Kalka Shimla Railway (India)

No 944 ter

Official name as proposed by the State Party: Kalka Shimla Railway

Location: States of Haryana (Panchkula District) and Himachal Pradesh (Solan and Shimla Districts)

Brief description:

The Kalka Shimla Railway (KSR) is a hill passenger railway with a single narrow-gauge track 96.6 km long. Its construction was planned in the mid-19th century to provide a service to the highland town of Shimla, at an altitude of more than 2,000 metres, which at the time was the summer residence of the colonial government. Its construction, in a particularly difficult mountain environment for two-thirds of the line's length, required a great deal of engineering design work, and was finally completed at the turn of the century (1899-1903).

Category of property:

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

1. BASIC DATA

Included in the Tentative List: 23 December 2004

International Assistance from the World Heritage Fund for preparing the Nomination: None

Date received by the World Heritage Centre: 25 January 2007.

Background: This is a proposal for the serial extension of the Mountain Railways of India, consisting at present of the Darjeeling Himalayan Railway, inscribed on the World Heritage List at the 23rd session of the World Heritage Committee (Marrakech, 1999), and the Nilgiri Mountain Railway, inscribed at the 29th session of the World Heritage Committee (Durban, 2005).

Consultations: ICOMOS consulted TICCIH.

Literature consulted (selection):

Coulls, A., *Railways as World Heritage Sites*, ICOMOS Thematic Study, Paris, 1999.

Scott, A., *World Heritage Railways*, Madrid, UNESCO, 2001.

Bhandari, R. R., *Kalka Shimla Railway,* 2003.

Technical Evaluation Mission: 11-16 September 2007

Additional information requested and received from the State Party: ICOMOS sent a letter to the State Party on 10 December 2007 on the following points:

- The submission of an itemised list of the nominated stations and buildings.

- The submission of a map for each station or building, indicating the boundaries of the core zone and the buffer zone associated with the properties.

The State Party sent additional documentation on 4 February 2008.

Date of ICOMOS approval of this report: 11 March 2008

2. THE PROPERTY

Description

The Kalka Shimla Railway has a single narrow-gauge track (gauge 0.762 m). The total line length is 96.60 km. The gradient does not exceed 30/1000. It runs from the town of Kalka, at an altitude of 656 m, from which point it extends the standard gauge Indian railway network towards the Himalayan mountains. It currently carries seven passenger services daily. Regular service is provided by diesel trains and rail-motor cars. There is one heritage steam locomotive that was recently restored and is available for charter use for tourists.

The line then rises to an intermediate plateau at an altitude of around 1,500 m, where it serves several stations, and then it climbs to the terminus town of Shimla, capital of the state of Himachal Pradesh, at an altitude of 2,075 m.

The line has 988 bridges and viaducts, which represent 3% of total line length. The largest bridges have multi-arch masonry galleries (74), sometimes in several levels, like Roman aqueducts.

The line has 917 curves, representing some 70% of total length. Most of these are sharp curves all along the line, and continue even in tunnels and bridges.

The line initially had 107 tunnels. As a result of landslides, this number has been reduced to 102. The total length of the tunnels represents 8% of the line's length. There are a large number of masonry retaining walls.

In territorial terms, the line passes through three districts in two Indian states:

- Section (i): from Kalka station to just before Taksal (km 3.7), in Panchkula district, state of Haryana.

- Section (ii): from Taksal to near Kathlee Ghat (km 74.2), in Solan district, state of Himachal Pradesh.

- Section (iii): from Kathlee Ghat to the end of the line at Shimla station (km 96.6), in Shimla district, state of Himachal Pradesh.

From a geographical viewpoint, the line can be clearly divided into three parts:

- The first part covers the first stage of the rise from Kalka to KumarHatti Dagshai (1,579 m).

This part has the following notable features:

- two tunnels (no. 10, Koti and no. 22, Dharampur);
- a bridge (no. 226, Forest of Chir) that has 32 arches on four levels, with a length of 97 m and a maximum height of 19.4 m;
- shortly before reaching the end of the upward gradient, the line turns through a complete spiral, at Sonwara (1,334 m).

- The second part is horizontal or has a slightly negative gradient, at an altitude of around 1,500 m, as far as Kanda Ghat (1,433 m).

- This part has a large tunnel (no. 33, Barog).

- The third part consists of the final climb.

It includes:

- two significant tunnels (no. 91, Taradevi and no. 103, Invernam).
- two relatively large bridges: curve bridge no. 493 that has 15 arches on three levels, with a length of 36 m and a maximum height of 16.40 m; curve bridge no. 541 that has 34 arches on four levels, with a length of 53 m and a maximum height of 23 m.

