

Northern Beaches Strategy, Site Assessment
Economic Appraisal

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Economic Evaluation Spreadsheets for each Option

Acknowledgment

Capital Insight provided the estimates of property costs, capital costs associated with construction and provision of the hospitals, and operating costs for the hospitals in each option for the evaluation in this report.

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Summary

This report provides an economic appraisal of three strategies and nine options for the location of future hospital services for residents of the Northern Beaches area of Sydney.

Strategy 1 (the Base Case) is an upgrade of the existing Mona Vale and Manly Hospitals along with some extra use of Royal North Shore Hospital.

Strategy 2 places a new hospital at one of five sites in Warringah Shire along with a complementary hospital service at Mona Vale. These sites are on and around the Dee Why public car park, the Brookvale bus depot, the (Frenchs Forest) intersection of the Warringah and Wakehurst Parkway, the northern end of the Warringah Golf Course, and the Beacon Hill secondary school site.

Strategy 3 places a new hospital at Mona Vale along with a complementary hospital service in Dee Why, Brookvale or Manly.

The report assumes that total use of public hospital services by residents of the Northern Beaches will be the same under each option. The study is therefore a cost-effectiveness study. It incorporates five sets of costs: land and property costs, hospital renovation and construction costs, hospital operating costs, access costs, and some environmental costs.

The results are described on pages 12 and 13 below. On the figures available to this report, strategy 2 options are the most cost-effective. The main driver of the benefits is estimated savings in hospital operating costs especially relative to strategy 1, but also to some extent relative to strategy 3 options. However, other factors like land suitability and access costs contribute some cost savings to some options.

Among the five strategy 2 options, the Beacon Hill and Frenchs Forest sites are marginally the most cost-effective, but the differences are generally small relative to the overall magnitude of the costs.

The benefits of strategies 2 (and 3) relative to strategy 1 depend on effective control of construction costs, achievement of significant savings in maintenance expenditures, and effective reuse of Manly and Mona Vale sites.

The report does not quantify possible differences in service quality between options. An assessment of potential differences in service quality was outside the scope of this report.

1 Introduction: Objective and Options

This report provides an economic appraisal of nine options for the location of future hospital services for residents of the Northern Beaches area of Sydney. This area comprises Manly, Warringah and Pittwater local council areas and currently contains some 230,000 residents. Of these, about 59 per cent live in Warringah, 24 per cent in Pittwater, and 17 per cent in Manly.

For public hospitals, the area is currently served mainly by Manly and Mona Vale Hospitals, which have 160 and 140 hospital beds respectively, as well as by the Royal North Shore Hospital (RNSH). However, both Manly and Mona Vale Hospitals are quite old, especially Manly Hospital, and require substantial expenditure to be brought up to contemporary health care standards.

In addition, residents access various private hospitals (mainly outside the Northern Beaches area) for about half of all their hospital services. The assumption underpinning the analysis in this report is that residents will continue to obtain half their hospital services from private hospitals.

The nine options for future hospital services for the region fall into three distinct strategic categories:

- Strategy 1: Upgrading the existing Manly and Mona Vale Hospitals with a combined total of 359 beds (195 at Manly and 164 beds at Mona Vale Hospital). There would be some specialization of services with obstetrics, gynaecology and paediatrics provided at Mona Vale Hospital and more complicated surgery at Manly Hospital. Services would generally be up to level 4. To create approximate service equivalence with the other two strategies, it is assumed that an additional 30 beds would be provided at RNSH.
- Strategy 2: A new Northern Beaches hospital at one of five sites in Warringah Shire along with a complementary hospital service at Mona Vale. The new hospital would contain 391 beds providing services up to level 5, with an adjacent 100 bed private hospital. The complementary facility at Mona Vale would contain hospital beds for temporary stays and an aged care facility. Manly Hospital would close for hospital purposes but part of the site may be retained for an old age home.
- Strategy 3: A new Northern Beaches hospital with 346 beds on the Mona Vale site providing services up to level 5, with an adjacent 100 bed private hospital. There would also be a complementary hospital service with 15 beds at a Warringah Shire site or the present Manly Hospital site. Provision is again made for an extra 30 hospital beds at RNSH.

