

EAST AFR. PROT.  
13827

13827  
9 MAR 10

Governor  
Circular

206

1910  
4th April

NAIROBI WATER SUPPLY

Transmits copy of a report by the Commissioner of Public Works discussing three separate schemes. Has included £7,421 in the current year's estimate for the inception of scheme No. 2. This expenditure will practically double the supply of water. Is considering the feasibility of handing over the water supply to the Nairobi Municipality. Does not think there would be any difficulty in paying for on the total cost.

of previous Paper.  
5688 Solo  
37349

Mr Butler.

Apart from the large under consumption, a deal of useful information on the Nairobi water supply will be found in Captain Sanderson's memo. of the 20 June 1909, which forms the 2nd encl. to Mr Jackson's despatch N. 366 of the 5th of July in O.S. 25056.

There can be no possible doubt that the water supply of Nairobi is inadequate and some of the previous correspondence indicates that from the point of view of public health, such a situation is positively dangerous, to say nothing of the discomfort of it. On the other hand, there is an ample supply available estimated at 20000 gallons per diem <sup>or more</sup> if only it could be brought into the town.

Copy there was 3 June  
of 1 copy of No 328. 7 June

Subsequent Paper

23.4.10

point about is - How are supply and demand to be brought into line?  
The Govt. gives the answer in the 1894  
Scheme's main proposal in bag 25056  
The R.C. has demanded economy  
in a scheme, which  
is the support of the Comm. of works, the  
total cost of which is £15,796 & the  
immediate outlay required for its  
implementation £7,421 which has  
been included in this year's estimate.  
From the technical point of view, we  
propose to, criticize a scheme  
put forward by the Comm. of works: we  
must rely on his judgment. It may  
be assessed, however, in ref. to the  
scheme proposed, that this first  
instalment enables the new water works  
at the Indian Bazaar to be built on the  
near Police line of Carl to have a fine  
water supply, although Parklands,  
Nariston's rising suburb, does not  
benefit as yet. But the present instal-  
ment will not be wasted - & one of  
the requirements of the Treasury is thus  
fulfilled. (See Treas. letter of October  
1899 in 36708/16) It may also be  
observed, that when completed, this  
scheme allows 25 gallons per capita per  
week & for 1000 more than the present  
provision, although this quantity  
is less than that considered desirable  
by Mr. S. B. Willoughby, viz. 30 gallons per  
person & a 10% per capita per week for

municipal purposes, the amount not  
contemplated by probably also much as we  
can expect to manage, & but Willoughby's  
estimate appears to have been considerably  
higher than those of other authorities.  
(1) The second point, subsidiary  
to the first, is - How should the water be  
distributed?  
As the Captain Sanderson's means  
is quite convincing, the stand pipe system  
is unsatisfactory, where possible,  
the meter system should be adopted.  
(2) The third point is - How should  
the cost be met?  
The Treas. has included £7,421 in the  
estimate. The Treasury took up a  
stubborn line in the previous correspondence  
on the proposed diversion of Railway  
Capital funds to pay for improving  
the water supply for non-railway purposes.  
Thus, we are left wholly in S.A.P.  
with no alternative but to make  
provision in the Est. for instalments of  
the work - & there is no need now to  
consider other possible ways of raising  
the money.  
(3) The fourth point is - What will be the  
Revenue from the water supply?  
Miss Heath with at length in Capt  
Sanderson's memo para VI pp. 9-10  
He arrives at the figure £41,500 as the  
net revenue, less £11,000 for cost of  
working, i.e. about £30,500 clear & will

to select of 27021 was given  
that, such as  
of 20 of was  
of other  
we are  
at same time  
of 13007/5  
the opportunity  
is right  
is going to  
that the  
is submitted  
with Mr. Wells

I would  
be glad  
to see a  
copy of the  
document  
sent to  
me.

ack  
2/15

W. H. H. H.

I agree

2/13  
May 26

J  
H. J. R.  
27/2

the group  
be very  
will be followed  
of activity



GOVERNMENT HOUSE,

NAIROBI.

