

C.S.

<u>PUBLIC WORKS.</u>	
(Misc.)	
No.	258/32.

TRN/LAN/3#3

193 2.

Hon. D. P. W.

SUBJECT.

193 2.

5th Sept.

CONSTRUCTION OF RIBBON TRACKS TO CAMP.

Previous Paper.

114/30.

MINUTES.

1-4.

Minute from Hon. D. P. W. of 5/9/32.

*g.2. Schottal with a track
depict to J. of S.*

*2. This experiment with
ribbon tracks is most interesting
and opens up wide possibilities.
Mr Roberts is to be congratulated
upon his initiative.*

J. M. D.

11. 9. 32.

Subsequent Paper.

*See note
page 2*

C.S.O. No.....258/32

Inside Minute Paper.

Sheet No.!:.....

7-11 S. of S. Despatch No. 162 of 15/12/32.

Mr J Pella Cook

Referred to you

cc for de-^g please.

J. S. M.

30. 1. 33.

- 12-17 Minute from Hon DofPW 7/1/33
- 18 ————— " ————— " ————— 8/1/33
- 19 Minute from Mr Thomas 21. 2. 33.

G. E. Draft despatch retitled.

Hon C. S. *J. S. M.*
Approved 25. 2. 33

J. S. M.
24. 2. 33

Hon. J. P. Woods.

Please see sub 20.

2. With reference to sub 18-19

(i) Net amount has been expended to date in 1933

under Head XXI, subhead 10

"Ribbon Tracks .." ?

(ii) What amount is required e.g.

weekly, under this subhead at

the present time ?

Y. D. W.

Hon. Colonial Secretary ^{10. 3. 33.}

Submitted

(i). Amount expended to date - £494.

(ii) Average weekly amount now being expended under this head. - £60.

Estimated average weekly amount required later in year - £70.

C. Roberts.

Director Public Works.

13-3-33

y. 2.

Submitted. We should
 have definite instructions from
 S. of S. in regard to the
 Estimates for 1933 before next
 longer. In the meantime I
 think that the D.P.W. can be
 properly authorised to carry on
 work on the Public Traders
 on the present scale, i.e.
 on the basis of an average
 weekly expenditure of £60.

Hon C.S.
 yes: I agree:
 J.G.
 15.3.33

~~Mr. J. P. G.~~

CNC $\frac{17}{33}$

Mr. Treasurers.

in CH
17. 3. 33

Please note authority

Julian

16. 3. 33.

b f
2. 4. 33.

Jan 20. 3. 33

S. of S. despatch, no. 71 of 28/4/33. 21-22.

~~Mr. Director P. W. H.~~

Mr. Treasurer. Asst Col Treas^v
To note. 2. VI. 33.

Mr. Craig Harman
a y e s.
30. V. 33

Hon. Col. Sec.

Noted.
C. Roberts
31-5-33.

P.A.
2/6/33

23. minute from Hon. D. P. W. of 15/3/35

Yt. Submitted. The D. P. W. to proceed as he proposes?

MCH
—
Ct.
16.3.35

~~18/3/35~~ 18/3/35

(I have no doubt that tracks capable of taking wheel traffic will eventually be made ~~available~~ as in the D.P.W.'s plans and that they will be beneficial but the position is that the present financial state of the Colony's funds requires the programme to be held up

~~Director~~ Director P. Wks.

To note.

MCH
—
Ct.
19.3.35

Hon. Col. Sec.

P.A.
19/3/35

Noted.
Ct. Remarks.

No.

(It is requested that, in any reference to this minute the above Number and the date may be quoted.)



MINUTE.

5th September. 1932.

~~From~~ To

~~To~~ From.

THE COLONIAL SECRETARY,

DIRECTOR OF PUBLIC WORKS.

Stanley, Falkland Islands.

Hon; Colonial Secretary,

I beg to submit the following information and photographs for record in connection with the work of Improvement to Tracks in the Colony. Up to August of this year the tracks for fifteen miles out from Stanley on the North and South camps have been marked out with white painted posts placed at four to the mile.

The track on the North camp has been diverted from the south side of Benders's paddock, and run through the Wireless Station grounds; two new gateways being put in to make this possible.

