



Bankability Study of Angul – Sukinda Road New Line in East Coast Railway



March 2013



FEEDBACK INFRASTRUCTURE SERVICES PRIVATE LIMITED

Transportation division

15th floor, Tower 9B, DLF cyber city, Phase III, Gurgaon – 122 002, Haryana

Board: +91-124-4169100

Fax: +91-124-4316655

Table of Contents

1	PROJECT BACKGROUND.....	1
1.1	Scope Covered in the Report	1
1.2	Project Rationale	2
1.3	Project Line	3
2	TRAFFIC PATTERN.....	4
2.1	Traffic Drivers.....	4
2.2	Current Potential Rail Traffic from the existing Industries	6
2.3	Individual Traffic Streams	7
3	FUTURE PROJECTIONS	20
3.1	Growth Rates.....	20
3.2	Company Wise Present Traffic	20
3.3	Commodity-wise present Traffic	20
3.4	Future Traffic Projections.....	21
4	FINANCIAL ANALYSIS.....	22
4.1	Project Development Cost	22
4.2	Schedule of Construction	22
4.3	Funding.....	22
4.4	Project Revenue	23
4.5	Project O&M Cost	24
4.6	P&L and Cashflows	24
4.7	Key Indicators of Financial Analysis	25

List of Figures

Figure 1: Map of project section with its environs	3
Figure 2: Commodity Flow in Shyam DRI.....	8

List of Tables

Table 1: Traffic Streams for Shyam DRI Ltd.	8
Table 2: Divertible traffic on the project line for Shyam DRI Ltd.	9
Table 3: Traffic Streams for Bhushan Power & Steel Ltd.....	10
Table 4: Snapshot of Raw Material Movement for JSPL	11
Table 5: Traffic Streams for Jindal Steel & Power Ltd.....	11
Table 6: Divertible traffic on the project line for Jindal Steel & Power Ltd.	12
Table 7: Traffic Streams for Bhushan Steel & Strips Ltd.	13
Table 8: Divertible traffic on the project line for Bhushan Steel & Strips Ltd.	14
Table 9: Traffic Streams for VISA Steel Ltd.....	15
Table 10: Divertible traffic on the project line for VISA Steel Ltd.	16
Table 11: Traffic Streams for Aarti Steel Ltd.....	17
Table 12: Traffic Streams for Jindal Stainless Ltd.	17
Table 13: Divertible traffic on the project line for Jindal Stainless Ltd.	18
Table 14: Traffic Streams for Aryan Ispat & Power Ltd.	18
Table 15: Company wise Traffic Projection (Unit: Million Tonnes)	20
Table 16: Commodity wise traffic movement (Unit: Million Tonnes)	20
Table 17: Commodity Wise Rail Traffic Realistic Scenario (Unit: Million Tonnes).....	21
Table 18: Capital Cost provided by RVNL for Bankability Report	22
Table 19: Schedule of Construction	22
Table 20: Construction Phasing & Financing Schedule	23
Table 21: Gross Earnings for the Project.....	23
Table 22: Summary of O&M Cost.....	24
Table 23: Assumed Tax rates.....	25
Table 24: Key financial indicators	25

DISCLAIMER

The information in this Report has been prepared based on information collected from primary and secondary sources. Wherever information was not readily available, reasonable assumptions have been made, in good faith to draw meaningful inferences and these have been mentioned in the respective sections of the report. All such assumptions are subject to further corroboration based on availability of information. The information and analysis presented in this Report is not and does not purport to be comprehensive or to have been independently verified. This report has been prepared by Feedback Infrastructure Services Pvt. Ltd. for its client, Rail Vikas Nigam Limited (RVNL) for its use for furthering the project. No external agency shall use any part of this report without the prior permission from RVNL.

The information contained in this Report is selective and is subject to updating, expansion, revision and amendment. It does not, and does not purport to, contain all the information that may be required.

This Report includes certain statements, estimates, projections and forecasts. Such statements, estimates, projections, targets and forecasts are based on reasonable assumptions made by the management, officer and employees of Feedback Infrastructure Services Pvt. Ltd. Assumptions and the base information on which they are made may or may not prove to be correct. No representation or warranty is given as to the reasonableness of forecasts or the assumptions on which they may be based and nothing in this Report is, or should be relied on as, a promise, representation or warranty.

1 PROJECT BACKGROUND

The Government of India launched the National Rail Vikas Yojana (NRVY) in December 2002 with the objective of achieving a significant improvement in transport capacity on the congested golden quadrilateral and diagonals and port connectivity with a view to significantly upgrade the country's rail infrastructure.

In order to achieve the above stated objectives, RVNL creates specific SPV's for implementation of these projects.

A SPV (Angul Sukinda Rail Line) has been incorporated for developing, financing, construction, operation and maintenance of 102 Km rail line between Angul and Budhapank rail station. Proposed rail line will connect chromate rich Sukinda region to Talcher coal fields and will serve as linkage to Banspani-Duburi rail line.

1.1 Scope Covered in the Report

1.1.1 Traffic Estimates

1. Commodity-wise freight and passenger transport demand estimation for twenty five (25) years from the year of starting of operation, in five year intervals, based on alternate growth scenarios bringing out the OD Matrix of freight movement connecting the originating points to consumption centers or production units.
2. The 'base year' traffic over which projections are to be made for the first year of operation of the project will be 2011-12.
3. Study and analysis of current rail borne traffic pattern and volume in both freight and passenger segments of Angul to Sukinda Road New Line in East Coast Railway.

1.1.2 Line Planning and traffic allocation

1. Mapping the production and consumption centers along the project line and feeder routes and extant transportation plans of these production centers and allocate traffic projection on various routes.
2. Assess, in view of the traffic growth in the above time horizon, whether additional capacity works will be needed and in what stretches.

1.1.3 Financial Appraisal

Calculation of project revenue is to be based on principles of Inter Railway Financial Adjustment being followed in Railways. O&M cost also to be worked out under "fixed" and "variable" heads as followed in Railway. Detailed financial evaluation of the project is done to evaluate the implementation of the project through PPP mode.

Followings are the detail work which will be taken:

1. Prepare detailed financial projections, involving estimation of overall project cost (based on cost to be provided by RVNL), detailed estimation of revenue and operations and maintenance costs and estimation of the resources to be mobilized.

2. Evaluate the Financial Internal Rate of Return, DSCR for carrying out the Bankability there of.
3. Evaluate Sensitivity Analysis for upto increase in cost project by 0% to 50% and revenue by +/-20%;
4. Examine various options for project funding in terms of debt & equity and suggest an appropriate Debt Equity Ratio thereof in the financial model; PAT, Balance sheet, etc.
5. Sensitivity Analysis thereof
6. Evaluate Landed Cost of the Project.

1.2 Project Rationale

Odisha has a huge mineral reserve and owing its mineral importance it is attracting major industrial investment in the state. Although Odisha has fairly good rail network but rail connectivity among different mines and ore reserve is limited which is impeding its industrial and economical growth.

Odisha government has signed various MoUs with leading companies for industrial setup (majority of plants are operational in Angul, Sukinda and Lapanga) in the state. Present route (via Dhenkanal) that connects Sukinda and Talchar coal field congested as well as longer than the proposed route. In anticipation of industrialization, the government is keen on getting the Angul to Sukinda rail line implemented in a time bound manner..

Proposed rail line provides a shorter (102 km) connectivity and would facilitate faster goods movement. This line will be connected to Banspani-Dubri line, which is currently being used by steel plants in Sukinda for inbound iron ore movement from Banspani and Barbil region. Major beneficiary of the this proposed line would be steel plants in Angul region (transporting iron ore from Banspani and Chromate from Sukinda), coal based thermal power plant in Sukinda (transporting thermal coal from Talchar coal fields, presently most of the power plant are captive) and steel & power plants in Lapanga and Rengali area (transporting iron ore from Banspani and coal from Talcher).

This rail may also facilitate the transportation of iron ore, coal, bauxite from nearby quarries to the upcoming industries in Jharsugoda Industrial Cluster and to nearby Thermal Power Plants.

The project is being implemented in SPV mode with equity partnership of Rail Vikas Nigam Limited, Govt. of Odisha, Jindal Steel & Power Ltd and Bhushan Steel & Power Ltd.

1.3 Project Line

The project new line starts at Budhapank Station near Angul and terminates at Baguapal Station near Sukinda with nine stations in between. The new line traverses through the districts of Angul, Dhenkanal and Jajpur in the state of Odisha.

