



1930.

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA.

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8 AUG 1930

PARLIAMENTARY STANDING COMMITTEE
ON PUBLIC WORKS.

REPORT

~~TOGETHER WITH~~

~~MINUTES OF EVIDENCE~~

RELATING TO THE PROPOSED CONSTRUCTION OF

CONCRETE ROADS, CITY AREA,
CANBERRA.

By Authority

H. J. ORRIN, GOVERNMENT PRINTER, CANBERRA.

MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

(Seventh Committee.)

ANDREW WILLIAM LACEY, Esq., M.P., Chairman.

Senate.

Senator John Braidwood Dooley.
Senator Matthew Reid.
Senator Burford Sampson.

House of Representatives.

Malcolm Duncan Cameron, Esq., M.P.
John Curtin, Esq., M.P.
The Honorable Henry Gregory, M.P.
Edward James Holloway, Esq., M.P.
William John Long, Esq., M.P.

INDEX.

	PAGE
Report	iii
Minutes of Evidence	i

EXTRACT FROM VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES, No. 14.

Dated 12th December, 1929.

5. PUBLIC WORKS COMMITTEE—REFERENCE OF WORK—CONSTRUCTION OF CONCRETE ROADS, CANBERRA.—Mr. Blakeley (Minister for Home Affairs) moved, pursuant to notice, That, in accordance with the provisions of the *Commonwealth Public Works Committee Act 1913-1921*, the following proposed work be referred to the Parliamentary Standing Committee on Public Works for investigation and report, viz.:—The construction of Concrete Roads, City Area, Canberra.
Mr. Blakeley having laid on the Table plans, &c., concerning the proposed work—
Question—put and passed.

LIST OF WITNESSES.

	PAGE
Bremner, Ernest John Leslie, Brown & Dureau Ltd., Melbourne	..
Hill, Thomas, Director-General of Works, Canberra	..
Morton, Henry Edgar, Civil Engineer, Sydney	..
Potts, William Elmhirst, Chief Engineer, Federal Capital Commission, Canberra	..
Robinson, Percy Stanley, Civil Engineer, Melbourne	..
Seaver, Thomas Whitechurch, Roads Engineer, National Roads and Motorists' Association, Sydney	..

CONCRETE ROADS, CITY AREA, CANBERRA.

REPORT.

The Parliamentary Standing Committee on Public Works to which the House of Representatives referred for investigation and report the question of the construction of concrete roads within the City Area, Canberra, has the honour to report as follows :—

INTRODUCTORY.

1. With the growth of vehicular traffic in Canberra and the employment of heavy omnibuses on certain routes, the maintenance of existing lightly constructed roads is becoming increasingly costly, and it is suggested that consideration should be given to the adoption of a progressive programme of road development, having for its ultimate aim the surfacing of the more important city streets with reinforced concrete.

PROPOSAL SUBMITTED.

2. The proposal of the Federal Capital Commission originally submitted for the consideration of the Committee was for the construction as a first stage of 4.6 miles of road at an estimated cost of £50,598, but during the course of the Committee's investigations, it was intimated that, in view of the financial position, certain sections were to be postponed, reducing the length of road to 3.46 miles, and the estimated cost to £45,533.

SECTIONS TO BE DEALT WITH.

FIRST STAGE.

3. With this amendment, the first stage comprised the reconstruction with concrete surface of the following :—

	Estimated Cost. £
Commonwealth Avenue from Griffith-street to State Circle (both roadways) including intersections in bituminous macadam—1,756 yards	13,316
National Circuit from King's-avenue to Franklin-street—1,515 yards	10,270
Brisbane-avenue, Southern Roadway, from King-street to National Circuit—530 yards	3,958
Wentworth-avenue, south-west roadway, from Gosse-street to McMillan Circle, and north-east roadway from Gosse-street to Cunningham-street, including intersections in bituminous macadam—2,287 yards	17,989
Total, 6,088 yards = 3.46 miles	45,533

SECOND STAGE.

