

## MECHANICAL SPECIFICATION

### QUALITY ASSURANCE

ALL EQUIPMENT USED ON THIS PROJECT MUST CARRY THE STANDARDS "MARK" FROM THE QUALITY ASSURANCE SERVICES OF AUSTRALIA - SAA IMPORTED EQUIPMENT MUST CARRY A EQUAL "MARK" RECOGNISED BY STANDARDS AUSTRALIA

### DEFINITION OF "APPROVAL":

THE WORDS "OR OTHER APPROVED" OR "TO BE APPROVED" ARE IMPLIED ALWAYS WHETHER FOLLOWING THE DESCRIPTION OF APPARATUS, MATERIAL, MAKER, OR NOT

THE CONTRACTOR MAY, IF HE SO DESIRES, TENDER ON ALTERNATIVE MAKES, PROVIDED THAT SUCH ALTERNATIVES ARE PROVEN TO BE OF EQUAL QUALITY TO THOSE SPECIFIED AND THAT THEY ARE SUBMITTED FOR THE APPROVAL OF THE CONSULTING ENGINEER BEFORE ORDERING. NO PRICE INCREASE WILL BE CONSIDERED FOR ALTERNATE EQUIPMENT. THE ENGINEER SHALL BE THE SOLE JUDGE AS TO THE RELATIVE MERITS OF THE ALTERNATIVES OFFERED. HIS DECISION SHALL BE FINAL.

IT SHOULD BE NOTED THAT EQUIPMENT CAPACITIES SIZES AND WORKING PRESSURES, AMPS, PHASES ARE CALCULATED AND INTERWOVEN AMONG THE COMPLEMENTARY EQUIPMENT HEREIN SPECIFIED AND TO FIT INTO ARCHITECTURAL ENVELOPE

ANY DEVIATION FROM ANY EQUIPMENT SPECIFIED MAY CHANGE CAPACITIES OF COMPLEMENTARY EQUIPMENT AND/AFFECT ITS ABILITY TO ACCOMMODATE THE SIZE WITHIN SPACE ALLOWED. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY RESULTING COMPLEMENTARY EQUIPMENT REQUIRED CHANGE OF BOTH PERFORMANCE AND PRICE

THE CONTRACTOR IS ADVISED TO CONSIDER CAREFULLY THE IMPLICATIONS ASSOCIATED WITH TENDERING ON ANY EQUIPMENT NOT NAMED OUTRIGHT WITHIN THIS SPECIFICATION

### SCOPE OF WORKS

THE WORK MUST INCLUDE THE DESIGN, DOCUMENTATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING, WARRANTY, MAINTENANCE, ETC. OF THE MECHANICAL SERVICES AS INDICATED IN THE SPECIFICATION AND THE MECHANICAL SERVICES DRAWINGS. THE WORKS MUST INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:

- WALL MOUNTED TYPE AIR COOLED REVERSE CYCLE SPLIT AIR CONDITIONING SYSTEMS TO RESPECTIVE APARTMENT AREAS COMPLETE WITH PIPEWORK, POWER & CONTROL WIRING, ETC.
- FULLY DUCTED TYPE AIR COOLED REVERSE CYCLE SPLIT AIR CONDITIONING SYSTEMS TO PENTHOUSE APARTMENT AREA COMPLETE WITH PIPEWORK, POWER & CONTROL WIRING, ETC.
- NATURAL VENTILATION TO CARPARK AREA
- DOMESTIC RANGE HOOD DUCTED (BOOSTER AS REQUIRED) FAN DIRECT TO OUTSIDE ATMOSPHERE
- TOILET/LAUNDRY VENTILATION TO ALL WET AREAS
- MAIN SWITCH ROOM VENTILATION
- REFUSE ROOM VENTILATION SYSTEM
- GAS FIRE PLACE FLUEING (POWER FLUE) AND INTAKE
- WARRANTIES & DEFECT LIABILITY
- ALL REQUIRED CRAINAGE, LIFTING AND/OR SAFETY DEVICES
- PROJECT INSTALLATION ACOUSTIC COMPLIANCE MUST MEET AT MINIMUM AIRAH RECOMMENDED VALUES
- REQUIREMENTS OF THE ACOUSTIC REPORT

### SCOPE

THE MECHANICAL CONTRACTOR MUST SUPPLY AND INSTALL TOTAL WORKS OBVIOUSLY REQUIRED TO COMPLETE THE PROJECT, ALL ITEMS, ACTIVITIES, MATERIALS AND LABOR WHETHER OR NOT THESE ARE CLEARLY IDENTIFIED IN SPECIFICATION OR DRAWINGS. THE WORK MUST INCLUDE DESIGN, DOCUMENTATION, TESTING, COMMISSIONING, WARRANTY, MAINTENANCE, ETC. OF THE MECHANICAL SERVICES. THE FOLLOWING NOTES ARE TO BE READ IN CONNECTION WITH THE CONTROL DESCRIPTIONS WITHIN THE DOCUMENTS. THE WORKS MUST INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:

#### RETAIL TENANCY AIR CONDITIONING SYSTEMS

AIR CONDITIONING SYSTEMS TO BE INSTALLED BY TENANT

#### TENANCY VENTILATION

TENANCY VENTILATION IS TO BE PROVIDED BY FUTURE TENANT TO SUIT PROPOSED TENANCY. PROVISION FOR MAKE UP/ OUTDOOR AIR HAS BEEN PROVIDED AS PART OF BASE BUILDING WORKS

#### APARTMENTS AIR CONDITIONING SYSTEMS

WALL SPLIT INVERTER TYPE AIR COOLED REVERSE CYCLE AIR CONDITIONING SYSTEMS TO RESPECTIVE APARTMENTS, ETC. EACH SYSTEM MUST BE COMPLETE WITH ALL CONTROL WIRING, POWER WIRING, PIPEWORK, VALVES, OIL TRAPS, FILTER/DRIERS, CONTROLS, ETC. IN ENTIRETY. ALL TO MANUFACTURERS RECOMMENDATIONS. ALL EQUIPMENT, PIPEWORK INSULATION, ETC., EXPOSED TO ATMOSPHERE MUST BE WEATHER AND VERMIN PROOFED UNITS TO BE INSTALLED AND ARRANGED FOR EASY SERVICE, REPAIR, MAINTENANCE, ETC., OF EQUIPMENT, COMPONENTS INSTALLED. RETURN AIR SECTION OF EACH UNIT MUST HAVE MANUFACTURER SUPPLIED DRY MEDIA TYPE FILTER BANK. FILTERS TO BE CLIP-IN TYPE MOUNTED IN HOLDING FRAME/SLIDE RAILS ARRANGED SO THAT NO AIR BY PASSES FILTER MEDIA. EACH AIR CONDITIONING SYSTEM TO BE CONTROLLED VIA 7 DAY FULLY PROGRAMMABLE CONTROLLER WITH TIME CLOCK, TEMPERATURE SETTING, THERMOSTAT, "ON-OFF SWITCH, FAN 3 SPEED SET, DIGITAL DISPLAY, FAULT INDICATOR, ENERGY SAVING, ETC.

#### APARTMENTS AIR CONDITIONING SYSTEMS

FULLY DUCTED TYPE SPLIT INVERTER AIR COOLED REVERSE CYCLE AIR CONDITIONING SYSTEMS TO RESPECTIVE APARTMENTS, ALL UNITS TO BE FULLY CONCEALED WITHIN BULKHEADS PROVIDED BY OTHERS ETC. EACH SYSTEM MUST BE COMPLETE WITH ALL INSULATED DUCTWORK, SPIGOTS, DAMPERS, PLENUM BOXES AND GRILLES (SUPPLY & RETURN), CONTROL WIRING, POWER WIRING, PIPEWORK, VALVES OIL TRAPS, FILTER/ DRIERS, CONTROLS, ETC. IN ENTIRETY

ALL EQUIPMENT MUST BE INSTALLED TO MANUFACTURERS RECOMMENDATIONS. ALL EQUIPMENT, PIPEWORK INSULATION, EXPOSED TO ATMOSPHERE MUST BE WEATHER AND VERMIN PROOFED UNITS TO BE INSTALLED AND ARRANGED FOR EASY SERVICE, REPAIR, MAINTENANCE, ETC., OF EQUIPMENT/ COMPONENTS INSTALLED. RETURN AIR SECTION OF EACH DUCTED UNIT MUST HAVE DRY MEDIA TYPE FILTER BANK. FILTERS TO BE CLIP-IN TYPE MOUNTED IN HOLDING FRAME/SLIDE RAILS IN FELT LINED ARRANGED SO AS NO AIR BY PASSES FILTER MEDIA

EACH AIR CONDITIONING SYSTEM TO BE CONTROLLED VIA 7 DAY FULLY PROGRAMMABLE CONTROLLER WITH TIME CLOCK, TEMPERATURE SETTING, THERMOSTAT, "ON-OFF SWITCH, FAN 3 SPEED SET, DIGITAL DISPLAY, FAULT INDICATOR, ENERGY SAVING, ETC. FINAL LOCATION TO BE DETERMINED ONSITE

#### APARTMENT VENTILATION

APARTMENTS ARE NATURALLY VENTILATED IN ACCORDANCE WITH NCC PART F4. VIA OPENABLE WINDOWS/ DOORS REFER TO ARCHITECTURAL DRAWINGS.

#### RESIDENTIAL KITCHEN

THE KITCHEN RANGE HOODS ARE DUCTED TYPE. HOODS ARE SUPPLIED AND INSTALLED BY BUILDER. MECHANICAL CONTRACTOR MUST CONNECT TO HOOD & SOLID DUCT TO DISCHARGE DIRECT TO OUTSIDE ATMOSPHERE. SYSTEM TO BE PROVIDED WITH NON RETURN AIR DAMPER. MECHANICAL CONTRACTOR MUST MAKE THEIR OWN ASSESSMENT OF EACH RESPECTIVE SYSTEM TO ENSURE ITS DUTY IS SUFFICIENT FOR THE PRESSURE DROP AND PROVIDE THE AIR QUANTITY REQUIRED. PROVIDE BOOSTER FANS WHERE REQUIRED

#### RESIDENTIAL BATH ROOMS

TOILET EXHAUST AIR FANS TO BE WIRED TO SEPARATE SWITCH INCORPORATED INTO LIGHTING GANG PLATE WHERE REQUIRED. DOUBLE POLE SWITCH TO BE PROVIDED BY ELECTRICAL CONTRACTOR. FAN TO RUN WHEN SWITCH IS ENERGISED AT EITHER LAUNDRY OR BATHROOM SWITCH. FAN ONLY TO TURN OFF WHEN BOTH SWITCHES ARE OFF. PROVIDE A ADJUSTABLE 6MIN RUN ON TIMER. AIR IS DRAWN IN THROUGH UNDER CUT DOORS ACROSS ROOM AND INTO FAN THEN DUCTED TO DISCHARGE DIRECT TO OUTSIDE ATMOSPHERE. SYSTEM TO BE PROVIDED WITH NON RETURN AIR DAMPER

#### CARPARK VENTILATION

GROUND FLOOR CAR PARK IS A PERFORMANCE BASED NATURAL VENTILATION SYSTEM IN ACCORDANCE WITH AS16682 CLASS 4, 4.

#### GAS METER CUPBOARD VENTILATION

GAS METER CUPBOARD TO BE NATURALLY VENTILATED IN ACCORDANCE WITH AUTHORITY REQUIREMENTS AND ASS601 TO ARCHITECTS DETAIL.

