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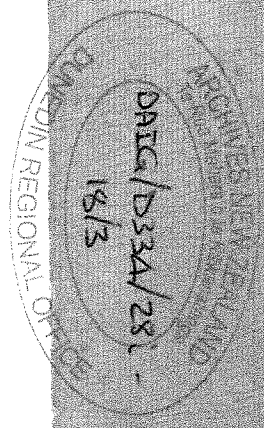
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Lower Manorburn Dam

Construction

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Lower Manorburn Dam (Construction) 18/3

Resident

18/3.

Alexandra,

FWL/RS.

Alexandra,

4th April, 1932.

Galloway Irrigation - Lower Manorburn Dam.

District Engineer,
Public Works Department,

DUNEDIN

I enclose herewith two tracings and one lithograph shewing the proposed work to divert the Manorburn Stream onto Galloway Flat.

The tracings shew the dam, in plan and developed section, and the litho shows the location of the dam and reservoir, the race line and the ^{sections} area served coloured green. You will note that I have, as forecasted in my report of the 11th instant, reverted to the original proposal, for a dam at the lower site.

Comparative estimates have shewn that the cost of the alternatives is practically the same in each case, as the cost of the upper dam, and access road thereto, plus the race and pipeline to the site of the lower dam is within a few pounds of the cost of the lower dam. The location of the race below the lower dam is the same in either case.

The lower site has so great advantages in the ease of operation, and lower maintenance, that there is no question as to which should be adopted.

The race fed by the lower dam will supply irrigation water right from its commencement and there will be no dead going, or unproductive travelling or maintenance for the raceman, as would be necessary with the upper site.

The upper site would have been warranted only if there was a marked saving in capital cost, and as there is not, it has been abandoned in favour of the lower site.

The present proposal is for an arch dam with gravity abutments. The arch has been designed with a thirty ton per square foot concrete load, and no provision for reinforcement is made. The concrete stress is therefore 470 per square inch and there should be no difficulty whatever in getting a factor of safety of six.

I have omitted reinforcing, although Head Office may consider it desirable, because in my opinion, it adds very little to the security unless a large percentage is put in, more for instance than was put in the Idaburn Dam.

The rock at the dam site is particularly dense and solid schist, and it will not be necessary to cut in more than sufficient to get a good bond at the foundations.

Memorandum to D.E. Dunedin re "Galloway Irrigation - Lower Manorburn Dam"
Dated 4/4/32.

The depth in the creek bed to rock has not been tested as the bed is heavy boulders, but there are indications that the depth is less than that shown tentatively on the plan, while the distance across the creek between the dolif rock walls (20 feet) is so small that a little extra depth would have little effect on the cost. The section proposed for the gravity abutments is shown, and provision is made to use portion of the gravity abutments as additional spillway. Although the water will go over this portion, no ogee section has been shown, the section being designed for a depth of 2.25 feet over the crest, without the support of the curved toe being taken into account, and with no reduction in resisting moment on account of water adhesion.

As Head Office may desire to modify this section, no attempt to finalise the dimensions has been made, but if splitter blocks are placed on the crest, flood flows should jump clear, and the section proposed should be suitable, except possibly at the deepest portion of the abutments near the junction with the arch.

It is proposed to build the abutments largely of stone obtained close by, laid in cement mortar, and within boxing, with two feet of concrete on both upstream and downstream faces.

As the maximum height of the gravity abutments is approximately twenty feet, and as the dam will always be full, any special expansion joint system does not appear necessary and it is proposed to build the dam without expansion joints, but to put a drain behind the cut-off wall in the gravity section to prevent uplift.

The storage provided for is one foot only, the crest of the dam being one foot higher than the water level of the race. This will give a storage of thirty dayheads which should be sufficient as the flow in the creek has been sufficient during this summer, without drawing on any storage, although the late summer has been very dry and creeks low. Additional storage could be obtained by raising the dam another 18 inches, but this does not appear necessary.

Spillway area is provided for a flood of 3000 cusecs, and the area over which water will travel on the downstream side, when the full width is in operation, is all sound rock.

It is proposed to make the race capacity 6 cusecs, on account of the area commanded being 380 acres. This will enable a good supply to be given to the land, which comprises most of the light gravelly land on Galloway.

The estimate for the work is as follows, based on 8/- per day:--

<u>Dam</u>	950 cyds. gravity dam @ £3	2850: -: -
	510 " arch " @ £4	2040: -: -
	Plant & accommodation	200: -: -
	Foundation excavation, 300 cyds @ 7/6	112:10: -
	Bypassing stream	100: -: -
	Outlet gate	20: -: -
		5322 10
<u>Race</u>	140 chs race @ £2	280: -: -
	Railway, road & farm crossings	300: -: -
	Additional boxes	50: -: -
	4 chs. flume @ £25	100: -: -
	Supervision	450: -: -
	Contingencies	497:10: -
		<u>£7000: -: -</u>

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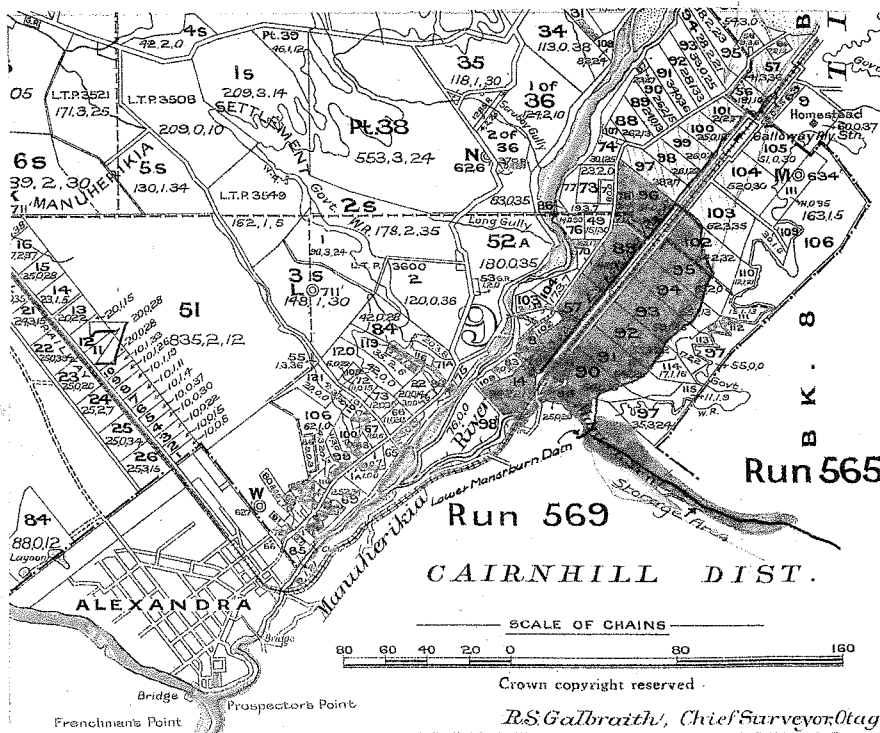
The work can be put in hand as soon as these proposals are approved.

W. Sanderson

Resident Engineer.

Encls.

Area shaded in pencil can be supplied by race from Galloway Creek. J.M.



Section	Area	Notes
W. Carlin	102	
"	95	
Parson	54	
Atfield	32.93	255 255 1/2
St. John	91	
Noble	90.614	
Clune	71.73.96	62 62 31
Rob.	89	41 41
Tibb	8, 57	20 5
Robson	70	14 14
Total		392 392 140