ALICE SPRINGS RECREATION LAKE
STATUS REPORT - JANUARY 1983

Prepared by
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Department of Transport and Works
Alice Springs
I refer to minute WSA7913 of 31 December 1982. Find enclosed a draft status report prepared in response to the request, and meeting one of the division's objectives for 1982/83.

The report clearly sets out the justification for the Todd River site and the reasons for passing over the other alternatives. The report highlights the work carried out to date, and provides a useful reference listing for all the reports of previous studies. Further work required is detailed in Chapter 4.

It is important to note that on the basis of recently-made-available flooding information and updated costs of flood damage, the flood attenuation aspects of the project are strengthened. Considering the project as multipurpose, that is having recreation, flood attenuation and irrigation benefits, then Alternative A is clearly the preferred option. This alternative has a benefit/cost ratio of three. In a related area, this alternative is being examined by the local Floodplain Management Committee Working Group as both feasible and desirable for flood mitigation for Alice Springs.

As Alternative B had previously been selected by Planning Branch on the basis of total project cost, the selection will need to be re-assessed.

Your comments on the above matters, and on the draft report are sought. The original text and drawings are held in Alice Springs. On receipt of your comments the report can be amended where necessary and finalised for production and forwarding to the Director.

T. J. VERHOEVEN
Regional Engineer Water
Alice Springs

18 January 1983

Encl.
ABSTRACT

1. The Northern Territory Government has recognised the need for a recreation lake in the vicinity of Alice Springs to benefit Central Australians.

2. Of a number of potential sites, that identified as the Telegraph Station site on the Todd River has been selected for the recreation lake. Selection was based on social, engineering, economic and environmental factors.

3. Aboriginal sites of significance have been identified within the impoundment area of the Telegraph Station lake site. Negotiations with the traditional owners need to be satisfactorily concluded.

4. Two alternatives of dam/spillway configuration at the Telegraph Station site are feasible. Selection should consider downstream effects (including flood mitigation benefits), economics and aesthetics. Alternative A has a benefit/cost ratio of approximately three, and is favoured by the Conservation Commission. Alternative B has a benefit/cost ratio of 0.15. An early decision is required so that design can be completed.

5. The project can be considered for either the Design Listing or Capital Works Program in 1983/84 depending on the priority given. An early indication of priority is required so that the project can be programmed accordingly.
ALICE SPRINGS RECREATION LAKE
STATUS REPORT - JANUARY 1983

CONTENTS
Chap.  
Abstract
1. Introduction
2. Comparison of alternative sites
3. Telegraph Station site
4. Conclusions and Recommendations
   References
1. INTRODUCTION

The concept of a recreation lake for Alice Springs, to provide for a diversity of recreational activities including boating, sailing, swimming, fishing, picnicking, camping and bushwalking emerged in 1970.

Several sites have been given consideration, varying from inspection of aerial photographs to detailed field reconnaissance. Sites extended from those on the Hugh River, 70 km west of Alice Springs, to those on Ross River and its tributaries, 70 km east of Alice Springs. Most of these sites were rejected due to factors such as poor accessibility or small storage size (see Chapter 2). Five sites remained for further, more detailed investigation; Birthday Gap on Hugh River, Ildjarabada and Pyberinge on Jay Creek, and Wigley Gorge and Telegraph Station on Todd River.

In late 1978 the abovementioned five sites were examined in the light of all information available, when the Northern Territory Government determined that the feasibility of a recreation lake should be examined as a matter of some priority. Following investigations completed in November 1978, the Wigley Gorge and Pyberinge sites were dropped because of small available size and small catchment area respectively (see Chapter 2). The remaining three sites were assessed, and a recommendation made to give priority for further study to the Telegraph Station site on the Todd River.

Since 1978, investigation has been directed at the Telegraph Station site. A number of Department reports summarising the results of these investigations and confirming the feasibility of a recreation lake at the Telegraph Station site, were completed in 1979.

Early in 1980 the firm Dames and Moore were commissioned to carry out an independent environmental study. Their report
concluded that the proposed lake at the Telegraph Station site is feasible and that it would help fill a significant need in the community. At the same time a public display of the proposal was held in Alice Springs. The display generated largely favourable response, with only a few objections.

