

5 June, 2024
Our File Ref: B22349AL002
Contact: Ben Hargreaves

Children's Medical Research Institute
214 Hawkesbury Road
C/- Empire Project Management

Attention: Einion Thomas – Senior Project Director

RE: CMRI BUILDING WESTMEAD HOSPITAL
HELIPAD FLIGHT PATH IMPACT ASSESSMENT

1. INTRODUCTION

L+R Airport Consulting (previously REHBEIN Airport Consulting) was engaged by the Children's Medical Research Institute (CMRI) to assess a proposed building development against the operational airspace associated with the existing Helicopter Landing Sites (HLS) at Westmead Hospital.

2. PROPOSED DEVELOPMENT

The proposed development is an expansion of the CMRI facilities through the provision of an additional Gene Technology Building (GTB).

Empire Project Management provided the following details of the development proposals:

- § Hassall general elevation and roof plan as follows:
 - Departmental Plan – Roof 016125/DA-1211 Rev B For Information
 - General Elevation – East 016125/DA_2002 Rev B For Information
- § Extracted survey sheet files identifying the set-out point on the corner of the current CMRI Stage 1 building (which is remaining).

The roof of the GTB building is at 65.24 m AHD. Fume ducts are proposed which extend nominally 3.25 m above roof height to an RL of 68.5 m AHD approximately.

3. WESTMEAD HOSPITAL HELIPADS

There are three helipads currently on the Westmead hospital campus:

- § The Central Acute Services Building (CASB) rooftop HLS;
- § The Children's Hospital Westmead (CHW) rooftop HLS; and
- § The Westmead Hospital (A&E) HLS.

Each HLS has a set of Obstacle Limitation Surfaces (OLS) and Object Identification Surfaces (OIS) associated with it, which are defined in accordance with the NSW Government Guideline GL2020_014 *Hospital Helicopter Landing Sites* in NSW (GL2020_014).

The extents of the OLS and OIS are shown in relation to the proposed development on Figure B22349/01 attached and are described in the following subsections.

The oval adjacent to the CareFlight helicopter base is also used as a ground-level HLS (CareFlight Oval HLS). However, it has no defined approach/departure paths and associated OLS/OIS, and pilots operate through the use of different flight profiles in order to avoid the existing obstacles on the Westmead campus and surrounding area.

3.1 Obstacle Limitation Surfaces

The Obstacle Limitation Surfaces (OLS) associated with the Westmead HLS consist of an approach/departure surface and transitional surfaces.

3.1.1 Approach/Departure Surfaces

An approach/departure surface is centred on each approach departure path and commences at the forward edge of the HLS Final Approach and Take-Off area (FATO) with a width of 25 m. The approach/departure surface slopes upward at 2.5° (4.5%) for a distance of 3.5 km, where it is 150 m wide.

The guideline GL2020_014 states that *"For PC1 survey purposes, the survey commences from the forward edge of the FATO ... from a datum point 1.5m above the FATO edge."* However in other areas the guideline is not absolutely clear whether this raised origin applies to the OLS surfaces themselves, and/or to the OIS (see Section 3.2). For the purposes of this assessment, the additional 1.5m has not been applied and the approach/departure surfaces are assumed to commence at the estimated FATO elevation noted in Section 4.

3.1.2 Transitional surfaces

The transitional surfaces start from the edges of the FATO parallel to the approach and departure path centreline, and from the outer edges of the approach/departure surface, and extend out at a slope of 2:1 to a distance of 75 m either side of the centreline. The transitional surfaces start from the edge of the FATO opposite the approach/departure surface and extend to the end of the approach/departure surface.

3.2 Object Identification Surfaces

The Object Identification Surfaces (OIS) consist of:

- § In all directions from the safety area, except under the approach/departure paths, the OIS starts at the safety area perimeter and extends out horizontally for a distance of 30 m;
- § Under the approach/departure surface, the OIS starts from the FATO outside edge and extends horizontally out for a distance of 700 m before continuing while rising at 2.5° to the end of the approach/departure surfaces; and
- § The width of the OIS increases as a function of distance from the safety area until, at the upper end of the surface, the OIS extends laterally 60 m on either side of the approach/departure surface.

