

Hunter Water S170 Register

SHI No.: *Name:*
3630054 Grahamstown Dam

Location No address NSW

Other ID nos IW ID: 60.



Description:

The Grahamstown Dam is a large earthen embankment style dam constructed on the former Grahamstown Moors. The George Schroder Pumping Station sits within the dam, connected by a metal pipe bridge. Other infrastructure is located on shore, including the control room and electrical equipment. The entrance to the Dam is via Schroder Park, which contains some public picnic infrastructure and interpretive material.

Significance:

Grahamstown Dam represents the last major expansion of the Newcastle water supply system and was substantially larger than all previous schemes. Unlike many other large-scale metropolitan dams, the Grahamstown Scheme relies on a long, low earth embankment dam which enclosed the Grahamstown Moors and allowed for storage of water from the Williams River. While somewhat modified, the Dam functions much as originally designed and supplies the bulk of the water to the Hunter Water network.

Assessed Significance: Local

Endorsed Significance: Local

Historical Notes:

Constructed: 1957-1964

After the end of World War II, the Board became preoccupied with the adequacy of their water sources. It was in March 1946 that the Board's then President, George Schroder, first raised the possibility of using the Grahamstown Moors as a possible new water source.

The Grahamstown Moors had a catchment area covering more than 78 square kilometres, and for years it had been known that a large amount of water could be impounded at the site. The local catchment however, was inadequate to cater for the demands of the region, posing a significant challenge in regards to its exploitation as a storage site.

Whilst investigations in regards to the utilisation of Grahamstown Dam as an auxiliary to the Tomago Water Supply Works were carried out from the late 1940s, and the Board obtained 2000 acres of the Grahamstown moorlands in 1948, an alternative proposition of constructing a much larger dam at Tillegra was preferred. In the early 1950s it was decided by the Engineering Experts' Committee that future investigation should concentrate on Tillegra. In the face of growing opposition to Tillegra Dam and following a visit to Europe to attend conferences and inspect waterworks however, Schroder was able to persuade the Board to delay the Tillegra Dam and fully exploit both the Tomago sandbeds and Grahamstown catchment area. The Board subsequently commissioned the Swedish consulting engineers Vattenbyggnadsbyran, to investigate. After visiting the region early in 1953 they delivered their report in September, and with it provided their solution to the problem of the Grahamstown Moor's inadequate catchment.

The scheme proposed by Vattenbyggnadsbyran provided for fresh water to be drawn from the Williams River near Seaham and conveyed by open canals and a tunnel to the storage dam constructed on the moors, formed by constructing an embankment across the natural depression.

As the Williams River was tidal at the point of extraction, the Swedish engineers outlined the necessity of constructing a weir to form a barrage between the tidal salt water and the fresh river water. Once collected, this fresh water would be conveyed by open canal for approximately 3 miles to a pumping station at Balickera, where the water would be lifted 15 meters before gravitating towards the dam through a 1200m long tunnel cut through a high ridge between the sites. The water would then feed into an outlet canal that delivered it to Grahamstown Dam. The Grahamstown Dam itself would form a large shallow storage basin with an average depth of 6 metres, a capacity of approximately 40 000 000 000 gallons and a surface area, when full, of about 12 square miles.

In February 1955 the Board's Amplification Committee broadly accepted the scheme, with construction of the Dam authorised on 5th April 1955.

Construction of the scheme commenced immediately after the official construction ceremony was performed by the then Premier, Mr J Cahill, on 30th November 1957.

On 9th July 1957 the Board had decided to request the Water Conservation and Irrigation Commission, in association with the Board, to design and construct the Grahamstown embankment complete, including all subsidiary embankments.

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The Dam wall which impounds the water of the lake, closing in the former moors drainage canal, is 4.8km long. Its construction involved the placement of an estimated total of 2 570 000 cubic yards of fill comprising approximately 2 300 000 cubic yards of sand and 270 000 cubic yards of clay.

Whilst the Grahamstown Scheme was first brought into service in 1960, utilising water from the immediate catchment area that naturally drained into the dam, it was not to be until 1964 that the scheme was finished.

The construction of No. 4 embankment was completed in the year 1958-59, with all other embankments except No. 1 (at Grahamstown Road) completed by the close of the 1960-61 financial year. Preparations of the basin included the clearing of timber and scrub and were carried out over several of years in the early 1960s. Property acquisitions were also still being carried out in the early 1960s, with approximately 75% achieved by 1960-61 (it was only in 1970-71 that the Board completed the acquisition of title to all lands within the Storage Reservoir Basin and all properties necessary to carry the deviated Pacific Highway).