The nominated property also includes the set of 21 railway stations of the line, some of which have annexes: 1) Kalka (plus 1 bungalow), 2) Taksal, 3) Gumman, 4) Koti, 5) Jabli, 6) Sonwara, 7) Dharampur Himachal, 8) Kumarhatti Dagshahi, 9) Barog, 10) Solan, 11) Solan Brewery, 12) Solagra (plus one rest house), 13) Kandaghat, 14) Kanoh, 15) Kathleeghat, 16) Shogi, 17) Taradevi, 18) Jutogh, 19) Summer Hill, 20) Shimla (plus two rest houses), 21 Shimla Bazar.

Only the built ensemble of Shimla station is described:

- The terminus station of Shimla, at an altitude of 2,075 m, in the setting of the Forest of Deodar. It was built in 1903 by the railway company. Originally the architecture was of wood, with galvanised sheet roofing, illustrating the typical Indian hill station in the early 20th century. It was however rebuilt in 1921 and considerably extended because of the growth in traffic and resulting technical constraints. In 1944, excessively heavy snowfall caused the platform roof to collapse.

- The *Crow Borough Officers* rest house in Shimla. This two-storey building was constructed in 1921, just next to the terminus station, for the engineers and officials of the KSR. It is in a belvedere position in a forested site, and commands a remarkable panorama towards the valleys to the south. It is one of the most charming mountain rest houses in India, with its architectural style and its interior equipment both preserved.

- The *Wood Bank Officers* rest house in Shimla, built in 1920, less than 200 metres from Shimla station. This is another typical house, still under the control of the KSR and very well conserved both in its architecture and interior appointments. It is also considered to be one of the most outstanding examples of this type in India.

History and development

The British began to move into this region of India in around 1820, and the first railway projects were particularly early, in the 1840s. However the broad gauges then used (1.67 m) were basically incompatible with any idea of providing rail transport to the hill regions.

The Shimla region took on considerable political importance as the Indian colonial government decided to take up summer residence there, because of the healthier climate linked to the altitude. The question of transport to the Himalayan foothills, the Delhi region and the Ganges plain then became crucial. The possibility of a rail link was mentioned as early as 1847. The opening of the *Grand Hindostan and Tibet Route* was however the first major advance in this field. It was operational in this region in 1856.

The first engineering development work was carried out in 1884-85, to establish a steam traction "adhesion line" with a gradient not exceeding 30/1000 (1/33), using the narrow gauge principle. The project was submitted to the government but was not immediately taken up.

Development work was revived by the arrival of the Delhi railway line at Kalka, in 1891. Other shorter layouts and other technical solutions were then considered by the engineers, such as the rack system. Finally a contract was signed between the government and the Ambala-Kalka Railway, for the construction and operation of an adhesion line with a gauge of 2 feet. The final general design project was presented and approved in 1899. It comprised the technical development work, the costing and the rolling stock. The Railway had to meet the cost of construction on its own; only the land was provided by the public authorities.

The work was begun, but at the request of the Army, the initial 2 foot gauge was increased to 2 feet 6 inches. The rails were in laminated steel, and were laid on wooden sleepers and ballast.

Traffic opened to the public on 9 November 1903. But exceptionally heavy snowfall damaged the track on 26 December of the same year, causing a large number of landslides. Difficult operating conditions were thus added to the high cost of initial establishment, and despite the high fares the Railway experienced serious financial difficulties. Its strategic importance led the government to acquire the line on 1st January 1905.

The first steam locomotives were 4-wheeled engines (1900), and these were followed by 6-wheeled (1902) and finally 10-wheeled engines. They were made by *Stewart & Co* of Glasgow. The locomotive models were derived from those used on the *Darjeeling Himalayan Railway*.

This rolling stock remained in service until 1953 with no major modifications.

The locomotives were then modified by the German company *Henschel*: increase in water and coal capacities, modification of the grate, modification of the valve gear. The modified steam locomotives began to be scrapped in the 1970s, and the last ones remained in service until 1980. They were replaced by diesel engines from 1952 onwards. One of the steam locomotives initially delivered in 1905 (KC 520) has been restored by KSR, in 2001, in order to re-establish the tradition of steam traction in the mountains, which today has been almost completely forgotten.

The carriages were built by the Railway itself from 1903 onwards. The first were very simple 4-wheeled carriages, light and short (17 feet). In 1910 new carriages were introduced using steel under-frames and bogies, thereby reducing the number of derailments. The KSR initially had 4 travel classes. Furthermore, extremely luxurious saloon cars could be rented. The second car of this type, built in 1912 (RA-2), has been conserved and restored.
Subsequent passenger carriages were made lighter and protected against the effects of corrosion by the use of aluminium.