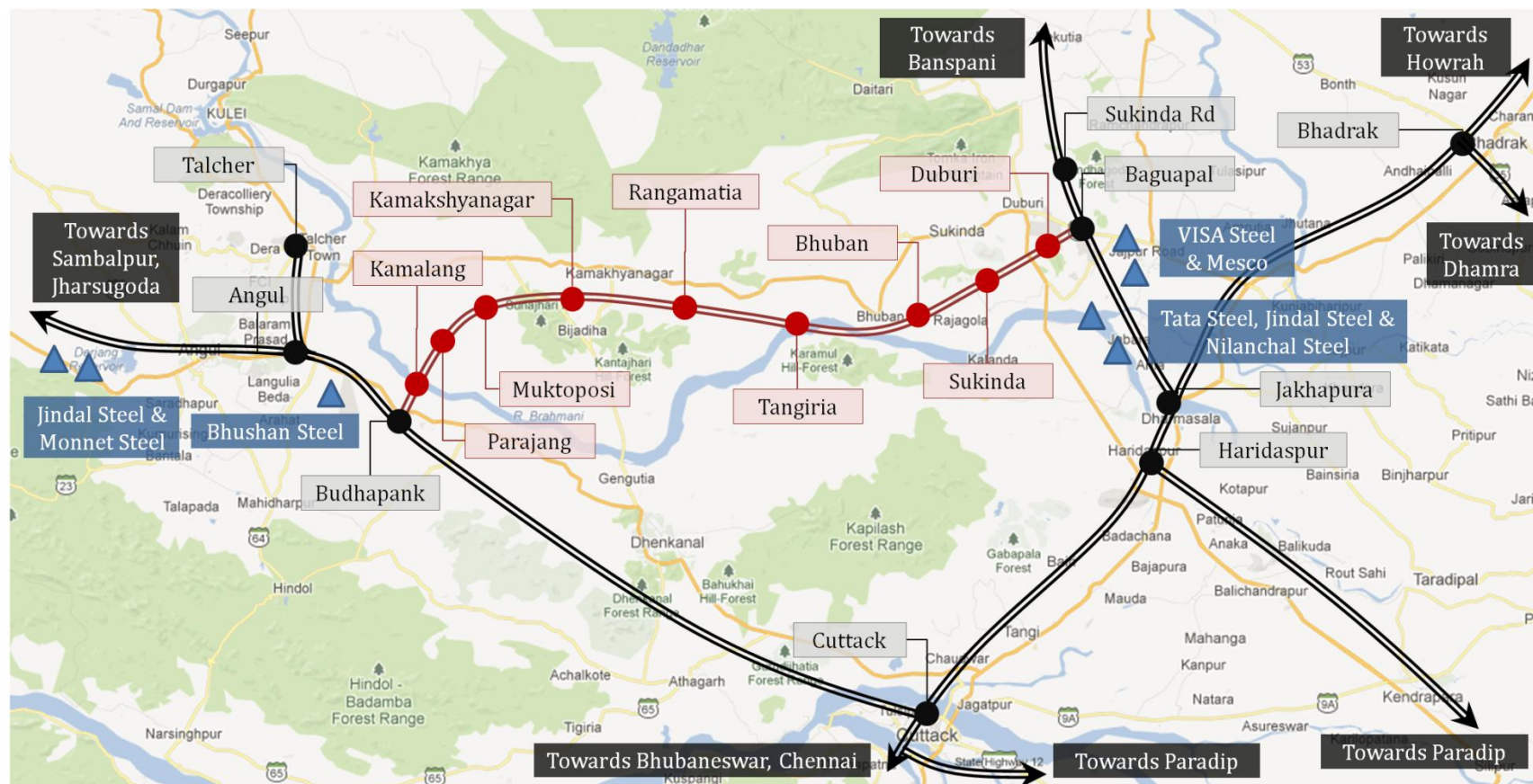


Figure 1: Map of project section with its environs

2 TRAFFIC PATTERN

2.1 Traffic Drivers

Following are the traffic drivers for the proposed new line between Budhapank and Sukinda Road Stations:



The above traffic drivers are discussed in brief in the table below:

S. No	Traffic Drivers	Locations	Potential
1	Ports	Paradip Port	The Port handled 54.25 Million tons in 2011-12. The Port has plans to enhance its capacity from 80 million metric tons at present to 143 million metric tons by the year 2015 and to 252 million metric tons by 2020 through a host of capacity expansion projects. In December 2012, Essar port has commissioned 16 million tons per annum dry bulk terminal at Paradip.
		Dhamra Port	<p>The location of Dhamra is in close proximity to the mineral belt of Odisha, Jharkhand and West Bengal and its dedicated connectivity will help efficiently serve the hinterland . The port is connected to Indian Railways Network on the Chennai-Howrah Line at Bhadrak (62 Kms from Dhamra Port) via a single track Broad Gauge Line. The line has been constructed by DPCL itself.</p> <p>The Commodity flow through the port is Import of Coking Coal, Non-Coking Coal, Thermal Coal and Limestone while Export commodity is iron ore.</p>
2	Mines	Mahanadi Coal Fields Ltd	Presently, there is an outward movement of about 28 rakes per day from MCL. The company plans to upgrade the rail loading capacity to 60 rakes per day by installing silos.

S. No	Traffic Drivers	Locations	Potential
			Out of the 28 outward rakes, approximately 16 are being transported to Paradip (14) and Dhamra (2) Ports for coastal shipping to various parts of India. Some of the important coastal shipping destinations are Mundra and Tuticorin. The difference in movement to both the ports is primarily because unlike Paradip Port, Dhamra Port does not have the facility to work with the bottom discharge BOBRN wagons which result in faster unloading of wagons. With time, as the coastal shipping of coal increases, the traffic is expected to be equitably distributed to both the Ports.
3	Steel Plants	Bhusan Steel & Strips Ltd.	Discussed in detail in section 2.3
		Aarti Steels Ltd	
		Bhusan Ltd. Lapanga	
		Aryan Ispt & Power Ltd.	
		Jindal Steel & Power	
		SMC Power Generation Ltd.	
		Shyam DRI Power Ltd.	
		Jindal Stainless Ltd.,	
		BRG Iron & Steel	
4	Power Plants	NTPC Talcher Kaniha Power Plant	<p>The power plant is located at Angul and has 6 units of 500 MW each summing up to a total power generation capacity of 3000 MW. The plant provides power to the states of Odisha, Bihar, Sikkim, Assam, Tripura, West Bengal, Jharkhand, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu and Pondicherry.</p> <p>The Coal for the plant is sourced from the Lingraj Block of Talcher Coal Field and the water is sourced from Samal Barrage Reservoir on river Bhahmani.</p>
		NTPC Talcher Thermal Power Plant	<p>The plant is located at Angul, in close vicinity of the Kaniha plant, and has an installed generation capacity of 460 MW with 4 x 60 MW units and 2 x 110 MW units. The plant was acquired by NTPC from Odisha State Electricity Board in 1995.</p> <p>The Coal for the plant is sourced from Jagannath Mines of Mahanadi Coal Fields and the water for steam generation is sourced from Brahmini River.</p>

S. No	Traffic Drivers	Locations	Potential
5	Aluminum Plant	National Aluminium Company Limited (NALCO)	<p>NALCO Angul has the installed capacity of 0.35 MTPA of the Aluminium Smelter and is being expanded to 0.46 MTPA. Nalco has also set up a 50,000 MT per annum Rolled Products Unit, integrated with the smelter plant at Angul for production of aluminium cold rolled sheets and coils from continuous caster route.</p> <p>Close to the Aluminium Smelter at Angul, a Captive Power Plant of 960 MW capacity, comprising 8 x 120 MW clusters, has been established for supply of power to the Smelter. The capacity is being planned to be expanded to 1200 MW.</p> <p>Despite having substantial production capacity, both for the Aluminium Smelter as well as the Power Plant, NALCO would not offer any traffic to the railways as the raw materials required by the manufacturing facility are either available locally or are procured through road based transport due to the insufficient volumes for rail movement.</p>

2.2 Current Potential Rail Traffic from the existing Industries

The consultants undertook a quick exercise for assessment of traffic on the rail line and the following traffic is likely to use the subject rail line for movement of its materials.