#### REFUSE ROOM VENTILATION

REFUSE ROOM EXHAUST VENTILATION VIA DUCT MOUNTED FAN SUPPORTED FROM SLAB OVER ON ANTI-VIBRATION ISOLATORS. FAN IS LOCATED IN BASEMENT LEVEL. FAN IS TO BE WIRED TO RUN 24HRS C/W KEYPED ON/OFF SWITCH LOCATED APPROX 1800mm AFFL WITHIN BIN ROOM. PROVIDE RUN STATUS NEON ON SWITCH BOARD. FAN TO BE WIRED FROM MSSB

#### MAIN SWITCH ROOM VENTILATION

SWITCH ROOM IS VENTILATED VIA HIGH LEVEL WALL MOUNTED FAN (EXHAUST ONLY) WITH BELL MOUTH INTAKE AND WIRE GUARD. AIR IS DRAWN IN FROM LOW LEVEL DOOR MOUNTED GRILLE WITH FIRE DAMPER BEHIND. LOCATION OF INTAKE AND DISCHARGE GRILLE IS TO PROMOTE CROSS FLOW VENTILATION. FAN DISCHARGING TO BASEMENT MEZZ STORAGE CAGE. FAN TO BE THERMOSTATICALLY CONTROLLED WITH WALL T'STAT APPROX 1500mm AFFL ON OPPOSITE WALL OR AS SHOWN

#### CORRIDOR SUPPLY AIR

CORRIDOR SUPPLY AIR FANS TO BE DUCT MOUNTED FAN LOCATED AT ROOF LEVEL MOUNTED ON GALVANIZED FRAME WITH APPROPRIATE ACOUSTIC ATTENUATION. SO NO NOISE IS TRANSFERRED THROUGH STRUCTURE. FAN TO BE PROVIDED WITH G4 RATED FILTER ON INLET SIDE OF FAN AND DUCTED DIRECT TO CORRIDOR SUPPLY AIR FIRE RATED SHAFT EXTEND DOWN BUILDING CORE. EACH LEVEL IS TO BE PROVIDED WITH A APPROPRIATE HALF CHEVRON GRILLE. VOLUME CONTROL DAMPER AND FIRE DAMPER TO DELIVER THE SPECIFIED SUPPLY AIR WITHIN THE COMMON CORRIDOR SPACE. FAN IS TO RUN 24hrs FROM PUBLIC BOARD C/W LOCAL ISOLATING SWITCH AND RUN STATUS NEON WITHIN MSB ROOM. FAN TO BE WIRED FROM PB.

#### TENDER OPTION- GAS FIRE PLACE POWER FLUE VENTILATION

PROVIDE TENDER OPTION PRICE (PER APARTMENT) TO MECHANICALLY VENTILATE GAS FIRE PLACES. PROVIDE ALL DUCTING AND FAN COMPATIBLE WITH SPECIFIED GAS FIRE PLACE (CONFIRM FINAL MODEL WITH BUILDER PRIOR TO SUBMITTING TENDER). FAN TO BE IN COMPLIANCE WITH AS 5601, AND MANUFACTURERS RECOMMENDATION. DISCHARGE TO BE IN ACCORDANCE WITH ASS601 AND AUTHORITY/ ENERGY SAFE REQUIREMENTS. PROVIDE WIRING FROM GAS FIRE PLACE TERMINALS TO FAN. FAN OPERATION TO BE INTERLINKED WIT FIRE PLACE. IF FAN IS NOT ACTIVE FIREPLACE MUST NOT TURN ON

#### ACOUSTIC CONTROL

ALL MECHANICAL SYSTEMS MUST BE FULLY ANALYSED TO VERIFY THAT THE ACOUSTIC PERFORMANCE SATISFACTORILY MEETS THE AIRAH RECOMMENDED VALUES AND THE FOLLOWING:

APARTMENT LIVING RM	- 35 dBA
BED ROOMS	- 25 dBA
TOILET AREAS	- 40 dBA
RETAIL AREAS	- 45 dBA
EXTERNAL ROOF PLANT	- 65 dBA

SUPPLY AND INSTALL ATTENUATORS AND ACOUSTIC INSULATION TREATMENT AS REQUIRED TO ACHIEVE SPECIFIED NOISE RATINGS. WHERE ATTENUATORS / SILENCERS ARE EXPOSED TO ATMOSPHERE OR GREASE, THEY MUST BE LINED WITH IMPERVIOUS FILM TO PREVENT THE INGRESS OF MOISTURE AND/OR GREASE

### REGULATIONS & STANDARDS

ALL MATERIALS, EQUIPMENT AND WORKMANSHIP MUST COMPLY WITH THE REQUIREMENTS OF LATEST EDITIONS OF ALL APPLICABLE REGULATIONS AND STANDARDS INCLUDING AS/NZS 1668:1, AS 1668:2, AS 1668:3, AS4254, AS 3666, AS 3500, AS 3000, AS 1851, NATSPEC, PLUMBING INDUSTRY COMMISSION GUIDELINES, BUILDING CODE OF AUSTRALIA (BCA/NCC) LATEST EDITION, GOVERNING AUTHORITIES, ETC. AND THIS SPECIFICATION.

#### HEATING & AIRCONDITIONING PERFORMANCE CONDITIONS

CAPACITIES FOR EACH AIR CONDITIONING SYSTEM MUST BE SELECTED FOR THE PEAK COOLING/HEATING LOAD. EACH SYSTEM MUST MEET THE PEAK ZONE COOLING/HEATING LOADS AS REQUIRED. THE SYSTEM IS TO MAINTAIN DESIGN CONDITIONS THROUGHOUT THE ENTIRE AIR CONDITIONED COMPARTMENT SPACES.

OUTDOOR DESIGN CONDITIONS	INDOOR DESIGN CONDITIONS
SUMMER 35°C db 21°C wb	SUMMER 24°C db 50% RH
WINTER 15°C db	WINTER 21°C db

CAPACITIES FOR SPECIFIED AIR CONDITIONING SYSTEMS ARE BASED ON THE FOLLOWING MINIMUM THERMAL PERFORMANCE VALUES. THE CONTRACTOR MUST OBTAIN WRITTEN CONFIRMATION FROM THE BUILDER THAT THE MINIMUM THERMAL PERFORMANCE VALUES LISTED BELOW HAVE BEEN PROVIDED. GLASS THERMAL COEFFICIENT U SHADE CO-EFFICIENT SC

APART'S	36	0.68
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#### VENTILATION PERFORMANCE

OUTDOOR AIR  
OUTDOOR AIR IS VIA NATURAL VENTILATION TO ALL APARTMENT AND COMMON AREAS BY OPENABLE WINDOWS AND DOORS EQUAL TO 5% OF THE FLOOR AREA PROVIDED BY THE ARCHITECT/BUILDER. UN WHERE NOTED OTHERWISE, PROVIDE MECHANICAL VENTILATION IN ACCORDANCE WITH AS16682 VIA THE A/C SYSTEM.  
WET AREA EXHAUST AIR SYSTEMS  
PROVIDE EXHAUST RATES AS SCHEDULED AND AS PER THE VENTILATION REQUIREMENTS TABLE. REFER TO AS16682  
MISCELLANEOUS EXHAUST SYSTEMS  
PROVIDE VENTILATION RATES AS NOTES AND IN COMPLIANCE WITH AS 1668:2

#### GRILLES AND LOUVRES

EXTERNAL LOUVRES, COWLS, ETC., MUST BE WEATHER AND VERMIN PROOFED & POWDER COLOUR COATED TO SUIT ARCHITECTS REQUIREMENTS. ALL AIR OUTLETS, COLLARS, ETC., EXPOSED TO VIEW WITHIN BUILDING TO BE COLOURED/POWDER COATED TO SUIT ARCHITECTS REQUIREMENTS.  
CAR PARK LOUVRES & VENTED DOORS TO BE SUPPLIED AND INSTALLED BY THE BUILDER WITH MINIMUM FREE AREA OPENINGS AS NOTED.  
ALL DOOR RELIEF GRILLES ARE TO BE ACOUSTIC CHEVRON TYPE AS SCHEDULED SUPPLIED BY THE MECHANICAL CONTRACTOR FOR INSTALLATION BY THE BUILDER.  
ALL GRILLES HAVE BEEN SIZED AND SELECTED BASED ON THE SPECIFIED MANUFACTURER. WHERE ALTERNATIVE MANUFACTURER IS OFFERED THE CONTRACTOR REMAINS RESPONSIBLE TO ENSURE GRILLE / DIFFUSER PERFORMANCES ARE EQUAL TO THE SPECIFIED WITH RESPECT TO THROW, EFFECTIVE DIFFUSION, PRESSURE DROP AND NOISE.

ALL GRILLES AND LOUVRES ARE TO BE PROVIDED WITH SHEET METAL PLENUMS, CUSHION HEADS AND NECK ADAPTORS AS REQUIRED. WHERE USED FOR HEATING AND/OR COOLING CUSHION HEADS AND PLENUMS MUST BE INSULATED IN COMPLIANCE WITH B.C.A. SECTION J.

#### DAMPERS

VOLUME CONTROL DAMPERS (VCD / OBD).  
PROVIDE AND INSTALL MANUAL BALANCING DAMPERS WHERE NOTED AND AS REQUIRED TO PROVIDE A FULL AND ACCURATE BALANCING OF ALL AIR SYSTEM, ETC.

#### FIRE AND SMOKE DAMPERS

THE CONTRACTOR MUST PROVIDE FIRE DAMPERS AND FIRE SEAL ALL AROUND PENETRATION TO MANUFACTURERS REQUIREMENTS SO AS TO MAINTAIN THE FIRE RATING (FR - STRUCTURAL ADEQUACY / INTEGRITY / INSULATION) AS REQUIRED TO MATCH THE INTEGRITY OF THE FIRE RATED / SMOKE RATED COMPARTMENT BOUNDARY MATERIAL WHERE INSTALLED.  
FIRE DAMPERS MUST HAVE SAME CROSS SECTIONAL FREE AREA OPENING AS THE DUCT WHERE INSTALLED SO AS NOT TO IMPEDE NOR DISRUPT ANY AIR FLOWS.  
THE CONTRACTOR MUST PROVIDE ROBUST MOTORS AND FAIL SAFE WIRING FOR ALL SMOKE DAMPERS AND FINAL SITE TESTING AS REQUIRED TO BE FULLY OPERATIONAL IN FIRE MODE TO THE SATISFACTION OF THE ENGINEER.

#### NON RETURN DAMPERS

ALL WET AREA EXHAUST FANS TO BE PROVIDED WITH NON RETURN DAMPERS ACCESSIBLE FROM AN ACCESS PANEL. PROVE FLAP DAMPER ON TOP OF RANGE HOODS PRIOR TO DUCT CONNECTION. BUILDER TO PROVIDE REMOVABLE PANEL IN CUPBOARD OVER RANGE HOOD FOR FLAP DAMPER MAINTENANCE ACCESS.

### DUCTWORK

DUCTWORK AND FITTINGS TO BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH LATEST EDITION OF S.M.A.C.N.A., NZ/AS4254, AS1668, NCC SECTION J AND GOVERNING AUTHORITIES, ETC. ALL TO PROVIDE A GOOD TRADES PERSON WORKMANSHIP TYPE INSTALLATION.

ALL DUCTWORK MUST BE GALVANISED SHEET IRON UNLESS OTHERWISE NOTED.  
- FIRST DIMENSION IS CLEAR INTERNAL WIDTH SIZE  
- SECOND DIMENSION IS CLEAR INTERNAL DEPTH SIZE

SOLID GALVANISED IRON DUCTWORK MUST BE FLANGE CONNECTED COMPLETE WITH GASKET & SEALANT. ALL AIR TIGHT GALVANISED IRON DUCTWORK TO BE SUPPORTED ON ALL THREADED RODS WITH NUTS AND WASHERS AND ANGLE IRON SUPPORTS AT RECOMMENDED CENTRES. ALL AS SCHEDULED IN S.M.A.N.C.A. STANDARDS, ETC., TO SUIT LOADS, ETC.

