

1932.

(SECOND SESSION.)

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS

FOR THE

YEAR ENDED 30TH JUNE, 1932,

Ordered by the Legislative Assembly to be printed, 29 November, 1932.



SYDNEY: ALFRED JAMES KENT, I.S.O., GOVERNMENT PRINTER.

1933.

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THE DEPARTMENT OF PUBLIC WORKS, N.S.W.

(ANNUAL REPORT FOR THE YEAR 1931-32.)

The Director of Works to the Honorable R. W. D. Weaver, M.L.A.,
Minister for Public Works.

Department of Public Works, New South Wales,
Sydney, 1 November, 1932.

Dear Sir,

I submit the following Report upon the operations of the Department of Public Works for the year ended 30th June, 1932.

The total expenditure from all sources amounted to £3,796,279 16s.

FINANCIAL.

The number of permanent officers decreased from 501 to 475, with reduction in salaries paid from £191,729 to £164,022, while the temporary officers were reduced from 418 to 399, and the salaries from £121,933 to £107,798. The total reduction in salaries paid amounted to £41,842.

The expenditure was provided from the following principal sources :

	£	s.	d.
Consolidated Revenue Fund	479,441	4	0
General Loans	2,080,369	1	7
Operations on Votes of other Departments	8,278	16	4
Funds provided by other Departments	171,199	7	8
Special Deposits Accounts	1,056,991	6	5
	£3,796,279	16	0

The principal works upon which expenditure was incurred were :—

	£	s.	d.
Sydney Harbour Bridge (Rate Account)	268,597	1	8
Bridges (including Sydney Harbour Bridge Loan Account)	1,363,840	2	10
River Murray (Loans)	111,289	13	7
„ (Other Departments)	133,576	1	0
Sewerage and Stormwater Drainage (Loans)	320,842	15	0
Water Supply (Loans)	190,893	17	6
Harbours and Rivers (Loans)	52,776	7	4
Unemployment Relief (Special Deposits)	402,338	17	3
Dredge Service (Revenue)	136,967	7	3
Hospitals (Other Departments)	14,001	5	6

WATER SUPPLY AND SEWERAGE BRANCH.

Exclusive of the Metropolitan and Hunter River Districts, water supply schemes in country towns were 87 in number at the end of the year, the total cost having been £4,183,923. The rainfall for the year was well above the average, and no shortages were reported.

Sewerage schemes numbered 14, and 16 towns have had stormwater channels constructed. The total cost for sewerage and drainage amounted to £1,210,569.

The principal water supply works completed were at Werris Creek (£111,231), Tenterfield (£83,077), and Grenfell (£71,554).

Sewerage schemes were in hand at Parkes and Mudgee.

The total expenditure for the year in respect of water supply works amounted to £356,025, and for sewerage works and stormwater channels £490,855, making a total expenditure of £846,880. These figures are somewhat less than for the previous year, when the corresponding figures were £515,782, and £391,465; total, £907,247.

Operations in connection with the South-west Tablelands Scheme have proceeded, and the expenditure has now amounted to £285,376. Water is already being supplied to the Railway Department at Cootamundra.

Minor works, consisting mainly of pumping plants, were carried out in connection with the water supplies at Broken Hill, Brewarrina, Casino, Grenfell, Katoomba, Moama, Morisset Mental Hospital, Peak Hill, Tamworth, Tenterfield, and Wagga. Works carried out with funds provided by the Unemployment Relief Council included Bourke, Glen Innes, Goulburn, Mudgee, Nyngan, and Orange.

Under construction from Loan Votes are a service reservoir at Lismore, 15 miles of 15-inch steel pipe-line from Cowang to Harden, under the South-west Tablelands' Scheme, and a service reservoir at Harden.

Unemployment relief works of water supply were under construction at the close of the year at Bathurst, Culcairn, Goulburn, and Nyngan.

The only investigations for town water supply proposals were for the small towns of Bombala, Burradoo, and Narrabri West.

Newcastle Sewerage Amplification.

This work has progressed to the extent of £88,795 expenditure for the year, bringing the total expenditure to £459,100. Carrington sewerage has also proceeded, bringing the total cost to £32,138 at the end of the year. Cessnock sewerage expenditure increased to £211,613. A complete scheme has been designed for the sewerage of Stockton, and an amended design prepared for Maitland. The Stormwater Drainage Scheme for Newcastle and district was considerably extended during the year, details of the extensions being furnished in the Chief Engineer's report.

Country Towns Sewerage and Stormwater Channels.

The principal works were Bathurst Low Level, £41,822 7s. 6d., Goulburn Extension, £6,159 15s. 4d., and Lismore Pumping Stations, Treatment Works, etc., £93,349 18s. 4d. Works are still in hand at Bathurst, Lismore, Mudgee, and Parkes.

Investigations and preliminary estimates were made for sewerage schemes at Casino and Leeton. Treatment works are in course of construction at Cessnock, Lismore, Morisset Mental Hospital, Mudgee and Parkes. Designs were prepared for treatment works at Katoomba and Orange. Treatment works have been completed at Forbes. Designs and estimates were prepared for sewerage installations at a number of public institutions and hospitals.

Treatment, Purification, and General Investigation.

A filtration plant was completed at Tenterfield, and remodelling of plant carried out at Broken Hill. Designs and specifications have been prepared for plants at Dungog and Forbes. Investigations are in hand for proposals at Armidale, Casino, Kiama, Lismore, Muswellbrook, and Werris Creek.

Metropolitan Stormwater Channels.

The following works were carried out with funds provided by the Unemployment Relief Council:—Powell's Creek and Strathfield Creek, in the municipalities of Concord, Homebush, and Strathfield; Lidcombe Stormwater Channel, George-street and Arthur-street branches; Salt Pan Creek, Salvia-street branch, Bankstown; Saleyards Creek Stormwater Drain, Homebush and Strathfield. The total expenditure amounted to £30,334 10s. 6d.

HARBOURS, ROADS, AND BRIDGES BRANCH.

Including £85,694 from Unemployed Relief Funds, the total expenditure of this Branch amounted to £433,404. The principal items were £271,501 for Harbour Works and Dredging, and £111,265 for Roads. As in the previous year, employment was rationed.

HARBOUR WORKS.

The major improvement works at Port Kembla, Coff's Harbour, and Newcastle were continued by day labour, while extensions and necessary repairs were carried out to jetties, moorings, break-waters, and training walls at those and other ports.

Dredging.

The quantity of material lifted was 3,125,614 tons, at an average cost of 10.22d. per ton. The cost in 1930-31 was 8.80d. per ton. The increase was mainly due to overhauls of plant deferred from the preceding year through shortage of funds.

Maintenance.

Maintenance of harbour and river works absorbed £24,101 3s. 6d., of which £10,126 10s. 2d. was contributed by the Unemployment Relief Council.

Swamp Drainage.

There are now in existence 26 trusts and 26 unions. No serious floods were experienced, and the works generally have been maintained in a satisfactory condition.

Coff's Harbour.

An expenditure of £28,643 8s. was added to this work. The total cost of the Eastern Breakwater now amounts to £190,028 6s. 10d.

Newcastle.

A further quantity of 5,320 cubic yards of rock was removed from the Bar. At King's Wharf 800 cubic yards of rock were broken, and the material now awaits removal. At Newcastle Ferry Wharf, 700 cubic yards were similarly dealt with. Dredging in Newcastle Harbour cost £65,464 12s. 5d. for lifting 1,793,672 tons, including submarine rock excavation.

Newcastle District Unemployment Relief Works.

River bank protection works were carried out at Horse-shoe Bend, Swiney's Point, West Maitland, at a cost of £4,690 6s. 6d.; swamp reclamation at Carrington cost £2,249 13s. 5d., and repairs to Wallis Creek flood gates, £357 1s. 9d.

Port Kembla.

A length of 75 feet was added to the Eastern Breakwater at a cost of £18,911 12s. 6d., bringing the total expenditure to £325,109 5s. Repairs to the Northern Breakwater cost £2,590 3s.

Training Walls.

An extension of the Southern Training Wall at Moruya River was commenced in January, 1932. The expenditure was £2,035 18s. 1d. for a length of 330 feet. At Wagonga River the Eastern Training Wall was extended 200 feet at a cost of £2,420 4s. 6d. The extension of the Western Training Wall is well in hand.

Roads.

The total expenditure on roads was £111,265. Of this, £29,870 was expended in the Western Division under the Federal Aid Roads Scheme, and £69,839 on Unemployment Relief Works in the Metropolitan District—the principal items of which were Bunnerong Crown Lands, Road Construction and Levelling, £26,122; and Centennial Park Levelling, £23,032.

Bridges.

No new bridges of any magnitude were undertaken. Minor bridges on Federal Aid Roads cost £7,843. Maintenance and repair of departmental bridges cost £11,546, in addition to which £9,595 was expended on behalf of the Main Roads Board.

Public Watering Places.

Five new excavated tanks in the Western Division put in hand last year were brought to completion at a total cost of £7,444, which was met from Unemployment Relief Funds. On public watering places generally the total expenditure was £10,099 for improved appliances, repairs, and maintenance.

Punts and Ferries.

The expenditure under this head amounted to £7,951.

RIVER MURRAY WATERS AGREEMENT.

Construction operations on the Hume Weir and associated works have proceeded at a reduced rate. The average number of men employed was 257, employment being rationed to three weeks out of four. The quantity of concrete placed was 17,647 cubic yards, making the total 400,492 cubic yards. Expenditure for the year amounted to £89,503, bringing the total to £3,077,122; funds being provided by the River Murray Commission.

ELECTRICAL ENGINEERING BRANCH.

An investigation was made for a hydro-electric supply for a small auxiliary scheme for construction purposes and operation of sluice gates in connection with the Hume Reservoir. Some further investigation was carried out in connection with the extension of the Burrinjuck Scheme.

At Burrinjuck repairs were effected to damages caused by flood, and the concrete foundation for the main supply pipes to No. 2 Power Station was completed, together with the two 9-foot diameter reinforced concrete pipes.

The Koorawatha-Grenfell 11 kV. Transmission Line, 25 miles in length, was constructed.

The operation of the scheme generally has been satisfactory, only minor faults having occurred. The total energy sold totalled 17,018,068 kWh., being an increase of 18½ per cent. Supply was made available to Grenfell in December, 1931, and an industrial supply for the South-west Tablelands Water Scheme in August, 1931. Negotiations for extensions to rural and township consumers have proceeded. A small nett profit on the scheme was realised. The gross revenue of the scheme increased from £78,625 9s. 2d. to £88,379 5s. 2d.

The Port Kembla Power Station showed a diminution in the amount of energy sold, the total being 7,966,602 kWh., a decrease of approximately 26 per cent. The gross receipts receded from £63,339 9s. 2d. to £53,143 5s. 1d. The operation of the system has been satisfactory from the engineering point of view, but financially the result is unsatisfactory, and the whole position is engaging the consideration of the Department.

The services of the Electrical Branch were largely requisitioned in connection with the operation of Country Towns Water Supply and Sewerage Schemes, the work comprising principally pumping plants and transmission lines. Technical assistance was also rendered to other Government Departments, including Local Government, Mines, Health, Education, Chief Secretary's, Metropolitan Meat Industry Board, Walsh Island Dockyard, and the Queensland Department of Mines.

GOVERNMENT ARCHITECT'S BRANCH.

The total expenditure by the Branch for the year under review was £157,324, of which £54,973 was provided by the Unemployment Relief Council.

A considerable proportion of the works mentioned in last year's report as being financed from Unemployment Relief Funds was brought to completion, comprising buildings for Schools, General Hospitals, and Mental Hospitals. The principal works were Canterbury Domestic Science School (£31,000), and Admission Blocks at Morisset Mental Hospital (£24,000).

The design for the new Medical School at the Sydney University was brought to completion, and contracts were subsequently let for the foundations and superstructure—the respective approximate costs being £5,000 and £93,000. Amongst the many designs prepared, a great proportion were for buildings in connection with Mental Hospitals at Gladesville, Callan Park, Milson Island, and Morisset, involving an estimated expenditure of £45,000 at Gladesville, £16,000 at Callan Park, £64,000 at Morisset, and £15,000 at Milson Island. Preliminary sketch schemes were also prepared for buildings at Wyee (Morisset), £78,000;

Morisset (£40,000); Callan Park (£11,000); and Lidcombe (£5,600). Designs for various country hospitals on behalf of the Hospitals Commission represented an estimated cost of about £130,000. Sketch schemes were prepared for Hospitals at Lismore, Mudgee, Glen Innes, and Narrabri, and preliminary sketches for a new Eastern Suburbs Hospital (£300,000), and new Base Hospital at Orange (£80,000).

The principal work brought to completion for the Education Department was the Hamilton Domestic Science School, at a cost of £30,681. Sketch plans were prepared for a new School and Architecture Department at the East Sydney Technical College, to cost about £61,000, and for new building at Cessnock High School, £22,000, as well as several other works. The total value of the building contracts let was £461,720, while the sketch proposals dealt with represented an estimated expenditure of £1,058,910.

SYDNEY HARBOUR BRIDGE.

This important structure was officially opened to traffic on Saturday, 19th March, 1932. Details of the construction work carried out during the year are given in the accompanying report by Dr. Bradfield, Chief Engineer.

The total expenditure to 30th June, 1932, amounted to £9,766,124 1s. 6d., in which is included £1,484,901 11s. 10d. for interest and exchange, and £1,325,789 8s. 2d. for cost of resumptions. When accounts are completed, the total expenditure will probably be found slightly to exceed £10,000,000, but this will be subject to reduction upon realisation of surplus resumed lands. Of the total expenditure, portion has been met by the amount collected from the rate under the Authorising Act of 1922, and which to the end of the year aggregated £1,439,952 3s. 8d., inclusive of accrued interest.

The question of the future control of the bridge received the consideration of the late Government, which decided that it should be in the hands of the State Transport Co-ordination Board, subsequently merged into the Transport Department, and legislation was passed giving effect to that decision. Under the Act the rate on the municipal and shire councils was limited to the end of 1939, which was the date it was originally anticipated the rate would expire.

The thoroughfare, including the bridge crossing, has been officially designated "Bradfield Highway." The bridge itself is officially known as "The Sydney Harbour Bridge."

ENGINEERING DESIGN BRANCH.

This branch has been busily occupied during the year mainly owing to the inception of numerous works of Unemployment Relief, comprising principally Water Supply and Sewerage Construction. Other works for which investigations were made and designs prepared were bridges, stormwater drainage, harbour works, electrical, drainage, and River Murray works. The actual construction of such works is in the hands of the respective construction branches concerned.

TESTING AND INSPECTION BRANCH.

The estimated value of the material sampled, tested and inspected, amounted to £424,191; the fees charged being £5,308.

SURVEY AND SURVEY DRAFTING BRANCH.

The bulk of the work of this branch during the year was in connection with Country Towns Water Supply and Sewerage. The new plans prepared numbered 1,876; while the helios printed numbered 22,165.

GOVERNMENT DOCKYARD, NEWCASTLE.

In conformity with the reduced volume of work obtaining, steps were taken to reduce the staff and to introduce a uniform working week of 35 hours. The number of employees decreased from 600 to 525.

GENERAL.

Every avenue of expenditure under the Department, including Staff, has been closely and constantly scrutinised with a view to effecting economies wherever possible, and the staff of the Department has loyally assisted in this while carrying on the work of the Department with the greatest efficiency.

G. W. MITCHELL,
Director.

Accountant's Report.

For the Year ended 30th June, 1932.

The staff of the Department, and the annual salary charges as at the 30th June, 1932, and the comparison of these with the similar particulars of the previous year will be found in the following :—

Year.	Permanent Officers.		Temporary Officers.		Total.	
	No.	Salary.	No.	Salary.	No.	Salary.
1931-32—		£		£		£
General Staff	361	133,241	281	79,724	642	212,965
Dredge Service Staff.....	114	30,781	118	28,074	232	58,855
1931-32 totals	475	164,022	399	107,798	874	271,820
1930-31—						
General Staff	378	153,938	295	88,917	673	242,855
Dredge Service Staff.....	123	37,791	123	33,016	246	70,807
1930-31 totals	501	191,729	418	121,933	919	313,662

NOTE.—The foregoing does not include Industrial Undertakings and Government Dockyard staffs.

Following are particulars of the expenditure and receipts of the Department for the year ended 30th June, 1932 :—

1. Consolidated Revenue Fund—

	Expenditure.		Receipts.	
	£	s. d.	£	s. d.
(a) Salaries and payments in the nature of salaries	120,763	15 4		
(b) Maintenance and working expenses, other than salaries	18,579	0 5		
(c) Maintenance of Public Works and Services, etc. —	£	s. d.		
Roads.....	4,525	8 2		
Bridges.....	9,459	12 6		
Punts, ferries and flood-boats	7,950	15 9		
Public watering-places	5,816	8 2		
Harbours and rivers	13,970	6 4		
Dredge service	136,967	7 3		
Public buildings	40,697	19 10		
Water supply, sewerage, and stormwater drainage	2,967	3 7		
State power supply.....	310	7 9		
State telephones.....	27,372	12 6		
Electricity and gas.....	45,700	15 9		
Miscellaneous	44,449	10 8		
	340,098	8 3		
	479,441	4 0		

2. General Loans—

Bridges.....	1,363,840	2 10		
Harbours and rivers	52,776	7 4		
Water supply works	190,893	17 6		
Sewerage and stormwater drainage works.....	326,842	15 0		
Public buildings	16,634	0 0		
Electrical works.....	23,012	16 2		
Public watering-places	1,079	9 2		
River Murray Commission—				
State contribution to their funds—Purchase of plant, etc.	111,289	13 7		
Sales, &c., of No. 1 Plant.....			4,939	6 0
Plant depreciation charge			9,196	0 5
Miscellaneous			4,240	11 5
	2,080,369	1 7	18,375	17 10

ACCOUNTANT'S REPORT for the Year ended the 30th June, 1932.

