

Chapter 2 - Infrastructure

This Chapter includes two long paragraphs viz. (a) 'Construction of Dimapur– Kohima New Line Project' and (b) 'Functioning of Special Purpose Vehicles of IRCON International Limited' involving money value of ₹ 1100.33 crore. These paragraphs highlight compliance issues relating to Planning including conducting Survey, acquisition of land, Procurement of Stores, Execution of the New Line Project and functioning of Special Purpose Vehicles of IRCON, etc.

2.1 Construction of Dimapur – Kohima New Line Project: Northeast Frontier Railway

2.1.1 Introduction

Nagaland is a land-locked hilly State in the North-Eastern Region of India. One of the biggest impediments in development of the State has been its inadequate transport infrastructure. Road transport is the only means of transport for the common people. The existing Broad Gauge (BG) Railway Line in the entire State is only 11.13 km. The functional railhead connecting Nagaland with the rest of the country is Dimapur, which is on the border with Assam and about 74 km. away from Kohima, the State Capital.

With a view to develop Railway network in Nagaland, a Reconnaissance Engineering-cum-Traffic Survey (RETS) was conducted in 2004 by Northeast Frontier Railway (NEFR) Construction Organization for construction of a new BG Railway line from Dimapur (DMV) to Kohima. The RETS Report was submitted in December 2004 with an estimated Project Cost of ₹ 911.99 crore for 88.40 km up to Zubza Town near Kohima. The Rate of Return (RoR) of the New Line Project was calculated at (-) 26.44 *per cent*. It was proposed to terminate the Railway line at Zubza, which was 23 km⁴⁷ short of Kohima due to the steep terrain from Zubza to Kohima. Accordingly, a New Line Project was sanctioned by Railway Board in 2006-07 at an initial Estimated Cost of ₹ 850 crore. The Project was declared as a National Project in May 2007.

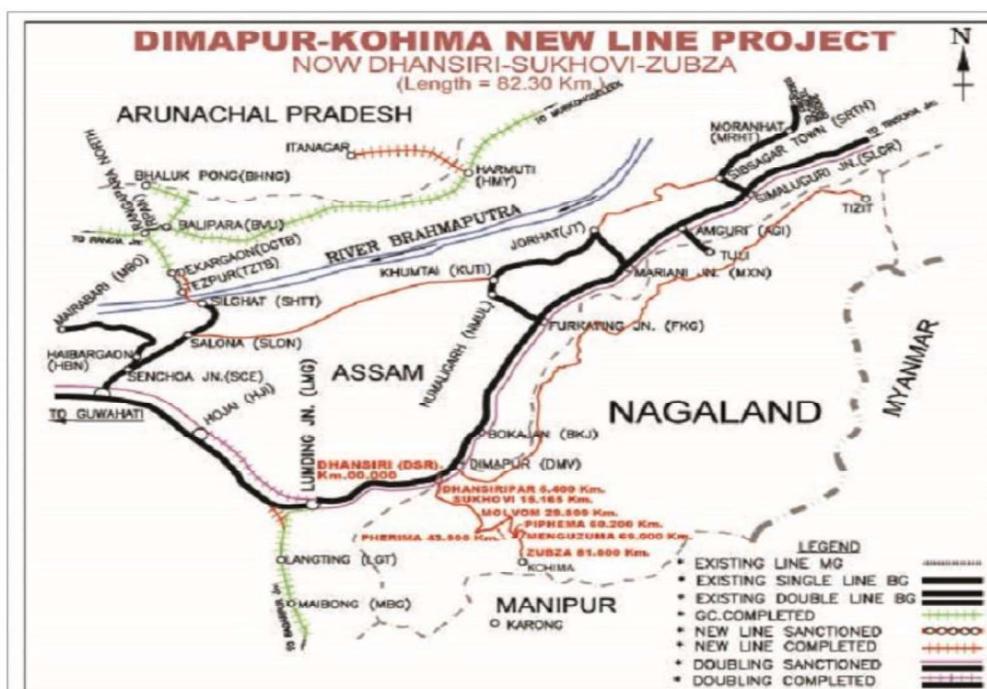
In January 2010, the Government of Nagaland requested Railway Administration for revision of the proposed alignment citing several problems – Reserve Forest and Zoological Park near Dimapur, very high compensation demanded by the farmers and connectivity to the Ganesh Nagar Industrial Area. Subsequently, the take-off of the project was

⁴⁷ As per RETS report of 2004.

changed to Dhansiri, a Railway Station on the BG main line in Karbi-Anglong district of Assam, about 19 km from Dimapur Railway Station.

Detailed Estimate for the New BG Line from Dhansiri – Sukhovi - Zubza was sanctioned by Ministry of Railways (MoR) in August 2015 for ₹ 2309.96 crore. The first revised estimate of the Project sanctioned in May 2022 was for ₹ 6663.20 crore. The month/period of completion of the New Line Project was March 2020 which has since been extended to March 2026. The physical and financial progress of the Project was below 25 per cent as of 31st March 2022.

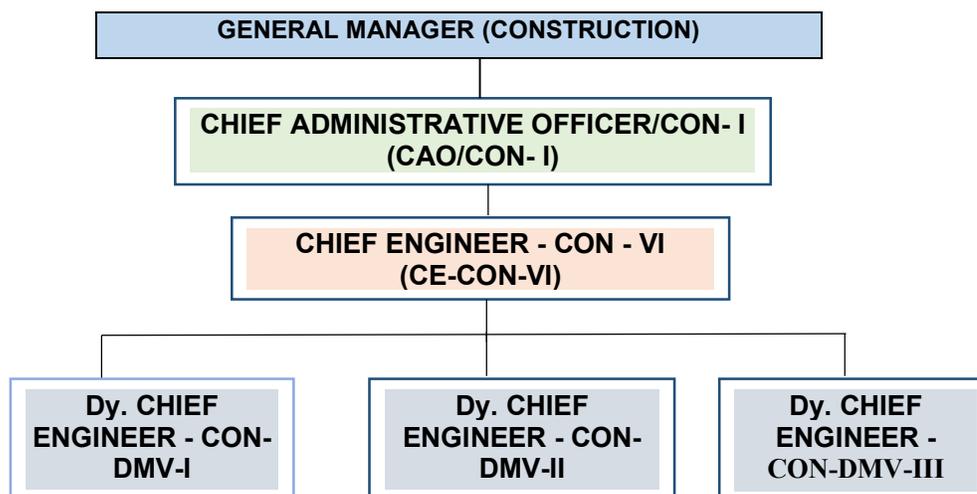
Dimapur to Zubza, now Dhansiri-Sukhovi-Zubza



Source: Records of NEFR (Construction)- brief of all projects as on 31 July 2018

The Chief Administrative Officer/Construction-I (CAO/Con-I) is the overall in-charge of the DMV-KOHIMA New Line Project and is responsible for its proper implementation. CAO/Con-1 reports to General Manager (CON) and is assisted by a Chief Engineer (CE/Con/VI) in Headquarters, Maligaon, & three Dy. Chief Engineers in Field Units– two in Dimapur and one in Lumding- along with Executive Engineers (XENs), Assistant Executive Engineers (AXENs) and other subordinate staff.

Organizational structure



This Audit report is on compliance issues relating to Planning including conducting Survey, acquisition of land, Procurement of Stores and Execution of the New Line Project, etc. The audit findings are discussed below:

2.1.2 Audit Findings

2.1.2.1 Planning

(A) Survey

(i) Infructuous expenditure of ₹ 5.44 crore on Pre-Construction Survey conducted by M/s RITES Ltd.

A Contract Agreement (CA) was awarded to M/s RITES Limited in July 2008 at a total cost of ₹ 6.85 crore for 'Final Location Survey (FLS)⁴⁸ between Dimapur to Zubza (approx. 88.40 km) with Geo-technical investigation and Pre-construction Survey⁴⁹ in connection with construction of new BG Railway line. The due date of completion of the work was 26 September 2009. Railway Administration later decided to delete the items of work related to Final Location Survey and the items related to Pre-Construction Survey were only executed.

Review of records revealed that M/s RITES completed the work at a total cost of ₹ 7.0 crore as per the Terms of Reference (ToR) and handed over Pre-Construction Survey Report to Railway Administration in November

⁴⁸ A Final Location Survey will generally be a post investment decision investigation to prepare working details and to make accurate costing in certain cases.

⁴⁹ Pre-construction Survey/Preliminary Survey consists of a detailed instrumental examination of the route to be selected as a result of the reconnaissance survey in order to estimate the cost of the proposed railway line.

2011. In December 2013, Railway Administration issued a Completion Certificate for the work.

Railway Administration awarded another Contract to M/s Associates Construction Company in May 2010 for the work- 'Conducting Geo-technical & geological investigation, sub-soil investigation for major/minor bridges and tunnels, Land Survey in connection with construction of new BG Line from Dimapur-Kohima' for ₹ 1.99 crore. The work was completed at a total cost of ₹ 2.52 crore.

Due to land acquisition problems and falling of a Zoological Park in the proposed alignment, the originating Station of the New Line Project was shifted from Dimapur to Dhansiri. The changed alignment originating from Dhansiri met the previously finalized alignment (by M/s RITES) which was at about 17 km from Dimapur end. To finalize the new alignment, FLS work was awarded to M/s Pioneer Surveyors from Chainage 0.00 km. to 20.00 km. in July 2012.

In February 2015, Railway Administration requested M/s RITES to suggest corrective measures for certain major anomalies detected in its Pre-Construction Survey Report (from Km. 20.00 to Km. 88.40). In reply, M/s RITES stated that the Final Report for Pre-Construction Survey was handed over to NEFR Administration after incorporating its comments. However, M/s RITES suggested some corrective measures, which were not agreed to by Railway Administration.

Railway Administration finally decided to abandon the Pre-Construction Survey Report of M/s RITES on the ground of difficulty in construction of alignment. While proposing for fresh FLS of the alignment, Railway Administration admitted that the Pre-Construction Survey Report of M/s RITES was not properly reviewed at that time. Railway Administration later awarded another Contract to M/s Ayesa in November 2015 for the work- 'Development of BG Single Railway line alignment from Chainage km. 20 (Dhansiri near Dimapur) up to Zubza near Kohima (approximate length - 60.00 km)' at a cost of ₹ 1.52 crore. The work was completed in November 2019.

Audit observed that even though the Pre-Construction Survey Report for the proposed alignment was submitted in November 2011 by M/s RITES, however, Railway Administration could examine (2015) the Pre-Construction Survey Report after more than three years. Thus, casual approach of Railway Administration to timely scrutinize the Pre-Construction Survey Report led to abandonment of the Report. Also the

Geo-tech Report on the finalized Section was abandoned resulting in infructuous expenditure of ₹ 5.44 crore⁵⁰ (**Annexure 2.1**).

Railway Administration in their reply stated (May 2022) that the alignment of RITES from Km 17.00 to Kohima was reviewed mainly to (i) avoid skirting of slopes which, owing to the geology of the area had the potential of inducing landslides, (ii) avoid sharp curves in Major Bridge portions and (iii) reduce overall alignment in curves by increasing length of tunnels. The decision to review the alignment was also attributed to inexperience of NEFR in construction activities in hilly terrain.