FLEXIBLE DUCTWORK MUST BE CONNECTED WITH JUBILEE CLIPS / RIVETED THEN DUCT TAPED. ALL TO BE MADE AIR TIGHT. FLEXIBLE DUCTWORK TO BE SUPPORTED ON ALL THREADED RODS WITH NUTS AND WASHERS AND PEAR HANGERS, TWO PIECE CLAMP, ETC., AT RECOMMENDED CENTRES. SO AS DUCTWORK IS INSTALLED IN A STRAIGHT LINE WITH NO SAGS OR DIPs. ALL AS SCHEDULED IN S.M.A.N.C.A. STANDARDS, ETC., TO SUIT LOADS, ETC.

DUCTWORK MUST INCLUDE ALL TRANSITIONS, TEES, BENDS, TURNING VANES, SPLITTERS, VOLUME CONTROL DAMPERS, FIRE DAMPERS, SUPPORTS, OFFSETS, FLEXIBLE CONNECTIONS ANTI-VIBRATION ISOLATORS FITTINGS, ETC., REQUIRED TO PROVIDE A COMPLETE OPERATIONAL AND FULLY BALANCED AIR DUCTED SYSTEM.

ALL DUCTWORK EXPOSED TO WEATHER MUST HAVE TOP SECTION CROSS BROKEN FOR WATER RUN-OFF. ALL SEAMS AND JOINTS TO BE SEALED WITH SILICONE WATER TIGHT.

COMMERCIAL KITCHEN TYPE DUCTWORK TO BE 12mm THICK GALVANISED IRON OR 0.9mm THICK STAINLESS STEEL COMPLETE WITH AIR TIGHT ACCESS PANELS. EVERY 3m AND EVERY CHANGE OF DIRECTION ALL TO COMPLY WITH LATEST EDITION OF S.M.A.C.N.A., NZ/AS4254, AS1668:1 & AS1668:2, NATSPEC, B.C.A. AND GOVERNING AUTHORITIES. DUCTWORK TO BE FIRE RATED WHERE PASSING THROUGH ANOTHER FIRE COMPARTMENT OR FIRE RATED WALL. KITCHEN DUCT TO BE ENCASED IN FIRE RATED ENCLOSURE, SHAFT, BULKHEAD OR SPRAYED WITH FIRE RESISTANCE MATERIAL HAVING THE SAME FIRE RATING AS MATERIAL WHERE INSTALLED, TO MAINTAIN FIRE RATING INTEGRITY.

#### DUCTWORK INSULATION

ALL TO COMPLY WITH N.C.C. SPECIFICATION J52b (LATEST EDITION)

#### SCOPE

(a) THIS SPECIFICATION CONTAINS THE REQUIREMENTS FOR THE SEALING AND INSULATING OF SUPPLY AND RETURN DUCTWORK AND FITTINGS USED IN AN AIR-CONDITIONING SYSTEM.

(b) FOR THE PURPOSES OF THIS SPECIFICATION, FITTINGS-

- (i) INCLUDE PASSIVE COMPONENTS OF A DUCTWORK SYSTEM, AND
- (ii) EXCLUDE ACTIVE COMPONENTS SUCH AS AIR-HANDLING UNIT COMPONENTS

#### SEALING OF DUCTWORK

- (a) DUCTWORK IN AN AIR-CONDITIONING SYSTEM MUST BE SEALED IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURERS RECOMMENDATIONS. DRAINS MUST BE INSTALLED ON GRADE AND SUPPORTED AT MINIMUM 1200mm CENTRES. CONDENSATE DRAIN TO DISCHARGE WITH VISIBLE OUTLET TO DRAIN PANS PROVIDED BY BUILDER. UN. EACH FAN COIL UNIT AND CONDENSING UNIT MUST BE DRAINED INDEPENDENTLY TO THE NEAREST APPROVED DRAIN POINT.
- (b) THE REQUIREMENTS OF (a) DO NOT-
  - (i) APPLY TO DUCTWORK LOCATED WITHIN THE ONLY OR LAST ROOM SERVED BY THE SYSTEM, AND
  - (ii) INCLUDE THE AIR LEAKAGE TESTING REQUIREMENTS OF CLAUSE 2.2.4 OF AS 4254.2

#### INSULATION OF DUCTWORK AND FITTINGS

- (a) DUCTWORK AND FITTINGS IN AN AIR-CONDITIONING SYSTEM MUST BE PROVIDED WITH INSULATION-
  - (i) COMPLYING WITH AS/NZS 4859:1, AND
  - (ii) HAVING A MATERIAL R-VALUE NOT LESS THAN-
    - (A) THAT SPECIFIED IN TABLE 3, OR
    - (B) 10, FOR FLEXIBLE DUCTWORK WITH A LENGTH TO AN OUTLET OR FROM AN INLET OF NOT MORE THAN 3 M.
- (b) INSULATION MUST-
  - (i) BE PROTECTED AGAINST THE EFFECTS OF WEATHER AND SUNLIGHT, AND
  - (ii) BE INSTALLED SO THAT IT-
    - (A) ABUTS ADJOINING INSULATION TO FORM A CONTINUOUS BARRIER, AND
    - (B) MAINTAINS ITS POSITION AND THICKNESS, OTHER THAN AT FLANGES AND SUPPORTS, AND
- (iii) WHEN CONVEYING COOLED AIR-
  - (A) BE PROTECTED BY A VAPOUR BARRIER ON THE OUTSIDE OF THE INSULATION, AND
  - (B) WHERE THE VAPOUR BARRIER IS A MEMBRANE, BE INSTALLED SO THAT ADJOINING SHEETS OF THE MEMBRANE-
    - (aa) OVERLAP BY 50 MM, AND
    - (bb) ARE BONDED OR TAPED TOGETHER.

(c) THE REQUIREMENTS OF (a) DO NOT APPLY TO-

- (i) DUCTWORK AND FITTINGS LOCATED WITHIN THE ONLY OR LAST ROOM SERVED BY THE SYSTEM, OR
- (ii) FITTINGS THAT FORM PART OF THE INTERFACE WITH THE CONDITIONED SPACE, OR
- (iii) RETURN AIR DUCTWORK IN, OR PASSING THROUGH, A CONDITIONED SPACE, OR
- (iv) DUCTWORK FOR OUTSIDE AIR AND EXHAUST AIR ASSOCIATED WITH AN AIR-CONDITIONING SYSTEM, OR
- (v) THE FLOOR OF AN IN-SITU AIR-HANDLING UNIT, OR
- (vi) PACKAGED AIR-CONDITIONING EQUIPMENT COMPLYING WITH MEPS, OR
- (viii) FLEXIBLE FAN CONNECTIONS.

TABLE 3 DUCTWORK & FITTINGS-MINIMUM MATERIAL R-VALUE

LOCATIONS OF DUCTWORK & FITTINGS	MIN. TOTAL R-VALUE For DUCTWORK AND FITTINGS IN EACH CLIMATE ZONE	
	1, 2, 3, 4, 5, 6 and 7	8
Within a conditioned space	12	16
Where exposed to direct sunlight	30	34
All other locations	20	24

#### ANTI-VIBRATION ISOLATORS

SUPPLY AND INSTALL ANTI-VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO ELIMINATE NOISE AND VIBRATION. TRANSITION THROUGH BUILDING STRUCTURE, ETC. ALL TO EQUIPMENT MANUFACTURERS RECOMMENDATIONS. UN.

VENTILATION FANS MUST SUPPORTED BY HARMONICALLY BALANCED EMBLETON SPRING MOUNTS WHERE NOTED AS REQUIRING SPRING MOUNTS.

PROVIDE ACOUSTIC FLEXIBLE DUCT CONNECTORS ON BOTH THE DISCHARGE AND INTAKE SIDES OF ALL FANS AND EQUIPMENT INCORPORATING A FAN ALL FLEXIBLE CONNECTIONS EXPOSED TO WEATHER MUST BE PROTECTED BY AN APPROVED SHEET METAL WEATHER GUARD.

#### MANUFACTURER'S REQUIREMENTS

ALL EQUIPMENT AND SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFIC RECOMMENDATIONS OF THE MANUFACTURER, INCLUDING THE PROVISION OF ANCILLARY OR SAFETY DEVICES DEEMED NECESSARY.

#### FIRE RATED WALL BRACKET

WHERE WALL MOUNTED FAN COIL UNIT IS PROVIDED ON FIRE RATED PARTY WALL. CONTRACTOR TO PROVIDE FIRE RATED WALL MOUNTED BRACKET SUPPORT EQUAL TO "SPLIT FIRE PRO" INSTALLATION TO BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

#### FIRE SEALING OF PENETRATIONS

PENETRATIONS THROUGH ALL WALL, FLOOR AND SHAFTS TO BE IN ACCORDANCE WITH BCA PART C3 - PROTECTION OF PENETRATIONS THROUGH ELEMENTS REQUIRED TO ACHIEVED FRL CONSTRUCTION. CONTRACTOR MUST PROVIDE ALL REQUIRED DAMPERS, WRAPPING, CLADDING, FIRE PILLOWS, FIRE RATED MASTIC ETC. AS REQUIRED TO THE SATISFACTION OF THE RELEVANT BUILDING SURVEYOR.

#### PIPEWORK AND FITTINGS

PIPE WORK SYSTEMS MUST BE SUPPLIED AND INSTALLED COMPLETE WITH ALL VALVES, FITTINGS, CONTROLS, ETC., IN ACCORDANCE WITH LATEST EDITIONS OF NCC, AS1074, AS1432, AS1477, AS1530, AS1571, AS1572, AS1585, AS/NZ 1677:1, AS1722, AS2032, AS2129, AS4041, ETC., THIS SPECIFICATION AND ALL OTHER APPLICATION CODES AND STANDARDS.

EACH PIPE WORK SYSTEMS MUST BE COMPLETE WITH ALL VALVES, FITTINGS, VENTS, DRAINS, SYSTEM EXPANSION COMPONENTS, ANCHORS, SUPPORTS, BRAIDED FLEXIBLE PIPE CONNECTIONS, INSULATION, VAPOUR BARRIERS, SHEATHING, AS REQUIRED FOR A COMPLETE OPERATIONAL BALANCED SYSTEM ALL ARRANGED FOR THE SAFE AND EFFICIENT MODE OF OPERATION.

ALL PIPING MUST BE INSTALLED AND ARRANGED TO SUIT THE STRUCTURAL CONSTRAINTS, LIMITED SPACES, ARCHITECTURAL REQUIREMENTS, ETC. ALL ARRANGED TO AVOID INTERFERENCE, CLASHES, ETC., WITH OTHER TRADES.

ALL PIPE LINES MUST BE SIZED IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURERS RECOMMENDATIONS FOR THE INSTALLED RISE AND EQUIVALENT LENGTH OF REFRIGERATION/WATER LINES FULLY INSULATED WITH ARMAFLEX, ETC., AND VAPOUR BARRIER SEALED. ALL AS REQUIRED.

WHERE EXPOSED TO THE WEATHER SERVICES PIPE WORK MUST BE INSULATED VAPOUR SEALED AND SHEATHED WITH METAL CLADDING. ALL PIPE WORK TO BE MOUNTED AND CLAMPED TO SUPPORTING FRAMES, NEATLY ARRANGED FOR EASY SERVICE, ETC. WHERE LOCATED ON METAL DECK ROOFS PIPES, FRAMES, ETC., MUST BE RUBBER ISOLATED SO AS NO ELECTROLYTIC REACTION OCCURS.

WHERE DISSIMILAR PIPE WORK METALS ARE USED THE MECHANICAL CONTRACTOR MUST ISOLATE WITH VULMETRIC OR EQUAL TYPE FITTINGS TO PREVENT ELECTROLYTIC REACTION IN SYSTEM. ALL TO BE INSTALLED TO MANUFACTURERS RECOMMENDATIONS.

