SITE NAME: Darjeeling Himalayan Railway

DATE OF INSCRIPTION: 4th December 1999

STATE PARTY: INDIA

CRITERIA: C (ii)(iv)

DECISION OF THE WORLD HERITAGE COMMITTEE:
Excerpt from the Report of the 23rd Session of the World Heritage Committee

The Committee inscribed the site on the World Heritage List under criteria (ii) and (iv):

Criterion (ii): The Darjeeling Himalayan Railway is an outstanding example of the influence of an innovative transportation system on the social and economic development of a multi-cultural region, which was to serve as a model for similar developments in many parts of the world.

Criterion (iv): The development of railways in the 19th century has a profound influence on social and economic developments in many parts of the world. This process is illustrated in an exceptional and seminal fashion by the Darjeeling Himalayan Railway.

The Committee drew the attention of the State Party to the recommendations of ICOMOS concerning a) the creation of a heritage conservation unit; b) the establishment of a buffer zone along the length of the railway line and the station and c) the establishment of an adapted management plan. All these issues could be examined by the Bureau at its twenty-fifth session in 2001.

The Observer of Germany underlined the importance of retaining the steam trains within the site. The Committee was assured by both ICOMOS and the Observer of India that, despite the movable character of the steam trains, they would most certainly remain in use due to their importance as a tourism attraction. The Observer of India, in thanking the Committee for its decision, drew the attention of the Committee to the importance of preserving this unique site, which was the first industrial heritage site in Asia to be inscribed on the World Heritage List.

BRIEF DESCRIPTIONS

The Darjeeling Himalayan Railway is the first, and still the most outstanding, example of a hill passenger railway. Opened in 1881, it applied bold and ingenious engineering solutions to the problem of establishing an effective rail link across a mountainous terrain of great beauty. It is still fully operational and retains most of its original features intact.

1.b  State, Province or Region: Darjeeling District, State of West Bengal

1.d  Exact location: 26°40' N, 88°27' E -- 27°02' N, 88°15' E
NOMINATION OF PROPERTIES FOR INCLUSION ON THE WORLD HERITAGE LIST

1. IDENTIFICATION OF PROPERTY

1a. Country (and State Party if different) : Republic of India
1b. State, Province or Region : State - West Bengal, District - Darjeeling
1c. Name of Property : Darjeeling Himalayan Railway
1d. Exact location on map and indication of geographical co-ordinates to the nearest second

The Darjeeling Himalayan Railway is from New Jalpaiguri railway station to Darjeeling station. The New Jalpaiguri station is at Latitude 26 degree, 40 min, 48 sec North and Longitude 88 degree, 27 min, 36 sec East. Darjeeling station is at Latitude 27 degree, 1 min, 48 sec North and Longitude 88 degree, 15 min, 36 sec East.
1e. Maps / plans showing boundary of area proposed for inscription and of any buffer Zone

The Index plan placed at Annexure 1 indicates the layout/alignment of the Darjeeling Himalayan Railway extending from New Jalpaiguri station to Darjeeling station. All railway properties including station buildings, sheds, workshops, rest houses etc falling in this alignment shall be a part of the area proposed for inscription. As the property is already extensively utilised by the populace and extensively mingles with the road network, creation of a buffer zone is neither feasible, nor desired. The buffer zone has never existed in the past.
1f. Area of property proposed for inscription(ha) and proposed buffer Zone (ha) if any

The property proposed for inscription comprises of a 88.48 km long railway line and associated service buildings and sheds along this route. It is not possible to exactly quantify the area in ha. There is no buffer zone.

2. JUSTIFICATION FOR INSCRIPTION

2a. Statement of significance

This railway is a living example of the engineering enterprise of the 19th century. Its construction provided an access to this hill station and also proved to be a boon for the tea growing industry. This line passes over the second highest railway station in the world, GHOMM and provides one of the most panoramic views to its travellers. Use of innovative measures like "Loops" and "Z reversing stations" to gain height in places where it was not otherwise possible is another very significant feature of this line. It is also noteworthy that this line besides being a tourist attraction, is also a regular mode of transport for the local population.

2b. Possible comparative analysis(including state of conservation of similar properties)

Although number of hill railways exist in India, Darjeeling Himalayan Railway is the first hill railway to be built in the country. It is also unique by virtue of its gauge and length and also special engineering methodology like utilising the Loops & Z shaped layouts for gaining heights. This railway also passes over breathtaking Himalayan landscapes. There is no other comparable railway property in India.

2c. Authenticity/Integrity

The authenticity and integrity of this line as originally commissioned in July 1881 has been preserved intact. There have been only minor additions like introduction of additional reversal between Tindharia & Rongtong at Km 24/6-13 and abandoning of loop no 1 at Km 15/11-12 due to sinking of formation. All the main station buildings have been preserved in original shape. The Ministry of Railways of the Government of India and also the North East Frontier Railway administration lay great emphasis on the preservation of this entire railway system including the line, rolling stock and all associated buildings in their original shape to the extent possible. Besides voluntary organisations like the Darjeeling Himalayan Railway Heritage Foundation are also engaged in ensuring that the original theme and structure of this system remains unaltered.

2d. Criteria under which inscription is proposed
Cultural criteria (I): This railway is a unique example of construction genius employed by railway engineers in the later part of 19th century. The manner in which height is gained in this railway by utilising various loops and Z type reversing stations is really amazing. This line also has the distinction of passing through the 2nd highest railway station in the world.

Cultural criteria (II): This railway also exhibits an important interchange of human values as it brought about a change in the lifestyle of the people living in that area. The concept of time changed, as the earlier journey time of 5-6 days between Calcutta & Darjeeling was compressed to less than 24 hours after the introduction of this railway.

Cultural criteria (III): This railway also bears a unique testimony to the cultural tradition of Tea plantation, which still remains to be the main source of livelihood of the populace of that region be it the landowners, the labourers, or the traders.

Cultural criteria (IV): Various facets of the railway line, viz. the innovative measures like loops & Zs used to gain height and also overcome obstacles, the workshop at Tindharia still using many original machines, use of the original steam engines, original coaches like the 1914 built "EVEREST", the station buildings of the 19th century preserved in their original shape all bear testimony to the technological skills of the by gone era are an outstanding demonstration of their function and illustrates a significant stage in human history.

3. DESCRIPTION

3a. Description of Property

The Darjeeling Himalayan Railway comprises of a 0.610 metre gauge line of length 88.48 kms connecting New Jalpaiguri with Darjeeling. The line passes through 13 stations namely New Jalpaiguri, Siliguri Town, Siliguri Junction, Sukna, Rongtong, Tindharia, Gayabari, Mahanadi, Kurseong, Tung, Sonada, Ghoom and Darjeeling. On the way to Darjeeling the line negotiates the 2nd highest railway station in the world i.e. Ghoom located at an altitude of 2257.65 metres. Since the line goes over a mountainous region, 73.41 percent of the Alignment consists of curves. The sharpest curve is located between Sukna and Rongtong at km.14/14 to 15/0 and it has a 120 degree of curvature. The Line climbs to an altitude of 2257.65 mtrs. (Ghoom) and finally reaches Darjeeling located at an altitude of 2074.77 mtrs. There are six reverses and three loops on this line, the most famous being the "BATASIA LOOP" between Ghoom and Darjeeling. The ruling gradient (steepest gradient) of the line is 1 in 18 (in 'Z' reverses).

3b. History and Development

The history of the Darjeeling Himalayan Railway dates back to the early nineteenth century and is linked to the very birth of the Darjeeling Region as the queen of hill stations and also one of the premier tea growing areas of India, which produces one of the finest quality of tea famous all over the world. A brief sketch of the history of this Railway is given below.

The Mountain spur, on the slopes of which the hill station of Darjeeling now stands, formed a part of the erstwhile independent "Kingdom of Sikkim". Covered with dense forests, originally this place was known as 'DORJILING', the place of the mystic Lama Dorji. General Lloyd of the British East India Company, who sided with Sikkim against the Nepalese in their war in 1814, found the place suitable as a sanatorium for the British troops. Thus in 1835, the East India Company obtained the lease of the strip of country to the south of the Sikkim Himalayas, which included the Darjeeling village for the purpose of an outpost of strategic importance. Dr.Campbok was appointed the agent of the leased tract of land and under his guidance Lt.Napier (afterwards know as Lord Napier of Magdaha) laid the foundation of the Hill station of Darjeeling. This led to the construction of the first road from the plains to the Hills. By 1840, the little town grew rapidly. It then had a population of only 10,000. By 1858 the mountain tracts including Darjeeling was annexed to the British Indian Empire.

The annexation brought rapid progress to Darjeeling and the adjoining region. The road built by Lt.Napier was found to be too steep for 'PALKI' and too narrow for wheeled traffic. Therefore, in 1861, the
construction of a new cart road with easy gradient was started. The new road facilitated cart movement and ‘TONGA’ service began to take the travellers up the hill.

By 1878, Calcutta was linked by Rail to Siliguri a small town at the base of the Himalayas. Cultivation of tea had also by then developed quite remarkably and the tea industry had become firmly established. All these developments naturally gave special importance to Darjeeling. The ‘TONGA’ service thus started proving to be inadequate and disadvantageous. To meet the new growth rate of the region, Franklin Prestage, the then Agent of the Eastern Bengal Railway Company suggested a steam tramway from Siliguri to Darjeeling. In 1878, he submitted a detailed scheme to the Govt of Bengal. Sir Ashley Eden, the then Lt. Governor approved the project in 1879.

The construction of the line began immediately and progressed rapidly. March 1880 saw the opening of the line upto Tindharia and by the year-end the line was extended upto Kurseong. In July 1881, the line upto Darjeeling was fully commissioned. A Company registered by the name of the Darjeeling Himalayan Railway took over the management of this line. M/s Gillanders Arbuthnet and Company, one of the leading and established firms of Calcutta in those days was appointed agents to the company.

The Darjeeling Himalayan Railway owned by the Darjeeling Himalayan company was purchased by the Indian Government on the 20th of Oct 1948. The management of the system was taken over by the Assam Railway on the 24th of December 1949. The reorganisation of the Indian Railways in 1952, saw this line being made a part of the jurisdiction of North Eastern Railway with Headquarter at Gorakhpur. On formation of the Northeast Frontier Railway on 15th January, 1958, the management of the line was finally passed on to the present managers i.e. the Northeast Frontier Railway.

Even today, after the course of 117 yrs., the Toy train (as it is fondly called) chugs its way up and round the bends unfolding breathtaking views of the vertical water-falls, gentle clouds rising up the green valleys and finally the ethereal splendour of the snows of the Kanchenjonga Range.

3c. Form and date of most recent records of property

The Darjeeling Himalayan Railway is now a property of the Central Government of India (Ministry of Railways). The assets that constitute the property such as land, service buildings, residential buildings, track, rolling stock etc. are well documented. The landed property is well demarcated in land plans maintained by the State Government of West Bengal. Land settlement records are updated periodically. The land records of the Darjeeling civil district were last updated in _______. The buildings are listed in building registers maintained by the Katihar division of the North Frontier Railway. These are updated as and when new assets are added or changes are effected in existing ones. The track records (Track diagrams) are maintained by the Divisional Railway Manager, Katihar and are maintained current. Reg. Bridges, a list of all the bridges on this railway is maintained in a Bridge register which is also maintained current. Similarly, the records pertaining to the rolling stock are maintained by the Tindharia Workshops which is also under the administrative control of the Divisional Railway Manager, Katihar and are maintained current.

3d. Present state of conservation

The Railways have a regular watch and ward organisation under the Divisional Railway Manager of Katihar Division (Northeast Frontier Railway), which has the responsibility of maintaining the assets. All the facets of the railway, viz. the track, buildings and the rolling stock are being well maintained as this is a running line. The Indian Railway administration spends about Rs.28 millions annually on the Darjeeling Himalayan Railway. The scale of investment is regulated according to the traffic generated as well as the actual requirement to keep the assets functional. The traffic generated on the line has reduced due to competition with the road traffic. Investments are being contemplated on the station buildings at Darjeeling, Ghoom, Kurseong & Tindharia to restore them to their former glory. The Railway formation between station Sukna and Mahanadi (about 32 kms.), which are susceptible to frequent landslides/slips, particularly during the monsoon Season, are being comprehensively stabilised to maintain uninterrupted running of trains on this section.

The fact that this line is a working railway line which is famous all over the world and is also visited by tourists both from India and abroad is a testimony to the acceptable state of conservation efforts being undertaken. It can be concluded that the Railways are very well alive to the need to conserve the entire
Darjeeling Himalayan Railway system in its original glory and necessary investments/steps to that effect are being taken.

3e. Policies and programmes related to the presentation and promotion of the property

Darjeeling, the Queen of hill Stations, has developed into a very popular tourist resort of Eastern India. It is widely known for the panoramic view of the peaks of Kanchenjonga, stately monasteries and the legendary view of the sunrise from the Tiger Hill. This railway continues to maintain a slender and delicate line for the old-world charm of Darjeeling, nestling in the Himalayas, with the modern and developing city of Siliguri in the plains. The fact that the Darjeeling Himalayan Railway by itself also has tremendous tourist potential is also being realised both by civic as well as the railway administrations. Various plans have therefore been made to improve as well as promote the property. Railways plan to attend to the track and formation at a considerable cost to improve the services on the line. Substantial investments to induct new locos and rolling stock are also being contemplated. The total level of investment contemplated is of the order of US$ 40 millions. This is evidence of the priority and attention this railway is receiving from the Govt of India.

3. Ministry of Railways have also sponsored a comprehensive study of the line by professional transportation consultants (Asian Institute of Transport Development) to study and recommend measures to improve the viability of the line and also to make it more attractive to the tourists. In order to give impetus to the development of the Darjeeling region, the Darjeeling Gorkha Hill Council (DGHC) was formed in the year 1988. The primary objective of the council is to have a direct hand in the development of the region so that in the process the ethnic culture and life of the simple hill people are adequately protected and preserved. Formation of this council is also giving an impetus to this railway which has a direct role in promoting the tourism and thereby, the economy of this region.

Regular interaction with the UK based Darjeeling Himalayan Railway Heritage Foundation is also being maintained and their views are also considered while making detailed improvement plans on this line. The conditions prevailing on similar railway systems around the world, like the Festiniog Railway etc are also being studied and useful information obtained is being tailored to suit our requirements. The Ministry of Tourism of the Government of India and the Department of Tourism, Ministry of Railways are working in close interaction to promote the Darjeeling area as well as the Darjeeling Himalayan Railway as a tourist destination. Presently discussions are also being held with the various recognised tour operators to help promote this destination.

4. MANAGEMENT

4a. Ownership

The Darjeeling Himalayan Railway including all its movable and immovable assets is owned by the Ministry of Railways, Government of India.

4b. Legal Status

The legal rights to the property is vested in the Ministry of Railways, Government of India.

4c. Protective measures and means of implementing them

The D H Railway being a property of the Government of India enjoys all legal and legislative protection available to the Central Government Property. The protective measures are enshrined in the Railway act of 1989 which replaced the Indian Railway Act 1890, and came into force from 1st July 1990 and the public premises (Eviction of unauthorised occupants) Act of 1971. The latter act was legislated to deal with the pressures of unauthorised occupation of Government land/premises.

4d. Agency/agencies with management authority
The administration of the Darjeeling Himalayan Railway is with the General Manager, Northeast Frontier Railway, having its Headquarters at Guwahati, the capital of the state of Assam. The postal Address is as under:

General Manager, Northeast Frontier Railway
Maligaon Railway Head Quarters,
Guwahati, Assam
Pin  781011.

4e. Level at which management is exercised (e.g. on property, regionally) and name and address of responsible person for contact purposes

At the Divisional level the management of this railway is in the hands of the Divisional Railway Manager based at Katihar, Bihar. The day to day maintenance and protection of the assets including running of trains by the Divisional Railway manager. His contact address is as under:

The Divisional Railway Manager, Northeast Frontier Railway
Katihar Division, Katihar,
Bihar, INDIA

At the Zonal level the management of this Railway is in the hands of the General Manager, Northeast Frontier Railway based at Maligaon, Guwahati, Assam. The formulation of polices, budgeting and investment proposals of a large nature are administered at his level. His contact address is as under:

General Manager, Northeast Frontier Railway
Maligaon Railway Head Quarters
Guwahati, Assam
India - 781011

4f. Agreed plans related to property (e.g. regional, local plan, conservation plan, tourism development plan)

Para 3e covers all these aspects.

4g. Sources and levels of finance

The source of finance for this Railway is the consolidated fund of India. The money required for maintenance and operations for day to day working or for capital investments on the line are taken from the consolidated fund of India, after the sanction of the Budget by the Parliament.

4h. Sources of expertise and training in conservation and management techniques

The management of this line is in the hands of Indian Railways personnel who have the experience of managing the second largest railway system in the world. Indian Railways also has 4 other hill railways which could provide learning experience to the railwaymen managing this line. Various technical and management training institutes available on the Indian Railway system like the Railway Staff College, Vadodara, the Indian Railway Institute of Civil Engineering, Pune, Indian Railway Institute of Mechanical & Electrical Engineering, Jamalpur, Indian Railway Institute of Signal & Telecommunications, Secunderabad, Zonal Training Institutes etc are also sources of expertise and training in conservation and management techniques. Managers and personnel working on the Darjeeling Himalayan Railway are regularly given the necessary training in conservation and management techniques at these institutions. With the present emphasis being given to this railway, the training aspect would be further reinforced.

4i. Visitor facilities and statistics

Railway stations on the Darjeeling Himalayan Railway are provided with waiting rooms for its users. At Darjeeling, Ghoom, Kurseong and Siliguri stations, cafeterias have also been provided to serve tea/snacks and meals for the users. Rest houses have also been provided at Siliguri, Kurseong and Darjeeling for the stay of Railway personnel visiting this line.

Over the years, townships have developed near the Railway premises at Tindharia, Kurseong, Ghoom and Darjeeling in a typical ribbon formation. A number of good hotels, holiday resorts and a youth hostel have sprung up at Kurseong, Ghoom and Darjeeling.
During the year 1997, 68110 tickets were sold on the Darjeeling Himalayan Railway. The total number of visitors who visited Darjeeling as obtained from the statistics maintained by the local civic administration was 625000 in 1997.

4j. Property management plan and statement of objectives (copy to be annexed)

The property management plans and the statement of objectives are attached.

4k. Staffing levels(professional, technical, maintenance)

The Railway is manned by the necessary technical and non technical staff as per standard norms and yardstick followed all over the Indian Railways. The Indian Railways have also standardised the qualifications and experience required for manning the various categories of postings of staff and these are followed on the Darjeeling Himalayan Railway also. At the managerial level, Asstt Engineers have been posted exclusively for this line, One Asstt Engineer looks after the track and buildings etc, while the other looks after the entire rolling stock, i.e. the locomotives and the coaches. Both the Engineers are assisted by a number of supervisors who are also assigned specific duties and responsibility. Overall, there are 1367 persons in different disciplines, who are working on the Darjeeling Himalayan Railway and have a direct accountability for various facets of the operations and maintenance on this railway. Managerial control is also exercised at the Divisional Level by the Divisional Railway Manager, Katihar and his team of senior officers of various disciplines, like locomotive, carriage and wagon, track, operations etc.

5. FACTORS AFFECTING THE PROPERTY

5a. Development Pressures(e.g. encroachment, adaptation, agriculture, mining)

The station premises are often beset with problems of encroachment due to pressures of increased population and commercialisation of the towns adjoining the stations. The development of the areas adjoining the station premises as well as the alignment have followed the traditional pattern of Ribbon development. The pressures due to encroachments are being tackled according to the public premises (Eviction of unauthorised occupants) act of 1971. The Divisional Engineer in charge of the section has been given the powers of the estate officer under this act to deal with cases of encroachment of Railway property and it is being ensured that there are no cases of a permanent encroachment on property belonging to the Darjeeling Himalayan Railway. There are no pressures relating to adaptation, agriculture and mining.

5b. Environmental Pressures(e.g. pollution, climate change)

The Darjeeling region is practically free from Environmental pressures. The region continues to be a favourite tourist destination due its pollution & noise-free atmosphere.

5c. Natural disasters and preparedness (earthquakes, floods, fires, etc.)

The Darjeeling region falls in zone V according to the classification of earthquake zones. All new Railway structures coming up in this region are therefore designed for earthquake forces of the prescribed intensity according to the classification of earthquake zones. However, it is to be noted that there has been no know history of earthquake higher than moderate intensity in the past forty years or so. The Railway structures have so far withstood the ravages of time. The Civil authorities maintain fire-stations manned round the clock to tackle incidences of Fire. There is thus no danger on this account as all round preparedness always exists. In the absence of any river, the question of floods does not arise.

5d. Visitor/tourism pressures
Even though, this railway is an international tourist attraction, the pressures due to visitors/tourism are not unmanageable. While 625000 visitors/tourists went to Darjeeling during the year 1997, the number of tickets sold on the Railway was 68110. The pressures on the railway are low because of the considerable time advantage which the road journey provides at present.

5e. Number of inhabitants within property, buffer zone

Traditionally, only Railway Quarters for use by staff working at site are located within Railway land. Presently there are 624 units of staff quarters on the DHR property. While exact census is not available, it can reasonably be assumed that there are approx. 3200 inhabitants within the property. There is no buffer zone.

6. MONITORING

6a. Key indicators for measuring state of conservation

The Darjeeling Himalayan Railway is a running line in the Railway parlance. It means that it is a section of the Railways where trains are being operated on a daily basis and which therefore has to be maintained strictly as per laid down norms and requirements. The key indicators for measuring the state of operations would therefore be an adequate indices for measuring the state of conservation also. The key operating indices which are regularly monitored on a yearly basis and which form the basis for taking major investment and conservation decisions are listed as under:

- No. of days of interruption to through traffic in a year
- No. of days of cancellation of train services on operational reasons.
- No. of derailments.
- No. of land slips affecting train running
- No. of encroachment cases.

6b. Administrative arrangements for monitoring property

The civil engineering items i.e. the track, bridges and buildings are regularly inspected by various levels of supervisory & managerial staff as per laid down inspection schedules. Key inspectors for this work are the "Permanent Way Inspector", the "Bridge Inspector" and the "Inspector of Works" who carry out regular inspections, identify lacunae and also take necessary remedial steps. These civil engineering items are also inspected at prescribed intervals by the Asstt Engineer and the Divisional Engineer stationed at New Jalpaiguri. The items of rolling stock, namely the locomotives and the coaches are maintained by a full fledged workshop located at Tindharia but also having maintenance sheds and depots at Tindharia, Kurseong & Darjeeling. The rolling stock organisation and train operations are directly under the control of the Asstt Mechanical Engineer based at the Tindharia shops who is also the Area Officer for this section. Periodical inspections are also carried out by the Divisional Railway Manager based at Katihar and the General Manager of the Northeast Frontier Railway stationed at Guwahati.

6c. Results of previous reporting exercises

The summary of the previous reporting exercises is as under:

- Interruption to through traffic in a year:
  - 1995 - 231 days.
  - 1996 - 113 days.
  - 1997 - 59 days.

- Cancellation of train services due to operational reasons:
  - 1995 - 30 days.
  - 1996 - 13 days.
1997 - 22 days.

III. Land slips affecting train running:
1995 - 201 Days.
1996 - 100 Days.
1997 - 37 Days.

IV. No. of derailments [in nos.]
1995 - 11 Nos.
1996 - 14 Nos.
1997 - 34 Nos.

V. Encroachment cases in a year [in nos.]:
1995 - 09
1996 - 11
1997 - 21

7. DOCUMENTATION

7a. Photographs, slides and, where available, film/video

# The following photographs/Slides are enclosed:
Starting station
Ending station
Midway station - Kurseong
Z- Crossings
Batasia loop between Ghum & Darjeeling stations
Loop between Rong-tong & Tindharia stations
Road & Rail crossings
Landscapes
Train sheds
Workshop & sheds
- Ghum station

7b. Copies of property management plans and extracts of other plans relevant to the property

A copy of the present property management plan is enclosed

c. Bibliography

Video presentation by Indian Railways titled
"WHERE THE JOURNEY NEVER ENDS"
Video presentation sponsored by National Geographic titled
"THE GREAT INDIAN RAILWAYS"

3. Darjeeling and its mountain railway- a guide and souvenir published by
DARJEELING HIMALAYAN RAILWAY COMPANY LTD. IN 1921.
d. Addresses where inventory, records and archives are held

Divisional Railway Manager
Katihar Division. N.F.Railway,
Katihar, Bihar,
India

2. Chief Engineer, N.F.Railway
Maligaon Railway Headquarters,
Guwahati, Assam,
India.

Sr Area Manager, N. F. Railway
New Jalpaiguri
West Bengal
India

4. Asstt Mechanical Engineer
Tindharia Workshops, NF Rly
Darjeeling Distt., West Bengal
India

8. SIGNATURE ON BEHALF OF STATE PARTY
AUTHORIZATION

1. I, Ashwani Lohani, Director, National Rail Museum, New Delhi, hereby grant free of charge to Unesco the non-exclusive right for the legal term of copyright to reproduce and use in accordance with the terms of paragraph 2 of the present authorization throughout the world the photograph(s) and/or slide(s) described in paragraph 4.

2. I understand that the photograph(s) and/or slide(s) described in paragraph 4 of the present authorization will be used by Unesco to disseminate information on the sites protected under the World Heritage Convention in the following ways:

   a) Unesco publications;
   b) co-publications with private publishing houses for World Heritage publications: a percentage of the profits will be given to the World Heritage Fund;
   c) postcards - to be sold at the sites protected under the World Heritage Convention through national parks services or antiquities (profits, if any, will be divided between the services in question and the World Heritage Fund);
   d) slide series - to be sold to schools, libraries, other institutions and eventually at the sites (profits, if any, will go to the World Heritage Fund);
   e) exhibitions, etc.

3. I also understand that I shall be free to grant the same rights to any other eventual user but without any prejudice to the rights granted to Unesco.