The reply of Railway Administration does not address the audit observation, i.e., failure of Railway Administration to timely review RITES Survey Report which was submitted in November 2011. Further, inordinate delay of about 3.5 years on Railway Administration's part in detecting/raising issues on technical anomalies/construction difficulties with M/s RITES led to abandonment of Survey Report. This, consequently led to infructuous expenditure of ₹ 5.44 crore on account of preparation of survey report by RITES.

As regard inexperience in construction activities in hilly terrain, it is pertinent to mention that the construction activities in adjoining Lumding - Silchar Gauge Conversion Project, which involved similar terrain, were in full swing in 2010 and the railway regularly experienced numerous cases of slope failure in the project. The reply of Railway Administration is vague, hence not tenable.

(B) Acquisition of land

Railway Administration started the land acquisition process for the Project from 2015 and continued post March 2021. Total compensation paid for land and zirat⁵¹ was ₹ 527.36 crore. The land acquisition process was delayed.

Audit noticed several major irregularities in the land acquisition process which led to irregular/infructuous expenditure of ₹ 141.70 crore during the period from 2015 to 2021 are discussed in subsequent paragraphs:

(i) Unjustified haste in acquisition of land led to infructuous expenditure of ₹ 23.34 crore

Pre-Construction Survey of the Project was conducted by M/s RITES and the Final Report was submitted to Railway Administration in November 2011. In 2012, the original alignment of Dimapur-Kohima New Line Project was revised. The take-off point of the New Line Project was

⁵⁰ Calculated proportionately

⁵¹ Zirat: Crops, including trees etc. standing on land.

changed from Dimapur (Nagaland) to Dhansiri (Assam). It was also decided to terminate the New Line alignment in Zubza, a place 18 km⁵² short of Kohima, due the high terrain from Zubza to Kohima.

Scrutiny of land acquisition records revealed that Northeast Frontier Railway Construction Organization (NFRCO) acquired a significant area of land (6161071.34 sq. ft.) for the Project in March 2016 on the alignment recommended by M/s RITES in their Pre-Construction Survey Report (November 2011), though the same was already decided (September 2015) to be improved/replaced by a new alignment and the work was already awarded to M/s Ayesa.

Audit further observed that the land acquired by Railway Administration based on the Pre-Construction Survey Report of M/s RITES did not fall on the revised alignment (as recommended by M/s Ayesa) of DMV-Kohima (now Dhansiri - Zubza) New Line Project. Railway Administration paid compensation of ₹ 23.34 crore for acquisition/procurement of land which was now of no use due to revision of the alignment and ultimately had to be abandoned.

Thus, it was observed that NEFR Administration was fully aware that the work for development of the revised alignment for the New Line Project (LoA issued in September 2015) was already in progress. Railway Administration did not wait for the Report on the proposed revision/update of the alignment and acquired land hastily based on the old RITES Pre-Construction Survey Report (**Annexure 2.2**).

Railway Administration in their reply stated (May 2022) that Land Survey on ground was completed by March 2015. Thereafter, in September 2015, a new Agency, M/s Ayesha was engaged to revise/refine the alignment from Chainage (Ch.) 20 km. to Zubza Yard (82.50 km.). Railway Administration contended that as the alignment in Kohima District did not require any major changes, it was decided to go ahead with land plan already surveyed in March 2015. Accordingly, in January 2016, Railway field authorities requested Deputy Commissioner (DC) Kohima to prepare and submit the estimate for compensation amount towards land acquisition. The land compensation amount of ₹ 23.34 crore was transferred to DC, Kohima on 26 February 2016. Thereafter, Railway Administration approached DC, Kohima, on 29 February 2016 to stop the disbursement of land compensation on the plea that Railway was finalizing a new alignment. However, the land compensation amount of ₹ 23.34 crore was disbursed by State authorities on 26 April 2016.

⁵² As per M/s Ayesa Report of 2019.

Railway Administration also stated that the land thus acquired could be utilized as Dumping Yards for 10 tunnels and one Escape Tunnel.

The reply of Railway Administration is not tenable. The contention that the change in alignment was not expected in the area proposed for acquisition of land was completely misleading and bereft of facts. Railway Administration was fully aware of the need for re-survey/change of the alignment from Ch. 20 km. to Zubza Yard (82.50 km.) which included the area proposed for land acquisition in February 2015 itself. Accordingly, in September 2015, M/s Ayesha was engaged to revise/refine the said alignment. Despite engaging the Agency for revision/refinement of the alignment, Railway Administration did not wait for agency's Report and acted in undue haste in transferring the compensation amount of ₹ 23.34 crore for acquisition of land to DC, Kohima on 26 February 2016.

Further, Railway Administration's contention (May 2022) that the acquired land could be utilized as Dumping Yards for 10 Tunnels and one Escape Tunnel is also not acceptable. As per records, only nine small tunnels, eight tunnels with length of less than one km, were within the new alignment Chainage and not in the old alignment Chainage with acquired land which was abandoned (June 2019). Moreover, for all the nine small tunnels, adequate land was already acquired in portal area to cater to all requirements including dumping of debris. Besides, the debris from T-10 could not be dumped in the abandoned land, as almost the entire area was practically inaccessible for debris from T-10 to be dumped across a ditch/gorge (having depth of approx. 24 mtr. and width approx. 380 mtr.) laying near to the portal of the tunnel.

Thus, acquisition of land for the New Line Project on the alignment already under up-dation/revision (which was ultimately abandoned) indicated gross negligence and failure of NEFR Construction Organization in safeguarding the financial interest of Indian Railways. NEFR may fix accountability on officials involved in taking such a callous/negligent approach towards acquisition of land.

(ii) Irregular expenditure of ₹ 79.70 crore on acquisition of land over Tunnels

Para 819 of Indian Railway Engineering Code, *inter-alia*, states that: 'permanent land' is land which will be required permanently after the Railway is open for traffic and the work of construction is complete. This head includes all land to be occupied by the formation of the permanent line of Railway with side slopes of banks and cuttings, the entrances to tunnels and shafts belonging to them.

Further, instructions issued by Railway Board's letter in September, 2018 stipulate that the following guidelines are to be followed for land acquisition near Tunnels:

- No land acquisition over tunnels, except at the entrances of the tunnels, i.e., for portal and for any adits/shafts which may be required for facilitation of the rate of construction or for provision of safety features.
- In geologically unstable regions, where there are chances of cave-ins during tunneling/excavation and also at locations of lower over burdens land acquisition may be resorted to on a case-to-case basis by Zonal Railways, based on practical considerations.

Northeast Frontier Railway Construction Organization (NFRCO) indiscreetly acquired land situated over/above all Tunnels⁵³ of the Project. It was also noticed that land over most of the Tunnels except Tunnel No. 1, was acquired prior to issue of Railway Board instructions in September, 2018.

Audit observed that even though NFRCO was initially reluctant to acquire the land over Tunnel No. 1, the same was ultimately acquired, primarily based on the request of Chief Secretary, Nagaland. In his letter⁵⁴ addressed to the GM (Con) NEFR, the Chief Secretary, Nagaland cited the example of earlier (February 2016 to November 2018) acquisition of land over ten Tunnels⁵⁵ of the Project and the geological instability of the region. His request for acquisition of the land over Tunnel No: 1 was acceded to and NFRCO acquired the land at a cost of ₹ 5.07 crore in March 2020 . The same was justified stating that the acquisition conformed with (a) Para (ii) of the Railway Board letter of September, 2018 and (b) the request of the Chief Secretary, Nagaland.

Audit scrutiny further revealed that NFRCO initially acquired land over all Tunnels being constructed over the Project, except Tunnel No. 1 for ₹ 74.62 crore. Later 5,99,723 sq. ft. of land over Tunnel No. 1 was also acquired at a cost of ₹ 5.07 crore. Audit did not find any document/record related to land acquisition cases indicating that any study was conducted on the possibility of cave-ins during tunneling/excavations as directed by RB (September 2018)⁵⁶. Final Location Survey Report of M/s Ayesa on the Project indicated the presence of overburden⁵⁷ over all Tunnels of the

⁵³ There are overall nineteen (19) tunnels in the project. However, calculation for acquisition of land over fourteen (14) tunnels has been made by Audit.

⁵⁴ Chief Secretary's, Nagaland D.O. Letter No: CSO/LR/7-141/ACQ-RAILWAYS/2014 (Pt-1) dated 19 December 2019.

⁵⁵ Tunnel nos. 2, 3, 6, 7, 8, 9, 10,17,18 and 19.

⁵⁶ Railway Board's letter no. 2018/W-I/Gen/Land Acquisition/Pt I dated 6 September 2018

⁵⁷ Overburden is the material that lies above an area.

Project and there was no mention of the possibility of cave-ins during tunneling/excavation.

Acquisition of land over Tunnels was in violation of codal provisions and Railway Board's Instructions of September 2018. Thus, Railway Administration's decision to acquire land over fourteen Tunnels in Dhansiri - Zubza New Line Project was irregular which led to avoidable expenditure of ₹ 79.70 crore towards acquisition of land over tunnels (**Annexure 2.3**).

Railway Administration in their reply stated (May 2022) that the land over tunnels was acquired in accordance with Naga Customary Laws and Article 371-A of the Constitution of India and also at the request of the Chief Secretary, Nagaland for acquisition of land over Tunnel No. T-1. It was further stated that a policy/code cannot over-ride Statutory Laws and there was geological instability/possibility of cave-ins in the area. Railway Administration also defended the acquisition of land over tunnels citing 'disturbed area' status of Nagaland and existence of Armed Forces (Special Powers) Act (AFSPA) in the State.

The reply of NEFR Administration is not tenable. Land over all other Tunnels, except Tunnel No. T-1 was acquired by Railway Administration without adhering to existing codal provisions. Railway Administration did not raise any issue with State Authorities in respect of acquisition of land over Tunnels and willingly paid compensation for the same. The issue of Customary Law and Article 371 A was raised only when Railway Board intervened in the matter (2018) and instructed to avoid acquisition of land over Tunnels as per codal provisions. This clearly established that Railway Administration failed to adhere to codal provisions for acquisition of land over Tunnels in earlier cases, which paved the way for raising compensation demand for Tunnel No. T-1.

On prevalence of Armed Forces (Special Powers) Act (AFSPA), disturbance by locals, it is known that each Project has its own challenges which are expected to be dealt locally with active co-operation of State Law & Order Authorities.

Thus, justifications like Customary Law and Article 371-A as well as geological instability & possibility of cave-ins for acquisition of land over Tunnel No. T-1 were clearly an afterthought to defend the acquisition. Had Railway Administration not acquired land over all Tunnels from the beginning of the land acquisition process as per codal provisions, the huge irregular expenditure of ₹ 79.70 crore could have been avoided. Railway Administration may look into it and fix accountability for acquisition of land in violation of codal provisions.

(iii) Avoidable expenditure of ₹ 12.97 crore on acquisition of extra land for line between Stations

As per Para 822 (C) of Railway Engineering Code, 'The minimum width of land to be taken up for a single line should be under ordinary circumstances as shown in the Sections and Tables printed as Appendix III. Para 829 of Code also provides that 'For the line between stations, the general arrangements for land shown in the sections in Appendix III should be followed. For new lines and doublings, the acquisition of agricultural land should be limited to the bare minimum. Area to be acquired need not conform to the arrangement given in Appendix III and the possibility of bringing borrow earth from elsewhere within reasonable distance or by making deeper borrow pits and in special cases even reducing the width of berms on either side of the embankment should be borne in mind'.