9 MAY 1910

BRITISH EAST AFRICA.

April 14th 1910.

EAST AFRICA PROTECTORATE.

No. 208

My Lord,

With reference to paragraph 6 Head 30 of Your Lordship's despatch No. 159 of the 11th ultimo and previous correspondence relating to the Nairobi Water Supply, I have the honour to report as follows:-

2. The whole question, the urgency and importance of which I fully recognise, has been engaging my attention since my arrival in this Protectorate. I concur generally with the scheme put forward by Mr. G. Bransby Williams for the drainage and sanitation of the town and regret that so much delay has taken place in completing it. The outbreak of an epidemic might at any moment involve us in hurried and uneconomical expenditure.

3. That delay is due, as Your Lordship is aware, to the insufficient water supply which is even now too scanty for the needs of the town and precludes the occupation of the native location, new Police Lines, Gaol, &c. on the outskirts of

the

THE RIGHT HONOURABLE

THE EARL OF CREVE, K.G.,

SECRETARY OF STATE FOR THE COLONIES,

DORNING STREET,

LONDON, E.C.

Report on Nairobi  
Water Supply  
by Mr. Gaten.

5689

(5)

the whole of it can subsequently be carried out there would be no cause for complaint.

I am considering the feasibility of handing over the water supply to the Nairobi Municipality. I do not think that there would be any difficulty in paying 4% on the total cost. The question of revenue was very fully dealt with by Captain Henderson in his Memorandum which is enclosed in the enclosure in Mr. Jackson's despatch above quoted. He estimated it at £4,154 with an annual expenditure of £1,100 for cost of working, upkeep, &c. Though these figures may be somewhat optimistic there should at any rate be a considerable balance over and above the £1,500 approximately needed to pay 4% interest on the £35,000 spent on the original installation and the extension now proposed.

I trust therefore that Your Lordship will feel justified in giving the Lords of Her Majesty's Treasury the assurance which they demand.

I have the honour to be  
Your Lordship's humble,  
servant,  
Herbert Hoover

*Herbert Hoover*  
GOVERNOR

INCLOSURE

In Despatch No. 208 of 17th 1916

NAIROBI WATER WORKS.

The Proposed Extensions, &c.

REPORT.

In my enclosure to (16) S.M.P.No. 43/1907 I showed that we only received 151,000 gallons at the first Break Pressure Tank, and 105,000 at the present Iron Reservoirs whereas theoretically we should obtain much more than these quantities, viz: 178,566 and 147,864 gallons respectively.

Note: As regards the discharge of the 5" Main, I see that I made a mistake in my calculations in my enclosure to (16), as the distance of this pipe is 5,567 yards and not 5,200, therefore the discharge should be 178,566 gallons per minute, not 173,959.

2. In Mr. O.B. Williams' letter of September 1st 1909 he thought that my theoretical calculations by Box's Formulae gave too large discharges and he used Kutter's instead (with which Formulae I am of course conversant) and made the discharges slightly under the actuals. Mr. Williams' calculations give however too small discharges because neither the present 5" or 4" Mains run full bore, and his calculations are for their doing so. Therefore as I have understood for many years past that Box's Formulae are more accurate than those of Kutter's for pipes of small diameters, I prefer to adhere to my original calculations and I firmly believe that there are obstructions somewhere in both Mains - either due to an insufficient number of Air Valves, or to incrustation which account for these pipes not filling and delivering their

their respective full theoretical discharges.

5. However even if the present Mains were made to discharge their full quantities they would not supply enough water for the reasonable demands of Nairobi and its suburbs. Hence the necessity of increasing the existing supply, by means of the adoption of one of the schemes now brought forward. At the present time some 800,000 to 1,000,000 gallons are flowing over the Waste Weir at the Head Works, and of course the best plan would be to bring the whole of this water into Nairobi. As this course however would be too costly more modest schemes have to be sought for, and in this minute I now bring three forward for consideration.

