Acoustic Report

Wellness Centre, Brookvale

Prepared for The Williams River Steel

Prepared by RCA Australia

RCA ref 15866-401/2

October 2021

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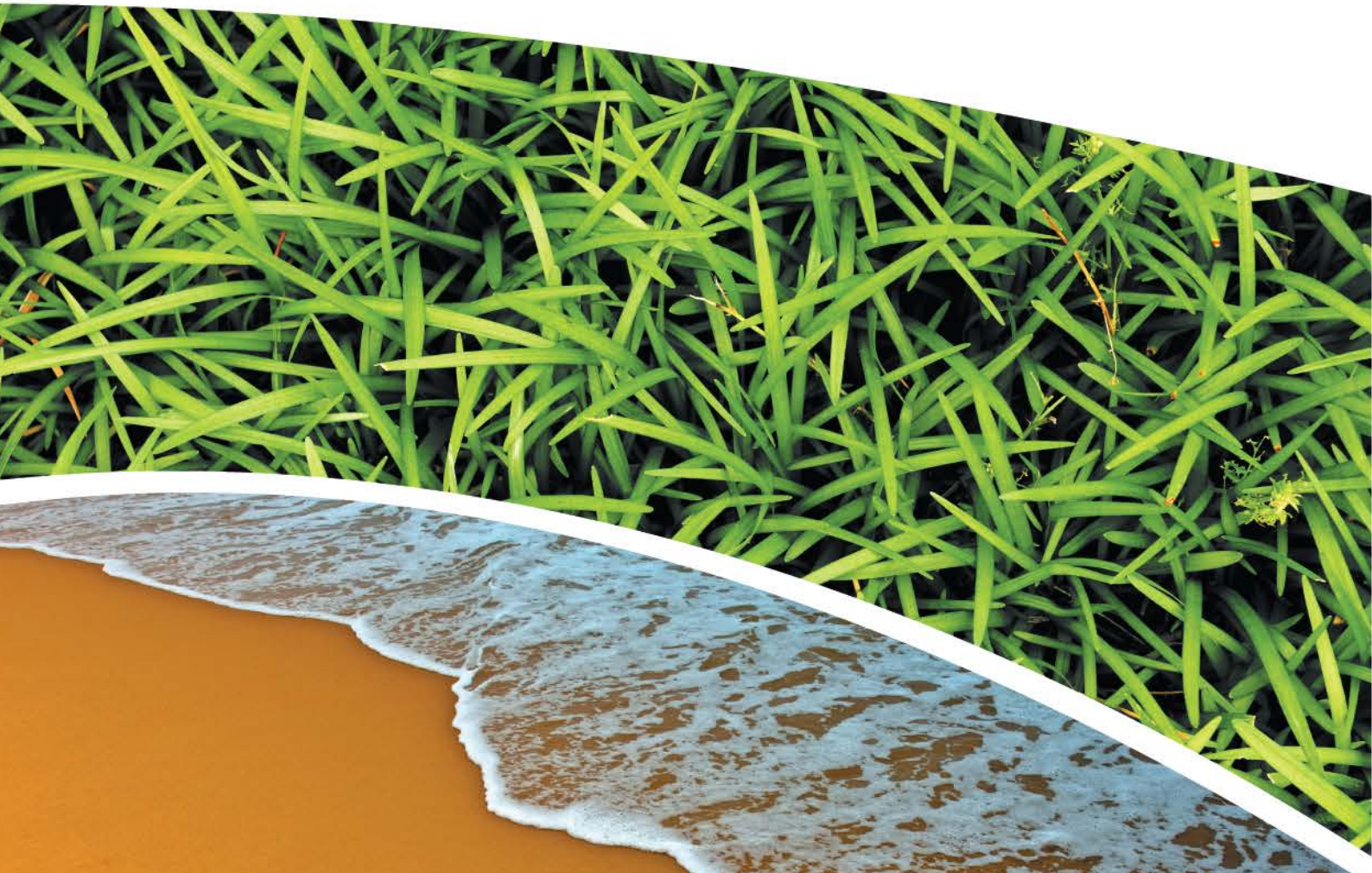

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DOCUMENT STATUS						
Rev No	**Comment**	**Author**	**Reviewer**	**Approved for Issue (Project Manager)**		
				Name	**Signature**	**Date**
/0	Draft	Dario Barbosa	Alex Rees	Alex Rees		24.08.21
/1	Final	Dario Barbosa	Alex Rees	Alex Rees		01.09.21
/2	Final	Dario Barbosa	Alex Rees	Alex Rees		19.10.21

DOCUMENT DISTRIBUTION				
Rev No	**Copies**	**Format**	**Issued to**	**Date**
/0	1	Electronic (email)	Chris White <chris.white@wrsteel.com.au>	24.08.21
/0	1	Electronic report	RCA – job archive	24.08.21
/1	1	Electronic (email)	Chris White <chris.white@wrsteel.com.au>	01.09.21
/1	1	Electronic report	RCA – job archive	01.09.21
/2	1	Electronic (email)	Chris White <chris.white@wrsteel.com.au>	19.10.21
/2	1	Electronic report	RCA – job archive	19.10.21

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RCA ref 15866-401/2

19 October 2021

The Williams River Steel
25 Old Punt Road
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Attention: Mr Chris White

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Noise & Vibration
Occupational Hygiene

ACOUSTIC REPORT
WELLNESS CENTRE, BROOKVALE

1 INTRODUCTION

RCA Australia (RCA) have been engaged by The Williams River Steel to complete an Acoustic Report to accompany the development application of a Wellness Centre located at 145 Old Pittwater Road, Brookvale NSW.

1.1 PROPOSAL DESCRIPTION

The proposed Wellness Centre will comprise: a 25-meter pool, a 15-meter LTS/ Hydro pool, a wellness centre, reception and administrative areas, an enclosed Café for patrons only and amenities including toilets and changerooms.

The architectural plans of the proposed Wellness Centre are shown in **Appendix A**.

The proposal is adjacent to a number of commercial receivers with no residential receivers nearby. We have identified by aerial imagery that the closest cluster of residential receivers are at approximately 370 meters South with no line of sight.

The proposed operational hours of the Wellness Centre are Monday to Friday between 5:00 AM and 12:00 PM, Saturday between 5 AM and 10 PM and Sunday between 6 AM and 10 PM. Based on a 100% occupancy there would be 76 patrons per day at the Wellness Centre.

Peak times would be between 6:00 AM to 8:00 AM on weekdays as well as between 7 AM to 12 PM on weekends.

1.2 PURPOSE OF THIS REPORT

The purpose of this report is to assess potential noise impacts from the operation of the proposal.

1.3 RELEVANT GUIDELINES

This assessment has been prepared in accordance with the following standards and relevant guidelines:

- *Noise Policy for Industry (NPfI) (NSW EPA 2017).*
- *NSW Road Noise Policy (RNP) (DEC 2011).*

2 SENSITIVE RECEIVERS

The closest identified commercial receivers were identified from aerial imagery. Proposed Wellness Centre and commercial receivers are shown in **Figure 1**.

Figure 1 *Proposed Wellness Centre is highlighted yellow.*

3 NOISE CRITERIA

3.1 NOISE POLICY FOR INDUSTRY

The *NPfI* provides guidance on setting industrial noise criteria and includes consideration of two types of criteria: amenity noise criteria and intrusive noise criteria.

The purpose of the amenity noise criteria is to set reasonable cumulative industrial noise levels for an area based on the receiver land use. *Table 2.2* of the *NPfI* provides noise amenity criteria. The *NPfI* states that to ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise, where the project amenity level is 5 dB less than the recommended amenity level.