4. On the completion of the section mentioned, it was proposed to deal with a further 9.28 miles of roads which, it was represented, should ultimately be of concrete. It was therefore proposed that the following sections be constructed during the next two years, at an estimated cost of £111,000, as funds could be made available, namely:—

	Length in Yards.
Pialligo-avenue, north-east side from Girraheen-street to Ainslie-avenue	922
Northbourne-avenue, east side from Alinga-street to Girraheen-street	1,048
City shops, West Row, Alinga-street and Northbourne-avenue	12,437
London Circuit, Essex-street to East Row	1,473
Melbourne-avenue, Tennyson-crescent to National Circuit	671
State Circle and Adelaide-avenue, Commonwealth-avenue to National Circuit	1,345
National Circuit, Franklin-street to Adelaide-avenue	1,658
Empire Circuit, Arthur Circle to Melbourne-avenue	923
Arthur Circle, Furneaux-street to Empire Circuit	1,219
Manuka Shops, Franklin-street, Bougainville-street, Flinders Way	1,185
Canberra-avenue, Manuka Circle, and State Circle from Giles-street to Commonwealth-avenue	3,023
Brisbane-avenue and Wentworth-avenue to complete, Gosse-street to National Circuit	1,651
Total = 9.28 miles	16,355

THIRD STAGE.

5. Subsequently, as the existing improved surfaces require renewal, or as permanent conditions in regard to locations or levels are realized, it was proposed to surface with concrete, at a cost of approximately £61,413, a further 5.15 miles embraced by the following roads, namely:—

	Length in Yards.
Roads in vicinity of Australian War Memorial, Peronne-crescent, Anzac-place, Flanders-avenue and Gallipoli-avenue	1,904
Gallipoli-avenue and Pialligo-avenue, south west side	1,768
Elouera-street and Doonkuna-street from Northbourne-avenue to Ainslie-avenue	1,152
Ainslie-avenue, London Circuit to Gallipoli-avenue	1,370
Commonwealth-avenue, Griffith-street to London Circuit	1,220
Commonwealth-avenue, front of Hotel Canberra	333
National Circuit, King's-avenue to Commonwealth-avenue	953
Giles-street, Jardine-street to Kennedy-street	360
Total = 5.15 miles	9,060

ESTIMATED COST.

6. Recapitulating the preceding details, it will be seen that the total cost of these proposals is estimated at:—

	£
First stage 3.46 miles	45,533
Second stage 9.28 miles	111,000
Third stage 5.15 miles	61,413
17.89 miles	217,946

DESCRIPTION OF ROAD PROPOSED.

7. In the proposals submitted to the Committee, the general width of concrete road pavement proposed was 20 feet, with gravel shoulders 3 feet wide on each side of the pavement. The pavement was to be 7 inches thick, increasing to 9 inches at each side, with the surface of the concrete finished smooth. Trachyte setts were to be placed at the edge of the pavement at intersections.

The pavement was designed to be constructed with a longitudinal joint along the centre line, and transverse joints at intervals of 50 feet. It was proposed to be reinforced with steel bars placed round the edges of each slab, and by a light mat composed of steel fabric placed about 2 inches below the surface. In addition, adjacent slabs were to be held together by dowels projecting from one slab to the other, with steel dowels joining the two portions of each slab where separated by pre-formed longitudinal joints.

COMMITTEE'S INVESTIGATIONS.

8. The Committee inspected the roads in Canberra proposed to be dealt with, and some roads in Adelaide, constructed of cement concrete and other materials. Evidence was taken from the Director-General of Works, the Chief Engineer, Federal Capital Commission, and experts on concrete road construction in Sydney, Melbourne, and Adelaide. Plans and specifications were carefully scrutinized, and information obtained as to various methods of road construction followed in Australia and throughout the world.

9. In regard to the first stage of the programme of road construction outlined, the inquiry of the Committee was deprived of most of its value by reason of the fact that the construction of approximately 3½ miles of concrete road in various sections, as set out in that stage, was commenced before reference was made to the Committee and completed at a cost of £41,280 before the Committee had concluded its investigations.

