

WATER RESOURCES

WATER RESOURCES AND THEIR MANAGEMENT

Introduction

The Victorian water sector employs about 14,000 persons in approximately 170 separate organisations and has a combined annual turnover approaching \$1,000m. Currently the Victorian Government is in the process of reforming the sector and over the past two years, a number of changes have occurred:

- (1) creation of the Department of Water Resources to act as the primary source of advice on all matters of State water policy and programme development and implementation;
- (2) restructure of the Melbourne and Metropolitan Board of Works to facilitate a different emphasis on functions and responsibilities;
- (3) creation of the Rural Water Commission as a utility to provide a range of water services to specific non-metropolitan water users (primarily irrigators);
- (4) creation of the Mornington Peninsula and District Water Board – a major regionally based water authority which provides a range of services; and
- (5) restructure of a large number of small water authorities, reducing the number to 145, that will provide water supply and sewerage services to urban centres across Victoria.

These changes have already had some effect in that they have:

- (1) reduced the excessive fragmentation of the water sector;
- (2) enhanced the capability of water agencies to provide services effectively and efficiently;
- (3) enhanced the accountability of water bodies to government and Parliament; and
- (4) enhanced the capacity of the water sector to provide comprehensive advice on matters of State wide and inter-regional water policy and planning.

Department of Water Resources

The Department of Water Resources was established on 1 July 1984 under the *Water (Central Management Restructuring) Act 1984*, as the central management agency for the water sector. In this role the Department is responsible for the provision of comprehensive policy advice to the Minister and the monitoring of policies and programmes of all agencies in the water industry.

The Department's objectives, as provided for in the *Water (Central Management Restructuring) Act 1984*, are to provide advice to the Minister on all matters relevant to the activities or functions of the Department to ensure:

- (1) that the water resources of the State are managed in ways which are most beneficial to the people of Victoria;
- (2) that water services are provided to local communities to the extent and to standards appropriate to the needs of those communities;
- (3) that water services and associated management, are provided and administered efficiently, economically, and in a manner fully accountable to the Victorian Government and the people of Victoria;
- (4) that there is security in the water sector, a working environment which is safe and satisfying; and
- (5) that the management of water resources and the provision of water services are undertaken in a socially and environmentally responsible manner, and in consultation with the appropriate authorities.

During 1986, critical areas of activity are:

- (1) reformation of legislation related to the water sector so that it clearly identifies government

- objectives and ensures effective and efficient management of Victoria's water resources;
- (2) the upgrading of State wide policy, planning, and management capabilities;
 - (3) further development of water pricing and financing for the water sector;
 - (4) the provision of support to the Ministerial Task Force associated with the State Salinity Strategy;
 - (5) the provision of support and recommendations to ministerial level discussion pertaining to the management of the River Murray-Darling Basin;
 - (6) implementation of the strategy plan to upgrade the quality of drinking water in Victoria;
 - (7) development of a State wide water sector information network;
 - (8) establishment of new structures, functions, and legal basis to ensure effective river management;
 - (9) development of a regional strategy plan for Geelong and the south-west of Victoria;
 - (10) assessment of personnel practices in the water sector; and
 - (11) development of an econometric model for the long-term optimisation of resource management.

As the Victorian water resources have been largely developed, a major role for agencies operating in the water sector is to establish effective management and planning techniques. The Department of Water Resources is currently developing a comprehensive data base to provide the basis for effective planning and management. It is also taking a longer term view of policies relevant to the water sector as a whole.

The operation of water resources is managed by the Melbourne and Metropolitan Board of Works and the Rural Water Commission, as well as the regional water bodies and water and sewerage authorities.

MELBOURNE AND METROPOLITAN BOARD OF WORKS

Introduction

The Melbourne and Metropolitan Board of Works is the authority empowered to provide, control, and manage the metropolitan water supply system; to provide the metropolitan area with an efficient sewerage system; and to deal with main drains and main drainage works, which includes controlling and managing the rivers and creeks within the metropolitan area. Other responsibilities include the development of metropolitan parks and waterways in specific areas of the metropolitan area as part of a long-term plan to ensure adequate recreational facilities for Melbourne's urban dwellers, and to develop strategies for the safe storage, transport, recycling, and disposal of industrial waste.

Melbourne's water storages

Water to Melbourne and the metropolitan area is supplied from nine major storage reservoirs drawing on the water resources of mountain catchment areas. Aqueducts and pipelines carry the water from on-stream storages distant from the city to off-stream water reserves located around the perimeter of the metropolitan area. Water is then conveyed to service reservoirs and elevated tanks throughout the suburbs for distribution to consumers.

The major storages, and their capacities in megalitres, are: Yan Yean (30,000); Maroondah (22,000); O'Shannassy (4,000); Silvan (40,000); Upper Yarra (200,000); Greenvale (27,000); Cardinia (287,000); and Winneke (95,000). Total storage capacity of the system is 705,000 megalitres. The Thomson Reservoir adds another 1.1 million megalitres of water storage and gives Melbourne a supply system with a storage capacity equivalent to three times the expected annual demand.