Note that the amenity noise level applies over the full assessment period, and average sound levels over the period will generally be lower than the worst-case 15-minute levels predicted in this assessment. An adjustment is therefore required to convert period criteria to 15-minute criteria. In accordance with *Section 2.2* of the *NPfI*, the equivalent 15-minute amenity criteria are equal to the period amenity criteria plus 3 dB.

The intrusiveness criteria only apply to residential receivers. There are no residential receivers nearby, therefore only amenity noise criterion is applicable. The project specific criterion is presented in **Table 1**.

Table 1 *Operational noise criteria - NPfI*

Time of Day	Intrusiveness Noise Levels	Amenity Noise Levels	Period Adjusted Project Amenity Noise Level	*Project Noise Trigger Level
			Commercial*	Commercial ($L_{Aeq,15min}$)
When in use	-	65 dBA	63 dBA	63 dBA

**We have assumed nearest receivers to all be commercial.*

3.2 ROAD NOISE POLICY

The *RNP* provides road noise criteria for additional traffic generated by land use developments. Additionally, the *RNP* states that provided any increase in total road noise due to a development is not greater than 2 dB, then the *RNP* objectives have been met. RCA note that a 2B increase in road noise is approximately equivalent to a 60% increase in traffic. This 2 dB increase screening criteria will be used to assess road noise impacts due to the proposal.

3.3 EXTERNAL PLANT NOISE

Based on the architectural planes of the proposed Wellness Centre shown in **Appendix A,** RCA has assumed the following:

- Floor level: cluster of 4 AC units; each unit with a sound power level (SWL) of 80 dBA.
- Roof top: cluster of 4 AC units; each unit with a SWL of 80 dBA.
- Roof top: cluster of 2 exhaust fan; each fan with a SWL of 85 dBA.

We sourced a representative SWL of a large condenser unit and of an exhaust fan from an *Association of Australasian Acoustical Consultants* (AAAC) guideline, as shown in **Figure 2**.

Small (single fan) condenser (outdoor unit)	65 dB
Medium (double fan) condenser (outdoor unit)	70 dB
Large (double fan) condenser (outdoor unit)	80 dB
Small exhaust fan (toilet, garbage room)	60 dB
Small kitchen exhaust fan	70 dB
Carpark exhaust fan	85 dB

Figure 2 *Sound Power Levels (LAeq) for external mechanical plant taken from AAAC guideline*.

4 NOISE ASSESSMENT

4.1 OPERATIONAL NOISE

RCA modelled using CadnaA computer software (version 2020) the potential noise impacts of sound emissions from external AC units, internal pool plant equipment, external mechanical ventilation, carpark and traffic generated from the development. The ISO 9613-2 algorithm was implemented, which incorporates the equivalent of a 2 m/s source to receiver wind in all directions or a moderate temperature inversion. The result is that the modelled predictions are made under 'noise enhancing' meteorological conditions. This provides some conservatism in the predictions made. The height of the receivers has been assessed at 1.5 m. Noise model inputs are shown in **Table 2**.

Table 2 *CadnaA noise model inputs*

Model parameter	Value	Notes / assumptions
Calculation algorithm	*ISO 9613-2*	-
Ground absorption coefficient	0	Mostly hard ground type between noise source and adjacent receivers.
Floor level AC units	Cluster of 4 units; each with a SWL of 80 dBA*	Represents a large (double fan) condenser (outdoor unit).
Roof top AC units	Cluster of 4 units; each with a SWL of 80 dBA*	Represents a large (double fan) condenser (outdoor unit).
Roof top exhaust fans	Cluster of 2 units; each with a SWL of 85 dBA*	Represents mechanical ventilation for amenities.
Onsite vehicles	20 Km/h moving point noise source with a SWL of 80 dBA.	Assumed 25 light vehicle movements within carpark during a 15-minute period.
Assessment locations	Height of 1.5 m at nearby commercial receivers	-

*Sound power level (SWL) data sourced from *AAAC - Guideline for Child Care Centre Acoustic Assessment*.

The Wellness Centre will have two pools: a 25-meter pool and an LTS/ Hydro pool. The pool plant for both pools would be located in the indoor plant room provided as shown in **Appendix A**. According to report "*Pool Heating Report - Brauer Industries - 25m Lap Pool & LTS Pool - Warringah Mall, Brookvale NSW- 29th September* 2021", the SWLs for the pool plant equipment are:

- 25 m Pool: EVO Cs-i 130 with a SPL of 63 dBA @ 1 meter.
- LTS/ Hydro pool: EVO CS-i 65 with a SPL of 60 dBA @ 1 meter & Evo Force-I 28-3 with a SPL of 58 dBA @ 1 meter.

Appendix B shows the pool plant brochure.

4.2 OPERATIONAL TRAFFIC NOISE

RCA have assessed potential road traffic noise increase due to the proposed development using the following formula:

$$Increase\ (dB) = 10 * log10\ (\frac{new\ total\ traffic}{current\ traffic})$$

RCA have sourced from the "*Transport for NSW-Traffic Volume Viewer"* an AM and a PM peak hour traffic count of Old Pittwater Road. According to report "*145 Old Pittwater Road, Brookvale- Traffic and parking assessment draft report (Ref 21490- 27 August 2021)*" prepared by Varga Traffic Planning, it is expected that the operation of the proposed Wellness Centre will generate a maximum of 94 vehicles per hour (vph) during the PM peak hour and 70 vph during the AM peak hour.

The output of the formula above was then compared against the *RNP's* objective to limit any increase in total road noise due to a development to 2 dB.

5 NOISE ASSESSMENT RESULTS

5.1 OPERATIONAL NOISE

A summary of the modelling results in CadnaA of the external plant noise impact from the proposed development are shown in **Table 3**.

Table 3 *Model Result and Compliance*

Commercial receiver ID	Predicted SPL at Receivers	Criteria	Time of Day	Compliance (Yes/No)
CI 1	39 dBA	63 dBA	When in use	Yes
CI 2	30 dBA	63 dBA	When in use	Yes
CI 3	41 dBA	63 dBA	When in use	Yes
CI 4	43 dBA	63 dBA	When in use	Yes
CI 5	48 dBA	63 dBA	When in use	Yes
CI 6	54 dBA	63 dBA	When in use	Yes

RCA have taken into consideration that the pool plant equipment will be kept indoors in a designated area as shown in **Appendix A**. The total sound pressure level (SPL) from the pool plant equipment inside the premises is 66 dBA (63 dBA+ 60 dBA+ 58 dBA). A SPL of 66 dBA is approximately equivalent to the level of normal conversation at 1 meter; a standard commercial wall construction would sufficiently mitigate this internal noise source. It has therefore been omitted from the calculations.

5.2 OPERATIONAL TRAFFIC NOISE

Available traffic information indicates the proposal is likely to generate operational traffic during peak hour 94 vehicle movements per hour.

Based on traffic data sourced from *Transport for NSW-Traffic Volume Viewer,* the 2018 AM peak hour traffic count was 4,366 and the 2018 PM peak hour traffic count was 4,340. Adding 94 vehicle movements per hour to the existing traffic volumes on Old Pittwater Road will produce a negligible increase according to the equation in Section **6.1**.

The *RNP* does not require any further assessment of operational traffic noise.

6 CONCLUSION

This report has assessed the potential noise impacts for the proposed Wellness Centre at 145 Old Pittwater Road, Brookvale NSW. RCA considers that the Proposed Wellness Centre will be suitable for development.

Yours faithfully

RCA AUSTRALIA

Dario Barbosa
Acoustic Consultant

REFERENCES

[1] Noise Policy for Industry (NPfI) (NSW EPA 2017).

