

Aviation Impact Assessment Report for 19a Evans Ave

Eastlakes, NSW 2018

Final Report

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Glossary

AGL	Above Ground Level
AHD	Australian Height Datum
ANEF	Aircraft Noise Exposure Forecast
AOC	Airport Owner-Company
CASA	Civil Aviation Safety Authority
DITRDCSA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DPHI	Department of Planning, Housing and Infrastructure
ft	feet
GLS	Ground-based Augmented Landing System
HDA	Housing Delivery Authority
IFP	Instrument Flight Procedures
IFR	Instrument Flight Rules
Km	Kilometres
L	Left
m	Metres
MOS	Manual of Standards
nm	Nautical miles
OLS	Obstacle Limitation Surface
PDU	Airservices' Procedure Design Unit
R	Right
RNP	Required Navigation Performance
RTCC	Radar Terrain Clearance Chart
Rwy	Runway
SACL	Sydney Airport Corporation Ltd
TC	Tower Crane
TIFPOP	Terminal Instrument Flight Procedure Obstacle Protection Area (formerly termed the PANS-OPS surface)
VFR	Visual Flight Rules

Executive Summary

- Builtcom Developments Eastlakes Pty Ltd is seeking approval to construct four buildings at 19a Evans Ave, Eastlakes. Four hammerhead cranes will undertake construction.
- The aviation impact assessment report is prepared for the Housing Delivery Authority (HDA) in support of the four building towers at 19a Evans Ave. It details the impact of the buildings and cranes on Sydney prescribed airspace and their compliance with aviation regulations and guidelines.
- The aviation impact assessment report will describe that the four cranes will each penetrate the Sydney terminal instrument flight procedure obstacle protection area (TIFPOP) surface for three months. In accordance with the Airports (Protection of Airspace) Regulations 2026, this crane penetration of the TIFPOP surface can be approved for two reasons, namely 1) the provision of public infrastructure; and no significant interference with airport operations.
- The 19a Evans Ave site is located approximately 2.5km east-northeast of the Runway (Rwy) 25 Threshold at Sydney Airport. Building developments in the Eastlakes area are impacted by the prescribed airspace restrictions defined for Sydney Airport.
- The heights of Sydney prescribed airspace are:
 - Sydney Obstacle Limitation Surface (OLS): 51m AHD;
 - TIFPOP (formerly termed PANS-OPS) Surface: From 79m (southeast of site) but 83m AHD over most of the site;
 - Radar Terrain Contour Chart (RTCC) Surface: 335.2m AHD.

Since the RTCC is significantly above the OLS and TIFPOP surfaces it is not a relevant surface to this project and is not referenced further in this report.

- Table 1 the maximum heights of the building towers and their impact on Sydney prescribed airspace.

Table 1: Impact of Building Towers on Sydney Prescribed Airspace

	Maximum Height (AHD)	TIFPOP Surface (AHD)	Impact on Prescribed Airspace
Building 01	64.9m	83m	14.9m penetration of OLS 18.1m below TIFPOP surface
Building 02	62.6m	83m	11.6m penetration of OLS 20.4m below TIFPOP surface
Building 03	70m	79m	19m penetration of OLS 9m below TIFPOP surface
Building 04	61.3m	79m	11.3m penetration of OLS 17.7m below TIFPOP surface

Table1 shows that the four building towers will penetrate the Sydney OLS but they will remain below the TIFPOP and RTCC surfaces.

- Four hammerhead cranes will undertake construction of the four building towers. One crane is allocated to each building. The upper floors of each building will be constructed consecutively. It means that generally only one crane will penetrate the TIFPOP surface at a time. There is some concurrent crane penetration for one month when TC3 and TC4 are in the TIFPOP surface. A two-stage construction strategy will be used to ensure that the four cranes will not penetrate the Sydney TIFPOP surface for more than three months.

Stage One: Crane Operations before Penetrating TIFPOP Surface

During Stage One, the four tower cranes will operate up to but not penetrate the TIFPOP surface. To ensure that the penetration of the TIFPOP surface will not exceed three months by each crane as many construction activities as possible will be undertaken during this stage.

Crane activities during Stage One will focus on constructing up to 10 building floors. The cranes will undertake the concrete pours, installing loading platforms, lifting construction materials and installing the façade.

Stage Two: Crane Operations when Penetrating TIFPOP Surface

During Stage Two the cranes will undertake construction activities by penetrating the TIFPOP surface. They will attend to constructing the final, approximately six floors, of each building tower. Like Stage One, the cranes will undertake the concrete pours, installing loading platforms that allow materials to be loaded onto concrete slabs, lifting construction materials and installing the façade.

Once the three-month penetration of the TIFPOP surface has ended each crane will be sequentially removed from the TIFPOP surface.

Post-Stage Two: Residual Works after Removal of Cranes from TIFPOP Surface

Some residual construction activities will take place following the removal of each crane from the TIFPOP surface. Each floor will be pre-loaded with as much material as possible prior to the tower cranes being dismantled. Material and man hoists will then be used to lift materials to the required floors. A 'stick-build' approach will also be adopted. This involves building elements being assembled piece by piece on-site using raw or standard building materials, rather than being largely preassembled in a factory. Building elements can be assembled by carpenters once materials are hoisted to the required floor. The adoption of a 'stick-build' approach reduces the reliance on tower cranes in lifting large heavy preassembled structures.

- Table 2 details the maximum height of each crane and their impact on Sydney prescribed airspace.

Table 2: Impact of Cranes on Sydney Prescribed Airspace

Crane ID	TIFPOP Height	Stage 1 Height (AHD)	Stage 2 Height (AHD)	Impact on Sydney Prescribed Airspace at Max. Height
TC1	83m AHD	77m AHD	98m AHD	Penetrate OLS by 47m Penetrate TIFPOP by 15m
TC2	83m AHD	77m AHD	98m AHD	Penetrate OLS by 47m Penetrate TIFPOP by 15m
TC3	77m AHD	77m AHD	97.7m AHD	Penetrate OLS by 46.7m Penetrate TIFPOP by 20.7m
TC4	79m AHD	71.5m AHD	82.7m AHD	Penetrate OLS by 31.7m Penetrate TIFPOP by 3.7m

Table 2 shows that each crane will penetrate the OLS and the TIFPOP surface for three months. TC3 has the largest penetration of the TIFPOP surface by 20.7m.

- Penetration of the TIFPOP surface by four cranes at 19a Evans Ave will require the RNP Rwy 25 and GLS/ILS Rwy 25 minima to be increased to 410ft and 300ft respectively. They will not impact aircraft landing Rwy 25 or taking-off Rwy 07. Due to the low number of aircraft movements using Rwy 07/25, an increase to the minima of the Rwy 25 RNP and GLS/ILS approaches will not impact the safety, efficiency and regularity of air transport operations or significantly interfere with airport operations at Sydney.

The buildings and cranes will not impact VFR operations in the vicinity of the Eastlakes area or emergency helicopter operations at the Prince of Wales Hospital Helipad.

- Cranes have been approved at Westfield Eastgardens to a maximum height of 107m AHD. This site is 3.2km southeast of the Rwy 25 Threshold. Although this site is located on the opposite side of the Rwy 25 extended runway centreline, it is slightly further

away from but at a similar bearing from the threshold as 19a Evans Ave. These cranes at Westfield Eastgardens are 10m taller than the tallest crane at 19a Evans Ave.

- The development site at 19a Evans Ave is located just inside the 20 ANEF contour. This means that housing development is conditionally acceptable in this area, including home units and flats. It may require additional treatments to be used in the construction of the building towers to reduce the potential impact of aircraft noise.
- The building and crane will not impact the communication, navigations and surveillance systems at Sydney Airport. They are also outside the area where extraneous lighting might present a risk to pilots.
- This aviation impact assessment report has concluded that the four building towers at 19a Evans Ave penetrate the Sydney OLS but are below the TIFPOP surface. The four hammerhead cranes each penetrate the OLS, and the TIFPOP surface for three months. Due to the small number of movements at Rwy 07/25 increases to the Rwy 25 RNP and ILS/GLS minima will not impact the safety, regularity and efficiency of air transport operations at Sydney Airport or interfere with airport operations. The buildings and cranes will not present a risk to the safety of VFR operations in the Eastlakes area or emergency helicopter operations at the Prince of Wales Hospital Helipad.

19a Evans Ave is slightly within the 20 ANEF noise contour, which means that some treatments may be needed for the buildings to reduce the impact of aircraft noise.

1.0 Introduction

Builtcom Developments Eastlakes Pty Ltd is seeking approval to construct four building towers at 19a Evans Ave, Eastlakes. Construction will be undertaken by four hammerhead cranes.

This aviation impact assessment report has been prepared for the Housing Delivery Authority (HDA) in support of the four building towers at 19a Evans Ave. It details the impact of the buildings and cranes on Sydney prescribed airspace and their compliance with aviation regulations and guidelines.

The site at 19a Evans Ave is located approximately 2.5km northeast of the Runway (Rwy) 25 Threshold at Sydney Airport. Each of the building towers will penetrate the Sydney obstacle limitation surface (OLS) but remain below the TIFPOP surface. The four cranes will penetrate the OLS and TIFPOP surfaces for three months.

This report reviews whether the penetration of Sydney prescribed airspace by the buildings and cranes will significantly impact airport operations at Sydney Airport, or the safety of VFR of aircraft and helicopter activities in the Eastlakes area. It undertakes an assessment about whether the buildings and cranes will impact emergency helicopter operations at the Prince of Wales Hospital Helipad.

