

LAST AFR. PROT.

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JUL 10

Capt R.B.

910

Gelgel Kenya Railway

Leads report with plans by Lieut
Hall R.B. on proposed Railway length
108 miles estimated cost £11,000,000

Ack: + thank - + copy of l^r + all
encs. with plans in original, to
the Genl - copy by - with refer to
copy despatch of 8th of April

H. J. K.
1/11

Copy to am - copy you long

Page 1

200

191



WAR OFFICE

WHITEHALL S.W.

3rd June 1910.

16985

Sir,

I have the honour to forward the enclosed report by Lieutenant Hall, Royal Engineers, on the proposed Gilgit Kenya Railway.

As compared with the Nairobi-Kenya Railway which was previously reported on, the Gilgit-Kenya line has practically no advantages. Assuming that Indian labour would be necessary it would cost practically as much. Its gradient is 2.5 % as compared with 1.5 % - the loads hauled by the engines would therefore be in the proportion of 3 - 5.

I have the honour to be

Sir,

Your Obedient Servant,

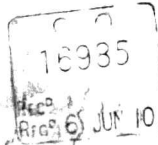
Under Secretary of State
for the Colonies,
Colonial Office,
Downing Street,

S.W.

A. G. Stevenson

Captain R.E.

1/c U.R.E.S.



From/

Lieut. H. A. L. Hall. R.E.,

To/

Capt. A. G. Stevenson D.S.O., R.E.

Longmoor Camp,

Went Buss,

Hants,

29th April 1910.

Sir,

I have the honour to herewith forward my report on the proposed Gilgit-Kanya Forest Railway.

I have the honour to be,

Sir,

Your obedient Servant,

H. A. L. Hall
Lieut R.E.

1s. 1 map.
1 section.

GILGIL - KENYA FOREST PROPOSED RAILWAY

The Gilgil - Kenya line was proposed as an alternative to the Nairobi Kenya line - Gilgil Station on the Uganda Railway was suggested as the starting point and some point on the edge of the forest between the Kaso Nyuki and the Ngara Muoni as the terminus.

As regards the starting place, a point 7 miles east of Gilgil on the Uganda Railway is considered the most suitable.

A suitable terminus was found at a point on the edge of the forest 4 miles north of the Ngara Muoni.

The starting point is situated in the Rift Valley while the terminus is on the western slopes of Mt. Kenya. Between them are interposed the Aberdare Mountains.

The line has therefore to climb the eastern escarpment of the Rift Valley and get round the Northern end of the Aberdare Mts.

The first 11 miles of the line is occupied in climbing the escarpment, which it will be seen, on referring to the map, is of a much gentler slope here than elsewhere.

From Mile 11 to 28 the ground is rocky and undulating but presents no great engineering difficulties.

Before the preliminary survey of this portion of the line is carried out, the valley of the Morondat River should be examined with a view to a better alignment, and before either can be settled as the better, a paper location of both may be necessary.

From Mile 28 to 42 the line runs along the Ougatabos Plains which are absolutely flat with a gentle slope

slope to the North.

From Mile 42 to 44 there is a stiff climb at ruling gradient, but no heavy work is necessary.

From Mile 44 to 62 is the descent to the *Uaso Nyiro Plains*. This is the portion of the line which decides the ruling gradient, for it is impossible to cross the *Uaso Pesi* higher up stream as it runs in a gorge.

Summit height is 7840 ft, and the *Uaso Pesi* 6420, a fall of 1420 ft, in ¹⁴ miles air line. This gives a gradient of 2%.

As, however, owing to the nature of the ground, the fall is made in 3 steps a 2.5% gradient (compensated) is found necessary.

No economy can be effected by making the ruling gradient with the load any steeper, so it is taken as 2.5%, compensated in both directions.

From Mile 62 to 95 the line traverses country best described as rolling, and not so easy as a casual inspection leads one to suppose.

