

HUNTER WATER

SECTION s170 REGISTER



ITEM NAME:

Burwood Beach Wastewater Treatment Works

Contents:



Item details



Historical Overview



Heritage Status



Heritage Significance



Description



Management



Key Images



References

ITEM DETAILS



Item Name	Burwood Beach Wastewater Treatment Works
Other / Former Names	N/A
NSW SHI No.	3630095
GID	272954
Plant No.	ST-BUR
Local Government Area	Newcastle
Lot and DP	Lot 1 DP 776283 and Lot 7 DP 776283
Address	129 Scenic Drive, Merewether NSW 2291
Curtilage	The curtilage of this asset is defined by its physical extent, not its legal allotment boundaries (as defined by the relevant Lot and DP(s)).



View of the partially demolished Screen House (foreground) and intact Pump House (background)



Asset location and curtilage (red boundary) (refer to Figure 1 for additional detail)

Current Use	Wastewater treatment works
Former Use	N/A
Designer / Builder	Public Works Department and Newcastle Council
Historical Notes	

Burwood Beach Wastewater Treatment Works were completed by the Public Works Department (and local government) in 1936, with the Board assuming control on the 9th March 1936. The works were constructed to replace the very unpopular Merewether Outfall, which formed part of the original sewage system for Newcastle, and which was endorsed in 1901. The Burwood Beach Wastewater Treatment Works were designed to pump and screen the whole of the sewage from the Newcastle district, with the solid matter removed and buried in the vicinity, whilst the liquid and fine solids gravitated to the ocean.

In 1927, the Public Works Department purchased 443 acres of land at Murdering Gully from the Trustees of the late E.C. Merewether. The land had a 4,000-foot ocean frontage, and at the northern end the cliffs sloped down onto a sandy beach, which continued southwards to within 1,000 feet of Glenrock Lagoon, the southern boundary of the acquired land.

The pumping station at the Burwood Beach Wastewater Treatment Works was constructed in the form of a circular concrete shaft, 32 feet in diameter and approximately 50 feet deep. In this concrete shaft seven vertical spindle electrically operated centrifugal pumping units and switchgear were installed. The sewage storage wells, which were also the pump suction wells, were located around the pump well. These storage wells were divided into two sections, with one section receiving the flow from the main Intercepting Sewer, and the other the flow from the Merewether Diversion Sewer.

A substantial concrete building was constructed over the pump well and housed the Newcastle Electric Supply Department’s transformer equipment for the electric supply to the works.



Figure 2: View of the 1936 buildings soon after their completion (date unknown)
Source: Photograph courtesy of Hunter Water

The sewage matter received from the incoming sewers was pumped from the storage wells to either or both of the screening plants, as was required. Each of the two screening plants consisted of coarse and fine screens. The coarse screens were made up of grids of inclined mild steel bars, spaced two inches apart, through which the sewage matter had to pass before reaching the fine screens. Any solids caught on these coarse screens were raked away. The two fine screens consisted of revolving inclined mild screening tables, circular in shape, the surfaces of which consisted of brass plates with numerous 1/16-inch slots. The sewage matter ran on to

the screens at the lowest point, with the liquid matter passing through the slots. The solids were caught on the plates however, and, as the screen revolved, were brought into the path of revolving brushes carried on rotating frames and swept into elevator pits. From here, the solid matter was elevated to hopper trucks, which would take them away for burying. The fine screens were housed in a concrete structure conforming in appearance to that over the pumping plants. The effluent pipe for conveying the liquids to the ocean was of substantial construction, particularly at the outlet and where it is subject to wave action.

This latter section consisted of 48 inches internal diameter flanged cast-iron pipes secured to reinforced concrete piles by steel bands. In order to ventilate the two main sewers draining to the wells, two 36-inch exhaust fans were installed as an integral part of the outfall works.

Pumping operations commenced on 12th February by the Constructing Authority, the Department of Public Works and Local Government, and on 9th March the responsibility for operation was passed to the Board. The intercepting sewer was brought into use on 1st September 1936.