In 1962 the Water Conservation and Irrigation Commission completed its work for the Board on the scheme, having completed the construction of the dam walls. In the same year, 45% higher than average rainfalls saw an abrupt rise in the level of the reservoir, inundating surrounding areas and threatening the Pacific Highway north of Raymond Terrace. Subsequently, an emergency spillway was built at Irrawang to prevent flooding of the highway. In 1965-66 it was decided, following investigations into the top of the clay core in the embankment, that a spillway at Burke's Gully under the Pacific Highway was to be constructed, thus relocating the spillway from Irrawang. The spillway was to consist of two vertical lift gates with a concrete lined approach and discharge canals. To allow the highway to cross the canal two bridges were provided by the Board. The gates were to each 9 feet by 10 feet, the concrete canals 18 feet by 15 feet and approximately 400 feet long, and the bridges 48 feet wide.

The Grahamstown Water Supply Scheme was officially opened on 11th July 1964 by the then Premier of NSW.

In the 1969-70 Annual Report it was noted that following extensive investigation tenders had been called for the sealing of part of the Grahamstown embankment using the bentonite slurry cut-off trench method, involving the excavation of a trench five feet wide down to the impervious strata. McDougall-Ireland Pty Ltd was awarded the contract for the project, and by 30th June 1970 the Company had carried out minor preliminary works. Problems related to the suitability of the backfill material were encountered in late 1971 however, resulting in the temporary suspension of works. After deciding to add 12% clay to the mixture, work was resumed until May 1972, when further problems were encountered and remedial measures once again carried out. All work on the Grahamstown Embankment was finally completed on 10th August 1973.

In 1978-79 the embankment near Campvale Pumping Station, over a length of 800m, was raised by 600mm following damage caused by wave action, thus raising the over height of rock protection to 1.2m above the designed top water level of storage.

1984-85 saw investigations into the feasibility of raising the level of Grahamstown Reservoir, in conjunction with the development of three major spillway options. After preliminary studies of downstream effects were made and cost estimates for the three options were prepared, new demand predictions saw the works postponed to between 1988 and 1991.

In June 1992, a programme to augment the Grahamstown Dam was announced, with these works completed in December 1994. Another programme of augmentation was carried out in the late 1990s, with the 1998-99 Annual Report stating that the corporation was carrying out work involving the construction of a new spillway and two bridges on the Pacific Highway adjoining the dam. These works would see the storage capacity of the dam increase by 50%, raising the top water level by 2.4m. With one of the bridges completed in 1999-2000, the entirety of the bridgework was completed in 2000-01. The Grahamstown Dam spillway and new embankment was completed in December 2005.

Designer: Vattenbyggnadsbyran (VBB) - Swedish
Builder: Engineering Consultancy

Builder: Hunter District Water Board/ Water Conservation and Irrigation Commission

Current Use: Water storage

Former Uses:

Physical Condition:

Recommended Management:

- This item contributes to local character and should be conserved.
- Original details should be maintained including doors, windows and original signage.
- New materials should be sympathetic to the nature and character of the original building.
- In the event of major proposed changes, prepare a Conservation Management Strategy and undertake an archival recording.
- Wherever possible, changes should be restricted to the interior of the building.

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- Routine maintenance of existing fabric is essential.

References:

Clem Lloyd, Patrick Troy and Shelley Schreiner 1992, For the Public Health. The Hunter District Water Board 1892-1992. Publisher: Longman Cheshire Pty Ltd, Melbourne.

Department of Public Works , Annual Reports, 1888 to 1892 and 1893-94 to 1960-61.

Glennie Jones 1967, The Movement for Newcastle's First Water Supply 1875-1885, Newcastle History Monographs No. 2. Publisher: The Council of the City of Newcastle, Newcastle.

Hunter District Water Board , Annual Reports, 1938-39 to 1987-88.

Hunter District Water Supply and Sewerage Board , Annual Reports, 1897-98 to 1937-38.

Hunter Water Board , Annual Reports, 1988-89 to 1990-91.

Hunter Water Corporation , Annual Reports, 1991-92 to 2008-09.

John W Armstrong 1967, Pipelines and People. The History of the Hunter District Water Board Newcastle, New South Wales. Publisher: The Hunter District Water Board, Newcastle.

Mal Hindley 1983, 'From Weirs, Dams and Sand', in Shaping the Hunter. Publisher: The Newcastle Division of the Institute of Engineers Australia, Newcastle.