MELBOURNE AND METROPOLITAN BOARD OF WORKS, RESERVOIRS AND THEIR CAPACITY, 1984-85

Reservoir	Usable storage capacity	Volume held in storage
	'000 megalitres	megalitres
Yan Yean	30	17,273
Maroondah	22	9,424
O'Shannassy	4	1,760
Silvan	40	29,578
Upper Yarra	200	113,302
Greenvale	27	20,034
Cardinia	287	193,472
Winneke	95	70,436
Thomson (a)	1,100	210,889
Total	705	455,279

(a) The Thomson Reservoir is not yet in use. Figures for this reservoir are not included in the total.

**MELBOURNE AND METROPOLITAN BOARD OF WORKS, WATER
SUPPLY SYSTEMS, STREAMFLOW YIELDS**
(megalitres)

Year	Yan Yean	Maroondah	O'Shannassy	Upper Yarra	Thomson diversion	Total water yield
1979-80	14,300	60,400	92,500	122,400	76,800	366,400
1980-81	10,900	82,800	114,400	183,800	112,400	504,300
1981-82	16,800	90,400	116,200	189,200	105,000	517,600
1982-83(a)	5,600	42,400	59,100	66,100	23,900	197,100
1983-84	15,100	84,400	120,000	186,500	112,200	518,200
1984-85	12,500	106,500	114,700	221,400	14,200	469,300

(a) The year 1982-83 was a period of major drought.

NOTE. The yield shown for O'Shannassy includes the yield from Coranderk, for the years 1979-80 to 1980-81 inclusive.

Cost of water supply system

The cost of capital works in respect of the water supply system under the control of the Board is shown in the following table for each of the years 1979-80 to 1984-85.

**MELBOURNE AND METROPOLITAN BOARD OF WORKS, CAPITAL OUTLAY ON
WATERWORKS**
(\$'000)

Particulars	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
Yan Yean system (including Greenvale)	27	17	12	40	24	53
Maroondah system (including Watson's Creek and Winneke)	49,177	31,104	11,923	2,132	1,046	1,261
O'Shannassy, Upper Yarra, and Thomson system (including Silvan and Cardinia)	22,672	36,555	61,078	71,983	62,138	51,468
Service reservoirs	3,935	5,916	10,070	9,823	3,630	8,318
Large mains and pumping stations	5,097	3,992	13,087	20,797	30,856	27,081
Reticulation	14,108	17,418	19,125	18,777	21,557	22,118
Afforestation	-	23	8	-	-	-
Investigations, future works	Cr.308	Cr.589	Cr.163	Cr.1,192	Cr.1,044	Cr.682
Total outlay	94,708	94,436	115,140	122,360	118,207	109,617

Consumption of water

Total water consumption for 1984-85 was 420,233 megalitres. Rainfall over the catchment areas averaged 1,169mm, the long-term weighted average rainfall being 1,240mm. At 30 June 1985, there were 977,887 properties or an estimated 2,504,000 persons in Melbourne supplied with reticulated water.

During the year ended 30 June 1985, the maximum consumption of water in Melbourne and suburbs on any one day was 2,385 megalitres on 15 January 1985, and the minimum consumption was 730 megalitres on 10 June 1985.

The following table shows, for each of the years 1979-80 to 1984-85, the number of properties supplied with water and sewers, the quantity of water consumed, the daily average consumption, the daily average consumption per head of population served, etc.:

**MELBOURNE AND METROPOLITAN BOARD OF WORKS,
WATER SUPPLY SERVICES, CONSUMPTION AND SEWERAGE CONNECTION (a)**

Particulars	Unit	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
Estimated population supplied with water	'000	2,472	2,527	2,545	2,569	2,501	2,504
Improved properties supplied with water	'000	899	914	931	948	963	978
Properties with water	'000	755	765	773	785	796	816
Water consumption -							
Annual total	'000ML	447	453	451	356	373	420
Average daily	ML	1,221	1,242	1,237	975	1,020	1,151

MELBOURNE AND METROPOLITAN BOARD OF WORKS,
WATER SUPPLY SERVICES, CONSUMPTION AND SEWERAGE CONNECTION (a) – *continued*

Particulars	Unit	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
<i>Water consumption – continued</i>							
Maximum day	ML	2,680	2,933	2,838	1,848	1,914	2,385
Minimum day	ML	714	771	786	614	628	730
Storage capacity (usable)	'000ML	610	704	704	705	705	705
Ratio of usable storage capacity to annual consumption		1.36	1.55	1.56	1.98	1.89	1.68
Daily average consumption per head	litres	495	491	486	380	407	460
Improved properties for which sewers were provided at 30 June	number	768,647	793,118	820,075	843,539	865,392	883,272

(a) Figures exclude water supplied to the Mornington Peninsula.

