Northern Beaches Health Service Redevelopment
A new wave in healthcare

Northern Beaches Hospital
SSI Application SSI 13_5982
Submissions Report/Preferred Infrastructure Report

February 2014

NSW GOVERNMENT Health Infrastructure

NSW GOVERNMENT Health Northern Sydney Local Health District

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Executive Summary

This Submissions Report/Preferred Infrastructure Report has been prepared to support Health Infrastructure's (HI) SSI application (SSI 13_5982) for the concept proposal for the Northern Beaches Hospital and the associated site clearance and preparatory works. It should be read in conjunction with the *Northern Beaches Hospital State Significant Infrastructure (SSI) Application Environmental Impact Statement for Stage 1 including Concept Design, Site Clearance & Preparatory Works* and the supporting appendices.

The Environmental Impact Statement (EIS) was placed on public exhibition from 30 October 2013 to 28 November 2013 inclusive. A total of 387 submissions were received from public authorities (7), businesses (3), community organisations (7) and the remainder from individuals. A significant number of submissions comprised two form letters, and there were also multiple submissions from a number of submitters. These have all been considered in preparing this report.

Key issues raised related to:

- Justification for the need for the hospital and its location in Frenchs Forest
- Use of a private hospital operator to deliver public health services and the implications of this for the quality of these services
- Use of Mona Vale and Manly Hospitals as alternative facilities to provide the required health services
- Impacts of the hospital development on traffic including traffic generation, capacity constraints of the existing road network, and effects on local roads
- Limited information provided in the EIS on how the traffic and transport issues associated with the hospital development would be addressed, particularly with regard to absence of any government funding for supporting roadworks
- Access to the hospital, with reference to existing traffic congestion in the local road network and broader network issues such as closure of Wakehurst parkway due to flooding
- Impacts on the endangered ecological community Duffys Forest Ecological Community (DFEC) and the adequacy of the proposed biodiversity offset strategy
- Impacts on The Forest High School including noise and vibration, and student safety moving to and from the school.

This report provides consideration of these and other issues raised. Where appropriate, clarification has been provided on specific matters relating to both the concept proposal and the initial site works, and further information has been provided with regard to mitigating impacts associated with the hospital development.

Impacts on DFEC will be further mitigated through the acquisition of an additional 284 suitable ecosystem credits under the NSW BioBanking Scheme to bring the total number of ecosystem credits to 343. This equals the number of ecosystem credits associated with the potential removal of all DFEC vegetation form the hospital site. The revised biodiversity offset strategy now also includes the retirement of 16 ecosystem credits from a 2.4 ha site in Aquatic Drive owned by Health Administration Corporation. This site contains DFEC vegetation and, in terms of area, would offset 46% of the DFEC vegetation removed from the hospital site. This site is also located within the Priority 1 wildlife corridor that broadly follows Wakehurst Parkway.

Further consultation has been undertaken with The Forest High School. The purpose of this was to better understand the nature of school activities in order to best program construction works on the hospital site and to avoid/minimise impacts on school operations, including the arrival and departure of students (and staff) from the school. The Northern Beaches Hospital project team will use the initial issues as raised by the school to help establish the key contract and scope of works documents for the construction activities for both Stage 1 and Stage 2 of the project.

The scope of the site clearance and preparatory works has been revised to include the diversion of electricity, gas and telecommunications services around the site boundaries and connection back into the existing services. The impacts associated with these works would be generally similar to those for the vegetation clearing and site preparatory works. Additional impacts associated with these works have been appropriately considered and where required, further mitigation measures have been identified to effectively manage these impacts to an acceptable level. The impacts of the services diversion works would be managed holistically with all other site preparation works.

Contents

Glossary

Acronym	Description
ACHS	Australian Council Healthcare Standards
ASA	Air Services Australia
BBAM	NSW BioBanking Assessment Methodology
CMP	Construction Management Plan
DE&C	Department of Education and Communities
DFEC	Duffys Forest Ecological Community
DGRs	Director General's environmental assessment requirements
DP&I	NSW Department of Planning and Infrastructure
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
HAC	Health Administration Corporation
HI	Health Infrastructure
ICNG	Interim Construction Noise Guideline
IRG	Interface Reference Group
LEP	Local Environmental Plan; a type of planning instrument made under Part 3 of the EP&A Act
LGA	Local Government Area
MTC	Major Trauma Centre
NBH	Northern Beaches Hospital
NBHS	Northern Beaches Health Service
NSHLD	Northern Sydney Local Health District
OCP	Organochlorine pesticide
OEH	NSW Office of Environment and Heritage
PIR	Preferred Infrastructure Report
RBL	Rating background level (for noise assessment)
RFS	NSW Rural Fire Service

Acronym	Description
RFT	Request for tender
RMS	NSW Roads and Maritime Services
RNSH	Royal North Shore Hospital
SAC	Site assessment criteria
SEPP	State Environmental Planning Policy; a type of planning instrument made under Part 3 of the EP&A Act
SSI	State Significant Infrastructure
TFHS	The Forest High School
TFHSC	The Forest High School Council
TfNSW	Transport for New South Wales
TSC Act	*Threatened Species Conservation Act 1995* (NSW)

1 Introduction

This Submissions Report/Preferred Infrastructure Report (PIR) has been prepared by SMEC Australia Pty Ltd on behalf of Health Infrastructure (HI). It provides a response to comments and issues raised in relation to the public exhibition of the environmental impact statement (EIS) for Stage 1 of the Northern Beaches Hospital development and confirmation of the scope of the Stage 1 works.

The EIS was placed on public exhibition from 30 October 2013 to 28 November 2013 inclusive. Public exhibition of the EIS was managed by the Department of Planning and Infrastructure (DP&I).

The Submissions Report/PIR supports a State Significant Infrastructure (SSI) application (SSI 13_5982) for planning approval under Part 5.1 of the *Environmental Planning and Assessment Act* (EP&A Act). Planning approval is being sought in respect of:

- The concept proposal for the hospital development; and
- Site clearance and preparatory works.

Stage 2, comprising the construction and operation of the hospital, will be subject to a separate SSI application.

The Submissions Report/PIR is structured as follows:

Section 1: Introduction and purpose of the Submissions Report/PIR;

Section 2: HI's response to issues raised in submissions from government agencies, business and the public;

Section 3: Additional information providing clarification on matters relating to biodiversity, and noise and vibration;

Section 4: Relevant information pertaining to the diversion of services that would now be included in the scope of the site clearing and preparatory activities;

Section 5: Consolidated summary of the final mitigation measures incorporating, where appropriate, any changes and/or additional information arising from HI's consideration of issues raised in submissions; and

Section 6: Concluding statement with respect to the planning approval application for the concept proposal, and site clearance and preparatory works.

2 Response to Submissions

A total of 387 submissions were received in relation to the exhibition of the EIS, broken down broadly as follows:

- Public authorities: 7
- Business: 3
- Community organisations: 7
- Community: 370.

A significant number of submissions comprised two form letters and there were also multiple submissions from a number of submitters. These have all been considered in preparing this report.

This section provides responses to the issues raised in submissions.

2.1 Public authorities

2.1.1 Department of Education and Communities

Given the inter-related nature of submissions from the Department of Education and Communities (DE&C), The Forest High School (TFHS), The Forest High School Council (TFHSC) and The Forest High P&C, the issues raised in these submissions are all considered in this section of the report.

Comment	Response
1. Design parameters for the hospital should be conditioned in the Stage 1 planning approval.	This is a matter for DP&I consideration. However, as a general comment HI has detailed specific design obligations in the RFT documentation. These include specific urban design and masterplanning principles as well as key architectural design requirements including the need for a high quality architectural response to provide the hospital with a sense of place and identity and flexibility for future use.
2. The traffic impact assessment should be updated to take account of potential construction and operational impacts on The Forest High School.	The traffic assessment provided in the EIS relates to the concept proposal for the hospital (and as such is high level in nature) and to the site clearance and preparatory works. A more detailed traffic assessment will be undertaken for the Stage 2 EIS. This will address construction impacts and operational impacts. This requirement is specified in the DGRs for the Stage 2 EIS.
3. Given the length of construction, it is important that construction noise be properly considered.	HI fully appreciates the likely and potential impacts of noise emissions from site works on school activities and operation, both with regard to the site clearing and preparatory works, and the subsequent hospital construction. The noise assessment has been undertaken consistent with the ICNG[1]. The guideline recognises that it may not always be practicable to meet the defined construction noise management goals, and focuses on the application of all 'reasonable and feasible' work practices to minimise construction noise impacts.

[1] NSW *Interim Construction Noise Guideline*, Dept of Environment and Climate Change, July 2009.

Comment		Response
		The ICNG also places an emphasis on effective consultation with noise-impacted receivers. In this regard, HI has recently met with TFHS Principals to discuss potential working periods and issues for consideration as part of the impacts of the enabling works on the school. These issues will be considered and suitable mitigation measures employed in the scope of works for the contractor and regularly reviewed by HI with the school. HI would continue to undertake regular consultation with the school on all and any matters that could impact on the school, both in relation to the Stage 1 works and the subsequent Stage 2 works.
4.	Background noise monitoring was undertaken during a school holiday period and is therefore not representative of normal conditions.	Background noise monitoring is undertaken to establish a rating background level (RBL) which in turn is used to establish noise management goals which relate to the nature of the land use. However, for school classrooms, the ICNG specifies a management level (internal) of 45 $dB(A)_{Leq(15min)}$ which is independent of the background noise level. As such, it is considered there is no need to undertake a second round of noise monitoring during a school term.
5.	Appropriate noise mitigation measures should be implemented to avoid/minimise impacts on students.	The potential impacts of noise emissions from the Stage 1 works on TFHS is acknowledged in the EIS which includes a specialist noise and vibration investigation. This identifies a range of potential management and mitigation measures that would be implemented to manage noise impacts on the school. These would be documented in the CMP which would be developed in consultation with TFHS (see following response).
6.	Request that the Construction Management Plan be amended to include consultation with The Forest High School (in addition to notification).	HI fully acknowledges the need to consult with TFHS with respect to activities on the hospital site that could negatively impact on school activities, and has already met with school representatives on a number of occasions. HI would require that the Managing Contractor finalise the CMP (and any supporting plans) in consultation with TFHS.
7.	All construction management plans should be drafted in consultation with The Forest High School.	Please refer to response provided for DE&C Comment #6.

The Forest High School

Comment		Response
1.	Background noise monitoring was undertaken during a school holiday period and is therefore not representative of normal conditions.	Please refer to response provided for DE&C Comment #4.
2.	Adequacy/practicality of noise mitigation measures.	The mitigation measures presented in the noise assessment report and EIS should be treated as potential mitigation measures and not as an exhaustive list. It is appreciated that there may be questions around the practicality of certain mitigation measures from the school's perspective. As

	Comment	Response
		stated in Section 8.3 of the EIS under the subheading 'Mitigation measures', planning with regard to sequencing and locations of site clearance works would be undertaken with due consideration to disruption to classes and examination periods. This would involve close consultation with the school and would be undertaken by or on behalf of HI. Please refer also to Section 3.1.2.
3.	Impact on school assemblies.	Adopting the same noise emission goal as for classrooms, ie 45 dB(A)$_{Leq(15min)}$, the noise assessment predicts that this could be exceeded (with reference to site works in Zone 3). It is anticipated that management of noise impacts on school assemblies would be effectively managed through appropriate programming of the works, this being undertaken in consultation with the school.
4.	Impact on outdoor activities.	Table 3 of the ICNG indicates the recommended management level for active recreation areas to be 65 dB(A) $_{Leq(15min)}$. This is acknowledged in the noise assessment report (refer Table 2). Table 5 of the noise assessment report lists the predicted noise levels for the school playground in relation to site works undertaken in the western third of the hospital site. This shows that noise emissions associated with the use of certain types of plant (noisiest) are likely to exceed the noise emissions goal. It is anticipated that management of noise impacts on outdoor activities would be effectively managed through appropriate programming of the works, this being undertaken in consultation with the school.
5.	Safety of students due to closure of Bantry Bay Road.	Bantry Bay Road would remain open for use by pedestrians until completion of the shared path along the western boundary of the hospital site. Safe pedestrian access would be provided along Bantry Bay Road such as through the temporary installation of safety barriers to separate pedestrians from construction traffic. Bantry Bay Road would be closed to public vehicles prior to commencement of construction.
6.	Safety of students associated with truck movements.	Section 8.1.2 of the EIS notes that entry to and exit from the site would be under an approved construction traffic management plan, and would involve the use of traffic controllers to direct traffic. Safe pedestrian access would be provided around the site and would involve the establishment of appropriate safety controls, such as temporary barriers, to separate pedestrians from areas used by construction traffic.
7.	Impact of construction vehicle movements on school bus movements.	As previously indicated, movements of construction vehicles would occur under an approved traffic management plan. This would address relevant matters including school bus movements. As far as practicable, construction vehicle movements to and from the site would be programmed to avoid sensitive periods such as the beginning and end of school days, and other times/days such as school sports days.
8.	Impacts of construction vehicles on transportation of students on sports day.	Please refer to response provided for TFHS Comment #7.

Comment		Response
9.	Clearing of the hospital site would add to congestion on Warringah Road and Frenchs Forest Road West.	Section 8.4 of the EIS indicates that the anticipated total number of vehicle movements per day to be less than 10, including personnel travelling to/from the site. This level of construction traffic is considered to have negligible impact on existing levels of traffic congestion.
10.	School to be consulted during preparation of CMP.	Please refer to response provided for DE&C Comment #6.
11.	School to be consulted on all future stages of the project.	The school has been consulted on a number of occasions to date as information has become available with regard to the nature of the Stage 1 works on the hospital site. HI would continue to consult with the school during both this stage and the subsequent stage of works.

The Forest High School Council

Comment		Response
1.	Supports the submission made by The Forest High School.	Noted.
2.	Need to address existing transport infrastructure with regard to managing traffic impacts during clearing and construction of the hospital.	Section 8.4 of the EIS discusses potential traffic impacts associated with site clearing and related preparatory works. Table 13 identifies management measures associated with these works, including those relate to traffic and accessibility. Potential traffic impacts associated with construction of the hospital will be examined in detail in the Stage 2 EIS.
3.	RMS and HI need to cooperate on delivering required transport infrastructure outcomes to support the hospital.	As indicated in Section 6.2 of the EIS, RMS and HI are represented on an Inter Departmental Committee and an Interface Reference Group, which are both intended to facilitate interagency coordination and cooperation in relation to delivery of the Northern Beaches Hospital project and supporting infrastructure. These arrangements will continue through Stage 2 of the project.
4.	Request ongoing consultation during all stages of the hospital project.	Please refer to response provided for TFHS Comment #11.

The Forest High P&C

The submission from The Forest High P&C indicated it supported the submission from The Forest High School. No other comment was provided.

2.1.2 Environment Protection Authority

General comments

Comment		Response
1.	EIS does not include any Statement of Commitments.	It is noted that the inclusion of a draft Statement of Commitments was usually specified in the DGRs for major environmental assessments undertaken under Part 3A of the EP&A Act (since repealed). There is no specific reference in the DGRs for the Northern Beaches Hospital to include such a draft Statement of Commitments in the EIS. Table 13 in Section 8.8 of the EIS provides a consolidated summary of management measures for the site clearing and related preparatory works, and is considered to be functionally equivalent to a Statement of Commitments. Section 5 of this report provides an updated list of these management measures which incorporates revised or additional measures following consideration of issues raised in submissions. No similar management measures are identified in relation to the concept proposal as these would be developed as part of the Stage 2 assessment for construction and operation of the hospital, and would be documented in the Stage 2 EIS.
2.	EPA email of 19 November 2013 regarding Appendix K of the EIS (Noise assessment for site clearing and preparatory works).	Responses to the issues raised in the email are provided in this section following consideration of the construction noise and vibration issues raised in the EPA submission.

Site contamination

Comment		Response
3.	Likely historic use of termiticides and other pesticides associated with footprints of former buildings and their curtilage.	This is acknowledged in Section 7.10 of the EIS. The Phase 1 contamination assessment undertaken by Douglas Partners (Appendix H to the EIS) included soil sampling at the minimum sampling density for site characterisation and analysis of this area, and included consideration of potential organochlorine pesticide (OCP) contamination. Table 3 in Appendix H identifies contaminants of concern including pesticides and notes the respective site assessment criteria (SAC). Table 5 presents the results of the soil analysis. This shows that none of the samples had OCP concentrations above the SAC for this contaminant.
4.	Fate of Bantry Bay Road.	Bantry Bay Road would eventually be demolished as part of the hospital site redevelopment. The timing of this is yet to be confirmed but would likely occur during construction of the hospital, ie Stage 2. All or part of the road pavement may be retained during construction as an internal access route within the site and to provide formal access to and from Warringah Road and Frenchs Forest Road West. This would be clarified in the Stage 2 EIS.

Comment	Response
5. Assessment of hydrocarbon or other contamination associated with Bantry Bay Road and drainage structures.	Any contamination risk associated with Bantry Bay Road is likely to be associated principally with the actual road construction materials, ie asphalt, bitumen, etc. The risk of contamination is considered low. It is noted that Bantry Bay Road is not identified on the EPA Contaminated Land Public Record nor on the list of contaminated sites notified to the EPA. Removal of the road pavement and redundant drainage infrastructure would include appropriate testing to verify the extent of any hydrocarbon or other contamination should it exist, and to inform development of any required management measures. This issue would be addressed in further detail in the Stage 2 EIS.
6. Pesticide contamination of bushland area from historic agricultural land use.	The earliest available aerial imagery of the area (taken in 1943) clearly shows land in use as orchard to be generally confined to the area now occupied by the high school. Later aerial photography shows the extent of the land in use as orchard to be generally unchanged, particularly with regard to the western boundary of the hospital site. The hospital site (between the school and Bantry Bay Road) is occupied by bushland. Based on the size and extent of the tree crowns, this suggests that this vegetation had been established for some time (likely several decades), and likely had never been cleared for use as an orchard. It is acknowledged that there may be potential for pesticide contamination to occur on the hospital site, such as from spray drift. The likelihood is considered low, however, additional sampling would be undertaken in the western portion of the hospital site prior to disturbance of this area to better characterise any risk associated with pesticide contamination and inform any required management measures for inclusion in the Final CMP.
7. WorkCover NSW should be consulted with regard to handling asbestos waste.	The main sources of asbestos on site are associated with the former residential dwellings and with potential for illegally dumped waste to contain asbestos-containing materials. The buildings have now been removed and any asbestos waste encountered during topsoil stripping and removal will be managed in accordance with the national *Code of Practice for the Safe Removal of Asbestos, Safe Work Australia* (2005). This code is referred to in Section 8.6 of the EIS which notes that notification of State OHS authorities may be required in relation to asbestos removal. All work related to removal and disposal of asbestos waste would be undertaken by a licensed contractor. WorkCover would be notified a minimum of five days in advance of commencement of any licensed asbestos removal (please refer to the updated management measures in Section 5.1.5 of this report). The Preliminary Construction Management Plan indicates that an unexpected finds protocol would be incorporated into the demolition/earthworks contractors' procedures, so that appropriate management procedures could be undertaken in an effective manner if suspected contamination was encountered during removal of remaining demolition materials from the former residential sites and the community health centre.

Comment	Response
8. Scope of site investigations to date are considered insufficient to adequately characterise the general contamination status of the site.	As noted in response to EPA Comment #6, additional sampling and analysis would be undertaken to further characterise the contamination status of the site. The methodology would accord with applicable guidelines and be consistent with work previously undertaken on the site. The results of the analysis would be provided to the EPA for review and comment prior to finalising the CMP.
9. Redevelopment of the site warrants the involvement of a site auditor.	Section 3.6.1 of the *Managing Land Contamination Planning Guidelines* (SEPP 55 guidelines) notes that 'as a general principle, a site audit is only necessary when the planning authority: • believes on reasonable grounds that the information provided by the proponent is incorrect or incomplete • wishes to verify the information provided by the proponent adheres to appropriate standards, procedures and guidelines • does not have the internal resources to conduct its own review.' With reference to the first criterion, and noting previous comment on the results of past investigations, it is anticipated that the additional soil sampling and analysis for the western portion of the hospital site (that would be undertaken prior to disturbance of this area) would adequately address the information gap noted by the EPA. The additional sampling and analysis would be undertaken by an experienced contaminated land consultant in accordance with applicable guidelines, standards, etc and appropriately documented. This would be provided to the EPA for review and comment. With regard to the third criterion, it is noted that the EPA is effectively acting as DP&I's technical advisor with regard to review of technical documentation. The investigation undertaken to date has not indicated that there is potential for significant contamination to occur on the hospital site. While the additional sampling will better characterise the contamination status, it is not expected to materially alter this conclusion. An occupational hygienist would be engaged to advise and provide clearance with regard to the management and disposal of any hazardous materials associated with the former buildings on the site. Given the above, it is not considered that involvement of a site auditor is necessary.

Waste control and management

Comment	Response
10. Waste should be managed in accordance with the waste management hierarchy.	This is acknowledged in Section 1.3 of the Waste Management Strategy (Appendix N to the EIS) which indicates that the strategy has been prepared to be consistent with the waste management hierarchy. The Waste Management Strategy is cross-referenced in the Preliminary CMP (Appendix O to the EIS).

Comment	Response
11. All waste generated should be assessed, classified and managed in accordance with DECCW guideline.	A preliminary classification of the expected waste streams associated with the site clearance and related preparatory works is provided in Section 2.3 of the Waste Management Strategy. The Final Mitigation Measures (Section 5.1.5 of this report) make specific reference to waste management being undertaken with reference to the DECCW guideline.
12. Vehicles transporting waste from the site should be covered.	This management and mitigation measure is included in Section 5.1.5 of this report.
13. Appropriate measures should be taken to prevent material being transported from site and deposited on roadways.	A management and mitigation measure is included in Section 5.1.5 of this report together with a requirement for regular inspection of local roads and clean up as required.

Dust control and management

Comment	Response
14. Dust emissions from the site should be minimised.	Section 8.7.2 of the EIS acknowledges the potential for dust emissions as a result of site clearing. The EIS and the Soil and Water Management Plan (Sections 4.4, 4.5) identify management measures to be implemented during site clearing and in the intervening period following completion of clearing and prior to commencement of construction. These address minimising dust emissions from the site.
15. Dust emissions from the site should be prevented.	Given that the works involve the removal of vegetation and the consequent exposure of bare ground, prevention of all dust emissions may not be achievable. However, the management measures identified in the response to EPA Comment #14 have been included to minimise the potential for dust emissions

Erosion and sediment control

Comment	Response
16. Earthmoving or vegetation removal should not commence until appropriate erosion and sediment controls are in place.	Section 2.1 of the Soil and Water Management Plan (Appendix L to the EIS) details the general sequencing of site clearing and preparatory works. This identifies the establishment of erosion and sediment controls as preceding any works on the site that involve disturbance of the ground surface or removal of vegetation.
17. Daily inspection of erosion and sediment controls to ensure ongoing adequacy.	Section 2.1 of the Soil and Water Management Plan indicates that sediment controls would be inspected regularly, including after significant rainfall events, and cleared of sediment before the design capacity is reached.

Construction noise and vibration

Comment	Response
18. Identification of surrounding noise-sensitive land uses.	Section 2 of the noise assessment (Appendix K to the EIS identifies the land uses surrounding the hospital site. This notes the school to the immediate west of the site, and the residential areas on the northern side of Frenchs Forest Road West and on the southern side of Warringah Road (in Bantry Bay Road, Hilmer Street and Karingal Crescent, and at the corner of Hilmer Street and Warringah Road).
19. Recommendation to undertake comprehensive noise and vibration assessment to construction activities.	Clarification on noise and vibration issues associated with site clearing and the related preparatory works (including the diversion of electricity, gas and telecommunications services) is provided in Section 3.3. This, together with the existing noise and vibration assessment (Appendix K to the EIS), is considered sufficient to adequately characterise the noise impacts associated with site clearing and the related preparatory works, and to inform the required management measures. Please also refer to the responses provided in relation to the EPA email of 19 November 2013 to DP&I.
20. Compliance with standard construction hours in ICNG.	Section 2.2 of the Preliminary CMP (Appendix O to the EIS) identifies the hours of operation for the site clearing and preparatory works. These are consistent with the recommended standard construction hours in the ICNG. It is not intended to carry out works outside of the recommended standard construction hours.
21. Scheduling of intra-day respite periods.	The recommendations made with respect to the specific nature of intra-day respite periods would be incorporated into the Final CMP, subject to the outcomes of consultation with the high school (please refer also to responses to DE&C Comments #5 and #6). Development and scheduling of intra-day respite periods would also address noise impacts on affected residents.
22. Adoption of special 'examination time' arrangements negotiated with TFHS.	Please refer to response provided for EPA Comment #21.
23. Minimising annoyance from reversing and movement alarms.	Finalisation of the CMP would include a safety risk assessment of construction activities to determine whether it would be practicable, reasonable and safe to use audible movement alarms of a type that would minimise noise impacts on adjacent sensitive receivers without compromising safety. This would include consideration of Smart type alarms that would adjust based on background noise levels and broadband type alarms.

The following table provides responses to matters raised in the EPA's email communication with DP&I, dated 19 November 2013. There is some duplication with respect to noise and vibration issues previously raised but responses have been included for completeness. Clarifications and additional information on the noise assessment that expands on the following responses are provided in Section 3.3.

Comment	Response
24. Scope of Stage 1 site preparation works and potential for generation of significant vibration.	The scope of works is set out in Section 8.1 of the EIS. The activities referred to by the EPA are not identified as they do not form part of the Stage 1 site preparation works. It is not considered that the identified activities would have potential for generation of significant vibration.
25. Background noise levels in Table 1 in Appendix K.	There is a transposition error in the table. The noise levels for logger A should be against logger B and vice versa. There is a similar transposition error in Table 2 with respect to the noise-affected levels for residences on Frenchs Forest Road West and Warringah Road. These transposition errors have not affected the analysis, nor the conclusions drawn. Amended versions of these two tables are provided in Section 3.3 of this report. Background noise levels and noise criteria for periods outside of the recommended standard construction hours have also been included for completeness.
26. Background noise levels not based on sensitive receiver locations.	Noise logging was undertaken at locations within the school grounds considered to be acoustically representative of the residential locations and secure from vandalism. The results of the noise logging are considered to be reasonably representative with a bias towards being more conservative (ie lower monitored noise levels), due to larger set back from the major adjacent roads required for security considerations compared with the potentially most affected receptors. This is discussed further in Section 3.3 of this report. It should be noted additional noise logging would be undertaken for the Stage 2 works, and would include consideration of operational noise issues.
27. Potential for construction activities outside of recommended standard hours.	There are no plans to undertake work outside the ICNG recommended standard construction hours. To minimise the impact on the school, where feasible and reasonable, work may be undertaken on Saturday mornings (within standard construction hours), in the afternoon after school hours and/or during vacation periods. This would be subject to works programming by the Managing Contractor and the outcomes of consultation with the school.
28. Potential for vibration impacts.	As noted previously, a description of the Stage 1 site works is provided in Section 8.1 of the EIS. None of the identified activities is considered to have potential for significant vibration impacts. Site compaction is not mentioned because it does not form part of the Stage 1 site works.
29. Reference to Zone 7 twice in figure on page 5 of Appendix K.	This is a typographical error. The three zones on the eastern part of the site should read (north to south): 'Zone 7', 'Zone 8', 'Zone 9'. This does not have any bearing on the outcomes of the analysis. The corrected figure is provided in Section 3.3 of this report.
30. Recommendation to revise the noise assessment.	A number of minor revisions have been made to the noise assessment to address the issues raised by the EPA. Further details are provided in Section 3.3.

Comment	Response
31. Establishment of background noise levels in accordance with NSW *Industrial Noise Policy*.	The acoustic consultants have confirmed that the procedures and guidelines of the INP have been referred to in the establishment of background noise levels (ie RBLs and ABLs) which form the basis of the construction noise criteria.
32. Need for close consultation with the school.	This is acknowledged in Section 8.3 of the EIS under the subheading 'Mitigation measures'. Please refer also to response provided to DE&C Comment #5 in Section 2.1.1 and additional information provided in Section 3.1.
33. Intra-day respite periods would increase duration of works and therefore impacts on receivers.	The need for respite periods (and associated matters such as timing, frequency, duration, etc) would form part of the consultation process with the school with regard to timing and scheduling of works that could impact on the school. Please refer also to additional information provided in Section 3.1.
34. Reason for undertaking vegetation chipping on site.	As indicated in Section 8.5 of the EIS, it is proposed to use chipped vegetation as a mulch material to assist in stabilising exposed areas of ground and reduce the risk of entrainment of unconsolidated material by wind or runoff. This would also reduce the number of vehicle movements from the site and would contribute to reducing traffic impacts on the local road network which, as noted in Section 7.4.1 of the EIS, is already heavily congested. Given the size of the site, there is ample opportunity to locate the vegetation chipper in the south eastern part of the site away from sensitive receivers (with cut vegetation transported to the chipper for processing). This would provide ample separation distance and would be fully expected to meet the identified noise management levels.

Operational noise and vibration

Comment	Response
35. A comprehensive noise assessment should be undertaken for operation of the hospital.	This is not an issue for the vegetation clearing and site preparatory works. This would be addressed in the Stage 2 EIS which would deal with such operational issues. The DGRs for the Stage 2 EIS make explicit reference to a quantitative noise and vibration assessment addressing relevant construction and operational matters. Further noise logging for the purpose of establishment of background noise levels would be undertaken for Stage 2 construction and operational matters, as necessary. The DGRs also require the Stage 2 EIS to provide details on feasible and reasonable measures to manage and mitigate noise and vibration impacts.
36. Recommended activities related to mitigation of operational noise impacts on surrounding noise-sensitive receivers.	Please refer to response provided for EPA Comment #35.

Clinical and related waste

Comment	Response
37. EIS provides minimal detail relating to management of clinical waste.	This is not an issue for the vegetation clearing and site preparatory works. This would be addressed in the Stage 2 EIS which would deal with such operational issues. As a general comment, management of clinical waste would be undertaken in accordance with all applicable regulatory requirements and accepted practice.
38. EIS does not make any reference to the *Protection of the Environment Operations (Waste) Regulation 2005* with regard to management of clinical waste.	This is not an issue for the vegetation clearing and site preparatory works. This would be addressed in the Stage 2 EIS which would deal with such operational issues. As a general comment, management of clinical waste would be undertaken in accordance with all applicable regulatory requirements including this Regulation..

