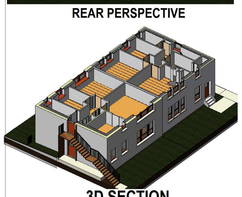
PROJECT 4 SEMESTER 2 PGCert DAER 2014

BRE REFURBISHED APARTMENTS

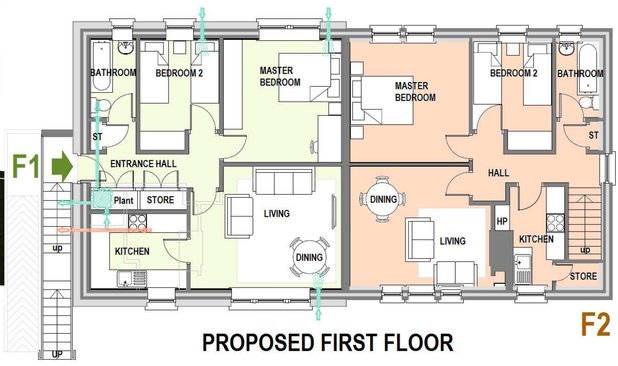
FRONT PERSPECTIVE

REAR PERSPECTIVE

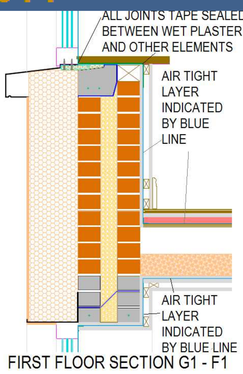


3D SECTION

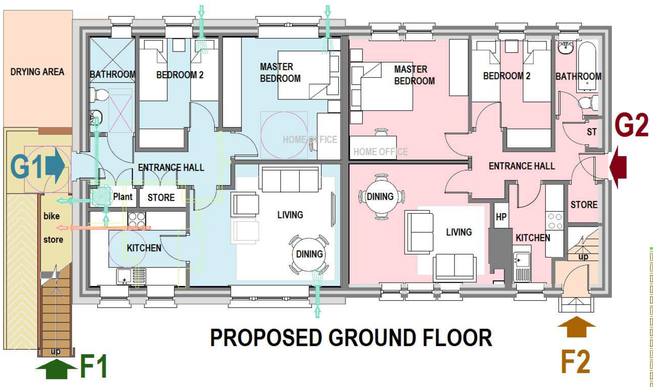
Bre / New Layout BER RATINGS			
G1	G2	F1	F2
E1-311	C2-196	E1-326	A2 47



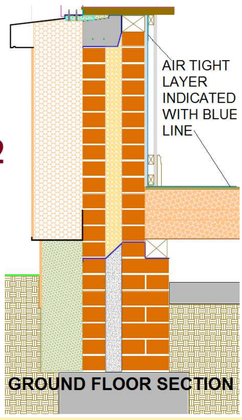
PROPOSED FIRST FLOOR



FIRST FLOOR SECTION G1 - F1



PROPOSED GROUND FLOOR



GROUND FLOOR SECTION

G1 AND F1 UPGRADE

STEP 1 AIR TIGHT MEMBRANES AND TAPES AERECO V2A FAN

D2 | G1 | D2-292 | F1 | D2-282

STEP 2 NEW DOUBLE GLAZED WINDOWS CERTIFIED U-VALUE OF 1.2 AND DOOR 0.9

D2 | G1 | D2-257 | F1 | D2-252

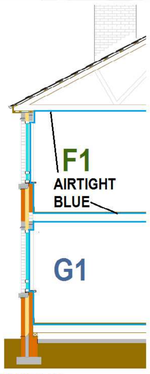
STEP 3 INSTALL EXTERNAL WALL INSULATION AND CAVITY FILL TO GIVE A U-VALUE OF 0.12

C1 | G1 | C1-163 | F1 | C1-155

STEP 4 INSTALL INSULATION TO FLOOR TO A U-VALUE OF 0.13

INSTALL INSULATION TO ROOF TO GIVE A U-VALUE OF 0.10

B3 | G1 | B3-128 | F1 | B3-128



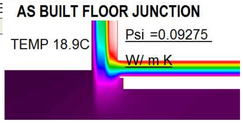
STEP 5 INSTALL HOT WATER CYLINDER WITH HEAT LOSSES OF 1/05kWH/DAY

B3 | G1 | B3-123 | F1 | B3-123

STEP 6 INSTALL LOW E

B2 | G1 | B2-115 | F1 | B2-115

AS BUILT FLOOR JUNCTION



STEP 7 INSTALL RADIATORS WITH TIME & TEMPERATURE CONTROL ZONES

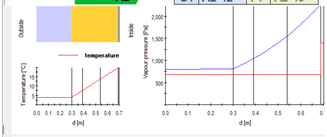
B2 | G1 | B2-106 | F1 | B2-106

STEP 8 INSTALL MITSUBISHI AIR TO WATER HEAT PUMP WITH AN EFFICIENCY OF 355.2% FOR SPACE AND WATER HEATING TESTED TO IS EN 14511-2 WITH WEATHER COMPENSATOR