Similarly to the OLS, as discussed in Section 3.1.1, the OIS is assumed to commence at the estimated FATO elevation.

4. ASSESSMENT OF PROPOSED DEVELOPMENT

In relation to the OIS and OLS of the three (3) Westmead HLS in proximity, the proposed development lies:

- § Outside the OIS and OLS for the CHW HLS;
- § Outside the OIS and OLS for the Westmead Hospital (A&E) HLS; and
- § Partially below the OIS, the OLS approach/departure and the OLS transitional surfaces for the CASB HLS.

Figure B22349/02 attached illustrates the proposed building and flues in relation to the OLS and OIS for the CASB HLS North-East flight path. To establish the three-dimensional geometry of the CASB HLS flight path OLS and OIS, the RL of the CASB HLS FATO is required. Empire Project Management advised that Schematic Design and approval of the CASB was based on an HLS RL of 82.5 m AHD. However, information available via OzRunways Electronic Flight Bag for the HLS¹ indicates an elevation of 264 feet, or 80.4 m approximately. This suggests the as-constructed HLS may differ from the original design and the lower elevation will be used for this assessment.

4.1 Building and Flues

At the proposed building roof maximum building elevation of 65.24m AHD, the building will sit 15.1 m below the OIS which extends horizontally at the HLS elevation of 80.4 m AHD. The flues at a maximum elevation of 68.5 m AHD will sit 11.9 m below the OIS.

At a maximum elevation of 65.24 m AHD, the northern corner of the building will be approximately 19.8 m below the CASB approach/departure path. The most critical flues indicated are approximately 27.1 m beneath the CASB transitional surface.

Information on rooftop protuberances other than flues has not been provided. To avoid impact on the operation of the CASB HLS, all antennae, poles, cell tower and similar objects should remain below the OIS elevation of 80.4 m AHD. Should any items require a maximum elevation higher than 80.4 m AHD they must be approved by Ambulance NSW and may require marking or lighting to make them more conspicuous to pilots in accordance with GL2020_014.

4.2 Exhaust plumes

Exhausts from flues can be a potential obstacle, depending on the upward velocities generated. GL2020_014 notes that:

... the heat generated by large chimneys under or close to the approach and departure paths may adversely affect helicopter performance during approaches to land or climbs after take-off. It may therefore be necessary to conduct wind tunnel or flight tests to establish if such adverse conditions do exist and, if so, to determine possible remedial action.

The Civil Aviation Safety Authority (CASA) has released an Advisory Circular AC139.E-02v1.0 *Plume rise assessments* (March 2023). It requires the proponent to make an initial assessment of the plume exit velocity to determine if it exceeds 4.3 m/s vertically. If the exit velocity exceeds 4.3 m/s, further assessment is required to determine the impact on flight protection surfaces.

¹ <https://www.ozrunways.com/helipads/view/content.jsp?code=YXWS>

Empire Project Management has advised that the discharge velocity is required to be in excess of 5 m/s for building compliance purposes. The plume rise should therefore be assessed to confirm whether the velocity will be below 4.3 m/s when it reaches the RL of the OIS at 80.4 m AHD. If the plume velocity will be in excess of 4.3 m/s above the OIS elevation, approval by Ambulance NSW will be required.

The process for undertaking further assessment required to obtain approval in relation to helicopter operations at Westmead must be agreed with Ambulance NSW, separately to any wider airspace assessment required by CASA under AC139.E-02v1.0.

As flue locations, elevations and exhaust details are typically subject to change as the design is finalised, it is recommended that, to ensure no impact on flight operations, the final flue configurations are assessed before construction and any required mitigation agreed with Ambulance NSW.