THE CONTRACTOR IS TO MAKE PROVISION FOR PIPEWORK EXPANSION WHERE REQUIRED OR DEEMED NECESSARY BY THE ENGINEER INCLUDING EXPANSION LOOPS, EXPANSION BELLOWES, DYNAMIC MOUNTS AND ANCHOR POINTS, AS REQUIRED TO PREVENT AGE HARDENING & LEAKS OVER THE LIFE OF THE INSTALLATION.

#### CONDENSATE DRAINS

ALL CONDENSATE DRAINS MUST BE CORRECTLY SIZED, TRAPPED AND INSTALLED IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURERS RECOMMENDATIONS. DRAINS MUST BE INSTALLED ON GRADE AND SUPPORTED AT MINIMUM 1200mm CENTRES. CONDENSATE DRAIN TO DISCHARGE WITH VISIBLE OUTLET TO DRAIN PANS PROVIDED BY BUILDER. UN. EACH FAN COIL UNIT AND CONDENSING UNIT MUST BE DRAINED INDEPENDENTLY TO THE NEAREST APPROVED DRAIN POINT.

#### PAINTING

DUCTWORK MUST BE PAINTED AS FOLLOWS:

- DUCTWORK WITHIN BUILDING STRUCTURE EXPOSED TO VIEW MUST BE PAINTED TO MATCH SURROUNDING SURFACES. ALL TO ARCHITECTS APPROVAL (EXCLUDING CAR PARK).
- ALL INTERNAL SURFACES OF DUCTWORK BEHIND AIR OUTLETS, GRILLES, DAMPERS, ETC., MUST BE PAINTED MATT BLACK SO AS NO LIGHT REFLECTION OCCURS.

PIPE WORK MUST BE PAINTED AS FOLLOWS:

- PIPE WORK WITHIN BUILDING STRUCTURE EXPOSED TO VIEW MUST BE PAINTED TO MATCH SURROUNDING SURFACES. ALL TO ARCHITECTS APPROVAL.
- WHERE PIPE WORK, SHEATHING, FLUE PIPES, ETC., ARE WITHIN BUILDING, PLANT ROOM EXPOSED TO VIEW, PIPE WORK, SHEATHING, FLUE PIPES, ETC., MUST BE PAINTED (COLOUR) TO APPROVAL.
- WHERE PIPE WORK, SHEATHING, FLUE PIPES, ETC., ARE EXTERNAL TO BUILDING STRUCTURE ALL MUST BE PAINTED WITH WEATHER, UV PROTECTIVE PAINT TO APPROVAL.

EQUIPMENT SUPPORTS MUST BE PAINTED AS FOLLOWS:

- EQUIPMENT TIMBER SUPPORTS EXPOSED TO WEATHER MUST BE PAINTED WITH WEATHER UV PROTECTIVE PAINT, TO APPROVAL.
- EQUIPMENT IRON SUPPORT FRAMES EXPOSED TO WEATHER MUST BE PAINTED WITH WEATHER UV PROTECTIVE PAINT/HOT DIPPED GALVANISED UNLESS OTHERWISE INDICATED ALL TO APPROVAL.

#### ELECTRICAL

EACH ITEM OF MECHANICAL EQUIPMENT MUST BE WIRED COMPLETE WITH LOCAL ISOLATING SWITCH LOCATED ADJACENT. COMPLY WITH THE CURRENT AS/NZ1668:1, AS 1668:2, SAA WIRING RULES AS3000, GOVERNING AUTHORITIES REQUIREMENTS, AS CODES, LOCAL SUPPLY AUTHORITY SPECIAL REQUIREMENTS, ETC.

LABEL ALL POWER OUTLETS, POWER SUPPLIES, SWITCHES, RELAYS, CONTACTS, CABLES, ETC., TO CLEARLY INDICATE EQUIPMENT CIRCUITS, SWITCHBOARD NUMBERS, ETC. LABELS ARE TO BE ENGRAVED AND FIXED TO THE FACE PLATES WITH INDUSTRIAL ADHESIVE. LABELS MUST BE BLACK LETTERS ON WHITE BACKGROUND. CONTRACTOR TO SUBMIT LABELLING SCHEDULE AND TYPICAL SAMPLE TO CONSULTING ENGINEERS FOR APPROVAL PRIOR TO ANY INSTALLATION ON THIS PROJECT.

THE ELECTRICAL WORKS MUST INCLUDE THE SUPPLY, INSTALLATION, OF ALL ELECTRICAL POWER WIRING, CONTROL WIRING, CONTACTS, RELAYS, LIGHTS, OVER LOAD PROTECTION, RUN ON TIMERS, TESTING, COMMISSIONING, WARRANTY, MAINTENANCE, ETC., FOR THE SAFE AND EFFICIENT MODE OF AUTOMATIC OPERATION OF THE MECHANICAL SERVICES. INSTALLATION OF ALL WORKS MUST BE CARRIED OUT BY AN EXPERIENCED AND QUALIFIED SUBCONTRACTOR FOR ELECTRICAL INSTALLATION OF AIR CONDITIONING SYSTEMS POWER, CONTROLS, ETC.

IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO NOTIFY THE BUILDERS ELECTRICAL CONTRACTOR WITHIN A SUITABLE TIME PERIOD FOR THE MECHANICAL EQUIPMENT ELECTRICAL LOAD REQUIREMENTS, PROVISIONS, ETC., AS APPLICABLE.

WHERE REQUIRED FOR FIRE RATING OF CABLES, i.e. ESSENTIAL SERVICES, ETC., MECHANICAL CONTRACTOR MUST PROVIDE CABLES OF MIMS, RADDOX, XLPE, ETC., WITH THE EQUIVALENT FIRE RATINGS OF THE INSTALLATION REQUIREMENTS AS APPLICABLE.

#### START UP

EQUIPMENT MANUFACTURERS OF SWITCHBOARDS, PUMPS, PACKAGED/ SPLIT AIR CONDITIONING UNITS, BOILERS, CHILLER SETS, CONDENSING SETS, PACKAGED REFRIGERATING/COOLING EQUIPMENT AND ALL OTHER EQUIPMENT AS APPLICABLE MUST ALLOW TO START UP EQUIPMENT AND PROVIDE THE REQUIRED TWELVE (12) MONTHS SERVICE AND WARRANTY.

#### VARIATIONS


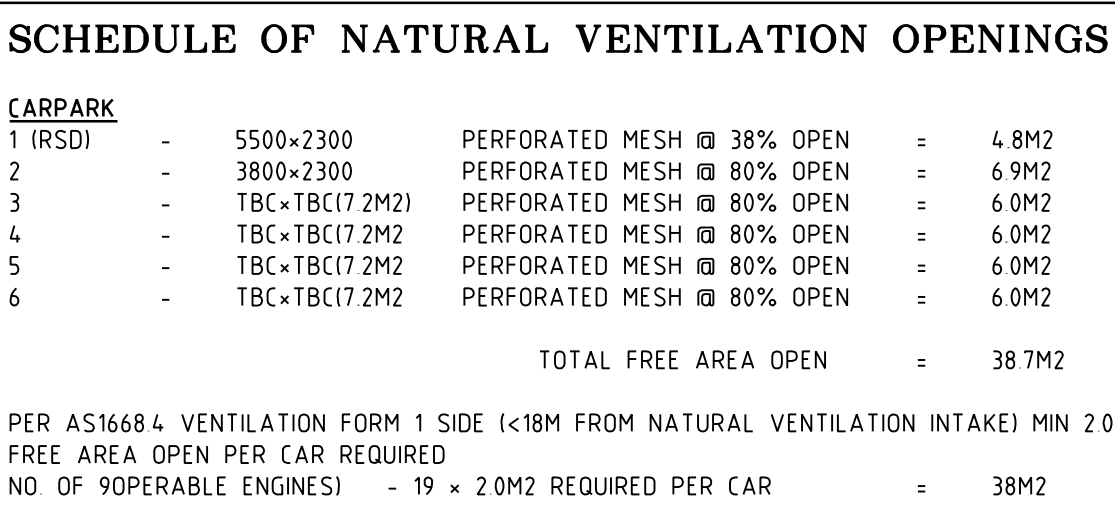
BY SUBMITTING A TENDER FOR THIS WORK, TENDERERS ACKNOWLEDGE THAT THEY HAVE FULLY ASSESSED THE NECESSARY EXTENT OF WORK AND HAVE ALLOWED SCALE AS-BUILT DRAWINGS THAT REFLECT THE TRUE EXTENT & LAYOUT OF THE WORK FOR ALL ITEMS, ACTIVITIES, MATERIALS AND LABOUR WHICH ARE OBVIOUSLY REQUIRED, WHETHER OR NOT THEY ARE CLEARLY IDENTIFIED ON PLANS OR SPECIFICATION. NO COST ADJUSTMENT WILL BE CONSIDERED FOR FAILURE TO RECOGNISE AND IDENTIFY ANY POTENTIAL EXTRA COSTS PRIOR TO SIGNING ANY CONTRACT.

#### TESTING BALANCING & COMMISSIONING

COMMISSIONING OF ALL EQUIPMENT TO THE EQUIPMENT MANUFACTURERS REQUIREMENTS IN ORDER TO ENSURE PROPER OPERATION OF THE INSTALLED EQUIPMENT AND TO VALIDATE ALL MANUFACTURERS EQUIPMENT WARRANTIES. ALL COMMISSIONING MUST COMPLY WITH SPECIAL ASHRAE, CIBSE & S.M.A.C.N.A. CONDITIONS AS PER COMMISSIONING & MAINTENANCE MANUAL.

FULL DETAILS OF ALL COMMISSIONING DATA FOR ALL EQUIPMENT MUST BE PRESENTED TO THE ENGINEER FOR HIS ASSESSMENT. PRACTICAL COMPLETION WILL NOT BE CONSIDERED UNTIL THIS REQUIREMENTS HAS BEEN MET. DATA MUST BE PRESENTED IN COMPARISON WITH CATALOGUE DATA INCLUDING PHASE BALANCING, MAXIMUM ELECTRICAL POWER DEMANDS, AIR/WATER FLOWS, PRESSURES, REV/S, SPEED, CAPACITIES, AIR/WATER ON/OFF CONDITIONS ALL AS APPLICABLE. THE ENGINEER MAY REQUEST FURTHER TESTS AND DATA.