B1 | G1 | B1-77 | F1 | B1-78

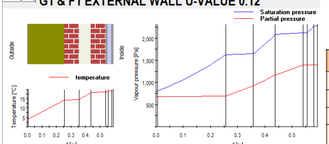
STEP 10 ASSUME Y-FACTOR OF 0.08 AS INSTRUCTED IN PROJECT BRIEF

A2 | G1 | A2-42 | F1 | A2-43



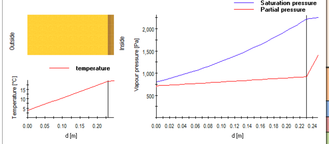
Name	T[°C]	d[m]	psat[Pa]	p[Pa]
External / Sheeted/filed roof+felt/boards under tiles,RU=0,2	3.8	0.705	799	676
Sheeted/filed roof+felt/boards under tiles,RU=0,2 / Isover Frame Roll 35	3.9	0.405	808	681
Isover Frame Roll 35 / Isover Frame Batt 35	7.5	0.315	1038	682

Laser diagram **G1 & F1 EXTERNAL WALL U-VALUE 0.12**

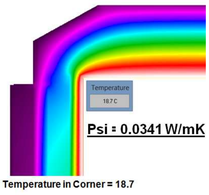


Name	T[°C]	d[m]	psat[Pa]	p[Pa]
External / Silicone Render	3.8	0.595	799	676
Silicone Render / Mineral wool batt - Variable thickness	4.0	0.585	813	678
Mineral wool batt - Variable thickness / Brick outer leaf & Mortar outer leaf [l = 0.000 / av	14.3	0.339	1627	691

Laser diagram **G1 GROUND FLOOR U-VALUE 0.13**



Name	T[°C]	d[m]	psat[Pa]	p[Pa]
External / Tyvek Solid	3.8	0.248	801	676
Tyvek Solid / Isover Frame Batt 32	3.8	0.248	801	712
Isover Frame Batt 32 / Oriented strand board (OSB)	19.2	0.018	2219	919
Oriented strand board (OSB) / Internal	19.5	0.000	2261	1403



Psi = 0.0341 W/mK

Temperature in Corner = 18.7

AS BUILT EAVES JUNCTION F2

G2 UPGRADE

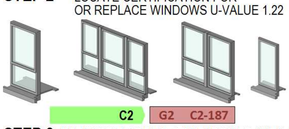
BRE RETROFIT FOR G2 INCLUDED THE FOLLOWING:-
UNCERTIFIED PVC WINDOWS AND DOORS
EXTERNAL WALLS U-VALUES 0.19 AND 0.27
RAISED TIMBER FLOOR U-VALUE 0.15
ELECTRIC COMBI SPACE AND WATER HEATING
100% LOW ENERGY LIGHTING
ROOM ONLY HEAT RECOVERY UNITS

THE FOLLOWING STEPS TO BE TAKEN TO UPGRADE TO NZeb ENERGY RATING:-
REMOVE HEAT RECOVERY UNITS AND PROVIDE NATURAL VENTILATION

STEP 1 LOCATE CERTIFICATION FOR OR REPLACE EXISTING DOOR U-VALUE 0.9

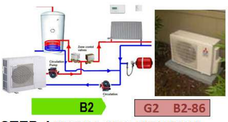
C2 | G2 | C2-189

STEP 2 LOCATE CERTIFICATION FOR OR REPLACE WINDOWS U-VALUE 1.22



C2 | G2 | C2-187

STEP 3 REPLACE EXISTING COMBI BOILER WITH A MITSUBISHI AIR TO WATER HEAT PUMP WITH AND EFFICIENCY OF 355.2% FOR SPACE AND WATER HEATING TESTED TO IS EN 14511-2 WITH WEATHER COMPENSATOR



B2 | G2 | B2-86

STEP 4 INSTALL 3 NO. MITSUBISHI PHOTOVOLTAICSOLAR PANELS PLUS IMPORT 190 KWH/YEAR FROM EXCESS FROM F2 TOTALLING 755 KWH/YEAR

A2 | G2 | A3-55

STEP 5 INSTALL HOT WATER CYLINDER WITH HEAT LOSSES OF 1.05 KWH/DAY WITH SEPERATE TIME CONTROLS FOR HOT WATER AND INSULATED PRIMARY PIPEWORK NOT TO EXCEED 1.5M

A3 | G2 | A3-50

STEP 10 ASSUME Y-FACTOR OF 0.08 AS INSTRUCTED IN PROJECT BRIEF

A2 | G2 | A2-44

FINAL BER RATINGS NZeb			
G1	G2	F1	F2
A2-42	A2-44	A2-43	A2 43

F2 UPGRADE

BRE RETROFIT FOR G2 INCLUDED THE FOLLOWING:-
UNCERTIFIED PVC WINDOWS AND DOORS
EXTERNAL WALLS U-VALUES 0.19 AND ROOF 0.13
RAISED TIMBER FLOOR U-VALUE 1.19
AIR TO WATER HEAT PUMP AND PV PANELS
100% LOW ENERGY LIGHTING
WHOLE HOUSE HEAT RECOVERY

