mitigation measures, capacity training plan, monitoring plan, and budget estimates of mitigation measures. EMP measures will be incorporated into bidding documents and contracts to ensure effective implementation.

- **Program & Donor** | N/A
- **Delivery Quality** | L
  | Half of the project will be funded through debt, creating a financial sustainability risk.
  | The level of debt required, while substantial in absolute terms, is a modest part of the overall investment program of MOR and of its current assets. The construction of new line forms part of a coherent high level network development program.
- **Demand Risk** | MI
  | A risk exists that actual traffic demand will be below traffic forecast on all projects. Part of the traffic forecast accounts in the feasibility study report is based on improved cooperation between North Korea and Russia.
  | The Bank task team has verified the Feasibility Study Report forecasts with an independent network model.

<table>
<thead>
<tr>
<th>Overall Risk Rating at Preparation</th>
<th>Overall Risk Rating During Implementation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>MI</td>
<td>The overall risk rating for preparation and implementation risks is MI.</td>
</tr>
</tbody>
</table>

Legend:
MI = Low likelihood, High Impact
L = Low likelihood, Low Impact
Annex 5: Implementation Support Plan

CHINA: JITUHUN Railway Project

Strategy and Approach for Implementation Support

1. The arrangements for this project are replicating the successful approach applied in the previous three railway projects. The strategy for implementation support has been developed based on the nature of the project and its risk profile and reflects the extensive experience of the Ministry of Railways (MOR) in implementing World Bank projects. The implementation support plan aims to make implementation support to the client more flexible and efficient and also focuses on the implementation of the risk mitigations measures designed in the Operational Risk Assessment Framework.

2. **Stakeholder risks.** The overall strategy entails active monitoring of resettlement by internal and external monitors, as well as capacity building support to the Preparatory Group (PG) and local governments to strengthen their implementation capacity in terms of World Bank requirements related to involuntary resettlement.

3. **Agency risks.** The Bank project team will support the Ministry of Railways and the newly established Preparatory Group on fiduciary and safeguard aspects, as follows:

   - **Procurement.** The project procurement arrangements replicate those of earlier successful projects and many other parallel projects led by the Ministry of Railways. Activities under the loan will be carried out by the Ministry’s Foreign Capital and Technical Import Center (FCTIC) assisted by a tendering company. The Bank team will continue to provide procurement training to FCTIC, procurement agent companies and the Preparatory Group, review and comment on procurement documents and monitor procurement progress against a detailed procurement plan.

   - **Financial Management.** Financial management training will be conducted before project implementation and a detailed project financial management manual has been developed and will be distributed to all project financial staff before project implementation. The unaudited semi-annual consolidated project financial statement will be submitted to the Bank for review and comment. An annual audit report will be due to the Bank by June 30 each year during implementation.

   - **Environmental and Social Safeguards.** The Bank team will monitor the implementation of the agreed Environmental Management Plan (EMP) and Resettlement Action Plan (RAP) and provide guidance to the Preparatory Group and FCTIC to address any issues. The Preparatory Group will monitor the implementation of safeguards with the support of two monitoring consultants who will focus on environment and land acquisition respectively.

Implementation Support Plan

4. The project task manager and most team members are based in Beijing and, as such, can provide timely, efficient and effective implementation support to the client when necessary. The
remainder of the Bank technical team involved with the program will participate in visits to China at least three times per year, allowing easy access to their technical expertise as well. The core team will annually carry out formal supervisions and field visits.

5. Detailed contributions from the Bank team are outlined below:

- **Technical inputs.** Railway engineering inputs are required to review bid documents to ensure fair competition through proper technical specifications and fair assessment of the technical aspects of bids. During construction and commissioning, technical supervision is required to validate on a spot check basis the proper implementation of the contracts. The team railway specialist will conduct visits on an annual basis throughout project implementation.

- **Fiduciary requirements and inputs.** A Bank financial management and a procurement specialists will provide training prior the start of the loan implementation. Both specialists will be based in the country office to provide timely support. Formal supervision of financial management will be carried out once a year, while procurement supervision will be carried out on a timely basis as required by the client, but at least twice a year when procurement supported by the Bank loan is close to start.

- **Safeguards.** A Bank environment specialist and a social specialist will closely monitor the project implementation. The activities of the social specialist will be particularly intense in the first part of project implementation, with an emphasis on the implementation of the Resettlement Action Plan at the time most involuntary resettlement is expected to take place. Both specialists will provide training on environment and resettlement monitoring and reporting in accordance with the Environmental Management Plan and the Resettlement Action Plan. Field visits be carried out on a as needed basis. Both specialists are based at the country office.

- **Economist/financial specialist.** An economist and financial specialist will participate in regular reviews of the financial situation of the Ministry of Railways and in preparing a framework to analyze the broader agglomeration benefits stemming from the project. This will be combined with the supervision of other Bank projects.

