

# Lake Macquarie Stardome

## Astronomical Observatory and Planetarium

### Concept Plan

NEWCASTLE ASTRONOMICAL SOCIETY

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#### Introduction

A public Observatory and Planetarium complex of the kind proposed in this paper would be an outstanding business opportunity through which Lake Macquarie City Council could provide an incredible visitor and research facility which allows people, young and old, to see objects in the Solar System, the Galaxy and galaxies beyond our Galaxy. More than simply stimulate an interest in physics and the nature of the Universe the observatory would be an integral unit operating within the proposed Munibung Hill Heritage Park.

As a visitor drawcard, the local economy would get a substantial boost, since the Observatory and Planetarium would tap into the multiplicity of interest streams that the Munibung Hill Heritage Park contains – indigenous culture and astronomy, deep time exploration, educational opportunities, science and technology research as well as broad community fascination with the night sky and cosmological phenomena, along with the conservation and associated attractions proposed for the Heritage Park.

#### Justifying an Observatory for Lake Macquarie

Interest in astronomy has increased immensely since the late '60s. The moon landing, the amazing space probes to distant planets, the Hubble Space Telescope and the International Space Station, the SETI<sup>1</sup> project, and the Shoemaker Levy comet crashing into Jupiter, have all fired the imagination of the public, and created a resurgence of interest in cosmology and the physics of the Universe.

Astronomy is now part of the primary and high school science curricula and University physics. An observatory allows everyone, and particularly young school and tertiary students to see for example, the colours of stars, the movement of the planets and their satellites, which can then be interpreted in terms of spectroscopy, physics and mechanics.

Newcastle, the seventh largest city in Australia, has no public observatory or planetarium.

Lake Macquarie City the sixth largest regional city in New South Wales with a population of 203,823 (as at June 2017), has the opportunity to fill a niche that has been overlooked or passed up by others.

Add Cessnock, Maitland, Port Stephens and the Hunter Valley, the population base is approximately 645,000. Include the Central Coast and this increases to over 1 million.

Filling the void people living within the Newcastle / Lake Macquarie area presently rely on the Newcastle Astronomical Society (NAS) to provide telescopes, owned by Society members. For many years they also provided viewing sessions for the Physics Department of the University of Newcastle, and for local area high schools.

This is far from ideal and not nearly sufficient to meet the latent demand.

By contrast, Brisbane and Wollongong have superb facilities. The Brisbane Planetarium routinely receives 25,000 school children each year with the Brisbane Skydome complex having welcomed in excess of 2 million visitors over the last 40 years. Wollongong has an observatory/planetarium complex known as Science Space. .

Science Space is founded upon the principles of education, hands-on learning and accessibility. Existing to advocate the value of science and technology and increase general science literacy. Science Space brings over 100 interactive exhibits, Science Shows, Workshops and Australia's #1 Planetarium to the Illawarra region.

Clearly, the Hunter region is grossly under-resourced, to the detriment of the local population, and particularly the children and tertiary education students in the region.

This observatory project seeks to address this short fall by providing a substantial public and educational amenity for Lake Macquarie City, contributing to the visitor economy resulting in new jobs and business diversification.

#### Visitor experience

First time viewers of the night sky are almost without exception amazed at what can be seen through a high quality telescope. To call it an 'eye-opener' is an understatement. For repeat customer visits, the guiding astronomical staff would point out that several visits to the Observatory throughout the year are needed to see all the planets and the major constellations, each of which has a variety of nebulae.

Of particular note is the emerging science of indigenous astronomy - <http://aboriginalastronomy.blogspot.com/> With the first astronomers being from First Peoples culture -

<http://www.abc.net.au/science/articles/2009/07/27/2632463.htm> - this aspect of the visitor economy would tie in very well with the Munibung Hill deep time story and the historical record of Biraban, Threlkeld and the Lake.

Special events are well embedded within the Astronomical Calendar. There is always something going on that an observatory and planetarium make doable. Opportunities are increased substantially when good facilities are on hand.

The opportunity to see rare phenomena such as the Shoemaker-Levy comet crashing into Jupiter, exploding stars, and close approaches of the planets and comets are only made possible with high quality technology of the kind proposed for the Munibung Hill Heritage Park Stardome Observatory and Planetarium.

By siting the observatory and planetarium within the Munibung Hill Heritage Park, the observatory benefits from the "we're here now, let's take a look" factor – cross fertilisation is a win-win.

