INTRODUCTION AND TERMS OF REFERENCE.

1. Railway board vide letter no. 89/W-1/NN/W/3/pt. dt. 21-03-1989 communicated sanction of Reconnaissance Engineering-cum-traffic survey for a new BG line between Bhopal to Ramjangmandi included in the year 1989-90 at an anticipated cost of Rs. 10 lakhs which was subsequently raised to Rs. 15 lakhs vide railway boards letter no. 89/w-1/CNL/W/2 dt. 12-01-1990. The survey was conducted and the report submitted to railway board letter no. WNC/400/3/41(S)dt. 3/7-03-1992 with an un-viable financial return of (-)22.45%
2. The Railway board vide their letter no. 89/W1/NL/W/3 dt. 31-03-1992 informed this railway that the Board after examining the project report in detail, decided to shelve the project.
3. The Railway Board vide letter no. 98/W1/NL/W/BPL-RMA dt. 01-06-1998 has directed this railway to update the Traffic survey of Ramgnajmandi – Bhopal at a cost of Rs. 2.0 lakhs chargeable under " 345, A-Indian Railway, Policy Formation. Directions, Research and other Miscellaneous Organizations Commercial Lines-Demand 2 Survey" with the following terms of reference:

   i. The proposed Survey will be for providing a Board Guage rail line between Ramgnaj Mandi and Bhopal touching Jahalwar, Aklera,Khilchipur,Biaora and Narsinghgarh.

   ii. To analyses the existing means of communication and transport facilities and their adequacy.

   iii. To asses passenger and goods traffic to move over the proposed route and the earnings.

iv. The outward goods traffic should cover the agricultural produce, minerals, forest produce, fruits and vegetable products and industrial goods.

v. To assess new inward goods traffic, keeping in view the local requirements of the people of the area.

vi. To assess the required track capacity for the movement of projected traffic.

vii. To determine the standard of signalling and interlocking at stations proposed on this route, keeping in view the number of trains expected to move daily on this route.

viii. To specify the telecommunication facilities required on the section.

ix. To suggest administrative set up for controlling the operation on the new BG line.

x. To work out the additional requirement of rolling stock both for passenger and goods traffic.

xi. To assess the requirement of Railway Quarters for the traffic department on New BG line.

xii. To work out the Financial Implication of the project.

xiii. To examine any other points that survey term may come across which will have bearing on the project.

ROUTE ALIGNMENT

1. At present Bhopal is connected to Bombay and Delhi on Central Railway truck route and is the capital city of Madhya Pradesh , Where as Ramganjmadi is situated on the Western Railway main line trunk route between Bombay and Delhi on Kota – Nagda section of Kota Division at a distance of 72 Kms form kota.
2. The area which will be served by the projected ine falls between two branch lines viz. Nagda-Bhopal and Kota- Bina, which connect the trunk

routes of Central Railway and Western Railway between Bombay and Delhi. These two branch lines are also inter-connected by Maksi – Ruthiyai BG single line.

3. The area falling between RamganjMandi and Bhopal is not linked by Railway line and is an under – developed area. If rail link between Bhopal and Ramganj Mandi is provide the underdeveloped area both of Madhya Pradesh and Rajasthan States can see the light of development by installation of new industries in this area.
4. The population of area mainly depends on agricultural produce and forest resources. The area surrounding Bhopal and Narsinghpur, Rajgard and Biaora are surrounded by hills. Similarly the area near Ramgnajmandi is also joined by Aravalli hills. The possibility of extracting lime stone, buildings stones etc. are very much there and as such new industries needing lime stones as raw materials can be developed.
5. At present the area to be served by the proposed project route is not having any rail link except for a 30Kms stretch of existing railway line of Broad Guage form Ramganjmandi to Jhalawar Road. The area is predominantly agricultural based and the inward and outward traffic which mainly comprised to food grains, pulses,cotton. Muster seeds, Groundnuts etc. move by road.
6. The essential aspect of a traffic survey is to find out the most appropriate and convenient route for the anticipated traffic of Railway keeping in view of engineering feasibility and justification made by increased receipts obtained.
7. The Survey team considered the proposed alignment between RamganjMandi and Bhopla of 262Kms. Length via Jhalawar Patna for a new BG line approved by the Railway Board (Ministry of Railway) and included in the Railway Budget for 1989-90.

