WHC Nomination Documentation

File Name: 944.pdf **UNESCO Region: ASIA AND THE PACIFIC**

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

Country (and State Party if different): Republic of India.
State, Province or Region: State – Maharashtra, City-Mumbai.
Name of Property: Victoria Terminus (Renamed as Chhatrapati Shivaji Terminus in the year 1995).
Exact location on map and indication of geographical coordinates to the nearest second

Victoria Terminus is situated in the City of Mumbai, on the Western coast of India. It is located at latitude 18 degrees 55 minutes 23 seconds North and longitude 72 degrees 50 minutes 4 seconds East.

Maps/plans showing boundary of area proposed for inscription and of any buffer Zone.

The site plan of the building is enclosed as Annexure-I. This building is situated at the end of the Victoria Terminus Suburban Station. At present, suburban booking office and the Central Railway Administrative Headquarter is functioning in this building. The drawings at Annexure II, III, IV, V & VI shows the ground floor plan, west elevation, south elevation, east elevation and north elevation respectively. The plan showing the buffer zone around the building is enclosed as Annexure VII. Since this building is not having any open space towards North there is no buffer zone in this direction. Buffer zone towards East, West and South of building is marked on the plan.

Area of property proposed for inscription(ha) and proposed buffer zone (ha) if any

The property proposed for inscription comprises of an area of 4400 sqm. The area of the buffer zone towards west is 1780 sqm, towards east is 2523 sqm and towards South is 454 sqm.

JUSTIFICATION FOR INSCSRIPTION

Statement of significance.

The administrative Hd.Qrs. of the Central Railway known as Victoria Terminus Building was constructed in 1888 by the Great Indian Peninsula Railway.

The Victoria Terminus Building was constructed under the guidance of Mr.F.W.Stevens, Consulting Architect. The building which took 10 years to complete is in late Italian Medieval Gothic style and is named Victoria Terminus in celebration of the Queen's Golden Jubilee on June 20, 1887. The High Victorian Gothic style was extremely compatible with both the Indian taste and its building tradition. The Gothic style, offering the colour and complexity of Mughal and Hindu architecture, harmonized and most effectively made reference to the indigenous preference for ornamentation, making it the right choice of style for Victoria Terminus. The skyline, turrets, pointed arches and eccentric ground plans of the Gothic Revival structure being closest in appearance to the traditional Indian palace architecture gave an appropriate platform for the incorporation of vernacular architecture.

The building is a utilitarian work of art, with Steven's wit and play in a deceptive non-symmetrical symmetry. The building is symmetrical about the east-west axis. The elements are freely changed in style, size and materials, and yet there is an indescribable unity in totality. The building was presented as a palace with all the sides of the building being as focal in nature as the other. The skyline and turrets of the Gothic Revival style being closest in appearance to the traditional Indian Palace emphasized the impact of the building.

The ‘C’ shaped building is planned symmetrically about the east-west axis. The uni-axial symmetry is crowned by a high central dome, which acts as the focal point around which the building is built. The two side wings enclose the courtyard, which opens on the street. The wings are anchored on all four sides by turrets that effectively balance and frame the central dome.

The choice of material used for the building is also exemplary, whereas the structure is built with Indian sand stone and limestone, choicest Italian marble has been used at prominent locations. Similarly the building is an exemplary in Indian Craftsmanship on stone.

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

In time, Victoria Terminus came to be considered one of the finest stations in the world and, next to the Taj Mahal at Agra, the most photographed monument in the country at that time. An English traveller, G.A.Mathews, described it in Diary of an Indian Tour, 1906, as “the most beautifully designed and the most elaborately ornamented railway building I have ever seen. The style is Italian Gothic, with certain Oriental modifications in the domes. It is said to have cost the G.I.P. 300,000 pounds and is certainly the finest railway station in India, if not in any country”.

Although a number of buildings viz. Fairlie Place, Eastern Railway Headquarters Calcutta, Churchgate; Western Railway Headquarters, Mumbai; Garden Reach, Headquarters of South Eastern Railway, Calcutta; Southern Railway Headquarters Madras were constructed after the construction of Victoria Terminus known for their architectural wonders, but the significance of Victoria Terminus is much ahead of all other buildings.

c. Authenticity/Integrity

The authenticity and integrity of the Victoria Terminus building have been maintained. There had been no change in the original structure of the building. Whenever any repair was to be carried out, it has been ensured that the same is done maintaining the original integrity of the building.

In 1969, the statue of “PROGRESS” was damaged due to lightning, but the Central Railway authorities with the help of Sir J.J.School of Arts succeeded to restore the statue to its original position. The preparation of this statue under the direction of Professors of Sir J.J.School of Arts and erection of the same in its location called for a great deal of skill from the Railway Engineers, who proved equal to the task.

There had been minor addition of few structures towards East side of the building, at the locations shown in the enclosed map at Annexure VII; out of which one is permanent and others are temporary in nature. However, the same are not obstructing the front view of the building which is towards western side of the building.

Criteria under which inscription is proposed.

Cultural criteria (I) : This magnificent and imposing structure built in medieval Italic Gothic architecture is definitely the most imposing station building in the world and one of the most magnificent buildings in the entire Indian sub continent. Finally completed in 1888, this building represents a masterpiece of human creative genius exhibited in the later part of the 19th century, which is even now recognised as unparalleled.

Cultural criteria (II): This railway station exhibits an important interchange of human values, by way of development of architecture, monumental art and town planning, with the railway station being the centre of the city.

Cultural criteria (III): This building is a testimony to a tradition of Railway transport in the history of India, since the railways were first started in India in Bombay.

Cultural criteria (IV): Various facets of this 19th century medieval Italian Gothic structure viz.the high central dome with a 16'6" tall figure of a lady with a flaming torch & a wheel in her hands, large size base reliefs of the busts of the then 10 Directors of the GIP Railway Company, the entrance gate columns crowned with a Lion (representing U.K),and a tiger (representing India) large number of embellishments in the statuary, the base reliefs, the ornamental friezes etc. All are representative of an outstanding architecture in building design and construction, which illustrates a significant stage in the art and architecture of human history.

3. Description

Description of property.

Victoria Terminus Building constructed in the year 1888 was originally meant for the housing of Administrative Headquarter of the Great Indian Peninsula Railway. The construction of this building was started in the year 1878, and was completed in the year 1888. This building is still being used as a booking office of Victoria Terminus Suburban Station utilised by thousands of commuters daily and also serves as the administrative headquarter of the Central Railway.

Architecture in Italian Gothic is essentially a structural style, and this building which has received worldwide appreciation on account of its series of well proportioned and ornamental arches and its spires and domes also has the dignity of a Cathedral. Nevertheless, the ornamentation to the main facade, which is towards the west, is despite the numerous bass reliefs and is effected by the presentation of a series of well proportioned and delicately ornamented run of arches and friezes as far as horizontal effect is concerned. The crowning point of the whole building is the central main dome carrying at its apex, a colossal 16'6" high figure of a lady pointing a flaming torch upwards in her right hand and a spoked wheel low in the left hand symbolizing "PROGRESS". This dome is the first octagonal ribbed masonry dome that was adapted to an Italian Gothic style building.

There are a large number of other embellishments in statuary, which the architect has introduced in decorating the large frontage and these are gargoyles, grotesques and figures of animals carrying standards and battle axes etc. In addition, there are a large number of bass reliefs and ornamental friezes which to a general observer, are more attractive than the statuary, which decorates the facade. On the facade are also in very prominent position, bass reliefs in large size busts of 10 Directors of the Old Great Indian Peninsula Railway Company. Two of them were Sir Jamshedji Jijibhoy and Sir Jagannath Shankarseth. The entrance gates to Victoria Terminus carry two columns which are crowned, one with a Lion(representing the United Kingdom) and the other with a Tiger(representing India) both sculptured in porbunder sand stone

Victoria Terminus station building has been considered as one of the finest station building of the world and architecturally one of the most splendid and magnificent late Italian Medieval Gothic edifices existing today.

History & Development.

Among the best, and also one of the very early ones to be built, is the Victoria Terminus in Bombay, at Bori Bunder. It derives its name from Queen Victoria because the station building was formally opened on Jubilee Day in 1887. Before 1852 when its first pier was constructed, Bori Bunder in Bombay was just a

landing place for country boats. The first station at Bori Bunder was “a miserable wooden structure”. Most of the upper class passengers boarded trains from Byculla which had a pretentious platform and an attractively-built shed. Originally Victoria Terminus was intended to accommodate only the offices and the main station. Since 1887, additional buildings at adjoining sites have been erected.The annexed building was used as a hospital during the 1914-18 World War, and is now used for offices. The new station building was opened in 1929, to deal with the main line traffic. The additions were so designed as to harmonise with the architectural magnificence of the 1888 building, and to create an impressive composite effect. The old and the new stations together comprise one of the largest and busiest station terminals anywhere in the world.

The site on which Victoria Terminus is located is of great historical importance, being associated with the very origin of Bombay as a city. Recent researches into old records show that Bombay derived its name originally from the Goddess Mumba Devi, or Maha Amba. The earliest temple dedicated to her is believed to have stood at the very place where Victoria Terminus was erected in 1888. The original shrine, was demolished by Mubarak Shah, better known as Qutab-Ud-Din, and was re-erected in 1317. It was again demolished in 1760 by the Portuguese.

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Form and date of most recent records of property.

The property now belongs to Government of India(Ministry of Railways). The land records of the building are available with the Chief Engineer’s Office of Central Railway as well as the local Revenue Authorities. The building structure is recorded in the Service Building Registers of the Mumbai Division of Central Railway. All the drawings of the building have been documented in a booklet form.

Present state of conservation

The overall state of conversation is satisfactory. From the view point of structural stability of the building, the structure can be classified as excellent. The foundation masonry and roofing are structurally stable.Over a period of time, due to pressure of expansion internal modifications have been carried out. However, these are mainly of temporary nature and do not pose a problem in maintaining the originality of the building.

e. Policies and Programmes related to presentation and promotion of the property.

The policy of the Railways is to preserve the structure in best possible way. Though it cannot be totally turned into a tourist attraction, it can be preserved as an example of finest Italian Gothic Architecture. Railways has drawn a conservation plan for enhancing the life of the building, maintaining the originality of the building.

4. Management.

Ownership.

The Victoria Terminus including of its moveable and immovable assets is owned by Central Railway under the Ministry of Railways, Government of India.

Legal Status.

All legal rights to the property are vested in the Ministry of Railways, Government of India.

c. Protective measures and means of implementing them.

A small Depot is established in the building itself which takes care of various day-to-day maintenance problems. On a regular basis the internal wood work is given a coat of painting which acts as preservative. Also the stone washing activity is done once in 3-4 years to avoid formation of algea etc. on the building. Special measures like water proofing are also carried out before monsoon to protect the structure from ill effects of penetration of water.

d. Agency/Agencies with Management Authority.

The administrative control and the management of this property is in the hands of Divisional Railway Manager, Mumbai Division, Central Railway. The day-to-day maintenance and protection of the building is also the responsibility of the Divisional Railway Manager. His postal address is as under :

The Divisional Railway Manager,
Central Railway,
Annexe Building,
Victoria Terminus,
MUMBAI –400001, India.

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

Chief Engineer, Central Railway, Mumbai is exercising the overall control as far as major investment proposals and the formulation of the policies regarding this property are concerned. His postal address is as under:

The Chief Engineer,
Central Railway,
Victoria Terminus,
MUMBAI-400001, India.

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

This building is not open for the tourist/public from inside. In near future also, there is no plan to open this property for the tourism purpose. However, the ground floor of the Northern side wing of the building is being used as the Booking Office for the suburban passengers. There is no major plan for development/modification of the same.

g. Sources and levels of finance

The sources of finance for this building is the consolidated fund of India. Money required for maintenance for day-to-day working, or for development purpose are taken from the consolidated fund of India, after the sanction of the Budget by the parliament.

Sources of expertise and training in conservation and management techniques

The management of this building is in the hands of Indian Railways personnels who have the technical qualification and experience in maintaining the Civil Engineering Structures. For training of such personnel, Indian Railways are having the Management Training Institute at Railway Staff College, Vadodara and Technical Institute at Pune “Indian Railway Institute of Civil Engineering”. These institutions are source of expertise and training in management and building maintenance techniques. Managers and staff concerned with the upkeep and maintenance of this building are regularly undergoing training in these institutions. The Railway Management is aware of the need of specialised training for conservation activity. Architectural Conservation Cell, Research and Consultancy Directorate, in

Associated Cement Company are the expert in this field, to whom Railways have entrusted the job to train personnels and to suggest the ways to conserve the building in its original condition. The training on a programmed basis is likely to start in near future.

i. Visitor facilities and statistics.

This building was originally designed for catering the need of Administrative Headquarter of the Great Indian Peninsula Railway. The ground floor of the North Wing of this building across the rail line is known as "STAR CHAMBER". Still it is being used as the Booking Office for the passengers of the Mumbai Suburban. The Star Chamber has a wealth of choice Italian marble, polished Indian blue stone and elaborate stone arches covered with carved foliage and grotesques. This part of the building is being utilised by thousands of passengers for purchasing tickets. In addition to this, approximately 12 lakhs of Mumbai suburban passengers are passing by the side of this area while going to their work place. Approximately 0.55 lakhs of Mumbai Main Line passengers are also having the panoramic view of this building while passing through this area. Although this building is not open to the public from inside, it has become a part and parcel of the citizens of Mumbai, as lakhs of people are using the Mumbai Victoria Terminus suburban and main line stations daily. Owing to great significance of this building, it is in the tourist itinery of all National and International tourists visiting Mumbai Metropolitan.
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j. Property management plan and statement of objective.(copy to be annexed).

This building is being utilised for the purpose of housing the Administrative Headquarter of Central Railway, and originally also it was designed for the same purpose. However, due to the pressure of expansion over the last 110 years, the utilisation of space for more and more persons had taken precedence over the principles of conservation.

Central Railway Administration is aware of the importance of conservation of this property in its originality following all principles of conservation. A plan is being drawn to carry out all the repairs to this building in totality, for which a detailed survey has been carried out by the Consultants of "Architectural Conservation Cell, Research and Consultancy Directorate of Associated Cement Companies, and based upon their suggestions, it has been envisaged to carry out the repairs and other measures to conserve this property.

Staffing levels.(Professional, technical, maintenance)

The upkeep and maintenance of this building is done by the technical and non -technical staff as per the standard norms and yardstick followed on all over the Indian Railways. At the managerial level, Assistant Engineer has been posted at Victoria Terminus who is assisted by Sr. Sectional Engineer and one Sectional Engineer and 96 men.

Managerial control is also exercised at the divisional level by the Divisional Railway Manager, Mumbai and his team of Sr.officers.

FACTORS AFFECTING THE PROPERTY

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

There are no encroachments within the premises of Victoria Terminus Building. In the buffer zone provided in front of the station building, i.e. towards west side, this area is restricted for the public movement by the security staff who is posted at the main gate. In the buffer zone which is available on the east side of the building, some few incongruous temporary structures have been added by Railway in the past, as well as one permanent structure towards northeast of the building. However there is no encroachment from the outsiders. Since the premises of this building except the booking office is not open to the public, there are no chances of encroachment of any nature in future also.

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

Towards main entrance/facade of the building, there is a busy road crossing. A number of road vehicles are plying over this road. On the east side of the building also vehicles which are coming to the V.T. main station are plying. The pollution due to the emission of the carbon monoxide from the automobiles, running in such a close proximity of the building is the source of pollution. In addition to this the constant breeze of saline content from the sea situated on east and west sides within 2-3 kms, also causes the degradation of the various building materials. The pollution level surrounding this national monument is beyond all permissible level. A row of shady trees has been provided in front of the main entrance of the building, to contain the problem of pollution due to the vehicular traffic.

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

Mumbai region of Maharashtra State is falling in the zone III. according to the classification of the earth quake zones. Although the details are not available whether this building has been designed for the earth quake loads, but this building has withstood a number of earthquakes in the last 110 years and no sign of distress or deterioration have been noticed so far.

From the past record, it has been observed that the area surrounding the Victoria Terminus building is not prone to the flooding.

To avoid any eventuality of fire in the building, necessary steps have been taken by provision of fire hydrants, fire buckets and portable fire extinguishers at various convenient locations. This building is only a two storeyed structure. In the vicinity of this building State Government is having full fledged fire brigade with all the necessary fire fighting equipment and machinery, who can take care of any eventuality of fire.

Visitor/tourism pressures.

The ground floor of the northern wing of the building is being used as the booking office for the suburban system of Central Railway,where thousands of passengers are using this area for buying tickets. Other than this, the rest of the area of the building is not open to the public and hence there is no tourism pressure of any kind to this building. Only the passers-by/tourist have panoramic view of the magnificent front facade of the building from the west side i.e. from the main road in front.

Number of inhabitants within property, buffer zone.

Administrative Headquarter of the Central Railway is functioning in this building. Approximately 1800 numbers of staff and officers are using this premises. However, the ground floor of the northern wing of the building is being used as the Booking Office for the suburban system where thousands of passengers are using this area for buying tickets.

MONITORING.

Key indicators for measuring state of conservation.

One Assistant Engineer with the technical and skilled staff has been posted at this building for monitoring the state of conservation. The key factors which are the indicator of the state of conservation are as follows :-
The apprearance of cracks in the structural components of the building like masonry columns and the stone arches.

Weathering/scaling/disintegration of the stones used in the building.

Monitoring the state of mortar used in the building construction.

Monitoring the leakages in the building to assess the health of the building.

Administrative arrangements for monitoring property.

For upkeep and maintenance of this building, one Assistant Engineer and one Sectional Engineer has been posted who along with their trained skilled and unskilled staff carry out minor repairs and maintenance. However, for the major repairs and maintenance, the works are some time entrusted to the expert in the field of maintenance of such buildings. At the higher level, the administrative control of this building is in the hands of Divisional Railway Manager, Mumbai CST.

Results of previous reporting exercises

Based upon the inspections of the Railway Officers and the other experts, repairs of minor nature are being carried out on a day-to-day basis. Prior to every monsoon, the flat roof of the building is being given a coat of water proofing treatment. For major repairs based upon the reporting at various levels, the following measures have been taken in the past.

The statue of "PROGRESS" which was damaged in the year 1969 due to lightening was restored to the original position.

2. The broken stained glasses have been replaced with the similar type of material matching with the original shape and shade.

7. DOCUMENTATION

Photographs, slides and where available, film/video.

Fifteen photographs and one film of 15 minutes pertaining to this building are enclosed.

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

Property Management Plans – Nil.
Other plans relevant to the property – Annexure I to VII.

Bibilography.

Mr. S.N.Sharma, Retired Chief Planning Officer, Central Railway,
History of the Great Indian Peninsula Railway, 1853-1869, Part I –
Volume I.

2. Mr. S.N.Sharma, Retired Chief Planning Officer, Central Railway,
History of the Great Indian Peninsula Railway, 1870-1900, Part I – Volume II.

3. Mr. J.N. Sahni, Indian Railways, One Hundred Years 1853-1953.

Addresses where inventory, records and archives are held.

The Chief Engineer, Central Railway, General Manager's Building,
Chhatrapati Shivaji Terminus, Mumbai-400001, India.

The Divisional Railway Manager, Central Railway, Annexe Building, Chhatrapati Shivaji Terminus, Mumbai-400001, 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-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.

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   (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.

New Delhi 3/8/1998

3/8/98

(A. Lohani)
Director
National Rail Museum
New Delhi - 110001

Director

राष्ट्रीय रेल संग्रहालय
National Rail Museum
रेल मंत्रालय
Ministry of Railways
रेल भवन
Rail Bhawan
नई दिल्ली/New Delhi

ANNEXURE 'A'

DARJEELING HIMALAYAN RAILWAY

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

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

निदेशक
Director
राष्ट्रीय रेल संग्रहालय
National Rail Museum
रेल मंत्रालय
Ministry of Railways
रेलवे बोर्ड
Railway Board
of India/New Delhi

PROPERTY MANAGEMENT PLAN

Victoria Terminus Building has unique significance for Indian Railways being its birth place. 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 up-keep, 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 Assistart 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)

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

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

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Assistant Engineer

↓

Senior Section Engineer (Works)

↓

Custodian

↓

Skilled & Unskilled staff.

Apart from the routine up-keep 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 a field of conservation of historical monuments

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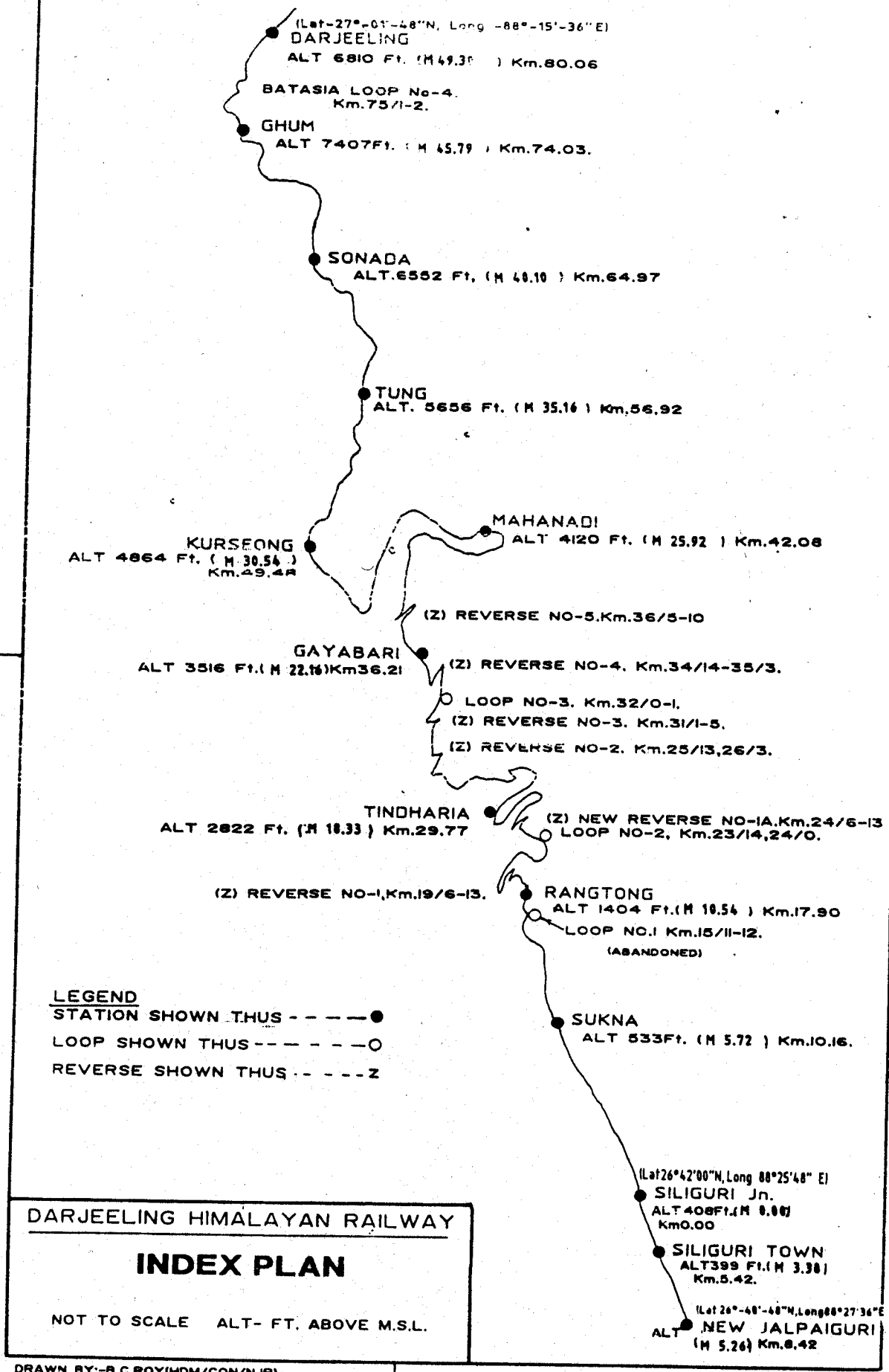
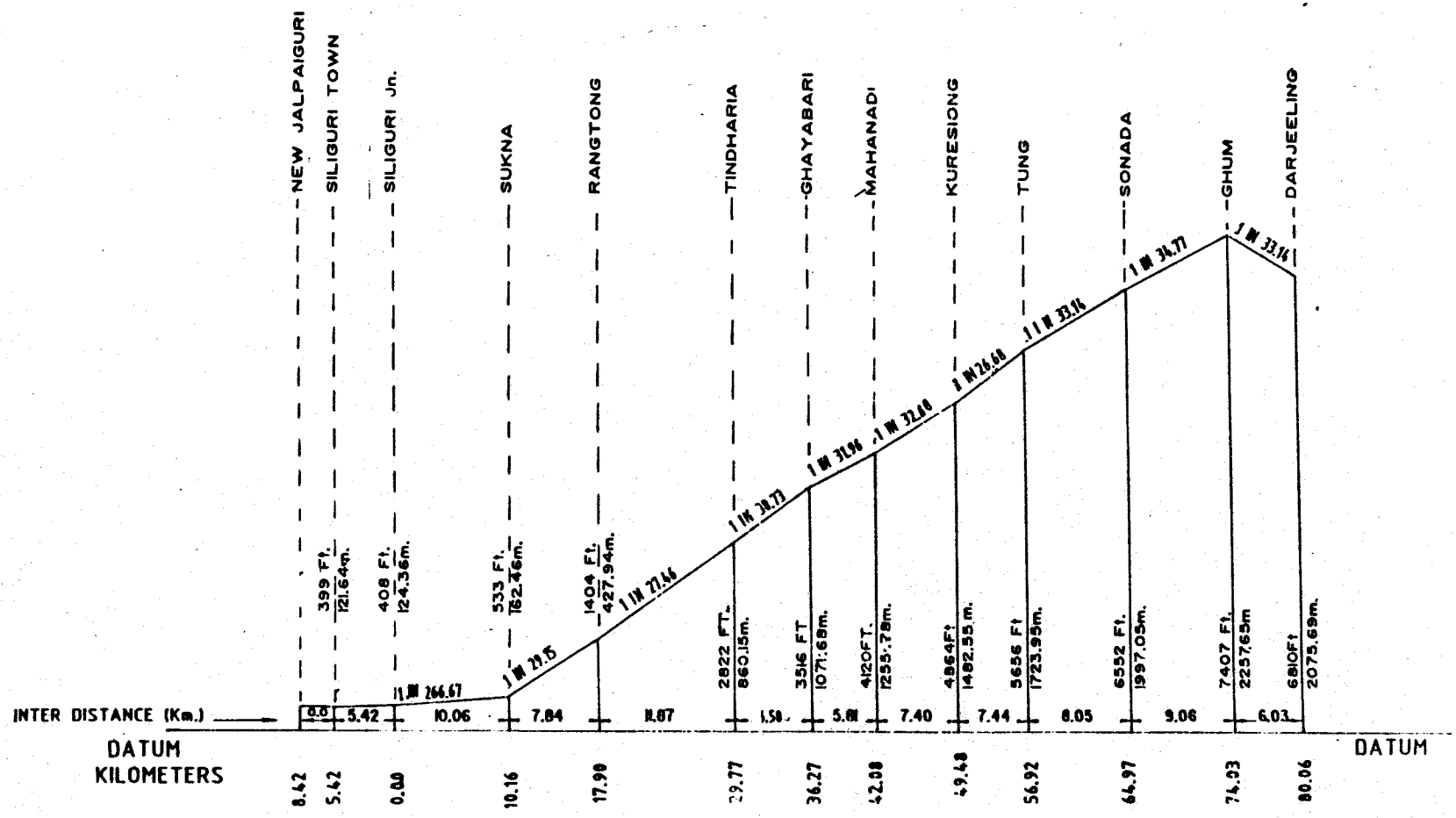
STATEMENT OF OBJECTIVES

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.


(Lat-27°-01'-48"N, Long -88°-15'-36"E)
DARJEELING
ALT 6810 Ft. (M 49.39) Km.80.06
BATASIA LOOP No-4.
Km.75/1-2.
GHUM
ALT 7407Ft. (M 45.79) Km.74.03.
SONADA
ALT.6552 Ft, (M 48.10) Km.64.97
TUNG
ALT. 5656 Ft. (M 35.16) Km.56.92
MAHANADI
ALT 4120 Ft. (M 25.92) Km.42.08
KURSEONG
ALT 4864 Ft. (M 30.54)
Km.49.48
(Z) REVERSE NO-5.Km.36/5-10
GAYABARI
ALT 3516 Ft.(M 22.16)Km36.21
(Z) REVERSE NO-4. Km.34/14-35/3.
LOOP NO-3. Km.32/0-1.
(Z) REVERSE NO-3. Km.31/1-5.
(Z) REVERSE NO-2. Km.25/13,26/3.
TINDHARIA
ALT 2822 Ft. (M 18.33) Km.29.77
(Z) NEW REVERSE NO-1A.Km.24/6-13
LOOP NO-2, Km.23/14,24/0.
(Z) REVERSE NO-1,Km.19/6-13.
RANGTONG
ALT 1404 Ft.(M 10.54) Km.17.90
LOOP NO.1 Km.15/11-12.
(ABANDONED)
LEGEND
STATION SHOWN THUS - - - —●
LOOP SHOWN THUS - - - - - - —O
REVERSE SHOWN THUS - - - - - Z
SUKNA
ALT 533Ft. (M 5.72) Km.10.16.
(Lat 26°42'00"N, Long 88°25'48" E)
SILIGURI Jn.
ALT 408Ft.(M 8.00)
Km0.00
SILIGURI TOWN
ALT399 Ft.(M 3.38)
Km.5.42.
(Lat 26°-40'-48"N, Long 88°-27'-36"E
ALT NEW JALPAIGURI
(M 5.26) Km.8.42
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 1cm.=100m
HORIZONTAL 1cm.=5Km.

DRAWN BY. B.C. ROY. (HDM/CON/NJP)


KURSEONG

Darjeeling Railway (India)

No 944

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) land-slips 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 land slips 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 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 XIX^{e} 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 XIX^{e} 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 XIX^{e} siècle.

Le contrefort couvert de forêts épaisses 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. A 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.

Le développement touristique de Darjeeling dépend largement de l'efficacité du service du chemin de fer himalayen. Des programmes destinés à l'améliorer sont par conséquent à l'étude. Sont envisagés des travaux d'amélioration de la voie et l'acquisition de nouvelles locomotives et de nouveaux matériels roulants. Actuellement, le ministère des chemins de fer finance une étude complète de la ligne par des conseillers spécialistes des transports.

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

Une mission d'expertise de l'ICOMOS a visité le bien en janvier 1999. L'ICOMOS a également examiné l'étude comparative des chemins de fer historiques coordonnée par le Musée national du chemin de fer de York (Royaume-Uni) en 1998 (voir ci-après).

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 boudhiste 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 nécessairement 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 XIX^{e} siècle a eu une profonde influence sur le développement économique et social dans de nombreuses partie 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

a) Country (and State Party if different) : INDIA, MINISTRY OF RAILWAYS
b) State, Province or Region : VARIOUS STATES IN INDIA
c) Name of Property : MOUNTAIN RAILWAYS OF INDIA

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

* 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 DHR[001]
1.e.2 Land Plans in Scale 1:1584 for entire length and breadth of the NMR[002] also indicating the demarcated buffer zone;
1.e.3 Sketch Map of the NMR[002] with Yard Diagrams of all Railway Stations of the NMR[002] in scale 1:100,000 for entire length of the NMR[002];
1.e.4 Index diagram book showing all curves, gradients and altitude of the entire NMR[002] ; 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

Core area	:	4.59 ha. (As in table above for site element 002)
Buffer Zone	:	500 ha. (As in table above for site element 002)
Total	:	505 ha.

2 Justification for Inscription

2a Statement of significance

The NMR[002] 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[001] opened in 1889. The NMR[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 19th 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[001] USED Zig-Zags & Spirals. The NMR[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[001] the next such Railway was the NMR[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[002] and these will be proposed for inclusion in the World Heritage list after inscription of the NMR[002].

The NMR[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-Oberlap 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 NMR[002] 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 DHR[001] 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 NMR[002] 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 NMR[002] 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 NMR[002]

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 NMR[002] 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 NMR[002].

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 NMR[002] 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 NMR[002] 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 NMR[002] 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 DHR[001] AND THE NMR[002] 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 DHR[001] and the NMR[002] 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 DHR[001] is already inscribed as a World Heritage Site, a brief description of the NMR[002] proposed to

be inscribed as a serial application for World Heritage Status is given below.

The NMR[002] 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. Mettupalayam 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 NMR[002] 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 (elevaton 1712 meters or 5617 feet), which climbs a total of 1330 m or 4363 feet in 19 kms. or 12 miles. On this rck section the averge 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 NMR[002] for nine years, Coonoor's importance still remains as one of the best stations on the line. Centenary Celebratons 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. Thakkirsi, 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 NMR[002] offer a rich and scenic expanse of the entire Nilgiri Mountain area. The engines are always at the Mettupalaiyam 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 DHR[001] and the NMR[002] 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 DHR[001] is already inscribed as a World Heritage

Site, a brief history of the NMR[002] 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 NMR[002] dates back to 1854 when proposals were first mooted by the British to build a Railway up the hills from Mettupalaiyam. Work began on the Madras-Coimbatore line in 1853, which opened in 1862. the branch to Mettupalaiyam 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 Mettupalaiyam 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 word 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) simlar 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 NMR[002] 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 I 1944, and in 1951 the NMR[002] 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 NMR[002]. 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 DHR[001] and the NMR[002] 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 NMR[002,] the Southern Railway of the Indian Railways with its headquarter at Chennai is in-charge. In turn, the NMR[002] 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 DHR[001] and the NMR[002] 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 NMR[002] 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 NMR[002] 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 NMR[002] 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) Nilgirirs, “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 Mettupalaiyam was knwon 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 NMR[002] 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 NMR[002] 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) Mettupalaiyam – Udagamandalam – Mettupalaiyam – Train Ride with On-board services for audio, guide, catering, complimentary photo and games.

4. Management

4a Ownership

As in the case of the DHR[001], the Ministry of railway, Government of India, owns all the movable and immovable assets of The NMR[002].

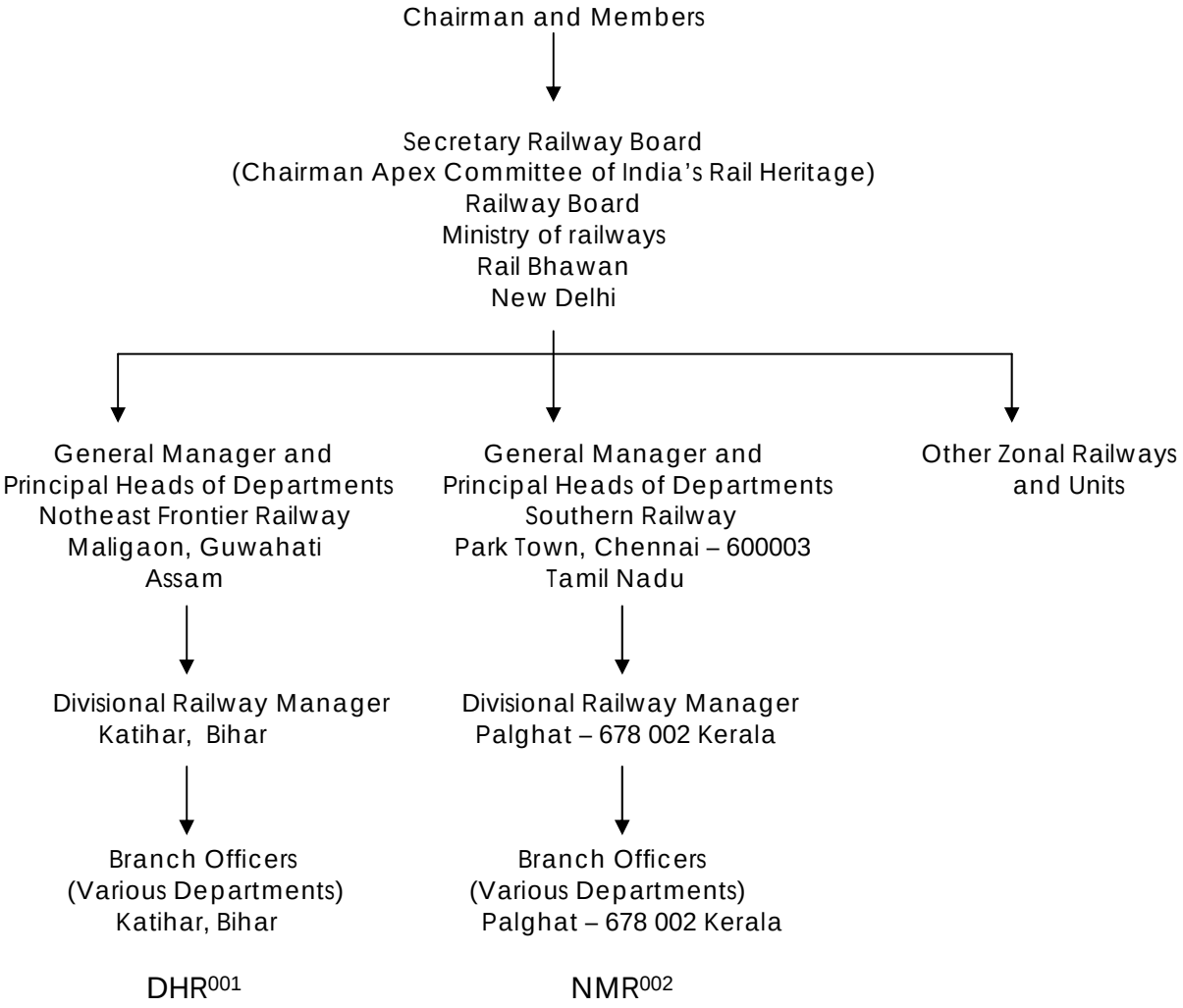
4b Legal Status

As in the case of the DHR[001], 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 DHR[001], the NMR[002] 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 unauthorised 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.



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 DHR[001 and] NMR[002] , 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 DHR[001] and NMR[002], 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 DHR[001] and NMR[002], 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 NMR[002], 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 NMR[002] 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 NMR[002].

During the year 2000, 2,94,118 tickets were sold on the NMR[002]. The total number of visitors who visited Nilgiri Mopuntains 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 DHR[001] and the NMR[002] 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 proivide 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[002] are provided at Coonoor, Lovedale and Udagamandalam for the stay of Railway personnel visiting this line.

The revenue generated on the DHR[001] and NMR[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[001] and NMR[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[001] and the NMR[002] have been preserved for the so many years. Consequent to the inscription of DHR[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[002]. In addition, for the DHR[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[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[001] and the NMR[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 DHR[001] and the NMR[002] 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 DHR[001] and the NMR[002] 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 DHR[001] and the NMR[002] 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[001] and the NMR[002] led to the appearance of community settlements along their route. Following the inscription of DHR[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[001], the NMR[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[001] and NMR[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 DHR[001] 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 priple 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 NMR[002] for its conservation and the benefit of the neighbouring communities.

7 Documentation

7a Photographs where available, film/video

For the NMR[002] , the following is enclosed: -

i) Book on the NMR[002] 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 (NMR[002]) – Written by R.R.Bhandari
ii) THE NILGIRIS – Written by Dharmalingam Venugopal
iii) Southern Railway Timetable July 2002 – June 2003.
Iv) NILGIRI MOUNTAIN RAILWAY (NMR[002]) Web page (http://www.railmuseaum.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

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_____ _____ _____

Place Date (V.N.Mathur)
Secretary
Railway Board

भारत INDIA

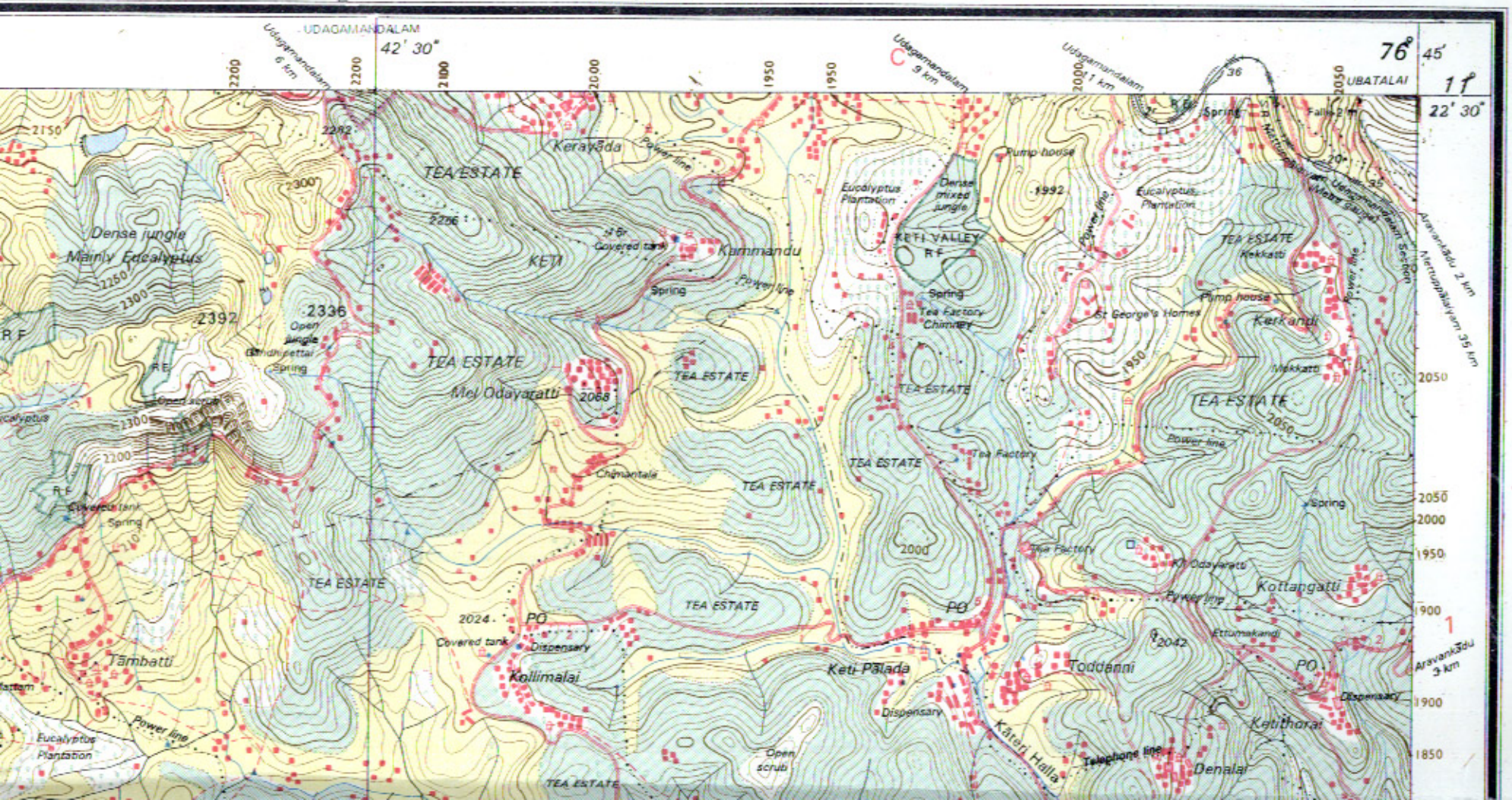
REFER TO THIS MAP AS :- 1:25,000

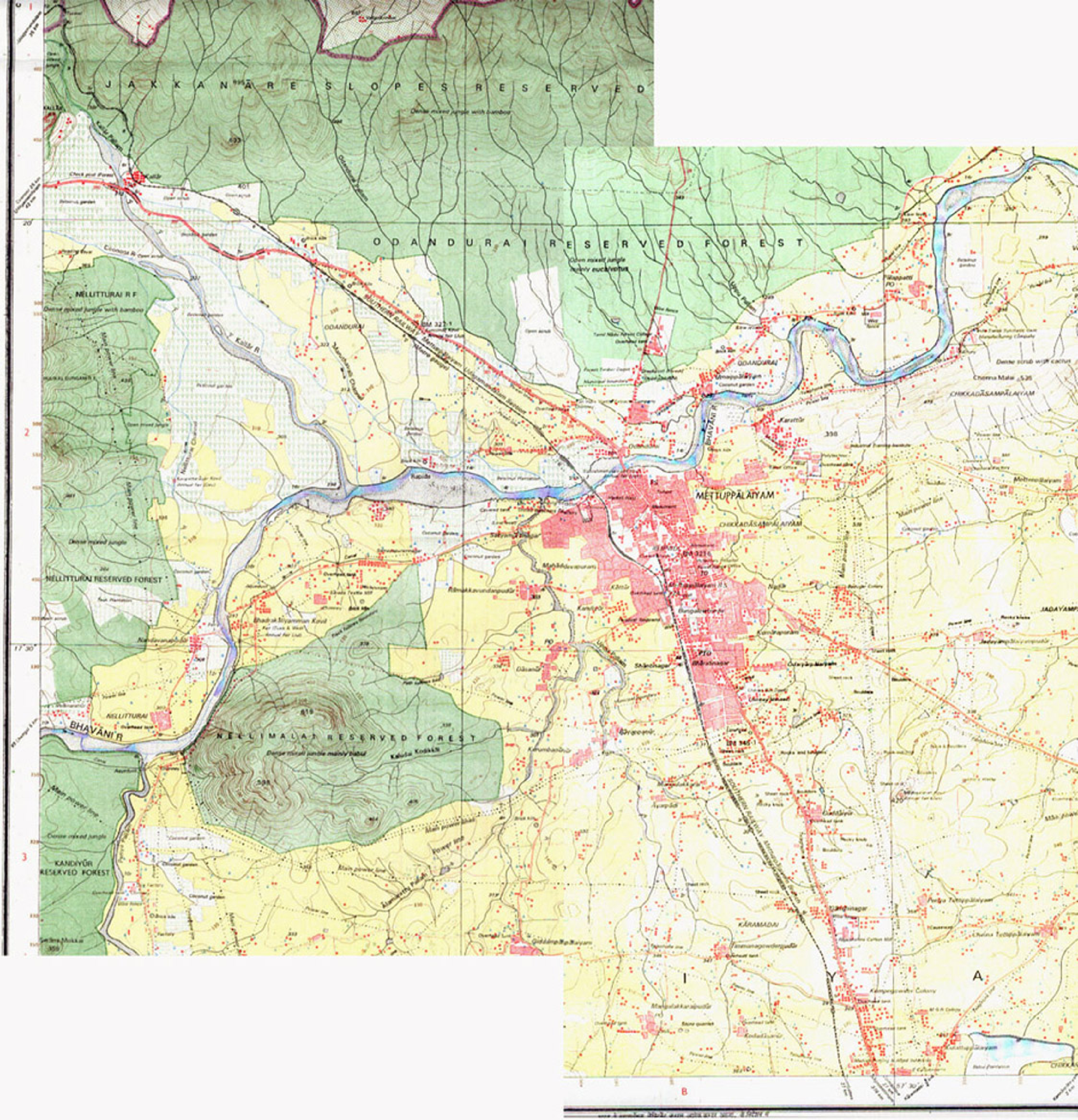
SHEET 58 A /11 /SE FIRST EDITION

FIRST EDITION

Magnetic Variation from True North about $2\frac{1}{4}^{\circ}$ West in 1995.
(Decreasing by about 2' annually)

NO. 58 A/11/SE





JAKKANĀRE SLOPES RESERVED
Dense mixed jungle with bamboo
ODANDURAI RESERVED FOREST
Open mixed jungle mainly eucalyptus
NELLUTTURAI R F
Dense mixed jungle with bamboo
ODANDURAI
METTUPPĀLAIYAM
CHIKKADĀSAMPĀLAIYAM
Karattūr
NELLUTTURAI RESERVED FOREST
Dense mixed jungle
BHAVĀNI R
NELLUTTURAI
NELLIMALAI RESERVED FOREST
Dense mixed jungle mainly babul
KANDIYŪR RESERVED FOREST
Dense mixed jungle
Main power line
SOUTHERN RAILWAY
KARAMADAI
JADAYAMP
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Y
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निर्यात के लिए नहीं NOT FOR EXPORT

तमिल नाडु
TAMIL NĀDU

COIMBATORE & NĪLGIRI DISTRICTS.

