Addendum to Section 4.3 of the Report *Economic impacts of minimum flow regimes on the Lindis River (March 2015)*

What has been modelled in Section 4.3 of the BERL Report assumed providing 'all of the water' for the potential duration when 'some' of the irrigation demand would not be available. In many ways this is the 'worst case' scenario.

OPUS Consultants have provided further estimates of the indicative capital and operating costs for this project. To do this OPUS Consultants considered the extent of the infrastructure required. OPUS Consultants have considered data from various current projects we have been directly involved in (Tarras Water, Ashburton Lyndhurst, Central Plains Water, Lower Waitaki and Wairarapa Water) to develop their estimates. In particular the recent Tarras water project that Delta and Downer spent considerable time refining the design and associated costs is very relevant.

These are presented in the table below.

	Lower	**Upper**	
Assumptions			
Area Irrigated	2,500	2,500	Ha
Daily Irrigation Need	5	5	mm/day
Flow Rate	125,000	125,000	m^3/day
Required pressure at Farm Boundary	350	400	kpa
Capital Costs	**$21,250,000**	**$57,500,000**	
Irrigation Network Infrastructure	$21,250,000	$32,500,000	
Off farm Infrastructure rate	$6,500	$9,000	per Ha
On farm Infrastructure rate	$2,000	$4,000	per Ha
Off farm Infrastructure Total	$16,250,000	$22,500,000	
On farm Infrastructure Total	$5,000,000	$10,000,000	
Storage	$0	$25,000,000	Total
Required Storage Days	0	20	days
Notes	Based on a residual flow in the Lindis river of 0 l/s	Based on a residual flow in the Lindis river of 950 l/s	These assume efficient irrigation, only abstracting out of the Lindis River and provides approximate reliability of > 80%.
Storage	0	2,500,000	m^3
Storage cost	$4	$10	per m^3 of Water
Operation and Maintenance Costs	**$2,045,000**	**$3,850,000**	**per Annum**
Power	$1,620,000	$2,700,000	per Annum
Pumping Capacity	1.2	1.5	kW/ha
Net Operational days per season	150	200	days
	This assumes that over an irrigation period of 1 September to 30 April irrigation does not occur every single day or at full capacity.		

Unit cost of Power	$0.15	$0.15	$ per Kw-hr
Pumping Capacity	3,000	3,750	kW
Energy used per season	10,800,000	18,000,000	Kw-hrs
Operation and Maintenance	$425,000	$1,150,000	per Annum
Cost as a % of Capital cost	2%	2%	per Annum

These costs are based on a high level analysis, are estimates only and have been given as a range. As a specific model has not been developed the range itself is uncertain. The types of things why the cost is uncertain are:

- Overall shape of command area
- Distance of source from irrigated area.
- Height of source compared to irrigated area. Where the source is lower then, costs tend to be more. Where the source is higher, then costs tend to be less.
- If storage is required the topography and geomorphology will have a large impact on the cost of storage.