multistorey carpark, which is topped by an existing helipad. The existing overhead enclosed walkway link spans the main driveway from the helipad on the roof of the multistorey car park to the hospital.

Figure 14 View north to Emergency Department

The proposed new Emergency Department building occupies the centre foreground of the image, and from this angle, the ambulance bay is at the front, with louvred plantroom enclosure immediately above.

As mentioned earlier, planning of the Emergency Department has necessitated finding a site of sufficiently large plan footprint with close-to-ground-level access from the street on the currently intensively occupied St George Hospital campus. As well as this, the intention has been to ensure the facility has a high level of visibility and accessibility, given its essential role in serving the urgent care needs of the community, and allowing both ambulances and private transport quick and convenient access.

Hence the facility presents boldly to the street and for a significant section of its façade is built to the street frontage. Towards the northern end of the façade there is some stepping-back of the façade itself to allow some landscaped softening. This is more clearly visible in the Figure 15 below.

In terms of scale, the facility is primarily a single-storey facility with some office accommodation and plantrooms forming a partial second storey at the northern and southern ends of the building. This contrasts with the bulk of the larger (8-storey approx.) Ward Block building immediately behind it.

In keeping with its need to be visible, the colouring has been selected to be mainly white, in contrast to the existing hospital buildings immediately behind. The brick-faced plinth at the base of the ambulance bay area is a colouring selected to provide a visual link into materials and textures of other existing hospital structures.

Against the white façade, the red emergency signage stands out clearly, and provides a vital wayfinding function for both ambulance drivers and public. Detailing of the façade has been kept simple and uncluttered and with minimal articulation, again to enhance the clarity of image for identification purposes.

Figure 15 View looking East

This is a view to the east, including some of the view downhill and to the southwest along Gray Street. This view of the facility shows very clearly how it sits very snugly into the site, with part of the ground floor storey beginning to drop below ground level as the street level rises northward.

In this image, the landscaped area is visible, partially screening the carparking area to the north of the ED. Even more definitively than the Figure 14 view, this angle shows its low-slung lines, in contrast to the bulk of Ward blocks and the like beyond.

Building lines are clean, articulation minimal, and the philosophy has been to provide a clean clear access to this essential facility without unnecessary clutter or distraction. All plant will be enclosed within clean and tidy plantroom enclosures. No plant will sit on the ED roof area.

Scale of buildings across the street varies from the primarily single-storey dwellings immediately opposite to apartment blocks of up to four storeys further southward along Gray Street.

The visual impact of the building is considered to be minimal and within the context of the opposite side of Gray Street. No views are lost as a result of the proposal.

6.6 Ecologically Sustainable Development

The principles of ecologically sustainable development as defined by clause 7(4) of Schedule 2 of the *Environmental and Planning Assessment Regulation 2000* are as follows:

(a) the ***precautionary principle***, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
   (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
   (ii) an assessment of the risk-weighted consequences of various options,

(b) ***inter-generational equity***, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) ***conservation of biological diversity and ecological integrity***, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
(d) ***improved valuation, pricing and incentive mechanisms***, namely, that environmental factors should be included in the valuation of assets and services, such as:
  (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
  (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
  (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The Precautionary Principle has been applied to the project through the careful evaluation of many options for the delivery of this important piece of public infrastructure. The option selected will not cause serious and irreversible damage to the environment and is therefor considered to comply with the Precautionary Principle.

Intergenerational equity is not impacted by this proposal. In fact the redevelopment of the ED within the existing hospital site provides a saving on the land resource and provides a high class clinical facility for future generations.

The site for the new Emergency Department is a highly urbanised hospital site that does not contain significant ecological integrity. However the waste management system and operations procedures that will be in place in the new facility will ensure the biological integrity of the site.

The principles of improved valuation, pricing and incentive mechanisms has been considered in the weighting of value on the options considered including those off site. The principles established in the design phase of this project looked to minimise costs in the life of the project as well as using long life cycle materials to avoid unnecessary waste and maintenance. The use of existing infrastructure wherever possible is also consistent with this principle.