Specifically the nine options by strategy are:

Strategy 1 Upgrading existing hospitals

Option 1: Upgrading Manly and Mona Vale Hospitals

Strategy 2: A new hospital in Warringah Shire plus complementary service at Mona Vale. The site for the new hospital could be at one of the following five locations.

Option 2A Dee Why public car park adjacent to Warringah Council

Option 2B Brookvale on and adjacent to the north end of bus depot

Option 2C Frenchs Forest at the north-west of junction of Wakehurst Parkway and Warringah Road

Option 2D Warringah Golf Course at the northern end of the golf course

Option 2E Beacon Hill on land next to closed secondary school north of Warringah Road

Strategy 3 A new hospital on the Mona Vale site plus a complementary service in Warringah or Manly. The complementary service could be at one of the three following locations.

Option 3A Dee Why adjacent to Warringah Council

Option 3B Brookvale adjacent to bus depot

Option 3C Manly Hospital

In each case, some patients will use RNSH or another hospital outside the Northern Beaches. Also it is envisaged that there will be a private hospital with strategies 2 and 3, but not with strategy 1.

2 Method of Economic Appraisal

For this report, total use of public hospital services by residents of the Northern Beaches is assumed to be the same under all nine options. Thus, it is assumed that the total use of hospitals (for inpatients, outpatient and emergencies) will not be affected by the locations in the different options. Also the split of services between public and private hospitals is assumed not to vary with the option.

This means where a level 5 or 6 hospital service is not available in the Northern Beaches area or where another service is not readily accessible within the area there will be more leakage to the RNSH or another hospital outside the area.

It is also assumed for the quantitative analysis reported below that each option will be capable of producing equivalent overall health outcomes. Whether certain options provide greater health security or greater health risks than others is outside the scope of this report.

It follows that the economic evaluation reported here is essentially a cost-effectiveness study. The object is to find the overall hospital system, inclusive of Northern Beach hospitals and RNSH, which will provide the forecast required services at least cost, inclusive of all social costs incurred and access costs.

The study incorporates five main sets of costs:

- Net land and property costs
- Hospital renovation and construction costs
- Hospital operating costs
- Access costs
- Environmental costs

For this report, it is assumed that land is acquired (where necessary) in 2007 and that major construction takes place in 2008 and 2009, with hospital fit out in 2010. In some options it is possible to dispose of currently owned land that becomes surplus to needs in 2011.

The facility is assumed to open in 2011 and to operate for 35 years to 2036. In that year most facilities will have some residual value. Operating costs up to end 2010 are the same for all options and not included in any option.

All the above costs are estimated for each hospital in each option in 2005 prices for the 2007 to 2036 period as appropriate and summed for each year. The Net Present Cost is the aggregate cost which allows for discounting by 7 per cent per annum, which is the central rate used by the NSW Treasury. Results with a 5 per cent discount rate are also shown in the spreadsheets.

3 Inputs to Economic Appraisal

Details of all inputs to the economic appraisal can be found on the one-page spreadsheet that contains all cost information for each option. The main estimation procedures and inputs are described below.

Land and property costs

Land and property costs are estimated on an incremental land cost and property take basis compared with the Option 1. Thus no land cost is allowed in Option 1. Estimated land and property acquisition costs are included for all other cases.

In addition, where currently owned public land becomes surplus to need under strategies 2 and 3, the estimated value of land available for other uses is included as an offsetting benefit in year 2011 when the new hospital starts to operate. The values used in the evaluation are based on the highest and best use as estimated by the NSW Valuer-General's Office.

It may be noted that an alternative evaluation process would be to include only the value of land used in each option. In that case, option 1 would be debited with the value of land used in that option and the other options would not be credited with the value of land freed up for other uses. The net results are not affected by our choice to work with incremental changes rather than with the total land value used in each option. The differences between land and property costs for each option are similar regardless of the approach taken.