Design for the dam has been carried out using departmental manpower resources, with a consultant expert on dams being engaged to provide advice and guidance. The Snowy Mountains Engineering Corporation was engaged in 1981 to conduct a hydraulic model study comparing two spillway options for the dam. Their results are tabulated (see Chapter 3). Also during 1981, the Conservation Commission conducted a study to produce a long term catchment management and rehabilitation program for the Todd River catchment upstream of the proposed impoundment area.
2. COMPARISON OF ALTERNATIVE SITES

As noted in Chapter 1, several sites up to 70 km distant from Alice Springs have been considered. As the primary objective is recreation the following criteria have been included in the assessment:

(i) Convenience to the public, expressed as distance from Alice Springs to be travelled by tourists and local users.
(ii) Accessibility to waters edge.
(iii) Potential for flushing of reservoir water, expressed as catchment area and storage volume.
(iv) Recreation potential, expressed as surface area when full, surface area exceeded for 90% of time, and maximum depth of water.

Other assessment criteria include:

(a) Environmental impact
(b) Additional benefits, such as flood mitigation and other beneficial uses for the water.
(c) Cost
(d) Dam and spillway options available.
(e) Site geology.
(f) Management of the lake.
(g) Land tenure.

Each of the sites are discussed below. A summary of values of criteria for each site is contained in Table 2.1. The location of each site is plotted on Figure 2.

2.1 Stuart Pass damsite
This site on the Hugh River was assessed by Herath as having probably the most majestic scenery of all sites considered (Reference 6). However the site has very poor access and it would only be accessible by bush walkers or helicopter if a dam was built. Thirteen kilometres of access road, through mountainous country and subject to flooding, would need to
### Table 4.1: Comparison of Sites for a Retention Dam with Water Supply

<table>
<thead>
<tr>
<th>Site</th>
<th>Land Tenure</th>
<th>Road Dist. from Alice Spr. (km)</th>
<th>Length of access road (km)</th>
<th>Permeability of water-body edge</th>
<th>Potential for flooding or reservoir water</th>
<th>Surface area of full (ha)</th>
<th>Est. surface area covered for 70% of time (ha)</th>
<th>Max. depth of water (m)</th>
<th>Order of cost (1989)</th>
<th>Other factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Water Sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1. Very poor access</td>
</tr>
<tr>
<td>Blackwater Pastoral Reserve</td>
<td>70</td>
<td>13</td>
<td>Poor</td>
<td>140</td>
<td>Not available</td>
<td>Not small</td>
<td>Not small</td>
<td>Not small</td>
<td>Not small</td>
<td>2. Scattered riparian systems</td>
</tr>
<tr>
<td>Birthday Gap Pastoral Reserve</td>
<td>60</td>
<td>13</td>
<td>Fair</td>
<td>120</td>
<td>3.0</td>
<td>95</td>
<td>60</td>
<td>10</td>
<td>$16 million</td>
<td>3. Geology considerations probably preclude low level development</td>
</tr>
<tr>
<td>Nay Creek</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Topography offers high level development with large storage</td>
</tr>
<tr>
<td>Spout Camp</td>
<td>Aboriginal</td>
<td>60</td>
<td>Poor</td>
<td>160</td>
<td>Not available</td>
<td>11</td>
<td>Not small</td>
<td>Not small</td>
<td></td>
<td>5. Relatively small catchment area insufficient to provide reliable surface area.</td>
</tr>
<tr>
<td>Blyberdine, Aboriginal</td>
<td>47</td>
<td>7</td>
<td>Good</td>
<td>222</td>
<td>1.4</td>
<td>64</td>
<td>45</td>
<td>11</td>
<td>$6 million</td>
<td>6. Economic benefit of $0.13 million annually from use of up to one million kilolitres annually for irrigation.</td>
</tr>
<tr>
<td>SITE BETWEEN NAY CREEK &amp; ALICE SPRING (Gra example Spout's Gap on Nay Creek)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. Close to Alice Springs - convenient to public transport - easy of management</td>
</tr>
<tr>
<td>Poor Water Sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Economic benefit of $0.13 million annually from use of up to one million kilolitres annually for irrigation.</td>
</tr>
<tr>
<td>Telegraph Station Reserve</td>
<td>5</td>
<td>3</td>
<td>Good</td>
<td>120</td>
<td>1.3</td>
<td>69</td>
<td>13</td>
<td></td>
<td></td>
<td>3. Close to Alice Springs - convenient to public transport - easy of management</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Not favoured by Conservation Commission</td>
</tr>
<tr>
<td>Mileby Game Crown</td>
<td>10</td>
<td>2</td>
<td>Fair</td>
<td>367</td>
<td>1.4</td>
<td>12</td>
<td>Not small</td>
<td>12</td>
<td>Not small</td>
<td>5. Negligible flood attenuation benefits</td>
</tr>
<tr>
<td>More River</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Negligible flood attenuation benefits</td>
</tr>
<tr>
<td>Several Pastoral Reserve</td>
<td>70</td>
<td>Poor</td>
<td>Poor</td>
<td>approx.</td>
<td>Not small</td>
<td>Not small</td>
<td>70</td>
<td>200</td>
<td></td>
<td>7. Storage volume and surface area too small</td>
</tr>
</tbody>
</table>