- **Railway policy advisor.** A railway policy advisor will participate in railway missions about twice a year. The advisor will combine discussions on policy aspects and analytical and advisory activities (AAA) with brief reviews of project progress to inform the policy dialogue.

6. An overview of the focus and timing of Bank support is presented in Table A5.1.
<table>
<thead>
<tr>
<th>Time</th>
<th>Focus</th>
<th>Skills Needed</th>
<th>Resource Estimate (annually, in staff weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First twelve months</td>
<td>Technical review of documents</td>
<td>Railway specialist</td>
<td>2 SW</td>
</tr>
<tr>
<td></td>
<td>Procurement training/activities</td>
<td>Procurement specialist</td>
<td>2 SW</td>
</tr>
<tr>
<td></td>
<td>Financial management training and supervision</td>
<td>Financial management specialist</td>
<td>2 SW</td>
</tr>
<tr>
<td></td>
<td>Land acquisition</td>
<td>Social Specialist</td>
<td>4 SW</td>
</tr>
<tr>
<td></td>
<td>EMP implementation and training</td>
<td>Environmental specialist</td>
<td>3 SW</td>
</tr>
<tr>
<td></td>
<td>Team leadership</td>
<td>Task Manager</td>
<td>4 SW</td>
</tr>
<tr>
<td></td>
<td>Policy and economics</td>
<td>Economics/policy advisors</td>
<td>2 SW</td>
</tr>
<tr>
<td>12-48 months</td>
<td>Technical reviews of document</td>
<td>Railway specialist</td>
<td>2 SW</td>
</tr>
<tr>
<td></td>
<td>Procurement training/activities</td>
<td>Procurement specialist</td>
<td>2 SW</td>
</tr>
<tr>
<td></td>
<td>Financial management training and supervision</td>
<td>Financial management specialist</td>
<td>2 SW</td>
</tr>
<tr>
<td></td>
<td>Land Acquisition</td>
<td>Social Specialist</td>
<td>4 SW</td>
</tr>
<tr>
<td></td>
<td>EMP implementation and training</td>
<td>Environmental Specialist</td>
<td>3 SW</td>
</tr>
<tr>
<td></td>
<td>Team Leadership</td>
<td>Task Manager</td>
<td>4 SW</td>
</tr>
<tr>
<td></td>
<td>Team co Leadership</td>
<td>Deputy Task Manager</td>
<td>4 SW</td>
</tr>
<tr>
<td></td>
<td>Policy and economics</td>
<td>Economics/policy advisors</td>
<td>2 SW</td>
</tr>
</tbody>
</table>
Annex 6: Team Composition  
CHINA: JITUHUN Railway Project

Table A6.1 presents World Bank staff and consultants who worked on the project.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Scales</td>
<td>Task Manager</td>
<td>EASCS</td>
</tr>
<tr>
<td>Gerald Ollivier</td>
<td>Deputy Task Manager</td>
<td>EASCS</td>
</tr>
<tr>
<td>Jianjun Guo</td>
<td>Senior Procurement Specialist</td>
<td>EAPCO</td>
</tr>
<tr>
<td>Ning Yang</td>
<td>Environment Specialist</td>
<td>EASCS</td>
</tr>
<tr>
<td>Songling Yao</td>
<td>Social Development Specialist</td>
<td>EASCS</td>
</tr>
<tr>
<td>Yi Dong</td>
<td>Senior Financial Management Specialist</td>
<td>EAPFM</td>
</tr>
<tr>
<td>Kishor Uprety</td>
<td>Legal Counsel</td>
<td>LEGES</td>
</tr>
<tr>
<td>Robert O’Leary</td>
<td>Senior Finance Officer</td>
<td>CTRFC</td>
</tr>
<tr>
<td>Weiling Li</td>
<td>Program Assistant</td>
<td>EACCF</td>
</tr>
<tr>
<td>Maria Luisa Juico</td>
<td>Program Assistant</td>
<td>EASIN</td>
</tr>
<tr>
<td>Richard Bullock</td>
<td>Railway Economic &amp; Financial Evaluation Advisor</td>
<td>Consultant</td>
</tr>
<tr>
<td>Jit Sondhi</td>
<td>Railway Engineering and Management Advisor</td>
<td>Consultant</td>
</tr>
<tr>
<td>Paul Amos</td>
<td>Transport Policy Advisor/Railway Specialist</td>
<td>Consultant</td>
</tr>
<tr>
<td>Peishen Wang</td>
<td>Environment Specialist</td>
<td>Consultant</td>
</tr>
<tr>
<td>Andrew Salzberg</td>
<td>Transport Specialist</td>
<td>EASIN Consultant</td>
</tr>
<tr>
<td>Wang Wei</td>
<td>Junior Professional Associate (JPA)</td>
<td>EASIN</td>
</tr>
</tbody>
</table>
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