8. The alignment selected is under developed and has a most back ward region comprising two states viz. Rajasthan and Madhya Pradesh Major part of the alignment is surrounded by hills. The area covered by the alignment in Jhalawar patna and Rajgarh is inhabited predominantly by Tribals.
9. For reaching Ramganj Mandi from Bhopal presently one has to travel from Bhopal to Maksi – Ujjain- Nagda branch line and then from Nagda to Ramganjmandi of main line trunk route of Mumbai-Delhi on Western Railway, covering a distance of 393Kms.
10. By providing direct route between Bhopal and Ramganj mandi the distance becomes 262Kms. If Bhopal – Ramganj Mandi route is linked, it will also serve as an alternative route for going towards Southen states of India, Mumbai as as well as towards Delhi.
11. There is a public demand to take new alignment via Chankheri-Khanpur. A meeting in this regard has been called by Chief Engineer (Const & Survey), Western Railway with the local representative on 23-06-1999 at Jhalwar. The representatives demanded that the new alignment should pass via Chandkheri - Khanpur, which is a pilgrimage canter due to the presence of Jain temple. This aspect has been thoroughly examined by the survey teem.
12. However, if the demand to take alignment via Chandkheri-khanpur to Aklera form Jhalawar city, is considered, there will be an increase of approx, 31 Kms in the route or say the total distance between Bhopal and Ramganj mandi shall increase to 293 Kms instead of 262Kms. Except giving connection to the Jain temple, there is no other traffic potential for considering this alignment. The survey team, therefore, selected the shorter route being cost effective.
13.

INDUSTRIES.

1. According to the latest statistical information of the district, 71 Industrial Estates were registered up to the year 1994/95. One large scale industry by the name M/s Rajasthan Textile Mills is situated at Bhavani Mandi which is in production form 8th May, 1963. It is producing staple, cotton, thread and fiber. 27392 spindles are available and further expansion program to increase the number of spindles by 22500 has been approved by the Government of India. The total production becomes to 49892 spindles per year. The unit will also produce synthetic yarn. Apart form the large factory, there are small scale units such as Stone Polishing, Stone cutting etc. These units are connected with M/s Associated Stone Industry, Kota Limited. The production capacity of the unit is 81 lakh Sq. Ft. Kota Stone & States, 2700 cubic meters of Marble Stone blocks and 350 cubic meters Granite Stone blocks.
2. The other major industries are M/s J.P.Industries at Bhavani Mandi dealing with paper cons, M/s Gulab Timber dealing in wooden packing boxes and M/s Pioneer Plastics dealing in Polythene bags. These industries meet the requirement of M/s Rajasthan Textile Mills, Bhavani Mandi.

MINERALS

1. Mainly sand stone, masonry stone and bentonite minerals are founds in the district. Their production in the year 1994-95 is given in the table below:

	Name of Minerals	Production in Metric Tonnes.
i.	Sand Stone	25520
ii.	Masonry Stone	228570
iii.	Bentonite	18920

2. Basically the District is rich in limestone and the stone required for building purposes. The Industry Department of Rajasthan Government is organizing an infrastructure to uplift the backward areas of the District by making an investment of Rs. 25 to 30 Crores to encourage the small scale sector industries which will help the local population of the district to earn their livelihood and development of the district.

ROADS

1. The district is suitably connected by roads. The main National Highway No. 12 is passing through Jaipur, Bundi, Tonk, Kota, Jhalawar and Bhopal , which are important towns and cities. There are various state roads which are connecting the other villages and Tehsils of the district. One of the important roads is Indragarh Bang Road-Bara-Jhalawar-Bhawani Mandi which is connected through National Highway No. 12. Many other small roads of over 740Kms. are also connecting various places.
2.

RIVERS

1. Important rivers falling in the district are Kalisind,Lokhan and Aahu.

RAJGARH DISTRICT (MAGDHYA PRADESH)

LOCATION

Rajgarh is situated in hilly region on the bank of Mevjen River. National Highway No. 12 traverses through this district. The nearest railway station is Biaora, which is on Guna Maksi route of Central Railway. The important district surrounding Rajgarh are Gunna sehore Jhapiapur and Jhalapur districts of Rajasthan State. It is bordering distance of Madhya Pradesh with

Rajasthan State. The important tehsils of the district are Khilchipur , Narsinghgarh,Binora, Rajgarh, Jeerapur and Sarangpur.