Other factors:

1. Very poor access
2. Scattered riparian systems
3. Geology considerations probably preclude low level development
4. Topography offers high level development with large storage
5. Relatively small catchment area insufficient to provide reliable surface area
6. Economic benefit of $0.13 million annually from use of up to one million kilolitres annually for irrigation
7. Close to Alice Springs - convenient to public transport - easy of management
ALICE SPRINGS
RECREATION LAKE
ALTERNATIVE SITES CONSIDERED
FIG. 2-1
be constructed from the Glen Helen Road, adding consider-
ably to the cost. The site has no natural spillways and 
is 70 km distant from Alice Springs. The site was re-
jected in 1974 on the basis of very poor access, lack of 
a natural spillway, high perceived cost and distance from 
Alice Springs (Reference 6).

2.2 Birthday Gap damsite
This site is located 68 km west of Alice Springs, on the 
Hugh River. An engineering-geological survey has found 
that the site may not be suitable for a low dam develop-
ment associated with a recreation lake due to the apparent 
deep weathering in the proposed spillway location (Reference 
10). Considerable grouting is required for any cut-off in 
the quartzite.

The significantly higher estimated cost of this site 
($16 million in 1983) is due to high costs of access, clear-
ing and leakage problems. This site, by virtue of its top-
go graphy, could offer a high level development with corres-
ponding large storage. Such development is not appropriate 
for a recreation lake because of the high cost and because 
the storage behaviour would be highly irregular (Reference 
12). However, the site could be economically attractive 
in future years as a major water supply storage for Alice 
Springs (Reference 12).

The site is rejected as one for a recreation lake due 
to foundation permeability and depth of weathering.

2.3 Pyberinge damsite
This site is located on Jay Creek approximately 60 km from 
Alice Springs, and is accessed 7 km from the Standley Chasm 
Road. Road access costs would be high as many creeks must 
be traversed to get to the storage. Although the catchment 
area is relatively small compared to most other sites, the 
sizes of the dam and reservoir are potentially larger 
(Reference 9).

The reservoir would rarely spill and its size would 
normally be considerably less than the potential maximum. 
Water level fluctuations over the years would make provi-
sion of access and facilities difficult.
The site was rejected in 1978 on the grounds that the relatively small catchment area was insufficient to provide a reliable surface area (Reference 8).

2.4 Ildjarabada damsite
This site is located on Jay Creek approximately 47 km from Alice Springs. Access to the waters edge for most of the perimeter is good. However the immediate surrounding countryside is possibly the least attractive visually, with only low hills adjacent to the potential water storage.

The dam is expected to spill on average every year and natural spillways are available (Reference 4).

The cost of this alternative is $6 million, which is approximately two-thirds that of the Telegraph Station Alternative A. However a dam at Ildjarabada would have none of the additional benefits associated with the Telegraph Station site. When the economic benefits of a dam at the Telegraph Station associated with flood mitigation and watering are considered, the cost of that alternative is much less than for Ildjarabada.

As this site is located on Jay Creek Reserve, any proposal would require the support of the Aboriginal land owners.

2.5 Dam sites between Jay Creek and Alice Springs
A number of sites, for example Simpson Gap on Roe Creek, have been suggested and examined. All these sites have been rejected as they lack topographic relief for the impoundment area; the greatest possible depths of water are required to minimise the effect of evaporation (Reference 9).