[2] NSW Road Noise Policy (RNP) (DEC 2011).

[3] AAAC Guideline for Child Care Centre Acoustic Assessment V3.0.

[4] 145 Old Pittwater Road, Brookvale- Traffic and parking assessment draft report (Ref 21490- 27 August 2021)

GLOSSARY

dB (A) ..... Unit of sound pressure level, modified by the A-weighting network to represent the sensitivity of the human ear.

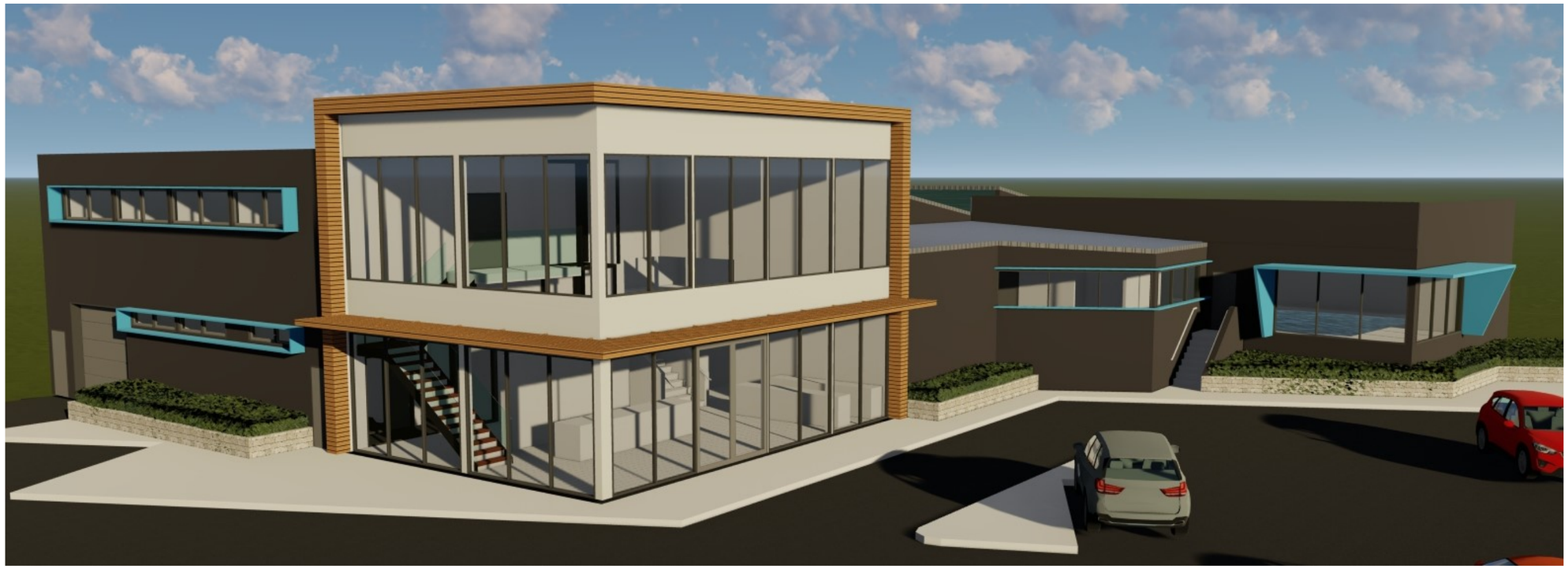
SPL (Lp) ..... The incremental variation of sound pressure from the reference pressure level expressed in decibels.

SWL (L_W) ..... Sound Power Level of a noise sources per unit time expressed in decibels from reference level $W_{O.}$

L_{eq} ..... Equivalent continuous noise level averaged over time on an equivalent energy basis.

Appendix A

Overall Plan



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A	27/7/21	PRELIM ISSUE	PJH
B	6/8/21	WELLNESS CENTRE ADDED	PJH

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Project
Proposed Swim School and Wellness Centre
No.145 OLD PITTWATER ROAD BROOKVALE
LOT 103 IN DP 1247294

Drawing Title
COVER SHEET

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PRELIMINARY

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EXISTING SITE PLAN

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PRELIMINARY

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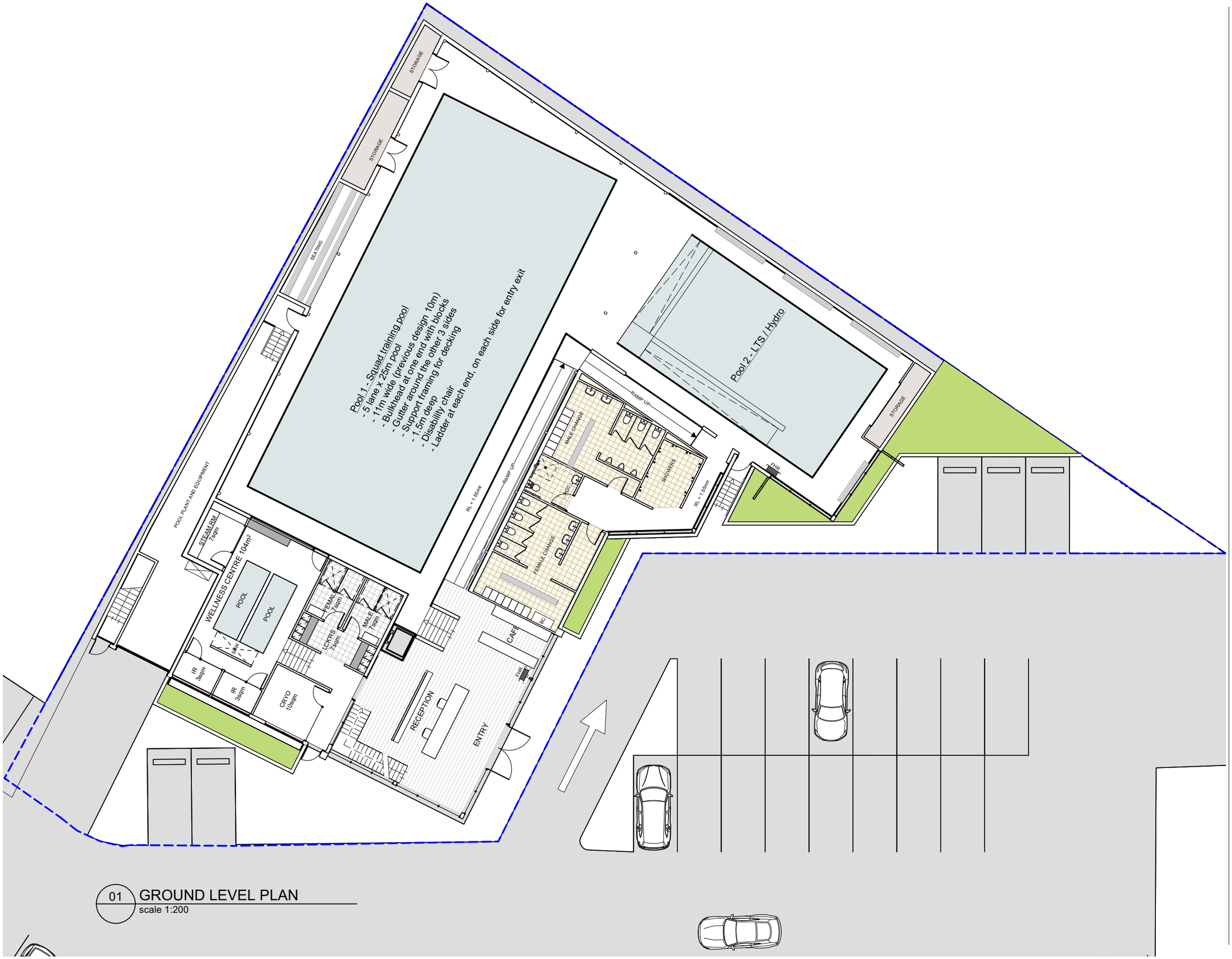