4. The list of photograph(s) and/or slide(s) for which the authorization is given is attached.
   (Please describe in the attachment the photographs and give for each a complete caption and the year of production or, if published, of first publication.)

5. All photographs and/or slides will be duly credited. The photographer's moral rights will be respected. Please indicate the exact wording to be used for the photographic credit.

6. I hereby declare and certify that I am duly authorized to grant the rights mentioned in paragraph 1 of the present authorization.

7. I hereby undertake to indemnify Unesco, and to hold it harmless of any responsibility, for any damages resulting from any violation of the certification mentioned under paragraph 6 of the present authorization.

8. Any differences or disputes which may arise from the exercise of the rights granted to Unesco will be settled in a friendly way. Reference to courts or arbitration is excluded.


(A. Lohani)
Director
National Rail Museum
New Delhi 110001
Ministry of Railways
Railway Board
New Delhi
ANNEXURE 'A'

**DARJEELING HIMALAYAN RAILWAY**

1. Photographs album on DHR submitted along with the Nomination Form vide Ministry of Railways' letter No. 97/Museum/ICOMOS dated 29th June, 1998.

2. 34 slides on Darjeeling Himalayan Railway submitted along with letter No. 97/Museum/ICOMOS dated 27/7/98.

ANNEXURE 'B'

**BOMBAY VICTORIA TERMINUS**

1. Photographs album on Victoria Terminus containing 15 nos of colour photographs submitted along with Nomination Form vide Ministry of Railways, Govt. of India's letter No. 97/Museum/ICOMOS dated 29th June, 1998.

2. 16 slides on the Victoria Terminus submitted along with letter No. 97/Museum/ICOMOS dated 27/7/98.

[Signature]
Director
National Rail Museum
Ministry of Railways
Railway Board
New Delhi
PROPERTY MANAGEMENT PLAN

Victoria Terminus Building has unique significance for Indian Railways being its birthplace. It is an important landmark of Mumbai and has been listed as Grade-I Heritage Building in India. Special care is being taken for day-to-day upkeep, maintenance and restoration of this historical building.

For day-to-day maintenance of the property as well as to plan the special repair works, a full-fledged set up is existing. The overall technical guidance to this set up is being provided by the Chief Engineer of Central Railway who is the technical head of central zone through the Administrative Head of Mumbai Division i.e. Divisional Railway Manager under whose jurisdiction the building is located. Under the Administrative Control of Divisional Railway Manager, Mumbai, the work is planned and supervised by Senior Divisional Engineer who is assisted by an Assistant Engineer and a Senior Sectional Engineer (Works). For day-to-day maintenance and up-keep of the property, a full time Custodian and a fleet of 90 skilled and semi-skilled staff are deployed.

The hierarchical chart of this set up is as under:

Chief Engineer  
(The technical head of Civil Engineering Deptt. of Central Railway)

Divisional Railway Manager  
(The Administrative Head of Mumbai area where the property is located)

Senior Divisional Engineer  
(The Technical Head for Civil Engineering works on Mumbai area)

Assistant Engineer  

Senior Section Engineer (Works)

Custodian  

Skilled & Unskilled staff

Apart from the routine upkeep and maintenance works, consultancy has also been obtained for preparation and implementation of a conservation plan from M/s Associated Cement Companies who have developed expertise in the field of conservation of historical monuments.
STATEMENT OF OBJECTIVES

The Magnificent Victoria Terminus Building was built in the year 1888 for the Administrative Office of Agent of Great Indian Peninsula Railway. In true sense it is the birth place for Indian Railways.

Presently the building is being utilised for housing the Administrative Headquarter of Central Railway. About 1800 people are working in this. Apart of this, the ground floor in North Wing is being used as Booking Office for the Suburban Train Services of Central Railway. Millions of people touch this building daily while commuting to and from the Suburban trains.

The building is an important landmark of Mumbai City and is of a great historical importance both for Indian Railways as well as the commuters of Mumbai. It is our endeavor to maintain this piece of art in its original beauty inspite of all the environmental, social and economical pressures.
DARJEELING HIMALAYAN RAILWAY

INDEX PLAN

NOT TO SCALE ALT- FT. ABOVE M.S.L.

DRAWN BY:B.C.ROY(HDM/CON/NJP)
DARJEELING HIMALAYAN RAILWAY

INDEX SECTION

SCALE

VERTICAL 1 cm. = 100 m
HORIZONTAL 1 cm. = 5 Km.

DRAWN BY: B.C. ROY (HDM/CON/H JP)
Identification

Nomination  The Darjeeling Himalayan Railway
Location          Darjeeling District, State of West Bengal
State Party              Republic of India
Date                3 July 1998

Justification by State Party

The Darjeeling Himalayan Railway is a unique example of construction genius employed by railway engineers in the latter part of the 19th century. The manner in which height is gained in this railway by utilizing various loops and zigzag reversing stations is remarkable. This line also has the distinction of passing through the second highest railway station in the world.  

Criterion i

This railway also exhibits an important interchange of human values, as it brought about a change in the life-style of the people living in the area. The concept of time changed, as the earlier journey time of five to six days between Calcutta and Darjeeling was compressed into less than 24 hours following the introduction of this railway.  

Criterion ii

The railway bears a unique testimony to the cultural tradition of tea plantation, which is still the main source of livelihood of the inhabitants of this region, whether landowners, labourers, or traders.  

Criterion iii

Various facets of the line, such as the innovative measures used to gain height and to overcome obstacles, the workshop at Tindharia, which is still using many original machines, the use of the original steam locomotives and original coaches, such as the Everest built in 1914, and the 19th century station buildings, which have preserved their original form, all bear witness to the technological skills of the bygone era and are an outstanding demonstration of their function, illustrating a significant stage in human history.  

Criterion iv

Category of property

In terms of the categories of cultural property set out in Article 1 of the 1972 World Heritage Convention, this is a site.

History and Description

History

The Darjeeling Himalayan Railway is intimately linked with the development of Darjeeling as the queen of hill stations and one of the main tea-growing areas in India, in the early 19th century.

The densely wooded mountain spur on which Darjeeling now stands was formerly part of the Kingdom of Sikkim. It was adopted by the British East India Company as a rest and recovery station for its soldiers in 1835, when the area was leased from Sikkim and building of the hill station began, linked to the plains by road. The region was annexed by the British Indian Empire in 1858.

Calcutta had been linked by rail in 1878 to Siliguri, in the foothills of the Himalaya. By this time the tea industry had become of great importance for the Darjeeling region, and the existing road transport system was inadequate to cope with the increased traffic. Franklin Prestage, Agent of the Eastern Bengal Railway, submitted a detailed proposal for a steam railway from Siliguri to Darjeeling. This received official approval and construction work began immediately. By 1881 it had been completed in three stages.

The privately owned Darjeeling Himalayan Railway (hereafter referred to as the DHR) was purchased by the Government of India in October 1948. Since 1958 it has been managed by the State-owned Northeast Frontier Railway.

Description

The DHR consists of 88.48km of 2ft (0.610m) gauge track that connects New Jalpaiguri with Darjeeling, passing through eleven stations between the two termini. One of these, Ghoom, is the second highest railway station in the world, at an altitude of 2258m.

Because it passes through a mountainous region, 73% of the total length of the line consists of curves, the sharpest of which is that between Sukna and Rongtong, where the track passes through 120°. There are six reverses and three loops on the line, the most famous of these being the Batasia Loop between Ghoom and Darjeeling. The steepest gradient is 1 in 18 (in zigzag reverses).

The nominated property consists of the permanent way itself, which varies in width between 3m and 50m, and all the associated buildings - stations, goods sheds ("godowns"), workshops, locomotive and rolling stock sheds, and railway residences. It repeatedly crosses the Hill Cart Road, necessitating the provision of 170 level crossings. During the monsoon months (July and August) landslips make it necessary for many of these to be reconstructed.

The "Toy Train," as it is affectionately known, affords breathtaking views of high waterfalls, green valleys that are often hidden by cloud, and at its end the splendid panorama of the snow-capped Kanchenjunga range. There are several distinct sections: the 10km plains section between Siliguri and Sukna (partly urban and partly agricultural), the 11km densely forested section from Sukna to beyond Rongtong, the 38km largely deforested open hill section with its many tea gardens to Kurseong, and finally the 30km alpine section to Darjeeling, dominated by stands of Himalayan pine and tea gardens.
Management and Protection

Legal status

The only protection to the Railway applies to the permanent way, which is in principle controlled under the general measures relating to Central Government property and the specific provisions of the 1989 Railway Act.

Management

The DHR is the property of the Government of India, vested in the Ministry of Railways. Administration of the Railway is the responsibility of the Northeast Frontier Railway, the headquarters of which is located at Guwahati, the capital of the State of Assam.

The fixed and moveable assets of the line are documented by the Northeast Frontier Railway and the buildings are included in a comprehensive register.

Conservation and Authenticity

Conservation history

This is a working railway and as a result is maintained according to regular programmes. The funding for these is variable, being dependent upon current needs and the level of traffic generated.

Investment plans have been prepared for the rehabilitation of the station buildings at Darjeeling, Ghoom, Kurseong, and Tindharia. There is a programme of stabilization in progress for the stretch between Sukna and Mahanadi, which is most susceptible to landslips in the monsoon season.

Development of tourism in Darjeeling is heavily dependent upon the efficient working of the Himalayan Railway. Plans are therefore being developed to improve its services. These include track improvement and the purchase of new locomotives and rolling stock. Concurrently the Ministry of Railways has sponsored a comprehensive study of the line by professional transportation consultants.

There is regular interaction with the UK-based Darjeeling Himalayan Railway Heritage Foundation. Studies are in progress on comparable railway systems elsewhere in the world, such as the Festiniog Railway in Wales (UK), the design of which inspired the Darjeeling Railway.

Authenticity

The authenticity of the route as originally commissioned in 1881 has been preserved in a remarkably intact condition, with only minor modifications of an evolutionary nature. All the main station buildings (with the exception of Siliguri Junction and Darjeeling, both of which have been rebuilt after being destroyed by fire) have been preserved in their original form.

Evaluation

Action by ICOMOS

An ICOMOS expert mission visited the property in January 1999. ICOMOS also benefited from the comparative study of historic railways coordinated by the National Railway Museum in York (UK) in 1998 (see below).

Qualities

The DHR represents an exceptional feat of civil engineering that has survived virtually intact up to the present day. It is notable also for the quality of many of its associated buildings, especially the intermediate stations, the railway residences and rest-houses, and the Tindharia workshops.

Comparative analysis

The 1998 comparative study of Railways as World Heritage Sites defines specific criteria for evaluating historic railways. To be considered for inscription on the World Heritage List they should conform with one or more of the following:

- be a creative work indicative of genius;
- demonstrate the influence of, and on, innovative technology;
- be an outstanding or typical example;
- be illustrative of economic or social developments.

The DHR was selected as a case-study. It was adjudged to be "an outstanding line on several counts, but ... particularly significant with regard to [its] social, economic, and political effects and the route's relationship with the landscape."

The report stresses the fact that the DHR does not possess any grand structures; on the contrary, its design was based on minimal capital expenditure. However, the engineering solutions adopted to cope with the steep gradients and relatively short distances were exceptional.

It also emphasizes the social and economic importance of the line. The narrow gauge adopted, which was admirably suited to the terrain, permitted the transportation of passengers and goods in a way that had a profound impact on the social and economic development of the Darjeeling area.

Finally, the report describes the intimate relationship of the Railway with the varied terrain through which it passes as outstanding.

In the light of these comments, there can be little doubt that the DHR is of outstanding quality. The combination of narrow gauge and zigzag reverses was the first in the world, and as such it is of exceptional technological interest. It was the first hill railway anywhere in the world and as such served as the prototype for numerous subsequent railways of this type, adopted in India, in Vietnam, in Burma, in Sumatra, in Java, and elsewhere.

One other point should not be overlooked. The DHR links not only the plains with the high Himalaya, but also two distinct cultural traditions - the Hindu culture of Bengal and the Buddhist culture of the mountain region. As a result Darjeeling, which lies at an important nodal point, reflects a cultural fusion between these two cultures (not forgetting, also, the British influence).

ICOMOS comments and recommendations for future action

ICOMOS is impressed by the quality of the DHR, and also by the commitment of those responsible for its management and maintenance to its conservation as part of the railway heritage, both of India and more widely. It is concerned, however, that there is no specific heritage expertise within the Northeast Frontier Railway staff. It proposes that Indian Railways should give special consideration to the possibility of transferring responsibility for conservation of the DHR to...
a special unit with expertise in heritage matters as well as formal railway management skills. Such a unit would have conservation of heritage values as a high priority in its management and operation. This would appear to be consonant with the development of the line as part of the overall tourism plan for the Darjeeling region.

There is no buffer zone along the length of the DHR. Given the complexities of planning in India, ICOMOS urges the State Party to prepare an environmental management plan in association with all the relevant authorities responsible for the protection of the landscape along its route.

ICOMOS is conscious that both proposals will require a lengthy period before they can be developed and implemented. It is conscious of the significance of the DHR, of the current level of conservation, and of the existing commitment of all concerned to its continued existence. It does not therefore propose that inscription on the World Heritage List should be conditional upon their application. It suggests that the Committee consider asking the State Party to provide regular progress reports, with the objective of having appropriate structures in force within the next five years.

The significance of this property lies in its continuing use as a working railway. Its abandonment would necessarily call its continuing World Heritage value into question.

**Brief description**

The Darjeeling Himalayan Railway is the first, and still the most outstanding, example of a hill passenger railway. Opened in 1881, it applied bold and ingenious engineering solutions to the problem of establishing an effective rail link across a mountainous terrain of great landscape beauty. It is still fully operational and retains most of its original features intact.

**Recommendation**

That this property be inscribed on the World Heritage List on the basis of *criteria ii and iv*:

**Criterion ii** The Darjeeling Himalayan Railway is an outstanding example of the influence of an innovative transportation system on the social and economic development of a multi-cultural region, which was to serve as a model for similar developments in many parts of the world.

**Criterion iv** The development of railways in the 19th century had a profound influence on social and economic developments in many parts of the world. This process is illustrated in an exceptional and seminal fashion by the Darjeeling Himalayan Railway

ICOMOS, September 1999
Darjeeling Himalayan Railway (Inde)
No 944

Identification
Bien proposé Darjeeling Himalayan Railway
Lieu District de Darjeeling, Etat du Bengale-Occidental
Etat Partie Union indienne
Date 3 juillet 1998

Justification émanant de l’Etat partie
Le Darjeeling Himalayan Railway (ci-après dénommé DHR) est un exemple exceptionnel du génie des ingénieurs des chemins de fer de la deuxième moitié du XIXᵉ siècle. La voie ferrée gagne en altitude de façon remarquable par l’utilisation de boucles et de gares permettant l’alternance du sens de la marche du train. La ligne se distingue aussi par le fait qu’elle passe par la deuxième gare la plus haute du monde.

Critère i
Le DHR témoigne d’un échange considérable de valeurs humaines car il a eu un impact sur la vie des habitants de la région. Ainsi, par exemple, la notion du temps a changé, car le chemin de fer a mis Calcutta à moins de 24 heures de Darjeeling alors qu’il fallait auparavant cinq à six jours de voyage pour aller d’une ville à l’autre.

Critère ii
Le DHR apporte un témoignage unique sur la tradition culturelle des plantations de thé qui demeurent le principal moyen d’existence des habitants de la région, qu’ils soient propriétaires terriens, ouvriers agricoles ou commerçants.

Critère iii
Plusieurs caractéristiques de la ligne - les innovations techniques utilisées pour gagner de l’altitude et franchir les obstacles, les ateliers de Tindharia qui utilisent encore de nombreuses machines d’origine, les voitures pour voyageurs et les locomotives à vapeur d’origine, comme l’Everest, construite en 1914, les gares datant du XIXᵉ siècle qui ont conservé leur aspect d’origine - témoignent des savoir-faire technologiques d’une époque révolue, illustrent de manière éminente leur fonction et représentent un stade important de l’histoire de l’humanité.

Critère iv

Catégorie de bien
En termes de catégories de biens culturels, telles qu’elles sont définies à l’article premier de la Convention du Patrimoine mondial de 1972, le bien proposé est un site.

Histoire et description
Histoire
Le DHR est intimement lié au développement de Darjeeling, reine des stations de montagne et l’une des principales régions productrices de thé en Inde au début du XIXᵉ siècle.

Le contrefort couvert de forêts épaisse auquel s’accroche la ville de Darjeeling faisait autrefois partie du royaume du Sikkim. Ce lieu fut choisi en 1835 par la Compagnie britannique des Indes Orientales pour servir de station de repos et de convalescence à ses soldats. C’est alors que la région fut achetée au Sikkim et que commença la construction de la station reliée à la plaine par une route. La région fut annexée par l’Empire britannique des Indes en 1858.

Dès 1878, Calcutta était reliée par le chemin de fer à Siliguri, sur les contreforts de l’Himalaya. À l’époque, l’industrie du thé avait pris un bel essor dans la région de Darjeeling, et le réseau de transport routier existant ne suffisait plus face à l’accroissement du trafic. Franklin Prestage, agent des chemins de fer du Bengale-Oriental, soumit une proposition détaillée pour la construction d’une ligne de chemin de fer à vapeur reliant Siliguri à Darjeeling. La proposition fut acceptée officiellement et les travaux de construction débutèrent immédiatement. En 1881 les trois phases de la construction étaient achevées.

La société privée Darjeeling Himalayan Railway a été rachetée par le Gouvernement de l’Union indienne en octobre 1948. Depuis 1958 elle est gérée par la société nationale Northeast Frontier Railway.

Description
Le DHR comporte une voie ferrée de 88,48km d’un écartement de 2 pieds (0.610m) qui relie les gares terminus de New Jalpaiguri et Darjeeling en passant par onze gares intermédiaires. L’une d’elles, Ghoom, construite à 2258m d’altitude, est la deuxième plus haute gare du monde.

Du fait que la ligne traverse une région montagneuse, son tracé est constitué à 73% de courbes, dont la plus serrée, entre Sukna et Rongtong, suit un arc de cercle de 120°. La ligne comporte également six gares permettant l’alternance du sens de la marche et trois boucles, dont la plus connue est celle de Batasia, entre Ghoom et Darjeeling. La pente la plus raide est de 1 pour 18 (dans les inversions de sens de la marche du train).

Le bien proposé pour inscription comprend l’emprise ferroviaire, sur une largeur qui varie de 3 à 50m, et tous les bâtiments annexes – gares et installations, ateliers, dépôts de locomotives et matériels roulants et habitations des cheminots. La voie traverse constamment Hill Cart Road, rendant indispensable l’aménagement de 170 passages à niveau. Les
glissements de terrains causés par la mousson (juillet et août) exigent la reconstruction de beaucoup de ces passages.

Le petit train ("Toy Train"), comme on l’appelle affectueusement, offre des vues prodigieuses sur des chutes d’eau vertigineuses, des vallées vertes souvent embrumées et, au bout du voyage, le splendide panorama de la chaîne du Kanchenjunga couronnée de neige. La ligne se divise en quatre parties : 10km en plaine entre Siliguri et Sukna (en partie urbanisée et en partie agricole), 11km de jungle épaisse entre Sukna et au-delà de Rongtong, 38km dans une région de collines en grande partie déboisées et couvertes de plantations de thé jusqu’à Kurseong et enfin 30km en milieu alpin jusqu’à Darjeeling, dominée par des terrasses plantées de pins de l’Himalaya et de thé.

**Gestion et protection**

**Statut juridique**

La seule protection dont bénéficie le chemin de fer s’applique à l’emprise ferroviaire qui est en principe protégée en vertu des mesures générales relatives aux biens du gouvernement central et des dispositions spécifiques de la Loi sur les chemins de fer de 1989.

**Gestion**

Le DHR est la propriété du gouvernement de l’Union indienne. Il est placé sous la tutelle du ministère des chemins de fer. L’administration du chemin de fer incombe à la Northeast Frontier Railway dont le siège social est situé à Guwahati, capitale de l’Etat de l’Assam.

Les équipements fixes et roulants de la ligne sont répertoriés par la Northeast Frontier Railway et les bâtiments sont inscrits dans un registre détaillé.

**Conservation et authenticité**

**Historique de la conservation**

Cette ligne de chemin de fer étant en service, elle est régulièrement entretenue suivant des programmes définis. Le financement des travaux d’entretien est variable car il répond aux besoins courants et dépend du niveau du trafic généré.

Des programmes d’investissement sont prévus pour la réhabilitation des bâtiments des gares de Darjeeling, Ghoom, Kurseong et Tindharia. Un programme de stabilisation de la voie est en cours pour la section comprise entre Sukna et Mahanadi, qui est une des plus sensibles aux glissements de terrain pendant la mousson.


Les contacts avec la Darjeeling Himalayan Railway Heritage Foundation basée au Royaume-Uni sont permanents. Des études sont en cours sur des réseaux ferroviaires semblables qui existent ailleurs dans le monde, comme le Festiniog Railway au Pays de Galles (Royaume-Uni), dont la conception a inspiré celle du DHR.

**Authenticité**

L’authenticité du tracé, tel qu’il a été construit à l’origine en 1881, a été fidèlement préservée, et ne compte que des modifications mineures, liées à un développement progressif et normal. Toutes les gares - à l’exception de Siliguri Junction et de Darjeeling qui ont été reconstruites après avoir été détruites par un incendie - ont conservé leur aspect d’origine.

**Evaluation**

**Action de l’ICOMOS**


**Caractéristiques**

Le DHR est un ouvrage de génie civil exceptionnel qui est parvenu jusqu’à nous presque intact. Il est également remarquable pour la qualité de nombreux bâtiments qui s’y rattachent, en particulier les gares intermédiaires, les maisons d’habitations et les maisons de repos appartenant à la ligne ainsi que les ateliers de Tindharia.

**Analyse comparative**

L’étude comparative de 1998 **Railways as World Heritage Sites** définit des critères d’évaluation spécifiques des lignes de chemin de fer historiques. Pour que leur proposition d’inscription sur la liste du patrimoine mondial soit prise en considération, ces sites doivent répondre à l’un ou plusieurs des critères suivants :

- être un ouvrage révélateur du génie créateur humain ;
- démontrer l’influence des innovations technologiques sur l’ouvrage et, inversement, l’influence de l’ouvrage sur la technologie ;
- être un exemple éminent ou typique ;
- illustrer l’évolution économique ou sociale.

Le DHR a été choisi comme étude de cas. Il a été déclaré « ligne de chemin de fer exceptionnelle à
plusieurs titres, mais plus particulièrement pour ce qui concerne ses implications sociales, économiques et politiques et pour sa relation au paysage. »

Le rapport insiste sur la modestie des infrastructures et des installations du DHR ; en effet, dès sa conception, l’investissement en capital a été minimal. Néanmoins, les solutions techniques adoptées pour vaincre les fortes pentes et les distances relativement courtes sont exceptionnelles.

Il souligne également l’importance économique et sociale de la ligne. Le choix du chemin de fer à voie étroite, admirablement adapté au terrain, a permis le transport des passagers et des marchandises et a profondément marqué l’évolution économique et sociale de la région de Darjeeling.

Enfin, le rapport qualifie d’exceptionnelle l’étroite relation qui existe entre le chemin de fer et les divers types de terrains qu’il traverse.

A la lumière de ces commentaires, l’éminente qualité du DHR ne fait pas de doute. L’association du chemin de fer à voie étroite et des gares qui permettent l’alternance du sens de la marche est le premier exemple de ce type jamais réalisé et représente à ce titre un intérêt technologique exceptionnel. C’est le premier chemin de fer de montagne au monde et, en tant que tel, il a servi de modèle à de nombreuses lignes construites ultérieurement en Inde, au Vietnam, à Burma, à Sumatra, à Java et ailleurs.

A noter enfin que le DHR ne relie pas seulement les plaines aux montagnes de l’Himalaya, il réunit aussi deux traditions culturelles – la culture hindoue du Bengale et la culture bouddhiste de la région montagneuse. En conséquence, Darjeeling, qui se situe en un point de rencontre important, reflète la fusion de ces deux cultures (sans oublier également l’influence britannique).

**Observations et recommandations de l’ICOMOS pour les actions futures**

L’ICOMOS est impressionné par la qualité du DHR, par le dévouement des personnes responsables de sa gestion et de son entretien eu égard à sa conservation comme témoin de l’histoire du chemin de fer tant en Inde que dans d’autres pays. Il s’inquiète cependant de ne trouver aucune compétence particulière relative à la conservation du patrimoine parmi le personnel de la Northeast Frontier Railway Il suggère que les chemins de fer indiens envisagent de confier la responsabilité de la conservation du DHR à une unité spéciale qui possède des connaissances en matière de patrimoine ainsi que des compétences en gestion des chemins de fer. Cette unité aurait comme une de ses priorités de gestion et d’action, la préservation des valeurs patrimoniales tout en tenant compte du développement harmonieux de la ligne dans le cadre d’un plan d’expansion du tourisme dans la région de Darjeeling.

Il n’existe pas de zone tampon le long du DHR. Etant donné la complexité des rouages de la planification en Inde, l’ICOMOS enjoint l’Etat Partie à préparer un plan de gestion environnementale avec le concours de toutes les autorités responsables de la protection du paysage tout au long de la voie ferrée.

L’ICOMOS est conscient que ces deux propositions exigeront une période assez longue avant de pouvoir être développées et appliquées. Il est conscient de l’importance du DHR, du niveau actuel de préservation et de l’engagement pris par toutes les parties concernées en faveur de sa pérennité. Il ne propose donc pas que l’inscription sur la Liste du patrimoine mondial soit soumise à la condition de leur application. Il suggère que le Comité envisage de demander à l’Etat Partie de soumettre des rapports périodiques dans le but d’établir des structures appropriées au cours des cinq années à venir.

La signification de ce bien repose sur son utilisation ininterrompue. Son abandon remettrait n’écessairement en question sa valeur de patrimoine mondial.