INDUSTRIES

1. According to 1995 statistical information, 98 small scale industries are located in the District with 3402 average daily workers. No large scale industry is available in the district. The main source of livelihood of the people of the district is agriculture.
2. The terrain is mostly rocky and surrounded by hills. Except Binora, No other place is connected by rail. Lately, the State Government of Madhya Pradesh has decided to establish some new industries in the district and plan of 350 industries is made out to be developed in the year 1995-96. One gas plant is also established in Peelukhedi village during 1990-91.

RIVER

1. Three important rivers viz. Nevjaa,Parwati and Kalisind are flowing through the district.

AGRICULTURE PRODUCE.

1. The main agriculture produces of the district are Soyabeen Jawar,Makka,wheat Groundnet and Gram.

MINERALS

Lime Stone,Moram and Sand Stone are the main minerals in the district.The production of these minerals as per the 1995-96 statistics of the district is as under.

Lime Stone	:	63615 Metric Tonnes
Moram	:	2924 Metric Tonnes
Sand Stone	:	27259 Metric Tonnes

BHOPAL DISTRICT

1. Bhopal is the capital city of Madhya Pradesh and is a district headquarter. It is surrounded by Sehore,Raisen, Gunna and Vidhisha district. It is well connected by railway lines. Mumbai CST-Delhi, Central Railway trunk route passes through Bhopal . It is connected to Western railway by Nagda-Ujjain – Makshi Bhopal branch line.
2. The population of the district is 13,51,479 according to the 1991 ensues. It has an area of 2772 Sq.Kms.
3. The important Tehsils are Huzoor (Phanda) and Berasia
4. Bhopal district is having large and small scale industries both in the private and public sector. Some of the large scale industries which are at Bhopal are Bharat Heavy Electrical Ltd. Union Carbide Plant & the new Bhopal Textiles Co.Ltd. etc. Total 18 small scale and 20 large scale industries are located in the district, as per 1995-96 statistical information for industries. In the year 1995-96, 234 industries are supporting 35604 workers on an average per day. Still a large population of the district is depending on agriculture.

RAINFALL

The average rainfall in the district has beeen recorded 742.4mm as per 1995-96 statistical information of the district, while in 1994-95 total rainfall has been recoreded 943.5mm.

ROAD TRANSPORT AND BUSES:

The total length of road in the district is 911 Kms. and 199 Kms of pucca and kaccha roads.State Transport buses of Madhya Pradesh originating at Bhopal are available for different destinations is Bhopal and neighbouring districts. The main road is mainly with big cities like

Indore, Gawalior, Jabalpur, Hosangabad, Nagpur and Kota, ST buses and licensed private buses are playing between Bairagarh and Bhopal round the clock due to sudden increase of industries near Bhopal.

MEANS OF COMMUNICATIONS AVAILABLE IN THE AREA.

1. The proposed Broad Guage rail line falls mainly in the istricts of Jhalawar and Rajgarh and a few village of Ramganj Mandi tehsil in Kota district and some villages of Bhopal district will also be served by this project route.
2. Road transport is available in all the district of project route, Some roads are concerted and some are Kachha Raod. The state highway is running almost parallel to the proposed rail line.
3. In Jhalawar district there is 94 Kms of National Highway, 756 Km major district Road, 56 Km. metellie road, 32m cement concrete Raods and 26 KM. is Pakka Raod, as per the district statistical hand book.
4. In Rajgarh district there is 1382 Km. Road out of this 955Km. is pakka roads and 427 Km. is Kachha raod.
5. In Huzoor and Benasia tahsil of Bhopal district there is 280Km and 5 Km. of Pakka raod and 280 Km. and 1 Km of Kachha road respectively.
6. Existing passenger transport system mainly connects the relevant districts through State Road Transport Corporation buses. SRTCs are running inter state bus services connecting important cities of the alignment . Night buses are also plying on the important routes. Interstate buses take about 12 Hrs. between Kota and Bhopal. State Transport buses are also available in the villages connecting them to Taluka Headquarters.
7. State Road Transport Corporation of Madhya Pradesh and Rajasthan have advised that the services on all routes are well patronised and the occupation ratio is 100% as per State Statistics information.