For a distance of four miles on suburban land five gateways have been paved with flat stones, drainage trenches cut, rocks and balsam bogs cleared; this has in some measure slightly improved the track for riders, but after carefully studying the work and the benefits derived therefrom, and considering all the circumstances, I am convinced that some other means should be adopted for a more substantial and permanent method of improving the tracks, especially over suburban lands, which are considered some of the worst in the East island.

With this in view and as explained to you verbally I am carrying out an experimental strip of ribbon track which should suffice for motors as well as horse traffic. This is in the first place running in the direction of Sappers Hill, on the track to Bluff Cove, Fitzroy and Darwin, and is mostly through peat bogs. The reason for starting it to the south is that it may be used next season
/for

for transporting the peat by lorry from the bogs to Stanley, thus effecting a saving over horse and cart transport.

This method of constructing tracks over large wastes is being carried out with success in Rhodesia and in South America.

It will be seen that should it ever be necessary to construct roads, the track is easily converted by digging out the centre portion and filling it with stone; the road would be completed for the full width.

I submit that such work prior to this has not been an economical proposition, but with the present unemployment problem it provides a useful work and one of public utility, and I am of the opinion that it will greatly assist in solving the problem of transport to the out stations.

In conclusion I would mention that with the above in view I have submitted in my draft estimates for 1933, an item for constructing ribbon tracks over suburban lands.

E. Roberts.
Director of Public Works.

TRN / LAN / 3#3-01



Background shows trenches cut 2' 6" wide and 1' 6" deep, and in course of being filled with rock to form mattress for track in foreground.

TRN / LAN / 3#3-02



A length of track through a grassy peat bog filled with rock to form mattress. The rock has yet to be hand knapped and covered with peat loam.

TRN (LAN) 3#3-03



Track passing through a peat bog with outcrop of rock. The portion of the track on the left has been hand knapped and covered with peat loam.

GOVERNMENT HOUSE,

STANLEY.

22nd September, 1932.

FALKLAND ISLANDS.

No. 172.

Sir,

In duplicate.

I have the honour to forward a copy of a report by the Director of Public Works on the progress made hitherto with the approved scheme for the improvement of tracks to the camp. For the most part the work has been performed over the suburban lands belonging to the Crown in the neighbourhood of Stanley, the ability of the farmers to co-operate having been seriously affected by the low prices obtained for their wool. So far as is known at present only the Falkland Islands Company, Limited, proposes to take advantage of the scheme in 1933 and provision in the sum of £200 to meet the half cost involved and to allow a margin for possible developments in other directions is being inserted in the estimate of the expenditure for that year under the same subhead of Head XXI. "Public Works Extraordinary" - 2. "Improvement of Tracks to the Camp".

2. You will see from the report that in Mr. Roberts's opinion owing to the extremely difficult nature of the country to be traversed the improvements carried out in this manner do not afford more than a partial solution of the problem particularly in view of the increasing use of motor transport in the Colony.

3. In order to keep abreast of the situation which thus arises and, more urgently, in order to find work for

the/

THE RIGHT HONOURABLE
SIR PHILIP CONLIFFE-LISTER,
G.B.E., P.C., M.C., M.P.,
SECRETARY OF STATE FOR THE COLONIES.

the unemployed I propose that Mr. Roberts's further scheme for the construction of ribbon tracks over the suburban lands should be adopted. The total distance to be crossed is about twelve miles, seven miles on the track towards Fitzroy and Darwin and five miles on the track to the North Camp; the total cost is estimated at 28,500, or about 2700 a mile on a basis of 8s/- a yard. I propose also that the rate of progress should be dependent on the position from time to time in regard to unemployment. The special merit of the scheme from this aspect lies in the fact that the money will be expended almost entirely on labour the materials necessary being reduced to a minimum.

4. In anticipation of your approval of these proposals the sum of 28,750 is being included in the estimate of the expenditure for 1933 under a new subhead of Head XXI. "Public Works Extraordinary".

I have the honour to be,

Sir,

Your most obedient
humble servant,

JAMES O'GRADY.

P.A.

RECEIVED
25 NOV 1932
PAID OFFICE

Z/E.367/12.