The report begins by detailing the legislative context and methodology. It states the reasons why the four cranes should be permitted to penetrate the Sydney TIFPOP surface. Details are provided of the heights of Sydney prescribed airspace at 19a Evans Ave. The construction strategy is detailed. Assessments are then made of the impact of the buildings and cranes on Sydney prescribed airspace, instrument flight procedures, and helicopter operations in the vicinity of Sydney Airport. Other nearby cranes that have received aviation approval are identified. The impact of aircraft noise on the development site, the risk to pilots of extraneous lighting from the crane, wildlife strikes, and the likelihood of impaired performance to aviation systems are also assessed. Finally, the obstacle lighting requirements for the buildings and cranes are detailed, along with key construction dates.

2.0 Legislative Context

Airspace surrounding an airport is protected by the Airports (Protection of Airspace) Regulations 2026. It details the process required to be undertaken when an obstacle could infringe prescribed airspace and the responsibilities of various organisations.

Prescribed airspace around an airport includes the obstacle limitation surface (OLS), the terminal instrument flight path procedure obstacle protection area (TIFPOP) and radar terrain contour chart (RTCC) surface. The TIFPOP was formerly termed the PANS-OPS surface.

Prescribed airspace is further delineated into primary and secondary surfaces. A primary surface incorporates the critical surfaces of the OLS that surround an airport's runways and the airspace within a TIFPOP. The secondary surface includes the outer horizontal, inner horizontal and conical surfaces of the OLS. A temporary controlled activity is permitted for an obstruction (e.g., crane) to penetrate a primary surface (e.g., TIFPOP) when it is not expected to continue longer than three months.

A sensitive controlled activity application must be made for a temporary obstruction to penetrate a primary surface. Permission is required from the airport owner-company (AOC), in this case Sydney Airport Corporation Ltd (SACL), before a sensitive application can be submitted to penetrate a primary surface. To obtain permission, details need to be provided the AOC about the purpose of the penetration, height and position of cranes, summary of the crane strategy, duration of the penetration, and the impact on the safety and efficiency of air transport operations. The AOC either approves the submission, enabling the application to proceed, or declines the request. If permission is declined, the formal application process does not commence. In making the decision the AOC will seek an assessment from Airservices' procedure design unit (PDU) about the impact on the TIFPOP.

Once approval has been granted to commence the application a development will be provided by the Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts (DITRDCA) within 40 working days. This period includes an assessment by CASA who determine the impact on aviation safety from the penetration of prescribed airspace.

For an application to penetrate a secondary surface e.g., the inner, horizontal, conical and outer horizontal surfaces of the OLS, an application is made to the AOC and the assessment commences immediately. The AOC seeks submissions from

Airservices and CASA. A decision will be made by DITRDCSA 40 working days after the TIFPOP assessment is provided by Airservices' PDU.

Should a development not be approved by DITRDCSA, there is opportunity to appeal to the Secretary and then the Administrative Appeals Tribunal.

When a building or crane operations in NSW take place within the vicinity of a hospital providing emergency helicopter operations approval for these activities must be obtained from Health NSW. In making a decision, Health NSW seek the view of Air Ambulance NSW and take account of guidelines detailed in CASA Advisory Circular (AC) 139.R01 v3.1 and National Airports Safeguarding Framework (NASF) Guideline H: Protecting Strategically Important Helicopter Landing Sites.

3.0 Methodology

This section provides an overview of the approach to determine the impact on prescribed airspace and aircraft operations of the proposed buildings and crane operations at 19a Evans Ave, Eastlakes.

Prescribed airspace defined for Sydney Airport governs the maximum permissible heights for buildings and cranes in the Eastlakes area. Calculations of the height of the OLS, TIFPOP and RTCC surfaces were sourced from planning information maintained by SACL. The heights of the TIFPOP and RTCC surfaces will be confirmed by Airservices' Procedure Design Unit (PDU) during the aviation application approval process.

Buildings in proximity to Sydney Airport and its flight paths are very noise sensitive. The acceptability of different forms of development are depicted by ANEF contours that surround an airport. A chart depicting the ANEF contours was prepared for Sydney Airport by Airservices. The 19a Evans Ave site was plotted on to the ANEF contour chart to provide a preliminary assessment about the impact of aircraft noise on the development site.

To explore the safety impact on aircraft and helicopter operations of the proposed development at 19a Evans Ave, discussions and/or information was obtained from:

- Sydney Airport Corporation Ltd (SACL) including 2039 Masterplan and details of other aviation approvals for cranes;
- Aeronautical charts prepared by Airservices about aircraft operations at Sydney Airport;

- Oz Runways-detailing operational information for Prince of Wales Hospital;
- National Airports Safeguarding Framework; and
- CASA-MOS Part 139 and AC139 R-01 v3.1.

4.0 Reason and Justification for Crane TIFPOP Penetration

This report will detail that four cranes will penetrate the Sydney TIFPOP surface, each for three months. The Airports Act (2026) details the criteria to be met for a crane penetration of the TIFPOP surface to be permitted. Below are the reasons why the crane penetration of the TIFPOP surface at 19a Evans Ave meets the approval criteria for a sensitive controlled activity detailed in Section 13 of the Act.

4.1 Provision of Public Infrastructure

The NSW Government has implemented policies to increase the housing supply in Sydney and the availability of below-market rental accommodation. To achieve these objectives, state government provides property developers with planning incentives, density bonuses and fast track approval to build greater numbers of affordable units. This policy enables building towers to be constructed to a greater height, often up to the TIFPOP surface.

In the case of 19a Evans Ave, the development has achieved a Significant State Development (SSD) categorisation because 10% of the proposed units have been designated for low-cost housing for at least 10 years. It requires the building towers to be built close to the TIFPOP surface and for crane operations to penetrate this surface when constructing their upper floors.

4.2 No Significant Interference to Airport Operations

To not significantly interfere with airport operations, the crane penetration of the TIFPOP surface must not impact the safety and efficiency of air transport operations at Sydney Airport. In the sections below this report details the impact of cranes on the TIFPOP surface and the impact on IFR and VFR operations at and around Sydney Airport.

5.0 Sydney Prescribed Airspace

This section details the heights of the Sydney Obstacle Limitation Surface (OLS), TIFPOP surface and RTCC surfaces at 19a Evans Ave.

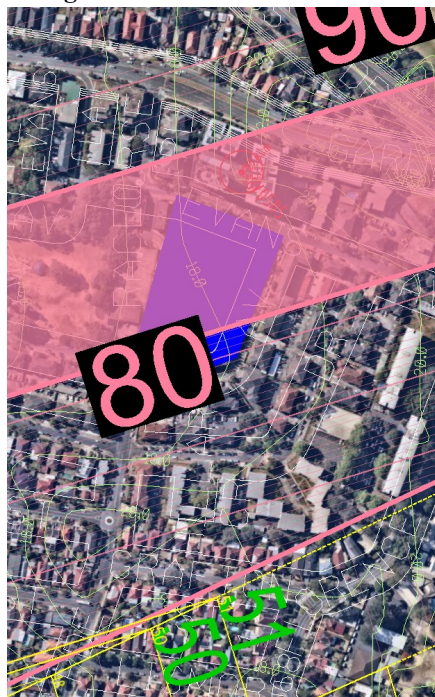
5.1 Sydney Airport Obstacle Limitation Surface (OLS)

The height of the Sydney OLS at 19a Evans Ave is 51m AHD.

5.2 Sydney Airport TIFPOP Surface

The Sydney TIFPOP surface, formerly termed the PANS-OPS surface, at 19a Evans Ave extends from 79m AHD at the southern boundary of the site and increases to 83m AHD over most of the site. Diagram 1 below presents the TIFPOP surface over 19a Evans Ave.

Diagram 1: Diagrammatic Presentation of TIFPOP Surface



Airservices' Procedure Design Unit (PDU) will confirm this height during their evaluation of the aviation application. They are final arbiter of the TIFPOP height.

5.3 RTCC Surface

At the position of 19a Evans Ave the height of the RTCC surface is 335.2m AHD.

Since the RTCC surface is significantly above the OLS and TIFPOP surfaces it will not impact this development. It will not be referenced further in this report.

6.0 Position of Building Towers

The development comprises four building towers. Below are the position coordinates for each corner of each building tower.

Table 3: Building 01 Position Coordinates

Position	Coordinates
Northwest Corner	E 334630196.8; N 6244765377.6
Southwest Corner	E 334625855.5; N 6244731945.6
Southeast Corner	E 334688113.7; N 6244721153.0
Northeast Corner	E 334693086.6; N 6244751042.1

Table 4: Building 02 Position Coordinates

Position	Coordinates
Northwest Corner	E 334717042.8; N 6244744722.5
Southwest Corner	E 334712060.5; N 6244713310.9
Southeast Corner	E 334743458.3; N 6244708233.3
Northeast Corner	E 334752259.3; N 6244731598.2

Table 5: Building 03 Position Coordinates

Position	Coordinates
Northwest Corner	E 334619577.8; N 6244708485.4
Southwest Corner	E 334609558.4; N 6244643764.9
Southeast Corner	E 334632684.3; N 6244640102.7
Northeast Corner	E 334642452.8; N 6244703640.0

Table 6: Building 04 Position Coordinates

Position	Coordinates
Northwest Corner	E 334665465.0; N 6244695692.8
Southwest Corner	E 334655442.8; N 6244636711.6
Southeast Corner	E 334714038.5; N 6244627278.0
Northeast Corner	E 334733757.1; N 6244688948.9

The position coordinates of each building tower are presented in Attachment 1.

7.0 Heights of Building Towers and Impact on Sydney Prescribed Airspace

This section details the height of each building tower and their impact on Sydney prescribed airspace.

7.1 Heights of Building Towers

The maximum heights of each building tower are:

- a) Building 01: 64.9m AHD;
- b) Building 02: 62.6m AHD;
- c) Building 03: 70m AHD;
- d) Building 04: 61.3m AHD.