In 1911, petrol-driven Rail Motor Cars were introduced on the line to carry mail. They were made by the *Drewery Car Co. Ltd.* in London, and were equipped with *White & Poppe 17 HP* engines. Car no. 12 of this type is preserved in the National Rail Museum, New Delhi. Diesel-electric motor cars were introduced from 1932, with large windows to give panoramic views of the magnificent Himalayan mountain scenery. One of these cars (no. 8) is known as the "Queen of Shivalik". With this type of car, the total journey time was reduced to 4½ hours, which is still the same today.
Generally speaking, the KSR has always attempted to improve its rolling stock, both in terms of technical performance and passenger comfort.

In 1947, following Indian independence, the offices of the Railway Board (which followed the colonial government to its place of summer residence) left Shimla and were set up permanently in Delhi. The regional management headquarters, which still today manages the Kalka Shimla Railway, was set up in Ambala, where it has remained ever since.

Kalka Shimla Railway values

The Kalka Shimla Railway is a very long-established and ambitious mountain railway project. It required a great deal of engineering development work, and took twenty years to become a reality, largely because of the very great difficulties at this location resulting from the combination of the Himalayan mountains and climatic conditions.

With the other Indian railways already inscribed on the World Heritage List, this is one of the first adhesion railways to reach the end of its line at an altitude of more than 2,000 metres, and is some 100 km long.

The civil engineering structures demonstrate, both by their impressive number and their massive appearance, the difficulty of the challenge of developing this type of project in such difficult mountain territory. The often experimental nature of the techniques used, both in construction and in traction, are another key feature of the challenge.

The Kalka Shimla Railway led to a long series of technology transfers from Europe (Great Britain, Germany) to the Indian subcontinent.
It has been used uninterruptedly for more than a century, with a high degree of continuity in use, serving the people who live in the mountains and tourists.

3. OUTSTANDING UNIVERSAL VALUE, INTEGRITY AND AUTHENTICITY

Integrity and authenticity

Integrity

- Structural integrity: the general infrastructure of the line is today very close to the characteristics of the line as it was in 1903.

- Functional integrity: the line has been systematically repaired and maintained in a spirit in keeping with that of its construction, maintaining continuous use and with no notable interruption of traffic.

- Integrity of use: from the outset the line has been used for large-scale and permanent transport, with all the characteristics associated with railway disenclavement of mountain areas. Traffic has been regular and continuous up to the present day, and it provides the whole range of initial services, particularly for passengers and tourists.

ICOMOS considers that the nominated property is in a general condition with regard to infrastructure, technical operation and social use that enables it to adequately express its values.

Authenticity

The track has been relaid and retaining walls rebuilt at many points during the highly eventful history of the railway's operation, regularly disturbed by snowfall and monsoon rain, landslides and rockfalls. This has led to the disappearance of some tunnels, which have been transformed into cuttings.

A single masonry multi-arch bridge, 20 metres long, was replaced in 1935 by a metallic girder bridge (structure no. 272). The others have remained in their original form, with their extremely massive masonry design featuring large number of small arches, sometimes on several levels (see 2 - Description).

The terminus station of Shimla was first rebuilt and extended in 1921 (See 2 - Description). In 1986-87, a station modernisation programme was carried out, with the complete covering of the platforms, the rebuilding of the platforms, a new passenger building and alterations to the former passenger buildings. Amongst the railway facilities the locomotive turntable has been preserved.

The other stations have generally remained in their original form, while undergoing repair works and works to adapt to changing traffic levels.

The two rest houses at Shimla station (no. 20), Crow Borough RH and Wood Bank RH, are in a good state of authenticity, and are typical examples of early 20th century Himalayan mountain chalet architecture.

The long continuity of use, over more than a hundred years, is also an important factor strengthening the authenticity of the line.

The rolling stock is old and has heritage value. Four of the original 4-wheeled carriages are still in use, and a significant number of the bogie-type carriages of 1910. The signalling system is still the same as in 1903. One of the original steam locomotives was restored in 2001 and is used for tourist specials.

ICOMOS considers that the conditions of integrity and authenticity have been met.

Comparative analysis

Amongst the five historic mountain railways of India, the Kalka Shimla Railway (KSR) is third in chronological terms: the oldest is the *Darjeeling*, opened in 1889 (DHR), followed by the *Nilgiri* in 1899 (NMR). The other two came into service shortly after the KSR: the *Matheran Light Railway* or MLR and the *Kangra Valley Railway* or KVR. All these railways are today living examples of mountain railways, constructed at the end of the 19th century for the opening up of high valleys and plateaux at altitude.

Faced with severe geographical and climatic situations, they all include original technical solutions and innovations to adapt the railways to the specific nature of their sites:

The DHR uses zigzags, with traction reversal and spirals. The NMR was one of the first to use rack & pinion for such long trains so as to follow very steep inclines. The KSR uses very heavy and complex engineering, including multi-arch viaducts, tunnels, retaining walls and a very large number of curves, in order to overcome the climatic conditions of a mountainous region. The railways were constructed successively, using significant and highly-diversified engineering work at a very early stage of railway development.