5. CONSTRUCTION

Construction methodology will need to be considered carefully in relation to the adjacent CASB and the flight path OLS and OIS. GL2020_014 notes:

Most sites will experience the requirement for a crane within the vicinity of the HLS during a hospital or adjacent development. The significance of this, on service delivery impact cannot be understated and there will be positioning and lighting requirements that need to be addressed in addition to the Civil Aviation Safety Authority (CASA) Manual of Standards (MOS) Part 139 requirements.

As it is unlikely that cranes can remain below the OIS elevation of 80.4 m AHD, crane locations and details will need to be agreed with Ambulance NSW prior to confirming a construction strategy. In general, the following principles should be taken into consideration:

- § Temporary penetration of the OIS elevation of 80.4 m AHD is likely to be acceptable (subject to confirmation by Ambulance NSW) provided the minimum lighting requirements set out in GL2020_014 section 3.12.7 are enacted;
- § Penetrations of the transitional surface of the OLS may be permissible, but must be confirmed by Ambulance NSW, to ensure no impact on service delivery; and
- § Penetrations of the approach/departure surface of the OLS will not be permissible.

Crane types (luffing or hammerhead), locations, height, reach, weather-vaning, recall (removal below or outside the approach/departure and/or transitional surfaces when required) and lock-off outside operational hours all need to be considered and the impact on the flight paths for all three HLS checked.

6. CONCLUSION

The proposed CMRI GTB development has been assessed for impacts on the adjacent Helicopter Landing Sites (HLS) on the Westmead hospital campus. The flight paths and associated protection surfaces for the CASB, Westmead Hospital (A&E) and Children's Hospital Westmead (CHW) HLS have been defined in accordance with NSW Government Guideline GL2020_014 *Hospital Helicopter Landing Sites in NSW*.

5 June, 2024

- 5 -

Our File Ref: B22349AL002

Contact: Ben Hargreaves

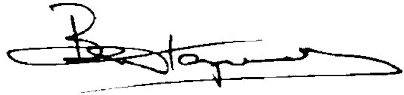
- § The proposed development lies outside the Obstacle Limitation Surfaces (OLS) extent for the Westmead Hospital (A&E) HLS and CHW HLS flight paths.
- § The proposed development is below the approach/departure and transitional OLS and below the Object Identification Surface (OIS) for the CASB flight path by 11.9 m or more;
- § As the exit velocity of the fume duct exhausts will exceed 4.3 m/s, further assessment is required to determine the potential impact on helicopter operations and the need for any mitigation. This should be done in consultation with Ambulance NSW; and
- § Construction methodology, including crane types, height, reach, weather-vaning, recall and lock-off outside operational hours must all be considered and agreed with Ambulance NSW prior to construction.

For further assistance in relation to this matter please contact the undersigned.