Attachment 2 presents the maximum height of each building tower.

7.2 Impact of Buildings on Sydney Prescribed Airspace

Table 7 below presents the maximum building height, the height of the TIFPOP surface and the impact on Sydney prescribed airspace.

Table 7: Maximum Building Heights and Impact on Sydney Prescribed Airspace

	Maximum Height (AHD)	TIFPOP Surface (AHD)	Impact on Prescribed Airspace
Building01	64.9m	83m	14.9m penetration of OLS 18.1m below TIFPOP surface
Building02	62.6m	83m	11.6m penetratioin of OLS 20.4m below TIFPOP surface
Building03	70m	79m	19m penetration of OLS 9m below TIFPOP surface
Building04	61.3m	79m	11.3m penetration of OLS 17.7m below TIFPOP surface

Table 7 shows that each building tower will penetrate the Sydney OLS but remain below the TIFPOP surface. Each building tower will require an aviation approval.

8.0 Summary of Crane Strategy

Four hammerhead cranes will undertake construction of the four building towers. One crane is allocated to each building. The upper floors of each building will be constructed consecutively. It means that generally only one crane will penetrate the TIFPOP surface at a time. There is some concurrent crane penetration for one month when TC3 and TC4 are both in the TIFPOP surface.

In most instances, the next crane to penetrate the TIFPOP surface will dismantle its predecessor before taking its place in this surface. Each crane is required to be installed and removed at different times to cater for construction sequencing, as well as the arrival of structural elements of the buildings, plant and equipment at different times as the project progresses.

Each of the four hammerhead cranes will be managed in two construction stages to ensure that no single crane requires a TIFPOP penetration of more than three months. Once the tower cranes have been removed from the TIFPOP surface further construction activities will be undertaken using material hoists, builders lifts and 'stick-build' initiatives that do not require the hammerhead cranes.

Below is a summary of the two construction stages that will be managed for each crane.

Stage One: Crane Operations before Penetrating TIFPOP Surface

During Stage One, the four tower cranes will operate up to but not penetrate the TIFPOP surface. To ensure that the penetration of the TIFPOP surface will not exceed three months by each crane as many construction activities as possible will be undertaken during this stage.

Crane activities during Stage One will focus on constructing up to 10 building floors. The cranes will undertake the concrete pours, installing loading platforms, lifting construction materials and installing the façade.

Tower Crane (TC)1 will be erected using a mobile crane. Once TC1 is operating, the tower cranes will erect others in a sequential manner i.e., TC1 will erect TC2, TC2 will erect TC3 and TC3 will erect TC4. The mobile crane is expected to penetrate the Sydney OLS but remain below the TIFPOP surface. A request will be made to SACL close to the commencement of construction for the mobile crane to penetrate the OLS. The mobile crane may need up to four days to erect TC1.

Stage Two: Crane Operations when Penetrating TIFPOP Surface

During Stage Two the cranes will undertake construction activities by penetrating the TIFPOP surface. They will attend to constructing the final, approximately six floors, of each building tower. Like Stage One, the cranes will undertake the concrete pours, installing loading platforms that allow materials to be loaded onto concrete slabs, lifting construction materials and installing the façade.

Once the three-month penetration of the TIFPOP surface has ended each crane will be sequentially removed from the TIFPOP surface i.e., TC2 will dismantle TC1, TC3 dismantles TC2 and TC4 dismantles TC3. A mobile crane will dismantle TC4. It is likely that the mobile crane will penetrate the OLS but remain below the TIFPOP surface. A request for the mobile crane to penetrate the OLS will be made to SACL closer to the date these operations will take place. The mobile crane may need up to four days to complete the dismantling of TC4.

Post-Stage Two: Residual Works after Removal of Cranes from TIFPOP Surface

Some residual construction activities will take place following the removal of each crane from the TIFPOP surface. Each floor will be pre-loaded with as much material as possible prior to the tower cranes being dismantled. Material and man hoists will then be used to lift materials to the required floors. A 'stick-build' approach will also be adopted. This involves building elements being assembled piece by piece on-site using raw or standard building materials, rather than being largely preassembled in a factory. Building elements can be assembled by carpenters once materials are hoisted to the required floor. The adoption of a 'stick-build' approach reduces the reliance on tower cranes in lifting large heavy preassembled structures.

9.0 Position and Height of Tower Cranes and Impact on Sydney Prescribed Airspace

This section details the position and operating radius of each crane. It then details the maximum heights of the cranes and the impact on Sydney prescribed airspace.

9.1 Position and Operating Radius of Tower Cranes

Table 8 below details the position coordinates of each shaft of the four hammerhead cranes and their operating radius.

Table 8: Crane Position and Operating Radius

Crane ID	Crane Shaft Position	Operating Radius
TC1	E 334641.57; N 6244761.52	50m
TC2	E 334732.09; N 6244704.19	45m
TC3	E 334643.61; N 6244660.72	55m
TC4	E 334689.70; N 6244663.52	40m

Attachment 3 presents the position of each crane shaft and their operating radius.

9.2 Heights of Tower Cranes at Each Construction Stage

Table 9 presents the maximum heights of each crane during each construction stage.

Table 9: Maximum Crane Heights at Each Construction Stage

Crane ID	Stage 1 Height (AHD)	Stage 2 Height (AHD)
TC1	77m AHD	98m AHD
TC2	77m AHD	98m AHD
TC3	77m AHD	97.7m AHD
TC4	71.5m AHD	82.7m AHD

Attachment 3 details the maximum crane for each construction stage.

9.3 Impact of Cranes on Sydney Prescribed Airspace at Each Construction Stage

Table 10 details the heights of the TIFPOP surface across the site, the maximum heights of the cranes during each construction stage, and their impact on Sydney prescribed airspace.

Table 10: Impact of Cranes on Sydney Prescribed Airspace

Crane ID	TIFPOP Height	Stage 1 Height (AHD)	Stage 2 Height (AHD)	Impact on Sydney Prescribed Airspace at Max. Height
TC1	83m AHD	77m AHD	98m AHD	Penetrate OLS by 47m Penetrate TIFPOP by 15m
TC2	83m AHD	77m AHD	98m AHD	Penetrate OLS by 47m Penetrate TIFPOP by 15m
TC3	77m AHD	77m AHD	97.7m AHD	Penetrate OLS by 46.7m Penetrate TIFPOP by 20.7m
TC4	79m AHD	71.5m AHD	82.7m AHD	Penetrate OLS by 31.7m Penetrate TIFPOP by 3.7m

9.4 Summary

Table 10 shows that the four tower cranes will all penetrate the Sydney OLS. The cranes will not penetrate the Sydney TIFPOP surface during Stage One. All four cranes will penetrate the TIFPOP surface during Stage Two for a duration of three months. TC3 has the greatest penetration of the TIFPOP surface at 20.7m.

10.0 Aircraft and Helicopter Operations in Eastlakes Area

This section presents analysis of the position of the 19a Evans Ave development in relation to designated airspace surrounding Sydney Airport. It then describes the impact on aircraft and helicopter operations from the penetration of the TIFPOP and OLS surfaces by the buildings and cranes. The impact of the buildings and cranes on the Prince of Wales Helipad are also detailed.

10.1 Designated Airspace

The 19a Evans Ave site is located approximately 2.5km northeast of the Sydney Runway (Rwy) 25 Threshold. It is within the Sydney Control Zone. Within the Sydney Control Zone VFR aircraft and helicopter operations can

operate up to 2,500ft (AHD), provided they have an air traffic control clearance.

The development site is clear to the west of the Victor 1 VFR transit route that tracks seaward of the coast from Sydney Heads to Jibbon Point. This route passes seaward of Maroubra, which is located approximately 6.8km east of Sydney Airport. Within Victor 1 aircraft must operate below 500ft (AHD).

10.2 Aircraft Movements at Runway 25

The development site is located closest to Sydney Rwy 07/25. Compared to the two north-south runways (34L/16R and 34R/16L), Runway 25 has a small number of aircraft movements. It is primarily used when westerly wind conditions exist. The number of arrivals to Runway 25 range from an average of six per day (March) to 11 per day (October) (Transport for NSW).

10.3 IFR Operations

All four buildings will penetrate the Sydney OLS but remain below the TIFPOP surface. Consequently, the buildings will not impact any instrument flight procedure at Sydney Airport.

All four cranes will penetrate the Sydney OLS, and the TIFPOP surface for three months. They will impact the Rwy 25 RNP and ILS/GLS approaches. An increase to the minima of these approaches will be required while the crane penetrations take place. Since the four cranes will penetrate the TIFPOP surface to different heights and for different periods the impact on instrument flight procedures will vary. Table 11 below details the procedures impacted, the increase required to the minima and the duration of the penetration.

Table 11: Impacted Instrument Procedures and Duration

Crane ID	Procedure Impacted	Existing Minima	Procedure Change Height	Temporary Minima	Duration of Procedure Change
TC1	RNP 25	360ft	15.0m/49ft	410ft	1/06/2028-31/08/2028
TC2	RNP 25	360ft	15.0m/49ft	410ft	1/09/2028-30/11/2028
TC3	GLS/ILS 25	230ft	20.7m/68ft	300ft	1/10/2028-31/12/2028
TC4	GLS/ILS 25	230ft	3.7m/12ft	250ft	1/11/2028-31/01/2029

Table 11 highlights that the RNP Rwy 25 minima will need to increase to 410ft from 1 June until 30 November 2028. The GLS/ILS Rwy 25 minima will need to increase to 300ft from 1 October until 31 December 2028. This minima can be reset to 250ft from 1 January until 31 January 2029.

Aircraft taking off from Rwy 07 will be at least 500ft before a north bound aircraft will turn left. They will be clear above and to the south of the cranes at 19a Evans Ave.