Site preparation, hospital construction, furnishing and related costs

Capital Insight provided detailed estimated construction costs for each option. These costs included site specific works, parking, new construction, renovations, major renewals, the provision of off-site infrastructure such as road access, contingencies, project planning and management fees, and furniture, fittings and equipment. The costs include all elements required to ensure that the project works and minimizes disturbances to local residents and to traffic in the vicinity of the proposed hospital.

For all options other than Option 1, the cost estimates include expenditure for a 100 bed private hospital. To obtain relevant public hospital costs, the private proportion of the total costs is netted out of the estimates. This is equivalent to assuming that a private operator would pay exactly this proportionate amount to government so that the government would neither gain nor lose from constructing the private component.

Option 1 is different from the other options in another significant way in that it is based on major renovation rather than new construction. The estimated life of the \$100 million plus renovations in years 2007 to 2009 is expected to be in the order of 15 years, with limited

residual value. At that time, a similar quantum of renovation is forecast with another life of some 15 years. Under the other options, construction and related costs are around \$300 million, but have an expected life of at least 30 years, with some residual value.

The capital cost estimates also allow for some expenditure, including off-site expenditure designed to minimize local disruption, especially from local traffic congestion. For the Dee Why site, there is provision for extensive underground parking to replace lost civic parking spaces. On the proposed golf course site, extensive flood mitigation work is allowed for. At the Beacon Hill site, there is an allowance for acquisition of some local properties so as to minimize local traffic impacts. At the Frenchs Forest site, an allowance of \$16 million is included to provide for an underpass from Warringah Road (East) into Wakehurst Parkway (South) so as to minimize traffic impacts from that site.

The last of these improvements (the underpass) is the most expensive. However, such an improvement to the intersection may be undertaken even without the hospital at that site. And, if it is not done otherwise, the provision of the underpass would provide substantial non-hospital (traffic) benefits. In this evaluation, it is assumed that 75 per cent of the costs (\$12 million) can be credited as a traffic benefit against the costs. While similar issues may arise at other sites, none would be of a similar order of magnitude or significance.

Residual value

The residual value of the existing Mona Vale and Manly Hospitals in 2036 is assumed to be 50 per cent of construction and related costs occurred in the renovations. This turns out to be about \$50 million.

For the new hospitals, the residual value is also assumed to be about 50 per cent of construction costs excluding fittings, plant and equipment. However, in order to avoid inflation of residual values for hospitals with higher construction costs, the residual value of each new hospital is assumed to be \$100 million.

No residual value has been allowed for land values.

Hospital operating costs

Capital Insight estimated hospital operating costs separately for inpatients, outpatients, emergency patients and community health patients, for each hospital in each option for 2011, 2016 and 2031. For 2011, the estimated operating costs were based on a total of 36,000 inpatients, 69,000 outpatients, 46,000 emergency attendances, and 283,000 community health presentations spread over the hospitals in each option.

There is only a small rise in the forecast workloads and costs over time. Applied Economics estimated interpolated figures for the intervening years.

Access costs

Applied Economics estimated costs of access to the hospitals separately for inpatients, outpatients, emergency patients, and visitors for each option. The process was as follows:

Capital Insight provided estimates of the services provided by each hospital in each option in 2011 based on the aggregate numbers given above. This provided estimated destinations.

We estimated demands (origins) for these services using population proportions; 59 per cent were assumed to originate in Warringah Shire, 24 per cent in Pittwater, and 17 per cent in Manly.

The population requiring services were then distributed to the hospitals in the system in each option subject to the constraints given by the supply of services forecast for each hospital. Typically about 80 per cent of patients were assumed to go to the closest hospital providing services and 20 per cent were assumed to go to another hospital for one or other reason. This allocation is considered realistic. Estimating a detailed allocation model was outside the scope of this report.

Drawing on a report by David Kilsby, the origin and destination trip times shown in Table 1 were estimated. Allowing \$10 per hour per person, two persons in a vehicle, and 10 cents per vehicle km (the resource cost of travel which excludes excise tax), the travel cost matrix shown in Table 2 was estimated.