Radiation Control Act and Regulation

Comment	Response
39. Recommends EPA be consulted with regard to licensing, management and handling of waste containing radioactive material.	This is not an issue for the vegetation clearing and site preparatory works. This issue would be addressed in the Stage 2 EIS which would deal with such operational issues and would involve consultation with the EPA on this and related matters for which the EPA has a statutory responsibility.

Energy and water conservation

Comment	Response
40. Design development should consider opportunities to incorporate measures to reduce energy and water use.	Section 3.2.2 of the Stormwater Management Plan (Appendix I to the EIS) notes that the opportunity for retention of stormwater for reticulation and reuse throughout the site would be investigated during the detailed design phase. Section 7 of the Infrastructure Management Plan (Appendix J to the EIS) identifies a number of sustainability measures that would also be addressed during detailed design.

2.1.3 NSW Rural Fire Service

Comment	Response
1. The EEC located to the east of the site should be managed to the standard of an asset protection zone or the buildings appropriately set back in accordance with *Planning for Bushfire Protection 2006*.	Table 12 in the Stage 1 EIS notes that building setbacks on the hospital site with reference to managing bushfire risk would be identified as a development constraint in the tender documentation for construction and operation of the hospital. As noted in Table 12 in the Stage 1 EIS, it is planned to retain the area of vegetation at the eastern end of the site but substantially reduce the understorey. This would materially contribute to reducing bush fire risk for the site. Management of this area of vegetation would be undertaken in accordance with the relevant matters in *Planning for Bushfire Protection 2006*. This issue would be addressed during design development and the outcomes documented in the Stage 2 EIS.

2.1.4 Office of Environment and Heritage

Biodiversity

Comment	Response
1. The proposed biodiversity offset strategy does not address any of the matters raised by OEH prior to public exhibition of the EIS.	As indicated in Section 8.2 of the EIS, the proposed biodiversity offset strategy was developed with reference to and in accordance with the *NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects* ('the interim policy'). The proposed hospital is SSI development and therefore mitigation of impacts on biodiversity can be considered under the interim policy. Please refer to the following responses with respect to the individual matters raised by OEH.
2. Reference to 'where available on the market' in relation to species/ecosystem credits does not refer to only those credits available on the Biobanking Public Register or Biobank site expression of interest register on the OEH website.	HI acknowledges that this matter was drawn to its attention in its meeting with OEH. Additional investigation has been undertaken into other potential offset sites within the Warringah LGA containing DFEC. Further details are provided in Section 3.2 of this report.
3. Expectation that the proponent would make a reasonable effort to locate and secure an offset site beyond simply looking at what is available on the public registers.	HI has identified six sites within the Warringah LGA with potential to generate DFEC ecosystem credits and has undertaken biobanking assessments for two of these sites. One of these sites is owned by Health Administration Corporation (HAC). Further details are provided in Section 3.2 of this report.
4. Proposed offset strategy is inadequate and does not meet certain Tier 3 variation criteria under the *NSW Interim Offsets Policy*.	Responses to the individual comments are provided for the identified criteria as follows. It is noted that there is no requirement under the interim policy to meet all the specified criteria.

	Comment	Response
5.	Criterion a) requires that the number of ecosystem credits should be the same.	Noted. HI has undertaken further assessment of the number of ecosystem credits required, taking account of the final services diversion design, particularly around the eastern boundary of the site where there would be some impact on vegetation in the adjoining road reserve (principally in relation to canopy clearing). The revised total number of ecosystem credits required is 343 (refer Section 3.2). The Belrose site would provide 59 suitable ecosystem credits leaving a shortfall of 284 credits. HI is currently arranging the purchase of the remaining credits from two existing biobanking agreements held by The Hills Shire Council.
6.	For criterion b), it is arguable whether Red-crowned Toadlet and Rosenburg's Goanna (which are both sandstone species) are of a higher conservation priority in the area than Powerful Owl given the large expanses of sandstone country protected in national parks north of Sydney Harbour..	All species have the same legislative status being listed as Vulnerable under the TSC Act (and not listed under the EPBC Act). However, the relative conservation priority of these species is no longer considered relevant as the Powerful Owl is an 'ecosystem credits species' and specific species credits are not required to be obtained to offset their loss. Suitable ecosystem credits to offset loss of Powerful Owl habitat would be incorporated into the total required 343 ecosystem credits.
7.	Criterion b) requires that the number of species credits should be the same.	Noted. Please also refer to response to OEH Comment #6.
8.	Criterion d) considered to be only partly met. The assessment report calculated that a suitable 35 ha offset site would be required to offset the ecosystem credits lost but the strategy argues other suitable sites have not been identified and the high land value would make this option too costly.	Please refer to response provided to OEH Comment #3.
9.	Criterion e) is not met as there is a substantial shortfall in the ecosystem credits required.	As noted in the response to OEH Comment #7, species credits for the Powerful Owl are not required and accordingly this criterion is no longer considered relevant.
10.	Recommend further work to identify additional offset options in the Sydney Basin which together with Biobank Agreement 55 would provide a better conservation outcome to offset the losses.	Please refer to response provided to OEH Comment #3.

Aboriginal heritage

Comment	Response
11. Planning approval conditions should require the Aboriginal heritage report recommendations to be implemented.	Section 7.8 of the EIS discusses Aboriginal heritage issues and notes the mitigation measures recommended in the specialist Aboriginal heritage report (Appendix F to the EIS) would be incorporated into the Final CMP.
12. Signage or some other appropriate form of recognition of the cultural significance of the study area should be included in the final development.	HI would undertake to provide appropriate acknowledgement of the cultural significance of the study area's Aboriginal heritage values in the final hospital development.

Flooding

Comment	Response
13. EIS does not address flooding matters specified in the Director-General's Requirements.	The OEH advice to DP&I with regard to matters for consideration in the DGRs makes reference to flooding, however this is not specifically identified as a key issue in the actual DGRs for the Stage 1 EIS. As noted in Section 3.2 of the EIS, the hospital site is located on a high point (ridgeline) in the landscape. The impact of the hospital development on flooding or vice versa is not considered to be a major risk.
14. Given the location of the hospital site on a ridge line, a detailed hydrological and hydraulic assessment is not considered necessary.	Noted. Please also refer to response provided for OEH Comment #13.
15. Issues related to localised flooding from increased stormwater runoff from the hospital site should be addressed prior to any works being undertaken on site.	As noted in Section 3 of the Stormwater Management Plan (Appendix I to the EIS), the stormwater drainage system for the hospital would be designed with reference to relevant DP&I procedures and design standards. Consultation would be undertaken with Warringah Council and RMS as the owners of the stormwater system to which drainage from the hospital site would discharge.
16. Issues related to impact on access due to flooding on Wakehurst Parkway should be addressed prior to any works being undertaken on site.	Access constraints related to flooding on Wakehurst Parkway are considered at a high level in the Stage 1 EIS in relation to the concept proposal. This notes the available alternative access routes. This issue would be investigated further in the Stage 2 EIS (as flooding is specifically identified as a key issue in the DGRs for this EIS).

2.1.5 *Sydney Water*

	Comment	Response
1.	No objection to the proposal.	Noted.
2.	Drinking water main available for connection is 450 mm main on southern side of Frenchs Forest Road.	Noted.
3.	The hospital development will be serviced by the proposed wastewater extensions designed under Case 133887WW.	Noted.

2.1.6 *Transport for NSW*

	Comment	Response
1.	A comprehensive parking provision assessment should be undertaken for the Stage 2 EIS.	The RFT proponents will be undertaking this as part of the Stage 2 EIS once details on hospital activities, bed numbers and staffing profile are further progressed.
2.	A Construction Traffic Management Plan (CTMP) for the site clearance works should be submitted to DP&I/Council prior to commencement of works.	It is noted that this is typically a requirement of planning approvals for infrastructure projects where there is a likelihood or potential for impacts on other road users. Warringah Council would be consulted during preparation of the CTMP.
3.	The CTMP should provide all necessary details relating to construction traffic movements to and from the site, and within the surrounding road network.	Agreed. It is noted that it is standard practice to include all such details in a CTMP.
4.	Truck routes should be confined to the State Road network unless impeded by turn bans and roadworks construction.	Agreed. It is noted that it is standard practice to include all such details in a CTMP.
5.	The CTMP should include pre-construction and post-construction road pavement condition surveys of haulage routes.	Agreed. It is noted that it is standard practice to include all such details in a CTMP.

2.1.7 *Warringah Council*

General concept

Comment	Response
1. Would like to see design excellence built into all aspects of built forms.	HI has detailed specific design obligations in the RFT documentation. These include specific urban design and masterplanning principles as well as key architectural design requirements including the need for a high quality architectural response to provide the hospital with a sense of place and identity and flexibility for future use.
2. Council reserves the right to comment in more detail on the concept proposal when the Hospital Operator, design and construction details are available.	HI has consulted with Council with regard to the concept proposal, and the site clearing and preparatory works. HI would continue to consult with Council during the site clearing works, and as part of the hospital design development process. It is noted that the DGRs for the Stage 2 EIS specifically require consultation with Warringah Council.
3. The primary hospital access on Frenchs Forest Road West will generate significant additional traffic on the local road network.	HI has been in ongoing consultation with both TfNSW and RMS in regard to the necessary upgrade requirements to both State and local roads to facilitate the required access to and from the hospital site and into the local road network.
4. Limited information provided in relation to future public transport improvements to service the hospital.	Section 7.4 of the ESI notes various matters currently under investigation by RMS and TfNSW including public transport enhancement opportunities. As indicated in Section 5.5 of the EIS, the Stage 2 EIS would include development of a sustainable travel demand management strategy within the context of wider public transport planning for the Warringah Road corridor, and with regard to any relevant strategies and actions arising out of the Northern Beaches Bus Rapid Transit (BRT) Pre-Feasibility Study.
5. References to the Cox Richardson State Significant Study are not appropriate given it was linked to a previous study that was abandoned in December 2011.	The original Cox Richardson study was referenced principally in relation to background information considered of relevance to the concept proposal. However, it is accepted that certain references, such as the proposed medium density residential height limit of 13 metres, are no longer relevant.
6. EIS reference (p44) to 13 metre height limit is incorrect.	Noted. Please also refer to response provided for WC Comment #5.
7. The concept proposal should recognise that the hospital will be located opposite existing low density residential development, and scale and massing on the hospital site should take this into account.	Section 3.4 of the EIS notes the surrounding land use and acknowledges the existing residential development on the northern side of Frenchs Forest Road West. Section 7.3 includes discussion on the masterplanning process undertaken for the reference design and notes the recommended 'cone' strategy of low building mass at the site perimeter rising to a high point at the centre of the site. It also notes that taller buildings should be closer to the south of the site, adjacent to Warringah Road. Please also refer to response provided for WC Comment #1.

Comment	Response
8. The concept proposal for the hospital should not pre-empt Council's Hospital Precinct Structure Plan.	The concept proposal is essentially focused on the development of the hospital site with appropriate consideration given to related matters outside the site such as the supporting roadworks. HI has not been provided with any specific details regarding Council's Hospital Precinct Structure Plan, however, development of the site is not anticipated to pre-empt the Plan. In this regard, HI would continue to consult with Council to identify any issues of potential concern to Council and to progress resolution of these.
9. The shadow diagram does not provide sufficient detail on impacts on surrounding public land and private properties.	The shadow diagram provided in Section 7.3 of the EIS is based on the reference design which, as is noted, may change following appointment of the Hospital Operator. The shadow diagram provides a preliminary indication of shading impacts on adjoining land for the winter solstice which is when the extent of shadows would be the greatest. The DGRs for the Stage 2 EIS require the provision of relevant shadow diagrams which would be developed for the final design.
10. Recommendation that planning approval application be accompanied by a detailed Shadow and Sunlight Access Report.	The DGRs for the Stage 2 EIS require provision of shadow diagrams and assessment of solar access.
11. A comprehensive view analysis should be prepared and submitted with any further planning approval application.	This is specified in the DGRs for the Stage 2 EIS and identified as a key issue.
12. Design of the hospital buildings should minimise overlooking to residential properties to the north and south.	Please refer to response to WC Comment #7.
13. An Acoustic Report should be prepared to address operational impacts on neighbouring residential properties.	This is a specific requirement (Key Issue #5) identified in the DGRs for the Stage 2 EIS and would be addressed in that EIS.

Transport and access

Comment	Response
14. No information is provided on truck access routes nor the volume of truck movements.	Section 8.4 of the EIS provides comment on construction traffic associated with the site clearing and preparatory works. It notes that as a general principle, heavy vehicles would be restricted to arterial and sub-arterial transport routes. Heavy vehicles exiting into Frenchs Forest Road West would turn right and enter the local road network via Wakehurst Parkway. Otherwise, use of suburban streets would be avoided as far as practicable. It further notes it is anticipated that there would be less than 10 construction vehicle movements per day.

Comment	Response
15. Truck movements should be via the main road network and not Frenchs Forest Road West, particularly during excavation works associated with Stage 2.	Please refer to response provided for Comment #14. As far as practicable, restricting heavy vehicle movements to arterial and sub-arterial transport routes would similarly apply for the Stage 2 works.
16. Concerned that main access to the hospital is from Frenchs Forest Road West, which should instead be the secondary access.	Please refer to response provided for WC Comment #3.
17. Traffic management needs to take account of set down, pick up arrangements at The Forest High School.	Please refer to response provided for TFHS Comment #7 (Section 2.1.1).
18. Limited detail provided on other transport infrastructure such as public transport and bicycles.	Table 4 in Section 6.2 of the EIS notes consultation that has occurred with TfNSW and RMS on a number of transport-related matters including integration of public transport initiatives into the hospital development. While HI has been consulting with TfNSW, it is that agency's responsibility for the delivery of public transport infrastructure. The RFT document to proponents requires that the Hospital Operator must develop an overall design that encourages the use of alternative modes of transport, including public transport, walking and cycling in order to reduce the reliance on private vehicle travel. The RFT document places the requirement on the Hospital Operator to ensure that the facility connects to bicycle and pedestrian networks and provides accessibility to public transport nodes. Hi would continue to consult with TfNSW to facilitate appropriate consideration of such transport infrastructure matters in the delivery of the hospital.

Biodiversity offset strategy

Comment	Response
19. Proposed retention of vegetation in Blinking Light Reserve with thinning of understorey not consistent with bushfire constraints advice and likely requirement for asset protection zones.	While retention of vegetation (with a thinned understorey) at the eastern end of the site is a design principle for the hospital site, the actual nature of its implementation would need to be mindful of other site management requirements such as bushfire protection. This would be considered as part of the assessment for the Stage 2 EIS. With regard to the asset protection zones shown in Figure 3 of Appendix E to the EIS, development of the reference design deliberately avoided locating any built structures in these locations, and this has been specified as a site constraint in the RFT documentation.

Comment	Response
20. Mitigation measures in the biodiversity offset strategy should be outlined in detail in an operational management plan.	It should be noted that retained vegetation on the hospital site would not be managed from the point of view of maintaining biodiversity values. Mitigation of biodiversity impacts would largely be addressed through the biobanking framework using ecosystem/species credits from areas with established biobanking agreements which already have management measures in place. Additional information on the revised biodiversity offset strategy is provided in Section 3.2.
21. Recommend staged clearing, fauna relocation and establishment of exclusion zones in accordance with NSW industry guidelines.	Section 3.3 of the Preliminary CMP provides for the preparation of an Environmental Work Method Statement (EWMS) to manage clearing activities and minimise biodiversity impacts, particularly on fauna. The EWMS would address these and other relevant matters. It should be noted that any staging of clearing would need to be coordinated with mitigating noise impacts on noise-sensitive receivers. OEH would be consulted with regard to the manner of managing removal of resident fauna from the site.
22. Recommend soil seed bank translocation.	This would be considered but would be contingent on identification of suitable receival sites.
23. Recommend implementation of fauna crossings.	The hospital development is not introducing a barrier to fauna movement and therefore this mitigation measure is not supported.
24. Recommend preparation/ implementation of weed management schedules.	This issue would be addressed in the EWMS for site clearing activities.
25. Recommend preparation/ implementation of planting schedules.	This is considered more appropriate to address in the Stage 2 EIS.
26. Recommend use of a project ecologist to assist in implementation of management measures.	Section 3.3 of the Preliminary CMP makes reference to the involvement of an ecologist in the development of the EWMS and in site clearing activities.
27. Recommend salvage and collection of plants, seeds and propagation materials.	HI would consider salvage and collection as recommended, further to specific discussion with Warringah Council's Environment section. HI would look to undertake this work on behalf of Council.
28. Recommend bushland protection fencing.	This is considered of potential relevance only for the eastern perimeter of the site. The majority of the eastern perimeter will be bordered by an easement for the Ausgrid 11 kV/33 kV transmission line. The easement will contain a gravel-surfaced access track for Ausgrid maintenance vehicles. The track will essentially demarcate the boundary between the hospital site and the adjoining road reserve, and serve to identify the extent of landscape management activities on the hospital site. As such, installation of bushland protection fencing is not considered necessary.

Comment	Response
29. Recommend implementation of tree protection mechanisms.	Where practicable, mature established trees on the hospital site would be retained such as around the site perimeter and at the eastern end of the site adjoining the road reserve beside Wakehurst Parkway. This however, will be contingent upon the final hospital design (which was not known at the time of preparation of this report) and construction requirements. Appropriate protection measures will be implemented for those trees to be retained to minimise the risk of any damage to them during construction.
30. Recommend installation of nest boxes.	It is noted this relates to the recommendation made in the biodiversity specialist report concerning the installation of nest boxes appropriate for utilisation by Eastern Pygmy Possum in secured offset areas. HI would consider this recommendation following finalisation of the biodiversity offset strategy.
31. Recommend implementation of hygiene protocols for equipment and plant.	The biodiversity specialist report identifies the introduction of disease as a risk and makes a number of recommendations to effectively manage this risk. These would be incorporated into the EWMS for site clearing activities.
32. Biobanking assessment has not accounted for modification of DFEC in Blinking Light Reserve.	The biobanking assessment supporting the EIS covers the entire hospital site and the portion of the adjoining road reserve affected by the services diversion. This takes in Blinking Light Reserve. The assessment has assumed that the entire hospital site would potentially be cleared notwithstanding it is intended to retain an area of vegetation at the eastern end of the site adjoining the road reserve where practicable. The biobanking assessment has been updated to address the footprint of the final services design and considers both vegetation that would need to be removed for access and for maintaining required clearances between conductors and the adjacent vegetation canopy.
33. Council can provide list of potential sites for creation and retirement of ecosystem credits.	HI received this information via OEH and has undertaken an investigation of the biodiversity offset potential of the identified sites with reference to the OEH interim policy on offsetting biodiversity impacts. Please also refer to response provided to OEH Comment #3.
34. Species credits from Belrose site not considered of higher conservation priority than Powerful Owl.	Please refer to response provided to OEH Comment #6 (Section 2.1.4).

Aboriginal heritage

Comment	Response
35. Clarification should be provided for inclusion of Aquatic Drive site in the Stage 1 EIS.	It was considered prudent to assess the Aboriginal heritage values of this site in the event that it was considered to have potential for impact mitigation works that in turn could have impacted on Aboriginal heritage values if they were to exist on the site.

Historic heritage

Comment	Response
36. Historic heritage report should recognise proposed change to heritage listing with regard to item 'Former Holland's Orchard Trees'.	The advice of the changed listing is acknowledged, however, it is not considered necessary to amend the historic heritage report.
37. Support recommended management measures in historic heritage report.	Noted. Section 7.9 of the EIS incorporates the recommended management measures. It is anticipated that implementation of these would be addressed through the conditions to the planning approval

Stormwater management strategy and plan

Comment	Response
38. Support reuse of stormwater for non-potable uses.	Section 3.2.2 of the Stormwater Management Plan (Appendix I to the EIS) notes that the opportunity for retention of stormwater for reticulation and reuse throughout the site would be investigated during the detailed design phase. Potential uses for the harvested stormwater include landscape irrigation and grey water reuse within the hospital development.
39. Request submission of a MUSIC model, report and associated data files to Council.	The Hospital Operator's design will further develop and finalise the stormwater management strategy for the site. Once finalised this will be made available to Council for review and comment.

Infrastructure management plan

Comment	Response
40. New services should avoid being located within the carriageway of Council's local roads.	This was an explicit constraint in the development of the design for the diversion of existing services.
41. Plan does not address the provision of new infrastructure to support access to the hospital.	Section 1 of the Infrastructure Management Plan notes that while preliminary details have been discussed with relevant authorities, further liaison will be required with the authorities and the Hospital Operator to determine the extent of the augmentation required with regard to provision of electrical, telecommunications, and hydraulics services to the site. These and other relevant matters such as street lighting would be addressed during detailed design.

Noise assessment

Comment	Response
42. A detailed noise assessment should be provided to Council for review as part of the Stage 2 EIS process.	The DGRs for the Stage 2 EIS identify Council as a party to be consulted during preparation of the EIS. Council would be provided with a copy of the noise assessment for review and comment prior to finalisation of the Stage 2 EIS.
43. The noise assessment should include consideration of helicopter operations, including management and mitigation of noise impacts on residential receivers.	Helicopter operations would form part of the noise and vibration assessment for the Stage 2 EIS. As is normal practice, the assessment would also address mitigation and management of noise and vibration impacts.

Soil and wastewater management

Comment	Response
44. The soil and water management plan does not fully address the Director-General's Requirements.	The DGRs specify preparation of a Soil and Water Management Plan that details measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and particles.' The information provided in the Soil and Water Management Plan (Appendix L to the EIS) is considered to sufficiently address the DGRs and to inform the Managing Contractor (who will be in charge of the site during the works) of required performance outcomes. It is anticipated that the specific matters noted by Council would be addressed in the Final CMP.

Groundwater factual report

Comment	Response
45. Concur with report recommendation to undertake additional groundwater assessments, and this should be undertaken when further design details are known.	Noted. The Hospital Operator will undertake additional geotechnical and groundwater investigations as required in order to confirm and finalise the design.
46. Groundwater discharge to Council's stormwater network will need to be appropriately managed to meet the requirements of the Northern Beaches Stormwater Management Plan.	This is not considered to be an issue for the site clearing and preparatory works but is potentially relevant for the Stage 2 EIS. HI would ensure the Hospital Operator is aware of this requirement.

Waste management strategy

Comment	Response
47. Clarification is required on where waste is to be recycled and disposed of.	Kimbriki Resource Recovery Centre is one potential receiving location for waste materials generated from the site clearing and preparatory activities. The appropriate disposal of waste generated from works will be the responsibility of the Managing Contractor.
48. Further investigation required on facilities that will recycle waste.	Please refer to response provided to WC Comment #47.

Preliminary construction management plan

Comment	Response
49. All construction traffic should be directed to Warringah Road or Wakehurst Parkway, avoiding Frenchs Forest Road West to the west of the hospital site.	This is acknowledged in Section 8.4 of the EIS and in the Preliminary CMP.
50. Pedestrian access to and around the site should be maintained, with particular attention given to safety and access for the mobility impaired.	Please refer to responses provided to TFHS Comments #5 and #6.
51. The condition of existing footpaths are to be maintained in good condition.	This requirement would be imposed on the Managing Contractor for the Stage 1 works.
52. Construction traffic should avoid Frenchs Forest Road during school finish times.	Please refer to response provided to TFHS Comment #7.

2.2 Business

2.2.1 Capital Investment Pty Ltd

Comment	Response
1. Supports the proposed hospital.	Noted.
2. Endorse the ongoing investigation and development of options for the supporting roadworks.	The delivery of the supporting roadworks will be the responsibility of RMS. It is anticipated that RMS would continue to consult with HI as part of broader stakeholder consultation activities.

Comment	Response
3. Additional amenities and supporting infrastructure should be properly planned for.	Planning and delivery of additional amenities and supporting infrastructure beyond the hospital site is the responsibility of other parties such as RMS (supporting roadworks), public transport (TfNSW), and DP&I and Warringah Council in relation to land use planning. HI would provide input to these activities as invited/requested.

2.2.2 *CityPlan Group*

Comment	Response
1. Designation of the Northern Beaches Hospital Precinct requires urgent planning to ensure orderly and staged approach to further precinct planning.	This is considered a separate matter to the hospital development and more appropriately addressed by DP&I. HI would contribute to any such process where invited.
2. The current zoning of the Frenchs Forest Business Park as B7 Business park is considered appropriate.	Noted.
3. Need for detailed planning study with involvement of landowners and businesses.	This is considered a separate matter to the hospital development and more appropriately addressed by DP&I.
4. Suggested precinct strategy plan based on previous plan developed by DP&I.	This is considered a separate matter to the hospital development and more appropriately addressed by DP&I.
5. Immediate sub-regional planning priority is the rapid planning and delivery of the hospital and associated infrastructure.	This is considered a separate matter to the hospital development and more appropriately addressed by DP&I.
6. Key matters for staged redevelopment of the existing Frenchs Forest Business Park.	These are considered a separate matter to the hospital development and more appropriately addressed by DP&I.
7. Precinct planning should be consistent with and supportive of the hospital development.	This is considered a separate matter to the hospital development and more appropriately addressed by DP&I.
8. Suggested approach to precinct development strategy.	This is considered a separate matter to the hospital development and more appropriately addressed by DP&I.

2.2.3 NRMA

Comment	Response
1. Proposal will add significant volume of traffic to already congested road network.	The capacity of the existing road network was recognised as a key issue from the outset of the project as noted in Section 7.4 of the EIS. As also noted, HI has consulted regularly with RMS and TfNSW with regard to investigating and developing options for the supporting roadworks, cognisant of hospital access requirements, existing network capacity constraints and strategic planning considerations. Design of the supporting roadworks will consider a range of relevant factors including capacity constraints in finalising the preferred design.
2. Request the DP&I expedite a comprehensive traffic and transport assessment prior to any progression of the proposal.	The DGRs for the Stage 2 EIS require preparation of a Transport Accessibility Study including assessment of traffic impacts on the local road network. It is anticipated that there would be similar requirement with regard to the environmental assessment for the supporting roadworks.

2.3 Community organisations

2.3.1 Friends of Narrabeen Lagoon Catchment

Comment	Response
1. The proposal would have a major impact on scenic amenity when viewed from vantage points in the Narrabeen lagoon catchment.	Section 7.3 of the EIS acknowledges that at 8-10 storeys, the hospital building(s) would be a prominent feature in the local landscape. The visual impact of the hospital would be assessed in detail in the Stage 2 EIS (and which is a requirement of the DGRs). HI has detailed specific design obligations in the RFT documentation. These include specific urban design and masterplanning principles as well as key architectural design requirements including the need for a high quality architectural response to provide the hospital with a sense of place and identity.
2. The proposal would require the removal of a significant remnant of high conservation bushland, DFEC, which is also a wildlife corridor.	The *Warringah Natural Area Survey Vegetation History and Wildlife Corridors* (Warringah Council 2005) identifies vegetation adjoining the section of Wakehurst Parkway between Oxford Falls and Aquatic Drive as part of a Priority 1 Vegetation Corridor. While the development of the hospital site would reduce the width of the corridor between Frenchs Forest Road and Warringah Road, the residual width would still be comparable to the sections of the corridor to the north of Frenchs Forest Road and to the south of Warringah Road. The inclusion of the HAC site in Aquatic Drive would offset about 46% of the maximum area of DFEC that could be removed on the hospital site. This site is also located within the Priority 1 Vegetation Corridor.

Comment		Response
3.	The environmental significance of the hospital site has been grossly undervalued.	The ecological values of the hospital site have been characterised and assessed in accordance with the NSW BioBanking Assessment Methodology which in turn has informed the development of the biodiversity offset strategy. Further information is provided in Section 3.2 regarding the revised biodiversity offset strategy.
4.	Blinking Light Reserve is part of the original stand of DFEC on the site and its primary values are the conservation value of the vegetation, its linking role in the wildlife corridor, and scenic amenity.	The area formerly comprising Blinking Light Reserve is now part of the hospital site and has no legal status as a reserve. The environmental assessment acknowledges the ecological values of this area and mitigation of impacts is addressed through the biodiversity offset strategy. This includes retention of vegetation where practicable which would partly support maintenance of these values. The revised biodiversity offset strategy includes the conservation of a parcel of land containing DFEC which will partially offset the loss of DFEC on the hospital site including in this location.
5.	The removal of understorey vegetation for bushfire risk management would reduce the ecological value of the EEC (DFEC).	This is acknowledged and accounted for in the environmental assessment and the impacts of this will be mitigated through the revised biodiversity offset strategy.
6.	There would be limited scope to provide on-site detention for stormwater.	Section 3.2.2 of the Stormwater Management Plan (Appendix I to the EIS) notes that opportunities for the retention of stormwater for reticulation and reuse throughout the site would be investigated during the detailed design phase. The outcomes of this investigation would be reported in the Stage 2 EIS.
7.	Water quality impacts have not been determined.	Water quality impacts associated with the concept proposal are considered in Section 7.11 of the Stage 1 EIS and with the site clearance and preparatory works in Section 8.5. Water quality impacts related to construction and operation of the hospital would be addressed in the Stage 2 EIS.
8.	Stormwater pollutants for hard surface areas would affect downstream areas in the catchment.	This issue would be addressed in the Stage 2 EIS.
9.	The additional increase in traffic would be significant and would affect surrounding areas.	Sections 7.4.2 and 7.4.3 of the EIS discuss traffic generation impacts associated with the 900 car park spaces assumed for the reference design. This notes that there is sufficient combined capacity in Frenchs Forest Road West and Warringah Road to accommodate the hospital traffic but acknowledges that the capacity limitations of the existing major intersections to absorb hospital traffic would exacerbate existing high levels of congestion experienced during the PM peak period. This issue would be considered further in the environmental assessment for the supporting roadworks for the hospital.