4. The First scheme is as follows:-	<u>Estimated cost.</u>
1st. To lay an 8" Steel Main pipe from the Head Works to the First Break Pressure Tank	£. 3,000
2nd. To take up the present 5" Cast Iron Main between these two points, and to relay it from the First Break Pressure Tank to a point on the pipe line 16,700 feet from the former R.L. 6,100	237
3rd. To allow the 4" Main to remain between these two points	...
4th. To lay a new 6" Main (steel) from R.L. 6,100 to the present Reservoirs	4,199
5th. To remove the present 8" Cast Iron Break Pressure Tank to R.L. 6,200	...
6th. Erect two Tanks 20 feet diameter 15 feet high at R.L. 6,100 or at some other convenient point on the line capable of holding 1,450 gallons each for Parklands = 2 x £360	720
7th. Construct one more Tank of the same size at the present Reservoirs for the Town Supply	360

591

12027  
9 MAY 10

GOVERNMENT HOUSE,  
NAIROBI,  
BRITISH EAST AFRICA

EAST AFRICA PROTECTORATE

April 14th 1910.

No. 208

My Lord,

With reference to paragraph 6 Head 30 of Your Lordship's despatch No. 129 of the 11th ultimo and previous correspondence relating to the Nairobi Water Supply, I have the honour to report as follows:-

*5689*  
REPORT ON Nairobi  
Water Supply  
by K. G. CREW

1. The whole question, the urgency and importance of which I fully recognize, has been engaging my attention since my arrival in this Protectorate. I concur generally with the scheme put forward by Mr. G. Bransby Williams for the drainage and sanitation of the town and regret that so much delay has taken place in completing it. The outbreak of an epidemic might at any moment involve us in hurried and uneconomical expenditure.

2. That delay is due, as Your Lordship is aware, to the insufficient water supply which is even now too scanty for the needs of the town and precludes the occupation of the native location, new Police Lines, Gaol, &c on the outskirts of the

THE RIGHT HONOURABLE  
THE EARL OF CREW, K.G.,  
SECRETARY OF STATE FOR THE COLONIES,  
DORNING STREET,  
LONDON, S.W.



## ENCLOSURE

Despatch No 208 of 11/10/1910

NAIROBI WATER WORKS.

The Proposed Extensions, &amp;c.

NO 10

591

REPORT

In my enclosure to (16) S.M.P.No. 43/1907 I showed that we only received 181,000 gallons at the first Break Pressure Tank, and 105,000 at the present Iron Reservoirs whereas theoretically we should obtain much more than these quantities, viz: 178,860 and 147,954 gallons respectively.

Note. As regards the discharge of the 5" Main, I see that I made a mistake in my calculations in my enclosure to (16), as the distance of this pipe is 5,567 yards and not 5,200, therefore the discharge should be 178,860 gallons per minute, not 173,952.

2. In Mr. G. B. Williams' letter of September 1st 1908 he thought that my theoretical calculations by Box's Formulae gave too large discharges and he used Kutler's instead (with which Formulae I am of course conversant) and made the discharges slightly under the actuals. Mr. Williams' calculations give however too small discharges because neither the present 5" or 4" Mains run full bore, and his calculations are for their doing so. Therefore as I have understood for many years past that Box's Formulae are more accurate than those of Kutler's for pipes of small diameters, I prefer to adhere to my original calculations, and I firmly believe that there are obstructions somewhere in both Mains - either due to an insufficient number of Air Valves, or to incrustation which account for these pipes not filling and delivering their

their respective full theoretical discharges.

3. However, even if the present Mains were made to discharge their full quantities they would not supply enough water for the reasonable demands of Nairobi and its suburbs. Hence the necessity of increasing the existing supply, by means of the adoption of one of the schemes now brought forward. At the present time some 900,000 to 1,000,000 gallons are flowing over the Waste Weir at the Head Works, and of course the best plan would be to bring the whole of this water into Nairobi. As this course however would be too costly more modest proposals have to be sought for, and in this minute I now bring three forward for consideration.