2.6 Telegraph Station damsite
The two alternatives for a dam at this site are examined in greater depth in Chapter 3, and are the subject of a number of reports (References 1, 2, 3, 5, 6, 7, 8, 11, 12, 13).

This site is judged to be preferable for a recreation lake. The site is convenient for the public, being only 5 km from the centre of Alice Springs. Access to the waters edge is good. The lake would offer a surface area of 92
hectares when full, and an area in excess of 60 hectares for 90 percent of the time. This would be adequate for non-motorised water sports such as swimming, canoeing, dinghy sailing and possibly fishing (Reference 12).

Hydrologically the site is suitable. The reservoir would be subject to regular flushing as the reduction in downstream flow volume is predicted to be reduced on average by only 20 percent (Reference 7). On average the dam would be filled to spill level three times every year.

Siltation of the lake could limit its life to the order of 100 years (Reference 7). However a comprehensive approach to sediment control incorporating both catchment management programs and structural control through large sediment traps will promote substantially longer life (Reference 3).

Public health aspects have been identified but should provide no major problems providing due recognition is given to the need for proper planning and management (Reference 2). This applies equally to any other lake site.

The cost of a dam at this site varies from $7.2 million to $9.5 million depending on the spillway alternative adopted. However a dam at this site has additional economic benefits which do not apply to the other sites including Ilidjarabada. Benefits of water availability for irrigation and flood mitigation for Alice Springs are detailed in Chapter 3. These benefits accrue to a present worth of $28.6 million over the life of the dam, and more than offset the cost of this proposal.

2.7 Wigley Gorge damsite
This site is located on the Todd River approximately 10 km from Alice Springs. When full, the storage would have a surface area of only 12 hectares, and a volume of 0.4 million cubic metres. The site was rejected in 1978 as it was considered to be too small a reservoir to meet recreation requirements (Reference 8).

2.8 Ross River damsites
Several damsites exist in the Ross River area approximately 70 km east of Alice Springs. However access to the waters
edge after dam construction would be as difficult as to the Stuart Pass site, and the cost of access roads in this area would prove expensive. The sites were rejected in 1974 because of distance from Alice Springs, very poor access, high cost and poor recreation options (Reference 6).
3. TELEGRAPH STATION SITE

Following completion of the department's study in 1978, investigations have been directed at the Telegraph Station site on the Todd River (Reference 8). Two spillway alternatives are feasible for this site; they have been labelled Spillway Alternative A and Spillway Alternative B. This chapter describes the two spillway alternatives and examines co-ordination, engineering, recreation, other benefits, environmental effects, financial considerations, management and legislation.

3.1 Co-ordination

The following departments and bodies have been involved with and contributed to the recreation lake feasibility study: Transport and Works, Mines and Energy, Health, Primary Production, Lands, Chief Minister, Conservation Commission, Office of Aboriginal Liaison, Alice Springs Town Council, Central Land Council.

3.2 Engineering considerations

As previously noted, two spillway alternatives are feasible for the site; they are labelled Spillway Alternative A and Spillway Alternative B on Figure 3.2.

The main dam on the Todd River, and weirs at saddles 2 and 3 to the west of the river are common to both alternatives. Types of dam construction considered include concrete, earthfill and rockfill. Rockfill construction was selected on the basis of cost, the consequence of failure of various material availability (Reference 12). The main dam would be of the rockfill type with a concrete membrane on the upstream face. The weirs at saddles 2 and 3 would be rockfill with impermeable clay/earth layers as required. Saddle 3 coincides with the area which will be preferred for recreational access. This means that the weir would have to be designed to fit in with access requirements such as roads, boat ramps and other facilities.
TELEGRAPH STATION DAMSITE

FIG. 3-2
In Alternative A the primary spillway is at saddle 4, discharging downstream of the Telegraph Station (Figure 3.2). This alternative requires a small dam at saddle 1.

In Alternative B the primary spillway is at saddle 1, discharging upstream of the Telegraph Station. For this alternative no structure is required at saddle 4. The crest levels are 2 m lower for Alternative B due to differences in primary spillway lengths (Table 3.2). Both alternatives utilise the low dam at saddle 3 as an emergency relief spillway which would be overtopped by floods having return periods of approximately 2000 years (Alternative A) and 10 000 years (Alternative B).