IFR aircraft landing Rwy 25 will be established on final before reaching 3nm (5.5km) final. This means that arriving aircraft will be established on final well before passing abeam to the south of the 19a Evans Ave development site.

10.4 VFR Operations

As noted above, 19a Evans Ave is within the Sydney control zone but clear to the north of the Victor 1 low level VFR transit corridor.

Due to the proximity to Sydney Airport, there are very few VFR operations over the Eastlakes area. On occasions when VFR aircraft and helicopters operate over the Eastlakes area, Civil Aviation Regulations require aircraft and helicopters operating visually to fly at least 1,000ft above built-up areas. In addition, the regulations require them to be 500ft above the highest obstacle within a 300m radius. Since the maximum height of the crane is 97.7m (321ft) AHD or approximately 91.4m (300ft) AGL, aircraft and helicopters operating VFR over the development site will not need to increase their height above 1,000ft to maintain the 1,000ft/500ft obstacle clearance requirements. Note the ground height at 19a Evans Ave is estimated to be 20ft (6.1m) AHD.

Helicopters departing from the helicopter landing site located close to the Rwy 25 Threshold will be able to observe the building towers and cranes and maintain visual separation from these obstacles. The buildings and cranes will be clearly visible, including having obstruction lighting and marking. Details of obstacle lighting and marking are presented later in this report.

10.5 Impact on Flight Paths at Prince of Wales Hospital Helipad

The closest strategically important helicopter landing site to 19a Evans Ave is the Prince of Wales Helipad. Prince of Wales Hospital has two helipads. The development site 19a Evans Ave is located approximately 2.5km south-southwest of the western helipad at the Prince of Wales Hospital.

Primary flight paths to the western helipad are northeast/southwest ($045^{\circ}/225^{\circ}$). The southwest flight path is closest to the 19a Evans Ave. It passes approximately 1km south of the development site. The 19a Evans Ave site is outside the horizontal dimensions of the obstacle limitation surface surrounding the southwest flight path to the Prince of Wales Hospital Helipad.

10.6 Conclusion

Penetration of the TIFPOP surface by four cranes at 19a Evans Ave will require the RNP Rwy 25 and GLS/ILS Rwy 25 minima to be increased to 410ft and 300ft respectively. They will not impact aircraft landing Rwy 25 or taking-off Rwy 07. Due to the low number of aircraft movements using Rwy 07/25, an increase to the minima of the Rwy 25 RNP and GLS/ILS approaches will not impact the safety, efficiency and regularity of air transport operations or significantly interfere with airport operations at Sydney.

The buildings and cranes will not impact VFR operations in the vicinity of the Eastlakes area or emergency helicopter operations at the Prince of Wales Hospital Helipad.

11.0 Other Nearby Buildings and Cranes

Cranes have been approved at Westfield Eastgardens to a maximum height of 107m AHD. This site is bounded by Bunnerong Road, Wentworth Ave, Banks Ave and Heffron Road. It is located 3.2km southeast of the Rwy 25 Threshold. Although this site is located on the opposite side of the Rwy 25 extended runway centreline, it is slightly further away from but at a similar bearing from the threshold as 19a Evans Ave. These cranes at Westfield Eastgardens are 10m taller than the tallest crane at 19a Evans Ave.

12.0 Exposure to Aircraft Noise

Airservices have published information about the likely impact of aircraft noise on various forms of land use in the vicinity of an airport. This information is depicted in an Aeronautical Noise Exposure Forecast (ANEF) chart. The ANEF chart depicts the noise contours surrounding an airport's runways. Each contour depicts an envelope, which relate to the forms of activity that are considered suitable with this volume of noise.

Attachment 4 presents the ANEF chart for Sydney Airport, along with the approximate position of the development site at 19a Evans Ave. The development site is depicted by a brown dot. It shows that the development site is located just inside the 20 ANEF contour. This means that housing development is conditionally acceptable in this area, including home units and flats. It may require additional treatments to be used in the construction of the building towers to reduce the potential impact of aircraft noise.

13.0 Risk of Extraneous Lighting Distracting Pilots

National Airports Safeguarding Framework (NASF) Guideline E provides details about when extraneous lighting from buildings and cranes may cause a distraction to pilots. The guideline specifies four zones that extend for 4,500m on final beyond a runway threshold. At 2.5km from the Rwy 25 Threshold (the distance when 19a Evans Ave is abeam its centreline) and 850m from the extended runway centreline, the development site is outside the area of Zone C (600m) where extraneous lighting may present a risk to pilots.

14.0 Wildlife Strikes

At 3.8km from the Sydney Airport aerodrome reference point, 19a Evans Ave is in Wildlife Management Area B, as defined the National Airports Safeguarding Framework (NASF) Guideline C. Sydney Airport, however, does not specify any off-airport planning controls for wildlife management.

15.0 Impact on Aviation Systems

At 3.8km from navigation aids located at Sydney Airport, the buildings and cranes will not impact aviation communication, navigations and surveillance (CNS) systems.

16.0 CASA

CASA will review this aviation impact assessment report as part of their assessment into the safety risk to aircraft and helicopter operations presented by the proposed buildings and cranes.

Since the buildings and cranes will penetrate the OLS and TIFPOP surface, CASA will almost certainly require these structures to be obstacle lit. Below are details of the obstacle lighting and the specifications of the lighting systems. These details also incorporate the procedures for monitoring and repairing obstacle lighting likely required by SACL.

16.1 Obstacle Lighting Requirements

- a) Building must be obstacle lit by medium intensity flashing red obstacle lighting during the hours of darkness at the highest point of the building;
- b) Cranes must be obstacle lit with a medium intensity red obstacle light at night at the tip of the boom and the highest point above the cabin;
- c) Obstacle lighting of the building and cranes must have remote monitoring capability, including:
 - The proposed obstacle lighting system must incorporate an alarm system that will provide remote monitoring to notify the designated person responsible for the maintenance of the obstacle lighting;
 - The contact details of the person responsible for the monitoring of the obstacle lighting must be sent to SACL prior to the commencement of the obstacle lighting becoming operational;
 - The designated person must be available 24 hours per day, 7 days per week;
 - In the event of the obstacle lighting being inoperable, the designated person must immediately contact Sydney Airport Airfield Operations Supervisor on 0419 278 208 or 02 9667 9824 to advise of the outage;

- Action must be taken to repair the obstacle lighting within 12 hours of the light not being operational;
- Once the obstacle lighting is working again, the person responsible for the maintenance of the obstacle lighting must notify the Sydney Airport Airfield Operations Supervisor.

16.2 Obstacle Lighting Specifications (Extract from CASR Part 139 (Aerodromes) Manual of Standards)

‘9.4.7 Characteristics of Medium Intensity Obstacle Lights

9.4.7.1 Medium intensity obstacle lights are to be flashing or steady red lights or flashing white lights, visible in all directions in azimuth.

9.4.7.2 The frequency of flashes is to be between 20 and 60 flashes per minute.

9.4.7.3 The peak effective intensity is to be 2,000 +/- 25% cd with a vertical distribution as follows:

- (a) vertical beam spread is to be 3° minimum (beam spread is defined as the angle between two directions in a plane for which the intensity is equal to 50% of the lower tolerance value of the peak intensity);
- (b) at -1 °elevation, the intensity is to be 50% minimum and 75% maximum of lower tolerance value of the peak intensity; and
- (c) at 0° elevation, the intensity is to be 100% minimum of the lower tolerance value of the peak intensity.

9.4.7.4 Where the flashing white light is used in lieu of obstacle marking during the day to indicate temporary obstacles in the vicinity of an aerodrome, in accordance with Paragraph 9.4.2.4(a), the peak effective intensity is to be increased to 20,000 +/-25% cd when the background luminance is 50 cd/m² or greater.’

16.3 Obstacle Marking on Hammerhead Cranes

Crane booms will be obstacle marked in alternating red and white bands of colour.

17.0 Key Construction Dates

Key construction dates are:

- Commencement of construction activities: 23rd March 2026;
- Commencement of crane operations: 1 February 2027;
- Completion of crane operations: 31 January 2029;
- Completion of all construction activities: 1 January 2030.

Table 12 details the dates of the crane penetrations of the Sydney OLS and TIFPOP surface.

Table 12: Dates of Crane Penetrations of OLS and TIFPOP Surface

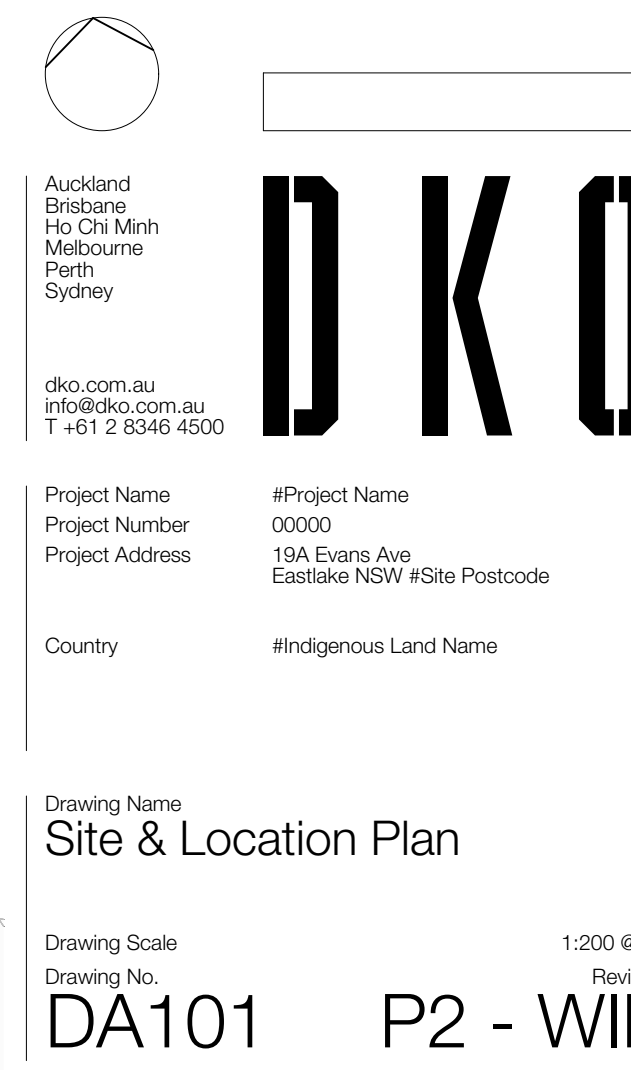
Crane ID	Dates of OLS Penetration	Dates of TIFPOP Penetration
TC1	1/02/2027-31/08/2028	1/06/2028-31/08/2028
TC2	1/05/2027-30/11/2028	1/09/2028-30/11/2028
TC3	1/06/2027-31/12/2028	1/10/2028-31/12/2028
TC4	1/08/2027-31/01/2029	1/11/2028-31/01/2029