3. Special Deposits Account.	Balance at 1st July, 1931.	Receipts.	Total.	Expenditure.	Balance at 30th June, 1932.
Name of Account.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Public Works Store Advance Account	105,073 7 10	56,284 14 4	161,358 2 2	48,747 1 9	112,611 0 5
Sydney Harbour Bridge—Municipal and Shire Rates Account	323,469 17 9	2 10 8	323,472 8 5	268,597 1 8	54,875 6 9
June Water Supply Administration Account...	1,522 0 4	13,816 11 4	15,338 11 8	13,899 14 3	1,438 17 5
June Water Supply—Renewal Account	45 11 8	1 7 7	46 19 3	.....	46 19 3
Broken Hill Water Supply Administration Account	36,603 17 2	45,566 17 10	82,170 15 0	49,321 11 0	32,849 4 0
Medlow Bath Township Water Supply	51 10 11	277 7 8	328 18 7	312 8 6	16 10 1
Bethunga Water Supply	527 6 2	280 7 5	807 13 7	.....	807 13 7
South West Tablelands Water Supply .....	.....	2,773 3 0	2,773 3 0	2,220 0 8	553 2 4
Public Works Department Working Account ...	8,557 15 8	20,437 1 5	28,994 17 1	22,383 15 11	6,611 1 2
Public Works Department—Suspense Account— General	457 7 0	1 8 11	458 16 5	294 5 9	164 10 8
Main Roads Board	54,155 15 5	1,649 8 11	55,805 4 4	47,969 16 9	7,835 7 7
Lands Department .....	.....	.....	.....	.....	.....
Burrinjuck Hydro-Electric Undertaking	3,951 4 2	88,379 5 2	92,330 9 5	86,356 0 4	5,974 9 1
Port Kembla Electricity Undertaking	2,732 6 2	53,143 5 1	55,875 11 3	52,500 18 11	3,374 12 4
Coal Loading and Shipping at Port Kembla ...	13,792 1 7	14,117 16 9	27,909 18 4	17,661 8 9	10,248 9 7
Leichhardt Depot Working Account	3,155 19 7	16,568 4 10	19,724 4 5	18,433 14 4	1,290 10 1
Testing Branch Working Account	513 15 1	8,780 4 0	9,293 19 1	8,645 3 9	648 15 4
Lighting and Heating all Departments	355 6 10	4,439 17 4	4,795 4 2	4,795 5 5	1 18 9
Unclaimed Salaries and Wages	1,123 0 2	594 18 10	1,717 19 0	1,556 16 7	161 2 5
Unclaimed Moneys	80 13 0	154 9 6	235 2 6	112 17 6	122 5 6
Security Deposit Account	3,620 14 11	7,379 13 10	11,000 8 9	9,099 10 1	1,900 18 8
State Sawmills	7,651 11 10	1,167 19 3	8,819 11 1	23 3 10	8,796 7 3
State Timber Yards	1,884 7 1	120 2 9	2,004 10 2	0 18 9	2,003 11 5
State Brickworks, Botany.....	.....	228 3 2	228 3 2	1 16 10	226 6 4
Advances to Officers to purchase Motor Cars.....	.....	33 6 8	33 6 8	.....	33 6 8
Middle Harbour-The Spit Bridge Surplus Tolls Account	0 13 8	.....	0 13 9	0 13 9	.....
Commonwealth Government Unemployment Relief Account	1,999 11 5	7 1 9	2,006 13 2	1,720 4 1	286 9 1
Unemployment Relief	550,168 10 4	.....	550,168 16 4	402,338 17 3	147,829 13 1
	£ 1,121,494 6 9	236,205 8 0	1,457,699 14 9	1,056,991 6 5	400,708 8 4

4. Operations on other Departments' Loan, Revenue, Special Purposes, and Special Deposit Accounts to meet Expenditure on Works carried out for them—

	Expenditure. £ s. d.	Receipts. £ s. d.
Loan votes .....	.....	3,028 13 11
Consolidated Revenue Votes— Treasurer's Advance Account	6,436 13 8	.....
Special Deposits Accounts	1,842 2 8	37 19 2
	£8,278 16 4	£3,065 13 1

5. Payments made by other Departments for Works and Services carried out by this Department—

Department.	Expenditure. £ s. d.	Receipts. £ s. d.
Agriculture	106 14 0	.....
* Education	461 2 4	.....
Health.....	178 0 3	.....
Hospitals Commission	14,001 5 6	.....
Henry Lawson Memorial Committee	389 12 6	.....
Labour and Industry	116 18 6	.....
Lands	413 0 0	.....
Main Roads Board	3,820 7 8	.....
National Art Gallery	394 18 0	.....
Orange District Ambulance.....	2,500 10 10	.....
State Lottery Office	2,308 5 7	.....
Sydney University.....	9,874 5 3	.....
Taxation Department	549 6 9	.....
Resumed Properties	601 16 0	.....
Sydney Hospital.....	205 17 11	.....
Water Conservation and Irrigation Commission	235 0 4	.....
Miscellaneous	1,466 5 3	.....
River Murray Commission	133,576 1 0	44,072 15 0
	£171,199 7 8	£44,072 15 0

6. Revenue received and paid into Consolidated Revenue—

	£ s. d.
Repayments made to Previous Year's Consolidated Revenue Votes	6,318 8 11
Rents, exclusive of Land	8,106 3 5
Miscellaneous services rendered	8,409 19 2
Unclassified receipts	294,946 12 4
Exchange on remittances	89,567 12 6
Fees	5 3 0
	£407,353 19 4

* In addition, work to the value of £41,623 12s. 4d. has been carried out in districts outside the metropolitan area for the Department of Education. This expenditure, although the work is directed and supervised by the Departmental Officers, does not go through Head Office Books.

JAMES ROBERTSON,

Accountant.

9th September, 1932.

The Director.

Water Supply and Sewerage Branch.

1. WATER SUPPLY AND SEWERAGE GENERALLY.

At the end of the year public water supplies constructed at a capital cost of £4,183,923 were in operation in 87 towns, 14 towns being now sewered, while stormwater channels have been constructed in 16 towns.

The total capital cost of sewerage schemes and stormwater channels amounts to £1,210,569.

The cities and towns in the Metropolitan and Hunter River districts are not included in these figures.

Although the months of August, September, and October, 1931, and January, 1932, were below the average, generally speaking, the rainfall for the year 1931-32 was well above the average, and no shortages were reported from the existing Country Towns Water Supplies on this account.

Several large water supply works were completed during the year, principal among these being complete schemes for the towns of Werris Creek, Tenterfield, and Grenfell.

Complete schemes of sewerage are still in progress for Parkes and Mudgee.

Works of Water Supply were brought to completion in 11 towns, and at 30th June, 1932, similar works were in progress in 4 towns.

Investigations of new schemes of water supply were carried out in three areas, and for the augmentation of existing supplies in four towns.

Work was brought to a completion on four stormwater channels in the Metropolitan Area, while one was in course of construction at the end of the period.

2. WATER SUPPLIES ADMINISTERED BY THE DEPARTMENT.

For the two supplies administered by the Department the corresponding period is the twelve months ending 31st December in each year.

(a) BROKEN HILL WATER SUPPLY.

The total quantities of water pumped from the two storage reservoirs were :—

	Gallons.
Umberumberka	271,748,000
Stephens Creek	152,372,500
Total	424,120,500

The average cost of pumping was approximately :—

Umberumberka	4.49d. per 1,000 gallons.
Stephens Creek	7.59d. per 1,000 gallons.

The average for the two was about 5.602d. per 1,000 gallons.

(b) JUNEJEE WATER SUPPLY.

Pumped at Tenandra.	Cost per 1,000 gallons to Railway Commis- sioners and Junej Council.	Supply from Bethungra to Railway Commissioners.	
		Gallons.	Cost per 1,000 gals.
97,548,778	3/9	—	—

3. EXPENDITURE FOR YEAR.

	£	s.	d.
Water Supply Works	356,024	18	9
Sewerage Works and Stormwater Channels	490,855	10	4
Total	846,880	9	1

4. LEGISLATION.

No legislation affecting the works of the branch was passed during the year.

5. STAFF ADMINISTRATION.

M ssrs. T. McDonnough and W. L. Cooke, Location Engineers, who reached the age limit for Departmental Officers, entered upon leave prior to retirement after long and meritorious service.

HERBERT FLEMING,

Chief Engineer, Water Supply and Sewerage.

30th September, 1932.

Annual Report to 30th June, 1932.

B. DETAIL REPORT.

(I) WATER SUPPLY.

(a) Country Towns Water Supply.

1. Works completed.
2. Works under construction.
3. Works proposed and investigations.

(II) SEWERAGE.

(a) Newcastle Sewerage and Stormwater Channels.

(b) Country Towns Sewerage and Stormwater Channels.

1. Works completed.
2. Works under construction.

(III) WATER SUPPLY AND SEWERAGE.

Treatment and purification and general investigation.

(IV) METROPOLITAN STORMWATER CHANNELS.

(a) Country Towns Water Supply.

1. WORKS COMPLETED (LOAN VOTE).

Broken Hill.—An electrically-driven pumping plant with a capacity of 96,000 gals. per hour has been installed in the Stephen's Creek Pumping Station, at a cost of £1,595.

Brewarrina.—A new 10 h.p. oil engine was installed by the council. The technical details in connection with the supply were attended to by the Department.

Casino.—An additional electrically-operated pumping plant, consisting of a borehole type pump with a capacity of 24,000 gals. per hour, has been installed in existing well, at a cost of £4,042 to 30th June, 1932.

Grenfell.—This scheme, which consists of an earth dam with concrete core, on Bogolong Creek, a pump station, rising main, service reservoir, and reticulation, has been completed by day labour.

The pumping machinery comprises electrically driven pumps in two units, with capacities of 10,000 and 20,000 gals. per hour, and is operated with current from the Burrenjack System.

The total cost of work amounts to £71,554 to 30th June, 1932.

Katoomba.—An additional pumping plant, consisting of an electrically-operated pump with a capacity of 60,000 gals. per hour and a transformer substation, have been installed at a cost of £2,575.

Moama.—An electrically operated pumping plant of 10,000 gals. per hour capacity, also an additional 6-inch rising main, has been installed, at a cost of £613 to 30th June, 1932.

Morisset Mental Hospital.—The contract for the building of the new spillway was completed, and the earth embankment has been enlarged by the hospital staff. Total cost has been £3,695 16s. 1d. to 30th June, 1932.

Peak Hill.—Original three-throw pump was replaced by a multi-stage centrifugal pump of 6,000 gals. per hour capacity, belt driven by existing motor. The arrangements for purchase were made by the council, and the technical details attended to by the Department.

South-west Tablelands.—The various units on the first section of the scheme, viz., as far as Cootamundra, were completed during the year, and individually tested. This section comprises the pumping station at Jugiong, with low and high lift pumps in duplicate, filtration plant, 22-inch rising main, No. 2 pumping station, 5 miles distant from the Jugiong Pumping Station, a further section of 5 miles of 22-inch rising main, two service reservoirs at Cowang Gap, 16-inch steel gravitation main to a new service reservoir at Cootamundra, together with transmission lines, automatic controls, etc. The tests on the mains proved very satisfactory, and although the pumping plants have not to date been finally accepted, they have been put into operation under the maintenance section of the contract, and water is now being supplied for the use of the Railway Department at Cootamundra. Owing to the delay in the finalisation of the proposed agreement with the Council water has not yet been supplied for domestic purposes to Cootamundra.

The cost to 30th June has been £285,376.

Tamworth.—The town supply has been augmented by the deepening of the old well at a cost of £272 to 30th June, 1932.

Tenterfield.—An electrically-driven pumping unit with a capacity of 20,000 gals. per hour was installed in pumphouse, and a second unit with a capacity of 15,000 gals. per hour was transferred from Hay Water Supply, the total cost of the two units being £961 5s. 2d.

Wagga.—A pumping plant, consisting of one unit of 10,000 gals. per hour, electrically driven was installed to supply the high-level area, at a cost of £129 9s. 2d. to 30th June, 1932.

Werris Creek.—A complete sewerage scheme to serve the town and also to supply railway requirements was completed.

It consists in a curved concrete dam on Quipolly Creek, having a capacity of 150,000,000 gals., a 12-inch cast-iron gravitation main, a concrete service reservoir with a capacity of 1,000,000 gals., a service main and reticulation.

The total cost of the scheme was £111,231 3s. 4d. to 30th June, 1932.

Unemployment Relief Works.

Bourke.—This work, which consists in a new 9-inch rising main, the electrification of the old steam pumping plant, with one low-lift pump and one high-lift pump each with a capacity of 20,000 gals. per hour, and the installation of a generating set was completed at a cost of £6,564 to 30th June, 1932.

Glen Innes.—The erection of a curved concrete storage reservoir with a capacity of 55,000,000 gals. just upstream of the existing pumping station on the Beardy River, to augment the present supply to the town, was completed at a cost of £11,341 to 30th June, 1932, partly with loan money and partly as an Unemployment Relief Work.

Goulburn.—A new pump, with a capacity of 30,000 gals. per hour, was installed to pump from the service reservoir to the high-level service reservoir, and a booster pump was installed with a capacity of 150,000 gals. per hour to increase the pressure in the main.

Mudgee.—A concrete service reservoir, with a capacity of 500,000 gals., an additional pump well and drive, also a pumphouse and electrically-driven pumping machinery of a borehole type, with a capacity of 10,000 gals. per hour, were completed during the year at a cost of £14,565 to 30th June, 1932, partly with loan money and partly as an Unemployment Relief Work.

With the exception of the pumping machinery, which was obtained under contract, the whole of this work was carried out by day labour.

Nyngan.—The new earth dam, which had been breached by flood waters in December, 1930, was repaired, the design being amended by strengthening the bank with timber sheathing and a rubble apron. This work was completed during the year at a cost of £8,941 to 30th June, 1932.

Orange.—The 15-inch wood-stave pipe, leading from the 15-inch cast-iron service main connected to the new service reservoir and proceeding as far as Summer-street, which is to augment the supply to the town, was completed, including a small re-arrangement of reticulation arrangements at Endsleigh-street. Repairs to spillway at Spring Creek Reservoir were also carried out. The total cost of these works was £9,778.

2. WORKS UNDER CONSTRUCTION (LOAN VOTE).

Lismore.—A new high-level service reservoir, with a capacity of 1,000,000 gals., is being constructed by the State Pipe Works by day labour.

South-west Tablelands.—The laying and jointing of a 15-inch steel pipe-line from Cowang to Harden, which is being carried out by day labour, is approaching completion. The length of this main is approximately 15 miles.

A concrete service reservoir has been put in hand at Harden.

Unemployment Relief Works.

Bathurst.—A concrete dam on Winburndale Creek, and a 12 inch woodstave pipe gravitation main from the dam to Bathurst which were commenced in the previous year are still in course of construction.

Culcairn.—A complete scheme for the town, which was commenced in the previous year, is approaching completion.

This consists of a pump station and a pumping plant in duplicate with electrically-driven pumps of a capacity of 2,400 and 3,000 gals. per hour respectively, a combined rising and service main and reticulation, and a reinforced concrete water tower with an available storage of 50,000 gals.

The scheme has been completed with the exception of the pump station and the installation of the pumps.

Goulburn.—A new pumping plant, with a capacity of 150,000 gals. per hour, is being installed in the existing pump-well, also a new 15-inch rising main leading from this pump to the service reservoir.

Nyngan.—Reconditioning of pumping plant was put in hand. Additions to generating plant, part cost chargeable to water supply, for the purpose of improving the power supply for pumping, are being carried out by the Council.

The council has in hand, under the supervision of this Department, the deepening of the storage reservoir at the new dam on the Bogan River.

3. WORKS PROPOSED AND INVESTIGATIONS.

During the past year the following investigations for town water supply proposals have been carried out, viz., Bombala, Burradoo, and Narrabri West.

Proposals for water supply augmentation were carried out for towns of Parkes, Katoomba, Nowra, and Bomaderry, and for a water supply for proposed swimming baths at Young.

A proposal was also investigated for the protection of Singleton Water Supply Pump Station against river bank erosion.

Surveys were carried out in connection with the amplification of Bathurst water supply for a storage reservoir on Winburndale Creek, together with access road to same, and a pipe-line from this reservoir to Bathurst; also for a storage reservoir on Billabong Creek for Parkes Water Supply; for a storage reservoir on Cascade Creek for Katoomba water supply augmentation; and for a storage reservoir for Kiama water supply augmentation.

Newcastle and Hunter River District Sewerage and Stormwater Channels.

(a) NEWCASTLE SEWERAGE AMPLIFICATION.

Main Intercepting Sewer and Gravitation Sewer.

Surveys for the acquisition of land for sewer shafts and the reservation of protective barriers and pillars in the coal measures, passed through by the sewer in the Merewether Estate, have been carried out during the year.

Deep Sinking.—The whole of the tunnelling is completed between No. 10 shaft and the pumping station, and 4,096 cubic yards of rock have been excavated during the period. The concreting of the gravitation sewer is complete, except the part of the tunnel between No. 4 shaft and the pumping station and the part at the junction of the old sewer and the new one at Merewether Beach. 3,637 cubic yards of concrete have been placed in tunnel during period, and 832 cubic yards of concrete in shafts.

Shallow Sinking.—The concreting of the tunnel between Lockyer-street and Newtown-road is completed and all manholes have been constructed. 207 cubic yards of concrete have been placed in the tunnels, and 539 cubic yards in the manhole shafts.

Open Cut.—This work has been completed to Carrington-street, and all pipes have been laid and manholes constructed. 4,056 cubic yards in O.T.R. have been excavated for the period, making a total of 16,363 cubic yards. 679 cubic yards of concrete have been placed, making a total of 1,044 cubic yards. 2,595 lineal feet of pipes have been laid, making a total of 4,123 lineal feet.

Pumping Station.—The pumping station (shaft No. 5) in Murdering Gully is under construction. 954 cubic yards of O.T.R. have been excavated, and 1,864 cubic yards of rock. 257 cubic yards of concrete have been placed.