Comment	Response
10. The EIS does not mention air pollution associated with traffic.	There would be negligible emissions associated with movement of construction traffic for the Stage 1 works relative to emissions from existing traffic. Similarly, vehicle emissions associated with hospital operation would be expected to be minimal in the context of vehicle emissions from traffic on surrounding roads. It is noted that air pollution is not identified as a key issue in the DGRs for Stage 2 of the hospital development.
11. Development associated with the hospital will result in further impacts on the wildlife corridor.	Impacts on ecology associated with the development of the hospital site would be confined to the Stage 1 works. The Stage 1 EIS identifies appropriate mitigation and management measures with respect to these impacts. There is potential for some additional impact on vegetation adjoining Wakehurst Parkway associated with the supporting roadworks. At the time of preparation of this report, HI was not aware of any decision by RMS with regard to the preferred supporting roadworks solution.
12. Cumulative impacts, including on nearby bushland areas and catchments, are not mentioned in the EIS.	Section 8.7.4 of the Stage 1 EIS makes specific reference to anticipated cumulative impacts associated with the site clearance and preparatory works, with the likelihood of these considered to be minimal. Consideration of cumulative impacts associated with construction and operation of the hospital would be addressed in the Stage 2 EIS.
13. The likely extent and potential cumulative impacts of the supporting roadworks are not specified.	As noted above with regard to the response for Comment #11, at the time of preparation of this report, HI was not aware of any decision by RMS with regard to the preferred supporting roadworks solution. It is anticipated that this issue would be addressed by RMS in the environmental assessment for the supporting roadworks.
14. Representatives of the Friends of Narrabeen Lagoon catchment Committee attended the Community Visioning Forums noted that issues raised included concerns about environmental impacts.	The Community Visioning Forums were convened by DP&I to inform planning for the Northern Beaches Hospital Precinct. Table 4 in Section 6 of the Stage 1 EIS acknowledges the high level issues raised in the forums and provides a general response to each issue. Consideration of the environmental impacts associated with the hospital is provided in the Stage 1 EIS with regard to site clearing and preparatory activities. The Stage 2 EIS will address impacts associated with construction and operation of the hospital. Consideration of environmental impacts associated with the supporting roadworks would be addressed in a separate assessment that will be prepared by RMS.
15. The environment was not included in the list of factors with regard to the location of the hospital.	The NSW Government confirmed the selection of the Frenchs Forest Site for the new Northern Beaches Hospital in 2006. This decision was informed by a robust qualitative analysis (which included environment among other considerations) in determining the Frenchs Forest site for the new hospital.
16. The wider community was not consulted in relation to selecting the location for the hospital.	Community representation was included in the qualitative analysis that led to the selection of the Frenchs Forest site for the new hospital.

Comment	Response
17. The response provided in Table 6 of the EIS does not address the environmental concerns raised at the Community Visioning Workshops.	Please refer response to Comment #14.
18. No clearing of bushland on the site should occur until final plans and infrastructure associated with the hospital have been approved. Clearing in advance of construction works is not supported.	This is a matter for DP&I to consider in its determination of the proposal.
19. The review of biodiversity aspects by P&J Smith concludes the environmental impact would be severe, the offset is inadequate and there is no offset proposed for the wildlife corridor.	The EIS acknowledges the impact of the hospital development on DFEC on the hospital site. As noted previously, HI has undertaken further investigations which have informed the revision of the biodiversity offset strategy presented in the Stage 1 EIS. Further details in this regard are provided in Section 3.2 of this report.

2.3.2 Garigal Landcare

Comment	Response
1. Decision on location of hospital did not take account of presence of DFEC or function of wildlife corridor.	Please refer to response provided to Friends of Narrabeen Lagoon Catchment Comment #15.
2. Insufficient opportunity to review EIS documentation.	The public exhibition of the EIS was managed by DP&I in accordance with the requirements specified in the *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2000*.
3. Mona Vale Hospital already provides suitable facilities and environment for health care.	Mona Vale Hospital is a Level 4 hospital whereas the Northern Beaches Hospital will be a Level 5 hospital providing a wider range of services. These include services not available or not able to be provided at either Mona Vale or Manly Hospitals.
4. Significant impact on DFEC.	The EIS acknowledges the impact of the hospital development on DFEC on the hospital site. As noted previously, HI has undertaken further investigations which have informed the revision of the biodiversity offset strategy presented in the Stage 1 EIS. This includes identification of a parcel of land containing DFEC and located within the Priority 1 Vegetation Corridor. Further details in this regard are provided in Section 3.2 of this report.
5. Proposed biodiversity offset strategy is inadequate.	Please refer to response provided to Comment #4.

Comment	Response
6. Bushland at hospital site provides potential habitat for Tiger Quoll.	A detailed investigation of the ecological values of the site was undertaken with development of the survey methodology involving close consultation with OEH to ensure all relevant matters had been accounted for. The likely significance of impacts upon this species was considered and is documented in the specialist biodiversity report (Appendix D to the biodiversity offset strategy). Removal of habitat was considered as part of the assessment which concluded that a significant impact was unlikely.
7. Local historical society not invited to comment on proposal.	The historic heritage assessment was undertaken by Australian Museum Business Services (now Australian Museum Consulting) under the direction of a highly experienced professional archaeologist. As noted in Section 7.9 of the EIS, the assessment was undertaken in accordance with relevant NSW and Commonwealth heritage assessment guidelines. No issues were identified that were considered to warrant consultation with the local historical society.
8. Site is environmentally unique in that it is part of two wildlife corridors.	The hospital site is located in part of the wildlife corridor identified in the *Warringah Natural Area Survey Vegetation History and Wildlife Corridors* (Warringah Council 2005) which identifies vegetation adjoining the section of Wakehurst Parkway between Oxford Falls and Aquatic Drive as part of a Priority 1 Vegetation Corridor. This north-south corridor is also identified in the *Warringah Biodiversity Conservation Study* (Eco Logical Australia 2011). Neither report identifies any other wildlife corridors in the immediate vicinity of the hospital site.
9. EIS does not provide consideration of wildlife corridor.	The biodiversity specialist report (Appendix D to the biodiversity offset strategy) acknowledges the presence of the wildlife corridor, and its ecological value with respect to the likely and potential impacts of the hospital development has been considered in the assessment.
10. Significant impact on local amenity.	The EIS acknowledges there would be an impact on local amenity both from construction activities and in the longer term. Detailed consideration of impacts would be addressed in the Stage 2 EIS which would also identify mitigation and management measures to avoid or reduce impacts as far as practicable.
11. Light/visual impacts associated with the hospital and its location.	This issue would be addressed in the Stage 2 EIS. Design development for the hospital would seek to minimise the visual impacts associated with the hospital including matters such as light spill.
12. Potential water quality impacts on Narrabeen Lagoon from runoff from the hospital site.	Water quality impacts associated with the concept proposal are considered in Section 7.11 of the Stage 1 EIS and with the site clearance and preparatory works in Section 8.5. Water quality impacts related to construction and operation of the hospital would be addressed in the Stage 2 EIS.
13. Addition of impervious surfaces would worsen existing flooding problems in the Narrabeen Lagoon catchment.	The extent of impervious surfaces on the hospital site will not be known until completion of the hospital design. However, given the size of the hospital site relative to the overall catchment area and its location in the catchment, it is anticipated that the increase in impervious area would not have a material effect on flooding. This issue would be considered further in the Stage 2 EIS.

Comment	Response
14. Existing capacity of roads is an issue in relation to hospital location.	The capacity of the existing road network was recognised as a key issue from the outset of the project as noted in Section 7.4 of the EIS. As also noted, HI has consulted regularly with RMS and TfNSW with regard to investigating and developing options for the supporting roadworks, cognisant of hospital access requirements, existing network capacity constraints and strategic planning considerations. Design of the supporting roadworks will consider a range of relevant factors including capacity constraints in finalising the preferred design.
15. Access by public transport needs to be provided.	Sections 7.4.1 and 7.4.4 of the EIS identify existing bus routes in the area and existing bus stops in proximity to the hospital site respectively.
16. Oppose concept of up to 10 storey, 70,000 m^2 hospital at Frenchs Forest.	Noted.
17. Oppose any clearing of vegetation.	Noted. Clearing of vegetation on the hospital will be unavoidable in order to build the hospital and related infrastructure. As noted elsewhere in this report, the extent of vegetation removed would be minimised as far as practicable.
18. Request additional comprehensive community consultation.	HI would continue to consult with all stakeholders regarding the subsequent stage of environmental assessment and during construction of the hospital.
19. Belrose site was granted to the community in return for accepting greater landfill at Belrose tip and use of site to offset hospital impact is 'double dipping'.	HI understands that in 2003 a formal restriction order was placed on the use of the 10 ha site at Belrose under Section 88D of the *Conveyancing Act 1919*, the terms of the order being as follows: 1. *A restriction on use is to be imposed on land contained in Folio Identifier 2826/729336 pursuant to Section 88D of the Conveyancing Act 1919 (NSW)* 2. *The effect of the restriction on use is as follows:* *"The land is not to be used for any commercial purpose, to the intent that the land be conserved essentially in its natural state, undeveloped."* 3. *The prescribed authority in which the land referred to above is vested is Waste recycling and Processing Corporation, previously known as Waste recycling and Processing Service of New South Wales.* The establishment of BioBanking Agreement 55 is considered to be consistent with the intended outcome of the protection order and it is presumed that the protection order would have been considered by OEH in formalising the agreement. The acquisition of the ecosystem and species credits associated with this agreement would not alter the intention of the protection order. Section 8.2 of the EIS notes that this land would be managed as a conservation reserve.

2.3.3 H.E.A.L.

Comment		Response
1.	Mona Vale and Manly Hospitals could continue to provide adequate health services with appropriate investment.	Manly and Mona Vale Hospitals as two separate facilities struggle to provide the critical mass to effectively support the provision of a higher level of clinical service delivery; health technology and diagnostic and support services that are required by the population they serve. The imperative for the NBHS Redevelopment Project is in the main driven by the following factors: • Manly and Mona Vale Hospitals are among the smallest hospitals in metropolitan NSW by throughput and as such are constrained in their ability to provide the range of services required by the NSLHD on a cost-effective basis • The current fragmentation of services and the unavailability of certain specialist services at Manly and Mona Vale Hospitals means in many instances patients and carers are required to travel between the two hospitals to access services and in some cases also have to travel outside the NBHS catchment, eg to RNSH • A Level 5 hospital will enable Northern Beaches residents to access more complex services in the local area and relieve the burden of providing these services at RNSH which is not its key role . This will enable RNSH to concentrate on its role as the Level 6 tertiary hospital for the District more effectively and will ensure better use of resources ultimately leading to better patient outcomes. It will also mean that residents of the Northern Beaches will be able to access more complex care closer to home.
2.	A new state-of-the-art Level 5 public hospital could be built at Mona Vale.	The NSW Government confirmed the selection of the Frenchs Forest Site for the new Northern Beaches Hospital in 2006. This decision was informed by a robust qualitative analysis which included consideration of the Mona Vale Hospital site for the new hospital. The analysis determined that a single, centrally-located hospital within the NBHS catchment will enable the provision of a wider range of services of higher role delineation, reducing the need for patients to travel outside the NBHS catchment.
3.	Manly Hospital could be retained/renovated/rebuilt/modernised to provide basic public medical services.	Please refer to response to Comment #2.
4.	There is a need for public hospital services in publicly run hospitals.	While not a planning issue, partnering with a private or not-for-profit hospital operator will allow the hospital to be built faster, delivering better value for the taxpayers of NSW. The same high quality care provided to patients in NSW will continue under a Hospital Operator-led model. The Hospital Operator will be required to meet stringent national and state health care standards and requirements and treat all patients under the same conditions as apply at any other public hospital in NSW.

Comment		Response
5.	No publicly available documentation of benefit-cost analysis for the development of Mona Vale Hospital compared to the new hospital at Frenchs Forest.	Evaluation of options for the new hospital was undertaken via a Value Management process. This include a range of factors including strategic cost estimates for the options considered.
6.	Such a benefit-cost analysis should address required new infrastructure and public transport planning.	Both these aspects were considered in the economic appraisal undertaken as part of the Preliminary Business Case in determining the Frenchs Forest site for the new hospital.
7.	The new hospital would generate enormous amounts of traffic.	Section 7.4.2 of the EIS notes that on-site parking would be provided for a maximum of 900 vehicles. While subject to the final design that would be prepared by the preferred Hospital Operator, this is based on the specified number of hospital beds and experience from other hospitals. It is considered unlikely that this number would vary greatly. The EIS notes that there is currently sufficient mid-block capacity to absorb this traffic generated but that capacity limitations of the existing major intersections to absorb hospital traffic would exacerbate existing high levels of congestion experienced during the PM peak period. This issue would be examined further in the Stage 2 EIS and it is anticipated it would be a key issue for consideration in the supporting roadworks EIS to be prepared by RMS.
8.	Impacts of traffic on emergency access vehicles.	The hospital will have two accesses off Frenchs Forest Road West and one off Warringah Road. One Frenchs Forest Road West accesses will be exclusively for ambulance use but ambulances will be able to use any access. As indicated in Table 4 in the EIS, HI has consulted regularly with TfNSW and RMS on a range of issues including access to the hospital and future network improvements. This has included consideration of ambulance access and a list of potential options identified for further investigation as part of the Stage 2 EIS. RMS is presently undertaking investigations into the supporting roadworks considering both local and wider network functionality. Design development is considering a range of issues including access by emergency vehicles.
9.	A detailed traffic study has yet to be undertaken.	The investigation undertaken to date has considered the impacts of traffic generation of the hospital development on the local road network. A more detailed traffic investigation would be undertaken as part of the Stage 2 EIS (as is required by the DGRs). As noted in the response to Comment #8, HI has consulted regularly with TfNSW and RMS on a range of traffic-related issues. In investigating options for the supporting roadworks, RMS has undertaken traffic modelling to inform design development. It is anticipated this traffic modelling will inform the traffic assessment for an EIS for the supporting roadworks.

Comment	Response
10. The hospital will need substantial space for parking.	The reference design for the hospital assumes on-site parking would be provided for a maximum of 900 vehicles. This would be accommodated completely within the hospital site. The final configuration of the parking arrangements would be confirmed during the detailed design of the hospital which would be undertaken by the preferred Hospital Operator.
11. Helicopters will need access to the site.	A helipad will be provided as part of the hospital development. While subject to final design, it is likely that this would be located on top of the main hospital building.
12. While proposed road upgrades may assist traffic flow around the site, there would be no change to traffic volumes.	The EIS has considered the issue of traffic generation associated with the concept proposal for the hospital development within the context of the local road network. This would be examined further in the Stage 2 EIS. Traffic volumes is an issue associated with the wider road network and one that would be more appropriately addressed by RMS in relation to the assessment of the supporting roadworks.
13. There would be a destruction of local amenity.	The EIS acknowledges there would be an impact on local amenity both from construction activities and in the longer term. Detailed consideration of impacts would be addressed in the Stage 2 EIS which would also identify mitigation and management measures to avoid or reduce impacts as far as practicable.
14. The planned hospital would destroy two wildlife corridors plus the most southern, well preserved, good sized patch of DFEC, plus roosting and foraging habitat of a threatened species.	Development of the hospital site would reduce the width of the vegetation corridor between Frenchs Forest Road and Warringah Road. Connectivity would be maintained through the existing vegetation in the road reserve to the east of the hospital site and on the eastern side of Wakehurst Parkway. As noted elsewhere in this report, clearing of the vegetation and removal of habitat on the hospital site would be offset through the NSW BioBanking Scheme. Section 3.2 provides additional details on the revised biodiversity offset strategy.
15. Fencing of the hospital site increased the number of swamp wallabies killed on Warringah Road.	The temporary fencing currently around the site was erected in October 2011 for security and public safety purposes. Following some community representations, access through the fence was provided at the western end and the shadecloth on the fence removed. One concern raised at the time related to wallaby roadkills but since then nothing further related to this matter has been brought to HI's attention.
16. The hospital site could provide prime habitat for Spotted-tail Quolls.	A detailed investigation of the ecological values of the site was undertaken with development of the survey methodology involving close consultation with OEH to ensure all relevant matters had been accounted for. The likely significance of impacts upon this species was considered and is documented in the specialist biodiversity report (Appendix D to the biodiversity offset strategy). Removal of habitat was considered as part of the assessment which concluded that a significant impact was unlikely.
17. Request that site clearing be delayed until plans for the hospital, supporting roadworks and public transport are finalised, approved and funded.	This is a matter for DP&I to consider in its determination of the proposal.

Comment	Response
18. Request that the consultation period be extended by four weeks and that a public hearing be conducted as no comprehensive community consultation has been undertaken.	This is a matter for DP&I to consider in its determination of the proposal.

2.3.4 National Parks Association of NSW

Comment	Response
1. Hospital development should not proceed as it would contribute to the extinction of DFEC.	Clearing of the vegetation on the hospital site would be offset through the NSW BioBanking Scheme. Section 3.2 provides additional details on the revised biodiversity offset strategy. This includes actions that would contribute to the preservation of DFEC within the local area.
2. The hospital site is a wildlife corridor for fauna moving from Garigal and Ku-ring-gai National Parks to Manly Dam reserve.	The hospital site is located in part of the wildlife corridor identified in the *Warringah Natural Area Survey Vegetation History and Wildlife Corridors* (Warringah Council 2005) which identifies vegetation adjoining the section of Wakehurst Parkway between Oxford Falls and Aquatic Drive as part of a Priority 1 Vegetation Corridor. This is acknowledged in the specialist biodiversity offset strategy (Appendix D to the biodiversity offset strategy). Development of the hospital site would reduce the width of the vegetation corridor between Frenchs Forest Road and Warringah Road. Connectivity would be maintained through the existing vegetation in the road reserve to the east of the hospital site and on the eastern side of Wakehurst Parkway.
3. Further development in the Narrabeen Lagoon catchment and associated increased intensity of land us will encroach upon remaining bush in the catchment.	This is a land use planning issue and separate to the hospital development. Further development in the Narrabeen Lagoon catchment would be addressed by Warringah Council within the statutory framework of the Warringah LEP.
4. Other issues such as the need to improve roads in the area will subject bushland to further cumulative impacts.	The EIS provides a comprehensive assessment of the impacts associated with the clearing of the hospital site. A biodiversity offset strategy has been developed to mitigate these impacts and, as noted elsewhere in this report, this has been revised to further mitigate impacts. This includes actions that would contribute to the preservation of DFEC within the local area. The cumulative impact of the supporting roadworks or other roadworks would be addressed in the environmental assessments for those activities.
5. The proposed biodiversity offsets are grossly inadequate.	Please refer to the responses provided to the OEH submission in Section 2.1.4. Additional information on the revised biodiversity offset strategy is provided in Section 3.2.

Comment	Response
6. Request that vegetation remain on the hospital site.	As noted in Section 5.1 of the EIS, the area of vegetation broadly consistent with the former Blinking Light Reserve at the eastern end of the site would be retained as far as practicable. This would be subject to the final design for the hospital. The complete retention of vegetation on the hospital site would be an unacceptable constraint to the development of the site for the hospital.

2.3.5 Northern Beaches Roadkill Prevention Committee

Comment	Response
1. The traffic assessment only considers the hospital precinct and does not consider the wider road network.	Section 7.4 of the EIS and Section 4 of Appendix C to the EIS (Transport assessment) provide a high level discussion of transport and accessibility issues associated with the hospital development within the context of the local road network both within and beyond the hospital precinct.
2. Local roads would be impacted by traffic avoiding arterial roads, and would also be affected by traffic generated by the hospital.	The EIS has considered the issue of traffic generation associated with the concept proposal for the hospital development within the context of the local road network. The EIS notes that there is currently sufficient mid-block capacity to absorb this traffic generated but that capacity limitations of the existing major intersections to absorb hospital traffic would exacerbate existing high levels of congestion experienced during the PM peak period. The issue of traffic avoiding arterial routes is an issue associated with the broader road network and one that would be more appropriately addressed by RMS in relation to the assessment of the supporting roadworks.
3. Connectivity loss for flora and fauna due to increased traffic density has not been addressed.	As noted elsewhere in this report, the EIS has considered the matter of traffic generation associated with the hospital development in the context of the local road network. The incremental impact of hospital traffic in the context of existing levels of traffic is considered minor, and associated incremental impacts such as on habitat connectivity are similarly expected to be minor.
4. Wildlife corridors will be cut.	Development of the hospital site would reduce the width of the vegetation corridor between Frenchs Forest Road and Warringah Road. Connectivity would be maintained through the existing vegetation in the road reserve to the east of the hospital site and on the eastern side of Wakehurst Parkway.
5. The Belrose offset site is not Powerful Owl territory.	HI has obtained clarification from OEH with respect to the need for species credits for the Powerful Owl. OEH has advised that species credits are not required as these are accounted for in the ecosystem credits for DFEC. Please also refer to the responses provided to OEH Comment #6 in Section 2.1.4.

Comment	Response
6. There have not been any successful translocations of a nesting pair of Powerful Owls.	The ecology investigation (Appendix D to the Biodiversity Offset Strategy) confirmed the presence of Powerful Owl on the hospital site during each of the three surveys undertaken. The site was identified as containing potential roosting and foraging habitat for this species, with anecdotal evidence suggesting a pair of owls roost in the adjacent school grounds. The EIS does not make any reference to the relocation of these owls and it is confirmed that this does not form part of the proposed mitigation measures.
7. No information provided on management of existing fauna on the hospital site such as in relation to relocation, etc.	This information is provided in Section 5 of the Biodiversity Specialist Report (Appendix D to the Biodiversity Offset Strategy). Further consideration of the recommendations made in the report has been undertaken with respect to revision of the biodiversity offset strategy.

2.3.6 Pittwater Natural Heritage Association

Comment	Response
1. Objects to rezoning proposal due to impacts of increased traffic.	Section 3.3 of the EIS discusses the existing zoning applying to the hospital site. The proposal does not require rezoning of the site through the effect of Section 115ZF(2) of the EP&A Act as noted. It is anticipated that Warringah Council would consider the rezoning of the hospital site as part of any future investigation related to Council's Hospital Precinct Structure Plan which Council has advised would be initiated in the near future.
2. Traffic on local roads including Wakehurst Parkway is causing a significant number of wildlife fatalities.	As noted elsewhere in this report, the EIS has considered the matter of traffic generation associated with the hospital development in the context of the local road network. The incremental impact of hospital traffic in the context of existing levels of traffic is considered minor, and associated impacts are similarly expected to be minor.
3. Any plan to rezone the site should include a plan to mitigate animal fatalities.	Changes to zoning of land is a matter for Warringah Council and DP&I to consider. It is anticipated that this would consider all relevant matters.

2.3.7 The Greens

Comment	Response
1. The proposed hospital is in the wrong location.	Please refer to response provided to H.E.A.L. Comment #2.
2. Emergency cases could face unacceptable travel times once the Mona Vale Hospital emergency department is downgraded.	HI has been in ongoing consultation with both TfNSW and RMS with regard to the necessary upgrade requirements to both State and local roads to facilitate the required access to and from the hospital site and into the local road network.

	Comment	Response
		This notwithstanding, the hospital will be located at major arterial road junction and access from the north can be facilitated by either Pittwater or Mona Vale Roads in the event of Wakehurst Parkway being closed. In addition the NSW Ambulance Service uses extensive contingency measures to counter such eventualities including air ambulance or use of other regional emergency departments (RNSH, Hornsby).
3.	Congestion on roads and closure of Wakehurst Parkway due to flooding could create a life-threatening situation for acute patients in ambulances trying to access the hospital.	The consultation between HI/TfNSW/RMS noted in the response to Comment #2 above has included consideration of potential measures to address the flooding issues experienced on Wakehurst Parkway.
4.	There is no funding for the required supporting roadworks.	The NSW Government has acknowledged that the development of the supporting roadworks solution is an important component of the broader precinct strategy for the Frenchs Forest area. As such, the NSW Government has committed to deliver the required road network upgrades to support the new hospital at Frenchs Forest. It is anticipated that details of these upgrades and associated budget will be provided by Government in early 2014. Funding of $6.5 million has been allocated in this current year's State Budget for the planning of road upgrades to support the new hospital. Approval for further funds will be sought in the 2014-15 NSW Budget to deliver an integrated transport and road network solution for the Northern Beaches area.
5.	Buses will be vulnerable to traffic congestion.	Development of the supporting roadworks by RMS has taken a network-wide approach. Improving efficiency in public transport movements such as by providing bus priority measures has been considered as part of this.
6.	The proposed hospital will irrevocably damage one of the last remaining remnants of DFEC.	Development of the hospital site will have an unavoidable impact on DFEC. Impacts on this community have been assessed in accordance with the NSW BioBanking Framework which has guided development of the biodiversity offset strategy. Please refer also to response to Comment #8 below.
7.	The development would sever a significant north-south wildlife corridor and compromise connectivity between substantial reserves.	Development of the hospital site would reduce the width of the vegetation corridor between Frenchs Forest Road and Warringah Road. While connectivity would be maintained through the existing vegetation in the road reserve to the east of the hospital site and on the eastern side of Wakehurst Parkway, it is noted that there may be potential for a further reduction in the width of the corridor in this location from the supporting roadworks.
8.	The proposed biodiversity offset is not an appropriate mitigation measure.	The biodiversity offset strategy has been developed in accordance with the NSW BioBanking Framework which is the preferred approach of the NSW Government to mitigating biodiversity impacts on endangered ecological communities and species. As noted in the responses provided to issues raised by OEH (refer Section 2.1.4), HI has revised the strategy presented in the EIS. Additional information on this is provided in Section 3.2.

Comment	Response
9. Construction of the hospital would impact local residents for several years.	Subject to obtaining all necessary approvals, construction of the hospital would commence in 2015 and be completed in 2018. The associated construction impacts will be unavoidable. These impacts would be appropriately assessed in the Stage 2 EIS which would also identify mitigation and management measures to minimise impacts on local residents. Effective and proactive consultation with affected residents and other landowners/occupants would be undertaken regularly prior to and during construction to ensure mitigation and management measures are as practicable as possible.
10. Once operational, there would be a loss of local amenity due to noise emissions and light pollution.	Section 5.4 of the EIS outlines the design principles for the hospital which include minimising impacts on local amenity. These would be assessed in detail in the Stage 2 EIS, and would include identification of appropriate measures to mitigate and manage impacts.
11. Inadequate consideration of impacts on the local community.	The EIS provides an initial consideration of community impacts based on the reference design and in relation to the site clearing and preparatory works. A more detailed assessment of socio-economic impacts would be undertaken for the Stage 2 EIS (as required by the DGRs) and which would be based on the final design prepared for the hospital.
12. There will be a downgrading of comprehensive public health care.	The same high quality care provided to patients in NSW will continue under a Hospital Operator-led model. The Hospital Operator will be required to meet stringent national and state health care standards and requirements and treat all patients under the same conditions as apply at any other public hospital in NSW.

2.4 Community

This section provides responses to issues raised in the remaining submissions. It is noted that many issues raised are common to those listed and responded to in the preceding three sections.

2.4.1 Need for the hospital

The need for a new hospital was raised in a large number of submissions. Alternatives, such as upgrading Mona Vale and/or Manly Hospitals, were suggested as solutions that could achieve a similar outcome in delivery of health services for the Northern Beaches.

A new hospital was identified as part of NSW Health's strategic planning process in direct response to a growing body of evidence to support the need for a higher level of health services for the Northern Beaches community. This evidence included Census data around demographic changes in the area (including an ageing population), as well as health sector staff, stakeholder and community feedback.

2.4.2 Hospital location

A large number of submissions questioned the decision to locate the hospital at Frenchs Forest. Mona Vale Hospital was identified as an alternative location that could provide the same level of

health services and was considered to provide a number of advantages over the Frenchs Forest location.

The proposed hospital site is vacant of buildings and structures, and is centrally located within the NBHS catchment area. The NSW Government confirmed the selection of the Frenchs Forest site for the new Northern Beaches Hospital in 2006. This decision was informed by a robust qualitative analysis in determining the Frenchs Forest site for the new hospital.

Locating the Northern Beaches Hospital at Frenchs Forest will provide improved access to more complex health care, create employment opportunities and facilitate innovation in health care delivery.

2.4.3 Future of Manly and Mona Vale hospitals

Concern over the closure of Manly Hospitals was expressed in a number of submissions. A number of submissions also assumed that Mona Vale Hospital would similarly be closed notwithstanding that Section 1.1 of the Stage 1 EIS outlined the new role of this hospital as part of the wider Northern Beaches Health Service Redevelopment project.

As two separate facilities, Manly and Mona Vale Hospitals are not able to efficiently provide the critical mass to effectively support the provision of a higher level of clinical service delivery required by the population they serve. As a Level 5 facility, the new Northern Beaches Hospital would provide a higher level of clinical services required for the Northern Beaches community.

Mona Vale Hospital will continue to play a key role in health care on the Northern Beaches when the new Northern Beaches Hospital opens. Services at Mona Vale Hospital will include a 24 hour, seven day a week Urgent Care Centre supported by easy access to diagnostic services with sub-acute services, including rehabilitation and aged care and palliative care services. In addition, a new Community Health Centre will be built at Mona Vale Hospital as part of the reconfiguration of community health services on the Northern Beaches.

Manly Hospital will continue to operate until the Northern Beaches Hospital is operational and services are transferred. The NSW Government will consider options for the future of the Manly Hospital site in consultation with the community at this time.

2.4.4 Private operator

A number of submissions expressed the view that delivery of health services should remain the responsibility of the government and that the operation of the hospital should also be undertaken by the government. Concern was also expressed that operation of the hospital by a private entity would lead to a decline in the level of public health care.

The Northern Beaches Hospital is about a partnership to provide high quality health service delivery to both public and private patients supported by appropriate infrastructure. The procurement model for the Northern Beaches Hospital will foster innovation in delivery of both infrastructure and services that will provide the Northern Beaches community with access to a purpose-built hospital constructed with state-of-the-art materials and digital technologies.

The Hospital Operator is required to have demonstrable experience delivering clinical services in an acute hospital setting, to have the vision, capability, capacity and commitment to deliver the Project, and a commitment to the establishment and maintenance of a positive and productive working

relationship with the local community, the NSLHD and NSW Health more broadly. The Hospital Operator will enter a long term service contract with the State through the NSLHD. The quality of care delivered by the Hospital Operator must meet National Safety and Quality Health Service Standards, National Mental Health Standards and Australian Council Healthcare Standards (ACHS) or equivalent accreditation. The Hospital Operator will also have to meet the requirements of the NSW Health Private Health Care Unit.

Public patients will access services at the new Northern Beaches Hospital in the same way that they currently access services at other hospitals in NSW.

2.4.5 Loss of public hospital beds

A number of submissions expressed concern that construction of the new hospital at Frenchs Forest, the reconfiguration of Mona Vale Hospital and closure of Manly Hospital would result in a reduction in the number of public hospital beds. Operation of the hospital by a private entity rather than the State was also seen as a factor that would contribute to a reduced number of public hospital beds.

In 2011/12, Manly and Mona Vale Hospitals had a combined average of 323 hospital beds with 194 beds used by public patients. At the commencement of operations, the NSLHD will have a total of 489 beds to meet the requirements of both public and private patients. This will comprise 423 beds at the Northern Beaches Hospital, and 56 sub-acute beds and 10 GEM beds at Mona Vale Hospital.