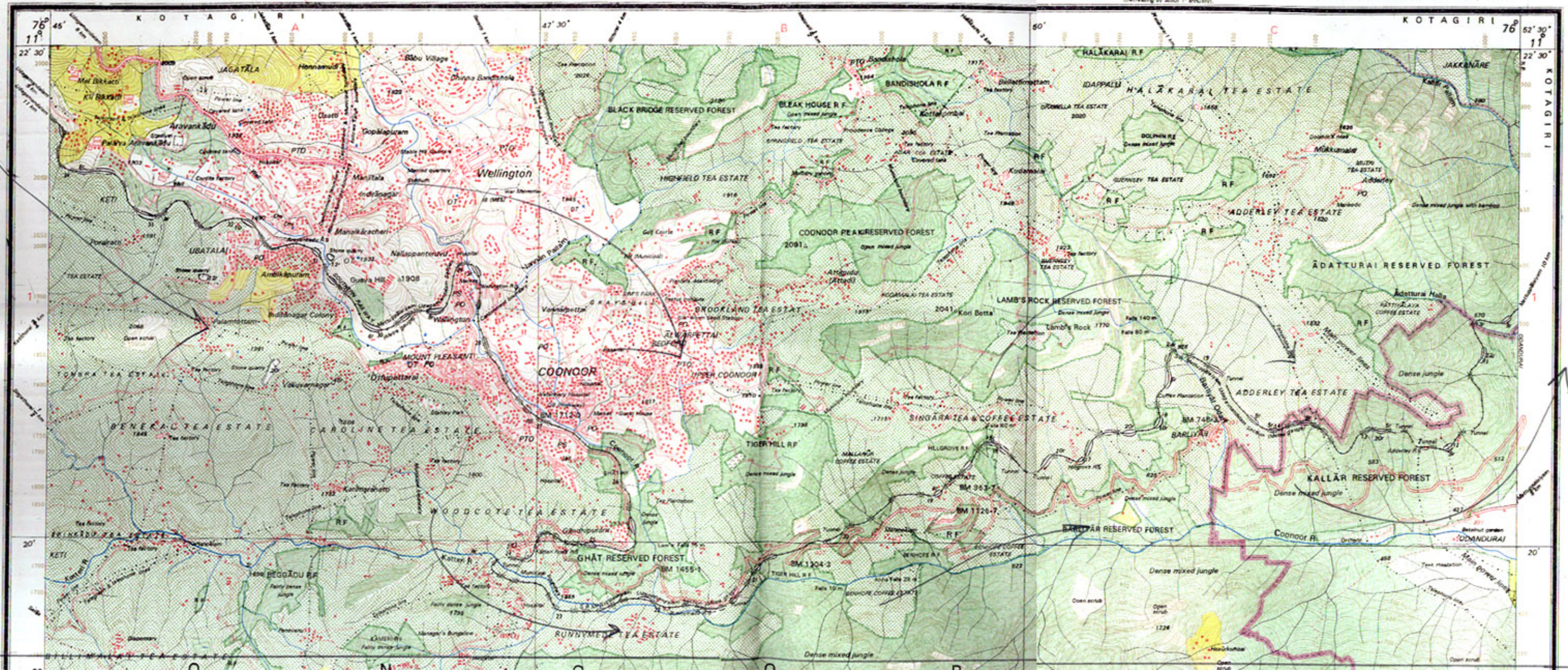
Surveyed 1994-96.

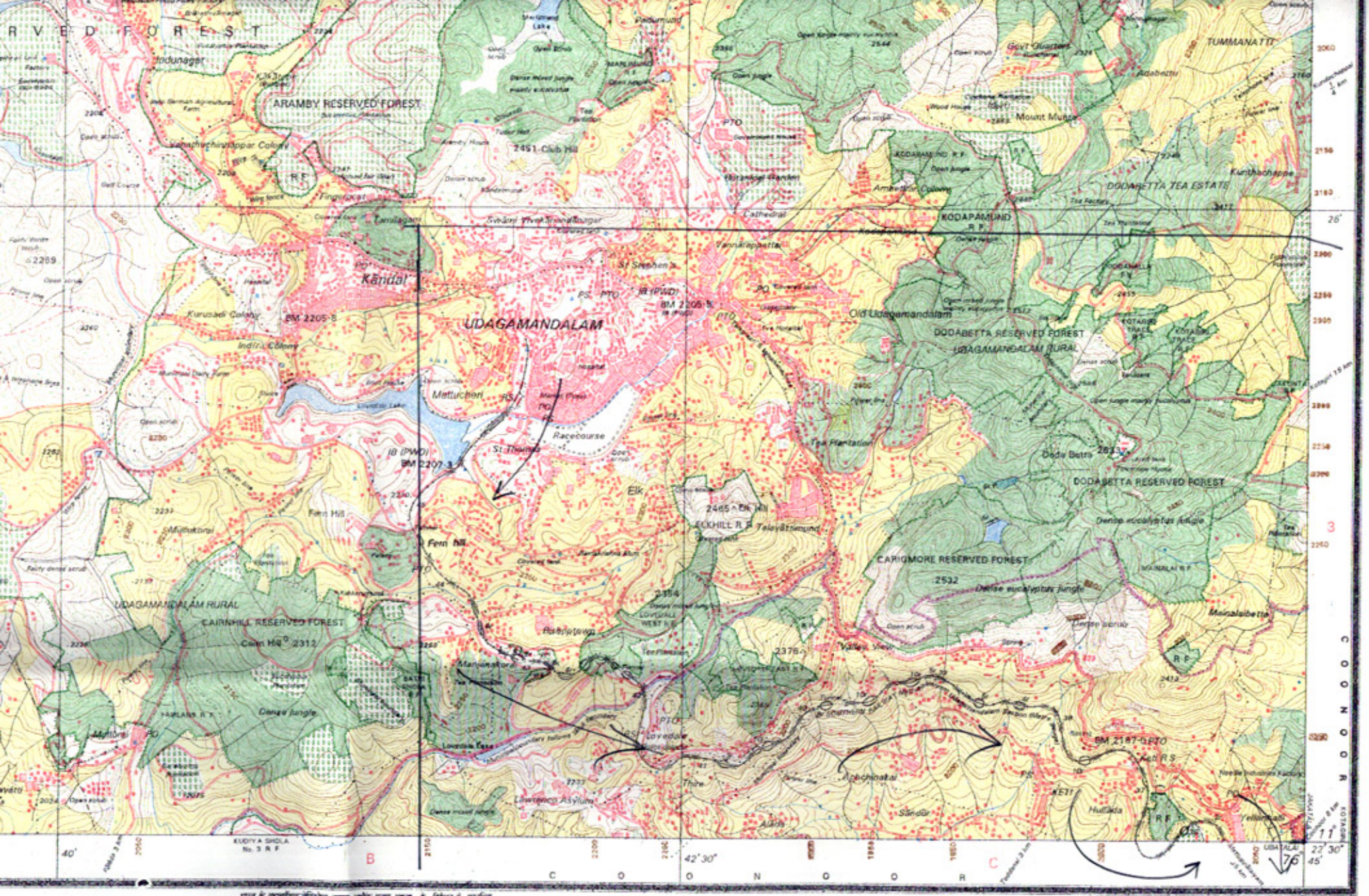
FIRST EDITION

Magnetic Variation from True North about 2 ½° West in 1990.
(Decreasing by about 1' annually)

SHEET 58 A/15/SW FIRST EDITION

No. 58 A/15/SW





भारत के सर्वेक्षक जेनरल के प्राधिकार से भारतीय सर्वेक्षण विभाग द्वारा प्रकाशित,
Published under the direction of Lieutenant General Ashok Kumar Ahuja, Surveyor General of India,

1998.

1:25,000

250 m to 1 cm

Metres 1000 500 0 1 2 3 Kilometres

4 cm to 1 km

HEIGHTS & CONTOURS IN METRES

CONTOUR INTERVAL 10 METRES

Water features are shown in blue where

Contours are approximate.

Administrative Index

PRINTED AT THE 1 (OLD) PRINTING GROUP OF SURVEY OF INDIA

Towns or Villages: inhabited; deserted. Fort

Huts: permanent; temporary. Tower. Antiquities

Temple. Chhatri. Church. Mosque. Idgah. Tomb. Graves

Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage

Mine. Vine on trellis. Grass. Scrub

Palms palmyra; other. Plantain. Conifer. Bamboo. Other trees

Boundary, international

" state demarcated; undemarcated

" district, subdivision, tahsil or taluk, forest


உதகமண்டலம்
उदगमण्डलम
UDAGAMANDALAM


MATRIC HIGHER SECONDARY SCHOOL

The National Museum of Indian Railways

National Rail Museum

D.O.No.2004/Museum/NMR 3/06/2004

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 error 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)

National Rail Museum, Chanakyapuri, New Delhi-110021 (INDIA)
Phone : 91-11-26880939, 26881816, 23304137 : Tele/Ans/Fax : 011-26880804
E-Mail : smehranrm@vsnl.net
Internet : http.//www.railmuseum.org

NILGIRI MOUNTAIN RAILWAY

COORDINATES & ALTITUDES OF STATIONS

KM	STATION	LATITUDE	LONGITUDE	ALTITUDE
0	METTUPALAYAM	11°-17'-54"	76°-56'-09"	325.22m
7.46	KALLAR	11°-20'-14"	76°-53'-04"	381.24m
17.26	HILLGROVE	11°-20'-25"	76°-50'-16"	1092.70m
27.03	COONOOR	11°-20'-36"	76°-47'-20"	1711.90m
28.54	WELLINGTON	11°-22'-14"	76°-47'-10"	1769.06m
31.34	ARAVANKADU	11°-21'-30"	76°-46'-14"	1872.69m
37.19	KETTI	11°-22'-49"	76°-44'-20"	2082.15m
41.76	LOVEDALE	11°-22'-54"	76°-42'-20"	2192.70m
45.88	UDAGAMANDALAM	11°-24'-09"	76°-41'-45"	2203.20m

7 b

Nilgiri Mountain Railway

NOMINATION FOR INCLUSION IN THE WORLD HERITAGE LIST

PROPERTY MANAGEMENT PLAN

SOUTHERN RAILWAY
PALGHAT DIVISION

I N D E X

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 upto 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 atleast 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) (i) 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 as :-

a) Identification of vulnerable areas.

b) Plantation of Juli Glora 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 hutments 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) Joints 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 Inspectors 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 periodical 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 Assistant Divisional Engineer/Podanur, who will 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 at 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 grace 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, jhopries 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) CATEGORUY – 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, cowdung, 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 in 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/Podanur.

" 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/Podanur 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 incipient 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 on the appeals against the orders of Estate Officers.

f) Railway Protection Force renders all help in removal of soft encroachments as and when their assistance is sought. They should also provide assistance in 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/Sr.Divisional 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 look-out for construction of new structures and report such occurrences at once to the Assistant Divisional Engineer/Podanur.

c) In case unauhorised 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.

(O) 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 Nilagiri Mountain Railway.

II BUILDINGS

The buildings in the Nilagiri 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 trusses, 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 out side 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 Nilagiri 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 Nilagiri 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 consist 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 steeel trough 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

Km	Type of Rail	Laid year	Type of sleeper	Laid year
0/0-2.67	50R	87-88	WOOD	71-72
2.67-2.603	50R	70-71	STEEL	71-72
2.603-5.737	50R	60-61	WOOD	47-48
5.737-6.268	50R	35-36	WOOD	55-56
6.268-7.335	50R	31-32	WOOD	47-48
7.335-8.335	50R	41-42	WOOD	41-42
8.335-12.670	50R	43-44	WOOD	81-82
12.670-16.268	50R	87-88	WOOD	81-82

(ii) SLEEPER DETAILS

Km	Laid year	Type of sleeper	Laid year
16.268-23.134	43-44	WOOD	81-82
23.134-24.603	40-41	WOOD	81-82
24.603-27.0	38-39	WOOD	81-82
27.0-27.134	65-66	WOOD	65-66
27.134-30.0	36-37	WOOD	48-49
30.0-33.536	41-45	WOOD	48-49
33.536-36.737	48-49	WOOD	48-49
36.737-36.780	54-55	WOOD	48-49
36.780-40.0	99-00	CST-9	1999-00
40.0-41.0	54-55	CST-9	97-98
41.0-42.0	97-98	CST-9	97-98
42.0-42.603	96-97	CST-9	95-98
42.603-45.837	95-96	CST-9	95-98
45.837-46.0	54-55	WOOD	48-49

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 60mm and + or – 6mm and given attention to keep within the tolerance and attention given wherever requires.

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.662 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/Arakkonam confirming to RDSO standard.

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

H. MAINTENANCE ORGANSIATION.

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.

G.No. & Stn	Jurisdiction	Track Structure	Gang hut
1/MTP	0/0-6/7	50R,W+ST	MTP Yard
2/QLR	6/7-10/7	50R,W+ST	QLR
3/ADY	10/7-14/0	50R,W+ST	12/2-3
4/HLG	14/0-17/0	50R,W+ST	16/11-12
5/HLG	17/0-19/7	50R,W+ST	18/11-12
6/RME	19/7-22/1	50R,W+ST	20/7-8
7/KXR	22/1-24/1	50R,W+ST	24/7
8/ONR	24/1-27/7	50R,W+ST	26/10-11
9/WEL	27/7-31/2	60R, W	WEL
10/AVK	31/2-35/0	60R CST-9	31/3-4
11/KXT	35/0-38/0	60R CST-9	37/2-3
12/LOV	38/0-42/0	60R CST-9	41/10-11
13/UAM	42/0-46/0	60R CST-9	UAM

ENGINEERING FEATURES OF NILGIRI MOUNTAIN RAILWAYS AT A GLANCE

1	**Date of opening of the section**	
A	MTP-QLR	15.06.1899
B	ONR to FER	15.09.1908
C	FER to UAM	15.10.1908
2	**Number of stations**	
A	Block stations	9
B	Watering stations	3
	TOTAL	12
3.	**Length of section**	45.88
4	**Gauge**	1 Metre
5	**Rack section**	
a)	Length	19 Kms .from 7/8-9 to Km.26/8-9
b)	Total Number of rack bars	12,000
C	Steepest gradient in the rack section	1 in 12.28
6	**Curves**	
a)	Total	216
b)	Between 10 to 17	180
c)	Between 5 to 10	23
d)	Flatter than 5	13
7	Track 50 R FF, 50 O, 60 R rails with M+2 & M+3 sleeper density Steel and wooden in Rack section and CST-9 plates	
8	Speed in the rack section	13 Kmph
9	Speed in non rack section	30 Kmph
10	**Tunnels**	
a)	Number of Tunnels	16
b)	Longest Tunnel	Tunnel No.16 at Km.44/7-9 between UA&M & LOV Length 137.46 Mtrs
c)	Length of track coming in Tunnels	952.71 Mtrs
11	Gangs	13 Gangs+1 gang to attend colony

IV BRIDGES

The prestigious stretch of track connectiing Mettupalayam and Ooty, 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 rivetted 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 Hilgroove stations at km12/8-9 is a marvellous piece of technological excellence/expertise worth mentioning, which was constructed during the year 1898. This design though has become obsolete now, caters to the water flow from nearby thick forest and water falls. This bridge spaning 42.30 metre has a fixed end at Hilgroove 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 builtup steel beams, bottom floor bracings, vertical and slanting members etc., with rivetted 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 spaning 24. 38m.,18.29m. 12 m and below.

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

Sl No.	No of Major bridges with steel girder & Spans	No.of Minor bridges with steel girder & spans	All Minor bridges of other structures like Rail slabs, CI pipe crossing & spans	Total
1)	31/51	24/67	132	250

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, tilting 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- tales 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) STRUCTURALCONDITIONS OFSTEEL WORK: It is ascertained whether the structural condition is satisfactory and loss of camber in the main girders assessed from comparative readings. Also distertion 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 atended immediately. It is also ascertained that the bearings are fully and evenly seated on the bed blocks and the holding down-bolts are inposition 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 Yelloow Zinchromate to IS.104 followed with one coat of Red Oxide Zinchromate 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.

Sl.No.	Designation.	No. of staff
1.	SSE/BRIDGES	1
2.	JE/I/BRIDGES	2
3.	Supervisor	2-
4.	Technician/Rivetter Gr.I	2
5.	Technician/Rivetter Gr.II	2
6.	Technician/Rivetter Gr.III	2
7.	Black Smith Gr.II-	1
8.	Welder/GasCuter Gr.I	1
9.	Mechanic Gr.1	1
10.	Helper Gr.I	44

V. TUNNELS

There are 16 tunnels between Kallar 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.44/7-9 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.DEN/C –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.

Tunnel No	Location	Between	Length	Vertical clearance at centre above R.L
1	9/10-11	ONR-HLG	34.44	4.648 Mtrs
2	11/10-11	ONR-HLG	19.51	4.039
3	12/3 ½			
4	12/7-8	ONR-HLG	446.84	4.135
5	144/6-7	ONR-HLG	19.51	3.68
6	14/9-10	ONR-HLG	79.25	5.182
7	15/3-4	ONR-HLG	88.39	4.1166
8	17/8-9	HLG-ONR	32.92	4.394
9	17/10-11	HLG-ONR	30.48	4.267
10	19/5-6	HLG-ONR	201.12	4.001
11	19/11-12	HLG-ONR	62.48	4.343
12	21/3-4	HLG-ONR	95.1	3.962
13	23/12-24/1	HLG-ONR	72.85	5.232
14	38/9-10	KXT-LOV	76.22	5.461
15	42/5-6	LOV-UAM	53.64	6.071
16	44/7-9	LOV-UAM	137.46	6.994
Total length of track under tunnels: 952.71 Mtrs				

Southern Railway

Property Management Plan

Application for Inscription as World Heritage Site

SOUTHERN RAILWAY

MANAGEMENT OF ROLLING STOCK ON NILGIRI MOUNTAIN RAILWAY

A. CARRIAGE & WAGON

There are 31 coaches and 11 wagons based at Mettuppalayam. 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 Mettuppalayam 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 Mettuppalayam- Kallar section with 'X' Class locomotives, procured from Swiss Locomotive Works, Winterthur in 1920 and 1952. Trains in the Coonoor–Udhagamandalam 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.

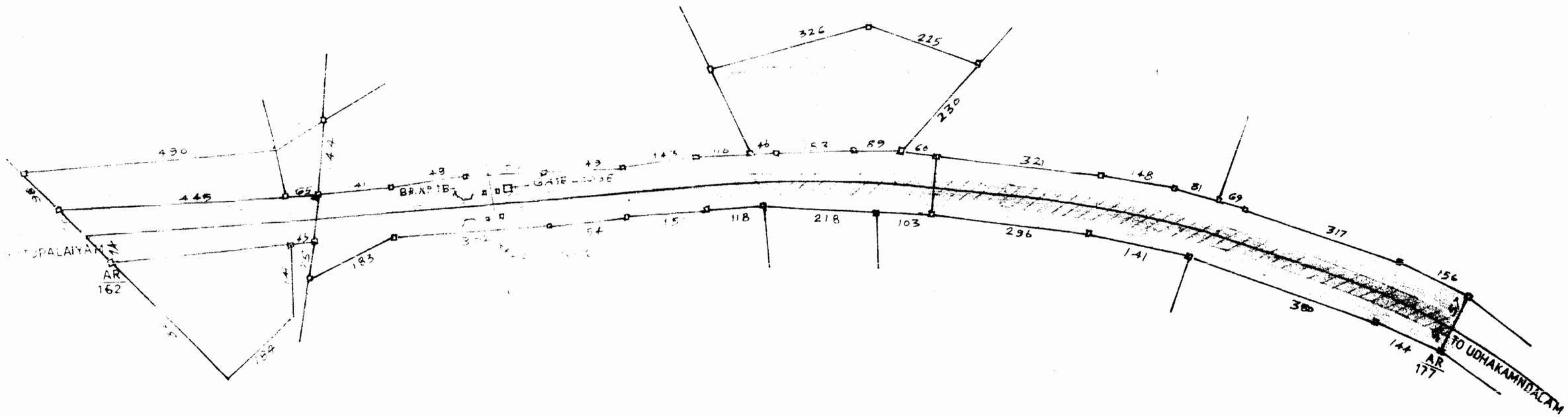
B) That of traction by pinions acting upon the rack bars.

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 adhension 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 Mettuppalayam. 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 duly 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 Nilagiri Mountain Railway.



AREA OF LAND = 1·94 Hectares
AREA UNDER CORE ZONE = 0·45 Hectares
AREA UNDER BUFFER ZONE = 1·49 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 0/240 TO KM 0/800

AREA OF LAND = 1.60 Hectares
AREA UNDER CORE ZONE = [redacted] Hectares
AREA UNDER BUFFER ZONE = 1.18 Hectares

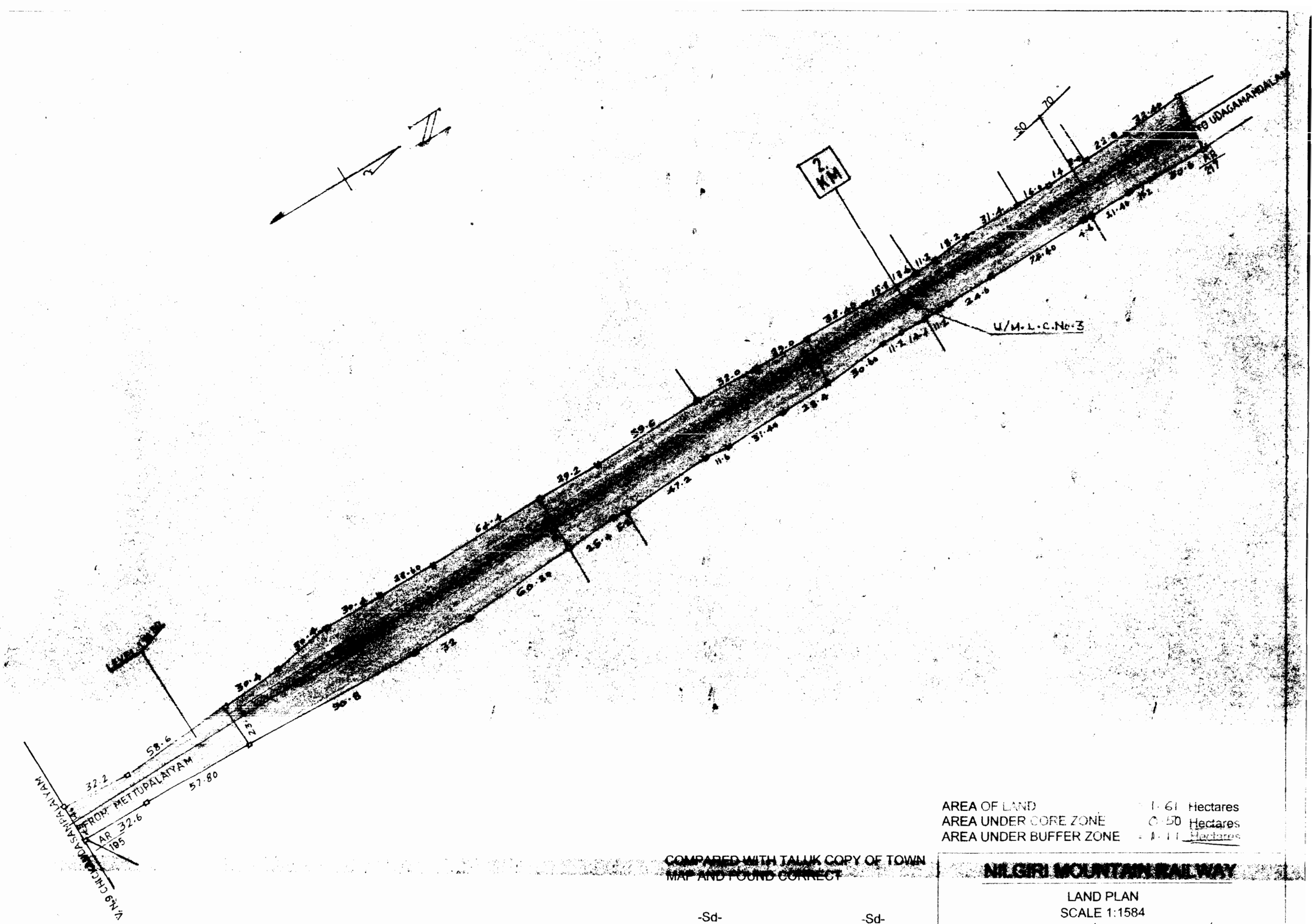
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 0/800 TO KM 1/520



AREA OF LAND 1·61 Hectares
AREA UNDER CORE ZONE 0·50 Hectares
AREA UNDER BUFFER ZONE 1·11 Hectares

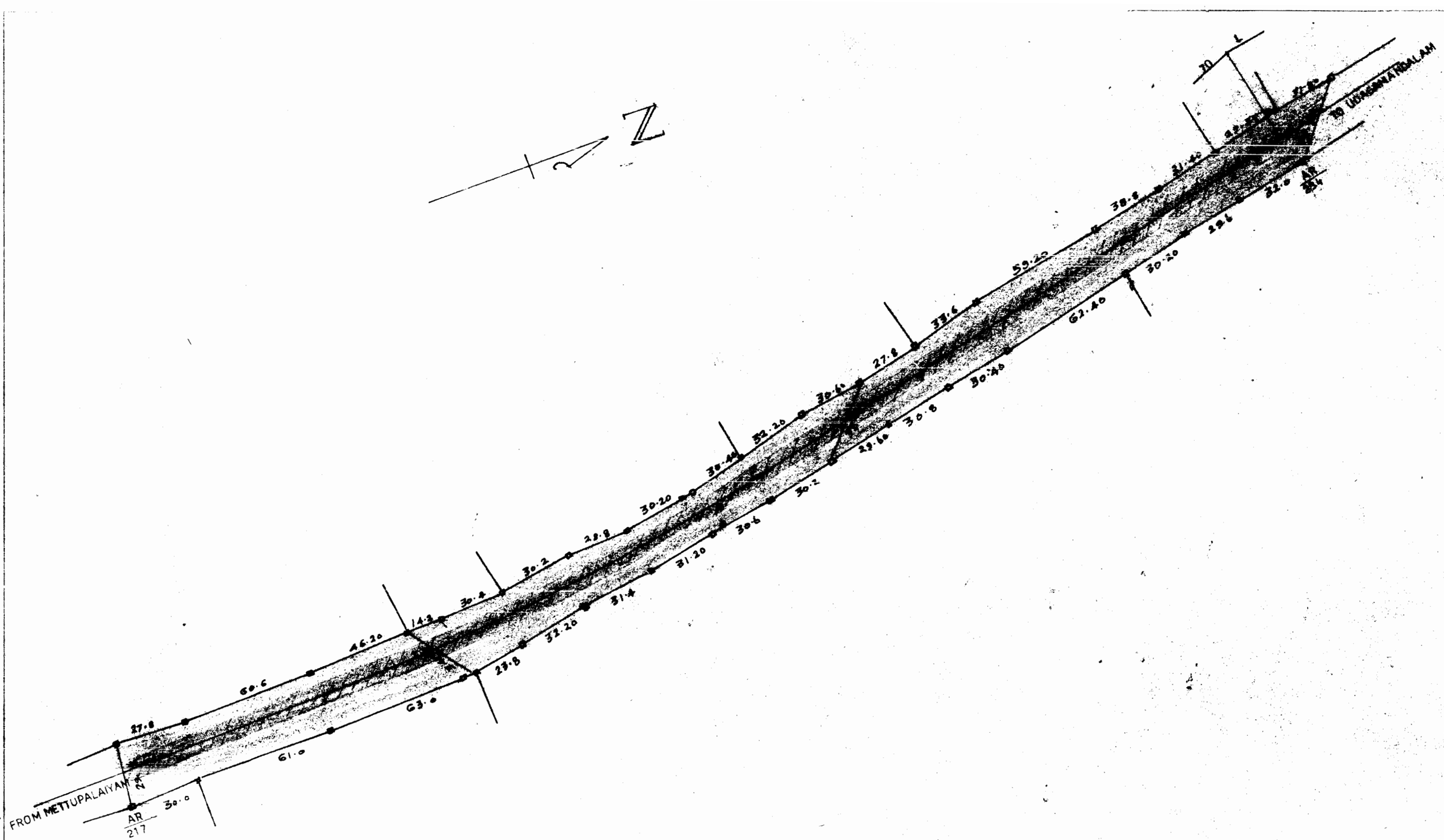
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 1/520 TO KM 2/160



AREA OF LAND = 1.15 Hectares
AREA UNDER CORE ZONE ~~= 0.48 Hectares~~
AREA UNDER BUFFER ZONE = 0.67 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

~~Sd~~
TAHSILDAR

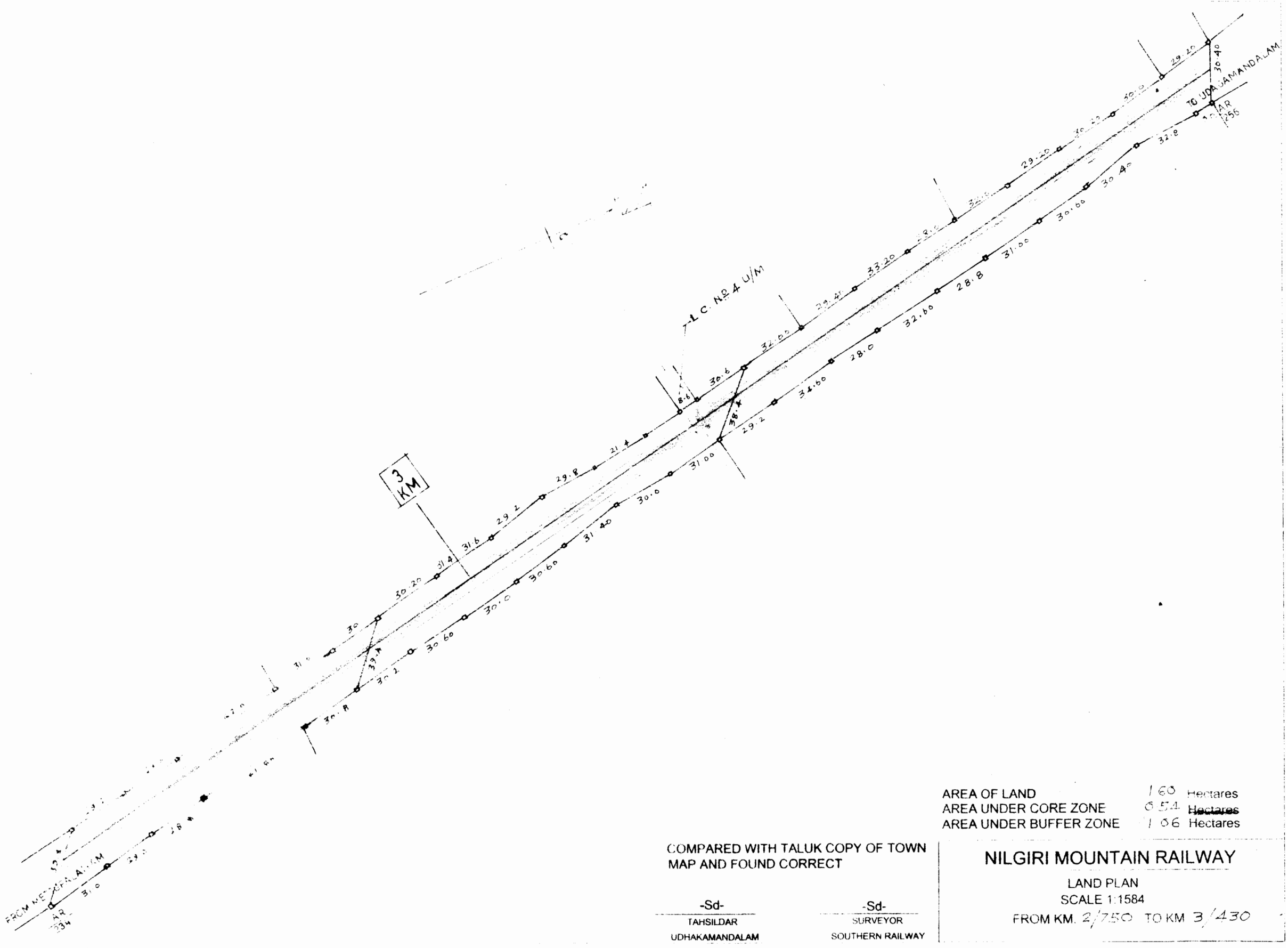
~~Sd~~
SURVEYOR

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1"=50ft

FROM KM 0/0 TO KM 2/250



AREA OF LAND 1.60 Hectares
AREA UNDER CORE ZONE 0.54 ~~Hectares~~
AREA UNDER BUFFER ZONE 1.06 Hectares

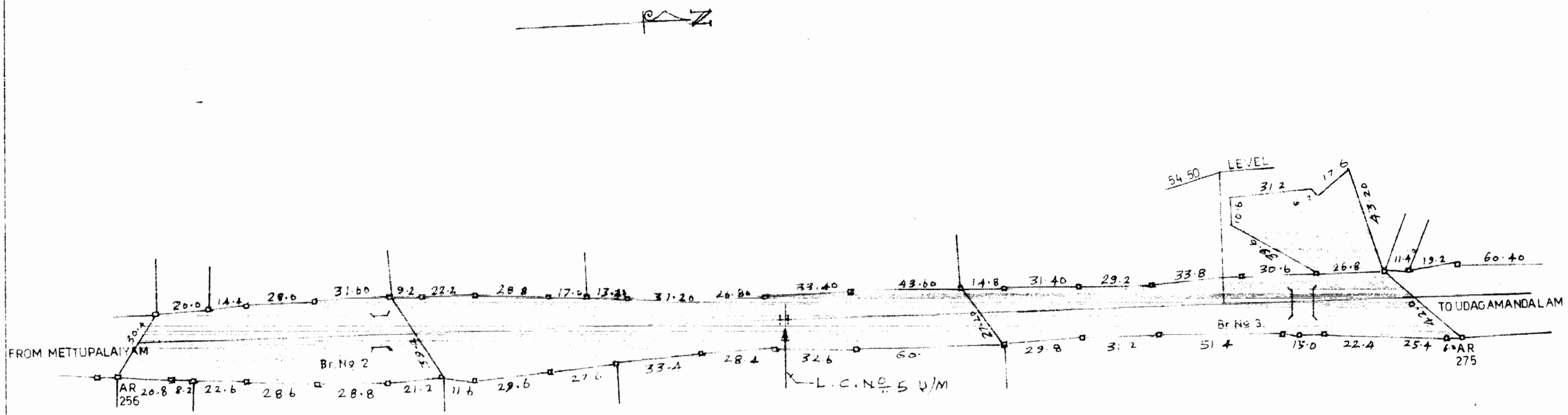
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 2/750 TO KM 3/430



AREA OF LAND = 1.43 Hectares
AREA UNDER CORE ZONE = ~~0.41 Hectares~~
AREA UNDER BUFFER ZONE = ~~1.02 Hectares~~

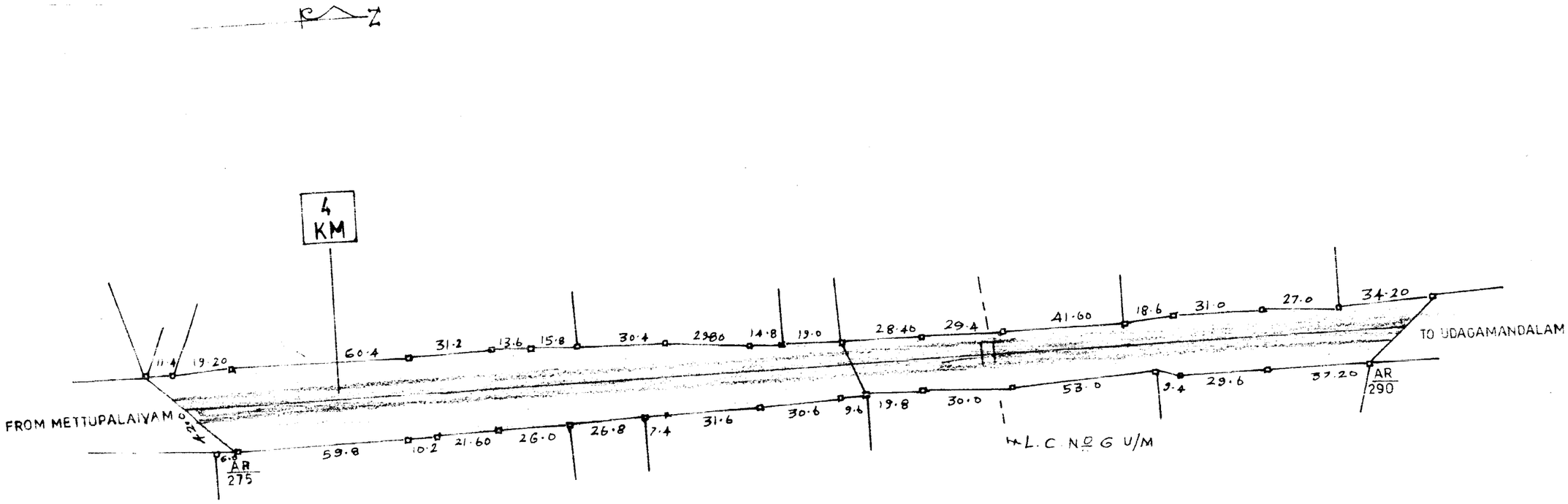
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 3/430 TO KM 3/950



AREA OF LAND - 1·25 Hectares
AREA UNDER CORE ZONE - 0·30 Hectares
AREA UNDER BUFFER ZONE - 0·95 Hectares

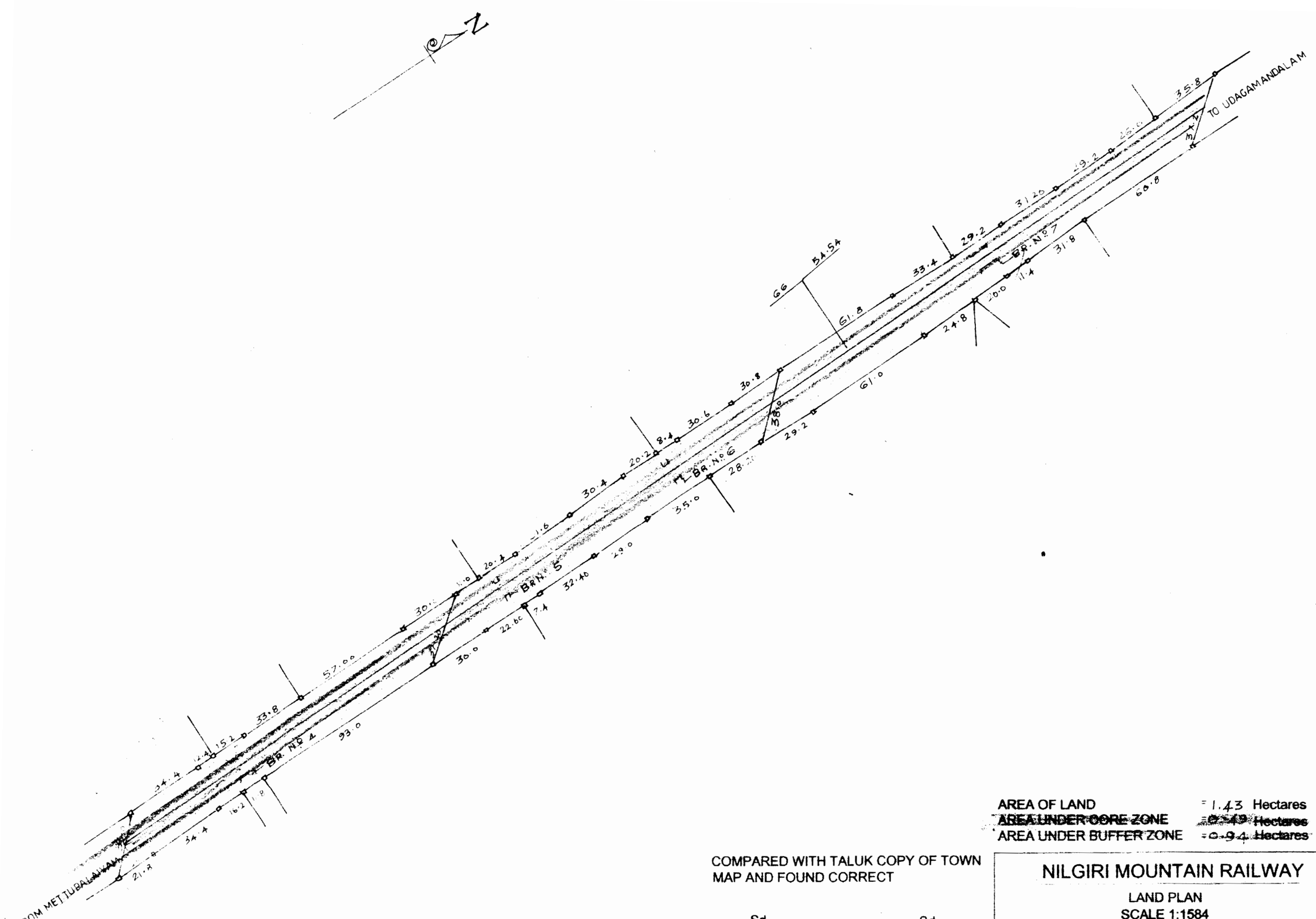
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 3/950 TO KM 4/390



AREA OF LAND = 1.43 Hectares
~~AREA UNDER OORE ZONE = 0.49 Hectares~~
AREA UNDER BUFFER ZONE = 0.94 Hectares

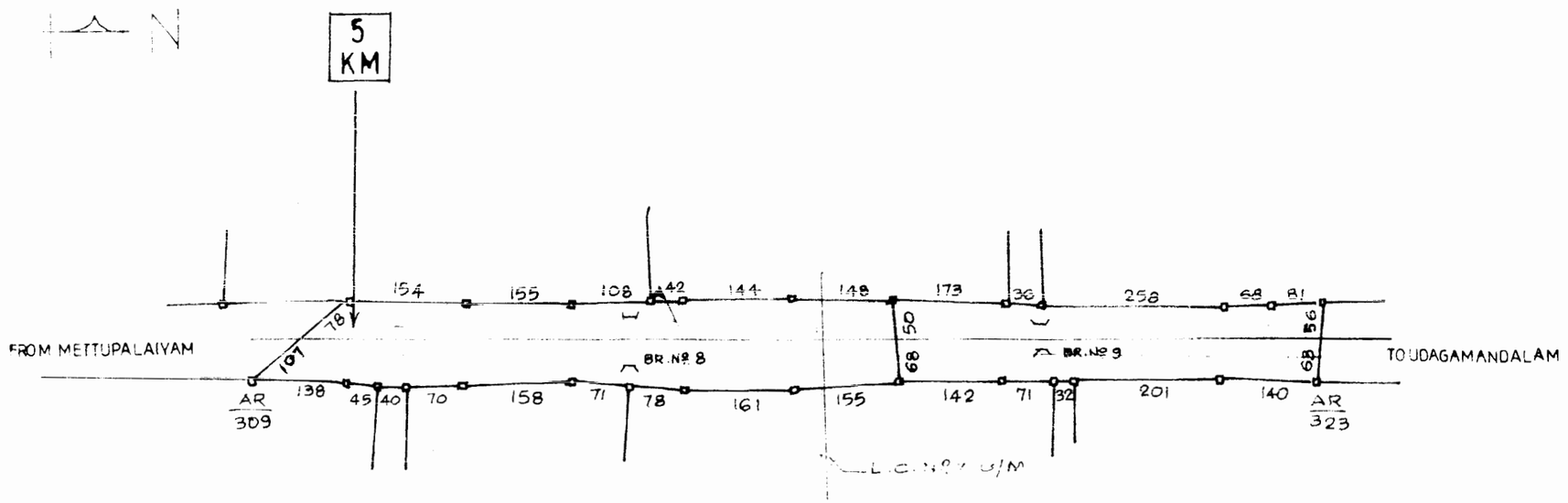
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 4/380 TO KM 4/980