Total cost for the year, £88,795. Total cost to date, £459,100.

Carrington Sewerage.

A revision of the detail survey has been completed. Land has been acquired for four (4) pumping stations, and provision has been made for overflow from pump-wells.

Gravitation Main.—Concrete pipes have been laid from the junction of the gravitation main with the main intercepting sewer in Carrington-street to the railway end of Mounter-street. 2,150 cubic yards of O.T.R. and 50 cubic yards of rock have been excavated. 1,840 lineal feet of pipes have been laid and 42 cubic yards of concrete placed.

Reticulation.—The reticulation in the zones around pumping stations Nos. 1, 2, and 3 has been completed, and, in the fourth zone about half completed. 11,237 cubic yards of O.T.R. have been excavated, 469 cubic yards of concrete placed, and 14,442 lineal feet of monier pipes laid. This work has all been done under great difficulties in running water, and this applies also to the pump-wells. In one place H₂S gas was so intense as to cause discomfort to the workers.

Pumping Stations.—No. 1 well has been sunk to its finished depth, and the bottom is nearly finished.

No. 2 well and No. 3 well are in course of construction, and No. 4 well has been sunk to the required depth and the bottom partly placed. 715 cubic yards of O.T.R. have been excavated, and 197 cubic yards of concrete placed.

Total cost to 30th June, 1932, £32,138.

Cessnock Sewerage.

Reticulation.—To date, 158,488 feet of 6-inch E.W. pipes, 22,609 feet of 9-inch, 13,724 feet of 12-inch, 4,054 feet of 15-inch, 5,627 feet of 18-inch E.W. and concrete pipes, 5,079 feet of 21-inch concrete pipes, and 2,898 feet of 30-inch concrete pipes have been laid. Sixteen miles 4,722 feet of sewer have been laid for the period, making a total of 40 miles 1,279 feet to date. 904 manholes have been constructed, and 47 vent shafts erected.

Gravitation Main.—3,493 feet of 12-inch diameter cast-iron pipes have been laid on the rising main, leaving 30 lineal feet still to be laid to complete.

Pumping Station.—The well and building have been completed and the pumps installed.

Treatment Works.—The sedimentation, digestion, humus and chlorination tanks, filter beds, and sludge drying beds are all nearing completion. 4,703 cubic yards of soil and 1,775 cubic yards of rock have been excavated. 2,100 cubic yards of concrete have been placed, and 3,600 cubic yards of filtering medium have been placed in the filter beds.

Total cost to 30th June, 1932, £211,613.

Morriset Mental Hospital Sewerage.

A contract has been let to the Building Construction Branch for the construction of main sewer, ejector station and sewage treatment works, and the work is now in hand.

Stockton Sewerage.

A complete revised scheme has been designed and set out, including sites for three (3) pumping stations and rising mains to North Stockton.

Wallsend and Jesmond Sewerage.

Additional survey information was obtained to permit of preparation of a preliminary estimate of cost of a scheme, with local treatment and disposal, for the information of the Hunter District Water Supply and Sewerage Board. The cost of a separate scheme for Jesmond was investigated with the assistance of plans from previous surveys.

Maitland Sewerage.

The amended design for the sewerage of West and East Maitland, with shallower trenches than in previous designs, was prepared and submitted to the Hunter District Water Supply and Sewerage Board with an estimate of cost.

Kurri Kurri and Weston Sewerage.

Preliminary survey, with a complete system of contour and bench marks, was carried out and sewerage plan designed to permit of compilation of estimate.

*(a) NEWCASTLE STORMWATER DRAINAGE.**Cottage Creek Stormwater Drainage System.*

Although the constructed channels, with acquired lands, have been transferred to the Hunter District Water Supply and Sewerage Board, there are several land matters which are still the subject of negotiations.

Throsby Creek Stormwater Drainage System.

Land acquisition surveys have been continued along the routes of completed and prospective channels, including Main Channel, Orchardtown, Adamstown, Lambton, Griffiths Flat, Hamilton, Mayfield, Wickham Park and other branches.

Main Channel.—1,970 feet of embankment to R.L. 9.00 have been formed and pitched with stone on the left bank of the creek, between Lewis-street and Hannell-street bridges, excepting a stretch facing private lands. The channel has been dredged for 1,000 feet and 33,400 cubic yards of dredged material have been deposited on Crown lands on the right bank for reclamation purposes.

Total cost for year, £7,879.

Adamstown Branch.

Murray-street Sub-branch.—Completed to Murray-street. During the period, 160 cubic yards of soil were excavated and 630 lineal feet of pipes laid, together with gratings.

Total cost to 30th June, 1932, of branch and sub-branch, £7,695.

New Lambton Branch.—Completed from the main channel to Evescourt-road. During the period, 2,775 cubic yards of soil were excavated and 587 cubic yards of concrete placed.

Total cost to 30th June, 1932, £7,533.

Hamilton Branch.

Completed from the main channel to Belford-street, and also from Awaba-road to Victoria-street. The intervening part is being constructed. Up-stream from Victoria-street the channel is also in the course of construction. Structures to carry traffic have been placed on Melville-road, Mandalong-road, and Popran-road. During the period, 4,093 cubic yards of soil were excavated in trench and 10,422 in open cut. 2,101 cubic yards of concrete were placed.

Glebe-road Sub-branch.—Completed from Melville-road to Mandalong-road, and in course of construction from Chatham-road, up-stream. 4,665 cubic yards of soil have been excavated, and 259 cubic yards of concrete placed.

Total cost of branch and sub-branch to 30th June, 1932, £54,077.

Victoria-street Branch.

Completed. During the period, 3,514 cubic yards of soil have been excavated, and 2,176 lineal feet of pipes laid.

Total cost to 30th June, 1932, £6,896.

Lambton Branch.

Completed from the main channel to Lambton Park. Structures to carry traffic over the channel were placed at Tocal and Durham roads. 11,372 cubic yards of soil were excavated, and 3,210 cubic yards of concrete placed.

Tyrone-road Sub-branch.—A start has been made on the construction of this branch.

Total cost to 30th June, 1932, of branch and sub-branch, £22,450.

Mackie-avenue Branch.

Completed from the main channel to King's-road, and pipes are being laid up-stream of this road. 2,536 cubic yards of soil have been excavated, and 1,898 lineal feet of pipes laid.

Total cost to 30th June, 1932, £4,325.

Henley-street Branch.

Completed. Structures to carry traffic were placed at Knight-street, Birdwood-street, and Orchardtown-road. 360 cubic yards of soil were excavated, and 420 cubic yards of concrete placed.

Total cost to 30th June, 1932, £2,312.

Mayfield Branch.

Denison-street Sub-branch.—Completed from the junction with Mayfield Branch, at Valencia-street to Hanbury-street. 2,892 cubic yards of soil have been excavated, and 834 cubic yards of concrete placed.

Total cost of Mayfield Branch to 30th June, 1932, £18,219.

Myer Park Filling.

During the period, 4,500 cubic yards of soil have been filled in, making a total of 11,935 cubic yards to date.

Wallsend-Plattsburg Stormwater Drain.

Main Channel.—The work was carried out under Unemployment Relief Grants. The construction of this channel is carried on down-stream of Boscawen-street, to about 50 feet below the footbridge, and for 600 feet up-stream of the Co-operative Railway to the Co-operative Railway Bridge, leaving an intervening space of 436 feet that has been partly excavated only. 2,713 cubic yards of soil have been excavated, and 876 cubic yards of concrete placed.

Irvine-street Branch.—This branch has been partly reconstructed, the channel being widened and deepened in places and relined with concrete.

Total cost of main channel and branch to 30th June, 1932, is £12,143.

Cardiff Stormwater Drain.

Constructed from Unemployment Relief Grants. This channel has been completed from the railway, up-stream, for 1,188 feet. Two wooden foot-bridges and one wooden traffic bridge were constructed over the channel. 8,330 cubic yards of soil were excavated, and 895 cubic yards of concrete placed.

Total cost to 30th June, 1932, £8,544.

Greta Stormwater Drain.

Constructed from Unemployment Relief Funds. This work was completed. 1,066 cubic yards of soil were excavated, and 355 cubic yards of concrete placed.

Total cost to 30th June, 1932, £3,056.

Cessnock Stormwater Drainage.

Preliminary survey and design, with estimates, were prepared and submitted to the Hunter District Water Supply and Sewerage Board.

(b) COUNTRY TOWNS SEWERAGE AND STORMWATER CHANNELS.

1. WORKS COMPLETED.

Bathurst.—A low level sewerage system including reticulation sewers, pumping station with machinery, rising main and addition to treatment works was carried out at a cost of £41,822 7s. 6d. to 30th June, 1932.

Goulburn.—The reticulation extensions to Garfield were completed as an Unemployment Relief Work by day labour at a cost of £6,159 15s. 4d. to 30th June, 1932, and the old septic tank system of treatment was converted with Loan money to one of sedimentation with separate sludge digestion and a Patterson chlorination plant was installed.

Lismore.—Two additional pumping stations and reticulation sewers for the North and South Lismore Sewerage and Treatment Works to deal with the whole of the sewage of Lismore were completed under contract by the State Monier Pipe Works at a cost of £93,349 18s. 4d. to 30th June, 1932.

2. WORKS UNDER CONSTRUCTION.

Bathurst.—Small extensions to the reticulation and additions to pump station are in progress.

Lismore.—A third pump station is being constructed to deal with the sewerage from the town and reticulation extensions are being carried out in the Avro Avondale Area. Both of these works are being constructed under contract by the State Monier Pipe Works.

Mudgee.—A complete scheme for the town including reticulation, pump station, rising main and treatment works is in course of construction by day labour.

Parkes.—A scheme for the town including reticulation, gravitation main and treatment works is approaching completion and is being carried out by day labour.

3. WATER SUPPLY AND SEWERAGE.

Treatment, Purification and General Investigation.

Water Supply.—The construction of the filtration plant at Tenterfield was completed and the plant put into operation and tested, very satisfactory results being obtained. The concrete work was carried out by the State Monier Pipe and Reinforced Concrete Works.

At Broken Hill the remodelling of the Mica-street filtration plant is being carried out under the supervision of the District Engineer, a circular concrete sedimentation tank being constructed as an addition to the existing work.

Preliminary tests on the filtration plant at Jugiong were carried out and full time tests on the Cargelligo filtration installation, satisfactory results being obtained in each case.

Designs and specification were prepared for a filtration plant at Dungog, and similar work in connection with a proposed filtration plant for Forbes is nearing completion.

Investigations have been made and reports furnished in connection with filtration plant proposals for the towns of Armidale, Casino, Kiama, Lismore, Muswellbrook, and Werris Creek.

Inspections of the catchment areas of the proposed water supply schemes for Gloucester, Grenfell, Kiama, and Tumbarumba were made in conjunction with officers of the Health Department, and reports furnished on the quality and treatment of the water and the areas to be declared catchment districts.

At the request of the Mullumbimby Council an investigation was made and a report furnished in regard to the proposed raising of the storage dam for hydro-electric purposes.

Regular inspections have been made of the water treatment plants at Bowral, Glen Innes, Orange, Singleton, Tenterfield, and Wellington and samples taken for bacteriological and chemical analysis.

Sewerage.—Investigations were made and reports and preliminary estimates furnished for sewerage schemes for the towns of Casino and Leeton.

A general design was completed for the proposed treatment works at Katoomba, working drawings now being in course of preparation by the Design Branch.

Preliminary designs and estimate for the Sewage Treatment Works Augmentation have been submitted to the Orange Council.

Treatment works at Cessnock, Lismore Morisset Mental Hospital, Mudgee and Parkes are being constructed and are nearing completion.

Construction of treatment works at Forbes is completed and house connections are being carried out.

Alterations and additions to the Goulburn treatment works have been completed and the chlorination plant installed, tested and set to work.

A scheme of irrigation of the land treatment area at Dubbo by means of graded channels was prepared, construction being carried out by the District Engineer, Dubbo. A similar scheme is in progress at Lithgow under the supervision of the District Engineer, Bathurst.

Plans and specification for a fine screening plant for Newcastle Sewerage were prepared and tenders are being invited.

Designs and estimates have been made for sewage installations in connection with the following hospitals and public buildings :—

Morisset Mental Hospital; Erina Shire Memorial Hospital, Gosford; Yass District Hospital; Manning River District Hospital, Taree; Glen Innes Hospital; Prince Alfred Memorial Hospital, Tenterfield.

Reports and advice *re* methods of operation, etc., were also given with regard to existing or proposed sewerage installations at the following :—

Stockton Mental Hospital; Taree Police Quarters; and Waterfall Sanatorium.

In the latter case the septic tanks were cleaned.

The sewage treatment works at Albury, Bathurst, Dubbo, Forbes, Goulburn, Hay, Katoomba, Lithgow, Narrandera, Orange, Tamworth, and Wagga have been visited regularly by the Departmental Inspector, the effluents tested and samples forwarded for analysis to the Health Department and advice tendered the Councils generally, *re* the management of the plants.

4. METROPOLITAN STORMWATER CHANNELS.

Unemployment Relief Works.

During the year the following stormwater channels were completed :—

Powell's Creek.—Open channel concrete inverts and concrete or brick walls draining portions of the Municipalities of Concord, Homebush, and Strathfield.

Strathfield Creek.—Open channel concrete inverts with brick walls draining portions of Municipalities of Homebush and Strathfield.

Lidcombe Stormwater Drainage.—

(a) Church-street Branch—Precast concrete pipes.

(b) Arthur-street Branch—Open channel in concrete.

Both these channels drain a large portion of the Municipality of Lidcombe.

Salt Pan Creek.—Salvia-street Branch—This is partly open concrete channel and partly precast concrete pipes and drains portion of the Municipality of Bankstown.

At the end of the year the following stormwater channel was still in course of construction :—

Saleyards Creek Stormwater Drain.—An open channel with concrete invert and brick walls draining portion of Municipalities of Homebush and Strathfield.

The total expenditure on the above stormwater channels for the twelve months amounted to £30,334 10s. 6d.

Harbours, Roads, and Bridges Branch.

Annual Report, 1931-32.

TOTAL EXPENDITURE.

The total expenditure on construction and maintenance of harbour works, dredging, roads, bridges, ferries, public watering places, etc., amounted to £433,404 (including £85,694 from Unemployment Relief Funds), as detailed hereunder:—

	£
Harbour works (including dredging)	271,501
Roads	111,265
Bridges	32,546
Punts and ferries	7,993
Public watering-places	10,099
	<hr/>
	£433,404

LOCAL GOVERNMENT INQUIRIES.

Local Government inquiries totalling ten were conducted by officers of the Branch for the Department of Local Government, including seven applications from Councils for special loans totalling £273,100.

INSPECTIONS FOR WATER RIGHTS.

Inspections in connection with water right applications and the supervision of shallow bores in the Western Division were again carried out on behalf of the Water Conservation and Irrigation Commission.

SERVICES ON BEHALF OF OTHER DEPARTMENTS.

During the period under review, the Chief Engineer for Local Government reported upon applications of Shire and Municipal Councils for unemployment relief grants.

Allocations for works were made to Shire and Municipal Councils throughout the State, practically all Councils participating.

District Engineers under the control of the Branch supervised road work on behalf of the Lands Department and various Park Trusts.

In addition to general maintenance of jetty appurtenances, the raising of a sunken drogher at Bullahdelah was undertaken on behalf of the Navigation Department.

Moorings at the Powder Magazines, Fullerton Cove, were renewed on behalf of the Explosives Department.

HARBOUR WORKS.

The major improvements works at Port Kembla, Coff's Harbour, and Newcastle were continued by day labour.

Particulars of these works are detailed later.

During the year the following larger repairs and extensions were carried out:—

Byron Bay	Repairs and maintenance of jetty and moorings.
Richmond River	Repairs to southern breakwater and Riley's Hill Dock Wharf.
Woolgoolga Jetty	Maintenance and repairs to jetty and moorings.
Coff's Harbour Jetty	Maintenance and repairs to jetty and moorings.
Hunter River	Repairs to flood bank at Horseshoe Bend, West Maitland, and repairs to Wallis Creek flood gates.
Newcastle Harbour	Southern breakwater repairs and construction of road and rail access to No. 3 Shed, Lee Wharf.
Port Kembla	Placing ironbark chafing pieces on fenders No. 4 Jetty.
Moruya	Extension of southern training wall.
Narooma	Extension and repairs to eastern training wall and extension of western training wall.

Owing to the limited funds available rationing was continued on all day labour works during the year under review in order to distribute employment as far as possible.

DREDGING.

Of the new dredging plant under construction at the end of the year 1930-31 the following was completed:—

Conversion of Dredge "Tempe" to all-electric.

Owing to limited funds available this dredge was not placed in commission following its conversion.

The new steel single-screw ladder dredge "Pluto" was still under construction at the end of the year.

The quantity of material lifted during the year totalled 3,125,614 tons, at a cost of 10.22 pence per ton compared with 8.80 pence per ton for the preceding year. Increased cost has been mainly due to the necessity for carrying out essential overhauls held over from the preceding year.

RIVER ENTRANCES.

During the year the majority of the river entrances were visited by bar dredges, and were maintained at a fairly satisfactory depth in view of the time dredges were available at each port.

Particulars of depths of bars and crossings at the various river entrances are detailed in Statement "D."

GENERAL MAINTENANCE.

The expenditure (excluding dredging and major construction works separately referred to) on the maintenance of the various harbour and river works amounted to £24,101 3s. 6d., which covers £10,126 10s. 2d. from Unemployment Relief Funds and £13,974 13s. 4d. from Revenue Vote.

DOCKS.

The transactions of the docks at the Tweed, Richmond and Clarence Rivers are detailed in Statement "E."

HYDROGRAPHIC SURVEYS.

Re-surveys of the Tweed, Clarence, Nambucca (part), Hunter (North Arm), Cook's (part), and Wagonga Rivers, and Coff's Harbour, Port Kembla, Botany Bay, and Bateman's Bay, were carried out during the year. Dredging surveys were also carried out in the various coastal districts.