The State will purchase services for public patients from the Hospital Operator on a volume basis in accordance with the State's requirements. The Hospital Operator will be required to provide sufficient public patient capacity to meet the annual contracted demand. This is envisaged to equate to approximately 250 public patient beds. The Hospital Operator will be required to treat all patients (public and private) that present to the hospital.

2.4.6 Hospital site layout

The issue of the layout of buildings on the hospital site was raised in a number of submissions with some noting the proximity of the high school to the west and residences on the northern side of Frenchs Forest Road West to the hospital site. A preference was expressed to locate buildings toward the south of the site and away from the school and Frenchs Forest Road West to reduce impacts such as overshadowing and reduced amenity. One submission questioned the capacity of the site, in terms of area, to accommodate a Level 5 hospital and provide for future expansion.

The reference design presented in the EIS was developed for the purpose of informing the concept proposal assessment and the design to be developed by the Hospital Operator. This in turn was informed by a masterplanning process as summarised in Section 5.2 of the EIS which reflected opportunities, constraints and other relevant issues with reference to the adopted planning principles for the hospital site.

As noted in the EIS, the building envelope provides for a minimum setback distance of six metres from all boundaries. With regard to the western boundary, ie adjacent to the school, the setback would be 13.6 metres due to the location of the shared path that would run beside and parallel to the school boundary. The building envelope also provides for massing of taller buildings toward the south of the site but noting other constraints such as areas for potential future expansion of the hospital facility.

2.4.7 Hospital design

One submission indicated that the 6-10 storey height of the building reflected the limitation of the site in accommodating a smaller building with an extended footprint. Another submission made comment with regard to alignment of buildings in line with solar design principles, and taking up other opportunities to encourage sustainable design outcomes.

A more extended layout would constrain operational efficiencies. As noted in the EIS, development of the reference design has been undertaken with regard to a range of masterplanning principles which included optimisation of operational efficiencies and a whole-of-building approach to the delivery of health and support services.

Development of the design by the Hospital Operator would consider a range of factors such as solar design principles that would assist in identifying and facilitating opportunities for optimising design outcomes. Opportunities for on-site water reuse and the use of alternative or complementary energy sources would also be investigated as part of the detailed design for the hospital.

2.4.8 Future expansion of the hospital

Several submissions questioned whether, given the size of the hospital site compared to a similar large hospital like Royal North Shore Hospital, whether there would be sufficient area to accommodate future expansion on the site.

The masterplanning for the hospital site has considered both the immediate health care needs and possible future expansion of services. With regard to the latter, these areas are generally at the southern (Warringah Road) of the site, and to the south east part of the site as noted in Section 5.4 of the EIS. The RFT document for tenderers identifies provision for future expansion as an explicit design constraint for the development of the design for the hospital.

2.4.9 Consultation

Several submissions considered the level of consultation undertaken with regard to the proposed hospital to be unsatisfactory. Some comments related to the decision on the location of the hospital and to the future of Mona Vale and Manly Hospitals; responses to these two issues have previously been provided in Sections 2.4.2 and 2.4.3 respectively. One submission noted the absence of any follow up from the Community Visioning Forums held in December 2012.

Community Visioning Forums

As part of DP&I's community engagement process for the Northern Beaches Hospital Precinct, two Community Visioning Workshops were conducted in December 2012. The forums invited participants to deliberate collectively on their aspirations for the future of the precinct and the range of issues to be considered in planning for the precinct.

Some 200 community representatives attended the sessions which included presentations from DP&I, HI and RMS in relation to the precinct. Many of the issues raised relate to the longer term and would be considered as relevant in the Stage 2 EIS for construction and operation of the hospital. Issues considered of relevance to the Stage 1 EIS have been taken into account during preparation of the EIS.

The decision to undertake any further consultation regarding the Northern Beaches Hospital Precinct would sit with DP&I.

Ongoing consultation

HI would continue to consult with all relevant public authorities as required during the Stage 1 works and, as relevant, with regard to both planning and construction for Stage 2.

HI would continue to consult with TFHS through regular meetings between the school and project team to notify the school of upcoming activities and associated impacts, and to identify and respond to any issues. This would take the form of a weekly meeting and regular poster presentations detailing locations and nature of works. Further information regarding consultation with TFHS is provided in Section 3.1.2.

Additional information about the upcoming work will be provided to the nearby community and Warringah Council seven days before works begins. This information will provide specific detail regarding activities, work hours, traffic control measures and compound/assembly information.

Further opportunity to comment on the construction and operation of the hospital and the supporting roadworks would occur in relation to the public exhibition of the Stage 2 EIS and the supporting roadworks EIS respectively.

2.4.10 Traffic congestion

A large number of submissions noted the existing high numbers of vehicles on the road network surrounding the hospital site, with particular reference to Warringah Road and Wakehurst Parkway, and the associated impacts on traffic movement.

The capacity of the existing road network was recognised as a key issue from the outset of the project as noted in Section 7.4 of the EIS. Section 6.2 of the EIS describes the Interface Reference Group (IRG) which comprises representatives of HI, NSW Health, RMS, TfNSW and DP&I, and which was established to facilitate investigation of transport solutions including public transport. This group shares information, examines the potential cumulative impact of both projects occurring simultaneously, and how it may affect local residents, businesses and the wider Northern Beaches community.

Separate to the IRG, HI has consulted regularly with RMS and TfNSW with regard to investigating and developing options for the supporting roadworks, cognisant of hospital access requirements, existing network capacity constraints and strategic planning considerations. Design of the supporting roadworks will consider a range of relevant factors including capacity constraints in finalising the preferred design.

Further opportunity will be available to comment on the traffic and transport network solution through the public exhibition process for both the Stage 2 EIS and the supporting roadworks EIS.

2.4.11 Flooding of Wakehurst Parkway

The issue of closure of Wakehurst Parkway due to flooding and the potential implications of this with regard to timely access to the hospital was raised in a number of submissions. It was noted that Wakehurst Parkway is a key transport route from the north.

The hospital will be located at major arterial road junction and access from the north can be facilitated by either Pittwater or Mona Vale Roads in the event of Wakehurst Parkway being closed. In addition the NSW Ambulance Service uses extensive contingency measures to counter such

eventualities including air ambulance or use of other regional emergency departments (RNSH, Hornsby).

HI has been in ongoing consultation with both TfNSW and RMS in regard to the necessary upgrade requirements to both State and local roads to facilitate the required access to and from the hospital site and into the local road network.

2.4.12 Public transport

A number of submissions made reference to allowing for efficient public transport connections (eg bus, light rail) to provide alternative access to and from the hospital, together with improving the level of access. Comment was also made in relation to the opportunity for development of a public transport hub.

The EIS identifies the existing bus stops on both Warringah Road and Frenchs Forest Road West immediately adjacent to the hospital site. Decision-making with regard to locations of bus stops is not the responsibility of HI. However, a far as HI is aware, there are no plans to relocate these stops although it is possible one or both may be temporarily located during construction, such as for public safety reasons.

The issue of increased frequency of bus services is considered a matter for TfNSW to address as the responsible authority. Similarly, the issue of a public transport hub is considered to more appropriately sit with TfNSW and RMS as the government authorities with responsibilities for public transport planning and infrastructure delivery. This notwithstanding, HI will provide input to planning as invited by TfNSW/RMS.

2.4.13 Main hospital access

A number of submissions contended that the principal access for the hospital should be off Warringah Road given it is already a major road and, in so doing, would largely avoid the use of Frenchs Forest Road by traffic associated with the hospital. This in turn would reduce the likelihood of impacts such as increased traffic congestion and increased use of local roads by through traffic. A main access from Wakehurst Parkway was identified as a possible alternative.

As noted in the EIS, Warringah Road already carries a significant volume of traffic across a large part of the day. This is considered a constraint for safe and efficient access to and from the hospital site. While it is acknowledged that there would be unavoidable impacts associated with the main hospital access being off Frenchs Forest Road West, it is considered there would be greater opportunity to more effectively manage and mitigate these impacts than would be for a main access off Warringah Road.

The design of the supporting roadworks may provide an opportunity for greater access from Warringah Road thereby reducing the number of vehicles entering the hospital site from Frenchs Forest Road West. However, at the time of preparation of this report, no information regarding the design was available. Increased use of the Warringah Road access would also be contingent on the final design developed by the Hospital Operator.

Provision of an access from Wakehurst Parkway is not considered practicable as:

- Its proximity to the Warringah Road and Frenchs Forest Road intersections would have a major impact on traffic within this section of Wakehurst Parkway

- It would increase the impact on DFEC and further reduce connectivity in the Priority 1 Vegetation Corridor.

2.4.14 Widening of Frenchs Forest Road

A number of submissions raised the issue of whether, given the front entrance of the hospital would be off Frenchs Forest Road West, consideration had been given to widening Frenchs Forest Road West.

HI, in consultation with RMS and TfNSW, has considered the local traffic implications of the hospital development and how traffic associated with the hospital would be effectively managed within the local network. This has included a preliminary investigation of the need for and value of widening a section of Frenchs Forest Road West immediately to the west of the intersection with Wakehurst Parkway, such as to provide additional storage for vehicles turning right into Wakehurst Parkway.

The issue of widening Frenchs Forest Road would be further addressed by RMS through development of the concept design for the supporting roadworks. This would consider matters such as additional traffic signals to manage access to and from the hospital.

The developable footprint for the hospital site has made allowance for the potential future widening of this section of Frenchs Forest Road West as has the services diversions.

2.4.15 Impacts on local roads

Impacts of the hospital development on local roads, both in relation to construction and related activities, and to the actual operation of the hospital were raised in a number of submissions. Construction-related issues largely concerned use of local roads by construction vehicles and the potential safety implications of this. A substantial number of submissions considered there would be major impacts on local roads given the main entrance of the hospital would be off Frenchs Forest Road West.

Stage 1 site clearing and preparatory works

As far as practicable Warringah Road would form the principal access to the site for construction as Bantry Bay Road would be closed to vehicles prior to commencement of works. Pedestrian access along Bantry Bay Road would be maintained until construction of the shared path along the western boundary was completed (refer Section 4.2.2).

Movements of vehicles to and from the site would be managed through an approved Traffic Management Plan. Vehicles exiting the site to Frenchs Forest Road West would, as far as practicable, be limited to right turn only to avoid travelling on suburban streets. Where practicable, heavy vehicle movements would be scheduled for outside of peak hours.

Use of the Frenchs Forest Road West exit would be avoided or minimised on school days, particularly at the beginning and end of the school day.

Operation

As noted in Section 2.4.14, HI, RMS and TfNSW have considered the local traffic implications of the hospital development and how traffic associated with the hospital would be effectively managed within the local network. RMS is presently developing the design for the supporting roadworks and

other local road network improvements. This will take into account the traffic and transport impacts of hospital operations on local roads.

2.4.16 Parking

Concern was expressed in several submissions that parking in local streets could be affected by hospital visitors who do not park within the hospital.

The potential for the hospital development to impact on parking in local roads was recognised as an issue early in masterplanning for the hospital. Accordingly, the reference design provides for a minimum of 900 parking spaces on the hospital site. This takes into account staff, visitor and related parking requirements. Options for parking on the hospital site comprise at-grade (on the surface), underground, above ground (multi-storey), or a combination of these. Specific details would not, however, be known until finalisation of the design by the Hospital Operator.

The eventual number of parking spaces would be dependent on the Hospital Operator's final design, and the impacts would be assessed in detail in the Stage 2 EIS. This would also further consider potential impacts on parking in local streets.

2.4.17 Opportunities for commercial development

One submission noted there would be an opportunity to provide for the development of new businesses, retails shops and community services as part of the development.

As is common with many hospitals, the facilities provided would likely include a small commercial operation providing food and beverages to hospital staff and visitors. This, however, would be a commercial decision made by the Hospital Operator. The Stage 2 EIS would provide further clarification on this matter.

Within the broader Northern Beaches Hospital Precinct, facilitating such development through appropriate land use planning would be the responsibility of DP&I supported by Warringah Council. Within the wider area, Council would be responsible authority.

2.4.18 Biodiversity

A large number of submissions expressed concerns over various aspects of the impacts of the hospital on biodiversity. These included the adequacy of the biodiversity offset strategy presented in the EIS and impacts on the wildlife corridor that generally follows Wakehurst Parkway between the Narrabeen Lagoon and Manly Dam localities. A number also indicated that they did not support offsetting the biodiversity impacts of the hospital development through the NSW BioBanking Scheme.

Adequacy of biodiversity offset

As indicated in Section 8.2 of the EIS, the proposed biodiversity offset strategy was developed with reference to and in accordance with the *NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects* ('the interim policy'). The proposed hospital is SSI development and therefore mitigation of impacts on biodiversity can be considered under the interim policy.

The final assessment of impacts on DFEC associated with development of the hospital site identified that 343 ecosystem credits will be required to offset impacts under the NSW BioBanking Scheme.

This takes into account the clearing of potentially the entire hospital site plus a small area to the immediate east/southeast of the site affected by the diversion of two high voltage transmission lines.

HI has identified six sites within the Warringah LGA with potential to generate DFEC ecosystem credits and has undertaken biobanking assessments for two of these sites. Five of these sites are located in Aquatic Drive and within the area mapped as the Priority 1 Vegetation Corridor.

In addition, HI is in the process of securing additional suitable ecosystem credits such that, at a minimum, the biodiversity offset strategy would comprise the same number of ecosystem credits associated with the potential full development of the hospital site and the associated services diversions.

At the time of preparation of this report, HI was finalising payment for the transfer of the ecosystem and species credits associated with BioBanking Agreement 55.

Development of the final biodiversity offset strategy would also be mindful of the impacts of the supporting roadworks. In this regard, HI would consult with RMS with regard to a coordinated offset strategy that would, subject to consideration of all relevant matters, provide the best ecological outcome within the identified Priority 1 Wildlife Corridor.

Further details are provided in Section 3.2 of this report.

Impact on wildlife corridor

The *Warringah Natural Area Survey Vegetation History and Wildlife Corridors* (Warringah Council 2005) identifies vegetation adjoining the section of Wakehurst Parkway between Oxford Falls and Aquatic Drive as part of a Priority 1 Vegetation Corridor. The biodiversity specialist report (Appendix D to the biodiversity offset strategy) acknowledges the presence of the wildlife corridor, and its ecological value with respect to the likely and potential impacts of the hospital development has been considered in the assessment.

While the development of the hospital site would reduce the width of the corridor between Frenchs Forest Road and Warringah Road, the residual width would still be comparable to the sections of the corridor to the north of Frenchs Forest Road and to the south of Warringah Road.

As noted above, HI has identified five sites within on Aquatic Drive and which are located within the Priority 1 Vegetation Corridor. Biobanking assessments have been conducted for two of these sites with one, a 2.3 ha site, being owned by HAC. The revised biodiversity offset strategy includes this area as part of the package of mitigation measures.

Further details are provided in Section 3.2.2 of this report.

Offsetting impacts through biobanking

The BioBanking Scheme has been in operation since July 2008 and is the NSW Government's preferred method for offsetting the impacts of development on biodiversity values, including endangered ecological communities and threatened species.

2.4.19 Noise and vibration from site clearing and preparatory works

The issue of noise impacts on the high school and local residents was raised in several submissions. It was noted that this would reduce local amenity and, in the case of school, could affect the ability of students to learn.

A noise and vibration impact assessment has been prepared that characterises the existing ambient noise environment, and assesses the likely and potential noise and vibration impacts associated with the site clearance and preparatory works. The principal sensitive receivers adjacent to the site are The Forest High School and the residences on the northern side of Frenchs Forest Road West. The assessment acknowledges there is potential for these receivers to be impacted by works adjacent to the western and northern boundaries of the site respectively.

As indicated in the EIS, site clearing works are unlikely to generate vibration emissions with the potential for building damage.

The two noisiest items of plant will be the vegetation chipper and chainsaws. The chipper would be located in the south east part of the site to maximize the separation distances between these two receivers. This is also the lower part of the site and the intervening topography would also assist in ameliorating noise emissions from the chipper on these receivers. Felled trees and other vegetation would be transported across the site to the chipper and stockpiled for chipping. The duration of operating periods of the chipper would be minimised as far as practicable.

The majority of clearing of the vegetation will be done using a backhoe and/or bulldozer except in areas where access may be limited. Clearing in these areas would likely be undertaken using chainsaws. This may include the area immediately adjacent to the existing boundary fence between the school and the hospital site.

Subsequent to the exhibition of the EIS, HI has undertaken further consultation with representatives of the high school. HI acknowledges the impacts on the high school, not only in relation to the site clearing and preparatory works but the subsequent construction works for the hospital. As a general management principle, works adjacent to the school would be programmed for school holiday periods. HI would also undertake a range of other measures to mitigate noise impacts on the school, these to be finalised in consultation with the school. Regular consultation would be undertaken with the school to identify any issues of concern and formulate an appropriate management response.

Noise and vibration emissions from the site clearing and related preparatory activities would be managed through a Noise and Vibration Management Plan. This would be a publicly available document and would provide specific details on matters such as working hours, use of noisy plant in proximity to sensitive receivers, etc. It would also include contact details for the person(s) in charge of the site clearing and preparatory works to allow prompt action to be taken in respect of any complaints made regarding noise.

Noise and vibration relating to construction of the hospital will be addressed in the Stage 2 EIS.

2.4.20 Traffic noise

A number of submissions expressed the view that there would be a reduction in amenity from additional traffic noise associated with the operation of the hospital.

This issue would be considered in the Stage 2 EIS with appropriate reference to NSW road traffic noise policy and guidelines. It is anticipated that road traffic noise would also be an issue for consideration in the impact assessment of the supporting roadworks

2.4.21 Noise from helicopters

Noise from helicopter operations was identified as an issue in several submissions with comment made that this would contribute to reducing amenity.

It is likely that helicopter retrievals in and out of the new Northern Beaches Hospital will be limited based on a review of helicopter retrieval statistics over the last financial year for both Mona Vale and Manly Hospitals and in consideration of the future role delineation. The majority of emergency retrievals out of the Northern Beaches Hospital in the planned service configuration would be focused on maternity and paediatric emergencies, and most of these would be by road as is current practice.

The preference for all retrievals where clinically appropriate is by road and this is reflected in the data. In addition it is considered that most retrievals by helicopter out of the new Northern Beaches Hospital would be to Major Trauma Centres (MTS) or Tertiary Referral Hospitals within the Sydney metropolitan area (RNSH, Westmead, Sydney Children's Hospital). The Northern Beaches Hospital will not be a designated MTS or a Tertiary Referral Hospital.

The extent of helicopter retrievals for emergency trauma cases into the new Northern Beaches Hospital is considered to be low to minimal as these cases would be taken directly from the site of the incident to the most appropriate MTS or Tertiary Referral Hospital as happens currently.

Air Services Australia (ASA) requirements have been reviewed with regard to likely helicopter flight paths. This indicated that that there no specific need to consult with ASA with regard to noise from helicopter operations. Noise impacts associated with hospital operation, including helicopter flights, would be assessed in the Stage 2 EIS.

2.4.22 Property values

The potential impact of the hospital development on property values was raised in one submission.

New development that includes the provision of modern services and facilities often enhances economic, social and environmental sustainable outcomes for the immediate community, including residents and businesses. The future hospital would be designed in a manner that considers the aesthetic natural values of the Warringah LGA and the north-east subregion. Discussion concerning the design and impact the hospital may have on property values will be provided in the Stage 2 EIS.

3 Additional Information

3.1 Consultation

3.1.1 Consultation undertaken for the Stage 1 EIS

Community letter and brochure

A letter and brochure were sent to about 1900 properties within a 500 metre radius of the proposed hospital site detailing the NBH project and the scope of works that would be undertaken at the site. These also provided information on the dates and locations for the public display of the Stage 1 EIS. The opportunity for interested parties to make submissions about the project to DP&I was also highlighted.

Project information line, project email and website

Information about the project was available via the project information line (9978 5410) and the project email address (northernbeaches.enquiries@hinfra.health.nsw.gov.au). These were monitored throughout the EIS exhibition period.

Information about the project was also provided on the Northern Beaches Health Service Redevelopment project website (www.nbhsredev.health.nsw.gov.au). This website includes a link to the DP&I website. The Executive Summary for the Stage 1 EIS was provided on the website.

Consultation with public authorities and other parties

Under *State Environmental Planning Policy (State and Regional Development) 2011*, consultation is required with relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. This included notification and liaison with:

- Warringah Council
- Roads and Maritime Services
- Transport for NSW
- Department of Education and Communities
- Office of Environment and Heritage
- Environment Protection Authority
- NSW Rural Fire Service
- Air Services Australia
- The Forest High School
- The Forest High School Council
- The Forest High School Parents & Citizens
- Local Aboriginal Land Council and stakeholders
- Local heritage group(s).

3.1.2 Further consultation with TFHS

Subsequent to the exhibition of the Stage 1 EIS, representatives of the NBH project team undertook further consultation with TFHS on 12 December 2013. The purpose of this was to better understand the nature of school activities in order to best program construction works on the hospital site and to avoid/minimise impacts on school operations, including the arrival and departure of students (and staff) from the school.

Discussion covered the following matters:

- 2014 term dates and holiday periods and key exam periods for NAPLAN, HSC trial exams and HSC final exams; the purpose of this was to identify the most appropriate times to undertake disruptive construction activities adjacent to the school
- Impacts on occupants of classrooms adjacent to the hospital site, and mitigation measures that could be implemented to minimise noise, vibration and dust impacts
- Impacts on use of bus stops on Frenchs Forest Road West including movements of students for offsite activities as well as daily drop offs and pick ups
- Movement and control of construction traffic including the use of Warringah Road as main site access
- Site security and how students would be prevented from gaining access to the hospital site.

The NBH project team will use the initial issues as raised by the school to help establish the key contract and scope of works documents for the construction activities for both Stage 1 and Stage 2 of the project.

It was agreed that regular weekly meetings would take place between the school and the NBH project team to provide timely notification to the school of upcoming worksite activities and their likely/anticipated impacts so as to be able to respond appropriately to any issues. Regular poster presentations would also be made to the school detailing the timing, locations and nature of upcoming works.

3.2 Biodiversity

The Stage 1 EIS indicated that up to 4.9 ha of Duffys Forest Ecological Community (DFEC) would be cleared on the hospital site. Subsequent to the public exhibition of the EIS, the engineering design for the diversion of various services (electricity, gas, telecommunications) was finalised. This resulted in an additional impact on 0.1 ha of DFEC taking the required offset to 343 ecosystem credits.

3.2.1 OEH interim policy

As indicated in the EIS, HI is seeking to offset the biodiversity impacts of clearing of DFEC associated with the hospital development via the NSW BioBanking Scheme and in accordance with the NSW *OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects* (OEH interim policy). As noted in the EIS, the OEH interim policy provides for a tiered approach to offsetting impacts on biodiversity based on the BioBanking Assessment Methodology (BBAM) with preference given to Tier 1, then Tier 2 and lastly Tier 3.

The EIS provided justification why offsetting via Tiers 1 and 2 would not be achievable and further discussion on this is provided as follows.

Tier 1 pathway

The Tier 1 pathway sets out an 'Improve or Maintain' standard where

> *red flag assets are protected and clearing only occurs within the variation rules set out in the BBAM, and the offsetting requirement calculated by the credit calculator is met.*

The hospital development would not meet the Tier 1 standard because red flag assets are to be cleared outside the rules allowed by the BBAM.

Clearing outside the rules allowed by the BBAM is necessary because:

- The entire site would potentially be utilised by the hospital development so options to avoid impacts on red flag areas on the site (ie DFEC), such as considering different configurations of the development footprint to retain DFEC, are not considered practicable
- The viability of biodiversity values of DFEC on the site would not be considered low or not viable.

Additionally, the hospital development would not meet the Tier 1 'Improve or Maintain' standard because the amount and type of offsetting proposed does not meet the requirements of the BBAM credit calculator. This is because the type and quantity of credits required as per the credit calculator are not currently available on the market or the biobanking public register.

The OEH interim policy acknowledges the possibility of this scenario by providing

> *for a range of mechanisms to be used to implement offsets (ie not only biobanking credits) in view of the currently limited supply of biodiversity credits on the market.*

The tiered approach to offsetting outlined in the policy is intended to provide flexibility for decision makers

> *who have to balance the relative environmental, social and economic merits of development proposals.*

As stated in the EIS, the hospital development would not be able to meet the Tier 1 'Improve or Maintain' standard so consideration was then given to whether a 'No Net Loss' outcome via the Tier 2 pathway could be achieved.

Tier 2 pathway

The Tier 2 pathway sets out a 'No Net Loss' standard where

> *some/all red flag assets are not protected and clearing is allowed outside the variation rules permitted by the BBAM, but all impacts are to be fully offset in accordance with the offsetting requirements calculated by the credit calculator.*

The hospital development would not meet the Tier 2 standard because although DFEC is able to be cleared outside the rules allowed by the BBAM, the amount and type of offsetting proposed does not meet the requirements of the BBAM credit calculator. As noted in relation to the consideration of the Tier 1 approach, the type and quantity of credits required as per the credit calculator are not currently available on the market or the biobanking public register.

HI has investigated the potential for DFEC ecosystem credits to be generated from other parcels of land within the Warringah LGA. These are listed in the following table together with comment on their potential as offset sites for the hospital development.

Table 1 Land parcels investigated in Warringah LGA containing DFEC

Site	Tenure	Comment
Lot 8, DP1058630 (Terrey Hills)	Crown Land Division Dept of Primary Industries	Site comprises Dundundra Falls Reserve which is managed by a Trust. Existing conservation management of DFEC unlikely to generate many additional credits for management under a biobanking agreement; as such, not investigated further.
Lot 2782, DP46992 (Aquatic Drive)	Crown Land Division Dept of Primary Industries	Within the same Priority 1 wildlife corridor as the hospital site. No biobanking assessments undertaken but each parcel of land could be expected to generate a similar number of ecosystem credits as the HAC site (see below). Establishment of biobanking agreements would be subject to negotiation with landowners (no such discussions undertaken to date).
Lot 2781, DP46992 (Aquatic Drive)	Metropolitan Local Aboriginal Land Council	
Lot 2780, DP46992 (Aquatic Drive)	Crown Land Division Dept of Primary Industries	
Lot 2782, DP46992 (Aquatic Drive)	Health Administration Corporation (HAC)	2.3 ha site within the same Priority 1 wildlife corridor as the hospital site. Biobanking assessment undertaken for the site identified it could generate 16 ecosystem credits. Moderate potential as a biobanking site, would be better managed as part of a suite of sites along Aquatic Drive.
Lot 11, D1112906 (Aquatic Drive)	Energy Australia	About 1.4 ha in area and immediately adjacent to HAC site. Northwest portion of the site is traversed by a high voltage transmission line. About one third of the site has been subject to past landfilling and this area is presently largely cleared of vegetation other than grass/weed species. Biobanking assessment undertaken for site identified it could generate five ecosystem credits. Establishment of a biobanking agreement would be subject to negotiation with Energy Australia (no such discussion undertaken to date). As for the other Aquatic Drive sites, this site would only offer biodiversity conservation value if part of the suite of sites on Aquatic Drive.

Given the unavailability of suitable credits currently on the market and the likelihood that the maximum number of ecosystem credits that could potentially be generated from the sites listed in Table 1 would be short of what is required, the hospital development would not be able to meet the Tier 2 'No Net Loss' standard.

As such, the only practicable option is considered to be a 'Mitigated Net Loss' outcome via the Tier 3 pathway.

Tier 3 pathway

The Tier 3 pathway sets out a 'Mitigated Net Loss' standard where

> *red flag assets are to be cleared and this clearing is considered acceptable under the requirements set out for no net loss; and the amount and type of offsetting proposed is inconsistent with the requirements of the BBAM credit calculator.*

The OEH interim policy states that

> *In considering whether the mitigated net loss standard is appropriate, consideration should be given to:*
>
> – whether the credits required by the calculator are available on the market;
>
> – whether alternative offset sites (other than credits) are available on the market;
>
> – the overall cost of the offsets and whether these costs are reasonable given the circumstances.

The OEH interim policy also states that

> *Should any of these circumstances apply, then it is reasonable to apply the variation criteria to the point that:*
>
> – suitable offset sites can be found within a reasonable timeframe;
>
> – the costs of offsetting is brought within a reasonable range; and
>
> – an offset to clearing ratio of at least 2:1 vegetated to cleared hectares is achieved.

The Mitigated Net Loss standard is considered appropriate because:

- No other suitable ecosystem credits required by the calculator are available on the market or readily available on the register of interest
- HI is unaware of any readily available alternative offset sites on the market but has identified a number of possible options in consultation with Warringah Council and HAC's own land holdings
- The cost of the ecosystem credits retired by the offset strategy is considered to be at the higher end of market average price per credit
- The proposed offset strategy would secure a suitable offset within a reasonable timeframe required by HI
- The proposed offset strategy would achieve an offset to clearing ratio of greater than 2:1 vegetated to cleared hectares.

Consideration of the revised biodiversity offset strategy against the OEH Interim Policy's Tier 3 variation criteria is provided on the following page.

Variation criterion	When is this option appropriate	How	Change from original strategy
a) Convert ecosystem credits for one vegetation type to any vegetation type within the same vegetation formation in the same IBRA bioregion.	When no matching ecosystem credits are available	Review to biometric vegetation database to identify vegetation types in the same formation in the same IBRA bioregion. Number of credits should be the same.	The final assessment of impacts on DFEC identified that a total of 343 ecosystem credits is required. Of these, 59 suitable credits are available through BioBanking Agreement 55 (from the Belrose site). Two options have been identified to obtain the remaining credits.
b) Convert one type of species credit to another type of species credit with the same or more endangered conservation status.	When species credit is not available and the matching species credit is considered a greater conservation priority.	Review conservation status of species Number of credits should be the same	N/A – no species credits are required for the Powerful Owl as OEH has advised that this is an 'ecosystem credits species'.
c) Remove/reduce the need for offsetting.	Where clearing is minimal (less 4 ha) and where the vegetation is not a highly cleared vegetation type or a Commonwealth or State listed TEC.	Identify and remove credits required for offsetting vegetation under 4ha and for vegetation types that aren't greater than 70% cleared or a Commonwealth or State listed TEC	N/A – clearing is >4ha, State listed TEC.
d) Convert ecosystem credits required to hectares and, if necessary, convert hectare figure to an estimate of land value.	Where suitable offset sites are known to exist but: • there is insufficient time to secure the offset sites at the time the decision is made; or • the proposal is to use the services of a third party provider such as the Nature Conservation Trust to secure offset sites and an estimate of cost is required.	Convert credits required to hectares using the credit to ha converter and ensure that the approval: • specifies the type, location and condition of offsets; and • secured offset sites in accordance with the requirements of section 5 of this Policy. An estimate of the cost of the offset can be made by using a Valuer General's estimate of land value.	No change. *The Belrose offset site meets the minimum area standard offset to clearing ratio of 2:1 and retires BioBanking credits.*
e) Waive the requirement for species credits NB: This criteria should not be used for EPBC Act listed species where the proposal is a controlled action.	Where no matching credits are available and all ecosystem credits have been obtained in accordance with this policy	Remove the requirement	N/A – this criterion is no longer relevant as OEH has confirmed that the species credits for the Powerful Owl are accounted for in the ecosystem credits.