**Brève description**

Le Darjeeling Himalayan Railway est le premier et le plus extraordinaire exemple de chemin de fer de montagne destiné aux voyageurs. Mis en service en 1881, il a appliqué des solutions d’ingénierie audacieuses et ingénieuses au problème de la construction d’une ligne de chemin de fer à travers une région montagneuse d’une grande beauté. Cette ligne est encore en service et la plupart de ses caractéristiques d’origine sont intactes.

**Recommandation**

Que ce bien soit inscrit sur la liste du patrimoine mondial sur la base des **critères ii et iv** :

**Critère ii** Le Darjeeling Himalayan Railway est un exemple éminent de l’influence que peut avoir un système de transport novateur sur le développement économique et social d’une région multiculturelle et qui a servi de modèle à de nombreux autres développements de ce type à travers le monde.

**Critère iv** Le développement du chemin de fer au XIXe siècle a eu une profonde influence sur le développement économique et social dans de nombreuses parties du monde. Ce processus est illustré de manière exceptionnelle, riche et exemplaire par le Darjeeling Himalayan Railway.

ICOMOS, septembre 1999
### Serial Nomination of Nilgiri Mountain Railway
for inclusion in the World Heritage List

#### 1 Identification of the Property

<table>
<thead>
<tr>
<th>Site Element</th>
<th>Name</th>
<th>Location or Municipality</th>
<th>Coordinates of Center Point (both ends of the Linear property)</th>
<th>Area of Core Zone</th>
<th>Area of Buffer Zone</th>
<th>Map Annex</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Darjeeling Himalayan Railway – 1879 (DHR)*</td>
<td>India, West Bengal State. Darjeeling and Jalpaiguri District from New Jalpaiguri to Darjeeling</td>
<td>Between 26° 40' 48&quot; N &amp; 27° 01'48&quot; N and 88° 27’ 36&quot; E &amp; 88° 15’ 36&quot; E</td>
<td>5.34 ha.*</td>
<td>70 ha.*</td>
<td>1.e.1</td>
</tr>
<tr>
<td>002</td>
<td>Nilgiri Mountain Railway – 1899 (NMR)**</td>
<td>India. Tamil Nadu State. Nilgiri District from Mettupalayam to Udagamandalam</td>
<td>Between 11°30’37”N &amp; 11°17’54” N and Between 76°56’9” E &amp; 76°17’55” E</td>
<td>39.18 ha.**</td>
<td>221.46 ha.</td>
<td>1.e.2 to 1.e.5</td>
</tr>
<tr>
<td>003 005</td>
<td>Other Mountain Railways i.e. Kalka Smon Railway, Matheran Light Railway &amp; Kangra Valley Railway will be proposed after inscription of the Nilgiri Mountain Railway.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Linear Property 87.48 Kilometers long and 0.61 meter wide; Buffer zone delineated all along the line to 3 m. on the hill side and 5 m. on the valley side.

** Linear Property 45.88 Kilometers long and 8.5 meter wide; Buffer zone delineated along the length of the line of varying width as in maps at 1.e.2 below.

d) Geographical coordinates to the nearest second

Between 11°30’37”N & 11°17’54” N
Between 76°56’9” E & 76°17’55” E
e) Maps, and plans if available, showing boundary or area proposed for inscription and of any buffer zone.

1.e.1 Sketch Map of the DHR001
1.e.2 Land Plans in Scale 1:1584 for entire length and breadth of the NMR002 also indicating the demarcated buffer zone;
1.e.3 Sketch Map of the NMR002 with Yard Diagrams of all Railway Stations of the NMR002 in scale 1:100,000 for entire length of the NMR002;
1.e.4 Index diagram book showing all curves, gradients and altitude of the entire NMR002; coordinates and altitudes of stations, list of station buildings, tunnels and bridges included in the core zone
1.e.5 Map of Southern Railway & Map of Indian Railways in Southern Railway Timetable.

f. Area of property proposed for inscription and proposed buffer zone if any

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Core area</td>
<td>4.59 ha. (As in table above for site element 002)</td>
</tr>
<tr>
<td>Buffer Zone</td>
<td>500 ha. (As in table above for site element 002)</td>
</tr>
<tr>
<td>Total</td>
<td>505 ha.</td>
</tr>
</tbody>
</table>

2 Justification for Inscription

2a Statement of significance

The NMR002 is amongst the first, and still outstanding, example of a hill passenger Railway. Opened in 1899, it applied bold and ingenious engineering solutions to the problem of establishing an effective rail link across a mountainous terrain of great beauty. It is still fully operational and easily the most authentic and original rack and adhesion Railway in the world. It remains much as it was at the time of its completion in September 1908: stations, signals, rural environment, locomotives and rolling stock; all are much as they were in the first decade after its completion. Such Railways are rare. This is the only such intact Railway in the entire Asia-Pacific region. As such it deserves conservation and global recognition of its qualities.
2b Possible comparative analysis (including state of conservation of similar properties)

Railways came to India in the 1850’s. Away from the mainline, separate hill Railways began with the construction of the DHR\textsuperscript{001} opened in 1889. The NMR\textsuperscript{002}, opened next in 1899. The Kalka-Simla Railway (KSR), Matheran Light Railway (MLR) and Kangra Valley Railway (KVR), followed thereafter. These Railways are all living example of the engineering enterprise of the 19\textsuperscript{th} century. Their construction provided an access to the area with its hill station that they serve and also proved to be a boon for the local population. They provide panoramic views to travelers. They use innovative measures to overcome the challenges of the terrain in distinctive ways. The DHR\textsuperscript{001} used Zig-Zags & Spirals. The NMR\textsuperscript{002} used rack & pinion to follow an incline steeper than that permissible by normal adhesion. The Matheran Light Railway used curves that were incredibly sharp and unique floating axles on the locomotives to go around the hillside. The Kalka Simla Railway and Kangara Valley Railway used very heavy engineering at a very early stage of Railway development. These are all outstanding examples of the earliest Hill Passenger Railways constructed one after the other that are fully operational with most of their original features intact, as tourist attractions as well as a regular mode of transport for the local population. Following the inscription of the DHR\textsuperscript{001} the next such Railway was the NMR\textsuperscript{002} and is proposed as a World Heritage Site in a serial nomination. Other Mountain Railways i.e. Kalka Simla Railway (KSR), Matheran Light Railway (MLR) and Kangra Valley Railway (KVR) were constructed after NMR\textsuperscript{002} and these will be proposed for inclusion in the World Heritage list after inscription of the NMR\textsuperscript{002}.

The NMR\textsuperscript{002} is a rack and adhesion Railway. Rack and adhesion Railways are mixed technology. They combine conventional sections of Railway, where traction is provided through the wheels of the locomotives on the rail (adhesion) and, where grades are too steep for this, sections where traction is provided by cog wheels (pinions) on the locomotive, which engage a rack, laid in the center of the tracks. It is this mixture of technology, and their consequent ability to carry considerable traffic in conventional rolling stock, which differentiates them from rack Railways pure and simple, where no traction is provided by adhesion. Rack Railways were built to enable Railways to penetrate extremely inhospitable and steep terrain, which would not be accessible to conventional adhesion Railways. The absolute limit for steam-worked adhesion Railways is about 1 in 20. Even this is very marginal. Electric traction can cope with gradients of up to 1 in 14,
although such grades scarcely make for efficient working. Rack technology makes for steeper grades possible. Most rack and adhesion Railways were built in last decade of the nineteenth and the first of the twentieth century, and the NMR002 is no exception. By the time rack and adhesion technology was mature, the motor age was dawning, and roads rather than Railways have been the normal means of access to such locations. With a very few exceptions rack and adhesion Railways have been built to a gauge of either one meter or 3'6". The European, South American and Vietnamese lines were built to the former gauge, the African, Indonesian, Japanese, Australian and New Zealand lines to the latter. The NMR002 is a meter-gauge Railway. There are also a couple of modern rack and adhesion Railways in the Asia-Pacific region, notably in Japan (the Oigawa-Ikawa line) and Australia (the standard-gauge Skitube, just ten years old), but, whatever their interest, they have no heritage value.

Rack and adhesion Railways are comparatively rare in the world. The technology for their construction was developed relatively late in the Railway age. Although the first rack Railways for tourist purposes date from the late 1860s and early 1870s (Mt Washington, USA and Rigi, Switzerland), rack and adhesion Railways, designed to carry a more serious traffic, were not built until the mid-1880s. Most rack and pinion lines use conventional flat floor (as opposed to stepped-floor) carriages and keep their maximum grade to around 1 in 8, so passengers don’t slide off their seats. Rack Railways exist in various parts of the world, mostly in Europe. These are, for the most part, tourist Railways, whose aim is to take tourists to a mountain peak. Most examples of such Railways are in Switzerland, where there are about sixteen of them, the longest a little over ten Kilometers in length. These are all modernized electrified Railways. Rack sections are a relatively small proportion of the total route, and, compared with the NMR002 elevations gained are also relatively modest. Some examples of such Railways in Switzerland are as follows:-

i) Rigi Railway, dating from 1871
ii) Pilatus Railway is an extreme case of grades as steep as 1 in 2
iii) Jungfrau Railway that reaches the highest Railway summit in Europe of 3,454 m (11,333 feet)
iv) Brienz-Rothorn Railway that is the last remaining steam-worked Swiss rack Railway.
v) Furka-Oberalp Rack Railway (52 km. long) and Brigue-Zermat Rack Railway (44 km long) together with a section of the adhesion-worked Rhaetian Railway from the route of the famous Glacier
Express. The Furka-Oberlalp is the most impressive, reaching an elevation of 2033 m. or 6670 feet (before recent tunneling 2160 m. or 7088 feet) through an ascent of 903 m. or 2964 feet (previously 1489 m or 4887 feet) on a maximum grade of 1 in 9.

vi) Berner Oberland Railway is a long line 74 km. in length. Applications of this technology outside Switzerland are rare. There are similar Railways in Austria and Hungary. Among the best known examples outside Switzerland are as follows:

i) Snowdon Mountain Railway in Wales (UK)
ii) Pikes Peak Railway in Colorado (USA)

iii) A remaining example in Asia, and the only real rival to the NMR002 is the nine Kilometers of Railway between Ambarawa and Bedono, the last surviving fragment of the 3'6" gauge line between Semarang and Yogyakarta in Java. Climbing by rack to an elevation of 711 m at Bedono, this line is maintained in original condition and with original locomotives for heritage and tourism purposes by the Indonesian Railway administration. However, although what remains is very authentic, it is only a fragment of original route and it is no longer a commercially operating Railway.

There were other examples of rack and adhesion Railways in South America, Africa, Australia and New Zealand, but they have been closed, while elsewhere in Asia, the Darlat line in Vietnam has been closed, the Usui-Toge section of the Japanese transalpine line bypassed by a tunnel, and the Bukkitinggi line in Sumatra has been both degraded and partially modernized. The finest example in some ways was the Transandino Railway, linking Chile and Argentina. This was a meter-gauge electrified Railway, which, however, retained some of its steam locomotives for emergency use until its closure. In just 36.5 km. between Rio Blanco (Chile) and Las Cuevas (Argentina) this line climbed 1730 m (5676 feet) to a summit of about 3200 m (10500 feet) in the Uspallata Tunnel (itself over three kilometers long) that was bored beneath the frontier. This was the outstanding rack and adhesion Railway in the world regrettably it no longer exists to be nominated for World Heritage Status. It loss leaves the NMR002 as easily the finest rack and adhesion Railway outside Switzerland and unquestionably most original example of the phenomenon in the world.

To compare the NMR002 as a technical feat with other rack Railways, it is probably best to examine the altitude gained over the length of the line. In the case of the NMR002 the rack section of the line
from Kallar to Coonoor climbs a total of 1330 m or 4363 feet in 19 km. or 12 miles. Since the closure of the Chilean Transandino and the opening of the new Furka tunnel on the Swiss Furko-Oberalp line, the NMR002's ascent by rack is easily the greatest of any surviving rack and adhesion line. Over its entire length of 46 km or 28.5 miles, the NMR002 climbs through a total of 1877 meters or 6158 feet by a mixture of rack and adhesion. This exceeds by a considerable margin the ascents on both the old Furka-Oberalp and the closed Transandino lines. Moreover, both these lines were electric-powered lines, while the steepest sections of the NMR002 continue to be worked by steam locomotives of a class introduced a few years after the Railway opened. By world standards then, and by any criterion, the NMR002 is an outstanding rack and adhesion Railway.

2c Authenticity/Integrity

This Railway is a living example of the engineering enterprise of the 19th century. Its construction provided an access to this hill station and also proved to be a boon for the tea growing industry. This line provides one of the most panoramic views to its travelers. Use of innovative measures like rack & pinion to follow an incline steeper than that permissible by normal adhesion is another very significant feature of this line. It is also noteworthy that this line besides being a tourist attraction, is also a regular mode of transport for the local population. The NMR002 retains its original features of 1899 when the first section was opened till Coonoor and 1908 when the remaining portion of this line was opened.

The stations are being well maintained as in the original construction except at the terminals at Udagamandalam that was extended in the 1980s and its locomotive depot demolished soon after. With this exception, the Railway’s significant original structures are still in use. Maintenance standards on the NMR002 are good, as the Railway is used fairly intensively (five passenger trains are scheduled each day, including a tourist special) but no more intensely than it was designed to be used.

The signaling system is original. The locomotives and rolling stock are old and also of heritage value though they are not from the date of the opening of the Railway. The steam locomotives which work all traffic on the rack section and the tourist special on the adhesion section are the X class designed in 1911 and built by the Swiss Locomotive and Machine Works (SLM) in Winterthur between 1913 and 1952. Most of the passenger cars date from the inter-war period.
Modern diesel locomotives also work trains on the adhesion sections. And there are some modern passenger cars on the line as well. Such innovations are essential to meet the needs of today’s clientele, but there is a lot of old equipment on the line for it to have much the same ambience as it did in the 1920’s. The Ministry of Railways of the Government of India and also the Southern Railway administration laid great emphasis on the preservation of this entire Railway system including the line, rolling stock and all associated buildings in their original shape to the extent possible.

The countryside served by the Railway also retains the charm that over time. The natives look upon the Railway as a friendly symbol of the mountains rather than as a harbinger of change. Overall, the NMR002 is authentic and well preserved. It has always been a working Railway and as always, it plays an important economic and social role serving the people of the district through which it runs.

2d Criteria under which inscription is proposed (and justification for inscription under these criteria)

Inscription is proposed under two of the criteria for the inclusion of cultural properties listed in the Operational Guidelines for the World Heritage Convention and the same criteria for which the DHR001 has been inscribed as a World Heritage Site. These are as follows:-

(ii) Exhibits an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design, and

(iv) It is an outstanding example of a type of building or architectural or technological ensemble or landscape, which illustrates a significant stage in human history.

An example of an interchange of human values, the NMR002 has a dual significance.

i) First, it is an example of a colonial Railway. It is part of that stage of globalisation, which was characterized by colonial rule, and the political and economic domination of the people of Asia, Africa and the Pacific by Europeans. Part of that process, of course, was technology transfer, as the NMR002 is a spectacular example (although hardly a unique one) of such transfer. With the technology came European patterns of organization. The Railway is a fine example of this. The Nilgiri plateau across which the NMR002
runs between Coonoor and Udagamandalam, was transformed by the Railway into a tea-growing area. Indeed, one of the interesting effects of the Railway has been the way it has contributed to a unique landscape made largely by human intervention. For the dominant tree cover on the Nilgiris is eucalyptus, imported from Australia by the British, while the dominant commercial crop is tea, similarly imported from China. This Railway also bears a unique testimony to the cultural tradition of Tea plantation, which still remains a source of livelihood of the populace of that region. Thus the landscape has been given unique qualities as a result of Railway construction. Socially, the Nilgiris have been a location for interaction British and South Indian communities. The social effects of this interaction remain prominent to this day.

ii) The second way in which technological and social interchange is evident is through the application of rack Railway technology as applied in the west to establish a rail link in a tropical location. Switzerland, of course, never had colonies, and most applications of Swiss rack Railway technology outside Europe were the work of the British or Dutch. The original intention to have a direct rack Railway on the Riggenbach system that was later dropped in favour of the Abt type of rack rail. Rigi system uses a Ladder type of central rail with the toothed wheel engaging the runs of the ladder; the ABT system has two adjacent rails in the center of the track with the teeth on the top out of step with each other. Perhaps the choice was made due to the recommendations made by Sir Guilford L. Molesworth, Consulting Engineer to the Government of India for the State Railways who in 1886 visited Harz Mountain Railway working on ABT system and strongly advocated this system in preference to Rigi system. The Swiss qualities of the NMR002 are strong. The steam locomotives which still work all traffic on the rack section and the tourist special on the adhesion section are the X class, designed in 1911 and built by the Swiss Locomotive and Machine Works (SLM) in Winterthur between 1913 and 1952. The export of technology from Switzerland has contributed to the unusual if not quite unique) features of the NMR002.

As an outstanding example of a technological ensemble illustrating a significant stage in human history, this Railway is a unique example of construction genius employed by Railway engineers in the later part of 19th century. When the Railway was being built, people went up the hills on horseback and on foot which took them more than 10 days to reach Udagamandalam, braving insects and wild animals. With the introduction of the Railway, the 45 km. journey took only 4 ½ hours. The
manner in which height is gained in this Railway by rack and pinion mechanism is amazing. The NMR002 became a part of the life of the local population and has remained as such. Various facets of the Railway line, viz. the rack &pinion mechanism to gain height, the steam engines, coaches, the station buildings preserved in their original shape all bear testimony to the technological skills of the bygone era are an outstanding demonstration of their function and illustrates a significant stage in human history. While the NMR002 is not quite unique as an example of the transfer of rack Railway technology to remote locations outside Europe, it is certainly the outstanding remaining example in the world, in terms of its scale, authenticity, continuity and presentation. Today, the NMR002 stands out as a heritage symbol of the region. As an ensemble, with its impeccably maintained permanent way; its elegant, original stations and associated buildings, and its large proportion of old rolling stock and locomotives, it is genuinely outstanding, even unique. This type of a development of the 19th century that is preserved over time. Thus, it is clearly and spectacularly illustrative of a significant stage in human history.

3 Description

3a Description of Property

The DHR001 AND THE NMR002 are amongst the earliest and most outstanding passenger Railways that were works of remarkable construction genius that applied bold and ingenious engineering solutions to the problem of establishing an effective rail link up a difficult mountainous terrain of great beauty, overcoming the challenges of the steep hills in a special way. The DHR001 and the NMR002 are outstanding examples of the influence of an innovative transportation system on the social and economic development of a multi-cultural region that was to serve as a model for similar developments in many parts of the world. These Railways also illustrate in an exceptional and seminal fashion the profound influence of Railways in the 19th century on the social and economic developments in many parts of the world. They are both fully operational and retain most of their original features in tact.

The detailed description of both these Railways is given in a book published by the National Rail Museum, New Delhi for these Railways and attached to this application. While the DHR001 is already inscribed as a World Heritage Site, a brief description of the NMR002 proposed to
be inscribed as a serial application for World Heritage Status is given below.

The NMR002 is a meter-gauge, single-track Railway, about 46 km in length, which runs from Mettupalaiyam to Udagamandalam in the state of Tamil Nadu, India. Names have changed since the end of the colonial period. Udagamandalam was previously anglicized as Ootacamund, and remains to the present generally abbreviated as Ooty. Under the British most of what is now Tamil Nadu state was known as Madras State, named after its capital city, which in the 1990s itself was renamed Chennai. Mettupalaiyam is the terminus of a broad-gauge branch line from the large city of Coimbatore. Trains can and do run through to Mettupalaiyam from Chennai, including the overnight Nilgiri Express with its connecting meter-gauge service to Udagamandalam. Mettupalaiyam is located at an elevation of 326 m (1069 feet) and Udagamandalam at an elevation of 2203 m (7228 feet). The Railway can be divided into three sections as follows:

i) The first section, some 7 km. from Mettupalaiyam to Kallar (elevation 405 m or 1329 feet), is across the central plain of Tamil Nadu. On this section the Railway runs through beetle-nut palm and other plantations. Mettupalaiyam and Kallar are in Coimbatore Civil District whereas the rest of the stations are in Nilgiris District. Maximum speed is 30 KMPH. Mettupalaiyam, was a small village in the 1850s and it gained importance as a railhead only after the British laid a Broad gauge line from Coimbatore to Mettupalaiyam in 1873. The Broad gauge train from Madras to Mettupalaiyam was called the Blue Mountain Express, the name of which was changed recently to the native Nilgiri Express. Mettupalaiyam has the carriage and Wagon Depot of the NMR002 and all the carriages and Wagons are maintained there.

ii) The second is the rack section of the line from just beyond Kallar to slightly short of Coonoor (elevation 1712 meters or 5617 feet), which climbs a total of 1330 m or 4363 feet in 19 kms. or 12 miles. On this rack section the average grade is 1 in 15 and the ruling grade is 1 in 12. There are 208 curves and 13 tunnels on this section, as well as a half tunnel, where the Railway formation has been cut into the sheer cliff wall, and hence is enclosed by rock on three sides. There are also 27 viaducts, most of composite steel and stone construction, featuring steel girder spans, typically of 60 feet (18.3 m – the Railway itself was constructed to imperial measurements, although its Swiss locomotives were built to metric measurements), supported on stone abutments and piers. The Kallar Bridge over the River Bhawani, the Adderley viaduct and the Burliar Bridge are
especially notable examples of such composite bridges. On this section the Railway climbs through almost uninhabited jungle. So steep are the hillsides that commercial exploitation of the forests has never occurred on any scale, and agriculture is impossible. Heavy rainfall and rich soil mean that these jungles are luxuriant and tropical. The last five kilometers feature fine views over the escarpment, which the train has just ascended, and the country opens up as tea grades start to line the Railway. Maximum speed is 13 kmph. Coonoor town is built on one of the best geographical locations in the Nilgiri Mountains. Surrounded by hills, Coonoor possesses a cool and equitable climate. After being a terminus for the NMR002 for nine years, Coonoor’s importance still remains as one of the best stations on the line. Centenary Celebrations of Coonoor Station was held on 18th December 1997, which was presided over by Shri Nitish Kumar, Hon’ble Union Minister of State for Railways.

iii) The third section is 18 km. long. It is a great contrast to what precedes it. The landscape is neat, almost manicured, and the dominant eucalyptus and acacia forest suggest to the passenger a journey in southeastern Australia rather than southern India. Although the rack section is behind the train, the Railway continues to climb across the Nilgiris, till it reaches its summit just before the terminus of Udagamandalam at an elevation of 2203 m (7228 feet). Although the climb here is not as steep as the rack section, the ruling gradient between Coonoor and Udagamandalam is still very steep 1 in 23. There are also three tunnels in this section including the longest on the line, some 282 m (925 feet) in length. Maximum speed is 30 kmph. Udagamandalam is also known as Ootacamund or Ooty Ootacamund is a corruption of the word Utaka – Mand, a mand or a collection of quaint huts of the original aboriginal todas. The todas believe that they have always lived on the Nilgiris. Legend has it that ‘God dropped a pearl on a mand and out of this pearl came their God. Thakkiri, who beat the earth with a cane to create rising dust and from whence came the first Toda. Udagamandalam, being the highest point of the line, is a sought after destination for tourists.

Rack rails consist of two toothed steel bars laid in a double row at 44 mm apart and 64 mm. above the running rails so that the tooth of one rail is directly opposite to the gap of the other to ensure that the engine pinions do not work off the racks while negotiating curves. Rack bars of two standard lengths i.e. full bars with 26 teeth per length of 3.12 m and half bars with 13 teeth per length of 1.56 m are in use. The pitch of rack teeth is 120 mm. The
entry to the rack is effected through specially designed entry
tongues laid in special channel sleepers fitted with bow springs and
connecting links connected finally to the rigid bars. The rack
section commences from km. 7/8-9 and ends at km. 26/8-9. The
racks are laid at a constant distance of 455 mm. from the inner rails
and are screwed by bolting to cast iron chairs fixed to the sleepers
with fang bolts.

Trains on the NMR002 offer a rich and scenic expanse of the entire
Nilgiri Mountain area. The engines are always at the Mettupalayam
end. The bogies running on the section were modified in 1992 at the
Golden Rock Workshops to enable the passengers to get a good view
on both the sides. Each of the Coaches and Wagons are provided
with brakesmen who independently operate friction brakes and rack
brakes on whistle codes from the driver. The sharpest curve is 17 1/2°.
There are over 200 sharp curves in this section. There are 16 tunnels in
the section Tunnel No. 5 is called a “half tunnel”, where the rock on top
hangs precariously. Out of this 10 tunnels are unlined as they are cut
through solid rocks. There are 250 bridges, of which 32 are major
bridges. This Railway is operating “X” class locomotives with pinion
wheels on rack rail arrangement to negotiate the steep gradient of 1 in
12. Due to the steep gradient and adverse weather conditions, the
following two different braking systems are used:

   i) Adhesion braking between wheel and rail through friction, which is
done by vacuum brake as well as brakes, applied through brake
gear.

   ii) Brake application through the pinion and rack bar, which is
connected, to the track. The locomotive pinions are made to drive
the pistons, which act as air compressors causing dynamic braking
effort. The clasp brakes actuated by hand wheels on the brake
drum, mounted on the pinions can also apply braking effort on the
cogwheel.

3b History

The DHR001 and the NMR002 are first two hill passenger Railways
establishing a separate and effective rail link up a difficult mountainous
terrain and overcoming the challenges of the steep hills in a special
way. Their history is given in a book published by the National Rail
Museum, New Delhi for these Railways and attached to this
application. While the DHR001 is already inscribed as a World Heritage
Site, a brief history of the NMR002 proposed to be inscribed as a serials\application for World Heritage Status is given below:

Protected by wild, jungle-covered escarpments and located at an elevation of roughly 2000 meters, the Nilgiris were isolated from most of humanity until the nineteenth century. Their tribal inhabitants, the Todas, did not participate in the mainstream of Indian cultural, social or religious life. Even the name of the hills, meaning Blue Mountains in Sanskrit, clearly reflects the perspective of a person looking at them from below, rather than that of an inhabitant of the district. It was the British, with their passion for cool-climate sanatoria where they could recreate aspects of English social life in a congenial climate, rather than Indian rulers, who thought that the Nilgiris might have potential. British settlement in the hills began in 1820. By 1830 there was military commandant there and British families from Madras had begun building summerhouses there, especially in the location they called Ootacamund (now Udagamandalam). By 1870, the Madras government as a whole was moving there for the summer, in imitation of the annual migration of the viceroy's Government from Calcutta to Simla.