8. Bus services playing in the area to be served by the project routes are 194 both ways with 9700 passenger head way and further bus routes, places served, route kilometres, number of frequencies fares etc. are summarized in the statement in Annexure – IX.

GOODS TRAFFIC

1. Goods traffic likely to be served by a new BG line has been grouped separately into short distance and long distance traffic. Before crediting the line with any anticipated short distance, condition of trade has to be examined to ascertain whether it is likely that the railway would be used in preference to road, for over a short lead door to door convenience of road transport, generally out weighs any small financial savings offered by the rail transport. If there is a marked on the proposed line, it can develop and attract some of the exportable surplus of the area. This produce becomes long distance traffic and the proposed line gets the benefit of the lead involved.
2. The traffic prospects of new line have been estimated separately for agricultural, Industrial and mineral sections. The following detailed information is collected for assessment of traffic prospects in the these sectors.

   Agriculture :- Prospects for increasing the area of cultivation with the prevision of better transport facilities.

   Industries:- Program of expansion of industries existing in this area and propects of new industries coming up the region as result of new railway line.

   Minerals :- Mineral resources in the area and program for exploitation and pattern of movement.

3. Beside the above the import into the area through the new line of grains and pulses and other consumable goods have been estimated in the bases of populations.
4. In reckoning the financial prospects of the prospects of the proposed new line, credit has been taken for the net revenue derived form all the additional traffic brought on the existing line as a direct result of the construction of the proposed line. It is therefore, necessary to estimate all such traffic separately and for this purpose the destination and originating station of all probable exports and imports has been ascertained and the lead of this traffic on the system determined.

DIVERSION OF EXISTING AND FUTURE TRAFFIC PROSPECTS

1. The Proposed rail line between Ramganj mandi and Bhopal will reduce the distance by 131Kms. between Ramgnaj Mandi and Bhopal, Consequently the traffic between these two stations at present moving via Nagda can easily be diverted to move over the proposed new line.
2. At present no passenger train is running over the existing route linking directly Ramganjmandi to Bhopal via Nagda which can be considered for diversion on the project route. Only one slow passenger train between Kota and Bhopal via Gunna- Bina is running at present which also cannot be diverted on this route as it serves the passenger originating on Gunna-Bina section for going to Bhopal and vice – versa.

DIVERSION OF GOODS TRAFFIC

1. In case of freight traffic also, there is not much traffic originating on Ramganj Mandi Kota section for destinations reached via Bhopal which can be diverted to the new route, Stone, Fertilizer and Cement which are the main originating traffic on Kota Division moves towards

Gujarat.Maharashtra and to Northan states like Punjab,Haryana, U.P etc. and therefore this traffic is not likely to move on the project route. Similarly, inward traffic which consists to coal, form Central an Eastern coal fields, food grain form Punjab and haryana will continue to move on the existing routes. As such there will not be any diverted freight traffic also on this route.

FUTURE TRAFFIC PROSPECTS

1. The economy of the area served by the proposed BG route is mainly agriculture based. The principal crops of the area wheat,Soya bean Jowar, Gram, Bajra, Rice Cotton, Pulses,Fruits and Vegetable products. After meeting with the local demand, the surplus agricultures produce of the area has been for rail movement.
2. The inward requirement of the population to be served by the proposed commodities such as Salt, Edible Oil, Jagree, Petrol , Kerosene, Diesel, Electrical Goods, Iron & Steel Goods have been assessed on per capita consumption basis. Accordingly, the traffic of Salt, Edible Oil and Jagee has been assumed for rail movement only and rest of the inward goods traffic has been considered to move by road for remote areas being in small quantity.
3. As there is no major industries in this area, the requirement of use of bulk petroleum products will not take place to move by rail as it will continue to move be road through road tankers being in small quantity.
4. As there is no proposal at present to act up any big industry in the area served by new line, no substantial increase in freight traffic either inward or outward is anticipated in the near future.
5. Taking into account the traffic prospects (both passenger and goods), it is anticipated that two passenger trains and 1.0 goods train each way in the

first year of its opening will be available for movement on the proposed BG rail link.