INLAND RIVERS.

Snagging operations on the Darling River, commenced during the previous year, were completed, the expenditure in the year under review from Federal Unemployment Relief Funds being £10 8s. 6d.

BOURKE LOCK AND WEIR.

The expenditure on maintenance and repairs amounted to £98 13s. 4d. on wharf and £817 11s. 3d. on the lock and weir. The latter amount includes the renewal and staunching of wickets, commenced during the year. The work was still in progress at 30th June.

No shipping was recorded during the year.

SWAMP DRAINAGE.

Twenty-six trusts and twenty-six unions were in operation at the close of the year.

The drains and other works of the North Coast Trusts have been maintained in a satisfactory condition, and in many cases improvements have been effected. The weather conditions throughout the year have been favourable to drainage areas generally, and no serious floods have been experienced.

TWEED RIVER.

Repairs were carried out to the Tie-wall at a cost of £545 2s. 5d., of which £350 was expended from Unemployment Relief Funds.

Repairs were effected to the Terranora Dock gates at a cost of £109 3s. 7d.

BYRON BAY.

General maintenance and repairs to jetty and moorings and jetty railway lines were carried out during the year at a cost of £744 9s. 4d.

RICHMOND RIVER.

Repairs were carried out to the Southern Breakwater at a cost of £1,989 11s. 1d., of which £1,881 16s. 11d. was met from Unemployment Relief Funds.

An expenditure of £111 12s. 8d. from Unemployment Relief Fund was also incurred on repairs to the northern Training Wall near North Creek Bridge.

Repairs to Riley's Hill Dock Wharf were carried out during the year, costing £148 12s. 6d.

WOOLGOOLGA JETTY.

The expenditure on maintenance of the jetty amounted to £129 13s., and included removal of tank stand, securing of kerbs, and inspection of boilers.

Buoys and moorings were also overhauled, and defective cables replaced.

COFF'S HARBOUR.

The construction works in connection with the eastern breakwater were continued throughout the year:—

Construction expenditure	£28,643 8s. 0d.
Tonnage of stone quarried	43,997 tons.

Eastern Breakwater.—Extended 124 feet to chainage of 774 feet. A gale in May, 1932, damaged the wall to a slight extent, but repairs were effected and good progress made during the year under review on the limited funds available. During the year 11,725 tons of stone were placed, costing £6,143 2s. 3d. making a total of 179,662 tons, at a total cost of £119,397 6s. 10d., and a unit cost of 13s. 3.5d. per ton.

Concrete work.—The construction of 40-ton concrete blocks was continued. 529 blocks were tipped on the sea side and centre of breakwater at a cost of £11,945 1s. 770 tons of concrete were placed on the top and centre of wall, costing £371 11s. 7d.

The total expenditure on the Eastern Breakwater to 30th June, 1932, amounted to £190,028 6s. 10d.

The total expenditure on these works, including all charges, amounted during the year to £28,881 9s. 4d.

Coff's Harbour Jetty.—The expenditure for the year on maintenance and renewal of piles, stringers and fenders, amounted to £424 11s. 5d.

Buoys and moorings were overhauled, and defective cables replaced.

Sand-drift Prevention.—The reclamation of the beach adjoining the Northern Breakwater was continued with a view to the prevention of sand drift, 12,542 tons of spoil being deposited. Fascine fences were also constructed.

MACLEAY RIVER.

Repairs to training walls were carried out at a cost of £95 3s. 10d.

Dredging was carried out on the Belmore River, the expenditure of £1,720 being met from Unemployment Relief Funds.

NEWCASTLE.

Submarine Rock Excavation.—The rockbreaker "Cyclops" continued operations on the bar throughout the year when weather conditions permitted. As a result of these operations and work already carried out at the end of the previous year the ladder-dredge "Juno" was able to remove 5,320 cubic yards of rock from the bar. A further quantity of rock was still awaiting dredging at the end of the year.

King's Wharf.—Further rock-breaking at the approach to this wharf was carried out by the "Cyclops" when weather conditions on the bar were unfavourable. At the end of the year it was estimated that a quantity of approximately 800 cubic yards had been broken and was awaiting dredging.

Newcastle Ferry Wharf.—Additional rockbreaking was performed by the "Cyclops" at the approach to this wharf when weather conditions on the bar were unfavourable. At the end of the year an estimated quantity of 700 cubic yards had been broken and was awaiting dredging.

Floating Dock.—No further dredging was carried out during the year on the floating dock site and approach channel.

Dredging.—

Description.	Tons.
Harbour improvements and maintenance	1,629,755
Reclamation	46,452
River dredging	117,465
Total tonnage	1,793,672
	£ s. d.
Cost	65,464 12 5

Tonnage lifted includes submarine rock excavation.

Lee Wharf Extension.—Construction of road and rail access to Lee Wharf Wheat Shed (No. 3) was completed during the year, the expenditure for the year being £749 14s. 9d.

Southern Breakwater.—Repairs were effected to the Southern Breakwater at a cost of £341.

General.—Repairs were carried out to Market Wharf, Newcastle Ferry Wharf, and various other wharves and plant within the harbour. The total expenditure on harbour maintenance for the year amounted to £6,069 2s. 11d.

UNEMPLOYMENT RELIEF WORKS (NEWCASTLE DISTRICT).

Wallis Creek.—Repairs to Wallis Creek flood gates were completed, the expenditure during the year amounting to £357 1s. 9d.

Horseshoe Bend—Swiney's Point—West Maitland.—Repairs to bank protection works by stone pitching and construction of new levee bank commenced during the previous year were completed, the cost during the year under review being £4,690 6s. 6d.

Carrington Swamps.—Part reclamation of Carrington Swamps was carried out with material obtained from old railway embankments, the expenditure for the year amounting to £2,249 13s. 5d.

HAWKESBURY RIVER AND BRISBANE WATER.

Renewal of beacon piles and buoys in Hawkesbury River and Brisbane Water were carried out at a cost of £39 3s. 7d.

SYDNEY HARBOUR AND PARRAMATTA RIVER.

Repairs were carried out to the Marsden-street Dam, Parramatta, at a cost of £85 0s. 10d. The outer domain sea-wall, Farm Cove, was repaired, and work was still in progress at the end of the year. The expenditure to 30th June from Unemployment Relief Funds was £402 9s. 1d.

COOK'S RIVER, BOTANY BAY AND GEORGE'S RIVER.

Repairs were effected to floodgates in Shea's Creek; the cost, £55 18s. 11d., being met from Unemployment Relief Funds.

Kurnell Jetty repairs were completed at a cost of £482 16s. The buoy at Kurnell was overhauled, and beacons in George's River were repaired and renewed during the year.

Borings which were being carried out in George's River on behalf of the Metropolitan Water, Sewerage, and Drainage Board were completed during the year.

WOLLONGONG HARBOUR.

Minor repairs were carried out to wharves and buildings at a cost of £15 6s. 4d.

PORT KEMBLA.

The year's output from the Gillan's Hill Quarry amounted to 98,009 tons, distributed as follows:—

Eastern breakwater construction	38,316 tons.
Eastern breakwater repairs	210 "
Northern breakwater repairs	5,560 "
Sea wall	16,471 "
State Metal Quarries	37,452 "
	<hr/> 98,009 tons.

The total output of this quarry since developmental work ceased up to 30th June, 1932, was 304,683 tons, costing £73,405 4s. 5d., at a unit cost of 57·82 pence per ton.

Eastern Breakwater.—Extended 75 feet during the year to chainage 3,206 feet. Heavy gales during September, 1931, and April, 1932, damaged the wall to some extent, but damage was repaired and satisfactory progress made during the year in view of the limited funds available. During the year 38,316 tons of stone were placed in construction, costing £18,911 12s. 6d., and 210 tons placed in repairs, costing £205 17s. Total stone tipped to 30th June, 1932, 1,102,908 tons, costing £325,109 5s.

Northern Breakwater.—During the year, 5,560 tons of stone were tipped in repairs costing £2,590 3s.

Haulage and Shipping of Coal.—Statements "A," "B," and "C" indicate traffic and shipping details of the port during the year.

Jetties.—No. 1 Jetty.—Minor repairs were carried out, treatment of structure against white ants was continued and a diver's examination was made with a view to ascertaining repairs required during the ensuing year at a total cost of £120 0s. 6d.

No. 3 Jetty.—Defective piles and girders were replaced and repairs effected to decking and coal loading frames at a cost of £143 1s. 1d.

No. 4 Jetty.—Iron chafing rails on one half of the fenders were replaced by ironbark chafing pieces. A pile was renewed and damaged fenders repaired. Total expenditure, £295 16s. 1d.

The total expenditure on jetty repairs for the year under review amounted to £719 17s. 11d.

HAULAGE AND SHIPPING UNDERTAKING.

The rebates of 5½ pence per ton on coastal and interstate shipments, and 10½ pence per ton on overseas shipments other than New Zealand, which were applied to the coal loading and shipping charges at this port during the previous year, were continued until 31st March, 1932, when they ceased.

These rebates were granted to assist the coal industry and its employees, and with a view to the development of the trade with consumers outside the State.

MORUYA RIVER.

Work was commenced during January, 1932, on the 500 feet extension of the southern training wall with a view to improvement of the depth on crossing and consequent saving in maintenance of the channel by dredging.

At the end of the year 330 feet of this wall had been completed, 5,150 tons of stone obtained from Dorman, Long's Quarry, having been placed in position by lighter at the 30th June, 1932, at a cost of £2,035 18s. 1d.

WAGONGA RIVER IMPROVEMENTS.

A 200-feet extension of the eastern training wall together with raising and repairing of subsided sections of wall already constructed was put in hand early in 1932. This work was completed before the end of the year, 5,077 tons of stone being punted and placed in position at a cost of £2,420 4s. 6d.

The extension of the western training wall upstream was commenced, and was still in hand at the end of the year, 1,700 tons being punted and placed in position at a cost of £322 1s. 6d.

TATHRA JETTY.

Fenders, piles, chafing pieces and decking were renewed and minor repairs effected at a cost of £194 2s. 9d. Repairs to the Cargo Shed were still in hand at the close of the year.

BERMAGUI JETTY.

Repairs were effected and defective girders, piles and decking were replaced at a cost of £337 0s. 7d.

EDEN JETTY.

The expenditure on maintenance of this jetty amounted to £245 10s. 2d., and included the renewal of wales, sills, decking, fenders, shore and jetty cranes and rail tracks.

OTHER PORTS.

At other far southern ports from Kiama to Merimbula, minor repairs were effected to jetties, and moorings were overhauled.

UNEMPLOYMENT RELIEF WORKS (HARBOURS AND RIVERS).

During the year a total amount of £11,846 10s. 2d. was expended on various works from Unemployment Relief Funds including the larger works referred to under the various headings above.

ROADS.

Of the total expenditure of £111,265, the sum of £29,870 was expended on formation and surfacing of roads in the Western Division in furtherance of the Federal Aid Roads scheme inaugurated in 1927 maintenance of Western Division roads accounted for £4,525 from Revenue Votes, grants to Western Division Municipalities absorbed £1,300 and £69,839 was expended on Unemployment Relief Works.

Federal Aid Roads.—The following work was carried out :—

	Year 1931-32.	Total, inclusive of previous years.
	miles.	miles.
Clearing ... ..	.....	376
Forming	47	588
Ballasting, gravelling, or sand-surfacing	5	124
Bridges	29	44
Culverts	376	719
Causeways	243	294

Grants to Western Division Municipalities.—Grants as under were made to councils for the purpose of maintaining sections of main roads within the municipalities.

	£
Bourke	250
Brewarrina	150
Broken Hill	400
Cobar	200
Wentworth	200
Wilcannia	100
	£1,300

Unemployment Relief Works.—The sum of £69,839 was expended from Unemployment Relief Tax Funds in providing work for unemployed, the following being the major undertakings :—

	£
Bunnerong Crown Lands road construction and levelling	26,122
Centennial Park levelling	23,032
Ku-ring-gai Chase roads	4,423
National Park roads	3,285
Sydney University roads	2,348
Leichhardt Canal road	1,317
Western Division roads	3,944

BRIDGES.

New Works.—The Departmental contribution towards the cost of the combined railway and vehicular bridge over the Clarence River at Grafton being erected by the Railway Department was £4,211. This work was practically complete at the close of the year.

Minor bridges on Federal Aid Roads cost £7,843.

Existing Works.—Maintenance and repair of Departmental bridges involved an expenditure of £11,546 in addition to which similar work costing £9,595 was carried out on behalf of the Main Roads Board. An expenditure of £815 from Unemployment Relief Funds is included in the former figure.

PUBLIC WATERING PLACES.

The work of excavating five new tanks put in hand last year was carried to completion as follows:

	Completed Cost.
	£
Twenty-six Mile Tank Road Ivanhoe-Wilcannia	997
Womboin Tank Road Nyngan-Brewarrina	1,429
Willybingbone Tank Road Nyngan-Brewarrina	1,355
Bundabulla Tank Road Brewarrina-Goodooga	1,151
Hospital Creek Tank Road Brewarrina-Goodooga	2,512

Funds for the foregoing were provided from the Unemployment Relief Vote, the expenditure for the year amounting to £3,193.

A number of new windmills was provided, tanks cleaned out, catchments improved and fencing erected in furtherance of the general scheme for improving public watering places in the Western Division.

The total expenditure on account of public watering places was £10,099, being £4,273 for new works and £5,826 for maintenance of existing establishments.

PUNTS AND FERRIES.

The maintenance of punt and ferry services controlled by the Department involved an expenditure of £7,951.

RIVER MURRAY WATERS AGREEMENT.

Branch Report—Year 1931-32.

At the Hume Reservoir the north-wing wall has been constructed to R.L.618 downstream and R.L.614 upstream. The outlet section of the main wall is constructed to levels varying from 630 to 635. Portion of the spillway section some 400 feet in length has been raised to R.L.566 and the adjacent 80 feet at the southern end is at R.L.570. The balance of the spillway section is completed to the temporary level, which corresponds to the storage of $1\frac{1}{4}$ million acre-feet.

The trash racks and valve houses have been completed.

Concrete placed during the year amounted to 17,647 cubic yards, making a total to date of 400,492 cubic yards.

Investigations to ascertain rate of siltation of storage have been put in hand.

Work on the road deviations was continued, the sections from Wagga-road to Table Top and Table Top to Mullenjandra, and totalling 1,027 chains, were completed with the exception of tarring.

A start has been made on the Mullenjandra to Cumeroona section.

The average number of men employed during the year was 257, employment being rationed on the basis of three weeks on and one week off.

Work on Lock 15 construction and lock site surveys is still held up due to lack of funds.

The expenditure by the Department from the River Murray Commission funds was £89,503, making a total to date of £3,077,122.

A detailed report of the operations of this Department as Constructing Authority for New South Wales for the year ended 30th June, 1932, is printed at the end of this report, Appendix "A."

R. VOWELL, M.Inst.C.E., M.I.E.A.,

Chief Engineer for Harbours, Roads
and Bridges, and National and
Local Government Works.

Chief Engineer for New South Wales,
River Murray Waters Act.

14th October, 1932.

APPENDIX A.

RIVER MURRAY WATERS ACT.

ANNUAL REPORT FOR YEAR ENDED 30TH JUNE, 1932.

A. HUME RESERVOIR.

1. Investigations and Designs.

Plan showing the construction stage for 1½ million acre-feet reservoir and plans showing reinforcement details for outlet sections were submitted to the River Murray Commission and duly approved.

Following on the decision of the River Murray Commission that the outlet section should be completed to R.L. 642 in order to house the operating winches and motors for the gates, the detailed plans are being prepared and will be submitted for the Commission's approval at an early date. In order to enable these plans to be prepared preliminary studies of suitable architectural details were made with a view to ensuring that the work to be carried out at this stage shall be in harmony with future requirements.

2. Land Acquisition.

The land resumed during the year under review was 56 acres, making a total of 11,249 acres resumed to date. Negotiations for further extensive acquisitions are approaching completion.

3. Construction.

(a) *Road of Access*.—Very little maintenance has been required during the year.

(b) *Quarry*.—The output during the year was 2,118 cubic yards, consisting of 1,977 cubic yards of spalls and 141 cubic yards of displacers.

(c) *Gravel and Crushed Stone*.—All gravel used in the concrete together with the small amount of crushed stone required were obtained from reserve dumps.

(d) *Concrete*.—Concrete placed during the year was 17,647 cubic yards, made up as follows :—

Main wall.....	c. yds.
North-wing wall	15,793
South-wing wall	1,180
Valve house.....	34
Trash racks	220
Core wall, etc.	360
	60

Total to date is 400,492 cubic yards.

The North-wing wall has been constructed to R.L. 618 downstream and R.L. 614 upstream. The outlet section of the main wall is constructed to levels varying between 630 and 635. Portion of the spillway section, some 400 feet in length, has been raised to R.L. 566, and the adjacent 80-feet at the southern end is at R.L. 570. The balance of the spillway section is completed to the temporary level 606, which corresponds to the storage of 1½ million acre-feet. The trash racks and valve houses have been completed.

(e) *Plant*.—The main aggregate bins and mixing plant have been dismantled and the space between the north-wing wall and the natural surface filled with clay. The belt conveyor for placing concrete has been re-modelled at the northern end and is now operating on the level throughout. One of the two cubic yards concrete mixers has been placed out of commission and the second one placed at a suitable point on the main wall to command the conveyor belt in its new position.

(f) *Outlet Works*.—All valves and stony sluices are in good order and have been operating frequently during the year.

(g) *Condition of Stored Water*.—Trouble with anabena was experienced during the summer, but not to any great extent.

(h) *Release of Stored Water*.—The discharge of water was regulated to suit the requirements of the Water Conservation and Irrigation Commission of New South Wales and the State Rivers and Water Supply of Victoria.