This action is to be deprecated, as the Committee is satisfied that it would have been able to make certain recommendations which would have resulted in a saving to the Commonwealth.

Attention was then concentrated on the construction of the future programme outlined in the second and third stages mentioned above.

TYPES OF ROAD SURFACES.

10. Various types of road surfaces are used in different localities, dependent upon the nature of the foundations, material available, and the volume and weight of traffic to be catered for.

For convenience of reference it is proposed to indicate the types considered as possibly being suitable for Canberra, as follows:—

Class A.—Cement concrete roads—suitable for heaviest type of traffic. Approximate cost £1 4s. per square yard, made up as follows:—

	Labour. d.	Rate, Material. s. d.	
Gravel shoulders, 6 feet wide.	6½	0 5	57
Trimming, boxing and rolling	5	0 5	
Sand foundations	½	0 2	
Joints	1	0 8	
Reinforcement	1	1 1	
Concrete delivered	..	13 6	
Forms	1	0 3	
Packing and tamping	3	..	
Finishing	1	..	
Curing	3	..	
Trachyte setts	1	0 2	
Test specimens and cores	1	..	
Contingencies	3	0 3	
Overhead on labour.	2	..	
		s. d.	
General administration	..	1 3	
Interest	..	0 2	
Total per square yard	..	20 4	

Class B.—Bituminous concrete; composed of a mixture prepared, as a rule, at an asphalt mixing plant, and consisting of asphalt cement and broken stone. It is suitable for arterial roads carrying fairly heavy and fast traffic. Its approximate cost is 10s. per square yard, made up as follows:—

	s.	d.	s.	d.
Mixing and Carting—				
Plant hire	1	6		
Metal	2	9		
Bitumen	0	9½		
Heating	0	2½		
Labour	0	7		
Cartage (say 1 mile)	0	5		
	6	3		
Filling course 5 per cent.	0	3½	6	6½
Spreading and rolling—				
Labour	0	6		
Rolling	0	5		
			0	11
Seal Coat—				
		d.		
Labour		2.5		
Rolling		1.2		
Plant		1.3		
Metal		1.6		
Bitumen		4.8		
Sundries		0.1		
			0	11½
			8	5
Reconditioning existing base (say)			1	6
			9	11, say 10s.

Class C.—Bituminous penetration macadam, is one having a wearing course of macadam, coated and filled with asphalt applied by the penetration method after the broken stone has been placed on the sub-grade or foundation.

It is claimed to be suitable for minor roads carrying medium traffic up to, say, 2,000 vehicles a day, and can be constructed at an approximate cost of 6s. per square yard, made up as follows:—

	s.	d.
Preparation of existing road	0	4
Metal	2	1
Spreading	0	3
Bitumen penetration and sealing—		
Labour	0	6½
Rolling	0	2½
Plant hire	0	1½
Screenings	0	8½
Spraying	0	3½
Bitumen	1	5½
Sundries	0	1
	6	1, say 6s.

Class D.—Bitumen spray treatment ; in which a compacted gravel or macadam surface is sprayed with tar or bitumen for the purpose of providing a smooth running surface, minimizing dust, and reducing loss of surface material under motor traffic. This class of road is claimed to be suitable for domestic suburban roads, and can be provided at an approximate cost of 1s. 6d. to 2s. per square yard, made up as follows :—

	s.	d.
Reconditioning road surface	0	5
Primer ($\frac{1}{4}$ gallon per square yard)	0	3
Seal Coat ($\frac{1}{2}$ gallon per square yard)	0	4
Screenings (1 cubic yard to 70 square yards)	0	3 $\frac{1}{2}$
Rolling	0	1 $\frac{1}{2}$
Labour	0	3
	1	8

varies from 1s. 6d. to 2s., according to nature of existing road.

CEMENT PENETRATION ROADS.