All are today fully operational with most of their original features intact. The operation of these historic lines is very close to the way they were originally operated, particularly in terms of serving the needs of local populations, and increasingly for tourist travel. All the railways pass through quite remarkable landscapes.

In international terms, the KSR is unique in that contemporary narrow-gauge adhesion mountain lines are much shorter. They are roughly ten kilometres long, whereas the KSR is around 100 km long, with a total level difference of around 1,500 m.

Furthermore, in Europe, lines as old as the KSR either have had their traffic interrupted, before being revived as purely historical trains (Wales, France), or have been profoundly upgraded with the introduction of modern trains and a resulting loss of authenticity (Austria, Switzerland). The KSR has undergone much more limited and gradual technical transformations, respecting the original criteria of line use. The civil engineering infrastructure has remained virtually unchanged. Furthermore, the service has been operated continuously for more than a century, in contexts of use and service that have remained very close to those of the railway's inception.

The nomination file argues that the closest railway to the KSR in civil engineering terms is the Semmering railway in Austria, which is already inscribed on the World Heritage List.

ICOMOS considers that the KSR is one of the most authentic mountain disenclavement railways currently in service worldwide, with a very high degree of continuity of technical maintenance and economic and social use.

ICOMOS does not however agree with all the arguments of the nomination file with regard to the international comparative analysis, and particularly the comparison with the Semmering, a transalpine line that is very different from the KSR, with a double standard-gauge track, and dating from a considerably older period.

The other comparable railways, particularly in Asia, are not considered, for example the Yunnan Railway (Vietnam – China), designed at the same period in a similar colonial framework (French Indochina). It is quite comparable with the KSR in terms of design, length and technical performance.

Furthermore, the innovations of the KSR are relative as – unlike the other Indian railways already inscribed on the World Heritage List – its layout design has been known in Continental Europe since the first experimental mountain railway lines. It follows the slopes of the sides of the Himalayan mountains, which explains the very large number of viaducts and tunnels, of which only a few have a significant heritage interest, and the almost permanent presence of curves in uphill gradients. The very massive design of its viaducts to cross ravines is ambiguous in terms of technical innovation: this represents admittedly a determined adaptation to suit land that is liable to landslides in the monsoon climate, but also a technical regression into a very large number of small and overdimensioned arches. It has no great viaduct or tunnel to simplify the layout, which also partly explains its great length for the level difference achieved.

ICOMOS considers however that the nominated property significantly completes the two Indian railway lines of Darjeeling and Nilgiri that are already inscribed on the World Heritage List.

ICOMOS considers that the comparative analysis justifies consideration of the Kalka Shimla Railway for the World Heritage List, particularly as one of a series of railway lines for the early disenclavement of mountain areas of India.

Justification of the Outstanding Universal Value

The nominated property is considered by the State Party to be of Outstanding Universal Value for the following reasons:

- The property is a living example of the railway engineering expertise of the 19th century. It was built to connect the erstwhile capital of the colonial empire in India to the Shivalik foothills and the Delhi region.
- It constitutes an exceptional mountain railway line layout with almost 100 km of line, more than 100 tunnels, a large number of viaducts with many arches on several levels, and more than 900 sharp curves representing 70% of the total alignment.
- The railway line has led to significant social and human development along the line, with around ten important settlements, including the terminus at Shimla, erstwhile summer capital of the colonial empire in India and, since independence, the capital city of the state of Himachal Pradesh.
- The property is one of the best preserved mountain railways in India, and remains much as it was at the time of its completion. In addition to its engineering infrastructure, it has retained its stations, signalling system and a rural environment and landscape that are virtually unchanged.

Criteria under which inscription is proposed

The extension is proposed for inscription on the basis of cultural criteria (ii) and (iv), the same criteria for which the two Indian railways have already been inscribed on the World Heritage List.

Criterion (ii): exhibit 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.

This criterion is justified by the State Party on the grounds that the Kalka Shimla Railway is an important example of interchange of human values, as a colonial railway. It is part of that stage of globalisation that was characterised by colonial rule, and the domination of the peoples of Asia, Africa and the Pacific by Europeans. This is particularly true here as the railway linked the summer capital of Britain's Indian colonial empire to the rest of the country.

It was the starting point for important human settlement that would not have been possible without the very arduous task of building the railway in a very difficult geographic environment.

The regular use of the railway, which required an extraordinary degree of technical skill, then enabled the social and cultural development of this region of the Himalayas. The town of Shimla in particular underwent very rapid growth, while still being reminiscent of its former function as the colonial summer capital.

ICOMOS considers that the Kalka Shimla Railway represents important culture and technology transfer, in the colonial setting in which it was built, particularly through the eminently political function of the terminus town of Shimla. The railway then enabled substantial and lasting settlement, of which it has remained the main vector up to the present day.

ICOMOS considers that this criterion has been justified.