AREA OF LAND = 0.68 Hectares
AREA UNDER CORE ZONE = 0.23 Hectares
AREA UNDER BUFFER ZONE = 0.45 Hectares

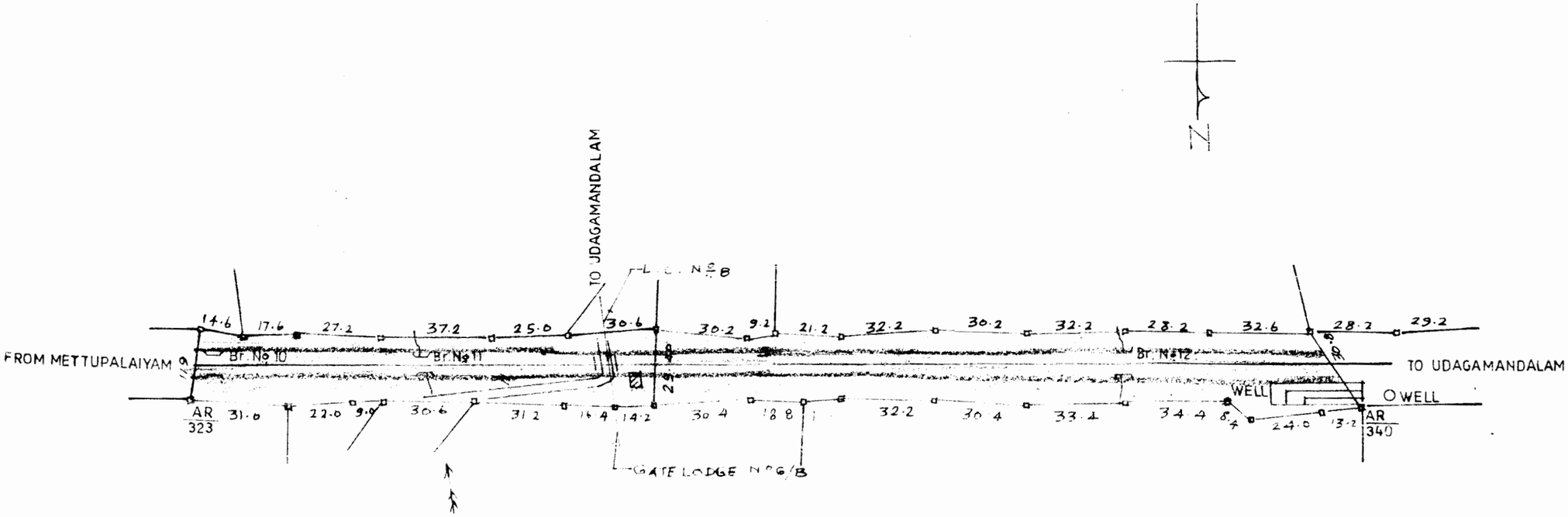
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 4/980 TO KM 5/240



AREA OF LAND = 0.89 Hectares
AREA UNDER CORE ZONE = 0.30 Hectares
AREA UNDER BUFFER ZONE = 0.59 Hectares

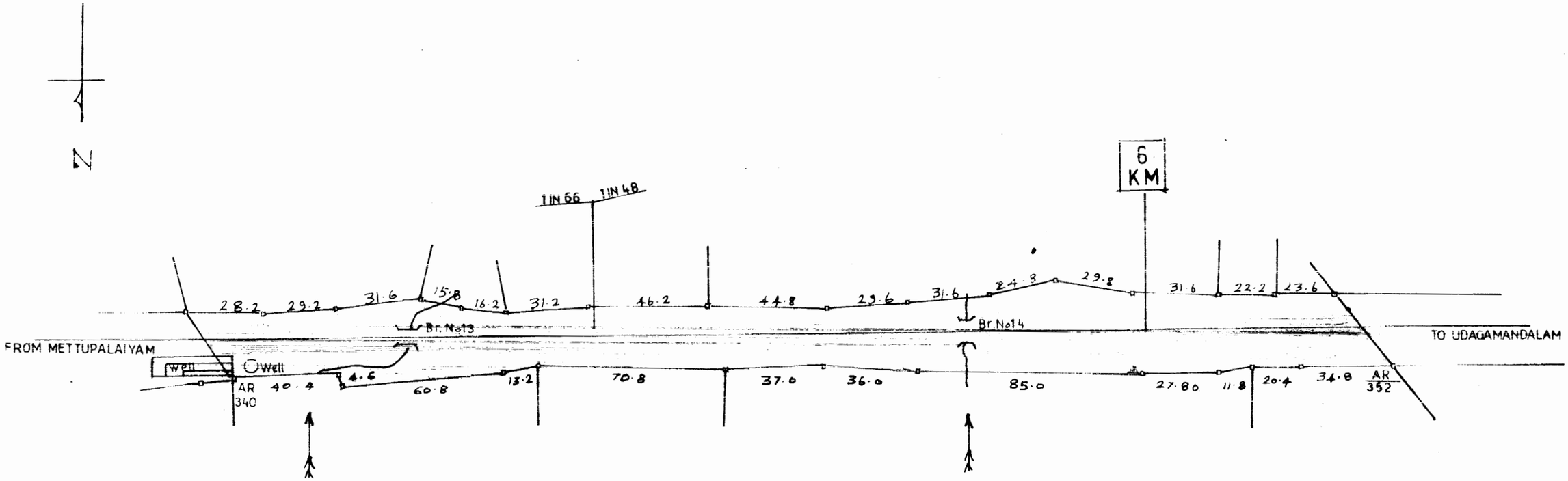
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 5/210 TO KM 5/620



AREA OF LAND = 1·59 Hectares
AREA UNDER CORE ZONE = 0·35 Hectares
AREA UNDER BUFFER ZONE = 1·24 Hectares

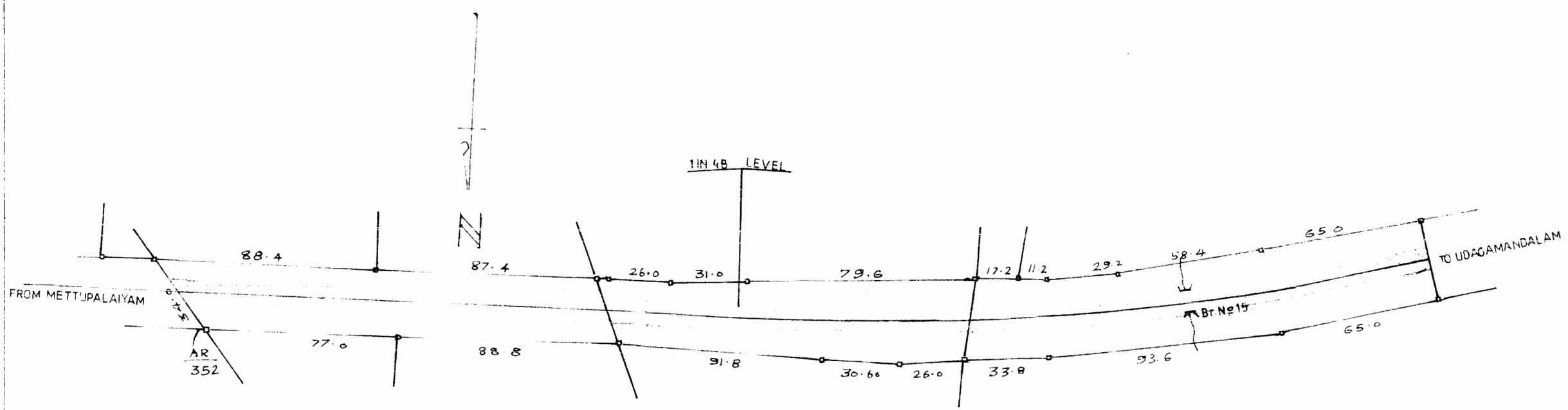
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 5/620 TO KM 6/080



AREA OF LAND = 1.51 Hectares
AREA UNDER CORE ZONE = ~~0.99~~ Hectares
AREA UNDER BUFFER ZONE = 0.52 Hectares

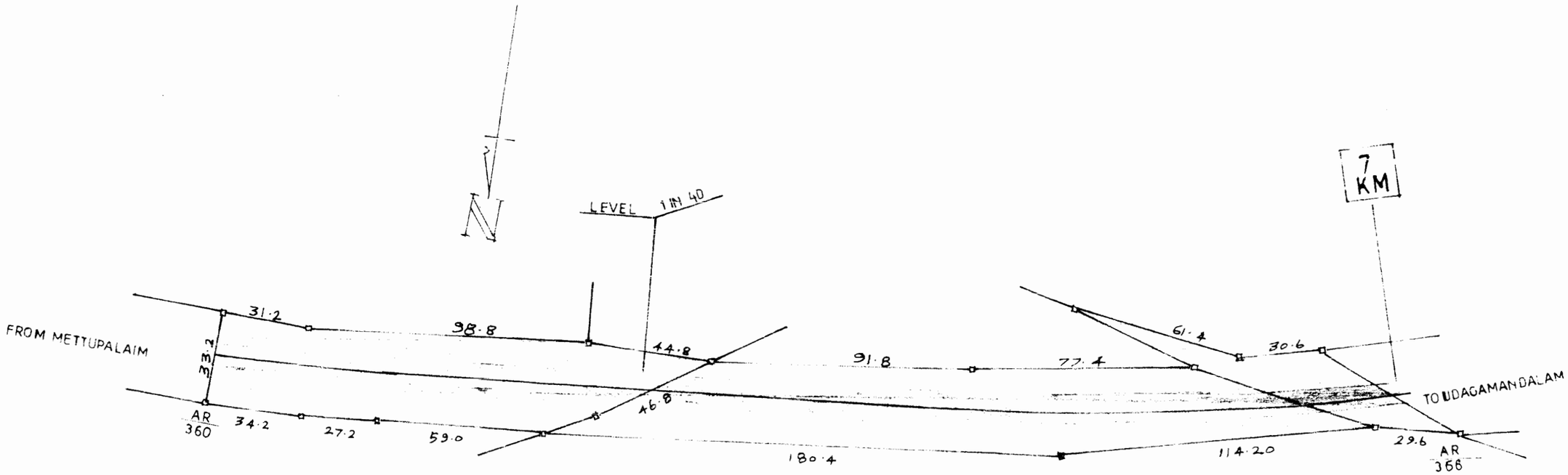
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 6/080 TO KM 6/580



AREA OF LAND = 1.02 Hectares
AREA UNDER CORE ZONE = 0.33 Hectares
AREA UNDER BUFFER ZONE = 0.69 Hectares

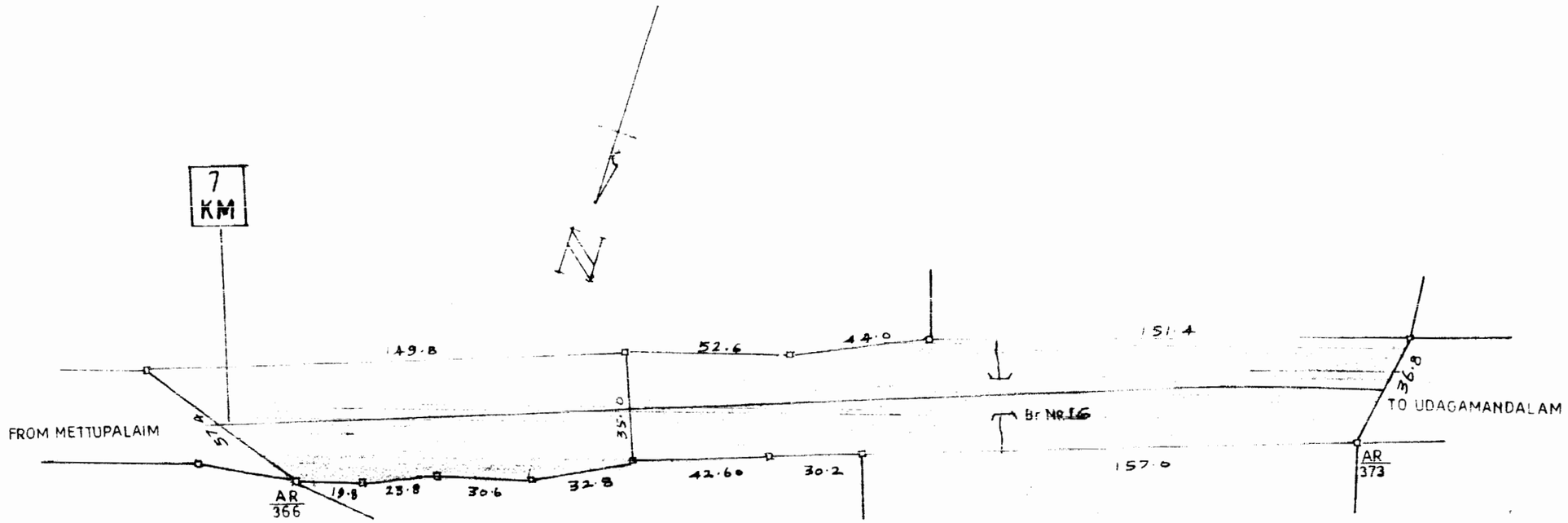
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 6/580 TO KM 7/000



AREA OF LAND = 1·27 Hectares
AREA UNDER CORE ZONE = 0·29 ~~Hectares~~
AREA UNDER BUFFER ZONE = 0·98 ~~Hectares~~

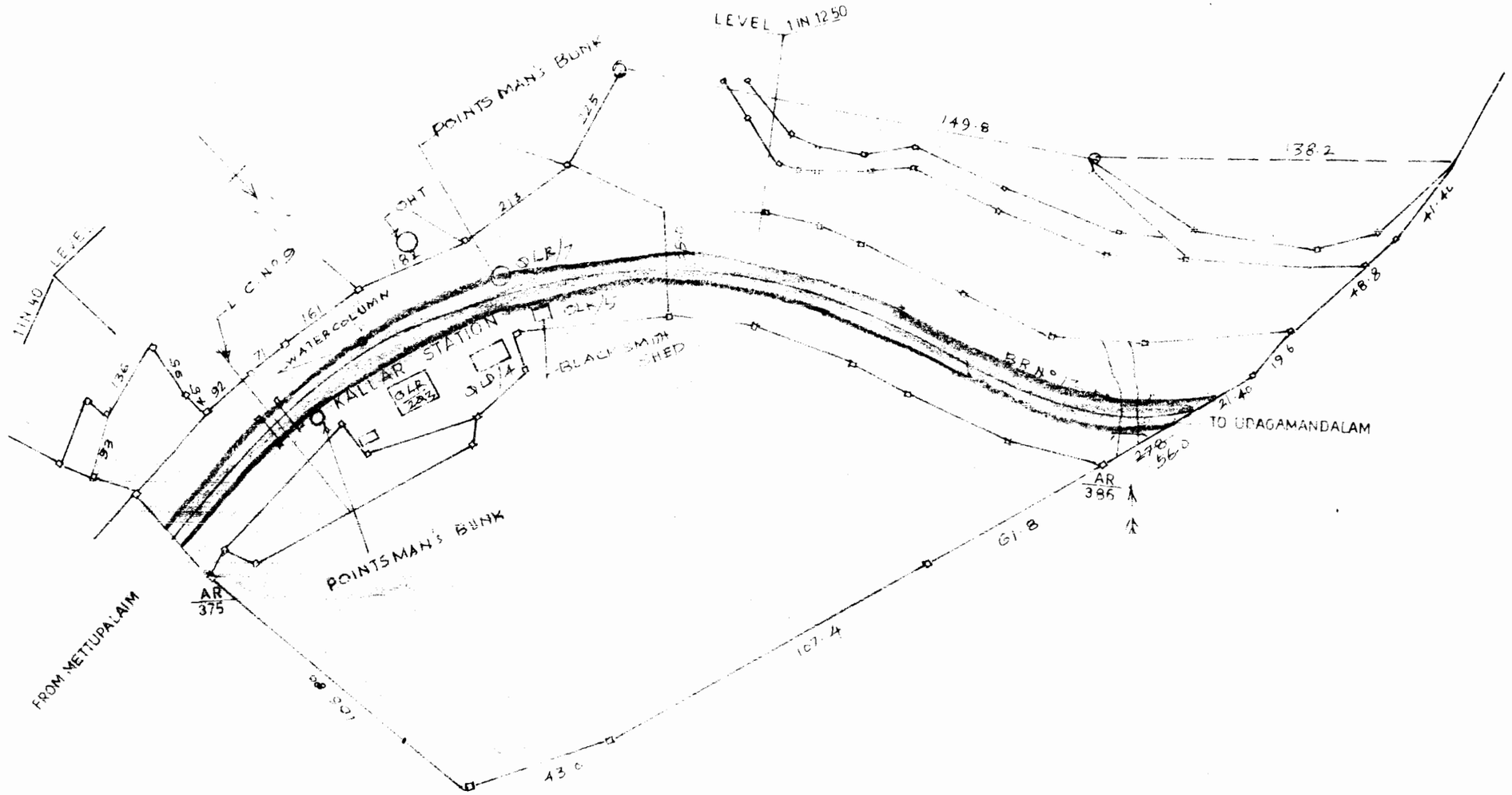
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 7/000 TO KM 7/360



AREA OF LAND = 4·82 Hectares
AREA UNDER CORE ZONE = ~~0·33~~ Hectares
AREA UNDER BUFFER ZONE = 4·49 Hectares

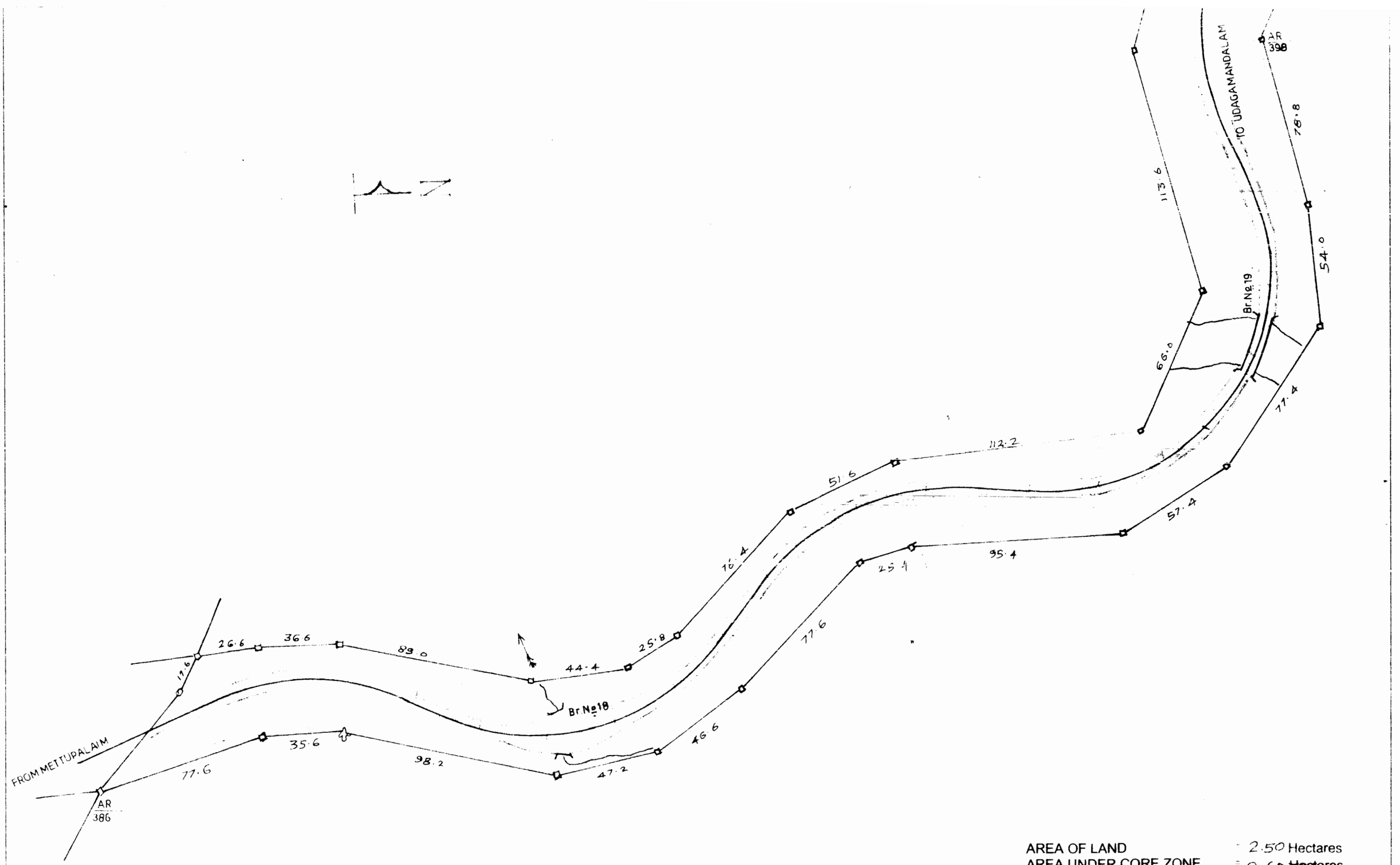
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 7/360 TO KM 7/770



AREA OF LAND = 2.50 Hectares
AREA UNDER CORE ZONE = 0.60 Hectares
AREA UNDER BUFFER ZONE = 1.90 Hectares

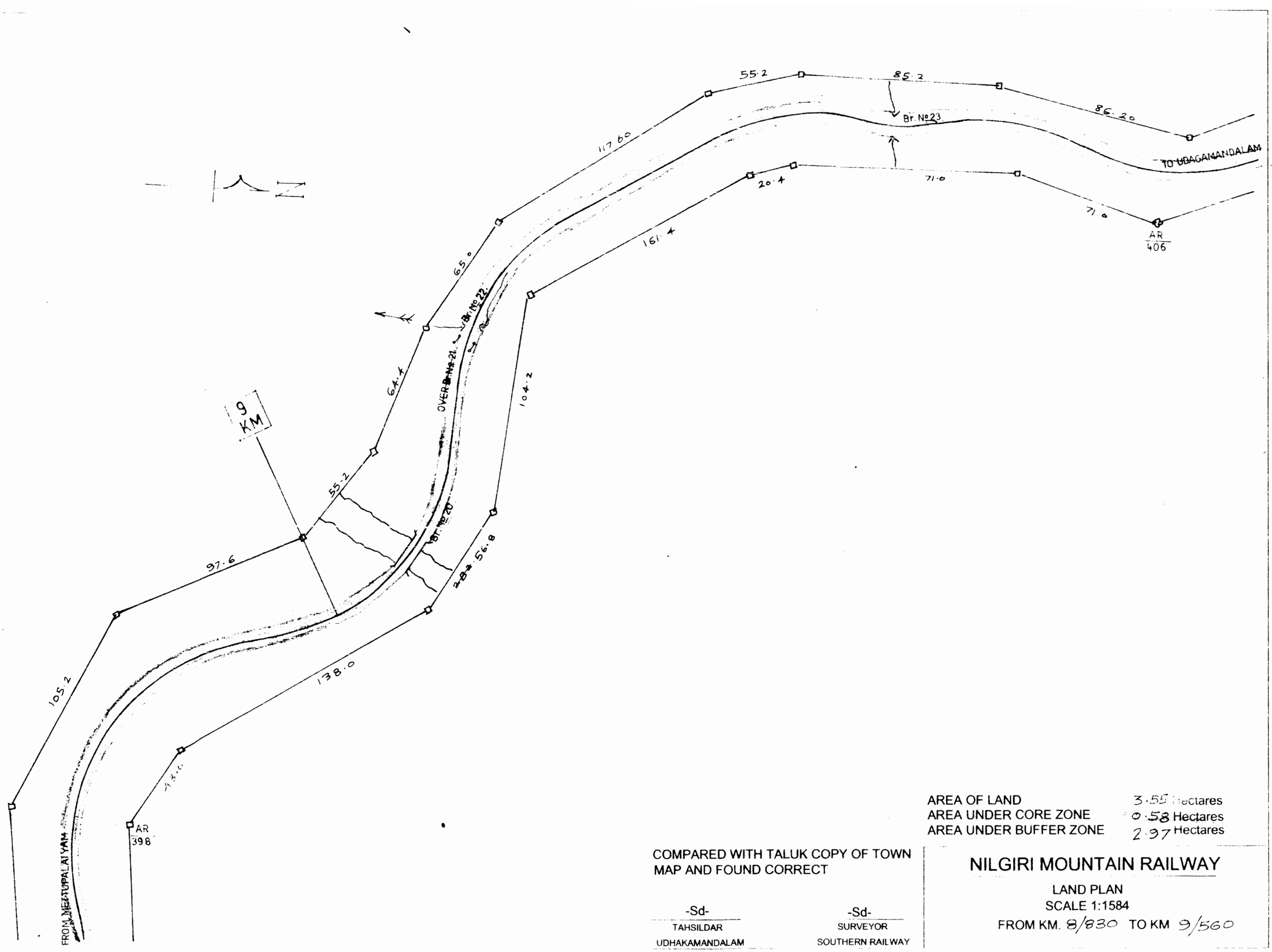
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 7/770 TO KM 8/830



AREA OF LAND 3·55 Hectares
AREA UNDER CORE ZONE 0·58 Hectares
AREA UNDER BUFFER ZONE 2·97 Hectares

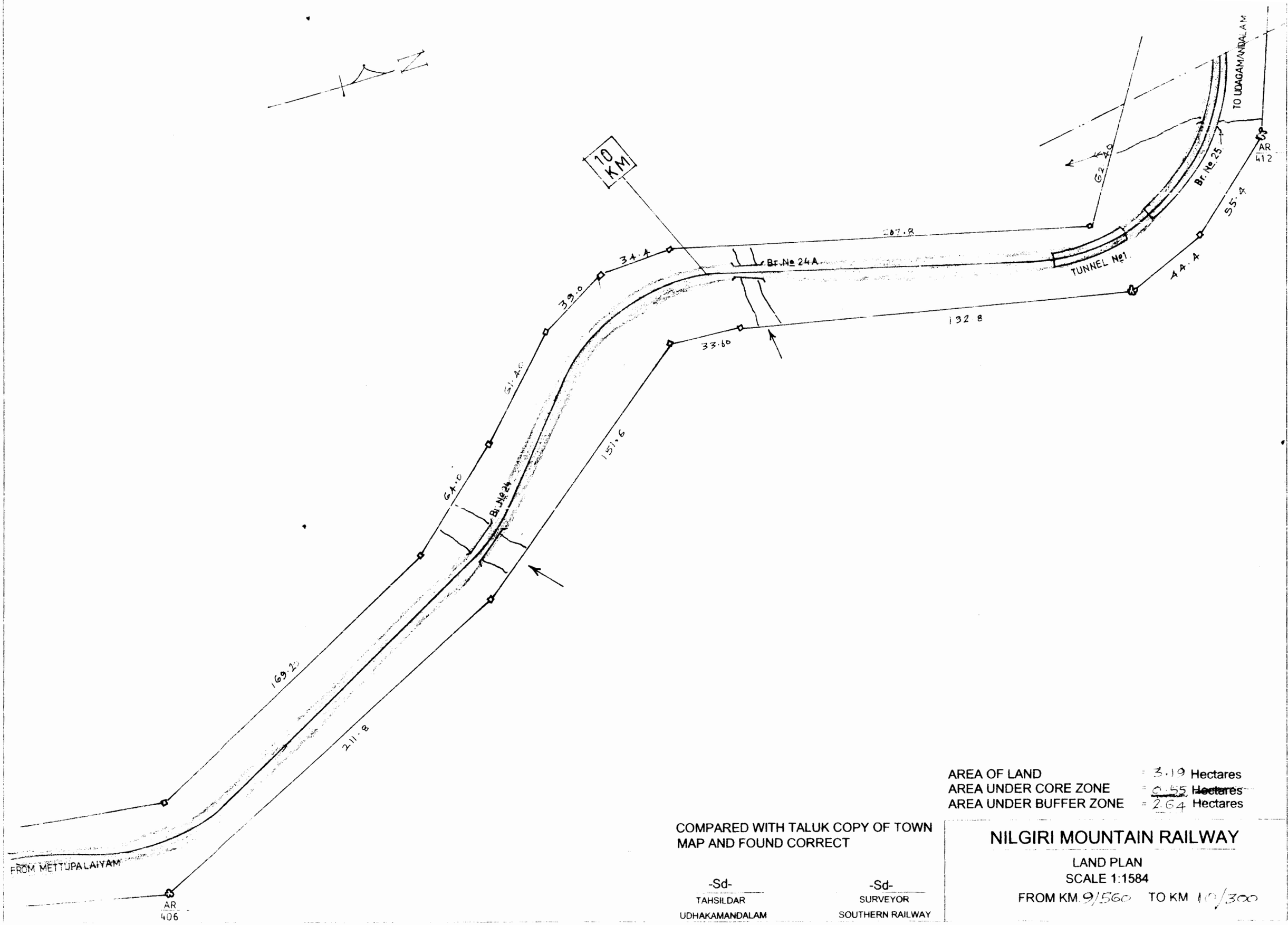
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 8/830 TO KM 9/560



AREA OF LAND = 3.19 Hectares
AREA UNDER CORE ZONE = 0.55 Hectares
AREA UNDER BUFFER ZONE = 2.64 Hectares

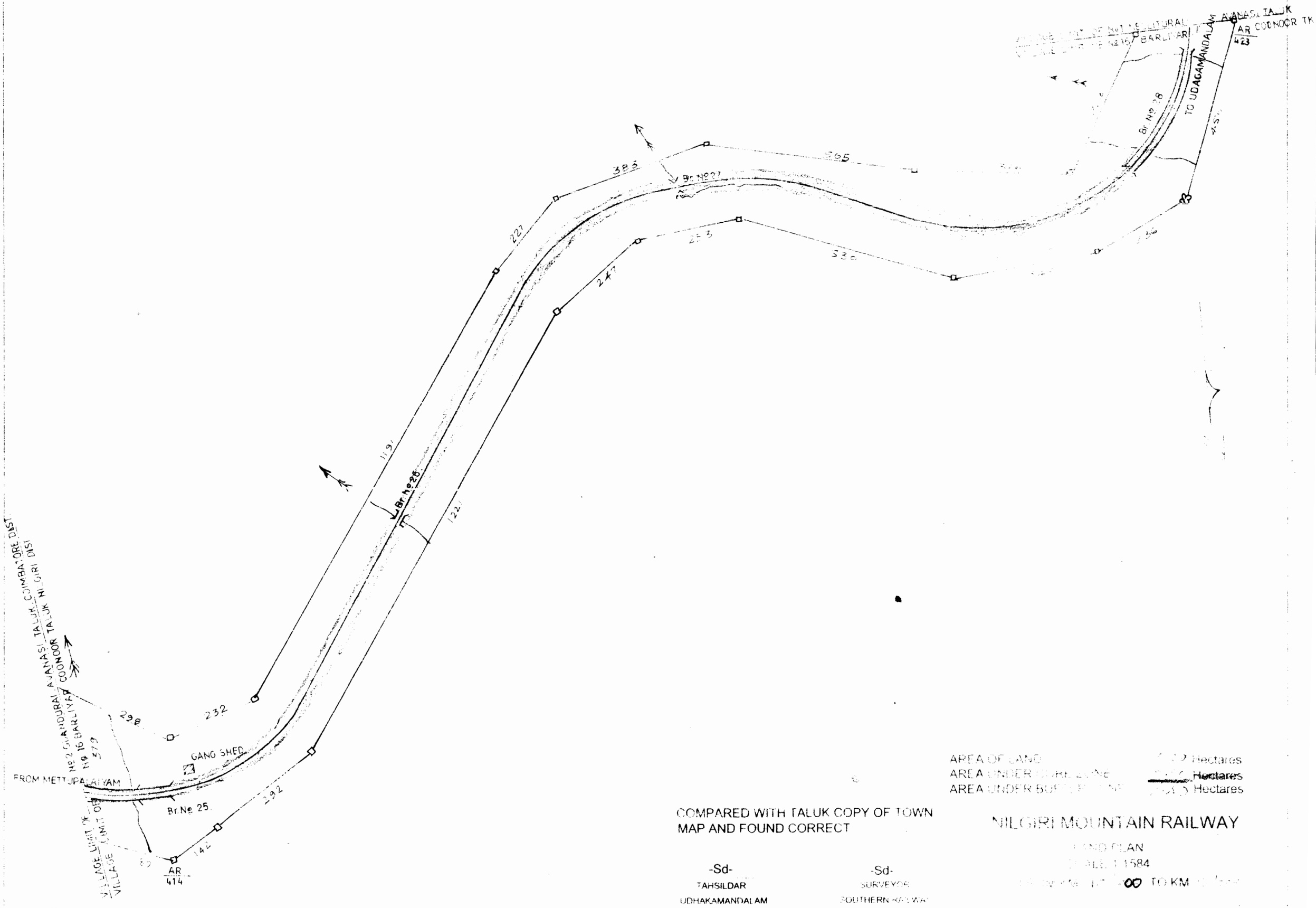
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 9/560 TO KM 10/300



AREA OF LAND [illegible] Hectares
AREA UNDER [illegible] Hectares
AREA UNDER [illegible] Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

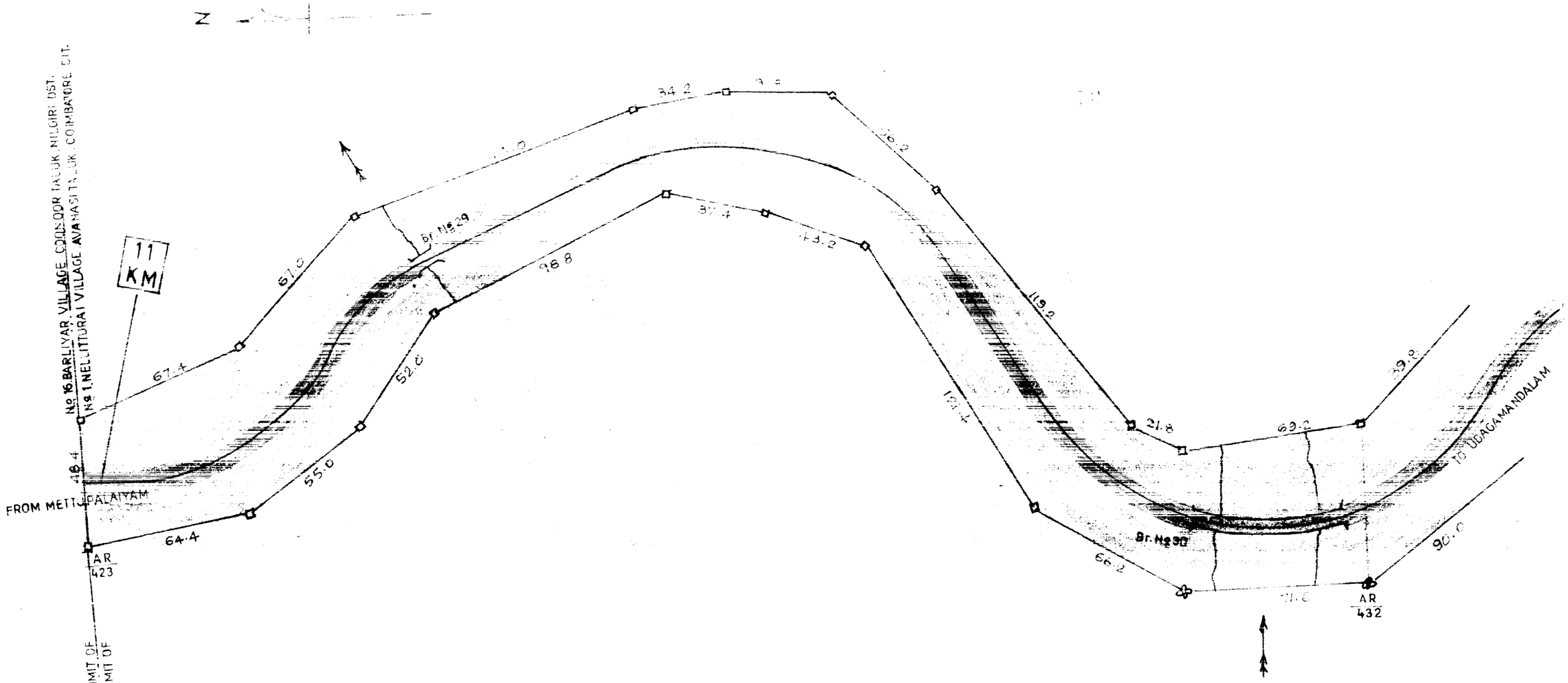
-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1584

[illegible] TO KM



AREA OF LAND [illegible] Hectares
AREA UNDER CORE ZONE [illegible] Hectares
AREA UNDER BUFFER ZONE [illegible] Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-

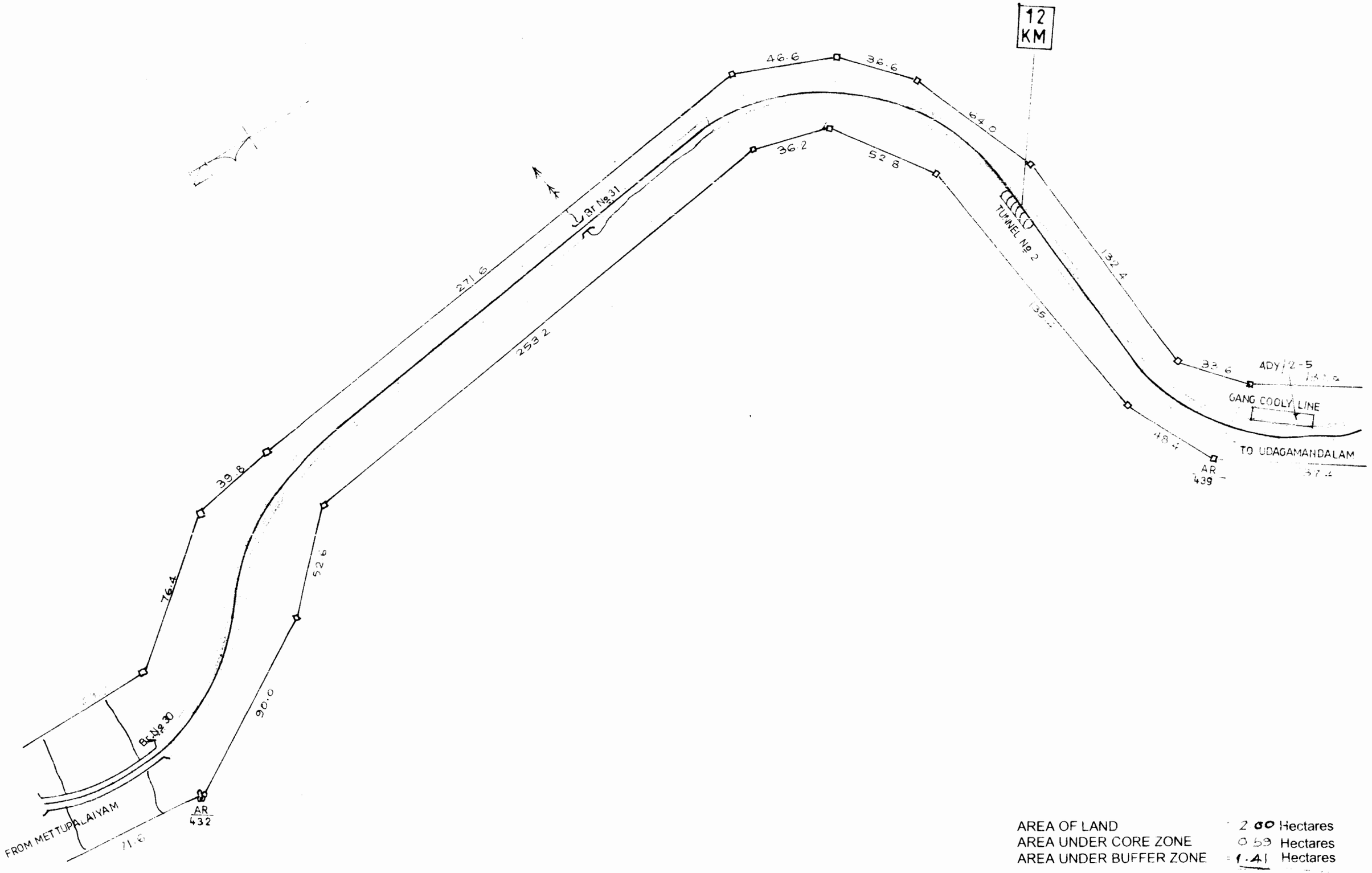
-Sd-

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1000

[illegible]



AREA OF LAND	2.60 Hectares
AREA UNDER CORE ZONE	0.59 Hectares
AREA UNDER BUFFER ZONE	1.41 Hectares

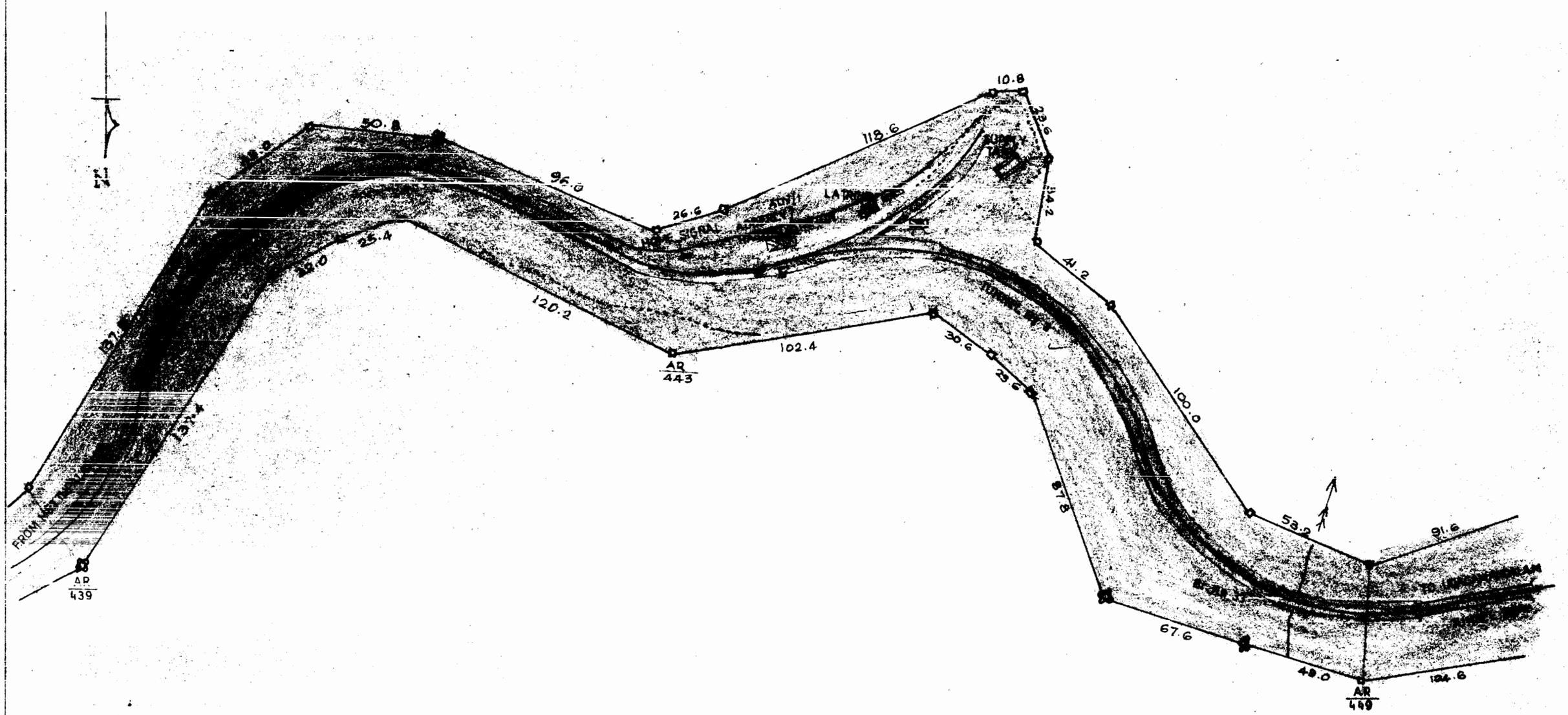
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 11/460 TO KM 12/140



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

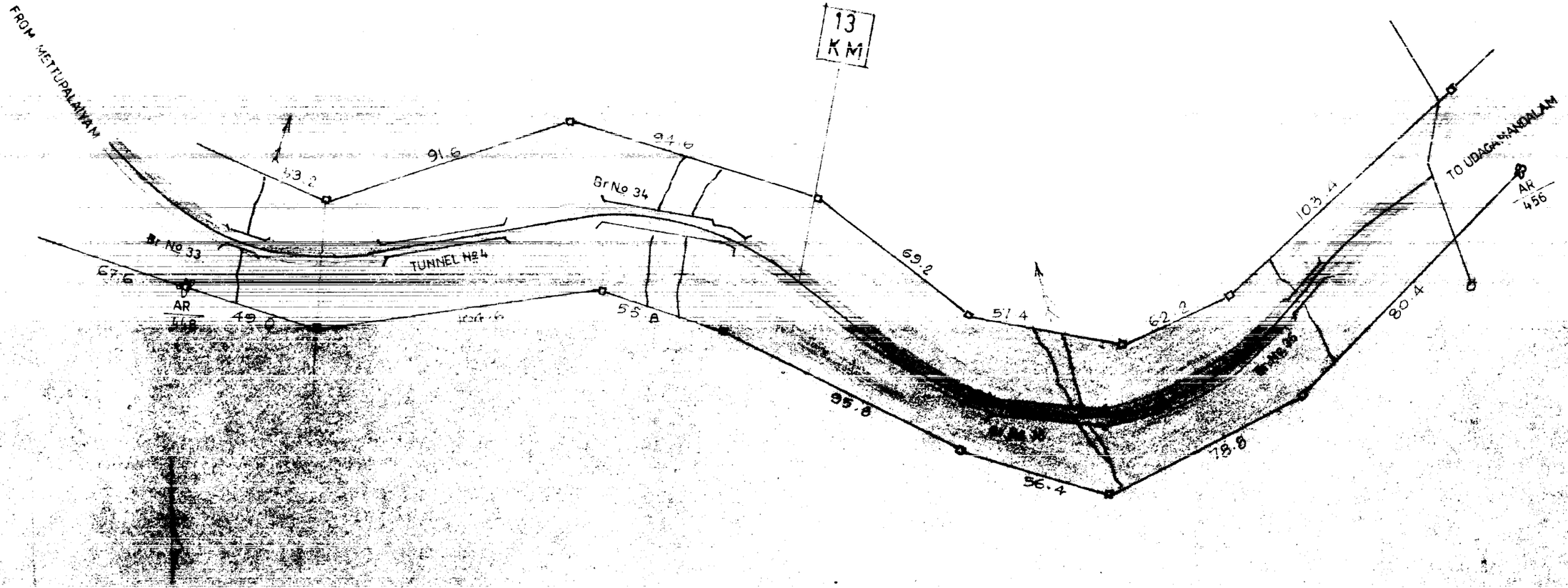
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 12/1440 TO KM 12/6220