18.0 Conclusion

This aviation impact assessment report has concluded that the four building towers at 19a Evans Ave penetrate the Sydney OLS but are below the TIFPOP surface. The four hammerhead cranes each penetrate the OLS, and the TIFPOP surface for three months. Due to the small number of movements at Rwy07/25 increases to the Rwy 25 RNP and ILS/GLS minima will not impact the safety, regularity and efficiency of air transport operations at Sydney Airport or significantly interfere with airport operations. The buildings and cranes will not present a risk to the safety of VFR operations in the Eastlakes area or emergency helicopter operations at the Prince of Wales Hospital Helipad.

19a Evans Ave is slightly within the 20 ANEF noise contour, which means that some treatments may be needed for the buildings to reduce the impact of aircraft noise. The buildings will not impact aviation CNS systems or present a risk to pilots from extraneous lighting.

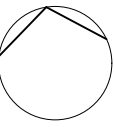
Rev	Date	By	Chk	Description
P1	10/04/2020			Issue for Coordination
P2 - WP	Work in Progress			Not in Transmittal Set





All works to be in accordance with authority & statutory approvals.
Refer to site survey for all information relating to existing site conditions.
All boundary information to be confirmed by registered surveyor before commencing works on site.
Refer to Adjacent Report and Landscape Documentation for all information relating to trees and their retention/removal, and all landscape works.
Drawings to be used in conjunction with all Specifications and Schedules, all specialist consultant documentation (BASIX, Nat-ERS, Section J Certificates).
Minor changes to building form & configuration may be required after Development Consent.
Do not scale from drawing; figure dimensions only to be used.
Building Contractor to verify all dimensions before commencing work.

Rev	Date	By	Chk	Description
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Auckland
Brisbane
Ho Chi Minh
Melbourne
Perth
Sydney

dco.com.au
info@dco.com.au
T +61 2 8346 4500

Project Name
Project Number
Project Address



#Project Name
00000
19A Evans Ave
Eastlake NSW #Site Postcode

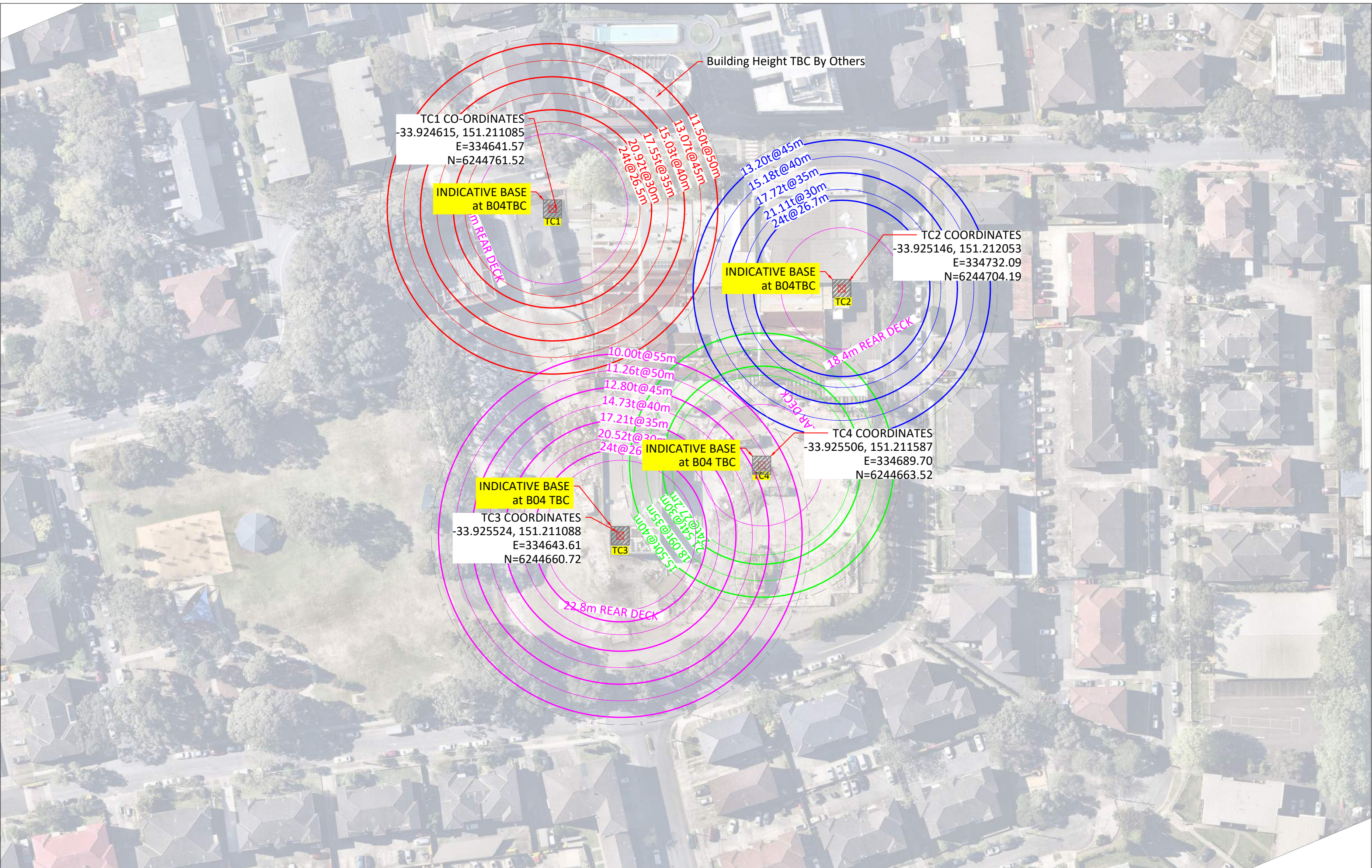
Country

#Indigenous Land Name

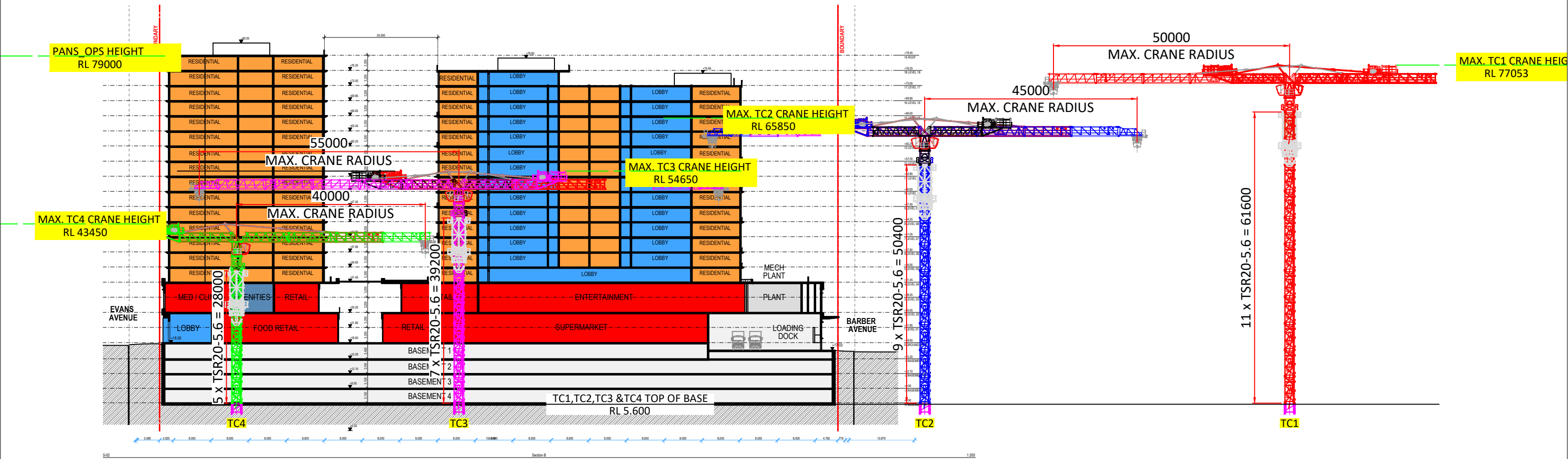
Drawing Name
Building Diagram

Drawing Scale
Drawing No.