Yours faithfully

For and on behalf of

LAMBERT & REHBEIN (SEQ) PTY LTD



B.J. HARGREAVES M.Eng, M.Sc, C.Eng MICE, MIEAust, CPEng

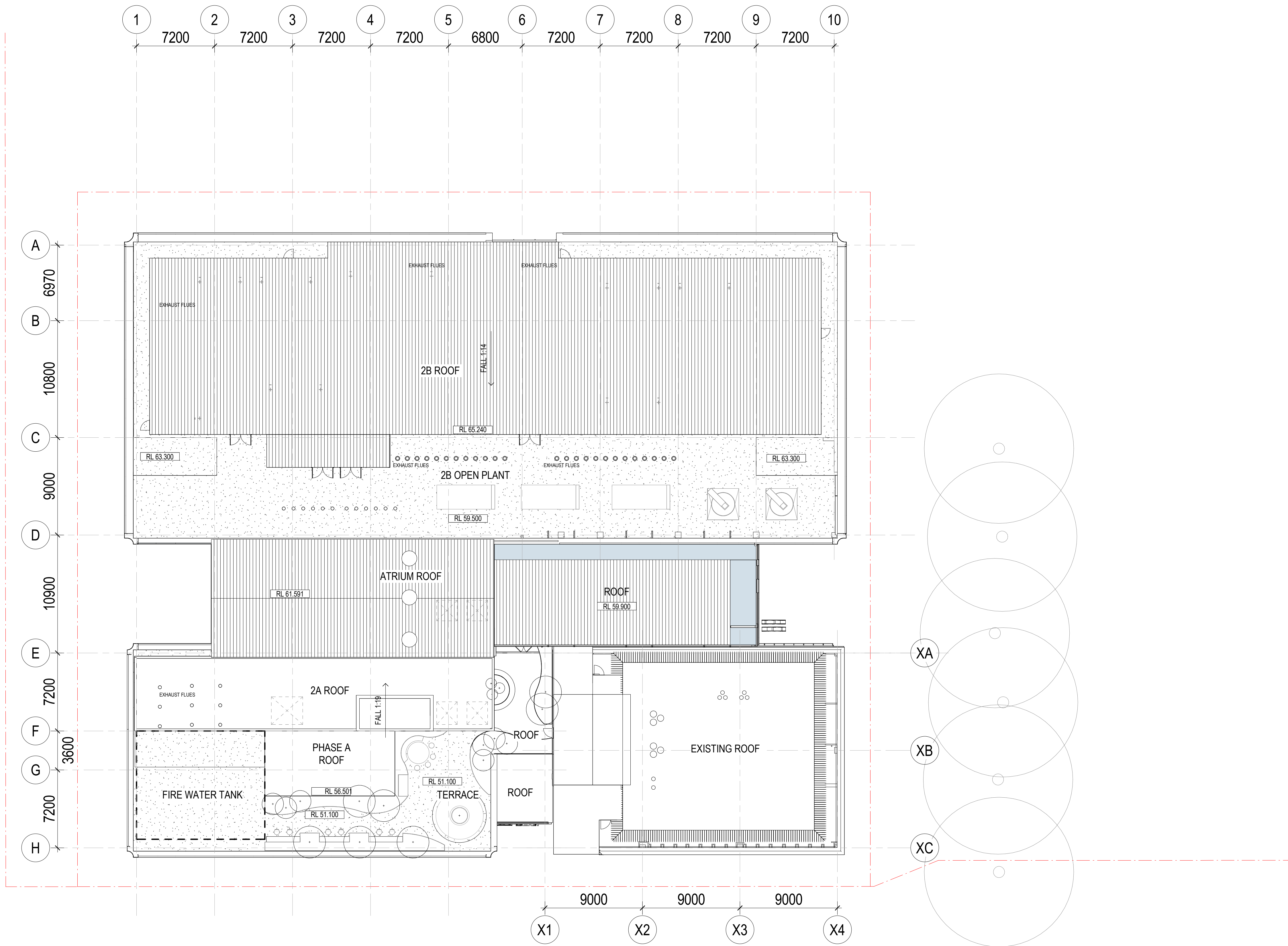
NATIONAL MANAGER - AVIATION

Enc: Figure B22349/01 (0)

Figure B22349/02 (2)

Hassall Drawings:

- Departmental Plan – Roof 016125/DA-1211 / B For Information
- General Elevation – East 016125/DA_2002 / B For Information



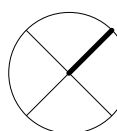
CONSULTANT

Hassell

Hassell LTD ABN 24 007 711 435
Level 2, Pier 8/9, 23 Hickson Rd
Sydney NSW 2000 Australia
T +61 2 9101 2000
F +61 2 9101 2100
sydney@hassellstudio.com
Nominated Architects NSW:
Tony Grist 5350
Glenn Scott 6942
Ross de la Motte 7398

REFERENCE

NORTH



0m 2m 4m 6m 8m

NOTES

1. Do not scale drawing. Written dimensions govern
 2. All dimensions are in millimeters unless noted otherwise
 3. All dimensions shall be verified on site before proceeding with the work. Hassell shall be notified in writing of any discrepancies.
 4. This drawing must be read in conjunction with all relevant contracts, specifications and drawings
- This drawing is an uncontrolled copy. Unless noted otherwise
© Copyright of this drawing is vested in Hassell Ltd.