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

The State Party justifies this criterion on the grounds that the KSR illustrates a significant stage in human history. It is a unique example of the creative genius of railway engineers at the start of the 20th century. At the time of its construction, it took several days, on horseback or on foot, in difficult conditions, to reach Shimla from the foothills of the Himalayas. The introduction of the railway reduced the journey time to less than half a day, in excellent travelling conditions.

The manner in which the Himalayan mountainside is pierced by many viaducts, tunnels, sharp curves and steep gradients is exceptional.

The train quickly became part of the way of life of local inhabitants, and it is still so today. Many original facets of the trains have been preserved, and they bear living witness to the functions of mountain railways, as a stage of human history. The railway has become the symbolic heritage of a whole region.

ICOMOS considers that the KSR is a very good illustration, as are the two railways already inscribed, of how access is provided to the high valleys and plateaux of the mountains of India. It is emblematic of the technical and material efforts made by societies of the time to disenclave mountain populations by means of the railway. It is a living and well-maintained line. It is used in a spirit and for purposes that are the same as those of its inception.

ICOMOS considers that this criterion has been justified.

ICOMOS considers that the nominated property meets criteria (ii) and (iv) and that Outstanding Universal Value has been demonstrated.

4. FACTORS AFFECTING THE PROPERTY

Pressure from economic and social development

The historic Indian mountain railways serve significant human communities with ancient rural activities. This is particularly true in the case of the KSR, whose traffic has developed in a way that is directly linked to and in harmony with the needs of these communities.

There are however fears of encroachment by local inhabitants on land close to the line.

The Zonal Railway plan is the responsibility of the *Divisional Rail Manager and the Senior Divisional Engineer*. The latter has been given the powers of a public officer to enforce the law, and in particular the Public Premises (Eviction of Unauthorized occupants) Law of 1971.

ICOMOS considers that illicit human encroachment close to the railway is a factor that could affect the property.

Pollution

The property is situated in mountainous terrain where occupations are rural in nature. It is claimed that it is relatively free from pollution problems.

Geographic conditions and impact of climate change

The rainy season is particularly intense in the KSR zone, but variations are considerable depending on the year (precipitation varies from 2.5 m to 4 m). This is confirmed by the statistics presented in the file for the last ten years. This has however always been the case from the railway's inception, and the design of the line reflects this fact.

Snowfall mainly affects the last geographical section of the line from mid-December to end-January. In exceptional cases, snowfall can be very abundant, up to 4 metres, resulting in the service being shut down and damage to the railway facilities, structures and buildings. The Company has appropriate snowplough rolling stock, and interruptions to traffic are brief in normal conditions of precipitation.

The issue of landslide, mudslide and rockfall is similar. On average the line has been affected by 21 significant incidents of this type a year since 1996. There are great differences from year to year, and there is no statistical link with the abundance of rainfall or snowfall as other reasons are involved (freezing-unfreezing, role of vegetation, etc.).

These climatic and geological causes give rise to around a hundred interruptions of service a year, which are generally not serious. The most significant may affect the very structure of the track, moving it or carrying it away, which may necessitate substantial track repair work.

Considerable efforts have been made over a number of years by Indian Railways, which has a specialised Research, Design & Standards Organisation whose role is to obtain a better understanding of the effects of rain and the causes of landslides in mountain areas. This work has led to recommendations concerning preventive measures: drains, tree planting, check dams, reinforcement of retaining walls, preventive removal of overhang, etc.).

The effects of climate change could lead to increased precipitation and landslides affecting the line. This has not however been reflected in the statistics gathered by the KSR up to now, whose dominant feature remains the high degree of annual variability.

Earthquakes

The KSR zone, situated on the mountainside of the Himalayas, is an earthquake risk zone. If an event took place that caused an impact remaining in the perimeter of landslides and localised damage to the track, this would be dealt with in the same way as exceptional climatic and geological events affecting the line were dealt with in the past.

Risk preparedness

The professional personnel of the KSR, and the technical assistance departments of Indian Railways, are fully operational, and are well prepared for climatic and geological risks. Over a century of operation, they have always managed to restore the integrity of the line.

They generally intervene within a short lead time, which contributes to the monitoring of the state of conservation of the property. The preventive actions undertaken over the last few years can only improve the present situation, assuming that climatic and geological data remain constant.

Indian Railways have been officially entrusted with the mission to conserve and preserve the five Indian mountain railway lines as heritage for posterity.

ICOMOS considers that the main threats to the property are:
- climatic and geological risks, which however have always formed part of the everyday operation of the Kalka Shimla Railway.
- the risks of unauthorised encroachment close to the railway, particularly in the buffer zone.

5. PROTECTION, CONSERVATION AND MANAGEMENT

Boundaries of the nominated property and buffer zone

The nominated property zone consists of a long strip 8 metres wide along the 96.6 km alignment of the track. Variations in the nominated property zone from this standard strip occur in the case of viaducts and tunnels, and some specific local situations, in stations in particular.

