There are also a number of hydraulically Harbour Trust dated 29 August 1903. The drawing shows the location of the 50HP (37 kW) electric motor, the accumulator, two intensifiers, a single and a double wool press.

The Sydney and Suburban Hydraulic Power Co. (SHPC)

The NSW government passed an Act of Parliament in 1888 authorising the establishment of an hydraulic power company to serve the central business district. The company was headed up by substantially the same group who started the Melbourne Hydraulic Power Co. some twelve months earlier. It commenced supply of power in January 1891 with Mr. George Swinburne as company engineer. By 1894 about 200 machines were connected to the system. Gradually the system expanded to cover roughly the area bounded by Pyrmont, Woolloomooloo and Broadway. The system supplied power for dock cranes, whips, wool presses, strong room doors, passenger and goods lifts.

The company supply dam was located between *Mt. Rennie and Waterloo* an area on the north west corner of South Dowling St. and O'Dea Ave. A steam powered Worthingtom pump pumped water along 2.5 mile (4 km) of cast iron main to the Company pump-house at Pier St. This building still survives today, with its water receiving tank on its roof, and accumulators inside.

SHPCo Pier St. Pumphouse

The engine house contained three steam powered Armstrong patent high pressure pumps with two capable of supplying 475 gal/m (2160 l/m) at 750 psi (5.2 MPa) when running at 50 rpm. The other was capable of supplying 200 gal/m (900 l/m) at the same pressure and 60 rpm. The pumps were manufactured by Abbott & Co., Gateshead-on-Tyne, UK. The pump output was fed to two accumulators, each with rams of 20" (508 mm) diameter and a stroke of 22 feet (6.7 m). The output was fed through 6" (150 mm) mains, and 3" (75 mm) and 4" (100 mm) sub-mains to consumers throughout the city. Control valves enabled sections of the mains to be closed down for repair/maintenance, as did valves at the entry to customer's premises.

	
Cover – type 6	Cover – type 2

About 150 of the covers to these valves (with the valves underneath) are still visible in the city streets. They are readily identifiable in several different types and have an identity code (HPCo, or SHPC) cast into the cover. The best streets to look for extant remains are Kent, Clarence and Sussex Sts. Two examples of the 7 different types are shown below with the cover removed to show the valve spindle below;

Water was sold to consumers after metering their output.

In 1920 the pumping station at Pier St was electrified with three centrifugal pumps each capable of 10 000 gal/hr (45 kL/hr) at 750 psi (5.2 MPa). Only the Pier St building, two accumulators and the rooftop water supply tank remain of this part of the system.

Competition from gas, and later diesel engines and electrical installations, together with the high cost of replacement and maintenance led to the final closure of the system in three stages between 1974 and 1975. Since then, many valve covers, and most of the consumer appliances have been removed as a part of the city redevelopment phases over the years.

Consumers of the Sydney and Suburban Hydraulic Power Co.

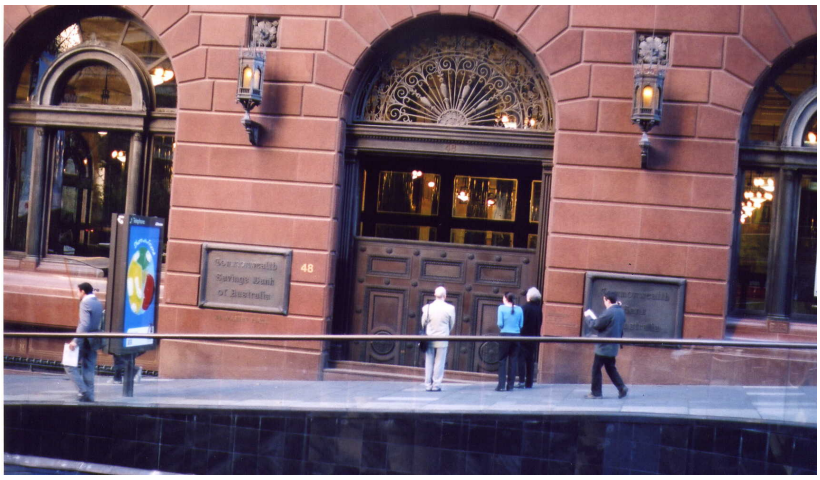
It is not known how many consumers were connected to the SHPC system at its peak, however, it was reported that by 1894 there were 149 lifts, 22 whips, 7 wool presses, 20 dock cranes and 2 motors connected – and this was just 3 years after commencing supply! The NSW Dept. of Labour and Industry reported that in 1903 it had registered 522 hydraulic lifts, and only 3 electric lifts, by 1919 this had risen to 2369 lifts and whips in the metropolitan area, most of which were operated hydraulically. It is also reported that SHPC had laid some 50 mile (80 km) of supply pipe throughout Sydney CBD at its closure.

Records suggest that the peak period for hydraulic power, under threat from diesel and electrical power, was in the mid 1930s and that the profit and loss break even point was reached in 1965. By 1968 there were no more than 150 customers on the system which ceased operation in 1975.

In 1957 the 150' (45.7 m) height limit on buildings was removed and many 'tall' buildings were demolished to make way for taller buildings. Improved design for electrically operated lifts, and

the requirements of safety laws for lift systems meant that, for practical purposes, all hydraulic lifts have been replaced.

