

1972

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

*Parliamentary Standing Committee on Public Works*

## REPORT

relating to the proposed construction of a

# SEWERAGE SYSTEM

at

## Katherine, Northern Territory

(THIRD REPORT OF 1972)

COMMONWEALTH GOVERNMENT PRINTING OFFICE  
CANBERRA: 1972.

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PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

SEWERAGE SYSTEM  
KATHERINE, NORTHERN TERRITORY

R E P O R T

By resolution on 10 November 1971, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for investigation and report to the Parliament, the proposal for construction of a sewerage system at Katherine, Northern Territory.

The Committee have the honour to report as follows:

THE REFERENCE

1. The proposal involves the construction of a sewerage reticulation system, pumping stations and treatment lagoons at Katherine. The area to be sewered includes the existing development along the eastern bank of the Katherine River from the hospital in the north to the abattoir in the south. It covers the whole of the present town and the sub-divisional development planned for the future.
2. The work is estimated to cost \$1.3 million.

THE COMMITTEE'S INVESTIGATION

3. The Committee received written submissions and drawings from the Northern Territory Administration and the Department of Works and took evidence from their representatives at a public hearing in Katherine. At that time, we also took evidence from representatives of the Katherine Chamber of Commerce, the Katherine Town Management Board and from five private witnesses.

4. We inspected the site for the proposed treatment plant and the earth settling tanks used for the preliminary treatment of industrial wastes from the abattoir.

KATHERINE

5. Katherine is an important regional centre situated on the Stuart Highway some 200 miles south of Darwin and 700 miles north of Alice Springs. It is connected to Darwin by rail and air services and a number of bus services operate to and from other towns.

6. It is the centre of a large pastoral district and has as one of its major industries an abattoir whose output is sold on the local and export beef markets. Katherine is also an important administrative centre with several Commonwealth departments and business interests having regional offices in the town. It has an 85 bed hospital which serves towns and properties between the Victoria River district and the Gulf of Carpentaria. Because of its location, Katherine is an important link and transshipping point in the road transport system and also in the co-ordinated road/rail system. It is the base for a number of popular tourist attractions in the area and has seen building activity increasing at a steady rate in recent years.

7. Population The population between 1954 and 1961 increased from only 555 to 606 excluding Aborigines. At the 1966 census, there were 1,302 persons, excluding Aborigines, and in June 1970 this figure had increased to 2,500 including 300 Aborigines. Based on the expected development in the Katherine region, the Committee were told that it is considered that annual population growth rates of about 10% between 1970 and 1975 and 8% between 1975 and 1980 are likely. On this basis, a population of 4,000 in 1975 increasing to 6,000 in 1980 is expected.

8. Municipal Services The management of municipal affairs in Katherine is the responsibility of the Northern Territory Administration with the District Officer as the local representative. The Administration provides garbage clearances and other municipal services.

9. A town management board of nine nominated members assists the Administration on matters affecting the town. It was a recommendation of the Katherine Town Management Board that a water-borne sewerage system be constructed in Katherine.

#### EXISTING SEWERAGE SERVICE

10. All dwellings and business premises in Katherine have septic tanks with absorption trenches. There is no system of pan clearances. The usual domestic arrangement consists of a 400 gallon septic tank with a rubble filled absorption trench about 40 ft long. Hotels, motels, caravan parks and guest houses have either larger septic tanks or a combination of several. When the absorption trenches cannot cope with the volume of effluent, arrangements can be made with a private contractor for the effluent to be pumped out and carted away in tankers at a cost of between \$3.50 and \$5.00 per service. Some businesses use their own tankers. The effluent is subsequently disposed of at the sanitary reserve about two miles south of the town.

11. Large institutions such as the hospital, public school and the abattoir have special arrangements. Effluent from the hospital is pumped from a large septic tank through a bio-filter before being chlorinated and discharged into the Katherine River. Sewage from the school is chlorinated and then fed into a large absorption trench near the river.

Industrial wastes from the Katherine meatworks are at present run off on to paddocks after treatment in a series of earth settling tanks.

#### THE NEED

12. Katherine is built on clay which overlays limestone gravels and rock at depths varying from 5 to 12 ft. Because of the clay, absorption of effluent by trenches is difficult and that which does not drain away has to be pumped out. Many septic tanks and absorption trenches are pumped out either weekly or twice weekly in the wet season and one motel often has four or five pump-outs per day. In March and April 1971, 883 pump-outs were recorded for the town.

13. The Committee were told of the health hazards involved in the operation described above. For example, it is possible for raw faeces and undigested sewage to be removed from tanks and at the sanitary reserve, which is about 200 yards off the Stuart Highway, the effluent is then pumped on to the ground to await absorption or evaporation. During the wet season, the reserve is often flooded and tankers are forced to pump-out only some 20 yards from the Stuart Highway. In addition, we were told of a number of occasions where unauthorised disposal of effluent has occurred on to lawns and in areas adjacent to the Stuart Highway.

