

18 Brahe Place, East Melbourne Proposed New Apartments Hot Water System Comparison

Microheat
3 May 2012
Revision No. 1

Prepared by **John Lucchetti** Project Number: 23708-MEL-H
Level 1, 280 King Street Melbourne, VIC, 3000

Phone (03) 85547000 **Fax** (03) 8554 7100 **Email** wge@wge.com.au **Web** www.wge.com.au

Revision

REVISION	DATE	COMMENT	APPROVED BY
0	16/12/2011	For Client Review and Comment	JAL
1	03/05/2012	Final	JAL

Contents

1.	EXECUTIVE SUMMARY	1
1.1	LOW RISE BUILDING (4 STORIES – 8 APARTMENTS)	1
2.	DESCRIPTION OF PLANT ARRANGEMENT OPTIONS	2
2.1	GENERAL OVERVIEW	2
2.2	CONTINUOUS FLOW ELECTRIC HOT WATER HEATERS (LOW RISE AND HIGH RISE BUILDINGS)	2
2.3	CENTRALISED GAS BOOSTED HOT WATER PLANT AND SOLAR STORAGE (LOW RISE)	2
3.	COSTS ASSOCIATED WITH HOT WATER SYSTEMS	3
3.1	INITIAL CAPITAL COSTS	3
APPENDIX A - TYPICAL HOT WATER PLANT LAYOUTS (GAS BOOSTED PLANT) LOW RISE		4
APPENDIX B – TYPICAL HOT WATER PLANT LAYOUTS (INDIVIDUAL ELECTRIC UNITS) LOW RISE		5

1. Executive Summary

This Hot water comparison report for the Hydraulic Services has been prepared at the request of Microheat for the development of proposed apartments at 18 Brahe Place, East Melbourne, Victoria.

This report sets out the conceptual layout of the hot water comparison between a centralised gas boosted hot water plant Vs. individual continuous flow electric hot water units for a low rise apartment building.

The two options under consideration are:

1.1 Low Rise Building (4 Stories – 8 Apartments)

- Hot water via individual continuous flow electric hot water heaters in each apartment
- Hot water via a centralised gas boosted solar arrangement.

The main considerations that must be considered when weighing the two options are:

- Initial capital cost expenditure
- Ongoing operating costs (To be prepared by RMIT)

2. Description of Plant Arrangement Options

2.1 General Overview

There are 2 options provided for hot water service comparison.

- Hot water via individual continuous flow electric hot water heaters in each apartment
- Hot water via a centralised gas boosted solar arrangement.

Installation of individual continuous flow electric hot water heaters will typically entail providing space within the apartment to house the individual hot water unit. Metering can be provided on an apartment by apartment basis as electricity and cold water consumption to each apartment is already metered. Hot water temperature would be set to 50C outlet, hence eliminating the need for tempering valves¹.

Installation of a central plant consisting of gas boosters, hot water storage tanks, solar panels and solar storage tanks will typically entail providing a space external to the building for housing. The equipment may be located at ground level or at roof top. A spatial allocation on the roof for solar collectors will be required. Individual apartment metering would be achieved through the use of a proprietary Origin energy remote hot water metering solution that would meter the hot water consumption of each apartment and accordingly apportion the associated gas costs. Note, this applies to developments with more than 20 apartments. Developments with less than 20 apartments may be installed with body corporate hot water meters for internal system monitoring of hot water plant by the body corporate. These meters will not be read by a gas retailer for billing purposes, they will be read by the body corporate who will then appropriately apportion the gas costs to apartment tenants.

2.2 Continuous Flow Electric Hot Water Heaters (Low Rise and High Rise Buildings)

A Microheat CFEWH SERIES 2-27 continuous flow electric water heater would be of adequate size to serve an apartment with 1 bathroom. A Microheat CFEWH SERIES 2-27 continuous flow electric water meter would be of adequate size to serving an apartment with a maximum of 2 bathrooms. Note, these units are selected based on setting a outlet temperature of 50C and the use of low flow fixture 'Wels' rating tapware. The units could be located within the joinery beneath the kitchen sink or at bathroom of each apartment, unit size 206mm (W) x 123mm (D) x 308mm (H).