Further, as per Para 8.7.3 of Railway Track Engineering, land purchased for construction of Railway Line is generally enough to accommodate slopes, borrow pits/spoil banks and for some margin between the toe of the bank and borrow pits/spoil banks.

Railway Board, in October 2020 directed GM (CON), NEFR to review the land requirement and limit the land width in Block Sections to 3 m from toe of bank to economize the Project.

Review of land acquisition records of the New Line Project, however, revealed that NFRCO acquired land much in excess of the minimum width required for the line between Stations (Block Section). A comparative study of land already acquired with what was actually needed for a single BG Railway Line revealed that NFRCO did not adhere to codal provisions and the land was indiscriminately acquired for the Project. Audit scrutiny further revealed that NFRCO acquired 16,22,815.48 sq. ft. of land in excess of what was actually needed as per prescribed norms. In doing so, NFRCO incurred avoidable expenditure of ₹ 12.97 crore on acquisition of excess land (**Annexure 2.4**).

On this being pointed out by audit, Railway Administration stated (May 2022) that the land was acquired to bare minimum as per the requirement but in some place in small stretches, extra land has been acquired which was essentially required to facilitate the construction of major bridges, tunnel portal, dumping yard and station yard.

Railway Administration remarks were as follows:

(A) Chainage from 18300 meter to 20250 meter

Muck from tunnel cannot be dumped along the same chainage⁵⁸. It was also contended that area could not be used for dumping due to construction of Bridge No. 85 between T- 1 A and T- 1.

Railway Administration's contention is not tenable. As per official records, Tunnel T-1 A starts from Ch. 21020 m to 21160 m and Tunnel T-1 from Ch. 21397 m to 24943 m. There was sufficient acquired land (ditch/valley) between Tunnel T-1 A and Tunnel T-1 for dumping debris from Portal 1 of the Tunnel. Physical evidence (picture below) clearly shows/proves that the debris from Portal 1(P-1) was being dumped in the valley/ditch adjacent to portal P-1 which contradicts the claim of Railway Administration about necessity of increased width of land between Ch. 18300 m to 20250 m to accommodate debris from Tunnel No. 1.

Portal P1 of Tunnel No. 1- Deposition of tunnel muck in ditch besides Portal P1



Source: Picture captured by Audit on 29 October 2021 (1100 hours) of Portal P1 of Tunnel No. 1 of Dimapur-Kohima New line Project

(B) Chainage from 38350 meter to 39150 meter

Railway Administration stated that extra width was taken to dump muck from Tunnel T-4, as dumping outside railway boundary will create social and environmental problems.

As per official records, sufficient land was acquired between Portal 1 (starting from Ch. 39843 m) of T- 4 and Ch. 39150 m, including a 200m x 200 m plot of land, which was more than sufficient for dumping

⁵⁸ Here Chainage (Ch.) denotes the distance of the location on the proposed New Line alignment from the Originating Point/Station (Dhansiri). The reference distance of the Originating Point/Station (Dhansiri) has been taken as 0 meter.

debris. There was absolutely no need to acquire the wide strip of land between Ch. 38350 m and 39150 m.

(C) Chainage from 43050 meter to 43300 meter

This Chainage falls in the location of Major Bridge No. 154 (Ch. 42695 to 43264). It is normal practice to acquire land of 50 m width on both sides of the center line of alignment of a Major Bridge. It was also stated that major/important bridge approaches are provided with minimum 50 m width for future repair and inspection.

Railway Administration reply is not tenable, as there is no extant/codal provision for acquisition of land over/along Major Bridges. Thus, acquisition merely based on 'normal practice' cannot be justified.

(D) Chainage from 73200 meter to 73600 meter

This stretch of land falls under Portal 2 of T-15 and generally, a Portal requires extra land for excavation and dumping of debris.

As per records, T-15 is a very small Tunnel⁵⁹ (Length: 160 m) and not much land was required for dumping debris. The stretch of land under consideration was 400 m long (Ch. 73200 to 73600) and only 20 m of this stretch (Ch. 73200 to 73220) falls inside T-15. In this regard 44000 sq. m of land was acquired, whereas the requirement was only 20164 sq. m. Moreover, a ditch existed between Ch. 73260 and 73280, which could be used for dumping debris of T-15. Thus, extra land of 23836 sq. m. was acquired unnecessarily, in violation of extant Rules for land acquisition.

(E) Chainage from 73600 meter to 73800 meter

As per Railway Administration reply, this stretch of land falls under A1 of Major Bridge No: 187, which required extra width.

Railway Administration reply is not tenable. As per official records, A1 of Major Bridge No:187 falls at Ch. 73910, which is more than 100 m away from the chainage (Ch.73800) up to which extra width of land was acquired. Moreover, to cater to the need for extra land at A1, a 120 m long and 100 m wide strip of land was already acquired.

Thus, non-adherence to extant provisions for acquisition of land for line between Stations (Block Section) led to avoidable expenditure of ₹ 12.97 crore. Reasons for acquisition of extra land may be investigated by Railway Administration and accountability fixed for the same. Steps may be taken to avoid such irregularities in future.

⁵⁹ Chainage of T-15 (including Portal) is from 73060 to 73220 i.e., 160 m long.

(iv) Irregular payment of compensation of ₹ 6.97 crore on Re-survey/re-classification of land

The Nagaland Land (Requisition & Acquisition) Act, 1965 deals with land acquisition cases and other related activities in the State.

Para 7(1) of the Act deals with the methodology where interested persons can appear personally or send duly authorized Agent before the Collector and state the nature of their respective interests in the land and the amount and particulars of their claim to compensation for such interests. Para 11 of the Act deals with the methodology of award of compensation which, *inter-alia*, provides that payment of such compensation may be agreed upon in writing between such persons and the Collector or in the absence of an Agreement, reasonable compensation in respect of:

- (a) requisition of such land; and
- (b) damage done during the period of requisition of such land.

Audit scrutiny of land acquisition cases related to Dimapur - Zubza New Line Project revealed that in two cases, Railway Administration paid additional compensation of ₹ 6.97 crore on account of re-classification/ re-survey of acquired land just after two to three years of payment of compensation to the affected land owners.

In both cases, re-survey/re-classification was done by the State Administration and no Joint Re-survey/Re-classification Report was found on record. Audit noticed that in one case, revised Estimates, along with Calculation Sheets for assessment of compensation on re-surveyed/re-classified land were forwarded by the District Administration to Railway authorities with only the signature of DC, Dimapur i.e., without joint signatures of Railway officials. When the issue of absence of joint signatures of State and Railway Officials on the Calculation Sheets and revised/additional Estimates of compensation was flagged by Associated Finance, the same were re-submitted with signatures of Railway officials on Xerox copies of original Calculation Sheets.

Audit found that compensation of ₹ 1.12 crore was also paid for Fish Ponds, which were non-existent during the original Survey, on the basis of re-survey of the land. Review further revealed that Dy. CE (Con), DMV, vide letter⁶⁰ addressed to DC, Dimapur stated that the Land Survey and Zirat⁶¹ Survey from Dhansiripar Village to Chumukedima were conducted along with District officials from the Land Record & Survey Department,

⁶⁰ Letter No: W/207/DMV/2014/19 dated 16 December 2014

⁶¹ Zirat: Crops, including trees, etc., standing on the land.

Gaon Buras, Village Chiefs and Villagers. There was nothing on record to show that DC, Dimapur, ever replied/contradicted Dy. CE (Con), DMV letter regarding Joint Land Survey/Zirat Survey with officials of relevant Departments (Land, Fisheries, etc.) and other relevant persons/entities (Gaon Buras, Village Chiefs and Villagers).

Thus, failure of Railway Administration to contest the compensation claims, based on irregular re-survey and in violation of Rules thereof, was questionable. Railway Administration decision to pay additional compensation on account of re-survey/re-classification of land was unjustified which led to irregular payment of ₹ 6.97 crore (**Annexure 2.5**).

In reply, Railway Administration stated (May 2022) that the land classification was done by the District Administration and not by Railways. Land Acquisition in Dimapur District from 2.8 km to 18.3 km started on 6 August 2014 and compensation was paid in March 2015. Later in February 2017, an amount of ₹ 2.66 crore was paid to affected land owners, comprising mainly of House, Fisheries and few plantations which were left in the main estimate, as officials from Fisheries Department and Public Works Department (PWD) were not available when the estimate was finalized.

All the fisheries were jointly surveyed by the CEO, Fisheries Department and XEN/CON/DMV on 15 October 2015 and the estimate was prepared by Fisheries Department. Houses and other left-out property were subsequently jointly surveyed on different dates as per convenience of State officials and Railway officials. State authorities were requested to furnish copies of Joint Re-survey/Re-classification Reports. Therefore, it can be seen from the above that there was no irregular payment regarding Re-Survey/Re-Classification of land.

Railway Administration reply is not tenable. As per available records, it was clear that in some cases, Joint Verification for Re-survey/Re-classification were not conducted. Contention of non-payment of compensation of left-out property and Fishery cases was not acceptable, as the issue of absence of officials and non-payment for property was neither raised by beneficiaries nor officials during Original Survey or when compensation was received by beneficiaries. It was clear that compensation payment for Re-survey/Re-classification was an afterthought and not based on facts or as per the Nagaland Land (Requisition & Acquisition) Act, 1965. Thus, the decision of Railway Administration to pay additional compensation without following Rules on the plea that Court proceedings were long and time consuming, was unjustified.

The issue of irregular additional payment for Re-survey/Re-classification needs to be scrutinized thoroughly and accountability be fixed on concerned officials. It may be ensured that future cases of Re-survey/Re-classification are dealt as per land acquisition rules.

(v) Irregular Payment of Establishment Charges of ₹ 18.72 crore on Land Compensation Cost

As per Para 853 of Indian Railway Engineering Code: 'The State Government is entitled, under Article 258 of the Constitution of India, to the re-imbusement of extra expenditure actually incurred over the Land Acquisition staff and contingencies for the work of acquisition for the Central Government. A reasonable charge, calculated on percentage basis, would be justified if the amount of such extra cost cannot be arrived at otherwise. Cost of litigation arising out of Collector's award also will be borne by the Railways'. Further, Para 854 of Indian Railway Engineering Code provides that the entire cost of any special establishment which may be entertained under Government Orders for acquisition purposes is included in the cost of land whether incurred by Civil or Railway Disbursing Offices.

Scrutiny of records related to acquisition of land for Dimapur-Zubza New Line Project revealed that:

- (A)** State Government (Nagaland) levied Establishment Charges/Cost at the rate of 8 *per cent* on total land acquisition cost/amount. The Establishment Cost at the rate of 8 *per cent* had two separate components viz. (i) expenses as State Revenue at the rate of 4 *per cent* and (ii) expenses for Technical Survey and preparation of Departmental Estimates at the rate of 4 *per cent*.
- (B)** Total payment made (inclusive of 4 *per cent* State Revenue) to Nagaland State Land Acquisition authorities by Railway Administration on acquisition of land for the Dimapur-Zubza New Line Project was ₹ 486.73 crore.