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GROUND LEVEL PLAN

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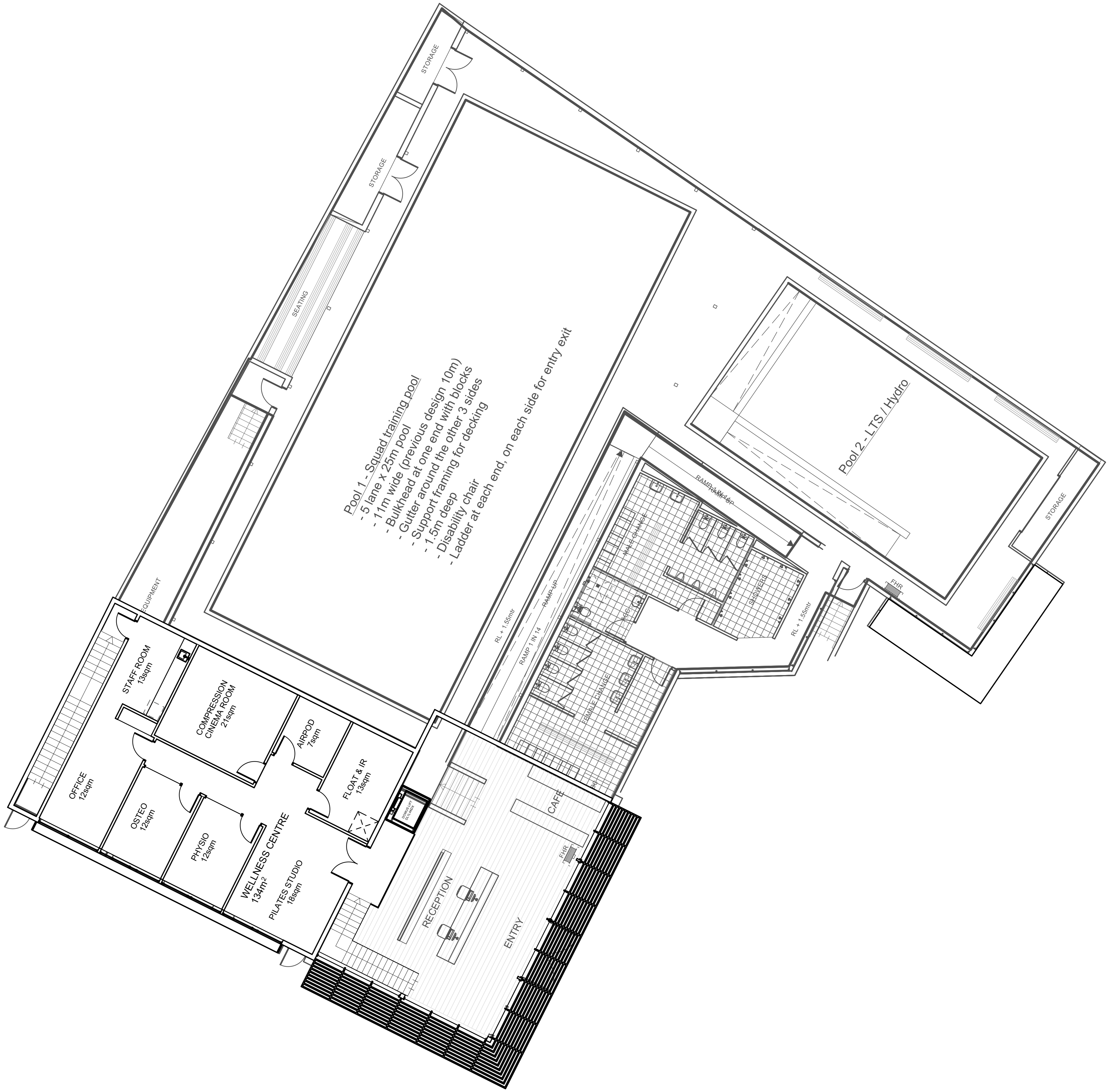

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LEVEL 1 PLAN

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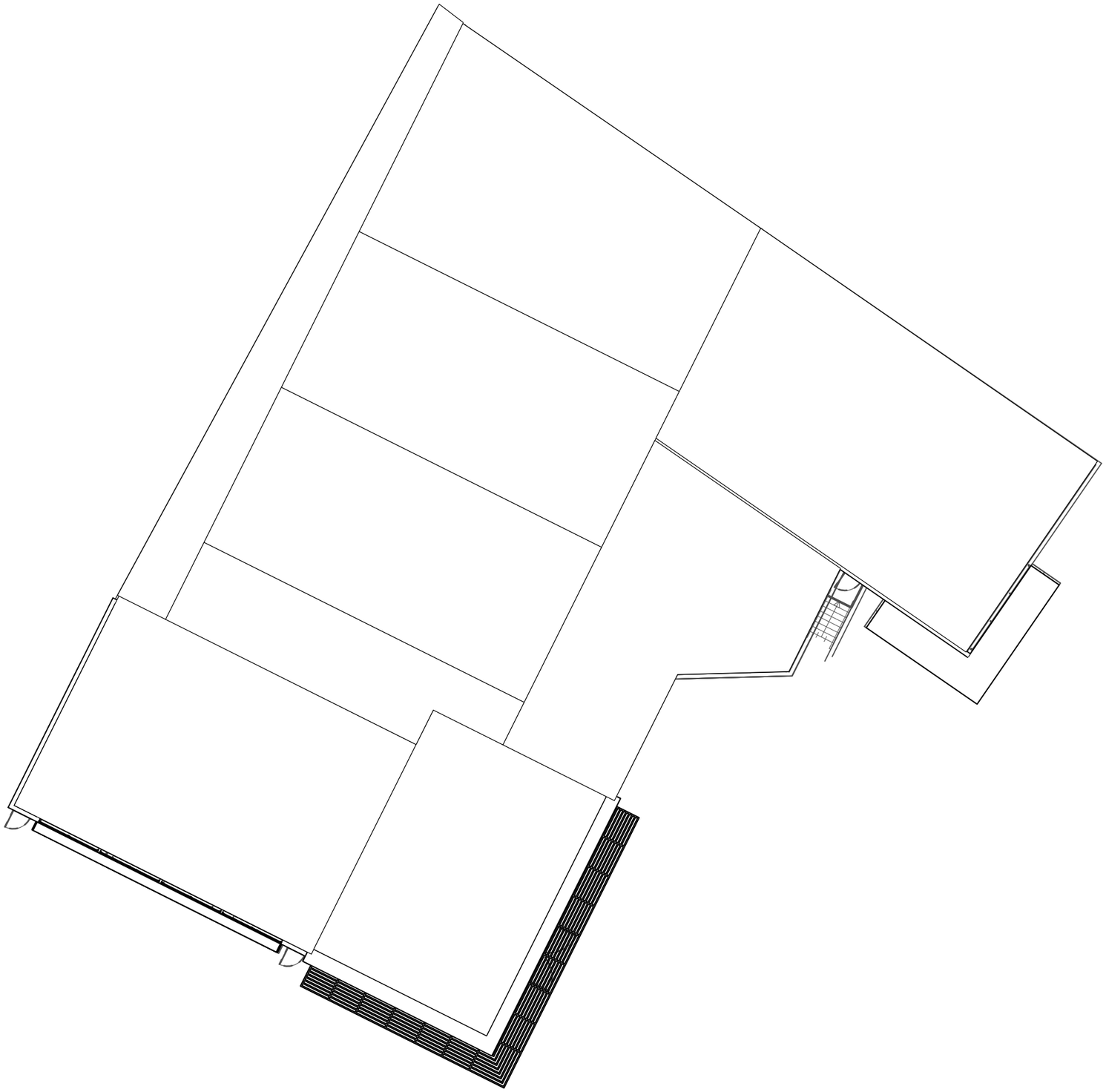