It should be noted that the electric hot water option does not include allowances for solar contribution. We are not aware of any planning permit requirements at this stage, but the Council may impose a solar hot water requirement which would make this option potentially difficult (and expensive) to configure to suit. Given this, we have not considered any solar contribution to this option.

2.3 Centralised Gas Boosted Hot Water Plant and Solar Storage (Low Rise)

A centralised gas boosted solar hot water that would be adequate to service 18 Brahe Place, consists of:

- Rheem MPE02K consisting of:
 - Free standing continuous flow gas heater manifold (2 x heaters)
 - 1 x Hot water flow and return pump
- Solar pre-heat plant:
 - 4 x Rheem or equivalent NPT200 Collectors
 - 2 x Double Variable pitch roof Frames
 - 2 x 410L Storage tanks
 - 1 x Solar Controller
- Flow and return hot water pumps
- Gas pipework and bulk meter
- Hot water meters

A centralised hot water system relies on a main hot water flow and return loop being constantly circulated throughout the building from which each individual apartment will draw from. A plant spatial will be required at ground floor with an approximate area of 6m². A roof top plat spatial area of approximately 15m² is required for the solar collectors. This area includes access for personnel maintenance.

Note, hot water plant outlet temperature would be set at 65C. All pipework will be of copper tube material and be lagged with 25mm Armaflex insulation or equivalent.

¹ It is assumed that the Microheat continuous flow water heater will comply with AS3498 and be clearly marked "THIS APPLIANCE DELIVERS WATER NOT EXCEEDING 50°C IN ACCORDANCE WITH AS 3498" As required by AS3500.4, Clause 1.9.3.(b).(iii)

3. Costs Associated With Hot Water Systems

3.1 Initial Capital Costs

We estimate the initial capital cost estimate of the individual electric water heater option to be approximately \$22,400

Item	Quantity	Cost	Total
MicroHeat CFEWH SERIES 2-27 including installation	8	\$1800	\$14,400
Electrical Costs Per apartment			
-Additional apartment electrical Infrastructure ²	8	\$1000	\$8,000
Total			\$22,400

We estimate the initial capital cost estimate for the central gas boosted solar plant option to be approximately \$38,985.

Item	Quantity	Cost	Total
Hot water Booster Plant	1	\$7,000	\$7,000
Hot water Flow & Return Pump	1	\$3,000	\$3,000
Hot water Solar Plant	1	\$8,000	\$8,000
Hot water plant enclosure – Plinth & Chain Wire Mesh	1	\$2,000	\$2,000
Bulk Cold Water Meter Assembly	1	\$1,000	\$1,000
Tempering valves	8	\$700	\$5,600
Gas pipework to Hot water plant, 100 dia approx. (copper)	30m	\$285 per meter	\$8,550
Gas Meter for Bulk Hot water plant ³	1	\$0	\$0
32 dia hot water flow – lagged, (copper)	25m	\$60 per meter	\$1,500
25 dia hot water flow – lagged, (copper)	75m	\$50 per meter	\$3,750
25 dia cold water flow (poly)	35m	\$35 per meter	\$1,225
Isolation valves, balancing valves	1	\$2,000	\$2,000
15mm dia hot water meters (body corporate)	8	\$300	\$2,400
Fire Collars	12	\$80	\$960
Total		\$	\$46,985
Optional deletion of solar panels		-\$8,000	
Revised Total			\$38,985

It should be noted that neither of the above cost estimates allow for hot water pipework, insulation and valving within the apartments as this will be similar for both systems. It is noted that tempering valves and thermostatic mixing valves are included in the comparison as they are not required to be installed as part of the continuous flow electric solution.