The nominated area also includes all 21 stations (See 2 - Description), together with a bungalow (Station 1 - Kalka), a rest house for company employees (Station 12 - Solagra) and two other rest houses (Station 20 - Shimla).

The buffer zone around the line corresponds to two strips, each about 4 metres wide, on either side of the nominated property zone. The width of this zone is reduced on the parts of the line with the steepest gradient (retaining walls, ravines), and may be reduced to the width of the civil engineering structures only (bridges, tunnels).

Following the ICOMOS request, a list of stations and detailed plans of the station buffer zones have been supplied.

ICOMOS considers that the boundaries of the property and its buffer zone are adequate.

Ownership

The owner of the nominated property is the Railway Ministry of the Indian Government. Ownership covers the railway infrastructures, land and real property of the Kalka Shimla Railway line; it also covers the railway rolling stock operating on the line.

Protection

Legal Protection

All the laws of the Indian Union relating to railways apply to the Kalka-Shima line, in particular:

- the *Railway Act* (1989), for technical protection measures.
- the *Public Premises Act* (1971). This includes in particular the right to expel unauthorised occupants by officers entrusted with this task by the Indian Railway Ministry.

Buffer zone:

The buffer zone is legally a public place, under the authority of the Railway Ministry, which is responsible for applying the provisions of the law there, particularly the *Public Premises Act*.

ICOMOS considers that this provision should enable measures to prevent illegal human occupancy in the buffer zone. However this is the only protection aspect really taken into account by the buffer zone, in view of its narrowness (see Boundaries).

Effectiveness of protection measures

It seems that legal protection should be primarily directed towards unauthorised use of railway land, from two viewpoints:

- to rectify existing encroachments,
- to prevent new encroachments.

ICOMOS considers that the legal protection in place is appropriate and that the Ministry of Railways is making efforts to apply the legal provisions against unauthorised occupation of land. Such occupations must be fully controlled both with regard to the nominated property and its buffer zone.

Conservation

Inventories, recording, research

The Kalka Shimla Railway has the technical documents necessary for the maintenance of track, infrastructure, rolling stock and stations; they are kept at the depots of the terminus stations of Kalka and Shimla. The documents concerning land ownership are at the Central Office in New Delhi and at the Divisional Office in Ambala.

Indian Railways has a central research department that considers climatic and geological effects with an impact on mountain lines (RDSO). It recommends protective action, particularly to prevent landslides.

Present state of conservation

The Kalka Shimla Railway has been in service continuously from its inception. It is in a good state of general conservation, and is permanently monitored. It is maintained on a regular and permanent basis by the KSR's teams of professionals.

Active conservation measures

The traditional arrangements for track maintenance by railway personnel are considered satisfactory to ensure the present and future conservation of the line.

ICOMOS considers that the Kalka Shimla Railway is in a satisfactory state of conservation, and that it is able to guarantee that this conservation will be continuously maintained in the future.

Management

Management structures and processes, including traditional management processes

The management structures involved are public, under the higher authority of the Indian Ministry of Railways in New Delhi. They are as follows in hierarchical order:

- Northern Railway Department, New Delhi, (General Manager).
- Indian Railways Regional Division Office, Ambala. (Divisional Rail Manager).
- Specialised departments, Ambala (Branch Officers):

    1) non-technical departments: commercial traffic, accounting, medical, shops, personnel, security,
    2) technical departments: civil engineering, mechanical engineering, electricity, signalling-communications.

- The organisation of the line into local districts at Kalka, Barog, Salogra and Shimla (depots, stations, rest houses for personnel).
- Private specialist works companies.

Technical management process:

The operation and maintenance of the KSR, like that of the Darjeeling and Nilgiri railways, are fully operational. Track, traction and passenger service are carried out in regular conditions that are in line with the original arrangements. The railway has a large number of competent staff, in the various fields of maintaining and repairing the track and rolling stock.

The rest houses have their own cleaning personnel.

Land management process: See Protection.

Policy framework: management plans and arrangements, including visitor management and presentation

The following plans apply to the KSR:

- The land plan of the railway.
- The railway management plan, comprising:

    - the rolling stock programme,
    - the works programme,
    - the machines and workshops programme.

For several years now efforts have been made to encourage tourism, by the organisation of special steam-driven tourist trains, and motor rail cars with panoramic windows. The station of Shimla and the main stations on the line have been improved by passenger reception facilities, and upgraded passenger facilities, cafeterias, etc. Interconnections are organised with trains arriving at Kalka from Delhi, on the basis of a one-day journey.

Since 2004 and the introduction of this programme, the number of Indian people visiting Shimla has strongly increased, and the number of foreigners has become quite significant. Shimla is a highly popular tourist destination in India.