Sl. No.	Name of the Plant	Annual Capacity (MTPA)
A.	Sidings of the firms already commissioned:	
1	M/s Bhusan Steel & Strips Ltd., Meramandali	3.00
2	M/s Aarti Steels Ltd. Ghantikhal Nidhipur	0.50
3	M/s Bhusan Ltd. Lapanga	2.70
4	M/s Aryan Ispt & Power Ltd. Lapanga	0.50
B.	Sidings of the Firms shortly coming up:	
1	M/s Jindal Steel & Power, Kerejanga	12.50
2	M/s SMC Power Generation Ltd., Brudamal	0.40
3	M/s Shyam DRI Power Ltd., Rengali	0.44
4	M/s Jindal Stainless Ltd., Jakhapura	1.60
5	M/s BRG Iron & Steel, Meramundali	0.60
6	M/s VISA Industries, Jakhapura	1.50

Source: Feedback Research & East Coast Railways

RTC has been granted to about 24 plants by the Zonal Railway (details annexed to the report), however the consultants have considered only those plants which have already commissioned their Sidings or are in advance stage of completion.

2.3 Individual Traffic Streams

2.3.1 Shyam Metallica & Energy Ltd.

Shyam Metallica & Energy Ltd. (Formerly Shyam DRI Power Ltd.) is one of the group companies with manufacturing facilities set up in Rengali (Dist. Sambalpur), Odisha. Following are the facilities set up by the company:

1. **DRI Kiln** – There are two DRI Kilns with capacity of 350 TPD each (0.25 million tonnes per annum in total). The plant produces high quality Sponge Iron by use of high quality Iron Ore from the mines in Odisha and washed coal with low ash and high fixed carbon percentage from in-house the coal washing facility.
2. **Power Plant** – With an installed capacity of 25 MW, the power plant supplies power to the Rolling Mill and SMS Plant. Surplus Power is sold to Gridco. As the plant is steam based, the water requirement is met by water from the Hirakud Reservoir, brought to the plant via a 9 Km long pipeline.
3. **Coal Washery** – The coal washery uses low grade coal from Talcher mines and refines it to increase fixed carbon content and reduce ash content. Washed coal is used by the DRI Plant and Meddling and Rejects are used by the Power Plant resulting in substantial cost savings. Washed Coal is also envisaged to be sent to manufacturing facilities and power plants of other group companies at Asansol, Durgapur and Burdwah.
4. **SMS Plant** – Billets, Blooms and high quality steel are produced at the plant.
5. **Rolling Mill** – TMT Bars are produced at the Rolling Mill.

The schematic in Figure 2 shows the commodity flow to and from various origins and destinations.

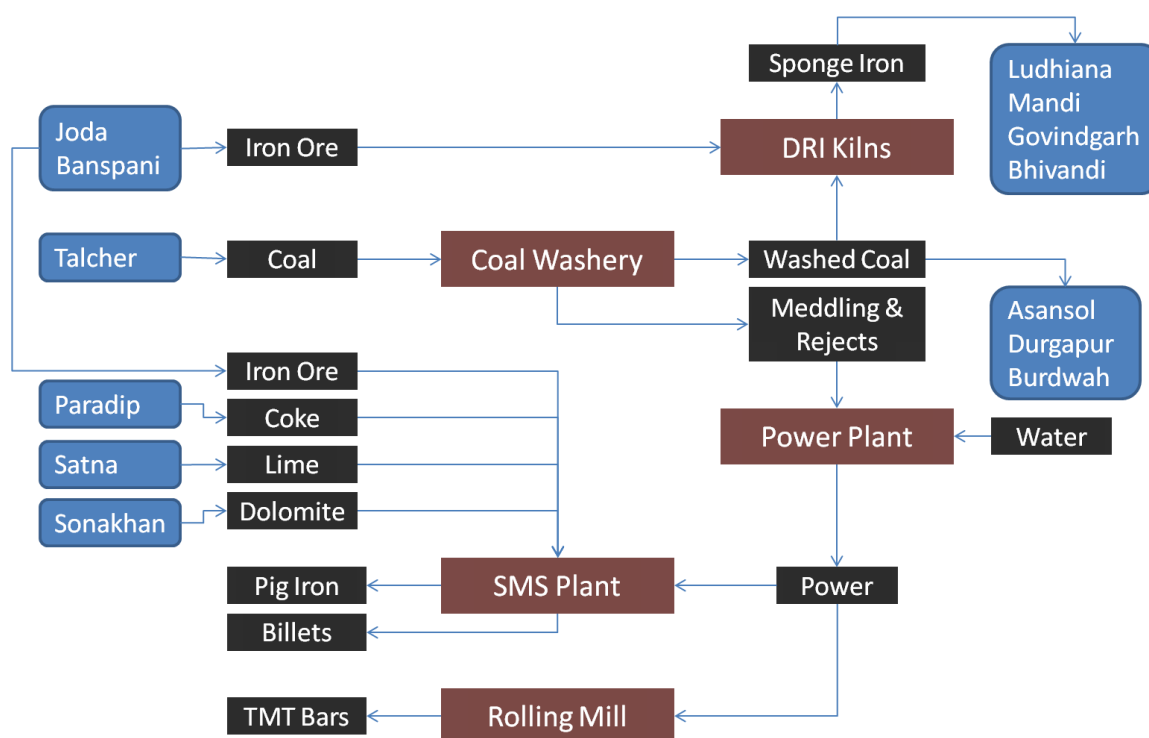


Figure 2: Commodity Flow in Shyam DRI

A MoU has been signed between the company and the government for a rail siding at the plant at Rengali for movement of their raw material as well as products.

The company has expansion plans for the manufacturing facility but currently the steel plant is not operational as the government had withdrawn permission for transporting the iron Ore from Joda area to their plant site in January 2011. Currently, the company is working towards restarting production but as per the site investigation there is little visibility of the same happening.

The rail-relevant traffic streams (along with the projected traffic for each stream) for the said industry are as follows:

Table 1: Traffic Streams for Shyam DRI Ltd.

Commodity	Origin	Destination	In/Out	Current Traffic (2011-12)
Ores	Barbil/Daitari	Rengali	In	0.73
Coke	Paradeep	Rengali	In	0.13
Lime	Satna	Rengali	In	0.05
Dolomite	Sonakhan	Rengali	In	0.02
Sponge Iron	Rengali	LDH	Out	0.03
Sponge Iron	Rengali	Mani Govind		0.03
Sponge Iron	Rengali	Bhivandi		0.03

Commodity	Origin	Destination	In/Out	Current Traffic (2011-12)
Washed Coal	Rengali	Asansol	Out	0.04
Washed Coal	Rengali	Durgapur	Out	0.04
Washed Coal	Rengali	Bundwan	Out	0.04
Pig Iron	Rengali	Various Destinations	Out	0.04
Total				1.19

Source: Primaries & Feedback's Analysis

From the above traffic, the amount of traffic that is expected to get routed to the project line is as follows:

Table 2: Divertible traffic on the project line for Shyam DRI Ltd.

Commodity	Origin	Destination	In/Out	2011-12	2016-17
Coke	Paradeep	Rengali	In	-	0.13
Pig Iron	Rengali	Various Destinations	Out	-	0.01
Total				-	0.14

Source: Primaries & Feedback's Analysis

On site investigation by the Consultant revealed that the plant is currently not in operation. Thus the above traffic is not taken for analysis.

2.3.2 Bhushan Power & Steel Ltd.

Bhushan Power & Steel Limited has implemented 2.3 MTPA Integrated Steel and Power Plant in Odisha at Lapanga town (District Sambalpur) comprising 8 DRI Kilns of 500 TPD, 376 MW Power Plant, Coal Washery, two CSP Plant, Blast Furnace, Coke Oven Plant, Sinter Plant, Oxygen Plant, Steel Making and Lime & Dolomite Plant, Cold Rolling Mill, Galvanizing and Galvalume.

The plant has been commissioned in four phases from 2005 till 2011. Presently, phase five of the project is under implementation where DRI Kilns, Iron Ore Beneficiation Plant, Pellet Plant, Cold Rolling, Pickling Line, Precision Tube Mill Black Bar Plant and Bright Bar Finishing Lines are being added.

The plant requires Coal, Coke, Iron Ore (lumps as well as fines), Limestone and Dunite which are presently being sourced from the following locations:

- Coal – Talcher, Ib Valley
- Coke – Imported via Haldia and Paradip Ports
- Iron Ore – Banspani
- Limestone – Satna
- Dunite – Imported via Paradip Port

The finished products (Billets and Rolled Products) are sent domestically all across the country to distribution centers in Howrah, Delhi, Chandigarh, Mumbai, Chennai as well as exported via Haldia and Paradip Ports.

The rail-relevant traffic streams (along with the projected traffic for each stream) for the said industry are as follows:

Table 3: Traffic Streams for Bhushan Power & Steel Ltd.