AREA OF LAND : [illegible]
AREA UNDER DUMB ZONE : [illegible]
AREA UNDER BUFFER ZONE : [illegible]

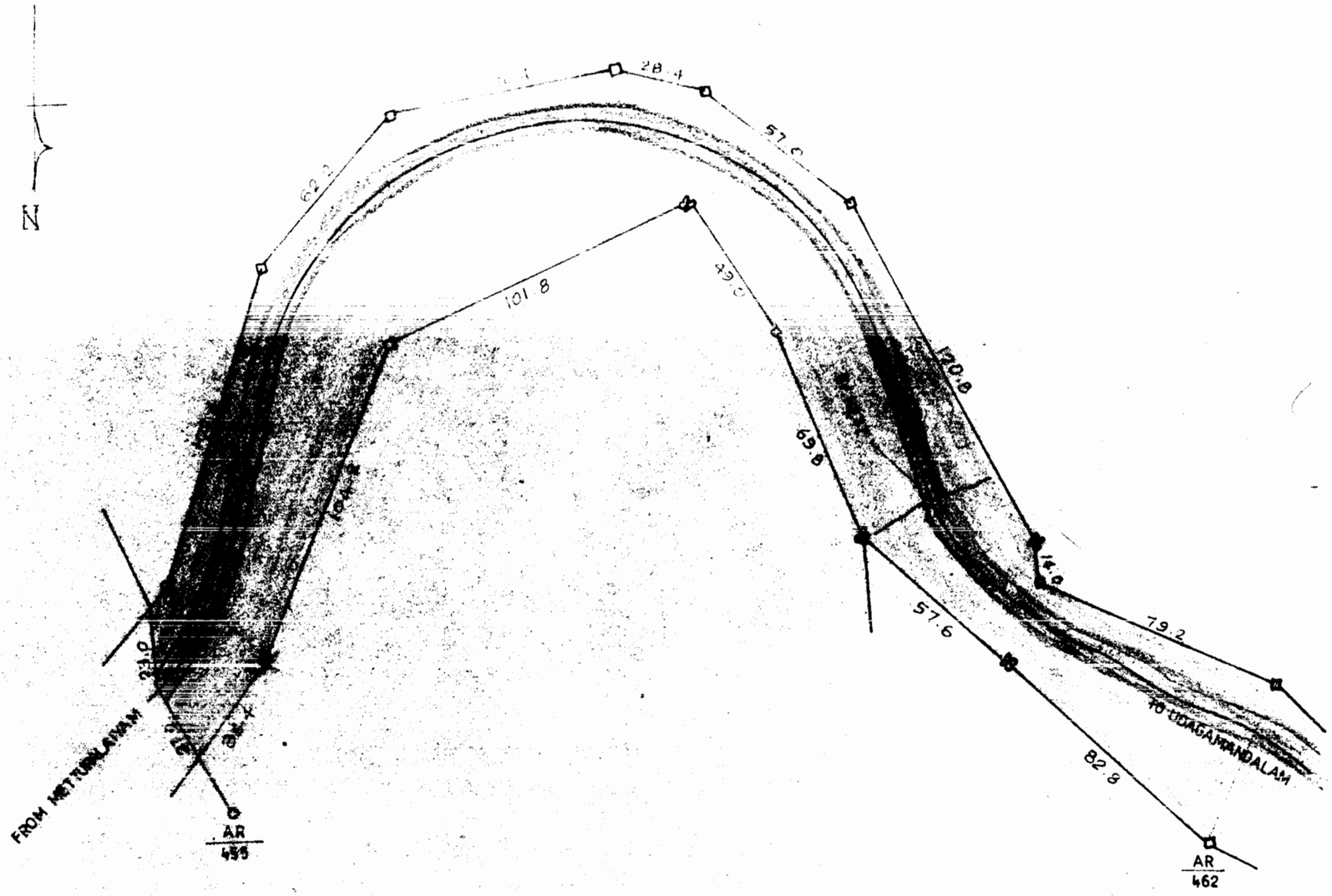
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 12/9.45 TO KM. [illegible]



AREA OF LAND = 1·52 Hectares
AREA UNDER CORE ZONE = 0·42 Hectares
AREA UNDER BUFFER ZONE = 1·10 Hectares

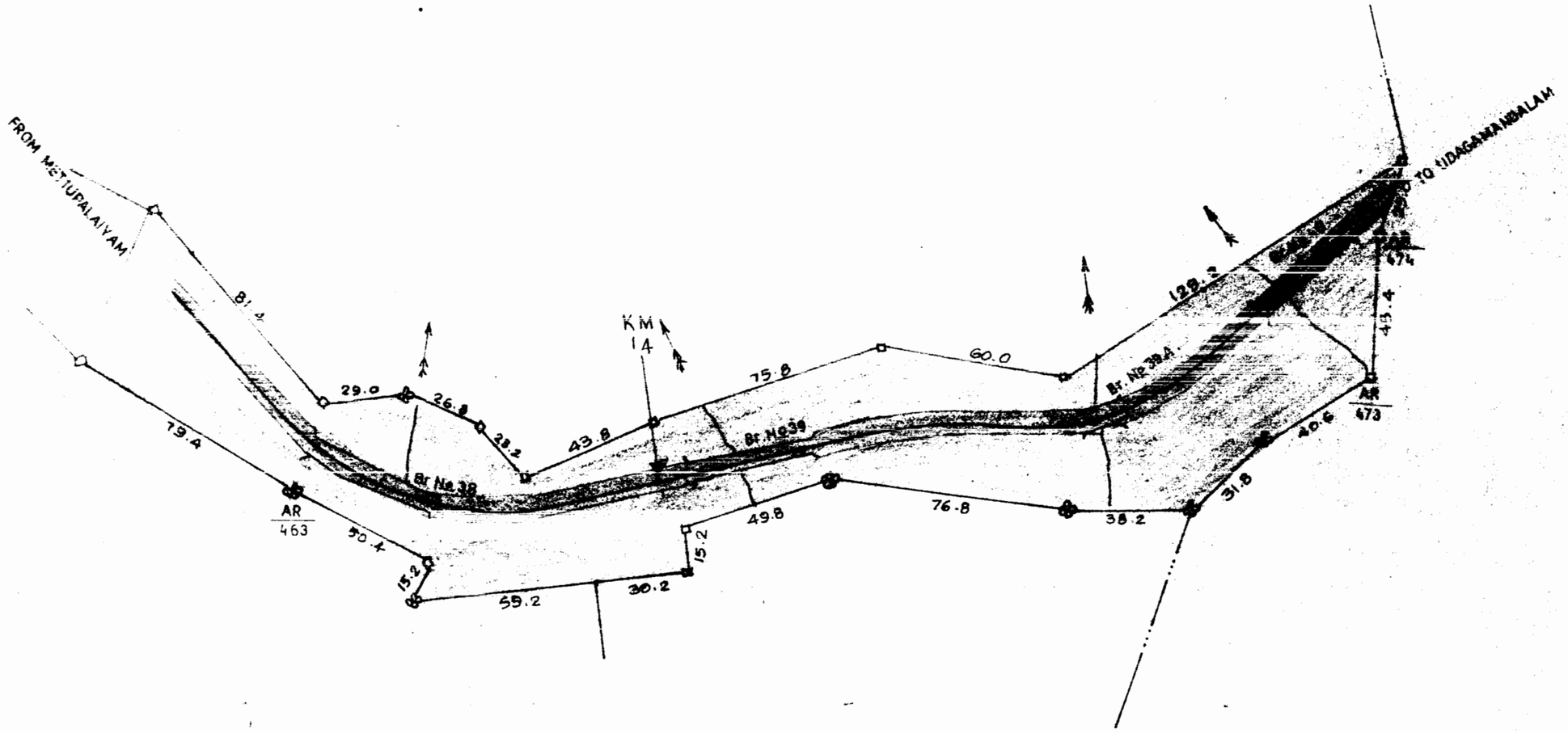
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 13/2000 TO KM 13/800



AREA OF LAND = 1.05 Hectares
AREA UNDER CORE ZONE = 0.37 Hectares
AREA UNDER BUFFER ZONE = 0.68 Hectares

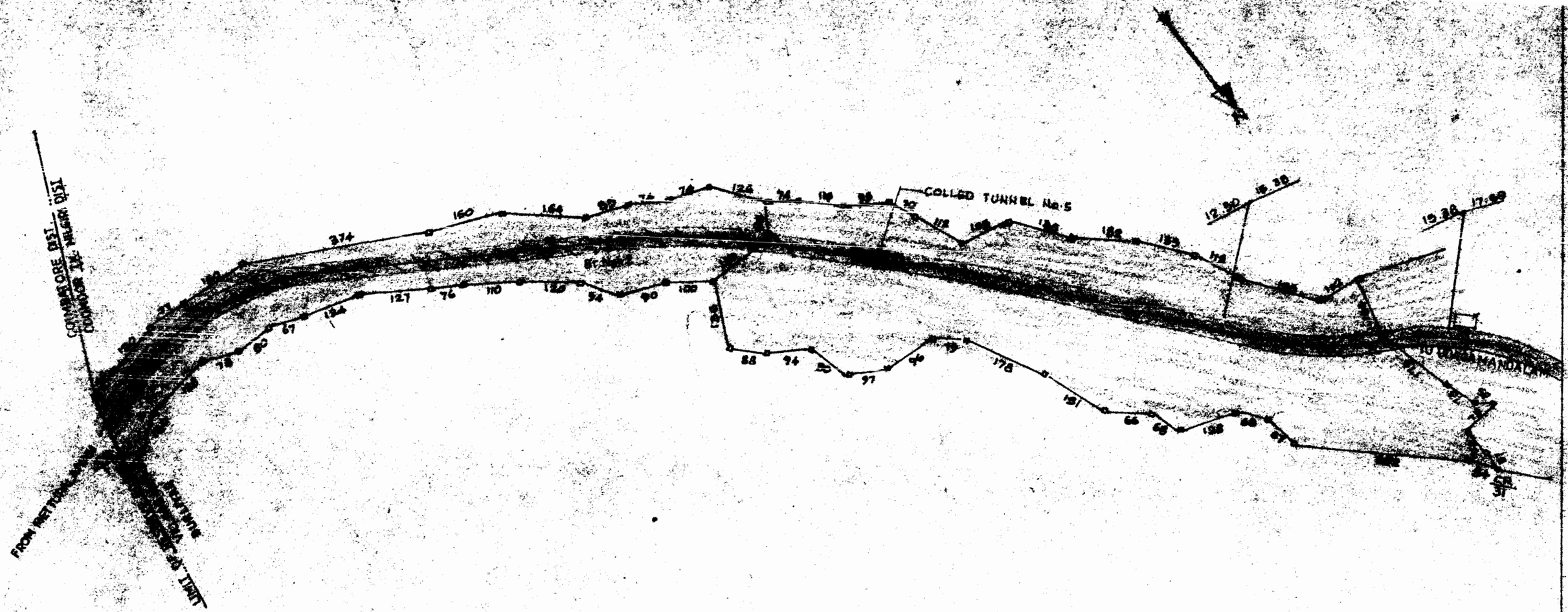
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 13/800 TO KM 14/260



AREA OF LAND = 2.96 Hectares
AREA UNDER CORE ZONE = 0.40 Hectares
AREA UNDER BUFFER ZONE = 2.56 Hectares

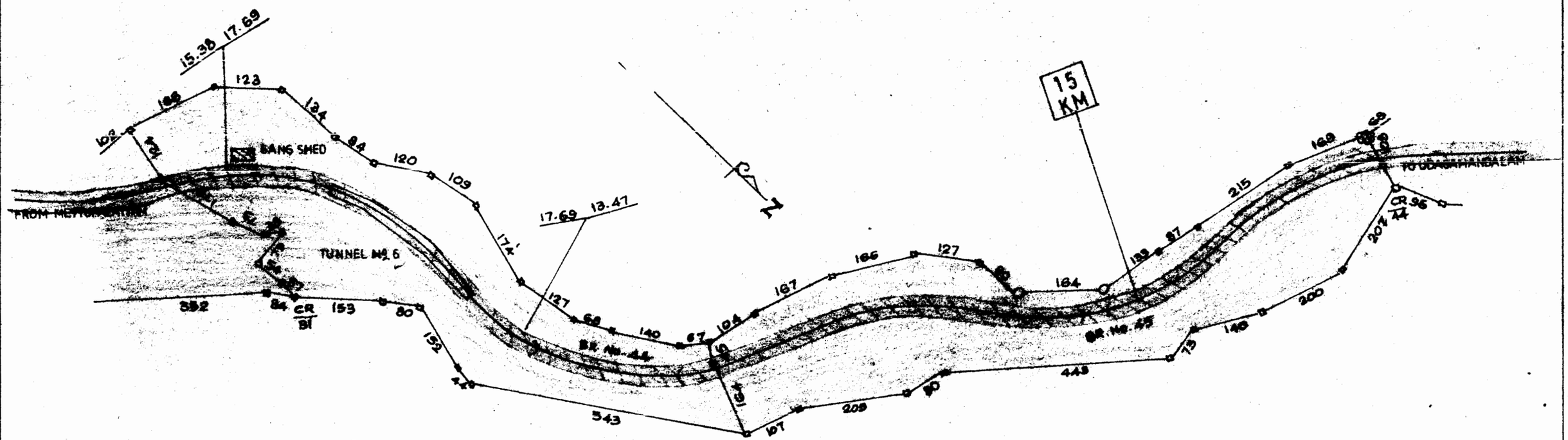
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 14.260 TO KM: 14/400



AREA OF LAND = 2·39 Hectares
AREA UNDER CORE ZONE = 0·43 Hectares
AREA UNDER BUFFER ZONE = 1·96 Hectares

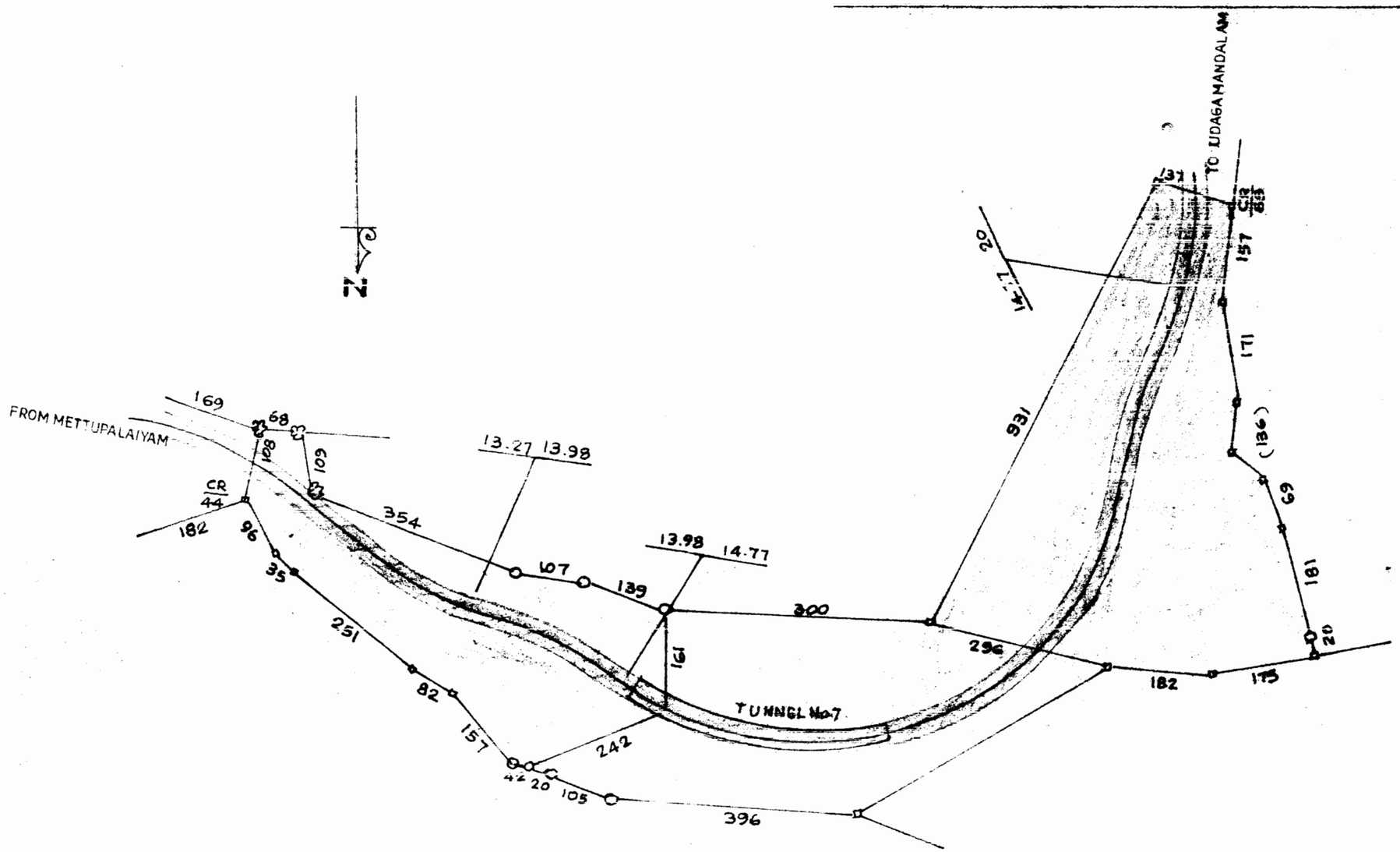
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 14/400 TO KM: 15/120



AREA OF LAND = 1.86 Hectares
AREA UNDER CORE ZONE = 0.37 Hectares
AREA UNDER BUFFER ZONE = 1.49 Hectares

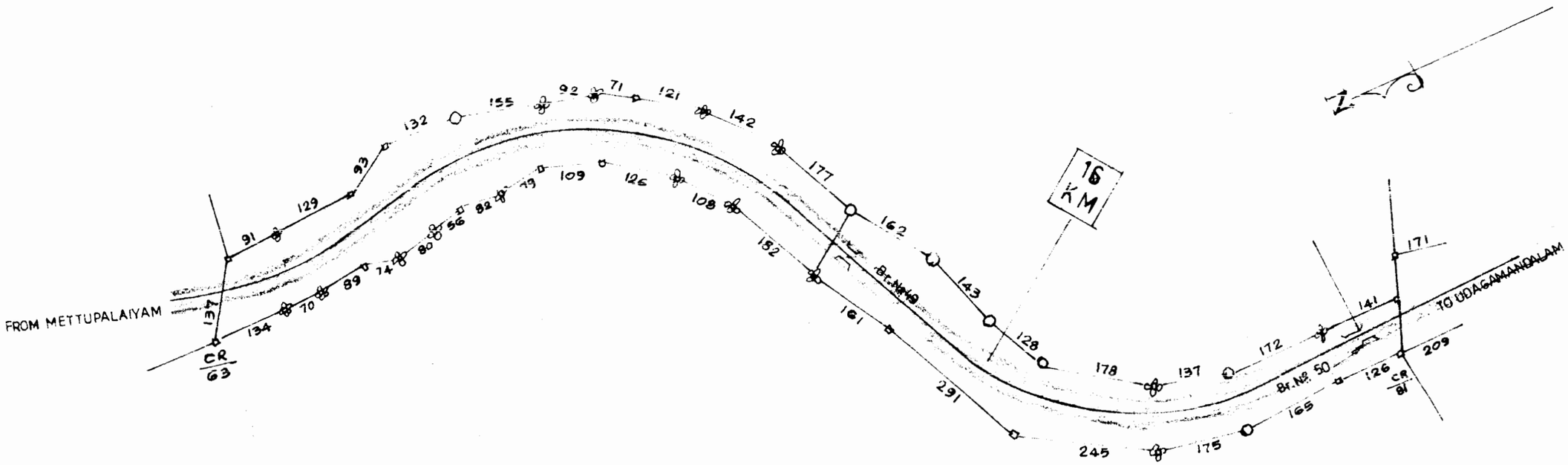
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 15/120 TO KM: 15/700



AREA OF LAND 1·22 Hectares
AREA UNDER CORE ZONE 0·37 ~~Hectares~~
AREA UNDER BUFFER ZONE 0·85 ~~Hectares~~

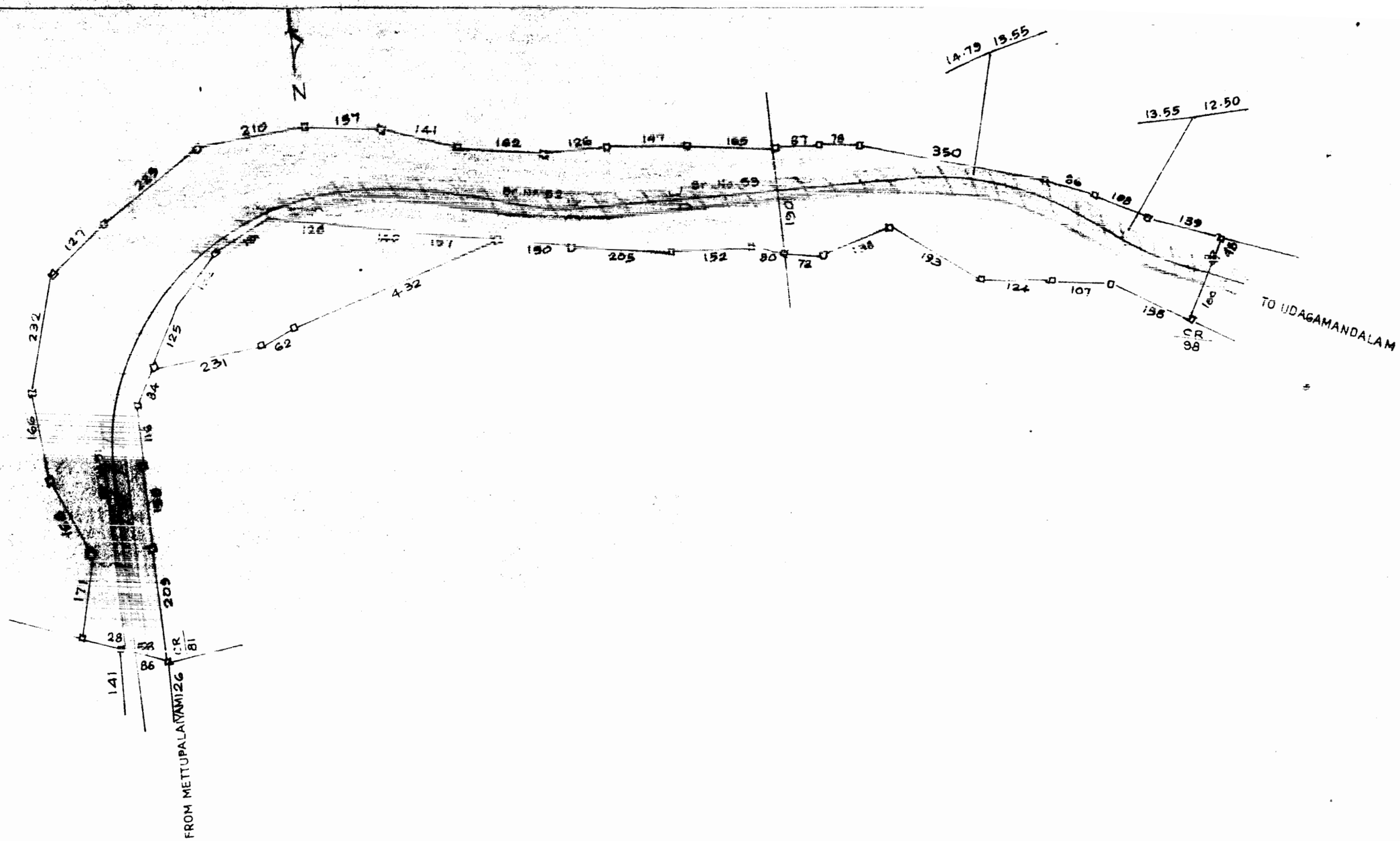
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 15/700 TO KM 16/150.



AREA OF LAND = 2·51 Hectares
AREA UNDER CORE ZONE = 0·49 Hectares
AREA UNDER BUFFER ZONE = 2·02 Hectares

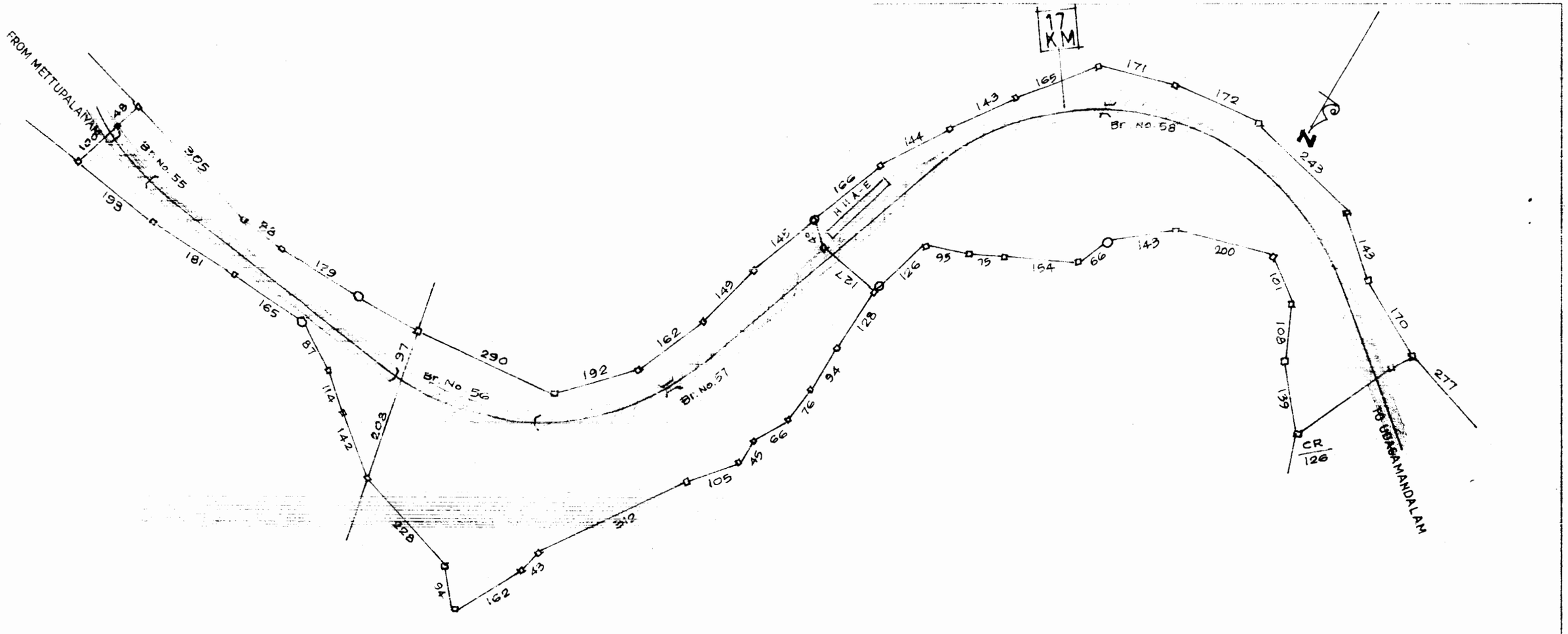
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 16/150 TO KM: 16/750.



AREA OF LAND - 2·74 Hectares
AREA UNDER CORE ZONE - ~~0·55 Hectares~~
AREA UNDER BUFFER ZONE - 2·19 Hectares

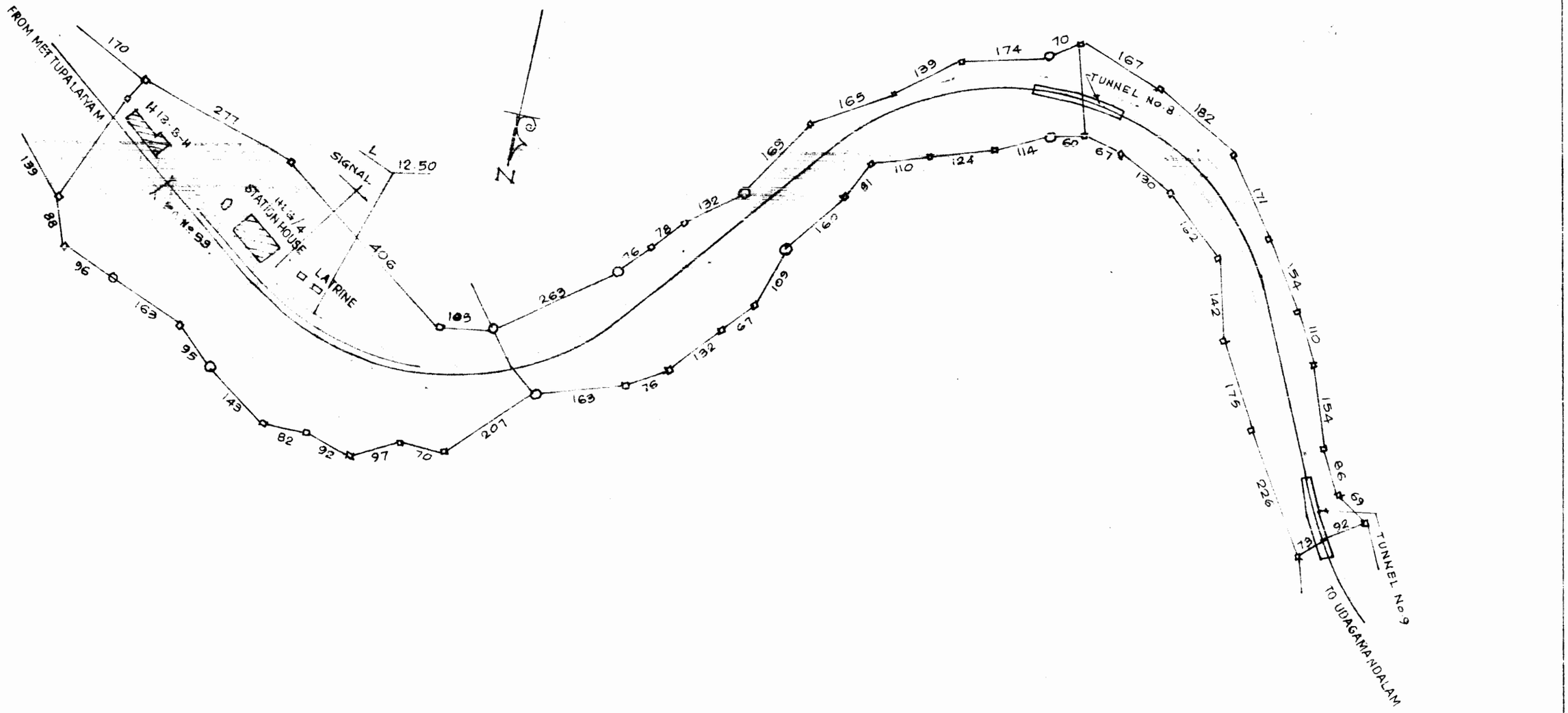
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 16/750 TO KM 17/170.



AREA OF LAND = 2·39 Hectares
AREA UNDER CORE ZONE = 0·54 Hectares
AREA UNDER BUFFER ZONE = 1·85 Hectares

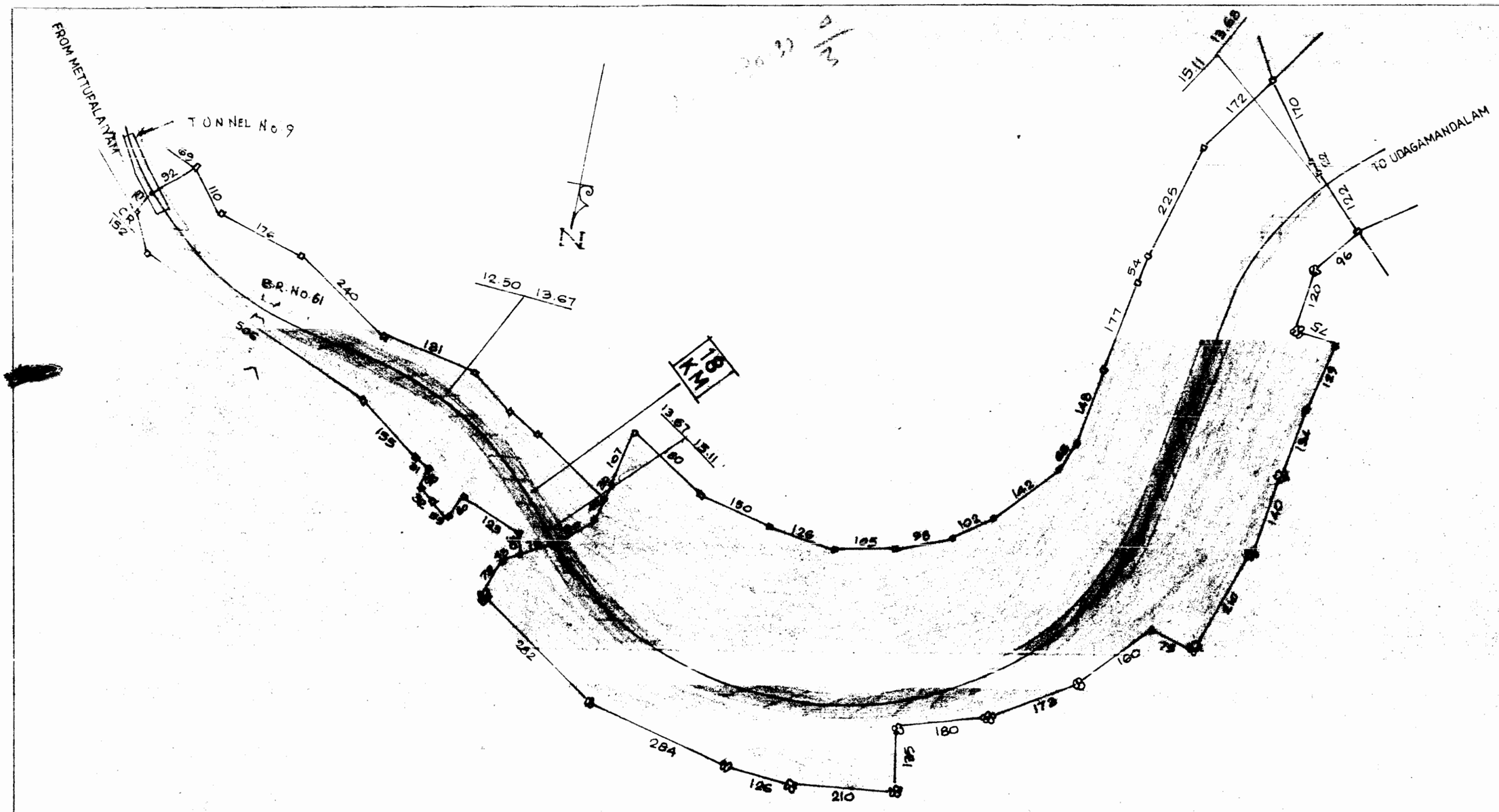
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 17/170 TO KM 17/810



AREA OF LAND	= 3.64 Hectares
AREA UNDER CORE ZONE	= 0.52 Hectares
AREA UNDER BUFFER ZONE	= 3.12 Hectares

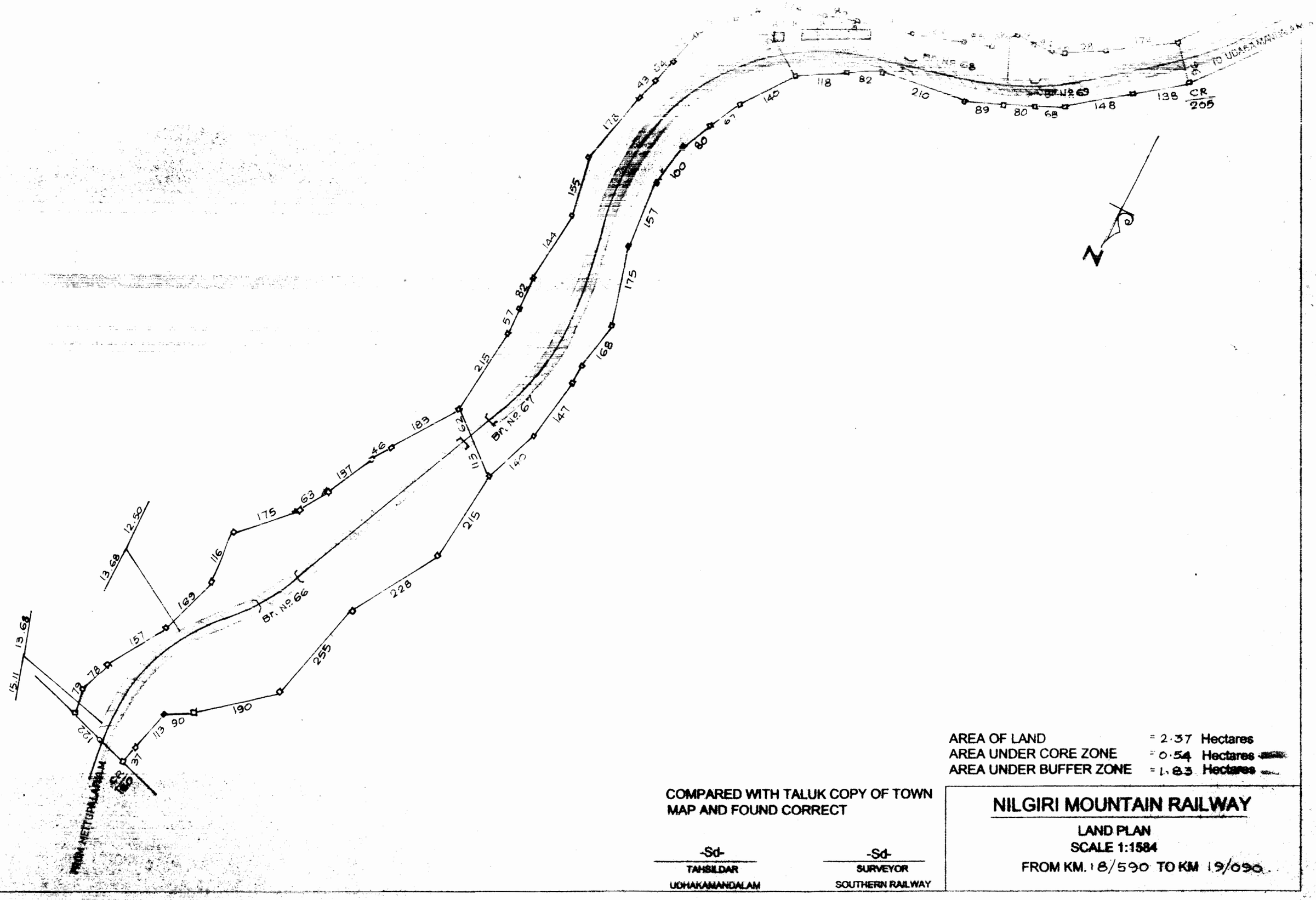
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 17/810 TO KM: 18/590 .



AREA OF LAND = 2·37 Hectares
AREA UNDER CORE ZONE = 0·54 Hectares
AREA UNDER BUFFER ZONE = 1·83 Hectares

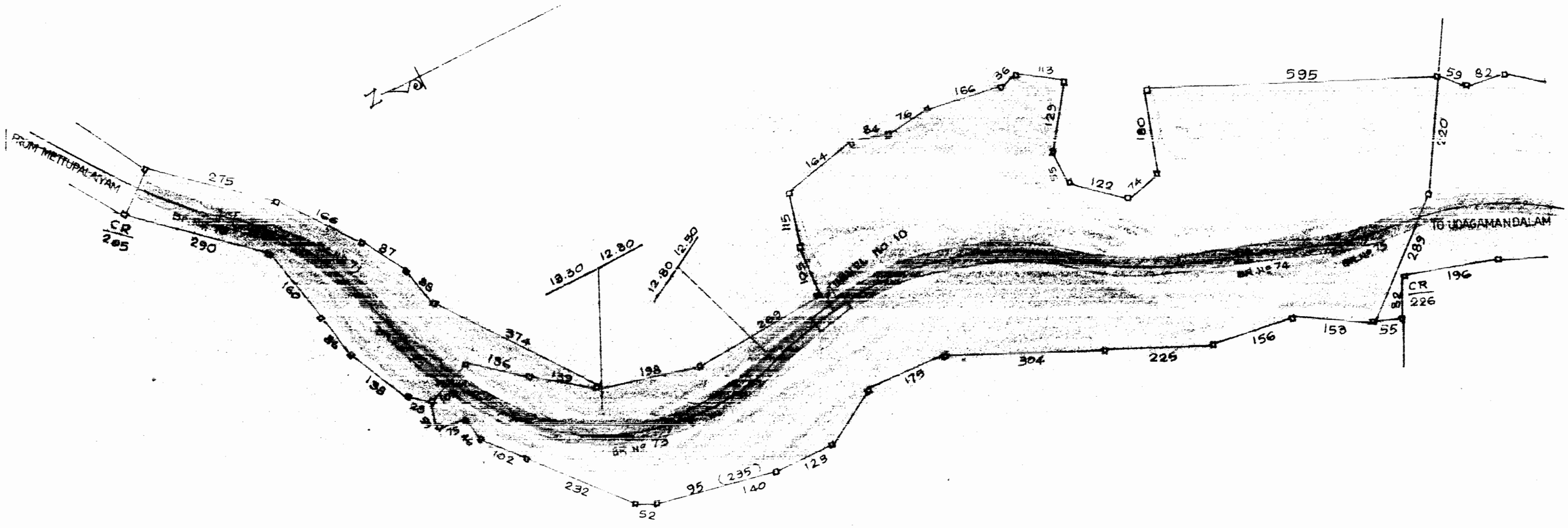
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 18/590 TO KM 19/090



AREA OF LAND = 3.06 Hectares
AREA UNDER CORE ZONE = 0.53 Hectares
AREA UNDER BUFFER ZONE = 2.53 Hectares

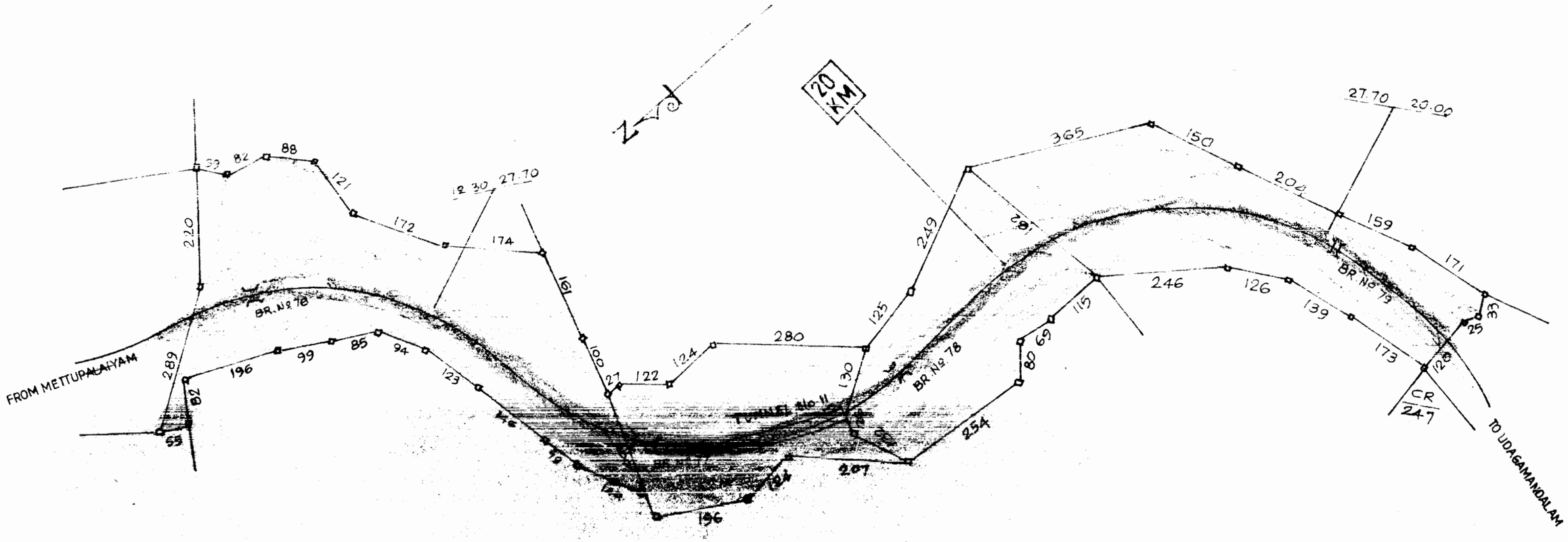
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 19/090 TO KM: 19/760.