Audit observed that in land acquisition cases, codal provision authorized the State Government to levy Establishment Charges/Cost to be incurred on Land Acquisition staff and any special establishment contingencies for the work of acquisition for the Central Government. Levy of Establishment Charges/Cost, on subjects/matters other than that mentioned above viz. State Revenue, clearly violate codal provisions thereon. Railway Administration's failure to identify and object to the unfair levy/demand of Establishment Charges (as State Revenue) at the rate of 4 *per cent* by the State Government led to irregular payment of ₹ 18.72 crore **(Annexure 2.6)**.

On this being pointed out by Audit, Railway Administration stated (May 2022) that the matter was taken up with State authorities and after obtaining their views, further required steps would be initiated for return of the amount levied as State Revenue.

Railway Administration needs to take appropriate steps in this regard and pursue the matter with the State Government to return the amount of ₹ 18.72 crore levied as State Revenue.

(C) Design and Drawings

Indian Railway Code for the Engineering Department and extant instructions of the Ministry of Railways (Railway Board) envisage that Contracts should not be awarded unless all Plans, Drawings and Estimates are approved/sanctioned by the competent authority. Extant provisions also envisage that due care should be exercised in conducting necessary soil and site investigations before finalization of Design & Drawings.

Anomalies related to Design & Drawings are discussed in subsequent Paragraphs.

(1) Avoidable liability of ₹ 879.05 crore due to injudiciously proposed cross-section of Tunnels

As per Paras 3.1 and 3.3 of Chapter 6 of Handbook on Railway Tunnels, shape and dimension of the cross-section of a Tunnel are determined by several factors, like required dimensional/clearance profile, additional space requirements for operating and safety equipment, drainage requirements, requirements arising from safety and rescue viewpoints, etc. Economic consideration is also an important factor in determining the dimension of the cross-section of a Tunnel.

One factor affecting determination of a tunnel cross-section is additional space required for operating equipment. In Tunnels with provision for 25 KVA Electric Traction power supply, Over Head Equipment (OHE) is one such operating equipment required to be provided. There are two types of Over Head Equipment namely, fixed OHE [also called Rigid Overhead Conductor Rail System (ROCS)] and flexible OHE. ROCS has many advantages like less requirement of overhead tunnel space, less maintenance cost etc. over flexible OHE.

Rigid Overhead Conductor Rail System (ROCS)/ Fixed Over Head Equipment



Source: RDSO's instruction No. TI/IN/0041

Flexible Over Head Equipment



Source: Indian Railway Green Energy Initiatives (irgreenri.gov.in)

Another factor affecting determination of a Tunnel cross-section is space required for provision of rescue pathways/walkways along the track inside the Tunnel. As per European Regulations (2014), walkway of minimum width of 0.80 m has to be provided on at least one side of tunnels (catering to single track) having length more than 500 m. Swedish Regulations provide for walkways of 1.20 m width for tunnels of more than 500 m in length. Further, Chief Commissioner of Railway Safety (CCRS) in May 2020, advised Railway Board to consider providing ROCS instead of flexible OHE in new tunnels in view of its operational as well as economic benefits due to less requirement of head space. This could lead to savings of about 9 *per cent* in construction cost and overall savings of about 25 *per cent* of the total cost of the tunnel.

Review of proposed cross-sections of Tunnels being constructed (T-6 to T-19) in DMV-KOHIMA New Line Project revealed that:

- (i) The Tunnels had provision for flexible Over Head Equipment (OHE).
- (ii) Walkways of 1.20 mtr width were provided on both sides of the track.
- (iii) All Tunnels had provision of Ballastless Track (BLT) of 3.10 mtr width.
- (iv) Drainage with dimensions more than the requirement (as per Hydrological Study) was provided in cross-sections of all Tunnels.
- (v) All the above-mentioned facilities/equipment were provided in all Tunnels, irrespective of their length.

Review further revealed that Railway Board while scrutinizing the 1st Revised Estimate for the Project asked (April 2021) NEFR Administration to clarify the type of OHE (fixed or flexible) provided in the Tunnels as it would affect the size and cost of a Tunnel.

NEFR Administration in their reply (June 2021) stated that the reduction of height due to adoption of fixed type OHE structure do not influence the

overall tunnel profile. The overall dimension of tunnel profile adopted will remain same for both the cases; hence, there is no reduction in the cost of the tunnel due to adoption of fixed type OHE in the tunnel.

Audit observed that NEFR Administration did not take cognizance of the advice of CCRS for provision of ROCS instead of flexible OHE in the tunnels. Audit further noticed that the pathways of the maximum width inside tunnels were provided even though the projected passengers traffic for the section was negligible. Also, the drainage of more than the required dimensions was provided to cater to unforeseen situations of large amount of water entering the tunnels.

Thus, NEFR Administration's reluctance/refusal to provide fixed OHE which was recommended by CCRS and unnecessary provision of facilities in the tunnels led to anticipated avoidable liability of ₹ 216.75 crore and overall liability of ₹ 879.05 crore on proposed construction of 14 tunnels of the Project (**Annexure 2.7**).

Railway Administration in their reply stated (May 2022) that Dimensioning of tunnel profile is based on the following main requirements but not limited to:

Functional Requirement as per Indian Railway Schedule of Dimensions (IRSOD):

As per Diagram No: 1A (Modified) of Indian Railway Schedule of Dimensions (IRSOD), applicable to tunnels and bridges, height of fixed structures above Rail level for 25 KV AC is 5870 mm. 650 mm depth below Rail level is required to accommodate track structure. Therefore, minimum clear height of fixed structure from crown to tunnel floor comes to 6520 mm.

Safety and other emergency requirement:

Safety issues for self-evacuation during emergency, i.e., Escape Walkway width, Electrical and Mechanical (E&M) i.e., ventilation requirements, fire safety and mitigation issues i.e., spread of fire and smoke, signages & CCTV fixtures, etc., play an important factor in tunnel profile.

Structural Design Requirement:

Horseshoe shape for the tunnel was adopted for the Project, duly optimizing the cross-section area. It automatically accommodates even Flexible OHE requirement. Therefore, even if we go for the ROCS, it would hardly be possible to reduce the cross-sectional area of the tunnel.

It is clear that the cross-section is not governed by OHE height/type but by other requirements such as E&M equipment, Walkway width and most importantly, the Fixed structure envelope. Statement VII made for

comparison had used data from Delhi Metro Rail Corporation (DMRC). DMRC tunnel shape is circular whereas in this Project it was horseshoe shaped as explained above. Therefore, the comparison is not realistic as the tunnels shapes were different and used for different Railway systems.

During the Exit Conference, Railway Administration stated that till date (June 2022), there were no instructions from Railway Board for adoption of Rigid OHE installation.

The reply of Railway Administration was not tenable in view of the following observations:

(a) Non-provision of Rigid Overhead Conductor Rail System (ROCS)

Audit contention in favor of provision of Rigid Overhead Conductor Rail System (ROCS) instead of flexible Over Head Equipment (OHE) was primarily based on the following considerations:

(i) Less Construction Cost

Provision of Rigid Overhead Conductor Rail System (ROCS) definitely requires less vertical clearance as it can be easily fitted in the crown of the tunnel with minimum length of fixed equipment/fixtures. As far as IRSOD is concerned, this is not sacrosanct and is amendable.

Further, while recommending for provision of ROCS in tunnels, Chief Commissioner of Railway Safety (CCRS), who is the highest authority on Railway safety having sound knowledge of different aspects of IRSOD and with competence for waiver of Schedule of Dimensions (SOD), must have given due cognizance of this aspect. Literature available on the Internet also clearly favors ROCS over flexible OHE in tunnels due to requirement of less vertical clearance and consequent savings in construction cost.

(ii) Maintenance benefits including huge recurring savings

Provision of ROCS in tunnels instead of flexible OHE is hugely advantageous due to the following reasons:

Easy Operation and Maintenance

As the contact wire allows more wear and its installation/replacing is easy in rigid catenary system, maintenance cost is greatly reduced. Periodical control of current bar profile connectors and tightening/cleaning of isolators are the only maintenance operations to be conducted.

No risk of breaking-off, more security

As there is no traction stress, it allows more contact wire wear without risk of breaking-off in rigid catenary system (ROCS).

More current carrying capability

Besides these maintenance benefits, the most significant benefit of ROCS is that of huge savings in Maintenance Costs as pointed out by audit. Most importantly, provision of the type of Overhead Equipment system is primarily concerned with the Electrical Department (Open Line & Construction) which is the end user, and its opinion is of paramount importance. As per available records, no correspondences/consultations were made with the Electrical Department in this regard.

Railway Administration's contention that there were no instructions from Railway Board for adoption of rigid OHE installation, was not tenable. guidelines for provision of ROCS for Tunnels were issued by RDSO in September 2020, but the same were not implemented/provided by Railway Administration while designing the cross-section of Tunnels.

Thus, NEFR Administration (i) did not give due cognizance to the advice of Chief Commissioner of Railway Safety, (ii) did not implement the guidelines issued by RDSO and (iii) did not seek advice of the User Department for provision of ROCS, etc. which resulted in financial burden/liability to Railway.

(b) Disproportionate/excess provision of Walkway width

Railway Administration in their reply did not give reasons for excess provision of width of pathways, size of drainage, etc. However, during the Exit Conference, Railway Administration stated that optimum width of pathways (1.20 mtr) was provided as per provisions of UIC-779-9. It was required for safe movement in tunnels during regular maintenance and evacuation, in case of emergencies. Therefore, it was required in all tunnels irrespective of their length.

Regarding pathways inside tunnels, the maximum width as per the international norm was provided ignoring the fact that the projected passenger traffic for the section was negligible with bleak prospects for its future increase. In case of emergency/accident, the full width of walkways (1.2 mtr) would be available to passengers, besides additional space of 0.115 mtr (maintenance reserve) on either side, which extended the walkways to 1.315 mtr width on each side. It clearly indicated that provision of walkways with 1.20 mtr width on both sides of the track in tunnels was more than that actually required even after considering safety aspects.

Moreover, NEFR Administration applied same parameters (width) for provision of walkways in tunnels having length less than 500 mtr (in one case walkway was provided even for tunnel of 80 mtr length) as provided for tunnels having length of more than 500 mtr. This was in violation of EU

guidelines which were being followed by the Railway Administration. Further, the space beside the Ballastless Track provided inside the tunnels could also be used as Escape Pathways in case of emergency, thus obviating the need for providing Pathways of maximum dimension. Moreover, safety tunnels are provided in all tunnels of more than 3 km with cross passages at 500 mtr intervals which greatly enhances the safety of passengers in case of emergency.

Keeping all these aspects in mind, provision of Footpath/Walkways of maximum width was not judicious as it had a significant escalating impact on the cross-section of the tunnel and consequent huge financial implication.

Audit has made cost comparisons based on data available in CCRS recommendations which cannot be overlooked. Railway Administration may examine the macro-aspects of Audit suggestions, CCRS recommendations and also seek opinion of the end user without going into micro-aspects of the case. This can lead to huge financial savings towards construction and maintenance of all future Projects not only in NEFR but in other Zonal Railways too.