Commodity	Origin	Destination	In/Out	Current Capacity (2011-12)
Coal	Ib Valley	Lapanga	In	1.36
Coal	Talcher	Lapanga	In	1.36
Steam Coal	Ib Valley	Lapanga	In	2.81
Iron Ore (lumps)	Banspani	Lapanga	In	3.08
Iron Ore (Fines)	Banspani	Lapanga	In	1.34
Limestone	Sama	Lapanga	In	0.46
Coking Coal	Haldia Port	Lapanga	In	0.39
Coking Coal	Paradip Port	Lapanga	In	0.39
Dunite	Paradip Port	Lapanga	In	0.04
Billets & Rolled Products	Lapanga	Howrah	Out	0.32
Billets & Rolled Products	Lapanga	NDLS	Out	0.29
Billets & Rolled Products	Lapanga	Chandigarh	Out	0.29
Billets & Rolled Products	Lapanga	Mumbai	Out	0.43
Billets & Rolled Products	Lapanga	Chennai	Out	0.17
Billets & Rolled Products	Lapanga	Haldia Port	Out	0.81
Total				13.5

Source: Primaries & Feedback's Analysis

None of the O-D pairs in the traffic streams of the plant is benefitting from the project rail link in terms of distance of travel. Hence, there would be no traffic from the said industry that would divert to the project line.

2.3.3 Jindal Steel & Power Ltd.

Jindal Steel and Power Limited (JSPL) is setting up a 6 MTPA integrated steel plant with captive power plant of capacity 1142 MW at Kerejanga (District Angul) in Odisha. The project would be executed in two phases. In phase 1, the steel plant will commence operation with 1.5 mtpa steel

production capacity followed by capacity addition of 4.5 mtpa in phase 2. The company also has distant plans to add another 6.5 mtpa steel production capacity later in phase 3. Following is the phase-wise plan of JSPL at Kerejanga:

- Phase 1 – Commencement of operation from 2013-14 with production capacity of 1.5 mtpa.
- Phase 2 – Commencement of operation from 2014-15 with capacity addition of 4.5 mtpa.
- Phase 3 – Commencement of operation from 2019-20 with capacity addition of 6.5 mtpa.

The plant, when commissioned, would require substantial amount of raw material including Iron Ore, Coal, Coke, Limestone, etc. For the 6 million tonnes steel plant, the following raw materials would be required (with quantity and likely source):

Table 4: Snapshot of Raw Material Movement for JSPL

Raw Material	Quantity	Source
Iron Ore (fines)	Approx. 6.5 million tonnes	Deojhar Mines (Odisha)
Iron Ore (lumps)	Approx. 3.5 million tonnes	Deojhar Mines (Odisha)
Coal	Approx. 6.5 million tonnes	Captive Mines in Talcher
Coal	Approx. 4.5 million tonnes	Linkage with Mahanadi Coal Fields
Coke	Approx. 3 million tonnes	Import via Dhamra and Paradip Ports
Limestone	Approx. 1.5 million tonnes	Jamshedpur/Rajasthan
Dolomite	Approx. 0.5 million tonnes	Rajasthan
Quartzite	Approx. 0.1 million tonnes	Rajasthan
Ferro Alloys	Approx. 0.05 million tonnes	Rajasthan

Source: Primaries, Rail Transport Clearance

The finished steel products are expected to be mostly exported through Dhamra and Paradip Ports. Minor quantities of the finished products are expected to be sold domestically.

The rail-relevant traffic streams (along with the expected capacity for each stream) for the said industry are as follows:

Table 5: Traffic Streams for Jindal Steel & Power Ltd.

Commodity	Origin	Destination	Expected capacity			
			In/Out	2011-12	2016-17	2021-22
Iron Ore Fines	Deojhar	Kerejanga	In	-	7.06	14.71
Iron Ore Lumps	Deojhar	Kerejanga	In	-	3.75	7.82
Imported Coking Coal	Paradip Port	Kerejanga	In	-	2.20	4.58
Imported Coking Coal	VSKP	Kerejanga	In	-	2.20	4.58
Non Coking Coal	Bilaspur	Kerejanga	In	-	0.41	0.85
Non Coking Coal	Jharsuguda	Kerejanga	In	-	0.41	0.85
Non Coking Coal for coal	Paradip Port	Kerejanga	In	-	5.13	10.68

Commodity	Origin	Destination	Expected capacity			
			In/Out	2011-12	2016-17	2021-22
washery						
Non Coking Coal for coal washery	VSKP	Kerejanga	In	-	5.13	10.68
Non Coking Coal for coal washery	Bilaspur	Kerejanga	In	-	5.13	10.68
Non Coking Coal for coal washery	Jharsuguda	Kerejanga	In	-	5.13	10.68
Raw Dolomite & Dolomite Fine	Rajasthan	Kerejanga	In	-	0.68	1.43
Lime Stone and Lime stone fines	Rajasthan	Kerejanga	In	-	1.34	2.78
Lime Stone and Lime stone fines	Jamshedpur	Kerejanga	In	-	1.34	2.78
Quartzite	Rajasthan	Kerejanga	In	-	0.26	0.54
Misc, Flux & Ferro alloy	Rajasthan	Kerejanga	In	-	0.11	0.23
Steel	Kerejanga	Various Destinations	Out	-	6.00	12.50
Total				-	46.2	96.3

Source: Primaries & Feedback's Analysis

From the above traffic, the amount of traffic that is expected to get routed to the subject project line is as follows:

Table 6: Divertible traffic on the project line for Jindal Steel & Power Ltd.

Commodity	Origin	Destination	In/Out	2016-17	2021-22
Iron Ore Fines	Deojhar	Kerejanga	In	7.06	14.71
Iron Ore Lumps	Deojhar	Kerejanga	In	3.75	7.82
Total				10.8	22.5

Source: Primaries & Feedback's Analysis

2.3.4 Bhushan Steel and Strips

BSSL Meramandali Plant (1.5 MT) is based on the Directly Reduced Iron (DRI) - Electric Arc Furnace (EAF), Blast Furnace –Ladle Furnace & RH-OB - continuous casting – rolling mill route with waste heat recovery based captive power plant (CPP). Plant is situated about 5 km from Meramanadali Railway Stations (on Angul – Cuttack broad gauge main railway line). The National Highway no. 42 touches northern side of plant. The plant is 18 km from Angul and 42 km from Dhenkanal. Nearest Railway station is Meramanadali on East coast railway and nearest port is Paradip, which is more than 215 km away. Plant has fully functional rail siding.

BSSL is contemplating to modify and expand the existing 1.5 MT integrated steel plant to 3.1 MT level which is expected to be completed by this year (2013). With this additional 3 million tones

augmented capacity, BSSL would touch total steelmaking capacity of 5.2 million tones. The steel plant will have the capacity to manufacture 2.0 MTPA of HR coils and 0.3 MTPA of billets and power generation capacity of 110 MW. The plant has also introduced some new products – Billets and Sponge Iron. Finished products are distributed to northern & western part of the country through Paradip port.

Bhushan steel would be the major beneficiary of upcoming line with its entire inbound traffic (coal and iron ore) using the proposed line.

The rail-relevant traffic streams (along with the projected traffic for each stream) for the said industry are as follows:

Table 7: Traffic Streams for Bhushan Steel & Strips Ltd.

Commodity	Origin	Destination	In/Out	2011-12	2016-17
Coal	Talcher	Meramandali	In	3.25	6.50
Steam Coal	Talcher	Meramandali	In	3.06	6.13
I/Ore	Banspani	Meramandali	In	3.20	6.39
I/Ore (BF Grade)	Banspani	Meramandali	In	0.31	0.61
I/Ore (Finer)	Banspani	Meramandali	In	0.96	1.92
Lime Stone	Satna	Meramandali	In	0.30	0.60
Lime Stone	Paradeep	Meramandali	In	0.30	0.60
Coking Coal for BF	Paradeep	Meramandali	In	0.33	0.65
Coking Coal for BF	Haldia	Meramandali	In	0.33	0.65
Coal for CDI - BF	Paradeep	Meramandali	In	0.08	0.17
Dolomite - SP	Bhardawar	Meramandali	In	0.06	0.11
Semi Finished	Meramandali	Howrah	Out	0.28	0.56
Finished Products, Billets Rolled Products	Meramandali	New Delhi	Out	0.25	3.25
Finished Products, Billets Rolled Products	Meramandali	Chandigarh	Out	0.25	3.25
Finished Products, Billets Rolled Products	Meramandali	Mumbai	Out	0.39	0.78
Finished Products, Billets Rolled Products	Meramandali	Chennai	Out	0.24	0.49
Finished Products, Billets Rolled Products	Meramandali	Haldia	Out	0.04	3.25
Finished Products, Billets Rolled Products	Meramandali	Paradip	Out	0.04	3.25
Total				13.6	39.1

Source: Primaries & Feedback's Analysis

From the above traffic, the amount of traffic that is expected to get routed to the project line is as follows:

Table 8: Divertible traffic on the project line for Bhushan Steel & Strips Ltd.