The Snowy Mountains Engineering Corporation was engaged to conduct a hydraulic model study comparing the effects of each spillway alternative and to develop a spillway design which would provide suitable energy dissipation. A videotape of model behaviour was made, and the results of the study documented (Reference 11). The study confirmed that Alternative A would considerably reduce the risk of flood damage both to the Telegraph Station buildings and to Alice Springs (Table 3.2 and Section 3.4). Alternative B results in a risk about the same as for natural river conditions, and has no flood mitigation benefits. Following the S.M.E.C. study, the Conservation Commission has expressed a preference for Alternative A on the grounds of visual and environmental impact within the Telegraph Station Reserve.

Sand traps consisting of low rockfill embankments upstream of the impoundment area are common to both alternatives. The traps would intercept alluvial bed-load material, decreasing the rate at which sedimentation of the lake would occur (References 3, 12). Mining of this course sediment by local contractors would be possible.

A number of routes for the access road have been investigated. The proposed route, giving access to both the lake and the sand traps, is common to both spillway alternatives (Figure 3.2).

Engineering geological assessment has indicated no major
### TABLE 3.2 TELEGRAPH STATION DAMSITE

#### COMPARISON OF SPILLWAY ALTERNATIVES

<table>
<thead>
<tr>
<th>Factor</th>
<th>Alternative A</th>
<th>Alternative B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engineering Considerations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Structures</td>
<td>Main embankment structures crest level 602 m AHD. Saddle 3 crest level 599 m AHD. Main spillway unobtrusive.</td>
<td>Main embankment structures crest level 600 m AHD. Saddle dam 3 crest level 597.5 m AHD. Extensive earthworks at main spillway. Visible from Telegraph Station.</td>
</tr>
<tr>
<td></td>
<td>Concrete-faced rockfill dam at Saddle 1.</td>
<td>No structure at saddle 4.</td>
</tr>
<tr>
<td>1.2 Conservation Commission</td>
<td>Preferred (visual &amp; environmental impact).</td>
<td>Not preferred</td>
</tr>
<tr>
<td>1.3 Frequency of overtopping saddle 3</td>
<td>Once in every 2000 years.</td>
<td>Once in every 10 000 years.</td>
</tr>
<tr>
<td>2. Recreation</td>
<td></td>
<td>The same for each alternative.</td>
</tr>
<tr>
<td>3. Other benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Irrigation water supply</td>
<td></td>
<td>The same for each alternative.</td>
</tr>
<tr>
<td>3.2 Flood attenuation</td>
<td>Significant reductions in peak discharge for all floods. The Q_{100} flood (1000 m^3 s^-1 peak) is reduced to the equivalent of a Q_{20} flood (618 m^3 s^-1 peak).</td>
<td>Negligible.</td>
</tr>
<tr>
<td>4. Environmental effects</td>
<td>Deep scouring (up to 2 m) of alluvium in main spillway gully.</td>
<td>Scouring in main spillway gully 1 m deep.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe scouring of alluvial river banks at point of entry of spillway flows, at Telegraph Station.</td>
</tr>
<tr>
<td>5. Financial considerations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Total project cost (1983)</td>
<td>$3.3 million</td>
<td>$3.2 million</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor</td>
<td>Alternative A</td>
<td>Alternative B</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>5.2 Project savings</td>
<td>$1.1 million</td>
<td>$1.1 million</td>
</tr>
<tr>
<td>Irrigation</td>
<td>$27.5 million</td>
<td>Nil</td>
</tr>
<tr>
<td>Flood attenuation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.3 Net cost or benefit</td>
<td>Net benefit $19.1 million</td>
<td>Net cost $8.1 million</td>
</tr>
<tr>
<td>5.4 Benefit/cost ratio</td>
<td>3</td>
<td>0.15</td>
</tr>
<tr>
<td>6. Management, legislation</td>
<td>Similar for each alternative</td>
<td></td>
</tr>
</tbody>
</table>
geological hazards and no construction problems which could not be handled by conventional methods (Reference 13). The assessment found that to achieve an acceptable degree of water-tightness under the dam, curtain grouting or a full cut-off trench would be required through the highly permeable jointed rock zones to a depth of 10 m. There is little potential for leakage from the reservoir perimeter generally because of the low permeability of the basement rocks. Some dozer trenching in the area of the spillway (saddle 4) is required if Alternative A is to proceed. This has not been carried out to date because of the environmental sensitivity of the area; it has required a positive commitment to Alternative A.