Table 1 Travel Time Matrix: Average Times in Minutes

Hospital	Pittwater	Warringah	Manly
Mona Vale	10	289	31
Dee Why / Brookvale (a)	40	15	15
Manly	52	25	8
RNSH	77	48	37

(a) An extra 15 per cent was allowed for the Beacon Hill and Frenchs Forest sites.

Table 2 Travel Cost Matrix: \$ per vehicle trip two ways

Hospital	Pittwater	Warringah	Manly
Mona Vale	7.60	21.28	23.56
Dee Why / Brookvale (a)	30.40	11.40	11.40
Manly	39.52	19.00	6.08
RNSH	58.52	36.48	28.12

(a) An extra 15 per cent was allowed for the Beacon Hill and Frenchs Forest sites.

Estimated access costs for inpatients, outpatients and emergency attendances were the product of estimated numbers going from each shire to each hospital and the unit costs in the travel cost matrix in Table 2. Visitor travel costs were based on six two-person visits over an average length of stay in hospital of four days.

The study does not include explicit estimates of staff travel costs. In so far as it is more difficult to recruit staff because of various factors, including access costs, these costs are likely to affect the salary and wage expenses of the hospitals. We understand that estimated operating costs of the options make some allowance for difficulties in recruiting staff.

Environmental costs

Most of the sites are either existing sites which are accepted by local residents as hospital areas or sites in commercial areas (Dee Why or Brookvale) with relatively small residential impacts. However, two sites (Beacon Hill and Frenchs Forest) may be perceived to have more adverse local environmental impacts with respect to local traffic, noise, visual impacts and loss of local open space than the other sites. These impacts may translate into lower property values in the immediate vicinity of the proposed hospital. Some order of magnitude estimates of the environmental impacts for these sites are included in this report.

For Beacon Hill, Capital Insight advises that some 150 houses may be adversely affected by increases in local traffic levels and that another 100 houses may be adversely affected by loss of visual amenity over bushland and green spaces. Allowing a discount of \$50,000 on a \$750,000 house (a discount of 6.66 per cent)¹, there would be a total property value discount of \$12.5 million for those 250 houses. This discount would occur during the construction process and be the capitalised value of any future annual loss of amenity.

About 40 houses could face a similar loss of amenity close to the Frenchs Forest site. This would be equivalent to a capital loss of \$2.0 million.

Unquantified factors

The above set of costs probably includes most important costs. However, it has not been possible to estimate some costs that have been identified as potentially important in the recent value management exercise. These include public transport convenience, potential value for private operators, and possibly some site disruption and environmental costs.

¹ See Abelson, P., 1979, 'Property Prices and the Value of Amenities', *Journal of Environmental Economics and Management*, Vol. 17, pp.225-32.

The value management study identified the Frenchs Forest and Beacon Hill sites, and to a less extent the Mona Vale site, as poor for public transport. While this is currently true, this may not be true in future for these sites, especially Frenchs Forest which is well placed on major roads.

This present study has not attempted to estimate the potential of each location to a private health operator. As noted, it has been assumed implicitly that the value of each site to a private operator is exactly equal to the amount that it takes to provide the private facility, with no premium for land values.

There may be disruption to public parking at Dee Why, to bus operations on the bus depot (and the environment for the hospital itself may not be optimal at this site), and to golfers and possibly to the environment on the Warringah golf course. We understand that these impacts have to some extent been factored into estimates of site values, property take and site preparation. However, there may be some additional unquantified impacts at these or other sites.

4 Results

Table 3 summarises the results. The estimated Net Present Cost is a discounted summary of all costs incurred from 2006-36. The other figures shown are not discounted. The detailed spreadsheets are provided in the Appendix (in separate electronic files).