Railway construction began early in this part of India. The history of the NMR002 dates back to 1854 when proposals were first mooted by the British to build a Railway up the hills from Mettupalayam. Work began on the Madras-Coimbatore line in 1853, which opened in 1862. the branch to Mettupalayam opened in 1873. These Railways were built to the standard Indian broad gauge of 5'6" (1670 mm). The problem then was how to replace the tedious ascent by bullock-cart or pony to Coonoor. The district engineer of the Nilgiris in 1873, J.L.L. Morant, was a well-read man, and just a year after the Railway opened to Mettupalayam he proposed building a rack Railway to conquer the escarpment. He was aware of the then new Mt. Washington and Rigi rack Railways and could see the potential of applying this technology to the ascent of the Nilgiris. Niklaus Riggenbach, the inventor of the rack system named after him, which was used on the Rigi Railway in Switzerland, offered to build a Railway into the Nilgiris in 1876, but on such terms that the Madras Government declined his offer. Riggenbach actually visited India in 1882 specifically to plan such a Railway. He reported that it was technically feasible, but the insistence of him and his partner, Morant, on a 4% Government guarantee, stymied the scheme.

Improving technology appeared to offer better prospects by the mid-1880s. The first rack and adhesion Railway in the world was opened
from Blankenburg to Tanne in the Harz Mountains of Germany in 1886. Although it was 28 km. in length, only 5.5 km. the steepest sections of the line, were rack-worked. Moreover, its rack system, designed by Roman Abt, was superior to the earlier Riggenbach system. Sir Guildford Molesworth, the former engineer in chief of the Ceylon Government Railway and a talented builder of mountain Railways there, visited the Harz in 1886. In his role as consulting engineer to the Government of India on railways, he advised a rack and adhesion line on the Abt system for the Nilgiris.

In 1874, proposals were made to build a Railway line from mettupalaiyam to Ootacamund (Now Udagamandalam) similar to the Lisbon Steam Tramways. However, the proposals became more feasible only in 1876 when M.Riggenbach, the Swiss inventor of the Rigi system of mountain Railways offered to construct the NMR002 on his patented “Rigi” pattern at an estimated cost of 4,00,000 pounds with certain conditions that the then Govt. did not agree. Two more proposals were drawn later, but to no avail. In 1882, Rigenbach submitted another proposal at 1,32,000 pounds, which found acceptance and the “Nilgiri Rigi Railway Company Ltd.” Was formed. However, it was only in 1885 that the Nilgiri Company was formed with a capital of 2.5 million to undertake the construction of the Mettupalaiyam-Coonoor Railway Line. Lord Wenlock inaugurated work on this line the then Governor of Madras Presidency, in August 1891. By the time the section from Mettupalayam to Coonoor was officially opened by the Governor of Madras on August 11, 1898, the line had already changed hands thrice, each time a new company being formed due to the liquidation of the earlier one.

Construction began in August 1891, but the company’s capital was exhausted three years later. A new company was formed in 1896 and completed the line through to Coonoor two years later. A shortage of capital delayed the opening for the best part of a year, and the company was quite unable to contemplate further construction on to Ootacamund (now Udagamandalam). It was relieved to be able to sell its assets to the Government in 1903. Thus, the railway was completed by the government through to its terminus in 1908. However, it was worked by company with the concession for the broad-gauge Railways on the plain, the Madras Railway Company to 1908, and thereafter the South Indian Railway. Direct Government control resumed 1944, and in 1951 the NMR002 was incorporated into the new Southern Railway, which has administered it ever since.
Thus, the building of these 46 km occupied no less than 32 years from the time of Riggenbach’s first concrete proposal until the Railway’s completion. The difficulties of terrain were extreme, and the technology experimental. It was only the success of Abt’s Railway in the Harz, which made possible the NMR002. The chequered history of the NMR002’s construction vividly illustrates both the Railway’s outstanding qualities in terms of its achievement, and its significance as an example of technology transfer from central Europe into southern India.

3c Form and Date of Most Recent Records of Property.

The DHR001 and the NMR002 are now the property of the Central Government of India (Ministry of Railways). The assets that constitute the property such as buildings, track, rolling stock etc. are documented and belong to the Indian Railways.

Specifically for the NMR002, the Southern Railway of the Indian Railways with its headquarter at Chennai is in-charge. In turn, the NMR002 falls under the administrative just jurisdiction of Palghat Division of the Southern Railway. The land is demarcated in land plans maintained by the State Government of Tamil Nadu. The Palghat Division maintains a liaison with the State Government at the district level in matters concerning land and land records, maintain a list of buildings in building registers. The Track records (Track diagrams) are maintained by the Divisional Railway Manager, Palghat. A list of all the Bridges with their diagrams is also maintained in a Bridge register. These are updated as and when new assets are added or changes are effected in the existing ones. Similarly, the Coonoor Loco Shed, which is also under the administrative control of Divisional railway Manager, maintains the records pertaining to the rolling stock Palghat. All these records are kept up to date.

3d Present state of conservation

The DHR001 and the NMR002 are both fully operational and retain most of their original features intact. The stations are being well maintained as in the original construction except at the terminus at Udagamandalam that was extended in the 1980s and its locomotive depot demolished soon after. With this exception, the railway’s significant original structures are still in use. Maintenance standards on the NMR002 are good, as the railway is used fairly intensively (four passenger trains are scheduled each day, including a tourist special) but no more intensely than it was designed to be used.
3e Policies and Programmes Related to the Presentation and Promotion of the Property

i) The Railways are alive to the need to conserve the entire NMR002 system in its original glory and necessary investments/steps to that effect are being taken. Although the revenue generated is very low, this line up the hills of the Nilgiris is still being operated and maintained in heritage interest. This also helps to preserve the old world charm of the steam era. Indian Railways are spending about US $ one million annually to keep the track and formation in shape for comfortable and safe travel on the line. In addition, investments to induct new locos and rolling stock are being contemplated. The priority and attention this railway is receiving from the Government of India is evident from the level of investment made annually and that contemplated in future. That there is a need to preserve the NMR002 for posterity is appreciated in the Indian Railway. Indian Railways is committed to the immovable and movable assets for conservation, maintenance, operation as well as necessary addition, in order to preserve the significance and values. This holds good although much expenditure is being incurred and the earnings are low.

ii) Indian Railways is committed to the involvement of professionals and stakeholders for conservation, maintenance, operation as well as necessary addition, in order to preserve the significance and values of the immovable and movable assets. Efforts are made to stimulate visitor interest in, and support for, the management and conservation of the Railway, to influence visitor behaviour, to maximise benefits and minimise any adverse impacts on the host community.

iii) Operating in mountainous terrain, such Railways are prone to disruptions especially as a result of landslides. Indian railways is committed to carry out necessary restorations in order to keep the full length of the Railway operational.

iv) Nilgiris, “the queen” of hill stations, has developed into a very popular tourist resort of South India. It is widely known for the panoramic view of the Western Ghats and the blue haze of the hills from which the name NILGIRIS, meaning “Blue Mountains” has been derived. The train from Chennai to Mettupalayam was known as the “Blue Mountain Express”, a tribute to the Nilgiris, for a long time. The train was renamed as “NILGIRI” Express after its more popular
Tamil name. The tremendous tourist potential of the NMR002 is realised by the civic as well as the railway administrations. Various developmental plans have, therefore, been made for improvement of the services and to promote tourism by the National Government Ministries, State Government and Indian Railways.

v) The Ministry of Tourism of the Government of India, State Government, and the Department of Tourism on the Ministry of Railways are working together to promote as a tourist destination, both the area as well as the Railway. Efforts are made to improve communication and access, attract more high spending domestic and overseas visitors, and developing the popularity of the Railway in all seasons. Efforts are also made to encourage people to travel by train instead of road to experience the journey by rail.

vi) To develop a high quality tourism product which meets the needs of identified target markets, within the overall objectives of the Heritage and Tourism, in addition to the Nilgiri Express and other regular service; the Indian Railway Tourism Corporation (IRCTC) has recently launched a number of tour packages to promote the NMR002 such as the following:-

a) Udagamandalam - Coonoor - Udagamandalam - Train Ride, Tea Garden Tour, Lunch in Scenic Surroundings, Visit to Dolphin's nose, Visit to Lamb's Rock and a visit to the Sims Park.
b) Mettur - Udagamandalam - Mettur - Train Ride with On-board services for audio, guide, catering, complimentary photo and games.

4. Management

4a Ownership

As in the case of the DHR001, the Ministry of railway, Government of India, owns all the movable and immovable assets of The NMR002.

4b Legal Status

As in the case of the DHR001, the legal right to the property is vested with the Ministry of railways, Government of India.
4c  **Protective Measures and means of implementing them**

As in the case of the DHR001, the NMR002 is a property of the Government of India and has the legal and legislative protection available under the Indian Constitution to Central Government property. The protective measures are provided in the Railway act of 1989 which replaced the Indian railway Act 1890 and came into force from 1st July 1990 and the public premises (eviction of unauthorized occupants) Act of 1971. The later act was legislated to deal with the pressures of unauthorized occupation of Government land/premises.

4d &
4e  **Agency/agencies with Management authority, Level at which management is exercised (e.g. on property, regionally) and name and address of responsible person for contact purposes.**

- **Chairman and Members**
  - Secretary Railway Board
    - (Chairman Apex Committee of India’s Rail Heritage)
    - Railway Board
    - Ministry of railways
    - Rail Bhawan
    - New Delhi
  - General Manager and Principal Heads of Departments
    - Northeast Frontier Railway
      - Maligaon, Guwahati
      - Assam
    - Southern Railway
      - Park Town, Chennai – 600003
      - Tamil Nadu
  - Divisional Railway Manager
    - Katihar, Bihar
  - Branch Officers
    - (Various Departments)
      - Katihar, Bihar

- **Other Zonal Railways and Units**
  - General Manager and Principal Heads of Departments
    - Maligaon, Guwahati
    - Assam
  - Divisional Railway Manager
    - Palghat – 678 002 Kerala
  - Branch Officers
    - (Various Departments)
      - Palghat – 678 002 Kerala
4f Agreed Plans related to property (e.g. regional, local, conservation, tourism development plan)

Para 3e covers all these aspects.

4g Sources and levels of Finance

For DHR001 and NMR002, the source of finance is the consolidated fund of India. The money required for maintenance and operations for day to day working or for capital investment on the line is taken from the consolidated fund of India after the sanction of the Budget by the Parliament.

The annual revenue expenses for operation and maintenance are sanctioned for the various departments controlled by the division acting under the charge of the Divisional Railway Manager as mentioned earlier in item 4f above.

For expenses on capital account or depreciation, the Indian Railways provides the arrangements through Railway Board, Zonal railways and the Divisions for Rolling Stock Program, Works Program and Machinery and Plant Program to address the necessary requirements for all expenditure towards immovable and movable assets as mentioned earlier in item 4f above.

4h Sources of expertise and training in conservation and management.

For DHR001 and NMR002, the conservation, maintenance and management of this line is controlled by Indian Railways. In this manner, they have remained preserved and in operation for so many years. Considering their appeal, in the present form they are being promoted for tourist services apart from the usual train service. Indian Railways also has other mountain railways that are being so preserved and maintained in other parts of the country.

The technical requirements with respect to the movable and immovable assets are taken care of by technically trained and selected personnel from various departments as listed in item 4e above. The Officers, Supervisors and workers are recruited based on their technical qualifications. Subsequently, for the Officers, training institutes for technical and management training are part of the Indian Railways such as Railway Staff College at Vadodra, the Indian Railway Institute of Civil Engineering, Pune, Indian railway Institute of Electrical
Engineering, Nasik, Indian Railway Institute of Mechanical 
& Electrical Engineering, Jamalpur, Indian Railway Institute of Signal 
and Telecommunications, Secunderabad, Supervisors and Staff are trained 
in their respective Zonal Training Institutes and various training schools 
and facilities available within that Zone. However, they can also be 
deputed to institutes and schools of other Zones as required from time 
to time. In addition, for all categories of employees, the Indian 
Railways can consider training in other institutions of the Public or 
Private sector in India or abroad.

4i Visitor Facilities and Statistics

Train Services, Station facilities, Platforms and passenger amenities 
are provided on the DHR001 and NMR002, for the requirements of both 
visitors and the commuters as these Railways have a special attraction 
for tourists. These services are publicised through the timetable and 
information made available through various channels.

In addition to the usual train services on the NMR002, tourist trains are 
being promoted by the Indian Railway Tourism and Catering 
Corporation (IRCTC) as mentioned earlier in item 3e above. Railway 
Stations on the NMR002 are provided with waiting rooms for the benefit 
of visitors. Most of the stations have a cafeteria, Retiring rooms are 
available at Udagamandalam, Lovedale and Coonoor and 
dormitories are available at Udagamandalam, Aravankadu and 
Wellington. Also, over the years, a number of good hotels, holiday 
resorts have also come up along the NMR002.

During the year 2000, 2,94,118 tickets were sold on the NMR002. The 
total number of visitors who visited Nilgiri Mountains as obtained from 
the statistics maintained by the local civic administration was 15,74,151 
in 2000.

4j Property Management Plan and Statement of Objectives

The DHR001 and the NMR002 are to be preserved as outstanding, 
examples of hill passenger railways. The old rail link across the 
mountainous terrain of great beauty should be maintained and the 
Railway should be kept operational. The conservation should be done 
to keep it as much as possible in the original condition with its original 
features even to the extent of maintaining steam traction as far as 
possible.
The Management and Organisation that makes this possible is through the Railway Board, Zonal Railway and Division as illustrated in paragraph 4d&e above. This provides the necessary planning, resources, budget and direction. The continued operation of these old Railways, inputs are necessary for movable and immovable assets for additions and replacements. For this planning, the Indian Railways provides the following program arrangements through Railway Board, Zonal Railways and the Divisions:

i) Rolling Stock Program: - To provide for Locomotives, Coaches and other rolling stock for addition/replacement as per requirements that are justified and approved.

ii) Works Program: - To provide for all works to be executed for immovable assets as per requirements that are justified and approved.

iii) Machinery & Plant Program: - To provide for all machinery & plant requirements for addition/replacement as per requirements that are justified and approved.

This aims to address the necessary requirements for all expenditure towards immovable and movable assets on Capital account or Depreciation Reserve Fund (DRF).

The operation and maintenance requirements to keep it running and conserved in terms of manpower, revenue expenses and assets are provided for in various departments through an organization as illustrated in item 4e above. This is controlled by the division acting under the charge of the Divisional Rail Manager through various departments that are primarily as follows: -

i) Non - Technical departments
   a) Operating and Commercial
   b) Accounts
   c) Medical
   d) Stores

ii) Technical Departments
    a) Civil Engineering
    b) Mechanical Engineering
    c) Electrical Engineering
    d) Signals & Telecommunications
These departments are each headed by a branch officer who reports to the Divisional Rail Manager and they have necessary technical, trained and skilled personnel to take care of the necessary requirements for operating, maintaining and conserving the Hill railways. Railway Rest houses on the NMR\textsuperscript{002} are provided at Coonoor, Lovedale and Udagamandalam for the stay of Railway personnel visiting this line.

The revenue generated on the DHR\textsuperscript{001} and NMR\textsuperscript{002} is very low and expenses are high. These Railways are also provided with inputs on Capital or Replacement account (DRF) to keep them operational. The Indian Railways are conserving the entire DHR\textsuperscript{001} and NMR\textsuperscript{002} system in its original glory and necessary investments/steps to that effect are being taken in heritage interest. This also helps to preserve the old world charm of the steam era.

In this manner, the values of the heritage of DHR\textsuperscript{001} and the NMR\textsuperscript{002} have been preserved for the so many years. Consequent to the inscription of DHR\textsuperscript{001} as a World Heritage Site, additional inputs have been provided there for better conservation and the same is expected to apply to the NMR\textsuperscript{002}. In addition, for the DHR\textsuperscript{001}, a stakeholders workshop with UNESCO has already been done to bring people and their heritage closer together. This is being followed up with a Support Services Program and Policy Development (SPPD) that includes a demonstration model. In this manner, Capacity Building measures have been initiated for Sustainable Development.

4k **Staffing levels (Professional, Technical and Maintenance)**

The organization chart has been illustrated in item 4d above. The various technical and non-technical departments have been listed in item 4j above. On the whole, just for the the NMR\textsuperscript{002}, there are about 360 persons in different disciplines.

5 **Factors Affecting the Property**

5a **Development Pressures (e.g. - encroachment, adaptation, agriculture, mining)**

The DHR\textsuperscript{001} and the NMR\textsuperscript{002} led to the appearance of community settlements and plantations along their route. Notwithstanding the development of road transport, these Railways are still working. The
Zonal Railway acting through the Divisional Rail Manager is empowered to address various issues concerning encroachments and buffer zones. The concerned Senior Divisional Engineer working under the Divisional Rail Manager has been given the powers of the estate officer. The legislative measures in force are the Railways Act (1989) and the Public Premises (Eviction of unauthorized occupants) Act (1971).

5b Environmental Pressures (e.g. - Pollution, climate change)

The DHR001 and the NMR002 are located in a mountainous terrain that is relatively free from pollution. The cultural values of the sites are mentioned in the statement of significance are also not threatened by environmental pressures.

5c Natural Disasters and Preparedness (earthquakes, floods, fires, etc.)

The DHR001 and the NMR002 are located in a mountainous terrain. The areas are classified as earthquake prone. There are also landslides especially during the rainy seasons. The Railways conduct necessary exercises to prevent such disruptions such as hillside strengthening, drainage works and tree plantations. There have been disruptions in service on particular portions of the linear route of these Railways but in all cases, the restoration has been carried out successfully.

The local authorities take care of minor restorations and seek sanction from higher authorities in terms of the organization as illustrated in item 4d above depending on the costs involved. The Indian Railways are committed to conserve these Railways as heritage for posterity and in this manner have always carried out the necessary restorations as early as possible.

Consequent to inscription as World Heritage, applications can also be made to the World Heritage Center for emergency assistance in terms of article 95 of the Operational Guidelines for the Implementation of the World Heritage Convention.

5d Visitor/Tourism Pressures.

The DHR001 and the NMR002 are operating with high costs and low revenues. Consequently, few services are in operation. The traveller pressures on the railway are low because of the considerable time advantage that the road journey provides at present. Marketing efforts are being made for attracting the high profile tourists to yield
higher revenues. These Railways are not operating at their maximum capacity and services can be augmented to cater for more tourists.

5e **Number of inhabitants within Property, Buffer Zone**

The DHR\textsuperscript{001} and the NMR\textsuperscript{002} led to the appearance of community settlements along their route. Following the inscription of DHR\textsuperscript{001} as World Heritage, a survey has been done to identify the inhabitants within three meters on either side of the track. Unlike the DHR\textsuperscript{001}, the NMR\textsuperscript{002} does not run alongside the road and is therefore not affected by roadside settlements. The Zonal Railway acting through the Divisional Rail Manager is empowered to address various issues concerning encroachments and buffer zones. The concerned Senior Divisional Engineer working under the Divisional Rail Manager has been given the powers of the estate officer. The legislative measures in force are the Railway Act (1989) and the Public Premises Act (1971).

6 **Monitoring**

6a **Key Indicators for Measuring State of Conservation**

The DHR\textsuperscript{001} and NMR\textsuperscript{002} are working Railways. Trains are being operated on daily basis maintained as per the requirements. The key indicators for measuring the state of operations are therefore the indices for measuring the state of conservation. The key operating indices which are regularly monitored on a yearly basis and which form the basis for taking major investment and conservation decision are listed as under:

i) Number of days of interruption to through traffic in a year.
ii) Number of days cancellation of train services on operational reasons.
iii) Number of derailments
iv) Number of land slips affecting train running.
v) Number of encroachment cases.

6b **Administrative Arrangements for Monitoring Property**

The organization chart has been illustrated in item 4d above. The various technical and non-technical departments have been listed in item 4j above.

The civil engineering items i.e. track, bridges and buildings are periodically inspected by various levels of supervisory and managerial
staff as per laid down inspection schedules. Key officials for this work are the “Section Engineer - Permanent Way”, the “Bridge Inspector” and the “Section Engineer - Works” who carry out regular inspections to identify the various lacunae and also take necessary steps to take corrective action. These civil engineering items are also inspected at prescribed intervals by the Assistant Divisional Engineer, Coimbatore and the Divisional Engineer (Central) based at Palghat.

The items of rolling stock, namely the locomotives and the coaches are maintained at a full-fledged Locomotive and Carriage and Wagon Shed at Coonoor. This shed is under the direct control of an Assistant Divisional Mechanical Engineer at Coonoor. The Divisional Railway Manager, Palghat and the General manager, Southern Railway, based at Chennai also carry out periodic inspections.

6c Results of previous reporting exercises

The inscription of the DHR001 has led to a positive commitment of the authorities as well as the people to conserve the heritage. Following the inscription in December 1999, the Hon’ble Minister of Railway in a ceremony at Darjeeling formally dedicated it to the nation in 2000. For the Capacity Building for Sustainable Development and to bring pipple and their heritage together a Stakeholder Workshop has been organized with UNESCO in January 2002. This is being followed up with a Support Services Program for Policy and Program Development (SPPD) with UNDP and UNESCO that includes a demonstration model to establish community multimedia Resource Centres. Similarly, inscription as World Heritage as a serial nomination will lead to similar initiatives on the NMR002 for its conservation and the benefit of the neighbouring communities.

7 Documentation

7a Photographs where available, film/video

For the NMR002, the following is enclosed:

i) Book on the NMR002 written by Shri R.R.Bhandari
ii) CD (3 copies) containing about 500 photographs of the property
iii) 3 Packets containing 110 photographs each of the property
iv) Floppy containing the application in MS Word format
v) Packet containing photographic slides of the of the property
7b Copies of Management plans and extracts of other plans relevant to the property

Property Management Plan in 3 copies including the management plans for land, buildings, track, bridges, tunnels and rolling stock is enclosed with the application.

7c Bibliography

i) Nilgiri Mountain Railway (NMR002) – Written by R.R.Bhandari
ii) THE NILGIRIS – Written by Dharmalingam Venugopal
iv) NILGIRI MOUNTAIN RAILWAY (NMR002) Web page (http://www.railmuseum.org/nmr)
v) Raildwar (http://www.geocities.com/raildwar/trtravel.htm)

7d Addresses where inventory, records and archives are held

1. Divisional Railway Manager, Palghat Division, Southern Railway, Palghat 678 002. Kerala, INDIA
2. Chief Mechanical Engineer, Southern Railway, Park Town, Chennai 600 003, Tamil Nadu, INDIA
3. Chief Engineer, Southern Railway, Park Town, Chennai 600 003, Tamil Nadu, INDIA
4. Asst. Mechanical Engineer, Southern Railway, Coonoor, Tamil Nadu, INDIA
5. Public Library, Coonoor, Tamil Nadu, INDIA
6. The Madras Archives, Under the Commissioner of Archives, Gandhi – Irwin Road, Egmore, Chennai 600 008 Tamil Nadu, INDIA
7. National Rail Archives National Rail Museum Chanakyapuri New Delhi 110 021 Delhi, INDIA

8 Signature on behalf of the State Party

Secretary, Railway Board
Rail Bhawan
AUTHORIZATION

1. I, ..................................................................................................... the undersigned, hereby grant free of charge to Unesco the non-exclusive right for the legal term of copyright to reproduce and use in accordance with the terms of paragraph 2 of the present authorization throughout the world the photograph(s) and/or slide(s) described in paragraph 4.

2. I understand that the photograph(s) and/or slide(s) described in paragraph 4 of the present authorization will be used by Unesco to disseminate information on the sites protected under the World Heritage Convention in the following ways:
   a) Unesco publications;
   b) co-editions with private publishing houses for World Heritage publications: a percentage of the profits will be given to the World Heritage Fund;
   c) postcards – to be sold at the sites protected under the World Heritage Convention through national parks services or antiquities (profits, if any, will be divided between the services in question and the World Heritage Fund);
   d) slide series – to be sold to schools, libraries, other institutions and eventually at the sites (profits, if any, will go to the World Heritage Fund);
   e) exhibitions, etc.

3. I also understand that I shall be free to grant the same rights to any other eventual user but without any prejudice to the rights granted to Unesco.

4. The list of photograph(s) and/or slide(s) for which the authorization is given is attached. (Please describe in the attachment the photographs and give for each a complete caption and the year of production or, if published, of first publication.)

5. All photographs and/or slides will be duly credited. The photographer’s moral rights will be respected. Please indicate the exact wording to be used for the photographic credit.

6. I hereby declare and certify that I am duly authorized to grant the rights mentioned in paragraph 1 of the present authorization.

7. I hereby undertake to indemnify Unesco, and to hold it harmless or any responsibility, for any damages resulting from any violation of the certification mentioned under paragraph 6 of the present authorization.

8. Any differences or disputes which may arise from the exercise of the rights granted to Unesco will be settled in a friendly way. Reference to courts or arbitration is excluded.

________________                ______________              ________________________
Place      Date                 (V.N.Mathur)
Secretary
Railway Board
Mr. Peter H. Stott  
UNESCO  
World Heritage Centre  
7, Place de Fontenoy, Paris, 07 SP

Dear Mr. Stott,

Sub: Nomination of Nilgiri Mountain Railway for inscription on the World Heritage List.

I understand that you had discussed with Mr. Rajesh Agrawal regarding typographical errors in the latitude and longitude of the stations in the Nilgiri Mountain Railway. I am sending a corrected version of the same for you to kindly include it in our application. We regret the inconvenience caused to you.