3.3 Recreation

The lake will provide significant benefits in terms of a wide range of recreational activities, many of which are not currently available to the residents of Alice Springs and surrounding areas (Reference 2). The other major towns in the Northern Territory have major expanses of water nearby; the most recent, at Tennant Creek, has proven a marked success and improved the quality of life of Tennant Creek residents.

Recreation aspects are discussed in detail in three studies (References 1, 8, 12). Water-based activities would include swimming, skin diving, canoeing, sculling, rowing boats, sailing, wind surfing, paddle boats, model boating and fishing/angling. Land-based activities would include picnicking/BBQs, children's playground, relaxing/sunbaking, sight seeing, hiking/bushwalking, birdwatching/wildlife appreciation, educational activities, and possibly camping.

Unacceptable activities would include motorised boats/water skiing and spear fishing.

3.4 Other benefits

The lake on the Todd River will offer other significant benefits: the provision of a water supply for parks and sporting grounds, and mitigation of the flood risk in the town area. The lake is economically justified on these grounds alone (Reference 12 and Section 3.6).
The potential to provide a draft of approximately one million kilolitres annually to water public and semi-public parks is common to both Alternatives A and B. There is a relative economic benefit associated with use of water from the dam compared with water from the town supply (see Section 3.6).

A recent department study has found that much of Alice Springs development has occurred on flood prone land (Reference 14). Flows in the Todd River of an average recurrence interval exceeding 10 years will cause flooding and associated damage in the town area. The 100 year flood (that is, the flood having a one percent probability of being equalled or exceeded in each year) would cause severe damage. It is estimated that over 200 hectares of the town area would be inundated, costing in the order of $80 million and leaving approximately 3500 residents seeking temporary accommodation. Rarer floods would be even more damaging.

Hydrology studies (References 7, 11) have shown that a dam on the Todd River with Spillway Alternative A would significantly attenuate flooding, to the extent of reducing the 100 year flood to the 20 year flood (Table 3.2). Thus only floods with a recurrence interval exceeding 100 years should cause appreciable damage, apart from floods associated with the Charles River or town drains. The attenuation effect is the result of temporary storage above the spill level. The economic benefit of this attenuation is detailed in Section 3.6 and tabulated in Table 3.2.

However a dam with Spillway Alternative B will have negligible flood attenuation effect (Reference 11). Because of the long saddle 1 spillway, the flooding behaviour of this alternative will be similar to that of the present river without a dam.

3.5 Environmental effects
A number of studies have examined effects of the lake on ecosystems, downstream sections of the Todd River, the Telegraph Station and on human health (References 2, 5, 7, 12). These studies have indicated no major environmental problems which could present opposition to the proposal, providing due recognition is given to the need for proper planning and management.
3.6 Financial considerations

The current (1983) estimates of total project costs are $9.5 million for Alternative A and $7.2 million for Alternative B, assuming project commencement in 1983. These estimates include the cost of the main dam, saddle dams, spillway, access roads, sand trap structures, service road, establishment, relocation of Telecom landline, stripping of the impoundment area, and ancillary works. Ancillary works include car parks, landscaping, water supply, boat ramp, amenities block, rangers quarters, fencing, sand beach, other recreational aids.

One economic advantage of both Alternatives A and B is the use of up to 1 million kilolitres of water annually for irrigation (Section 3.4). The relative benefit (expressed as present worth) is derived by subtracting the cost of pipelines (from the dam to the areas to be watered) from the saving involved with not using town water supply. This relative benefit is $1.1 million ($2 million minus $0.9 million) and is calculated on present energy costs for pumping water. As the cost of energy rises the value of the relative benefit will increase.

The effect of using this annual draft is to reduce the net cost of the project: Spillway Alternative A is reduced to $8.4 million, while Spillway Alternative B is reduced to $6.1 million.