Notes:

- Hot Water equipment cost based upon supply cost quotation (budget allowance \$900/unit), with an allowance of 2 x supply cost for installed cost of plant
- Extra over cost of running three phase power to each apartment to suit the hot water system based on past project experience, exact costs may vary on a project by project basis depending on the Electrical Authorities requirements.
- Based on a typical tapping arrangement the gas authority will not normally charge for supply and installation of a gas meter.
- Price allowance for tempering valve includes tempering valve and access panel to be provided

Appendix A - Typical Hot Water Plant Layouts (Gas Boosted Plant) Low Rise

W & C ENGINEERS

#23,708

13/12/11

"GAS BOOSTED CENTRALISED HOTWATER PLANT"



PROPOSED LOCATION OF HOTWATER BOOSTER PLANT

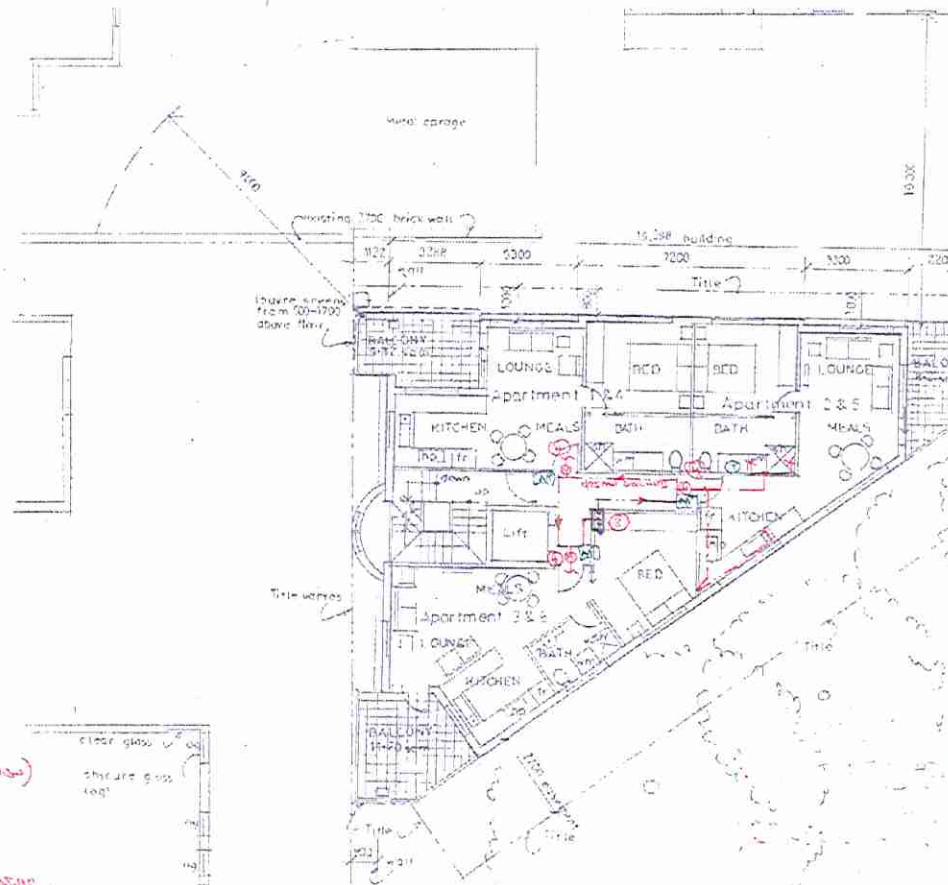
REFERENCE NOTES:

1. REMOVE BASE PLANT. (S/S IN CONSTRUCTION)
2 max. cumulated flow shw shd. MAINTAIN PRESSURE, HALF RETURN PIPE.
2 max. SINK STAGNANT TANK. EQUIPMENT MOUNTED ON A CONCRETE PLATE ON CHIMNEY LIKE MESH ENCLOSURE.
2. 4.25 HWP 100 RHL.
0.15 HWP 100 RHL.
0.15 SINK ON SINKY RHL.
0.15 HWP 100 RHL.
3. 4.25 HWP 100 RHL. 0.15 HWP 100 RHL.
0.15 SINK ON FIB TANK.
0.15 HWP 100 RHL. 0.15 SINK ON FIB TANK.
LUBES IN TWO SECTIONS OUT (150mm only).
4. 0.15 HWP 100 RHL. 0.15 HWP 100 RHL.
0.15 SINK ON FIB TANK.
0.15 HWP 100 RHL. 0.15 SINK ON FIB TANK.
LUBES IN TWO SECTIONS OUT (150mm only).