On that basis the project is considered to be consistent with the principles of ESD.

6.7 Amenity

The new Emergency Department with its low profile has little impact on solar access to nearby properties, being only a maximum of two storeys in height at its highest point. Shadow Diagrams provided in **Appendix C** illustrate this point.

There are no windows within the new facility that will overlook any backyards or private areas of nearby residences or other facilities. The ambulance bay area is proposed to be screened to ensure the privacy of persons being transferred to and from ambulances into the ED itself, and this will likewise ensure that impact of this will be minimal on neighbouring properties.

The number of ambulances able to be accommodated within the ambulance bay area (eight in total) will mean that usually all the transfer of patients to the ED will occur entirely within the ambulance bay. This will mean that ambulances will not be queuing in Gray Street, thereby minimising any impact on residences.

Previously intrusive building on this frontage have been removed and the amenity for residences opposite substantially improved. The acoustic assessment indicates that there will be no substantial noise impacts on residents or other facilities within the hospital.

6.8 Landscaping

The removal of 29 trees will be required as part of theis proposal. Three other trees which were originally to be removed have been retained due to changes in design following advice from the arborist.The landscape plan proposed for the site recognises the inherent limitations of the site while still allowing a level of soft landscaping to be implemented. The mixture of trees shrubs and groundcover/climbers reflects the constrained space and provides and softening along the street frontage to Gray Street. The use of a mural wall adds dimension to the landscape adjoining the car park and softens the otherwise hard surfaces in that location. The amount of landscaping and the species selection is considered to be appropriate to the proposal.

6.9 Noise and Vibration

6.9.1 Noise

The Acoustic Assessment undertaken by Acoustic Logic is attached at **Appendix M** and identifies:

- noise generating activities with the potential to create adverse impact (primarily ventilation plant and emergency generator).
- potentially effected residential properties.
- appropriate noise emission controls applicable to the site; and
- Provides an outline of acoustic treatments as required to ensure compliance with noise
- emission controls is achieved.

The nearest residential development to the site is to the west of the site, on the opposite side of Gray Street.

Operational Noise

A summary of their report is provided below.

> *Noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic 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. Therefore a number of different noise descriptors are typically used in the assessment of noise.*
>
> *In the case of 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 interval.*
> *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 measurement period. L_{eq} is important in the assessment of plant and traffic noise impact as it closely corresponds with human perception of a changing noise environment.

In addition, sleep disturbance is typically concerned with peak noise events, using the $L_{1(1min)}$ noise descriptor (the loudest 1% of noise over a 1minute period).

Noise emission goals for the site will be developed to ensure that the amenity of nearby land users (both within the hospital grounds and the residential properties on Gray Street) is not adversely affected. Pursuant to EPA guidelines (the Industrial Noise Policy) noise from emergency vehicles is not typically assessed.

The primary noise generation by the site is likely to be from building services, which will consist of:

- *Ventilation plant and*
- *An emergency generator proposed to be located on Gray Street*

Noise Monitoring

Unattended monitoring was conducted at the site using a noise monitor installed in a landscaped area on Gray Street. The monitoring period was from Tuesday 16 and 20 February 2012 using an Acoustic Research Laboratories Pty Ltd noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of the measurements using a Rion NC-73 calibrator, no significant drift was detected. Measurements were taken on an A-weighted fast response mode

As there are no specific noise emission guidelines for Hospitals or similar developments in the any Kogarah Council planning control. In the absence of this, the following noise emission controls will be adopted:

- *For ventilation plant generally – the EPA Industrial Noise Policy and commonly adopted EPA sleep disturbance guidelines.*
- *For the emergency generator – the EPA Noise Control Manual will be used.*

The INP and sleep disturbance guidelines will be applied for typical noise generating activities (typical use of plant, not emergency).

Industrial Noise Control and Sleep Disturbance Guidelines (Ventilation Plant)

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5 dB(A). Where applicable, the intrusive noise level should be penalized (increased) to account for any annoying characteristics such as tonality.