Variation criterion	When is this option appropriate	How	Change from original strategy
f) Convert ecosystem credits to a regional conservation priority as identified in a regional conservation plan or similar.	When no matching credits are available and variation 1 is not feasible	Identify areas of high conservation priority in existing regional conservation plans or similar. Convert credits required to hectares1. Identify eligible offset sites and ensure areas are of sufficient size, condition and landscape context.	No change. *Contiguous with Garigal National Park (will be added to National Park upon retirement of credits). Identified in the Draft Warringah Council Biodiversity Study as having high conservation significance.*

The final assessment of impacts on DFEC associated with development of the hospital site identified that 343 ecosystem credits will be required to offset impacts under the NSW BioBanking Scheme. As previously noted, this takes into account the clearing of potentially the entire hospital site plus a small area to the immediate east/southeast of the site affected by the diversions of the 33 kV and 11 kV transmission lines.

The revised biodiversity offset strategy would secure the same number of suitable ecosystem credits. This would satisfy variation criterion a) under Tier 3 of the OEH interim policy, ie convert ecosystem credits for one vegetation type to any vegetation type within the same vegetation formation in the same IBRA bioregion with the number of credits ideally being the same.

3.2.2 Revised biodiversity offset strategy

As indicated in Section 8.2 of the EIS, a site at Belrose managed by Waste Assets Management Corporation (WAMC) has suitable ecosystem credits for offsetting of impacts. These comprise:

- *Red Bloodwood–Smooth-barked Apple shrubby forest on shale or ironstone or coastal plateaux, Sydney Basin* (ME 39, 30 credits)
- *Sydney Peppermint–Smooth-barked Apple–Red Bloodwood shrubby open forest on slopes of moist sandstone gullies, eastern Sydney Basin* (ME 12, 29 credits).

Since the public exhibition of the EIS, HI has progressed the transfer of the full package of ecosystem and species credits associated with BioBanking Agreement 55 from WAMC. At the time of preparation of this report, HI was finalising payment for the transfer of the credits.

With reference to the discussion in Section 3.2.1, the revised biodiversity offset strategy now comprises:

- Developing Lot 2782, DP46992 (Aquatic Drive) as a 2.3 ha biobank site and retiring the 16 ecosystem credits generated
- Purchase of the entire package of ecosystem and species credits associated with BioBanking Agreement 55 and the subsequent retirement of these (but please note discussion in Section 3.2.3 with regard to the species credits for Red-crowned Toadlet)
- Purchase of 284 suitable ecosystem credits available via BioBanking Agreement No. 38 held by The Hills Shire Council to match the required offset of 343 ecosystem credits.

In terms of area, the Aquatic Drive site represents 46% of the area of DFEC on the hospital site. This site is also located within the Priority 1 Vegetation Corridor.

At the time of submission of this report to DP&I, HI had undertaken further discussion with The Hills Shire Council and had issued a letter of intent to purchase the 284 ecosystem credits. It is anticipated that the transfer will be completed by the end of March 2014.

Further, the NSW Government would investigate the potential of the four other Aquatic Drive sites as offset sites with regard to the supporting roadworks with a view to permanent protection of these areas and preserving the conservation values in this Priority 1 wildlife corridor within the constraints of the hospital and supporting roadworks.

3.2.3 Other issues

Species credits

The BioBanking assessment for the hospital site identified that 121 species credits would be required with regard to the impact of the hospital development on Powerful Owl (*Ninox strenua*) habitat. HI has subsequently obtained clarification from OEH that the Powerful Owl is an 'ecosystem credits species' and specific species credits are not required to be obtained to offset their loss. Suitable ecosystem credits to offset loss of Powerful Owl habitat would instead be incorporated into the total required 343 ecosystem credits in accordance with the OEH interim policy.

Other ecosystem and species credits from the Belrose site

In addition to the ecosystem credits noted previously, the Belrose site also contains the following ecosystem and species credits:

- *Hairpin Banksia–Kunzia amibgua–Allocasuarina distyla heath on coastal sandstone plateaux, Sydney Basin* (12 credits)
- *Hairpin Banksia–Slender Tea-tree heath on coastal sandstone plateaux, Sydney Basin* (6 credits)
- Red-crowned Toadlet (17 credits)
- Rosenberg's Goanna (29 credits).

As indicated in the EIS, the biodiversity strategy comprises the retirement of all the ecosystem and species credits from this site. However, HI notes that ecology investigations undertaken in relation to the supporting roadworks have identified Red-crowned Toadlet as occurring in the area and could potentially be impacted. For the purposes of continuing to facilitate a whole-of-government approach to the project, HI reserves the right to transfer these credits to RMS if required to offset the impacts of the supporting roadworks.

3.3 Noise and vibration

3.3.1 Clarifications to noise assessment

Noise monitoring and derivation of construction noise criteria

The noise environment in the project area is dominated by road traffic noise from the nearby roads, particularly Warringah Road, Wakehurst Parkway (both major arterial roads) and to a lesser degree, Frenchs Forest Road. The potentially most affected residential receptors are the dwellings on the northern side of Frenchs Forest Road West directly opposite the hospital site, and two dwellings to

the south on the corner of Hilmer Street and Warringah Road, also directly opposite the site. These residences have full exposure as there is no acoustic shielding provided by intervening buildings or major structures.

Due to some sensitivity associated with the project at the time of preparation of the noise assessment, no noise logging was undertaken within residential properties. Instead, noise logging was undertaken within the school grounds which is exposed to the same road traffic noise sources and therefore the same acoustic environment as the nearest, potentially most affected residences identified above. Noise loggers were located within the school grounds at somewhat greater distances to the major adjacent roads compared with the potentially most affected residential receptors identified above due to security considerations.

Due to these larger set-back distances to the adjacent roads, monitored noise levels are potentially somewhat lower and therefore more conservative. The logging is considered to be reasonably acoustically representative of the residential locations as the noise sources making up the noise environment are the same. The results of the noise logging are therefore considered adequate for the purpose of the construction noise assessment for Stage 1 early works.

The acoustic consultants that undertook the noise assessment for the EIS have confirmed that the procedures and guidance provided within the INP have been referred to in order to derive the background noise levels used to establish the construction noise criteria for the project.

Recommended standard hours of construction

All work would be undertaken in accordance with the ICNG recommended standard construction hours, ie:

- Monday to Friday, 7.00 am to 6.00 pm
- Saturday, 8.00 am to 1.00 pm
- No work on Sundays or public holidays.

During periods of high noise impact, there will also be consideration of scheduling respite periods for activities identified as being particularly annoying in Section 4.5 of the ICNG.

Consultation with TFHS and respite periods

Consultation would be undertaken with the school regarding timing duration and nature of works. This would include consideration of the need for special examination time arrangements. The need for respite periods during high noise impact activities and periods would form part of the consultation process with the school.

As noted previously, consultation with the school has already commenced. This will continue through the project.

Reversing and movement alarms

A risk assessment would be undertaken as part of the Final CMP. Where practicable, reasonable and safe to do so, smart type reversing alarms whose volume automatically adjusts to the background noise level and broad band alarms would be used on site.

3.3.2 Amendments to noise assessment report

Background noise levels and criteria

Tables 1 and 2 of the noise assessment report provided as Appendix K to the EIS inadvertently transposed the locations of the two noise loggers. The noise levels for logger A should be against logger B and vice versa. There is a similar transposition error in Table 2 with respect to the noise-affected levels for residences on Frenchs Forest Road West and Warringah Road. These errors did not have any effect on the outcomes of the analysis.

The corrected tables are provided as follows and now include the construction noise criteria for time periods outside the ICNG recommended standard construction hours.

Measured Background Noise Levels (*Table 1*)

Location	Background Noise Level $dB(A)_{L90}$	Average (Road Traffic) Noise (at residential property boundary) $dB(A)_{Leq(15\ min)}$
Logger A (School/Frenchs Forest Road)	44 (7am to 6pm)[1] 40 (6pm to 10pm) 34 (10pm to 7am)	64
Logger B (Warringah Road)	52 (7am to 6pm)[1] 48 (6pm to 10pm) 36 (10pm to 7am)	69

1 Recommended standard construction hours (Mon–Fri)

Noise Emission Goals (*Table 2*)

Location	'Noise Affected' Level – $dB(A)_{L90}$	'Highly Noise Affected' Level – $dB(A)_{L90}$
Residences – Frenchs Forest Road West	54 (7am to 6pm) 45 (6pm to 10pm) 39 (10pm to 7am)	75
Residences – Warringah Road	62 (7am to 6pm) 53 (6pm to 10pm) 41 (10pm to 7am)	75
Frenchs Forest School – Classroom	45 (measured inside a classroom)	N/A
Frenchs Forest School – Playground	65	N/A

There was also a minor labelling error with Figure 1 in the noise assessment report with regard to the numbering of the nine management zones on the hospital site. The corrected Figure 1 is also shown on the following page.

Figure 1 Noise assessment design for site clearing and preparatory works

Revised noise predictions

As a conservative measure and with reference to Section 4.5 of the ICNG, 5 dB(A) has been added to the predicted noise levels for chainsaws. The following table presents the revised predicted noise levels for chainsaws as presented in Table 5 of the noise assessment report. Predicted noise levels for other noisy items of plant have been included for completeness. The predictions are for the potentially most affected noise-sensitive receptors these being the school to the west of the site, residences to the north on Frenchs Forest Road West and the dwellings at the corner of Warringah Road and Hilmer Street to the south.

Predicted Noise Levels (Standard Construction Hours Assessment) *(Table 5)*

Noise receiver location	Work area (zone)	Noise source	Predicted noise level $dB(A)_{Leq(15\ min)}$	Noise emission goal $dB(A)_{Leq(15\ min)}$
School classroom (internal)	1,2	Wood chipper Chainsaw Backhoe/Front-end loaders	55-67 60-72 45-57	45
	3,4,5	Wood chipper Chainsaw Backhoe/Front-end loaders	50-55 55-60 40-45	45
School playground	1,2,3	Wood chipper Chainsaw Backhoe/Front-end loaders	65-85 70-90 55-75	65
	4,5,6	Wood chipper Chainsaw Backhoe/Front-end loaders	40-65 45-70 30-55	65
Residences – Frenchs Forest Road West	1,4,7	Wood chipper Chainsaw Backhoe/Front-end loaders	65-80 70-85 55-70	54
	2,5,8	Wood chipper Chainsaw Backhoe/Front-end loaders	55-65 60-70 45-55	54
Residences – South of Warringah Road (Karingal Crescent and Bantry Bay Road)	3,6	Wood chipper Chainsaw Backhoe/Front-end loaders	66-76 71-81 56-66	62
	2,5,8,9	Wood chipper Chainsaw Backhoe/Front-end loaders	58-66 63-71 48-56	62

All predicted noise levels are the same as presented in the original noise assessment report except for predicted noise emissions from the chainsaw, which is now higher.

Revised noise mitigation measures

The acoustic consultants have reviewed the recommended noise mitigation measures for the Stage 1 works and these are briefly outlined in this section.

It should be noted that further potential mitigation measures have been noted in discussions between HI and TFHS, such as the installation of double glazing and assisted ventilation, and the implementation of these would be progressed through further consultation. These may provide

better management outcomes and make some of the following recommended measures relating to the school redundant.

For the wood chipper, recommended mitigation measures include:

- Locating the wood chipper in the southeast of the hospital site (zones 8, 9) as far as practicable from the school and the residential areas.
- Localised imperforate plywood or similar noise screen to provide at least line of sight screening from the major noise sources (say 2.5 m high) on the western side of the chipper.

The above measures are expected to reduce noise from the wood chipper to the criteria or marginally above.

For the backhoe/dozer/front end loader, recommended mitigation measures to minimise noise impacts include:

- No use of the backhoe/dozer/front end loader during school hours in zones 1 and 2 unless the school agrees to have windows closed and there is also no conflict with use of the school playground. This would be subject to consultation.
- Work outside school hours in zones 1 and 2 if the closure of classroom windows school is not agreeable to closed windows.
- Use of the backhoe/dozer/front end loader is not recommended prior to 8:00am in zones 1, 5 and 7 to minimise potentially high noise impact at the residences immediately adjacent on Frenchs Forest Road.

Recommended mitigation measures during use of the chainsaw in order to minimise noise impacts include:

- No use of chainsaws in zones 1 and 2 during school hours.
- Where feasible, avoid use of chainsaw in zones 3, 4 and 5 during school hours and incorporate intra-day respite periods if this is not feasible. Intra-day respite periods would constitute regular breaks within periods of use.
- To minimise the noise impact on Frenchs Forest Road residents, restrict use of chainsaws in zones 1, 4 and 7 until after 8.00 am and incorporate intra-day respite periods as noise levels may lie above 75 dB(A) at times which is within the ICNG highly noise affected range.
- To minimise the noise impact on residents adjacent to Warringah Road, restrict use of chainsaws in zones 3 and 6 until after 8.00 am and incorporate intra-day respite periods as noise levels may lie above 75 dB(A) at times, which is within the ICNG highly noise affected range.

3.3.3 Management of construction-related noise impacts on The Forest High School

In addition to the potential mitigation measures noted in discussions between HI and TFHS, feasible and reasonable noise mitigation measures that would be considered by the Managing Contractor in relation to work site planning would include but not be limited to the following:

- Consideration of quiet plant and equipment during selection of plant including use of equipment with residential grade mufflers, as a minimum
- Use of Smart type reversing alarms and broadband alarms subject to safety considerations
- Planning the layout of the site so that the chipper is located at the southeast of the site away from noise-sensitive receptors

- Planning layout of the site so site access is at a location least impacting noise-sensitive receptors and such that reversing is minimised (ie use of turning circles where possible).
- Use of localised noise screens
- Making on-site staff aware of noise sensitivities on site and to operate plant and undertake operations with this in mind
- Respite periods for high noise impact activities and operations, where appropriate and reasonable and feasible
- In high noise impact zones closest to the boundary, undertaking works outside school hours and/or during school holidays
- Advance warning of high noise impact activities and duration of events
- Provision of a contact number to address issues as they occur
- Minimising noisy activities such as use of the chainsaw, where possible and undertaking these works outside school hours where possible
- Immediate response to complaints

Many of the above measures would also serve to minimise noise levels at nearby residences.

As noted previously, close and proactive consultation would be undertaken with the school in relation to works, timing, duration and related matters.

Specific potential mitigation measures for major site activities which may be implemented where reasonable and feasible have been described in the previous section of this report.

4 Additional Site Preparatory Works

4.1 Introduction

The range of preparatory activities to ready the hospital site for construction includes the diversion of various electricity, gas and telecommunications services that run through the site. It was originally intended to assess the impacts of these diversions separate to the Stage 1 EIS. However, due to unforseen delays in finalising the engineering designs, HI is now proposing that these would form part of the scope of the overall site preparation works.

This section provides:

- A description of the services diversions and related works
- Assessment of the associated impacts (these being broadly similar in nature and extent to those associated with other site preparation activities reported in the Stage 1 EIS)
- A summary of consultation with relevant stakeholders including The Forest High School in relation to the services diversions that would run along the western boundary of the hospital site immediately adjacent to the high school
- Additional mitigation measures (ie with regard to those identified in the EIS for the original Stage 1 site preparatory activities).

4.2 Description of services diversions

4.2.1 Services diversions

These existing services (both above ground and underground) generally run along Bantry Bay Road which effectively bisects the hospital site. These services are listed in Table 2 together with a description of where each would be relocated to. Existing services that would be decommissioned are also noted.

There would be some related works on Frenchs Forest Road West between Gladys Avenue and Wakehurst Parkway involving removal of a section of the existing 11 kV line and bundling of existing 33 kV cables.

4.2.2 Shared path

The works would include provision of a formal pedestrian access adjacent to the western boundary between Warringah Road and Frenchs Forest Road West. This would be for general public use and would replace the existing informal thoroughfare in this general location.

The path would be located within the 5.6 m wide western services easement adjacent to the existing boundary fence. The shared path would incorporate appropriate landscaping and safety features, such as lighting.

The path would be opened prior to commencement of the Stage 2 construction works on the hospital site.

Table 2 Existing services and description of diversions

Service (Owner)	Description of diversion
200 mm diameter 1050 kPa high pressure natural gas main (Jemena)	Underground from existing connection within the hospital site at Bantry Bay Road along the southern, western and northern boundaries. The main will cross Frenchs Forest Road West underground and connect into the existing main on the northern side of the road.
33 kV transmission line (Ausgrid)	The diversion will commence from an existing pole on the southern side of Warringah Road at the corner of Bantry Bay Road. It will cross Warringah Road and connect to a new pole just outside of the hospital site in the road reserve. It will then run above ground parallel to the southern site boundary to the east of Bantry Bay Road and then along the eastern site boundary. The new section of line would connect to the existing line at the northwest corner of the Frenchs Forest Road West/Wakehurst Parkway intersection. Access to the line would be provided via an unsealed track within the hospital site. A formal easement would be established encompassing the route of the line and the access.
11 kV transmission line (Ausgrid)	The diversion will commence from an existing pole on the northern side of Frenchs Forest Road West about 60 metres west of Gladys Avenue. A new pole will be installed about 10 metres to the east which will transition the 11 kV line from overhead to underground. It will then run underground (in the footpath/nature strip) on the northern side of Frenchs Forest Road West to the eastern side of Gladys Avenue. From here it will cross under Frenchs Forest Road West connecting into a new transformer within the hospital site. It will then run underground along the western and southern boundaries to about 30 metres east of Bantry Bay Road. It will then transition back to an overhead line connecting to a pole that carries the diverted 33 kV line. The 11 kV line will be co-located with the 33 kV line around the eastern boundary of the site. It will then cross Wakehurst Parkway just to the south of the Frenchs Forest Road intersection and connect back into an existing 11 kV line.
415 V power line (Ausgrid)	The section of line along Bantry Bay Road will be decommissioned. The existing section of line on the southern side of Frenchs Forest Road West will be relocated to the northern side of the road an co-located with the 33 kV line.
Street lighting (co-located on 415 V power line poles) (Ausgrid)	None – existing service will be decommissioned.
100 mm diameter water supply (Sydney Water)	None – existing service will be decommissioned.
Telecommunications (Telstra/Optus/Uecomm)	These will be relocated along the southern, western and northern boundaries (underground). A short section of work would occur in the southeast corner of the high school grounds associated with connecting the services to existing telecommunications infrastructure.

4.2.3 Construction hours and duration of works

As far as practicable, the services diversion works would be undertaken during the recommended standard hours of work[2] as follows:

- Monday to Friday between 7.00 am and 6.00 pm.
- Saturday between 8.00 am and 1.00 pm.
- No work would be undertaken on Sundays or on public holidays.

However, some works may be required out of the above recommended standard hours such as in relation to:

- Connection to existing services to minimise impacts on businesses and residences in the event of an interruption to supply
- Works in proximity to Warringah Road and Frenchs Forest Road West for safety reasons and in order to minimise disruptions to traffic.

Appropriate consultation would be undertaken prior to any such out of hours works.

The services diversions would be undertaken as part of the overall site preparation works. The duration of the overall works would be approximately 16 weeks, and would be scheduled to be completed by the end of 2014.

4.2.4 Plant and equipment

Equipment and machinery required for the works would typically include:

- Elevated working platform (EWP) for removing overhead wiring and other fittings
- Bulldozer, front-end loader, backhoe and/or excavator
- Light vibratory roller
- Articulated and fixed trucks
- Mobile crane (diesel or electric)
- Dump truck(s)
- Light vehicles (eg cars or 4WDs)
- Petrol-powered hand tools, eg chain saw, brushcutter.

4.2.5 Earthworks

Earthworks would be required in relation to:

- Excavation of the service trenches along the hospital boundaries for installation of the underground services
- Installation of poles for the overhead 33 kV/11 kV transmission lines within the hospital site (along the southern and eastern boundaries)
- Construction of the access track for the 33 kV transmission line
- Installation of the 11 kV overhead-underground transition pole and 10 metre underground section of line in the footpath/nature strip on the northern side of Frenchs Forest Road West

[2] NSW *Interim Construction Noise Guideline* (Department of Environment and Climate Change 2009)

- Connection of the diverted section of gas main under Frenchs Forest Road West to the existing main on the northern side of the road
- Removal of redundant infrastructure (principally in Bantry Bay Road)
- Disconnection/capping of existing water and sewer services.

It is not anticipated there would be a need to remove excavated spoil from the service trenches on the hospital site. Excavations would generally be backfilled and any surplus spoil spread on site. Ausgrid would be responsible for the disposal of any surplus spoil from excavations outside the hospital site. Where required, this would be undertaken in accordance with *NUS174C Environmental Handbook for Construction and Maintenance* (Ausgrid 2011).

4.2.6 Traffic management and access

The services diversion works would require access for light and heavy vehicles, and for construction plant. Access to the hospital site would be available as follows:

- From Warringah Road: left in, left out, to Bantry Bay Road for eastbound vehicles only
- From Frenchs Forest Road West: all movements (under traffic control) to and from Bantry Bay Road.

Warringah Road would be used as the primary access to minimise the number of construction vehicles using Frenchs Forest Road West. Access to and from the site would occur under an approved traffic management plan. The plan would also cover any works outside the hospital site that could impact on road users.

Adequate safe parking is available in Bantry Bay Road (within the hospital site) and would be restricted to designated locations clear of obstruction.

For safety reasons, Bantry Bay Road would be closed to all vehicle traffic apart from that associated with the services diversion works and construction of the shared path. Alternative safe access for vehicle traffic would be available via Wakehurst Parkway.

During the services diversion works at the western end of the hospital site, use of the informal thoroughfare would not be permitted for safety reasons. Alternative access would be provided along Bantry Bay Road. Temporary barriers would be established to separate pedestrians from construction traffic and activities within the site.

4.3 Consultation

The Forest High School

The western services diversions would be immediately adjacent to the boundary with the high school. Clearing of vegetation adjacent to the school has been assessed in the Stage 1 EIS, however, there would be some additional impacts associated with excavation and backfilling of trenches for the gas, 11 kV and telecommunications diversions. These relate primarily to noise and vibration emissions from operation of plant.

As noted in Section 3.1, HI undertook further consultation with TFHS in December 2013. This covered a range of matters including the services diversions works. The principal aim of the meeting

was to better understand the potential constraints of the school's timetable on construction activities.

This included a review of the 2014 term dates and holiday periods and key exam periods for NAPLAN, HSC trial exams and HSC final exams. The purpose of this was to identify the most appropriate times to undertake disruptive construction activities next to the school. Discussion covered impacts on the classrooms adjacent to the hospital site, and how these could be mitigated and effectively managed.

Discussion also covered the movement of construction traffic, particularly on Frenchs Forest Road West and the issue of safety in relation to the movement of students to and from the school, and other road users such as buses and parents/guardians collecting and delivering children to the school.

HI will use the initial issues raised by the school and the school timetable to help establish the key contract and scope of works documents for the construction activities.

Utility/services owners

Consultation has also been undertaken with the owners of the affected services, ie:

- Jemena
- Ausgrid
- Sydney Water
- Telstra
- Optus
- Uecomm.

This has principally been in relation to confirming and meeting design requirements for the respective service diversions.

4.4 Assessment of impacts of services diversions

The impacts associated with the services diversions relate principally to biodiversity and noise. These are discussed as follows. Comment on other potential impacts is also provided.

4.4.1 Biodiversity

The assessment of impacts on biodiversity reported in the Stage 1 EIS assumed that the entire site would potentially be cleared notwithstanding the intention to retain the area of vegetation at the eastern end of the site where practicable. As such this, took in the clearing of vegetation associated with all the services diversions with the exception of part of the area for the 33 kV/11 kV transmission lines along the southeast and eastern site boundaries.

Multiple iterations of the 33 kV/11 kV transmission line design were undertaken. These were driven by environmental considerations (principally to minimise the impact on DFEC and individual mature trees) as much as to resolve engineering and constructability issues. Access to the line for maintenance and other activities will be via a formed but unpaved track located largely within the hospital site.

The final 33 kV/11 kV services diversion will increase the impact footprint on DFEC by an additional 0.1 ha. This relates to clearing at ground level that is required for a section of the access track just outside the southern boundary to the east of Bantry Bay Road and for the installation of the poles that will be located on or immediately adjacent to the eastern boundary in the road reserve. Some

trimming of the canopy in the road reserve will also be required to provide the necessary clearances for the conductors. This has also been accounted for in the revised biobanking assessment.

The additional impact on DFEC has been accounted for in the revised biodiversity offset strategy (refer Section 3.2.2).

Works for the installation of the pole and undergrounding of the 11 kV line on the northern side of Frenchs Forest Road West would occur in the footpath and/or adjoining nature strip. Vegetation in the nature strip comprises grass and several planted street trees. The ecological value of these is considered minimal and impacts would be similarly minor.

4.4.2 Noise and vibration

A Noise and Vibration Impact Assessment for the services diversions has been prepared by Acoustic Logic and is included as Appendix 1.

Existing environment

The existing acoustic environment, particularly along Warringah Road and Wakehurst Parkway, is heavily influenced by road traffic noise emissions. Frenchs Forest Road West is relatively less heavily trafficked but still characterised to a certain extent by similar emissions. Measured background noise levels are provided in Table 3.

Table 3 Measured background noise levels

Location	Background Noise Level $dB(A)_{L90}$	Average (Road Traffic) Noise (at residential property boundary) $dB(A)_{Leq(15\ min)}$
Logger A (School/Frenchs Forest Road)	44 (7am to 6pm)[1] 40 (6pm to 10pm) 34 (10pm to 7am)	64
Logger B (Warringah Road)	52 (7am to 6pm)[1] 48 (6pm to 10pm) 36 (10pm to 7am)	69

1 Recommended standard construction hours (Mon–Fri)

The principal sensitive receivers comprise the high school and residences on the northern side of Frenchs Forest Road West from about 60 metres west of Gladys Avenue and Wakehurst Parkway.

The two residences on the corner of Hilmer Street and Warringah Road opposite the hospital site may also be exposed to works associated with the installation of the new pole for the 33 kV diversion and the services diversions along the southern boundary of the hospital site. These residences are already subject to road traffic noise.

Assessment of potential noise impacts

Based on the measured background noise levels, noise emissions goals have been derived and are presented in Table 4 (following page). These are the same as the revised noise emission goals for the broader site clearing and preparatory works.

Table 4 Noise emission goals

Location	'Noise Affected' Level – dB(A)$_{L90}$	'Highly Noise Affected' Level – dB(A)$_{L90}$
Residences – Frenchs Forest Road West	54 (7am to 6pm) 45 (6pm to 10pm) 39 (10pm to 7am)	75
Residences – Warringah Road	62 (7am to 6pm) 53 (6pm to 10pm) 41 (10pm to 7am)	75
Frenchs Forest School – Classroom	45 (measured inside a classroom)	N/A
Frenchs Forest School – Playground	65	N/A

With regard to the work zones shown in the revised figure provided in Section 3.3.2, the services diversions would be located in the following zones:

- Western boundary – zones 1,2, 3
- Southern boundary – zones 3, 6, 9
- Eastern boundary – zones 7, 8, 9
- Northern boundary – zones 1, 4, 7.

Sound power levels associated with plant with the highest noise emissions are provided in Table 5. Clearing of vegetation would precede the services diversion works on the hospital site. The impacts associated with this activity have been assessed in the Stage 1 EIS and clarification on the assessment provided in Section 3.3 of this report.

Table 5 Equipment sound power levels

Equipment item,	Sound power level – dB(A)$_{Leq(15\ min)}$
Vibratory roller	105-110
Backhoe/excavator (in soil)	105
Front-end loader	105
Crane (diesel)	105
Crane (electric)	95

A summary of work activity areas and predicted noise levels at nearby receivers is provided in Table 6 (following page). The predictions in this table are without any acoustic treatment/management provided.

Table 6 Predicted noise levels

Noise receiver location	Work area (zone)	Noise source	Predicted noise level $dB(A)_{Leq(15\ min)}$	Noise emission goal $dB(A)_{Leq(15\ min)}$
School classroom (internal)	1,2	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	40-57 50-57	45
	3,6	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	35-35 45-45	
School playground	1,2,3	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	50-65 60-75	65
	6	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	25-45 35-55	
Residences – Frenchs Forest Road West	1,4,7	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	50-60 60-70	54 (7am–6pm) 45 (6pm–10pm) 39 (10pm–7am)
	2	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	40-45 50-55	
Residences – South of Warringah Road (Karingal Crescent and Bantry Bay Road)	3,6	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	51-56 61-66	62 (7am–6pm) 53 (6pm–10pm) 41 (10pm–7am)
	2	Electric Crane Roller/Diesel Crane/ Backhoe/ Front-end loaders	43-46 53-56	

Given the size of the hospital site, noise levels at nearby receivers will vary depending on where work is undertaken on the site. In this regard the following is noted with respect to noise emissions from the plant identified in Table 6:

- Noise levels for works in zones 1 and 2 (ie nearest to school classrooms) are predicted to exceed the in-classroom noise management goal of 45 dB(A) by up to 12 dB(A) while works further away, such as in zone 3, would meet the in-classroom management goal of 45 dB(A)
- Similarly, noise levels for works in zones 1 and 2 are predicted to exceed the playground noise management goal of 65 dB(A) by up to 10 dB(A)
- Noise levels for works in zones 1 and 7, ie adjacent to the northern site boundary and opposite residences on Frenchs Forest Road West are predicted to exceed the management goal of 54 dB(A) by up to 16 dB(A)
- Noise levels for works in zones 3 and 6, ie adjacent to the southern site boundary adjoining Warringah Road are predicted to exceed the management goal of 54 dB(A) by up to 4 dB(A).