GROUND FLOOR

- ALL PIPEWORK - COPPER TUBE
- HOTWATER PLANT OUTLET TEMPERATURE $\approx 65^{\circ}\text{C}$.
- ALL PIPEWORK - INSULATED WITH 25mm THK ARMAFLEX OR EQUIVALENT.
- TEMPERING VALVES REQUIRED AT BATHROOMS.

* SINKS, LAUNDRY, CLOTHES WASHING MACHINE $\approx 60^{\circ}\text{C}$
* BATH, SHOWERS $\approx 43^{\circ}\text{C}$.



LEVEL 1 & LEVEL 2.

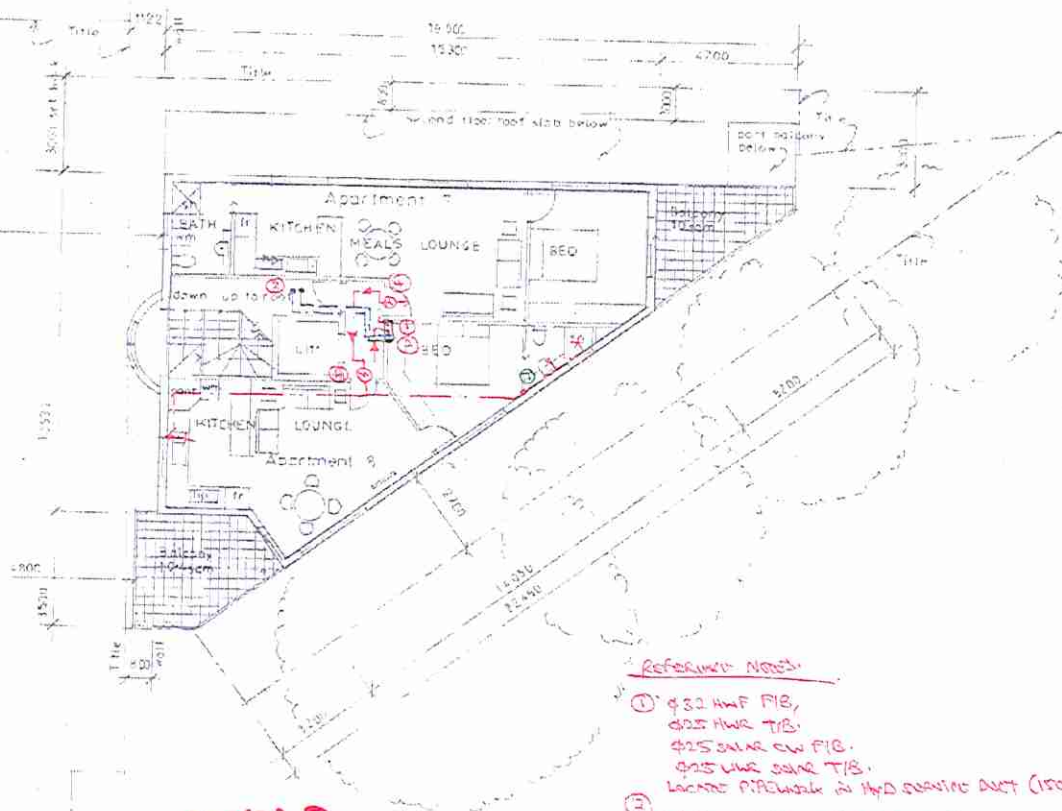
W&C ENGINEERS

#23,708
13/12/11

" GAS BOOSTED CENTRALISED HOTWATER PLANT"



* Sink, Laundry, clothes washing machine - 60°C
* Bath, showers - 43°C.