We assure you of our highest consideration on heritage matters.

With best wishes,

Yours sincerely,

(SANDEEP MEHRA)  
DIRECTOR

C/- H.E. Mrs Neelam Sabharwal, Ambassador Permanent Delegation of India to UNESCO (Fax: 0147345188)
<table>
<thead>
<tr>
<th>KM</th>
<th>STATION</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ALTITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>METTUPALAYAM</td>
<td>11°-17'-54&quot;</td>
<td>76°-56'-09&quot;</td>
<td>325.22m</td>
</tr>
<tr>
<td>7.46</td>
<td>KALLAR</td>
<td>11°-20'-14&quot;</td>
<td>76°-53'-64&quot;</td>
<td>381.24m</td>
</tr>
<tr>
<td>17.26</td>
<td>HILLGROVE</td>
<td>11°-20'-25&quot;</td>
<td>76°-50'-16&quot;</td>
<td>1092.70m</td>
</tr>
<tr>
<td>27.63</td>
<td>COONOOR</td>
<td>11°-20'-36&quot;</td>
<td>76°-47'-20&quot;</td>
<td>1711.90m</td>
</tr>
<tr>
<td>28.54</td>
<td>WELLMINGTON</td>
<td>11°-22'-14&quot;</td>
<td>76°-47'-10&quot;</td>
<td>1769.08m</td>
</tr>
<tr>
<td>31.34</td>
<td>ARAVANKADU</td>
<td>11°-21'-30&quot;</td>
<td>76°-45'-14&quot;</td>
<td>1872.69m</td>
</tr>
<tr>
<td>37.19</td>
<td>KETTI</td>
<td>11°-22'-48&quot;</td>
<td>76°-44'-20&quot;</td>
<td>2082.15m</td>
</tr>
<tr>
<td>41.76</td>
<td>LOVEDALE</td>
<td>11°-22'-54&quot;</td>
<td>76°-42'-20&quot;</td>
<td>2192.70m</td>
</tr>
<tr>
<td>45.88</td>
<td>UDAGAMANDALAM</td>
<td>11°-24'-09&quot;</td>
<td>76°-41'-45&quot;</td>
<td>2203.20m</td>
</tr>
</tbody>
</table>
Nilgiri Mountain Railway

NOMINATION FOR INCLUSION IN THE WORLD HERITAGE LIST

PROPERTY MANAGEMENT PLAN

SOUTHERN RAILWAY
PALGHAT DIVISION
<table>
<thead>
<tr>
<th>I</th>
<th>Land</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Buildings</td>
<td>8</td>
</tr>
<tr>
<td>III</td>
<td>Track</td>
<td>12</td>
</tr>
<tr>
<td>IV</td>
<td>Bridges</td>
<td>17</td>
</tr>
<tr>
<td>V</td>
<td>Tunnels</td>
<td>19</td>
</tr>
<tr>
<td>V</td>
<td>ROLLING STOCK</td>
<td>21</td>
</tr>
</tbody>
</table>
PROPERTY MANAGEMENT PLAN

Civil Engineering department of the Palghat Division is responsible for the management of the following properties.

I. Land.
II. Buildings.
III. Track.
IV. Bridges.
V. Tunnels.

The existing system for maintenance preservation and management of these assets is given in detail.

I. LAND

(A) Ownership of Railway land

(a) The ownership of all land held by the Railway vests in the Central Government, the interests of the Railway being confined to the rights of occupation as user. Hence, it is the duty of Railway Administration to preserve unimpaired, the title to all land in its occupation and to keep it free from encroachment. With a view to avoid any litigation, accurate and certified land plans of all railway land are maintained and boundaries adequately demarcated and verified therewith at regular intervals.

(B) Land Records in Chief Engineer's Office

a) A complete series of land plans for the Nilagiri Mountain Railway are maintained in the Chief Engineers office. The original tracing that are duly certified by the State Government are kept as permanent records in the Chief Engineer’s office at Chennai. Sufficient copies of certified plans are made out and supplied to the Divisional Engineers for reference, a copy being kept in the cover of each relevant file.

b) Land Records Registers are maintained in the Chief Engineer’s office at Chennai, in which all details of transactions, both acquisition and relinquishment are noted.

(C) Land Records in Senior Divisional Engineer's Office at Palghat.

a) Senior Divisional Engineer is responsible to ensure that records of title are carefully preserved and kept up to date by noting all changes on the copies of authorised land plans in their possession. All land plans show complete dimensions preferably with boundary stones and their numbers.
b) Land Records Registers are maintained in the Senior Divisional Engineer’s office.

Entries in the Land Register are duly initialed by the Senior Divisional Engineer as and when any transaction takes place.

(D) Demarcation of Land Boundaries

a) For proper demarcation of land boundaries, the following guidelines exist:

i) All land permanently occupied for the purposes of Railway, are having its boundaries defined on the ground in such a manner as to enable such boundaries to be readily ascertained and identified.

ii) For this purpose, the boundary of the railway land is defined by boundary stones.

iii) The position and each boundary stone is shown on the land plan.

(E) Boundary Stones

a) The boundary stones of suitable size and section, projecting about 500mm above ground and inscribed with SR (Southern Railway) the stones being colour washed red. The stones are fixed squarely, the outside face representing the boundary with the letters and number facing the Railway line. The stones are kept clear from jungle growth or shrubs for at least 1 metre all round within the Railway limits.

b) Boundary stones are fixed at every point of change of alignment. In hilly country and for sharp curves, each stone is so placed that it can be observed from the adjoining stone on either side.

(F) Construction of boundary wall in areas having habitation.

a) In areas having habitation bordering railway land and also where habitation is likely in near future, boundary walls will be provided, so that potential encroachments are prevented and outsiders do not develop any right of entry on railway land.

(ii) Other preventive steps are:

a) Identification of vulnerable areas.

b) Plantation of Julli Gloria of similarly effective bushes in the area.

c) Ensuring proper maintenance of boundary pillar.
d) Preventive unauthorised entry of road vehicles into railway land threatening side collision with trains, through Plantation/fencing will be done.

e) Construction of structures and unauthorised nutments obstructing the visibility to road users at the manned level crossings will not be permitted.

f) Interaction with local authorities for assistance in preventing encroachments in these areas.

g) Joint visits of the vulnerable locations by representatives of concerned departments along with civil authorities (wherever required) with a view to create adequate impression in the locality that Railways are serious in preventing encroachments in the areas.

(G) Land Plans

a) Up to date land plans are available in the Senior Divisional Engineers' Office at Palghat and copies are made available to the Field Inspector whenever required in connection with any work.

b) Copies of certified land plans pertaining to their jurisdictions showing complete dimensions, are in the possession of the Assistant Divisional Engineer, at Podanur, Section Engineer / Permanent Way/Coonoor.

(H) Verification of Land Boundaries

a) Zonal Railway Administration is responsible for the demarcation and periodic verification of the boundaries and maintenance of proper records in connection with land in the possession of that Railway.

b) The Section Engineer/Permanent Way/Coonoor is responsible for maintaining railway land without any encroachments or development of easement rights. He endeavours to prevent and remove encroachments, as and when they arise and where removal of encroachment is possible without referring to PPE act. In case where he is not able to remove them, he reports the cases to the Assistan Divisional Engineer/Podanur, who, on receipt of such reports takes immediate measures to remove the encroachments. Special care is given to prevent encroachment on railway land situated above tunnels and below bridges especially Road over/Under bridges.

c) The Section Engineer/Permanent Way/Coonoor inspects and maintains the railway land boundaries between stations and unimportant stations. The Section Engineer/Works/Coonoor shall inspect and maintains the land boundaries at important stations and staff colonies.
d) Maintenance of land boundaries verification Register.

Railways maintains printed registers showing "Details of Encroachments" and action taken thereon. The entries in the register are certified by the Section Engineer/Permanent Way/Coonoor and verified/inspected by the Assistant Divisional Engineer & Senior Divisional Engineer. The registers have adequate pages so that record of inspection and verification of land boundaries for a period of 15 years can be accommodated in the register. A certificate is given by the Section Engineer / Coonoor once a year which is verified and counter signed by Assistant Divisional Engineer / Podanur with regard to correct demarcation of land boundaries.

e) During his inspections, the Assistant Divisional Engineer/Podanur ensures that Railway boundaries are demarcated correctly and that there are no encroachments. In cases where he cannot prevail on the parties to remove the encroachments, he reports the facts with particulars to the Senior Divisional Engineer/Palghat, who takes up the matter with local authorities.

(i) Removal of encroachments.

a) New encroachments are removed promptly under provisions of section 147 of Railway Act 1989. For old encroachments where party is not amenable to persuasion for removal of such encroachments, action is taken under the provisions of Public Premises (Eviction of Unauthorised Occupants) Act 1971. Encroachment of railway land by railway staff also constitutes grave misconduct on their part and is 'good and sufficient reason' for imposition of major penalty after following the procedure laid down in the Discipline and Appeal Rules.

b) When an encroachment is in the process of building up, it is removed then and there.

c) Where the encroachments are of a temporary nature in the shape of jhuggies, jhopies and squatters and where it may be difficult to take action under PPE Act the same are removed in consultation and with the assistance of local civil authorities.

d) Every year, at the close of financial year, detailed survey of encroachments is made under the following categories:

i) CATEGORY – A Encroachments by outsiders removal of which requires action under Public premises Eviction (PPE) Act.

ii) CATEGORY – B encroachments by outsiders which do not require action under PPE Act (e.g. temporary occupation of land by hawkers, using Railway land for cattle, cow dung, refuse etc.).

iii) CATEGORY – C Encroachment by Railway staff in the form of temporary huts etc.
iv) CATEGORY – D Encroachment by Railway staff who have been allotted railway accommodation by way of additions to be structures, unauthorised use of land for cultivation etc.

Note: Category ‘A’ encroachment is of the hard type and Category ‘B’, ‘C’ & ‘D’ encroachments are of the soft types.

e) The Section Engineer (Works)/Coonoor maintains details of encroachments in a register showing their incidence and removal with necessary details as given in Encroachment Inspection Register.

One page of this register is allotted to each encroachment. A scale plan of the encroachment is provided on the facing side.

Once a case is opened the entries are not discontinued unless and until the encroachment is removed. A note to that effect is made on the register. The frequency of inspection of encroachment is at least once in 3 months.

Section Engineer (Works)/Coonoor gives a certificate in the following proforma, once in three months, which is verified and countersigned by the Assistant Divisional Engineer/Palghat.

* I…………………………………… Section Engineer(Works)/Coonoor certify that I have inspected the Railway land in my section during the quarter ending ……………… And there have been no encroachments except at the locations shown in this register, that have been reported upon vide references given against each."

Sd/-
Section Engineer(Works)/Coonoor

Assistant Divisional Engineer/Palghat submits every month the summary of the status of removal of encroachments to the Senior Divisional Engineer/Palghat.

Monthly progress regarding additions and removal of encroachments, filing eviction cases and their progress in court of Estate Officer, in Civil Courts etc. is submitted by Palghat Division to Head Quarter at Chennai.

Encroachment plans to scale are made for every encroachment. These encroachment plans along with details of encroachment are checked and signed by Section Engineer (Works)/Assistant Divisional Engineer. Records of such encroachment plans are kept in the Divisional office/Palghat and these encroachment plans are handed over and taken over by Section Engineer(Works)/Assistant Divisional Engineer at the time of change of charge.
A copy of encroachment plan is available with Section Engineer (Works)Coonoor/Assistant Divisional Engineer/Podanur, Senior Divisional Engineer/Palghat. Any encroachment added or removed is reflected in the encroachment plan.

A copy of encroachment plan is handed over by the Assistant Divisional Engineer to Station Masters/Railway Protection Force Inspectors (where Section Engineer (Works) is not headquartered).

(J) Steps to control the unauthorised use of Railway land

Following further steps are adopted to control the unauthorised use of railway land:-

(a) For any addition/alteration of a pucca structure, written sanction of the Senior Divisional Engineer/Palghat is necessary. Any structure in which cement is used is classified as pucca structure.

(b) For alteration/addition of any temporary structure, written sanction of Assistant Divisional Engineer is necessary.

(c) To prevent imminent encroachments on vacant railway land, planting of suitable trees/shrubs including quick growing thorny trees like Prosopis Juliflora (Vilayati Babul) is adopted.

(d) Eviction process includes interactions :-

(i) Identification of the existing encroachments.

(ii) Ensuring that all the cases under the PPE Act have been filed.

(iii) Estate Officers expedite finalisation of the cases pending with them.

(iv) Action for possession in accordance with the extant orders where eviction orders are received.

(v) Mobilisation of help of Civil Authorities by formal/informal requests at different levels till the required assistance is forthcoming.

(vi) Cases directed to the courts are pursued for early finalisation with the help of the Railway Advocates.

(K) Division of Responsibility

The following division of responsibility between the station staff and the engineering staff should be observed in regard to encroachments within the station areas:

a) At stations, the Station Master is primarily responsible for preventing encroachments and for driving out trespassers by obtaining help from RPF/Police and Section Engineer(Works)/Coonoor as necessary
b) The responsibility for preventing encroachments and for driving out trespassers in circulating areas of the stations and rests with the Station Master. They take the assistance from Engineering and Railway Protection Force staff as found necessary.

c) Whenever an encroachment is noticed or otherwise is noticed which requires action under PPE Act, the Station Master/Chief Goods Clerk advises the concerned Engineering staff for undertaking eviction proceedings.

d) At station, where Section Engg. (Works) is not posted, but Inspector/RPF is there, then the Inspector/RPF is responsible for checking fresh encroachments.

e) Adequate training is provided to the Estate Officers to make them well conversant with the Provisions of the PPE Act, 1971 and also various avenues available to them while dealing with the cases of encroachments course contents may include case histories and various relevant court judgements or the appeals against the orders of Estate Officers.

f) Railway Protection Force renders all help in removal of such encroachments as and when their assistance is sought. They should also provide assistance to co-ordination with State Police/Government Railway Police where cases have been decided by the Estate Officers.

(L) Railway land in important Towns in the Section.

In all such cities where the cost of land is very high, special staff including Railway Protection Force is deputed to deal with the encroachments and its removal. This batch of staff is jointly responsible to ensure that no further encroachment of Railway land takes place. They immediately remove the encroachments to avoid any development of the same. In case of non-removal, due to certain unavoidable reasons, they lodge FIR with Government Railway Police/Civil Police and report the encroachments with copy of encroachment plan, FIR etc. to the Divisional Engineer/Divisonal Engineer who will initiate action for removal of encroachment and keep headquarters informed. Assistance of Railway Protection Force is enlisted when dealing with the Civil Police.

(M) Maintenance of Rights of Way

a) The Assistant Divisional Engineers and Section Engineers (Works) ensure that the rights of way across Railway land are not allowed to be infringed upon.

Prompt action is taken to prevent any person obtaining squatter's rights on railway property.
(N) Religious Structures
   a) There is a total ban on licensing land for religious purposes.

   The Senior Supervisors keep a constant lookout for construction of new
   structures and report such occurrences at once to the Assistant Divisional
   Engineer/Padanur.

   c) In case unauthorised new constructions are noticed, it should
   possible for the Assistant Divisional Engineer and Staff to persuade those
   concerned, to desist from further construction. If required, the Assistant
   Divisional Engineer reports immediately to the Senior Divisional Engineer, who
   will then ask the Department concerned to take requisite measures. When this
   stage is reached, the matter is be reported by the Senior Divisional Engineer to
   the Principal Chief Engineer. District authorities are informed about such
   instances promptly and impress upon them the need for removal of such new
   constructions.

(0) Eviction of unauthorised occupants - The eviction of unauthorised
occupants from public premises is regulated by the provisions of "The Public
Premises (Eviction of Unauthorised Occupants) Act. 1971". Action under this
Act can be taken only by those officers who are appointed as Estate Officers by a
notification in the official Gazette. Additional Divisional Railway Manager is the
Estate Officer for Land in Nilgiri Mountain Railway.

II BUILDINGS

The buildings in the Nilgiri Mountain Railway section were constructed during
1899. The special features of the buildings are –

➢ The buildings are very high roof structures with gentle slope

➢ Building walls were constructed in Random Rubble/coursed rubble
   masonry in lime mortar

➢ The roofs in the buildings are off with Mangalore tiled roofing and with
   Teak wood tresses, rafters and reapers

➢ Teak wood planks false ceiling provided in the buildings for weather proof

➢ Teak wood doors with half glazed panel shutters and teak wood windows
   with ornamental grills in the buildings

➢ Natural hard granite stones were used for the flooring in the buildings

➢ Sufficient water supply and sanitary fittings are available in the buildings

➢ The outside wall of the buildings are finished with flush pointing in
   lime/cement mortar

➢ The buildings are maintained in the same line of its originality of
   construction to maintain its heritage
A. Maintenance of the Buildings

1. Organization set up
2. Inspection of Buildings by the works Engineers
3. Nature of works involved
4. Petty Repair Book
5. Procuring of materials
6. Attending of works
7. Care to be taken while attending the repair works
8. Service Improvements Group and colony committee

1. Organization set up:
   - For maintaining the buildings the following arrangements available under the control of Assistant Divisional Engineer @ Podanur
   - Section Engineer/Works/Podanur assisted by Junior Engineer/Works/Coonoor under them the following artisan staff are working:
     1. Skilled technician (Brick layer) with helpers
     2. Skilled technician (Carpenter) with helpers
     3. Skilled technician (Plumber) with helpers

2. Inspection of the Buildings by Works Engineers
   - Section Engineer/Works will inspect all the buildings systematically once in a year
   - Section Engineer enters the remarks in the building inspection register in which each page is allotted for each building and reports are submitted to Assistant Divisional Engineer/Podanur.
   - Assistant Divisional Engineer/Podanur inspects as many building as possible particularly those requiring heavy repairs

3. Nature of Works Involved
   - Periodical brightening of the buildings includes White washing /colour washing /painting / polishing of doors and windows and wooden members
b. Through Zonal Contractor (Annual Maintenance Contract)
   i. The brightening works such as white/colour washing painting, polishing and other major works are under taken through zonal contract.
   ii. The Zonal contract is from 1st July of each year and valid up to 30th June of next year

Care to be taken while attending the repair works

- Either if its through department or through zonal contract much care is taken to repair the building in line with its originality and architectural finish.
- For wood works same type of wooden materials are used.
- The original carvings in the wood work are followed at the time of replacement/repairing the wooden members.
- In the case of major works in which the value exceeds beyond zonal contract amount the work is taken up duly submitting necessary proposals.
- The proposals for the work/repairs required are prepared by the Section Engineer/Works and submitted to the Senior Divisional Engineer/Palghat through Assistant Divisional Engineer/Podanur.
- Assistant Divisional Engineer/Podanur scrutinizes the proposals and if found required forwards to Division.
- Senior Divisional Engineer/Palghat satisfy about the proposal and approves the proposal for estimating and further process

B. Service Improvements Group (SIG) and Colony Committee

- For the better maintenance of the buildings in the Nilgiri Mountain Railway section SIG is functioning.
- SIG comprises of representatives from Engineering, Medical, Operating, Electrical Departments
- SIG will check and ensure about the amenities available in the buildings for the users.
- Colony committee meeting is conducted at regular interval for the better maintenance of staff Quarters.
III TRACK

The 45.88 Km. long Nilgiri Mountain Railway track is maintained by Civil Engineering Department. The elevation of Mettupalayam Railway Station is 326 metre from MSL and elevation of Udagamandalam is 2203 metre from MSL. Thereby, the average gradient works out to 1 in 24.5. The gauge of the line is 1000mm. The track is lying with steep gradients and sharp curves in the Blue Mountain.

The track structure consists of 50 R & 60 R rails with M+2, M+3 and M+4 sleeper density. The sleepers are hard wood sleepers as well as ST Sleepers. On the ‘Rack’ section wooden and steel through sleepers are laid alternatively. CST-9 sleepers M+4 density with 60 R Rails laid between AVK-UAM

A. Type of Rail and Sleepers, laid year shown in the Table as below.

(i) RAIL DETAILS

<table>
<thead>
<tr>
<th>Km</th>
<th>Type of Rail</th>
<th>Laid year</th>
<th>Type of sleeper</th>
<th>Laid year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-2.67</td>
<td>50R</td>
<td>87-88</td>
<td>WOOD</td>
<td>71-72</td>
</tr>
<tr>
<td>2.67-2.603</td>
<td>50R</td>
<td>70-71</td>
<td>STEEL</td>
<td>71-72</td>
</tr>
<tr>
<td>2.603-5.737</td>
<td>50R</td>
<td>60-61</td>
<td>WOOD</td>
<td>47-48</td>
</tr>
<tr>
<td>5.737-6.258</td>
<td>50R</td>
<td>35-36</td>
<td>WOOD</td>
<td>55-56</td>
</tr>
<tr>
<td>6.268-7.335</td>
<td>50R</td>
<td>31-32</td>
<td>WOOD</td>
<td>47-48</td>
</tr>
<tr>
<td>7.335-8.335</td>
<td>50R</td>
<td>41-42</td>
<td>WOOD</td>
<td>41-42</td>
</tr>
<tr>
<td>8.335-12.670</td>
<td>50R</td>
<td>43-44</td>
<td>WOOD</td>
<td>81-82</td>
</tr>
<tr>
<td>12.670-16.268</td>
<td>50R</td>
<td>67-68</td>
<td>WOOD</td>
<td>51-52</td>
</tr>
</tbody>
</table>

(ii) SLEEPER DETAILS

<table>
<thead>
<tr>
<th>Km</th>
<th>Laid year</th>
<th>Type of sleeper</th>
<th>Laid year</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.268-23.134</td>
<td>43-44</td>
<td>WOOD</td>
<td>81-82</td>
</tr>
<tr>
<td>23.134-24.603</td>
<td>40-41</td>
<td>WOOD</td>
<td>81-82</td>
</tr>
<tr>
<td>24.603-27.0</td>
<td>38-39</td>
<td>WOOD</td>
<td>81-82</td>
</tr>
<tr>
<td>27.0-27.134</td>
<td>35-66</td>
<td>WOOD</td>
<td>65-66</td>
</tr>
<tr>
<td>27.134-30.0</td>
<td>36-37</td>
<td>WOOD</td>
<td>48-49</td>
</tr>
<tr>
<td>30.0-33.536</td>
<td>41-45</td>
<td>WOOD</td>
<td>48-49</td>
</tr>
<tr>
<td>33.536-36.737</td>
<td>48-49</td>
<td>WOOD</td>
<td>48-49</td>
</tr>
<tr>
<td>36.737-36.780</td>
<td>54-55</td>
<td>WOOD</td>
<td>48-49</td>
</tr>
<tr>
<td>36.780-40.0</td>
<td>99-00</td>
<td>CST-9</td>
<td>1999-00</td>
</tr>
<tr>
<td>40.0-41.0</td>
<td>54-55</td>
<td>CST-9</td>
<td>97-98</td>
</tr>
<tr>
<td>41.0-42.0</td>
<td>97-98</td>
<td>CST-9</td>
<td>97-98</td>
</tr>
<tr>
<td>42.0-42.603</td>
<td>96-97</td>
<td>CST-9</td>
<td>95-98</td>
</tr>
<tr>
<td>42.603-45.837</td>
<td>95-96</td>
<td>CST-9</td>
<td>95-98</td>
</tr>
<tr>
<td>45.837-46.0</td>
<td>54-55</td>
<td>WOOD</td>
<td>48-49</td>
</tr>
</tbody>
</table>
C. MAINTENANCE OF TRACK

Maintenance of track is being carried out by systematic planned schedules as well on need based.

(i) BY PLANNED SCHEDULE:

Systematic through packing.- Through packing is being done once in a year thoroughly throughout the section overhauling the track for maintaining the track parameter, and renewal of scattered fittings, fastening, sleepers and Rails

(ii) BY NEED BASED MAINTENANCE

1. Track is being given attention based on foot/P.Trolley/Foot plate inspections of JE/Permanent Way, SSE, ADEN & Sr. DEN and joints are maintained by frequent attention

2. Greasing of gauge face of sharp curve being done by gang

D. MAINTENANCE OF RACK BAR:

Tooth clearance is being checked at the time of through packing and during inspections for the tolerance of 80mm and + or - 6mm and given attention to keep within the tolerance and attention given wherever required.

E. PATROLLING OF TRACK

During day time visual inspection carried out by Keyman starting from one end to another end and return back to their headquarters in their gang beat, before the passage of the first train which is No.862 Passenger from MTP to UAM

F. MAJOR OVERHAULING OF TRACK

Major overhauling done by awarding contracts like slipped earth removal, Complete Track Renewal, through rack bar renewal, Through sleeper renewal, being done for upgrading and keeping fit for traffic.

G. QUALITY OF MATERIALS USED

(i) Materials like rack bar, fish plate, bolts are used which are manufactured at Railway Workshop/Araikonam confirming to RDSO standard.

(ii) Rails:- after thorough checking at the plant itself, besides visual inspection Rails are checked ultrasonically.
H. MAINTENANCE ORGANISATION.

The section is divided into number of Gang beat i.e. 13 Gang beats with Gangs of specified strength as following for maintaining the respective gang beat.