Involvement of local communities

In institutional terms, they seem limited to a few technical consultations with municipal authorities on land issues. There is no organic cooperation.

Local cooperation in relation to tourism is beginning to appear.

Contacts with the local population are through commercial transport relationships, in the traditional way.

ICOMOS considers that the management system should be extended to include the territorial authorities of the areas in which the line is situated, so as to improve:

- matters relating to buffer zone management,
- the process of raising awareness among visitors and tourists of the heritage value of the property and its landscapes.

Resources, including staffing levels, expertise and training

At the time of nomination, the KSR had a total workforce of 2,401 people.

Financial management represents a high cost, exceeding the strict self-financing capacities of transport receipts on the line. Financial resources are guaranteed by the Indian consolidated fund, as part of the annual budget allocated by the Parliament to the Ministry of Railways.

Capital expenditure and depreciation are allocated on the basis of the three railway management plan programmes.

ICOMOS considers that the technical management system of the railway line operates adequately, and that from this fundamental viewpoint it provides full guarantees for the conservation of the property's outstanding universal value.

ICOMOS considers however that the architectural management of the station buildings and their annexes, to ensure respect for the property's outstanding universal value, has not been sufficiently taken into account, and that a medium-term project should be drawn up for this purpose.

ICOMOS considers that the technical measures for the railway line management are satisfactory, but that the management plan should be substantially improved in terms of architectural conservation, and by involving the territorial authorities.

6. MONITORING

Monitoring is organised by the departments of the line, under the responsibility of the engineers, technicians and employees of the KSR.

The following indexes reflect both the functioning of the line and the conservation of its value. They have been place for 10 years, and the average figures are as follows:

- number of days of interruption of through traffic for technical reasons (15.5 per year),
- number of days of cancellation for organisational reasons (0),
- number of derailments (2.1),
- number of land slips affecting train running (20.8),
- number of unauthorised encroachment cases (2.1).

Taken as a whole, these results constitute a monitoring charter for KSR personnel.

Infrastructures (rails, bridges, tunnels, retaining walls) are regularly inspected by the engineering sections concerned:

- track engineers,
- bridge engineers,
- works engineers.

They issue reports and make recommendations about works to be carried out.

The divisional engineer and the assistant divisional engineer regularly carry out monitoring inspections.

The rolling stock is regularly monitored in the depots at Kalka and Shimla by the mechanical engineering department.

ICOMOS considers that there is a lack of specific technical and architectural monitoring of the stations and annexes forming part of the nominated property, and that this should be added to the plan for the management and monitoring of the property.

ICOMOS considers that the technical monitoring indexes and the structures responsible for technical monitoring are satisfactory for the conservation of the property and the expression of its universal value, but that indexes and structures should be created for the purpose of architectural monitoring of the buildings.

7. CONCLUSIONS

ICOMOS considers that the universal value of the Kalka Shimla Railway is justified, with a view to extending the inscription of the Indian Mountain Railways of Darjeeling and Nilgiri. Its management plan is adequate to ensure the conservation of its outstanding universal value.

Recommendations with respect to inscription

ICOMOS recommends that the extension of the Indian Mountain Railways to include the Kalka Shimla Railway on the World Heritage List should be approved on the basis of ***criteria (ii) and (iv)***.

Recommended Statement of Outstanding Universal Value

The Kalka Shimla Railway has outstanding universal value:

- It represents an exceptional technical achievement in the development of the Himalayan mountains because of its length, its altitude and the difficulty of the terrain through which it runs in difficult tropical climatic conditions.

- It was designed under British colonial rule, as Shimla was the government's summer capital. Furthermore, the Indian population quickly made use of the railway to settle in the mountains and set up enduring human communities. The effectiveness of rail transport, which considerably reduced the duration and difficulty of travel, was an essential factor in this social and cultural development.

- The Kalka Shimla Railway has seen its traction regularly upgraded, in a spirit of use in keeping with its origins, while its infrastructures have been maintained in very good condition, by ongoing maintenance and repair work, which has been both exemplary and in line with the railway's authenticity.

Criterion (ii): The Kalka Shimla Railway exhibits an important cultural and technology transfer in the colonial setting of the period of its construction, particularly with regard to the eminently political function of the terminus station, Shimla. The railway then enabled significant and enduring human settlement, of which it has remained the main vector up to the present day.

Criterion (iv)*:* The Kalka Shimla Railway is an outstanding example, like the other two Indian railways already inscribed on the World Heritage List, of how access has been provided to the plains and plateaux of the Indian mountains. It is emblematic of the technical and material efforts of human societies of this period to disenclave mountain populations through the railway. It is a well-maintained living line. It is used in a spirit and for purposes that are the same as those of its inception.

The property has been very satisfactorily maintained since its inception, both with regard to the general state of infrastructure conservation and operation. The long continuity of maintenance and of uses for local passengers, goods and tourism, for more than one hundred years, is an important factor in the line's authenticity.