Studies:

- 1 Futurepast Heritage Consulting Pty Ltd 2010, 'Hunter Water Conservation and Heritage Register Study'.
Reference: .
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Listings:

- 1 *Heritage Act - s.170 NSW State agency heritage register:*
Listing date: . Reference Number:
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Data Entry: *Date First Entered:* 26/Apr/2010 *Date Updated:* 10/Sep/2010 *Status:* Partial

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Images



Grahamstown Dam

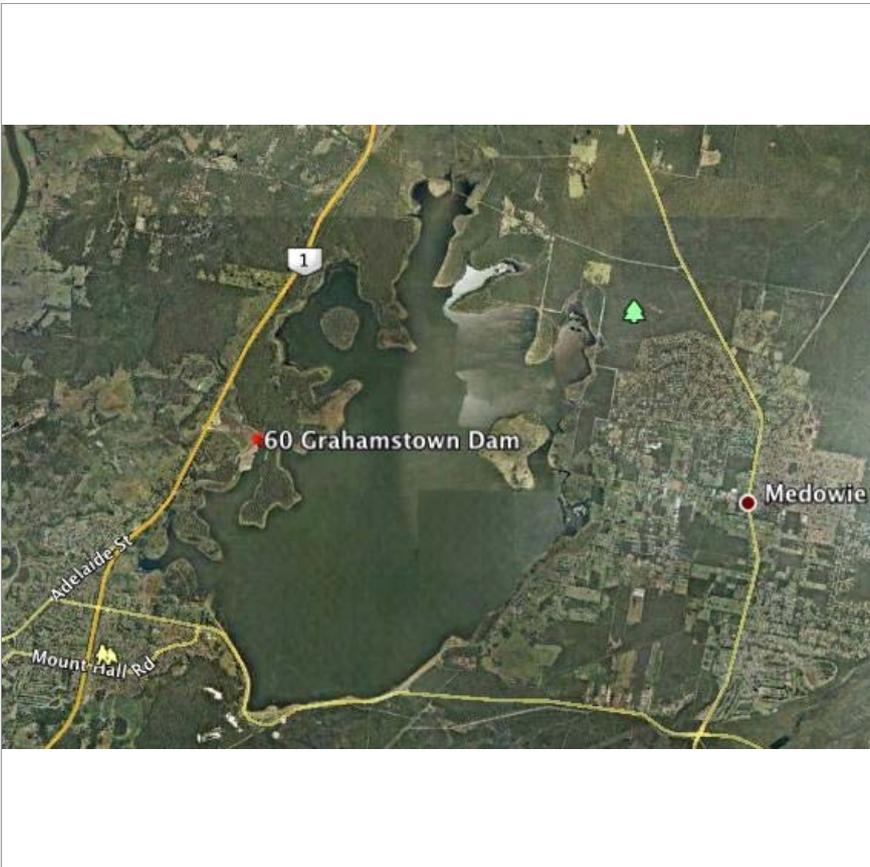
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Grahamstown Dam (Courtesy of Google Earth)

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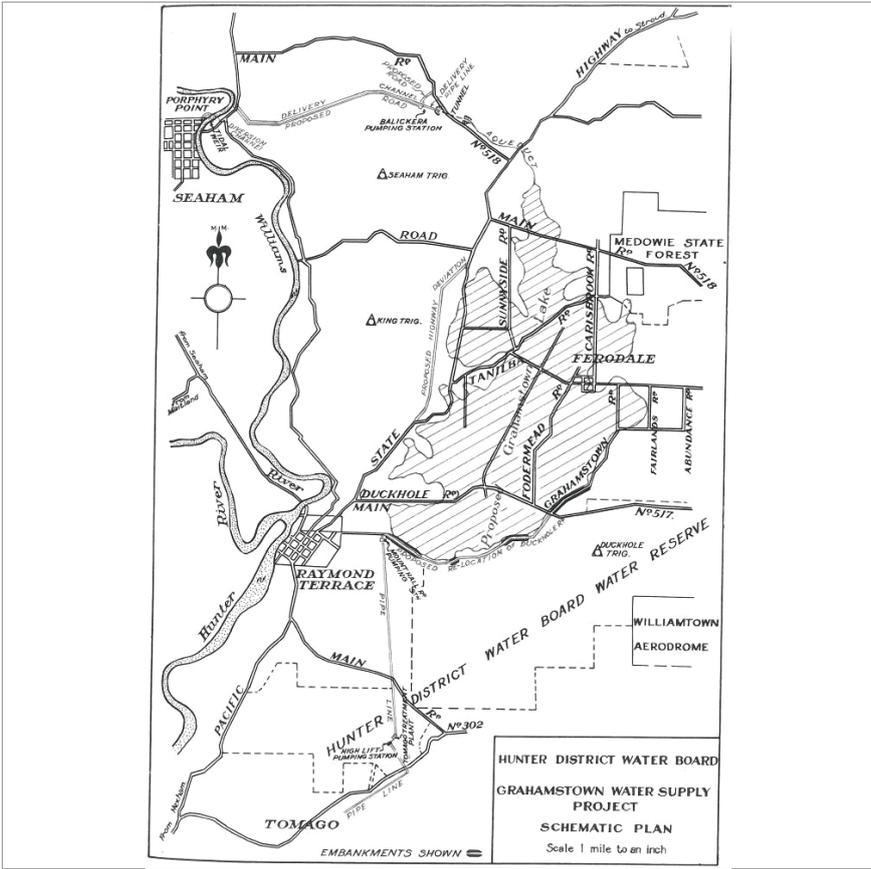
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Grahamstown Dam Schematic Plan (Courtesy of HDWB Annual Report 1954-55)