MELBOURNE AND METROPOLITAN BOARD OF WORKS,
WATER CONSUMPTION (a)
(megalitres)

Particulars	1983-84	1984-85
Annual total	385,484	436,218
Daily average	1,053	1,195
Maximum day	1,963	2,460
Minimum day	661	756

(a) All figures include water supplied to the Mornington Peninsula, i.e. 12,524 ML in 1983-84; and 15,985 ML in 1984-85.

Sewerage system

General description of the sewerage system

Melbourne's sewerage system has two main component parts: the Werribee Farm, or Western System, which serves mainly the northern and western areas of the metropolitan area; and the South-Eastern System which caters for development north-east, east, and south-east of Melbourne.

The Werribee Farm has been in service since 1897 and purifies and disposes of about 67.5 per cent of the flow from Melbourne's sewered areas. Depending on the time of year, land filtration and lagooning are used to purify raw sewerage before the resultant 'reconditioned water' is discharged through drain outlets into Port Phillip Bay. Land filtration is used in summer, grass filtration in winter, and lagooning for excess wet weather flows and as a year-round supplementary treatment method. Lush vegetation growth at the Farm, promoted by the nutrients in sewage applied to land and grass filtration areas, is grazed by cattle and sheep, and substantial numbers of animals are sold each year to help offset the cost of sewerage treatment at the Farm.

While the Farm has been serving Melbourne for more than 85 years, urban growth and industrial expansion have necessitated far-ranging expansion of the sewerage system in recent years. The South-Eastern Sewerage System, commissioned in September 1975, is the most significant recent addition.

It has four component parts—the South-Eastern Trunk Sewer, a main sewer conveying sewage by gravity from Kew to Carrum; intercepting systems diverting sewage from existing main sewers into the trunk sewer; a purification plant, located near Carrum and being built in two stages each of 290 megalitres a day capacity (mean dry weather flow), and a 56 kilometre outfall from the plant discharging purified wastewater into Bass Strait near Cape Schanck.

As the keystone of the South-Eastern project, the plant is one of the most modern of its type. It is set in 616 hectares which have been landscaped to blend with the surrounding countryside at Carrum. The plant uses the activated sludge process to produce a colourless, odourless, reconditioned water. Electric power is generated on-site from by-product gas, and the plant has a first-stage capacity to serve a population of 900,000.

The main section of the South-Eastern Trunk Sewer extends for some 33 kilometres from Kew to Carrum and comprises 23 kilometres of tunnel from Kew to Braeside and 9 kilometres of conduit constructed by the open cut method from Braeside to Carrum. The outfall from Carrum to Bass Strait was constructed with tunnelling and trenching methods.

The Dandenong Valley Trunk Sewer has now been constructed from Carrum to Ringwood and serves development in the Dandenong Creek catchment. Commissioning of this major trunk sewer provides for a future population of some one million people. It has enabled removal of four neighbourhood sewage treatment plants which were used to provide sewerage facilities earlier than would have otherwise been possible.

As development in Croydon and parts of Knox and Lilydale progresses, a further extension of the trunk sewer will be required.

Regional and smaller neighbourhood sewage treatment plants are used to provide facilities for developed areas which are remote from the main gravity sewerage system. They will be phased out as the gravity mains are extended.

Further major sewerage works will be necessary to cope with the expanding metropolitan area. Work has started on the \$266m Western Trunk Sewer to replace the existing Main Outfall Sewer between Brooklyn pumping station and Werribee. The Main Outfall Sewer is now overloaded and also has severe structural deterioration.

Other planned sewerage amplification works include the North-Western Sewer which is required to provide for present and future development in the western sector of Melbourne and provision of sewerage services to townships in the Upper Yarra Valley for which the Board assumed responsibility recently.

The Board is also the authority for the disposal of stormwater in metropolitan Melbourne, and the main drainage system is separated from the sewerage system. Responsibility for street drainage flowing into the main drainage system rests with the various municipalities.

At 30 June 1984, 865,000 properties were provided with sewerage, representing a total population of about 2,361,000 people. The total cost of the sewerage system to that date was \$1,259,981,000.

The cost of sewerage works during each of the years 1979-80 to 1984-85 is shown in the following table:

**MELBOURNE AND METROPOLITAN BOARD OF WORKS, CAPITAL OUTLAY ON
THE SEWERAGE SYSTEM
(\$'000)**

Particulars	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
Farm purchase and preparation	1,793	2,032	1,233	2,194	3,898	5,378
Treatment works	2,675	4,611	2,805	5,004	5,028	6,744
Outfall sewer and rising mains	104	825	1,150	1,039	211	280
Pumping stations, buildings, and plant	865	855	1,799	4,485	2,771	4,652
Main and branch sewers	17,463	18,426	21,853	24,841	35,828	36,465
Reticulation sewers	45,128	54,586	58,994	49,809	50,729	61,317
Sanitary depots	1	Cr.34	-	-	-	-
Investigations	Cr.377	Cr.349	Cr.357	Cr.359	Cr.2,797	Cr.2,792
Total outlay	67,652	80,952	87,477	87,013	95,668	117,628

Disposal of nightsoil from unsewered premises

The responsibility for the collection, removal, and disposal of nightsoil from unsewered premises within the Melbourne metropolitan area was transferred from the individual municipal councils to the Melbourne and Metropolitan Board of Works by legislation in 1922. By agreement, each council pays to the Board a prescribed amount per annum to offset the cost of the service, etc. For the year 1984-85, working expenses were \$402,505, costs of conveying and treatment \$107,255, and interest \$57,027, making a total of \$566,787. Revenue was \$348,144, giving a deficit of \$218,643.