4. The first scheme is as follows:-

	<u>Estimated cost.</u>
1st. To lay an 8" Steel Main pipe from the Head Works to the First Break Pressure Tank ... ..	£. 3,000
2nd. To take up the present 5" Cast Iron Main between these two points, and to relay it from the First Break Pressure Tank to a point on the pipe line 12,000 feet from the former R.L. 6,100 ... ..	237
3rd. To allow the 4" Main to remain between these two points ... ..	...
4th. To lay a new 6" Main (steel) from R.L. 6,100 to the present Reservoirs ... ..	4,199
5th. To remove the present 24000 Break Pressure Tank to R.L. 6,200 ... ..	...
6th. Erect two Tanks 20 feet diameter 15 feet high at R.L. 6,100 or at some other convenient point on the line capable of holding 29,450 gallons each for Parklands = 2 x £560	720
7th. Construct one more Tank of the same size at the present Reservoirs for the Town Supply ... ..	360
8th.	...

Estimated Cost.

9th. To take up as much as of the 4" Pipe as is required for Parklands from the existing one of this diameter which will be replaced by the new 6" Steel Main say 5 miles @ 50 cents per foot	500
9th. Lay 80,000 feet of 2 1/2" Galvanized Iron Pipes in Parklands, the new Indian Bazaar, the New Native Location, the new Police Lines and new Jail @ Rs.1/- per foot.	4,000
10th. Lay 40,000 Galvanized Iron 1" pipes to link up with the Stand Posts @ 50 cents per foot	1,754
11th. Fix 100 new Stand Posts @ £1 each	100
12th. Provide 30 new Meters for the new Indian Bazaar @ £4 each	120
13th. Raise the Dam at the Head Works 2'6"	250
Total	£14,041
10% contingencies	1,404
Total	£15,445

THE DETAILS OF SCHEME No.2 are:

1. To lay an 8" Main as in Scheme No.1	3,090
4. To lay new 5" Steel Main from R.L. 6,100 to the present Reservoirs.	3,424
All other Items as in Scheme No.1	7,685
Total	£14,200
Add 10% contingencies	1,427
Total	£15,627

Thos

Those for SCHEME No.1 are:

Estimated Cost

1. To lay a 7" Main instead of an 8" Main	2,883
4. To lay a 5" Main as in Scheme No.2	2,404
Add all other Items as in Scheme No.1	7,888
<b>Total</b>	<b>15,175</b>
Add contingence 10%	1,518
<b>Total</b>	<b>16,693</b>

Therefore Scheme No.1 will probably cost	£16,488
" " No.2 " " "	£15,000
" " No.3 " " "	£15,700

Thus Scheme No.1 will cost less than scheme No.2	
" " No.1 " " £1,300 " " No.2	
" " No.2 " " £224 " " No.1	

5. IN SCHEME No.1

Gains per Hour

The 8" Main should discharge	470,000
The combined 5" and 4" Mains should discharge	450,000
The combined 7" and 4" Mains should discharge at the present	440,000

IN SCHEME No.2

Gains per Hour

The 7" Main should discharge	470,000
The 5" and 4" Mains combined as before in Scheme No.2	450,000

IN SCHEME No.3

Gains per Hour

The 7" Steel Main should discharge	474,700
The 5" and 4" Mains combined as before in Scheme No.2	450,000

Note

Note. In Scheme No. 5 and 6 the 6" Main would consist of first a relaid Cast Iron Pipe 16,300 feet long and then a new steel one from R.L.6100 to the Present Reservoirs.

3. The Reservoirs on the Hill now hold:

	Gallons
No. 3 Square Tank 20' x 20' x 4' = 3 x 19000	57,000
No. 1 Round Tank 20' diameter x 15' high = 20450	69,450
Therefore the total capacity of these Reservoirs	126,450
Add one new Tank to be erected close to these	69,450
The capacity of the 5 Tanks will therefore be	195,900

The 6" Main from R.L.6100 will discharge 11,071 gal. p.hr.