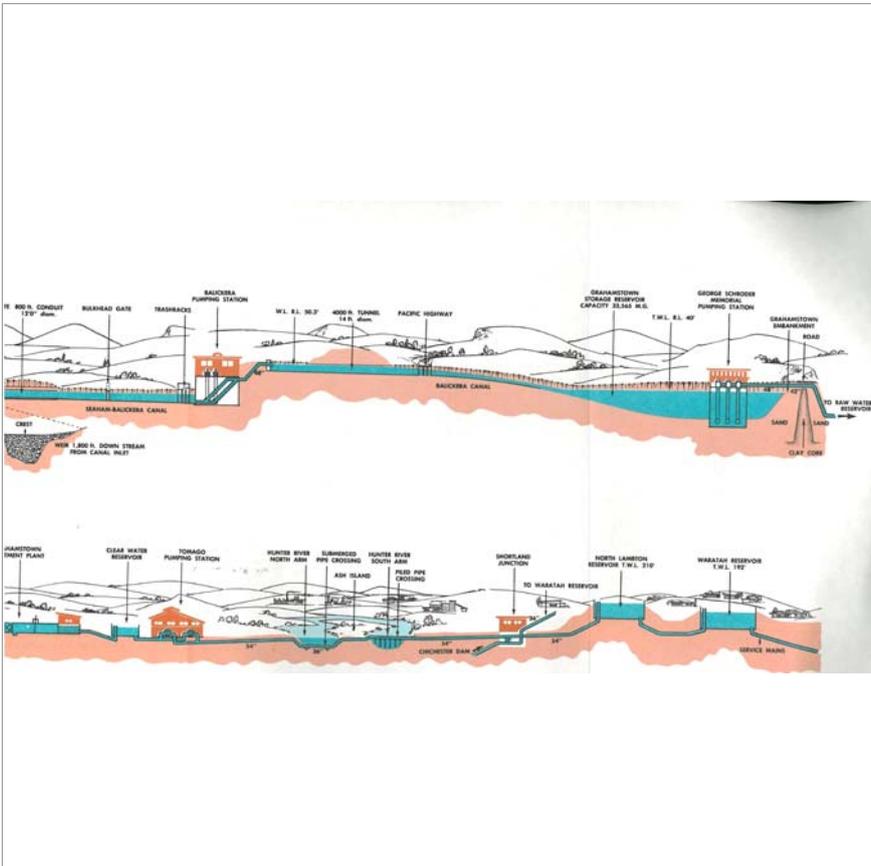
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Grahamstown Dam System Diagram (Courtesy of HDWB)