From Mile 95 to the terminus the line travels on an even slope along a spur from *Mr. Kenya* to the edge of the forest.

Length of line.

108 Miles.

Gauge.

Metre.

Gradient.

2.5% compensated.

Maximum Curvature.

8°.

Estimated cost.

£.414,000.

Cost per mile.

£.3833.

The estimated cost is based on the assumption that local native labour will be procurable. ~~It is however~~

~~scantiful~~ if *it will be*

It is however doubtful if

if it will be possible to obtain sufficient, in which case indentured Indian labour will have to be made use of. This will add to the cost as follows:-

Extra cost of earthwork.	£.40,000
Passages from India for 4000 men.	£.26,400.
Recruiting in India.	<u>2,000.</u>
Total:-	£.68,000.

bringing the total estimated cost up to £.482,000 which can be taken as a maximum figure.

A line from *Nairobi* to the same point of the forest would be ¹³⁴~~80~~ miles long and would cost :-

80 miles as per estimate C. Page 3	}	£.
<i>Capt Steven on Nairobi-Kenya</i>		313,840
<i>Report</i> <i>£2.3923.</i>		
54 miles forest branch page 13		
of the same report <i>£2.3450.</i>		<u>186,300</u>
Total.		£.500,140.

The following table shows the estimated cost, ~~length~~ length and haulage to *Nairobi* the centre point of the Colony of the two lines.

	Cost with Native Labour.	Cost with Indian Lab.	Milage.	Haulage.
<i>Nairobi Line</i>	£.500,140	£.-----	134.	134.
<i>Gilgil Line</i>	£.414,000	£.482,400	108.	182.

In the case of the *Nairobi-Kenya* route the question of using Indian labour is not considered as the line runs through *KiKenya* Country for its whole length and there will be no difficulty in obtaining local labour.

From the above table it will be seen that the *Gilgil - Kenya* route is the shorter by 26 ~~miles~~ miles, but that the haulage is longer by 48 miles.

It is also obvious that, if Indian indentured labour is found necessary on this route, that the Nairobi-Kenya route is the better. Even if local labour is procurable the Adak-Kenya route is not recommended for the following reasons:-

The working of the line @ £200 per mile would be £21600.

For many years to come very little traffic other than timber may be expected - However allowing £1600 for this - £20,000 remains to be paid off by the timber - i.e. 41/8 per ton of timber.

Interest on £414,000 capital cost of the railway @ 5% is £20,000.

Another 41/8 per ton of timber must therefore be added, making a total of 24-3-4.

To this must also be added freight on the Kenya Railway royalties, insurance, interest on capital.

The price of timber at Nairobi is 24 per ton of 50 cub.ft. To construct this line would therefore result in a dead loss.

ESTIMATE.

Length:- 108 Miles.

Gauge:- Metre.

Coat.

	Total	sq. Mile.
	£.	£.
I. Survey.	2700	25
II. Land and Compensation.	400	4
III. Earth and Rockwork.	99800	924
IV. Bridges and Culverts.	17050	166
V. Permanent Way.	226540	2099
VI. Telegraphs.	8022	74
VII. Station Buildings & Machinery.	13950	129
VIII. Fencing.	436	4
IX. Plant.	5150	48
X. General Charges.	39854	369
Total (say):-	£.414000	3833.

Using African labour and allowing the same rates as quoted by *Captain Stevenson* in his report on the *Nairobi - East Wall*, *Kenya* *Estimate*, viz:-
 Earthwork £2 - 0 - 0 per 1000 cubic feet.

Rockwork £3 - 13 - 4 -----

the amount including 5% for contingencies works out to £99,800 or £924 per mile.

Using indentured Indian labour at the following rates

Earthwork £2 - 15 - 8 per 1000 cubic Feet.

Rockwork £5 - 0 - 0 -----

the amount including 5% for contingencies works out to £139,800 or £1,294 per mile.

The above prices include pay, food, tools and in the case of native labour, white subordinate supervision.