The 5" Main the First Break Reservoir Tank

12,850

Therefore the 6" Main will fill these Tanks with no one drawing from them in 7 hours and 38 minutes, and the 5" Main in 8 hours and 30 minutes. Now the water will probably only be drawn off of the pipes for use in the Town from 5 a.m. to 10 p.m. = 16 hours. Therefore for some 38 minutes per day. If the 5" Main is laid the Tanks will overflow. Therefore in order to get the value of the full supply by this main it will eventually be necessary to erect an additional one 20' diameter x 15' at an estimated cost of £360 when funds admit.

The 6" Main will when the tanks are put in supply 25 gallons per day per acre for 16,204 people and the 5" Main the same amount for a population of  $\frac{264000}{25} = 10,560$ .

7. As regards the 4" existing Main from the First Break Pressure Tank or from R.L.6100 it is proposed to utilize its discharge for supplying Parklands and its vicinity.

From the First Break Pressure Tank to the existing Reservoirs

Reservoirs this 4" Cast Iron Pipe will discharge  $\frac{151,800}{24}$   
 = 6,300 gallons per hour and from R.L. 6100 to the same  
 point it will discharge  $\frac{100,800}{24}$  = 4,200 gallons per hour.

Therefore the proposed 2 new Tanks to contain

$$(2 \times 29450) = 58,900 \text{ gallons will fill in}$$

$\frac{58900}{6125}$  and  $\frac{58900}{4200}$  = 9 hours, 55 minutes, and  
 14 hours respectively.

It is not now however proposed to place these Tanks on  
 the Hill where the present ones are, but either at the  
 First Break Pressure Tank, R.L. 6100, or at some convenient  
 point to give sufficient pressure between R.L. 6100 and the  
 Ainsworth bridge. From these Tanks the discharges however  
 will probably be greater than those above above as no  
 portion of Parklands is as high as the Site of the exist-  
 ing Tanks on the Hill. The exact discharge however cannot  
 be determined until levels are taken all over Parklands.  
 The Supply from the above mentioned Pipes will give  
 25 gallons per head to a population of  $\frac{151800}{25}$ ,  $\frac{100800}{25}$   
 = 6,048 and 4,032 respectively.

Therefore the proposed improvements will supply  
 $(11204 + 4032) = 15,236$ , and  $(10598 + 6048) = 16646$  people  
 respectively. That is to say they will suffice for 1,000  
 more than the present population. Therefore a few years  
 hence it may have to either increase the supply, or to  
 decrease the Allowance of water per head per day.

5. Now as regards the merits of the respective Schemes.  
 Scheme No. 1 is defective in that the new 6 inch Steel Main  
 from R.L. 6100 will practically carry no more water than a  
 5" one from the First Break Pressure Tank R.L. 6431, and  
 the former will cost £971 more than the latter.

Scheme No. 3 has the advantage that if we put down a 7" <sup>dia</sup>

Main

(10)

Main now from the Head Works to the First Break Pressure Tank we may have to take it up in a few years, owing to increase in population and lay one of larger diameter. It has this advantage however, viz: that it will cost £628 less than an 8" Steel Main.

Scheme No. 2 is however, to my mind, the best one because:

1. The 8" Main will deliver 578,880 gallons per diem as against 414,720 from a 7" Steel Pipe, and the former will supply  $\frac{578880}{25} = 23,155$  souls with 25 gallons per diem, as against  $\frac{414720}{25} = 16,588$  by the latter pipe.

The 8" Main will therefore allow for an expansion of population for many years to come, whereas the 7" one will not do so.

2. The 5" Cast Iron Pipe to be relaid from the 1st Break Pressure Tank to R.L. 6100, and a new steel one of the same diameter to be put down from R.L. 6100 to the present Reservoirs will carry enough water for the Town to meet existing requirements, and
3. A 4" Cast Iron one will carry quite sufficient water for Parklands and its vicinity.