Connection of the diverted sections of the 11 kV and 33 kV transmission line to the existing high voltage transmission lines in Frenchs Forest Road East and Bantry Bay Road respectively would be undertaken outside of the recommended standard construction hours for reasons of safety, to minimise disruption to traffic. As a general comment, it would be considered desirable to connect the diverted sections of the 11 kV and 33 kV lines to the existing lines to effectively manage the risk of interruption to supply and the associated consequences of this. The duration of work for the connections across Warringah Road and Wakehurst Parkway is anticipated to be over 1-2 nights.

Connection of the 33 kV line to the existing sections of line would be undertaken in close proximity to existing residences and would include use of an EWP. There would be potential for sleep disturbance to the occupants of nearby residences.

Assessment of potential vibration impacts

Vibration goals for the amenity of nearby land users are those recommended by the EPA's *Assessing Vibration: A technical guideline*. These levels are presented in Table 7.

Table 7 Vibration goals

Location	Time	Peak velocity (mm/s)	
		Preferred	Maximum
Continuous vibration			
Residences	Daytime	0.28	0.56
Schools	When in use	0.56	1.12
Impulsive vibration			
Residences	Daytime	8.6	17.0
Schools	When in use	18.0	36.0

The primary vibration-creating activity relates to compacting the backfilled services trenches. Compaction/rolling would, however, not be extensive due to the sensitivity of the services. Given that the nearest building (a classroom block within the high school) is no closer than 25 metres from the work area, the works are not expected to generate vibration levels exceeding EPA guidelines.

4.4.3 Other impacts

Traffic & access

Site access would be as for the site clearing and related preparatory works. Access to and from the site would be via Bantry Bay Road which would be permanently closed to the public prior to the commencement of works. As far as practicable, access would principally be from Warringah Road. Use of Frenchs Forest Road West to enter/exit the hospital site would be avoided where practicable to minimise impacts on road users and adjacent receivers.

Temporary partial road closures may be required:

- In Frenchs Forest Road West for the undergrounding of the 11 kV line and the connection of the diverted section of the gas main into the existing main

- At Warringah Road/Bantry Bay Road for the connection of the 33 kV line
- At Wakehurst Parkway south of the Frenchs Forest Road intersection for the connection of the 11 kV line.

The 11 kV and 33 kV connections would be undertaken outside of recommended standard construction hours which would assist in minimising impacts on road users. The works would be undertaken under an approved traffic management plan.

Partial closure of a small section of Frenchs Forest Road West on its northern side may be required for construction of the section of 11 kV line that would be undergrounded. Temporary partial road closures may also be required for the installation of the underground sections of the 11 kV line and gas main.

The route of the underground section of the 11 kV line crosses two driveways and works could potentially affect access. Consultation would be undertaken with the affected property owners in relation to works programming so as to avoid/minimise disruption to access.

It may be necessary to temporarily restrict pedestrian access on the northern side of Frenchs Forest Road West for safety reasons. Suitable, safe alternative access is available on the southern side of the road. Safe crossing is available to the east at the Wakehurst Parkway intersection (signalised) and to the west at Bluegum Crescent (pedestrian crossing) opposite the main school entrance.

Soils and water

Potential sedimentation and erosion impacts relate to the risk of mobilisation of unconsolidated material (eg soils, vegetation) by rainfall/runoff, and transportation of this material off the hospital site via formal or natural drainage paths.

Spills of hazardous materials such as oil (for the 11 kV transformer) or fuel is another potential risk that could impact on soils and local groundwater. Refuelling of plant on site is likely to be limited to petrol-powered hand tools such as chainsaws and brushcutters.

Air quality

Construction of the services diversions within the hospital site would require the clearing of vegetation along the diversion routes. Depending on programming of the site works, this may occur as part of the overall clearing on the site. Regardless, vegetation clearing would expose bare soil which would represent a potential source of dust emissions that could impact on nearby receivers if not appropriately managed. Dust emissions would largely comprise a nuisance impact.

Operation of plant and machinery would have associated emissions, however, the volume of these would not be of material concern and would be readily dispersed. Emissions from traffic on nearby roads would likely be a much greater influence on local air quality.

Aboriginal heritage

The Aboriginal heritage assessment (Appendix F to the Stage 1 EIS) notes the high level of disturbance across the majority of the hospital site and the apparent lack of substantial intact topsoil, indicating that there is unlikely to be any archaeological potential for intact or substantial Aboriginal stone artefact deposits. It concluded that there was low potential for the recovery of in situ Aboriginal objects and low research potential.

However, it also noted the presence of sandstone outcrops in the northeast part of the site, and where the ground surface was currently obscured by vegetation. Despite having low recovery potential, it noted there was a possibility that art/engravings may be present in this area. This location is within the area of vegetation that would be retained on the site but could be impacted by the diversion of the 33 kV/11 kV transmission line.

There are no Aboriginal heritage issues associated with the works along Frenchs Forest Road West.

Historic heritage

The historic heritage assessment undertaken by AMBS (Appendix G to the Stage 1 EIS) noted that there is one item of local heritage significance listed under the Warringah LEP within the vicinity of the hospital site, the 'Former Holland's Orchard Trees', located in the nature strip adjacent to Warringah Road about 80 metres to the west of the hospital site.

It further noted there were no items of State significance listed under either Part 3A (State Heritage Register) or any register kept by RMS under Section 170 (Heritage Conservation Register) of the *Heritage Act 1977* within the study area or its vicinity. Similarly, there were no heritage items listed under either the Register of the National Estate or the National Trust Register within the study area or its vicinity.

The services diversions would be generally located on the hospital site boundaries and as such, would not impact on the local heritage item noted above. There are no historic heritage issues associated with the works along Frenchs Forest Road West.

Bushfire

As noted in the Stage 1 EIS, the hospital site and adjacent land are designated Bush Fire Prone Land (BFPL) under the certified Warringah Bush Fire Prone Land Map 2010. The above-ground services diversions would have negligible impact on bushfire risk. The principal issue instead relates to risk to infrastructure from bushfire.

Design of the above-ground services diversions would take appropriate consideration of bushfire risk and would meet the requirements of *Planning for Bushfire Protection 2006* and AS3959-2009 *Construction of Buildings In Bushfire-prone Areas*. Design and construction of the substation would comply with Ausgrid's NS187 *Passive Fire Mitigation of Substations*.

4.5 Management of impacts

As a general comment, impacts associated with the services diversions would be managed holistically with all the other activities on the site under the Final CMP. This would also provide for proactive consultation with all affected stakeholders to avoid/minimise impacts and facilitate effective management of impacts.

Works related to the electricity services diversions undertaken by or on behalf of Ausgrid would be undertaken in accordance with *NUS174C Environmental Handbook for Construction and Maintenance* (Ausgrid 2011).

Further details are provided in Section 5 (Final Mitigation Measures).

5 Final Mitigation Measures

This section provides an updated list of mitigation and management measures for the site clearing and preparatory works, including the services diversions. This updates Table 13 in Section 8.8 of the Stage 1 EIS.

Additions and revisions are shown in **bold**. Deletions are shown in ~~strikethrough~~.

5.1.1 Flora and fauna

- Impacts on DFEC ~~and Powerful Owl~~ would be mitigated through implementation of the **revised** biodiversity offset strategy **as documented in Section 3.2.2 of this report**.
- Preparation and implementation of EWMS to cover all pre-clearing and site clearing activities.

5.1.2 Noise and vibration

- Management of noise impacts would be in accordance with the measures identified in the ~~attached~~ acoustic assessments prepared by Acoustic Logic for the site clearing **and services diversions** works.
- **HI will use the issues raised by The Forest High School and the school timetable to assist in establishing the key contract and scope of works documents for the construction activities in order to minimise impacts on school activities.**

5.1.3 Transport and accessibility

- Bantry Bay Road would be closed to vehicles ~~and pedestrians~~ prior to commencement of works. **Safe pedestrian access would be maintained along Bantry Bay Road until construction of the shared path is completed.**
- As far as practicable Warringah Road would form the principal access to the site.
- Heavy vehicles exiting the site to Frenchs Forest Road West would, as far as practicable, be limited to right turn only to avoid travelling on suburban streets.
- **Impacts on road users** ~~Movements of vehicles to and from the site~~ would be managed through an approved Traffic Management Plan.
- Preparation of this Plan would include appropriate consultation with RMS and Warringah Council.
- Use of local roads by heavy vehicles would be avoided as far as practicable.
- As far as practicable, heavy vehicle movements would be scheduled for outside of peak hours.
- Use of the Frenchs Forest Road West exit would be avoided or minimised on school days, at the beginning and end of the school day.
- **Consultation would be undertaken with the affected property owners in Frenchs Forest Road West in relation to 11 kV works programming so as to avoid/minimise disruption to access to properties.**

5.1.4 Sedimentation and erosion

- The Managing Contractor would prepare an erosion and sediment control plan consistent with the Soil and Water Management Plan (Appendix L to the EIS) and *Managing Urban Stormwater–Soils and Construction* (4th ed., Landcom 2004).

5.1.5 Servicing and waste

- **All waste generated would be assessed, classified and managed in accordance with the *Waste Classification Guidelines, Part 1: Classifying Waste* (DECCW 2009).**
- Management of waste would be **addressed in the Final CMP and would be** undertaken in accordance with the Waste Management Strategy (Appendix N to the EIS).
- A NSW licensed Asbestos Removalist as per the Code of Practice for the Safe Removal of Asbestos, 2nd ed. [NOHSC: 2002 (2005)] would be engaged to remove any asbestos present on site.
- **WorkCover would be notified a minimum of five days in advance of commencement of any licensed asbestos removal.**
- An Unexpected Findings Protocol would be established and implemented in case potentially contaminated, hazardous or unsuitable material were encountered during the site works.
- **All vehicles transporting waste from the site would be covered.**
- **Appropriate measures would be taken to prevent material being transported from site and deposited on roadways.**
- **The Final CMP would provide for regular inspection of surrounding roads and clean up of any material deposited (subject to applicable worker safety considerations).**

5.1.6 Heritage

- The recommendations of the Aboriginal heritage assessment (Appendix F to the Stage 1 EIS) and historic heritage assessment (Appendix G to the Stage 1 EIS) would be implemented.

5.1.7 Air quality

- Management of dust generation would be undertaken in accordance with Section 8.5 of the Soil and Water Management Plan (Appendix L to the Stage 1 EIS).

5.1.8 Energy conservation

- The recommendations in Section 4.1 of the Waste Management Strategy (Appendix N to the Stage 1 EIS) would be implemented.

5.1.9 Bushfire

- **Design of the above-ground services diversions would take appropriate consideration of bushfire risk and would meet the requirements of *Planning for Bushfire Protection 2006* and AS3959-2009 *Construction of Buildings In Bushfire-prone Areas*.**
- **Design and construction of the substation would comply with Ausgrid's NS187 *Passive Fire Mitigation of Substations*.**

6 Conclusion

This report has been prepared to support HI's SSI application (SSI 13_5982) for the concept proposal for the Northern Beaches Hospital and the associated site clearance and preparatory works. It should be read in conjunction with the *Northern Beaches Hospital State Significant Infrastructure (SSI) Application Environmental Impact Statement for Stage 1 including Concept Design, Site Clearance & Preparatory Works* and the supporting appendices.

This report has considered the issues raised in the submissions made during the public exhibition process. Where appropriate, clarification has been provided on specific matters relating to both the concept proposal and the initial site works, and further information has been provided with regard to mitigating impacts associated with the hospital development.

The scope of the site clearance and preparatory works has been revised to include the diversion of electricity, gas and telecommunications services around the site boundaries and connection back into the existing services. The additional impacts associated with these works have been appropriately considered and where required, further mitigation measures have been identified to effectively manage these impacts to an acceptable level. The impacts of the services diversion works would be managed holistically with all other site preparation works.

7 References

SMEC Australia (2014) *Biobanking Assessment Report Lot 3 Aquatic Drive*, report prepared for Health Infrastructure, Jan 2014, Sydney.

Smith, P and J Smith J (2005) *Warringah Natural History Area Survey, Vegetation History and Wildlife Corridor*, report prepared for Warringah Council.

Appendix 1

Noise and vibration assessment for services diversion works

Northern Beaches Hospital

Western Services Diversion - Acoustic Assessment

SYDNEY
A: 9 Sarah St Mascot NSW 2020
T: (02) 8339 8000
F: (02) 8338 8399

SYDNEY MELBOURNE BRISBANE CANBERRA
LONDON DUBAI SINGAPORE GREECE

www.acousticlogic.com.au
ABN: 11 068 954 343

DOCUMENT CONTROL REGISTER

Project Number	20130604.2
Project Name	Northern Beaches Hospital
Document Title	Western Services Diversion - Acoustic Assessment
Document Reference	20130604.2/2907A/R2/TT
Issue Type	Email
Attention To	SMEC Chris Masters

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	29/07/2013	20130604.2/2907A/R0/TT	TT		
1	29/07/2013	20130604.2/2907A/R1/TT	TT		TT
2	22/11/2013	20130604.2/2907A/R2/TT	TT		TT

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1 INTRODUCTION

Acoustic Logic Consultancy has been engaged to conduct a review of potential noise and vibration generation created as a result of the diversion of services on the southern and western boundaries of the Northern Beaches Hospital, Frenchs Forest.

In this report we will:

- Identify noise sensitive development in the vicinity of the site.
- Undertake a review of ambient noise conditions at the site.
- Determine noise/vibration emission goals for the works based on EPA Construction Noise Guidelines.
- Identify typical noise sources associated with the works and predict noise emissions at nearby sensitive development.
- Determine noise management strategies for the works.

2 SITE DESCRIPTION AND PROPOSED WORKS

The Northern Beaches Hospital development will be located on the corner of Warringah Road and the Wakehurst Parkway, Frenchs Forest.

The site is bounded as follows:

- To the north by Frenchs Forest Road West, which carries low-medium traffic volumes. Further to the north, on the opposite side of Frenchs Forest Road West is a mixture of one a two storey residential development.
- To the south by Warringah Road, which carries high traffic volumes. Further to the south, on the opposite side of Warringah Road is a mixture of commercial development and one a two storey residential development.
- To the west by Frenchs Forest High School. We note that there is a two storey classroom building in the north-eastern corner of the school grounds, approximately 25m from the site bound with the hospital.
- To the east by Wakehurst Parkway, which carries high volumes of traffic.

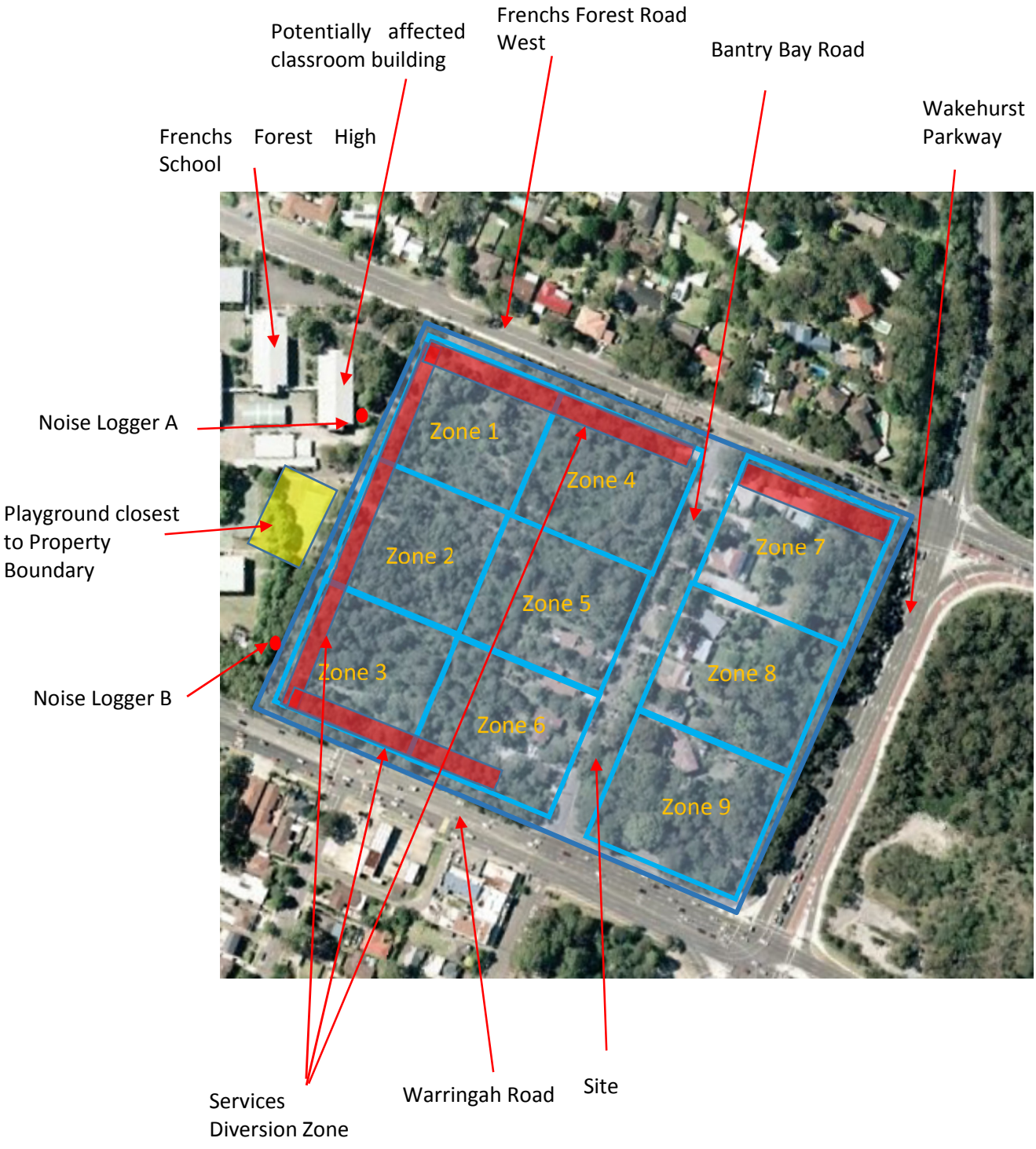
The Northern Beaches Hospital site was divided into nine sectors for the purpose of the ecology survey design as shown in the aerial photograph below. This division has been adopted for this investigation as it is considered useful for assessment and management of noise and vibration impacts.

The proposed works involve the diversion of services to new trenches to be constructed along the property boundary of the site (on the western, northern and southern boundaries of the hospital site as per the aerial photograph below).

The works the subject of this assessment do not require works to above ground services (power lines) or works done outside of standard construction hours.

The works associated with the Western Services Diversion is expected to take more than 3 weeks. A list of likely equipment is presented in section 5.

See aerial photograph below.



3 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

4 SURVEY OF EXISTING AMBIENT NOISE

Both long term unattended noise logging, and attended noise measurements were conducted to quantify the existing acoustic environmental at the site.

Unattended noise monitoring was conducted between 2 and 9 July 2013 using an Acoustic Research Laboratories monitor set on A-weighted fast response mode. The monitor was calibrated before and after the measurements using a Rion Type NC-73 calibrator. No significant drift was recorded.

Two monitors were installed (refer to aerial photograph):

- One monitor ("Logger A") was installed next to the school building nearest the Hospital site. Noise levels at this logger will be indicative of ambient noise levels at the Frenchs Forest School and at the residential development on Frenchs Forest Road, to the north of the site.

- A second monitor (Logger B") was installed on the school property boundary, towards the southern end of the site. Noise levels at this logger will be indicative of ambient noise levels on Warringah Road.

In addition, attended measurements of average road traffic noise levels were made both on Warringah Road and Frenchs Forest Road West. These measurements were made using a Norsonic 140 Type 1 sound meter set on A-weighted fast response mode.

Measured noise levels are presented below.

Table 1 – Measured Background Noise Level

Location	**Daytime Noise Levels (7am-6pm)**	
	Background Noise Level - dB(A)L_{90}	Average (Road Traffic) Noise Level (at residential property boundary) - dB(A)$L_{eq(15min)}$
Logger A (School/Frenchs Forest Road)	44	64
Logger B (Warringah Road)	52	69

5 ACOUSTIC CRITERIA

Given the scale of the proposed works and the proximity of noise sensitive development, the "quantitative" assessment procedure, as outlined in the Interim Construction Noise Guidelines (ICNG) will be used (as opposed to the more simple "qualitative" assessment method outlined in the Guidelines).

The quantitative assessment method requires:

- Determination of noise generation goals (based on ambient noise monitoring).
- Prediction of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission goals is not possible.

5.1 NOISE GOALS

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected" level*. Where construction noise is predicted to exceed the "noise effected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise effected level". For residential properties, the "noise effected" level occurs when construction noise exceeds ambient levels by more than:
    - 10dB(A)$L_{eq(15min)}$for work during standard construction hours (7am-6pm Monday to Friday and 8am to 1pm on Saturdays) and
    - 5dB(A)$L_{eq(15min)}$for work outside of standard construction hours.
- "*Highly noise affected level".* Where noise emissions are such that nearby properties are "highly noise effected", noise controls such as respite periods should be considered. For residential properties, the "highly noise effected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

A summary is presented below.

Table 2 – Noise Emission Goals

Location	"Noise Affected" Level - dB(A)$L_{eq(15min)}$	"Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$
Residences – Frenchs Forest Road	54 (during standard construction hours) 49 (outside of standard construction hours)	75
Residences – Warringah Road	62 (during standard construction hours) 57 (outside of standard construction hours)	75
Frenchs Forest School - Classroom	45 (measured inside a classroom)	N/A
Frenchs Forest School - Playground	65	N/A

5.2 VIBRATION

Site clearing works are unlikely to create vibration with the potential for building damage.

Vibration goals for the amenity of nearby land users are those recommended by the EPA document *Assessing Vibration: A technical guideline.* These levels are presented below:

Table 3 – Vibration Goals

Location	Time	Peak velocity (mm/s)	
		Preferred	Maximum
Continuous Vibration			
Residences	Daytime	0.28	0.56
Schools	When in use	0.56	1.12
Impulsive Vibration			
Residences	Daytime	8.6	17
Schools	When in use	18	36

6 ASSESSMENT/RECOMMENDATIONS

6.1 NOISE EMISSION ANALYSIS

The primary vibration crating activity is likely to be compacting backfilled services trenches. ALC is advised that compaction/rolling is not expected to be extensive due to the sensitivity of the services below. Given the nearest school building is no closer than 25m from the work area, these works are not expected to create vibration levels exceeding EPA guidelines.

Proposed equipment to be used is set out below. In addition, the typical sound power (ie – the noise level at zero metres distance) created by each item will also be presented.

Table 4 – Equipment Sound Power Levels

Equipment Item	Sound Power Level – dB(A)$L_{eq(15min)}$
Vibratory Roller	105-110
Backhoe/Excavator (in soil)	105
Front-End loader	105
Crane (Diesel)	105
Crane (Electric)	95

Given the size of the site, noise levels at nearby developments will vary greatly depending on where the work is undertaken. A summary of work activity areas and predicted noise level at nearby receivers is set out in table 5, below. The predictions in table 5 are based on the assumption that there is *no* acoustic treatment/management undertaken.

Predictions are made at the following locations:

- For the school – the predictions are made *inside* the classroom nearest the property boundary with the Hospital (windows assumed to be open).
- For residential properties – the predictions is made at the property boundary of the residential dwelling.

Predicted levels and assessment against standard construction hours criteria are as follows:

Table 5 – Predicted Noise Levels
(Standard Construction Hours Assessment)

Noise Receiver Location	Work Area	Noise Source	Predicted Noise Level – dB(A)$L_{eq(15min)}$	Noise Emission Goal – dB(A)$L_{eq(15min)}$
School Classroom (internal level)	Zone 1 and 2	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	40-47 50-57	45
	Zones 3 and 6	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	35-35 45-45	45
School Playground	Zone 1, 2, 3	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	50-65 60-75	65
	Zones 6	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	25-45 35-55	65
Residences – Frenchs Forest Road	Zone 1, 4 and 7	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	50-60 60-70	54
	Zones 2	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	40-45 50-55	54
Residences – South of Warringah Road (Karingal Crescent and Banrty Bay Road)	Zones 3, 6	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	51-56 61-66	62
	Zone 2	Electric Crane Roller/Diesel Crane/Backhoe/Front-end loaders	43-46 53-56	62

Comments:

- Noise impact on the classroom (nearest to eastern property boundary of school):
    - When working close to the property boundary (Zones 1 and 2) - Without acoustic treatment, noise levels in classrooms (windows open) are predicted to be 45-57 when using the roller/backhoe/diesel crane, exceeding the target of 45dB(A).
    - When working further away from the boundary (zones 3 and 6) noise emissions are predicted to be less than 45dB(A) in the classroom, which is compliant with noise impact goal of 45dB(A).
    - Potential acoustic treatments:
        - Compliant noise levels in the classroom can be achieved if the windows to the classroom are kept closed.

- In the event that a noise screen is constructed along the western edge of zones 1 and 2, noise levels of approximately 40-50dB(A) would be achieved in the classrooms (windows open), which is a marginal exceedance of noise goals.

- However, a screen would provide no benefit for noise created by a crane. If a crane is located in zones 1 or 2 (near the western property boundary), it would be necessary to use either an electric crane (rather than diesel) or to acoustically treat the crane engine.

- Noise impact on the school playground closest to property boundary (shown in yellow on aerial photo):

  - When working close to the property boundary (Zones 1, 2 and 3) - Without acoustic treatment, noise levels in playground are predicted to 55-75dB(A) when using the roller/backhoe/diesel crane, exceeding the target of 65dB(A).

  - Use of a noise screen along the property boundary with the school would reduce noise levels by approximately 7dB(A), with a predicted noise level of 49-69dB(A) predicted, marginally exceeding 65dB(A) noise goal.

  - Noise from a crane, however, would not be reduced by any screening. A diesel crane located close to the western property boundary would create a noise level of 70-75dB(A), exceeding the 65dB(A) goal.

- Noise impact on the Frenchs Forest Road West residences:

  - When working close to the northern property boundary in Zone 1 - Without acoustic treatment, noise levels at the residential property boundary are predicted to be 55-70dB(A) when using the backhoe/excavator, exceeding the target of 54dB(A).

  - When working further away from the boundary (zone 2, 3, 6) noise emissions are predicted 45-55dB(A) when using the backhoe/front end loader, which is generally compliant with noise emission goals.

- Noise impact on Warringah Road residences:

  - When working close to the southern property boundary (Zones 3 and 6) - Without acoustic treatment, noise levels residential property boundary are predicted to be 56-66dB(A) when using the backhoe, intermittently exceeding the target of 62dB(A).

  - When working further away from the boundary (zone 2) noise emissions are predicted to be less than the 62dB(A) noise goal.

6.2 RECOMMENDATIONS

Recommended noise mitigation strategies are outlined below.

6.2.1 Work in Zones 1 and 2:

Noise Impact on school

- If the school is prepared to close windows to the classrooms in the building closest to the hospital grounds:
    - Noise emissions are predicted to generally comply with 45dB(A) noise goal within the classroom.
    - Any crane (electrical or diesel) should be located as far as practicable from the western property boundary of the Hospital site.
- If the School is not prepared to close classroom windows:
    - Option 1 - Ensure works in zones 1 and 2 are not done during school hours OR.
    - Option 2:
        - Erect noise screens along the western boundary of the Hospital site in zones 1 and 2. With a 2.5m high screen (providing line of sight between the equipment and the first floor of the school classroom building), noise emissions are predicted to be only marginally higher than the 45dB(A) noise goal. Screen to be constructed using plywood or similar imperforate sheeting.
        - In addition – any crane would either need to be electric, or the diesel engine acoustically treated such that it has an effective sound power level of no more than 95dB(A).

6.2.2 Work in Zones 1, 4, 7:

Noise Impact on residents (Frenchs Forest Road West)

Although noise when working in zone 1, 4 and 7 is predicted to exceed the 54dB(A) noise goal at the residences on Frenchs Forest Road West, significant acoustic treatments are practicable.

We recommend that any works in the 25m nearest the northern property boundary should not start prior to 8am.

6.2.3 Work in Zones 3 and 6:

Noise Impact on School.

Noise impact on the school classrooms is not predicted to be excessively impacted by works in zones 3 and 6.

Noise impact on the playground is predicted to exceed guidelines for noise impacts on outdoor areas. To mitigate this impact, either:

- Option 1:
    - Erect a noise screen along the western edge of zone 3 (2m high, plywood sheeting) and
    - Use an electric crane or a diesel crane with acoustically treated motor.
- Option 2 - Avoid works on the western boundary of zone 3 during recess/lunch.

Noise Impact on residents (Warringah Road)

In our opinion, no noise management controls are warranted to reduce noise impacts on residents on Warringah Road. Although noise levels are predicted to marginally exceed the 62dB(A) noise emission goal, noise levels at the nearest residents are predicted to be no more than 66dB(A) at the nearest residences, which is quieter than the noise crated by traffic on Warringah Road.

7 CONCLUSION

This report provides the results of an assessment of noise and vibration from the proposed services diversion work on the western and southern boundary of the proposed Northern Beaches Hospital site.

Noise and vibration generation have been assessed with reference to applicable EPA acoustic guidelines.