Commodity	Origin	Destination	In/Out	2011 -12	2016 -17
Coal	Talcher	Meramandali	In	-	-
Steam Coal	Talcher	Meramandali	In	-	-
I/Ore	Banspani	Meramandali	In	-	6.39
I/Ore (BF Grade)	Banspani	Meramandali	In	-	0.61
I/Ore (Finer)	Banspani	Meramandali	In	-	1.92
Lime Stone	Satna	Meramandali	In	-	0.60
Lime Stone	Paradeep	Meramandali	In	-	-
Coking Coal for BF	Paradeep	Meramandali	In	-	-
Coking Coal for BF	Haldia	Meramandali	In	-	0.65
Coal for CDI - BF	Paradeep	Meramandali	In	-	-
Dolomite - SP	Bhardawar	Meramandali	In	-	-
Semi Finished	Meramandali	Howrah	Out	-	-
Finished Products, Billets Rolled Products	Meramandali	New Delhi	Out	-	-
Finished Products, Billets Rolled Products	Meramandali	Chandigarh	Out	-	-
Finished Products, Billets Rolled Products	Meramandali	Mumbai	Out	-	-
Finished Products, Billets Rolled Products	Meramandali	Chennai	Out	-	-
Finished Products, Billets Rolled Products	Meramandali	Haldia	Out	-	3.25
Finished Products, Billets Rolled Products	Meramandali	Paradip	Out	-	-
Total				-	13.4

Source: Primaries & Feedback's Analysis

2.3.5 VISA Steel Limited

VISA Steel Limited is a subsidiary of VISA Infrastructure Limited. VISA Steel is operating a 0.5 MTPA Special Steel Plant and 75 MW Power Plant at Kalinganagar. The current operations include 400,000 TPA Coke Oven plant (8 Batteries of 11 Ovens each with Stamp Charging facility), 225,000 TPA Pig Iron plant (250 Cu.m. Blast Furnace), 300,000 TPA Sponge Iron plant (2 x 500 TPA DRI Kilns), 50,000 TPA Ferro Chrome plant (2 x 16.5 MVA Submerged Arc Furnace), 75 MW Power plant (3 x 25 MW TG), 0.5 Million TPA Special Steel plant (70 T EAF with VD, LRF & Continuous Caster) and 0.5 million TPA Bar & Wire Rod Mill. The company plans to set up a 0.5 MTPA Iron Ore Sinter Plant, 300 TPD Lime Plant and 1 x 150 MW Captive Power Plant. An additional 0.5 MTPA Special and Stainless Steel Plant with 425,000 TPA Pig Iron Plant, 300,000 TPA Sponge Iron Plant will also be set-up to raise capacity to 1 MTPA.

VISA Steel is operating a 75 MW captive Power Plant and have plans to eventually expand its power generating capacity (totaling to 375 MW at Kalinganagar plant) along with commencement of production at the Coal Block at Patrapada in Talcher.

The location at Kalinganagar offers logistic advantages with Talcher coalfields situated 110 km away, Daitari iron ore mines located 30 km away, the Keonjhar and Barbil mines 100-150 km away, the Sukinda Valley having nearly 99% of India's chrome reserves just 35 km away, both Dhamra & Paradip ports 120 km away and Jakhapura Railway Station 2 km away

Presently all iron ore requirement is fulfilled by Joda Barbil Area and ore is transported by road. Coking Coal is transported from Paradip, Vizag and Dhamra port.

A subsidiary of VISA Steel (with a shareholding of 65%, the balance 35% being held by Baosteel - one of the largest Steel and Stainless Steel manufacturers in China) is setting up 4x16.5 MVA Submerged Arc Furnaces for production of 100,000 TPA Ferro Chrome at Kalinganagar in Odisha. The Company will add value to the locally available Chrome Ore and Chrome Concentrates into Ferro Chrome. A significant quality of ferro chrome produced at this plant will be exported to China and the balance to Japan, S. Korea, Taiwan, Europe & USA etc.

The rail-relevant traffic streams (along with the projected capacity for each stream) for the said industry are as follows:

Table 9: Traffic Streams for VISA Steel Ltd.

Commodity	Origin	Destination	In/Out	2011-12	2016-17
Iron Ore	Barbil/Daitari	Kalinga Nagar	In	0.32	0.96
DRI Grade Iron Ore	Joda	Kalinga Nagar	In	0.48	1.44
Coking Coal	Paradeep	Kalinga Nagar	In	0.36	1.08
Non-Coking Coal	Talcher	Kalinga Nagar	In	0.48	1.44
Lime Stone	Biramitrapur	Kalinga Nagar	In	0.02	0.07
Dolomite	Biramitrapur	Kalinga Nagar	In	0.03	0.09
Steel Billets	Kalinga Nagar	Various Destinations	Out	0.33	1.00
Coke	Kalinga Nagar	Rourkela	Out	0.02	4.87
Coke	Kalinga Nagar	Jamshedpur	Out	0.02	4.87
Coke	Kalinga Nagar	Kharagpur	Out	0.02	4.87
Coke	Kalinga Nagar	Other destinations	Out	0.02	4.87
Total				2.10	25.56

Source: Primaries & Feedback's Analysis

From the above traffic, the amount of traffic that is expected to get routed to the project line is as follows:

Table 10: Divertible traffic on the project line for VISA Steel Ltd.

Commodity	Origin	Destination	In/Out	2011-12	2016-17
Non-Coking Coal	Talcher	Kalinga Nagar	In	-	1.44
Steel Billets	Kalinga Nagar	Various Destinations	Out	-	0.20
Total				-	1.64

Source: Primaries & Feedback's Analysis

2.3.6 Aarti Steels

Aarti Steels Limited (ASL) is engaged in the manufacturing of iron and steel products like rounds and bars (manufacturing capacity of 150,000 TPA), steel billets (capacity of 270,000 TPA), steel wires (capacity of 42,000 TPA) and ferro alloys (capacity of 25,000 TPA). The manufacturing facilities of the company are situated in Ludhiana and Cuttack. The company has set-up a Direct Reduced Iron (DRI) plant at Cuttack for manufacturing sponge-iron (installed capacity of 160,000 TPA), a 40 MW captive power-plant and a 50 MW independent power plant that was commissioned in 2010. Currently firm is in expansion mode and is planning to commission coal washery plant (1 MT), Sponge Iron Kiln, 60 MW power plant, Sinter plant (343000 TPY), coke oven (236000 TPY) and Ferro Alloy Plant by September 2013. Plant has good logistic arrangement with functional rail siding, sources its iron ore requirement from Barbil/Banspani region and coal requirement from Talchar coal fields. Plant has rail siding that expedite inward and outward logistic movement.

Company has a wide range of finished product portfolio, which includes roll products, wire rods, Silicon manganese, and Ferro manganese and sponge iron.

The rail-relevant traffic streams (along with the projected traffic for each stream) for the said industry are as follows:

Table 11: Traffic Streams for Aarti Steel Ltd.

Commodity	Origin	Destination	In/Out	2011-12	2016-17	2021-22
Coal	Talcher	Nidhipur	In	1.00	1.00	1.40
Iron Ore	Barbil	Nidhipur	In	0.05	0.05	0.07
Iron Ore	Banspani	Nidhipur	In	0.05	0.05	0.07
Limestone	Satna	Nidhipur	In	0.30	0.30	0.42
Dolomite	Bardwar	Nidhipur	In	0.06	0.06	0.08
Steel	Nidhipur	GVG	Out	0.10	0.10	0.14
Steel	Nidhipur	DDL	Out	0.10	0.10	0.14
Steel	Nidhipur	JRC	Out	0.10	0.10	0.14
Total				1.76	1.76	2.47

Source: Primaries & Feedback's Analysis

None of the O-D pairs in the traffic streams of Aarti steels is benefitting from the project rail link in terms of distance of travel. Hence, there would be no traffic from the said industry that would divert to the project line.

2.3.7 Jindal Stainless Limited

Jindal Stainless Limited, has its manufacturing facility located at Kalinganagar. The plant has current production capacity of 1.6 Million tones. All iron ore requirement is fulfilled by Banspani area and coke is imported via Paradip port. The plant comprises of 250,000 tons per annum of Ferro Alloy's facilities and 1 million tons per annum of stainless steel making facilities with state-of-the-art technology. This complex with captive power generation is scalable up to 3.2 million tons per annum of stainless steel making, which will make it the world's largest stainless steel facility at single site.

