Name of work: **Final location Survey for New BG Line between THIYAT HAMIRA (JSM)-SANU {55.800 Km.}**

Narrative **PROJECT REPORT**

(ENGINEERING)

CIVIL

CHAPTER - 1

1. INTRODUCTION :-

1.1. OBJECT OF INVESTIGATION AND ORDERS OF GOVERNMENT :

1.1.1. Survey work for new railway line between THIYAT HAMIRA (JSM)-SANU is included in union budget 2010-11 & now the Final location survey for a New BG line i.e. between Thiyat Hamira - sanu is completed. The Final location survey Was carried out for BG line between Thiyat Hamira-Sanu. The detailed estimate cost of the work come out as Rs 262,45,62,552.00

1.1.2. NEED FOR NEW LINE :-

Huge limestone deposits are available in Sanu Mines of Jaisalmer area.The State Public sector Unit, Rajasthan State Mines and Minerals Ltd. (RSMML) is mining SMS grade limestone and supplying it to SAIL,TISCO and Jindal Steel among others.Hoewver,no railway link is available between Sanu and Jaisalmer. The dispatch of limestone by RSMML from Jaisalmer area is likely to increase from the present level of 3.3 million tones per year to 8.4 million tonnes per year in next 5 years. The railway Ministry was requested by RSMML to construct a new railway line from Thaiyat Hameera Railway Station (Jaisalmer District) to Sanu Mines, (Jaisalmer Distric).Accordingly the Railway Ministry the work of New BG line included in P.B. item No. 4 of 2014-15।

1.1.2 HISTORY OF PAST INVESTIGATION:-

This survey is the first one of its kind as no such exercise for the entire project section has been undertaken in the past by Railways. However detailed survey was carried out in 1993 by

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RSMML, Jodhpur through a consultancy firm of N.Delhi engaged by RSMML.

1.1.4 TERMS OF REFERENCE:-

The terms of reference for Engineering Department are as under:-

1.1.4.1 Alignment: Alignment for the New BG line will follow Max 2.0 degree Curve.

1.1.4.2 Grade: Ruling Gradient shall be 1 in 150 (Compensated).

1.1.4.3 Gradient in Yards : 1:1200

1.1.4.4 Curvature: Curvature shall not be sharper than 2.0 degree.

1.1.4.5 Standard of Construction: Standard of construction shall be 25T loading standard for new bridges.

1.1.4.6 Track structure: To confirm to Group 'D' BG lines 60Kg. New rails on PRC sleeper with 1660 sleepers per km density on main line and 60Kg Second hand rails on PRC sleepers with 1540 density in loops & sidings. The ballast cushion proposed as 300mm on main line and 250mm on loop line.

1.1.4.7 Vertical Clearance: Clearance for 25KV A.C. OHE should be planned for BG standard.

1.1.4.8 Loops: Loops shall be of clear standing room of 725 m each.

1.1.4.9 Platform: Platform shall be able to accommodate 22 coaches with provision of 26 coaches in future without yard remolding.

1.2 SCOPE OF SURVEY :

1.2.1 The scope of Final location survey is for a New BG line between THIYAT HAMIRA (JSM)-SANU. Take off point is taken from the existing BG station of Thiyat Hamira and End point of new line at lime stone mines Sanu. The alignment is passing through undulating, plain and Hilly, area and sand dunes; the ruling gradient of 1 in 150 compensated and curves not exceeding 2.0 degrees.

1.3 PROGRAMME AND METHODOLOGY OF INVESTIGATION :

1.3.1 PROGRAMME OF INVESTIGATION:

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The survey for this project line was sanctioned for BG line in the year 2010-2011. The Final location survey team headed by XEN/AXEN completed the survey work from Thayat Hamira to Sanu in July 2014.

1.3.2 METHODOLOGY OF INVESTIGATION:

Before commencing the field work details of area to be surveyed were collected. Topographic sheets covering the area under investigation published by Survey of India were studied.

1.3.2.2 On the basis of reconnaissance of Project area, Final location survey was under taken to identify the feasible route of the project line.

1.3.2.3 Based on the Reconnaissance survey and study of existing details collected, most economical and feasible alternative was decided and along the identified route was under taken connecting all the important locations of the area. A Detailed Final location survey was already conducted by Railway Through consultancy firm and detailed and data are taken from that survey report.

1.3.2.4 Since it is a Final location survey detailed investigations, study of Hydrological data, soil strata etc. has been carried out which has been done before taking up actual construction work after sanction of the project.