The third column shows the overall results relative to the Base Case, renovating the existing Mona Vale and Manly Hospitals. On the basis of the figures used in this report, this indicates that the Beacon Hill and Frenchs Forest sites would provide estimated net savings of \$87 million and \$85 million respectively. The next ranking sites would be the Brookvale Golf Course and Bus Depot sites with estimated net benefits of \$80 million and \$75 million respectively. The Dee Why site is the least efficient Warringah site mainly because of high site and construction costs.

Table 3 Summary of Results: \$ million in 2005 prices

Option	NPC ^a 7%	NPC of savings compared with Option 1	Net land and property costs ^b	Construction & related costs ^c	Operating costs in 2011 ^d	Access costs in 2011 ^e
Base Case						
1. Mona Vale + Manly	2203	0	0	134	204	7.1
Major Hospital in Warringah						
2A. Dee Why + MV	2152	51	4	311	186	6.5
2B. Brookvale + MV	2128	75	0	281	186	6.5
2C. Frenchs Forest + MV ^f	2118	85	-28	300	186	7.4
2D. W. Golf Course + MV	2123	80	-18	304	186	6.5
2E. Beacon Hill + MV ^f	2116	87	-34	294	186	7.4
Major Hospital at Mona Vale						
3A. Mona Vale + Dee Why	2150	53	-33	288	191	7.9
3B. Mona Vale + Brookvale	2150	53	-33	288	191	7.9
3C. Mona Vale + Manly	2155	48	-30	288	191	7.9

Notes

- (a) NPC is Net Present Cost.
- (b) This column is the incremental cost of land taken less land sold relative to Option 1.
- (c) These are capital costs incurred before opening of the hospital. Further capital expenditures in the order of \$100 million are allowed for Option 1 in years 16 and 17.
- (d) Estimated annual cost of servicing all Northern Beach residents in 2011.
- (e) Estimated access costs for inpatients, outpatients, emergency attendances and visitors to Mona Vale, Warringah, Manly and RHS Hospitals in 2011.
- (f) Option 2C includes \$2.0 million environmental costs. Option 2E includes \$12.5 million environmental costs.

The major driver of these estimated net savings is the forecast saving in operating expenses. Capital Insight estimates that annual system-wide hospital operating costs in 2011 will fall from \$204 million in the Base Case to \$186 million in each of the Warringah options. The concentration of hospital services also provides potential benefits from rationalizing land uses. These benefits offset the higher capital costs of the Warringah options.

The four most cost-effective Warringah (strategy 2) options are also more cost-effective than the Mona Vale (strategy 3) options. The Mona Vale option is forecast to have higher operating costs and is slightly inferior overall on access cost grounds.

Other possible issues

In principle the costs are estimated for provision of a given standard of service at the three hospitals in any given system inclusive of services provided at RNSH. However, it may be more difficult to achieve this quality of service under strategy 1. It may be more difficult to recruit staff, to ensure minimal cross-infection, to avoid cancellation of services, and generally to guarantee patient safety under strategy 1. These potential issues could be material but have not been quantified in this report. Any service differences between the other options are expected to be more minor.

Another potential disadvantage of strategy 1 is that a collocated private hospital is unlikely. This could increase the services required from the public hospitals but this has not been costed.

On the other hand, it should be noted that the benefits of strategies 2 and 3 relative to 1 are based on (i) control of construction costs, (ii) achievement of significant savings in maintenance expenditures, and (iii) effective reuse of Manly and Mona Vale sites.

The report has not estimated public transport costs (the access costs are based on private travel modes). It has been suggested that the Warringah sites along Pittwater Road offer substantial advantages in access to public transport. We do not have data on numbers arriving at hospital by public transport. However, in the timescale of this project, there could be reasonable public transport services close to Frenchs Forest site.

The site development plans for Dee Why, Frenchs Forest and Wakehurst Golf Course include substantial expenditures on local improvements which could provide some benefits in terms of reduced local congestion, reduced flooding and so on. Within the scope of this evaluation, it has not been possible to quantify or cost these potential benefits.

New buildings may provide more environmentally friendly materials or energy design with environmental benefits that are separate from and not included in estimates of hospital operating costs.