AREA OF LAND = 2·47 Hectares
AREA UNDER CORE ZONE ~~0·43 Hectares~~
AREA UNDER BUFFER ZONE = 2·04 Hectares

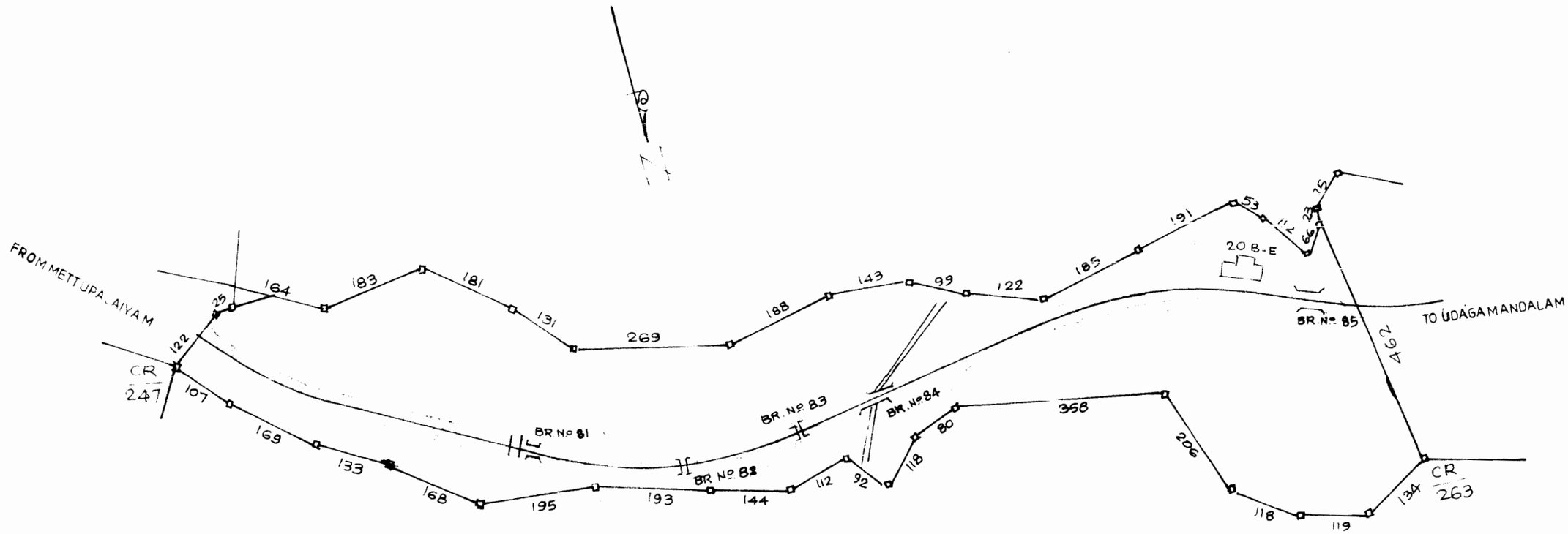
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
METTUPALAYAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 19/760 TO KM: 20/190.



AREA OF LAND	1·95 Hectares
AREA UNDER CORE ZONE	0·34 Hectares
AREA UNDER BUFFER ZONE	1·61 Hectares

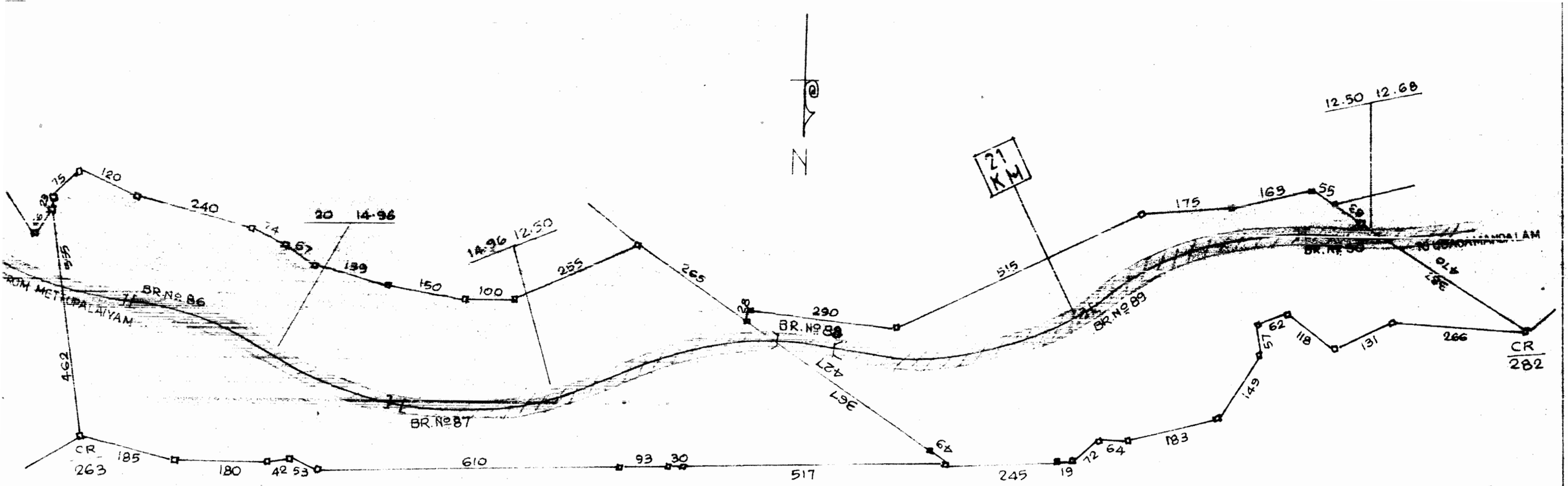
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 20/190 TO KM: 20/620.



AREA OF LAND - 4·06 Hectares
AREA UNDER CORE ZONE - 0·44 Hectares
AREA UNDER BUFFER ZONE - 3·62 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

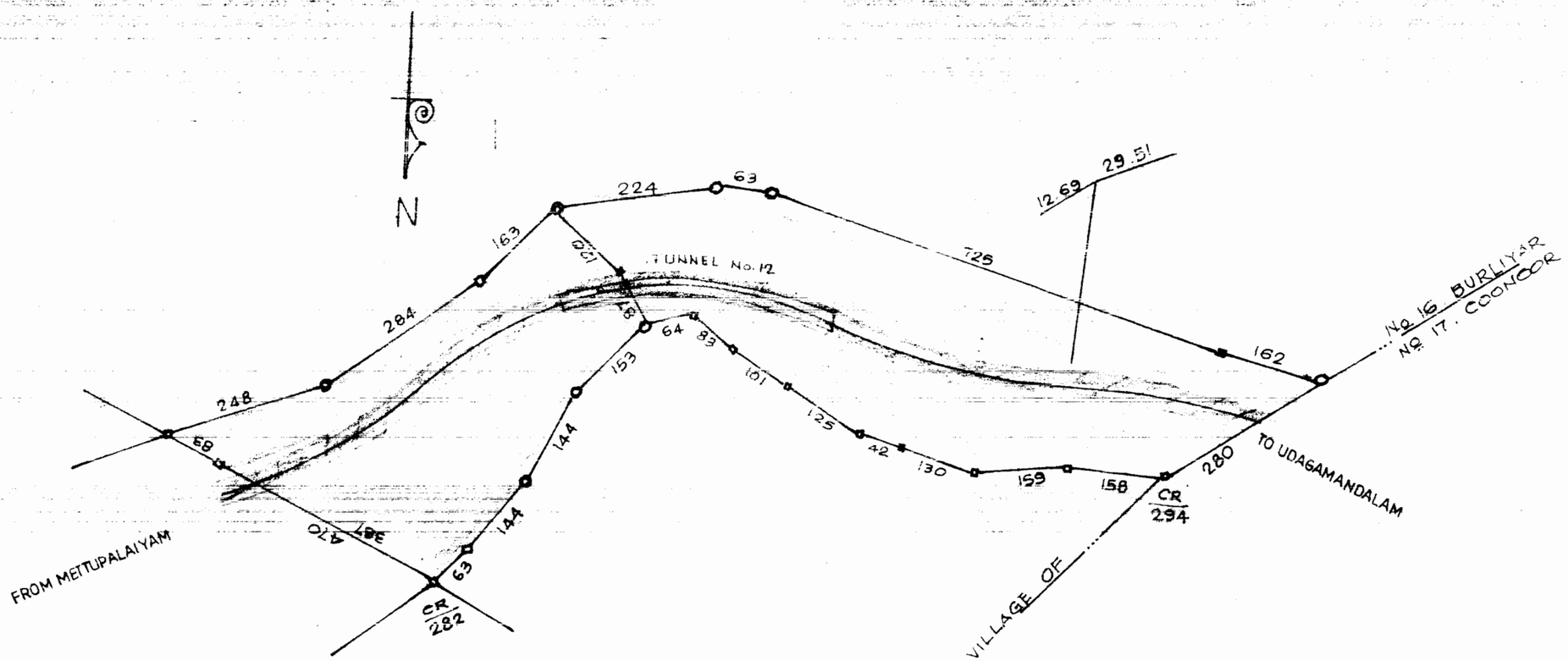
Sd-

Sd-

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1584



AREA OF LAND 1.59 Hectares
AREA UNDER CORE ZONE ~~0.87~~ Hectares
AREA UNDER BUFFER ZONE 1.32 Hectares

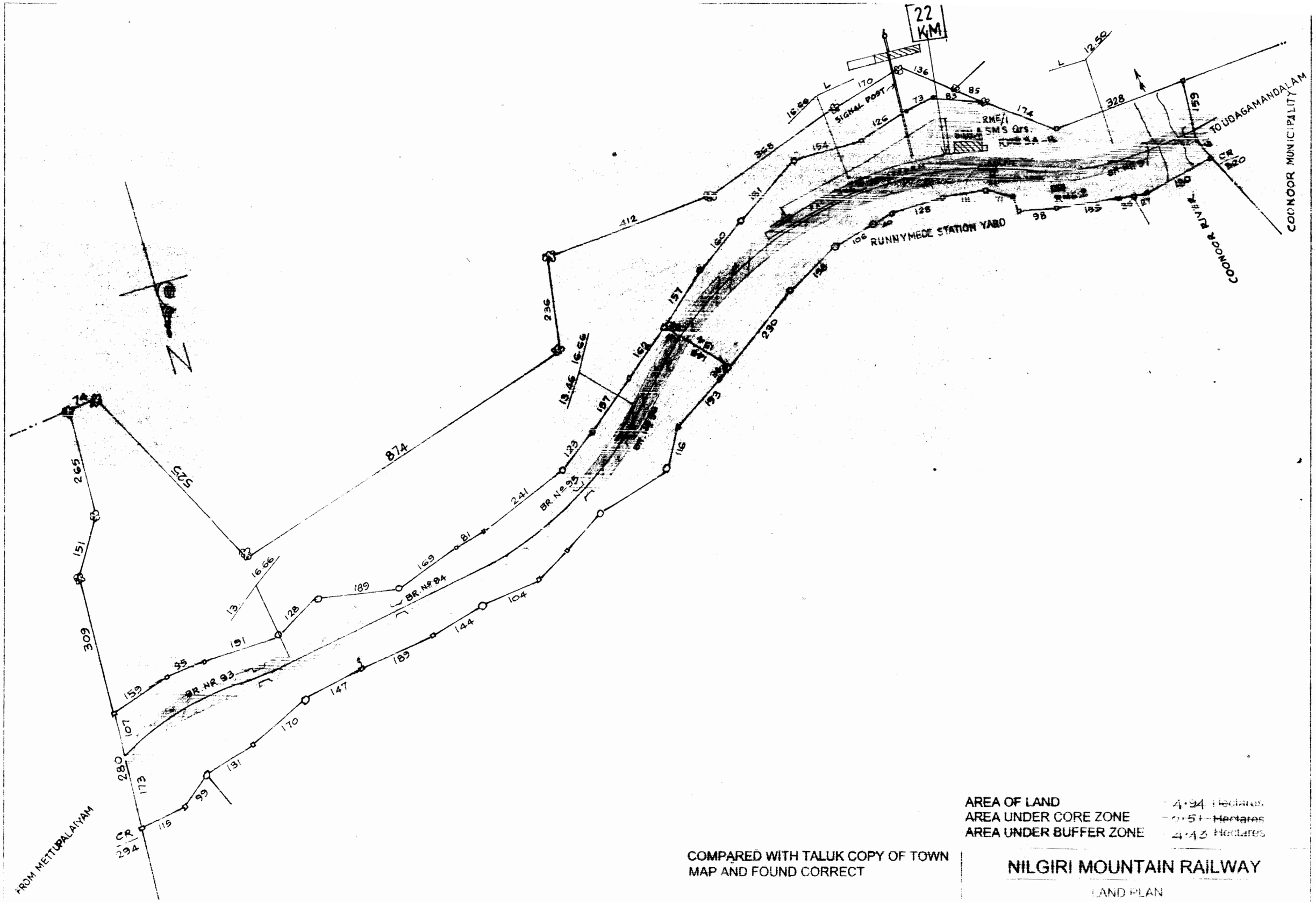
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 21/130 TO KM: 21/470



COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

Sd-
SURVEYOR

Sd-
SURVEYOR

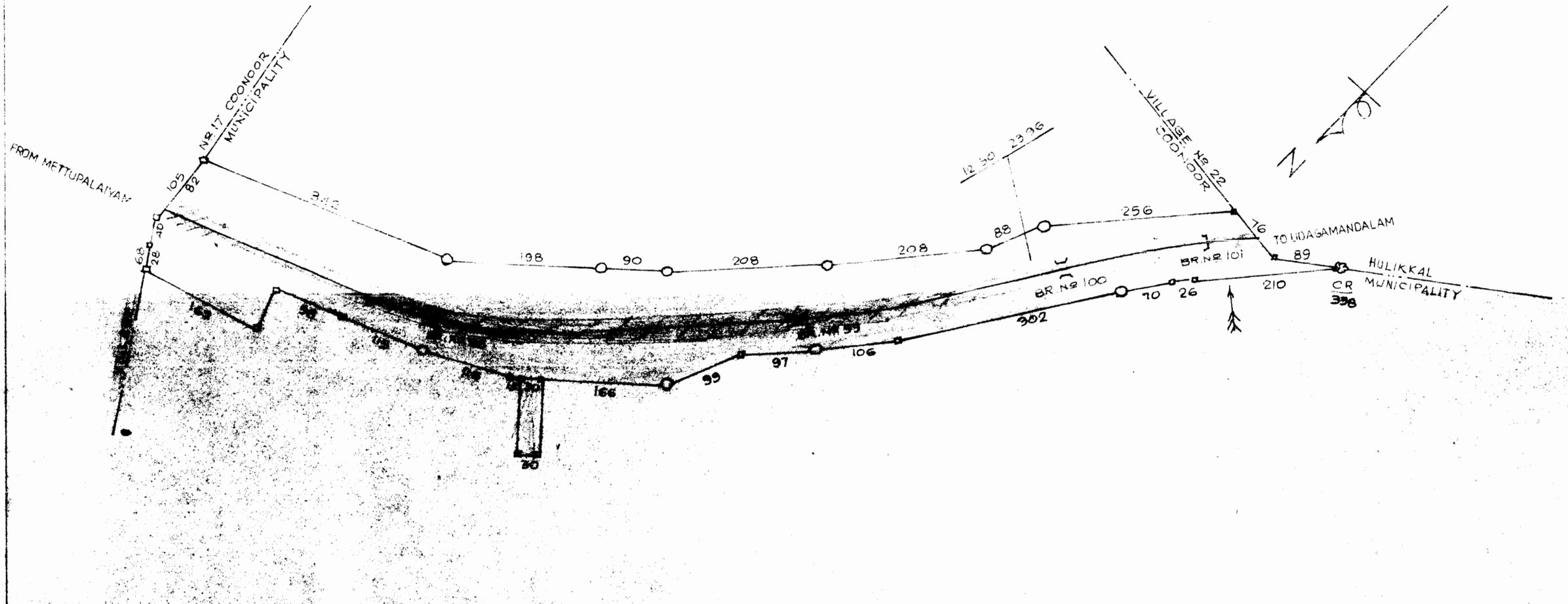
AREA OF LAND	4·94 Hectares
AREA UNDER CORE ZONE	0·51 Hectares
AREA UNDER BUFFER ZONE	4·43 Hectares

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1000

FROM KM 21/0.00 TO KM 22/0.00



AREA OF LAND = 1·45 Hectares
AREA UNDER CORE ZONE = 0·35 Hectares
AREA UNDER BUFFER ZONE = 1·10 Hectares

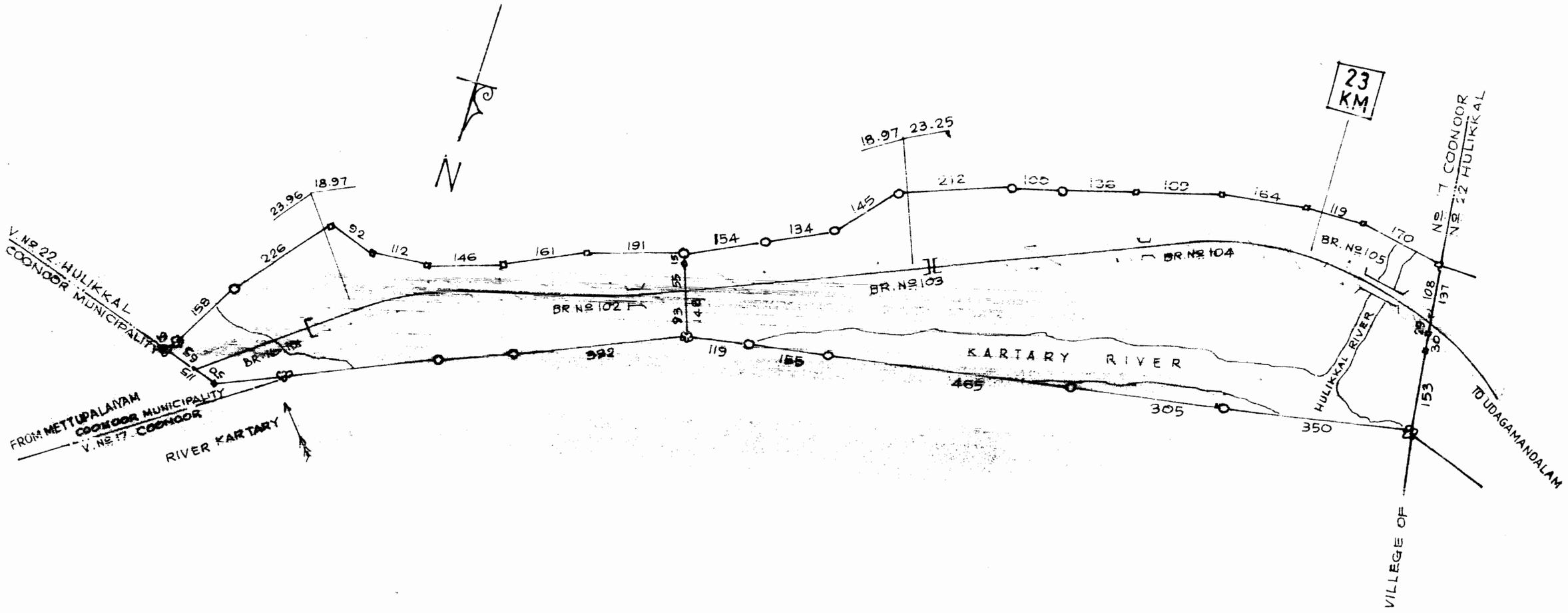
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 22/120 TO KM: 22/560.



AREA OF LAND = 2·55 Hectares
AREA UNDER CORE ZONE = 0·39 Hectares
AREA UNDER BUFFER ZONE = 2·16 Hectares

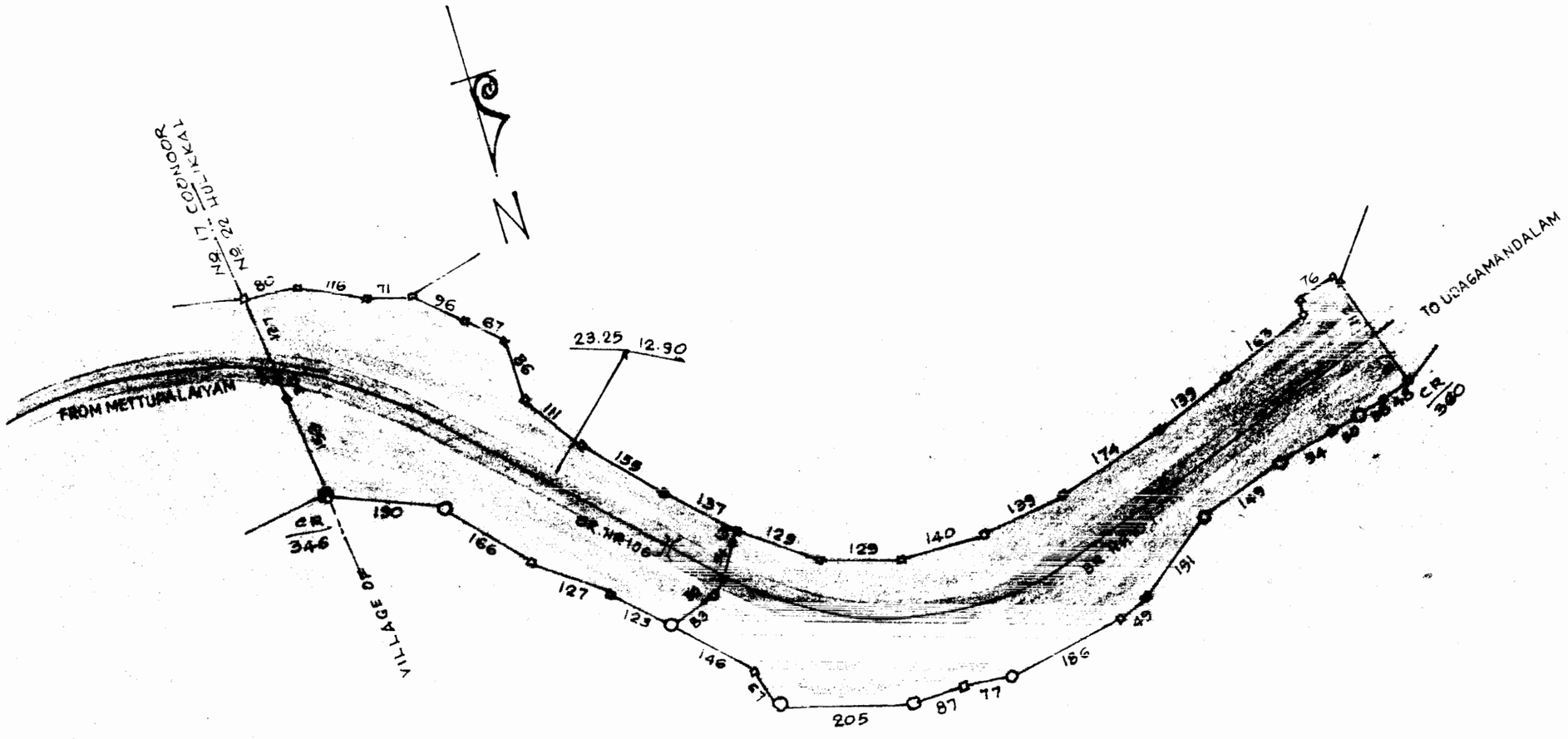
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 22/560 TO KM 23/060.



AREA OF LAND = 1·69 Hectares
AREA UNDER CORE ZONE = 0·31 Hectares
AREA UNDER BUFFER ZONE = 1·38 Hectares

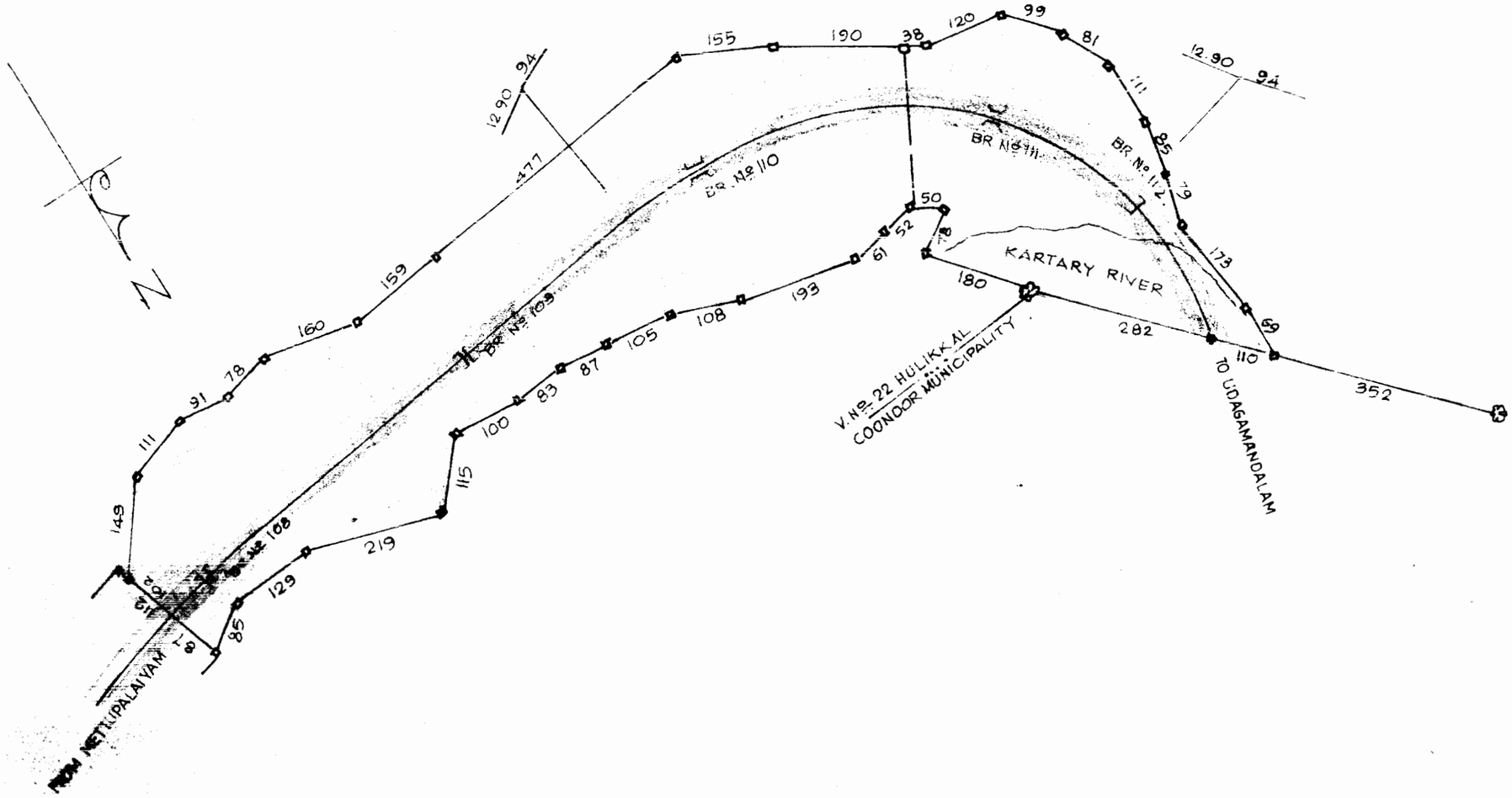
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 23/060 TO KM: 23/440.



AREA OF LAND 2·49 Hectares
AREA UNDER CORE ZONE ~~0·32 Hectares~~
AREA UNDER BUFFER ZONE ~~1·17 Hectares~~

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

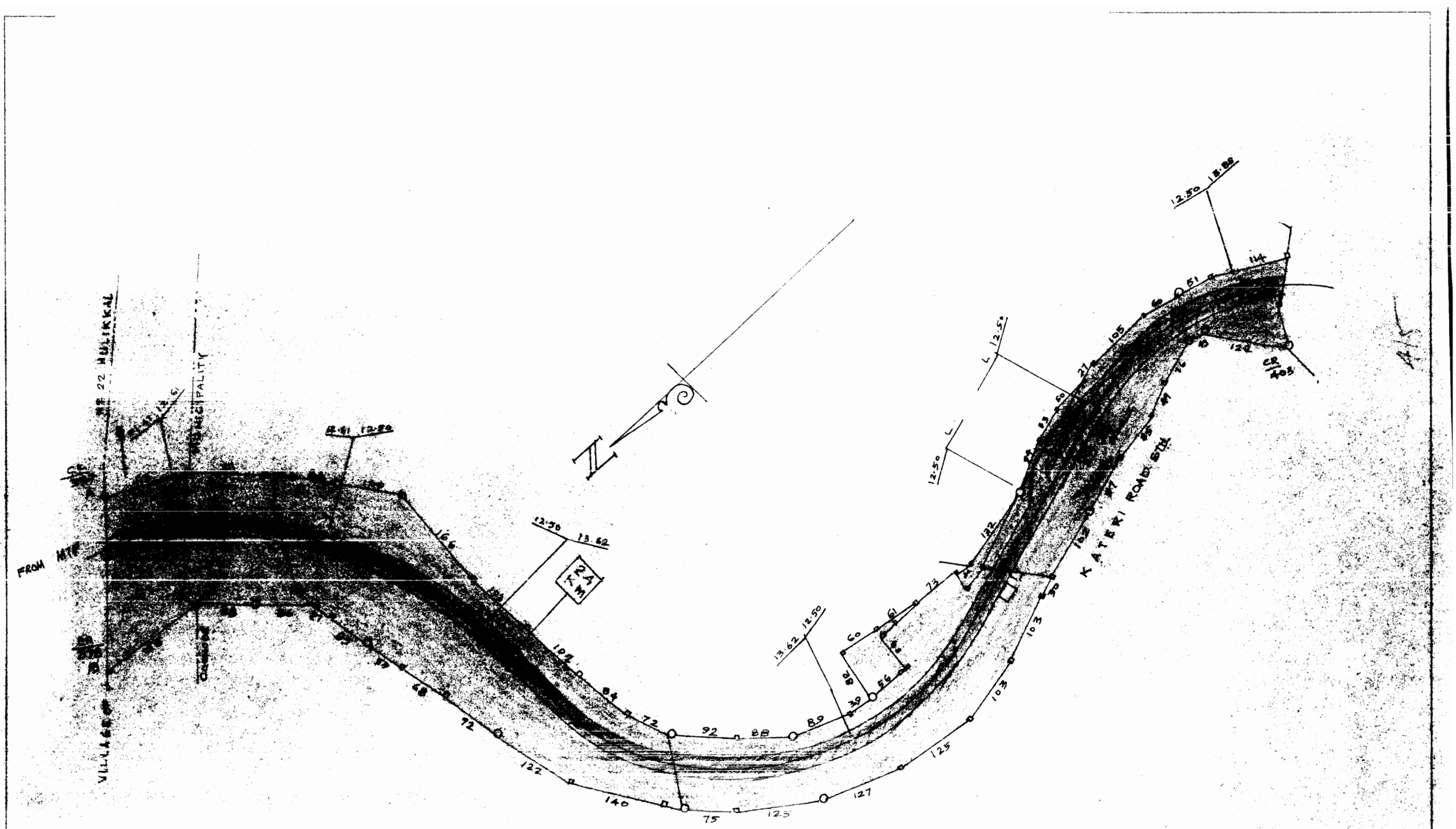
-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1584

FROM KM: 23/440 TO KM: 23/840



AREA OF LAND = 2.73 Hectares
AREA UNDER CORE ZONE = 0.53 Hectares
AREA UNDER BUFFER ZONE = 1.20 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 23/840 TO KM 24/400

AREA OF LAND = 2.50 Hectares
AREA UNDER CORE ZONE = 0.33 Hectares
AREA UNDER BUFFER ZONE = 2.17 Hectares

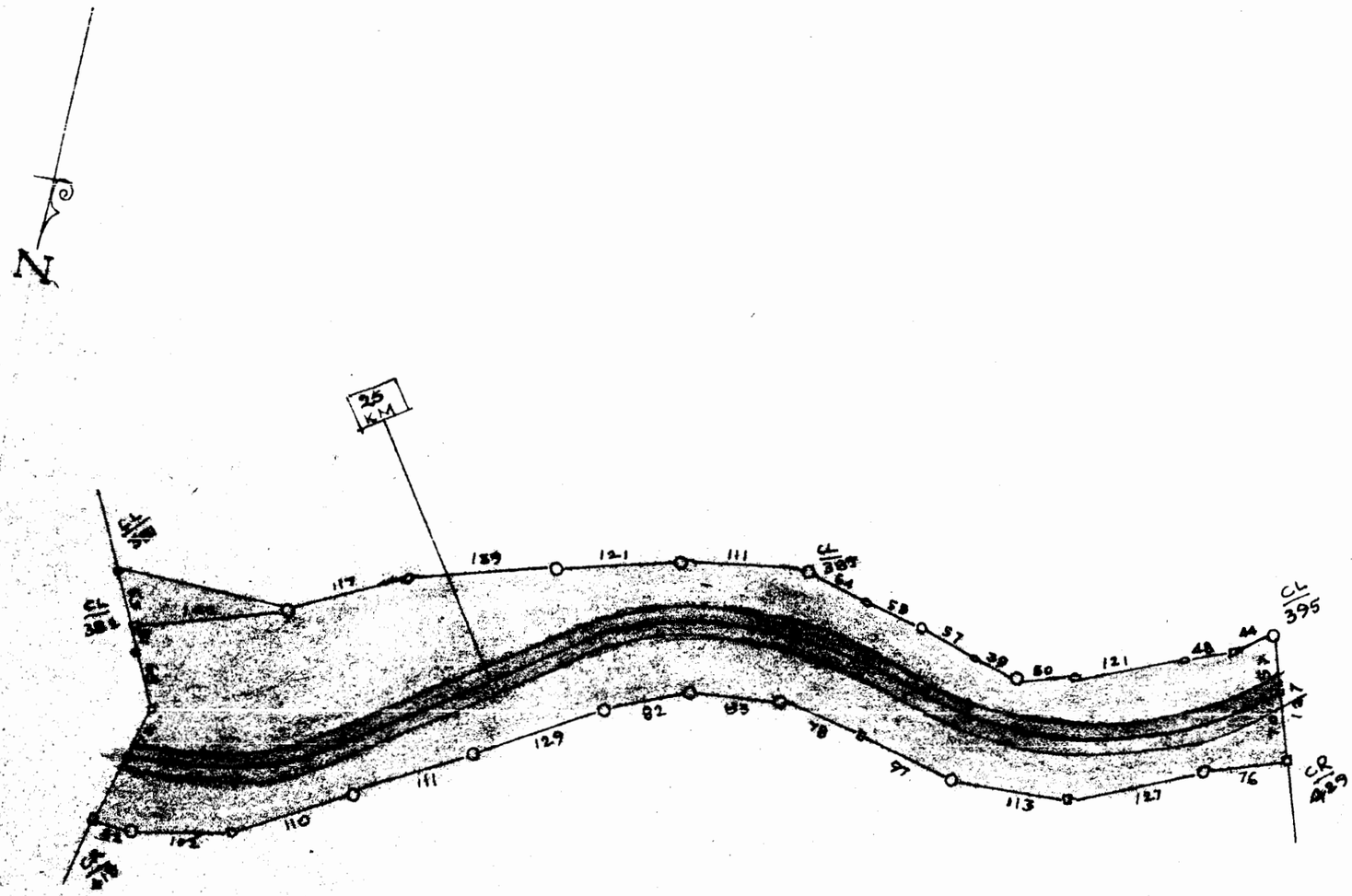
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 24/400 TO KM 24/300



AREA OF LAND = 1.32 Hectares
AREA UNDER CORE ZONE = 0.37 Hectares
AREA UNDER BUFFER ZONE = 1.09 Hectares

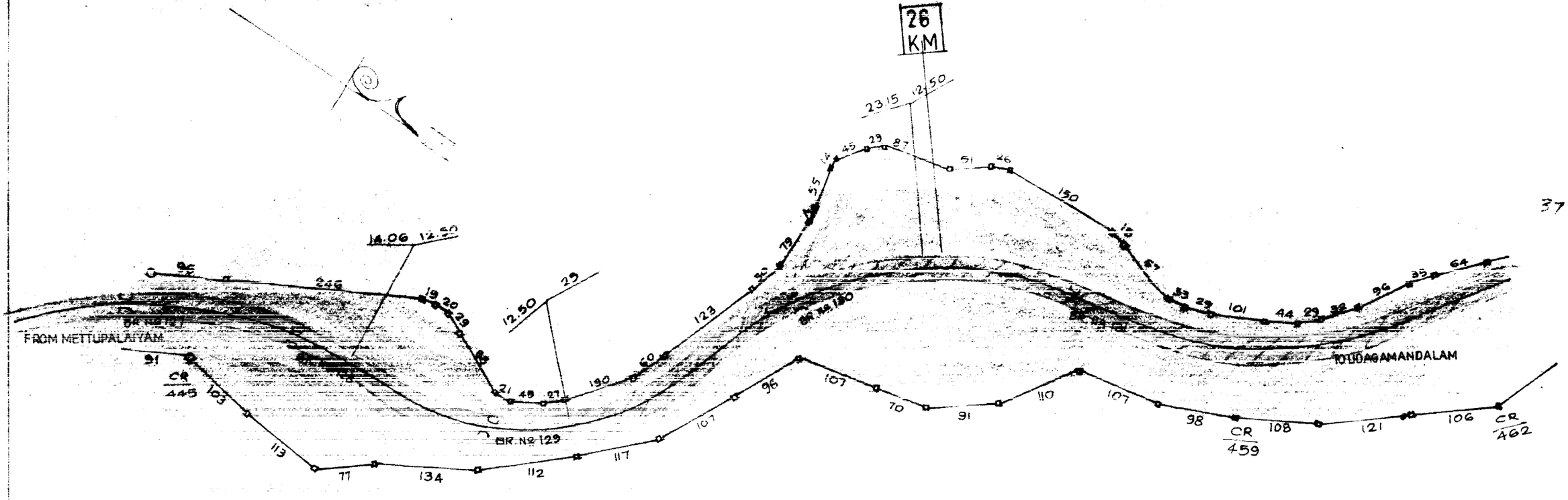
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 24/900 TO KM 25/230



37

AREA OF LAND = 3.00 Hectares
AREA UNDER CORE ZONE = 0.47 Hectares
AREA UNDER BUFFER ZONE = 2.53 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 25/~~230~~ TO KM: 26/230.

N

ROOM METHUPA

OUTER

GATE KEEPER'S QTR.

GATE LODGE

AREA OF LAND = 1.02 Hectares
AREA UNDER CORE ZONE = 0.51 Hectares
AREA UNDER BUFFER ZONE = 0.51 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

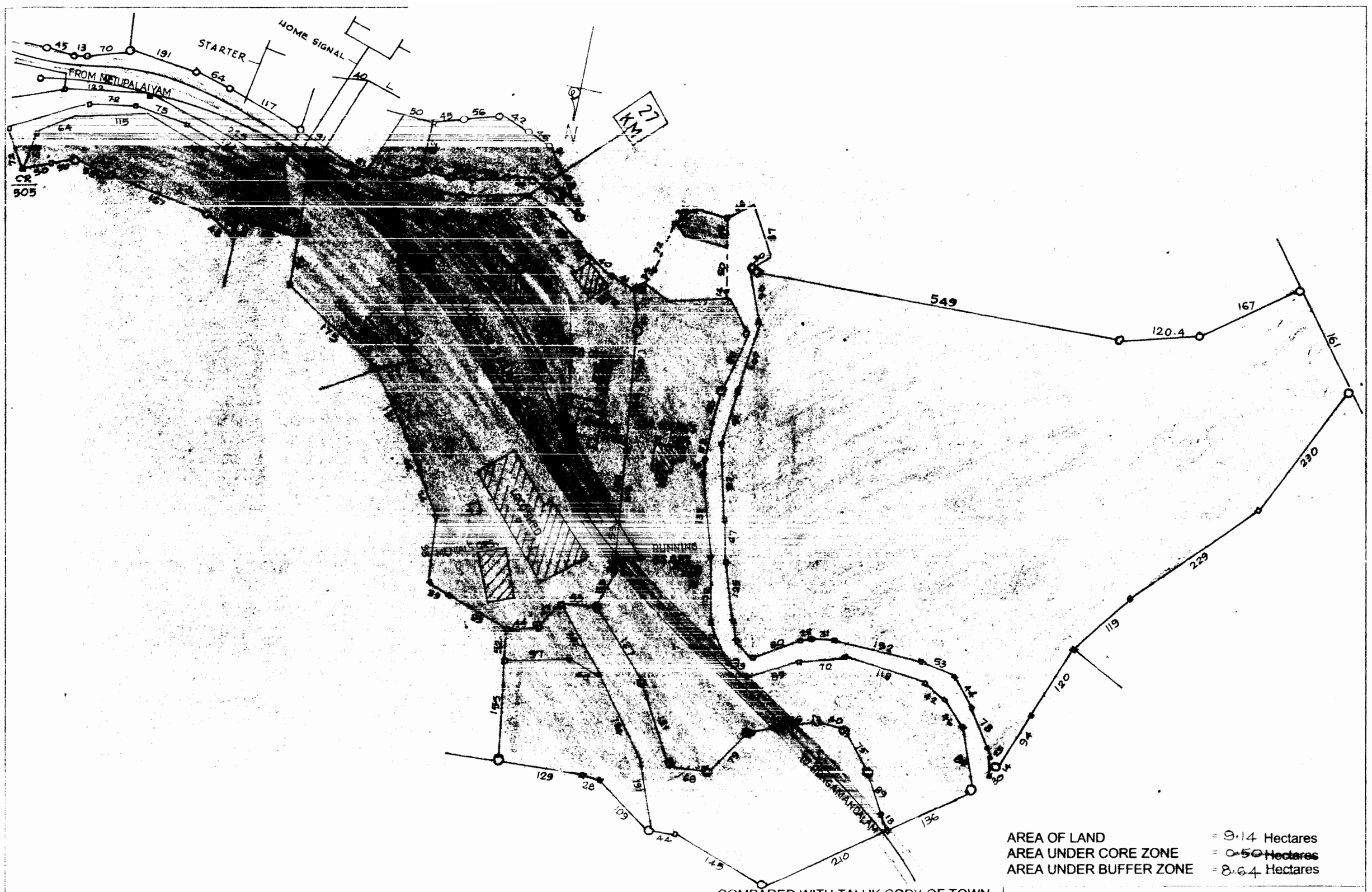
-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1584

PROJECT [illegible] 800



AREA OF LAND = 9.14 Hectares
AREA UNDER CORE ZONE = ~~0.50 Hectares~~
AREA UNDER BUFFER ZONE = 8.64 Hectares

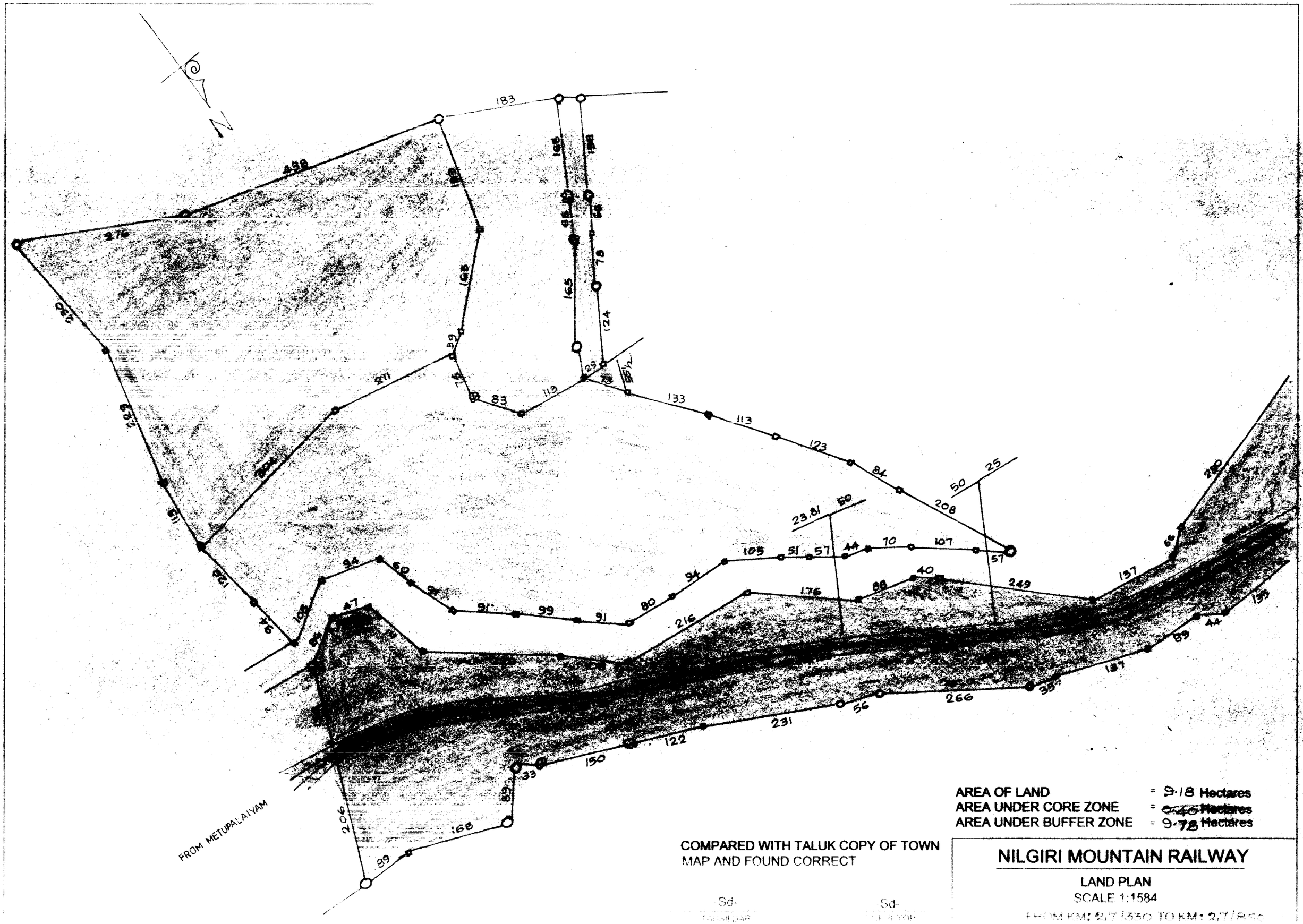
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 26/800 TO KM: 27/330 .