REV DESCRIPTION

- | | |
|---|------------------|
| A | SCHEMATIC DESIGN |
| B | FOR INFORMATION |

DATE

14.09.22
29.02.24

CLIENT

CHILDRENS MEDICAL
RESEARCH INSTITUTE

PROJECT

CMRI GENE TECHNOLOGIES
BUILDING

214 Hawkesbury Rd, Westmead NSW 2145

STATUS

SCHEMATIC DESIGN

DRAWING TITLE

DEPARTMENTAL PLAN - ROOF

REVIEWED

MW

APPROVED

KL

DRAWING NO.

DA_1211

SCALE @ A1

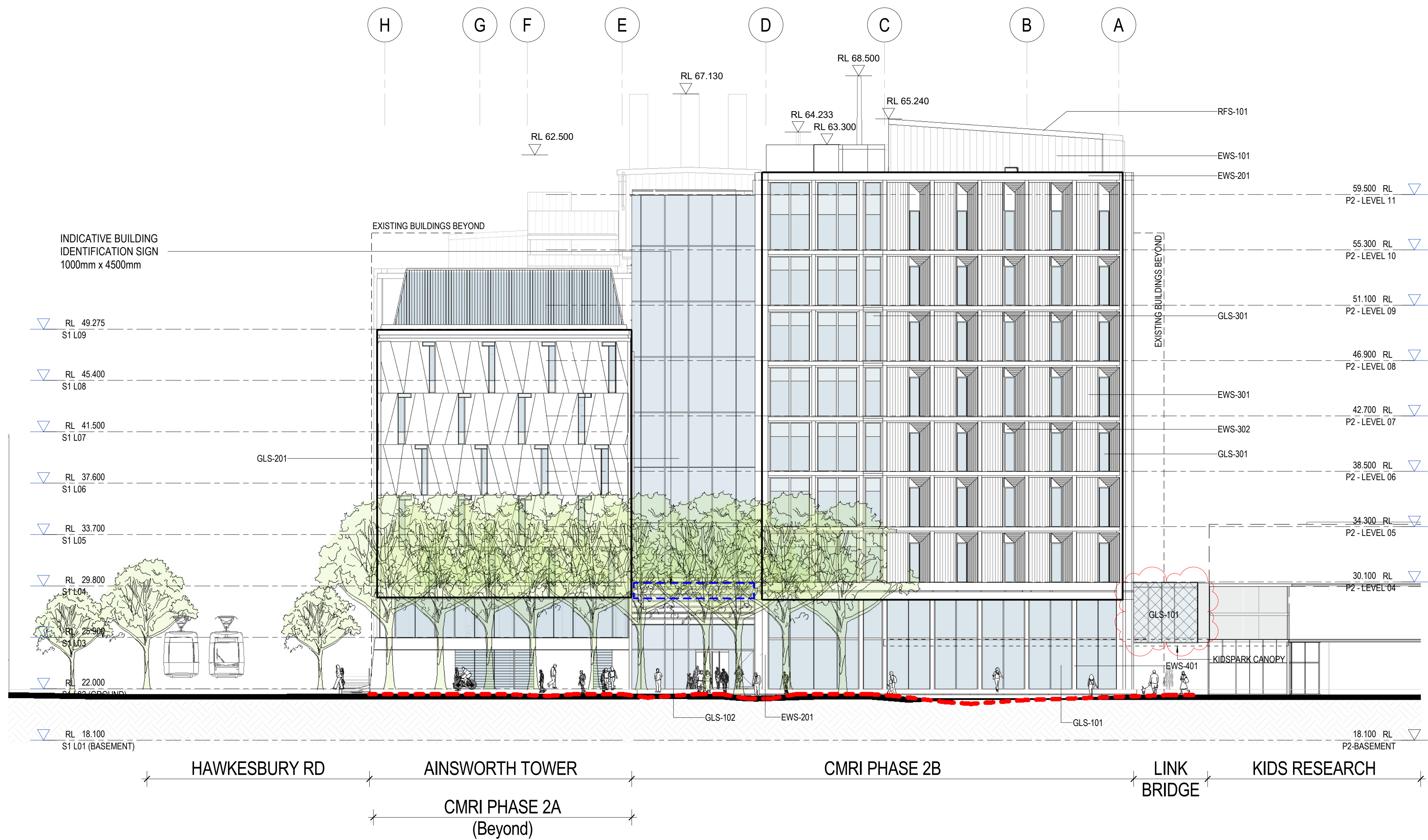
1 : 200

PROJECT NO.

016125

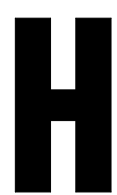
REV NO.

B



FACADE LEGEND

EWS - 101 METAL WALL CLADDING	GLS - 102 AUTOMATED OPERABLE GLAZED LOUVER	LVS - 101 METAL WEATHERPROOF LOUVERED WALL SYSTEM	RD: ROLLER DOOR
EWS - 201 GLASS REINFORCED METAL CLADDING GRID	GLS - 201 PERFORMANCE GLAZED CURTAIN WALL VISION PANEL	LVS - 301 METAL WEATHERPROOF LOUVER WITHING FRAMING SYSTEM	
EWS - 301 TERRACOTTA RAINSCREEN WITHIN FRAMING SYSTEM	GLS - 202 INSULATED GLAZED CURTAINWALL SHADOWBOX SPANDREL PANEL	RFS - 101 METAL ROOF CLADDING	
EWS - 302 METAL CLAD PANEL WITHIN FRAMING SYSTEM	GLS - 301 PERFORMANCE GLAZING VISION PANEL WITH ALUMINIUM FRAMING	--- NATURAL GROUND	
EWS - 401 FRAMING METAL CLADDING SYSTEM	GLS - 302 INSULATED GLAZED CURTAINWALL SHADOWBOX SPANDREL PANEL ALUMINIUM FRAMING	Future Work	