**MacCORMACK ASSOCIATES CONSULTANTS Pty. Ltd.**  
ABN 79 978 727 380

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Web: [maccormack.com.au](http://maccormack.com.au)



**CONSULT AUSTRALIA**  
Member Firm

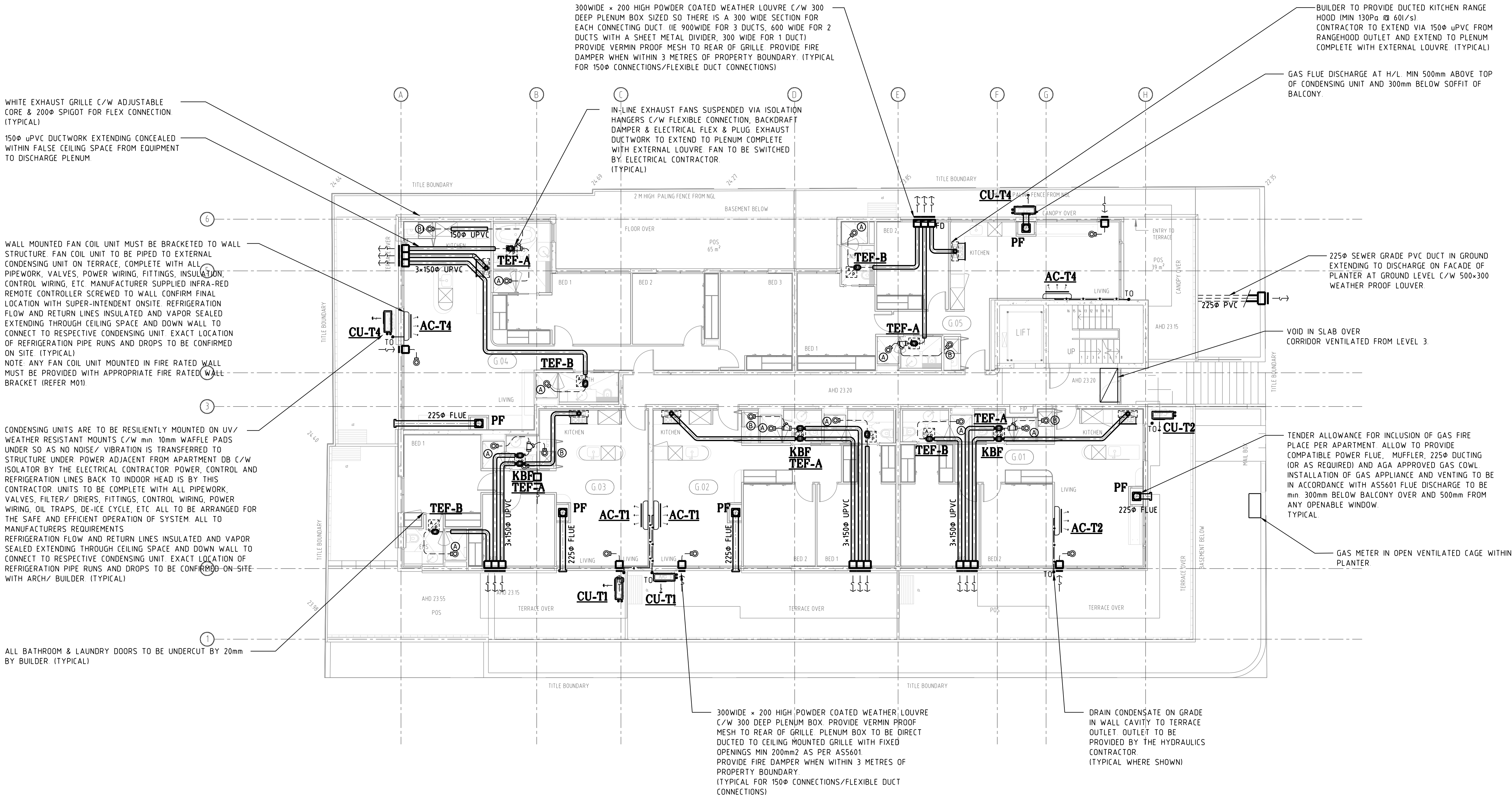
project title  
**1 VINE STREET  
HEIDELBERG, VIC 3084**

# BASEMENT LEVEL AIR-CONDITIONING & VENTILATION LAYOUT

scale 1100 @ A1			
designed ASG	checked ASG		
drawn AV/AS	date MAY 2017		
job number	1939		
issue	T1		<b>M2</b>
drawing	2 of 8		

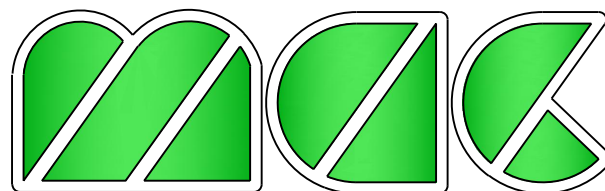
TENDER NOTE  
PROVIDE SEPARATE TENDER PRICE TO ALLOW VENTILATION/  
DISCHARGE OF GAS FIRE PLACE TO APARTMENT FACADE  
TENDER OPTION PRICE TO INCLUDE ALL POWER FLUE, INLINE  
FAN, DUCTING, INSTALLATION DISCHARGE ETC  
BASED ON JETMASTER -HORIZON MODEL. CONFIRM WITH  
BUILDER PRIOR TO TENDER BEING SUBMITTED.

FLUE DISCHARGE NOTE -  
FLUE DISCHARGE TO BE min. 300mm BELOW BALCONY OVER  
AND 500mm FROM ANY OPENABLE WINDOW.  
TYPICAL.



T1	TENDER ISSUE	AV	07/08/17
P1	PRELIMINARY ISSUE	ST	18/05/17

issue	rev.	description	by	date
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Do not scale. All dimensions to be checked on site.

This drawing is available in electronic format at a cost of \$125 payable by this subcontractor

project title  
**1 VINE STREET  
HEIDELBERG, VIC 3084**

service  
**MECHANICAL SERVICES**

**GROUND FLOOR  
AIR-CONDITIONING &  
VENTILATION LAYOUT**  
drawing title

scale 0 0.5 1 2 3 4m  
1:1000 A1

designed  
ASG

checked  
ASG

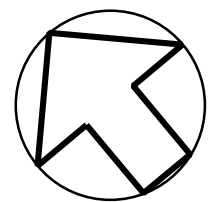
drawn  
AV/AS

date  
MAY 2017

job  
number 1939

issue  
T1

drawing  
3 of 8



drawing  
number

**M3**



IN-LINE EXHAUST FANS SUSPENDED VIA ISOLATION HANGERS C/W FLEXIBLE CONNECTION, BACKDRAFT DAMPER & ELECTRICAL FLEX & PLUG EXHAUST DUCTWORK TO EXTEND TO PLENUM COMPLETE WITH EXTERNAL LOUVRE. FAN TO BE SWITCHED BY ELECTRICAL CONTRACTOR (TYPICAL)

WALL MOUNTED FAN COIL UNIT MUST BE BRACKETED TO WALL STRUCTURE. FAN COIL UNIT TO BE PIPED TO EXTERNAL CONDENSING UNIT ON TERRACE. COMPLETE WITH ALL PIPEWORK, VALVES, POWER WIRING, FITTINGS, INSULATION, CONTROL WIRING, ETC. MANUFACTURER SUPPLIED INFRA-RED REMOTE CONTROLLER SCREWED TO WALL. CONFIRM FINAL LOCATION WITH SUPER-INTENDENT. ON-SITE REFRIGERATION FLOW AND RETURN LINES INSULATED AND VAPOR SEALED. EXTENDING THROUGH CEILING SPACE AND DOWN WALL TO CONNECT TO RESPECTIVE CONDENSING UNIT. EXACT LOCATION OF REFRIGERATION PIPE RUNS AND DROPS TO BE CONFIRMED ON SITE (TYPICAL).  
NOTE: ANY FAN COIL UNIT MOUNTED IN FIRE-RATED WALL MUST BE PROVIDED WITH APPROPRIATE FIRE-RATED WALL BRACKET (REFER M01)

DRAIN CONDENSATE ON GRADE IN WALL CAVITY TO TERRACE OUTLET. OUTLET TO BE PROVIDED BY THE HYDRAULICS CONTRACTOR (TYPICAL WHERE SHOWN)

ALL BATHROOM & LAUNDRY DOORS TO BE UNDERCUT BY 20mm BY BUILDER (TYPICAL)

GAS FLUE DISCHARGE AT H/L MIN 500mm ABOVE TOP OF CONDENSING UNIT AND 300mm BELOW SOFFIT OF BALCONY.

WHITE EXHAUST GRILLE C/W ADJUSTABLE CORE & 200mm SPIGOT FOR FLEX CONNECTION (TYPICAL)

**TENDER NOTE**  
PROVIDE SEPARATE TENDER PRICE TO ALLOW VENTILATION/ DISCHARGE OF GAS FIRE PLACE TO APARTMENT FACADE.  
TENDER OPTION PRICE TO INCLUDE ALL POWER FLUE, IN-LINE FAN, DUCTING, INSTALLATION, DISCHARGE ETC.  
BASED ON JETMASTER -HORIZON MODEL. CONFIRM WITH BUILDER PRIOR TO TENDER BEING SUBMITTED.

**FLUE DISCHARGE NOTE** -  
FLUE DISCHARGE TO BE MIN. 300mm BELOW BALCONY OVER AND 500mm FROM ANY OPENABLE WINDOW.  
TYPICAL.

CEILING MOUNTED EXHAUST FAN C/W FLEXIBLE DUCT CONNECTION TO 150mm UPVC DUCT & DISCHARGE VIA EXTERNAL LOUVRE GRILLE (TYPICAL WHERE SHOWN)

300WIDE x 200 HIGH POWDER COATED WEATHER LOUVRE C/W 300 DEEP PLENUM BOX SIZED SO THERE IS A 300 WIDE SECTION FOR EACH CONNECTING DUCT. (IE 900WIDE FOR 3 DUCTS, 600 WIDE FOR 2 DUCTS WITH A SHEET METAL DIVIDER, 300 WIDE FOR 1 DUCT). PROVIDE VERMIN PROOF MESH TO REAR OF GRILLE. PROVIDE FIRE DAMPER WHEN WITHIN 3 METRES OF PROPERTY BOUNDARY. (TYPICAL FOR 150mm CONNECTIONS/FLEXIBLE DUCT CONNECTIONS)

300WIDE x 200 HIGH POWDER COATED WEATHER LOUVRE C/W 300 DEEP PLENUM BOX. PROVIDE VERMIN PROOF MESH TO REAR OF GRILLE. PLENUM BOX TO BE DIRECT DUCTED TO CEILING MOUNTED GRILLE WITH FIXED OPENINGS MIN 200mm<sup>2</sup> AS PER AS5601. PROVIDE FIRE DAMPER WHEN WITHIN 3 METRES OF PROPERTY BOUNDARY. (TYPICAL FOR 150mm CONNECTIONS/FLEXIBLE DUCT CONNECTIONS)

4-SETS OF REFRIGERANT PIPEWORK RISE T/A WITHIN SHAFT. ALL PIPEWORK TO BE FULLY INSULATED AND VAPOR SEALED, MOUNTED ON CABLE TRAY, UNIT STRUT FRAME OF THE LIKE. ALL TO BE HARD DRAWN COPPER.

BUILDER TO PROVIDE DUCTED KITCHEN RANGE HOOD (MIN 130Pa @ 60L/s).  
CONTRACTOR TO EXTEND VIA 150mm UPVC FROM RANGEHOOD OUTLET AND EXTEND TO PLENUM COMPLETE WITH EXTERNAL LOUVRE (TYPICAL)

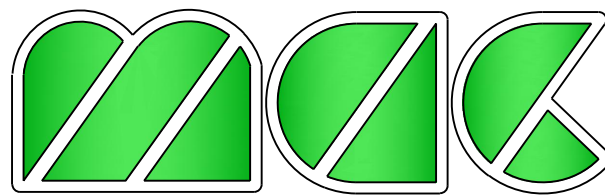
VOID IN SLAB  
CORRIDOR VENTILATED FROM LEVEL 3

TENDER ALLOWANCE FOR INCLUSION OF GAS FIRE PLACE PER APARTMENT. ALLOW TO PROVIDE COMPATIBLE POWER FLUE, MUFFLER, 225mm DUCTING (OR AS REQUIRED) AND AGA APPROVED GAS COWL. INSTALLATION OF GAS APPLIANCE AND VENTING TO BE IN ACCORDANCE WITH AS5601. FLUE DISCHARGE TO BE MIN. 300mm BELOW BALCONY OVER AND 500mm FROM ANY OPENABLE WINDOW. TYPICAL.

150mm UPVC DUCTWORK EXTENDING CONCEALED WITHIN FALSE CEILING SPACE FROM EQUIPMENT TO DISCHARGE PLENUM

T1	TENDER ISSUE	AV	07/08/17
P1	PRELIMINARY ISSUE	ST	18/05/17

issue	rev.	description	by	date
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Do not scale. All dimensions to be checked on site.