Conclusion

Compliance with noise emission criteria will be achievable using standard acoustic controls, discussed in principle below:

Typically it is equipment that is either externally located, or where there is ductwork connecting a fan to an external louvre which will require acoustic analysis to ensure there is no adverse impact

on nearby properties. This will typically include air-handling units (outside air and exhaust air ducting), and dedicate outside air, relief air fans and exhaust fans.

The following treatments are anticipated:

- *Air handling units – internal duct lining or in-duct attenuators for an exhaust air or outside air ducting to the AHU.*
- *If necessary, use of acoustic louvres for any external plant room louvre will be reviewed.*
- *For external fans (generally roof mounted exhaust fans) – typically the building structure will provide screening between the fan casing and the residential properties on Gray Street. In the event further acoustic treatment is needed, external cladding of fan casings and in-duct treatment to discharge ducting will be incorporated.*
- *Generator (assuming no acoustic enclosure). Anticipated treatments as follows:*
- *Plant room to be constructed of 140mm concrete block or similar.*
- *If a sheet metal roof is proposed to the plant room – 13mm plasterboard ceiling is recommended below (75mm thick insulation to ceiling cavity).*
- *Line the underside of the ceiling and at least one wall of the plant room with noise absorptive lining (50mm thick perforated foil faced insulation)*
- *Air intake - indicatively a 2100mm long 40% open area attenuator behind the intake louvre.*
- *Air discharge – indicatively a 2400mm long 40% open area attenuator behind the discharge louvre. Louvre is not to be directed towards Gray Street).*
- *Gas exhaust – muffler required such that noise level at 1m from gas discharge point no more than 70dB(A).*
- *Generator to sit on 40mm static deflection spring vibration isolators.*
- *In the event a generator with acoustic enclosure is selected, these treatments can potentially be reduced.*

Demolition and Construction Noise

With any major construction site there will be noise associated with demolition and construction. The management of impacts arising from these activities is now routine practice, both to address impacts to surrounding properties, and for commercial reasons, to limit impacts on nearby tenancies.

The requirement for a noise management plan to be developed prior to works commencing is proposed once a construction programme and methodology has been determined.

Compliance with these controls is achievable, with detailed acoustic treatments of all primary plant items to be determined in consultation with the design team. Noise therefore is not considered to be a significant impact.

6.9.2 Vibration

A minor amount of rock excavation is expected to be required adjacent the northern end of the site in the area currently occupied by Griffith House. In accordance with the Geotechnical Report's recommendations, continuous vibration monitoring will be carried out during any rock excavations. Peak Particle Velocity (PPV) vibration instrumentation will be provided adjacent neighbouring buildings and structures, and monitored to ensure PPV readings are limited to a maximum of 5mm/sec by using smaller machinery hammers or alternative techniques.

6.10 Transport and Accessibility

The assessment of the traffic and transportation related elements of the proposed redevelopment of St George Hospital Emergency Department is included in the Cardno Report attached at **Appendix F**. The report looked specifically at:

- The design and operation of each of the loading dock components of the site with respect to the potential capacity and compliance with the relevant standards;
- The potential impacts on pedestrian movements in the area;
- The potential impacts on parking with the changes proposed;
- The potential traffic impacts relating to driveway and intersection operation from the redevelopment.
- The loading docks and service facilities at the ED to ensure they have been appropriately located and designed in accordance with the relevant Australian Standards.

The report concludes:

The proposed redevelopment generally has a positive impact on pedestrians by removing potential conflict points with driveways and the existing provisions cater for the pedestrian desire lines throughout the site, and implementation of the refuge island at the intersection of Kensington Street/Gray Street provides a benefit for pedestrian safety[1].

The changes to parking proposed as part of the works create an increase in parking for some user types (short term and drop off) but a decrease in longer term spaces. The deficiency in parking demand can be met by adjacent parking facilities in the area and it is noted that the area is well served by frequent public transport connections. A shift to these modes could be expected also.

The assessment considers the potential traffic impacts of the redevelopment on intersection capacity and the study intersections have sufficient capacity to accommodate the expected demands.