11. Consideration was also given to another class of road surface, called the cement penetration process which has recently received some attention. This is formed by laying the broken stone in place and grouting a thin cement mixture through it.

Sections of this type of road have been successfully laid in Victoria, where it is claimed that roads almost equal to cement concrete roads have been constructed at prices varying from 7s. to 9s. 2d. per square yard.

above / An example of this class of road, laid as an experiment in Canberra, however, did not commend itself to the Committee, nor could it be assured that the work could be carried out in Canberra at the price quoted ; consequently the Committee is not prepared to recommend this class of road for heavy traffic in preference to the well-known and well-tried bituminous concrete.

CONSIDERATIONS AFFECTING THE PROPOSAL.

12. It is realized, that in considering a road policy for Canberra, a compromise must perhaps be arrived at between the natural desire of individuals and the community generally for excellence in the standard of work to be carried out in the national capital with the maximum of travel comfort, and a reasonable type of road improvement, taking into consideration the amount of prospective traffic and the economics of road service.

With the high ideals held of making Canberra a model city, the first impulse would lead to the construction of first-class road surfaces generally throughout the city, were it not for the fact that probably for many years to come the amount of traffic to be carried by the majority of the city roads would not justify heavy capital cost at the present time.

13. The high-class bituminous road of the Class B type would undoubtedly carry the traffic for a number of years. Although it has not as effective an appearance for main city streets as the cement road, it is considered that, under existing circumstances, the utmost economy should be exercised, in respect of road construction in Canberra, and, in the opinion of the Committee, the time has not yet arrived when the high ideals of what may be aimed at for the ultimate perfect road surface can be realized.

14. The Committee, therefore, after due consideration, is unanimously of opinion that the volume of traffic does not at present justify the high capital expenditure involved by the construction of any more concrete roads in Canberra.

ALTERNATIVES.

15. Certain of the less important roads, however, carry a fairly large volume of heavy traffic, and the figures furnished to the Committee as to the cost of maintenance of such roads under existing conditions are startling ; four of them exceed £500 per mile per annum, while one section (east row, City) reaches the enormous figure of £1,143 per mile per annum. It is obvious that when the cost of maintenance of gravel road surfaces has reached such dimensions, it has become an economic necessity to provide a superior type.

16. In certain conditions it may be possible to relieve these roads of the very heavy traffic to which they are now subjected, but where such traffic cannot reasonably be diverted to better surfaced roads, the Committee is unanimously of opinion that where heavy maintenance costs are being incurred, steps should be taken to substitute bitumen penetration macadam or bitumen spray treatment for the existing gravel surfaces.

OMNIBUS ROUTES.

17. In the opinion of the Committee there is room for improvement in the location of omnibus routes, and it is thought that a readjustment of omnibus routes, to take advantage of the better road surfaces already existing, would preclude the necessity for the provision of higher class roads in some instances.

c/ 18. It is realized that with the growth of the city the centres of denser population may change, with a consequent variation in the volume of traffic which will be carried by certain roads. It is, therefore, recommended that no bituminous concrete road should be constructed unless it is reasonably certain that, with the ultimate development of the city, such road will be called upon to carry a large volume of heavy traffic.

SUMMARY OF RECOMMENDATIONS.

19. After carefully considering all the circumstances surrounding the question, the Committee is unanimously of opinion—

- (a) That the volume of traffic does not at present justify a high capital expenditure involved by the construction of any more concrete roads in Canberra;
 - (b) That for many years all reasonable road requirements of Canberra can be met by providing :—
 - (i) Bituminous concrete roads for omnibus routes (where no cement road already exists) and other roads which it is reasonably certain will be called upon to carry specially heavy traffic;
 - (ii) Bituminous penetration roads for secondary traffic and suburban communication roads; and
 - (iii) Bitumen spray treatment for other domestic suburban roads,
- and recommends that such progressive improvement be aimed at to be effected as and when funds can be made available.

W. Lacey

W. LACEY,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Parliament House, Canberra.

31st July, 1930.