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ROOF PLAN

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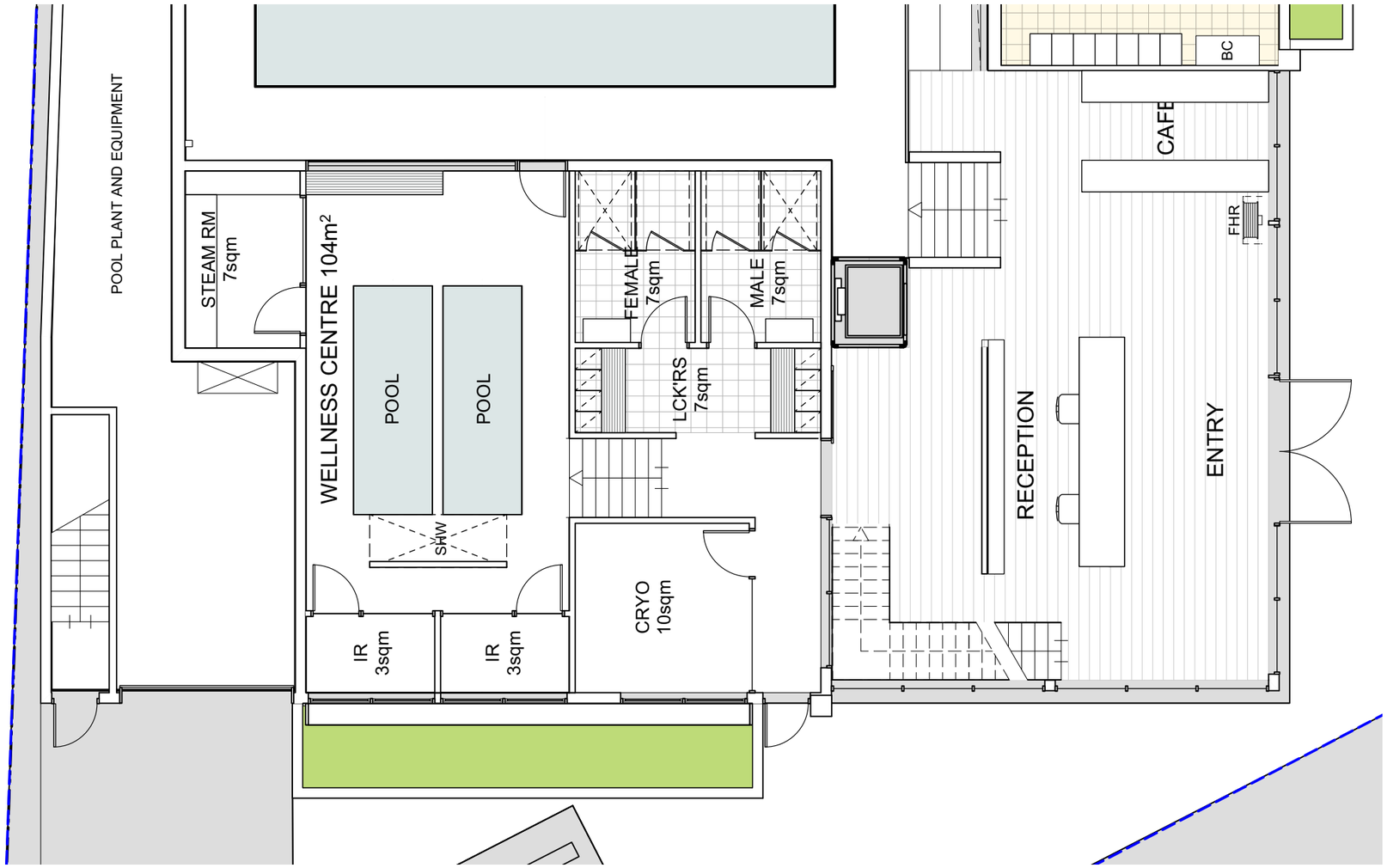

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WELLNESS CENTRE GROUND PLAN

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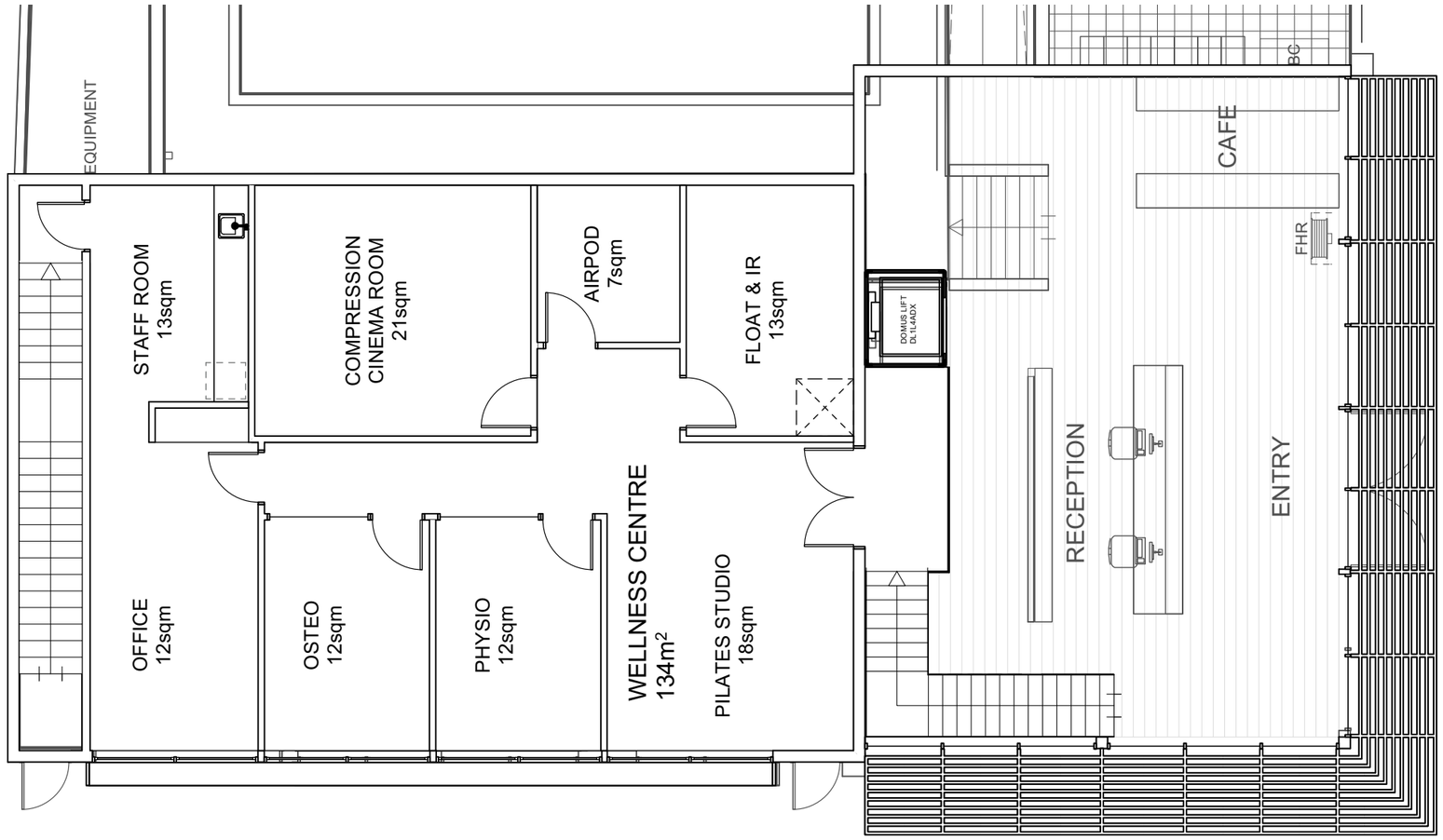