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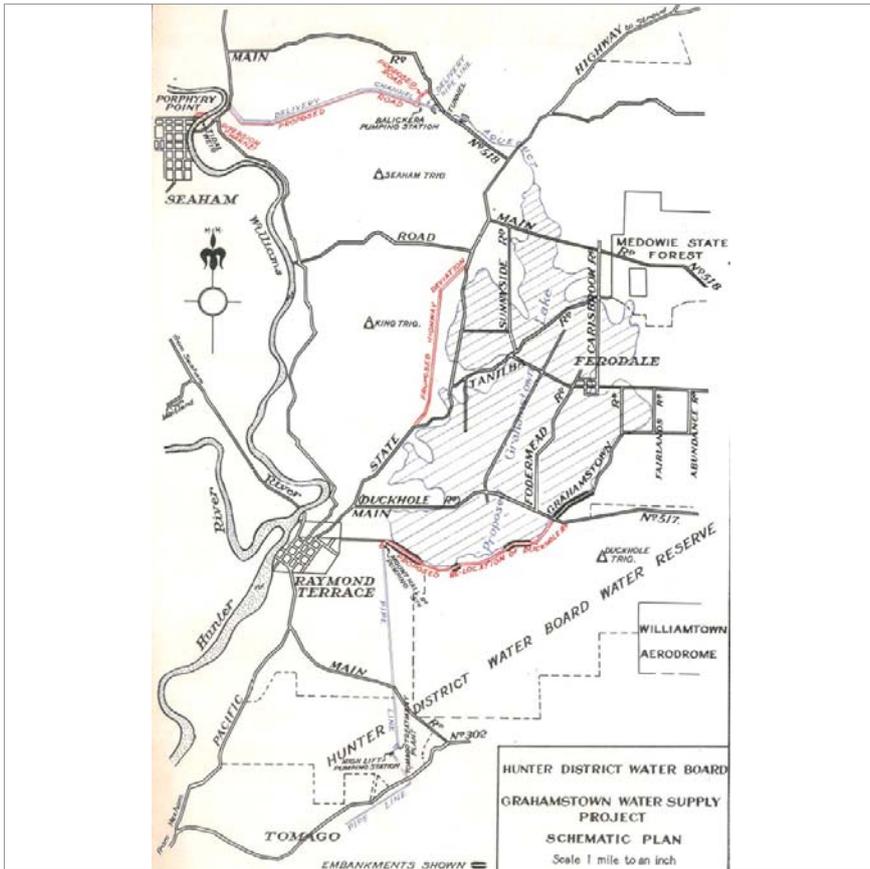
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Grahamstown Dam Plan (Courtesy of HDWB Annual Report 1954-55)

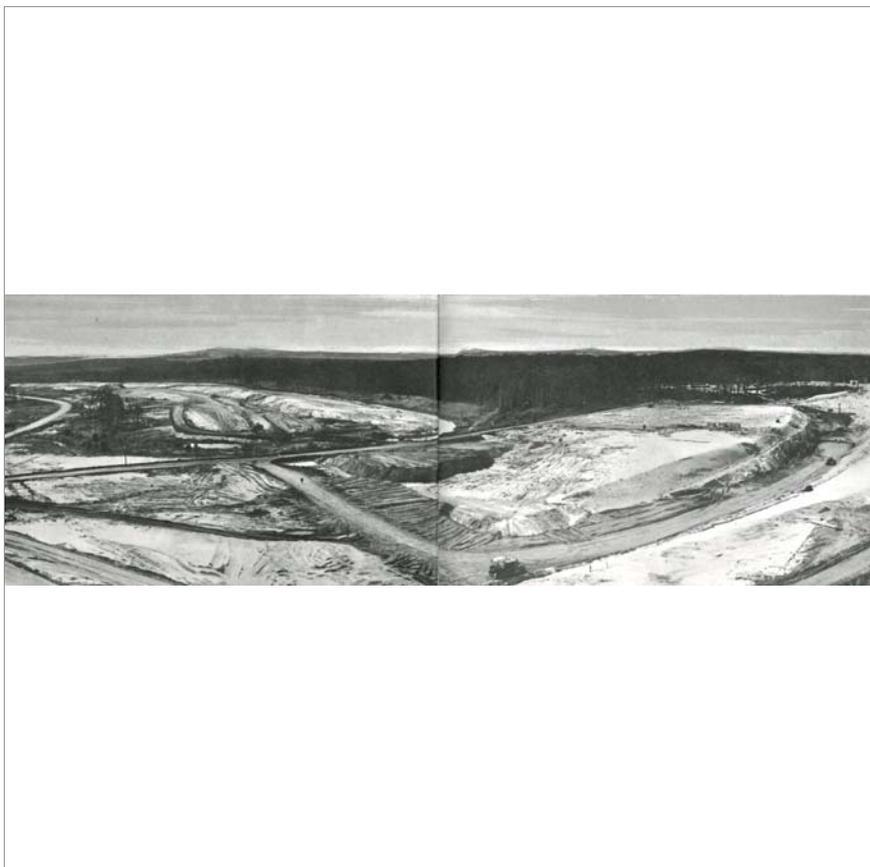
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Grahamstown Dam - Construction of the embankment (Courtesy of John W. Armstrong, "Pipelines and People")

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