As this estimate is being prepared for a comparison between the proposed *Gilgil-Kenya and Nairobi-Kenya* the first figure, viz., £299,800 is taken for the purposes of this estimate.

(iv) BRIDGES & CULVERTS.

Bridges and viaducts will be required as follows:-

R. Lol Orombo	20 ft. span.	£.	200
Mile 18	200 ft. span, 50 ft. viaduct.		2800
R. Kalau	30 ft. span.		300
Mile 59.	600 ft. span, 50 ft. viaduct.		8400
R. Pesi	50 ft. span.		450
R. Mutara	20 ft. span.		200
R. Suquni	} 1 - 40 ft. span. } 2 - 20 ft. spans }-		1150
Uaso Nyiro		50 ft. span.	450
14 - 6 ft. openings at various places.		© £150.	2100
Culverts.	say.		1000
			17050

Add 5% for contingencies.

850
£. 17900

Cost per mile £.166.

The

The prices used are the same used in the estimate for
 the Nairobi-Kenya Railway viz:-

Concrete.	£ 5	per 1000 cubic feet.	
Masonry.	£ 3-16-8.	-----	
20 ft. girder bridge in 6 - ft. bank			£ 200
6 ft. concrete culverts, per ft. run.			5
Girders erected per ton.			24
Viaducts, -----			23-10-0

(v) PERMANENT WAY.

Rails weighing 50 lbs. per yard, laid on steel sleepers, are allowed for, and the cost is £1,400 per mile at Nairobi.

No. 1 Station is 70 miles from Nairobi and the mean point of the proposed line therefor 75 miles + 54 = 129 miles. Allowing 10/- per ton mile for its carriage the value of the material is increased by £60 odd.

Cost of Materials.	£ 1460
Packing and Boxing.	100
	<u>£. 1560 per mile.</u>
108 miles @ £1560	168480
----- ballasting @ £400	43700
30 sets points and crossings @ £35.	1050
2 miles sidings @ £1560	3120
	<u>215350</u>
Add 5% for contingencies.	10790
Total:-	<u>£. 226140</u>

Cost per mile £2099.4x

(vi) Telegraphs.

The prices used are ^a the same ^{for these} used in the estimate for
the Nairobi-Kenya Railway v12:-

Concrete. £ 5	per 1000 cubic feet.	
Masonry. £ 3-16-8.	-----	
20 ft. girder bridge in 6 - ft. bank		£ 200
6 ft. concrete culverts, per ft. run.		5
Girders erected per ton.		24
Viaducts, -----		23-10-0
(v) PERMANENT WAY.		

Rails weighing 50 lbs. per yard, laid on steel sleepers, are allowed for, and the cost is £1,400 per mile at Nairobi.

No. 1 Station is 70 miles from Nairobi and the mean point of the proposed line ^{is} therefore 75 ~~miles~~ + 54 = 129 miles. Allowing £d. per ton mile for its carriage the value of the material is increased by £60 odd.

Cost of Materials.	£. 1460
Packing and Boxing.	100
	£. 1560 per mile.
100 miles @ £1560	156480
----- ballasting @ £400	43200
50 sets points and crossings @ £28.	1050
2 miles sidings @ £1560	3120
	215850
Add 5% for contingencies.	10799
Total:-	£. 226649

Cost per mile £2099.4x

(vi) Telegraphs.

The prices used are the ^{as} ~~for~~ those used in the estimate for the Nairobi-Kenya Railway viz:-

Concrete. £ 5	per 1000 cubic feet.	
Masonry . £ 3-15-8.	-----	
20 ft.girder bridge in 6 - ft.bank		£. 200
6 ft.concrete culverts, per ft.run.		5
Girders erected per ton.		24 24
Viaducts,-----		23-10-0
(v) PERMANENT WAY.		

Rails weighing 50 lbs.per yard, laid on steel sleepers, are allowed for, and the cost is £1,400 per mile at Nairobi.