1:48.69 @ A1
Revision



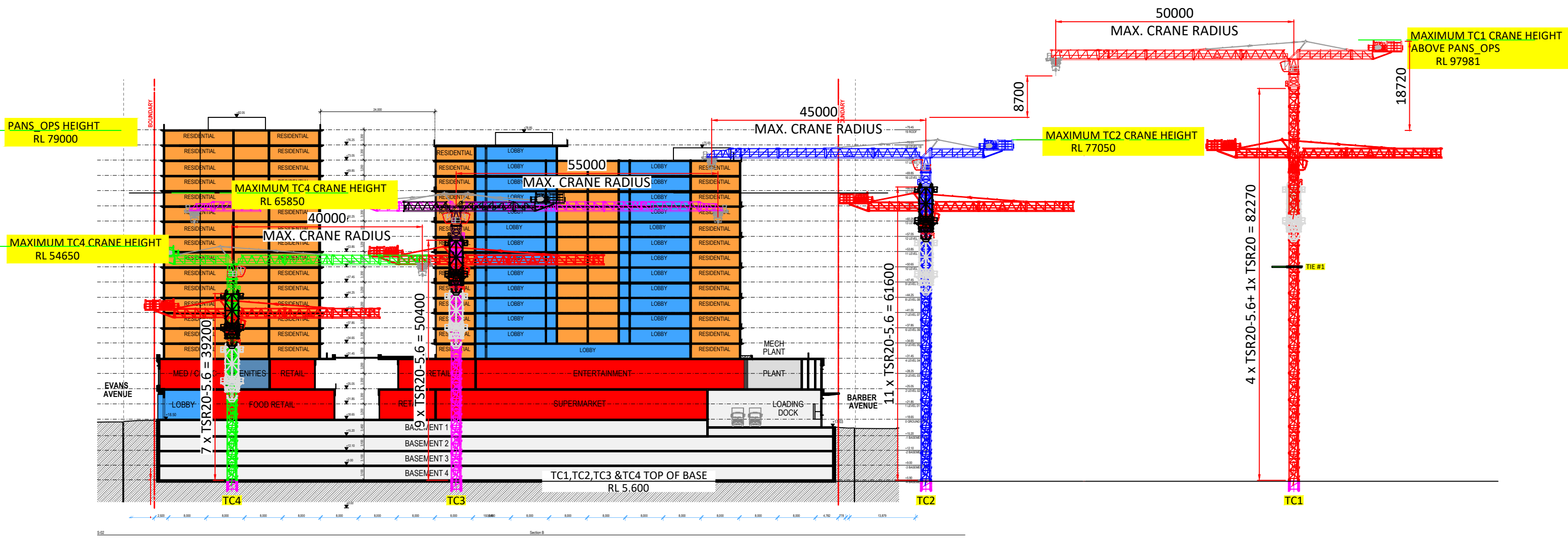
LVL80 TOWER CRANES, MOBILE CRANES, ADELAIDE/ACT/BRISBANE/MELBOURNE/ PERTH/SYDNEY/NEW ZEALAND HEAD OFFICE 7 CURTIS RD, MULGRAVE NSW 2765 +61 1300 30 40 52	CLIENT Builtcom	PROJECT EASTLAKES MIXED USED DEVELOPMENT_NSW	CRANE	MODEL	JIB	CAPACITY	TOWERS	REV	DESCRIPTION	DRN.	CHK.	DATE	DWG NO.	SHEET NO.	SCALE	DRAWN BY		
			TC1	J560	50	24	15	P1	Information	AK	-	02.10.25	6276-01-01	T100	1:500 @ A3	AK		
			TC2	J560	45	24	15	P2	FOR INFORMATION	AK	-	14.05.26						
			TC3	J560	55	24	15											
		DRAWING NEARMAP+CRANE RADIAL+ COORDINATES	TC4	J560	40	24	15											REV P2
NOT FOR CONSTRUCTION THIS DRAWING HAS BEEN ISSUED FOR INFORMATION ONLY AND SUBJECT TO FINAL ENGINEERING DESIGN. ALL DETAILS REMAIN CONCEPTS AND SHOULD NOT BE RELIED UPON. DO NOT SCALE OFF THIS DRAWING. THESE DRAWINGS REMAIN THE PROPERTY OF LVL80 CRANES, ANY MODIFICATION OR REPRODUCTION OF THEM IN ANY FORM IS PROHIBITED WITHOUT WRITTEN CONSENT FROM LVL80 CRANES.																		



INITIALLY WITH ALL 4 CRANES BELOW PANS-OPS
SLAB AROUND TC4 TO BE BELOW L01

- NOTES:
- BUILDING SCREENS/SCAFFOLD AND JUMPFORM HAS NOT BEEN CONSIDERED IN THIS STUDY.
 - CRANES HAD BEEN PLACED IN INDICATIVE LOCATIONS AND FURTHER STUDIES TO BE DONE ONCE BUILDING SEQUENCING INFORMATION AVAILABLE.

LVL80 LVL80 CRANES TOWER CRANES, MOBILE CRANES, ADELAIDE/ACT/BRISBANE/MELBOURNE/ PERTH/SYDNEY/NEW ZEALAND HEAD OFFICE 7 CURTIS RD, MULGRAVE NSW 2765 +61 1300 30 40 52	CLIENT Builtcom	PROJECT	EASTLAKES MIXED USED DEVELOPMENT_NSW					CRANE	MODEL	JIB	CAPACITY	TOWERS	REV	DESCRIPTION	DRN.	CHK.	DATE	DWG NO.	SHEET NO.	SCALE	DRAWN BY
		DRAWING	ELEVATION	TC1	J560	50	24	15	P1	Information	AK	-	02.10.25	6276-01-01	T200	1:800 @ A3	AK				
				TC2	J560	45	24	15	P2	FOR INFORMATION	AK	-	14.05.26	NOT FOR CONSTRUCTION THIS DRAWING HAS BEEN ISSUED FOR INFORMATION ONLY AND SUBJECT TO FINAL ENGINEERING DESIGN. ALL DETAILS REMAIN CONCEPTS AND SHOULD NOT BE RELIED UPON. DO NOT SCALE OFF THIS DRAWING. THESE DRAWINGS REMAIN THE PROPERTY OF LVL80 CRANES, ANY MODIFICATION OR REPRODUCTION OF THEM IN ANY FORM IS PROHIBITED WITHOUT WRITTEN CONSENT FROM LVL80 CRANES.		REV					
				TC3	J560	55	24	15													
				TC4	J560	40	24	15													



TC1 CLIMBS TO ITS MAXIMUM HEIGHT ABOVE PANS_OPS
SLAB AROUND TC4 TO BE BELOW L05

- NOTES:
- BUILDING SCREENS/SCAFFOLD AND JUMPFORM HAS NOT BEEN CONSIDERED IN THIS STUDY.
 - CRANES HAD BEEN PLACED IN INDICATIVE LOCATIONS AND FURTHER STUDIES TO BE DONE ONCE BUILDING SEQUENCING INFORMATION AVAILABLE.

LVL80 CRANES
TOWER CRANES, MOBILE CRANES,
ADELAIDE/ACT/BRISBANE/MELBOURNE/
PERTH/SYDNEY/NEW ZEALAND

HEAD OFFICE
7 CURTIS RD, MULGRAVE NSW 2765
+61 1300 30 40 52

CLIENT

Builtcom

PROJECT

EASTLAKES MIXED USED DEVELOPMENT_NSW

DRAWING

FINAL HEIGHT OF TC1

CRANE	MODEL	JIB	CAPACITY	TOWERS
TC1	J560	50	24	15
TC2	J560	45	24	15
TC3	J560	55	24	15
TC4	J560	40	24	15

REV	DESCRIPTION	DRN.	CHK.	DATE	DWG NO.	SHEET NO.	SCALE	DRAWN BY
P1	Information	AK	-	02.10.25	6276-01-01	T201	1:800 @ A3	AK
P2	FOR INFORMATION	AK	-	14.05.26				