TRAFFIC FACILITIES

1. Ramganjmandi – Bhopal New BG line section having a length of 262 Kms. form North West side to Southeast and consists of 27 stations inclusive of Ramganjmandi and Bhopal. Out of these 12 stations will be provided with 'B' Class stations and 15 stations will be of 'D' class with standard interlocking.
2. All the new stations except Ramganj mandi and Bhopal shall be equipped with Standard – III Colour – Light Signaling. This is as per the Board's latest guide lines to Rly's Bd's letter (copy) may be seen as Annexure – A
3. All the stations except Jhalawar city , Aklers, Rajgarh, Narsinghgarh and Gandhinagar shall be provide with 2 lines only, having a sick siding of 60 meters each and 686 meters loop.
4. Stations such as Jhalawar City, Aklers, Rajgarh, Narsinghgarh and Gandhinager will be provided with 3 lines having 60 meters long sick siding and 686 M loop.
5. Good shed facilities will be provided at Jhalawar City, Aklars, Rajgarh, Narsinghgarh and Gandhninager.
6. At all stations basic passenger amenities as prescribed by Railway Board should be provided.
7. There will be two passenger trains, which will start, simultaneously form Kota and Bhopal in Morning hours.
8. Trains will be worked by diesel traction.
9. Running room facilities will be provided either at Aklara and Rajgarh.
10. Flag station (D class) will have rail level platforms and waiting hall (sheds) with small booking window. These 'D' class stations will be

provided at such locations traffic demands and at a later date they can be converted into regular stations.

11. All stations except Jhalawar city, Aklora, Rajgarh , Narsinghgarh and Gandhinager of 'B' class single line will have medium level platform with one booking window with waiting room if necessary.

12. At stations such as Jhalawar city, Aklora, Rajgarh , Narsinghgarh and Gandhinager shall be provided with two booking window with High level platform.

13. The running of passenger train has been proposed form Kota to Bhopal as Kota is already having facility for maintenance of rake. Primary maintenance will be provided at Kota and secondary maintenance at Bhopal.

14. Detailed traffic facilities will be identified at the time of final location survey.

15. Statement showing No. of stations to be proposed on a new BG line with intermediate distances between Ramganj Mandi- Bhopal Rail link.

Sr No.	Name of Station	Total dist. In Kms Ex RMA	Interned. Dist. In Kms.	Class of Station
1.	Ramganj Mandi Jn.	00.00	-	'B'
			5.80	
2.	Julmi	05.80	-	'D'
			14.11	
3.	Jhalawar City	19.91	-	'B'
			8.15	
4.	Jhalarapatan	28.06	-	'D'
			12.84	
5.	Janakhera	40.90	-	'D'

			14.90	
6.	Amotha	55.80	-	'D'
			12.18	
7.	Aklora	67.98	-	'B'
			8.11	
8.	Pachala	76.09	-	'D'
			6.41	
9.	Chateli	82.50	-	'D'
			9.13	
10.	Nayagoan	91.63	-	'B'
			9.45	
11.	Bhojpur	101.08	-	'D'
			10.14	
12.	Devpur	111.22	-	'D'
			9.02	
13.	Khilchipur	120.24	-	'B'
			14.92	
14.	Rajgarh	135.16	-	'B'
			12.79	
15.	Narsingh pura	147.95	-	'D'
			8.78	
16.	Biora Jn.	156.73	-	'B'
			8.62	
17.	Pipalkhoda	165.35	-	'D'
			11.53	
18.	Sankagh	176.88	-	'D'
			11.66	
19.	Narsinghgarh	188.54	-	'B'

			10.41	
20.	Jamuia Ganesh	198.95	-	'D'
			13.82	
21.	Kurawar	212.77	-	'D'
			11.82	
22.	Shampur	224.60	-	'D'
			6.33	
23.	Duraha	231.13	-	'D'
			5.59	
24.	Jharkhera	236.72	-	'D'
			7.59	
25.	Maganaliyaghat	244.31	-	'D'
			9.94	
26.	Gandhinagar	254.25	-	'B'
			7.75	
27.	Bhopal	262.00	-	'B'

FINANCIAL APPRAISAL

1. Coaching Earnings: As already discussed in Chapter no. VII, second class passenger earnings for first year of the opening of the line i.e 2005-06 have been estimated by applying formula 'F' and 'N' obtaining on the comparable section to urban and rural population separately to be served by the proposed alignment.