14. A further example of the disposal problem is that absorption trenches have generally an effective life of only three to four years and in the case of Government houses, a cost of about \$400 per house is incurred in replacing them. Similar problems are experienced with Housing Commission and private homes. The result is that at any given time, a number of houses have an ineffective sewage disposal system necessitating regular pump-outs of the septic tanks until such time as the trenches can be replaced.

15. The problem is naturally more acute and the public health risk more pronounced where there is a greater concentration of people such as in the central business area. Many business houses require regular pump-outs of septic tanks whilst motels and similar establishments have found it necessary to instal complex and costly absorption trenches. However, the latter is only practicable where sufficient space exists to locate the trenches and future development of these establishments is therefore inhibited. The open-air picture theatre has had to construct absorption trenches along the front of the screen inside the theatre. As substantial development within the existing business area is expected, the already critical position of effluent disposal can only worsen unless remedial measures are taken.

16. The following table indicates the recorded incidence of infective hepatitis in Katherine as compared with Darwin over the last two years.

	<u>Darwin</u>	<u>Katherine</u>
<u>1969/70</u>		
0 - 14 age group	10	10
Total cases	42	24
<u>1970/71</u>		
0 - 14 age group	25	21
Total cases	108	45

As Darwin's population is roughly 15 times greater, it is clear that the incidence of hepatitis per 1,000 population is critically higher in Katherine. It was submitted to the Committee that a water-borne sewerage system would be a major factor in alleviating this serious problem.

17. Committee's Conclusion The Committee concluded that the present sewerage system in Katherine is unsatisfactory and that there is a need to replace the present system of effluent disposal.

#### THE PROPOSAL

18. Planning Outline The treatment lagoons for the system proposed in this reference are to be located south of the township on a special purpose lease at present held by the Northmeat Abattoir. Negotiations are now proceeding to acquire 120 acres of the lease for sewerage purposes. The lagoons will be sited over half a mile from the meatworks. The Department of Primary Industry believes that this separation will be sufficient so as not to jeopardise the abattoir's export licence on health grounds. Any odour from the plant will normally be carried by the prevailing winds away from the township and no nuisance is therefore expected in this regard.

19. The scheme will be designed so that it can be expanded to service present and future urban development. However, floods estimated to be of 50-year frequency will interfere with the operation of the proposed system but we were told that the design will be such that the system can quickly be brought back into full operation after the floods subside.

20. Alternative Proposals The Committee were told that several alternative methods of sewerage treatment were considered by the Northern Territory Administration and the Department of Works, but the proposed scheme is the only one which economically meets the standards set by the Department of Health.

21. To avoid discharge of any treated effluent into the Katherine River, a large lagoon area would be necessary for evaporation purposes.



However, the cost of providing such an area to facilitate evaporation at all times would be prohibitive in view of the heavy rains and flooding which occur at Katherine during the wet season.

22. Another proposal considered was for the use of evaporation ponds in the dry season and discharge of untreated effluent into the river during the "wet". Whilst savings in operating and capital costs would follow from using this approach, the effluent would not comply with Department of Health requirements and it was agreed that untreated effluent should not be discharged into the river.

23. Consequently, it was decided that the most suitable scheme was one in which effluent was evaporated in ponds during the dry season and treated to Department of Health standards prior to discharge to the river in the wet season. This approach is the basis of the reference to the Committee.

24. Design The proposal is to provide a water-borne sewerage system for Katherine designed to serve a population of 6,000 which is expected by 1980. The area to be sewered includes the existing development along the eastern bank of the Katherine River from the hospital in the north to the abattoir in the south. This will cover the whole of the present town and facilitate the inclusion of future sub-divisional development.

25. Water-borne sewage will be collected from residential and business premises by reticulation sewers and will be carried by rising mains and pumping stations to a series of lagoons to be built about two miles south of the main business centre. In the dry season, evaporation ponds will be used.

During other periods, when effluent cannot be evaporated, it will be passed through filters and chlorinated prior to discharge into the Katherine River. The treatment process will meet the effluent disposal standards set by the Department of Health.

26. The abattoir's industrial wastes will be disposed of through the sewerage system. The wastes, which consist of wash-down water containing meat, blood, hair, dirt, fat, salt and detergents will be partially treated at the abattoir and the effluent should then only have a limited putrescible content which will be acceptable for further treatment in the town treatment plant. This material will comply with the sewerage regulations which require that no trade wastes shall be discharged into a sewer or that discharge is only permitted subject to certain conditions which in this case will include screening, grease removal and partial treatment to reach an approved standard.