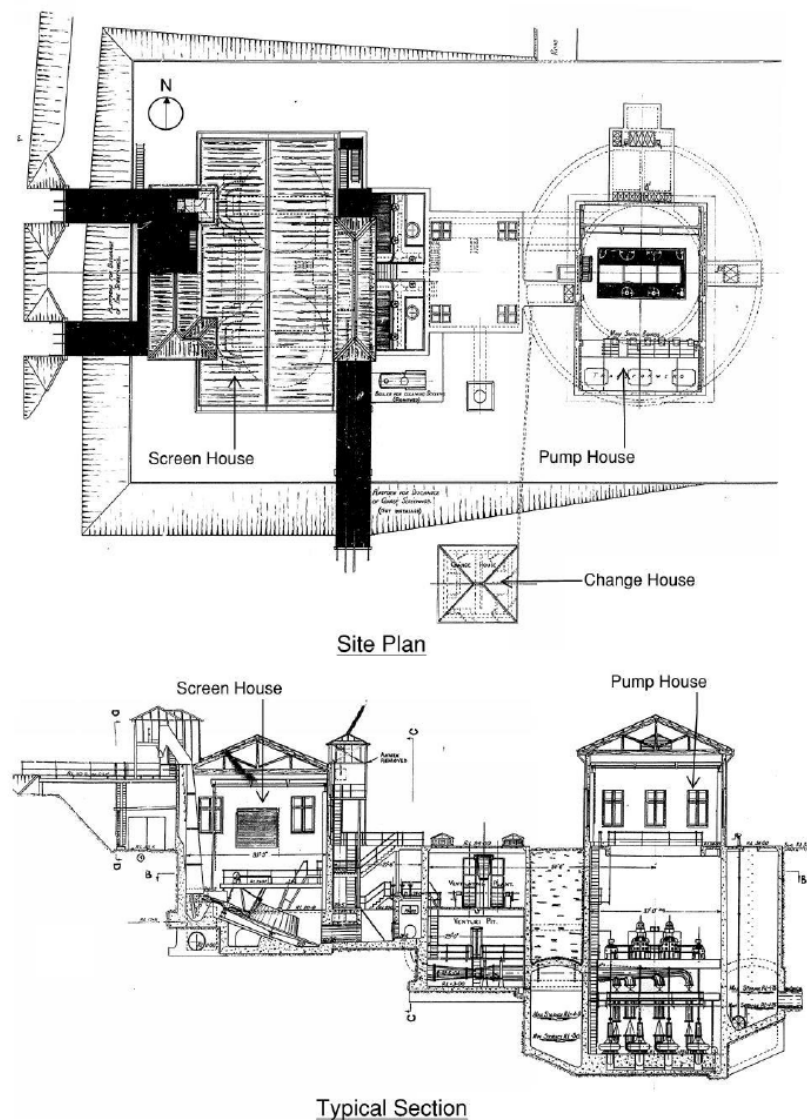


Figure 3: Plan and Section of the Screen and Pump House

Source: GHD 2017

In the 1936-37 Annual Report it was noted that the grounds of the Burwood Beach Wastewater Treatment Works were gradually being brought into order. Furthermore, in this same year, installation of ventilation equipment, including suction fans, was completed and put into operation. As a result of this, the ventilating shafts at Empire Park and Gibson Street, among others, were sealed off. In 1939-40 a boiler house was constructed at the Burwood Beach Wastewater Treatment Works.

It was also reported in 1936-37 that the Burwood Beach Wastewater Treatment Works had successfully prevented, during the past year, the pollution of the adjacent beaches, with regular inspections having been made. At that time, the solids obtained from the coarse and fine screen were buried in trenches, excavated for that purpose, adjacent to the pumping station.

A number of conferences regarding the discharge of sewage effluent into the ocean from the Burwood Beach outfall works were held in 1967-68 with the Department of Public Health. Consequently, in 1968-69, the Board commissioned civil and structural engineers to make a special investigation into the feasibility and relative merits of deep ocean disposal and at least two methods of full treatment of effluent, including the biological treatment process and the activated sludge disposal process. The report from this study of the future requirements at the Burwood Beach Wastewater Treatment Plant was submitted in 1970-71. In the 1971-72 Annual Report it was announced that recommendations had been made for stage development works at Burwood Beach, which included: the provision of an ocean outfall pipeline 5,000 feet offshore under stage one, the reconstruction and amplification of the pumping station and provision of further grit removal and screening facilities as part of stage two, with the third stage including the provision of primary treatment sludge disposal facilities, with the allowance, if required, for a conventional activated sludge plant as a secondary treatment.