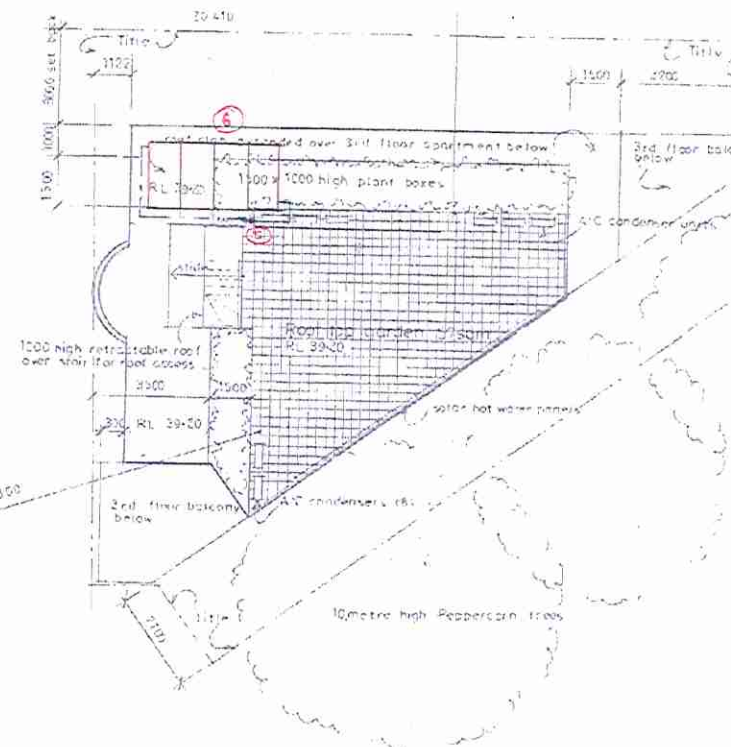
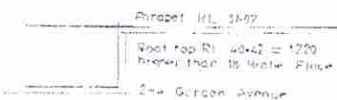
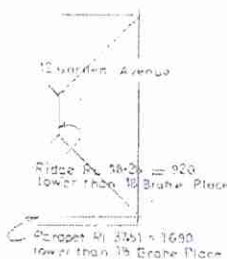


LEVEL 3

RL 26.35

REFERENCE NOTES

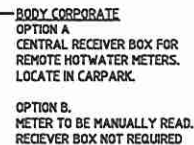
1. 432 kW FIB,
425 kW TIB,
425 solar CW FIB,
425 kW solar TIB.
Locate pipework in hyd service duct (1500x300).
2. Solar CW supply and return water
Return to offset in C/S of L3.
3. 425 solar CW TIB,
425 kW solar FIB.
4. 415 m2 solar panel located in
C/S of corridor above access level
of 45.00 m.
NOTE: Panels are of 2000x1000mm.
5. 425 solar CW FIB,
425 kW solar TIB.
6. Solar panels to be mounted
with pitch mounting frames.
(4m x 2m).
Refer to per manufacturers instructions.