AREA OF LAND = 9·18 Hectares
AREA UNDER CORE ZONE = ~~0·40~~ Hectares
AREA UNDER BUFFER ZONE = 9·~~78~~ Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

Sd·

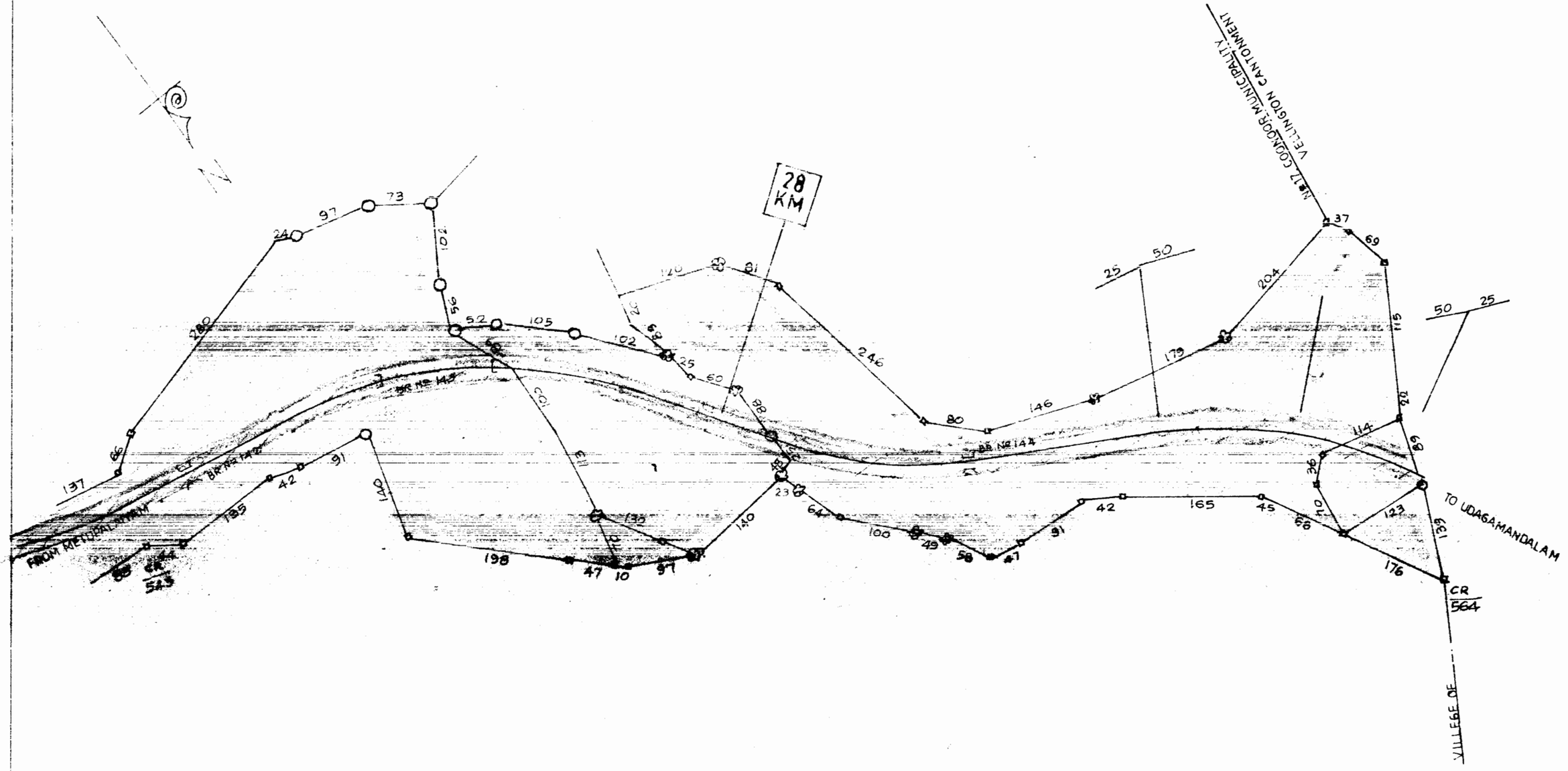
Sd·

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1584

FROM KM: 2/7 (350 TO KM: 3/7/850



AREA OF LAND = 2.30 Hectares
AREA UNDER CORE ZONE = 0.45 ~~Hectares~~
AREA UNDER BUFFER ZONE = 1.85 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

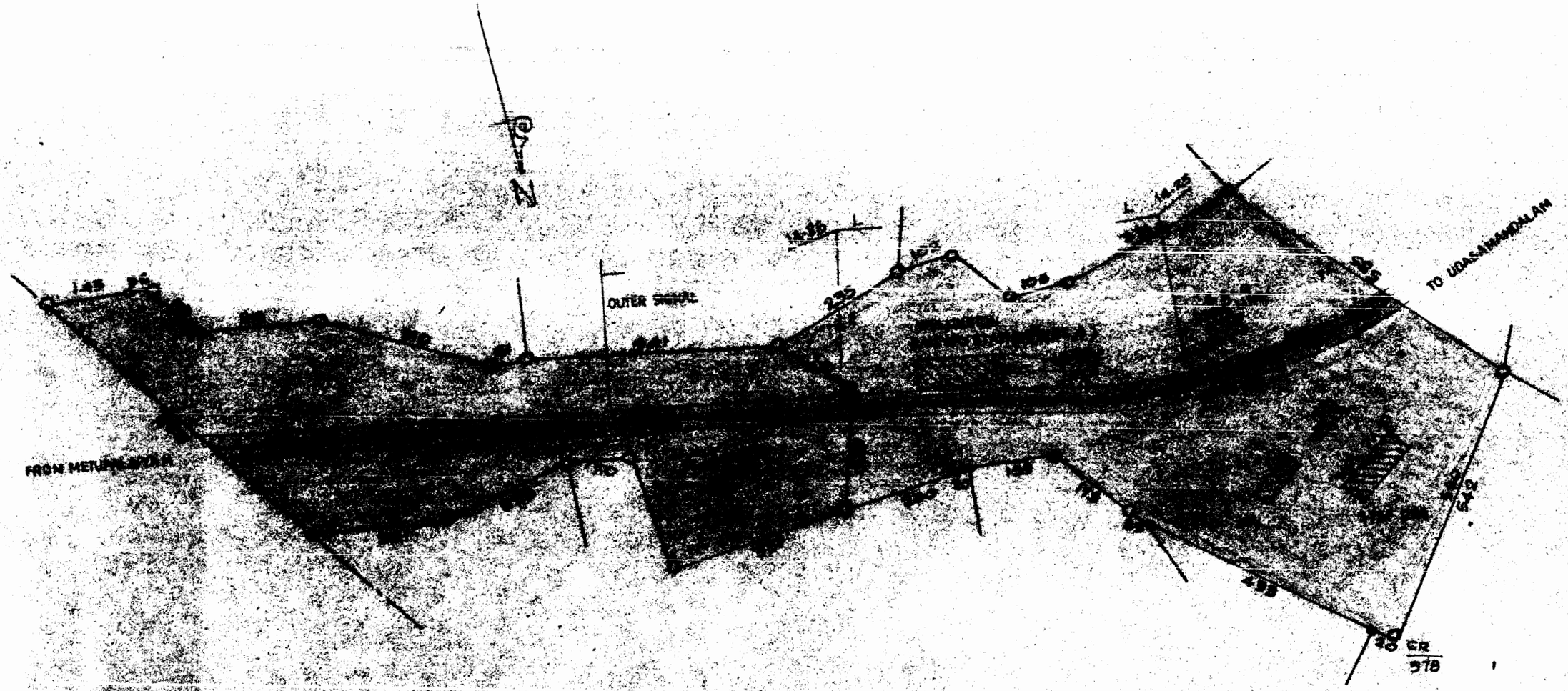
-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SCALE 1:1584

FROM KM: 27/850 TO KM: 28/280.



AREA OF LAND = 3.96 Hectares
AREA UNDER CORE ZONE = 0.64 Hectares
AREA UNDER BUFFER ZONE = 3.32 Hectares approx.

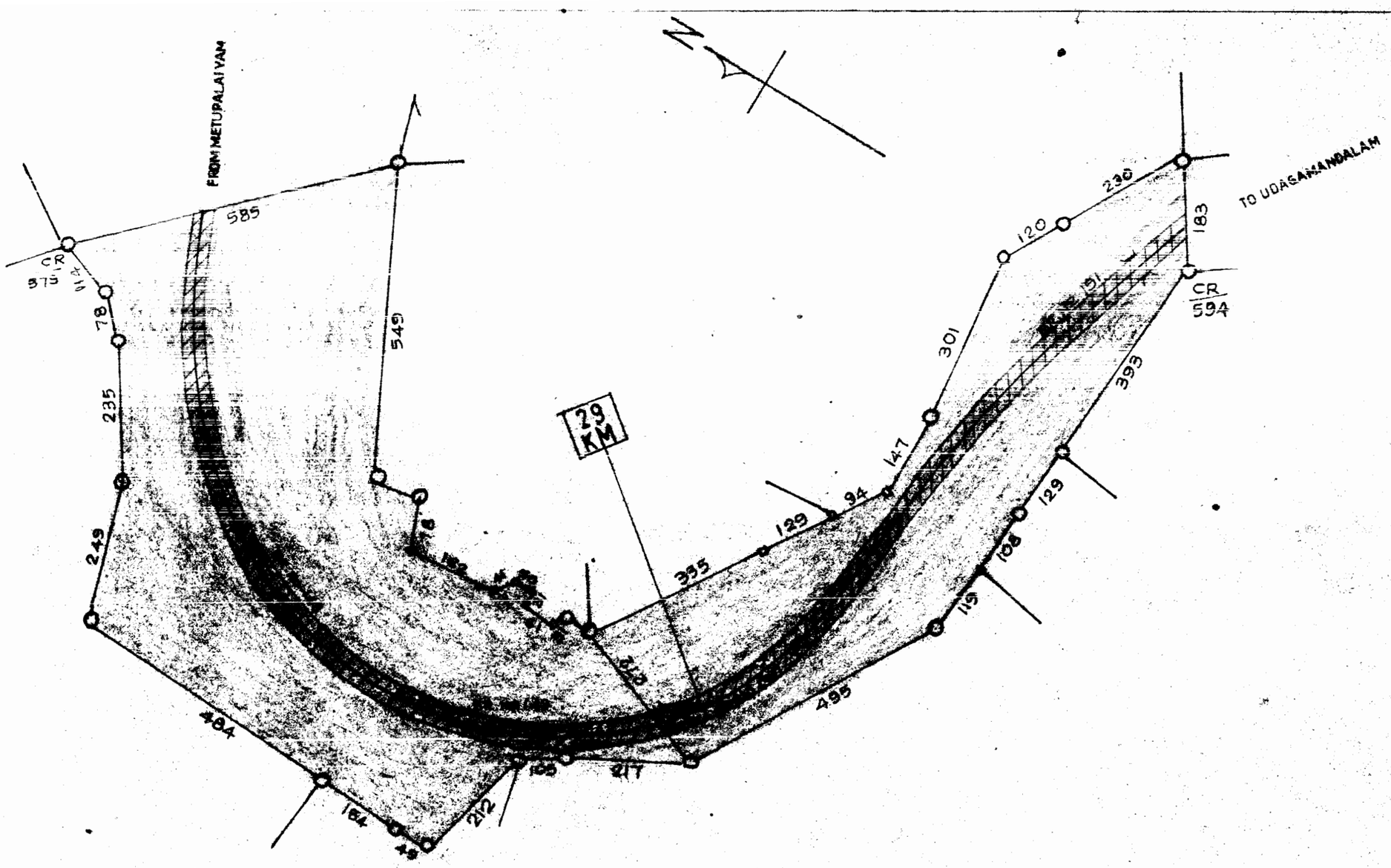
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

Sd
TAHSILDAR
UDHAGAMANDALAM

Sd
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM: 28/280 TO KM: 28/700.



AREA OF LAND = 3·38 Hectares
AREA UNDER CORE ZONE = 0·43 Hectares
AREA UNDER BUFFER ZONE = 2·95 Hectares

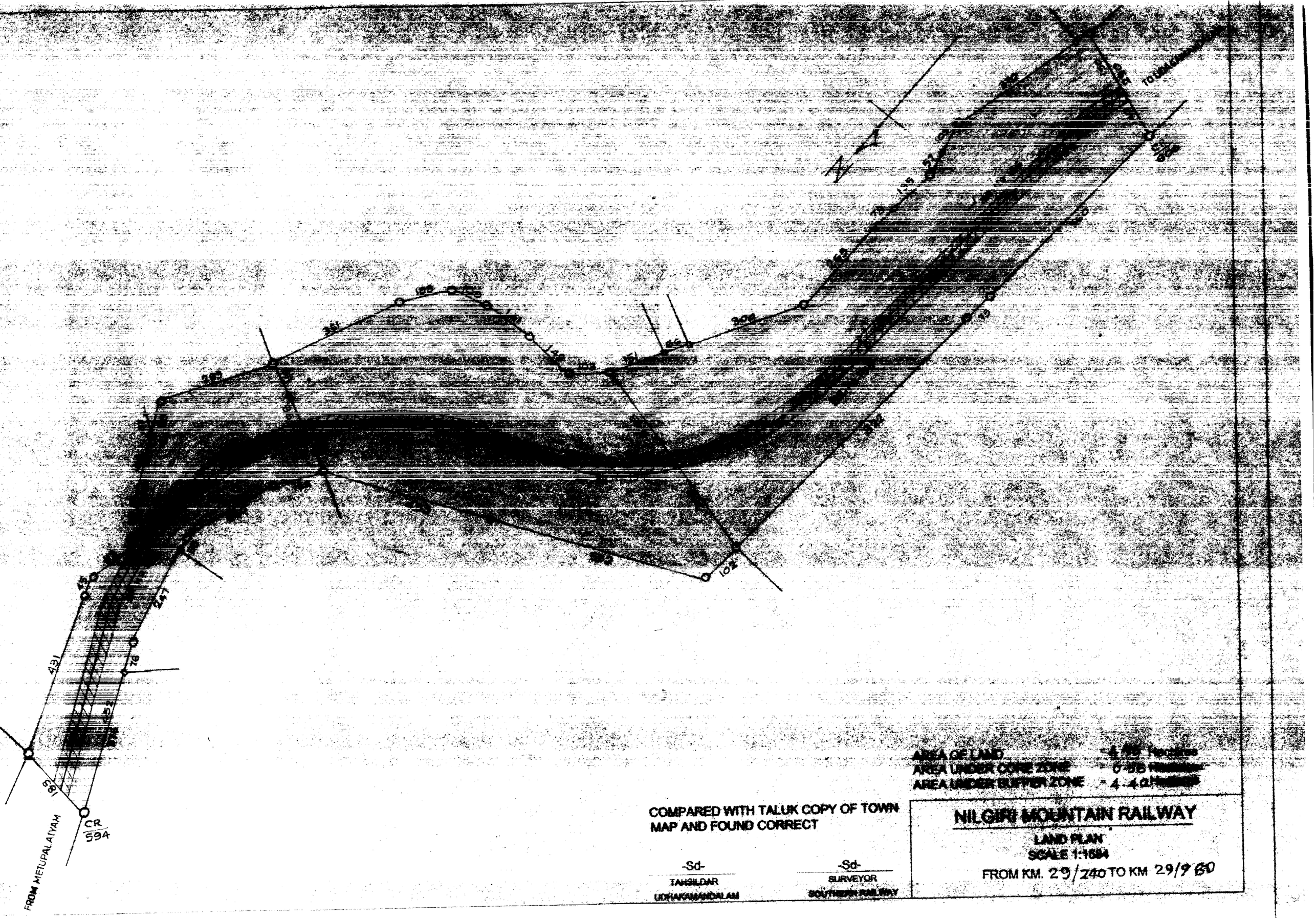
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 28/700 TO KM. 29/240



AREA OF LAND - 4.46 Hectares
AREA UNDER CORE ZONE - 0.26 Hectares
AREA UNDER BUFFER ZONE - 4.40 Hectares

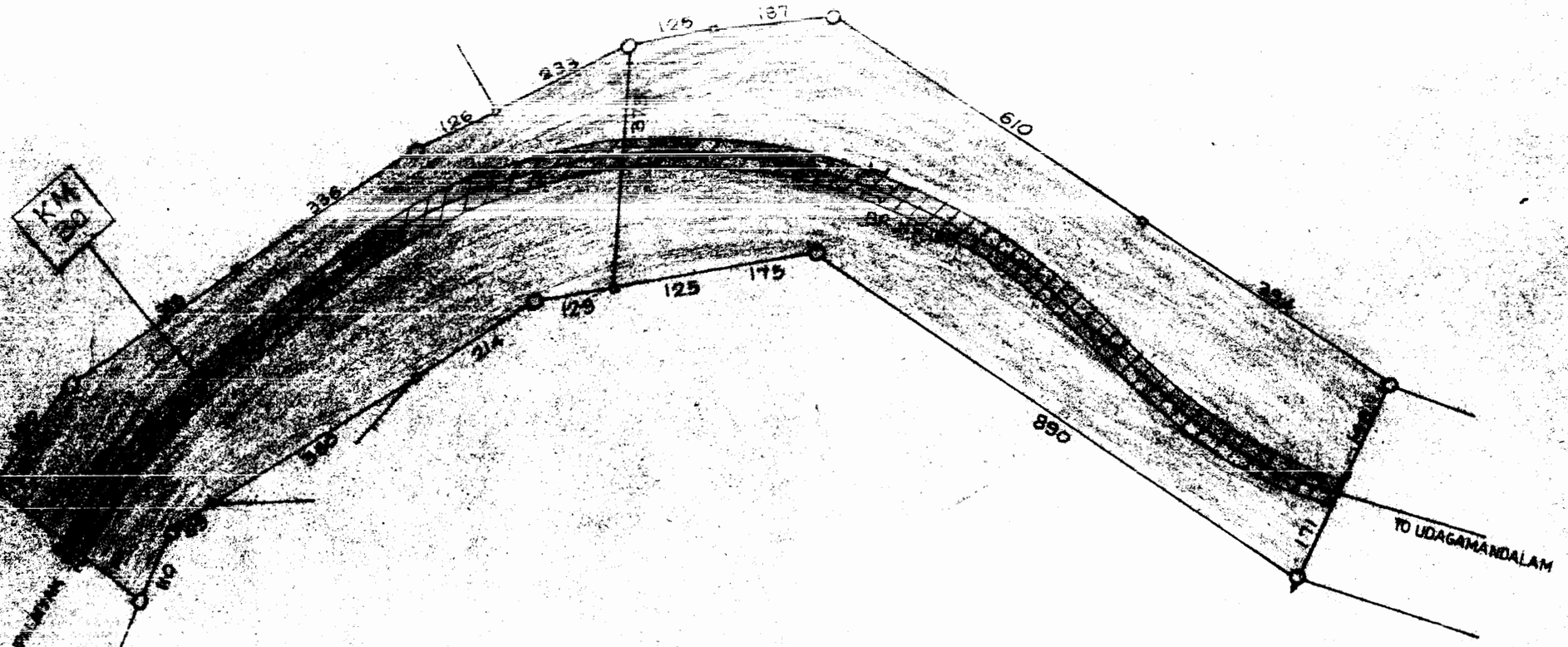
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 29/240 TO KM 29/780



AREA OF LAND = 3.06 Hectares
AREA UNDER CORE ZONE = [redacted]
AREA UNDER BUFFER ZONE = [redacted]

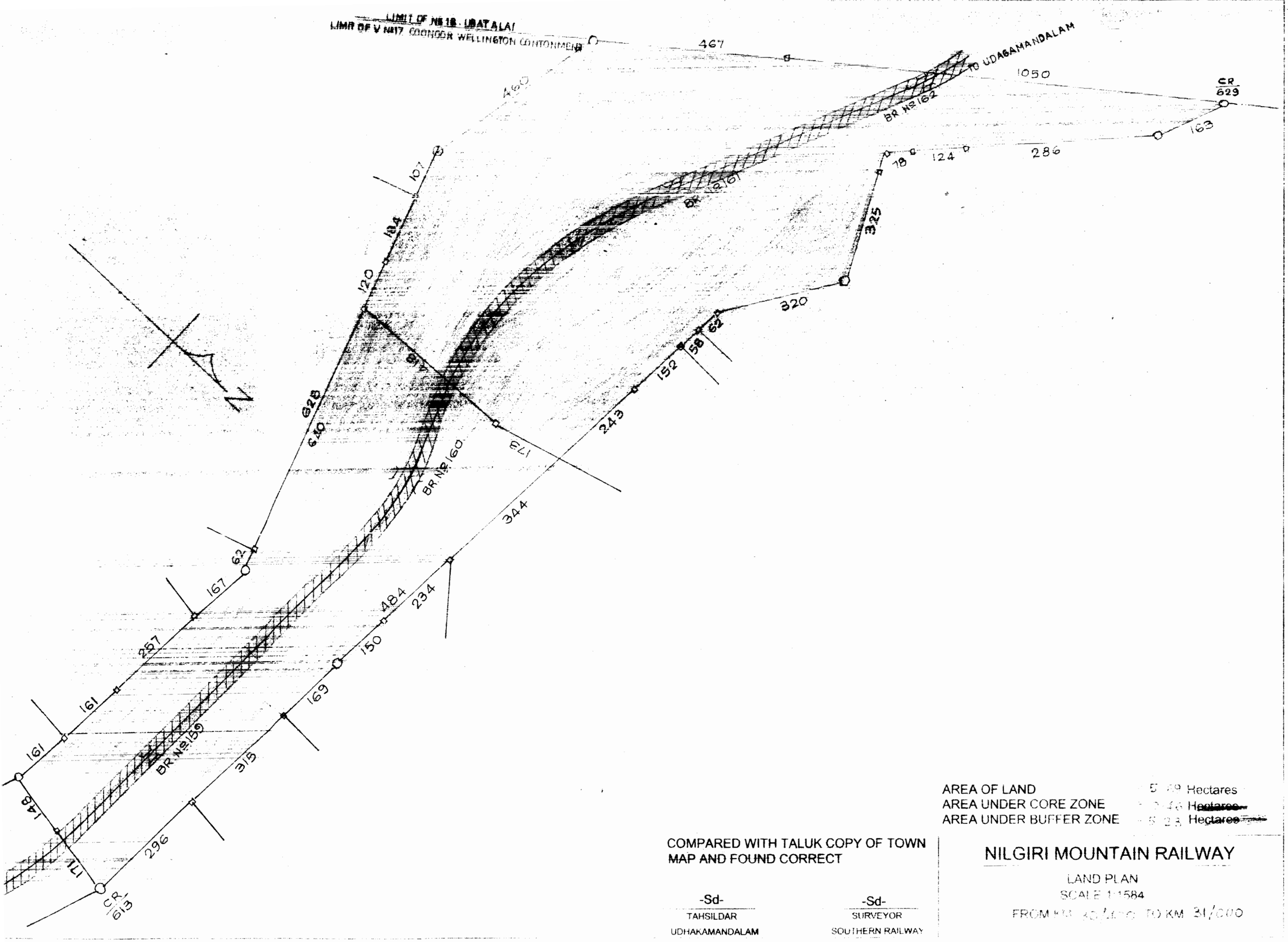
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 29/950 TO KM. 30/410



COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

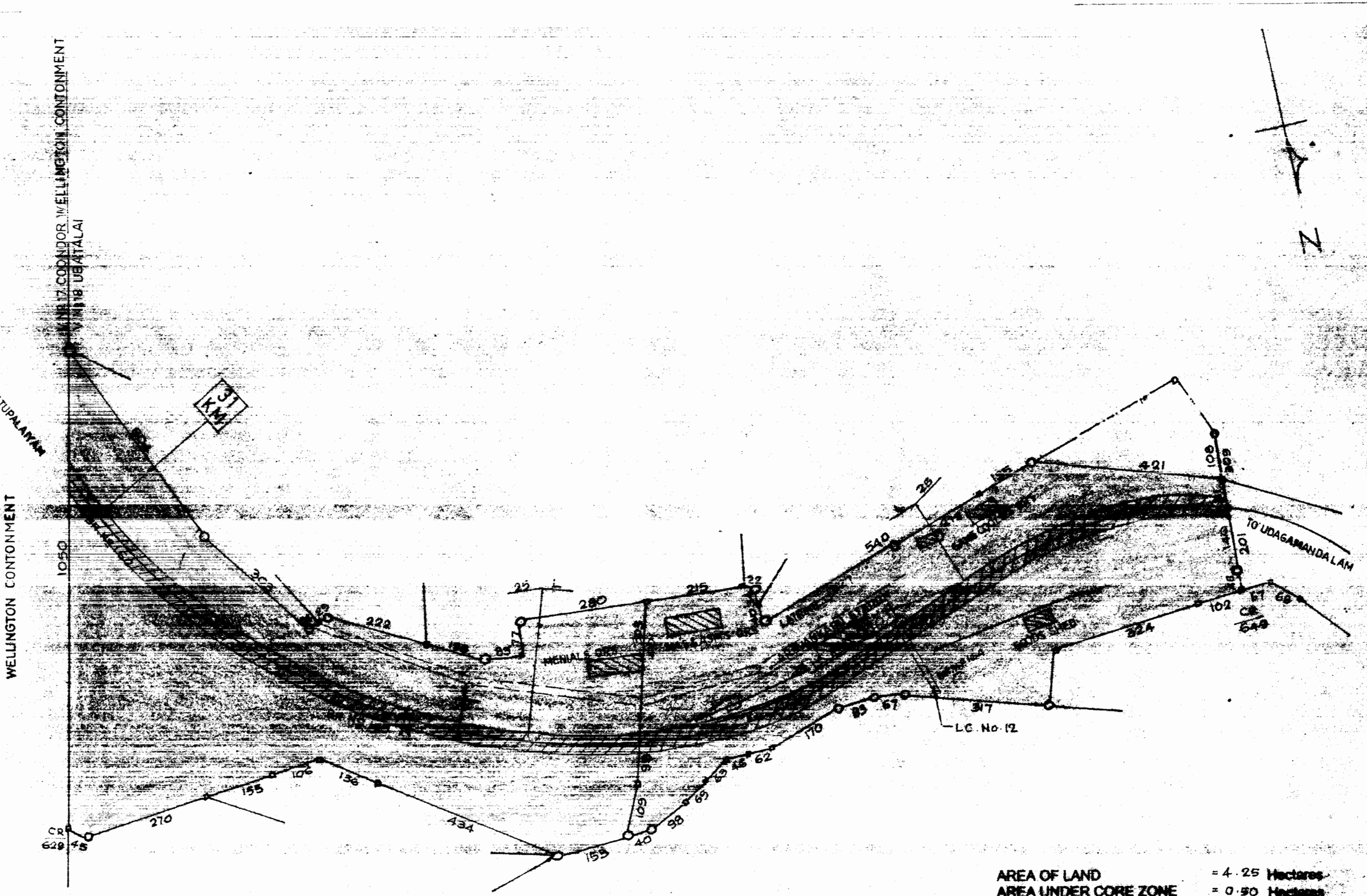
-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

AREA OF LAND [illegible] Hectares
AREA UNDER CORE ZONE [illegible] Hectares
AREA UNDER BUFFER ZONE [illegible] Hectares

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 30/[illegible] TO KM 31/000



AREA OF LAND = 4·25 Hectares
AREA UNDER CORE ZONE = 0·50 Hectares
AREA UNDER BUFFER ZONE = 3·75 Hectares

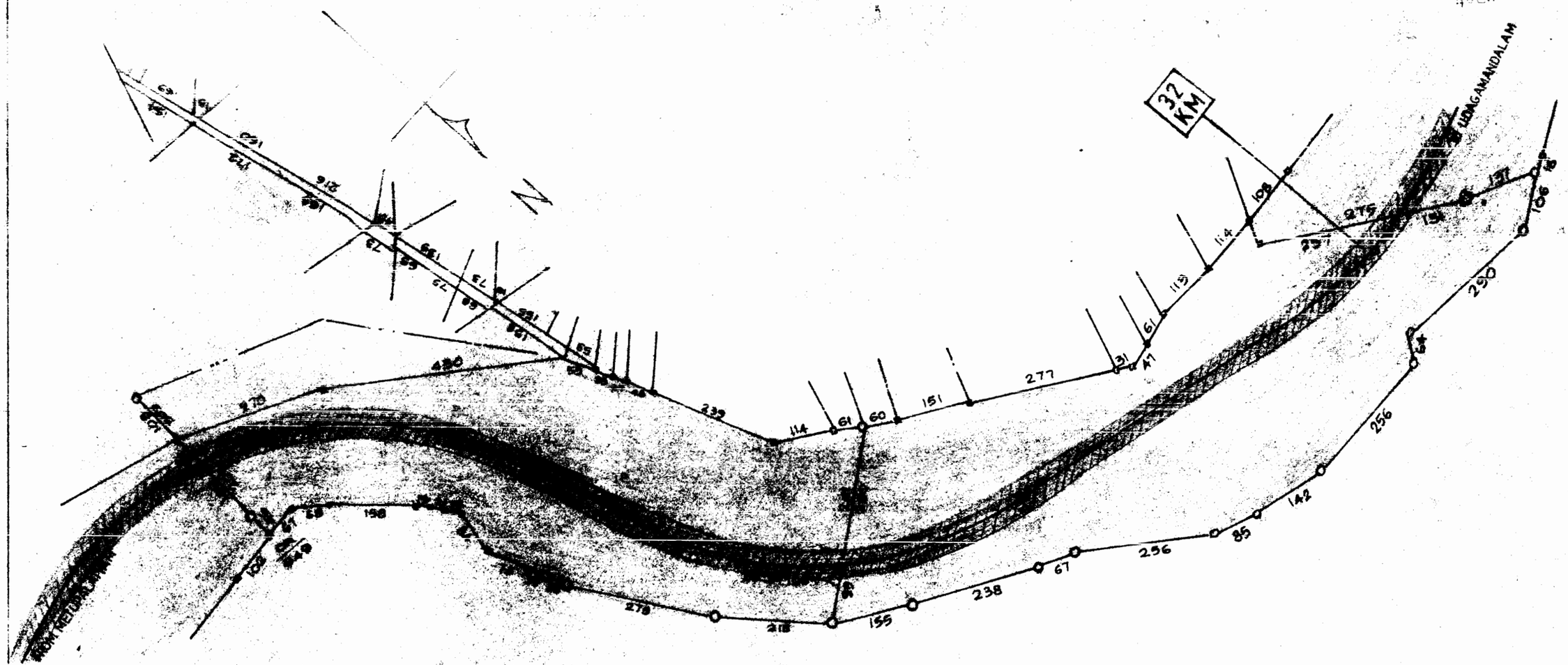
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 31/000 TO KM. 31/600



AREA OF LAND = 2·82 Hectares
AREA UNDER CORE ZONE = 0·34 Hectares
AREA UNDER BUFFER ZONE = 2·48 Hectares

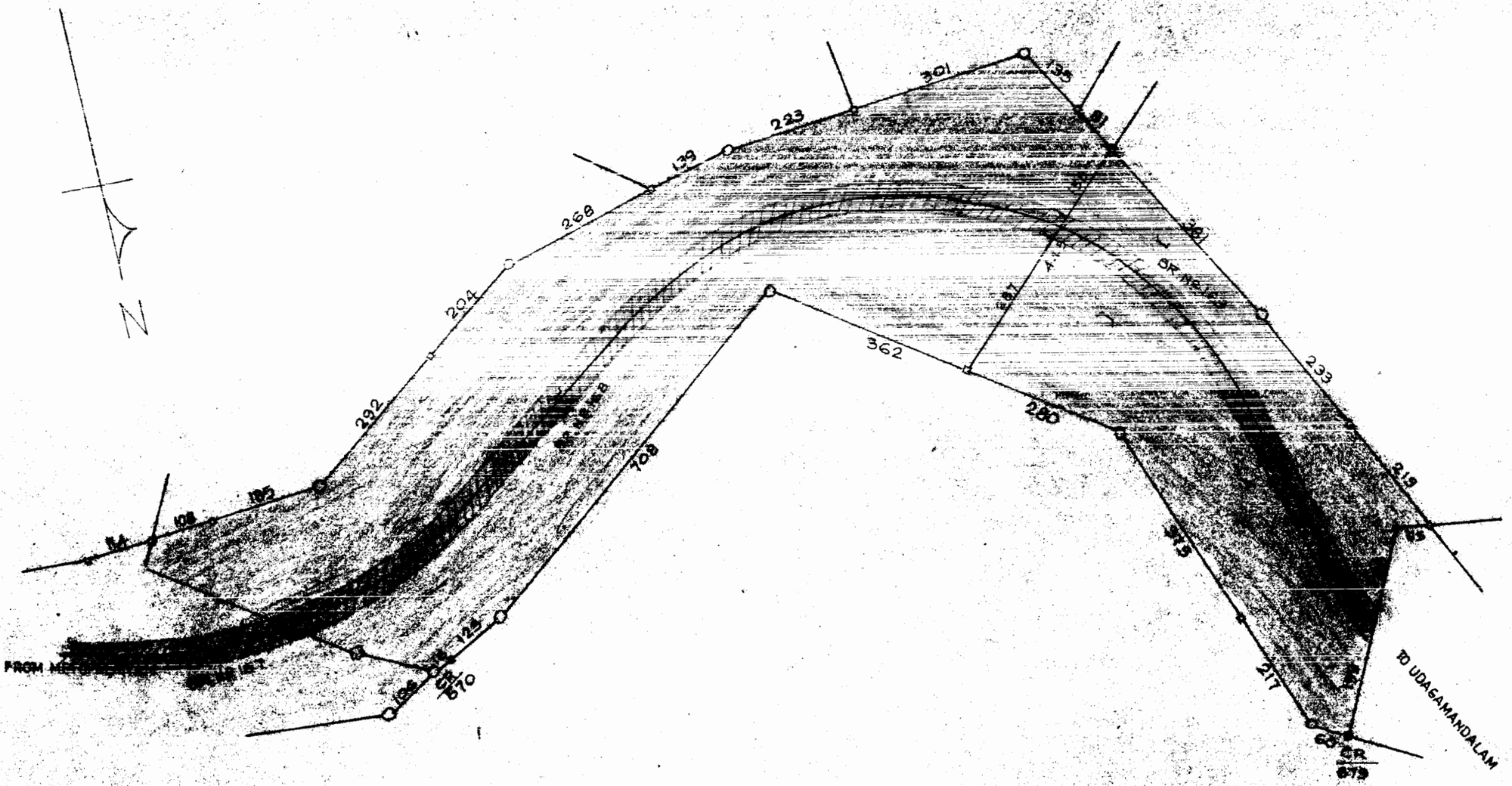
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 31/600 TO KM 32/000



AREA OF LAND = 3.55 Hectares
AREA UNDER CORE ZONE = [illegible]
AREA UNDER BUFFER ZONE = [illegible]

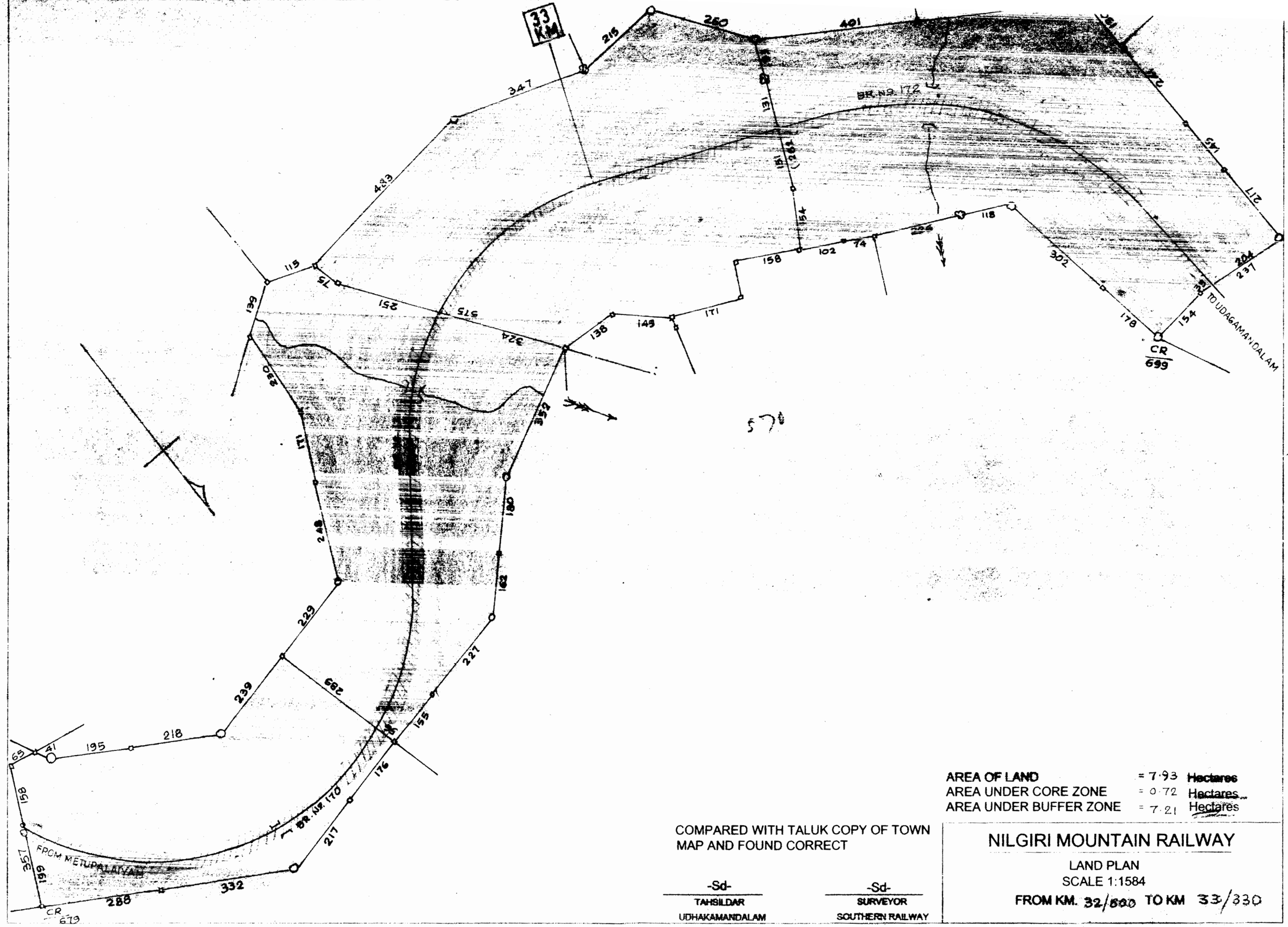
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 32/000 TO KM 32/600



AREA OF LAND = 7·93 Hectares
AREA UNDER CORE ZONE = 0·72 Hectares
AREA UNDER BUFFER ZONE = 7·21 Hectares

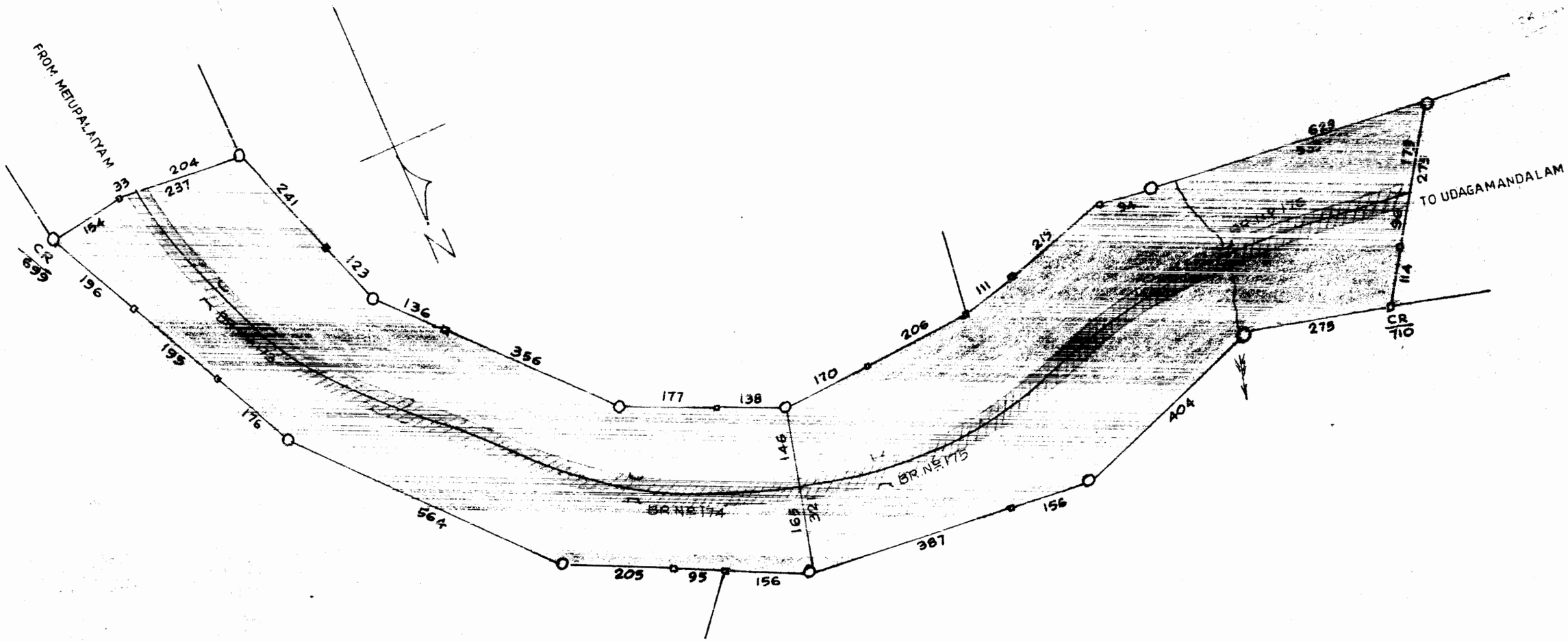
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 32/600 TO KM 33/330



AREA OF LAND = 3.51 Hectares
AREA UNDER CORE ZONE = 0.44 Hectares
AREA UNDER BUFFER ZONE = 3.07 Hectares

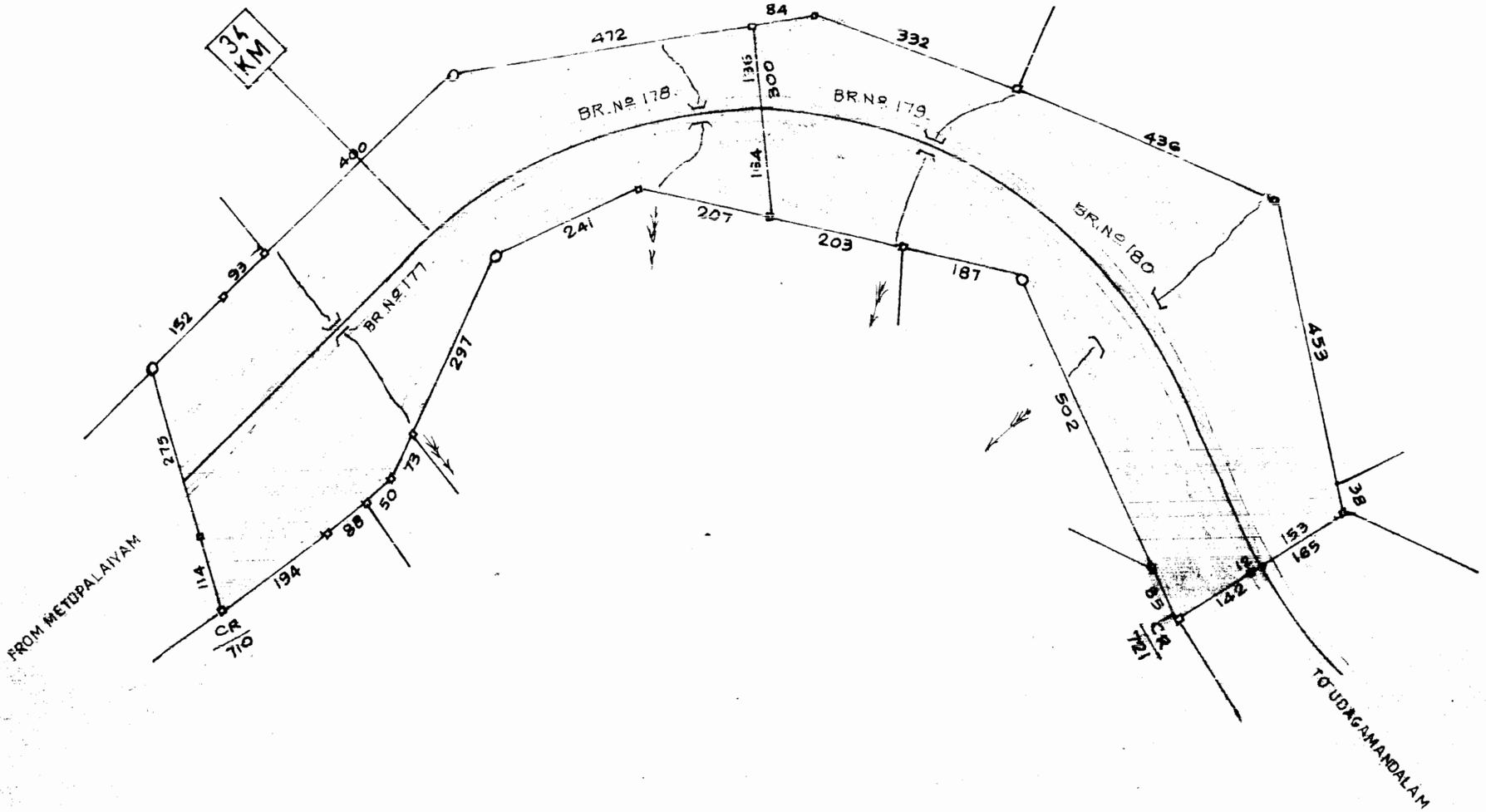
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 33/330 TO KM 33/880