ENCLOSURE.

24th November, 1932.

Sir,

I have the honour to refer to your memorandum No.96162/32 of the 10th November regarding a proposal to construct ribbon tracks over certain districts in the Falkland Islands.

2. We have noted with interest the proposals of the Director of Public Works which are clearly shown in the photographs. We have no experience of roads of this nature which differ from modern practice in road construction inasmuch as no drainage of the road surface and road bed appears to be provided.

3. "The construction of roads in new countries such as Colonies and undeveloped regions" was one of the subjects dealt with by the Sixth Congress of the Permanent International Association of Road Congresses held in Washington in 1930. One of a number of papers submitted to the Congress on the above subject represented the practice in the Colonies and undeveloped territories of the British Empire and contained the following reference to the question of drainage:-

"Drainage Without exception the very worst enemy of a road is water and therefore a most important consideration in the construction of roads is the subject of drainage, which comprises not only the getting rid of water from the surface of the road, but also the adequate draining of water from the subsoil on which the road itself is formed It has often been the case that, to keep down the cost of the road, the drainage work has been curtailed.

/ Far

The Under Secretary of State,
COLONIAL OFFICE.

Far more economical is it to provide for drainage and to leave the road incomplete in some other respect."

Unless the stone-filled trenches in the ribbon roads are drained sideways i.e. at approximately right angles to the general alignment of the road, it would appear that the trenches themselves will act as drains and will soften the surface on which the stones rest. Such a system of drainage would entail a method of getting rid of the water collected by the ribbon tracks either by sumps or collecting drains entirely apart from the road. This apparent necessity seems to indicate the possible economy of some kind of "formation" such as is normal and well tried practice in road construction of every type from "dirt" roads to the latest types of tar macadam concrete etc.

4. We suggest it might be desirable to lay down an experimental length of road constructed more in accordance with modern practice and somewhat on the lines indicated on the accompanying sketch. This would not entail more excavation or metalling than is required with ribbon roads and should not, in consequence prove more costly. A short length would suffice to show whether it provides a more efficient road than the ribbon type of construction. Our suggestion is that a formation width of about 18 ft. be provided, of which only 8 ft. in the middle should be metalled, the portions outside being made up to road level with material recovered from the side ditches. It may be necessary to insert at intervals dry stone drains about 12" wide between the metalled portion and the ditches for drainage purposes. The foundation of the road should be about 8" thick made up with similar material to that which is used in the ribbon roads but a further thickness of binding material, either sand or fine gravel, should be placed on the top. We are not quite sure whether the top spit should be removed or whether it is

/ likely

likely to prove a more suitable base for the road metalling, in its natural state, but the Director of Public Works will know which is the better course to adopt.

5. We shall be interested to learn in due course the Colony's experience with the ribbon type of road.

I have the honour to be,

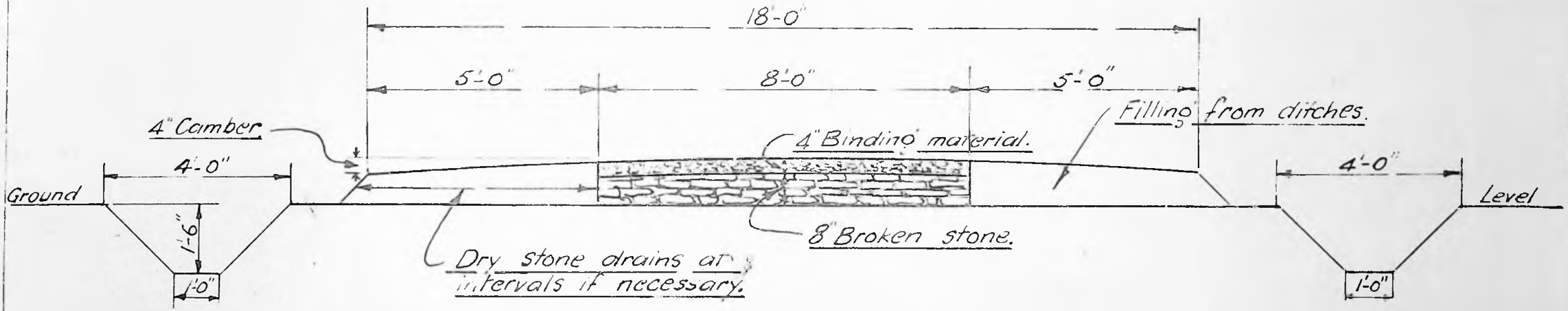
Sir,

Your obedient servant,

(Sd) J. C. Lamson.

for Crown Agents.