(i) *Siltation Stations*.—Four concrete siltation station platforms were constructed on the Murray arm of the storage, and cross sections of the basin at these stations are being obtained. Evaporation tests have been put in hand and will be continued at regular intervals to enable the percentage of silt in the incoming waters to be estimated.

(j) *New South Wales Embankment*.—As referred to above, the upstream portion of the embankment to North-wing wall has been constructed, the quantity of filling placed to date being 10,236 cubic yards and the top level at the 30th June being R.L. 610.

(k) *Wymah Ferry*.—A site has been tentatively selected for the future operation of this service and a proposal submitted for the consideration of the River Murray Commission.

(l) *Road Deviations*.—The first section from Wagga Road to Table Top has been completed with the exception of tarring, the total length being 283 chains. The work carried out during the year under review was as follows :—

Formation	chains.
Fencing	41
Side drains	72
Gravel, 1st coat	90
Gravel, 2nd coat.....	103
	112

The second section from Table Top to Mullenjandra has also been completed with the exception of tarring, the total length of this section being 744 chains. The work carried out during the year was as follows :—

Clearing	chains.
Formation	24
Fencing	272
Side drains	287
Gravel, 1st coat	73
Gravel, 2nd coat.....	263
	455

The timber bridge over Mullenjandra Creek was also completed.

The third section from Mullenjandra to Cumberoona was commenced and the following work was carried out :—

Clearing	chains.
Formation	172
Fencing	138
Side drains	45
Gravel, 1st coat	65
Gravel, 2nd coat.....	71

(m) *General*.—The average number of men employed during the year was 257, employment being rationed on the basis of three weeks on and one week off.

The health of the community has been uniformly good.

B. LOCKS AND WEIRS.

(1) *Surveys and Borings.*—No work was carried out during the year under review either on the Murray or Murrumbidgee Rivers.

(2) *Lock and Weir No. 10 at Wentworth.*—The lock was operated 56 times for the passage of 25 steamers towing 19 barges, the remainder being for small boats. The traffic return shows :—

83 tons of wool.

152 tons of fruit.

776 tons of general freight.

1,050 tons of construction material.

(3) *Lock and Weir No. 15 at Euston.*—Plant and buildings have been maintained in good order.

(4) *Proposed Weir at Yarrawonga.*—Consideration of details of design for the weir proposed to be constructed at Yarrawonga was given, in conjunction with the State Rivers and Water Supply Commission of Victoria and the Water Conservation and Irrigation Commission of New South Wales, with a view to a definite proposal being placed before the River Murray Commission.

(Sgd.) R. VOWELL, M.Inst. C.E.,
Chief Engineer for New South Wales,
River Murray Waters Act,
12th August, 1931.

ANNUAL REPORT—PORT KEMBLA DISTRICT, 1931-32.

Port Kembla Traffic and Shipping Returns.

STATEMENT A.

<i>Coal and Coke Shipped at Port Kembla.</i>		Tons
Cargo coal		109,456
Cargo coke		39,035
Bunker coal		95,541
Total (all Jetties, including A.I. and S. Jetty.)		244,032
<i>Traffic (Other than for Shipment).</i>		tons. cwt. qr.
Inwards haulage		34,444 16 1
Outwards haulage		63,340 5 0
Total		97,785 1 1

SUMMARY OF ACCOUNTS ISSUED.

STATEMENT B.

Port Kembla Shipping.

	£	s.	d.	£	s.	d.
Shipping—Cargo	4,969	12	3			
„ Bunkers	4,370	2	6			
Berthing	1,390	1	8			
Mooring ropes	309	18	1			
Launch	630	0	0			
Gangway	120	0	0			
Electric crane—5 ton	325	10	0			
„ 2 ton	227	15	10			
Waiting time	29	14	9			
Haulage, waggon hire, loco. hire, etc.	1,827	1	11			
Way leave	230	1	3			
Telephone calls	8	5	2			
Water to Shipping	223	15	0			
Lighterage	1	0	0			
Miscellaneous revenue	87	10	11			
				14,750	9	4
<i>Navigation Department—</i>						
Harbour dues	5,678	4	8			
Tonnage dues	2,143	9	1			
				7,821	13	9
<i>Port Kembla Electricity Supply—</i>						
Bulk Supplies	30,142	19	0			
Industrial Supplies	19,658	12	5			
Retail Supplies	1,888	11	4			
Minimum Annual Payment adj.	93	18	10			
Undercharge Shellharbour Council	242	4	5			
Rents receivable	346	4	2			
Miscellaneous Revenue	577	9	8			
Motor vehicles	179	4	4			
				53,129	4	2
<i>Resumed Properties Department—</i>						
Rent of cottages	760	2	10			
Rent of land	1,450	4	6			
Camping area	37	7	0			
Sanitary fees	31	13	3			
				2,279	7	7
<i>Port Kembla Harbour Improvements—</i>						
Sale of spalls	3,487	13	3			
Outside services	238	13	9			
				3,726	7	0
<i>Wollongong Shipping—</i>						
Coal into bin				78	10	0
Stock				1,049	12	9
<i>Miscellaneous Votes—</i>						
Boat fees	25	5	0			
Miscellaneous services	137	8	0			
Sundries	11	3	3			
				173	16	3
Total				£83,039	0	10

PORT KEMBLA.

Trade and Shipping Returns, 1931-32.

Vessels entering Port Kembla.	Arrivals.	Net Registered Tonnage.
Overseas	117	326,391
Coastal	186	42,693
Interstate	145	166,192
Total	448	535,276

Principal Exports.

Item.	Tonnage.	Value.
		£
Cargo coal	109,456	109,456
Bunker coal	95,541	95,541
Coke	39,035	39,035
Copper	10,411	403,426
Bluestone	348	10,788
Slag .....	.....	.....
Fertilisers	{ 34,128	166,139
	{ 205 (a)	8,418 (a)
Manufactured metals	1,632	181,415
Finished products of iron and steel	16,916	137,446
Total	307,672	1,151,664

(a) Bags.

Principal Imports.

Blister copper	{ 302	13,784
Ore	{ 11,052 (a)	428,265 (a)
Scrap copper	925	12,680
Slimes	152	6,943
Concentrates	148	44,003
Matte	115	2,875
	1,728	24,210
Phosphate Rock	{ 14,125	32,492
	{ 563 (b)	4,184 (b)
Sulphur	1,101	9,250
Pyrites	388	810
Fertiliser (by rail)	759	7,009
Bags and packing materials by rail	{ 90 (c)	3,237 (c)
	{ 246	8,337
Lead	75	1,419
Zinc Ingots	50	1,043
Stores	27	697
Iron ore	51,938	42,569
Total	83,784	643,807

(a) Cathodes.

(b) By rail.

(c) Bags by steamer.

Financial Statement.

Item.	Revenue.	Expenditure.
	£ s. d.	£ s. d.
(a) Haulage and shipment	19,285 5 1	18,634 13 5
(b) Electricity supply	53,955 1 7	79,708 0 10
Total	73,240 6 8	98,342 14 3

(a) Haulage and Shipment.—Interest on capital debt provided for since and including 1928-29.

(b) Electricity Supply.—Initial provision for contribution to Capital Assets Renewal made in year 1929-30.
Interest on capital debt provided for since and including 1928-29.

STATEMENT D.

PARTICULARS OF RIVER ENTRANCES OF NEW SOUTH WALES.

1931-32.

Name of Port.	Depth on Bar prior to commencement of work. Position variable.	Sailing distance from Sydney.	Total length of River.	Limit of Navigation for Boats drawing 4 feet.	Catchment Area of River.	Area of Tidal Compartment.	Proposed width of River Entrance between Break-water.	Depths during the year 1931-32 at Low Water Spring Tides.						Anticipated Depth on Completion of Scheme.	
								Maximum.		Average.		Minimum.			
								Bar.	Crossing.	Bar.	Crossing.	Bar.	Crossing.		
	ft. in.	Sea mls.	St. mls.	St. mls.	Sq. mls.	Acres.	Sq. mls.	ft.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft.
Tweed	3 0	372	46	24	418	5,000	8 500	8 0	9 0	6 3	9 0	2 6 ^a	9 0	9	
Richmond	7 0	328	149	68	2,683	6,800	10½ 1,000	13 0	11 0	11 2	10 8½	7 0 ^b	9 9	12	
Clarence	8 0	294	247	67	8,505	34,000	53 1,400	13 6	12 0	10 11	10 8	9 0	9 6	18	
Bellinger	3 9	228	76	15	479	1,640	2½ 500	5 9	7 0	4 6	4 8	2 7 ^c	2 9 ^m	9	
Nambucca	4 9	219	58	9	552	2,730	4½ 500	6 0	5 0	4 11	4 9½	2 6 ^d	4 6	9	
Macleay	5 0	208	214	39	4,581	3,550	6 700	9 0	...	7 8½	...	5 0 ^e	...	12	
Hastings	5 0	172½	110	19	1,389	6,400	10 650	10 3	9 6	8 3	8 10	5 3 ^f	8 3	10	
Camden Haven	4 6	159½	18	13	238	7,240	11½ 400	7 3	7 0	5 5	6 10	4 0 ^g	6 6	8	
Manning	8 0	141	141	29	3,164	6,800	10½ 800	7 0	8 6	6 1½	8 6	4 0 ^h	8 6	12	
Cape Hawke ...	2 3	125	46	17	514	21,930	34½ 400	5 0	8 0	3 5	7 10	1 4 ⁱ	6 0	9	
Lake Macquarie	...	50	...	...	291	26,000	40½ ...	6 9	5 9	4 10	4 5	3 6 ^j	3 6 ⁿ	...
Crookhaven (including Shoalhaven River).	11 0	71	205	22	2,801	2,808 6,533	4½ 10½ ...	13 6	8 6	13 6	8 6	13 6	8 6	12	
Bateman's Bay	4 0	129	70	24	696	3,750	6 ...	10 0	...	7 11	...	7 0	...	10	
Moruya	6 0	139	93	4	609	1,550	2½ ...	9 0	9 0	7 6	7 5	4 6 ^k	4 9 ^o	9	
Wagonga .....	...	158	9	5	52	1,650	2½ 340	8 6	7 0	6 8	6 7	4 6 ^l	6 0	10

^a—Tweed River, Minimum bar, 1 day only.^b—Richmond " " " 1 " "^c—Bellinger " " " 1 " "^d—Nambucca " " " 1 " "^e—Macleay " " " 1 " "^f—Hastings " " " 3 days "^g—Camden Haven " " " 2 " "^h—Manning " " " 1 day "ⁱ—Cape Hawke, Minimum bar, 2 days only.^j—Lake Macquarie " " " 2 " "^k—Moruya " " " 1 " "^l—Wagonga " " " 1 " "^m—Bellinger River, Minimum crossing, 1 day only.ⁿ—Lake Macquarie " " " 3 days "^o—Moruya " " " 1 day "

STATEMENT E.

DOCK TRANSACTIONS.

Year ending 30th June, 1932.

	Terranora.	Riley's Hill.	Ashby.
No. of Government vessels docked	1	13	6
Gross Tonnage of Government vessels docked	156	2,177	610
No. of private vessels docked	8	Nil.	5
Gross Tonnage of private vessels docked	421	Nil.	321
* Revenue received during year	£109 13s. 3d.	£59 2s. 9d.	£240 18s. 6d.
† Expenditure, docking private vessels	£83 19s. 8d.	£30 3s. 7d.	£193 2s. 0d.
Cost—Dock maintenance and repairs	£237 15s. 11d.	£422 2s. 4d.	£258 16s. 3d.

* "Revenue" includes receipts from docking vessels for other Departments.

† "Expenditure" includes cost of docking vessels for other Departments.

Electrical Engineering Branch.

Annual Report, 1931-32.

I. INTRODUCTION.

The Branch's work falls into four main groups:—

1. Hydro-electric investigations.
2. Construction, operation and maintenance of the Burrinjuck Electricity Supply.
3. Construction, operation and maintenance of the Port Kembla Electricity Supply.
4. Electrical engineering assistance to other Departments and other Branches of this Department.

II. HYDRO-ELECTRIC INVESTIGATIONS.

No field work was carried out during the year, but further investigation was carried out in connection with the extension of Burrinjuck.

Hume Reservoir.—Investigation was carried out for a small auxiliary hydro-electric supply for construction purposes and for the operation of the sluice gates. The specification for the plant was prepared and tenders have been invited.

Wyangala Dam Hydro-electric Investigation.—Reinforced concrete screen structure on the upstream face of the dam has been completed.

Stream Gauging.—Stream gauging purely for hydro-electric purposes was discontinued in June, 1931. The Water Conservation and Irrigation Commission has been carrying on a few of the stations for general information on stream flows.

III. BURRINJUCK ELECTRICITY SUPPLY.

Construction.

No. 1 Power Station.—After the flood of June, 1931, had subsided, a small amount of scour along the pipe line was repaired by stone pitching and concrete. The bank of spoil tipped from the power station excavation was moved by the flood and partly blocked the neck of the tail race raising the tail water level. A considerable portion of this had to be removed by manual labour and the tail water level was thereby reduced to R.L. 968.

Preliminary preparations for No. 2 transformer bank were started including an access tramway along the top of the concrete pipe cover.

No. 2 Power Station.—The concrete foundation for the reinforced concrete portion of the main supply pipes was placed. The two 9 feet diameter reinforced concrete pipes, together with the concrete cover forming the transformer bench, were completed.

Transmission Lines, Substations, etc.—No extensions to the 66 kV systems were made.

Following investigations into the use of 66 kV single-bushing transformers with earth return, the installation of one unit was effected at Jeir on the Yass-Canberra Transmission Line. This unit has been functioning satisfactorily during the past six months.

The only work of a major nature undertaken was the Koorawatha-Grenfell 11 kV Transmission Line, the total length being 25 miles. The Koorawatha Substation was also completed by the addition of the main equipment.

Other construction work undertaken was of a minor nature covering the provision of a small number of retail supplies.

Operation.

Generation.—The plant ran continuously throughout the year. The minimum level of the storage was R.L. 1138.5, giving a head on the turbines of 170 feet, and the maximum was R.L. 1180, which is a full storage.

Energy—

Generated	...	...	...	...	...	...	...	...	...	20,235,350 kWh
*Output	20,313,260 kWh
Used in station	32,922 kWh

Maximum half-hour demand—

Station	4,600 kW
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Annual Load Factor—

Station	50.2 per cent.
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Distribution.—With the exception of a number of minor failures the operation of the system has been very satisfactory.

Replacements of an obsolete type of lightning arrester on the 66 kV transmission lines have been completed.

Serious trouble due to conductor vibration experienced since the erection of the Temora Transmission Line has been rectified.

The conversion of the Marilba system from 6,600 volts to 11,000 volts has been commenced.

Radio interference investigation has been undertaken and the wave length of transmission altered to 185 metres.

The energy sold, totalling 17,018,068 kWh increased by 18½ per cent. approximately.

* Incorrect, due to unreliable meters, now being rectified.

Commercial.

Bulk Supplies.—Supply was made available to Grenfell Municipal Council in December, 1931, following execution of agreement during the previous financial year.

Industrial Supplies.—Supply was made available to South-West Tablelands Water Supply in August, 1931.

Retail Supplies.—Negotiations were effected with a number of rural and township residents principally in the Koorawatha, Gundagai and Cootamundra districts. The principal townships involved were Adelong and Koorawatha. Supplies were provided to a number of rural and township residents following the completion of the requisite agreements.

Trading.—Preliminary investigations in connection with the proposals to revise bulk supply and retail supply rates were effected.

The general trading continued to show an improvement. Despite meeting increased charges for the overseas transmission of interest and considerable non-recurring charges in connection with early investigations, a small net profit resulted from the year's activities.

IV. PORT KEMBLA ELECTRICITY SUPPLY.

Construction.

Power Station.—Owing to the continued slackness of trade and the consequential small demand for electricity for industrial purposes, no steps have yet been taken to erect the 5,000 kW turbo-generator which was purchased from the Adelaide Electric Company. The plant is stored at the power station.

The rearrangement of the step-up substation has now been satisfactorily completed.

Transmission Lines, Substations, etc.—No extensions to the 33 kV system were made.

Work generally on the 6.6 kV distribution system was of a minor nature. The principal work was that of a supply to the South Kemplla Colliery.

Operation.

Generation.—The operation of the power station plant during the year was satisfactory. No major failures of plant occurred.

Energy—

Generated and purchased	...	...	...	...	...	...	...	...	10,426,673 kWh
Output	...	...	...	...	...	...	...	...	9,677,549 kWh
Used in station	...	...	...	...	...	...	...	...	524,799 kWh

Maximum half-hour demand—

Station	...	...	...	...	...	...	...	...	3,196 kW
System	...	...	...	...	...	...	...	...	3,144 kW

Annual Load Factor—

Station	...	...	...	...	...	...	...	...	34.9 per cent.
System	...	...	...	...	...	...	...	...	35.1 „

The arrangement covering the interchange of power between the Department and Australian Iron & Steel, Ltd., has been maintained during the year.

Distribution.—With the exception of a number of minor failures the operation of the system has been satisfactory.

Operating conditions of the main 33 kV transmission lines have been improved by the addition and rearrangement of modern lightning arresters.

The energy sold, totalling 7,966,602 kWh, decreased by 26 per cent. approximately.

Commercial.

Bulk Supplies.—Agreements covering supplies made available during the previous financial year were executed by Nattai Shire Council (Milton Park supply) in January, 1932, and Shellharbour Municipal Council (Peterborough supply) in June, 1932.

Industrial Supplies.—Agreements were executed by Jamberoo Co-operative Dairy Society, Ltd. (in connection with the revised terms and conditions of supply), in December, 1931, and by South Kemplla Colliery in June, 1932.

A supply was made available to South Kemplla Colliery in June, 1932.

Negotiations were opened with other prospective industrial consumers, but finality was not reached.

Retail Supplies.—Negotiations were effected with a number of rural and township residents principally in the Yerrinbool district. Supplies were provided to a number of rural residents following completion of the requisite agreements.