Drainage

The Board has been responsible for main stormwater drainage in the Melbourne metropolitan area since 1924. The current drainage area under the Board's control covers some 4,385 square kilometres. Besides being responsible for underground drains and the smaller creeks and watercourses, the Board also has responsibility over the metropolitan rivers within the drainage area. Local drainage responsibilities, namely those areas draining less than about 60 hectares, rest with the respective municipal councils.

The drainage functions of the Melbourne and Metropolitan Board of Works are aimed at the control of flooding, erosion, prevention of pollution and spread of disease, environment protection, and improved flood prediction and include construction of works, maintenance of works and natural channels, and policing of regulations. The Board carries out necessary maintenance to ensure the

required waterway area remains available. Such maintenance includes the removal of sediment, erosion prevention measures, clearing debris and rubbish, and de-snagging. In so doing, the appearance of the creeks and watercourses is preserved and dangerous areas eliminated.

At 30 June 1985, the total length of constructed drains under the Board's control was 575 kilometres.

Waterways management

With increased emphasis on recreational use of waterways and nearby lands, the Board has been heavily involved in providing information for various studies and reports on such matters. During 1983-84, these included the Lower Yarra and Maribyrnong River Concept Plans and the Upper Yarra River Management Strategy Report.

A more natural treatment of streams is to be stressed in future flood plain management and strategic planning of watercourses. Forward plans will be prepared for large drainage catchments for optimum use of retarding basins and for non-structural treatment of floodways. Development on lands liable to flooding will be controlled. In the current review of metropolitan open space policy, the Board is working towards the preparation of open space planning guidelines and a revised financial policy. A greater emphasis will be placed on the promotion and development of a linear open space network, particularly along urban waterways.

The Yarra River and its immediate environs is treated primarily as an open space system for nature conservation and recreation with provision, where appropriate, for primary production and forestry.

Consistent with these objectives, the Board is charged with the responsibility for preparing and implementing concept plans for the lower reaches of the Yarra River and similar plans for the lower Maribyrnong River. A concept plan for the Yarra River from Punt Road to Dights Falls went on public exhibition in 1985. The Board has recently completed the beautification of the Yarra River South Bank as the first stage of implementing the Lower Yarra Concept Plan approved in 1982.

Metropolitan parks

The primary objectives for the parks system, outlined in 1975 and re-affirmed by the Board in 1983, are to:

- (1) provide for people of all ages and abilities, a range of recreational and educational opportunities of a regional nature and generally not provided elsewhere in the metropolitan area;
- (2) protect and enhance existing environmental resources so as to develop satisfying high quality natural and rural open space landscapes; and
- (3) develop historical, recreational, and educational facilities appropriate to the type, scale, and quality of surrounding land-uses.

The Board continued to buy land for its metropolitan parks, adding 61 hectares at a cost of \$4,146,021, thus bringing the total area in Board ownership to 2,516 hectares, and total cost of acquisition to 30 June 1985 to \$43m.

Park management

Apart from the developed picnic parks, management is orientated towards the protection of natural resources through fencing, revegetation, and pest eradication. Public access is being provided to see commercial orchards, market gardens, farm animals, and crop production areas. Emphasis is on facilitating access to high quality landscapes, particularly visual and pedestrian access.

Interpretation is becoming increasingly important, particularly of rural activities and natural features.

Management prescriptions are being prepared to guide field staff in the sensitive management of the parks' natural resources. The need for comprehensive management plans and 'minimum damage' land improvement policies have been recognised as a high priority.

Reservoir parks with picnic facilities exist at the Maroondah, Upper Yarra, Silvan, Cardinia, Yan Yean, Toorourrong, Greenvale, and Winneke Reservoirs, at Coranderrk Weir, Fernshaw, Donnelly's Weir, and the top of Black Spur – the latter four all being in the vicinity of Healesville. The metropolitan parks are:

- (1) Dandenong Valley, in the valley of the creek between Boronia Road and Wellington Road. This is being developed and will eventually comprise 1,330 hectares: sections totalling 246 hectares are now open to the public;
- (2) Maribyrnong Valley, off the Calder Highway at Keilor, will eventually cover 460 hectares, including both MMBW and council-managed land. The Brimbank Park section of 146 hectares is now open;

- (3) The Yarra Valley Park will eventually occupy 1,432 hectares along the river from Burke Road, Ivanhoe to Pound Bend, Warrandyte. Initial development has been centred on Banksia Park, off Templestowe Road, Bulleen and Westerfolds Park, off Porter Street, Templestowe;
- (4) The Spring Park Golf Course (6 holes) at the corner of Springvale and Lower Dandenong Roads;
- (5) Point Cook, off Aviation Road, adjoining the RAAF Base, will be of 933 hectares. The Board now manages 447 hectares, including a beach recreation use; and
- (6) Werribee Park, including the historic Chirnside mansion and 131 hectares of formal garden and free range zoo operated by the Zoological Board.