— FALKLAND ISLANDS. —
SUGGESTED ROAD SECTION.



BROWN AGENTS FOR THE COLONIES
DRAWING
23 NOV. 1932
OFFICE
MILLBANK, LONDON, S.W.

258/32.

FALKLAND ISLANDS.

NO. 162



GOVING STREET,

15 December, 1932.

Sir,

I have the honour to acknowledge the receipt of your despatch No. 172 of the 22nd of September regarding the proposal to construct ribbon tracks over certain districts in the Falkland Islands and to enclose a copy of a letter which has been received from the Crown Agents for the Colonies on the subject. I have to request that the scheme may be reconsidered in the light of the observations and the suggestion put forward in this letter.

I have the honour to be,

Sir,

Your most obedient,

humble servant,

(Sgd.) P. CUNLIFFE-LISTER.

Yt. C.A.
24. 11. 32.

GOVERNOR,

SIR JAMES O'GRADY, K.C.M.G.

etc., etc., etc.

No.
(It is requested that, in any reference to this minute the above Number and the date may be quoted.)

MINUTE.

7th February, 1933

~~From~~ To

~~From~~ Director of Public Works,

THE COLONIAL SECRETARY,

Stanley.

Stanley, Falkland Islands.

M.P.258/32. → CONSTRUCTION OF RIBBON TRACK to CAMP.

With reference to the Secretary of State's despatch No. 162 of the 15th December, 1932, and letter from the Crown Agents for the Colonies, Ref. Z/E367/12 of the 24th November, 1932, regarding the laying of 'ribbon' tracks to the camp, I have the honour to submit the following report and observations for the information of His Excellency the Governor.

2. The question of drainage has received full consideration and where natural drainage does not exist ample provision has been made both for subsoil and surface. From the photographs, Nos 1 to 3 attached, it will be seen that it is impossible for the trenches to become full of water and so act as drains, as the frequent occurrence of underground 'runners' provide natural drainage; and where it is found that these are too far apart or not of sufficient diameter stone conduits are formed with flat rocks and suitable side trenches formed of sufficient sizes and depths to carry off the water - as will be seen from photographs Nos 4 and 5 attached. Where tracks or roads are built on a hillside 'bleeder' drains and ditches are cut and led into the conduits and side ditches.

3. With reference to paragraph 4 of the above letter, regarding a suggestion for an experimental length of road to be constructed more in accordance with the

modern practice and somewhat on the lines indicated on the sketch accompanying letter, this is the exact method of road construction which is being, and has been, carried out on the outskirts of Stanley, excepting that the width of the road is 18 feet. This type of road has only been made possible by the fact that the peat cut from the surface has been removed and utilised as fuel.

With regard to the question as to whether the top spit should be removed or not, I consider that in any method of track construction adopted in the 'camp', it is essential that not only should the top spit be removed but also the peat to get to the solid bottom of clay and stone. Various methods have been tried and experiments carried out, e.g.

- (a) By forming tracks on flat slabs of rock laid over the unbroken surface.
- (b) By laying a strong gauge wire netting over the unbroken and broken surface as re-inforcement.

These methods have failed, and it can be clearly understood when it is explained that during some 8 months of the year the surface where peat exists, and it exists over 90% of the area, can be likened to a jelly consisting of black peat, and in many cases where the surface has been broken it oozes through and often runs into streams as liquid peat mud.

4. One mile of the experimental 'ribbon' track was completed in October, 1932, and has been used daily for 3 months by lorries and carts for the transport of the season's peat. I have driven over the track almost daily on tours of inspection and am more than pleased with the way it has stood up to the traffic. It might be explained that the only heavy traffic

over this kind of track is between the months of October and February - during the peat season. At other times of the year the number of vehicles passing to and fro in one day will not be more than four.