In the 1974-75 Annual Report it was announced that the Board was still planning the construction of these works. Whilst it was reported in 1975-76 that these investigations and designs were nearing completion, the 1976-77 Annual Report announced that work on the Burwood Beach Wastewater Treatment Works had been deferred pending the availability of funds.

In 1981-82 it was announced that as the Burwood Beach system was falling well below modern standards, investigations were proceeding for construction of a deep ocean outfall, as well as the upgrading of treatment processes so as to remove gross solids, floatables and greases more effectively. According to the report, the construction of these upgrades would commence when the funds were available. In 1982-83 however, it was announced that focus was shifting from the construction of a long offshore tunnel to the investigation of alternatives to the traditional ocean outfall solution. As such, the operation of the sewage transport system that fed Burwood Beach was being thoroughly examined.

In 1984-85 it was reported that an upgrade in two stages had been approved by the Board to amend the overloaded and inadequate sewage treatment facilities at Burwood Beach. The construction of the programme was to take five years, with Stage One including the construction of an ocean outfall and preliminary treatment facilities, including the amplification of the pumping station, and stage two seeing the construction of a secondary treatment plant. The contract for the construction of the ocean outfall, including a shaft, tunnel and diffuser, had been awarded to the Sydney-based firm Roberts Construction Limited in September 1985, with the completion of works scheduled for June 1987.

Tunnelling and marine works were completed by 1987-88. Stage One works were carried out by the contractors Barclay Brothers and was commissioned on 26th May 1989. Stage Two, the construction of a new administration building, new preliminary treatment facilities and a new pumping station was commissioned in December 1989. At this time, the old screening plant and pumping station were decommissioned. The removal efficiency of the new screens was remarked in the 1989-90 Annual Report to have been substantially higher than the old plant, and the hydraulic capacity twice that of the old plant.

Stage Three of the upgrade was commenced in 1988-89 following successful pilot plant testing and the commencement of detailed concept design and layout. This stage consisted of the construction of a new secondary treatment plant.

Stage Four of the programme comprised the identification of the infiltration and inflow points into the sewerage system and the rectification of these where economically viable. It also included other system changes to eliminate wet weather overflows. Equipment was obtained for flow measurement in sewer mains and analysis of storm flows begun to highlight system weaknesses in 1988-89.

The Burwood Beach Secondary Treatment Plant was finally commissioned in June 1992. However, after odours from the biofilter were judged to be at an unacceptable level, the biofilter was taken offline. Tenders were called for a cover, ventilation system and odour control equipment, with the contract awarded in 1994. Following commissioning tests, the biofilter was recommissioned in that same year.

In February 2009, work began, once again, on the first stage of an upgrade to Burwood Beach Wastewater Treatment Works. These works consisted of an upgrade to the odour control capacity of the facility. A new biofilter was to be installed, which would comprise a bed of specially designed organic matter, including shredded wood, bark chips and either compost or peat to treat the odorous air.

In 2020 a vent stack was removed from site. Also in 2020, demolition of the Screen House to roughly ground level was undertaken.

HERITAGE STATUS



Listing Details

☒ S170 Heritage and Conservation Register

☐ Local heritage listing

☐ State heritage listing

Conservation Management Plan

☐ N/A

Heritage Asset Action Plan

☐ N/A

Aboriginal Sites Registered within the Site

Four sites registered in or within 200 metres of Lot 1 DP 776283. AHIMS search undertaken on 16 January 2023.

Historical Archaeological Potential

Not assessed.

HERITAGE SIGNIFICANCE



Level of Significance

Local

Statement of Significance

Burwood Beach WWTW has historical significance as the first major sewage treatment plant located in the Newcastle area.