(2) Inconsistency in planning for tunnel construction led to avoidable expenditure of ₹ 6.14 crore

CA No. CON/DMV-KOHIMA/2331 dated 16 March 2017 was executed with ABCI Infrastructures Private Limited in March 2017 for the work - 'Construction of three Single Line BG Tunnel (approx. length: 3960 RM⁶²) in between Stations Sukhovi and Molvom in connection with DMV-KOHIMA New Line Project' at a total cost of ₹ 321.59 crore.

Review of records revealed that at first, the cross-section area of the Tunnels was approved with provision of ballastless track, which had lesser cross-sectional area. Later, considering maintenance problems of ballastless track, Railway Administration decided (March 2018) to construct the Tunnel with ballasted track and making provision for future track maintenance with Ballast Cleaning Machine (BCM). This change in scope from ballastless to ballasted track resulted in increase of the cross-section area of Tunnels No: T-1A, T-2 & T-3, as ballasted track required more horizontal space (width) than the ballastless one. As Tunnel No: T-1 already had sufficient cross-section area, there was no need to change the same. However, increase in the cross-section area of the Tunnels (T-1A, T-2 & T-3) resulted in increase in cost of the Tunnels by about 7.2 per cent of the Original Cost.

⁶² RM – Running Meter.

In 2020, Railway Administration proposed to provide ballastless tracks in all Tunnels of the Project (including T-1, T-1A, T-2, T-3) based on recommendations of the Study Team on Tunnels. The proposal was conveyed to Railway Board through Revised Estimate 1 (RE-1) for the Dimapur-Kohima New Line Project. The Revised Estimate was sanctioned in May 2022 and Railway Board agreed to the proposal of provision of ballastless track as recommended by the Zonal Railway Administration.

Audit noticed that in March 2018, Railway Administration decided to provide ballasted track instead of ballastless track for Tunnels No: T-1, T-1A, T-2 & T-3 (as initially proposed), on the plea that ballastless tracks had maintenance problems and its excessive cost. In March 2020, it was decided to adopt ballastless track on the ground of it being maintenance free and economical. The diametrically opposite stand on the type of track taken within two years clearly indicated that Railway Administration's decisions were not based on any scientific or engineering study.

As a result, the decision to change the scope of work from ballastless to ballasted track increased the cross-section area of Tunnels No: T-1A, T-2 & T-3. The subsequent decision of Railway Administration to again adopt ballastless track made the increase in cross-section area of the Tunnels unnecessary/meaningless.

Thus, unnecessary increase in cross-section area of Tunnels led to avoidable expenditure of ₹ 6.14 crore (**Annexure 2.8**).

Railway Administration in their reply stated (May 2022) that the length of tunnel increased to 4526 mtr to avoid skirting around the fragile slope of the hilly terrain. Tunnel No. 1 has ruling gradient of 1 in 60 with final cross-section area 41.55 sq. mtr. Ballasted track was preferred and it requires provision for maintenance by Ballast Cleaning Machine and hence the extra width. Therefore, to run Ballast Cleaning Machine for maintenance inside Tunnel No. 1, cross-section changed and increased. The Section adopted is as per decision taken in March-2018. In addition, Tunnel No. 1 is 3490 mtr long and requires extra cross-section so as to expedite fumes of the diesel loco from the tube of the tunnel by flow of air inside the tunnel.

Railway Administration further stated that based on the experience gained from ballasted track in tunnels in Lumbding- Silchar (LMG-SCL) Section in NEFR and from other sections, it was decided to adopt ballastless track in tunnels in Phase-3 of the Project. Hence, increase in cross-section area of Tunnel cannot be termed as unnecessary which was using ballasted track as per extant construction practice at the time of taking decision. Thus, the expenditure of ₹ 6.14 crore could not be avoided and was justified as per the then requirement.

Railway Administration's contentions are not tenable. The Audit observation was related to the increase in cross-section area of Tunnels No: T- 1A, T-2 & T-3 and not T-1, as mentioned in the Railway reply. The cross-section area of these Tunnels was originally approved with provision of ballastless track with lesser cross-sectional area.

Railway Administration did not make any advance study of the cost and maintenance implications/benefits in providing ballastless instead of ballasted tracks. Had Railway Administration made a proper study on the benefits of ballastless tracks in time, the entire extra expenditure on provision of excess cross-section area could have been avoided.

(D) Stores Procurement

(i) Procurement of Signaling material resulted in blockage of Railway revenues to the tune of ₹ 11.44 crore

As per Para 1438 of Indian Railway Code for Engineering Department, procurement of material for specific works should not be done in excess nor in undue advance of the requirement. While premature procurement results in blockage of Railway revenue and loss of utility of material, delayed procurement results in delay in commissioning of Projects. Better understanding between Departments involved in a Project and judicious approach of concerned Executives w.r.t. timely procurement, can avoid premature/delayed procurement of stores material.

In a construction Project, work related to Signal & Telecommunication (S&T) Department comes into play only after completion of civil construction activities. Inter-linking the procurement process of Signaling material with progress of Civil Engineering works is very important to avoid premature/delayed procurement.

Review of records related to procurement of Signaling material for DMV-KOHIMA New Line Project revealed that huge quantities of Signaling material were procured at a very early stage of Project execution (2017 to 2020) without ascertaining the progress of Civil Engineering works. It was found that all Signaling material required for the whole Project worth ₹ 11.44 crore was procured when progress of Civil Engineering works was not even 25 *per cent*. It was also seen that in many cases, material like Integrated Power Supply (IPS), cables etc., were still not installed/utilized even after more than 15-20 *per cent* of their codal life was over. Further review of records revealed that the revised target date of completion of the whole Project was March 2026.

Thus, improper and hasty procurement of signaling material led to blockage of ₹ 11.44 crore of Railway revenue for a period ranging from one year to four years (**Annexure 2.9**).

In reply, Railway Administration stated (May 2022) that:

- A) The Detailed Estimate of DMV-Kohima New Line project has been sanctioned by Board in the year 2015-2016 and initially tentative target for completion of the project was March/2020 and accordingly Civil Engineering works were also in advance stage. After observing the progress of the civil work and to complete S&T work within the targeted period, process for procurement of stores materials viz. IPS, Cables, LED Signals etc. had been initiated.
- B) The target set for First phase for this project was in the year 2020-21. As store procurement is a long lead process required around one year to receive the materials, hence, the procurement has been planned in the year 2017-18 and materials have been received in the year 2018-19. The physical work has been started in the year 2019-20 and finally get commissioned in the year 2020-21. Further, the work of Phase-2 is in progress and targeted for commissioning in the year 2022-23.

Further, the codal life of Signalling assets, viz. Cables, IPS is 20 years and codal life of LED signals, secondary cells, etc. are based in terms of operations i.e., from the date of installation. Hence, major portion of codal life of store materials those were procured is intact. Hence, there is no loss of revenue due to loss of codal life of Assets.

The reply of Railway Administration is not acceptable as huge quantities of Signaling material were procured at a very early stage of Project execution (2017-2019) when physical progress of the Project was very less. Consequently, most of the material was lying idle resulting in blockage of Capital and loss of significant portion of codal life.

Railway Administration may develop a proper mechanism for procurement of S&T material and initiate the procurement process only after civil engineering works of a Project reach an advanced stage. This would go a long way in avoiding cases of blockage of Capital due to idling of assets/materials.

2.1.2.2 Execution of Project

(A) Irregular Expenditure of ₹ 6.50 crore on provision of Blanketing Material

Detailed Estimate for DMV-KOHIMA New Line Project was sanctioned by Railway Board in 2015. While sanctioning the Detailed Estimate, Railway Board (January 2015) made observations against the proposed thickness (1 meter) of blanketing material and asked NFRCO to assess the real requirement. In response, NFRCO assured (February 2015) the Railway Board that in view the quality of local earth available, provision of 600 mm

thick blanketing material was kept in Detailed Estimate. This was reiterated by NFRCO in March 2015.

Further, as per RDSO Instructions (July 2019) for 'rationalization of formation layer thickness on Indian Railway track', blanketing material thickness over sub-grade soil of SQ1 category would be 550 mm.

Review of records related to provision of blanketing material in Dhansiri - Sukhovi Section of DMV-Kohima New Line Project, revealed that:

- (i) Contrary to its assurance, Railway Administration provided 1 m thick blanketing material on most of the formations in Dhansiri-Sukhovi Section.
- (ii) Despite specific Instructions of RDSO (July 2019), NFRCO continued to provide blanketing materials of 1 m thickness on formations after July 2019.

Further scrutiny of records revealed that Railway Administration provided 23296 cubic meter of blanketing material in excess of requirement, violating its own commitment (February & March 2015) at a cost of ₹ 2.67 crore. Moreover, even after clear RDSO Instructions, 33867 cubic meter blanketing material worth ₹ 3.83 crore was provided, in excess of requirement, after July 2019.

Provision of blanketing material of thickness more than agreed/required on formations, was highly irregular and led to avoidable expenditure of ₹ 6.50 crore **[Annexure 2.10 (a) & (b)]**.

In reply, Railway Administration stated (May 2022) that guidelines of GE: G-0014 (Nov-2009)/RDSO were followed for Earthwork & Blanketing in the Dhansiri - Sukhovi section as per which blanketing thickness was to be kept 1000 mm for SQ1 grade of soil in Railway formation. RDSO released guidelines in July 2019 i.e., 'Rationalization of formation layer thickness on Indian Railway track' with recommendation of 550 mm thick blanketing layer for SQ1 grade soil by the time formation was almost ready except few stretches where blanketing material was not compacted properly. These stretches were also provided with 1000 mm blanketing for uniformity in section as per extant guidelines applicable at that time.

The opening of section is done by CRS, who insist to do work as per railway specifications and guidelines. The assurance though was given for less thickness of blanketing material to RB at time of Detailed Estimate (DE) sanction, considering revision of specifications under process. However, as there was delay in revision of specifications, during initial execution of phase 1 work, same was done as per extant specifications at the time of execution, as mentioned above.

Railway Administration reply is not acceptable in view of the fact that a significant quantity of blanketing material was provided with 01 m thickness, even after receipt of RDSO Guidelines of July 2019 for provision of blanketing material of 550 mm thickness which was in violation of same. Further, NFRCO assured RB in February 2015 that the provision of 600 mm thick blanketing material was kept in the Detailed Estimate keeping in view the quality of local earth available.

This showed that the Railway Administration was well aware of the quality of local earth. But in spite of the assurance, Railway Administration provided blanketing material of 1 meter thickness. This was contrary to the assurance given to Railway Board and in excess of the blanketing requirement which resulted in avoidable expenditure.

(B) Payment of ₹ 42.38 crore to Contractors towards Price Variation

Timely completion of a Project is vital for achievement of desired objectives. Proper Contract Management is critical to ensure achievement of Project targets. But due to various factors, Projects are delayed and extensions to currency of Contracts granted either on Railway or Contractor Account. Such extensions unless granted judiciously often result in payment of undue Price Variation.

Review of records revealed that several extensions ranging from three to 58 months were granted to contractors in 11 cases mainly due to non-clearance of site, i.e., land. It was also noticed that in seven Contract Agreements, involving payment of Price Variation, main reasons for extension of currency of CAs were delay in approval of drawings and clearance of site. This led to slow progress in execution of works.

Thus, failure of NFRCO to complete works within the original date of completion in respect of seven Engineering Contracts resulted in obligatory payment of Price Variation of ₹ 42.38 crore to Contractors for the period beyond the original date of completion (**Annexure 2.11**).