AREA OF LAND = 2 93 Hectares
AREA UNDER CORE ZONE = 0 35 Hectares
AREA UNDER BUFFER ZONE = 2 58 Hectares

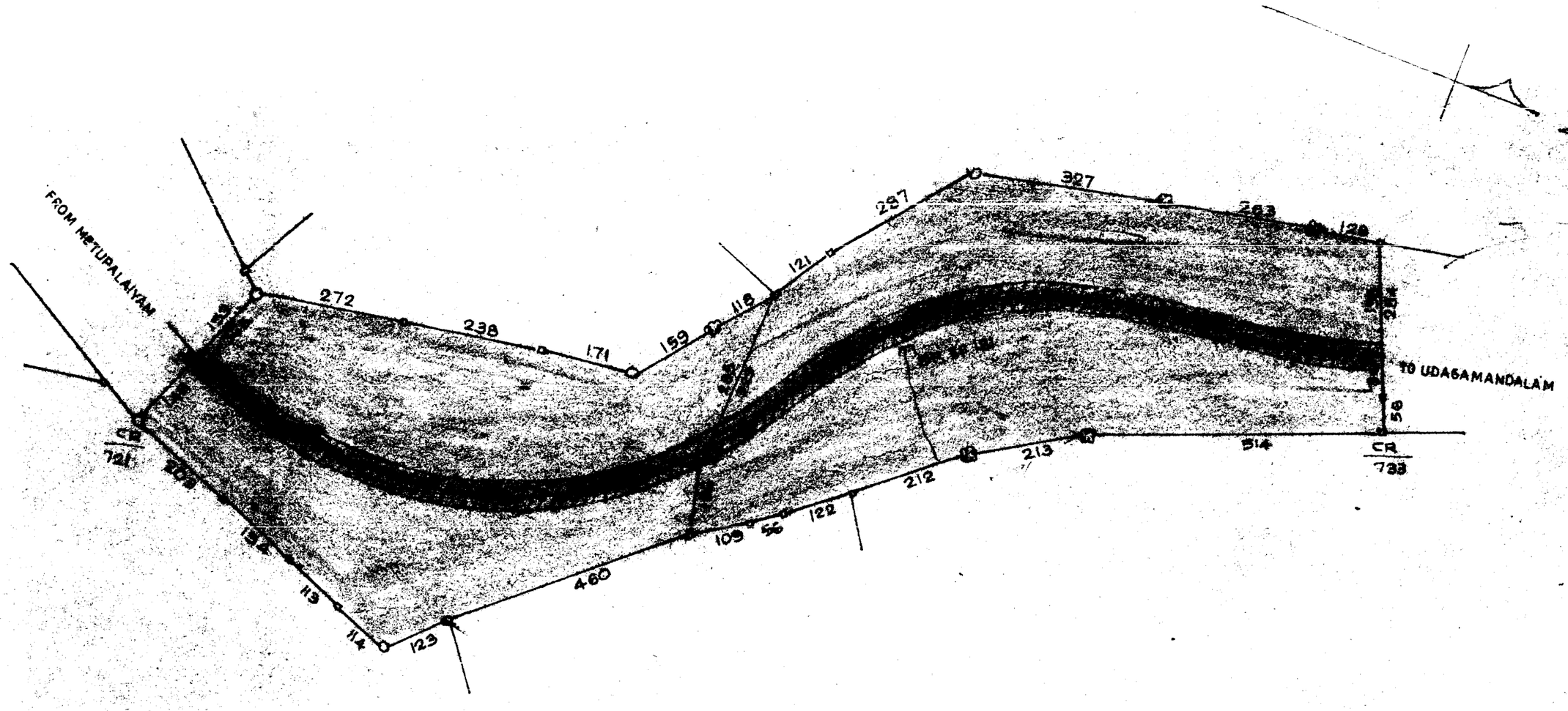
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 33/880 TO KM 34/330



AREA OF LAND = 3.61 Hectares
AREA UNDER CORE ZONE = 0.37 Hectares
AREA UNDER BUFFER ZONE = 3.24 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

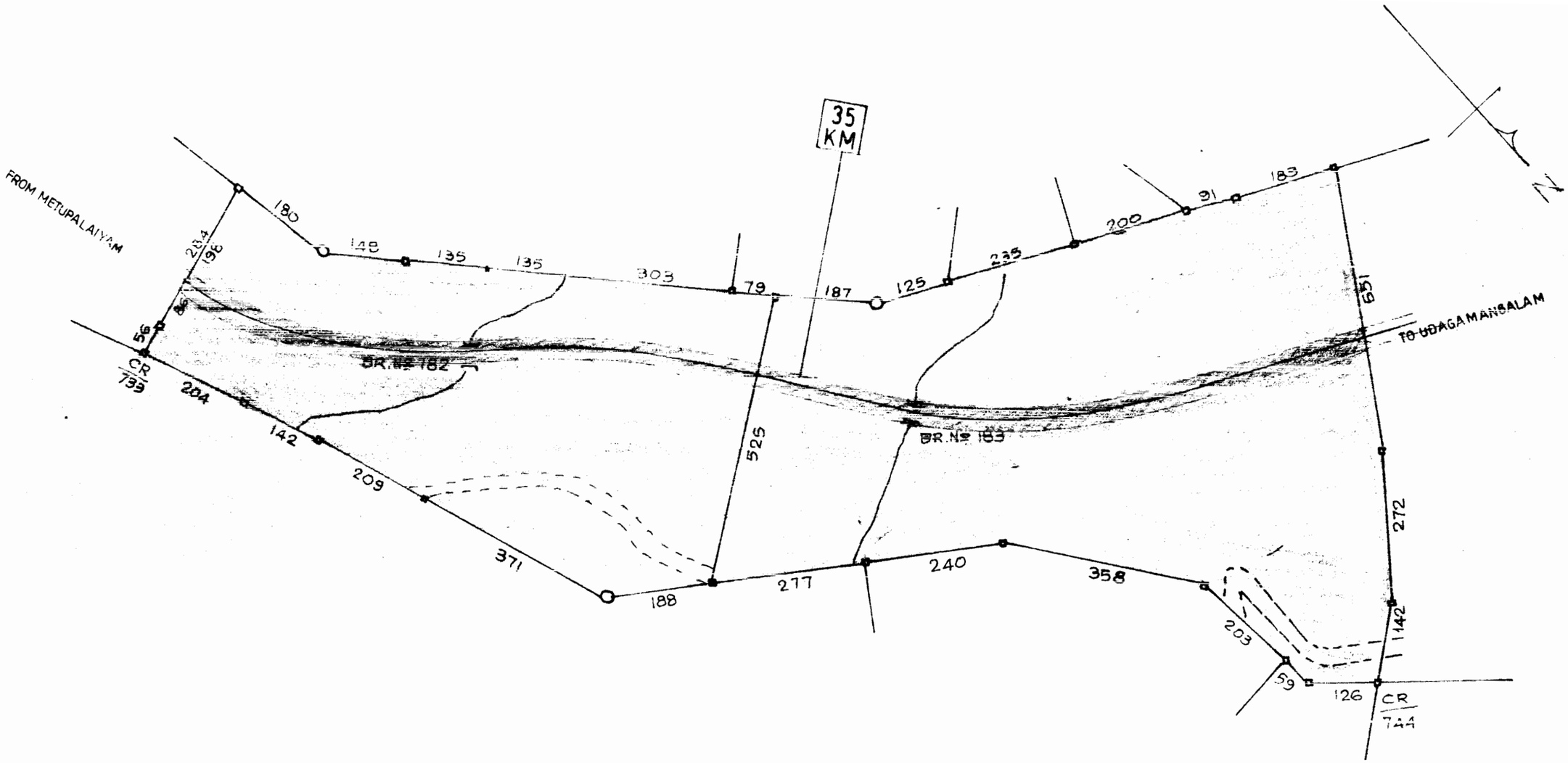
-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN

SHOWING SURVEY

PROPOSED [illegible] TO BE [illegible]



AREA OF LAND = 4.23 Hectares
AREA UNDER CORE ZONE = 0.85 Hectares
AREA UNDER BUFFER ZONE = 3.38 Hectares

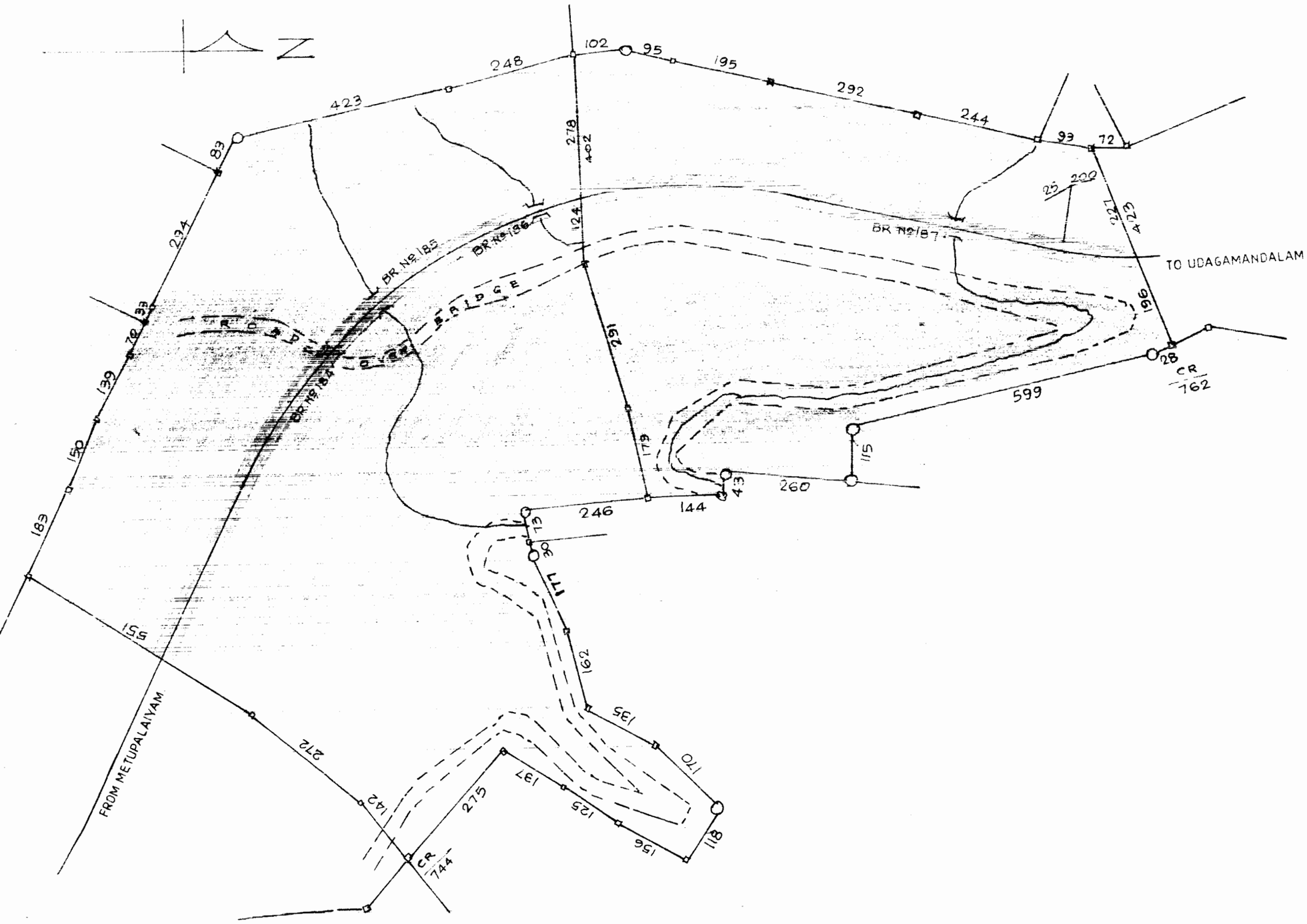
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 34/770 TO KM 35/210



AREA OF LAND = 7.38 Hectares
AREA UNDER CORE ZONE = 0.38 Hectares
AREA UNDER BUFFER ZONE = 7.00 Hectares

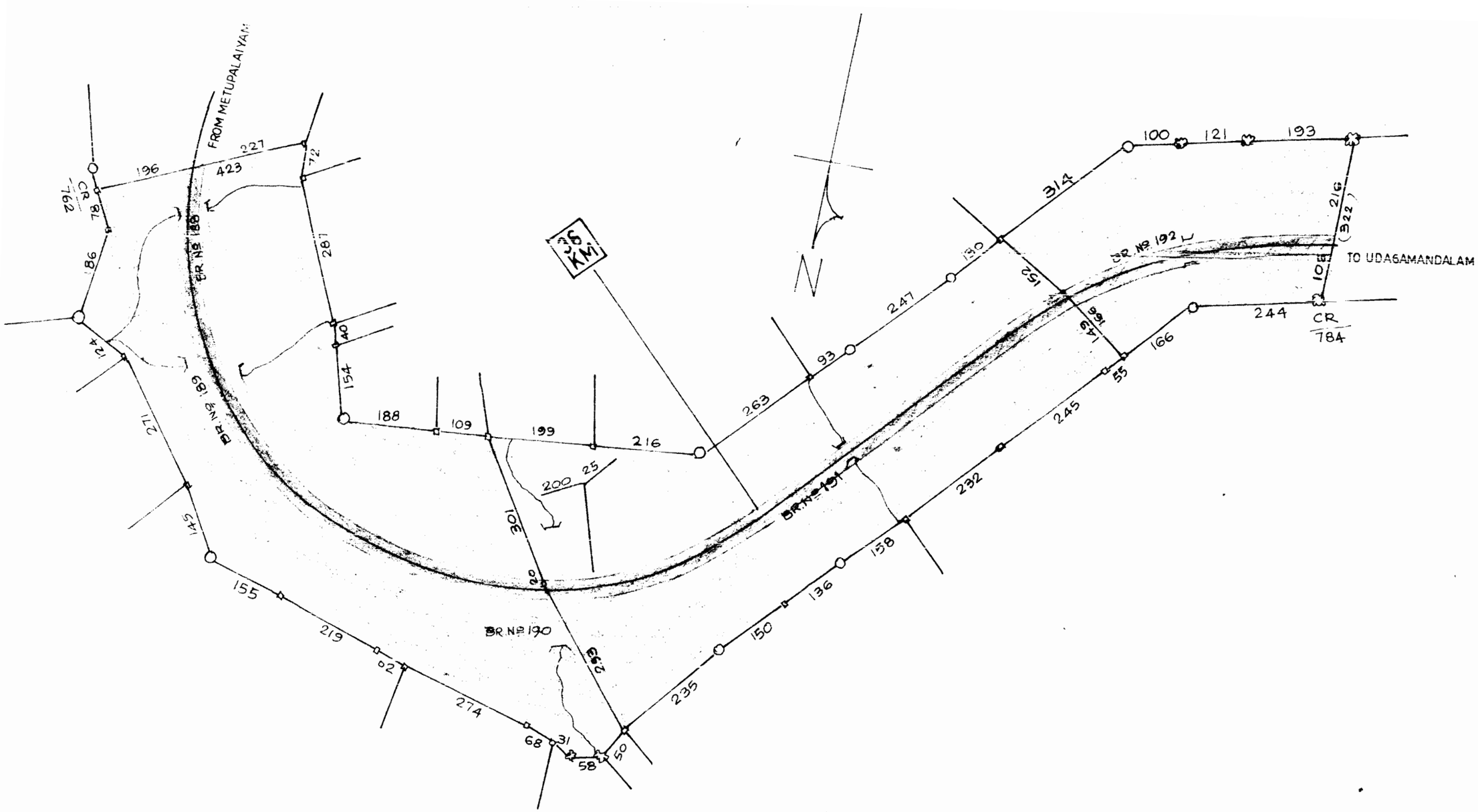
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 35/210 TO KM 35/685



AREA OF LAND = 4·32 Hectares
AREA UNDER CORE ZONE = 0·47 Hectares
AREA UNDER BUFFER ZONE = 3·85 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 35/685 TO KM 36/250

AREA OF LAND = 6·58 Hectares
AREA UNDER CORE ZONE = 0·57 Hectares
AREA UNDER BUFFER ZONE = 6·01 Hectares

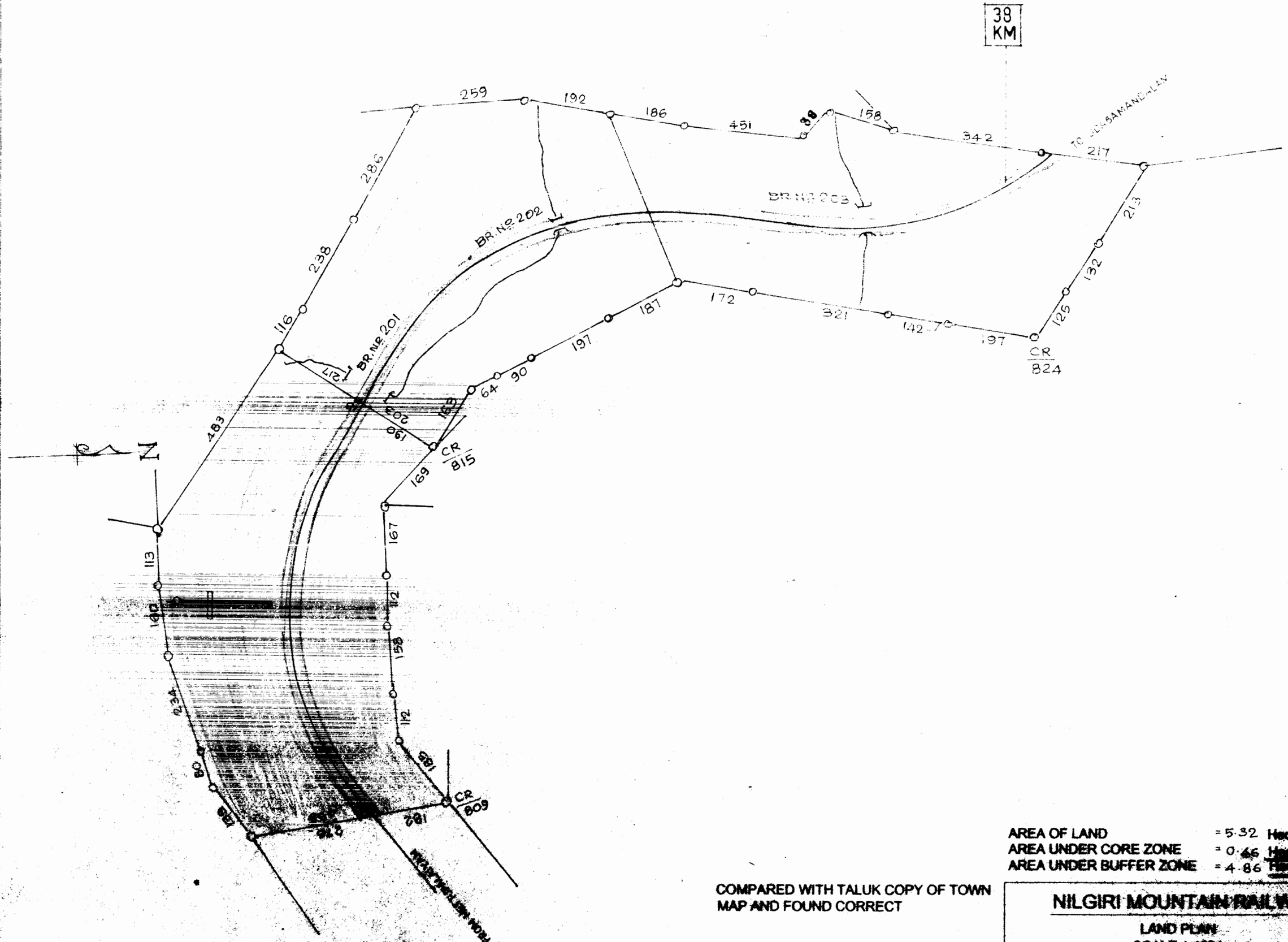
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

Dte.
Inspector
(Encroachment)

Dte.
Inspector
(Encroachment)

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 35/750 TO KM. 37/500



AREA OF LAND = 5.32 Hectares
AREA UNDER CORE ZONE = 0.46 Hectares
AREA UNDER BUFFER ZONE = 4.86 Hectares

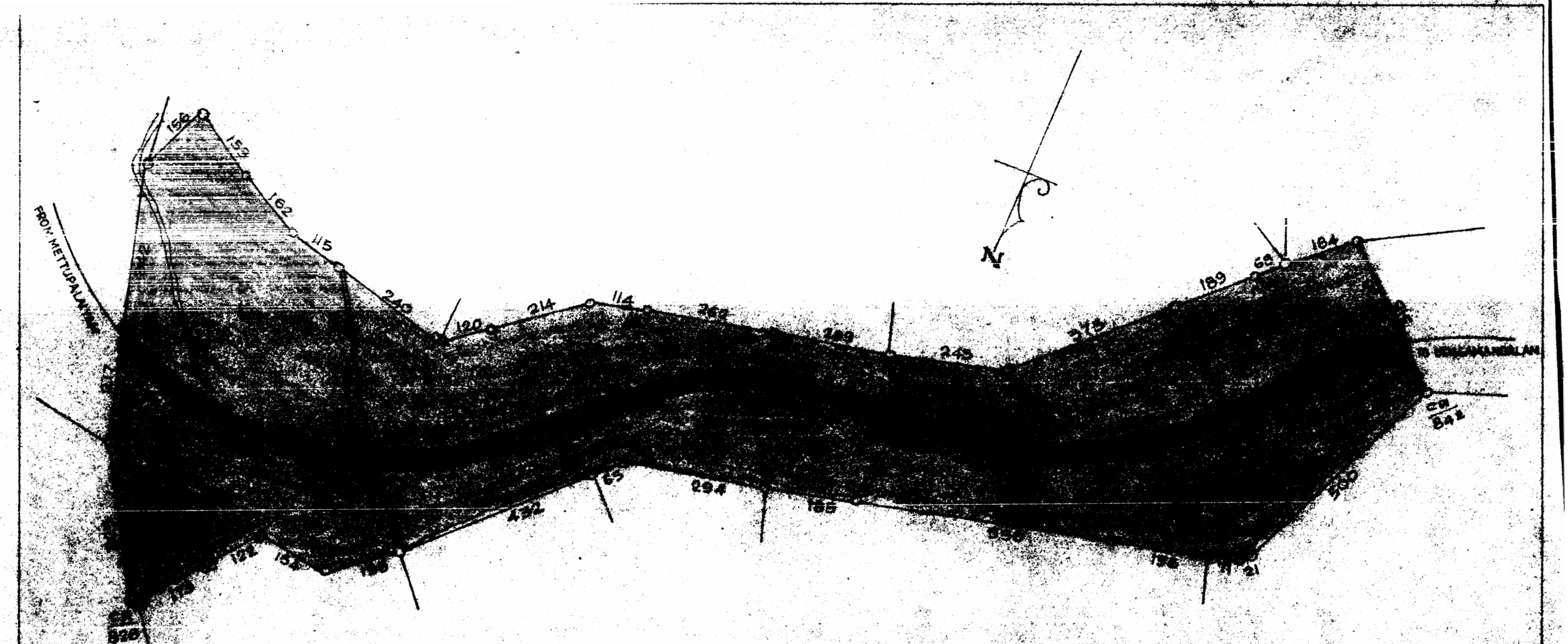
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1000
FROM KM. 37/500 TO KM 38/000



AREA OF LAND = 4·83 Hectares
AREA UNDER CORE ZONE = 0·45 Hectares
AREA UNDER BUFFER ZONE = 4·38 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
PASSING 3.0/1969 TO 1981 3.0/1969

AREA OF LAND = 4·28 Hectares
AREA UNDER CORE ZONE = [illegible]
AREA UNDER BUFFER ZONE = 1·78 Hectares

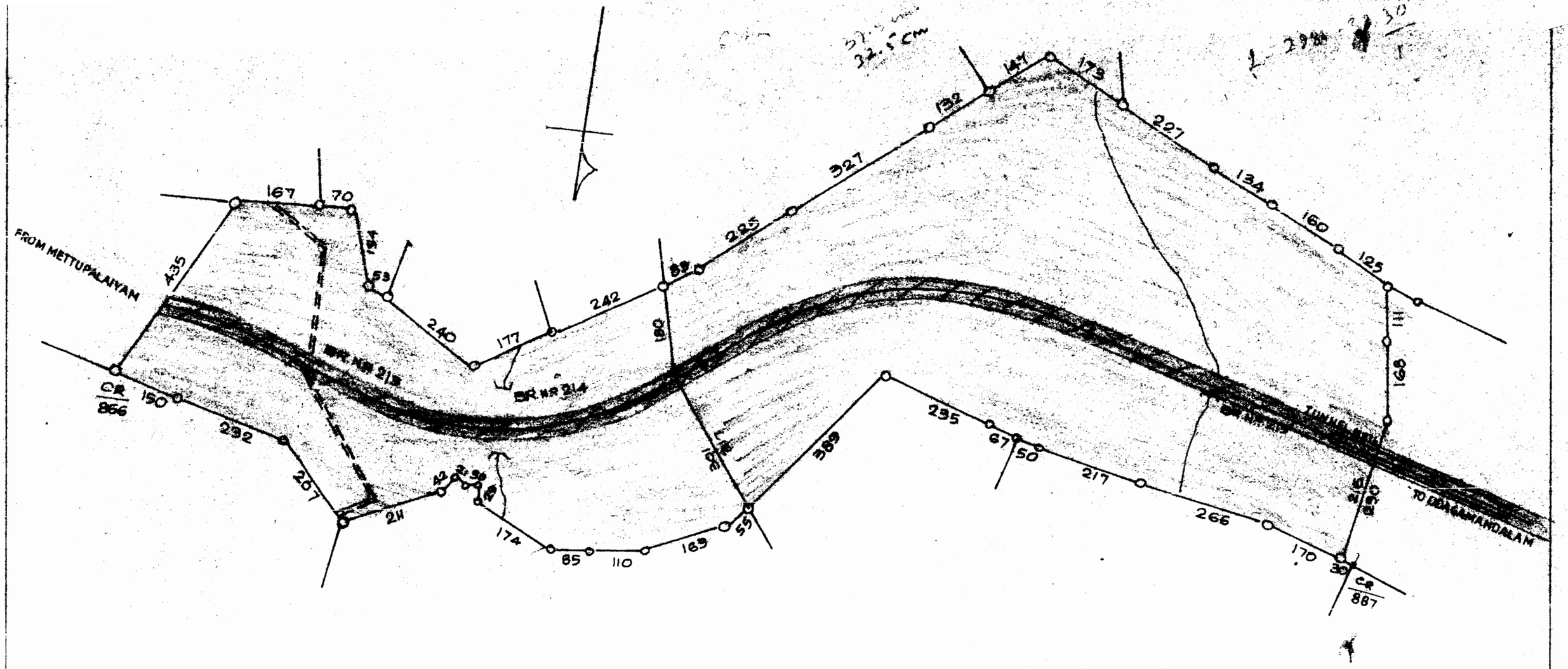
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

TAHSILDAR
UDHAYAMANDALAM

SUPERVISOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 38/600 TO KM. 39/200



AREA OF LAND = 5·15 Hectares
AREA UNDER CORE ZONE = 0·42 Hectares
AREA UNDER BUFFER ZONE = 4·73 Hectares

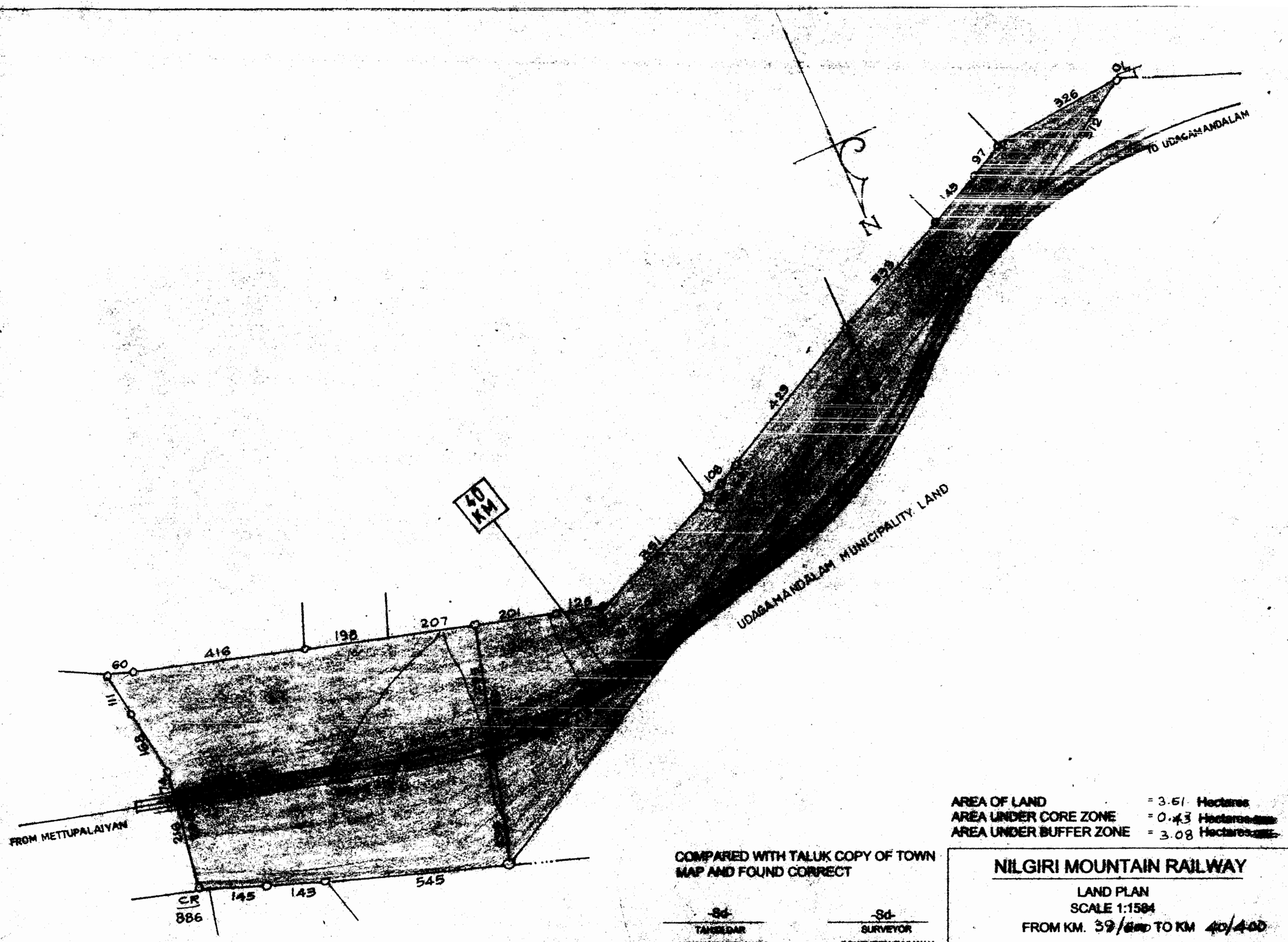
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 39/200 TO KM 39/600



AREA OF LAND = 3.61 Hectares
AREA UNDER CORE ZONE = 0.43 Hectares
AREA UNDER BUFFER ZONE = 3.08 Hectares

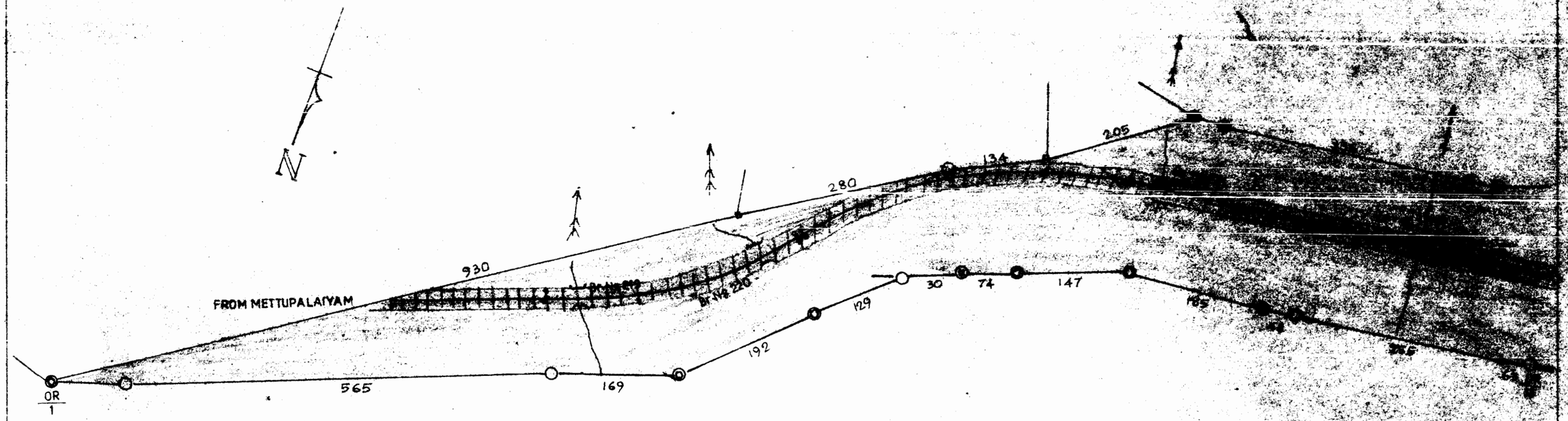
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 39/~~000~~ TO KM 40/400



AREA OF LAND : 2.28 Hectares
AREA UNDER DRY ZONE : 0.38 "
AREA UNDER WET ZONE : 1.90 "

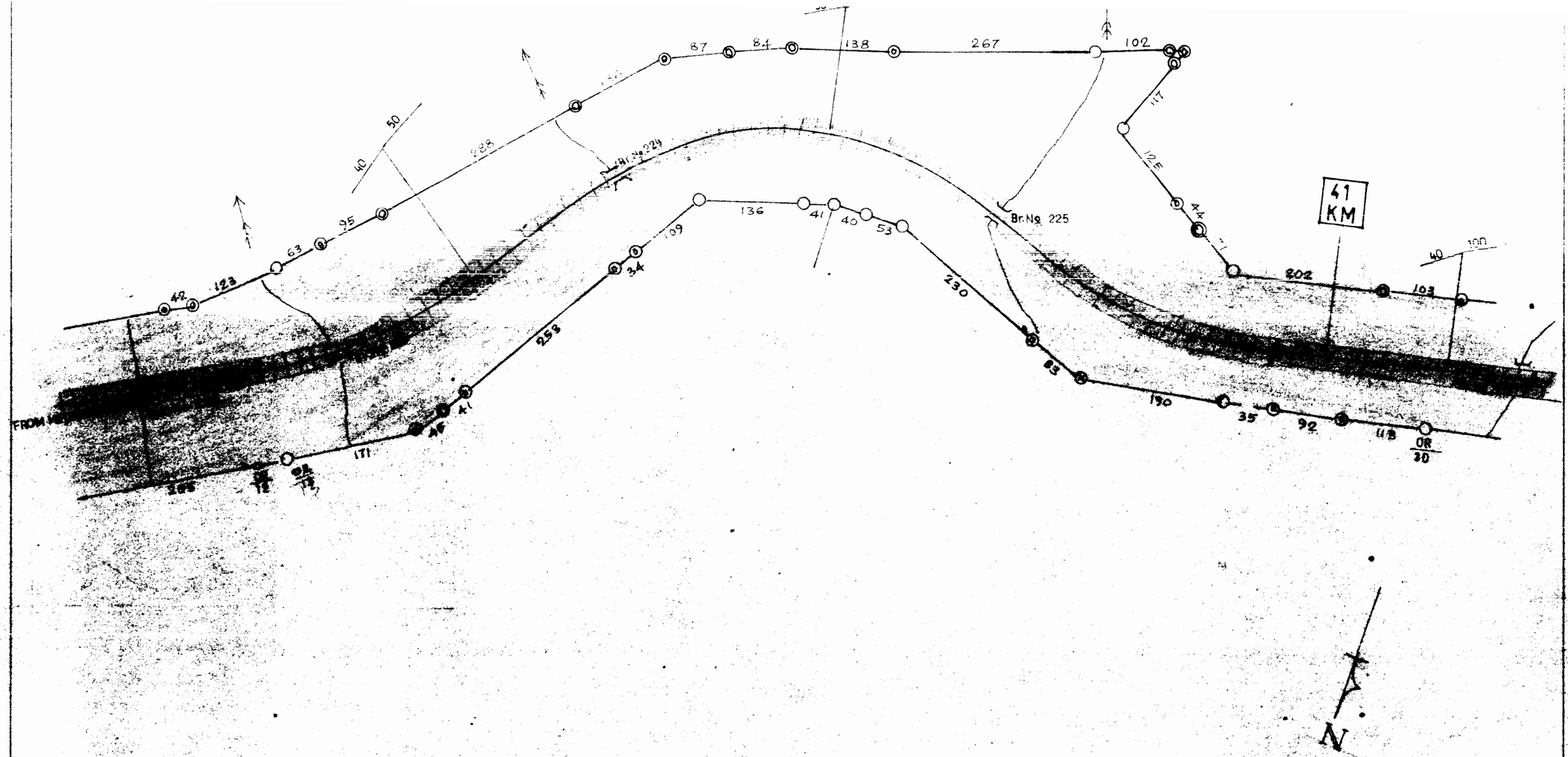
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
KOTAGAMUNDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 40/400 TO KM 40/880



AREA OF LAND = 3.71 Hectares
AREA UNDER CORE ZONE = 0.49 Hectares
AREA UNDER BUFFER ZONE = 3.22 Hectares

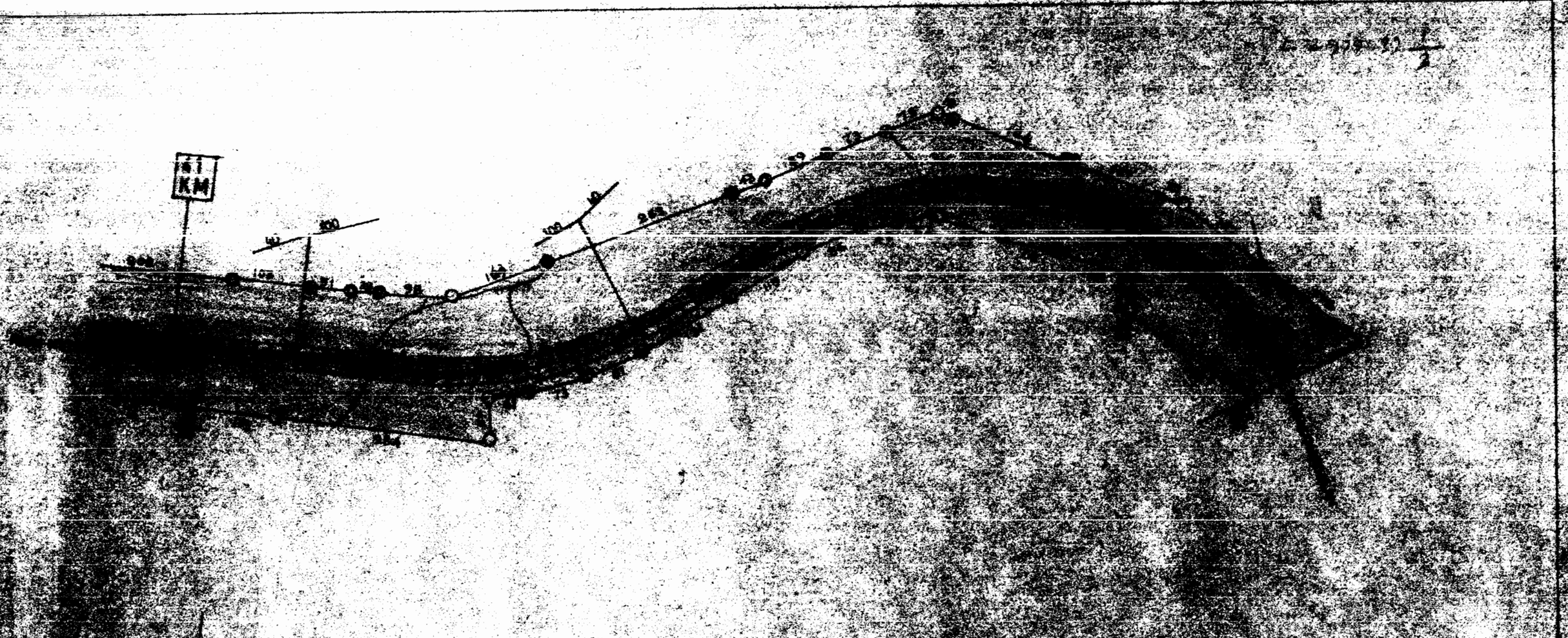
COMPARED WITH TALUK COPY OF TOWN
MAP AND FOUND CORRECT

-Sd-

-Sd-

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584

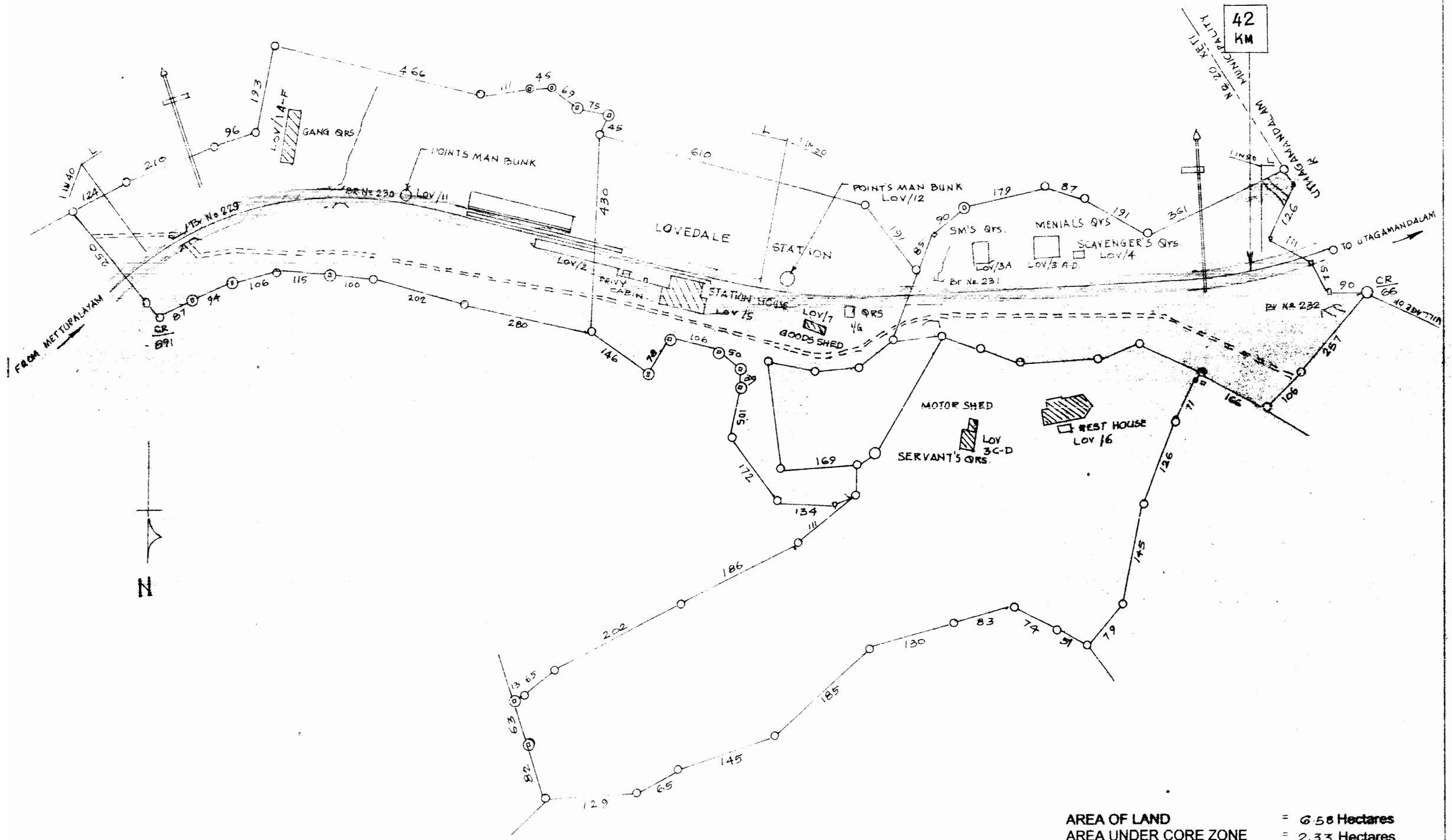


MADRAS MOUNTAIN RAILWAY

SECTION PLAN

SCALE 1/1000

PROFILE 41/600 TO KM 41/600



AREA OF LAND = 6.58 Hectares
AREA UNDER CORE ZONE = 2.33 Hectares
AREA UNDER BUFFER ZONE = 4.25 Hectares