The WWTW also have a degree of aesthetic value due to the distinctive and attractively designed reinforced concrete buildings, being predominately the Pump House and former Screen House. The Change House is less distinctive but has contributory aesthetic value.

The Pump House, as the remaining of the two buildings, is intact and is somewhat unusual in its design, being more formal and ornate than other comparable WWTW buildings within the Hunter Water asset portfolio. As the Screen House building has been partially demolished, the Pump House now remains as the key representative building on site that speaks to the original design intent of the WWTW.

NSW SHR Criteria

☒ a) Historical

☐ b) Associative

☒ c) Aesthetic / Technical

☐ d) Social

☐ e) Research Potential (yield new information)

☒ f) Rare

☒ g) Representative

Significant Elements

- Overall form, scale and fabric of the Pump House building including views to and from this building.
- Overall form, scale and fabric of the Change House building and visual relationship with the Pump House.
- Colour scheme applied to buildings throughout the overall site.
- Row of palm trees to the north of the 1936 buildings.
- Original roof structure to Pump House including gantries and associated equipment.
- Rendered masonry and textured external walls to both buildings.
- Original timber joinery to windows and doors to both buildings.
- Original fabric associated with the foreman's office within the Pump House.
- Fenestration rhythm and detailing (including sills, lintels and projective decorative hoods) to Pump House.
- Decorative elements such as corbels, projecting masonry, concrete awnings and timber eaves to Pump House.
- Any original equipment remaining on site (even if not located *in situ*).
- Original fixtures and fittings such as light switches, power switches, lights, door pulleys, etc.

DESCRIPTION



Setting

The WWTW are located within a relatively isolated context within the Glenrock State Conservation Area, with Burwood Beach and the associated coastline located to the east and south. The WWTW are surrounded by vegetation and are accessible via an asphalted track off Scenic Drive.

External Appearance

The Burwood WWTW consists of a modern wastewater treatment works (c. 1990s), which also contains historical (constructed in 1936) buildings and infrastructure elements. These historical buildings and elements formed the original treatment works, which have been progressively upgraded from the 1960s onwards but are no longer in use. The operational portion of the WWTW remains in use and is located adjacent to the historical buildings.

The original (1936) Burwood WWTW consists of two large buildings; a pumping station ('Pump House') and a screening building ('Screen House'), as well as a small building between these two which previously functioned as the original blacksmith's shop ('Change House'). These buildings are located in proximity to one another to the northern side of the overall WWTW, with the newer (2009) buildings and elements being predominately located to the south of the historical buildings. The majority of the Screen House has been demolished with only sub-surface structure in the form of concrete footings and remnant walls remaining.

Frequently used access roads are located immediately adjacent to the original/historical buildings. Staff and contractors associated with the WWTW regularly work in close proximity to the original/historical buildings, including the Screen House.

The pumping station building, or Pump House is a two-storey rendered masonry building with rendered concrete awnings over doors and windows, decorative rendered sills, timber windows and framed and sheeted doors. The roof is timber framed with modern corrugated sheeting and slatted timber eaves; it is in good condition with the roof sheeting having been recently installed. The louvered vent at the top of the face has been waterproofed/sealed.

The pumping station building, or Pump House is connected by a tunnel to the screening chamber building or Screen House. At present, only the footings/basement walls of the Screen House remain on site, as the remainder of the building was demolished c. 2020. Prior to the removal of the majority of the building, the building was similar in style to the pumping station building/Pump House but was in much poorer repair with a collapsed roof.

As noted above, the modern treatment works, which are not significant and date from the 1990s, are located between the old plant and Burwood Beach

Internal Appearance

The Pump House contains a sewage pumping station with a covered dry well and limited original pumping gear and equipment (now predominately used for storage). A foreman's office featuring

	<p>original timber joinery is located in one corner. Evidence of original fixings (e.g., lights, gantries and pulleys) remain present.</p> <p>The Screen House is now empty of all equipment and internal structures as a result of its partial demolition. The original layout of the building and sub-surface equipment remains somewhat legible despite this.</p> <p>The Change House is largely devoid of internal features or elements. Limited examples of original features (e.g., power or light switches) remain present.</p>
Overall Condition	Fair to good.
Moveable Heritage Objects	<ul style="list-style-type: none"> Any original equipment remaining on site that is no longer <i>in situ</i>.