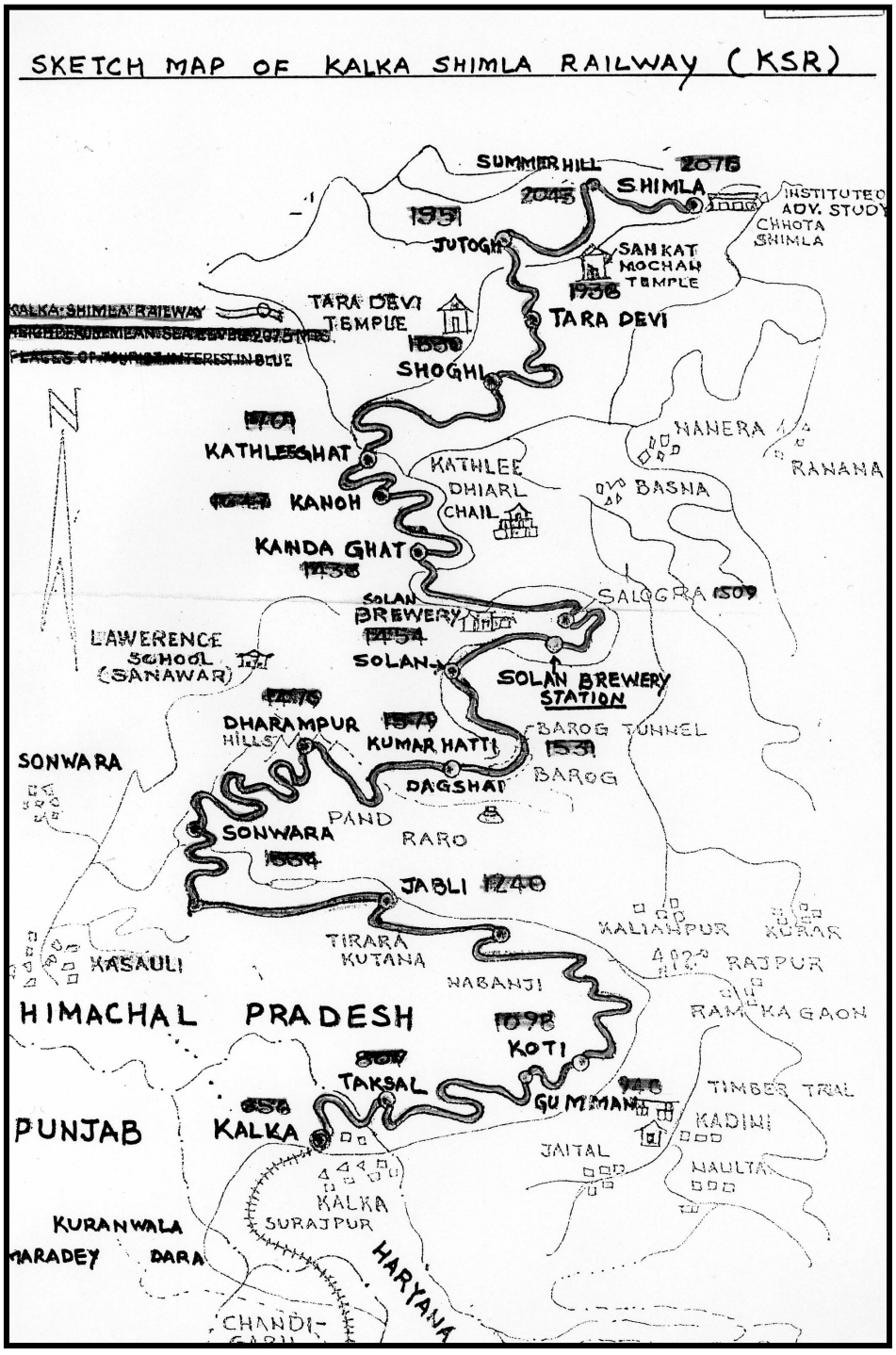
The legal protection in place is adequate. The public management of the line and its many employees are a guarantee of the conservation of its integrity and authenticity over the coming years, enabling a lasting expression of its heritage values. The management plan presented however lacks a programme for the conservation of the stations and annexes.

ICOMOS recommends that the State Party give consideration to the following:

- In the framework of the management plan, drawing up a detailed technical and architectural inventory of the stations and annex buildings included in the property, indicating their state of conservation and the planned programme of works, to ensure respect for the property's outstanding universal value.

- Stepping up control of encroachment on land in the nominated property zone and in the buffer zone.

- Considering, as part of the management plan, more extensive local cooperation, in order to more fully present the property's outstanding universal value and to organise visitor arrangements with this in mind.



The railway line from Kalka to Shimla

Twisting track on the hill

Shimla railway station

Bridge

Carriage