THE FOLLOWING STEPS TO BE TAKEN TO UPGRADE TO NZeb ENERGY RATING:-
REMOVE HEAT RECOVERY UNITS AND PROVIDE NATURAL VENTILATION

STEP 1 LOCATE CERTIFICATION FOR OR REPLACE EXISTING DOOR U-VALUE 0.9

A2 | F2 | A2-45

STEP 2 LOCATE CERTIFICATION FOR OR REPLACE WINDOWS U-VALUE 1.22

A2 | F2 | A2-42

STEP 3 Y-FACTOR HAS BEEN CALCULATED AS 0.074

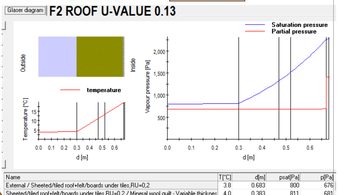
$$\Sigma (L \times \Psi) / \Sigma (Aexp) = Y$$

A2 | F2 | A2-36

STEP 4 EXPORT EXCESSIVE ENERGY (190 KWH/ /YEAR)PRODUCED BY PV PANELS TO G2

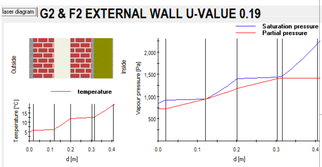
A2 | F2 | A2-43

Glaser diagram **F2 ROOF U-VALUE 0.13**



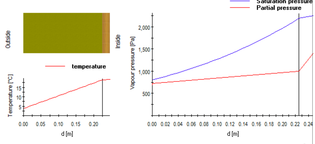
Name	T[°C]	d[m]	psat[Pa]	p[Pa]
External / Sheeted/filed roof+felt/boards under tiles,RU=0,2	3.8	0.683	800	676
Sheeted/filed roof+felt/boards under tiles,RU=0,2 / Mineral wool quilt - Variable thickness	4.0	0.383	811	681
Mineral wool quilt - Variable thickness / Mineral wool quilt - Variable thickness	11.1	0.213	1321	683

Laser diagram **G2 & F2 EXTERNAL WALL U-VALUE 0.19**

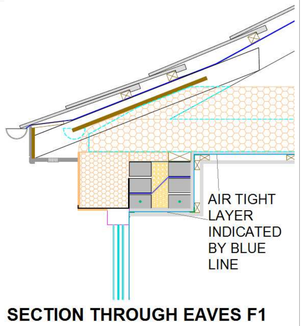


Name	T[°C]	d[m]	psat[Pa]	p[Pa]
Brick, outer leaf & Mortar outer leaf [l = 0.000 / automatic disregarding acc. BRE 4.4.3] /	6.1	0.291	940	940
Expanded polystyrene (EPS) - Full Fill Cavity / Brick inner leaf & Mortar outer leaf [l = 0.0	11.9	0.211	1296	1177
Brick, inner leaf & Mortar outer leaf [l = 0.000 / automatic disregarding acc. BRE 4.4.3] /	12.4	0.109	1439	1404

Laser diagram **G2 FLOOR U-VALUE 0.15**



Name	T[°C]	d[m]	psat[Pa]	p[Pa]
External / Tyvek Solid	3.8	0.247	802	676
Tyvek Solid / Mineral wool batt - Variable thickness	3.8	0.247	802	725
Mineral wool batt - Variable thickness / Chipboard [600 kg/m³]	19.0	0.022	2190	1000
Chipboard [600 kg/m³] / Internal	19.4	0.000	2246	1403

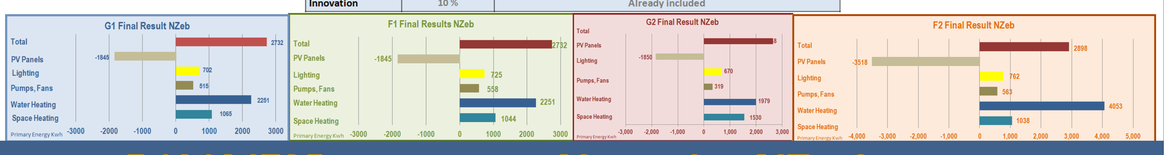


SECTION THROUGH EAVES F1

BREEAM Result Sheet Domestic Refurbishment Pre Assessment Estimator

Apartment	G1	G2	F1	F2
BREEAM Score	88.78%	83.73%	88.78%	79.9%
BREEAM Rating	Outstanding	Excellent	Outstanding	Excellent
BICYCLE STORES				
4M CLOTHES LINE				
DISABLED ACCESS				
U-VALUES				

Section	Section Weighting	Total Credits Available Including Innovation	Total Credits Provided G1	G2	F1	F2
Management	12%	16	10	11	10	11
Health &Wellbeing	17%	13	9	9	9	9
Energy	43%	32	32	29	32	30
Water	11%	6	4	4	4	4
Materials	8%	45	16	16	16	16
Pollution	6%	9	6	6	6	6
Waste	3%	6	4	3	4	3
Innovation	10 %	Already included				



D13124795 Alexander O'Toole