This drawing is available in electronic format at a cost of \$125 payable by this subcontractor.

project title  
**1 VINE STREET  
HEIDELBERG, VIC 3084**

service  
**MECHANICAL SERVICES**

**FIRST FLOOR  
AIR-CONDITIONING &  
VENTILATION LAYOUT**  
drawing title

scale 1:1000  
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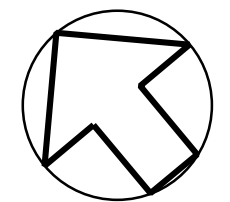
designed ASG checked ASG

drawn AV/AS date MAY 2017

job number 1939

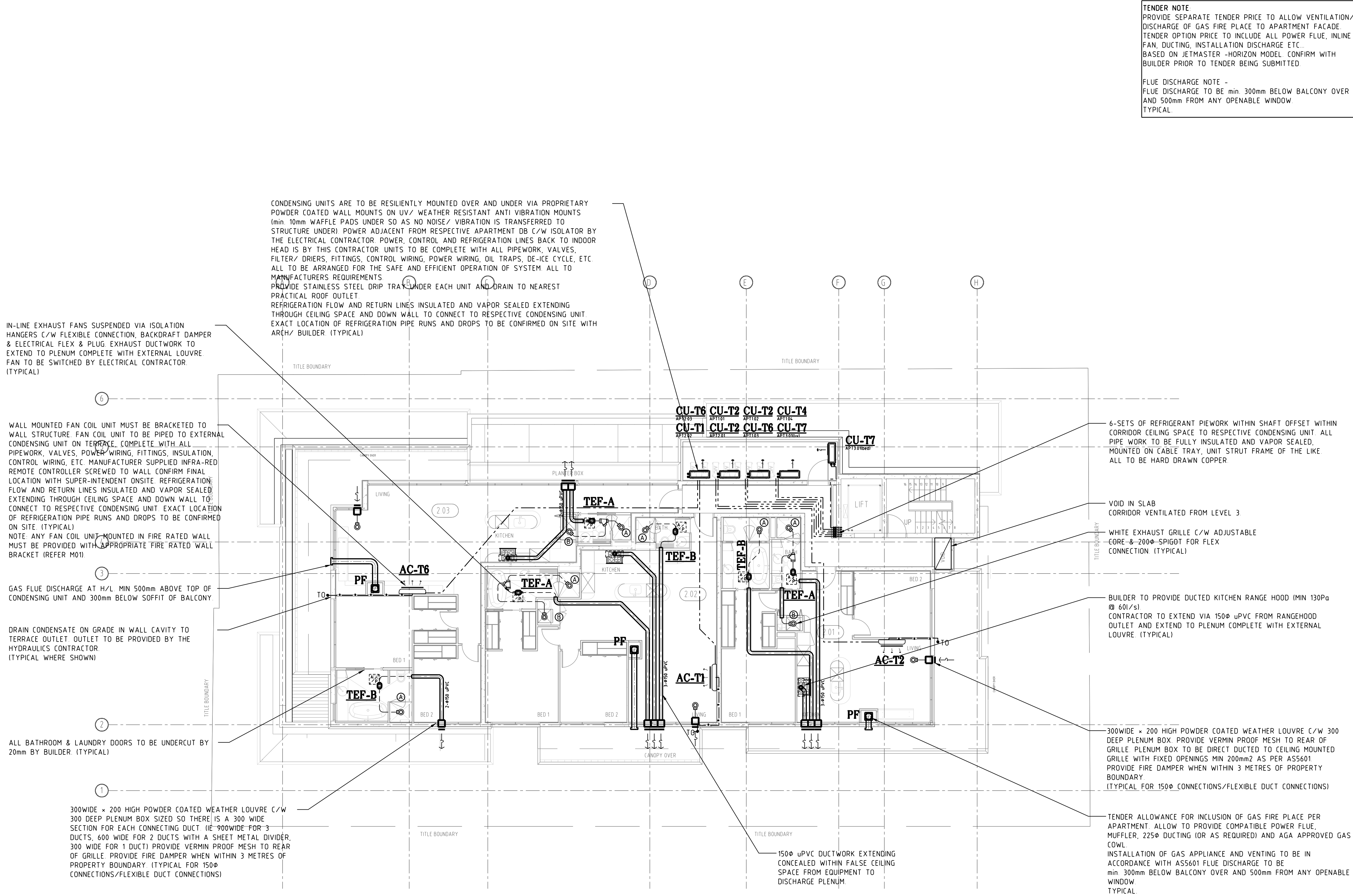
issue T1

drawing 4 of 8



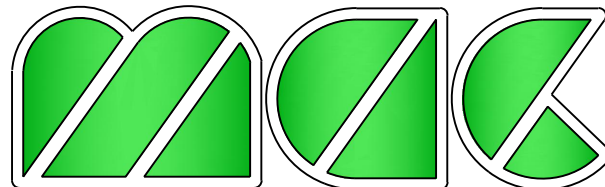
drawing number

**M4**



T1	TENDER ISSUE	AV	07/08/17
P1	PRELIMINARY ISSUE	ST	18/05/17

issue	rev.	description	by	date
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project title  
**1 VINE STREET  
HEIDELBERG, VIC 3084**

service  
**MECHANICAL SERVICES**

**SECOND FLOOR  
AIR-CONDITIONING &  
VENTILATION LAYOUT**  
drawing title

scale  
1:1000  
0 0.5 1 2 3 4m

designed  
ASG

checked  
ASG

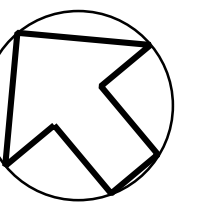
drawn

date  
MAY 2017

job  
number  
1939

issue  
T1

drawing  
5 of 8



drawing  
number

**M5**

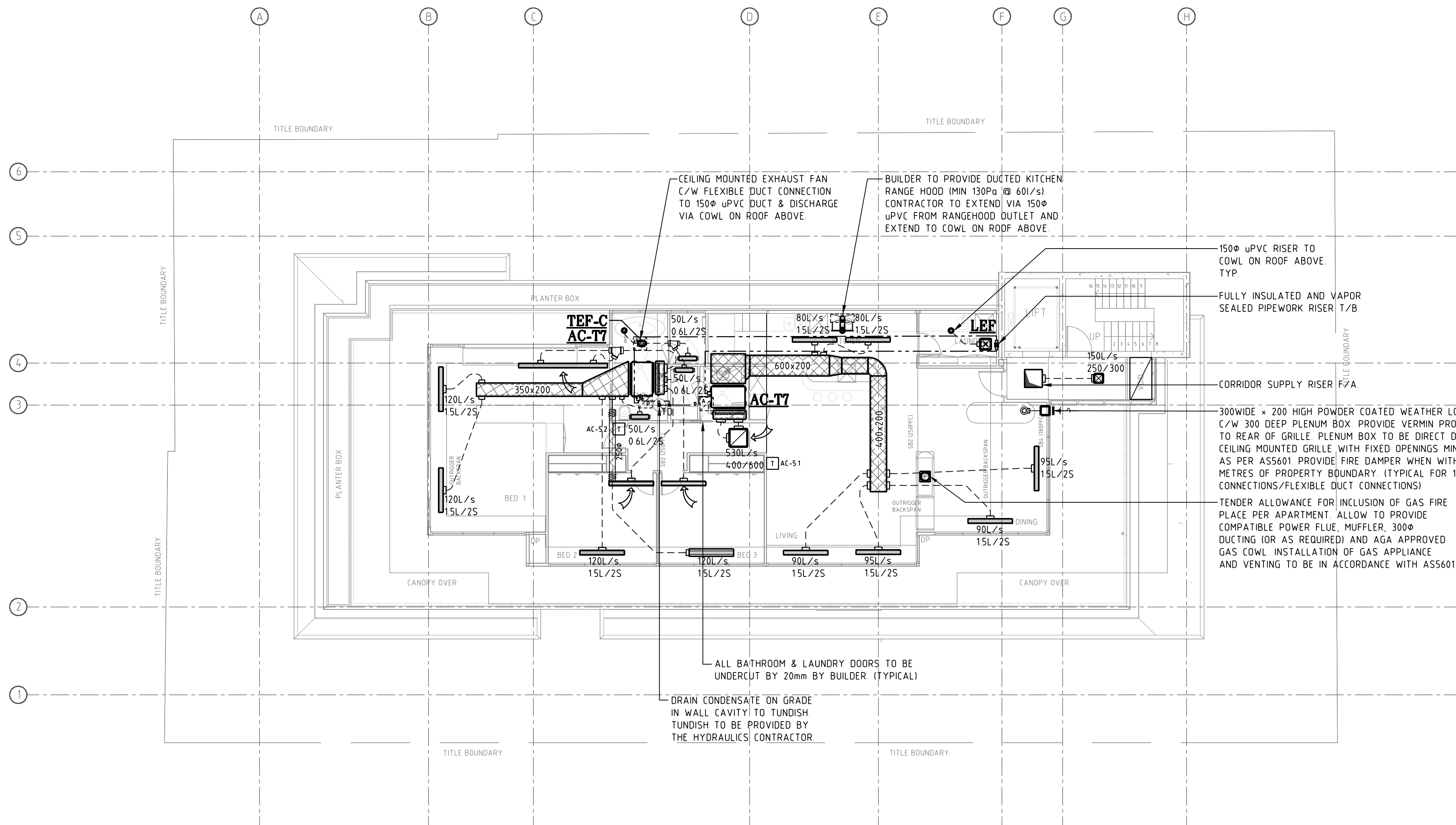


TYPICAL GRILLE LEGEND:

90L/s  
15L/2S

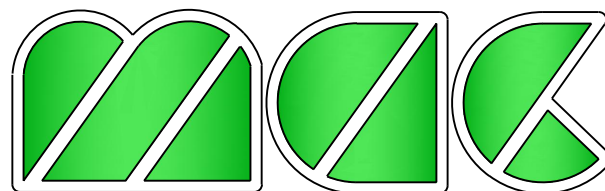
DENOTES CEILING MOUNTED LINEAR SLOT AIR GRILLE COMPLETE WITH ACOUSTIC CUSHION HEAD BOX, SPIGOT, V.C.D., ETC  
AIRFLOW IL/S  
PLENUM LENGTH / No OF SLOTS

- ALL GRILLES TO BE SUPPLIED FROM HOLYOAKE MULTI SLOT CEILING GRILLES (MODEL: CSD-25)
- RETURN AIR LINEAR SLOTS DIFFUSER EQUAL TO OR GREATER THAN THE LENGTH / SLOT NO. OF THE ASSOCIATED SUPPLY DIFFUSER
- ALL FLEXIBLE DUCT SPIGOTS FROM HARD DUCTED S/A TO BE OVALISED



T1	TENDER ISSUE	AS	07 08 17
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issue	rev.	description	by	date
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Architects reflected ceiling plans and other detailed  
drawings.

Do not scale. All dimensions to be checked on site.