27. Pumping Stations It will be necessary to pump the sewage because of the flat terrain and the elongation of the town along the river bank and because of the presence of rock at relatively shallow depths. It is proposed that six pumping stations will discharge either to gravity lines or direct to the sewage treatment plant. As a minimum number of pumping stations is desirable to reduce maintenance costs and control odour, the Committee were told that in the final design an attempt will be made to reduce the number of pumping stations.

28. Treatment and Disposal The proposed treatment plant will consist of a series of lagoons producing high quality effluent which during the dry season will be evaporated from ponds. During periods of

moderate rainfall, the ponds will have some capacity for temporary storage of effluent, but under sustained wet weather conditions, overflow to the Katherine River may occur. The Committee were told such overflows will be diluted by the coincident high river flow but as an additional safeguard, facilities for filtering and chlorination will be provided. The design of the treatment lagoons will provide for a minimum period of 30 days detention of effluent in both wet and dry seasons.

29. House Connections Connection junctions for residences will be provided as part of the present work and the cost of linking to these will be met by the house-owner. However, house-owners will be permitted to retain their existing septic systems, providing they are considered to be functioning satisfactorily.

30. Water Supply As most of the users of the sewerage system are already using water closets, there is not likely to be any significant increase in the consumption of water because of the proposed work.

31. Committee's Conclusion The Committee recommend the construction of the work in this reference.

#### ESTIMATE OF COST

32. The estimated cost of the work when referred to the Committee was \$1.3 million made up as follows:

Sewerage reticulation, rising mains and	
pumping stations	950,000
Treatment plant and effluent pipeline	<u>350,000</u>
	<u>1,300,000</u>

PROGRAMME

33. After an approval to proceed is given, it is expected that design and documentation will be completed in time for tenders to be called early in 1972. Subject to Parliamentary approval, a contract could then be let, about mid-1972, and the work completed by late 1973.

OTHER OBSERVATIONS

34. Concern was expressed to the Committee by several witnesses that the discharge of effluent into the Katherine River from the treatment facilities would create pollution and would be a health hazard. This concern was particularly related to the use of the river for recreation purposes and of its water for rural and domestic purposes by landholders downstream of the treatment works.

35. The Committee were satisfied that the safeguards being built into the proposed system will provide protection for these users. The most important is that effluent will generally only discharge into the river in the wet season coincidentally with periods of high flows in the stream. It is also important that any effluent being discharged is to be filtered and chlorinated after having been held in the treatment lagoons for at least 30 days. The introduction of the proposed system will eliminate two points (school and hospital) where effluent is now discharged into the river in the town and as this effluent will now be treated and for most of the year evaporated, there is expected to be some lessening of the present degree of pollution.

RECOMMENDATIONS AND CONCLUSIONS

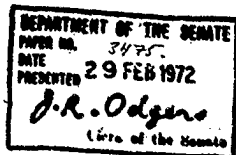
36. The summary of recommendations and conclusions of the Committee is set out below. Alongside each is shown the paragraph in the report to which it refers.

	<u>Paragraph</u>
1. THE PRESENT SEWERAGE SYSTEM IN KATHERINE IS UNSATISFACTORY.	17
2. THERE IS A NEED TO REPLACE THE PRESENT SYSTEM OF EFFLUENT DISPOSAL.	17
3. THE COMMITTEE RECOMMEND THE CONSTRUCTION OF THE WORK IN THIS REFERENCE.	31
4. THE ESTIMATED COST OF THE WORK WHEN REFERRED TO THE COMMITTEE WAS \$1.3 MILLION.	32

(C.R. KELLY)  
Chairman

Parliamentary Standing Committee on Public Works,  
Parliament House,  
CANBERRA, A.C.T.

24 February 1972.



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17. Committee's Conclusion The Committee concluded that the present sewerage system in Katherine is unsatisfactory and that there is a need to replace the present system of effluent disposal.

#### THE PROPOSAL

18. Planning Outline The treatment lagoons for the system proposed in this reference are to be located south of the township on a special purpose lease at present held by the Northmeat Abattoir. Negotiations are now proceeding to acquire 120 acres of the lease for sewerage purposes. The lagoons will be sited over half a mile from the meatworks. The Department of Primary Industry believes that this separation will be sufficient so as not to jeopardise the abattoir's export licence on health grounds. Any odour from the plant will normally be carried by the prevailing winds away from the township and no nuisance is therefore expected in this regard.

19. The scheme will be designed so that it can be expanded to service present and future urban development. However, floods estimated to be of 50-year frequency will interfere with the operation of the proposed system but we were told that the design will be such that the system can quickly be brought back into full operation after the floods subside.