Industrial waste

Melbourne's industries, like those of other busy manufacturing cities, produce large quantities of industrial wastes. Much can be disposed of safely through the sewerage system. However, in recent years the varieties and quantities of hazardous and intractable wastes have been increasing.

At present the Board accepts some industrial liquid wastes for treatment and disposal through its sewerage system, under a system of trade waste agreements. The Board has entered into about 4,300 individual agreements which specify the conditions under which it will accept particular wastes and its charges for the service. Current policy is to accept bio-degradable substances but to limit the level of toxic material and other pollutants.

The Board leaves the setting up and operation of hazardous waste treatment and storage to private firms where possible and only carries out this function itself where necessary. The user-pays principle is followed, with working funds being provided by a new Victorian Waste Management Fund.

Pensioner benefits and other concessions

In recent years the Victorian Government has initiated a range of concessions to water charges for eligible pensioners and low-income earners. These include:

- (1) A home-owner eligible pensioner rebate of 50 per cent of water and sewerage charges up to a maximum of \$67.50. In 1984-85 the scheme was extended to allow eligible pensioners who do not receive the maximum rebate to apply the unused portion of it to reduce water-by-measure charges by up to 50 per cent. Rebates totalling \$15.7m were allowed under this scheme in 1984-85; and
- (2) A concession for tenants, who are also eligible pensioners, beneficiaries, or low-income earners holding a Commonwealth health card, of 50 per cent of water-by-measure charges up to a maximum of \$67.50. Rebates totalling \$620,000 were allowed under this scheme in 1984-85. The cost of these rebates is met directly by the Victorian Government. Slightly over 200,000 ratepayers, or about one in four, opted to pay their rates in four instalments during the year. The Board also arranges alternative payment plans for ratepayers who find it difficult to pay their rates by the due date.

Finance

Assessed value of property

The net annual value of property from 1979-80 to 1984-85 for the purpose of the Board's rating is shown in the following table:

MELBOURNE AND METROPOLITAN BOARD OF WORKS, ASSESSED VALUE OF PROPERTY RATED (\$m)

Rate	Net annual value of property					
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
Water rate	1,719.5	1,752.3	2,614.2	2,672.5	2,742.4	2,766.2
Metropolitan general rate (for sewerage services)	1,435.7	1,478.3	2,241.7	2,296.8	2,410.7	2,471.6
Metropolitan drainage and river improvement rate	1,402.1	1,421.7	2,120.5	2,165.3	2,277.8	2,305.7
Metropolitan improvement rate	1,743.9	1,777.3	2,624.7	2,720.7	2,778.5	2,815.8

Finance for capital works

Capital works are financed mainly from money which the Board is given approval to borrow after the annual meeting of the Australian Loan Council has considered the projected loan programmes of semi-governmental authorities throughout Australia.

Board's borrowing powers and loan liability

The Board is empowered under section 187 of its Act to borrow up to \$2,500m, exclusive of loans of \$4.8m originally raised by the Victorian Government for the construction of waterworks for the supply of Melbourne and suburbs. In addition, the Board may, under section 200 of its Act, receive advances by way of loans from the Treasurer of Victoria, and the value of these loans is not included in the limit of \$2,500m quoted in section 187. At 30 June 1985, the Board's total loan liability amounted to \$2,328m, of which \$1,942m had been incurred under section 187. All money borrowed is charged and secured upon the Board's revenues.

Revenue, expenditure, etc.

The following table shows the revenue, expenditure, surplus or deficit, and capital outlay of the Board in respect of its water supply, sewerage, and drainage functions during each of the years 1979-80 to 1984-85. The Board keeps a separate account of its financial activities as the Metropolitan Planning Authority.

MELBOURNE AND METROPOLITAN BOARD OF WORKS, REVENUE,
EXPENDITURE, ETC.
(\$,000)