<table>
<thead>
<tr>
<th>G.No. &amp; Stn</th>
<th>Jurisdiction</th>
<th>Track Structure</th>
<th>Gang hut</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/MTP</td>
<td>0/0-6/7</td>
<td>50R,W+ST</td>
<td>MTP Yard</td>
</tr>
<tr>
<td>2/QLR</td>
<td>6/7-10/7</td>
<td>50R,W+ST</td>
<td>QLR</td>
</tr>
<tr>
<td>3/ADY</td>
<td>10/7-14/0</td>
<td>50R,W+ST</td>
<td>12/2-3</td>
</tr>
<tr>
<td>4/HLG</td>
<td>14/0-17/0</td>
<td>50R,W+ST</td>
<td>18/11-12</td>
</tr>
<tr>
<td>5/HLG</td>
<td>17/0-19/7</td>
<td>50R,W+ST</td>
<td>18/11-12</td>
</tr>
<tr>
<td>6/RME</td>
<td>19/7-22/1</td>
<td>50R,W+ST</td>
<td>20/7-8</td>
</tr>
<tr>
<td>7/KXR</td>
<td>22/1-24/1</td>
<td>50R,W+ST</td>
<td>24/7</td>
</tr>
<tr>
<td>8/ONR</td>
<td>24/1-27/7</td>
<td>50R,W+ST</td>
<td>26/10-11</td>
</tr>
<tr>
<td>9/WEL</td>
<td>27/7-31/2</td>
<td>60R, W</td>
<td>WEL</td>
</tr>
<tr>
<td>10/AVK</td>
<td>31/2-35/0</td>
<td>60R CST-9</td>
<td>31/3-4</td>
</tr>
<tr>
<td>11/KXT</td>
<td>35/0-38/0</td>
<td>60R CST-9</td>
<td>37/2-3</td>
</tr>
<tr>
<td>12/LOV</td>
<td>38/0-42/0</td>
<td>60R CST-9</td>
<td>41/10-11</td>
</tr>
<tr>
<td>13/UAM</td>
<td>42/0-46/0</td>
<td>60R CST-9</td>
<td>UAM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Date of opening of the section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>MTP-QLR</td>
<td>15.06.1899</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>ONR to FER</td>
<td>15.06.1908</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>FER to UAM</td>
<td>15.10.1908</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Number of stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Block stations</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Watering stations</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Length of section</td>
<td>45.88</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gauge</td>
<td>1 Metre</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rack section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Length</td>
<td>19 Kms from 7/8-9 to 26/8-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Total Number of rack bars</td>
<td>12,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Steepest gradient in the rack section</td>
<td>1 in 12.28</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Curves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Total</td>
<td>216</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Between 10 to 17</td>
<td>180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Between 5 to 10</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Flatter than 5</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Track 50 R FF, 50 O, 60 R rails with M+2 &amp; M+3 sleeper density</td>
<td>Steel and wooden in Rack section and CST-9 plates</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Speed in the rack section</td>
<td>13 Kmph</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Speed in non rack section</td>
<td>30 Kmph</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Tunnels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Number of Tunnels</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Longest Tunnel</td>
<td>Tunnel No.16 at Km.447-9 between UA&amp;M &amp; LOV Length 137.46 Mtrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Length of track coming in Tunnels</td>
<td>952.71 Mtrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Gangs</td>
<td>13 Gangs+1 gang to attend colony</td>
<td></td>
</tr>
</tbody>
</table>
IV BRIDGES

The prestigious stretch of track connecting Mettupalayam and Coiy, which was laid during the year of 1899 has 31 major bridges and 24 minor bridges of steel construction as superstructure.

The following bridges are noteworthy to mention due to their uniqueness, design and the construction methods being adopted:

(a) BRIDGE No.1 between Mettupalayam and Kallar stations:

This bridge consists of 2 spans of open web steel girder of 30.48 metre span. Design and construction of open web girder is worth mentioning due to technical excellence. The floor system of this bridge consists of 9 cross girders and 8 pairs of stringers which are in sound condition and having riveted connections. Continuous ballasted trough is provided over girder top.

(b) BRIDGE No. 34

The design and execution of one span of Underslung steel girder of 36.58 metre span at Br. No.34 situated between Kallar and Hilgrove stations at km 12/8-9 is a marvellous piece of technological excellence/expertise worth mentioning, which was constructed during the year 1899. This design though has become obsolete now, caters to the water flow from nearby thick forest and water falls. This bridge spanning 42.30 metre has a fixed end at Hilgrove side, and provided with Roller bearings at the other end to take care of any expansion or contraction due to thermal and other conditions. This is provided with ballasted steel trough on top. Structural members of girder consists of top and bottom built-up steel beams, bottom floor bracings, vertical and slanting members etc., with riveted connections. Structural condition of this bridge is excellent and timely maintenance attended to, for preservation of this structure.

All other bridges are having steel plate girders spanning 24.38m., 18.23m., 12 m and below.

A. Details of major and minor steel girder bridges and other structures:

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>No of Major bridges with steel girder</th>
<th>No of Minor bridges with steel girder &amp; spans</th>
<th>All Minor bridges of other structures like Rail slabs, CI pipe crossing &amp; spans</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>31/51</td>
<td>24/67</td>
<td>132</td>
<td>250</td>
</tr>
</tbody>
</table>

B. Maintenance schedule of bridges:

(i) INSPECTION: Detailed periodical inspection of steel girders is done by Sr. Section Engineer/Bridges. And there on, any important points noted down during the inspection, is brought to notice of Assistant Divisional Engineer and Sr. Divisional Engineer of Palghat Division, for remedical action involving sanction of competent authority.
(a) **FOUNDATION AND FLOORING:** The steel works and bearings of girders 12.2met. clear span and above, including all Road under/Over bridges are inspected once in 5 years, about 20 % the inspection carried out by every year. The details of inspection of bridge includes examination of flooring and foundations to ascertain whether scour has taken place particularly around the piers, near abutments and also along curtain walls and down stream of drop walls. It will also be ascertained whether there is any settlement or undermining of the foundation. The condition of the flooring, drop walls, curtain walls, apron and pitching will be examined. At specified bridges, soundings and annual survey of scour holes will be taken during flood as per extant instructions.

(b) **MASONRY IN SUB-STRUCTURE:** During inspection it is ascertained whether the masonry is in any way cracked, shaken or crushed, particularly under the bed blocks in the ballast wall, abutments and piers and there is any bulging, shearing, tiling and apparent signs of movement in abutments, wing and return walls. Also it is ascertained whether there is any deterioration due to weathering or any damage to the stone or brick or leaching of the mortar in the joints. Seepage of water through joints in the masonry through cracks in the masonry are marked by Red paint for their entire lengths and dated tell- takes placed at their extremities and numbered. This will enable cracks to be readily located and any extension detected. Where extensive cracks are noticed, sketch of the cracks should be kept in the bridge inspection register with the details like cracks in the masonry are marked by Red paint for their entire lengths, depth, width, location etc.

(c) **UNDER WATER SUB-STRUCTURE INSPECTION:** The sub structure of the bridges which are normally under water will be inspected by adopting suitable methods which may include engaging of divers and special equipments.

(d) **STRUCTURAL CONDITIONS OF STEEL WORK:** It is ascertained whether the structural condition is satisfactory and loss of camber in the main girders assessed from comparative readings. Also distortion of members like unbraced bottom chord members near the ends of the span, top chord members with insufficient restraint by bracings, diagonal web members, tension members, top flanges of plate girders etc., and high incidence of loose rivets are attended immediately. It is also ascertained that the bearings are fully and evenly seated on the bed blocks and the holding down-bolts are in position and anchored in the bed blocks. Also the rollers and sliding plates provided at the expansion ends to permit expansion and contraction are well greased free of dust and working freely. Girders are also observed under train load for any abnormal movement or evidence of settlement.
(ii) PAINTING:

Complete scheme of painting is applied on ascertaining the condition of paint film of girders. After surface preparation, one coat of Yellow Zinchronate to IS 104 followed with one coat of Red Oxide Zinchronate to IS.2074 as priming coats and 2 coats of Red Oxide to IS.123 are generally applied. However patch painting also will be resorted to, on members where corrosion and peeling off paint film is noticed.

(iii) LUBRICATION OF BEARINGS:

Periodically of lubrication of bearings of girders is once in three years. However this will be advanced, subject to conditions prevailing at site.

C. ESTABLISHMENT:

Bridge organisation vested with responsibility of maintaining the structures in sound condition, as the following officials for carrying out necessary repairs and other maintenance activities.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Designation.</th>
<th>No. of staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>SSE/BRIDGES</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>JEI/BRIDGES</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Supervisor</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>Technician/Riveter Gr.I</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Technician/Riveter Gr.II</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>Technician/Riveter Gr.III</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>Blacksmith Gr.II</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Welder/GasCutter Gr.I</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Mechanic Gr.1</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Helper Gr.1</td>
<td>44</td>
</tr>
</tbody>
</table>

V. TUNNELS

There are 16 tunnels between Kollar and Udagamandalam. Most of the tunnels are not lined. A list of tunnels together with their length is given in Annexure II. The longest tunnel is Tunnel No.16 at Km.447-9 between Udagamandalam and Lovedale stations. The total length of track coming under tunnels is 952.71 mts. Directed Track Maintenance with lighting arrangements is done in the tunnel portion of track.

(A) The schedule of inspection for the tunnels are as under

a) SSE/PW/ONR — Once in a year after Monsoon entering in manuscript register.
b) ADEN once in a year before Monsoon entering the details in printed register
c) Sr. DENIC — As necessary from safety point of view and on reference from ADEN
During inspection of tunnels as well as during normal push trolley inspections the tunnels are checked for proper side drains infringement of schedule of dimension, any crack in walls, linings, Arch, weep holes, falling of trees at the approaches and cutting of the tunnels, corrosion of Rails, inside tunnels, lighting arrangements, trolley refugees, drainage system of track etc.,

Portals at either ends are checked for any signs of masonry crack, bulging etc.,

The unlined tunnels are watched and ascertained with respect their sound condition.

The curves are checked for curve parameter and attended whenever necessary

The Permanent Way staff right from Gangmen are educated during almost all times for the maintenance of tunnels and watch out for loose boulders, earth erosion etc.,

The location and list of tunnels in this NM Railway are as under,

<table>
<thead>
<tr>
<th>Tunnel No</th>
<th>Location</th>
<th>Between</th>
<th>Length</th>
<th>Vertical clearance at centre above R.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/10-11</td>
<td>OHR-HLG</td>
<td>34.44</td>
<td>4.648 Mtrs</td>
</tr>
<tr>
<td>2</td>
<td>11/10-11</td>
<td>OHR-HLG</td>
<td>19.51</td>
<td>4.039</td>
</tr>
<tr>
<td>3</td>
<td>12/3 1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>127-6</td>
<td>OHR-HLG</td>
<td>446.84</td>
<td>4.135</td>
</tr>
<tr>
<td>5</td>
<td>148/6-7</td>
<td>OHR-HLG</td>
<td>19.51</td>
<td>3.68</td>
</tr>
<tr>
<td>6</td>
<td>14/9-10</td>
<td>OHR-HLG</td>
<td>79.25</td>
<td>5.182</td>
</tr>
<tr>
<td>7</td>
<td>15/3-4</td>
<td>OHR-HLG</td>
<td>88.39</td>
<td>4.1166</td>
</tr>
<tr>
<td>8</td>
<td>17/8-9</td>
<td>HLG-ONR</td>
<td>32.92</td>
<td>4.394</td>
</tr>
<tr>
<td>9</td>
<td>17/10-11</td>
<td>HLG-ONR</td>
<td>30.48</td>
<td>4.267</td>
</tr>
<tr>
<td>10</td>
<td>19/5-6</td>
<td>HLG-ONR</td>
<td>201.12</td>
<td>4.801</td>
</tr>
<tr>
<td>11</td>
<td>19/11-12</td>
<td>HLG-ONR</td>
<td>62.48</td>
<td>4.343</td>
</tr>
<tr>
<td>12</td>
<td>21/3-4</td>
<td>HLG-ONR</td>
<td>96.1</td>
<td>3.962</td>
</tr>
<tr>
<td>13</td>
<td>23/12-24/1</td>
<td>HLG-ONR</td>
<td>72.85</td>
<td>5.232</td>
</tr>
<tr>
<td>14</td>
<td>38/8-10</td>
<td>KKT-LOV</td>
<td>76.22</td>
<td>5.461</td>
</tr>
<tr>
<td>15</td>
<td>42/6-6</td>
<td>LOV-UAM</td>
<td>53.64</td>
<td>6.071</td>
</tr>
<tr>
<td>16</td>
<td>44/7-9</td>
<td>LOV-UAM</td>
<td>137.46</td>
<td>6.994</td>
</tr>
</tbody>
</table>

Total length of track under tunnels: 952.71 Mtrs
Southern Railway

Property Management Plan

Application for Inscription as World Heritage Site
There are 31 coaches and 11 wagons based at Mettupalayam. All the coaches were procured in 1931/1932 and wagons in 1936. All the coaches have been rebuilt in 1966. 12 coaches have been rebuilt again between 1994 and 1997 with steel bodies similar to bus body. The coaches are of simple design except for the pinion wheel arrangement and Indian Railways have the capacity to build similar rolling stock if the need arises. Periodical over haul of these rolling stock is done at Mettupalayam itself under the supervision of the Senior Section Engineer (C&W). For major repairs and rehabilitation, the rolling are loaded in open flat rail trucks and sent to Golden rock workshops. The material assistance for maintenance of the rolling stock is received from Golden rock workshops. Facilities are available in the open market for reconditioning of the pinion wheels, manufacture of pinion brake pull rods, hand brake spindles etc. The plain bearing axle boxes of the rolling stock are repacked with foam-rubber lubricating pads in lieu of oil-soaked waste.
There are 2 pit lines, with a holding capacity of 3 coaches each, for day-to-day maintenance of coaches. There is a pit on the platform also, to facilitate under gear attention on platform itself. Similar facilities are available at Coonoor and Udhagamandalam also. To despatch the locos and rolling stock to workshops, a M.G loading ramp is available, from where the locos and coaches/ wagons can be pushed on to B.G. flat trucks.

Coaches used in the system have a tare weight varying between 11.82 to 12.7 tonnes and have IRS underframes. The coaches have vacuum brakes and also rack and adhesion brakes manually controlled.

On date, we have one tourist coach (66 vintage), 4 full 1st class coaches (66 vintage), 5 partial first class (65 vintage), 15 second class (1932/65 vintage), 3 SLRs and 4 LRs (66 vintage). All these 32 coaches are Periodically Overhauled at Mettupalayam. 13 of them are however revamped at GOC, during last 2-3 years.
B. LOCOMOTIVES

Trains are operated in the Mettupalayam- Kallar section with 'X' Class locomotives, procured from Swiss Locomotive Works, Winterthur in 1920 and 1952. Trains in the Coonoor- Udumgalam section are operated with M.G.diesel locomotives.

The locomotives used for working on the ABT system has two distinct functions:

A) That of traction by adhesion as in an ordinary loco.
B) That of traction by pinions acting upon the rack bars.

At present, X Class locomotives are used on this section. The X class locomotives were obtained in two series. The first lot of 7 was introduced in 1925 and 2nd lot as put on the line during 1952. Except for minor changes in components like distributor valves, fitment of driving pinions, tension of springs of cog wheel assembly etc., both series remain otherwise the same. These engines are tank engines of 0-8-2 type, with 4 cylinders of compound type. High pressure cylinders work adhesion wheels, while low pressure cylinders powered with the exhaust from the high pressure cylinders. The locomotives are at present Periodically Overhauled at Golden Rock Workshops. Two diesel locos used on the hill are attended by staff from Golden rock Diesel loco shed, at Coonoor itself.
The 'X' class locomotives are maintained by Coonoor Loco shed. Out of the 8 steam locos, 6 are fitted with cogwheel arrangement for operation in the rack section between Coonoor and Mettupalayam. High-pressure cylinders work the adhesion wheels, while low-pressure cylinders powered by the exhaust steam from high-pressure cylinders, operate the cogwheel system. The periodical overhaul of the locomotives is done at Golden rock workshops. Facilities are available in the workshops as well as the nearby market at Coimbatore for manufacture of components and for undertaking repairs to the cylinders. The loco shed has a well-equipped Machine shop for manufacture of critical spare parts.

As per the original design, these locos are to use 'A' grade lumpy coal. In view of the significant advancement in the combustion technology all over the world, it was decided to convert the combustion system of one loco into oil-fired system. In the first phase, the locomotive was converted into diesel-fired loco indigenously and in the second phase, furnace oil was introduced as fuel duty modifying the pre heating and combustion arrangements. To reduce the cost further, drained lube oil from diesel locos mixed with the furnace oil in the ratio of 50:50 was used as fuel, with good results.

The technology available in the country is capable of manufacturing new locomotives and rolling stock and supplying necessary spares and fuel for sustaining the services of the prestigious Nilgiri Mountain Railway.
NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 8/480 TO KM 9/580

AREA OF LAND 3.56 Hectares
AREA UNDER CORE ZONE 0.58 Hectares
AREA UNDER BUFFER ZONE 2.37 Hectares

COMPARSED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

Sd/-
TASHILDAR
UDUMALPETAM

Sd/-
SURVEYOR
SOUTHERN RAILWAY
NILGIRI MOUNTAIN RAILWAY
LAND PLAN
SCALE 1:1564
FROM KM 1.2/160 TO KM 12/160

AREA OF LAND = 2.68 Hectares
AREA UNDER CORE ZONE = 0.55 Hectares
AREA UNDER BUFFER ZONE = 2.13 Hectares

COMPAIRED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

Sd-

TAMKIDAR
UDUMALPET

Sd-

SURVEYOR
SOUTHERN RAILWAY
NILGIRI MOUNTAIN RAILWAY
LAND PLAN
SCALE 1:1584
FROM KM 16/750 TO KM 17/170.

AREA OF LAND
AREA UNDER CORE ZONE
AREA UNDER BUFFER ZONE
2.74 Hectares
0.66 Hectares
2.18 Hectares

COMPIRED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSLER
UDANGA MANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY
NILGIRI MOUNTAIN RAILWAY

AREA OF LAND: 5.15 Hectares
AREA UNDER CORE ZONE: 0.48 Hectares
AREA UNDER BUFFER ZONE: 4.73 Hectares

LAND PLAN
SCALE 1:1564
FROM KM 39.200 TO KM 39.800

COMPAReD WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

- Sd-
TANSHIDAI
SURVEYOR

- Sd-
VALLAMAN PLAN
SOUTHERN RAILWAY
NILGIRI MOUNTAIN RAILWAY
LAND PLAN
SCALE 1:1500
FROM KM. 41/000 TO KM 42/000

AREA OF LAND = 6.55 Hectares
AREA UNDER CORE ZONE = 2.33 Hectares
AREA UNDER BUFFER ZONE = 4.25 Hectares

COMPAARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
FAKIRUDDIN
TOPOGRAPHER

-Sd-
SURVEYOR
SOUTHERN RAILWAY
Identification

Nomination The Darjeeling Himalayan Railway
Location Darjeeling District, State of West Bengal
State Party Republic of India
Date 3 July 1998

Justification by State Party

The Darjeeling Himalayan Railway is a unique example of construction genius employed by railway engineers in the latter part of the 19th century. The manner in which height is gained in this railway by utilizing various loops and zigzag reversing stations is remarkable. This line also has the distinction of passing through the second highest railway station in the world.

Criterion i

This railway also exhibits an important interchange of human values, as it brought about a change in the life-style of the people living in the area. The concept of time changed, as the earlier journey time of five to six days between Calcutta and Darjeeling was compressed into less than 24 hours following the introduction of this railway.

Criterion ii

The railway bears a unique testimony to the cultural tradition of tea plantation, which is still the main source of livelihood of the inhabitants of this region, whether landowners, labourers, or traders.

Criterion iii

Various facets of the line, such as the innovative measures used to gain height and to overcome obstacles, the workshop at Tindharia, which is still using many original machines, the use of the original steam locomotives and original coaches, such as the Everest built in 1914, and the 19th century station buildings, which have preserved their original form, all bear witness to the technological skills of the bygone era and are an outstanding demonstration of their function, illustrating a significant stage in human history.

Criterion iv

Category of property

In terms of the categories of cultural property set out in Article 1 of the 1972 World Heritage Convention, this is a site.

History and Description

History

The Darjeeling Himalayan Railway is intimately linked with the development of Darjeeling as the queen of hill stations and one of the main tea-growing areas in India, in the early 19th century.

The densely wooded mountain spur on which Darjeeling now stands was formerly part of the Kingdom of Sikkim. It was adopted by the British East India Company as a rest and recovery station for its soldiers in 1835, when the area was leased from Sikkim and building of the hill station began, linked to the plains by road. The region was annexed by the British Indian Empire in 1858.

Calcutta had been linked by rail in 1878 to Siliguri, in the foothills of the Himalaya. By this time the tea industry had become of great importance for the Darjeeling region, and the existing road transport system was inadequate to cope with the increased traffic. Franklin Prestage, Agent of the Eastern Bengal Railway, submitted a detailed proposal for a steam railway from Siliguri to Darjeeling. This received official approval and construction work began immediately. By 1881 it had been completed in three stages.

The privately owned Darjeeling Himalayan Railway (hereafter referred to as the DHR) was purchased by the Government of India in October 1948. Since 1958 it has been managed by the State-owned Northeast Frontier Railway.

Description

The DHR consists of 88.48km of 2ft (0.610m) gauge track that connects New Jalpaiguri with Darjeeling, passing through eleven stations between the two termini. One of these, Ghoom, is the second highest railway station in the world, at an altitude of 2258m.

Because it passes through a mountainous region, 73% of the total length of the line consists of curves, the sharpest of which is that between Sukna and Rongtong, where the track passes through 120°. There are six reverses and three loops on the line, the most famous of these being the Batasia Loop between Ghoom and Darjeeling. The steepest gradient is 1 in 18 (in zigzag reverses).

The nominated property consists of the permanent way itself, which varies in width between 3m and 50m, and all the associated buildings - stations, goods sheds (“godowns”), workshops, locomotive and rolling stock sheds, and railway residences. It repeatedly crosses the Hill Cart Road, necessitating the provision of 170 level crossings. During the monsoon months (July and August) landslips make it necessary for many of these to be reconstructed.

The "Toy Train," as it is affectionately known, affords breathtaking views of high waterfalls, green valleys that are often hidden by cloud, and at its end the splendid panorama of the snow-capped Kanchenjunga range. There are several distinct sections: the 10km plains section between Siliguri and Sukna (partly urban and partly agricultural), the 11km densely forested section from Sukna to beyond Rongtong, the 38km largely deforested open hill section with its many tea gardens to Kurseong, and finally the 30km alpine section to Darjeeling, dominated by stands of Himalayan pine and tea gardens.
Management and Protection

Legal status

The only protection to the Railway applies to the permanent way, which is in principle controlled under the general measures relating to Central Government property and the specific provisions of the 1989 Railway Act.

Management

The DHR is the property of the Government of India, vested in the Ministry of Railways. Administration of the Railway is the responsibility of the Northeast Frontier Railway, the headquarters of which is located at Guwahati, the capital of the State of Assam.

The fixed and moveable assets of the line are documented by the Northeast Frontier Railway and the buildings are included in a comprehensive register.

Conservation and Authenticity

Conservation history

This is a working railway and as a result is maintained according to regular programmes. The funding for these is variable, being dependent upon current needs and the level of traffic generated.

Investment plans have been prepared for the rehabilitation of the station buildings at Darjeeling, Ghoom, Kurseong, and Tindharia. There is a programme of stabilization in progress for the stretch between Sukna and Mahanadi, which is most susceptible to landslips in the monsoon season.

Development of tourism in Darjeeling is heavily dependent upon the efficient working of the Himalayan Railway. Plans are therefore being developed to improve its services. These include track improvement and the purchase of new locomotives and rolling stock. Concurrently the Ministry of Railways has sponsored a comprehensive study of the line by professional transportation consultants.

There is regular interaction with the UK-based Darjeeling Himalayan Railway Heritage Foundation. Studies are in progress on comparable railway systems elsewhere in the world, such as the Festiniog Railway in Wales (UK), the design of which inspired the Darjeeling Railway.

Authenticity

The authenticity of the route as originally commissioned in 1881 has been preserved in a remarkably intact condition, with only minor modifications of an evolutionary nature. All the main station buildings (with the exception of Siliguri Junction and Darjeeling, both of which have been rebuilt after being destroyed by fire) have been preserved in their original form.

Evaluation

Action by ICOMOS

An ICOMOS expert mission visited the property in January 1999. ICOMOS also benefited from the comparative study of historic railways coordinated by the National Railway Museum in York (UK) in 1998 (see below).

Qualities

The DHR represents an exceptional feat of civil engineering that has survived virtually intact up to the present day. It is notable also for the quality of many of its associated buildings, especially the intermediate stations, the railway residences and rest-houses, and the Tindharia workshops.

Comparative analysis

The 1998 comparative study of Railways as World Heritage Sites defines specific criteria for evaluating historic railways.

To be considered for inscription on the World Heritage List they should conform with one or more of the following:

- be a creative work indicative of genius;
- demonstrate the influence of, and on, innovative technology;
- be an outstanding or typical example;
- be illustrative of economic or social developments.

The DHR was selected as a case-study. It was adjudged to be "an outstanding line on several counts, but ... particularly significant with regard to [its] social, economic, and political effects and the route's relationship with the landscape."

The report stresses the fact that the DHR does not possess any grand structures; on the contrary, its design was based on minimal capital expenditure. However, the engineering solutions adopted to cope with the steep gradients and relatively short distances were exceptional.

It also emphasizes the social and economic importance of the line. The narrow gauge adopted, which was admirably suited to the terrain, permitted the transportation of passengers and goods in a way that had a profound impact on the social and economic development of the Darjeeling area.

Finally, the report describes the intimate relationship of the Railway with the varied terrain through which it passes as outstanding.

In the light of these comments, there can be little doubt that the DHR is of outstanding quality. The combination of narrow gauge and zigzag reverses was the first in the world, and as such it is of exceptional technological interest. It was the first hill railway anywhere in the world and as such served as the prototype for numerous subsequent railways of this type, adopted in India, in Vietnam, in Burma, in Sumatra, in Java, and elsewhere.

One other point should not be overlooked. The DHR links not only the plains with the high Himalaya, but also two distinct cultural traditions - the Hindu culture of Bengal and the Buddhist culture of the mountain region. As a result Darjeeling, which lies at an important nodal point, reflects a cultural fusion between these two cultures (not forgetting, also, the British influence).