The second economic advantage is one of flood attenuation (Section 3.4). This advantage only applies to Spillway Alternative A proposal. The long term annual cost to the Northern Territory of flooding in the Todd River without a dam is calculated to be $3.7 million. The action of the dam and Spillway Alternative A results in marked flood attenuation; the long term annual cost of flooding is reduced to $0.4 million. The annual saving is thus $3.3 million; this converts to a present worth saving of $27.5 million.

To summarise (see Table 3.2), the net cost of the dam with Spillway Alternative B is $6.1 million. However the net benefit of the dam with Spillway Alternative A is $19.1 million ($27.5 M + $1.1 M - $9.5 M). This alternative has a benefit/cost ratio exceeding unity (approximately three), and in terms of economics is the preferred site and alternative.
3.7 Management

Discussions on management were held between the Department of Transport and Works, the Conservation Commission and the Alice Springs Town Council during 1980. As a result it was agreed that, should the project go ahead -

(i) Project management including engineering design, documentation and construction supervision are the responsibility of the Department of Transport and Works. This includes access roads.

(ii) The department would also be responsible for maintenance of the dam and spillway structures, and for monitoring programs.

(iii) The Conservation Commission would be responsible for the design of recreation areas, inconsultation with the Alice Springs Town Council and other bodies. The Commission has since prepared a brief on development of recreation and facilities (Reference 1).

(iv) The commission would be responsible for management of the recreation areas.

In addition, the Conservation Commission has prepared a report providing information on which decisions regarding management of the Todd River catchment to control sediment movement into the proposed dam may be based (Reference 3). The report indicates that formulation of a suitable catchment management plan incorporating sediment trapping devices, catchment rehabilitation and long term control of broad-scale land management will be essential if the dam is to have acceptable water quality and usable life. This management plan will need input from the owner of Bond Springs Station, the Conservation Commission and the Department of Transport and Works.

3.8 Legislation

3.8.1 The Central Land Council has considered that the establishment of the recreation lake at the Telegraph Station site would desecrate sites of significance there, and would he
contrary both to the wishes of the
Aboriginal people concerned and to the
provisions of the Sacred Sites Protection
Act. Negotiations with the traditional
owners have been continuing since 1979.
These negotiations need to be satisfactor-
ily concluded before any field work can
commence.

3.8.2 Under the provisions of the Control of
Waters Act, the dam and spillway struc-
tures will need to be approved and licensed
by the Controller of Water Resources.
4.1 The need for a recreation lake in the vicinity of Alice Springs to benefit Central Australians has been recognised by the Northern Territory Government.

4.2 Of a number of potential sites, a recreation lake is feasible at only two; the Telegraph Station site on the Todd River, and the Ildjarabada site on Jay Creek.

4.3 On the basis of project cost alone, the Ildjarabada site is the least costly ($6 million). However when other benefits including use of water for irrigation, flood attenuation and proximity to Alice Springs are considered, the Telegraph Station site is clearly preferred.

4.4 Two alternatives of dam/spillway configuration at the Telegraph Station site are feasible. Alternative A has a benefit/cost ratio of approximately 3, while Alternative B has a benefit/cost ratio of only 0.15. The Conservation Commission clearly favours Alternative A on the grounds of visual and environmental impact within the Telegraph Station Reserve. An early decision on selection of an alternative is required so that design can be completed.

4.5 Aboriginal sites of significance have been identified within the impoundment area of the Telegraph Station site. Negotiations, which have been continuing since 1979, need to be satisfactorily concluded with the traditional owners before any field work can commence.

4.6 If Alternative A is to proceed, some dozer trenching in the area of saddle spillway 4 is required to complete the engineering geological assessment.
4.7 The project can be considered for either the Design Listing or Capital Works Program in 1983/84 depending on the priority given. An early indication of priority is required so that the project can be programmed.

4.8 The Department of Transport and Works will be responsible for project management (including engineering design, documentation and construction supervision), maintenance of the dam and spillway structures, and for monitoring programs.

4.9 The Conservation Commission will be responsible for the design and management of recreation areas.

4.10 A management plan for the Todd River catchment is essential to aid in the control of sediment movement. The plan will need input from the owner of Bond Springs Station, the Conservation Commission and the Department of Transport and Works.
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