In reply, Railway Administration attributed the delay in completion of works to various factors, viz., lengthy process of land acquisition, COVID-19 pandemic, local agitations, land disputes, encountering of bad geological strata in work-site and Nagaland being a disturbed area. It also stated that the work, being a targeted work, Contracts were awarded in anticipation of earliest resolution of issues and acquisition of land.

Price Variation was provided as per relevant General Conditions of Contract (GCC) Clauses and on merit of each case. Being targeted work, Contracts are awarded in anticipation of earliest resolution of issues and

acquisition of land so that work commences at the earliest to achieve the targets.

Railway Administration reply is not tenable in view of the instructions contained in Indian Railway Compendium for Tenders/Contracts wherein it was clearly stated that 'Before calling Tenders, the following conditions should be fulfilled in terms of Railway Board letter dated 29 August 1980 and 22 February 1985:

- (i) The Railway is in a position to handover the site of work and plan to the Contractor.
- (ii) The Railway should be ready with full knowledge of character and scope of work.
- (iii) The Railway is ready with design, detailed drawing, Schedule of Quantities etc.'

Had Railway Administration followed the above instructions, delay in execution of Project work and payment of Price Variation of ₹ 42.38 crore could have been avoided.

2.1.2.3 Other Issues

(i) Avoidable expenditure of ₹ 7.68 crore on ballast due to poor Contract Management

A Contract Agreement (CA) was executed in August 2018 for the work 'Manufacture, supply & stacking of machine crushed ballast between Dhansiri - Rangapahar Section and between Dhansiri to Sukhovi stations in connection with Dhansiri - Zubza (BG) New Railway Line' with M/s Shivam-Pushpas-TQ (Joint Venture) for ₹ 18.95 crore. As per CA, the total scope of work for the whole Dhansiri - Sukhovi Section was 88000 cubic meter of machine crushed ballast.

Review of records revealed that various extension for completion of the work were granted in a casual manner, even when the target date for opening of the section was imminent. Even though progress of work was very poor from the start, Railway Administration never took serious action to make the Contractor to expedite the work, viz. issue of seven days' Notice, 48-hour Notice or even terminating the CA. The Contractor could supply only 33280 cubic meter of Ballast costing ₹ 7.16 crores out of the total requirement of 88000 cubic meter.

Meanwhile, Railway Administration executed another Contract Agreement in December 2020 with M/s Cementone for the work 'Manufacturing and supply of 45000 cubic meter hard machine crushed stone ballast of Pakur' for the Section from Dhansiri (0 km) to Sukhovi (17 km). The Contractor supplied 49275 cubic meter Pakur Ballast. It was observed that the average cost of Pakur Ballast inclusive of freight charges was ₹ 3712.61

per cubic meter⁶³ as compared to cost of local Ballast of ₹ 2152.95 per cubic meter supplied by M/s Shivam-Pushpas (Previous contractor).

Railway Administration did not manage the Contract for local machine crushed Ballast properly to ensure timely supply of the contracted quantity of Ballast and resorted to procurement of Pakur variety Ballast (costly compared to local Ballast) to make good the shortfall. Had the Contract for procurement of local Ballast been properly managed, the necessity for procurement of Pakur ballast could have been avoided and extra money of ₹ 7.68 crore paid on Pakur ballast saved (**Annexure 2.12**).

In reply, Railway Administration stated (May 2022) that the Contractor could start the supply for local machine crushed ballast from 2019 when the formation became ready. The slow progress of the work was attributed mainly to Covid -19 pandemic in the years 2020 and 2021. They further contended that the work being a targeted one, with CRS inspection being scheduled in the year 2021, it was decided for supply of Pakur ballast as local suppliers were unable to supply adequate ballast. The work for supply of Pakur Ballast was awarded in September 2020.

Railway Administration's reply was not tenable as the Contractor for supply of local ballast was unduly favoured. Extensions for completion of supply were liberally given and no penal action was taken despite the very slow progress of work. No Tender was floated for supply of local ballast in the intervening period. In fact, the Tender for supply of Pakur variety ballast was floated way back in November 2018. This resulted in avoidable expenditure of ₹ 7.68 crore on ballast procurement due to poor Contract Management. Thus, it was evident that Railway Authorities had already made up their mind for procurement of Pakur variety ballast, even when the supply of local machine crushed ballast had not started due to on-going formation work.

2.1.3 Conclusion

With a view to develop Railway Network in Nagaland, a New Line Project to connect the State Capital Kohima with Dimapur was sanctioned by Railway Board in 2006-07. However, the New Line Project was re-aligned between Dhansiri and Zubza near Kohima. The work on the project was started in the year 2016.

Pre-construction Survey of the DMV-Kohima New Line Project was completed in 2011. Due to laxity of Railway Administration, Final Location Survey of a major part of the Project (60 km.) had to be

⁶³ Cost per cubic meter- ₹ 1260.70 (+) average freight charges per cubic meter- ₹ 2451.91

re-conducted, resulting in infructuous expenditure of ₹ 5.44 crore on the original Pre-Construction Survey work which had to be abandoned.

Audit noticed several major irregularities in the land acquisition process which led to irregular/infructuous expenditure of ₹ 141.70 crore during the period from 2015 to 2021. These included infructuous/avoidable expenditure of ₹ 23.34 crore on account of compensation paid for acquisition/procurement of land which was of no use due to revision of the alignment, ₹ 79.70 crore towards acquisition of land made over tunnels, ₹ 12.97 crore on acquisition of excess land, additional compensation of ₹ 6.97 crore paid on account of re-classification/re-survey of acquired land just after two to three years of payment of compensation to the affected land owners and ₹ 18.72 crore paid to the State Government towards establishment charges.

A case of avoidable liability ₹ 879.05 crore was noticed where reluctance to adopt cost cutting measures coupled with excessive provision of facilities in cross-section designs of Tunnels led to huge avoidable liability in construction of Tunnels. In another case, reversal of decision regarding use of ballasted or ballastless track in Tunnels led to avoidable expenditure. Irregularities were also noticed in provision of blanketing where blanketing material was provided in excess of requirement which led irregular expenditure of ₹ 6.50 crores. In one case, poor Contract Management led to avoidable expenditure of ₹ 7.68 crore, where the more expensive Pakur Ballast had to be procured due to improper handling of Contract Agreement for procurement of local ballast at cheaper rates.

Though the Detailed Estimate for the New Line project was sanctioned in 2015, progress of the Project was hampered due to initiation of a new FLS work which was completed in 2019. Progress of the Project was also hampered due to land disputes and delays in settling unjustified re-survey/reclassification claims. Extensions for completion of work were granted liberally resulting in delay in completion of works coupled with extra payment of ₹ 42.38 crore due to Price Variation. All these factors led to change in the target date for completion of the Project from March 2020 to March 2026.

The audit observations on land acquisition in this Report are few illustrative cases where serious irregularities were noticed. There is a likelihood that such errors of omission and commission, whether in this project or other projects may exist in many more cases. Railway Administration may thoroughly examine the remaining land acquisition cases to rule out existence of such irregularities.

2.1.4 Recommendations

Ministry of Railways may consider:

- *To ensure that the Pre-Construction Survey/Final Location Survey (FLS) Reports are critically analyzed to detect probable technical/construction lacunae and their comprehensive resolution prior to final acceptance. This would prevent delays affecting progress of the Project and infructuous expenditure on multiple Surveys.*
- *To strengthen land acquisition mechanism in order to prevent wasteful/avoidable expenditure on account of unnecessary /irregular acquisition of land. Accountability for acquisition of land in violation of codal provisions may be fixed.*
- *To allow payment of compensation in re-classification/re-survey cases only after proper Joint Verification of claims and provided they fell under the purview of relevant provisions of the Nagaland Land (Requisition & Acquisition) Act, 1965. The issue of irregular additional payment for Re-survey/Re-classification needs to be scrutinized thoroughly and accountability be fixed on concerned officials. It may be ensured that future cases of Re-survey/Re-classification are dealt as per land acquisition rules.*
- *To revisit the proposals related to cross-sections of Tunnels of DMV-Kohima New Line Project and also other upcoming Construction Projects to avoid unnecessary financial liability.*
- *To issue instructions for strict compliance of codal provisions/rules/orders and ensure timely approval of Designs & Drawings and handing over of sites to Contractors to avoid delay in completion of work and payment of Price Variation to Contractors.*

The matter was referred to the MoR in June 2022; no reply was received (August 2022).

2.2 Functioning of Special Purpose Vehicles of IRCON International Limited

2.2.1 Introduction

IRCON International Limited (IRCON), the Company, was incorporated in April 1976, for the purpose of construction of Railway Projects in India and abroad. The Company diversified its activities in 1985 to other constructions too. The scope was further enhanced in 1993 to include

projects on Public Private Partnerships (PPPs), business relating to leasing, real estate, etc. IRCON International Limited has formed four⁶⁴ wholly owned subsidiaries to undertake the projects relating to development, maintenance and management of National Highways. These subsidiaries were formed as Special Purpose Vehicles (SPVs) to undertake National Highway Projects awarded by National Highway Authority of India (NHAI) on PPP Mode. The National Highway Projects viz. Vadodara Kim Expressway and Davanagere Haveri Highway were under construction as on March 2020. Operations in other two projects viz. IPBTL and ISGTL started February 2019 and June 2018 respectively.

2.2.2 Scope of Audit

Audit reviewed two projects i.e., IRCON PB Tollway Limited (IPBTL) and IRCON Shivpuri Guna Tollway Limited (ISGTL) as indicated in **Table 2.1**.

Table 2.1: Details of the Projects

Sl. No	Project	SPVs created (date) for the project	Date of award by NHAI. (Commencement of project)	Concession period	Project cost
1	Four laning of Shivpuri to Guna from Km 236.00 to km 332.100 (Package-I) in the State of Madhya Pradesh	ISGTL (May 2015)	31/03/2015 (07/06/2018)	20 years from 25/01/2016	Phase-I ₹ 868.26 crore Phase-II ₹ 126.78 crore (Agreement was finalized at Premium of ₹ 20.19 crore per annum with 5 per cent annual increment)
2.	Widening and Strengthening of the existing Bikaner & Phalodi Section to Four lane from km 4.200 to km 55.250 and Two Lane with paved shoulder from Km 55.250 to Km 163.500 of NH-15 in the state of Rajasthan	IPBTL (September 2014)	27/08/2014 (15/2/2019)	26 years from 14/10/2015	₹ 844 crore 1. Equity Share Capital of ₹ 165 crore 2. Debt Capital: ₹ 352 crore & 3. NHAI Grant: ₹ 327 crore

Source: Records of IRCON International Limited

⁶⁴ IRCON PB Tollway Limited (IPBTL), IRCON Shivpuri Guna Tollway Limited (ISGTL), IRCON Vadodara Kim Expressway Limited and IRCON Davanagere Haveri Highway Limited)

Audit examination included ascertaining whether the viability of the projects was worked out realistically.

2.2.3 Financial performance of the Special Purpose Vehicles

The project executed by IRCON Shivpuri-Guna Tollway Limited (ISGTL) is being executed in two phases viz. Phase-I and Phase-II. Phase-I commenced toll collections from 7 June 2018 where as the project executed by IRCON Phalodi-Bikaner Tollway Limited (IPBTL) commenced its operations from 20 February 2019. The financial performance of the two Special Purpose Vehicles (SPVs) is indicated in **Table 2.2**.