ICOMOS comments and recommendations for future action

ICOMOS is impressed by the quality of the DHR, and also by the commitment of those responsible for its management and maintenance to its conservation as part of the railway heritage, both of India and more widely. It is concerned, however, that there is no specific heritage expertise within the Northeast Frontier Railway staff. It proposes that Indian Railways should give special consideration to the possibility of transferring responsibility for conservation of the DHR to...
a special unit with expertise in heritage matters as well as formal railway management skills. Such a unit would have conservation of heritage values as a high priority in its management and operation. This would appear to be consonant with the development of the line as part of the overall tourism plan for the Darjeeling region.

There is no buffer zone along the length of the DHR. Given the complexities of planning in India, ICOMOS urges the State Party to prepare an environmental management plan in association with all the relevant authorities responsible for the protection of the landscape along its route.

ICOMOS is conscious that both proposals will require a lengthy period before they can be developed and implemented. It is conscious of the significance of the DHR, of the current level of conservation, and of the existing commitment of all concerned to its continued existence. It does not therefore propose that inscription on the World Heritage List should be conditional upon their application. It suggests that the Committee consider asking the State Party to provide regular progress reports, with the objective of having appropriate structures in force within the next five years.

The significance of this property lies in its continuing use as a working railway. Its abandonment would necessarily call its continuing World Heritage value into question.

**Brief description**

The Darjeeling Himalayan Railway is the first, and still the most outstanding, example of a hill passenger railway. Opened in 1881, it applied bold and ingenious engineering solutions to the problem of establishing an effective rail link across a mountainous terrain of great landscape beauty. It is still fully operational and retains most of its original features intact.

**Recommendation**

That this property be inscribed on the World Heritage List on the basis of criteria ii and iv:

**Criterion ii** The Darjeeling Himalayan Railway is an outstanding example of the influence of an innovative transportation system on the social and economic development of a multi-cultural region, which was to serve as a model for similar developments in many parts of the world.

**Criterion iv** The development of railways in the 19th century had a profound influence on social and economic developments in many parts of the world. This process is illustrated in an exceptional and seminal fashion by the Darjeeling Himalayan Railway

ICOMOS, September 1999
Darjeeling Himalayan Railway
(Inde)
No 944

Identification
Bien proposé: Darjeeling Himalayan Railway
Lieu: District de Darjeeling, Etat du Bengale-Occidental
Etat Partie: Union indienne
Date: 3 juillet 1998

Justification émanant de l’Etat partie

Le Darjeeling Himalayan Railway (ci-après dénommé DHR) est un exemple exceptionnel du génie des ingénieurs des chemins de fer de la deuxième moitié du XIXe siècle. La voie ferrée gagne en altitude de façon remarquable par l’utilisation de boucles et de gares permettant l’alternance du sens de la marche du train. La ligne se distingue aussi par le fait qu’elle passe par la deuxième gare la plus haute du monde. Critère i

Le DHR témoigne d’un échange considérable de valeurs humaines car il a eu un impact sur la vie des habitants de la région. Ainsi, par exemple, la notion du temps a changé, car le chemin de fer a mis Calcutta à moins de 24 heures de Darjeeling alors qu’il fallait auparavant cinq à six jours de voyage pour aller d’une ville à l’autre. Critère ii

Le DHR apporte un témoignage unique sur la tradition culturelle des plantations de thé qui demeurent le principal moyen d’existence des habitants de la région, qu’ils soient propriétaires terriens, ouvriers agricoles ou commerçants. Critère iii

Plusieurs caractéristiques de la ligne - les innovations techniques utilisées pour gagner de l’altitude et franchir les obstacles, les ateliers de Tindharia qui utilisent encore de nombreuses machines d’origine, les voitures pour voyageurs et les locomotives à vapeur d’origine, comme l’Everest, construite en 1914, les gares datant du XIXe siècle qui ont conservé leur aspect d’origine - témoignent des savoir-faire technologiques d’une époque révolue, illustrent de manière éminente leur fonction et représentent un stade important de l’histoire de l’humanité. Critère iv

Catégorie de bien

En termes de catégories de biens culturels, telles qu’elles sont définies à l’article premier de la Convention du Patrimoine mondial de 1972, le bien proposé est un site.

Histoire et description

Histoire

Le DHR est intimement lié au développement de Darjeeling, reine des stations de montagne et l’une des principales régions productrices de thé en Inde au début du XIXe siècle.

Le contrefort couvert de forêts épaisse auquel s’accroche la ville de Darjeeling faisait autrefois partie du royaume du Sikkim. Ce lieu fut choisi en 1835 par la Compagnie britannique des Indes Orientales pour servir de station de repos et de convalescence à ses soldats. C’est alors que la région fut achetée au Sikkim et que commença la construction de la station reliée à la plaine par une route. La région fut annexée par l’Empire britannique des Indes en 1858.

Dès 1878, Calcutta était reliée par le chemin de fer à Siliguri, sur les contreforts de l’Himalaya. À l’époque, l’industrie du thé avait pris un bel essor dans la région de Darjeeling, et le réseau de transport routier existant ne suffisait plus face à l’accroissement du trafic. Franklin Prestage, agent des chemins de fer du Bengale-Oriental, soumit une proposition détaillée pour la construction d’une ligne de chemin de fer à vapeur reliant Siliguri à Darjeeling. La proposition fut acceptée officiellement et les travaux de construction débutèrent immédiatement. En 1881 les trois phases de la construction étaient achevées.

La société privée Darjeeling Himalayan Railway a été rachetée par le Gouvernement de l’Union indienne en octobre 1948. Depuis 1958 elle est gérée par la société nationale Northeast Frontier Railway.

Description

Le DHR comporte une voie ferrée de 88,48km d’un écartement de 2 pieds (0.610m) qui relie les gares terminus de New Jalpaiguri et Darjeeling en passant par onze gares intermédiaires. L’une d’elles, Ghoom, construite à 2258m d’altitude, est la deuxième plus haute gare du monde.

Du fait que la ligne traverse une région montagneuse, son tracé est constitué à 73% de courbes, dont la plus serrée, entre Sukna et Rongtong, suit un arc de cercle de 120°. La ligne comporte également six gares permettant l’alternance du sens de la marche et trois boucles, dont la plus connue est celle de Batasia, entre Ghoom et Darjeeling. La pente la plus raide est de 1 pour 18 (dans les inversions de sens de la marche du train).

Le bien proposé pour inscription comprend l’emprise ferroviaire, sur une largeur qui varie de 3 à 50m, et tous les bâtiments annexes – gares et installations, ateliers, dépôts de locomotives et matériels roulants et habitations des cheminots. La voie traverse constamment Hill Cart Road, rendant indispensable l’aménagement de 170 passages à niveau. Les
glissements de terrains causés par la mousson (juillet et août) exigent la reconstruction de beaucoup de ces passages.

Le petit train ("Toy Train"), comme on l’appelle affectueusement, offre des vues prodigieuses sur des chutes d’eau vertigineuses, des vallées vertes souvent embrumées et, au bout du voyage, le splendide panorama de la chaîne du Kanchenjunga couronnée de neige. La ligne se divise en quatre parties : 10km en plaine entre Siliguri et Sukna (en partie urbanisée et en partie agricole), 11km de jungle épaisse entre Sukna et au-delà de Rongtong, 38km dans une région de collines en grande partie déboisées et couvertes de plantations de thé jusqu’à Kurseong et enfin 30km en milieu alpin jusqu’à Darjeeling, dominée par des terrasses plantées de pins de l’Himalaya et de thé.

Gestion et protection

Statut juridique

La seule protection dont bénéficie le chemin de fer s’applique à l’emprise ferroviaire qui est en principe protégée en vertu des mesures générales relatives aux biens du gouvernement central et des dispositions spécifiques de la Loi sur les chemins de fer de 1989.

Gestion

Le DHR est la propriété du gouvernement de l’Union indienne. Il est placé sous la tutelle du ministère des chemins de fer. L’administration du chemin de fer incombe à la Northeast Frontier Railway dont le siège social est situé à Guwahati, capitale de l’État de l’Assam.

Les équipements fixes et roulants de la ligne sont répertoriés par la Northeast Frontier Railway et les bâtiments sont inscrits dans un registre détaillé.

Conservation et authenticité

Historique de la conservation

Cette ligne de chemin de fer étant en service, elle est régulièrement entretenue suivant des programmes définis. Le financement des travaux d’entretien est variable car il répond aux besoins courants et dépend du niveau du trafic généré.

Des programmes d’investissement sont prévus pour la réhabilitation des bâtiments des gares de Darjeeling, Ghoom, Kurseong et Tindharia. Un programme de stabilisation de la voie est en cours pour la section comprise entre Sukna et Mahanadi, qui est une des plus sensibles aux glissements de terrain pendant la mousson.


Les contacts avec la Darjeeling Himalayan Railway Heritage Foundation basée au Royaume-Uni sont permanents. Des études sont en cours sur des réseaux ferroviaires semblables qui existent ailleurs dans le monde, comme le Festiniog Railway au Pays de Galles (Royaume-Uni), dont la conception a inspiré celle du DHR.

Authenticité

L’authenticité du tracé, tel qu’il a été construit à l’origine en 1881, a été fidèlement préservée, et ne compte que des modifications mineures, liées à un développement progressif et normal. Toutes les gares - à l’exception de Siliguri Junction et de Darjeeling qui ont été reconstruites après avoir été détruites par un incendie - ont conservé leur aspect d’origine.

Évaluation

Action de l’ICOMOS


Caractéristiques

Le DHR est un ouvrage de génie civil exceptionnel qui est parvenu jusqu’à nous presque intact. Il est également remarquable pour la qualité de nombreux bâtiments qui s’y rattachent, en particulier les gares intermédiaires, les maisons d’habitations et les maisons de repos appartenant à la ligne ainsi que les ateliers de Tindharia.

Analyse comparative

L’étude comparative de 1998 Railways as World Heritage Sites définit des critères d’évaluation spécifiques des lignes de chemin de fer historiques. Pour que leur proposition d’inscription sur la liste du patrimoine mondial soit prise en considération, ces sites doivent répondre à l’un ou plusieurs des critères suivants :

• être un ouvrage révélateur du génie créateur humain ;
• démontrer l’influence des innovations technologiques sur l’ouvrage et, inversement, l’influence de l’ouvrage sur la technologie ;
• être un exemple éminent ou typique ;
• illustrer l’évolution économique ou sociale.

Le DHR a été choisi comme étude de cas. Il a été déclaré « ligne de chemin de fer exceptionnelle à
plusieurs titres, mais plus particulièrement pour ce qui concerne ses implications sociales, économiques et politiques et pour sa relation au paysage.

Le rapport insiste sur la modestie des infrastructures et des installations du DHR ; en effet, dès sa conception, l’investissement en capital a été minimal. Néanmoins, les solutions techniques adoptées pour vaincre les fortes pentes et les distances relativement courtes sont exceptionnelles.

Il souligne également l’importance économique et sociale de la ligne. Le choix du chemin de fer à voie étroite, admirablement adapté au terrain, a permis le transport des passagers et des marchandises et a profondément marqué l’évolution économique et sociale de la région de Darjeeling.

Enfin, le rapport qualifie d’exceptionnelle l’étroite relation qui existe entre le chemin de fer et les divers types de terrains qu’il traverse.

A la lumière de ces commentaires, l’éminente qualité du DHR ne fait pas de doute. L’association du chemin de fer à voie étroite et des gares qui permettent l’alternance du sens de la marche est le premier exemple de ce type jamais réalisé et représente à ce titre un intérêt technologique exceptionnel. C’est le premier chemin de fer de montagne au monde et, en tant que tel, il a servi de modèle à de nombreuses lignes construites ultérieurement en Inde, au Vietnam, à Burma, à Sumatra, à Java et ailleurs.

A noter enfin que le DHR ne relie pas seulement les plaines aux montagnes de l’Himalaya, il réunit aussi deux traditions culturelles – la culture hindoue du Bengale et la culture bouddhiste de la région montagneuse. En conséquence, Darjeeling, qui se situe en un point de rencontre important, reflète la fusion de ces deux cultures (sans oublier également l’influence britannique).

**Observations et recommandations de l’ICOMOS pour les actions futures**

L’ICOMOS est impressionné par la qualité du DHR, par le dévouement des personnes responsables de sa gestion et de son entretien eu égard à sa conservation comme témoin de l’histoire du chemin de fer tant en Inde que dans d’autres pays. Il s’inquiète cependant de ne trouver aucune compétence particulière relative à la conservation du patrimoine parmi le personnel de la Northeast Frontier Railway Il suggère que les chemins de fer indiens envisagent de confier la responsabilité de la conservation du DHR à une unité spéciale qui possède des connaissances en matière de patrimoine ainsi que des compétences en gestion des chemins de fer. Cette unité aurait comme une de ses priorités de gestion et d’action, la préservation des valeurs patrimoniales tout en tenant compte du développement harmonieux de la ligne dans le cadre d’un plan d’expansion du tourisme dans la région de Darjeeling.

Il n’existe pas de zone tampon le long du DHR. Etant donné la complexité des rouages de la planification en Inde, l’ICOMOS enjoint l’Etat Partie à préparer un plan de gestion environnementale avec le concours de toutes les autorités responsables de la protection du paysage tout au long de la voie ferrée.

L’ICOMOS est conscient que ces deux propositions exigèrent une période assez longue avant de pouvoir être développées et appliquées. Il est conscient de l’importance du DHR, du niveau actuel de préservation et de l’engagement pris par toutes les parties concernées en faveur de sa pérennité. Il ne propose donc pas que l’inscription sur la Liste du patrimoine mondial soit soumise à la condition de leur application. Il suggère que le Comité envisage de demander à l’Etat Partie de soumettre des rapports périodiques dans le but d’établir des structures appropriées au cours des cinq années à venir.

La signification de ce bien repose sur son utilisation ininterrompue. Son abandon remettrait inévitablement en question sa valeur de patrimoine mondial.

**Brève description**

Le Darjeeling Himalayan Railway est le premier et le plus extraordinaire exemple de chemin de fer de montagne destiné aux voyageurs. Mis en service en 1881, il a appliqué des solutions d’ingénierie audacieuses et ingénieuses au problème de la construction d’une ligne de chemin de fer à travers une région montagneuse d’une grande beauté. Cette ligne est encore en service et la plupart de ses caractéristiques d’origine sont intactes.

**Recommandation**

Que ce bien soit inscrit sur la liste du patrimoine mondial sur la base des critères **ii et iv** :

- **Critère ii** Le Darjeeling Himalayan Railway est un exemple éminent de l’influence que peut avoir un système de transport novateur sur le développement économique et social d’une région multiculturelle et qui a servi de modèle à de nombreux autres développements de ce type à travers le monde.

- **Critère iv** Le développement du chemin de fer au XIXe siècle a eu une profonde influence sur le développement économique et social dans de nombreuses parties du monde. Ce processus est illustré de manière exceptionnelle, riche et exemplaire par le Darjeeling Himalayan Railway.

ICOMOS, septembre 1999
1. BASIC DATA

State Party: India
Name of property: Mountain Railways of India
Location: Nilgiri District, Tamil Nadu State
Date received: 29 January 2004

Category of property:

In terms of the categories of cultural property set out in Article 1 of the 1972 World Heritage Convention, this is a site. The Nilgiri Mountain Railway (NMR) is proposed as an extension to the existing World Heritage Site, Darjeeling Himalayan Railway (DHR), forming a serial nomination: Mountain Railways of India.

Brief description:

The Nilgiri Mountain Railway is a meter-gauge single-track railway in Tamil Nadu State, 46km long. Its construction was first proposed in 1854, but due to the difficulty of the mountainous location, the work only started in 1891 being completed in 1908. This railway represented the latest technology of the time, and it was highly significant facilitating population movement and the social-economic development in the British colonial era.

2. THE PROPERTY

Description

The Nilgiri Mountain Railway (NMR) consists of 45.88km of a meter-gauge single-track railway that connects Mettupalayiyam to Udagamandalam (earlier: Ootacamund or Ooty) in Tamil Nadu State. Mettupalayiyam is located at an elevation of 326m and Udagamandalam at 2203m. Rack rails consist of two toothed steel bars laid in a double row at 44mm apart and 64mm above the running rails so that the tooth of one rail is directly opposite to the gap of the other to ensure that the engine pinions do not work off the racks in curves. Rack bars of two standard lengths are in use: full bar (26 teeth per 3.12m) and half bar (13 teeth per 1.56m). The pitch of rack teeth is 120 mm. The entry to the rack is effected through specially designed entry tongues laid in special channel sleepers fitted with bow springs and connecting links connected finally to the rigid bars. The racks are laid at a constant distance of 455 mm. from the inner rails and are screwed by bolting to cast iron chairs fixed to the sleepers with fang bolts.

The railway can be divided into three sections:

1) The first section, ca 7 km, from Mettupalayiyam to Kallar (elevation 405m), is across the central plain of Tamil Nadu. The Railway runs through beetle-nut palm and other plantations. Maximum speed is 30km/h. Mettupalayiyam, was a small village in the 1850s and it gained importance as a railhead only after the British laid a Broad gauge line from Coimbatore to Mettupalayiyam in 1873. The Broad gauge train from Madras to Mettupalayiyam was called the Blue Mountain Express, the name of which was changed recently to the native Nilgiri Express. Mettupalayiyam has the carriage and Wagon Depot of the NMR and all the carriages and Wagons are maintained there.

2) The second is the rack section of the line, from Kallar to Coonoor (elevation 1712m), climbing 1330m in 19 km. On this rack section the average grade is 1 in 15 and the ruling grade is 1 in 12. There are 208 curves and 13 tunnels, as well as a half tunnel, where the Railway has been cut into the sheer cliff wall, enclosed by rock on three sides. There are 27 viaducts, built in steel and stone, featuring steel girder spans, typically of 60 feet (18.3m) supported on stone abutments and piers. The Kallar Bridge over the River Bhawani, the Adderley viaduct and the Burlia Bridge are examples of such composite bridges. Here, the Railway climbs through almost uninhabited, tropical jungle. The last five kilometres feature fine views over the escarpment, which the train has just ascended. Maximum speed is 13km/h. Coonoor town is built on one of the best geographical locations in the Nilgiri Mountains with a cool and equitable climate.

3) The third section is 18km long. The landscape is neat with dominant eucalyptus and acacia forest. The railway continues to climb across the Nilgiris till it reaches its summit just before the terminus of Udagamandalam at 2203m. Although the climb here is not as steep as the rack section, the ruling gradient between Coonoor and Udagamandalam is still very steep 1 in 23. There are three tunnels in this section including the longest on the line, some 282m. Maximum speed is 30km/h. The name of Udagamandalam refers to a collection of quaint huts of the aboriginal Todas, who believe they have always lived here. This place is popular for tourists.

The bogies were modified in 1992 to enable the passengers to get a good view on both sides. The coaches and wagons are provided with brakesmen who independently operate friction brakes and rack brakes on whistle codes from the driver. The railway is operating “X” class locomotives with pinion wheels on rack rail arrangement to negotiate the steep gradient of 1 in 12. Due to the steep gradient and adverse weather conditions, two different braking systems are used: i) adhesion braking between wheel and rail through friction, ii) brake application through the pinion and rack bar, connected to the track. The locomotive pinions are made to drive the pistons, which act as air compressors causing dynamic braking effort. The clasp brakes actuated by hand wheels on the brake drum, mounted on the pinions can also apply braking effort on the cogwheel.

History

Protected by wild, jungle-covered escarpments and located at an elevation of roughly 2000 meters, the Nilgiris hills were isolated until the 19th century with their tribal inhabitants, the Todas. The name of the hills means Blue Mountains in Sanskrit and reflects the perspective of a person looking at them from below. British settlement in the hills began in 1820. By 1830 there was military commandant, and British families from Madras began...
building summerhouses, especially in Udagamandalam (Ootacamund). By 1870, the Madras government as a whole was moving there for the summer, in imitation of the annual migration of the viceroy’s Government from Calcutta to Simla.

The history of NMR dates back to 1854 when proposals were first made by the British to build a railway up the hills. Work began on the Madras-Coimbatore line (5'6") in 1853, and the branch to Mettupalaiyam opened in 1873. The problem was how to replace the tedious ascent by bullock-cart or pony to Coonoor. In 1873, the district engineer of the Nilgiris, J.L.L. Morant, proposed building a rack railway, but the first offers were declined. Sir Guildford Molesworth, the former engineer in chief of the Ceylon Government Railway, acting as consultant to the Government of India, advised a rack and adhesion line on the model of the Abt system built in the Harz Mountains in Germany. In 1882, M. Riggenbach, the Swiss inventor of Rigi rack railway, submitted a proposal for the construction of the railway line. This was accepted, and the Nilgiri Rigi Railway Company Ltd was formed in 1885. The work was inaugurated in 1891, and finally completed in 1908. Subsequently the railway was run by different companies, and was then incorporated into the Southern Railway in 1951.

Management regime
Legal provision:
The Ministry of Railways of the Government of India owns all the movable and immovable assets of the NMR.

The NMR has the legal protection available under the Indian constitution to Central Government property. The current protective measures are provided in the Railway act of 1989, dealing also with the pressures of unauthorised occupation of Government land and premises.

Management structure:
The management is guaranteed by the Ministry of Railways and the relevant branch offices.

There is a Property Management Plan, which deals with the management of the land, the buildings, the track, the bridges, and the tunnels.

Resources:
The resources are provided by the Indian Ministry of Railways.

Train services, station facilities, platforms and passenger amenities are provided for visitors and commuters. In addition, special tourist trains are promoted. Most stations have cafeteria; retiring rooms are available at Udagamandalam, Lovedale, Coonoor and Wellington. The total number of visitors to Nilgiri mountains in 2000 was ca 1.5 million; ca 294,000 tickets were sold on NMR.

Justification by the State Party (summary)
The property is nominated on the basis of criteria ii and iv:
Criterion ii: NMR is an example of a colonial Railway, and part of that stage of globalisation, which was characterized by colonial rule, and the political and economic domination of the people of Asia, Africa and the Pacific by Europeans. Part of that process was technology transfer, and NMR is a spectacular example of such transfer. The Nilgiri plateau was transformed into a tea-growing area, a landscape made largely by human intervention with eucalyptus as the dominant tree, imported from Australia. Socially, the Nilgiris Mountains have been a location for interaction British and South Indian communities.

The technological and social interchange is also evident in the application of rack Railway technology as applied in the west to establish a rail link in a tropical location. The Swiss qualities of the NMR are strong. The steam locomotives which still work all traffic on the rack section and the tourist special on the adhesion section are the X class, designed in 1911 and built by the Swiss Locomotive and Machine Works in Winterthur between 1913 and 1952. The export of technology from Switzerland has contributed to the unusual if not quite unique features of the NMR.

Criterion iv: This Railway is a unique example of construction genius employed by Railway engineers in the latter part of 19th century. Before the railway it took more than 10 days to reach Udagamandalam, braving insects and wild animals. With the introduction of the Railway, the 45 km journey took only 4 ½ hours. Various facets of the Railway line, viz. the rack & pinion mechanism to gain height, the steam engines, coaches, the station buildings preserved in their original shape all bear testimony to the technological skills of the bygone era are an outstanding demonstration of their function and illustrates a significant stage in human history. As an example of the transfer of rack railway technology to remote locations outside Europe, the NMR is certainly the outstanding remaining example in the world, in terms of its scale, authenticity, continuity and presentation. As an ensemble, with its impeccably maintained permanent way; its elegant, original stations and associated buildings, and its large proportion of old rolling stock and locomotives, it is genuinely outstanding, even unique.

3. ICOMOS EVALUATION
Actions by ICOMOS

Conservation
Conservation history:
The railway has been regularly maintained and used. The oldest rails on the line were laid in 1931-32 and the newest in 1999-2000. Most date from the 1940s and 1950s. Steel bridges are regularly painted and are in excellent condition. The date of its last painting is recorded on each steel span. Some inevitable damage has been caused in this high rainfall monsoon area. The worst damage was on 11 November 1993, when 333mm of rain in one day washed away 200 metres of track at km 20.4 (as well as causing considerable loss of life). Services on the section were
suspended for three months and rebuilding cost a total of 3,500,000 rupees.

State of conservation:
Protection is as good as can be expected for such a site. This is a working railway, which means it needs to be maintained and repaired as well as conserved on a regular basis.

Management:
The NMR is well managed, and there is a detailed management plan with the nomination. In addition, the railway’s relative isolation and topography guarantee some protection already; forestry regulations and management provide protection on the most remarkable section from Kallar to Coonoor; and the buffer zone assures adequate measures in the urban areas.

The Southern Railway has a secure resources base and high-quality personnel who recognise the importance of heritage. They maintain the NMR to high standards and provide resources to do so, even though it is one of the most unprofitable sections of their railway.

The Southern Railway has a secure resources base and high-quality personnel who recognise the importance of heritage. They maintain the NMR to high standards and provide resources to do so, even though it is one of the most unprofitable sections of their railway.

The buffer zone is often only 8.5m. Nevertheless, considering that the most critical section on the escarpment between Kallar and Coonoor is through forest under the control of the Forestry Department, protection is considered to be adequately assured. The only section where development poses a potential threat is in the town of Coonoor. This is a relatively short section (about one kilometre long), and the railway is at that point in a narrow valley with rather steep sides. The reservation at this point is relatively wide, because it includes the station and its forecourt, the workshops, locomotive depot, the junction of the main line, and the line into the station. In fact, the topography provides a real protection to the railway extending far beyond its formal buffer zone.

Risk analysis:
The region where the railway is located is earthquake prone as well as being subject to abundant tropical rains. There is also the risk of landslides especially during rainy season. It is recognized, however, that the Indian Railways are committed to monitor and prevent damage as far as possible.