Particulars	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
REVENUE						
Water supply –						
Water rates and charges (including revenue from water supplied by measure)	111,452	132,291	143,684	159,579	188,158	194,528
Sewerage –						
Sewerage rates	121,972	132,451	147,685	170,000	191,352	205,822
Trade waste charges	9,717	11,221	12,640	12,891	14,309	14,957
Sanitary and miscellaneous charges	4,127	4,760	5,790	6,748	24,679	15,483
Metropolitan farm –						
Grazing fees, rents, pastures, etc.	3	3	7	22	87	53
Balance, livestock account	2,374	1,343	1,296	1,765	1,713	1,804
Metropolitan drainage and rivers –						
Drainage and river improvement rate	18,499	20,040	24,141	28,079	31,464	33,981
Miscellaneous income	122	165	348	503	2,730	1,829
Total	268,266	302,274	335,591	379,587	454,492	468,457
EXPENDITURE						
Water supply –						
Management	15,199	18,212	23,850	25,614	28,851	28,962
Maintenance	23,784	30,448	38,280	58,363	67,414	72,067
Sewerage –						
Management	15,507	18,387	23,533	25,560	25,495	28,061
Maintenance	27,382	31,359	40,417	59,661	75,350	71,000
Metropolitan farm –						
Management	1,027	1,087	1,701	1,810	1,208	1,940
Maintenance	4,308	5,729	6,292	7,671	7,857	8,088
Metropolitan drainage and rivers –						
Management	3,510	3,906	5,308	5,885	6,266	7,437
Maintenance	5,306	6,596	8,955	11,052	12,203	12,063
Loan flotation expenses	2,430	2,693	(a)	(a)	(b)	(b)
Interest and finance expenses	118,818	118,747	141,651	169,641	174,845	193,088
Contributions to –						
Sinking fund	4,074	4,555	5,421	87	Cr.192	Cr.762
Loans redeemed reserve	8,378	8,698	10,220	3,032	2,594	2,595
Renewals fund	5,632	6,520	7,318	(c)	(c)	(c)
Depreciation	309	322	(d)	(d)	(d)	(d)
Superannuation fund	5,450	6,289	(d)	(d)	(d)	(d)
Provident fund	–	2,000	(d)	(d)	(d)	(d)
Municipalities for valuations, etc.	441	448	(a)	(a)	(a)	(a)
Rates equalisation reserve or general reserve	2,952	Cr.2,408	Cr.5,355	Cr.27,858	Cr.2,399	Cr.216,978
Adjustment to previous year's expenditure	–	–	–	–	–	200,898
Appropriations for contingencies, accrued interest, etc.	–	5,000	–	–	–	(e)3,198

MELBOURNE AND METROPOLITAN BOARD OF WORKS, REVENUE,
EXPENDITURE, ETC.
(\$,000) - *continued*

Particulars	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
EXPENDITURE						
Insurance fund	4,500	4,292	(a)	(a)	(a)	(a)
Capital works	18,400	28,200	28,000	10,247	-	-
Contribution to Consolidated Fund	-	-	-	27,680	55,000	56,800
Other	859	1,194	-	1,142	-	-
Total	268,266	302,274	335,591	379,587	454,492	468,457
Capital outlay at 30 June -						
Water supply	818,798	913,234	1,028,374	1,150,734	1,275,842	1,385,459
Sewerage	903,001	983,953	1,071,430	1,158,443	1,259,981	1,377,609
Drainage and river improvement works	101,339	114,153	131,736	144,071	155,365	162,300

(a) Included in management expenses.

(b) Included in finance expenses.

(c) Renewals Fund ceased 1982-83 onwards.

(d) Included in management, maintenance, and capital expenditure.

(e) Includes Foreign Currency Variations Reserve.

Town planning, metropolitan freeways, etc.

As a result of the passing of the *Metropolitan Bridges Highways and Foreshores Act 1974* by the Victorian Parliament, the Board's road making powers, road assets, etc., and certain officers and other employees were transferred to the Country Roads Board, on 1 July 1974.

Also, under the same Act, the Board's responsibility for foreshores reverted to the Public Works Department.

In June 1984, the Victorian Government announced its plans for the Board to continue to manage Melbourne's hydraulic systems (water supply, sewerage, and waterways) and to be responsible for open spaces and the disposal of intractable wastes. Responsibility for the Melbourne Metropolitan Planning Scheme transferred to the Ministry for Planning and Environment in July 1985.

The following table summarises the revenue, expenditure, and capital outlay of the Board in connection with its functions as the Metropolitan Planning Authority during the period 1979-80 to 1984-85.

MELBOURNE AND METROPOLITAN BOARD OF WORKS: METROPOLITAN
IMPROVEMENT FUND, REVENUE ACCOUNT, AND CAPITAL OUTLAY
(\$'000)

Particulars	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
REVENUE						
Metropolitan improvement rate and sundry income	19,447	20,866	33,841	30,522	30,174	31,504
Sales of land	2,565	4,734	4,095	1,965	1,901	4,023
Total revenue	22,012	25,600	37,936	32,487	32,075	35,527
EXPENDITURE						
Management	6,453	7,532	10,011	11,413	13,240	14,783
Maintenance	1,027	1,580	3,589	5,351	5,620	7,632
Interest	51	51	52	52	51	52
Reserved land and acquisitions	2,415	4,535	2,242	3,934	1,464	3,519
Metropolitan parks and land acquisitions	6,677	2,663	3,840	1,798	187	4,276
Construction works	1,847	1,869	4,932	9,426	3,651	1,824
Contribution to Melbourne Underground Rail Loop Authority	3,900	5,225	6,328	7,367	8,499	7,930
Transfer to rates equalisation fund	Cr.828	1,513	6,900	Cr.9,221	Cr.686	Cr.4,531
Contribution to Consolidated Fund	-	-	-	2,320	-	-
Other	470	632	42	47	49	42
Total expenditure	22,012	25,600	37,936	32,487	32,075	35,527
Capital outlay at 30 June	75,715	80,786	86,952	101,183	103,893	110,410