The plant is well connected by the Road (connectivity through NH-5) & Railway (Dubri-Banspani rail line) and networks and is located within 150 kms from the mines and shipping port.

The rail-relevant traffic streams (along with the projected traffic for each stream) for the said industry are as follows:

Table 12: Traffic Streams for Jindal Stainless Ltd.

Commodity	Origin	Destination	In/Out	2016-17	2021-22
Coke	Paradeep	Kalinga Nagar	In	7.31	7.31
Iron Ore	Banspani	Kalinga Nagar	In	0.73	0.73
Lime/Dolomite	Satna	Kalinga Nagar	In	1.65	1.65
Lime/Dolomite	Birmitrapur	Kalinga Nagar	In	0.85	0.85
DRI	Koenjhar, Joda	Kalinga Nagar	In	0.17	0.17
Cast stainless	Kalinga Nagar	Domestic Market	Out	0.07	0.07
Cast stainless	Kalinga Nagar	Paradeep	Out	0.07	0.07
Hot/cold Rolled products	Kalinga Nagar	Paradeep	Out	0.26	0.26

Commodity	Origin	Destination	In/Out	2016-17	2021-22
Hot/cold Rolled products	Kalinga Nagar	Domestic Market	Out	0.26	0.26
Cold Pigs	Kalinga Nagar	Kolkata	Out	0.42	0.42
Cold Pigs	Kalinga Nagar	North	Out	0.42	0.42
Ferro Chrome, Coke Breeze	Kalinga Nagar	Hissar	Out	0.07	0.07
Total				12.29	12.29

Source: Primaries & Feedback's Analysis

From the above traffic, the amount of traffic that is expected to get routed to the project line is as follows:

Table 13: Divertible traffic on the project line for Jindal Stainless Ltd.

Commodity	Origin	Destination	In/Out	2011-12	2016-17	2021-22
Cast stainless	Kalinga Nagar	Domestic Market	Out	-	0.04	0.04
Hot/cold Rolled products	Kalinga Nagar	Domestic Market	Out	-	0.13	0.13
Total				-	0.17	0.17

Source: Primaries & Feedback's Analysis

2.3.8 Aryan Ispat & Power Limited

The rail-relevant traffic streams (along with the projected traffic for each stream) for the said industry are as follows:

Table 14: Traffic Streams for Aryan Ispat & Power Ltd.

Commodity	Origin	Destination	In/Out	2011-12	2016-17	2021-22
Iron Ore	Barbil	Lapanga	In	-	0.40	0.56
Coal	Talcher	Lapanga	In	-	0.35	0.49
Coal	Korba	Lapanga	In	-	0.35	0.49
Manganese	Various Origins	Lapanga	In	-	0.20	0.28
Dolomite	Various Origins	Lapanga	In	-	-	-
Steel	Lapanga	Various Destinations	Out	-	0.25	0.35
Total				-	1.55	2.17

Source: Primaries & Feedback's Analysis

None of the O-D pairs in the traffic streams of the plant is benefitting from the project rail link in terms of distance of travel. Hence, there would be no traffic from the said industry that would divert to the project line.

3 FUTURE PROJECTIONS

3.1 Growth Rates

While the consultants have done a detailed traffic exercise to assess the current traffic for the project line, at this stage, the growth rates for the traffic stream has been assumed keeping in view the past trend. The growth rate is constantly tapered down to project a realistic traffic figures.

	(2017-22)	(2022-27)	(2027-32)	(Beyond 2033)
Growth Rates	7%	5%	3%	2%

3.2 Company Wise Present Traffic

The total traffic moving to and from all the industries is shown in the following table:

Table 15: Company wise Traffic Projection (Unit: Million Tonnes)

S. No.	Company	2011-12	2017-18	2022-23	2027-28	2032-33	2037-38	2041-42
1	Aarti Steel	1.76	1.88	2.59	3.25	3.73	4.11	4.45
2	Aryan Ispat & Power	-	1.66	2.28	2.86	3.28	3.62	3.92
3	Bhushan Limited	13.52	14.47	19.92	24.94	28.63	31.61	34.21
4	Bhushan Steel and Strips	13.66	39.15	39.15	44.45	51.03	56.35	60.99
5	Jindal Steel & Power	-	46.26	96.37	97.04	111.41	123.00	133.14
6	Jindal Stainless	-	13.15	18.10	22.66	26.02	28.72	31.09
7	Shyam DRI	1.19	1.27	1.75	2.19	2.51	2.77	3.00
8	VISA Steel	2.10	2.25	3.10	3.88	4.45	4.92	5.32
Total		32.24	120.09	183.25	201.26	231.06	255.10	276.13

Source: Primaries & Feedback's Analysis

3.3 Commodity-wise present Traffic

Based on the primary surveys, the total current traffic in the region is as follows:

Table 16: Commodity wise traffic movement (Unit: Million Tonnes)

S. No.	Commodity	2011-12	2017-18	2022-23	2027-28	2032-33	2037-38	2041-42
1	Domestic Coal	13.53	42.49	68.75	73.39	84.25	93.02	100.69
2	Imported Coal	2.00	14.97	23.23	26.62	30.56	33.74	36.52
3	Iron Ore	9.91	26.96	41.39	45.79	52.56	58.03	62.82
4	Minerals	1.64	8.38	13.41	14.88	17.08	18.86	20.41
5	Misc	1.01	2.00	2.81	3.25	3.73	4.12	4.46
6	Steel	4.15	25.28	33.67	37.34	42.87	47.33	51.24
Total		32.24	120.09	183.25	201.26	231.06	255.10	276.13

Source: Feedback's Analysis

3.4 Future Traffic Projections

The consolidated commodity wise Rail share projections on the project route derived from the analysis are as follows:

Table 17: Commodity Wise Rail Traffic Realistic Scenario (Unit: Million Tonnes)

S. No.	Grouped Commodity	2017-18	2022-23	2027-28	2032-33	2037-38	2041-42
1	Domestic Coal	0.51	0.71	0.89	1.02	1.12	1.21
2	Imported Coal	0.65	0.65	0.74	0.85	0.94	1.01
3	Iron	19.76	31.49	33.38	38.32	42.31	45.80
4	Minerals	0.60	0.60	0.68	0.78	0.86	0.93
5	Misc	-	-	-	-	-	-
6	Steel	4.75	6.17	6.71	7.71	8.51	9.21
Total		26.28	39.61	42.40	48.67	53.74	58.17

Source: Primaries & Feedback's Analysis

The expected traffic to be generated on the project line is approximately 58.17 MT for the target year which will be beyond the capacity of the project line.

4 FINANCIAL ANALYSIS

The financial analysis for the project railway line has been carried out for a period of 35 years including 5 years construction period.

4.1 Project Development Cost

For the purpose of this report, RVNL has provided the following capital cost for the project:

Table 18: Capital Cost provided by RVNL for Bankability Report

Construction Cost (Rs. Crore)	Capital Cost
Civil Engineering	8,690
Electrical Engineering	1,097
S&T Engineering	434
Mechanical	0
Gross Total	10,221
Contingencies@3%	307
Sub Total 'A'	10,527
D&G Charges @8.75% on 'A'	921
RVNL Charges @5% on 'A'	526
Total Projected Cost	11,975

4.2 Schedule of Construction

The schedule of construction and investment phasing as considered is presented below:

Table 19: Schedule of Construction

Construction Year:	Year 1	Year 2	Year 3	Year 4	Year 5
Percent Completion	8.00%	13.00%	24.00%	35.00%	20.00%

The duration of construction and schedule of construction is based on Final Location Survey report by East Coast Railways for the project stretch. The construction work has been assumed to commence from 2012-13 for analytical purposes.

4.3 Funding

For the analytical purpose, following Debt Equity ratio is assumed:

Debt	70.4%
Equity	29.6%

Since the equity for the project is fixed at 420 Cr, the percentage of debt is slightly higher.

The cost of debt has been assumed at 11%. The funding pattern for the project that emerges is as follows:

Table 20: Construction Phasing & Financing Schedule

Construction Phasing	C1	C2	C3	C4	C5
	2012	2013	2014	2015	2016
Construction cost	958	1,557	2,874	4,191	2,395
Preliminary and pre-operative expenses	60				
Total	1,018	1,557	2,874	4,191	2,395
IDC	-	-	73	398	827
Total Landed Cost	1,018	1,557	2,947	4,589	3,222

No escalation in cost has been considered for the analytical purposes. The Preliminary & pre-operative expenses have been assumed at 0.5% of the capital cost. The interest during construction cost comes to Rs. 1,298 Million.