Authenticity and integrity
The railway has been remarkably little altered since it was built. It has three major stations, Mettupalaiyam, Coonoor and Udhagamandalam. The first two, which are also where the railway’s workshops and depots are located, are in most essential respects exactly as they were when built in the 1890s. Coonoor is a particularly impressive station, with retiring rooms providing accommodation on the first floor. There have been, of course, some modifications (electric light, sewerage and signage), but they are fundamentally intact. The same applies to the carriage and wagon workshops at Mettupalaiyam and the locomotive workshops and depot at Coonoor. The station at Udhagamandalam is not as authentic. Its original building remains, but it had an extension added in the 1980s and the locomotive facilities have been removed. The minor stations are well conserved. While there have been some closures (notably Fernhill near Udhagamandalam, which has been converted into a resthouse), most remain as built.
The interiors, fittings and furnishings are largely original and are used exactly as intended when built. This includes their ticket racks, cash boxes, and even their records. The original ticketing system, using Edmondson card tickets, continues in use. Signaling on the railway is totally original and contributes to both its authenticity and character.

The locomotives and rolling stock are strictly speaking moveable items. However, since there is nowhere else in India (and indeed very few railways anywhere in the world) they can be used, they are in effect irremovable from the NMR, other than by being scrapped or exhibited elsewhere. The locomotives are not those with which the line was opened, but were introduced in 1920 to a design developed by SLM, the Swiss Locomotive and Machine Works at Winterthur. Eight of these survive and all are still based at Coonoor. These eight SLM machines constitute the world’s largest steam rack locomotive fleet and also its most original. The coaches, too, are significant. There is a total of 31 coaches on the NMR, all built during 1931 and 1932. They are the oldest passenger coaches in regular use on Indian Railways and some of the oldest used on regular trains anywhere in the world. They are also the only timber coaches still used in India.

Comparative evaluation
Taken as a whole, the railway is quite a large undertaking. According to the international comparative assessment provided in the nomination document and confirmed by TICCIH, it is easily the most original and one of the largest rack-and-pinion railways in the world. The NMR is an almost perfect example of the Abt rack system as it was at the height of its development, and it is supplemented with old-fashioned block working by Neale’s tablet. Most stations, all signal boxes and workshops, and virtually the entire infrastructure are still in their original condition.

Railways were never very common in British railway practice. They were more numerous in the Austro-Hungarian Empire and in Switzerland. On the World Heritage List, there is the 41km long Semmering Railway in Austria, which was built 1848-54.

The NMR railway is one of five surviving historic railways in India, including the Darjeeling Himalayan Railway (DHR) already inscribed on the World Heritage List. TICCIH has indicated that the DHR and the NMR are the two most innovative and outstanding of the five.

The DHR is basically a roadside tramway, 0.61m wide, with no notable structures, and built extremely economically. It was the first Indian mountain railway (1880-81), and experimental in nature. By contrast, the Nilgiri Mountain Railway, built nearby in 1890-92, is an altogether more substantial affair. Its gauge is broader, about 1m, and it is on its own reservation throughout its length. The NMR climbs far more quickly and on steeper grades, using the Abt rack system. This is what makes the Nilgiri Mountain Railway unusual. There are few other Abt rack railways in the world, and none so authentic throughout. It is also big for a rack railway, with relatively large steam locomotives and heavy trains.
Outstanding universal value

General statement:

The NMR has unusually high cultural values, reflecting successive waves of population movement into the Nilgiri Mountains. The movement from the plains into the Nilgiris began only during the later colonial period, after the British began to use the area as a resort. The railway was an essential part of that population movement, which transformed the Nilgiris from a remote area inhabited by tribal people with minimal connections with the rest of the country into an important region. The district is now thoroughly integrated into the mainstream of Indian social, cultural and political life.

The railway and the improved communication it brought was a critical part of this process. The railway brought the tribal people of the Nilgiris, like the district itself, into the mainstream of Indian life. They were converted to Hinduism and Christianity; and their traditional barter economy monetarised. A new population of Tamils (the most numerous), Kannadigas and Keralans from the plains, and of course British (now almost entirely departed) came to live in their land, which, thanks to the railway, was no longer a remote mountain fastness. A part of these changes was more intensive (and, in modern terms, more rational) use of the land, although the Nilgiris remain far from densely populated by Indian standards. The Toda people, one of the five main tribal groups, celebrated the coming of the railway in at least two songs dating from the early twentieth century.

Few railways have led to the creation of such works, which reflect its cultural significance. This significance is highly representative, and it is also unusually striking and well documented. As such the NRM has claims to universal significance on cultural grounds. The railway was a product of the colonial era, and it was built primarily to serve the colonial masters – their tea gardens, their summer capital, their cordite factory – but Indians, both the tribal peoples who had been there for centuries and the numerous migrants who came with the British from the plains, have made it their own, culturally as much as economically.

Thus, the cultural significance of the Nilgiri Mountain Railway extends beyond its significance as a built structure in a landscape, although it is notable in this regard alone. The landscape through which it passes is beautiful but challenging, and the technical solutions the railway’s builders used to meet the landscape’s challenges are a testimony to their creativity and ingenuity. But the NRM is also a railway which had a crucial role in causing changes in population, economic patterns and culture. It is a tangible expression of those changes which it occasioned.

Evaluation of criteria:

The present nomination is proposed as an extension to the existing World Heritage property, ‘Darjeeling Himalayan Railway’, of which the construction was completed by 1881. This property has been inscribed on the basis of criteria ii and iv as follows:

Criterion ii: Like the Darjeeling Himalayan Railway, the Nilgiri Mountain Railway is an outstanding example of the influence of an innovative transportation system on the social and economic development of a multicultural region, which was to serve as a model for similar developments in many parts of the world.

Criterion iv: The development of railways in the 19th century had a profound influence on social and economic developments in many parts of the world. This process is illustrated in an exceptional and seminal fashion by the two mountain railways in India, DHR and NMR. Of these, the NMR is distinguished representing a technically advanced phase, while the other mountain railways already inscribed, i.e. Semmering Railway in Austria and DHR in India, represent the beginnings of this development.

4. ICOMOS RECOMMENDATIONS

Recommendation with respect to inscription

ICOMOS recommends that the World Heritage Committee adopt the following draft decision:

The World Heritage Committee,

1. Having examined Document WHC-05/29.COM/8B,
2. Approves the extension on the basis of the existing criteria ii and iv:

Criterion ii: The mountain railways of India are outstanding examples of the interchange of values on developments in technology, and the impact of innovative transportation system on the social and economic development of a multicultural region, which was to serve as a model for similar developments in many parts of the world.

Criterion iv: The development of railways in the 19th century had a profound influence on social and economic developments in many parts of the world. The Mountain Railways of India are outstanding examples of a technological ensemble, representing different phases of the development in high mountain areas.

ICOMOS, April 2005
Map showing the route of Nilgiri Mountain Railway
Coaches of the Nilgiri Mountain Railway

View of second section through the jungle
Le chemin de fer peut se diviser en trois sections.

1) La première section, d'environ 7 km, de Mettupalaiyam à Kallar (altitude 405 m d'altitude) traverse la plaine centrale du Tamil Nadu. Le chemin de fer traverse des plantations de noix de bétel et d'autres plantations. La vitesse maximale est de 30 km/h. Mettupalaiyam était dans les années 1850 un petit village, et ne gagna de l'importance en tant que gare tête de ligne qu'après l'établissement par les Britanniques d'une voie large reliant Coimbatore à Mettupalaiyam en 1873. Le train à voie large de Madras à Mettupalaiyam était nommé le Blue Mountain Express, mais il a récemment été renommé le Nilgiri Express. Mettupalaiyam comporte le dépôt des wagons du CFMN, où l'entretien de tous les wagons est assuré.

2) La seconde est la section en pente de la ligne, de Kallar à Coonoor (altitude 1712 m), qui grimpe de 1 330 m sur 19 km. Sur ce tronçon, la rampe moyenne est de 1 sur 15 et la rampe fondamentale de 1 sur 12. Il y a 208 virages et 13 tunnels, ainsi qu'un « demi-tunnel », la voie ferrée ayant été taillée dans le mur de la falaise et étant fermée sur trois côtés par la roche. On compte 27 viaducs construits en acier et en pierre, avec des travées à poutrelles, en règle générale de 18,3 m, soutenues par des culées et des piles en pierre. Le pont Kallar au-dessus de la Bhawani, le viaduc Adderley et le pont Burlair sont des exemples de ces ponts composites. Ici, le chemin fer grimpe au travers d'une jungle tropicale quasi inhabitée. Les cinq derniers kilomètres offrent de belles vues sur l'escarpement que vient d'escalader le train. La vitesse maximale est de 13 km/h. La ville de Coonoor est construite sur un des meilleurs emplacements géographiques des montagnes Nilgiri, avec un climat doux et clément.

3) La troisième section fait 18 km de long, avec un beau paysage essentiellement composé de forêts d'eucalyptus et d'acacias. Le chemin de fer continue à grimper dans les Nilgiri jusqu'à atteindre le sommet, à Udagamandalam à une altitude de 2203 m. Quoique la pente ici ne soit pas aussi abrupte que sur le tronçon précédent, la rampe fondamentale entre Coonoor et Udagamandalam reste très marquée (1 sur 23). Cette section comporte trois tunnels, dont le plus long de la ligne, de 282 m. La vitesse maximale est de 30 km/h. Le nom d'Udagamandalam fait référence à un ensemble de huttes pittoresques des Todas, autochtones qui pensent avoir toujours vécu ici. C'est un site très apprécié des touristes.

Les bogies ont été modifiés en 1992 pour permettre aux passagers d’avoir une bonne vue des deux côtés. Avec les wagons, on compte les hommes chargés d’opérer indépendamment des freins à friction et des freins à crémaillère, en fonction des coups de sifflet codés du
Le CFMN est légalement protégé par la constitution indienne, en qualité de propriété du gouvernement central. Les mesures actuelles de protection sont énoncées dans la loi sur les chemins de fer de 1989, qui traite également des pressions relatives à l’occupation non autorisée de terrains et de locaux du gouvernement.

Structure de la gestion :

La gestion est garantie par le ministère des Chemins de fer et ses directions afférentes.

Il existe un plan de gestion du bien qui traite de la gestion des terrains, des bâtiments, de la voie, des ponts et des tunnels.

Ressources :

Les ressources sont fournies par le ministère indien des Chemins de fer.

Des services à bord, des gares, des quais et des aménagements pour les passagers sont fournis pour les visiteurs et les passagers. En outre, des trains spécialement destinés aux touristes sont proposés. La plupart des gares possèdent une cafétéria, et des salles de repos sont disponibles à Udagamandalam, Lovedale, Coonoor et Wellington. En 2000, environ 1,5 millions de personnes ont visité les monts Nilgiri, et près de 294 000 billets pour le CFMN ont été vendus.

Justification émanant de l’État partie (résumé)

Le bien est proposé pour inscription sur la base des critères ii et iv :  

Critère ii : Le chemin de fer des montagnes Nilgiri est un exemple de chemin de fer colonial, appartenant à ce stade de la mondialisation caractérisé par le colonialisme et la domination politique et économique des Européens sur les peuples d’Asie, d’Afrique et du Pacifique. Le transfert de technologie s’inscrivait dans ce processus, et le CFMN en est un exemple remarquable. Le plateau du Nilgiri fut transformé en une zone de culture du thé, un paysage largement façonné par l’intervention de l’homme, où l’eucalyptus, importé d’Australie, était prédominant. Socialement, les monts Nilgiri ont été un lieu d’interaction entre la communauté britannique et celles du sud de l’Inde. L’échange technologique et social est également évident dans l’application de la technologie de chemin de fer à crémaillère, appliquée en Occident pour mettre en place une liaison ferroviaire dans un lieu tropical. Le CFMN présente très nettement des caractéristiques suisses. Les locomotives à vapeur, toujours en service, opèrent toutes sur la section à crémaillère, les trains destinés aux touristes sur la section à adhérence sont de la classe X, conçue en 1911 et construite par la Fabrique suisse de machines et de locomotives de Winterthur entre 1913 et 1952. L’exportation de cette technologie depuis la Suisse a contribué aux caractéristiques inhabituelles, voire uniques, du CFMN.

Critère iv : Ce chemin de fer est un exemple unique du génie constructeur des ingénieurs ferroviaires à la fin du
XIXe siècle. Avant lui, il fallait plus de 10 jours pour se rendre à Udagamandalam, en bravant les insectes et les animaux sauvages. Avec l’introduction du chemin de fer, il ne fallait plus que 4 h ½ pour couvrir les 45 km du trajet. Diverses facettes de la voie de chemin de fer, notamment le mécanisme de crémaillères permettant l’ascension, les machines à vapeur, les wagons, les gares, préservés dans leur forme d’origine, témoignent des compétences technologiques de cette ère révolue ; d’une efficacité remarquable, elles marquent une étape significative dans l’histoire de l’humanité. Le chemin de fer des montagnes Nilgiri est très certainement le plus remarquable des exemples de transferts de technologie de chemin de fer à crémaillère vers des contrées isolées en dehors de l’Europe, en termes d’échelle, d’authenticité, de continuité et de présentation. En tant qu’ensemble, avec sa voie impeccablement entretenue, ses gares et leurs annexes élégantes et originales, et son nombre important de wagons et de locomotives d’époque, il est réellement exceptionnel, voire unique.

3. ÉVALUATION DE L’ICOMOS

Actions de l’ICOMOS

Une mission d’expertise de l’ICOMOS s’est rendue sur le site en septembre-octobre 2004.

Conservation

Historique de la conservation :

Le chemin de fer est depuis toujours régulièrement entretenu et utilisé. Les plus anciens rails de la ligne ont été posés en 1931-1932, et les plus récents en 1999-2000. La plupart datent des années 1940 et 1950. Les ponts en béton, les viaducs, les passerelles, les gares, préservés dans leur forme d’origine, témoignent des compétences technologiques de cette ère révolue ; d’une efficacité remarquable, elles marquent une étape significative dans l’histoire de l’humanité. Le chemin de fer des montagnes Nilgiri est très certainement le plus remarquable des exemples de transferts de technologie de chemin de fer à crémaillère vers des contrées isolées en dehors de l’Europe, en termes d’échelle, d’authenticité, de continuité et de présentation. En tant qu’ensemble, avec sa voie impeccablement entretenue, ses gares et leurs annexes élégantes et originales, et son nombre important de wagons et de locomotives d’époque, il est réellement exceptionnel, voire unique.

État de conservation :

La protection est aussi bonne qu’on pourrait l’espérer pour un site de ce type. Il s’agit d’un chemin de fer en service, ce qui implique qu’il doit faire l’objet d’entretien et de réparation tout autant que de conservation de façon régulière.

Gestion :

Le chemin de fer des montagnes Nilgiri est bien géré, et un plan de gestion détaillé accompagne la proposition d’inscription. En outre, l’isolement relatif et la topographie du chemin de fer assurent une forme de protection ; par ailleurs, les réglementations et la gestion forestière assurent la protection du tronçon le plus remarquable, de Kallar à Coonoor, et la zone tampon assure des mesures appropriées de protection dans les zones urbaines.

Le Chemin de Fer du Sud est une organisation qui dispose d’une base de ressources sûre et d’un personnel de haute qualité, qui reconnaît l’importance du patrimoine. Ils entretiennent le CFMN selon des normes élevées et fournissent les ressources pour ce faire, même s’il s’agit d’un des tronçons les moins rentables de leur chemin de fer.

La zone tampon ne mesure souvent que 8,5 m. Néanmoins, considérant que la section la plus critique sur l’escarpement entre Kallar et Coonoor traverse la forêt et est sous le contrôle du département des Forêts, la protection est assurée. La seule section où le développement représente une menace potentielle se trouve dans la ville de Coonoor. C’est une section relativement courte (environ un kilomètre de long), et le chemin de fer est à ce niveau, dans une étroite vallée avec des versants assez abruptes. La réserve à ce stade est grande, parce qu’il inclut la gare et sa cour, les ateliers et le dépôt de locomotives, et la jonction de la ligne principale et la ligne dans la gare. En fait, la topographie offre une réelle protection au chemin de fer s’étendant au-delà de sa zone tampon officielle.

Analyse des risques :

La région où le chemin de fer se trouve est dans une zone à risque sismique, tout en étant soumise aux pluies tropicales abondantes. Il y a également un risque de glissements de terrain, particulièrement à la saison des pluies. On note cependant que la société des chemins de fer indienne est soucieuse de contrôler et de prévenir les dégâts dans toute la mesure du possible.

Authenticité et intégrité

Le chemin de fer a été remarquablement peu altéré depuis sa construction. Il comporte trois gares principales, Mettupalaiyam, Coonoor et Udhagamandalam. Les deux premières, où se trouvent également les ateliers et les entrepôts des chemins de fer, sont à tous les égards essentiellement, exactement tels qu’elles ont été construites dans les années 1890. Coonoor est une gare particulièrement impressionnante, avec des salles de repos accueillant les visiteurs au premier étage. Il y a eu des modifications (électricité, égouts, signalisation), mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont globalement intactes. Il en va de même pour les ateliers des wagons à Mettupalaiyam et les ateliers et dépôts des locomotives à Coonoor. La gare d’Udhagamandalam n’est pas aussi authentique. Son bâtiment d’origine demeure, mais une extension a été ajoutée dans les années 1980. Coonoor est une gare de transport, mais les gares sont d...
entièrement d’origine et contribue à la fois à son authenticité et à son caractère.

*Stricto sensu*, les locomotives et le matériel roulant sont des biens mobiliers. Cependant, ils ne peuvent être utilisés nulle part ailleurs en Inde (et en fait sur très peu de chemins de fer dans le monde), il est en fait impossible de les dissocier du chemin de fer des montagnes Nilgiri, autrement que par leur mise au rebut ou une exposition ailleurs. Les locomotives ne sont pas celles d’origine, mais ont été introduites en 1920, d’après une conception de SLM, la Fabrique suisse de machines et de locomotives de Winterthur. De celles-ci, huit subsistent, toutes établies à Coonoor. Ces huit machines SLM constituent le plus grand parc de locomotives à crémaillère et à vapeur au monde, mais aussi le plus authentique. Les wagons eux aussi sont importants. On en compte au total 31 sur le CFMN, tous construits en 1931 et 1932. Ce sont les plus anciens wagons de passagers utilisés sur les Chemins de fer indiens, et certains des plus anciens utilisés sur des liaisons ferroviaires régulières à l’échelle mondiale. Ce sont aussi les seuls wagons en bois encore en usage en Inde.

**Évaluation comparative**

Dans l’ensemble, le chemin de fer représente un ensemble assez vaste. Selon l’analyse comparative internationale fournie dans le dossier de proposition d’inscription et confirmée par le TICCIH, c’est de loin l’un des plus originaux et des plus grands chemin de fer à crémaillère du monde. Le chemin de fer des montagnes Nilgiri est un exemple quasi parfait du système à crémaillère Abt à l’apogée de son développement, complété par le système ancien de Neale’s tablet. La plupart des gares, tous les postes d’aiguillage et les ateliers, la quasi totalité de l’infrastructure, restent dans leur condition d’origine. Les chemins de fer à crémaillère n’ont jamais été courants dans la tradition britannique. Ils étaient bien plus nombreux dans l’empire austro-hongrois et en Suisse. La Liste du patrimoine mondial comprend déjà le chemin de fer de Semmering en Autriche, long de 41 km et construit entre 1848 et 1854.

Le chemin de fer des montagnes Nilgiri est l’un des cinq chemins de fer historiques subsistant en Inde, parmi lesquels le Darjeeling Himalayan Railway (DHR), déjà inscrit sur la Liste du patrimoine mondial. Le TICCIH a indiqué que les CFMD et le DHR étaient les deux chemins de fer les plus novateurs et les plus exceptionnels des cinq.

Fondamentalement, le CFMD est une ligne de tramway de 0,61 m de large, sans structures notables, et d’une construction extrêmement économique. Ce fut le premier chemin de fer de montagne en Inde (1880-1881); il est donc expérientiel par nature. À l’inverse, le chemin de fer des montagnes Nilgiri, construit presque vingt ans après, est un projet d’une plus grande envergure. Sa voie, plus large, mesure environ 1 m, et il possède son espace propre sur tout le trajet. Il grimpe bien plus rapidement, sur une pente plus abrupte, au moyen du système à crémaillère Abt. C’est ce qui rend le chemin de fer des montagnes Nilgiri inhabituel. Il existe peu d’autres chemins de fer à crémaillère Abt dans le monde, et aucun d’aussi authentique sur toute sa longueur. Pour un chemin de fer à crémaillère, il est également de taille notable, avec des locomotives à vapeur relativement grandes et des trains lourds.

**Valeur universelle exceptionnelle**

**Déclaration générale** :  
Le chemin de fer des montagnes Nilgiri présente des caractéristiques culturelles exceptionnelles, reflétant les vagues successives de mouvements de la population vers les monts Nilgiri. La migration des plaines vers les Nilgiri ne commença qu’à la fin de la période coloniale, lorsque les Britanniques commencèrent à utiliser la région comme un lieu de villégiature. Le chemin de fer était une partie essentielle de cette migration, qui transforma les Nilgiri, de contrée isolée habitée par une population tribale entretenant très peu de contact avec le reste du pays, en une région importante. Le district est maintenant totalement intégré à la vie sociale, culturelle et politique courante de l’Inde.

La voie ferrée et l’amélioration de la communication qu’il entraîna furent des éléments cruciaux de ce processus. Le chemin de fer fit entrer la tribu des Nilgiri, comme le district lui-même, dans la vie indienne. Ils se convertirent à l’hindouisme et au christianisme, et leur économie traditionnelle basée sur le troc devint une économie monétaire. Une nouvelle population de Tamils (les plus nombreux), de Kannadigas et de Keralans des plaines et bien sûr, de Britanniques (quasiment tous partis aujourd’hui) vint vivre dans cette contrée qui, grâce au chemin de fer, cessa d’être une région montagneuse isolée. Une partie de ces changements entraînèrent un usage plus intensif (et, en termes modernes, plus rationnel) de la terre, quoique les Nilgiri restent loin d’être une région densément peuplée selon les critères indiens. Les Todas, l’un des cinq grands groupes tribaux, célèbrèrent l’arrivée du chemin de fer dans au moins deux chansons datant du début du vingtième siècle.

Peu de chemins de fer donnèrent naissance à de telles œuvres, qui reflètent son importance culturelle. Cette importance est représentative et elle est également très frappante et bien documentée. À ce titre, le chemin de fer des montagnes Nilgiri peut se prévaloir d’une importance culturelle universelle. Le chemin de fer est le produit d’une époque coloniale, né principalement pour servir les maîtres coloniaux – leurs jardins à thé, leur capitale d’été, leur usine de cordite – mais les Indiens, tant les populations traditionnelle basée sur le troc devint une économie monétaire. Une nouvelle population de Tamils (les plus nombreux), de Kannadigas et de Keralans des plaines et bien sûr, de Britanniques (quasiment tous partis aujourd’hui) vint vivre dans cette contrée qui, grâce au chemin de fer, cessa d’être une région montagneuse isolée. Une partie de ces changements entraînèrent un usage plus intensif (et, en termes modernes, plus rationnel) de la terre, quoique les Nilgiri restent loin d’être une région densément peuplée selon les critères indiens. Les Todas, l’un des cinq grands groupes tribaux, célèbrèrent l’arrivée du chemin de fer dans au moins deux chansons datant du début du vingtième siècle.

Ainsi, l’importance culturelle du chemin de fer des montagnes Nilgiri s’étend au-delà de sa signification en tant que structure bâtie dans un paysage, quoiqu’il soit déjà remarquable à ce seul titre. Le paysage qu’il traverse est magnifique mais difficile, et les solutions techniques adoptées par les constructeurs pour relever les défis du lieu témoignent de leur créativité et de leur ingéniosité. Mais le CFMN a aussi joué un rôle crucial dans le changement des schémas démographiques, économiques et culturels de la région. C’est aussi une expression tangible des changements qu’il a occasionnés.
Évaluation des critères :

La présente proposition d’inscription est proposée en tant qu’extension du bien déjà inscrit sur la Liste du patrimoine mondial, le Darjeeling Himalayan Railway, dont la construction s’acheva en 1881. Ce bien a été inscrit sur la base des critères ii et iv comme suit :

Critère ii : Comme le Darjeeling Himalayan Railway, le chemin de fer des montagnes Nilgiri est un exemple exceptionnel de l’influence d’un système novateur de transport sur le développement social et économique d’une région pluriculturelle, qui devait servir de modèle à des développements similaires dans bien des régions du monde.

Critère iv : Le développement des chemins de fer au XIXe siècle a eu une profonde influence sur les développements sociaux et économiques dans de nombreuses régions du monde. Ce processus est illustré de manière exceptionnelle et authentique par les deux chemins de fer de montagne indiens, le Darjeeling Himalayan Railway et le chemin de fer des montagnes Nilgiri. De ces chemins de fer, le chemin de fer des montagnes Nilgiri se distingue par le fait qu’il représente une phase plus avancée techniquement, tandis que les autres chemins de fer déjà inscrits, c’est-à-dire le chemin de fer de Semmering en Autriche et le Darjeeling Himalayan Railway illustrent les débuts de ce développement.

4. RECOMMANDATIONS DE L’ICOMOS

Recommandation concernant l’inscription

L’ICOMOS recommande que le Comité du patrimoine mondial adopte le projet de décision suivant :

Le Comité du patrimoine mondial,

1. Ayant examiné le document WHC-05/29.COM/8B,

2. Approuve l’extension sur la base des critères existants ii et iv :

Critère ii : Les chemins de fer de montagne en Inde sont un exemple exceptionnel de l’échange de valeur sur le développement technologique, et de l’impact d’un système de transport novateur sur le développement social et économique d’une région pluriculturelle, qui devait servir de modèle à des développements similaires dans bien des régions du monde.

Critère iv : Le développement des chemins de fer au XIXe siècle a eu une profonde influence sur les développements sociaux et économiques dans de nombreuses régions du monde. Les chemins de fer de montagne en Inde sont des exemples exceptionnels d’un ensemble technologique, représentant différentes phases du développement en région de haute montagne.

ICOMOS, avril 2005
Plan indiquant le tracé du chemin de fer de montagne de Nilgiri
Wagons du chemin de fer de montagne de Nilgiri

Vue de la deuxième section à travers la jungle