This drawing is available in electronic format at a cost of  
\$125 payable by this subcontractor

project title  
**1 VINE STREET  
HEIDELBERG, VIC 3084**

service  
**MECHANICAL SERVICES**

**THIRD FLOOR  
AIR-CONDITIONING &  
VENTILATION LAYOUT**  
drawing title

scale 0 1 2 3 4m  
1:100

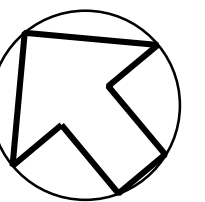
designed ASG	checked ASG
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drawn	date MAY 2017
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job number	1939
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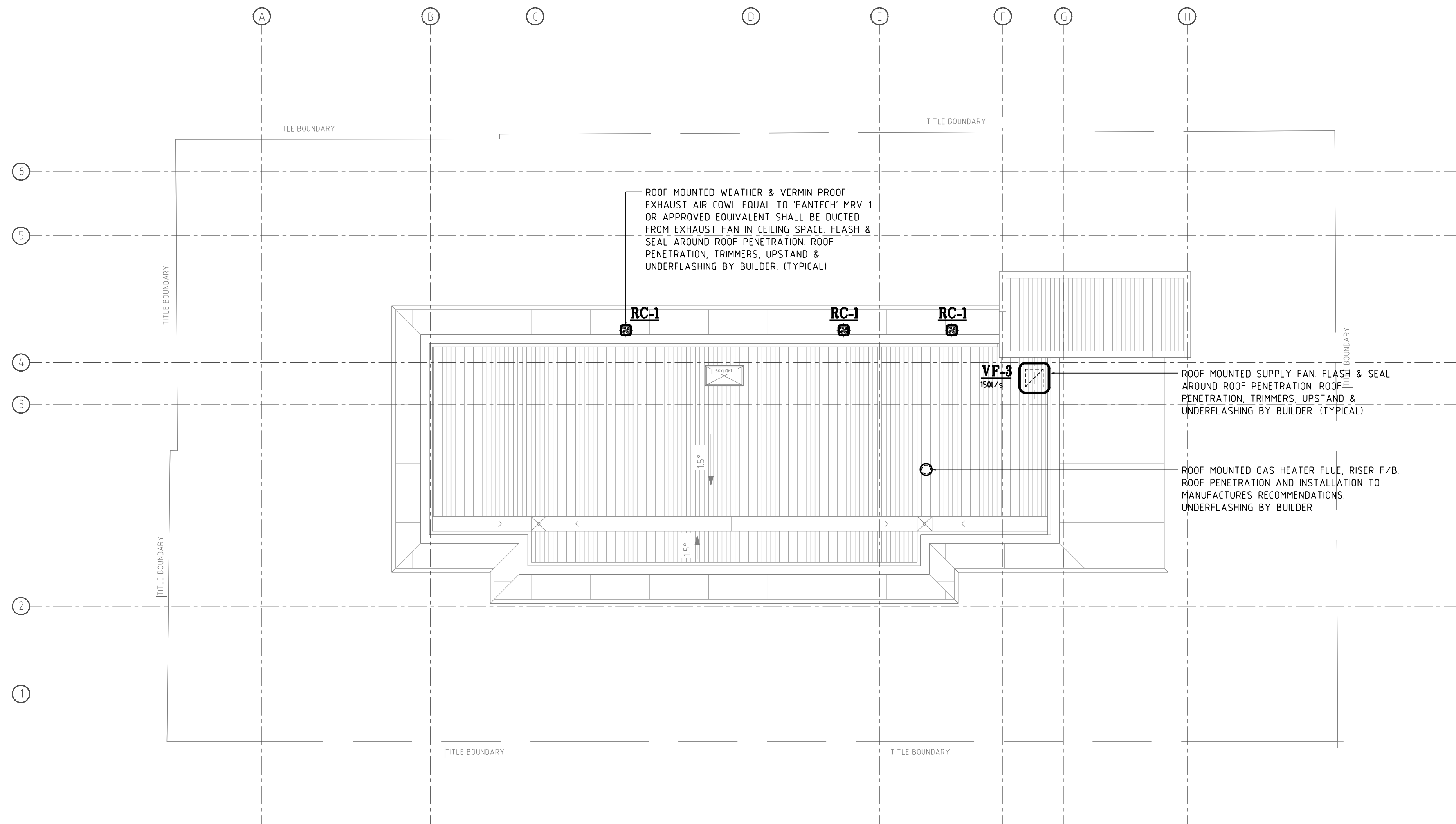
issue	T1
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drawing	6 of 8
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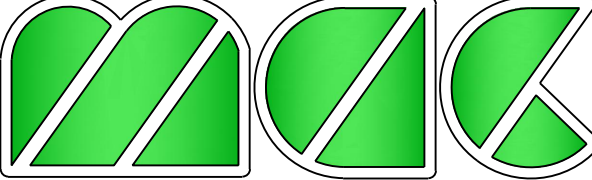
drawing  
number

**M6**



BUILDER IS RESPONSIBLE TO PROVIDE MAINTENANCE ACCESS TO ALL ROOF MOUNTED EQUIPMENT INCLUDING ALL REQUIRED HAND RAILS, WALKWAYS, HARNESS TIE POINTS, ETC AS REQUIRED IN ACCORDANCE WITH WORK SAFE GUIDELINES, AS 1657, RBS APPROVAL & ALL OTHER RELEVANT STANDARDS/GOVERNING AUTHORITIES ALL TO OH&S CONSULTANT ADVICE


T1		TENDER ISSUE	AS	07 08 17
P1		PRELIMINARY ISSUE	ST	18 05 17
issue	rev.	description	by	date



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project title

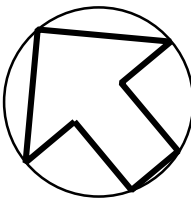
**1 VINE STREET  
HEIDELBERG, VIC 3084**

service

**MECHANICAL SERVICES**

**ROOF PLAN  
AIR-CONDITIONING &  
VENTILATION LAYOUT**

drawing title

scale	0 0.5 1 2 3 4m	
1:100	A1	
designed	checked	
ASG	ASG	
drawn	date	drawing number
	MAY 2017	
job number	1939	
issue	T1	<b>M7</b>
drawing	7 of 8	



## AIR CONDITIONING & FAN COIL UNIT SCHEDULE:

SELECTION: DAIKIN

CODE	LOCATION	AIR ON °CDB °CWB	CAP S/A	I/s O/A	Ex Pa Stat	CAP GTH	kW GSH	HEAT kW	F.C.U. Ph	Elect. FUSE	INDOOR/dimens heightxwidthxdepth	kg	C.U. Elect. Ph	Elect. FUSE	FLA	OUTDOOR/dim. heightxwidthxdepth	kg
AC/CU-T1	LIVING ROOM AS SHOWN	24 17.2	320	-	-	5.86	4.63	6.9	-	-	FTXS60LVMA 340 x 1050 x 248	14	1	-	7.9	RXS60LVMA 735 x 825 x 300	4.6
AC/CU-T2	LIVING ROOM AS SHOWN	24 17.2	351	-	-	6.94	5.27	7.89	-	-	FTXS71LVMA 340 x 1050 x 248	14	1	-	10.1	RXS71LVMA 770 x 900 x 320	7.1
AC/CU-T3	LIVING ROOM AS SHOWN	24 17.2	396	-	-	8.30	6.16	8.88	-	-	FTXS85LVMA 340 x 1200 x 240	17	1	-	11.9	RXS85LVMA 990 x 940 x 320	8.0
AC/CU-T4	LIVING ROOM AS SHOWN	24 17.2	378	-	-	9.18	6.44	10.36	-	-	FTXS95LVMA 340 x 1200 x 240	18	1	-	14.8	RXS95LVMA 990 x 940 x 320	8.2
AC/CU-T5	LIVING ROOM AS SHOWN	24 17.2	267	-	-	6.96	4.62	8	-	-	FAQ71CVEA 290 x 1050 x 238	13	1	-	28	RZ0571AV1 990 x 940 x 320	7.5
AC/CU-T6	LIVING ROOM AS SHOWN	24 17.2	383	-	-	9.79	9.22	11.2	-	-	FAQ100CVEA 340 x 1200 x 240	17	1	-	28.6	RZ05100AV1 1430 x 940 x 320	10.8
AC/CU-T7	AS SHOWN LEVEL 3	24 17.2	532		90	6.95	6.4	7.51	1	-	26 FDY071LAV1 360 x 1188 x 869	47	1	32	27.5	RZ0571AV1 990 x 940 x 320	7.5

## EXHAUST FAN SCHEDULE:

FANTECH OR EQUAL MANUF:

CODE	LOCATION	MODEL No	SYSTEM	CAPACITY l/s Pa	dBA	rps	Ph	kW	F.L.A	WEIGHT Kg	SYSTEM NOTES	
TEF-A	AS SHOWN	JCE202-3(HI)	Exh AIR	90	200	4.9	4.1	1	0.1	0.45	33	EXHAUST AIR FAN TO BE WIRED BY ELEC CONTRACTOR SWITCHING TO BE WIRED TO LIGHTING GANG PLATE. DOUBLE POLE AS REQUIRED
TEF-B	AS SHOWN	JCE202-3(LO)	Exh AIR	50	140	4.2	3.3	1	0.07	0.34	33	EXHAUST AIR FAN TO BE WIRED BY ELEC CONTRACTOR SWITCHING TO BE WIRED TO LIGHTING GANG PLATE
TEF-C	AS SHOWN	JCE202-3(HI)	Exh AIR	100	200	4.9	4.1	1	0.1	0.45	33	EXHAUST AIR FAN TO BE WIRED BY ELEC CONTRACTOR SWITCHING TO BE WIRED TO LIGHTING GANG PLATE. DOUBLE POLE AS REQUIRED
LEF	AS SHOWN	ULT29-150SDWT	Exh AIR	40	100	3.7	1.6	1	0.06	0.27	33	EXHAUST AIR FAN TO BE WIRED BY ELEC CONTRACTOR SWITCHING TO BE WIRED TO LIGHTING GANG PLATE
KBF	AS SHOWN	TD-500/150 (LO)	Exh AIR	60	100	3.9	3.1	1	0.045	0.22	2.7	DUCT MOUNTED FAN TO BE PROVIDED WITH FLEXIBLE CONNECTION. ELEC CONTRACTOR TO SWITCH FROM KITCHEN BENCH GPO
VF-1	BASEMENT	TD-800/200ECO	Exh AIR	200	100	4.5	3.4	1	0.11	0.75	4.9	IN LINE BIN ROOM EXHAUST AIR FAN FAN TO OPERATE 24hrs C/W KEYED ON/OFF SWITCH
VF-2	BASEMENT	TD-800/200ECO	Exh AIR	200	100	4.5	3.4	1	0.11	0.75	4.9	MSB ROOM EXHAUST AIR FAN THERMOSTATICALLY CONTROLLED FAN IS TO BE INITIALLY SET TO ACTIVATE WHEN ROOM TEMPERATURE EXCEEDS 22°C
VF-3	ROOF	CE356S	Supply AIR	150	100	4.3	1.5	1	0.07	0.32	20	CORRIDOR SUPPLY AIR ROOF MOUNTED FAN FAN TO OPERATE 24hrs C/W KEYED ON/OFF SWITCH
RC-1	ROOF	MRV1	Exh AIR	<100	50	-	-	-	-	-	1	ROOF MOUNTED EXHAUST COWL

### NOTE:

- ALL DUCT MOUNTED FANS TO BE PROVIDED WITH FLEXIBLE CONNECTION ON AIR INTAKE AND AIR DISCHARGE SIDES OF FAN
- ALL BATHROOM/ LAUNDRY DOORS SERVED BY AN EXHAUST SYSTEM ARE TO BE UNDERCUT BY 20mm BY THE BUILDER
- ALL FANS SERVING A CONDITIONED ZONE MUST BE PROVIDED WITH A LOW STATIC LOSS BACK DRAFT DAMPER
- ALL FANS MUST BE MOUNTED ON ANTI-VIBRATION ISOLATING MOUNTS FROM STRUCTURE DESIGNED FOR LOAD BEARING
- EACH FAN TO HAVE A LOCAL ISOLATING ON/OFF SWITCH MOUNTED ADJACENT EQUIPMENT
- ALL BATHROOM FANS TO BE WIRED INTO LIGHTING CIRCUIT SWITCHED VIA SEPARATE 10A SWITCH INTEGRATED WITHIN LIGHTING GANG PLATE WHERE FAN SERVES TWO SPACES ELECTRICAL CONTRACTOR TO DOUBLE POLE LOCAL WALL MOUNTED SWITCH
- ALL CARPARK FANS ARE TO BE VSD CONTROLLED & PROVIDED WITH METAL BLADES
- ALL FANS TO BE INSTALLED TO MANUFACTURERS RECOMMENDATIONS
- UPON COMPLETION OF FULLY CO-ORDINATED SHOP DRAWINGS AND DISCHARGE ARRANGEMENTS CONTRACTOR TO CONDUCT STATIC PRESSURE CALCULATIONS FOR EACH FAN AND RESELECT FAN TO SUIT AS REQUIRED

## EXHAUST AIR OUTLETS SCHEDULE

CODE	I/s	PRESS DROP Pa	SIZE Neck	FACE	CON FLEX DUCT dia	EQUAL MANUF MODEL	FANTECH TYPE
A	50	5	200dia	315dia	200	ALG Model 200	CEILING MTD ROUND OUTLET WITH ADJUST CORE, SPIGOT & ACOUSTIC PLENUM BOX
B	40	5	200dia	315dia	200	ALG Model 200	CEILING MTD ROUND OUTLET WITH ADJUST CORE, SPIGOT & ACOUSTIC PLENUM BOX

- ALL EXHAUST AIR GRILLES TO BE ROUND TYPE UNLESS OTHERWISE INDICATED. GRILLES MUST BE INSTALLED COMPLETE WITH CUSHION HEAD BOX, SPIGOT, V.C.D., ETC.