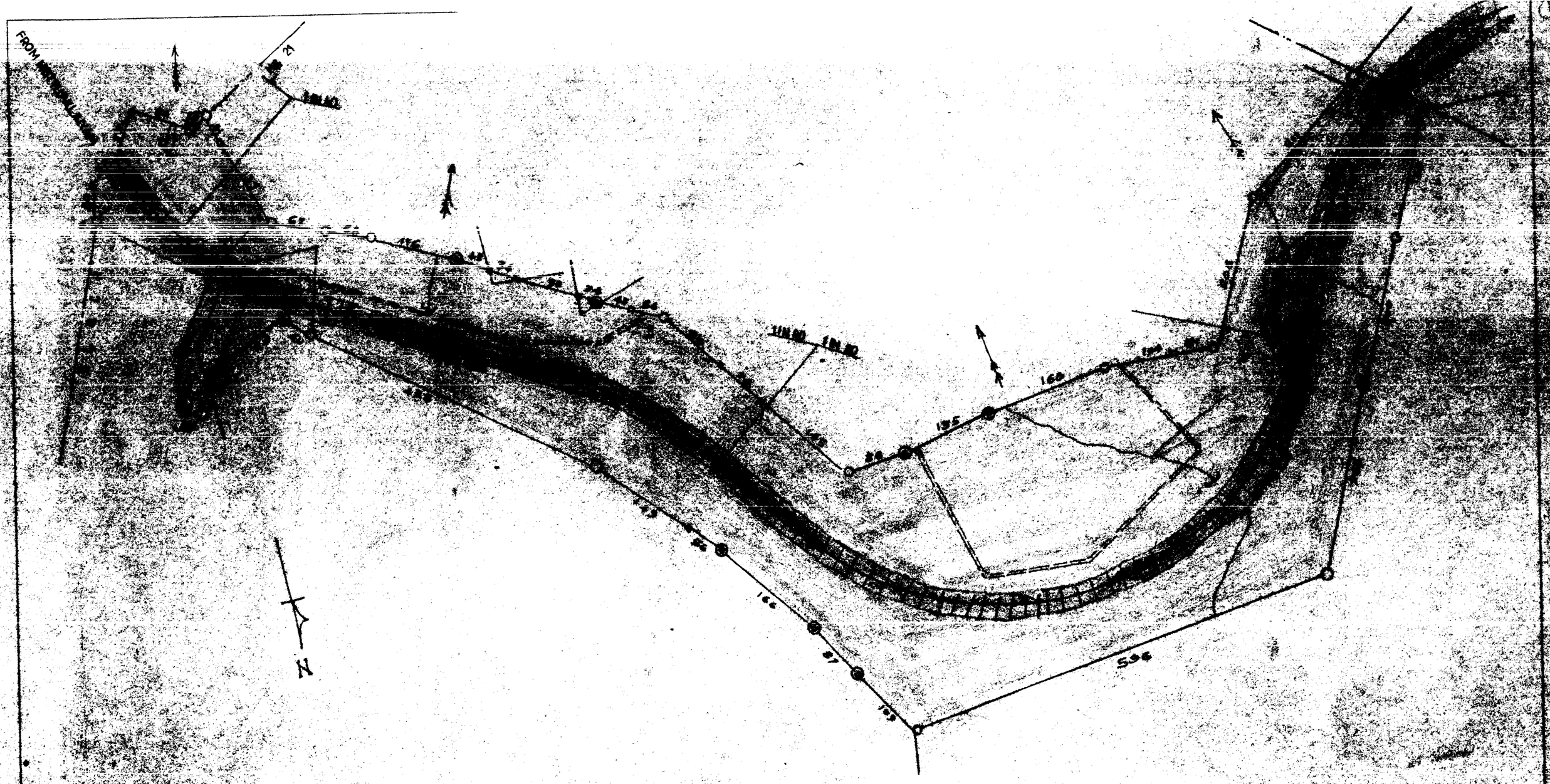
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 41/600 TO KM 42/060



COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

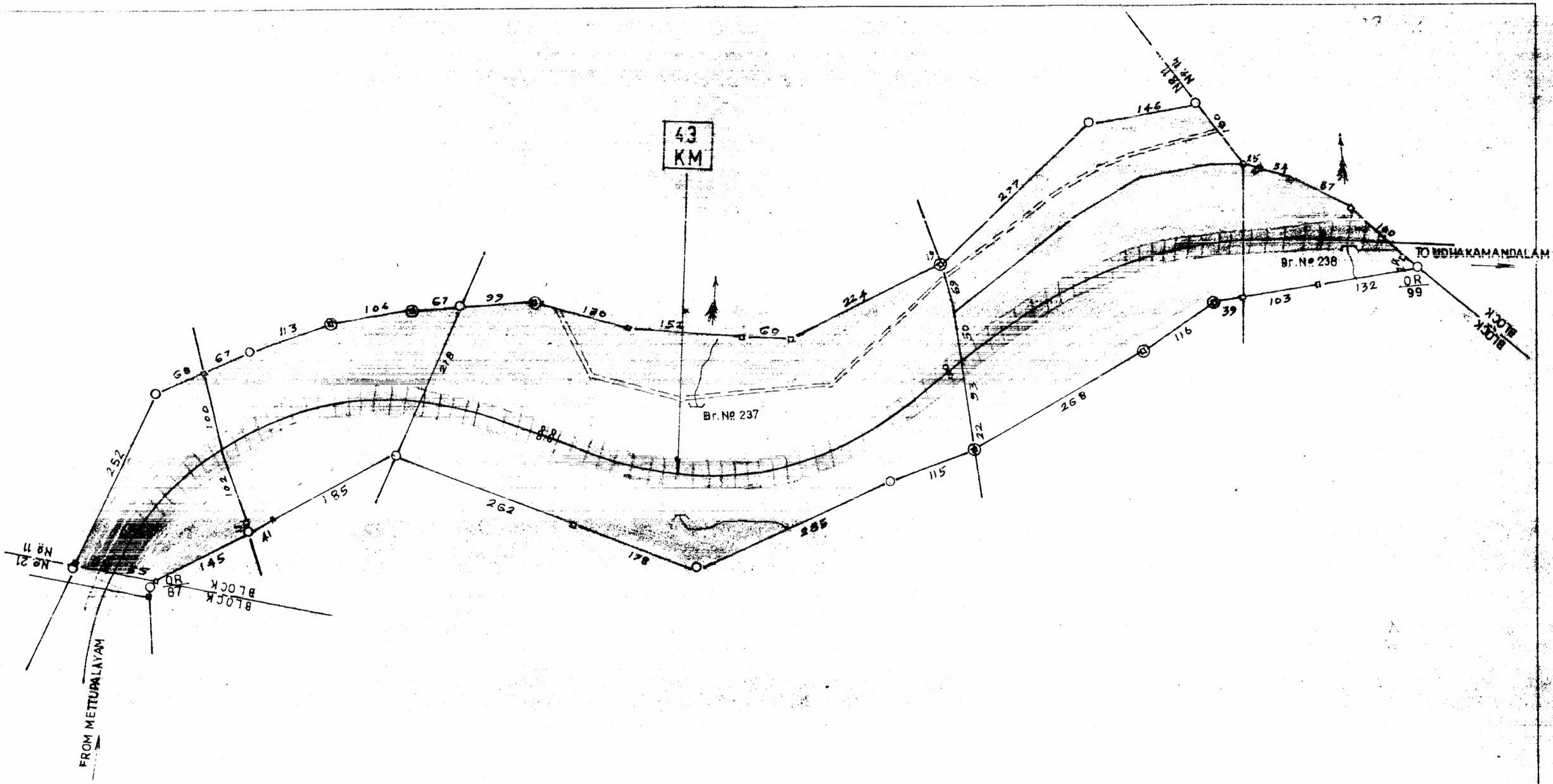
-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

AREA OF LAND
AREA UNDER DOUBLE LINE
AREA UNDER SINGLE LINE

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:2500
FROM KM. 42/340 TO KM. 43/800



AREA OF LAND = 3.99 Hectares
AREA UNDER CORE ZONE = 0.47 Hectares
AREA UNDER BUFFER ZONE = 3.52 Hectares

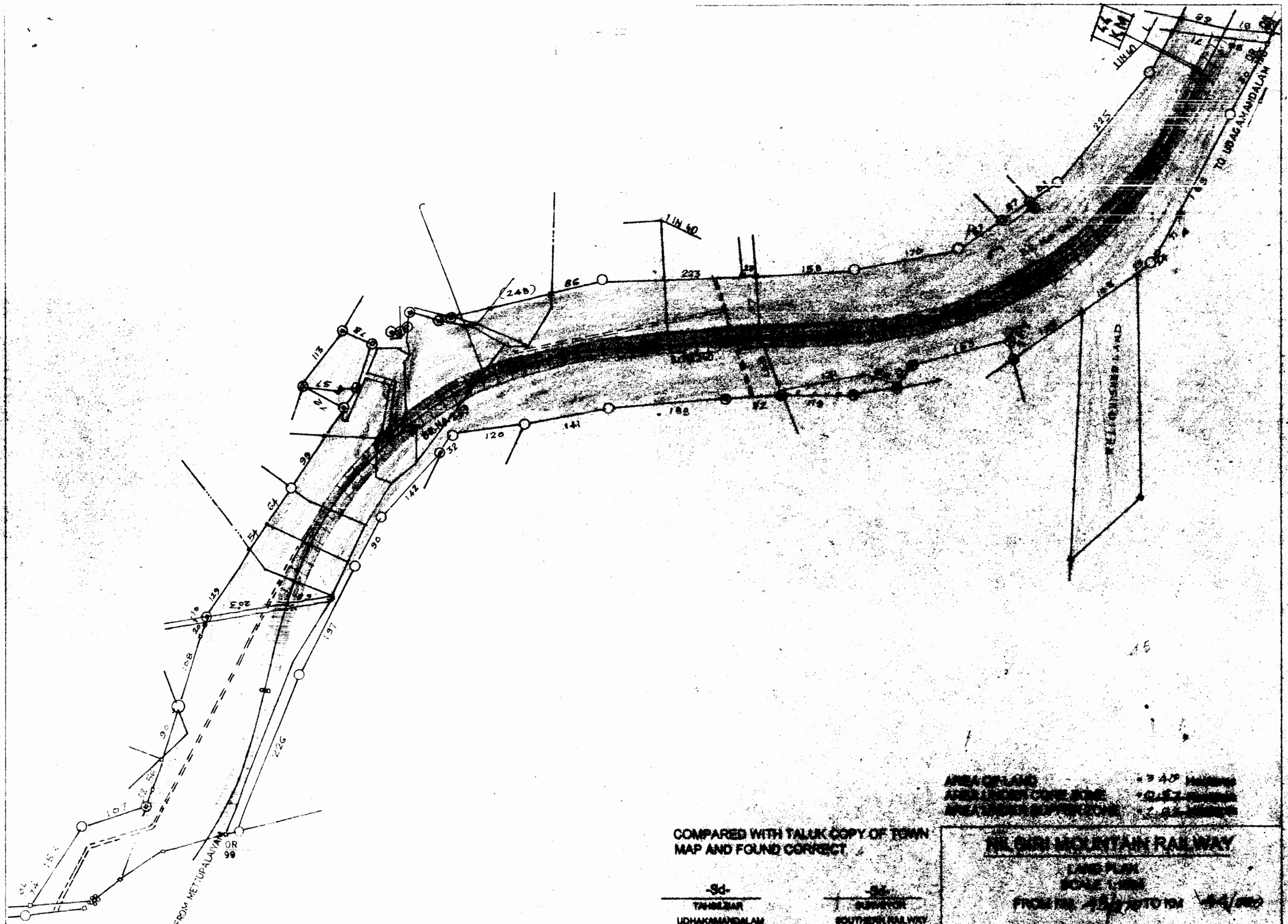
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAKAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 42/800 TO KM 43/270



COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

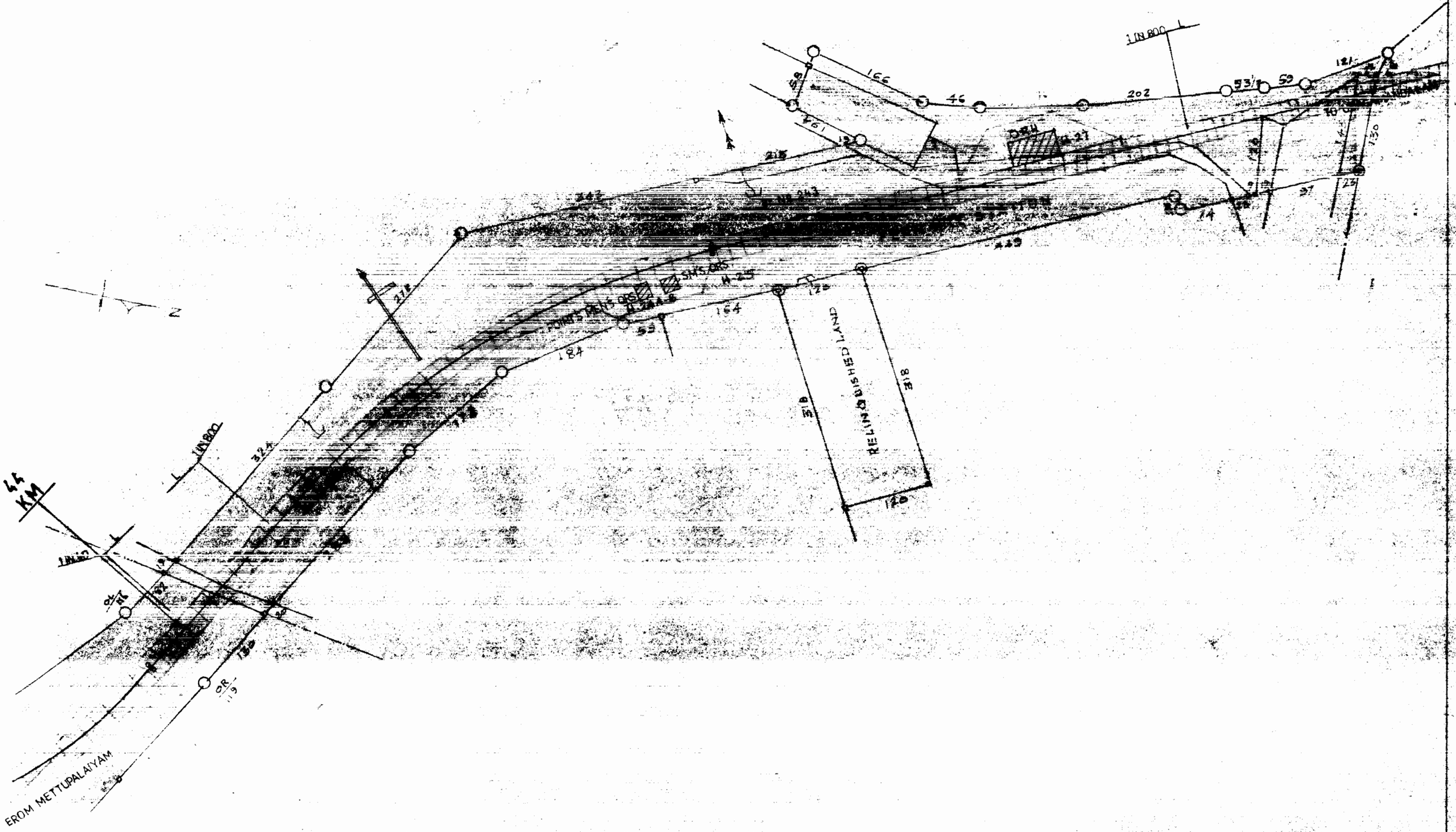
-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SUPERVISOR
SOUTHERN RAILWAY

AREA OF LAND ... 3.40 ...
AREA UNDER CASE ... 0.67 ...
AREA UNDER BUILDINGS ... 2.73 ...

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:2500
FROM KM 43/700 TO KM 44/000



AREA OF LAND = 3·50 Hectares
AREA UNDER CORE ZONE = 0·47 Hectares
AREA UNDER BUFFER ZONE = 3·03 Hectares

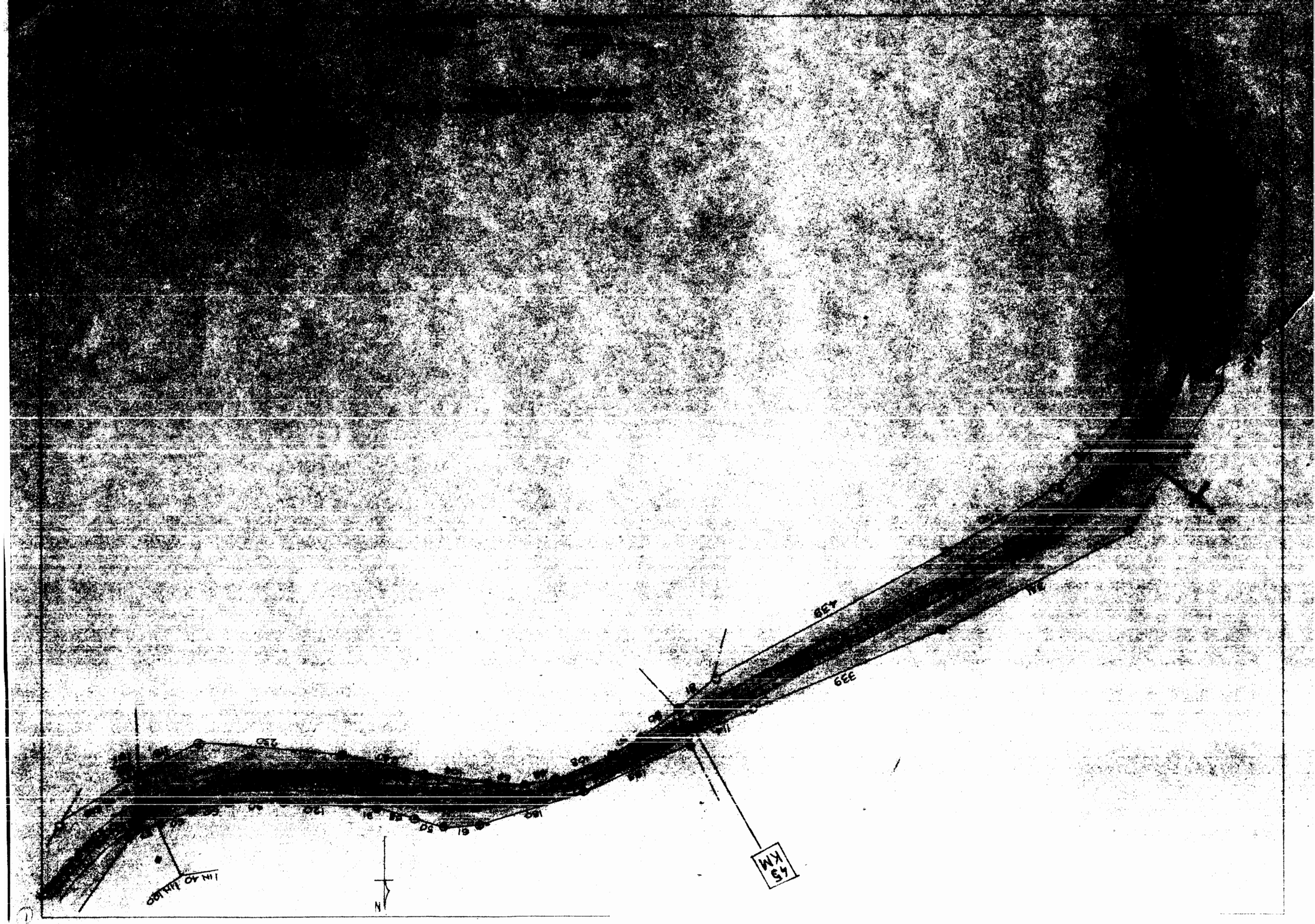
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

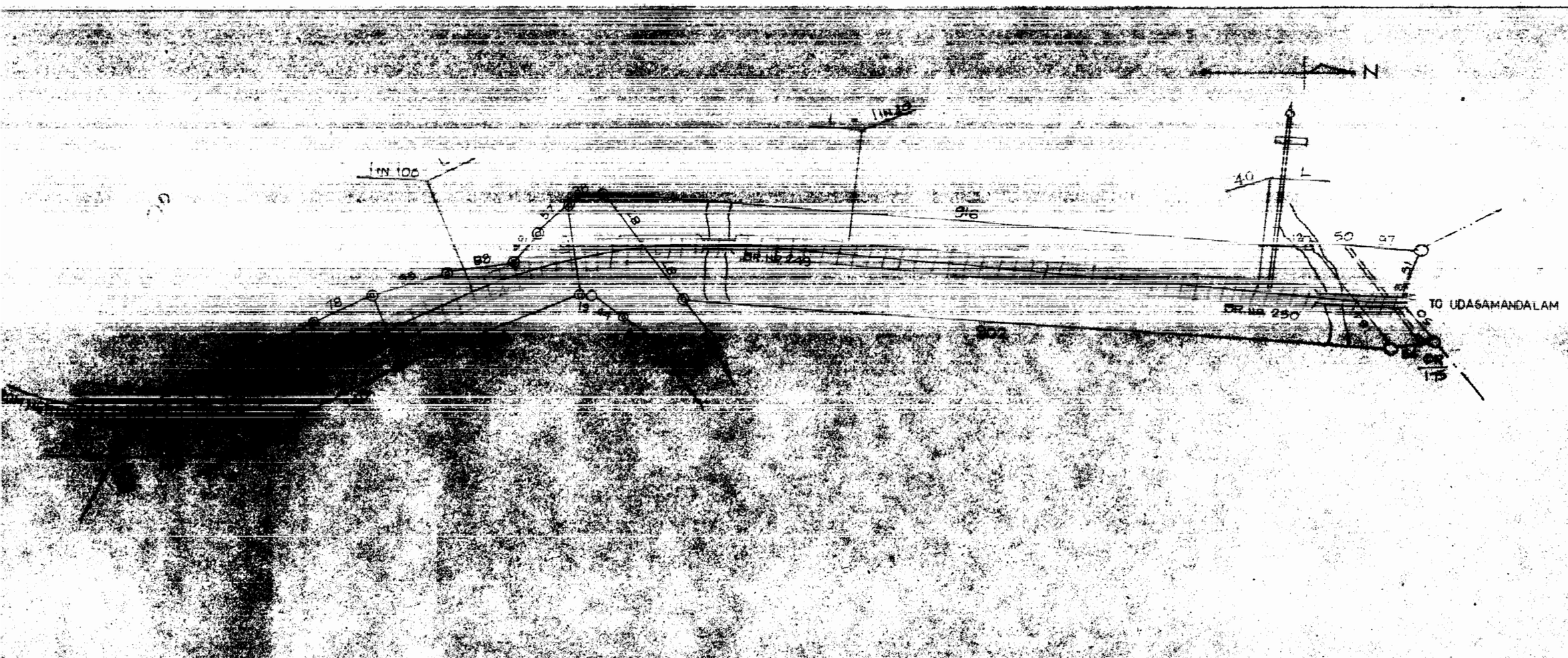
[illegible]
[illegible]

SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1000
FROM KM 44/000 TO KM 46/000


45 KM
N



AREA OF LAND = 1.50 Hectares
AREA UNDER CORE ZONE = ~~0.41 Hectares~~
AREA UNDER BUFFER ZONE = 1.09 Hectares

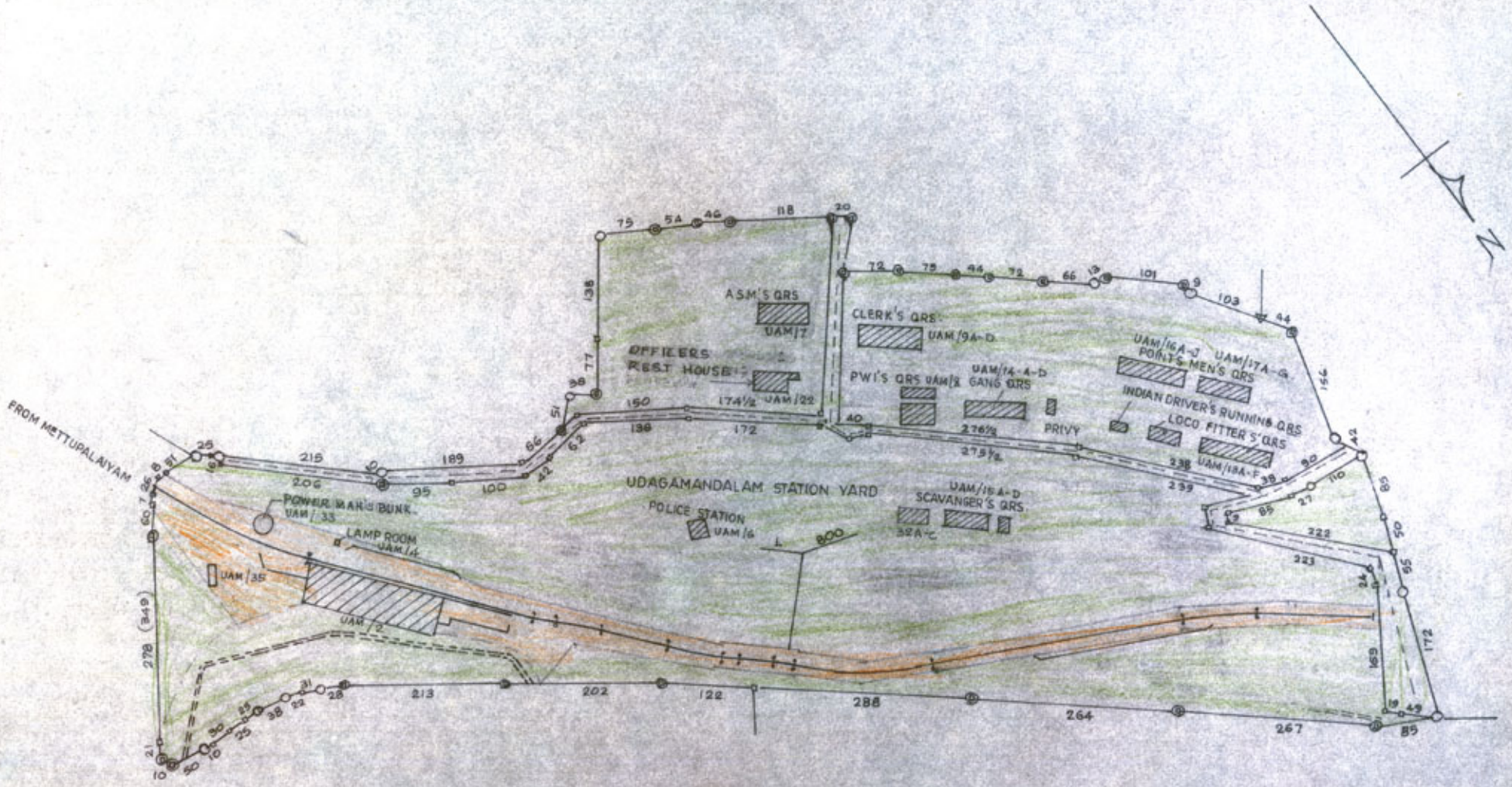
COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

Sd/-
TAHSILDAR
UDHAGAMANDALAM

Sd/-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM. 45/300 TO KM 45/470



AREA OF LAND = 6.64 Hectares
AREA UNDER CORE ZONE = 0.60 Hectares
AREA UNDER BUFFER ZONE = 6.04 Hectares

COMPARED WITH TALUK COPY OF TOWN MAP AND FOUND CORRECT

-Sd-
TAHSILDAR
UDHAGAMANDALAM

-Sd-
SURVEYOR
SOUTHERN RAILWAY

NILGIRI MOUNTAIN RAILWAY

LAND PLAN
SCALE 1:1584
FROM KM 45/470 TO KM 46/000

Darjeeling Railway (India)

No 944

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) land-slips 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 land slips 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 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 XIX^{e} 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 XIX^{e} 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 XIX^{e} siècle.

Le contrefort couvert de forêts épaisses 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. A 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.

Le développement touristique de Darjeeling dépend largement de l'efficacité du service du chemin de fer himalayen. Des programmes destinés à l'améliorer sont par conséquent à l'étude. Sont envisagés des travaux d'amélioration de la voie et l'acquisition de nouvelles locomotives et de nouveaux matériels roulants. Actuellement, le ministère des chemins de fer finance une étude complète de la ligne par des conseillers spécialistes des transports.

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

Une mission d'expertise de l'ICOMOS a visité le bien en janvier 1999. L'ICOMOS a également examiné l'étude comparative des chemins de fer historiques coordonnée par le Musée national du chemin de fer de York (Royaume-Uni) en 1998 (voir ci-après).

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 boudhiste 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 nécessairement 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 XIX^{e} siècle a eu une profonde influence sur le développement économique et social dans de nombreuses partie du monde. Ce processus est illustré de manière exceptionnelle, riche et exemplaire par le Darjeeling Himalayan Railway.

ICOMOS, septembre 1999

Nilgiri Railway (India)

No 944 bis

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. Mettupalaiyam 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 Mettupalaiyam 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. 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 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 Burliar 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 reclined. 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 2000was 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 later 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

An ICOMOS expert mission visited the property in September-October 2004.

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 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. Rack 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 nearly two decades later, 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 which 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:

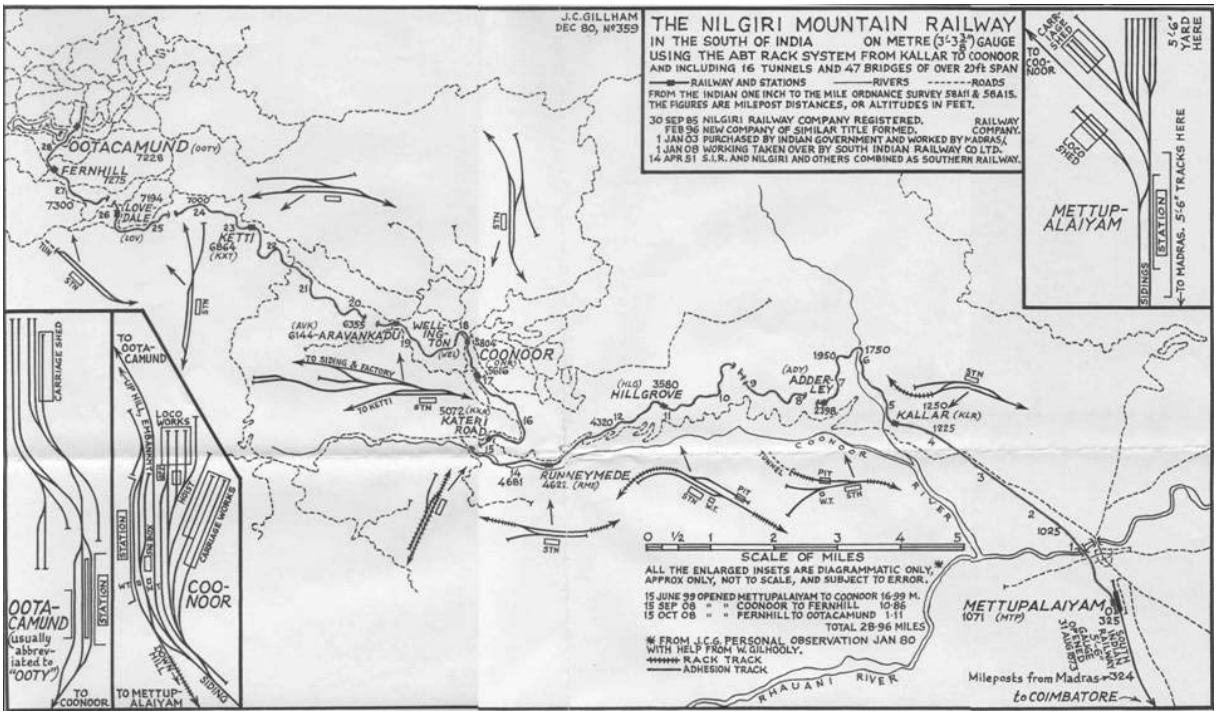
The World Heritage Committee,

1. Having examined Document WHC-05/29.COM/8B,

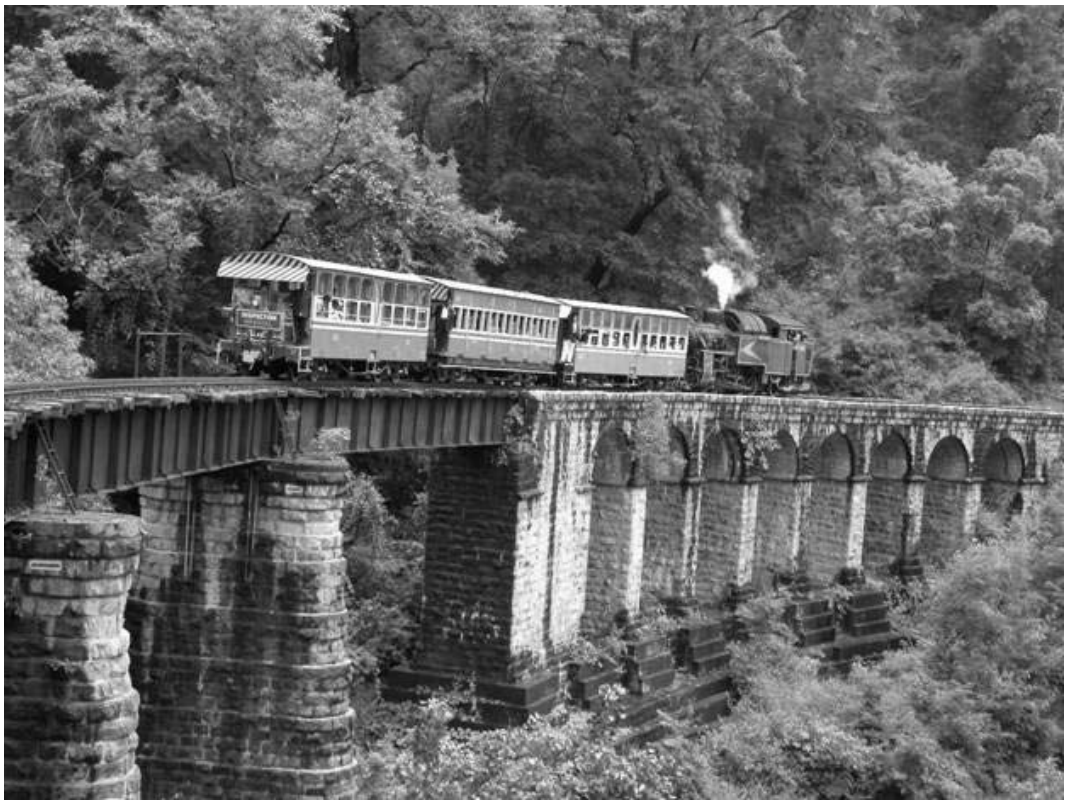
2. Approves the extension on the basis of the ***existing criteria ii and iv***:

> ***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

Chemin de fer des Nilgiri (Inde)

No 944 bis

1. IDENTIFICATION

État partie : Inde

Bien proposé : Chemins de fer de montagne en Inde

Lieu : District de Nilgiri, État du Tamil Nadu

Date de réception : 29 janvier 2004

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, il s'agit d'un *site*. Le chemin de fer des montagnes Nilgiri (CFMN) est proposé en tant qu'extension de l'actuel site du Patrimoine mondial, le *Darjeeling Himalayan Railway* (DHR), pour former une proposition d'inscription en série : les chemins de fer de montagne en Inde.

Brève description :

Le chemin de fer des montagnes Nilgiri est une voie ferrée unique s'étendant sur 46 km dans l'État du Tamil Nadu. Sa construction fut tout d'abord proposée en 1854 mais, la situation géographique de la région montagneuse rendant les travaux difficiles, ceux-ci ne commencèrent qu'en 1891 pour s'achever en 1908. Ce chemin de fer illustre la technologie de pointe de son temps et joua un grand rôle pour faciliter les mouvements de population et le développement socio-économique à l'époque coloniale britannique.

2. LE BIEN

Description

Le chemin de fer des montagnes Nilgiri (CFMN) se compose d'une seule voie ferrée de 45,88 km de long qui relie Mettupalaiyam à Udagamandalam (jadis Ootacamund ou Ooty), dans l'État du Tamil Nadu. Mettupalaiyam se trouve à 326 m d'altitude et Udagamandalam à 2203 m. Les crémaillères se composent de deux barres d'acier crantées, disposées sur une double rangée de 44 mm d'espacement, et 64 mm au-dessus des rails de roulement, de sorte que la dent d'un rail soit directement face à la lacune de l'autre, afin que les pignons du moteur ne sortent pas des crémaillères dans les virages. Des porte-encoches de deux longueurs standard sont utilisées : barre complète (26 dents sur 3,12 m) et moitié de barre (13 dents sur 1,56 m). Le pas entre les dents de crémaillère est de 120 mm. L'entrée de la crémaillère se fait au moyen d'aiguilles d'entrée spécialement conçues, posées sur des traverses spéciales, équipées de ressorts en arc et de raccords raccordés au final sur les barres rigides. Les crémaillères sont posées à une distance constante de 455 mm depuis les rails intérieurs, et sont vissées par des boulons à des coussinets de rail en fonte, fixés aux traverses au moyen de boulons traversants avec écrou indésserrable.

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 Burliar 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, juste avant le terminus, 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

conducteur. Sur ce chemin de fer circulent des locomotives de classe « X », avec des roues à engrenages s'emboîtant dans des crémaillères, pour négocier la rampe abrupte de 1 sur 12. Du fait de la pente marquée et des conditions climatiques défavorables, deux systèmes de freinage différents sont utilisés : i) le freinage à adhérence entre la roue et le rail par le frottement, ii) l'application de freins sur les barres de crémaillère, raccordées à la voie. Les engrenages de la locomotive sont faits pour mobiliser les pistons, qui agissent comme des compresseurs à air, causant un effort de freinage dynamique. Les freins à mâchoires actionnés par des volants sur le tambour de frein, monté sur les engrenages, peuvent aussi appliquer un effort de freinage sur la roue dentée.

Histoire

Protégés par des escarpements couverts d'une jungle sauvage, à environ 2000 m d'altitude, les montagnes Nilgiri sont restés isolées jusqu'aux XIXe siècle, habitées par la seule population tribale des Todas. Leur nom signifie Montagnes Bleues en sanscrit : c'est ainsi qu'on les voit si l'on se tient à leur pied. Le peuplement britannique des monts commença en 1820. En 1830, il y avait un commandant militaire, et les familles britanniques de Madras commencèrent à y construire leur résidence d'été, avec une prédilection pour Udagamandalam (Ootacamund). En 1870, le gouvernement de Madras tout entier s'y installait pour l'été, imitant la migration annuelle du gouvernement du vice-roi de Calcutta à Simla.

L'histoire du CFMN remonte à 1854, lorsque les Britanniques proposèrent pour la première fois de construire un chemin de fer dans les montagnes. Les travaux commencèrent sur la ligne Madras-Coimbatore (5'6'') en 1853, et le tronçon jusqu'à Mettupalaiyam ouvrit en 1873. Il s'agissait de remplacer la fastidieuse ascension jusqu'à Coonoor en char à bœufs ou à cheval. En 1873, l'ingénieur de district des Nilgiri, J.L.L. Morant, proposa la construction d'un chemin de fer à crémaillère, mais les premières offres furent déclinées. Sir Guildford Molesworth, ancien ingénieur en chef des chemins de fer du gouvernement de Ceylan, agissant en qualité de consultant pour le gouvernement de l'Inde, conseilla une voie à crémaillère et à adhérence, sur le modèle du système Abt construit dans les monts Harz en Allemagne. En 1882, M. Riggenbach, l'inventeur suisse du chemin de fer à crémaillère Rigi, soumit une proposition de construction de la ligne de chemin de fer. Elle fut acceptée, et la *Nilgiri Rigi Railway Company Ltd* fut constituée en 1885. Le travail fut inauguré en 1891, et enfin achevé en 1908. Par la suite, le chemin de fer fut exploité par différentes compagnies avant d'être incorporée au *Southern Railway* en 1951.

Politique de gestion

Dispositions légales :

Le ministère des Chemins de fer du Gouvernement de l'Inde possède la totalité des biens mobiliers et immobiliers du chemin de fer des montagnes Nilgiri.

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, appliqué 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 acier sont régulièrement repeints et sont en excellent état. La date de la dernière retouche de peinture est consignée sur chaque travée d'acier. Inévitablement, il y a eu des dégâts, la zone étant une région où les pluies de mousson sont fortes. Les dégâts les plus graves ont eu lieu le 11 novembre 1993 : 333 mm de précipitations en une seule journée ont détruit 200 m de voie au km 20,4 (causant également des pertes humaines considérables). Les services ont été suspendus pendant trois mois sur le tronçon, et la reconstruction a coûté au total 350 000 000 roupies.

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 essentielles, 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 bien sûr quelques 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 et les infrastructures pour les locomotives ont été supprimées. Les gares plus petites sont bien conservées. S'il y a eu quelques fermetures (notamment Fernhill à proximité d'Udhagamandalam, convertie en une maison de repos), la plupart restent telles qu'elles ont été bâties. Les intérieurs, les aménagements et le mobilier sont largement d'origine, et sont utilisés aujourd'hui exactement pour l'usage auquel ils étaient destinés : casiers à billets, caisses et même registres. Le système original de billetterie, avec des billets Edmonson, est toujours utilisé. La signalisation du chemin de fer est

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 expérimental 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, célébrèrent 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 tribales qui habitaient là depuis des siècles que les nombreux migrants qui vinrent des plaines avec les Britanniques, se l'approprièrent, tant culturellement qu'économiquement.

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 :

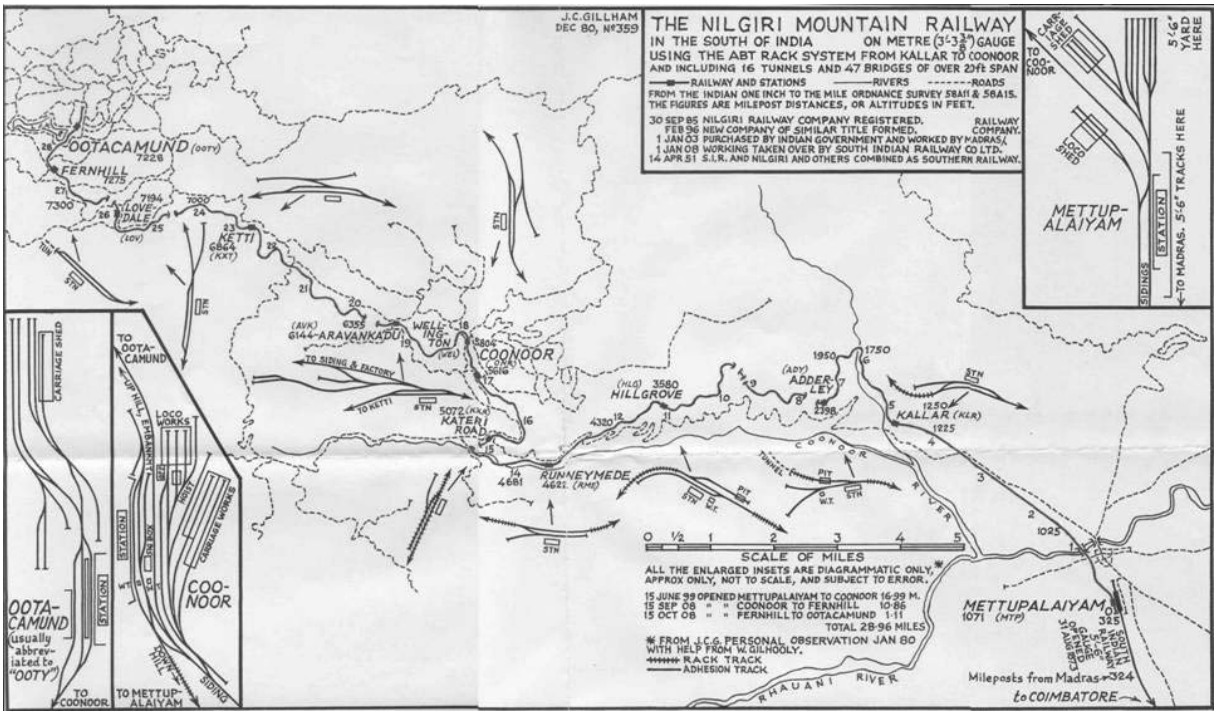
Le Comité du patrimoine mondial,

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

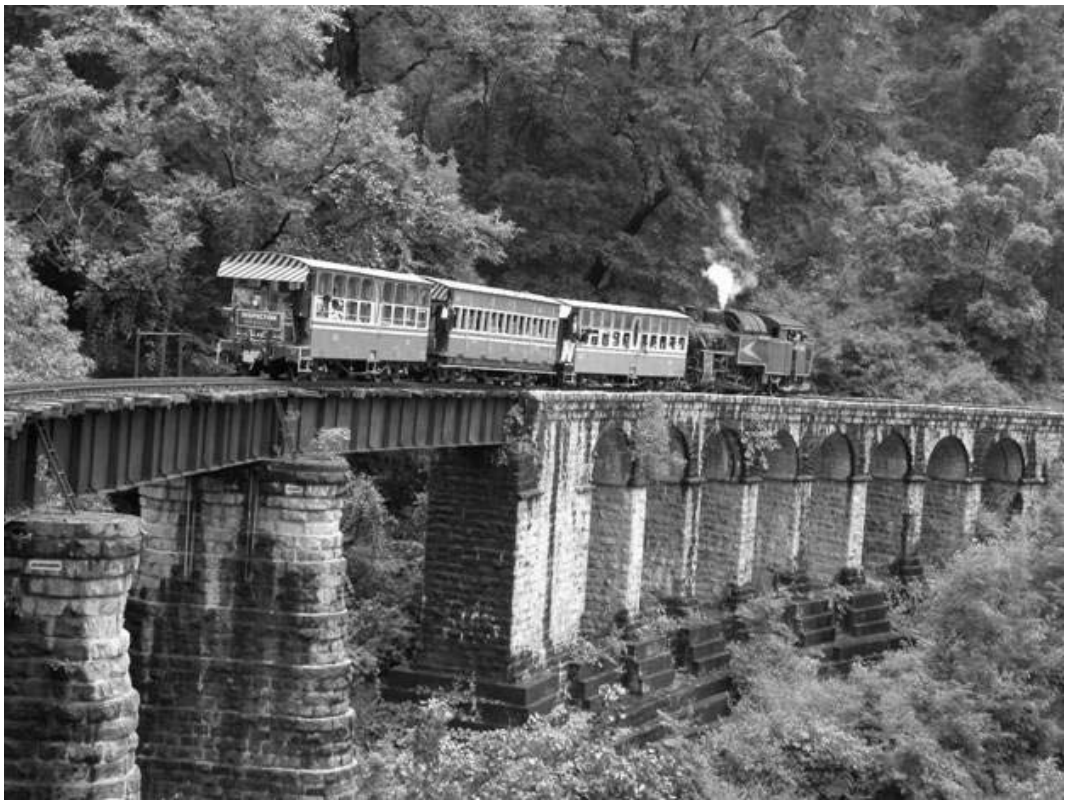
2. Approuve l'extension sur la base des ***critères existants ii et iv*** :

> ***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