Preliminary investigation in connection with proposals to revise retail supply rates was effected.

Trading.—The revised method of handling and keeping retail accounts was placed into operation and has proved satisfactory. The revised method of dissecting trading costs to enable closer analysis of the economics relating to various sections to be made was inaugurated.

The general trading was unsatisfactory, mainly due to the effect of the depression on the industrial consumers and the necessity of meeting increased charges for the overseas remittance of interest.

V. WORK FOR OTHER BRANCHES.

Water Supply and Sewerage Branch.

Assistance has been given to the Water Supply and Sewerage Branch by reviewing specifications and making recommendations with respect to the acceptance of the electrical sections of tenders for electrically operated pumping plants.

Assistance has been given in the testing of pumping plants and negotiations have been conducted with Municipal Councils and other bodies for electricity supplies for pumping plants in connection with water supply and sewerage schemes.

South West Tablelands.—A system for the remote control of the pumps at No. 2 pumping station from No. 1 pumping station has now been installed. Pending certain adjustments both stations are being operated manually.

Cessnock Sewerage.—Negotiations were conducted with the Caledonian Collieries Ltd. with regard to a supply of electricity to the sewerage pumping plant and the treatment works. A short transmission line was constructed by the Company in connection with the supply to the treatment works.

Bourke Water Supply.—Negotiations were conducted with the franchise holder with regard to the electricity supply to the pumping station. Plans and specifications were prepared for the wiring of the two pumping stations for electric power. This work was carried out under the supervision of the District Engineer.

Broken Hill Water Supply Filtration Plant.—Assistance has been given to the District Engineer, in his negotiations with the Broken Hill Municipal Council with regard to the power supply to the Mica-street Filtration Plant.

Katoomba Water Supply.—Assistance was given by an officer of the Branch in the testing of the new high level pumping plant. Later in the year an officer visited Katoomba and investigated complaints with regard to the unsatisfactory operation of the motor.

Mudgee Water Supply.—Assistance was given in the testing of the additional pumping plant.

An extension of the remote control system was arranged, the erection of which was effected by the Council.

Mudgee Sewerage.—Arrangements were made with the Mudgee Municipal Council to erect a transmission line and substation to the sewerage treatment works, with material supplied by the Department.

Assistance has been given in connection with the following schemes during the year.

Water Supply.—Bourke, Broken Hill, Culcairn, Goulburn, Grenfell, Katoomba, Mudgee, Nyngan, Orange, South West Tablelands, Tenterfield, Wagga Wagga.

Sewerage.—Cessnock, Forbes, Lismore, Mudgee, Newcastle, Parkes, Wagga Wagga.

Harbours, Rivers, and Drainage Branch.

Byron Bay Jetty.—General technical supervision has been exercised with regard to the maintenance of the electrical portion of the cranes at the above jetty. During the year negotiations were carried out with the Byron Shire Council with regard to a reduction in the rate for the maintenance of the branch transmission line and substation, owing to the Shire having given a supply to another consumer over the same line.

VI. WORK FOR OTHER DEPARTMENTS.

Local Government Department.

All electricity franchise agreements submitted to the Local Government Department have been reviewed, and assistance has been given in connection with the electricity loan proposals made by local governing bodies.

Technical assistance was given to the Commissioner during his hearing of the application by the Clarence River County Council for approval to a loan to extend the operations of the hydro-electric system to Lismore and Coff's Harbour. The inquiry was held at Grafton.

Mines Department.

The preparation of examination papers for the Electric Motor Driver' Examinations, which are held quarterly at Sydney and Broken Hill, and occasionally at other centres, has been carried out by this Branch. Viva Voce examination at the examinations held in Sydney have also been conducted by an officer of this Branch.

Health Department.

Orange Mental Hospital.—Negotiations have been conducted with the Orange Municipal Council with regard to the conversion of the existing rate for electricity supply from a unit rate to a bulk supply rate. The Council has agreed to this step which, it is anticipated, will result in a substantial saving in the cost of electricity.

Education Department.

Drummcayne Furniture Workshops.—General supervision has been given to the electrical installation in this workshop, and arrangements were made with regard to the installation of additional switchgear, motors, etc., to specifications prepared by this Branch.

Chief Secretary's Department.

Government Tourist Bureau.—General engineering supervision has been exercised over the power plants at Jenolan Caves, Hotel Kosciusko, Yarrangobilly Caves and the Wombeyan Caves. Arrangements were made for the overhaul of the oil engine driven plant at the Hotel Kosciusko. The telephone line from the hotel to the summit was overhauled and put in proper working order under the supervision of this Branch before the advent of snow in order to be in readiness for the winter season.

The pelton wheel from the generating plant at the Yarrangobilly Caves was overhauled under the supervision of this Branch.

Metropolitan Meat Industry Board.—An investigation was carried out for the above Board as to the amount of power available from the steam used for process work at the By-Products Building at the Homebush State Abattoirs.

Walsh Island Dockyard.

Assistance has been given to the Dockyard with regard to the supply of electricity thereto.

Queensland Department of Mines.

At the request of the above Department, an inspection was made and tests were carried out on motors for the use of the Queensland State Coal Mines.

V. J. F. BRAIN,
Chief Electrical Engineer.

Public Works Department,
30th August, 1932.

Sydney Harbour Bridge.

Report for the year ended 30th June, 1932.

I have the honour to submit the following report on the work of the Branch for the year ended 30th June, 1932 :—

1. CONSTRUCTION OF THE NORTHERN APPROACH BY THE SYDNEY HARBOUR BRIDGE BRANCH.

During this year, the Branch had to expedite its work to allow other authorities sufficient time for the installation of their equipment so that everything could be in readiness for train, tram and vehicular traffic by 19th March, 1932.

(a) *Excavation.*

The total excavation work during the year amounted to 32,215 cubic yards, the principal items being, widening of McDougall-street, excavation near Walker-street, and grading for track formation.

(b) *Concrete.*

A total of 11,079 cubic yards of concrete were poured, 6,765 cubic yards for the roadway and footway, 2,429 cubic yards of reinforced, 231 cubic yards of lightly reinforced, and the remainder as plain concrete and various small items.

(c) *Waterproofing.*

During the year, 896 square yards of fabric waterproofing were laid, being chiefly that for the subway under Blue-street to North Sydney Station. The viaduct in the vicinity of the 220 feet steel arch required 3,144 square yards of mastic waterproofing. The protection of the foregoing fabric and mastic waterproofing required 451 cubic yards of brickwork.

(d) *Brickwork.*

Various works were carried out with brickwork, the principal ones being the shops at Milson's Point Station and the North Sydney Station building, including the shops fronting Blue-street. The total quantity of brickwork was 1,221 cubic yards.

(e) *Drainage System.*

During this year, the major portion of the drainage system was constructed, a total of 7,629 feet of pipes being laid, ranging from the 30-inch reinforced concrete pipes in Walker-street to the 4-inch earthenware pipes in Milson's Point Station.

(f) *Surfaces of Footways and Roadways.*

The roadway from the north end of contract to its junction with Alfred-street was laid in sheet asphalt upon an 8-inch reinforced concrete slab. The sheet asphalt was laid in two courses, the binder course and surface course, each being 1½ inches thick.

The area of sheet asphalt was 14,514 square yards.

McDougall-street reconditioning and widening was carried out with bitumen penetration as were repairs to Arthur-street and the completion of the work at the corner of Burton and Broughton streets. The total area penetrated was 2,814 square yards.

The platforms and concourse of North Sydney and Milson's Point Stations were surfaced with mastic asphalt 1½ inches thick, the total area being 7,069 square yards.

(g) *General.*

The 220 feet steel arch was completed.

The whole of the trackwork for both trams and trains was carried out, a ballast train and plough van being used to spread the ballast evenly.

In addition, a large amount of work was carried out by contract in accordance with the plans and specifications prepared in the Drawing Office. The chief ones were tiling of North Sydney and Milson's Point Stations; magnesite flooring for station offices; terazzo flooring for lavatories in North Sydney and Milson's Point Stations; metal awnings to Alfred and Broughton street entrances of Milson's Point Station; terra cotta facing to Milson's Point Station; and collapsible gates and ticket barriers to North Sydney and Milson's Point Stations.

During the year, the Signal Engineer and the Electrical Engineer of the Railway Department were collaborated with in order to arrange for the installation and housing equipment as the work proceeded.

2. CONTRACT OF DORMAN, LONG AND COMPANY, LTD.

(a) *Civil Engineering.*

At 1st July, 1931, the construction of the pylons had advanced to above the arches over the footway and railway tracks, from then onwards it proceeded rapidly because during the period when the anchorage cables did not allow construction to proceed, the quarry was able to cut most of the granite masonry and send it up for storage on the sites at Dawes' Point and Milson's Point. The method adopted was to build course by course setting the masonry first and then pouring the concrete behind.

Two heavy reinforced concrete floors were constructed and also a reinforced concrete structure on the top of each pylon. These latter were made use of for the cleaning down of the pylons by leaving openings in the walls to act as the anchorages for steel joists resting on the granite parapet and supporting the scaffolds.

Milson's Point pylon was completed in January, 1932, and Dawes' Point pylon in December, 1931. As soon as the pylons were finished, a commencement was made to clean down and point the masonry. This was a laborious process and was carried out by men using wire brushes and water on the dressed surfaces, with the addition of weak hydrochloric acid on the rock-faced surfaces. Masons were employed at the same time to cut out and point the joints after the cleaners.

The contractors employed as many men as the scaffolds would hold in order to have the pylons cleaned down in time for the Opening Ceremony, these men worked from 6 a.m. to 6 p.m. The Dawes' Point pylon was completed by the opening date and the Milson's Point pylon soon afterwards.

In July, 1931, the coke concrete was placed in the trough plates of the roadway on the southern half of the arch. Rapid progress was made, as ample supplies were obtained by using metallurgical coke from Bellambi coke ovens to augment the original source of supply from Wongawilli. The remainder of the coke concrete had been previously placed in position with the exception of a small section at each pylon which was not finished until early in 1932 as the area was covered by the crane towers used for the construction of the pylons.

Roadway asphalt paving had been laid the previous year on the approach spans leaving the roadway over the arch section to be completed during the present year. When the coke concrete had been placed and cured, a start was made in August, 1931, on the rock asphalt pavement.

Dorman, Long and Co. desired to use the finished roadway pavement as a working platform for the adzing and painting of the railway and tramway track transoms, in order to do this the sub-contractors, Neuchatel Asphalt Co., increased their output by using heaters at the Waterloo works as well as the portable heaters on the site. The section through the arch was completed during September, 1931.

This completed the roadway pavement except for the small area at each pylon where the crane towers stood. These areas were completed early in 1932.

Asphalt paving was laid on the footways of the main span also on the transverse footways through the pylons; the material being a sheet asphalt with a high bitumen content.

The laying of the timber transoms and planking for the train and tram tracks was in progress at the end of June, 1931, and the work was pushed on with all possible speed during the year.

Ironbark transoms were supplied under sub-contract by Allen Taylor and Co., Ltd., and were obtained from all over the coastal districts of New South Wales, as considerable difficulty was experienced in obtaining the required lengths.

During the year, transoms were adzed and bolted down on approach spans Nos. 2, 3, 4, 5 and 10 and on the main arch.

A start was made to lay the 100-lb. rails in September, 1931, this work being finished in January, 1932. For the tram tracks, the rails were laid directly on the transoms, sleeper plates being used for the train tracks. Screw spikes were used in all cases to hold the rails down on the transoms.

On completion, the permanent-way was used by the Department to convey ballast trains to Dawes' Point side, the first train going across on 20th January, 1932.

By 3rd February, the overhead wiring had been fixed in position by the Electrical Branch, and on 4th February, a commencement was made to test load the approach spans and main arch.

The work of cleaning up the site had already been started at 1st July, 1931, and is now complete. All rubbish and spoil dumps have been removed and the concrete saddles at the entrances to the anchorage tunnels cut off below ground level and the tunnels filled with spoil.

The western side of the anchorage tunnel at Milson's Point passes under the edge of approach pier No. 15. It was considered advisable to underpin the pier in case the rock gave way in the course of time and accordingly a heavy concrete bulkhead was built across the tunnel at this point.

Where damaged, the sea-wall and parapet along Hickson-road in front of the Dawes' Point pylon, has been re-built by the contractors and the Department has regraded the roadway and opened it to traffic.

The old building at Dawes' Point previously used as a works office by the contractors and the Department was sold and demolished and the Department has filled in the pylon to the level of the back doorway and regraded the whole of the area under the approach spans and round the pylon.

At Milson's Point, the Department has regraded under the approach spans and at present is completing the regrading round the pylon.

During the year the following work was carried out under the various contract schedule items :—

No. 1 concrete	6,859 cubic yards.
No. 2 concrete	124 cubic yards.
Granite masonry	2,434 cubic yards.
Four-cut work on granite masonry	31,552 super. feet.
Coke concrete	1,144 cubic yards.
Asphalt on roadway	11,941 super. yards.
Asphalt on footways	5,405 super. yards.
Timber work	54,763 cubic feet.
Ruberoïd protection	51,164 lineal feet.
Reinforcing bars	115 tons.
Rails and fastenings	10,054 lineal yards.

(b) *Fabrication of Steelwork.*

The delivery of rolled steel to the workshops ceased during December, 1931.

There were 552 tons of steel delivered during the year.

The total tonnage of metalwork delivered for the Bridge was 53,355 tons, including scrap, and 695 tons of field rivets.

Fabrication of steelwork was completed during December, 1931, 944 tons being fabricated during the first seven months of the year. The total output of the shops during the contract was 52,781 tons, of which 11,026 tons were Australian steel and 41,755 tons were English steel, a total of 52,781 tons, or 79 per cent. from England and 21 per cent. from Australia.

The removal of the fabricating plant commenced during August, 1931. The dismantling of the heavy fabricating shop commenced on 16th November, 1931. The shops should be completely dismantled by the end of July, 1932.

(c) *Erection of Steelwork.*

The erection of steelwork under the contract was completed during January, 1932, a total of 1,367 tons being erected during the year, making 52,781 tons in all for the completion of the contract.

The erection work to complete the contract during the year comprised the following items:—

1. Erection of overhead wiring structures on the main span.
2. Completion of the riveting of the web splices of the top chords after the removal of the reinforcing plates.
3. Erection of painting cranes on the top chords on north and south sides.
4. Erection of steelwork in the pylon towers above the 155 feet level.
5. Erection of access stairways, footways and handrailing on the top and bottom chords.
6. Re-conditioning of the approach span painting cranes and gantries.
7. Laying of the permanent way expansion joints and fittings.
8. Completion of the painting of the steelwork.
9. Erection of door and fences on lower chord and diagonal at panel points 22 and on main bearings.

This work is not yet completed.

The last rivet was driven in the shops on 26th November, 1931, on the pylon stairway steelwork. The last rivet was driven in the field at the crown of the arch on 28th August, 1931, and in the deck troughing after the removal of the timber towers supporting the pylon cranes on 21st January, 1932.

The test loading of the approach spans and main span was carried out from 3rd February to 27th February, 1932.

(d) *Painting.*

During the year, the first field coat was applied to:—

1. Outside surfaces and inner floors of the upper and lower chords.
2. The lower portion of the main span cross-girders.

The second field coat was applied to the following during the year:—

1. All roadway and footway parapets on approach and main spans.
2. Trusses and cross frames of span No. 1.
3. On twelve panels of lateral system of upper and lower chords.
4. Exterior surfaces of all hangers.
5. On twelve panels of posts and diagonals.
6. All main span cross-girders excepting the four centre cross-girders which were painted last year.
7. On twenty panels of railway and roadway stringers. The painting was completed during March except for the plated ends of cross-girders at panel points Nos. 20, 18, 16 and 14, southern end.
8. Outside surfaces and inner floors of the upper and lower chords.

The total quantity of paint used in the contract is as follows:—

	Gallons.
Shop priming coat of red lead	18,600
First field coat	9,300
Second field coat	8,200
Total	36,600

3. CONSTRUCTION OF THE SOUTHERN APPROACH BY THE SYDNEY HARBOUR BRIDGE BRANCH.

During the year a considerable amount of leeway had to be made up owing to curtailment of funds during previous years.

(a) *Excavation.*

The excavation amounted to 33,930 cubic yards, the main items being the regrading under the southern approach steelwork and the widening of Argyle Cut.

(b) *Concrete Work.*

A total of 13,969 cubic yards of concrete were poured, of which the concrete slab of Bradfield Highway accounts for 5,398 cubic yards.

(c) *Waterproofing.*

Mastic waterproofing, 72 square yards and fabric waterproofing 702 square yards, a total of 774 square yards, required 83 cubic yards of protective brickwork.

(d) *Roadways and Footways.*

The sheet asphalt of Bradfield Highway was laid to a similar specification to that on the northern approach, with the exception that the bitumen used by one contractor was an oil residual bitumen whereas on the northern side, and for that portion on the southern approach carried out by the City Council, it was Trinidad bitumen. The total area was 21,857 square yards.

The Crescent subways and the pedestrian subway connecting Upper Fort street and York-street North were surfaced with 1½-inch mastic asphalt.

(e) *General.*

In addition to the above, there was a considerable amount of work which included the erection of overhead wiring structures and the casting and erection of the reinforced concrete lamp standards.

The drainage system of the southern approach was laid, entailing the laying of 3,190 linear feet of various sizes of concrete pipes varying from 21 inches to 9 inches in diameter.

Brick retaining walls were completed in Kent-street from Gas-lane and Jenkin-street to Napoleon-street, and on the west side of Bradfield Highway in the vicinity of the Crescent, ordinance fences were erected on them. Blocks were stripped, filling placed and kerb and gutter laid both in Kent-street and Gas-lane. The latter and Jenkin-street were cobbled, and Kent-street penetrated, with the exception of the area clear of the regrading.

P.M.G. cables, City Council cables, tramway feeders, water, gas, and hydraulic mains, and Water Board electric overhead power supply and poles were lifted and re-routed where necessary.