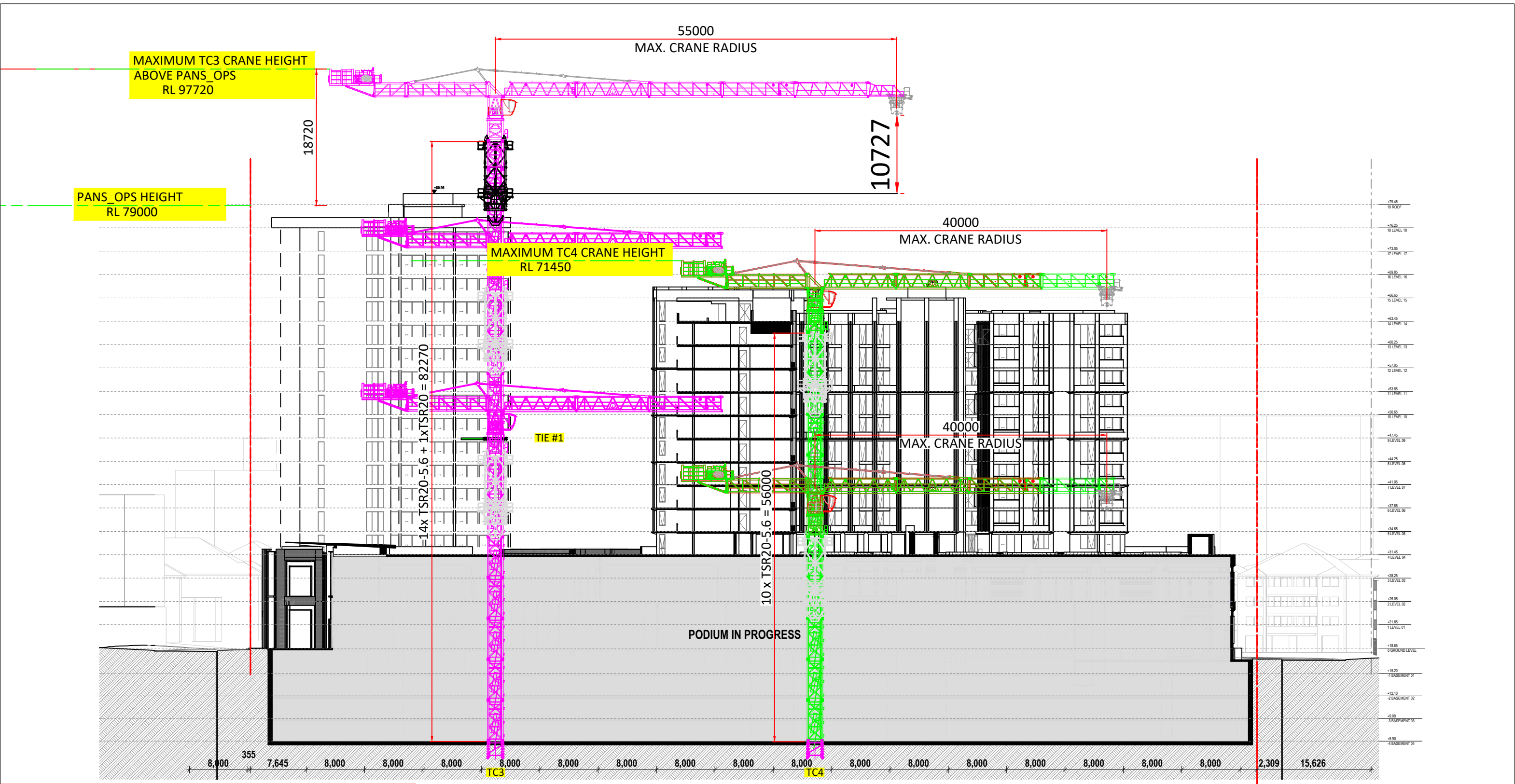
NOT FOR CONSTRUCTION

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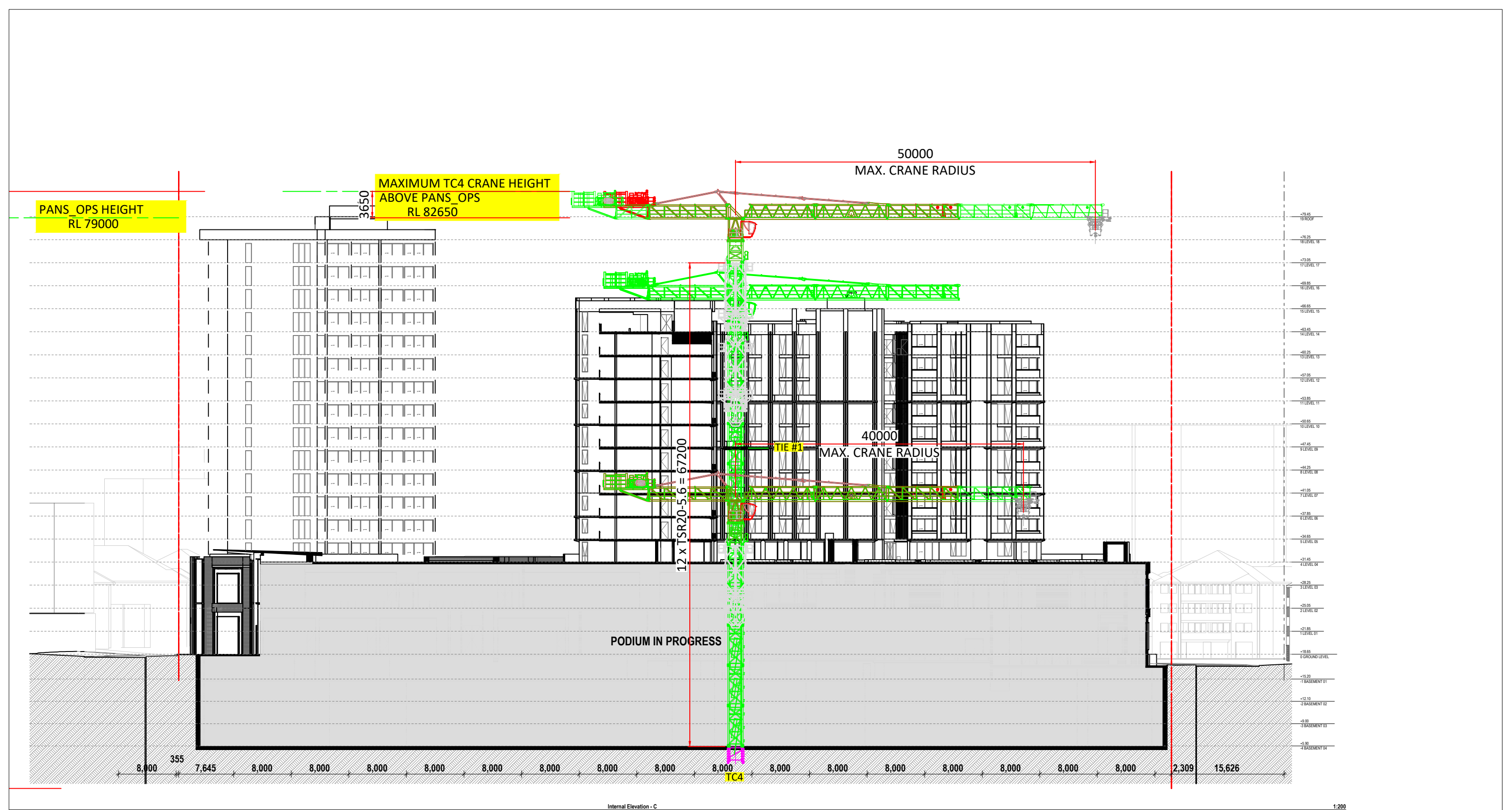
REV

P2



- ASSUMPTIONS TC2 ALREADY TAKEN OUT
- TC3 GAIN HEIGHTS AND COMPLETE THE ADJACENT BUILDING
- STRUCTURE AROUND TC4 TO BE BELOW L13

LVL80 LVL80 CRANES TOWER CRANES, MOBILE CRANES, ADELAIDE/ACT/BRISBANE/MELBOURNE/ PERTH/SYDNEY/NEW ZEALAND HEAD OFFICE 7 CURTIS RD, MULGRAVE NSW 2765 +61 1300 30 40 52	CLIENT Builtcom	PROJECT	CRANE	MODEL	JIB	CAPACITY	TOWERS	REV	DESCRIPTION	DRN.	CHK.	DATE	DWG NO.	SHEET NO.	SCALE	DRAWN BY	
		EASTLAKES MIXED USED DEVELOPMENT_NSW						P1	Information	AK	-	02.10.25	6276-01-01	T203	1:500 @ A3	AK	
								P2	FOR INFORMATION	AK	-	14.05.26					
		DRAWING	TC1	J560	50	24	15										REV P2
		ELEVATION TC3 MAXIMUM HEIGHT	TC2	J560	45	24	15										
			TC3	J560	55	24	15										
			TC4	J560	40	24	15										



- ASSUMPTIONS TC3 HELPS INCREASE JIB LENGTH OF TC4 TO 50m AND IS TAKEN OUT- TBC
- TC4 GAIN HEIGHTS AND COMPLETE THE ADJACENT BUILDING

LVL80 LVL80 CRANES TOWER CRANES, MOBILE CRANES, ADELAIDE/ACT/BRISBANE/MELBOURNE/ PERTH/SYDNEY/NEW ZEALAND HEAD OFFICE 7 CURTIS RD, MULGRAVE NSW 2765 +61 1300 30 40 52	CLIENT Builtcom	PROJECT EASTLAKES MIXED USED DEVELOPMENT_NSW	CRANE	MODEL	JIB	CAPACITY	TOWERS	REV	DESCRIPTION			DRN.	CHK.	DATE	DWG NO.	SHEET NO.	SCALE	DRAWN BY	
			TC1	J560	50	24	15	P1	Information			AK	-	02.10.25	6276-01-01	T204	1:500 @ A3	AK	
			TC2	J560	45	24	15	P2	FOR INFORMATION			AK	-	14.05.26	NOT FOR CONSTRUCTION THIS DRAWING HAS BEEN ISSUED FOR INFORMATION ONLY AND SUBJECT TO FINAL ENGINEERING DESIGN. ALL DETAILS REMAIN CONCEPTS AND SHOULD NOT BE RELIED UPON. DO NOT SCALE OFF THIS DRAWING. THESE DRAWINGS REMAIN THE PROPERTY OF LVL80 CRANES, ANY MODIFICATION OR REPRODUCTION OF THEM IN ANY FORM IS PROHIBITED WITHOUT WRITTEN CONSENT FROM LVL80 CRANES.				
			TC3	J560	55	24	15												
			TC4	J560	40	24	15												
		DRAWING ELEVATION TC4 MAXIMUM HEIGHT																	REV P2

Sydney Airport ANEF 2039

Table 2.1 Building Site Acceptability Based on ANEF Zones - AS2021:2025

Building type	ANEF Zone of site		
	Acceptable	Conditionally acceptable	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF (Note 1)	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF (Note 1)	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Notes:

- The actual location of the 20 ANEF contours is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside by near to the 20 ANEF contour.
- Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).
- There will be cases where a building of a particular type will contain spaces used for activities which would generally be ground in a different type of building (e.g. an office in an industrial building). In these cases Table 2.1 should be used to determine suite acceptability, but internal design noise levels within the specific spaced should be determined by Table 3.3.
- This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect if aircraft noise on outdoor areas associated with the buildings should be considered.
- In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.

ANEF contours modelled with INM 7.0d with terrain

Where figures have been rounded, discrepancies may occur between totals and the sums of component items.