RURAL WATER COMMISSION

History and development

Following a Royal Commission on water supply, the Victorian Parliament passed the Irrigation Act of 1886 which vested the right to the use and control of all surface waters of Victoria in the Crown. This Act also provided for the establishment of irrigation trusts and within a few years, large areas of Victoria were included in their districts. However most of the trusts failed due to inadequate water conservation, divided control of water resources, insufficient charges, and irregular revenue because water was used on a large scale only in dry years. Their failure made clear the need for a single authority to manage Victoria's water resources and resulted in the formation of the State Rivers and Water Supply Commission.

The State Rivers and Water Supply Commission was constituted under the Water Act passed by the Victorian Parliament in 1905. Under the provisions of the Act, the Commission was made responsible in general terms for the conservation, distribution, and management of Victoria's water resources outside the Melbourne metropolitan area.

In recent years the Commission's role broadened. The *Groundwater Act 1969* gave the Commission additional responsibilities in regard to control of underground water. Amendments to the Local Government Act in 1973 extended the Commission's powers over sub-division of land. Prior to the amendment, the Commission's approval was only required for sub-divisions within irrigation districts. After amendment its approval was required for all sub-divisions outside the Melbourne metropolitan area. The *Drainage of Land Act 1975* conferred on the Commission additional powers relating to the drainage of land and management of flood plains, outside the Melbourne and Metropolitan Board of Works and Dandenong Valley Authority area. The Commission comprised three Commissioners appointed by the Governor in Council.

On 1 July 1984 under the provisions of the *Water (Central Management Restructuring) Act 1984*, the State Rivers and Water Supply Commission was abolished and replaced by the Rural Water Commission which took over all assets of the previous organisation. The three member Commission was replaced with an eight member Board of Management comprised as follows: the general manager of the Commission; a director-general of Water Resources; a staff representative; two representatives of irrigation farmers; one representative of domestic and stock users; one person experienced in waterway management; and one person experienced in management of water or any other managerial, financial, economic, or technical area.

Its primary mission is 'To manage relevant water and land resources, to provide water, water related services and the necessary infrastructure for irrigation, domestic, stock, commercial, industrial, recreational and environmental uses in non-metropolitan areas of Victoria'.

Its statutory functions, as set out by Order in Council, are as follows:

- (1) provide water and water-related services for irrigation, domestic, and stock uses and for commercial, industrial, recreational, environmental, and other beneficial uses in irrigation and other rural areas throughout Victoria;
- (2) design, construct, operate, and maintain the necessary infrastructure to enable the delivery of services;
- (3) allocate and sell water, and where necessary purchase water, and implement pricing and demand management policies;
- (4) undertake resource assessment and investigations pursuant to the effective and efficient operation and maintenance of rural water services;
- (5) undertake water services and related functions as may be assigned by legislation, directed by the Minister or delegated to the Commission by other public authorities; and
- (6) develop public education programmes to promote broad community awareness of the role of rural water services in Victoria's social and economic development.

The Commission employs 2,800 people and in 1984-85, the total operating and capital expenditure was \$100m and \$55m, respectively.

Irrigation

Most irrigation is carried out in constituted districts although there is an increasingly large proportion of 'private diverters', that is, irrigators who are authorised to take water from watercourses but whose holdings are not located inside an irrigation district. In the irrigation districts, water assigned to a given district is allocated to lands commanded by the channel system and suitable for irrigation on the basis of a water right. Irrigators pay a fixed sum for the volume of water allocated under water rights whether or not the water is actually used.

Irrigation water is managed so that water rights would be available under conditions of worst recorded drought. In most years water in excess of water rights is usually available as water sales. The water right system ensures the irrigators of a minimum volume of water each year and ensures that the Commission has constant revenue to help meet the costs of district operations.

A feature of Victorian irrigation policy has been the development of closer settlement by intensive irrigation, that is, by allocating relatively large quantities of water per holding instead of limiting the allocation of water to a portion of each holding. This has meant that Victorian irrigation is predominantly devoted to dairying and horticulture, rather than to sheep raising.

Domestic and stock water

The Commission operates a complex system of channels and pipelines which supplies domestic and stock water requirements of farms and towns throughout the Wimmera-Mallee. The supply comes largely from storages in the Grampians. Current emphasis is on improving delivery efficiency of the system and strategies are being developed to replace open channels with pipelines, so reducing the enormous losses through evaporation and seepage.