No. 1 Station is 70 miles from Nairobi and the mean point of the proposed line ^{is} therefore ~~75~~ ~~miles~~ + 54 = 124 miles. Allowing 1d. per ton mile for its carriage the value of the material is increased by 250 odd.

Cost of Materials.	£. 1460
Packing and Boxing.	100
	<u>£. 1560 per mile.</u>
108 miles @ £1560	168480
-----"----- ballasting @ £400	43200
30 sets points and crossings @ £35.	1050
2 miles sidings @ £1560	3120
	<u>215850</u>
Add 5% for contingencies.	10790
Total:-	<u>£. 226640</u>

Cost per mile £2089.4x

(vi) Telegraphs.

9

VI. TELEGRAPHS.

100 miles single wire of steel poles @ \$20.	\$2,560.
Instruments for 3 offices @ \$10.	\$30.
	<u>7,840.</u>
plus 10% for contingencies.	380.
Total cost.	\$8,220.

Cost per mile \$74.

VII. STATION BUILDINGS & MACHINERY.

As the country traversed by the proposed line is at present uninhabited it is not necessary to completely equip ~~every~~ ^{Station} all. They are only useful as watering places and crossing stations, with the exception of the following.

No. 1 Station is at the Junction, No. 2 will form the station for ~~business~~ ^{business} and ~~the~~ ^{the} ~~for~~ ^{for} ~~Here~~ ^{Here} and ~~Nyen~~ ^{Nyen}. These stations must therefore be fully equipped.

No. 1 Station.

	\$.
Station buildings.	360
2-100 gall. tanks erected complete.	600
Piping.	340
Ash Pit.	40
Weighting chains.	80
Engine shed.	540
Goods shed.	100
Engine pits.	70
Boiler washing out arrangements.	60
Triangle.	380
Signal Cabin.	150
Quarters for Train Staff.	600
	<u>\$3,340.</u>

b

<u>No.</u>	<u>Station.</u>	<u>£.</u>
	Station Buildings.	360
	2 - 500 gallon water tanks.	600
	Pipings.	200
	Ash Pit.	40
	Weighing Machine.	80
	Goods Store.	100
		<u>1380</u>

<u>No.</u>	<u>Station.</u>	<u>£.</u>
	Station Buildings.	360
	500 gallon water tank.	300
	Pipings.	150
	Ash Pit.	40
	Weighing Machine.	80
	Engine Shed.	640
	Goods Store.	100
	Engine Pits.	70
	Boiler washing out arrangements.	60
	Triangle.	300
	Shedders for train staff.	600
		<u>2690</u>

<u>Stations I to IV & V</u>		<u>£.</u>
	Station Buildings.	300
	500 gallon tank.	300
	Pipings.	150
	Ash Pit.	40
		<u>690</u>

8 Stations @ 2690 :- £.3450.

<u>For Permanent Way work</u>		<u>£.</u>
	27 landies @ £.86.	2322
	108 native huts @ £.2.	216
		<u>2538</u>

Tools for masons etc.	2700
Water tanks.	400
2 miles Mone rail with 6 sets points, & crossings & 24 tip trucks.	500
	<u>4100</u>

(b) Engineering.

Pumping (tool etc.)	60
30 plate layer trolleys @ 2 each.	60
Tools - engineering shops.	300
	<u>370</u>

(c) Locomotive.

Tools for engine sheds.	300
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(d) Station Furniture.

	300
--	-----

Requisition.

(a) Construction.	4100
(b) Engineering.	370
(c) Locomotive.	300
(d) Station Furniture.	300
	<u>5070</u>
plus 2% for contingencies.	120

Total. £. 5190.

Cost per mile = £. 48.

GENERAL CHARGES.

These are based on the figures arrived at by *Capt. Stevenson* in his estimate on the *Nairobi East Hill House Railway*, corrections and additions being made to suit local conditions.

They are subdivided as follows:-

- (a) Superintendence.
- (b) Engineering.
- (c) Stores.
- (d) Accounts.
- (e) Medical.
- (f) Police.
- (g) Materials.