With respect to other traffic impacts, it is recommended that "Keep Clear" zones be implemented as shown to improve access to and from Short Street/Chapel Street as well as the emergency department drop off and ambulance access. This should be complemented by liaison with RMS to ensure that an appropriate strategy is implemented to manage queuing on Gray Street to ensure access to these critical hospital components is not impacted.

Based on Cardno's assessment above, the proposal is considered to have little impact on traffic movements, intersection operation or parking.

6.11 Heritage

A detailed analysis of the impacts of the demolition of Griffith House and an assessment against both the Heritage provisions of the KLEP and the Heritage Council Guidelines and Policy is provided in the Heritage Impact Statement (HIS) prepared by Urbis at **Appendix G**.

The HIS concludes that the proposed demolition of Griffith House, a local heritage item, is acknowledged and Griffith House whist having local heritage significance is not an exceptional building in aesthetic terms. It has been altered and added to and has some structural and damp issues. The matter is one of resolving the future of the hospital site to provide world class medical services and to balance this with a building of local significance.

The proposal is not detrimental to heritage items in the vicinity.

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[1] The provision of a pedestrian safety island is not included as part of this proposal but may be considered at a later date if required.

Prior to Griffith House being demolished it will be archivally recorded and the site interpreted in relation to the contribution the former dwelling made to the historical, associative and aesthetic contribution to this part of Kogarah. This recommendation has been adopted as a mitigation measure in Chapter 7.

6.12 Existing Structures on Site

This has been dealt with previously in this report. In summary, there are no plans for the existing emergency department at this stage. It's reuse and/or refurbishment will be further investigated once it is decanted and surveyed so it's suitability for various uses can be assessed. This work is not part of this application.

6.13 Infrastructure and Utilities

Reports prepared by Umow Lai, Acor and Cardno (refer **Appendix N**) in consultation with the various agencies have confirmed that subject to some minor upgrades there are utilities and infrastructure available to service the building. Most of the services will be extended from the existing building to which the ED will connect. Details of the proposed infrastructure has previously been provided in Section 4.8.

6.14 Sediment, Erosion and Dust Controls (Construction and Excavation)

Sediment and erosion control measures will be provided for the construction and excavation works generally in accordance with Managing Urban Stormwater - Soils & Construction Volume 1 2004 (Landcom – "The Blue Book"). These will include measures such as stablised rock site entry/exit or "cattle grid" shaker, perimeter silt fences and sediment traps on stormwater pits.

Dust and fine particles will be minimised by regular watering of exposed areas and fine mesh screens attached to site fences, as well as limitation on the hours of work. A detailed soil and sedimentation plan will be prepared in accordance with The Blue Book prior to construction and included in the Construction Management Plan.

6.15 Groundwater

The Geotechnical investigation performed by Jeffery and Katauskas attached at **Appendix L** advises that groundwater was not encountered during or on completion of augering any of the boreholes in their investigation. They concluded that the proposal is not likely to intercept, use or affect groundwater. However the Preliminary Stage 1 Environmental Site Assessment prepared by EIS in November 2011 and attached at **Appendix I** has indicated that *"additional soil and groundwater investigations should be undertaken to assess the potential for contamination to be migrating onto the site from the adjacent fire station property (located at the corner of Gray and Kensington Streets), and to assess whether any contamination is migrating off-site at the down-gradient site boundaries (associated with the unidentified UST and other historical site activities)".*

Advice from Kogarah Council on the s149(2) & (5) Certificate is that the site is not in a flood affected zone.

6.16 Hazards

No hazardous material as defined by SEPP 33 will be used or stored on site.

7. Mitigation Measures

While it is considered that the proposed development will have minimal impacts, the following measures are to be put in place to mitigate any impacts identified. These measures have been derived from the assessment in Section 6 and those detailed in specialist consultants' reports.

7.1 Traffic and Access (Construction and Operation)

- Traffic, access servicing and layout arrangements are to be in accordance with the Traffic and Transport Report by Cardno dated July 2012.
- A detailed Traffic Construction Management Plan is to be prepared prior to construction and implemented during the construction of the proposal.