ROOF PLAN

RL 30.20





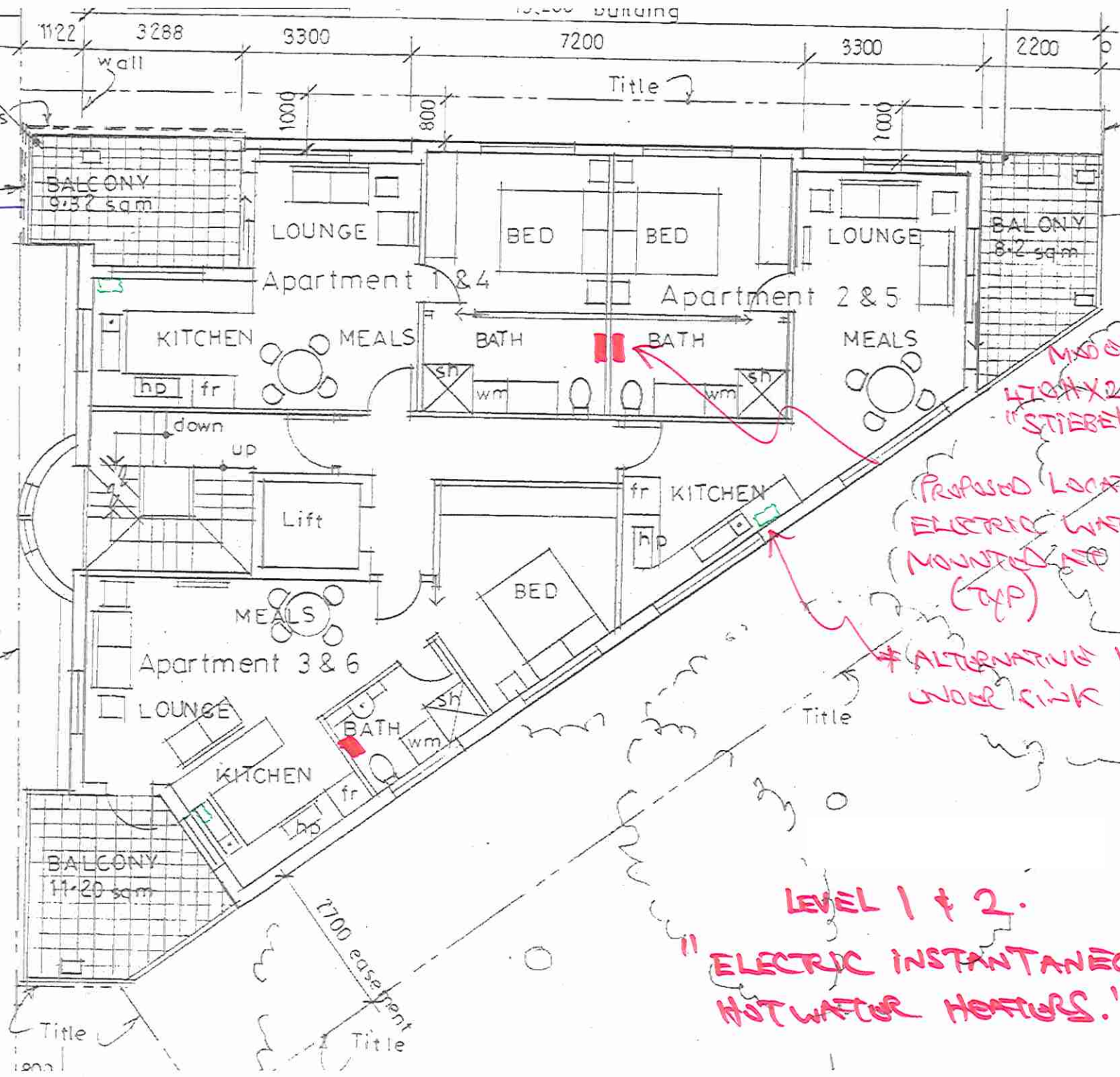
HOT WATER SCHEMATIC (TYPICAL)
GAS BOOSTED CENTRALISED PLANT - 50% SOLAR CONTRIBUTION

NOT TO SCALE

Appendix B – Typical Hot Water Plant Layouts (Individual Electric Units) Low Rise

W4 C ENCLERS
#23,708.
13/12/11

louvre screens
from 500-1700
above floor



MODEL: PEL 18
470H X 225W X 110 DPA
"STIEBEL ETON"

PROPOSED LOCATION OF
ELECTRIC WATER HEATERS
(MOUNTED IN BATHROOM.
(TYP)

*ALTERNATIVE LOCATION
UNDER SINK BENCH.

LEVEL 1 & 2.
"ELECTRIC INSTANTANEOUS
HOT WATER HEATERS."