Table 2.2: Financial performance of the two SPVs i.e ISGTL and IPBTL (₹ in crore)

Sl. No.	Particulars	ISGTL					IPBTL				
		2020-21	2019-20	2018-19	2017-18	2016-17	2020-21	2019-20	2018-19	2017-18	2016-17
1	Equity Share Capital	150	150	150	150	150	165	165	165	165	165
2	Loan from holding company	490.07	540.87	561.59	525.82	162.65	297.04	379.29	337.85	242.85	80
3	Revenue from Operations	110.78	94.44	149.75	381.93	294.12	54.86	70.4	356.07	277.54	177.89
4	Other Income	0.38	0.44	0.43	0.02	0.61	0.44	0.33	0.82	1.27	0.88
5	Total Income	111.16	94.88	150.18	381.95	294.73	55.3	70.73	356.89	278.81	178.77
6	Total Expenses	125.22	125.61	180.69	381.93	294.12	68.39	87.89	359.71	277.57	177.94
	Net Profit (Loss) after tax	-14.06	-30.83	-30.61	-0.06	0.39	-21.38	-17.17	-2.11	0.82	0.54

Source: Financial statement of ISGTL and IPBTL

From the above, it can be seen that the revenue from operations of ISGTL after commissioning (June 2018) had increased from ₹ 94.44 crore in 2019-20 to ₹ 110.78 crore in 2020-21. Similarly, the loss suffered by the Company also decreased to ₹ 14.06 crore in 2020-21 from ₹ 30.83 crore in 2019-20.

Whereas in case of IPBTL the revenue from operations which was ₹ 70.40 crore in 2019-20 (after commissioning in February 2019) decreased to ₹ 54.86 crore in 2020-21. Due to decrease in revenue the loss of the SPV increased to ₹ 21.38 crore 2020-21 as compared to loss of ₹ 17.17 crore in 2019-20.

2.2.3.1 Viability of the projects

IRCON engaged consultants⁶⁵ for pre-bid engineering services for these two projects at a cost of ₹ 31.65 lakh (₹ 16.64 lakh for ISGTL and ₹ 15.01

⁶⁵ M/s Caritas Infra Consulting Private Limited for pre-bid engineering services of ISGTL engaged in February 2015 and M/s Almondz Global Infra Company Ltd for pre-bid engineering services of IPBTL projects engaged in July 2014.

lakh for IPBTL). The viability of the projects was required to be evaluated in terms of Project Internal Rate of Return (IRR)⁶⁶ and Equity IRR⁶⁷ using discounted cash flow analysis⁶⁸. Based on the capital cost and financial analysis option for either Grants for implementation of the projects or premium in the form of revenue share and/or upfront payment was to be worked out. The Company prepared a financial model for the projects and decided to bid for (a) ISGTL for a premium of ₹ 20.19 crore per annum with annual increment of 5 *per cent* and for (b) IPBTL a grant of ₹ 327 crore as per the details indicated in **Table 2.3**.

Table 2.3: Details for assessment of viability of the Projects

S. No.	SPV	Concession period	Proposal for the Project	IRR, Equity IRR and NPV
1	ISGTL	20 years including construction period of 910 days	Premium of ₹ 20.19 crore per annum with annual increment of 5 <i>per cent</i>	12.96 <i>per cent</i> , 15.07 <i>per cent</i> and ₹ 314.23 crore respectively
2	IPBTL	26 years including construction period of 910 days	Grant of ₹ 327 crore	13.38 <i>per cent</i> , 13.75 <i>per cent</i> and ₹ 70.97 crore respectively

Source: Records of IRCON International Limited

NHAI awarded these projects i.e., Bikaner Phalodi Tollway and Shivpuri Guna Tollway Project to IRCON on 27 August 2014 and 31 March 2015 respectively.

IRCON stated (July 2021) that as per the financial model for ISGTL, Project IRR was 12.79 *per cent* and Equity IRR was 17.46 *per cent*. The Project NPV and Equity NPV for ISGTL were ₹ 247.96 crore and ₹ 272.76 crore respectively.

⁶⁶ The Internal Rate of Return (IRR) is the discount rate at which the net present value of the cash flow of a project is zero. The IRR may be calculated based on either economic, or financial (ie, market) prices of all costs and revenues (or benefits). If the financial IRR is less than the cost of capital, it implies that the project would lose money. If the economic IRR is less than the opportunity cost of capital (i.e. a predetermined cut-off rate of investment), the project is not viable from an economic point of view.

The project IRR takes as its inflows the full amount(s) of money that are needed in the project. The outflows are the cash generated by the project. The IRR is the internal rate of return of these cash flows. The calculation assumes that no debt is used for the project.

⁶⁷ Equity IRR assumes that you use debt for the project, so the inflows are the cash flows required minus any debt that was raised for the project. The outflows are cash flows from the project minus any interest and debt repayments. Hence, equity IRR is essentially the "leveraged" version of project IRR.

⁶⁸ **Discounted cash flow (DCF)** is a valuation method used to estimate the value of an investment based on its future **cash flows**. **DCF analysis** attempts to figure out the value of an investment today, based on projections of how much money it will generate in the future.

The reply of the management is not acceptable as the management, while obtaining the approval for submission of bid on 27 March 2015 had quoted the Project IRR at the rate 12.96 *per cent* and Equity IRR at the rate 15.07 *per cent*.

2.2.3.1 (i) Unrealistic financial analysis of the projects

The financial model is a tool for evaluating a new project and facilitating negotiations among lenders, sponsor(s) and a government authority. Since the core aim of financial modelling is to forecast the performance of a project under uncertainty; economic and financial assumptions are made to predict the project performance. The financial viability of the project is prepared on the basis of proforma financial statements (e.g. income statement, balance sheet and cash flow statement) and key ratios such as Net Present Value⁶⁹ (NPV), internal rate of return (IRR) and return on equity. In addition, three types of financial model outputs such as revenues, net profit and IRR will be enough to find the most suitable strategy for the project.

Audit examined the assumptions made by the Company in the financial model for ascertaining the viability of the projects. It was revealed in audit that the assumptions made in the financial model for the projects were not proper and realistic. Had the assumptions for the financial model been taken realistically, the IRR and Equity IRR for both the projects would have been less than the projected as stated in the following paragraphs.

IRCON stated (July 2021) that it had followed due diligence in bidding for the two Build-Operate-Transfer (BOT) road projects. IRCON had appointed traffic study consultants for both projects and based on the field data collected by the traffic study consultants, the financial models were developed duly incorporating standard financial modeling concepts.

The financial model developed for ISGTL and IPBTL provided decision making parameters like Project IRR, Equity IRR, NPV and Debt Service Coverage Ratios. Based on the values of the same, it was decided to bid for the projects. The financial models for projects gave desired returns, based on which management decided to participate in the bids.

Though the IRCON had appointed the consultants for traffic study and financial modeling but it had ignored the report submitted by the Consultant in case of IPBTL and inflated the projected revenue figures to improve the IRR.

⁶⁹ Net present value (NPV) is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project. It is the sum of the present value of all future cash flows. The present value refers to discounted value of cash flows at future dates. A project is considered for investment if its NPV is positive.

2.2.3.1 (ii) IRCON- Bikaner-Phalodi Tollway Limited (IPBTL)

As per the financial model, the projected IRR by the Company for the project was 13.38 *per cent* and Equity IRR of 13.75 *per cent*. With these projected values, the NPV of the project worked out to ₹ 70.97⁷⁰ crore as indicated in **Annexure 2.13**. The Company submitted the bid for the project for a grant of ₹ 327 crore after assessing the project IRR, Equity IRR and NPV as given above. Audit, however, observed that the Company had not made the following assumptions realistically to ascertain the viability of the project.

Expenditure for toll collection

In the Financial Model, the expenditure towards three toll collection plazas of IPBTL was considered as ₹ 5.20 crore for the year 2018-19 with an annual escalation of 5 *per cent*. The basis on which the expenditure for toll collection was considered as ₹ 5.20 crore was not on record. However, it was observed that while awarding the tender for appointment of a toll collection agency for this project, the estimated expenditure for toll collection was worked out (March, 2018) as ₹ 16.18 crore per annum. This estimate was prepared on the basis of the actual expenditure of IRCON's similar Joint Venture project i.e., IRCON Soma Tollway Private Limited (ISTPL).

However, the Company at the time of preparation of financial model for IPBTL ignored the fact that the actual toll collection expenditure of ISTPL during 2014-15 was ₹ 8 crore for two toll plazas. Therefore, assuming ₹ 5.20 crore as toll collection expenditure for three toll plazas of IPBTL was unrealistic.

Under estimation of toll collection expenditure resulted into overstatement of IRR of the project.

IRCON stated (July 2021) that the comparison of ₹ 5.20 crore for toll plaza collection expenditure with ISTPL's expenditure of ₹ 8 crore is not reasonable. As per work methodology of IRCON in tolling projects, Toll Expenditure consists of toll collection Expenditure, Patrolling & Incident Management and Office Expenses such as Premise up keeping, maintenance, manpower supply etc.

In the finance Model prepared (For 3 Tolls – one of 10 Lanes & other two of 8 Lanes, in 2018-19), while bidding the above components were Toll Collection Expenditure (₹ 5.20 crore), Electricity & Patrolling (₹ 2.14 crore) and Office Expenditure (₹ 3.69 crore). The total of above comes out to

⁷⁰ At a discount rate of 12 *per cent*

₹ 11.03 crore. After excluding Electricity cost the expenditure for Toll Plaza collection & Operation including Patrolling comes out to ₹ 10.97 crore.

As compared to above, the expenditure of two tolls of 10 lanes of ISTPL, is ₹ 8 crore as stated in the audit para. If we calculate Toll Palza expenditure in proportion of Lanes the expenditure for above three tolls comes out to ₹ 10.69 crore.

In light of above, it can be seen that the estimated expenditure considered against Toll Plaza is in line with latest available project expenditure at the time of bidding.

The reply of IRCON is not acceptable in view of the fact that the toll collection expenditure of ISTPL amounting to ₹ 8 crore for the year 2014-15 did not include Electricity expenses and office expenses. Further, these expenses of ₹ 8 crore pertain to 2014-15 which should have been adjusted for cost during 2018-19. Instead, only ₹ 5.20 crore has been considered for 2018-19

Thus, the expenditure towards three toll collection plazas of IBPTP considered by the Company was not realistic.

Equity support by NHAI

The Company, in the financial model, had considered the equity support (grant) by NHAI for the project as ₹ 329.16 crore. However, the bid of IRCON for this project was submitted by the Company with a grant of ₹ 327 crore which was accepted by NHAI. Thus, the main bidding component was not considered correctly by the Company while preparing the financial model. This also affected the projected IRR of the project.

IRCON stated (July 2021) that the bid parameters for deciding the bid were either the payment of Premium or Grant. Thus, in order to submit most competitive bid, least grant needed be quoted and thus the parameter for consideration was kept 13.75 *per cent* Equity IRR (EIRR) which resulted in grant of ₹ 327 crore.