Electric subways and ducts from the Argyle Substation were constructed near the south end of contract.

The old stone arch spanning Argyle Cut was demolished and Argyle Cut widened to sixty feet.

The concreting of the tunnel floors and the laying of precast cable racks, the pouring of drains and the building of a signal hut were completed. The railway tracks were laid, fastened, lifted and concreted in the tunnels and laid on ballast outside. Negative conductor rails were laid where necessary.

The tramway tracks were laid on ballast throughout; crossovers having been assembled above ground and afterwards laid in the tunnel.

In connection with the Opening Ceremony, the dais, various stands, sanitary accommodation sheds, wireless gear huts and electric works, etc., were erected, and afterwards dismantled, police barriers were also distributed along the line of the procession and later collected.

4. FINANCIAL REVIEW.

(a) *Land Tax.*

Under the Sydney Harbour Bridge Act, 1922, a land tax of one-halfpenny in the pound was imposed upon the unimproved capital value of all rateable land within the City of Sydney, the Municipalities of North Sydney, Mosman, Manly, Lane Cove, Ku-ring-gai and Willoughby, the Shire of Warringah and portion of the Shire of Hornsby, to defray one-third of the capital cost of the construction and land resumptions and provide for the maintenance and lighting of the roadway and footways of the Sydney Harbour Bridge and approaches.

During the year, the Sydney Harbour Bridge (Administration) Act, 1932, was passed, and one of its provisions was that the land tax should continue until the year 1939 and that the proceeds therefrom are to be paid to a special account in the Treasury. From this account, interest, maintenance, lighting, collection of tolls and all other outgoings incurred by the Crown apart from the costs and expenses of construction are to be paid.

The tax was first imposed in 1923, the details of the rate levy for the years 1923-32 are shown on the table attached. Of the total of £1,631,614 due to 30th June, 1932, a total of £1,439,952 3s. 8d. had been received, leaving a balance of £191,661 16s. 4d. to be paid before 31st December, 1932.

The table shows the details of rates due since the tax was first imposed, the payments to 30th June, 1932, and the balance outstanding at that date.

Under the Sydney Harbour Bridge (Administration) Act, 1932, the administration, control and management of the Bridge was vested in the State Transport (Co-ordination) Board.

Subsequently, the Ministry of Transport Act, 1932 was assented to and the Transport Co-ordination Board ceased to function, the administration, control and management of the Bridge passing to the Transport Commissioners.

Sydney Harbour Bridge Rate Levy—Amounts Due, Payments and Outstanding Amounts at 30th June, 1932.

	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.	1931.	1932.	Total.	Payments to 30th June, 1932.	Balance Outstanding. 30th June, 1932.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
City Council	74,035 19 0	91,666 4 1	92,149 5 0	92,512 6 1	124,928 15 1	126,967 1 4	125,080 6 11	126,240 15 7	118,604 4 6	99,716 5 0	1,072,801 2 7	945,235 12 0	127,565 10 7
Hornsby Shire Council	3,072 18 6	3,203 11 0	3,326 17 9	3,348 5 6	3,879 2 1	3,826 11 8	3,759 15 2	4,782 5 6	4,659 12 0	4,411 13 4	38,270 12 6	32,034 16 9	6,235 15 9
Ku-ring-gai Municipal Council	6,259 11 2	6,625 0 7	7,703 0 5	7,739 4 8	7,917 16 7	12,075 10 2	12,406 7 10	12,652 12 8	12,721 9 3	10,955 8 11	97,056 2 3	87,369 13 4	9,686 8 11
Lane Cove Municipal Council	2,400 6 10	2,440 14 1	2,440 0 6	3,012 1 11	3,027 18 10	3,014 15 11	3,740 18 11	3,817 13 5	3,871 10 1	3,354 7 4	31,120 7 10	27,539 0 1	3,581 7 9
Manly Municipal Council	5,051 12 1	6,362 16 8	6,437 19 6	6,494 8 4	7,611 12 11	7,580 19 3	7,543 9 11	8,148 13 8	7,588 16 8	6,213 16 8	69,034 5 8	59,960 13 4	9,073 12 4
Mosman Municipal Council	5,357 7 6	5,854 17 3	5,850 3 4	5,900 4 0	6,737 13 11	6,709 11 4	6,230 18 6	8,457 7 8	7,873 6 5	6,994 12 2	65,966 2 1	58,791 1 6	7,175 0 7
North Sydney Municipal Council	9,646 10 2	9,699 12 4	10,943 12 1	10,838 14 3	10,700 8 5	12,599 7 1	12,377 14 5	12,319 2 0	12,994 0 8	10,301 3 9	112,420 5 2	103,327 15 7	9,092 9 7
Warringah Shire Council	3,919 10 7	4,721 3 1	5,647 6 8	7,032 19 1	7,103 4 8	7,812 6 9	8,554 4 1	8,991 0 10	9,223 11 11	7,263 13 10	70,269 1 6	59,956 0 5	10,313 1 1
Willoughby Municipal Council	5,024 10 2	5,294 11 4	5,389 14 5	7,831 11 10	7,824 7 7	7,782 7 10	9,049 10 1	9,240 19 8	9,245 16 10	7,992 10 8	74,676 0 5	65,737 10 8	8,938 9 9
Total	114,768 6 0	135,868 10 5	139,887 19 8	144,709 15 8	179,731 0 1	188,368 11 4	189,643 5 10	194,650 11 0	186,782 8 4	157,203 11 8	1,631,614 0 0	1,439,952 3 8	191,661 16 4

Sydney Harbour Bridge—Expenditure to 30th June, 1932.

Item.	To 30th June, 1923.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	Totals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Main Bridge—Salaries Electrical and Signalling Equipment ...	17,058 7 4*	1,581 5 9	15,821 18 8	12,703 0 0	16,120 17 10	22,093 10 4	31,979 14 1	29,548 0 8	28,490 0 3	71,326 1 7	246,722 16 6
Dorman, Long & Co.—Contract	6,769 4 2	100,029 14 6	450,265 2 1	674,409 5 11	603,760 0 3	1,000,969 16 8	731,448 7 3	470,769 18 11	4,038,421 9 9
Dorman, Long & Co.—Wages Variations	10,101 13 5	38,827 8 8	64,493 11 2	84,633 14 6	141,638 3 5	122,406 19 3	49,098 8 7	511,199 19 0
Dorman, Long & Co.—Excess Overhead	12,035 14 11	7,663 18 11	8,209 6 3	7,154 7 7	35,063 7 8
Dorman, Long & Co.—Painting Cranes	1,312 10 0	.....	3,937 10 0	5,250 0 0
Dorman, Long & Co.—Day Labour	248 4 0	248 4 0
Approaches	91,651 13 6	103,503 3 2	89,133 18 6	86,261 7 1	263,391 13 7	335,836 19 9	169,486 6 6	367,734 9 0	525,240 14 8	2,032,240 5 9
Resumptions	46,195 0 0	73,753 8 7	245,382 3 5	278,799 7 2	432,175 11 7	123,898 15 2	12,156 5 0	39,897 9 3	73,581 8 0	1,325,789 8 2
Lavender Bay Station	43,730 18 0	58,704 9 2	3,274 5 6	4,535 19 4	Cr. 28,469 4 3†	559 7 6	2,700 5 3	Cr. 310 15 5	1,411 13 9	86,136 18 10
Interest on Expenditure	22,619 19 3	35,266 13 1	68,572 19 11	273,519 3 4	283,336 6 3	365,616 15 5	336,919 4 1	1,385,851 1 4
Road at Moruya	150 0 0	.....	.....	.....	.....	.....	150 0 0
Exchange on Remittances, etc.	8,510 10 6	89,540 0 0	99,050 10 6
Total	17,058 7 4	183,158 17 3	258,552 3 9	483,394 14 7	910,076 15 3	1,496,667 8 3	1,466,223 9 6	1,648,811 12 8	1,673,003 1 9	1,629,177 11 2	9,766,124 1 6

* This amount includes all costs involved from the inception of the work in 1900 to 30th June, 1923. † A credit of £31,395 0s. 10d. was received from the Railway Department in June, 1928, in adjustment of amounts over-debited during previous years.

(b) *Expenditure.*

The total expenditure to 30th June, 1932, is shown in the following table. The cost to date of the Bridge and approaches, including land resumptions, accrued interest and all other charges, is £9,766,124 1s. 6d., of which interest and exchange account for £1,484,901 11s. 10d., and resumptions, £1,325,789 8s. 2d.

For the contract of Dorman, Long and Co., Ltd., wages variations due to alterations of awards and the introduction of the shorter working week and the excess overhead consequent thereon is approximately 13½ per cent. of the payment under the contract. This percentage will be reduced to about 13 per cent. on the completion of the contract, when the retention money is paid to the contractors.

5. STAFF.

I wish to express my appreciation of the excellent manner in which the Staff of the Sydney Harbour Bridge Branch carried out their duties during the past year.

J. J. C. BRADFIELD,
Chief Engineer,
Sydney Harbour Bridge.

25th August, 1932.

Government Architect's Branch.

Annual Report for year 1931-32.

The certified expenditure for the year is set forth hereunder :—

Vote or Account.	1931-32.		
	£	s.	d.
Loans	16,450	18	8
Consolidated Revenue	46,131	1	3
Special Deposits	6,292	16	1
Unemployment Relief	54,972	11	4
Other Departments	33,476	19	11
	<hr/> £157,324 7 3 <hr/>		

In addition to the foregoing, work totalling £41,623 12s. 4d. has been supervised for the Department of Education.

UNEMPLOYMENT RELIEF WORK.

The following works, which were referred to under the above heading in the Annual Report for the year 1930-31, were brought to completion during the year 1931-32.

Schools—	£
Canterbury Domestic Science School...	31,000
New Lambton Intermediate Girls' High School and Additions to Infants' School	14,157
Parkes Intermediate High School	11,950
Grenfell Public School	6,000
State Hospitals—	
Liverpool State Hospital—Nurses' Home	11,000
Coast Hospital—Medical Officers' Quarters	6,000
Liverpool State Hospitals—Recreation Hall	2,220
Mental Hospitals—	
Morisset Mental Hospital—Male and Female Admission Blocks	24,000
Broughton Hall Psychiatric Clinic—New Ward Block	14,000
Morisset Mental Hospital—Chronic Male Ward	11,000

DESIGN.

The outstanding feature of the year's work was the completion of the design for the New Medical School at the University. The plans provide for a building comprising a semi-basement, ground floor and four upper floors. Fire-proof construction will be used throughout, the framework consisting of reinforced concrete veneered externally with facing bricks. The roof, of mansard type, will be covered with local slates. The site chosen, although within the University grounds, is as near as possible to the Royal Prince Alfred Hospital, to which it will have connection by means of a covered way. This proximity and access were desired in order to facilitate close co-operation between the medical faculties at the University and at the hospital. Already the foundations of this building have been put in at a cost exceeding £5,000, and a contract for the erection of the super-structure has been let at about £93,000.

As a source of activity, *Mental Hospitals* figured prominently in the year's work. The designs completed comprise additions and new buildings at Gladesville, new units at Callan Park, at Milson Island and at Morisset. At Gladesville Mental Hospital the additional accommodation already planned comprises a second storey to four of the original single storey ward units and a new nurses' quarters block. Plans for the erection of a new hospital ward block for sick and infirm patients are in hand and are being completed as quickly as possible. These works, when carried out, will make provision for nearly 300 patients and 55 nurses, and the expenditure contemplated will exceed £45,000.

Plans and specifications have been completed for a new brick building at Callan Park Mental Hospital to accommodate 80 quiet and industrious patients. In this case the dormitory portion will consist of two floors, while the social services section will be contained in a separate single storey unit connected to the wards by a main corridor. The cost of this building is estimated at about £16,000.

The completed designs for Morisset Mental Hospital comprise two identical ward units for female refractory patients, each capable of housing 40 patients in dormitories and single rooms; a ward block each for male and female industrious patients, each block making provision for 60 patients; a new nurses' quarters block of two storeys capable of accommodating the matron, 22 nurses and 5 domestics; a new laundry block, a new male ward block, to be used temporarily as quarters for warders; an operating theatre and a new administration block. For these new buildings the sum of about £64,000 will be required.

A considerable amount of work has been given to the preparation of contract drawings for the hospital unit of a new hospital for mental defectives, which it is intended to establish at Wood's Point, near Morisset. The buildings at present being designed comprise three two-ward blocks, each capable of accommodating 25 patients, and an operating block which, in addition to the operating theatre and a laboratory, will contain offices and staff rooms. The total cost of this initial unit will be about £18,000.

New drawings and specifications for a dormitory block at Milson Island Mental Hospital have been completed, as have also the plans, etc., for a new kitchen block. These two buildings are expected to cost upwards of £15,000.

Sketch schemes dealt with in connection with *State and Mental Hospitals* include the following :—

A complete scheme for a Criminal Mental Hospital at Wyee (Morisset) estimated to cost £78,000; a quiet and industrious block, an administration block and two hospital ward blocks at Morisset (£40,000); a new ward block for the Repatriation Department within the grounds at Callan Park (£11,000); and an administration block at Lidcombe State Hospital (£5,600).

For the *Hospitals Commission* a fair amount of designing work has also been carried out. Completed designs include those for Camden, the Rachel Forster, Temora, and Wellington Hospitals, where, in each case, somewhat considerable additions and alterations to buildings are contemplated. Working drawings, etc., for a new nurses' quarters at Lismore are almost complete, as are also those for extensive alterations and additions to the Nepean Hospital. Much time and effort have been expended in bringing to an advanced stage the designs for entirely new buildings at Manning River Hospital and Erina Shire Memorial Hospital; also in connection with new and altered buildings at Bourke. These buildings represent an estimated cost of about £130,000, besides which more than a score of lesser hospital schemes have been completed.

Various sketch schemes of new and altered buildings have also been drawn up for consideration. The most important of these includes Lismore District Hospital (£20,000), Mudgee Hospital (£13,700), Glen Innes (£9,150), and Narrabri (£8,500).

Preliminary sketches have been prepared for complete new hospitals for the Eastern Suburbs at an approximate cost of £300,000, and of a new Base Hospital at Orange, the cost of which is expected to reach £80,000.

The activity of the Branch in connection with preparation of designs for the *Department of Public Instruction* was not so apparent as during the year 1930-31, that Department having requested a suspension of action in a number of cases which were in hand. Completed designs for entirely new and detached buildings include Infants' Schools at Marrickville West and Parramatta East, and a Trades School at Wollongong. Plans for Infants' Buildings as additions to schools already existing at Queanbeyan and Harcourt have been finalised, as have also the Contract Drawings for four additional class rooms, etc., to the High School at Tamworth. Much of the designing work required in connection with a new Boys' High School at Newcastle and a new Girls' School at Bankstown has been completed.

Sewerage works have been fairly numerous. Plans and specifications have been prepared covering installations at the following schools :—Arncliffe West, Auburn North, Brighton-le-Sands, Forbes, Granville Public and Granville Trades, Greenwich, Hurstville Central Junior Technical and Northbridge.

Sketch plans undertaken for the Department of Public Instruction include a new School and Architectural Department at East Sydney Technical College at an estimated cost of about £61,000; new buildings for Cessnock High School at an estimated cost of £22,000, and additions to Wollongong Girls' School and Marrickville West School at about £11,000 and £5,900 respectively.

For the *Child Welfare Department*, contract drawings and specifications have been completed for a new hospital block in connection with the Girls' Industrial School at Parramatta.

Contracts for the *Chief Secretary's Department* and the *Justice Department* were not numerous, consisting chiefly of repairs and maintenance work. Sketch plans completed include proposals for new Police Buildings at Belmore, Lane Cove and Tumbulgum, the estimates ranging from about £1,150 to £3,000.

Important additions to other *Public Buildings* dealt with as sketches only, comprise those for the Department of Labour and Industry, £33,900; the Public Library, £25,000; and the National Art Gallery, £19,600.

Nielsen Park—Proposed Bathing Pool and Dressing Pavilion.—Sketch plans have been completed for this work at an estimated cost of £5,000.

Much useful work has been accomplished during the year in the direction of preparing new record plans and in bringing existing record plans up to date. For this purpose all the large Metropolitan Institutions have been visited, existing plans checked, and amended and new measured drawings prepared where necessary.

During the year 112 contracts were prepared, the building work represented having an estimated value of £461,720.

Sketch proposals dealt with are estimated at £1,058,910.

Summary.

Original drawings prepared	...	...	...	.....	...	...	859	
Copies of	"	"	...	...	...	...	2,883	
			Total	...	...	...	—	3,742
Draft specifications prepared	...	...	...	...	...	...	143	
Copies of	"	"	...	...	...	...	1,059	
			Total	...	...	...	—	1,202

BUILDING OPERATIONS.

Apart from Unemployment Relief Works, which were completed during the year 1931-32 and which are referred to elsewhere, the principal buildings erected were :—

SCHOOLS.

Newcastle Domestic Science School—£30,681.—This school is a three-storey brick building with slate roof and includes home and cookery Sections, outbuildings, etc. The 1st and 2nd floor floors are of reinforced concrete overlaid with blackbutt flooring. The work was carried out by the Building Construction Branch.

Mental Hospitals.

Gladesville Mental Hospital.—Additional storeys to male and female blocks—estimated cost, £16,000.—This building is designed to meet the demand for improved accommodation. The additions provide for sleeping accommodation on the 1st floor, which will permit of the use of the present ground floor for recreation and storage purposes.

Hospitals Generally.

Tweed District Hospital, Murwillumbah.—New operating theatre block—completed cost, £1,174.—The new operating block is a single storey building of timber construction. The walls are lined externally with weatherboard and internally with reinforced cement rendering. The ceilings are fibrous plaster and the roof of galvanised corrugated iron. The accommodation comprises operating theatre, anaesthetic room, sterilizer and complete high pressure sterilizing plant, which comprises two water sterilizers, one dressing sterilizer, one box sterilizer, and one instrument sterilizer. The building is fitted throughout with electric light and the unit over the operating table is a modern shadowless light.