WFC ENGINEERS

#23708

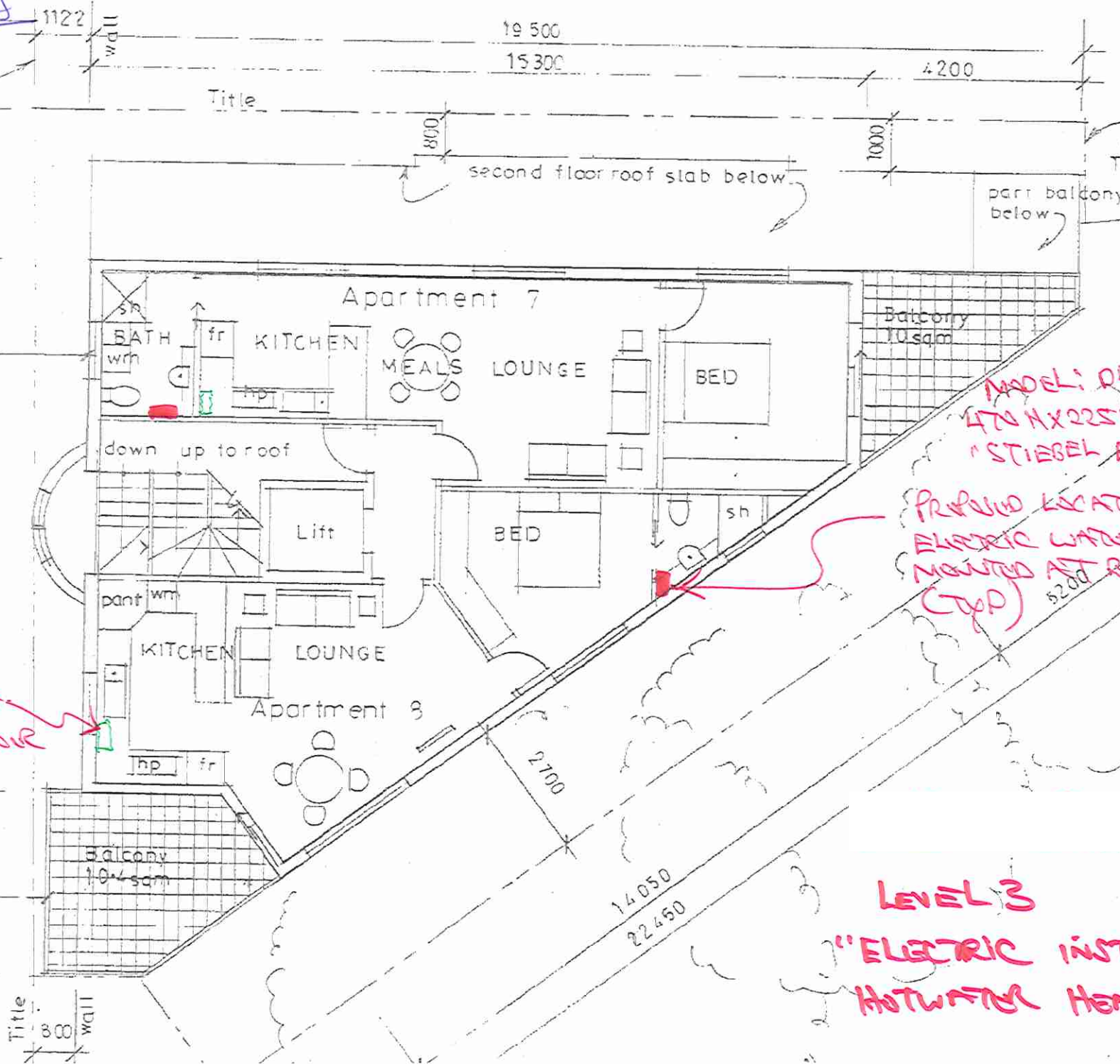
13/12/11

3000 set back

10530

* ALTERNATIVE LOCATION UNDER SINK BENCH

3500



MODEL: DEL 18
470 H X 225 W X 110 D GR
"STIEBEL ELTRON"

PROPOSED LOCATION OF
ELECTRIC WATER HEATERS
MOUNTED AT BATHROOM.
(TYP)

LEVEL 3

"ELECTRIC INSTANTANEOUS
HOTWATER HEATERS"