Financing Schedule	2012	2013	2014	2015	2016
Equity	1,018	1,557	1,625	-	-
Debt	-	-	1,321	4,589	3,222
Total	1,018	1,557	2,947	4,589	3,222

The landed cost of the project comes to Rs. 13,332 Million.

For the amortization of debt, following assumptions have been used:

- The principle debt details are as follows:
 - Moratorium for principle repayment post construction: 2 years
 - Debt repayment tenure post moratorium: 10 years
 - Interest rate: 11%

4.4 Project Revenue

Revenue has been calculated for the freight traffic likely to use the project rail section on operation. Freight Charges has been taken from the Railways Freight Revenue Table 2012-13 and the project revenue is calculated. The results of the same are shown in subsequent sections:

4.4.1 Revenue

The gross revenue for the project comes out to be as follows:

Table 21: Gross Earnings for the Project

Year	2017	2022	2027	2032	2037	2042
Revenue Mn)	3,834.0	5,692.34	6,101.61	7,002.74	7,641.08	7,902.62

4.5 Project O&M Cost

For the purpose of this report detailed O&M cost is not calculated. Consultants have analyzed the operating ratio of East Coast Railways of last three years which is as follows:

	Net Earnings	Net Expenditure	Operating Ratio
2009-10	49.75	117.63	42%
2010-11	50.27	140.54	36%
2011-12	52.21	138.26	38%

Based on the above, Consultants have estimated the following operating ratios for the project duration:

Year	2017	2020	2026	2030	2035	2039	2042
Operating Ratio	42.0%	41.0%	39%	38%	37%	36.0%	35.0%

Consultants will present a detailed assessment of the O&M costs in the subsequent reports.

4.5.1 Total O&M Cost

Based on above, summary of O&M Cost is given below:

Table 22: Summary of O&M Cost

Year	2017	2022	2027	2032	2037	2042	2046
Total O&M Costs (Rs. Millions)	1,610.29	2,311.09	2,391.83	2,647.04	2,781.35	2,765.92	2,765.92

4.6 P&L and Cashflows

For the purpose of Profit & Loss Statements, Depreciation and the Tax rates have been used as follows:

- i. **Depreciation rates:** For depreciation of assets under IT Act, depreciation rate @ 10% on WDV basis has been considered. For depreciation under Companies Act, rate @ 3.33% on SLM has been considered.
- ii. **Taxation:** Tax cost has been considered to get a picture of the net earnings estimated to accrue to the project. Exemption under section 80IA has also been considered during a period of 10 consecutive years in a block of first 15 years of operation. While calculating the tax liability, the following tax rates has been considered.

Table 23: Assumed Tax rates

	Corporate	MAT
Base Tax Rate	30%	18.5%
Surcharge	5.00%	7.5%
Education Cess	3.00%	3.0%
Effective Rate	32.45%	20.48%

While estimating the tax liability, whichever is higher of Corporate Tax or MAT, has been considered.

4.7 Key Indicators of Financial Analysis

Based on the above stated inputs, the exercise of financial analysis has been carried out for the proposed project. The indicators estimated in the process are:

1. Post-Tax Project Internal Rate of Return (P-IRR)

IRR indicates the return a project will generate over a period of time. It is that rate of discount, which makes the Net Present Value equal to zero. Internal Rate of Return on Project is the return on the total project cash flows.

2. Post-Tax Equity Internal Rate of Return (E-IRR)

IRR indicates the return a project will generate over a period of time. It is that rate of discount, which makes the Net Present Value equal to zero. Internal Rate of Return on Equity (E-IRR) is the return that accrues on the equity investment. The return for viability depends upon the expectation from the investment and accounts for taxes, interest, loan repayment, etc.

4.7.1 Results

The financial analysis has been carried out using the inputs as already explained above. The outputs for the financial indicators are shown in the table below:

Table 24: Key financial indicators

Key Financial Indicators	Values
Pre-tax IRR	19.0%
Post-tax IRR	16.9%
Equity IRR	19.6%
Minimum DSCR	1.4
Average DSCR	2.2

Annexure: List of Plant with RTC

Traffic to be generated over the Angul/Budhapank-Sukhinda Road New BG Line (Iron ore, M/Ore, Chrome ore ex. Nayagarh/Banspani area & coal ex. Talcher)

Sl. No.	Name of the Plant	Annual Capacity
1	M/s SCAW Industries Pvt. Ltd., Dhenkanal	0.80
2	M/s Bhusan Steel & Strips Ltd., Meramandali	3.00
3	M/s Aarti Steels Ltd., Ghantikhal Nidhipur	0.50
4	M/s BRG Iron & Steel Co. Ltd., Meramandali	0.60
5	M/s Maheshwary Ispat Ltd., Rajathgarh	0.25
6	M/s Uttam Galva Steels Ltd., Porianpur	3.00
7	M/s Oriss Sponge Iron Ltd., Porianpur	2.27
8	M/s Patnaik Steels & Alloys Ltd., Nayagarh	1.30
9	M/s Maithan Ispat Ltd., Jakhapura	0.27
10	M/s Jindal Stainless Ltd., Jakhapura	1.60
11	M/s VISA Industries, Jakhapura	1.50
12	M/s Tata Steel, Kalinganagar	6.00
13	M/s Monnet Ispat & Energy Ltd., Kerejanga	1.00
14	M/s Sree Metaliks Ltd., Kerejanga	0.37
15	M/s Viraj Steel & Energy Ltd., Rengali	0.50
16	M/s Shyam DRI Power Ltd., Rengali	0.44
17	M/s Bhusan Ltd., Lapanga	1.35
18	M/s SMC Power Generation Ltd., Brundamal	0.40
19	M/s Aryan Ispat & Power Ltd., Lapanga	0.50
20	M/s Arcelor Mittal India Ltd., Kendujhargarh	12.00
21	M/s Rungta Mines Ltd., Meramandali	2.00
22	M/s MGM Steels Ltd., Meramandali	0.25
23	M/s Jindal Steel & Power, Korejanga	12.50
24	M/s SAG International, GADH	0.25
	Total	52.65

Revenue Calculation

Name of Generator	Commodity	Origin	Destination	Part of study link being used	Classification	Project section being used as a part of the total O-D distance											
						2017		2022		2027		2032		2037		2042	
						Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist
Outward																	
Aryan Ispat & Power	Steel	Lapanga	Various Destinations	Angul-Sukinda	180.0	104	464	104	464	104	464	104	464	104	464	104	464
Bhushan Steel and Strips	Finished Products , Billets Rolled Products	Meramandali	Haldia	Angul-Sukinda	180.0	104	464	104	464	104	464	104	464	104	464	104	464
Jindal Steel & Power	Steel	Kerejanga	Various Destinations	Angul-Sukinda	180.0	104	266	104	266	104	266	104	266	104	266	104	266
VISA Steel	Steel Billets	Kalinga Nagar	Various Destinations	Angul-Sukinda	180.0	104	404	104	404	104	404	104	404	104	404	104	404
Jindal Stainless	Cast stainless	Kalinga Nagar	Domestic Market	Angul-Sukinda	180.0	104	404	104	404	104	404	104	404	104	404	104	404
	Hot/cold Rolled products	Kalinga Nagar	Domestic Market	Angul-Sukinda	180.0	104	404	104	404	104	404	104	404	104	404	104	404
Inward																	
Jindal Steel & Power	Iron Ore Fines	Deojhar	Kerejanga	Angul-Sukinda	160.0	104	358	104	358	104	358	104	358	104	358	104	358
	Iron Ore Lumps	Deojhar	Kerejanga	Angul-Sukinda	160.0	104	358	104	358	104	358	104	358	104	358	104	358

Name of Generator	Commodity	Origin	Destination	Part of study link being used	Classification	Project section being used as a part of the total O-D distance											
						2017		2022		2027		2032		2037		2042	
						Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist	Project section	Total O-D dist
Bhushan Steel and Strips	I/Ore	Banspani	Meraman dali	Angul-Sukinda	160.0	104	322	104	322	104	322	104	322	104	322	104	322
	I/Ore (BF Grade)	Banspani	Meraman dali	Angul-Sukinda	160.0	104	322	104	322	104	322	104	322	104	322	104	322
	I/Ore (Finer)	Banspani	Meraman dali	Angul-Sukinda	160.0	104	322	104	322	104	322	104	322	104	322	104	322
	Lime Stone	Satna	Meraman dali	Angul-Sukinda	160.0	104	104	104	104	104	104	104	104	104	104	104	104
	Coking Coal for BF	Haldia	Meraman dali	Angul-Sukinda	150.0	104	464	104	464	104	464	104	464	104	464	104	464
VISA Steel	Non-Coking Coal	Talcher	Kalinga Nagar	Angul-Sukinda	150.0	104	378	104	378	104	378	104	378	104	378	104	378