The Management contention that with EIRR of 14 *per cent* the grant would have been ₹ 327 crore is wrong. The Management while working out the Project IRR of 13.38 *per cent* and Equity IRR of 13.75 *per cent* had considered the Equity support (Grant) as ₹ 329.16 crore.

Audit worked out the projected IRR, Equity IRR and NPV of the project on the basis of financial model prepared by the Company after incorporating the realistic parameters pointed out above. It was observed that Project IRR and Equity IRR were 11.67 *per cent* and 11.47 *per cent respectively* only against project IRR of 13.38 *per cent* and Equity IRR of 13.75 *per*

cent, projected by the Company in its appraisal. Further with the above parameters, pointed out by Audit, the NPV of the project was 'negative'.

Thus, the Project IRR and Equity IRR were lesser than projected by the Company (**Annexure 2.14**). The reasons for the assumptions regarding lower toll collection expenditure and higher equity support were not found on record. Moreover, with the realistic parameters pointed out by audit, the NPV of the projects would have been negative (**Annexure 2.14**). Thus, audit observed that the project was not viable.

2.2.3.1 (iii) IRCON Shivpuri Guna Tollway Limited (ISGTL)

The IRR projected, in the financial model; by the Company for the project was 12.96 *per cent* and Equity IRR of 15.07 *per cent*. With these projected values, the NPV of the project was positive (₹ 314.23 crore) (**Annexure 2.15**). On the basis of these projections, the project was assessed as viable. Audit, however, observed that the Company had not made the following assumptions, realistically, in the financial model, to ascertain the viability of the project.

Traffic Revenue

The Company had appointed a consultant for conducting traffic surveys and recommend feasibility or otherwise of the project. The traffic surveys were to be used for working out the projected toll revenue in the financial model. It was noticed that the Company, in the financial model, had taken toll revenue at higher side than the projections made by the consultant. The average toll revenue suggested by the consultant was ₹ 280.38 crore⁷¹ *per year* (for 18 years of concession period) whereas the Company had inflated the toll revenue to an average of ₹ 322.57 crore (for 18 years of concession period). This resulted in higher projected toll revenue to the tune of ₹ 760.26 crore for the project during 18 years concession period (excluding construction period of two years).

IRCON stated (July 2020) that during the bid stage, for forecast of Toll rates w.r.t Toll Notification 2007, escalation based on WPI⁷² was calculated and it was found that there is escalation of 6.91 *per cent per year* till 2014-15. Based on this calculation, escalation factor *per year* was taken 6.5 *per cent* for calculating Toll rate in 2014-15. The same factor was taken for estimating Toll Rate in the year 2018-19. But the actual inflation rate was in lower side considerably during these years hence, the

⁷¹ This included toll revenue at toll plazas for seven categories of vehicles viz. car/jeep/van, LCV(incl mini bus), buses, trucks, three axial commercial vehicles, HCM/EME (4 to 6 axle) and Over sized vehicles (7 or more axles)

⁷² Wholesale price index

revenue forecast based on extrapolated escalation rate of 6.5 *per cent* was found higher side.

IRCON further stated (July 2021) that the traffic survey was conducted as per Indian Road Congress standards by the consultant. The annual growth rate of the revenue from traffic was recommended as 5 *per cent* while finalization of financial model, the same 5 *per cent* was considered as annual growth rate for the revenue from traffic.

As can be seen from the financial model, the average toll revenue for 18 years is ₹ 280.38 crore only. Toll rate increase in the financial model is only 5 *per cent*.

IRCON's reply is not accepted in view of the fact that the consultant had considered the escalation rate of 5 *per cent* considering the escalation of 6.91 *per cent* in WPI. But, the IRCON at bidding stage inflated the revenue suggested by consultant by ₹ 760.26 crore which made the IRR attractive. The IRCON in its reply of July 2020 accepted that escalation factor per year was taken 6.5 *per cent* for calculating Toll rate in 2014-15. The same factor was taken for estimating Toll Rate in the year 2018-19.

Repayment of loan

As per the assumptions in the financial model, the loan of ₹ 696.53⁷³ crore is repayable in 12 years in equal installments. However, in the financial model, the repayment of loan was considered only in case of surplus instead of scheduled repayment of equal installments. As the estimated revenue worked out in the financial model was not sufficient to repay the scheduled installment of loan, the Company considered the repayment of loan in case of surplus only. Due to this, the Equity Investment was shown at lower side which resulted into depiction of higher and attractive Equity IRR.

IRCON stated (July 2020) that the repayment of loan instalments were assumed for 10 years as per the assumption sheet. It is submitted that, during Financial Model calculation, instalment period was considered for 12 years. Based on Financial Model submitted by the consultant, Competent Authority has reviewed with different combination of premium, Equity & desired IRR with calculated Project Cost. Competent authority, to make the bid proposal more competitive, has accorded approval for bidding with Project IRR 12.96 *per cent* and Equity IRR 15.07 *per cent*.

⁷³ Rs 607.78 crore for phase-I and Rs 88.75 crore for phase-II. Subsequently, the SPV entered into agreement with the holding company for a loan 579.59 crore for phase-I of the project.

IRCON further stated (July 2021) that the loan to ISGTL was provided by IRCON. This project is a BOT project and may experience cash outflow uncertainty due to traffic risk. Therefore, it was decided at the modelling stage that the SPV will repay surplus cash after meeting its expenditure.

IRCON's contention that it was decided at the modelling stage that the SPV will repay surplus cash after meeting its expenditure was not found on record and seems to be only an after thought. Further, assumptions contained in the financial model clearly mentioned that loan would be repayable in 12 years in equal instalments.

The overall impact of the above audit observations was that the project IRR and Equity IRR of the project worked out to 10.85 *per cent* and 10.28 *per cent* only as against 12.96 *per cent* and Equity IRR of 15.07 *per cent* respectively projected by the Company in its financial model (**Annexure 2.16**). The NPV of the project taking into consideration the facts brought out by audit worked out as negative $\{(-) ₹ 65.91 \text{ crore at discounted rate of } 12^{74} \text{ per cent}\}$. Thus, it is observed that the project was not viable.

IRCON stated (July 2021) that the conclusion is not correct, as even if audit observations are taken into account and the Project IRR is 10.85 *per cent*, it is higher than the Weighted Average Cost of Capital (WACC) of 9.12 *per cent*. In such a case where the WACC is lower than Project IRR, the Project NPV cannot be negative. It is correct that the Equity NPV of ISGTL is calculated to be ₹ 272.76 crore by taking discounting factor of 9.12 *per cent* (WACC) instead of 12 *per cent* as was done for IPBTL. However even if 12 *per cent* discounting factor was used, the Equity NPV would be ₹ 133.81 crore. As per standard financial models, if the project has positive Equity NPV, it can be accepted as viable project.

IRCON's reply that project IRR 12.79 *per cent* is more than the WACC is not correct as the actual projected IRR was 10.85 *per cent* only which is less than the hurdle rate of 13 *per cent*. Further, IRCON's reply is not correct as at 12 *per cent* discounting factor, the NPV worked out as negative $(-) ₹ 65.91 \text{ crore}$.

2.2.4 Operation and Maintenance of the Toll Roads

The operation of Phase-I of the Shivpuri Guna Tollway (executed by ISGTL) toll road started w.e.f. 7 June 2018. Audit compared the projected

⁷⁴ As per functional plan on 'Transport for National Capital Region-2032', the prevailing discount rates are computed at a rate of 12 *per cent*. It was observed that whereas the NPV of the ISGTL was calculated at a discount rate of only 9.12 *per cent*, the NPV for IPBTL was calculated at a discount rate of 12 *per cent*. Thus, the Company had not computed NPV on the basis of prevailing discount rate uniformly.

revenues and traffic volume of the project with the actuals. It was observed that the actual revenue from operation of these projects was less than the projected revenues by 30 per cent in 2018-19 and 33 per cent during 2019-20. Similarly, actual traffic volumes were less than the projected volumes by 8.58 per cent and 9.22 per cent during 2018-19 and 2019-20 respectively. In 2020-21, though the actual traffic was higher than the projected traffic by 5.78 per cent but the actual revenue was less than the projected revenue by 10.71 per cent as is clear from the details given in **Table 2.4**.

Table 2.4: Details of projected revenues and traffic volume of the Project with the actuals

Sl. No.	Particulars	2018-19	2019-20	2020-21
1	Projected revenue (₹ in crore)	104.15	115.15	123.675
2	Actual revenue (₹ in crore)	72.88	94.160	110.430
	Variation (in per cent)	- 30.02	- 18.29	- 10.71
3	Projected average daily traffic volume PCU ⁷⁵	23,156	24,313	25,529
4	Actual average daily traffic volume PCU	21,169	22,069	27,005
	Variation (in per cent)	- 8.58	- 9.23	5.78

Source: Records of IRCON International Limited and ISGTL

Similarly, in respect of IRCON Bikaner-Phalodi Tollway project (completed on 15/2/2019), the actual traffic was less than the projected traffic by 24.06 per cent, 32.69 per cent and 41.27 per cent during the years 2018-19, 2019-20 and 2020-21 respectively. Revenue earned also did not match upto the projected figures during the years from 2018-19 to 2020-21 detailed in **Table 2.5**.

Table 2.5: Details of projected revenues and traffic volume of the Project with the actuals

Sl. No.	Particulars	2018-19	2019-20	2020-21
1	Projected revenue (₹ in crore)	6.63	66.81	73.76
2	Actual revenue (₹ in crore)	4.74	45.12	43.02
	Variation (in per cent)	- 28.51	- 32.46	- 41.68
3	Projected average daily traffic volume PCU	37,505	39,380	41,349
4	Actual average daily traffic volume PCU	28,483	26,506	24,286
	Variation (in per cent)	- 24.06	- 32.69	- 41.27

Source: Records of IRCON International Limited and ISGTL

⁷⁵ Passenger Car Unit (PCU) is used to measure the traffic volume or number of vehicles passing through a road.

Audit observed that the traffic volumes were inflated by the Company which resulted in unrealistically higher NPV for the project.

IRCON stated (July 2021) that Traffic survey was conducted as per IRCSP- 19 and standard industry practice. As per the respective reports for both the projects, the traffic PCU were forecast. The same was used as input in Financial Model also for purpose of revenue calculation.

IRCON's contention that revenue forecast by the consultant was used as input in financial model was not correct as while working out the projected revenue in case of ISGTL, IRCON has considered the higher toll rates than the rates considered by the consultant which resulted into overstatement of toll revenue to the tune of ₹ 760.26 crore.

2.2.5 Conclusion

The Company undertook two tollway projects of NHAI (Shivpuri Guna Tollway Project and Bikaner Phalodi Tollway Project) on PPP mode and formed two SPVs to execute these projects. These projects were assumed financially viable on the basis of a financial model. The NPV of the projects executed by ISGTL and IBPTL was worked out as positive in the financial model. Audit observed that assumptions in the financial model were not proper and realistic. Consequently, as per the realistic assumptions pointed out by Audit, NPV of both the projects turned out to be negative and therefore non-viable. It was also seen that the profitability of both the SPVs had decreased after commencement of the operations. Thus, the financial results of the SPVs after commencement of their operations also corroborated the audit observations.

2.2.6 Recommendation:

The Company may consider:

Adopting more realistic assumptions in the financial models for such projects.

The matter was referred to the MoR in October 2020; no reply was received (August 2022).