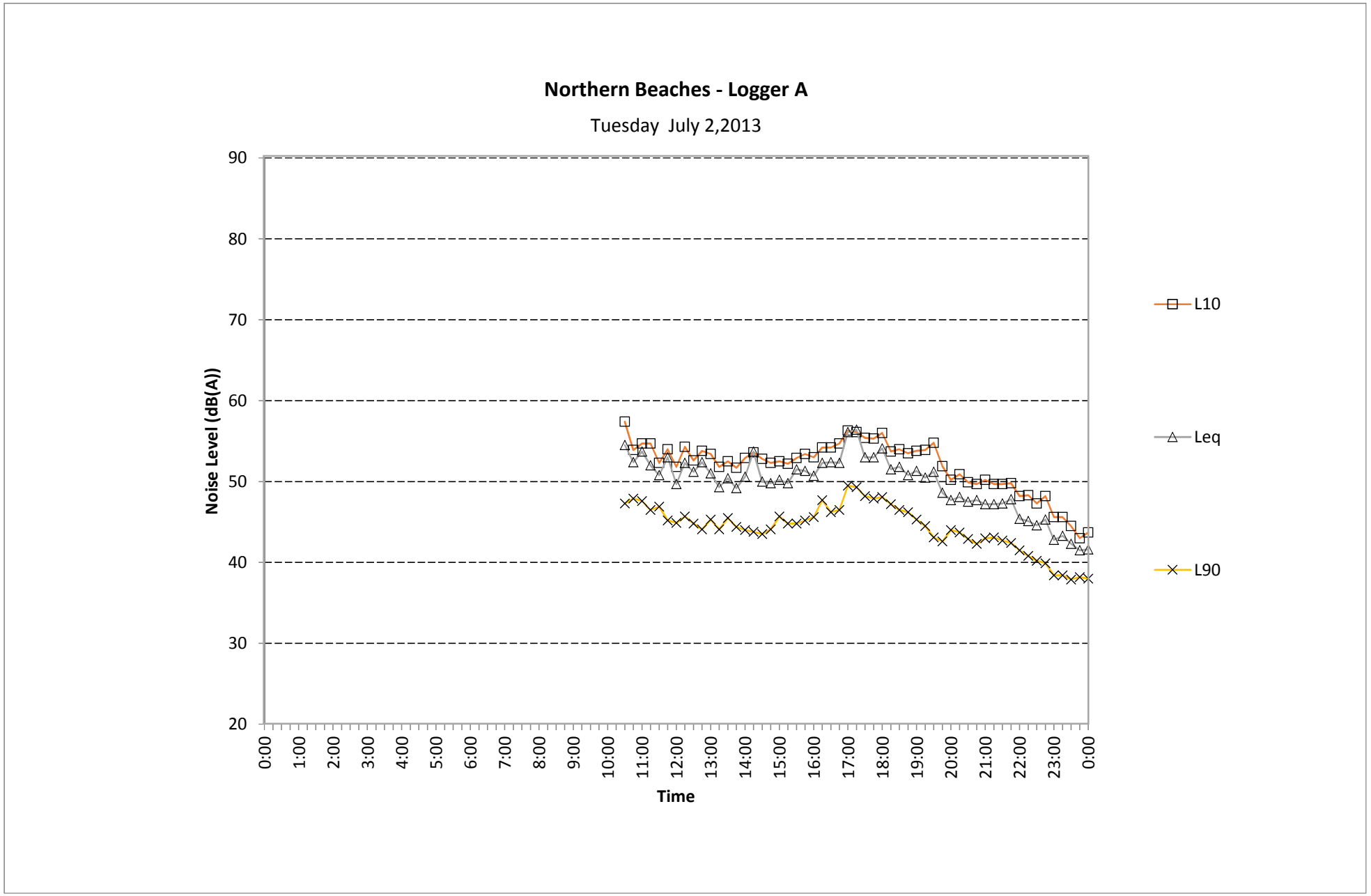
Provided that the recommendations set out in section 6 of this report are adopted, noise and vibration impacts will be mitigated as much as practicable.