5. As you are no doubt aware the Honourable Colonial Secretary has accompanied me on several of these visits. He has inspected the tracks and the work in hand and has expressed himself delighted with the results of the experiment.

6. Further I beg to make a few observations which I submit may be of assistance in understanding the problems which are to be met with in the Colony in this connection.

For the most part the route, over which the line of track runs, consists of hills and deep valleys with a layer of peat and swamps covered with the typical vegetation of coarse grass and diddledee bush, intermingled with streams in the lower regions and stone runs on the hillsides and upper reaches. The bog strata encountered over about 90% of the area varies in depth from 2 to 15 feet. Wherever possible the deep bogs are avoided by diversion, as the only possible way of forming a track over these is by the expensive method of raft work (see photographs Nos 6 and 7). In the instance depicted on these photographs an attempt was made to cut through the 15 feet of peat during very dry weather, the aim being the building of a road 15 feet wide on the solid. Despite the fact that the trench was 40 feet wide at the commencement the sides continually subsided. The attempt was therefore abandoned and the road is being carried over a raft as illustrated. For this reason any track or road takes the line where the least peat is encountered. This varies from 1'6" to 3' in depth.

It is impossible to construct tracks on this peat. In the winter for about 5 months of the year it will only bear a man's weight where the surface is unbroken. The method adopted is to remove the peat and get to the solid bottom. This being done and before the clay is encountered a layer of rocks is found intermingled with numerous outlets. Locally these are termed "underground runners". As well as forming a good foundation they carry off the water between the peat and clay and so form a valuable natural drain (see photograph No 8). Numbers of these runners eventually join up and form small streams which discharge into the sea or main stream. The rock found in these runs is a hard metamorphic sandstone.

In view of the above statement regarding the drainage one would naturally say that the land must be well drained. This is so in that part between the peat and the clay but it does not drain the peat. A trench in a peat bank can be cut and the water will run out from the face for a depth of 3 inches; leave this bank exposed to the drying winds and the face will crack and shrink, but at any period by cutting off a 3 inch strip from this dry face the peat will be found to be just as wet as the day the bank was first opened.

7. In conclusion might I be allowed to state that it was perhaps unfortunate when forwarding my report and photographs on 'ribbon' tracks, I did not give fuller details on the nature of the country. The remarks regarding drainage in Crown Agents' letter of the 24th November, 1932, are appreciated, and I agree that the construction of these tracks differs entirely from modern practice, and after carefully studying the problem

of trackmaking I am convinced that modern methods could not be applied; also that the use of roadmaking machinery such as tractors and graders is of doubtful value except for speeding up construction. Road and trackmaking has not been allowed to develop in a haphazard manner. It has been under proper control from the moment that the necessity was first seen, and I am confident that any work done will not be lost should any further improvements or developments take place. The aim has been to select a method of construction which will ensure a good, serviceable track at a minimum cost.

8. It is the consensus of opinion locally that when these tracks are completed they will be a success and a great boon to doctors, mailmen and other riders who have to make long journeys on horseback in these undeveloped regions, for the most part over tracks of a soft, sinuous and tortuous nature, with many steep gradients - 1 in 4 being quite common. These travellers frequently get their horses bogged whilst struggling through the morasses of peat, riders get thrown with serious results, occasionally they are lost, and it is common for riders to arrive exhausted after having ridden over the country for 8 to 10 hours - this being the average time taken between stations in Winter - against strong winds, accompanied by frequent rain and hail squalls. Therefore anything that will lighten their burden, speed up travel and at the same time be of a lasting nature has much to commend itself.

C. Roberts
Director Public Works.

Enclosures.

3 sheets of photographs.

No. _____

MINUTE.

(It is requested that, in any reference to this minute the above Number and the date may be quoted.)

8th February, 19 33

~~XXXX~~ To

~~XXXX~~ From Director Public Works,

THE COLONIAL SECRETARY,

Stanley.

Stanley, Falkland Islands.