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WELLNESS CENTRE LEVEL 1

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PRELIMINARY

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02 BUILDING ELEVATION 02
scale 1:200

03 BUILDING ELEVATION 03
scale 1:200

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BUILDING ELEVATIONS

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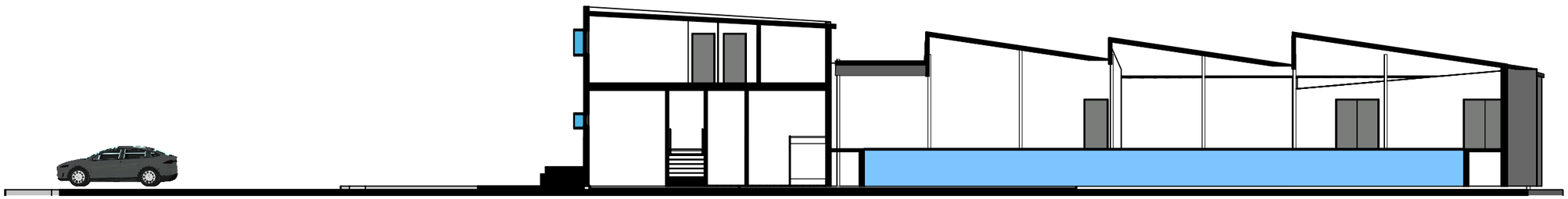

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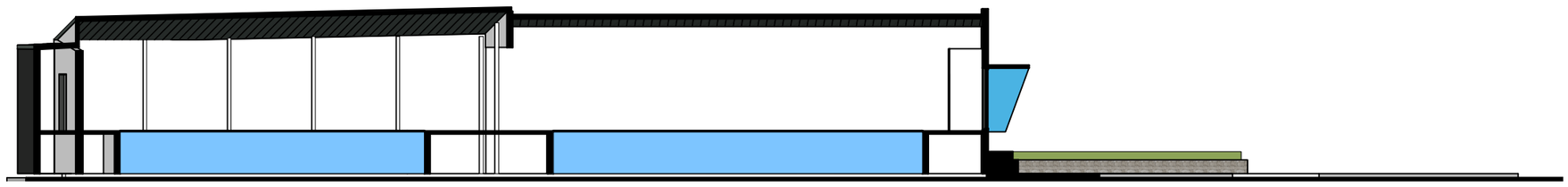

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BUILDING SECTIONS

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Appendix B

Pool Plant Brochure

EVO HEAT
www.evoheat.com.au
HOT H_2O TECHNOLOGY

25 YEAR WARRANTY
on titanium heat exchanger

HOTELS

RESORTS

AQUATIC

SWIM SCHOOLS

WATER PARKS

EVO CS-i

INVERTER POOL HEAT PUMP

COMMERCIAL PERFORMANCE SERIES

EVOTECH INVERTER

SWIM EVERYDAY WITH EVOHEAT

COMMERCIAL

EVO CS-i

INVERTER POOL HEAT PUMP

COMMERCIAL PERFORMANCE SERIES

EVOTECH INVERTER

FORMIDABLE PERFORMANCE UP TO 300kW

Engineered to meet the demands of any commercial application, the Evo CS-i is the most reliable and efficient way to heat a commercial pool. Designed with the latest full inverter technology and exclusive smart features, the Evo CS-i delivers reliable, year round performance with the lowest operating costs. Ideal for aquatic facilities, sports and leisure centres, water parks, apartments, resorts and hotels, - there is no job too big for the Evo CS-i series!

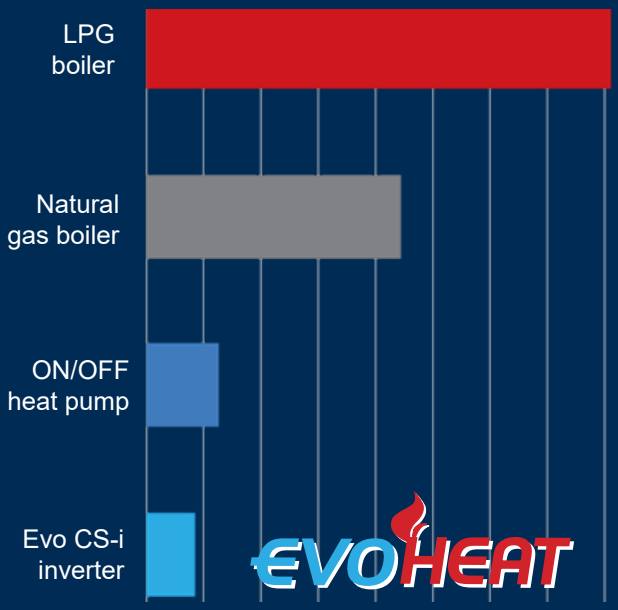
- Power boost mode
- 304 stainless steel cabinet
- Auto defrost with Thermotec Element
- EEV2 technology
- Simple operation
- Eco-friendly R410A refrigerant
- Colour LCD touch screen controller
- Easy installation & compact footprint
- Heating, cooling & auto modes
- Quiet operation
- Stable performance from -15°C
- Vertical airflow
- Full stepless inverter technology
- Ideal to work with solar PV

C.O.P. up to 16.1

EXCEPTIONAL PERFORMANCE & LOW OPERATING COSTS
Evo CS-i series delivers commercial pool heating with exceptional performance, low operating costs & a C.O.P. as high as 16.1.

LATEST STEPLESS DC FULL INVERTER TECHNOLOGY
Incorporating the latest full inverter technology - including DC stepless compressors, fans, and PC boards; the CS-i series will automatically adjust it's power and electricity consumption based on the exact requirements of your pool. This ensures your pool reaches the desired temperature faster, and is maintained more efficiently.

RUNNING COST COMPARISON



COLOUR LCD TOUCH SCREEN CONTROLLER
Featuring an easy to use, colour touch screen controller that allows you to maintain your pool temperature to within 0.1 degree while delivering optimum performance.

POWER BOOST MODE
Ideal for commercial applications, the power boost mode allows you to increase the heat output to heat your pool faster.

HEATING & COOLING MODES
The Evo CS-i series is equipped to automatically heat or cool your pool water based on your set temperature - so you can be sure your pool is always at your desired temperature!