20. Alternative Proposals The Committee were told that several alternative methods of sewerage treatment were considered by the Northern Territory Administration and the Department of Works, but the proposed scheme is the only one which economically meets the standards set by the Department of Health.

21. To avoid discharge of any treated effluent into the Katherine River, a large lagoon area would be necessary for evaporation purposes.

However, the cost of providing such an area to facilitate evaporation at all times would be prohibitive in view of the heavy rains and flooding which occur at Katherine during the wet season.

22. Another proposal considered was for the use of evaporation ponds in the dry season and discharge of untreated effluent into the river during the "wet". Whilst savings in operating and capital costs would follow from using this approach, the effluent would not comply with Department of Health requirements and it was agreed that untreated effluent should not be discharged into the river.

23. Consequently, it was decided that the most suitable scheme was one in which effluent was evaporated in ponds during the dry season and treated to Department of Health standards prior to discharge to the river in the wet season. This approach is the basis of the reference to the Committee.

24. Design The proposal is to provide a water-borne sewerage system for Katherine designed to serve a population of 6,000 which is expected by 1980. The area to be sewered includes the existing development along the eastern bank of the Katherine River from the hospital in the north to the abattoir in the south. This will cover the whole of the present town and facilitate the inclusion of future sub-divisional development.

25. Water-borne sewage will be collected from residential and business premises by reticulation sewers and will be carried by rising mains and pumping stations to a series of lagoons to be built about two miles south of the main business centre. In the dry season, evaporation ponds will be used.

During other periods, when effluent cannot be evaporated, it will be passed through filters and chlorinated prior to discharge into the Katherine River. The treatment process will meet the effluent disposal standards set by the Department of Health.

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28. Treatment and Disposal The proposed treatment plant will consist of a series of lagoons producing high quality effluent which during the dry season will be evaporated from ponds. During periods of

moderate rainfall, the ponds will have some capacity for temporary storage of effluent, but under sustained wet weather conditions, overflow to the Katherine River may occur. The Committee were told such overflows will be diluted by the coincident high river flow but as an additional safeguard, facilities for filtering and chlorination will be provided. The design of the treatment lagoons will provide for a minimum period of 30 days detention of effluent in both wet and dry seasons.

29. House Connections Connection junctions for residences will be provided as part of the present work and the cost of linking to these will be met by the house-owner. However, house-owners will be permitted to retain their existing septic systems, providing they are considered to be functioning satisfactorily.

30. Water Supply As most of the users of the sewerage system are already using water closets, there is not likely to be any significant increase in the consumption of water because of the proposed work.

31. Committee's Conclusion The Committee recommend the construction of the work in this reference.

#### ESTIMATE OF COST

32. The estimated cost of the work when referred to the Committee was \$1.3 million made up as follows:

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Sewerage reticulation, rising mains and	
pumping stations	950,000
Treatment plant and effluent pipeline	<u>350,000</u>
	<u>1,300,000</u>



PROGRAMME

33. After an approval to proceed is given, it is expected that design and documentation will be completed in time for tenders to be called early in 1972. Subject to Parliamentary approval, a contract could then be let, about mid-1972, and the work completed by late 1973.

OTHER OBSERVATIONS

34. Concern was expressed to the Committee by several witnesses that the discharge of effluent into the Katherine River from the treatment facilities would create pollution and would be a health hazard. This concern was particularly related to the use of the river for recreation purposes and of its water for rural and domestic purposes by landholders downstream of the treatment works.

35. The Committee were satisfied that the safeguards being built into the proposed system will provide protection for these users. The most important is that effluent will generally only discharge into the river in the wet season coincidentally with periods of high flows in the stream. It is also important that any effluent being discharged is to be filtered and chlorinated after having been held in the treatment lagoons for at least 30 days. The introduction of the proposed system will eliminate two points (school and hospital) where effluent is now discharged into the river in the town and as this effluent will now be treated and for most of the year evaporated, there is expected to be some lessening of the present degree of pollution.

RECOMMENDATIONS AND CONCLUSIONS

36. The summary of recommendations and conclusions of the Committee is set out below. Alongside each is shown the paragraph in the report to which it refers.

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1. THE PRESENT SEWERAGE SYSTEM IN KATHERINE IS UNSATISFACTORY.	17
2. THERE IS A NEED TO REPLACE THE PRESENT SYSTEM OF EFFLUENT DISPOSAL.	17
3. THE COMMITTEE RECOMMEND THE CONSTRUCTION OF THE WORK IN THIS REFERENCE.	31
4. THE ESTIMATED COST OF THE WORK WHEN REFERRED TO THE COMMITTEE WAS \$1.3 MILLION.	32

  
 (C.R. KELLY)  
Chairman

Parliamentary Standing Committee on Public Works,  
 Parliament House,  
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