General Building Operations.

The new alignment of streets to the southern approach to the Sydney Harbour Bridge necessitated remodelling of the following premises :—

Grafton Bond.—Estimated cost, £2,600.—This work comprises the demolition of front wall of the building and remodelling to suit the new street alignment. Improvements are also being effected to goods lift.

Noyes Bros., Sussex-street.—Remodelling—estimated cost, £7,987.—These premises were remodelled to suit the new street alignments. The front wall was demolished and a new frontage erected on the adjusted alignment. Extensive internal alterations were effected including improvements to goods lift. Special precautions were necessary to combat percolation of water from the roadway above the basement section situated beneath the level of the street.

During the year several building works were carried out at the request of the University authorities. Chief among these works are the following :—

New Medical School—Foundations.—Contract price, £5,090.—The foundations, including extensive excavation and concrete construction, have been completed by the State Monier Pipe and Reinforced Concrete Works. The super-structure is now in course of erection under a separate contract.

New Sports Pavilions.—Contract price, £3,148.—The pavilions are situated on the eastern and western ends of the University Sports Grounds. The new buildings are constructed of brick and synthetic stone roofed in mottled French pattern tiles.

Honour Rolls.—Contract price, £1,473.—The Honour Rolls are of chaste design in bronze and are located in the main portico approach to the quadrangle and the portico has been remodelled to provide a suitable setting.

Orange Ambulance Station.—Completed cost, £2,490.—The building is of brick construction with tiled roof and comprises plant room and offices on ground floor, and Superintendent's flat and bearers' room on 1st floor. The building is situated within the grounds of the Orange Hospital.

General Maintenance Work.

During the year an amount of £32,687 has been spent in maintenance of public buildings in the Metropolitan area.

ENGINEERING.

The work of this section of the branch has proceeded along similar lines to previous years, with the exception that increased attention has been devoted to standardisation, plant operation, maintenance, and application of fuel, electricity, and gas. The result has been that savings totalling over £20,000 were achieved for departments interested during the financial year.

The value of works undertaken during the year is as follows :—

Proposals.	Working Drawings.	In Hand.	Completed.
£	£	£	£
57,193	17,790	16,741	26,583

Apart from the abovementioned activities, the Engineering Section has become the determining authority in the control of the undermentioned items of expenditure :—

	Annual Expenditure.
(1) Public Institutions—Fuel of all kinds	£20,133
(2) Public Institutions and Government Buildings—Electricity and Gas... ..	45,700
(3) Public Institutions and Government Buildings—Public Telephones, including BO6 network	27,372
Total	£93,205

As a result of the close relationship existing between design, maintenance, and application of fuel, electricity and gas, the reduction in cost throughout the larger Public Institutions total £9,455 for the last financial year, despite an increase of 340 occupied beds and large increases in essential plant and equipment.

EVAN SMITH, F.R.I.B.A.,
Government Architect.

September, 1932.

*91683—D

Engineering Design Branch.

Annual Report, 1931-32.

I submit herewith report on the operations of the Branch for the twelve months period ending 30th June, 1932, being the third annual report since its inception.

The past year has been a particularly active one in so far as the operations of the Branch are concerned, especially with regard to Water Supply and Sewerage works, for which the designs were required as a matter of great urgency, entailing considerable additional work in the preparation of plans. It is only recently with the improved facilities under the rearrangement of amalgamated drawing offices that it has been possible for these works to be utilised for urgent unemployment relief.

The work performed during the year included the following (the order of the list being made to accord with the work attended to for the different branches, although as stated previously such divisions no longer exist with regard to design, these now falling into the natural divisions of civil, mechanical and electrical sections).

Bridges.

Preliminary designs and estimates were prepared for crossing over the Hunter River at Melvilles Crossing, for Fowlers Swamp Creek (near Kiama); also for Shannon Vale Crossing, Glen Innes, in connection with the water supply. Investigations with regard to the strengthening of the Gasworks Bridge (Parramatta) are in hand.

Plans and specifications were prepared for Fowlers Swamp Creek (Mullengandra to Cumboroona road deviation).

Plans and specifications for 75 bridges (166 plans) on main roads were examined and transferred to the Main Roads Board.

Harbour Works.

Further designs and estimates (preliminary) were prepared for additional wharfage facilities at Port Kembla, also for the lighting of Tomago Rocks, Hunter River. Numerous sketches, designs and estimates, returns, etc., were prepared in connection with coastal harbour construction and maintenance.

Detailed drawings were checked and examined for the dredge plant under construction at the Government Dockyard, Walsh Island, Newcastle, "Pluto," 100 plans.

Swamp Drainage.

Further preliminary designs and estimates were prepared in connection with Tuckean Swamp (Coraki). Investigations with regard to Lavender Swamp (Murwillumbah) and Martin Swamp (Clarence River) were also attended to.

Water Supply.

Preliminary designs and estimates were prepared for new schemes for Bombala, Coffs Harbour, Greta and Branxton, Hillston, Kandos, Kempsey and Lower Macleay, Kyogle, Manilla, Moruya, Tumbarrumba and West Narrabri, and for additions and alterations (or extensions) at Albury, *Bathurst, Cowra, Forbes, Glen Innes, Grafton, Jerilderie, Katoomba, *Kiama, Lismore, Mudgee, *Nowra, Orange, South West Tablelands, Tamworth, Urana and Wentworth, as well as other minor works.

Plans and specifications were prepared for alterations, additions and/or extensions at *Bathurst (Winburndale Scheme), Bourke, Broken Hill, Casino, Culcairn Glen Innes, Goulburn, Katoomba, Lismore, Mudgee, Morisset Mental Hospital, Nyngan, Orange and South West Tablelands (including deaeration) in addition to other minor works, and are at present in progress for Coonabarabran, Gulgong, and Manilla (new schemes), and Broken Hill, Goulburn and South West Tablelands, many special details being required for the last mentioned works.

Sewerage.

Plans and specifications were prepared for No. 3 Pumping Station at Lismore, for a complete new scheme for Mudgee, and for Parkes; also for alterations and additions to the treatment works at Bathurst and Goulburn.

Plans and specifications are in progress for extensive alterations at Katoomba, and for additions at Morisset and Rydalmere Mental Hospitals.

Stormwater Drainage.

Plans and specifications were prepared for Salt Pan Creek Channel, Appian Way Branch (Bankstown), for Powells Creek (Homebush) extension Strathfield Creek Branch.

Electrical.

Detail plans were prepared for the installation of a second transformer bank in the main step-up station at Burrinjuck; also preliminary designs for proposed step-up substation at future No. 2 Power House and for interconnection with the existing system. Extensions to the reticulation of the Port Kembla system were prepared.

Other work attended to included, standard arrangements in connection with transmission and metering equipment, wiring and operating diagrams, data and log sheets for use in the field, also the collection of statistics with regard to electricity supply.

*Supplementary Schemes.

River Murray Works.

Detail drawings for Hume Reservoir have been attended to as required. Drawings Nos. 83 to 88 relating mainly to the roadway over the structure were prepared. Drawings Nos. 37, 37A, 38, 38A, 78, 79, relating mainly to reinforcement in connection with stoney sluice wells were approved by the River Murray Commission during the year.

Plans and specifications were prepared for auxiliary hydro-electric plant.

Plans in connection with electric operation and control of the gates and valves are in hand.

General.

Standard Specifications (A.C.E.S.A.)—The specification for reinforced concrete pipes (Road-making Materials Committee) was revised and referred back to the sub-committee in Victoria.

The specification for General Conditions of Contract is in course of preparation.

Extraneous.—As in previous years inspections, tests and trials of plant and machinery, relief of officers in other branches, etc., have been attended to from time to time by members of the Drawing Office staff.

Staff.—The staff at present consists of the following officers:—35 professional, 3 clerical, 8 general; total, 46. The services of Mr. H. Leahy, Designing Engineer, second in charge of the branch, were lost owing to his untimely decease, and Mr. R. Rutledge (Sewerage Section) reached the age of retirement. Officers in all sections have shown keen interest in the work of the Department and made every effort to cope with special calls on them during the year.

G. B. CARLETON, M.Inst.C.E.,
Principal Designing Engineer.

7th October, 1932.

Survey and Survey Drafting Branch.

General survey drafting, heliographing, plan mounting and recording were carried out in connection with the following works :—

Country Towns Sewerage.

Albury, Armidale, Cessnock, Casino, Dubbo, Forbes, Grafton, Glen Innes, Goulburn, Griffith, Hamilton, Katoomba, Leeton, Lithgow, Mudgee, Morisset Mental Hospital, Newcastle, Parkes, Tamworth.

Country Towns Water Supply.

Albury Extensions, Armidale, Bathurst, Blue Mountains Shire, Brewarrina, Bowral, Burradoo, Canowindra, Condobolin, Cobar, Grafton, Glen Innes, Greta, Grenfell, Kiama, Kempsey, Molong, Moss Vale, Moruya, Muswellbrook, Medlow Bath, Narrandera, Nowra, Orange, Picton, Tamworth, Tumut, Wagga Wagga, Werri Creek.

Stormwater Channels.

Bankstown, Homebush, Newcastle (Throsby Creek and Cottage Creek Channels), Lidcombe, West Kempsey.

Electrical Development.

Easements and resumptions in connection with the Burrinjuck Hydro-Electric Scheme and the Port Kembla Electricity Supply.

Harbours and Rivers.

Broken Bay and Hawkesbury River, Hunter River (North Channel), Cook's River and Shea's Creek, Coff's Harbour, Botany Bay, Port Stephens, Myall River, Port Kembla, Nambucca River, Tweed River, Newcastle Harbour, Bateman's Bay, Clarence River and Wagonga Inlet.

Swamp Drainage.

Austral-Eden and Marriott Drainage Unions.

Public Watering Places.

Plans and descriptions were prepared in connection with the establishment of four watering places, three were revoked and seven partly revoked.

Local Government.

Descriptions were prepared of alterations to the boundaries of 38 municipalities and shires and in connection with residential districts in 11 municipalities and shires. Action was taken in connection with resumptions, etc., for 33 municipalities and shires and 55 plans prepared.

Murray River Waters Act.

Upper Murray Storage and Bethunga Bridge road deviation.

Land Matters.

Information on legal and land matters was obtained by search for practically all resumption and easement plans, also in connection with public watering places and other works generally.

General.

Three hundred and sixty-seven plans and descriptions for resumptions, easements and appropriations, etc., were drawn and prepared; 9 detail sheets were drawn and traced, and 289 miscellaneous drawings including plans, sections, diagrams, capacity curves and tables were prepared.

The number of files dealt with was 4,016.

Helios to the number of 22,165 were printed and 1,436 plans mounted. This includes (in addition to work for this Department) heliographing and plan mounting for the Valuer-General's and Fisheries Departments.

In the Plan Room 1,876 new plans and 384 Field and Level Books were registered and 14,266 plans were issued and returned.

Survey.

Field surveys were carried out in connection with the following :—

Mudgee Sewerage (including detail survey), Katoomba Sewerage, Casino Sewerage, Leeton Sewerage; Katoomba Water Supply, Bathurst Water Supply, Kiama Water Supply; Throsby Creek Stormwater Channel, Cottage Creek Stormwater Channel, Powell's Creek Stormwater Channel; Koorawatha to Grenfell, Murrumburrah to Cootamundra, Gundagai to Tenandra, Galong to Marilba, Marilba to Yass, Bogalara to Canberra Transmission Lines; Malacoota Road extension; Parramatta Cottage Homes Sites, Botany Fire Station, Gladesville Mental Hospital Site, Public Schools A.A. Association, Upper Murray Storage Land Matters; Sydney Harbour Bridge, Cook's River and Shea's Creek, Bateman's Bay, Coff's Harbour, Nambucca River, Clarence River, Tweed River, Hunter River, Port Kembla, Wagonga Inlet, and State Metal Quarries, Kiama.

2nd August, 1932.

T. G. WILSON,
Officer-in-Charge of Surveys.

Testing and Inspection Branch.

Annual Report, 1931-32.

Herewith is submitted report on the operations of the Testing Branch for year ending 30th June, 1932.

The estimated value of the material sampled, tested and inspected before being despatched from the manufacturer amounted to approximately £424,191. The fees charged for the work carried out amount to £5,308 4s. 6d.

Cement Testing.

Four hundred and forty-seven (447) certificates covering the sampling, testing and issuing of 1,289,240 jute bags of cement of an estimated value of £337,599 were issued during the year. Fees amounting to £2,590 were charged for the work carried out.

Steelwork Inspection.

Three thousand eight hundred and thirty-six (3,836) tons of rails, fishplates, structural steel, mild steel and cast iron pipes, etc., together with 641 valves and hydrants and 93 unclassified miscellaneous jobs of an estimated value of £86,592 were inspected and tested prior to despatch from various works at Newcastle. The fees charged for the work carried out amounted to £1,743. Two thousand five hundred and seventy-six (2,576) M.S. pipes were sent forward on account of the South West Tablelands Water Supply. A total of 461 consignments were dispatched.

Miscellaneous Investigations.

Four hundred and twelve (412) reports covering 1,187 tests of concrete cubes, iron and steel bars, paints, oils and asphaltum, etc., were carried out in the Testing Branch laboratories. Fees charged for the work performed amounted to £974.

One hundred and ninety-seven instruments were overhauled and repaired by the Instrument Maker.

Summarised details of the work carried out are given in the following statement :—

Summary of Work carried out.

Particulars of Service.	Unit.	Quantity.	Reports.	Tests.	Estimated Value.	Fees.
					£	£ s. d.
Cement Testing	Bags	1,289,240	.....	447	337,599	2,590 5 0
Steelwork Inspection—						
Rails and fishplates	Tons	662	.....	.....	8,085	57 19 9
Structural steel	"	817	.....	.....	10,621	101 15 6
Pig-iron	"	39	.....	.....	234	0 9 9
Cast-iron pipes and castings	"	349	.....	.....	6,685	112 12 2
Mild steel pipes	"	1,969	.....	.....	38,667	834 13 2
Valves and hydrants.....	No.	641	.....	.....	2,547	19 7 0
Miscellaneous jobs	"	93	.....	.....	19,753	616 19 3
Miscellaneous Investigations—						
Concrete cubes .....	" .....	.....	208	706	.....	279 11 0
Sand.....	" .....	.....	21	35	.....	50 0 9
Iron and steel.....	" .....	.....	72	236	.....	96 2 6
Paints, oils, etc. ....	" .....	.....	10	31	.....	76 4 6
Asphaltum .....	" .....	.....	17	50	.....	87 8 8
Coal .....	" .....	.....	2	2	.....	4 0 0
Miscellaneous (not classified) .....	" .....	.....	82	127	.....	249 16 6
Standardised sand	Cwt.	75	.....	.....	.....	130 19 0
Instrument maker.....	No.	197	.....	.....	.....	.....
Totals .....	.....	.....	.....	.....	424,191	5,308 4 6

A. MORRISON,

Superintendent of Testing and Inspection.

The Director.

Walsh Island Dockyard and Engineering Works, Newcastle.

Annual Report, 1931-32.

In common with many other large Engineering Works in the Commonwealth, the Walsh Island Dockyard has had a very lean time during the past year. The scarcity of engineering work in Australia and the curtailment of Governmental expenditure have been the factors in the falling off in the Dockyard's activities.

The Ladder Dredge "Pluto" has been practically completed, and almost all the 15-inch diameter Mild Steel Pipes for the South West Tablelands Water Supply have been delivered.

A contract was secured for extensive repairs to the S.S. "Newton Elm," which proved successful both from the point of view of cost and the delivery of the vessel before the time specified in the contract.

During January of this year a change was made in the Management and a Committee was appointed consisting of the Director for Public Works, Mr. G. W. Mitchell, as Chairman; Mr. T. H. Tennant, Acting Manager, and Mr. L. Wells, Employees' Representative. The first meeting of the Committee was held on the 23rd February, 1932.

The Committee immediately reviewed the overhead charges, making a number of alterations which considerably reduced the expenses in this direction. The previous system of rationing was discontinued and a uniform working week of 35 hours instituted, which has resulted in savings in power, ferry service and supervision. It was found necessary to dispense with a number of the staff.

Notwithstanding these economies the scarcity of engineering work and the keenness of competition did not permit of a sufficient turn-over being secured to enable the operations of the Establishment to be carried on without loss.

There are 108 Apprentices to be kept in employment, providing a problem that can only be satisfactorily solved by increased activity.

The governing factor in making ends meet is the securing of a turn-over commensurate with the Overhead Expenses, and every effort is being made towards obtaining the requisite volume of work.

At the end of the year the number of employees was 525, inclusive of 108 Apprentices referred to.

Among the jobs which passed through the shops were :—

Parapets and overhead structures for Sydney Harbour Bridge.

Dished ends for the Meat Industry Board.

Repairs to Floating Plant for the Main Roads Board and Public Works Department.

Spelter and Lead Pans for Rylands Bros, Ltd.

Annealing Covers for Lysaghts Ltd.

Valves and Special Pipes for Public Works Department and Metropolitan Water, Sewerage and Drainage Board.

Twelve (12) steamers ranging from 1,675 to 5,041 tons were docked in the larger section of the Floating Dock and twelve (12) in the smaller dock. It is pleasing to record that very satisfactory reports have been received from the various Shipping firms who have made use of this plant, the work being expeditiously carried out and at a cost comparable with similar work elsewhere in the Commonwealth.

T. H. TENNANT,

Acting Manager.

25th July, 1932.

31ST MARCH. 1928

30TH JUNE. 1928.

30TH SEPTEMBER. 1928

31ST DECEMBER. 1928.

31ST MARCH. 1929.

30TH JUNE. 1929.

30TH SEPTEMBER. 1929.

31ST DECEMBER. 1929.

31ST MARCH. 1930.

30TH JUNE. 1930.

30TH SEPTEMBER 1930.

31ST DECEMBER 1930.

31ST MARCH 1931.

30TH JUNE 1931.