When the SHPC system closed, many businesses retained hydraulic equipment by replacing the reticulated water with a small electrically driven oil hydraulic plant known as the Hydraglide. It should be noted that some of the large bronze doors of the Commonwealth Banks in Pitt St and Martin Pl, and Westpac in George St are still hydraulically operated from systems such as this.



Commonwealth Bank, Martin Pl.

Failures in the SHPC system were actually quite rare when one considers the size of the system and the number of consumers connected to it.

"… The failure of the system which resulted in the 20' high, 6" thick door at the Commonwealth Trading Bank, Martin Place, opening in the middle of the night was a rarity in a city wide service that lasted from 1891 to 1975." (State Bank, 1988).

"… I was once nearly killed as the cylinder burst and the door fell." (Ivan Turner, 2006 pers.. comm.).

The system seems to have provided a modicum of entertainment as well;

"… I noticed there was a bit of a competition. To open the door it had to be lifted a couple of inches to release the locks, then the door could be lowered. The competition was to see who could get the door down and flush with the entry by the 10th strike of the GPO Clock." (Ivan Turner, 2006, pers. comm..).

Whilst there are remains of goods lifts, wool lifts and bank bullion lifts in the city, there is very little evidence of passenger lifts from the hydraulic age. There are some lift shaft cages such as in 2 Martin Place, and the Strand Arcade. However, Mark Foys Building, now the Downing Centre in Liverpool St. had several banks of lifts for the public, and these, like others in the city, have been modernised and electrified. But in one lift shaft on level 1, now used as a service duct, there remains a set of lift doors from the hydraulic period proudly exhibiting the Mark Foys logo.

Lift Doors, Downing Centre

Lend Lease (AGL Building, Gas Lane)

Another customer of the SHPCo. was a passenger lift in the Lend Lease owned AGL building at the western end of Gas Lane. This building has the remains of a passenger lift servicing four floors. The lift shaft has been covered at each floor level, but the timber slatted surround for the hydraulics and the ram remain. The lift car is still in place at the Hickson Rd level. This is the only hydraulic ram located in Sydney that has its manufacturer's name cast into the cylinder – "Sydney Hydraulic Power Co Ld".

Lend Lease, Gas Lane

The State Theatre, Market St.

One jewel discovered during this research project was the mechanisms for the Organ lift and orchestra platform within the State Theatre. Both were operated from the SHPC mains. The organ lift ram is 3 ½" diameter (89 mm) with a lift approximately 14' (4.3 m). The orchestra platform is 12' x 30' (3.6 m x 9.1 m) with a curved front decorated with a beautiful pressed metal panel.

State Theatre Orchestra Platform

The steel support frame under the orchestra platform, and the frame to support the cylinder were made of Dorman Long Steel , as supplied to the Sydney Harbour Bridge.

The cast iron cylinder is some 13 ½" diameter (343 mm dia) with a stroke of about 12' (3.6 m). The cylinder is located in a small shaft cut into the sandstone below the basement.

Orchestra Platform Ram

Orchestra Platform Cylinder Pit

Campbell's Stores, The Rocks
The remnants of two hydraulic whips can be seen on the face of the Campbell's Stores buildings on the western side of Circular Quay. These were originally connected to the SHPC mains when they were operational.

Remains of Other SHPC Customers
There are some remains of hydraulic whips and lifts in public space in the atrium of No. 1 Kent St (not in-situ), the foyer of the Sydney Theatre Co., behind 397 George St, and outside Moore's Wharf in Towns Pl. (not in situ, as the building has been moved from its original location). In semi-public space in the Windmill St level of Publicis Mojo Advertising there are the remains of a passenger/goods lift, a wool bale drop, and a wool bale lift.

Another significant set of remains are the intensifiers and wool presses located in the Dalgety Apartment building in Jones St, Ultimo – originally Dalgety's Wool Stores. These were fed from the SHPC main, and are still in their original location. The rams were manufactured by The Austral Otis Engineering Co. (Melbourne), and the steelwork was from Dorman Long and Co.

Intensifier (front) and Wool press, Dalgety's, Ultimo

Heritage Protection of Hydraulic Remains
Many remnants of hydraulic power in Sydney are recognised for their value, and well protected due to their location in recognised heritage space or within classified buildings such as Garden Island, Walsh Bay, No. 1 Kent St, the Commonwealth Banks in Martin Pl and Pitt Sts, the Argyle Stores and Campbell's stores in the Rocks, etc.

Remnants of bullion lift, George St.

However, some remnants have been located in buildings that are significant buildings, where there is current, or likely, refurbishment to be undertaken. In fact one bullion lift was located behind a recent partition wall in one of the old bank buildings in George St. This had only been discovered by building management some weeks before this research project started. As the era of hydraulic power has been mostly forgotten it is essential that remains such as this are identified and recorded by heritage professionals so that they are not inadvertently destroyed in refurbishment projects.

The big question – is that all there is?

Because hydraulic mechanisms are most likely located in the basements of building, and because they are no longer operative, there could well be some excellent examples of cylinders, whips, control mechanisms, stop valves and electro-mechanical control components still extant.

To this end readers are invited to contact the author of this paper if they can supply any information on the remains of Sydney's hydraulic system, or if they had experience installing or using hydraulic systems in the past

The extensive Bibliography has been omitted from this version to reduce file size.
The author's contact details are given below.

A special thanks to Paul Yunnie, for many years Vice-Chairman of the Heritage Group and now a Corresponding Member living in Australia, for enabling us to use this paper.

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