GLS - 101 PERFORMANCE GLAZED SHOPFRONT VISION PANEL		Indicative Signage Zone	



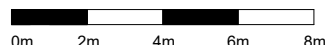
CONSULTANT

Hassell

Hassell LTD ABN 24 007 711 435
Level 2, Pier 8/9, 23 Hickson Rd
Sydney NSW 2000 Australia
T +61 2 9101 2000
F +61 2 9101 2100
sydney@hassellstudio.com
Nominated Architects NSW:
Tony Grist 5350
Glenn Scott 6942
Ross de la Motte 7398

REFERENCE

NORTH



NOTES

1. Do not scale drawing. Written dimensions govern
 2. All dimensions are in millimeters unless noted otherwise
 3. All dimensions shall be verified on site before proceeding with the work. Hassell shall be notified in writing of any discrepancies.
 4. This drawing must be read in conjunction with all relevant contracts, specifications and drawings
- This drawing is an uncontrolled copy. Unless noted otherwise
© Copyright of this drawing is vested in Hassell Ltd.

REV DESCRIPTION

A SCHEMATIC DESIGN
B FOR INFORMATION

DATE

14.09.22
29.02.24

CLIENT

CHILDRENS MEDICAL
RESEARCH INSTITUTE
PROJECT
CMRI GENE TECHNOLOGIES
BUILDING
214 Hawkesbury Rd, Westmead NSW 2145

STATUS

SCHEMATIC DESIGN
DRAWING TITLE
GENERAL ELEVATION - EAST

REVIEWED

MW

APPROVED
KL

DRAWING NO.
DA_2002

SCALE @ A1

1 : 200

PROJECT NO.
016125

REV NO.
B