<sup>1</sup> SETI: Search for Extraterrestrial Intelligence

As a case in point. The ABC tv Stargazing event in May – 22-24 – with the Stargazing Live event on May 23 attracting 700 people to Speers Point Park would no doubt be upsized by a factor of 3 or more given an extensive marketing campaign. Such events would complement Councils existing Festivals and special events agenda.

### **The facility**

The proposed facility would include a telescope with a diameter of **at least** 600mm housed under a 7m dome, a planetarium, and associated rooms suitable for conferences and functions and light refreshments.

The observatory as proposed would be a public facility owned and operated by Lake Macquarie City Council, in a similar fashion to LakeMac Print, the Art Gallery, Libraries and Holiday Parks. It would be cost neutral or profit generating, with the added advantage of providing spin off business opportunities across the Local Government Area. A genuine win-win for all associated parties.

### **Siting and Operation**

The site needs to be away from 'light pollution'. Muniibung Hill provides an ideal locality, its elevation being an added bonus. Since only the dome needs to be visible, with appropriate landscaping, visual impact would be negligible. It is possible, however, to visualise an aesthetically acceptable building should it follow the model we are suggesting, the Auckland Stardome, N.Z.

As a public enterprise it could be a venue providing real world work experience for volunteers. Staffing the observatory and planetarium could be a joint activity of Council and the Newcastle Astronomical Society, since there is a wealth of expertise contained within this professionally focused community organisation.

Typically, municipal observatories are open to the public at least one night per week and to school, university or tourist groups. Other nights by arrangement.

The proposal is for a much more ambitious project with the Lake Macquarie Stardome Observatory and Planetarium open 7 days a week. (See the Conclusion section for the number of hours the Auckland Stardome is open, as an indicator of visitor demand).

### **Competitive advantage**

The size of the telescope housed within the Lake Macquarie Stardome Observatory and Planetarium will be what sets it apart from other facilities open the public.

Most observatories in Australia are either large facilities offering the public very limited access as a sideline function, or are small club activities offering public use of telescopes owned by their members. As such they rarely have a planetarium or telescopes larger than those typically owned by amateurs around the world.

The size of the telescope proposed here, 800 – 1000mm will allow the visiting public – customers - to observe the colour and structure of faint objects well beyond the capacity of small amateur telescopes. The structure of galaxies and the colour of nebulae will be visible, where as galaxies are normally seen as faint smudges and nebulae normally appear grey.

Fitted with 'go to' computer drives, the telescope will also be able to pick out certain planets by day, in addition to remote planets such as Neptune and Uranus at night.

### **Resourcing**

It is believed that a Munibung Hill Heritage Park sited Observatory and Planetarium would be best owned by the people of the city through local government, i.e. Lake Macquarie City Council, so that it remains a public amenity. However, it is acknowledged that it could be funded and operated with a partnership arrangement under the leadership of Lake Macquarie City Council. Others could include the University of Newcastle and the Department of Education.

A number of income streams would ensure financial viability: visitor entry fees, guided tour package charges, time based user pays fees, hire of rooms and equipment, product sales and sponsorships.

This kind of project is ideally suited to attracting federal and state government funding.

### **Conclusion**

It is proposed that the Observatory and Planetarium be an integral part of the multi-faceted Munibung Hill Heritage Park complex that will include indigenous interpretation areas, geological displays, walking trails, visitor picnic and rest areas, lookout /viewing platforms, function rooms and tourist information centre, all nestled within the larger conservation area.

The Auckland Stardome, N.Z that was opened in 1966 provides a good indication of the popularity of high quality well run facilities. It is open for 75 hours per week. Monday to Sunday opening hours here: <https://www.stardome.org.nz/>

With the proviso that this proposal receives in principal endorsement by Lake Macquarie City Council, the Newcastle Astronomical Society would be pleased to be party to the preparation of a much more comprehensive plan detailing:

- Telescopes, Domes, Planetariums, Building design, program scheduling, merchandising potential and staffing requirements.

### **Note:**

This proposal has already received endorsements from the School of Mathematical and Physical Sciences, University of Newcastle, Lake Macquarie Business Ltd, Rotary Club Warners Bay and High Schools. Newcastle Astronomical Society (NAS) is of the understanding that when fully teased out this proposed Astronomical Observatory and Planetarium would attract endorsements from additional schools and local business especially those associated with the visitor economy.

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