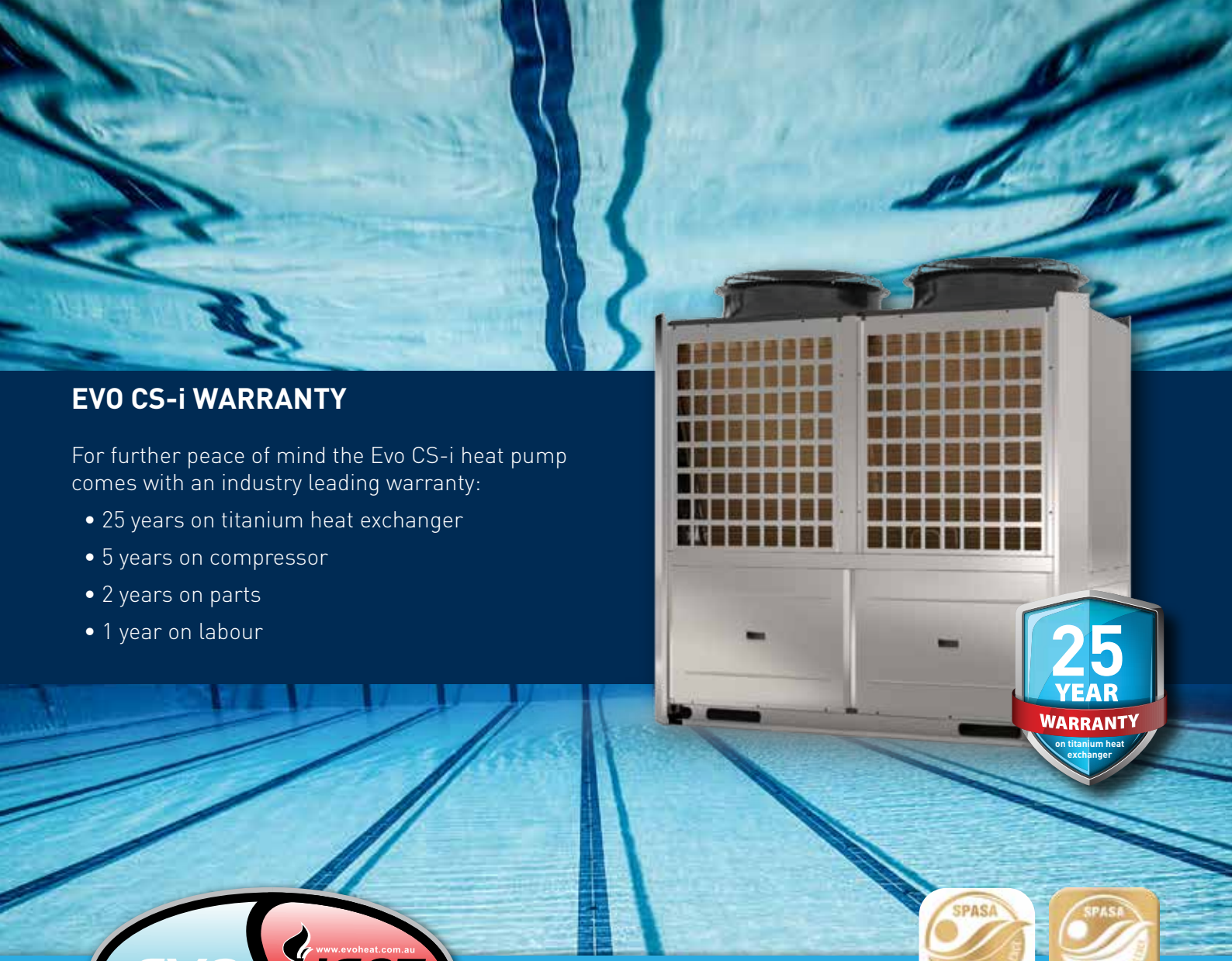
304 STAINLESS STEEL CABINET
The 304 stainless steel cabinet will ensure long term corrosion resistance. Ask us about out optional upgrade to 316 stainless steel.

AUTO DEFROST WITH THERMOTEC ELEMENT
Designed with auto defrost with Thermotec Element, the Evo CS-i series provide automatic defrosting and allows the heat pump to work efficiently in ambient temperatures as low as -15°C.

SLASH YOUR OPERATING COSTS WITH THE EVO CS-i

MODEL	EVO CS-i 65	EVO CS-i 130	EVO CS-i 250
Heat output at 27°C air 26°C water (kW)	65	130	250
Heat output at 15°C air 26°C water (kW)	50	100	190
Cooling output at 55°C air 35°C water (kW)	15	54	110
Cooling output at 45°C air 26°C water (kW)	30	73	130
C.O.P. AT 27°C AIR	**16.10 - 6.10**	**16.00 - 6.20**	**16.10 - 6.12**
POWER BOOST MODE AT 27 DEG AIR	**80kW**	**175kW**	**300kW**
Consumed power at 27 deg air (kW)	0.76-10.65	1.76-20.97	3.81-40.85
Power supply	400/3/50	400/3/50	400/3/50
*Max running current AMPS per phase	19.74	41	85
Compressor type	Mitsubishi DC	Mitsubishi DC	Mitsubishi DC
Refrigerant	R410A	R410A	R410A
PVC water connection (mm)	63	110	110
Water flow rate (L/min)	458	883	1833
Noise dB(A) at 1M	60	63	65
Net dimensions L/W/H (mm)	1750/840/1750	2170/1150/2130	2480/1330/2360
Net weight (kg)	358	700	900

The data above is based on the EVO heat pump only, it does not include auxiliary devices. Product specification information provided above is correct at the date of printing, this data may change without notice. Please speak with an EvoHeat Specialist for the most current product specifications.



EVO CS-i WARRANTY

For further peace of mind the Evo CS-i heat pump comes with an industry leading warranty:

- 25 years on titanium heat exchanger
- 5 years on compressor
- 2 years on parts
- 1 year on labour

EVO HEAT
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HOT H_2O TECHNOLOGY

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THE SPECIALISTS IN POOL AND SPA HEATING

EvoHeat are the industry specialists in energy efficient pool and spa heating and cooling. Australian owned and operated and with more than 15 years' experience in providing tailored domestic and commercial solutions, EvoHeat are the industries' preferred supplier of heat pump water heating technologies.

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HOT H_2O TECHNOLOGY

SWIM EVERYDAY WITH EVOHEAT

FORCE-i

SWIMMING POOL & SPA HEAT PUMP

HIGH PERFORMANCE SERIES

EVOTECH INVERTER

DOMESTIC

FORCE-i

SWIMMING POOL & SPA INVERTER HEAT PUMPS

HIGH PERFORMANCE SERIES

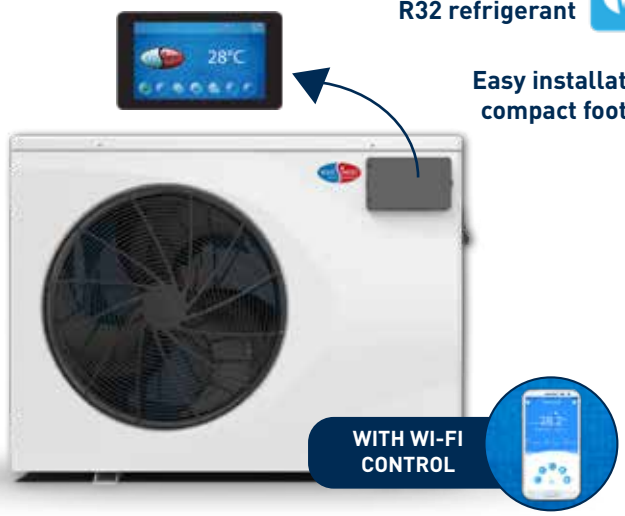
EVOTECH INVERTER

INTRODUCING THE MOST EFFICIENT YEAR-ROUND POOL HEATER AVAILABLE

The Evo Force-i series heat pump is our high performance pool and spa inverter heat pump that provides year round pool heating with the lowest running costs. Designed with the latest stepless full DC inverter compressors, fans, and control systems – all working in perfect harmony to provide optimized heating and cooling with the lowest operating costs. With higher performances, lower noise levels, and more features as standard; the Evo Force-i is the most energy efficient & environmentally friendly year round pool heater available.