2. Upper class passenger and other coaching earnings for the subsequent 20 year have been worked out on the basis of average annual growth rate of population in the past five decades census in Kota district, Jhalawar district, Rajgarh district and Bhopal districts. There after the coaching earnings have been assumed to remain constant.
3. Goods Earnings – Earnings of the goods traffic anticipated on the basis of agriculture production vis-à-vis local consumption and marketable surplus. forest produce, raw materials , finished products form industries have been estimated on the actual lead of each commodity. The freight rates operative from 1st july, 199 have been adopted for working out the earnings.
4. Total goods earnings for the project route have been worked out on the bases of proportionate lead.
5. Construction of line give an encouragement to the growth in industrial production. Therefore, a single growth of 2% per annum has been applied to bath inward and out ward traffic assessed for working out the additional goods earnings for the subsequent 20 years after the opening of the new line. There after traffic is assumed to remain contant.

WORKING EXPENSES

1. **Coaching Traffic :** It is proposed to run two passenger trains each way with a composition of 12 coaches. Expenses of the passenger traffic have been estimated by applying the cost of haulage of a Broad gauge passenger vehicles per Km as given in End Results for the year 1995-96 and duly updated to bring to the level in 199/2000. The working expenses thus computed are given in Annexure – XI

2. **Goods Traffic :** Working expenses of the goods traffic anticipated for movement in the first year of the opening of the line have been worked out by adopting the unit cost applicable to Western Railway Broad Gauge system for 1995/96. These costs are updated by 42.02% to bring them to the current level i.e 1999-2000. As diesel traction has been proposed for the new alignment, the end results as given in Schedule 'F' Group 'C' applicable to diesel have been adopted.
3. For additional traffic involving movement over the existing line for which the credit has been given to the project line, working expenses at 78.5% variable cost has been considered. Similarly, variable cost of 78.5% has also been adopted for the traffic likely to grow after the 1st year of the opening of the line(Annexure – X)
4. A statement showing gross coaching earnings, goods earnings, Working expenses both in coaching and goods traffic and net earnings for the year 2005/06 and subsequent year is placed on Annexure XIV, summary of which is tabulated below:

1. Gross Earning	
a) Coaching	**1088.73**
b) Goods	**1156.86**
2. Total Gross Earnings (1a + 1b)	**2245.59**
3. Working Expenses	
a) Coaching	**1345.98**
b) Goods	**615.48**
4. Total Working Expenses (3a + 2b)	**1961.46**
5. Net Earnings	**284.13**

As given in End Results for the year 1995-96 and July updated to bring to the level of 199/2000. The working expenses thus computed are given in Annexure – XI

5. Goods Traffic: Working expenses of the goods traffic anticipated for movement in the first year of the opening of the line have been worked out by adopting the unit cost applicable to Western Railway Gauge system for 1995/96. These costs are updated by 42.02 % to bring them to the current level i.e 1999-2000. As diesel traction has been proposed for the new alignment, the end results as given in Schedule 'F' Group 'C' applicable to diesel have been adopted.

For additional traffic involving movement over the existing line for which the credit has been given to the project line, working expenses at 78.5% variable cost has been considered. Similarly variable cost of 78.5% has also been updated for the traffic likely to grow after the 1st year of the opening of the line (Annexure – X)

1. Gross Earning	
a) Coaching	**1088.73**
b) Goods	**1156.86**
2. Total Gross Earnings (1a + 1b)	**2245.59**
3. Working Expenses	
a) Coaching	**1345.98**
b) Goods	**615.48**
4. Total Working Expenses (3a + 2b)	**1961.46**
5. Net Earnings	**284.13**

The period of construction as given in Engineering estimate will be 7 years. There is the annual outlay during the period of construction will be as under (Annexure – XVIII)

1st year	2123.00
2nd year	2123.00
3rd year	4246.01
4th year	4246.01
5th year	8492.01
6th year	8492.01
7th year	12738.03
Total	42460.07

FINANCIAL IMPLICATIONS

1. The life of the project has been assumed as 30 years for " Internal Rate of Retrun" some assets requires replacement during the life of the project and some out l ve the project life.
2. Financial return : The financial results of the project have been worked out by adopting IRR technique as given in Evaluation Sheet placed on Annexure XVI. The IRR has been worked out to (-) 01.10%. The criteria for considering a project remunerative stipulate that the minimum rate of return should be more than 14% when IRR method is applied since the IRR is less than 14% the project is therefore not considered financially viable.