(h) Transport.

As the earthwork in this proposed railway works out to practically the same as in the proposed Nairobi-Kenya route it can be safely assumed that the same time may be allowed for construction, viz:— 21 months.

<u>(a) Superint. Staff.</u>	3400
<u>(b) Engineering Staff.</u>	20150
Workshops.	1900
Survey.	500
	<u>26000</u>

<u>(c) Stores.</u>	
1 Superintendent.	400
1 Storekeeper.	250
7 Clerks.	140
100 Labourers.	400
	<u>1200</u>
	£. 1300
	per annum.

Total for 21 months— £. 2142.

<u>(d) Accounts.</u>	1940
<u>(e) Medical.</u>	1745
<u>(f) Police.</u>	1482
<u>(g) Materials.</u>	
Oil & Stores.	100
Tools.	140
Medical Stores.	50
Store Yard and Buildings.	200
Water Supply.	200
	<u>£. 2090</u>
<u>(h) Transport.</u>	
Donkeys. (say)	2000

To railway transport, during construction, of the following materials over 50 miles, the mean distance of 50 per ton mile, a fair figure owing to the disadvantageous conditions under which

(h) Transport.

As the earthwork in this proposed railway works out to practically the same as in the proposed Nairobi-Kenya route it can be safely assumed that the same time may be allowed for construction, viz:- 21 months.

(a) Superintendence. £. 3540

(b) Engineering Staff. 20180

Workshops. 1980

Survey. 388

42

£. 23588

(c) Stores.

1 Superintendent. 400

1 Store-keeper. 250

3 Clerks. 180

100 L. Messengers. 400

28

£. 1230

per annum.

Total for 21 months:- £. 2142.

(d) Accounts. 1940

(e) Printing. 1785

(f) Police. 1482

(g) Miscellaneous.

Small Stores. 100

Tools. 1540

Medical Stores. 50

Store Transport Charges. 200

Water Supply. 200

£. 2090

(h) Transport.

Donkeys. (say) 2000

To railway transport, during construction, of the following materials over 50 miles, the mean distance @ 50 per ten mile, a fair figure owing to the disadvantageous conditions under which

a railway

a railway in construction is worked as

4500 tons food.

3000 tons cement.

2000 tons miscellaneous.

9500 tons.

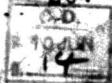
Total. £ 4775.

Reconstitutions

(a)	Superintendence.	£ 3740
(b)	Engineering.	23542
(c)	Stores.	1230
(d)	Accounts.	1040
(e)	Medical.	1700
(f)	Police.	1450
(g)	Materials.	2000
(h)	Transport.	4075

Total £. 30884

Cost per mile = £. 360.



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~~W~~
16985/10
rad.

DRAFT.

Capt. A. G. Stevenson
R.R.

15 June '10

MINUTE 5/6

- Mr. North 9/6
- Mr. Butler 9/6
- Mr. Fiddes
- Mr. Tait
- Mr. Cope
- Sir C. Lucas
- Sir F. Hopwood
- Col. Seely
- Lord Curzon

Sir,

I am directed by the E
of course to ask, with
thanks, the receipt of your
letter of the 3rd of June,
and to thank you for the
transmission of a report by
Lt. Hall, R.R., on the
proposed Gilgit - Kenya
Rly.

(Signed) G. V. FIDDES

~~Capt. A. G. Stevenson~~
Stevenson - (10)

2 d/5

~~208~~

Edw. Conf
Gnr
Gimond.

Yours

16 June 10.

Mr Noall 9/6
Mr Butler 9/3

Sir

With referce to my Conf
deaf of the 8th of April, I
have the honor to ack
knowment to you the
accompanying copy of a
lt. from Capt Ag Stearns
R.E. enclosing a report
by Lt. Hall R.E. on the

Capt Stearns June 3
+ all enclos
(Plans in orig)