Name of Generator	Commodity	Origin	Destination	Earnings in Rs million for total section						Apportioned Earnings in Rs Million for the Total section					
				2017	2022	2027	2032	2037	2042	2017	2022	2027	2032	2037	2042
Aryan Ispat & Power	Steel	Lapanga	Various Destinations	35	49	61	61	61	61	8	11	14	14	14	14
Bhushan Steel and Strips	Finished Products, Billets Rolled Products	Meramandali	Haldia	2141	2141	2431	2791	3082	3336	481	481	546	627	692	749
Jindal Steel & Power	Steel	Kerejanga	Various Destinations	486	1012	1012	1162	1258	1258	190	397	397	455	493	493
VISA Steel	Steel Billets	Kalinga Nagar	Various Destinations	42	58	73	84	93	100	11	15	19	22	24	26
Jindal Stainless	Cast stainless	Kalinga Nagar	Domestic Market	23	32	40	46	51	55	6	8	10	12	13	14
	Hot/cold Rolled products	Kalinga Nagar	Domestic Market	84	115	144	166	183	198	22	30	37	43	47	51
Jindal Steel & Power	Iron Ore Fines	Deojhar	Kerejanga	3330	6937	7145	8203	8879	8879	970	2021	2082	2390	2587	2587
	Iron Ore Lumps	Deojhar	Kerejanga	1770	3687	3798	4360	4719	4719	516	1074	1106	1270	1375	1375
Bhushan Steel and Strips	I/Ore	Banspani	Meramandali	2658	2658	3018	3465	3826	4141	861	861	977	1122	1239	1341
	I/Ore (BF Grade)	Banspani	Meramandali	256	256	290	333	368	398	83	83	94	108	119	129
	I/Ore (Finer)	Banspani	Meramandali	799	799	907	1042	1150	1245	259	259	294	337	372	403
	Lime Stone	Satna	Meramandali	282	282	320	368	406	439	282	282	320	368	406	439
	Coking Coal for BF	Haldia	Meramandali	357	357	406	466	515	557	80	80	91	105	116	125
VISA Steel	Non-Coking Coal	Talcher	Kalinga Nagar	241	332	415	477	526	570	66	91	114	131	145	157

Project Revenues

Name of Generator	Commodity	Origin	Destination	Gross Earnings in Rs. Million for the Project Section (latest Prices)					
				2017	2022	2027	2032	2037	2042
Outward									
Aryan Ispat & Power	Steel	Lapanga	Various Destinations	8	11	14	14	14	14
Bhushan Steel and Strips	Finished Products, Billets Rolled Products	Meramandali	Haldia	481	481	546	627	692	749
Jindal Steel & Power	Steel	Kerejanga	Various Destinations	190	397	397	455	493	493
VISA Steel	Steel Billets	Kalinga Nagar	Various Destinations	11	15	19	22	24	26
Jindal Stainless	Cast stainless	Kalinga Nagar	Domestic Market	6	8	10	12	13	14
	Hot/cold Rolled products	Kalinga Nagar	Domestic Market	22	30	37	43	47	51
Inward									
Jindal Steel & Power	Iron Ore Fines	Deojhar	Kerejanga	970	2021	2082	2390	2587	2587
	Iron Ore Lumps	Deojhar	Kerejanga	516	1074	1106	1270	1375	1375
Bhushan Steel and Strips	I/Ore	Banspani	Meramandali	861	861	977	1122	1239	1341
	I/Ore (BF Grade)	Banspani	Meramandali	83	83	94	108	119	129
	I/Ore (Finer)	Banspani	Meramandali	259	259	294	337	372	403
	Lime Stone	Satna	Meramandali	282	282	320	368	406	439
	Coking Coal for BF	Haldia	Meramandali	80	80	91	105	116	125
VISA Steel	Non-Coking Coal	Talcher	Kalinga Nagar	66	91	114	131	145	157
	TOTAL REVENUE @ 100%			3,834	5,692	6,102	7,003	7,641	7,903
	TOTAL REVENUE			3,834	5,692	6,102	7,003	7,641	7,903

Project Cash flows

Project Cash flows								Equity Cash flows				
Year	Capital Expenditure (incl Pre Ops, excl IDC)	Profit before tax	Interest repayment	Book Depreciation	Tax	Pre Tax Project IRR	Post tax project IRR	Equity share capital inflow	Profit after tax (PAT)	Book Depreciation	Principle repayment	Equity IRR
2012	1,018	-	-	-	-	(1,018)	(1,018)	1,018	-	-	-	(1018)
2013	1,557	-	-	-	-	(1,557)	(1,557)	1,557	-	-	-	(1557)
2014	2,874	-	-	-	-	(2,874)	(2,874)	1,625	-	-	-	(1625)
2015	4,191	-	-	-	-	(4,191)	(4,191)	-	-	-	-	0
2016	2,395	-	-	-	-	(2,395)	(2,395)	-	-	-	-	0
2017	-	818	1,005	401	168	2,224	2,056	-	651	401	-	1052
2018	-	1,013	1,005	401	207	2,418	2,211	-	805	401	-	1206
2019	-	1,275	954	401	261	2,630	2,369	-	1,014	401	913	501
2020	-	1,605	854	401	366	2,860	2,494	-	1,239	401	913	726
2021	-	1,955	753	401	508	3,110	2,601	-	1,447	401	913	935
2022	-	2,328	653	401	477	3,381	2,904	-	1,851	401	913	1338
2023	-	2,491	553	401	510	3,445	2,934	-	1,981	401	913	1469
2024	-	2,656	452	401	544	3,509	2,965	-	2,112	401	913	1600
2025	-	2,823	352	401	578	3,575	2,997	-	2,244	401	913	1732
2026	-	2,990	251	401	612	3,642	3,029	-	2,377	401	913	1865
2027	-	3,158	151	401	647	3,710	3,063	-	2,511	401	913	1999
2028	-	3,380	50	401	692	3,831	3,139	-	2,688	401	913	2175
2029	-	3,555	-	401	728	3,956	3,228	-	2,827	401	-	3228
2030	-	3,684	-	401	755	4,085	3,330	-	2,930	401	-	3330
2031	-	3,818	-	401	782	4,218	3,436	-	3,036	401	-	3436
2032	-	3,955	-	401	1,333	4,356	3,023	-	2,622	401	-	3023
2033	-	4,052	-	401	1,372	4,452	3,080	-	2,679	401	-	3080
2034	-	4,150	-	401	1,411	4,551	3,140	-	2,739	401	-	3140
2035	-	4,251	-	401	1,451	4,652	3,201	-	2,800	401	-	3201
2036	-	4,354	-	401	1,490	4,755	3,265	-	2,864	401	-	3265
2037	-	4,459	-	401	1,529	4,860	3,330	-	2,930	401	-	3330

Project Cash flows								Equity Cash flows				
Year	Capital Expenditure (incl Pre Ops, excl IDC)	Profit before tax	Interest repayment	Book Depreciation	Tax	Pre Tax Project IRR	Post tax project IRR	Equity share capital inflow	Profit after tax (PAT)	Book Depreciation	Principle repayment	Equity IRR
2038	-	4,513	-	401	1,552	4,914	3,362	-	2,962	401	-	3362
2039	-	4,568	-	401	1,574	4,969	3,395	-	2,994	401	-	3395
2040	-	4,624	-	401	1,596	5,024	3,429	-	3,028	401	-	3429
2041	-	4,680	-	401	1,617	5,080	3,463	-	3,062	401	-	3463
2042	-	4,736	-	401	1,639	5,137	3,498	-	3,097	401	-	3498
2043	-	4,736	-	401	1,641	5,137	3,495	-	3,095	401	-	3495
2044	-	4,736	-	401	1,644	5,137	3,493	-	3,092	401	-	3493
2045	-	4,736	-	401	1,646	5,137	3,491	-	3,090	401	-	3491
2046	-	4,736	-	401	1,648	5,137	3,488	-	3,088	401	-	3488

Key Financial Indicators	
Pretax IRR	19.0%
Post tax IRR	16.9%
Equity IRR	19.6%