FRIENDLY ON THE ENVIRONMENT & YOUR POCKET

- Auto defrost with Thermotec Element
- Robust ABS cabinet
- Built in timers
- Eco-friendly R32 refrigerant
- Intelligent LCD touch screen controller
- Easy installation & compact footprint
- Heating, cooling & auto modes
- Quiet operation
- Extremely energy efficient C.O.P. up to 16.28
- Horizontal airflow
- Latest full stepless inverter technology
- Ideal to work with solar PV



Guaranteed stable performance from -15°C air

EVO HEAT
HOT H2O TECHNOLOGY

EXCEPTIONAL PERFORMANCE & LOW OPERATING COSTS - Evo Force-i series delivers pool heating with exceptional performance, low operating costs & a C.O.P. as high as 16.28+. Combine your Evo Force-i pool heat pump with a pool blanket &/or your solar PV for the ultimate energy efficient pool heating!

LATEST STEPLESS DC FULL INVERTER TECHNOLOGY - incorporating the latest full inverter technology - including DC stepless compressors, fans, and PC boards; the Force-i range will automatically adjust it's power and electricity consumption based on the exact requirements of your pool. This ensures your pool reaches the desired temperature faster, and is maintained more efficiently **– SAVING YOU ON YOUR HOUSEHOLD ENERGY BILL.**

COLOUR TOUCHSCREEN CONTROLLER - designed with a cutting edge, intelligent colour LCD touchscreen controller, you can maintain your water temperature to within 0.1 of a degree while maximising optimum heater operating performance.

WI-FI CONTROL - control your Evo Force-i pool heat pump anytime,anywhere with the smart Wi-Fi controller app. Available for iOS and Android, the smart phone controller app offers you an easy and convenient way to monitor and control your pool temperature.

HEATING & COOLING MODES - the Force-i series is equipped to automatically heat or cool your pool water based on your set temperature - so you can be sure your pool is always at your desired temperature!

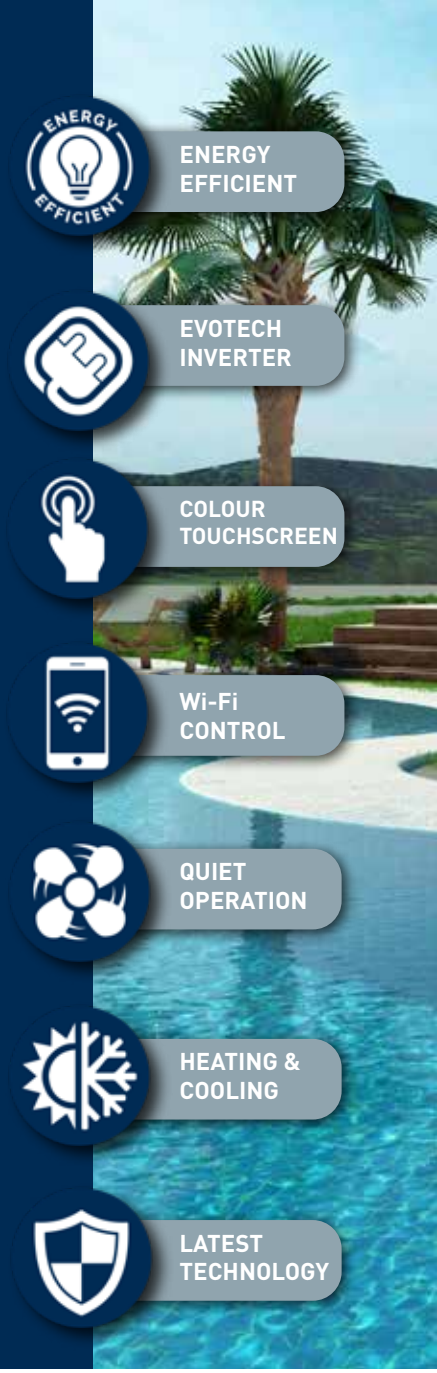
VERY QUIET OPERATION - our low noise fan blades ensures minimal operating noise which is ideal for you and your neighbours!

AUTOMATIC DEFROST - designed with a four-way valve reverse defrost method, the Force-i series provides automatic defrosting and allows the heat pump to work efficiently in ambient air temperatures as low as -15°C.

TITANIUM HEAT EXCHANGER - the titanium thread heat exchanger ensures maximum heat transfer with the ultimate corrosion resistance, improving the heat transfer efficiency by up to 30% compared to standard heat exchangers.

ELECTRONIC EXPANSION VALVE 2 TECHNOLOGY - Electronic Expansion Valve 2 Technology is the absolute latest and the best possible refrigeration control system available in the market today. This results in higher C.O.P. and improved efficiency of up to 20% compared to other commercial heater brands.

LATEST CORROSION PROTECTION TECHNOLOGY - the bluetec hydrophilic coating on the condenser fins is the latest technology in corrosion protection allowing your heat pump to maintain its high efficiency for many years to come.



MODEL	Evo Force-i 9	Evo Force-i 12	Evo Force-i 17	Evo Force-i 19	Evo Force-i 24	Evo Force-i 28-3
Heat output at 27°C air/26°C water (kW)	9	12	17	19.5	24.2	28.3
Heat output at 15°C air/26°C water (kW)	7.4	9.7	12.4	15.4	19.9	23.3
Cooling output at 35°C air/30°C water (kW)	4.5	6.4	8.6	10.5	14.2	16.5
C.O.P. at 27°C air	**16.13~6.76**	**16.28~6.79**	**15.71~6.76**	**16.16~6.19**	**16.11~6.05**	**16.13~6.10**
Consumed power (kW)	0.33~1.33	0.18~1.77	0.24~2.52	0.28~3.15	0.35~4.00	0.42~4.64
Power supply	230/1/50	230/1/50	230/1/50	2230/1/50	230/1/50	400/3/50
Max current (amps) per phase	9.3	12.1	14.7	18.7	24.1	11.7
Connection type	10amp	15amp	hard wired	hard wired	hard wired	hard wired
Fan quantity	1	1	1	1	2	2
Fan speed (RPM)	400-800	400-800	500-750	500-900	400-800	400-900
Noise dB(A) at 1M	40-50	42-52	44-53	45-56	46-57	48-58
Noise dB(A) at 1M in silence mode	40	42	44	45	46	48
Refrigerant gas	R32	R32	R32	R32	R32	R32
PVC Water connection (mm)	40	40	40	40	40	40
Water flow volume (L/min)	60	80	90	110	150	160
Water pressure drop (max) kPa	4	4.5	5	6	11	15
Net dimensions L/W/H (mm)	1046/453/768	1046/453/768	1161/490/862	1161/490/862	1161/490/1274	1161/490/1274
Net weight (kg)	52	58	69	90	111	120

* Performance condition: 27°C air / water 26°C / humid 80% * The data above is based on the EVO heat pump only, it does not include auxiliary devices. Product specification information provided above is correct at the date of printing, this data may change without notice. Please speak with an EvoHeat Specialist for the most current product specifications.

EVO FORCE-i WARRANTY

For further peace of mind the Evo Force-i heat pump comes with an industry leading warranty:

- 25 years on titanium heat exchanger
- 5 years on compressor
- 2 years on parts
- 1 year on labour

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THE SPECIALISTS IN POOL AND SPA HEATING

EvoHeat are 100% Australian owned and operated company and are the industry specialists in pool and spa heat pumps. For over a decade we've been building an award winning reputation for pool and spa heating products that are renowned for reducing your energy bills and delivering reliability.

Our exclusive pool heaters are durable and utilise cutting edge components sourced from leading brand manufacturers around the world. EvoHeat only specialise in heat pump technology and are constantly developing and improving our heating applications to ensure we offer you the best in the market.

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Updated 28.07.2021