MANAGEMENT



Approval and Assessment Requirements

Minor or inconsequential impacts: Anything other than routine repair and maintenance must be discussed with the Environment Team to determine the level of heritage assessment required.

More than minor or inconsequential impacts: As above. Additionally, consultation with the relevant local council is required.

Demolition or removal from the register requires consultation with Heritage NSW and archival recording.

General / Ongoing Management

- Changes within the defined curtilage should be preceded by the appropriate level of heritage assessment and approval. Advice and/or confirmation should be sought from the Environment Team prior to undertaking any works.
- Maintain overall form, shape and scale of the Pump and Change Houses.
- Changes to significant fabric may be supportable if no feasible alternative is available to ensure ongoing operation and/or safety. Assessment will be required.
- Replacement/removal of redundant or failing elements or equipment is acceptable. Assessment will be required.
- Removal of non-significant elements (such as non-descript services and contemporary buildings, elements and/or infrastructure within the asset curtilage) is supportable.
- Maintain internal features of the Pump House unless this is not feasible for operational and/or safety purposes. Assessment will be required.
- Continue the existing colour scheme for any new buildings introduced within the asset curtilage.

Priority Conservation Works

- Assess structural condition of Pump and Change Houses and repair as necessary. In particular, masonry walls and associated render should be assessed and repaired as priority to avoid any further deterioration of the fabric.
- Enclose the Change House in a sympathetic and minimally impactful way so as to avoid further deterioration of internal wall surfaces and other fabric.
- Explore options to retain the remnants of the Screen House *in situ* and enclose the remaining structure to preserve remnant fabric, if feasible. Consider interpretation opportunities as part of this process.
- Assess all timber joinery to the Pump and Changes Houses and patch, repair and re-paint as required. Unpainted timber, if present, should not be painted.
- Refinish and re-paint painted masonry render to the Pump and Change Houses.
- Consider the re-instatement of windows and other elements to the Change House based on historical photographs. The ongoing use of the Change House (and therefore ongoing maintenance to the building) is encouraged.
- Rationalise internal and external services across both buildings to be less obtrusive and more discreet.



Image 1: View of palm trees, entrance driveway, Pump House (left), Change House (middle) and partially demolished Screen House (right)



Image 2: View of the northern and eastern elevations of the Pump House



Image 3: View of the Change House facing southwest



Image 4: View of the remains of the Screen House showing *in situ* equipment



Image 5: Internal view of the Pump House showing gantries, pulley, timber door, original windows and original light fittings



Image 6: Foreman's office within the Pump House showing original joinery



Image 7: Detail of joinery and other decorative elements to the exterior of the Pump House (noting the decorative projecting hood has been sympathetically replaced)

Image 8: Internal view within the Change House

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.
- GHD, 2017, *Burwood Beach WWTW – Structural Assessment*, prepared for Hunter Water Corporation.
- 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.
- Futurepast Heritage Consulting Pty Ltd, 2010, 'Hunter Water Conservation and Heritage Register Study'.
- 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.



In partnership with



Environmental &
Social Consultants

FIGURE 1

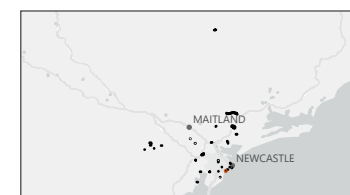
S170 Review - Heritage Curtilages

Legend

- Road
- +— Railway
- Lot Boundary
- ▭ Heritage Curtilages
- NPWS Reserve



Burwood Beach Wastewater Treatment Works



0 160
Metres

Scale 1:4,000 at A4
GDA 1994 MGA Zone 56

This document and the information are subject to Terms and Conditions and Umwelt (Australia) Pty Ltd ("Umwelt") Copyright in the drawings, information and data recorded ("the information") is the property of Umwelt. This document and the information are solely for the use of the authorized recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by Umwelt. Umwelt makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information.
APPROVED FOR AND ON BEHALF OF Umwelt