XXI. P.W.E. (10). - Ribbon tracks to Camp over Suburban Lands.

I beg to submit that approval be given to incur expenditure under the above subhead of Public Works in connection with the forming of tracks over suburban lands to boundaries of land owned by Messrs The Falkland Islands Company on the Estancia and Port Harriet tracks.

2. Unless approval is given to incur some expenditure under this head it will be necessary to discharge or stand off some 12 men until such time as the 1933 Estimates are approved.

G. Roberts,
Director Public Works.

GOVERNMENT HOUSE,
STANLEY.

2nd March, 1933.

FALKLAND ISLANDS.

No. 35.

Sir,

I have the honour to acknowledge the receipt of your despatch No. 162 of the 15th of December, 1932, enclosing a copy of a letter from the Crown Agents for the Colonies in regard to the proposed construction of ribbon tracks in the Falkland Islands.

2. I enclose a copy of a report, with photographs, which has been prepared in this connection by Mr. G. Roberts, Director of Public Works. You will see that Mr. Roberts describes fully the peculiar nature of the country to be traversed and differentiates clearly between the construction of made roads and passable tracks, which latter, it is scarcely necessary for me to say, are in immediate question.

3. I am satisfied that the ribbon tracks have stood the test of practical experiment as being suited to local conditions and also that they provide an economical means of relief work for the unemployed. I shall be grateful, therefore, if authority is given for their continuance.

I have the honour to be,

Sir,

Your most obedient
humble servant,

JAMES O'GRADY.

THE RIGHT HONOURABLE
SIR PHILIP CUNLIFFE-LISTER,
G.B.E., P.C., M.C., M.P.,
SECRETARY OF STATE FOR THE COLONIES.

C.P.A.

20 APR 1933

Z/E.367/12.

19th April 1933.

Sir,

I have the honour to acknowledge the receipt of your letter No.19229/33 of the 10th April transmitting a copy of a despatch,with enclosure, from the Governor of the Falkland Islands regarding the proposed construction of ribbon tracks over certain districts in the Falkland Islands.

2. In our letter of the 24th November 1932, we expressed some fear that the ribbon tracks might not prove satisfactory unless a system of drainage was introduced for the purpose of getting rid of the water collected by the ribbon tracks. We now note from the Director of Public Works' memorandum dated 7th February that natural drainage exists in many places and that where natural drainage cannot be relied upon, ample provision has been made to carry off both the subsoil and surface water. In the circumstances,therefore our principal doubt with regard to the suitability of ribbon tracks has been removed.

3. We are pleased to note that sections of road have been constructed on the outskirts of Stanley on the lines indicated in the sketch section which accompanied our letter of the 24th November. It will,therefore, be possible to judge in the future the relative suitability of the two forms of construction.

4. We return as requested the photographs which accompanied your letter.

I have the honour to be

Sir,

Your obedient servant,

The Under Secretary of State,
COLONIAL OFFICE.
S.W.1.

(Sd) J. C. Lammie

CROWN AGENT.

CA

o hms'



22

FALKLAND ISLANDS.

DOWNING STREET,

NO: 26.

28 April, 1933.

Sir,

Red 20

I have the honour to acknowledge the receipt of your despatch No. 30 of the 2nd of March regarding the proposed construction of ribbon tracks over certain districts of the Falkland Islands and to enclose a copy of a letter from the Crown Agents for the Colonies on the subject.

19/4/33

2. I now have to convey to you my approval of the proposals submitted in your despatch No. 172 of the 22nd of September, 1932.

I have the honour to be,

Sir,

Your most obedient,
humble servant,

(for the Secretary of State)

(Signed) PLYMOUTH

GOVERNOR,

SIR JAMES O'GRADY, M.C.M.G.

etc., etc., etc.

No.

(It is requested that, in any reference to this minute, the above Number and the date may be quoted).

MINUTE.

15th March, 1935

From Director of Public Works,

To

Stanley.

THE COLONIAL SECRETARY,

Stanley, Falkland Islands.

TRACKS TO THE CAMP.

Work on tracks to the 'camp' will close down on the 27th of this month. I would recommend that the crushers, engines and portable buildings now being used on this work might be brought to the works depot in Stanley for use on other works or safe storage as the case may be.

2. Submitted for instructions please?

G. Roberts,

Director of Public Works.