Report prepared by

ACOUSTIC LOGIC CONSULTANCY PTY LTD
Thomas Taylor

Appendix 1

Noise Monitoring Data


Northern Beaches - Logger A
Tuesday July 2,2013
Noise Level (dB(A))
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80
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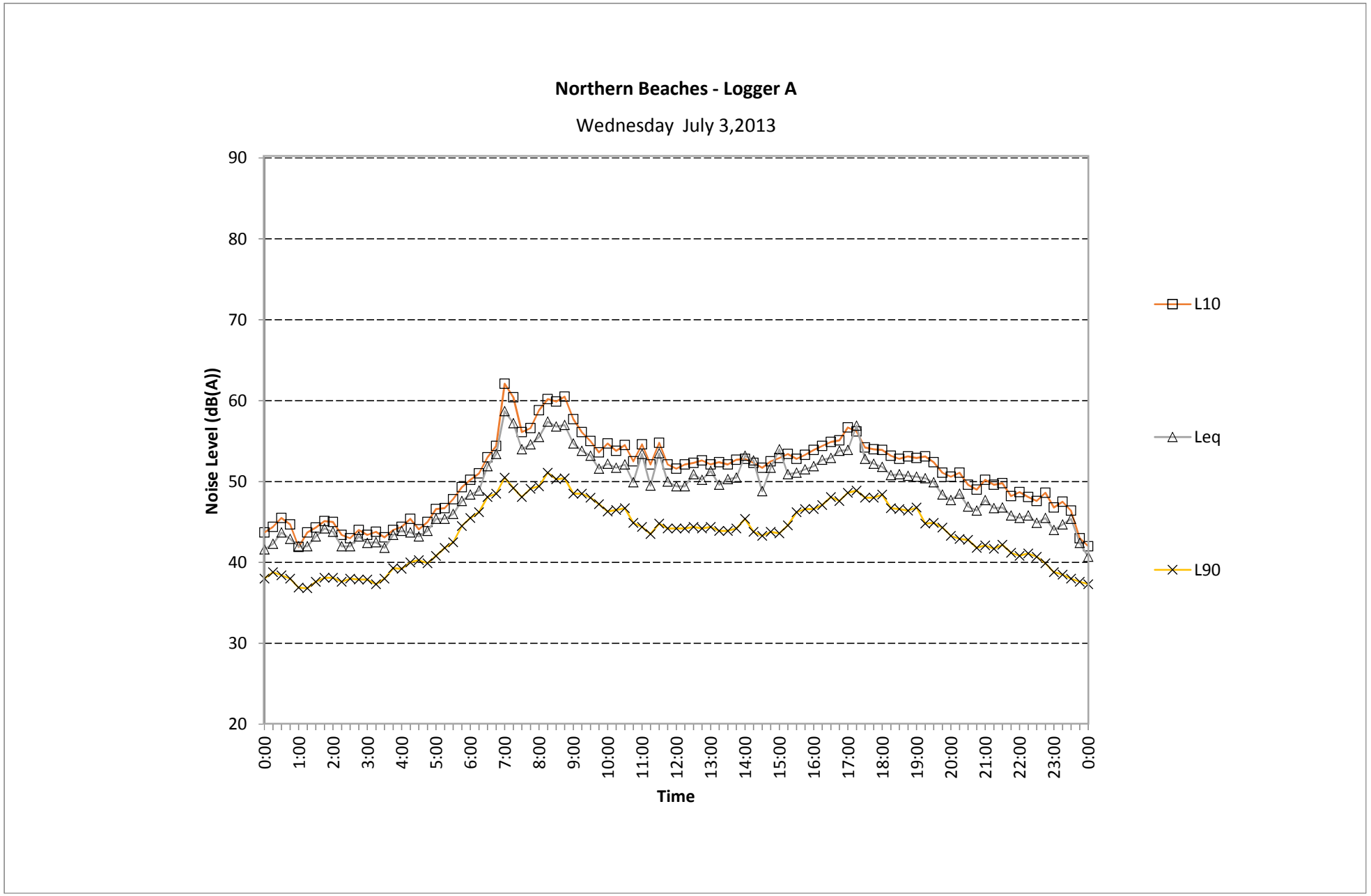
Northern Beaches - Logger A
Wednesday July 3,2013
Noise Level (dB(A))
90
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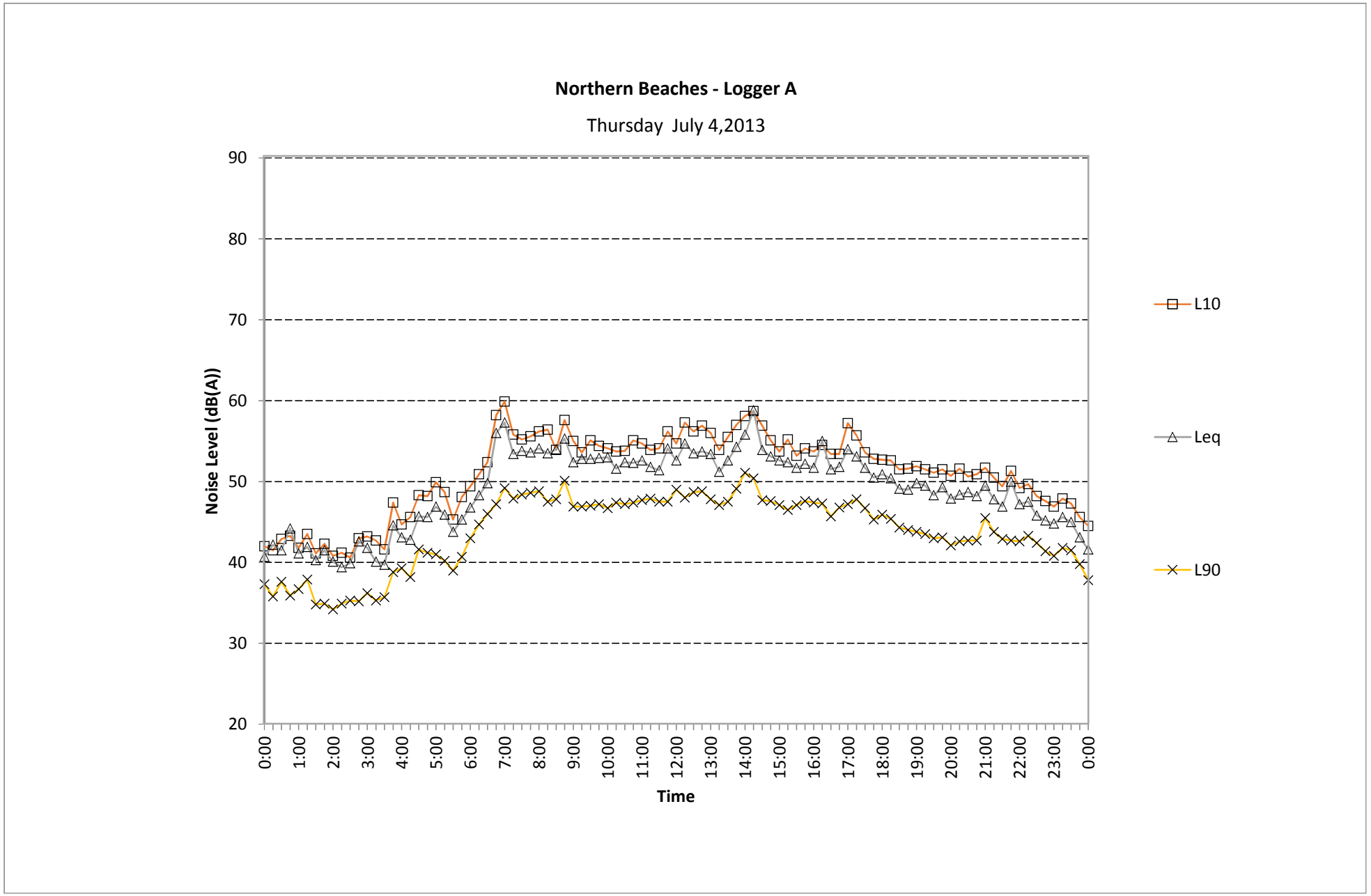
Northern Beaches - Logger A
Thursday July 4,2013
Noise Level (dB(A))
90
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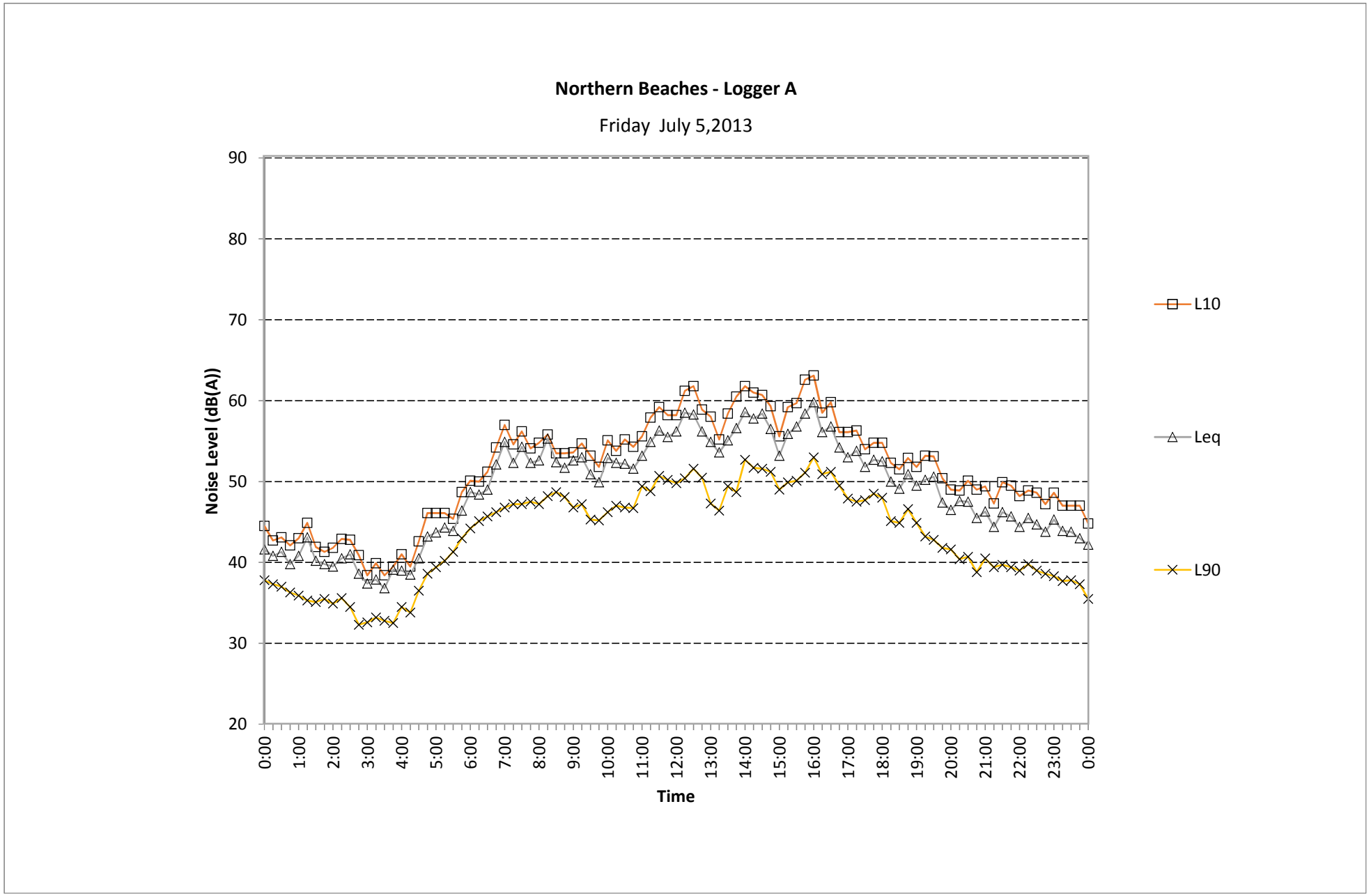
Northern Beaches - Logger A
Friday July 5,2013
Noise Level (dB(A))
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Time
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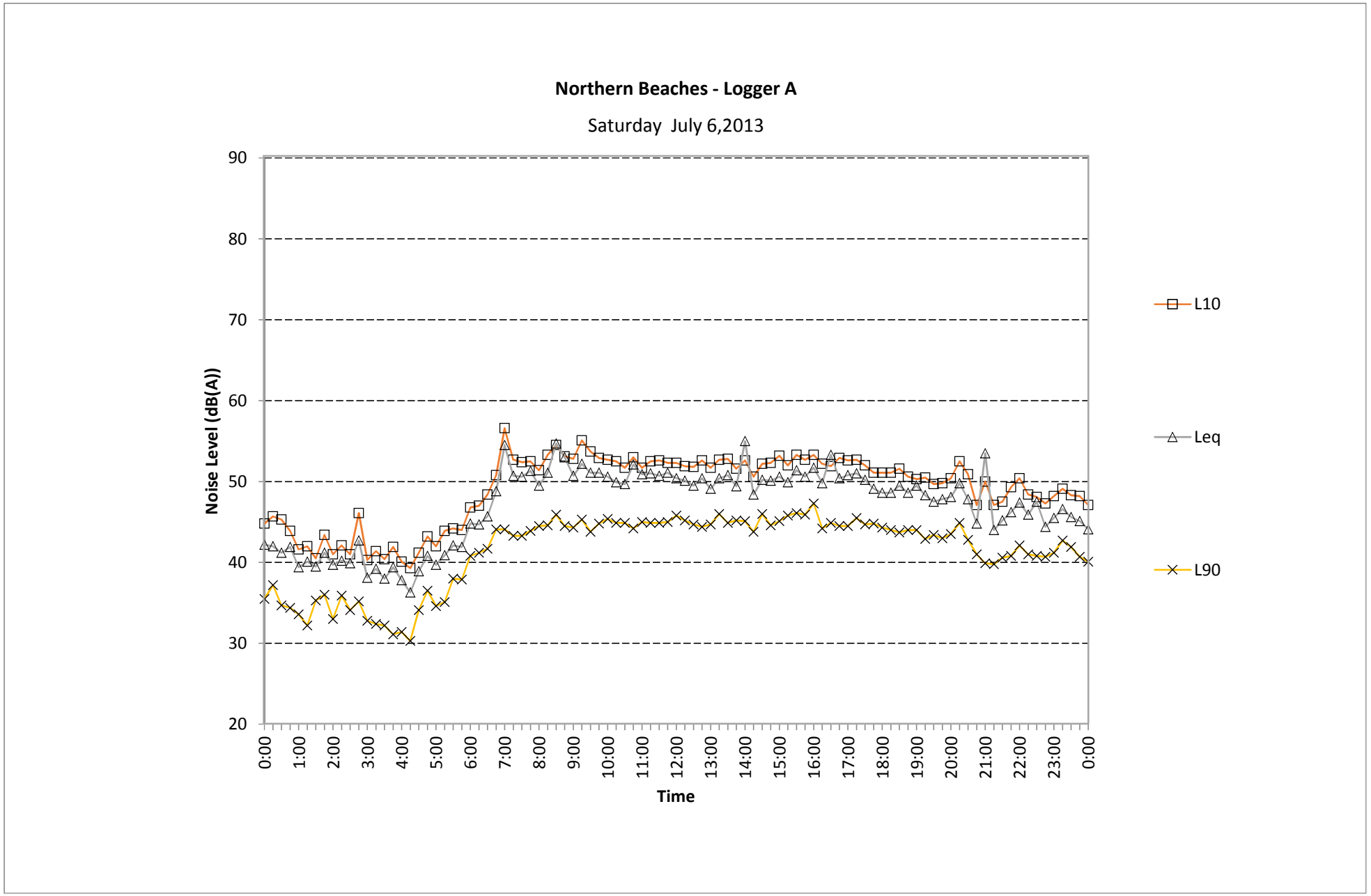
Northern Beaches - Logger A
Saturday July 6,2013
Noise Level (dB(A))
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Time
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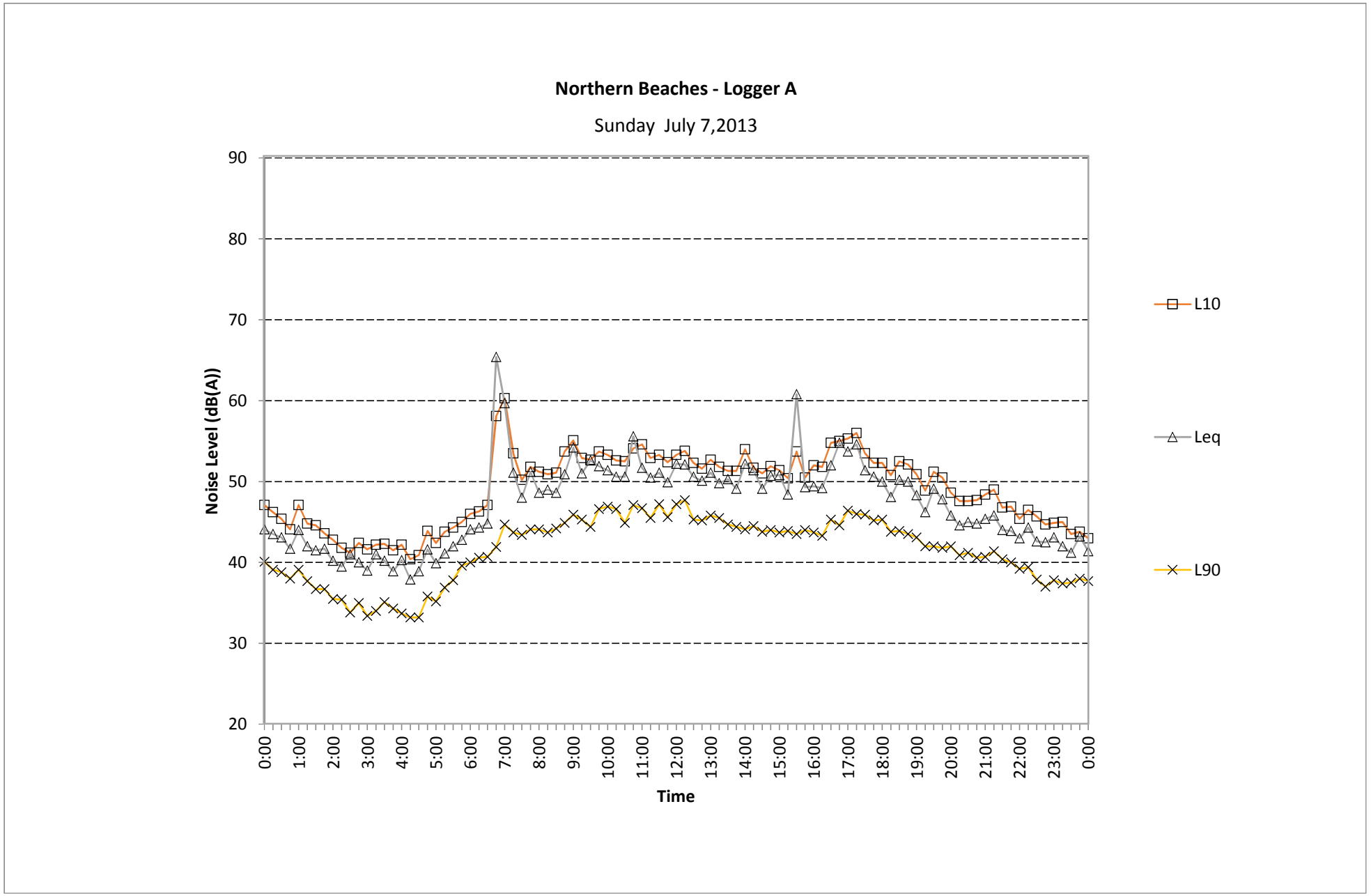
Northern Beaches - Logger A
Sunday July 7,2013
Noise Level (dB(A))
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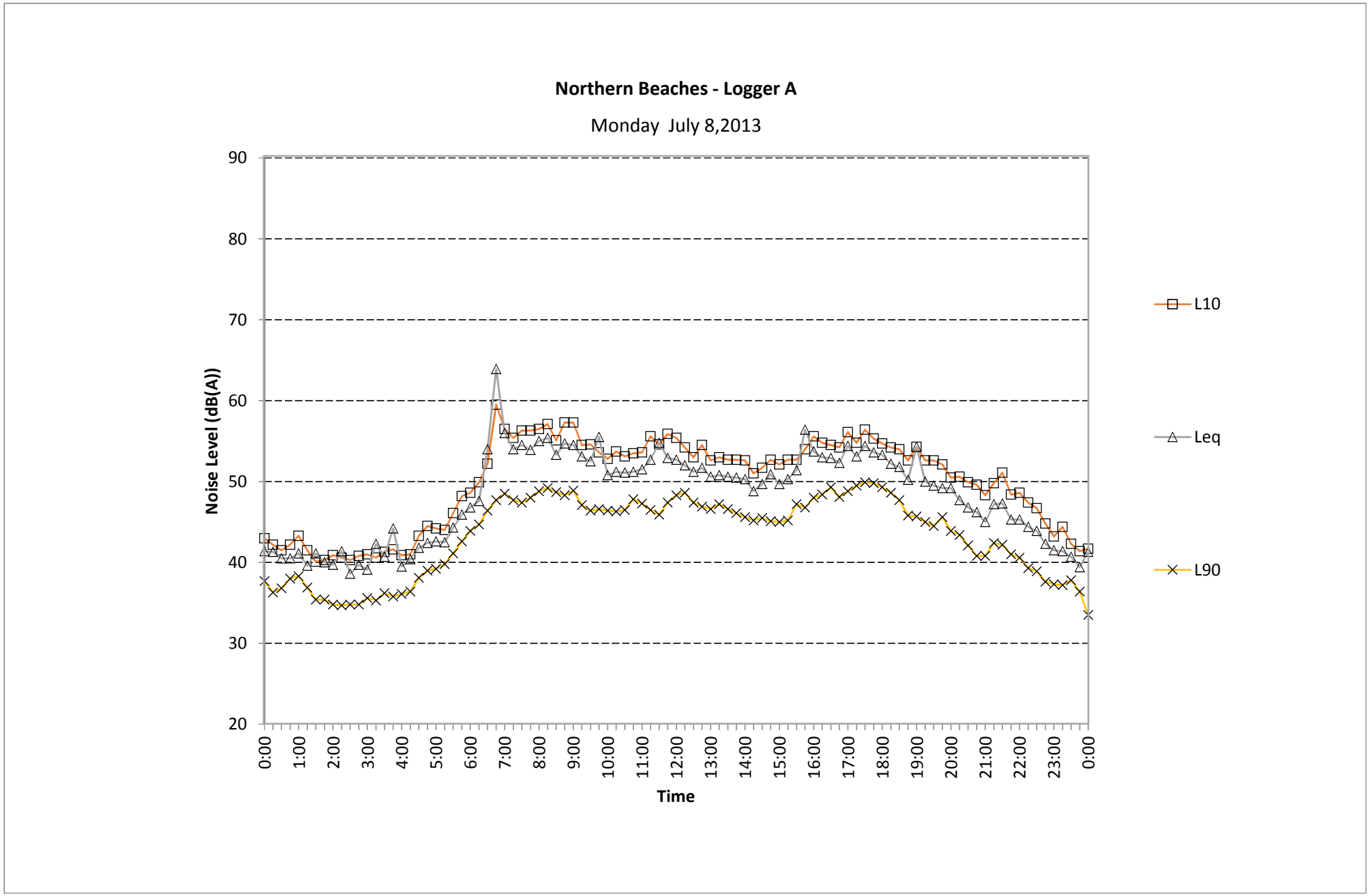
Northern Beaches - Logger A
Monday July 8,2013
Noise Level (dB(A))
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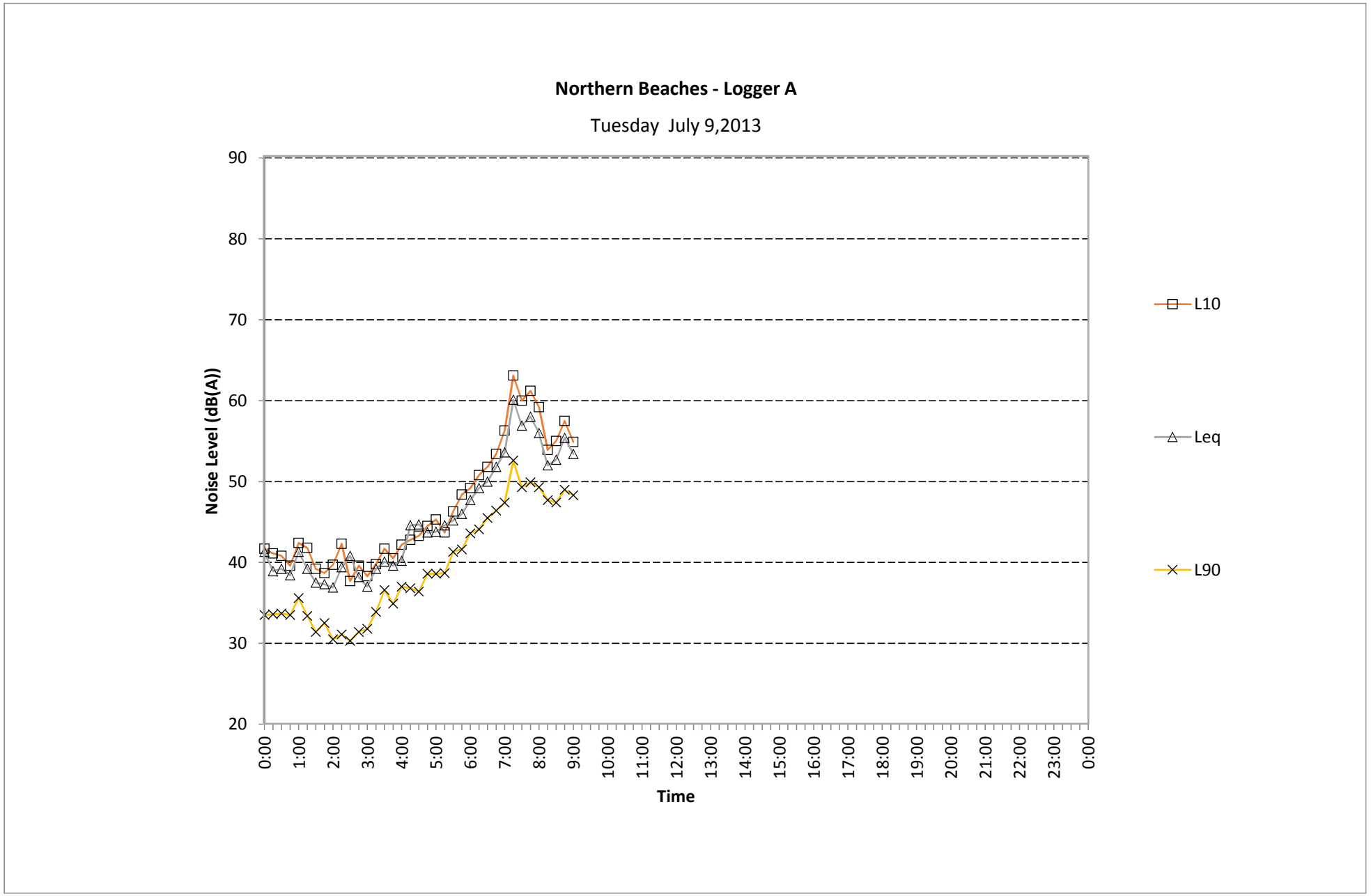
Northern Beaches - Logger A
Tuesday July 9,2013
Noise Level (dB(A))
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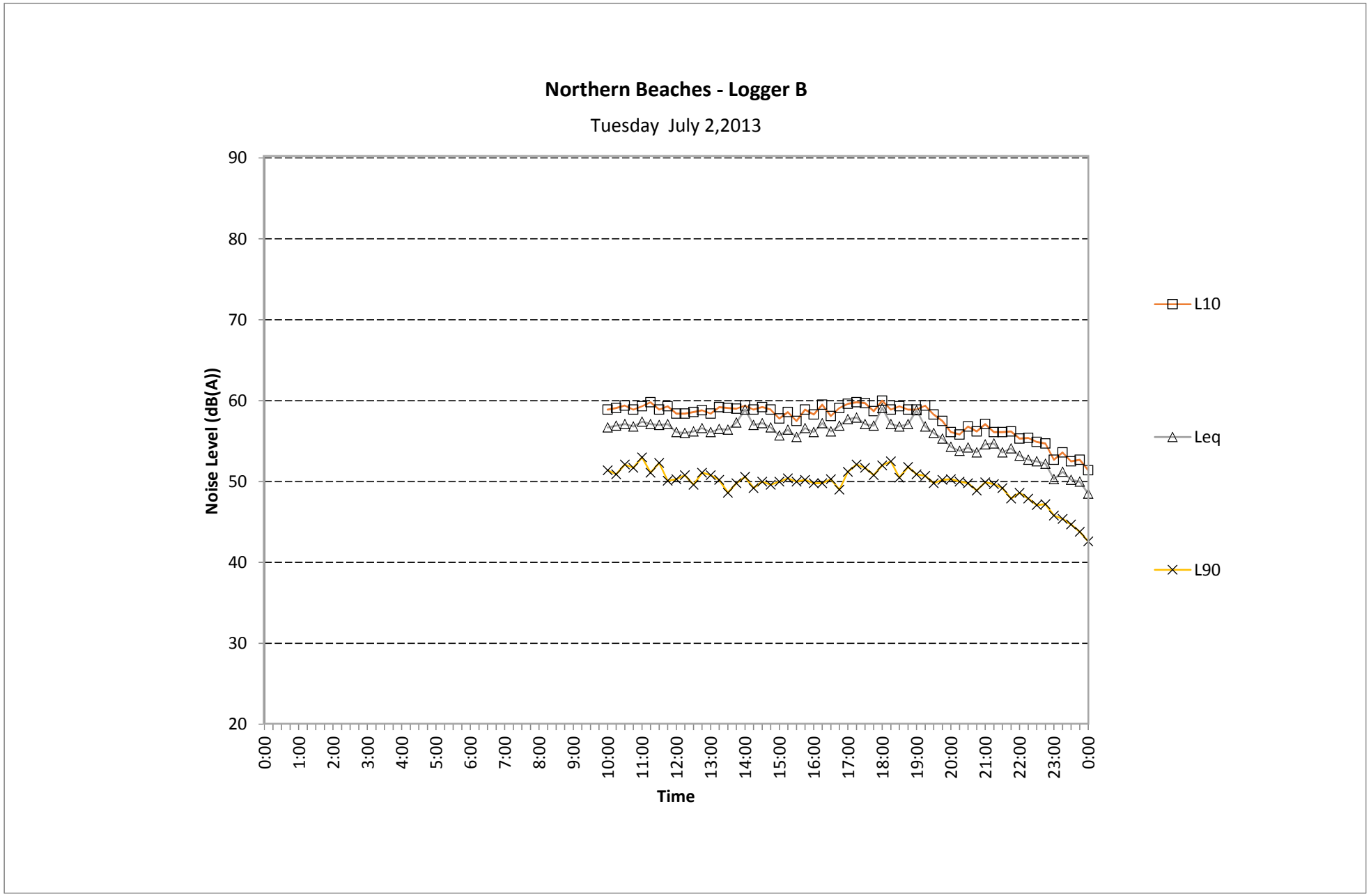
Northern Beaches - Logger B
Tuesday July 2,2013
Noise Level (dB(A))
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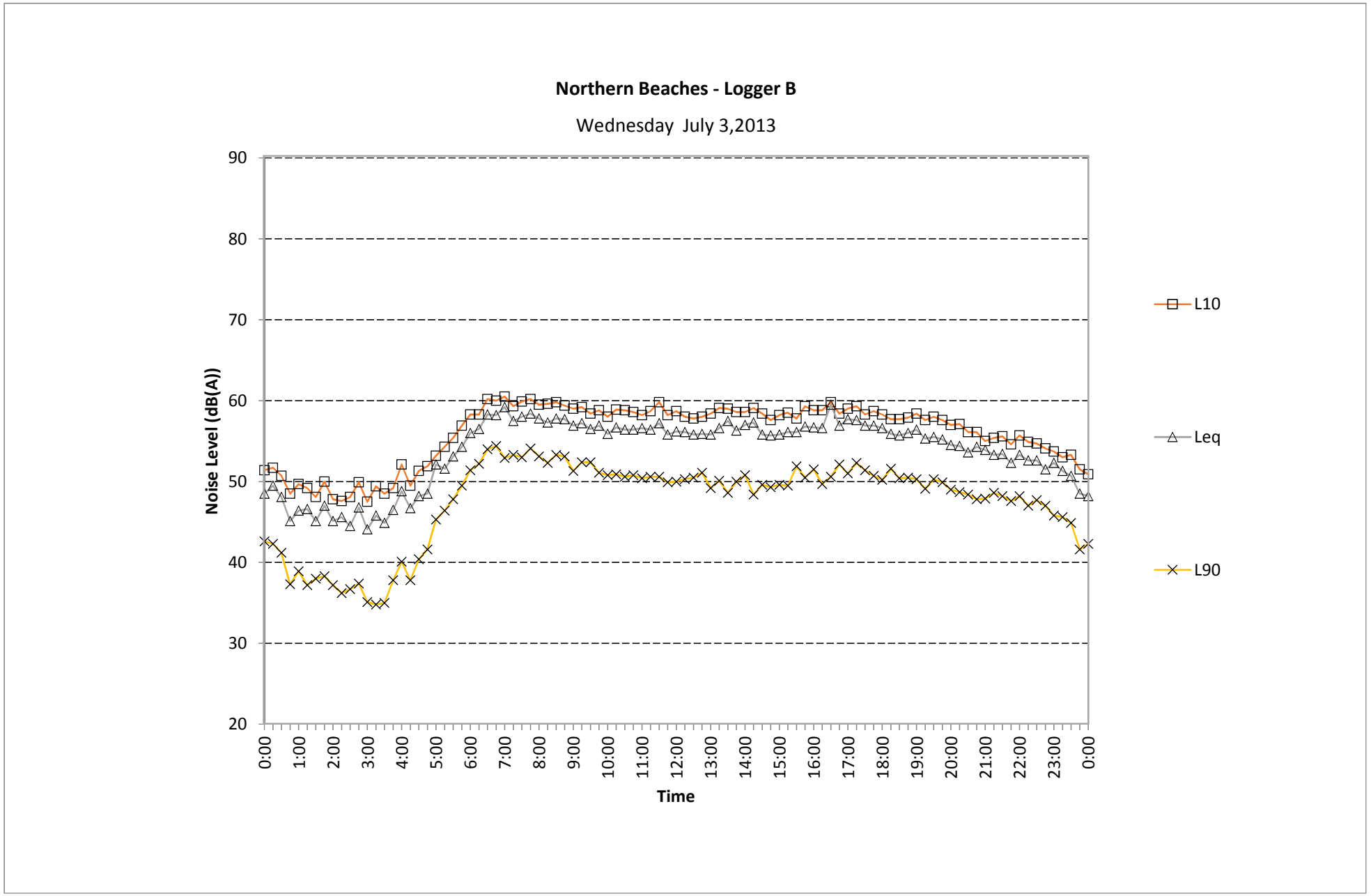
Northern Beaches - Logger B
Wednesday July 3,2013
Noise Level (dB(A))
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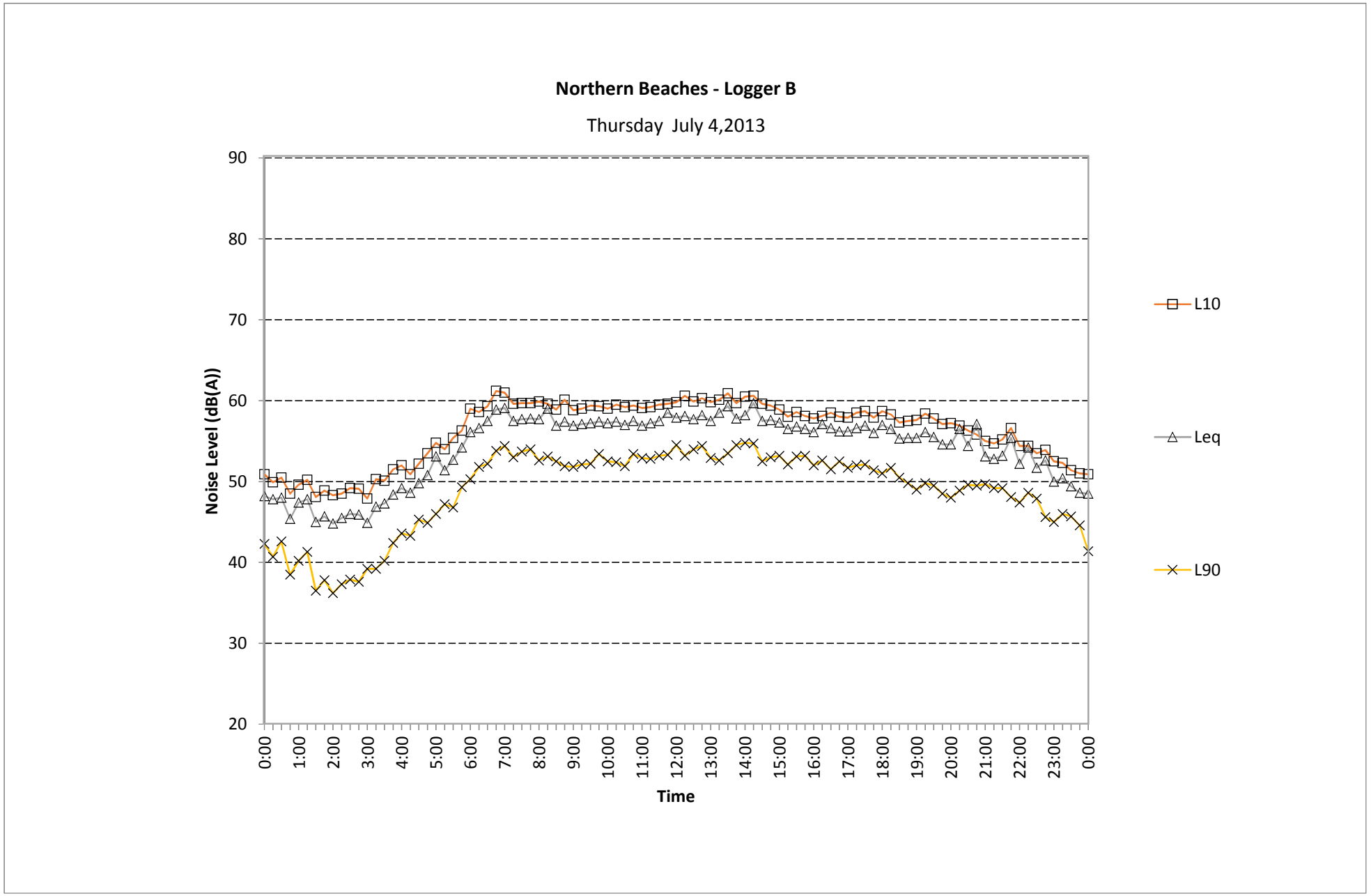
Northern Beaches - Logger B
Thursday July 4,2013
Noise Level (dB(A))
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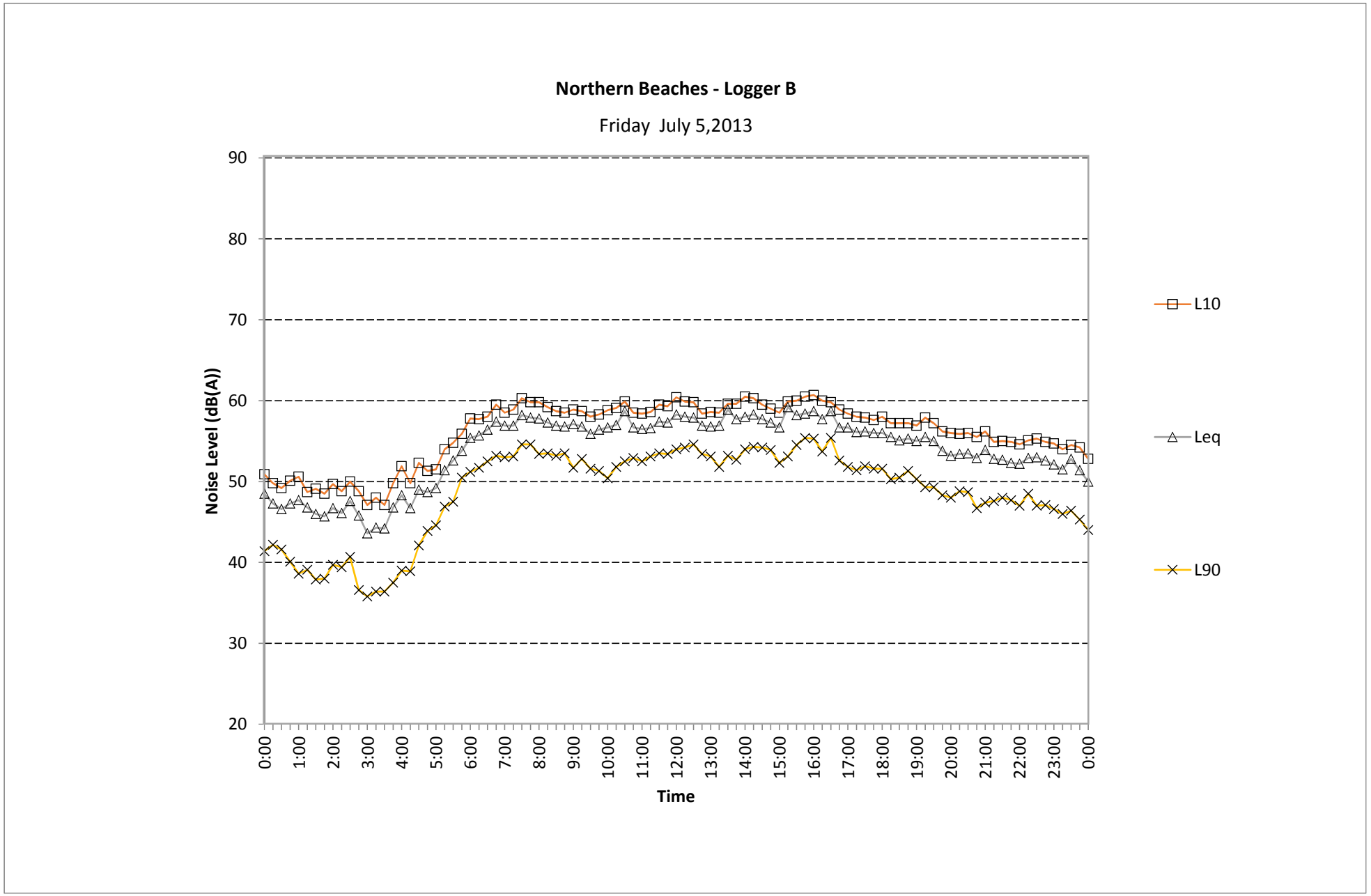
Northern Beaches - Logger B
Friday July 5,2013
Noise Level (dB(A))
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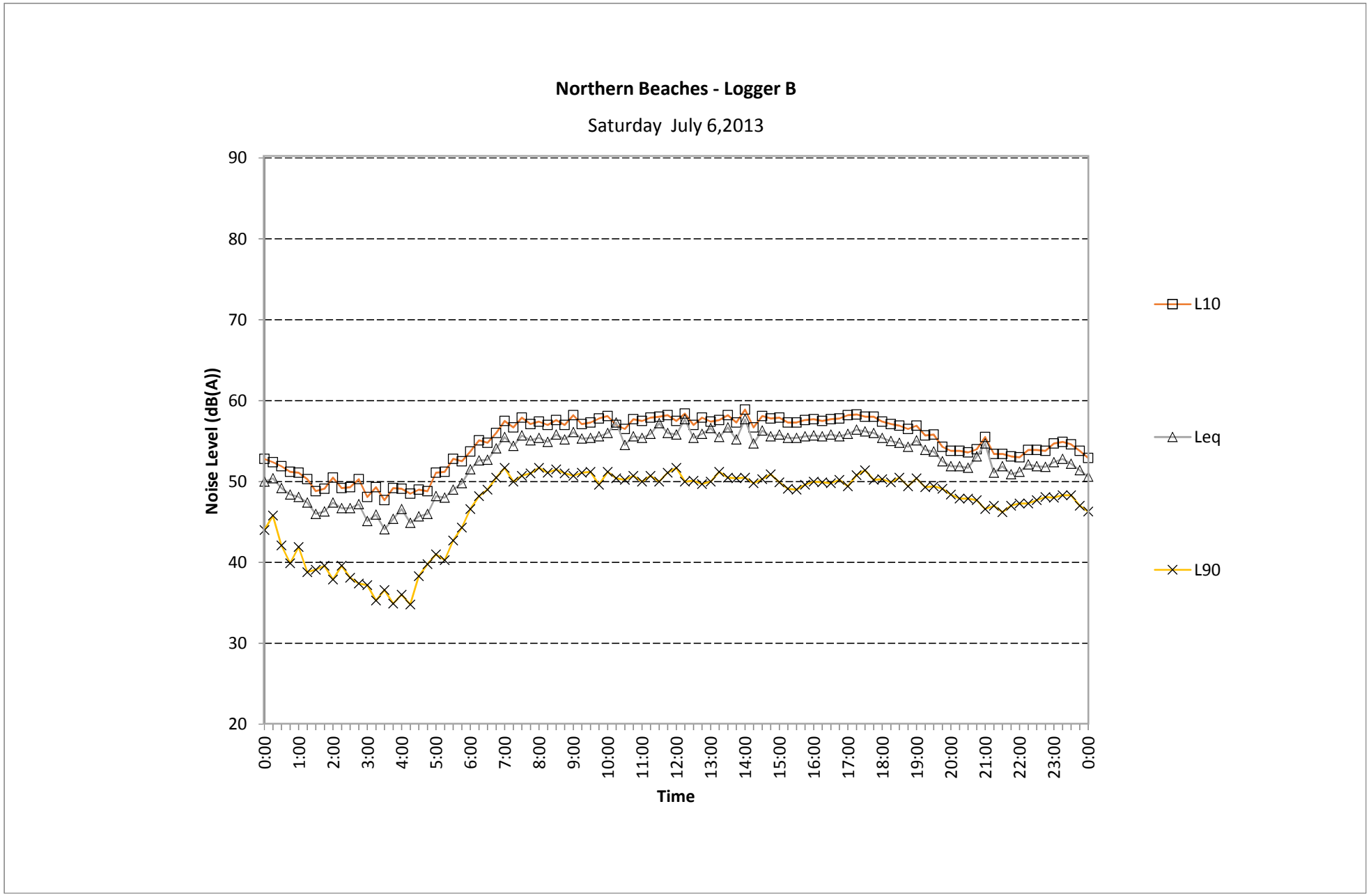
Northern Beaches - Logger B
Saturday July 6,2013
Noise Level (dB(A))
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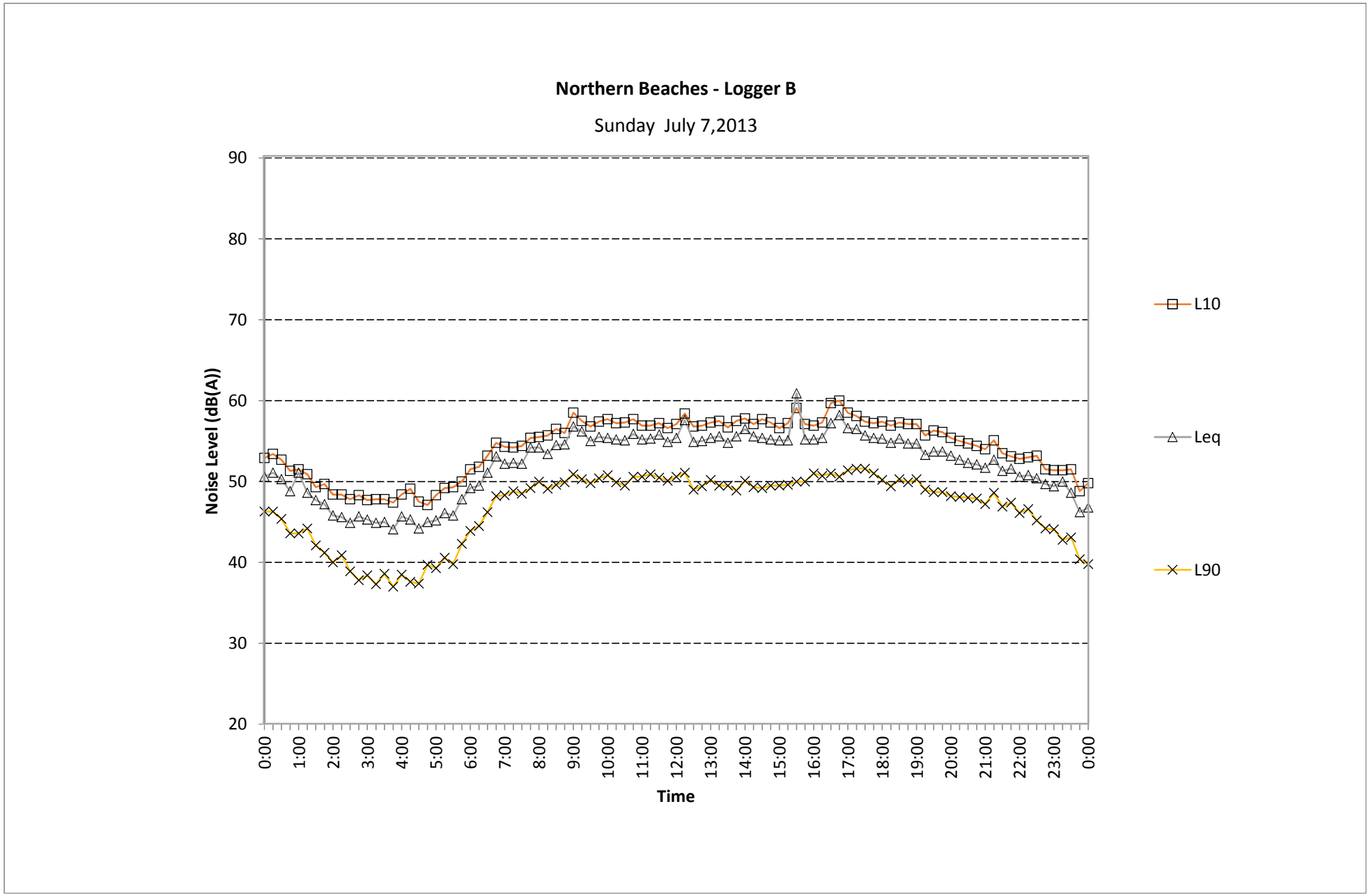
Northern Beaches - Logger B
Sunday July 7,2013
Noise Level (dB(A))
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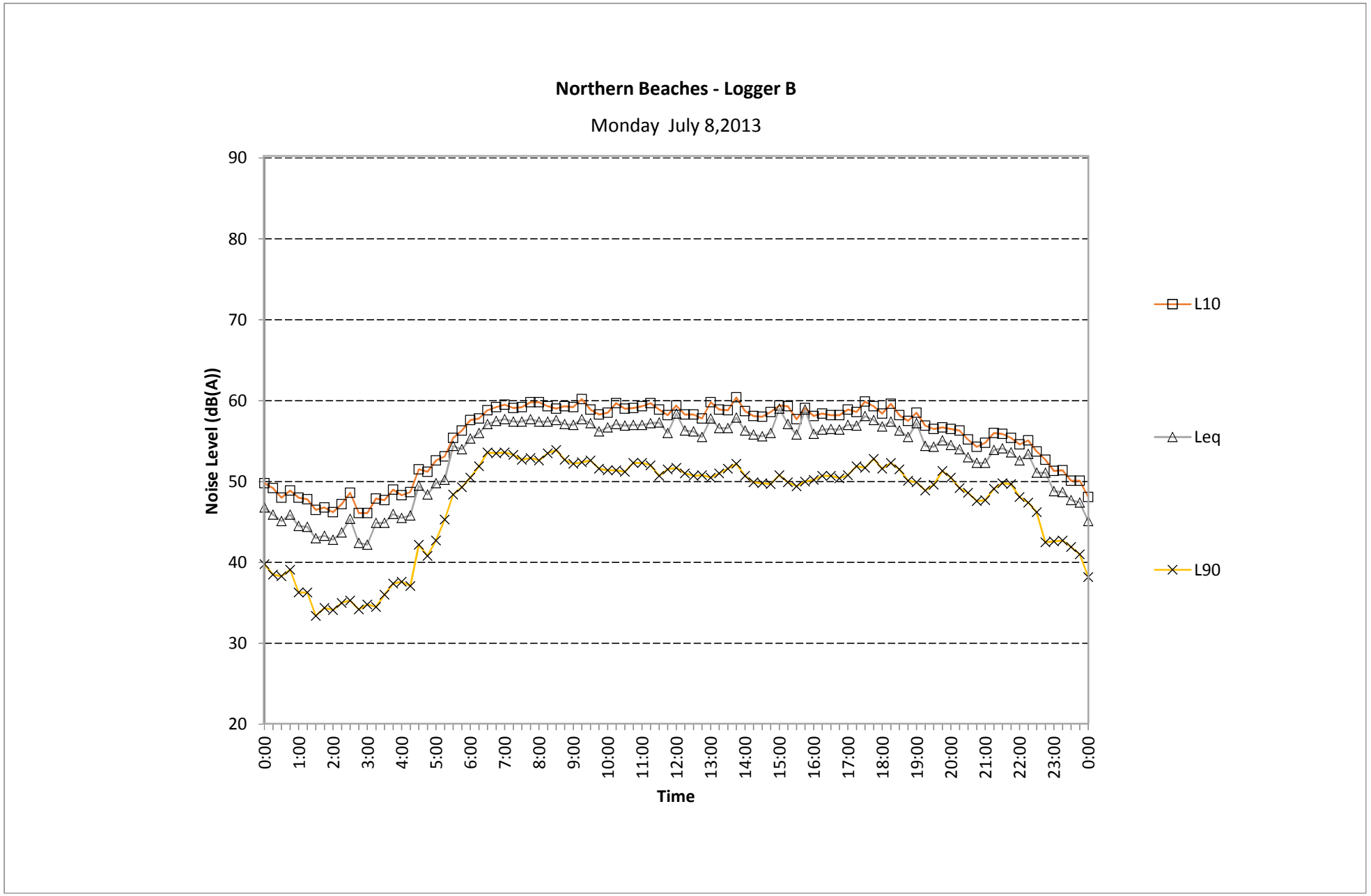
Northern Beaches - Logger B
Monday July 8,2013
Noise Level (dB(A))
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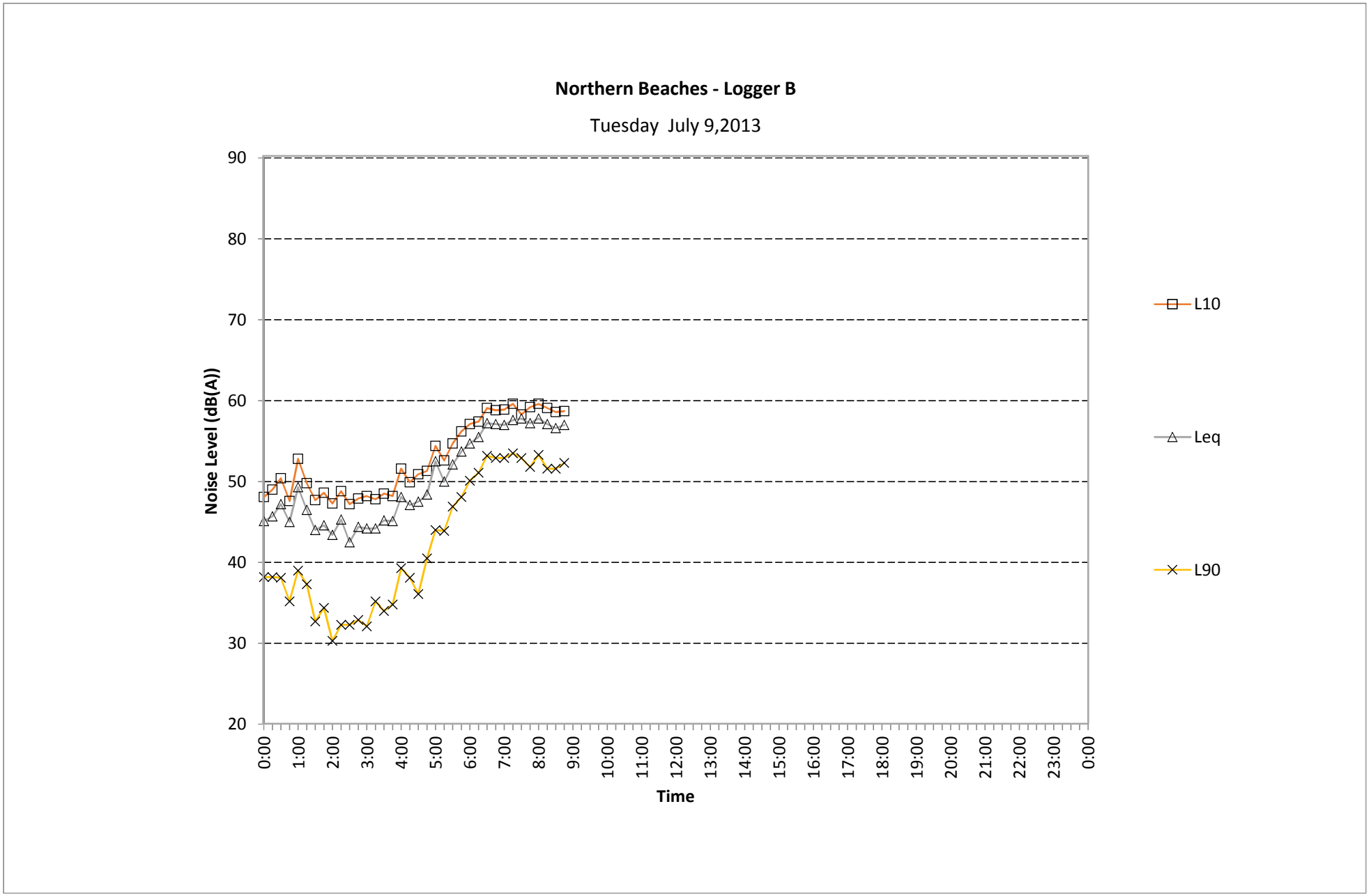
Northern Beaches - Logger B
Tuesday July 9,2013
Noise Level (dB(A))
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