1.3.2.5 Yards Plans (Concept plans) were prepared as per the requirement.

1.3.2.6 As per the conceptual yard plans and detailed Estimate & Report were finalised.

CHAPTER - II

2.0 CHARASTERISTICS OF PROJECT AREA :-

2.1 TOPOGRAPHICAL OUTLINE OF THE AREA:

The Sanu Mining Complex lies between latitudes of 27^0 15 to 27^0 18 and longitudes of 70^0 35′ to 70^0 15′ in Jaisalmer District. The entire Project area falls in Rajasthan State. The terrain through which alignment passed is plain and sand dunes.

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The rainfall in this region is scanty with average annual rainfall upto 121mm.The water table is 70 to 120 metres below ground level.

2.2 MEANS OF COMMUNICATION:

2.2.1 Roads: All the proposed stations are connected by roads and some are even connected with State Highway.

2.2.2 Railway: Jaisalmer and Bikaner are connected by Rail route.

2.2.3 Airways: None of the station is connected by air service.

2.3 OUTLINE OF CIVIL ADMINISTRATION :

Proposed alignment passes through following districts of Rajasthan State.

(i) Jaisalmer

The alignment is passing through the underdeveloped area of Rajasthan.

CHAPTER - III

3.0 STANDARD OF CONSTRUCTION:

Standards of construction proposed to be adopted for New BG line between Thiyat Hamira-sanu as under:-

3.1 GAUGE : Broad Gauge (1676 mm).

3.2 CATEGORY OF LINE: Proposed line will be constructed as Group "D" standard with a maximum speed potential of 100Kmph.

3.3 LENGTH OF LINE: Total length of new BG line between Thiyat Hamira to sanu 55.800kms.

3.4 GRADIENT :

3.4.1 Ruling Gradient: The ruling gradient of 1 in 150 duly compensated for curvature has been adopted.

3.4.2 Grade Compensation for Curves: Grade compensation for curves has been provided at the rate of 0.04% per degree of curvature.

3.5 CURVES: maximum degree of curvature is kept to 2.0 degree.

3.6 PERMANENT WAY

3.6.1 60Kg new rails on PRC sleeper density of 1660 per km and 300 mm ballast cushion is proposed for main line. For loops and siding

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60Kg(Second hand rails) rails on PRC sleepers with sleeper density of 1540 and 250mm ballast cushion is proposed.

3.6.2 Sleepers: PSC sleepers with 1660 sleepers per km for main line and PSC sleepers with 1540 density for loop lines and sidings are proposed.

3.6.3 Point & Crossing: 1 in 12 curved switches with CMS crossing on PSC sleepers are proposed for main line & loop lines.

3.6.4 Ballast: Machine crushed stone ballast of 65 mm size will be used. Ballast cushion provided on main line & loop lines will be 300 mm & 250 mm respectively.

3.7 BRIDGES: Bridges are proposed to be built to 25T Loading standard of 2008.

3.8 FIXED STRUCTURE CLEARANCE: clearance for fixed structures is adopted as per recommended Schedule of dimensions for 1676mm BG.

3.9 ROAD CROSSINGS: ROB/RUB has been provided at road crossing.

3.10 STATION AND BUILDINGS :

3.10.1 Stations:-New stations, all 'B' class are proposed as under:-

S/N	Station	Chainages	Inter distances	Remarks
1	Thayat Hamira (Existing)	0.000		
2	Kalyan ghat	8.600		Halt Station
3	Baishakhi	18.700		Halt Station
4	Lanela	28.500	28.500	Crossing Station
5	Mokal	40.500		Halt Station
6	Sanu	55.00	26.500	Terminal Station

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Total 06 Nos(1 crossing station)are new stations. Station Building: 02 Nos new station buildings are proposed along with required S&T structures. The officers, Subordinate rest rooms are proposed at Sanu.

3.10.2 Residential accommodation: - Provision for residential accommodation has been made in the estimate for 30% of the maintenance staff.

CHAPTER - IV

4.0 ROUTE SELECTION:

The alignment takes-off from existing Thiyat Hamira station and further deflects to right by 16^0 46' 30'' i.e. towards west to reach Kalyan Ghat. From Kalyan Ghat it goes to Baishakhi and then it goes near to Lanela. From Lanela alignment traverses to Mokal. and finally reaches sanu.

CHAPTER - V

5.0 PROJECT ENGINEERING ESTIMATTION OF COST AND CONSTRUCTION SCHEDULE

5.1 PROJECT ENGINEERING :

5.1.1 For the purpose of estimating length of project line is considered as one section only.

1. **Section - Thiyat Hamira-Sanu 55.800 Kms.**

The quantities for various items of work have been worked out on the basis of detailed L-sections.