2026 Daily Movements by Runway																				
Aircraft	Arrivals				Departures				Arrivals				Departures							
	Day	Night	Total	All	Day	Night	Total	All	Day	Night	Total	All	Day	Night	Total	All				
Runway 07																	Runway 25			
737800	9.44	1.42	10.85	16.83	0.60	5.48	16.33	7.80	1.81	9.62	5.49	0.92	6.42	16.03						
737MAX	3.15	0.47	3.62	1.63	0.20	1.83	5.44	2.60	0.60	3.21	1.82	0.31	2.14	5.34						
747400	0.20	0.00	0.20	0.11	0.02	0.13	0.33	0.17	0.07	0.12	0.03	0.15	0.32							
777200	1.32	0.06	1.39	0.28	0.07	0.35	1.74	0.81	0.11	0.92	0.63	0.13	0.76	1.68						
777300	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.00	0.03	0.03	0.08	0.00	0.08	0.11						
7773ER	0.41	0.10	0.51	0.49	0.02	0.51	1.02	0.29	0.11	0.41	0.55	0.05	0.60	1.01						
A320-232	1.65	0.34	1.12	0.56	0.13	0.69	2.01	0.76	0.29	1.06	0.81	0.34	1.15	2.21						
A320-232	0.98	0.45	2.10	0.94	0.10	1.04	3.14	1.36	0.58	1.94	1.03	0.15	1.19	3.13						
A320NEO	0.55	0.15	0.70	0.31	0.03	0.35	1.05	0.45	0.19	0.65	0.34	0.05	0.40	1.04						
A321-232	1.54	0.27	1.81	0.52	0.15	0.66	2.47	1.20	0.37	1.57	0.65	0.24	0.89	2.46						
A321NEO	0.51	0.09	0.60	0.17	0.05	0.22	0.82	0.40	0.12	0.52	0.22	0.08	0.30	0.82						
A330-343	3.22	0.46	3.68	1.54	0.22	1.57	5.25	2.64	0.60	3.24	2.21	0.27	2.48	5.72						
A340-642	0.08	0.00	0.08	0.07	0.00	0.07	0.15	0.05	0.00	0.05	0.04	0.00	0.04	0.10						
A380-841	0.27	0.06	0.32	0.23	0.05	0.28	0.60	0.22	0.12	0.34	0.33	0.10	0.43	0.77						
A380-961	0.01	0.02	0.14	0.10	0.02	0.12	0.26	0.09	0.05	0.15	0.14	0.04	0.19	0.33						
CNA441	0.00	0.38	0.38	0.00	0.04	0.04	0.43	0.00	0.52	0.52	0.00	0.17	0.17	0.69						
CNA680	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.03	0.03	0.00	0.02	0.02	0.05						
DHC830	2.30	0.07	2.37	1.58	0.15	1.73	4.10	2.29	0.16	2.45	1.90	0.16	2.06	4.31						
DO228	0.08	0.03	0.12	0.09	0.02	0.11	0.22	0.09	0.04	0.13	0.10	0.03	0.13	0.25						
DO328	1.01	0.06	1.07	0.39	0.08	0.47	1.54	0.86	0.08	0.94	0.48	0.07	0.56	1.50						
FI0062	0.40	0.00	0.40	0.11	0.00	0.11	0.51	0.23	0.00	0.23	0.09	0.00	0.09	0.33						
GV	0.00	0.02	0.02	0.00	0.02	0.02	0.04	0.00	0.07	0.07	0.00	0.33	0.33	0.40						
LEAR35	0.00	0.15	0.15	0.08	0.00	0.09	0.23	0.00	0.17	0.17	0.08	0.03	0.09	0.25						
MD11GE	0.07	0.00	0.07	0.06	0.00	0.06	0.13	0.06	0.00	0.06	0.04	0.00	0.04	0.09						
SF340	3.30	0.08	3.38	1.52	0.17	1.69	5.07	2.73	0.07	2.80	1.65	0.16	1.81	4.61						
BAE146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
TOTAL	30.58	10.58	41.16	16.48	6.00	22.48	68.93	25.11	31.25	62.50	18.80	3.69	22.49	53.74						
Runway 16L																	Runway 34R			
737800	39.56	14.33	53.88	35.14	17.53	72.67	126.55	33.00	11.63	44.63	40.43	15.55	55.98	100.61						
A320-232	6.01	2.25	8.26	10.20	3.51	13.71	21.98	5.37	2.14	7.51	7.74	2.98	10.72	18.24						
A320NEO	2.00	0.15	2.15	1.40	0.17	4.57	7.32	1.79	0.71	2.50	2.58	0.99	3.57	6.08						
A321-232	6.07	2.91	8.98	7.33	3.86	11.19	20.17	5.34	2.85	8.19	5.94	3.37	9.31	17.50						
A321NEO	2.02	0.97	2.99	2.44	1.29	3.73	6.72	1.78	0.95	2.73	1.98	1.12	3.10	5.83						
A330-343	5.45	0.87	6.33	11.48	2.07	15.55	19.88	4.60	1.16	5.76	8.55	1.69	10.24	16.00						
A340-642	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
A380-841	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
A380-961	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
CNA441	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
CNA680	0.00	2.58	2.58	0.00	3.83	3.83	6.41	0.00	2.75	2.75	0.00	3.97	3.97	6.72						
DHC830	13.27	2.14	15.42	11.96	1.55	13.51	28.92	10.87	1.61	12.47	9.41	1.32	10.73	23.21						
DO228	0.58	0.43	1.01	0.46	0.55	1.01	2.02	0.30	0.55	0.85	0.50	0.40	0.90	1.74						
DO328	1.51	0.00	1.51	1.71	0.60	2.30	3.81	1.76	1.00	2.76	1.21	0.41	1.62	3.39						
FI0062	0.74	0.00	0.74	1.15	0.00	1.15	1.89	0.63	0.00	0.63	0.65	0.00	0.65	1.27						
GV	0.00	0.52	0.52	0.00	0.93	0.93	1.45	0.00	0.43	0.43	0.00	0.62	0.62	1.05						
LEAR35	0.00	1.04	1.04	0.57	0.43	1.01	2.05	0.00	1.43	1.43	0.29	0.55	0.84	2.27						
MD11GE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
SF340	4.49	0.00	4.49	5.85	0.00	5.85	10.34	4.48	0.00	4.48	4.31	0.00	4.31	8.79						
BAE146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
TOTAL	94.89	34.31	129.20	130.07	43.68	173.75	302.75	80.91	30.33	111.43	97.07	38.73	135.80	247.23						
Runway 16R																	Runway 34L			
Aircraft	Day	Night	Total	All	Day	Night	Total	All	Day	Night	Total	All	Day	Night	Total	All				
737800	22.60	8.20	30.89	15.53	3.51	19.04	60.50	17.13	8.39	25.52	12.96	2.95	15.91	41.41						
737MAX	7.20	2.35	10.55	5.17	1.17	6.35	16.68	5.71	2.80	8.51	4.32	0.98	5.30	13.84						
747400	0.26	0.16	0.43	0.15	0.04	0.24	0.32	0.12	0.07	0.14	0.15	0.03	0.18	0.37						
777200	5.27	2.51	7.78	2.28	2.71	10.00	17.78	6.60	2.32	8.92	5.79	2.08	7.88	16.80						
777300	0.00	0.85	0.85	0.93	0.05	0.93	1.78	0.00	0.12	1.12	0.98	0.00	0.98	2.09						
A320-232	2.64	1.56	4.67	1.06	1.75	13.20	3.28	4.15	7.42	4.49	0.87	0.87	5.35	12.27						
A320-232	4.19	1.22	5.41	2.22	2.00	2.47	8.80	2.60	2.01	4.60	1.62	0.62	1.62	6.27						
A320NEO	1.33	0.78	2.11	0.82	0.00	0.82	2.93	0.87	0.67	1.53	0.54	0.00	0.54	2.07						
A321-232	0.85	4.42	5.14	1.89	3.13	7.55	2.31	0.68	2.77	0.83	1.74	0.57	2.33	3.35						
A321NEO	0.47	0.93	1.41	0.41	0.04	0.45	1.22	0.32	0.14	0.46	0.29	0.00	0.29	0.86						
A330-343	18.02	4.55	22.57	15.69	4.21	19.90	42.47	16.65	5.77	22.42	12.92	3.35	16.26	38.89						
A340-642	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
A380-841	0.00	0.58	0.57	0.00	0.00	0.00	0.00	0.00	0.28	0.31	0.00	0.00	0.31	0.60						
A380-961	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
CNA441	1.25	1.26	2.51	1.84	0.95	1.78	3.29	0.94	1.67	2.61	1.52	0.79	2.31	4.92						
CNA680	0.00	0.88	0.88	0.00	1.43	1.43	2.31	0.00	2.89	2.89	0.00	0.55	0.55	1.44						
DHC830	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
DHC830	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
DO228	0.44	0.56	1.00	0.99	0.00	0.99	2.00	0.51	0.39	0.90	0.86	0.00	0.86	1.76						
DO328	4.29	1.65	5.94	4.87	1.19	6.06	12.00	3.57	1.21	4.79	4.14	0.85	4.99	9.77						
FI0062	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
GV	0.00	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.00	0.00	0.00	0.00						
LEAR35	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.00	0.21	0.21	0.00	0.56	0.56	0.76						
MD11GE	0.58	0.00	0.58	0.57	0.00	0.57	1.15	0.29	0.00	0.29	0.33	0.00	0.33	0.62						
SF340	1.71	0.81	2.52	1.91	0.45	2.36	3.72	1.20	0.40	1.60	1.20	0.00	1.20	2.40						
BAE146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	3.00	0.00	0.00	0.00	0.00						
TOTAL	113.98	40.04	154.02	108.50	35.64	144.15	298.17	95.46	44.85	144.00	84.97	25.21	110.18	255.17						