Urban water supply

The Commission operates three major urban water supply systems – Mornington Peninsula, Otway, and Coliban – as well as a number of minor urban systems in towns associated with its irrigation or domestic and stock supply systems. Bulk water is also supplied to some water boards through these systems. At present the Commission is preparing to hand over the Mornington Peninsula system to the newly formed Mornington Peninsula and District Water Board.

Other urban water supplies and sewerage services outside the metropolitan area are operated and managed by local autonomous water boards which are overviewed by the Department of Water Resources, acting for the Minister of Water Supply.

Water resource planning and management

The Commission adopts strategies and maintains standards necessary to ensure that the State's water resources are developed in a co-ordinated manner to satisfy the varied and increasing water needs to domestic, industrial, and agricultural users throughout the State.

Fulfilling this role requires the development of appropriate water policy; measurement and protection of the quality and quantity of water throughout the State; the development of river flood-plain management strategies; the provision of engineering and technical services to the River Murray Commission; construction of major headworks; provision of salinity mitigation facilities; the control of water quality of receiving waters; provision of recreational facilities; and the overview and transfer of funds to other authorities including the Dandenong Valley Authority and the First Mildura Irrigation Trust.

Salinity

The salinisation of soils has emerged as a major environmental problem in northern Victoria threatening the productivity of irrigated lands and therefore undermining the economic viability of certain irrigation districts. In the Goulburn-Murray Irrigation District, Australia's largest irrigation region, 1,400 square kilometres have suffered damage from salt and 4,000 square kilometres are potentially salt prone. Salinity has been the subject of government inquiries in recent years and the Commission has for some time been investigating and implementing strategies to overcome the problem.

A major element of salinity is the rising of the water tables, bringing salt to surface soils. Strategies adopted to overcome this include use of evaporation basins in association with groundwater pumping, tile drainage, and laser grading to improve water-use efficiency.

Flood plain management

The Water Commission is the lead agency involved in the development of strategies for flood plain management, including mitigation works aimed at reducing flood losses. Flood studies are systematically carried out throughout the State and strategies developed for flood prone areas.

The Commission also has an important role in land-use planning. As the Drainage Authority for the State, pursuant to the *Drainage of Land Act 1975*, outside the metropolitan area and the area of the Dandenong Valley Authority, the Commission is required to provide advice on flooding and drainage matters. It also gives consideration to these aspects when processing subdivisions, land planning, and development proposals in the 168 municipalities within its jurisdiction.

Implementation of flood plain management strategies and, in particular, proclamation of areas liable to flooding has necessitated upgrading of land-use controls to recognise the limitations of land-use imposed by the probability of flooding in these areas.

COUNTRY TOWN SUPPLIES

Introduction

As a result of the migration of a significant number of people to country areas in the 1850s, there was a need to ensure adequate water supplies. At that time, no water supply authority existed so the Victorian Government established the Victorian Water Supply Department. This Department had responsibility for the construction of reservoirs where the need was greatest. In 1881, the Water Conservation Act was introduced. This was the first comprehensive legislation for the supply of water to country areas.

By 1945, there were 258 cities and towns in Victoria with water supply systems, providing reticulated supplies to 51 per cent of Victoria's population outside the Melbourne metropolitan area. By 30 June 1985, this had increased to 450 cities and towns with reticulated water supplies. The management of these supplies is by either the Rural Water Commission or local authorities. At 30 June 1985, supplies to 105 of these towns and cities was by the Rural Water Commission, while the remaining 345 were supplied by local water authorities.

Sixty-two towns are supplied by the Commission's major urban supply systems on the Mornington Peninsula and in the Otway and Coliban areas which were constructed primarily to supply towns (though a substantial volume of water for irrigation is supplied to the Bendigo-Castlemaine area). A further 52 towns are supplied from the irrigation network or from the Wimmera-Mallee channel.

Local authorities

Over the last 100 years, a large number of often very small water and sewerage authorities were established in country Victoria to administer water and sewerage systems. Since 1982, there has been an ongoing reorganisation of these authorities in an attempt to reduce the excessive number of authorities and provide for more effective management.

At 30 June 1985, of the 339 bodies existing prior to 1982, 327 had been abolished and replaced by 145 successor bodies. The remaining bodies were in the process of restructuring.

The Department of Water Resources takes a role in overseeing these local authorities and providing effective advice and guidelines of policy, financial, and management issues.

Present level of service

Water. By 30 June 1985, 345 towns throughout rural Victoria – with an estimated population of 1,226,835 people – had reticulated water supplies.

Sewerage. By 30 June 1985, 152 towns outside the Melbourne metropolitan area had operating facilities serving an estimated total population of 1,166,361.

During 1984-85, reticulated water was supplied to Congupna and Oxley, while reticulated sewerage was supplied to Chiltern, Drysdale/Clifton Springs, Mallacoota, and Yackandandah. Sewerage schemes have been approved for a further 11 towns. Proposed schemes for sewerage a further 66 towns have been submitted for approval. There still remain 12 towns throughout the State with populations of 1,000 or more that do not have reticulated sewerage.