7.2 Geotechnical and Contamination

- Due to the presence of PAHs and TPHs in BH101, remediation and/or management of this area will be required to meet the requirements of SEPP55. An additional investigation in the vicinity of BH101 would be prudent (following the demolition of the existing building in this area) in order to establish the horizontal extent of the contaminated fill material. A remedial action plan (RAP) should subsequently be prepared and implemented during the proposed works (EIS (2012).

- Continuous vibration monitoring will be carried out during any rock excavations. Peak Particle Velocity (PPV) vibration instrumentation will be provided to adjacent neighbouring buildings and structures, and monitored to ensure PPV readings are limited to a maximum of 5mm/sec by using smaller machinery hammers or alternative techniques.

7.3 Operational Management

Detail design must incorporate the noise attenuation measures outlined in the Acoustic Assessment prepared by Acoustic Logic and dated 23 July 2012.

7.4 Heritage

Prior to demolition of Griffith House, the property is to be archivally recorded and an interpretation strategy prepared in accordance with the recommendations of Urbis in their report dated June 2012.

7.5 Construction Management

Prior to construction a detailed Construction Management Plan is to be prepared which addresses (but is not limited to) the following:

- Construction noise and vibration
- Dust management and Air pollution monitoring
- Odour control,
- Soil and erosion control;
- Tree protection (where relevant)
- Site management in accordance with legislative requirements;
- Hours of Construction work;
- Waste management
- Implementation of NSW Groundwater Policy Framework and Groundwater Quality Protection Policies

7.6 Tree Protection

Tree removal and protection is to be carried out in accordance with the recommendations of the Arboricultural Impact Assessment prepared by Arboreport dated 27th July 2012.

8 Consultation

During the course of design development several meetings have been held with Kogarah. Notes from these discussions are attached at **Appendix O**.

Consultation has also been undertaken with the RMS and utility providers during the design phase of the proposal. Further discussions with RMS occurred in July and a copy of the final Traffic Report prepared by Cardno has also be issued to RMS for their review. Similarly extensive consultation has been undertaken with the Local Health District as well as staff of the hospital.

Discussions with Air Services Australia and CASA have confirmed that the proposal is well within the limits of the Obstacle Limitation Surface (OLS) and therefore referral is not required unless construction methodology requires over height cranes.

The proposal was discussed with Angela Malloch, Senior Land Use and Transport Planner in the Planning and Programs Division of Transport for NSW in July 2012. She advised that Transport for NSW had no further comments on the application. The application was also discussed with State Rail at the same time and they indicated that they had no comments on the proposal due to its distance from the rail corridor (refer Appendix O).

On the basis that there is no groundwater on site and that there is no intention to extract or impact upon groundwater, no specific consultation has yet been undertaken with Office of Water. Meetings have been arranged with the NSW Fire Brigade as adjoining neighbour.

The site does not contain Threatened Species, Endangered Ecological Communities or Aboriginal Archaeology. Heritage items within the locality are not listed to be of State importance. On that basis no specific consultation with OEH is considered warranted.

9. Conclusion

This Environmental Impact Statement (EIS) has been prepared to consider the environmental, social and economic impacts of the proposed redevelopment of the Emergency Department at St George Hospital. The documentation provided is considered to meet the requirements of the Director Generals' requirements as well as the legislative requirements of the EP&A Act and EP&A Regulation.

The proposal is critical to the delivery of effective and contemporary models of health care and to the efficiency of hospital operations. It is consistent with the principles of Ecologically Sustainable Development as defined by Schedule 2(7)(4) of the EP&A Regulation and will not have significant impact traffic and pedestrian movements in and around the site. Environmental investigations have identified that subject to an additional soil and groundwater study the site can be made suitable for the proposed use and there is no hazardous waste or materials to be used or stored on site.

Given the merits of the proposal as described in this EIS and the significant benefits to the public as a result of this facility, it is recommended that the Minister give the application favourable consideration.