5.1.2 LAND :

5.1.2.1 Thiyat Hamira-Sanu being a New BG line project total land is to be acquired through out the section from Thiyat Hamira to Sanu.

5.1.2.2 For this proposed line total 380.67 Hectare land will be required.

5.1.2.3 Apart from above in some locations forest land will be acquired.

5.1.2.4 Total land required is 380.67 hectares.

5.1.2.5 Land is proposed to be acquired for single BG line only. In case of bank the land acquisition is proposed considering formation width of formation as 6.85m with side slopes of 2:1,

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keeping 3mts. and 5m distances, from toe on either side. In case of cutting the land acquisition is proposed considering formation width of 6.25mts at the bottom excluding side drains and slope of 1:1.

5.1.2.6 Land is also required for loops, station building & residential quarters etc at station yard.

5.1.2.7 Provision has also been made for compulsory acquisition of land as per new land acquisition Act of Sept. 2013.

5.1.3. FORMATION :

5.1.3.1 Earthwork for bank is proposed with contractor's own earth of good quality compacted to maximum dry density of 98% as per modified proctor test,

5.1.3.2 The quantity of earth work have been worked out considering the following:-

(a) The width of formation in bank is kept as 6.85m at top with a side slope of 2 horizontal to 1 vertical.

(b) The width of cutting is kept as 6.25mts at the bottom excluding side drains of 1.2mts top width. For cutting in hard soil side slope of 1:1 and for rock cutting top 300mm depth with side slope of 1:1 and for remaining depth steeper slope of 1 horizontal to 4 vertical has been taken.

5.1.3.3. Dry stone pitching is proposed on the approaches of bridges.

5.1.4 BRIDGES :

5.1.4.1 The total number of bridges on the project alignment are 44 Nos. grouped as under:-

Section	Important	Major	Minor	RUBs	ROBs	Total
(NEW)	NIL	03	29	08	02	42
TOTAL	NIL	03	29	08	02	42

5.1.4.2 The estimate for major bridges has been prepared by actual calculation of quantities based on typical drawings and minor bridges are divided into groups according to span, height and length and typical calculation for each group were made.

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5.1.4.3 Major and minor bridges which are mostly with PSC slabs are proposed to 25T 2008 loading standard.

5.1.4.4 Abstract and list of bridges are placed in Annexure.

5.1.5.4 TRACK STRUCTURE:

Main line is proposed with 60kg new rails on PRC sleepers with sleeper density of 1660 and 300 mm ballast cushion.

5.1.5.1 60kg Second hand rails are proposed to be used for loop lines on PRC sleeper with sleeper density of 1540 and 250mm ballast cushion.

5.1.5.2 Good quality machine crushed stone ballast as per Railway's specification is proposed to be used.

5.1.6 CURVES: curves less than or equal to 2.0 degree are proposed. Abstract & list of curves are placed at Annexure.

5.1.7 LEVEL CROSSINGS: There is no level crossing on the proposed alignment. ROB/RUB have been provided at all road crossing.

5.2 STATIONS AND BUILDINGS:

5.2.1 Being a New line project 06 Nos (1 crossing station) of new stations are provided.

5.3 RESIDENTIAL BUILDINGS:

Total 33 nos. of quarters are proposed for station staff, Civil, Electrical and S&T staff and for gang quarters.

Note---Considering 30% requirement. No type I quarter proposed as there is no category D after 6th pay commission.

5.4 EQUIPMENTS:

The required tools and equipments were kept in report.

5.5 GENERAL CHARGES :

Provision in general charges have been made on the following:-

Majority of the works will be executed through agency of the contractors; hence minimum provision is kept for Gazetted and non-Gazetted staff in Civil Engineering Estimate.

The necessary provision has been kept for all concerned departments.

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5.6 RATES:

Rates of accepted tenders and as per Railway Bd, Rate list th rate for Rails ,Sleepers etc. are taken for estimating purpose.

5.6.1 COST : Estimated cost of the project is as under

	Thayat Hamira-Sanu
Gross Cost	Rs. 262,45,62,552.00
CRRM	NIL
Net Cost	Rs.262,45,62,552.00

PERIOD OF COMPLETION

The completion period for the whole project will be 3 years.

5.7 SCHEDULE OF CONSTRUCTION :

YEAR	GROSS COST
1st year	Rs. 92.05 Crores
2nd year	Rs. 107.66 Crores
3rd year	Rs. 62.74 Crores
Total	Rs. 262.45 Crores

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