I therefore on these grounds recommend it for sanction. In order however to utilize any portion of it the following money would be required in any one financial year:-

For the 8" Steel Main	£3,000
For the taking up and relaying existing 5" Cast Iron Pipes	257
For 2 1/2" and 1" Pipes in the new Native and Indian Locations and in new Police Lines and Jail	say 600
For the new Steel 5" Main	<u>3,494</u>

Total £7,421

For

(a)  
For this sum all the Pipes on the existing system would run full bore instead of being closed for several hours each day as at present, and the new Native Location and Indian Bazaar could be built on, also pure water would be available for the new Police Lines and Jail, which is not so now. The Parkside supply however would benefit very little by this expenditure.

3. I prepared several other schemes besides these three now brought forward, but the former I rejected because they were either far too expensive, or else they would not give enough water.

Ed/- G.N. Watts.

COMMISSIONER OF PUBLIC WORKS.

Nairobi.

November 13th 1909.



1115/11  
 Treasury

9 June 1911

Dear Mr. Parkinson

Yours letter 3<sup>rd</sup>

Nairobi

June 13529/110

Water Supply

The find Watt's report  
 extremely difficult to  
 understand especially as  
 we have no previous  
 We send you back the  
 original enclosures to

your previous letter of 20  
Apr 1908 (32400 p. 9) Can  
you let me have either  
the originals for a time  
or a copy

Yours faithfully  
A. W. Hood

Govt 13827 Earl

Copy to the file for info 1917

2

DRAFT

The Sec. to the Treasury

3 June 1910.

MINUTE

- Mr. Fetherston 1/6
- Mr. ~~Butler~~ <sup>1/6</sup>
- Mr. Fidler 2
- Mr. Just
- Mr. Cox
- Mr. O. Lucas
- Sir F. Hodgwood
- Col. Solly
- Lord Uxbridge

In  
 With reference to the letter from the  
 Dept. of the Admiralty & Treasury  
 letter of the 21<sup>st</sup> of February,  
 relating to the estimates of revenue  
 expenditures of the Govt for the  
 year 1910-11, I am directed by  
 the Govt of India to transmit  
 to you a copy of correspondence  
 with the Govt of the East on  
 the subject of the Nairobi water  
 supply.

orig. 5 July 1917

25156  
To Secy 12 Aug  
25156

From Govt 14 April  
13827

Copy sent to Secy of State

a sum of £7423  
is included  
is inserted in the  
draft estimate for  
the current financial year

this series, and  
special reference was made  
to the <sup>subject</sup> under Head 32,  
Public works, Extraordinary,  
in the second instalment  
of the letter for this department  
of the 10th of October.

3. In view of the report  
was furnished, by the  
Syndicate, last week, of the progress  
of the work, and the fact  
that the work is now  
well advanced, it is  
two specimens, and

by your letter No 160 of the  
of the 7th of October 1902,  
viz. (1) that such rates and  
payments will be imposed  
for the use of the water as  
will yield a net return  
after allowing for maintenance,  
depreciation etc. of

at least 4% on the  
total capital expended  
on the water works, and  
without involving any  
payment by the Govt,  
except equitable payments  
by way of rates on other  
property or for water  
supplied; and (2) that  
~~the temporary works~~ the  
first instalment of the  
scheme as now proposed  
will not be wasted, where  
~~the whole scheme~~ the  
permit of the completion of  
the scheme.

and I have the  
honour to inform you, with  
the concurrence of the  
to inform the Governor that  
he may proceed with  
the scheme, as explained  
in his despatch No 204

of the 14th of April, to the  
extent of 27421 during  
the current year, on

the understanding that steps are taken to fulfil  
the conditions stated in  
the first assurance  
granted a long  
~~ago on page 2 of the~~

which are fulfilled.



W. V. THORP