## DOOR GRILLE SCHEDULE

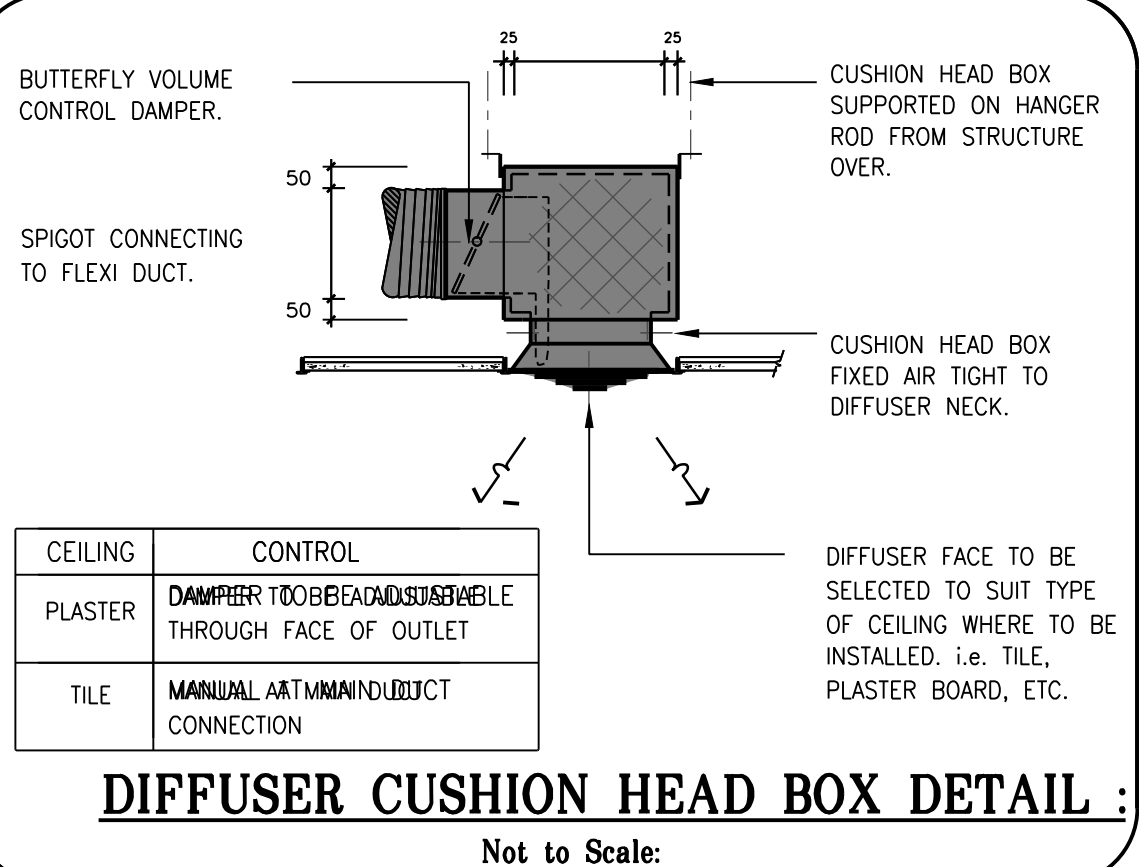
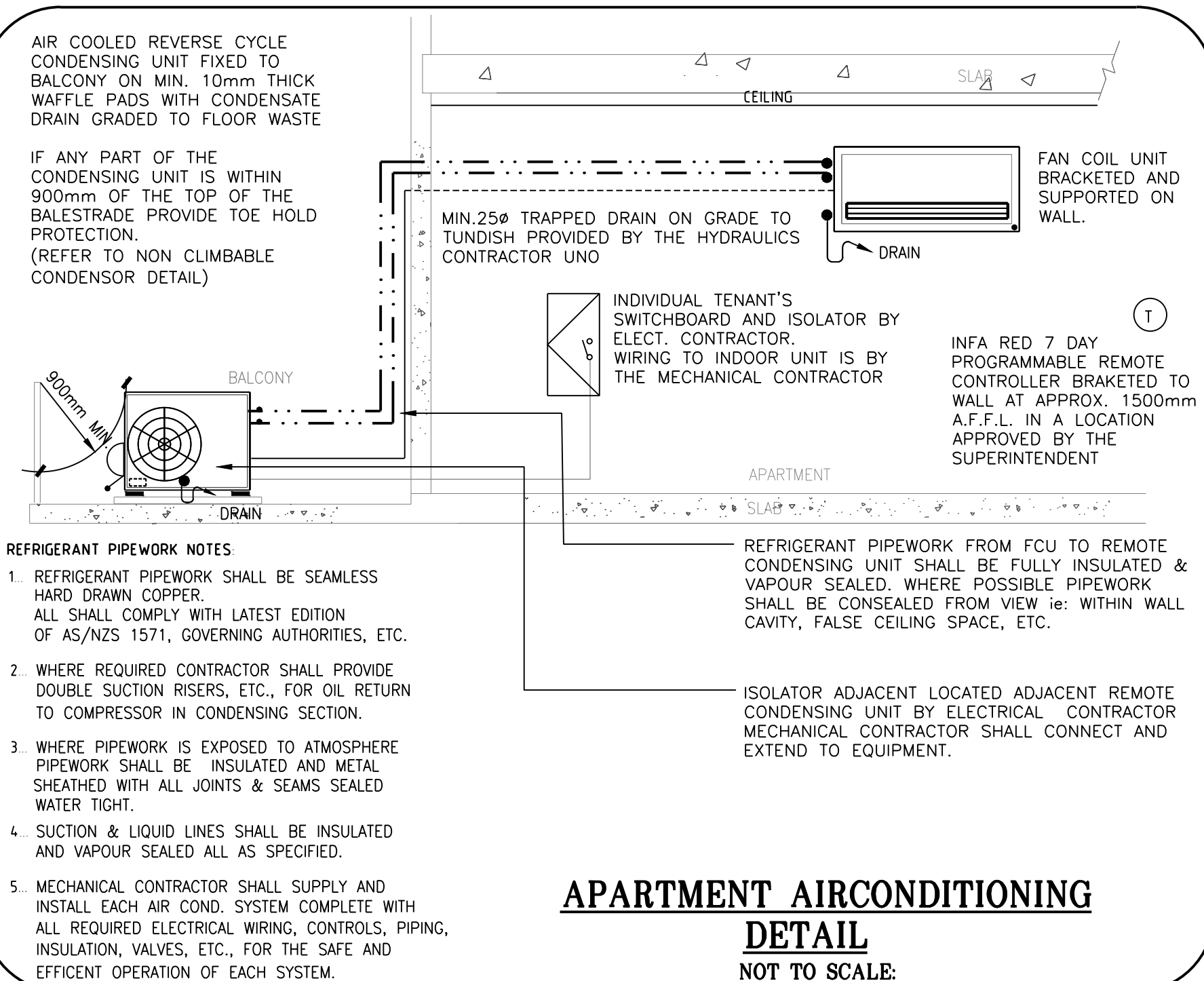
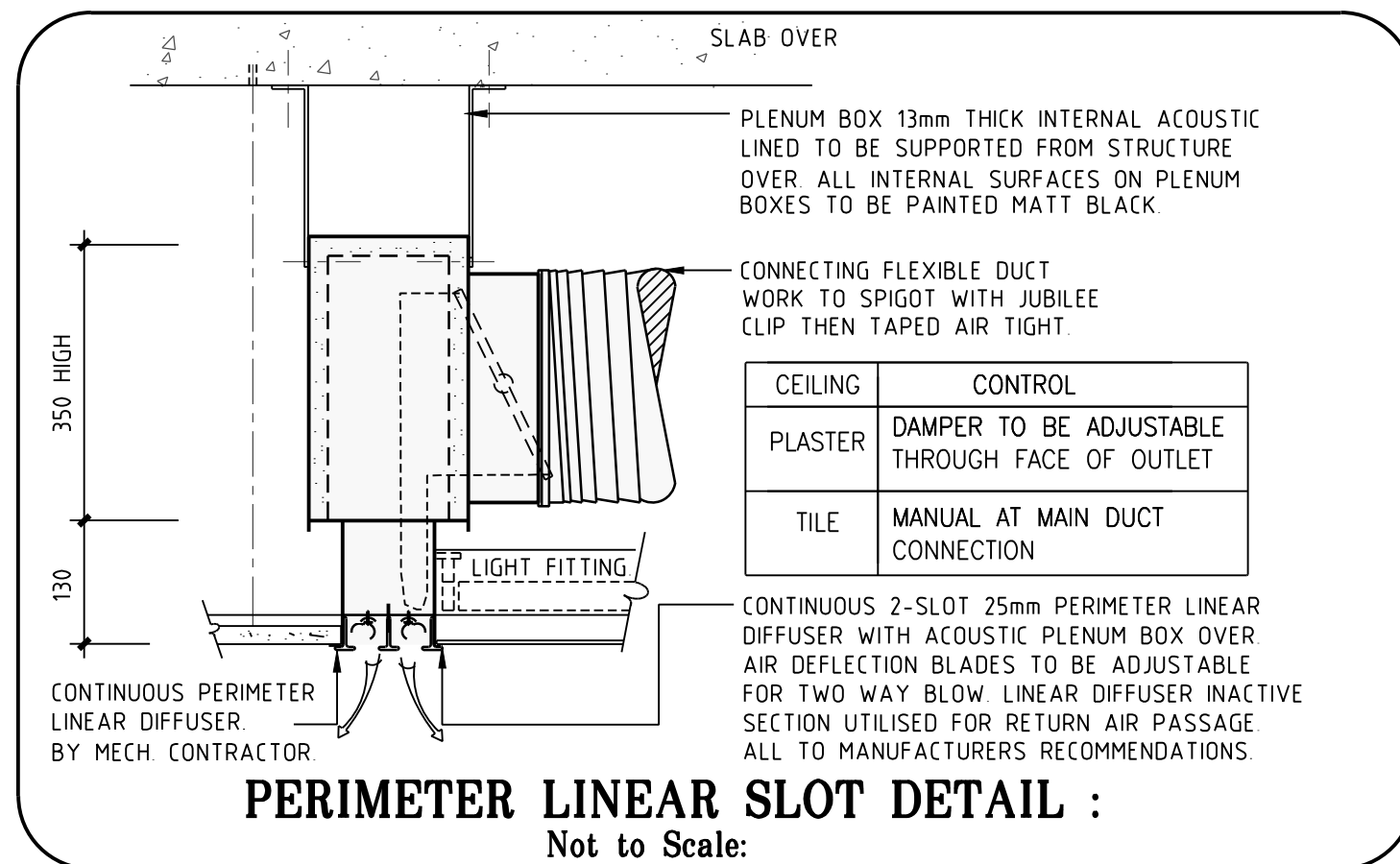
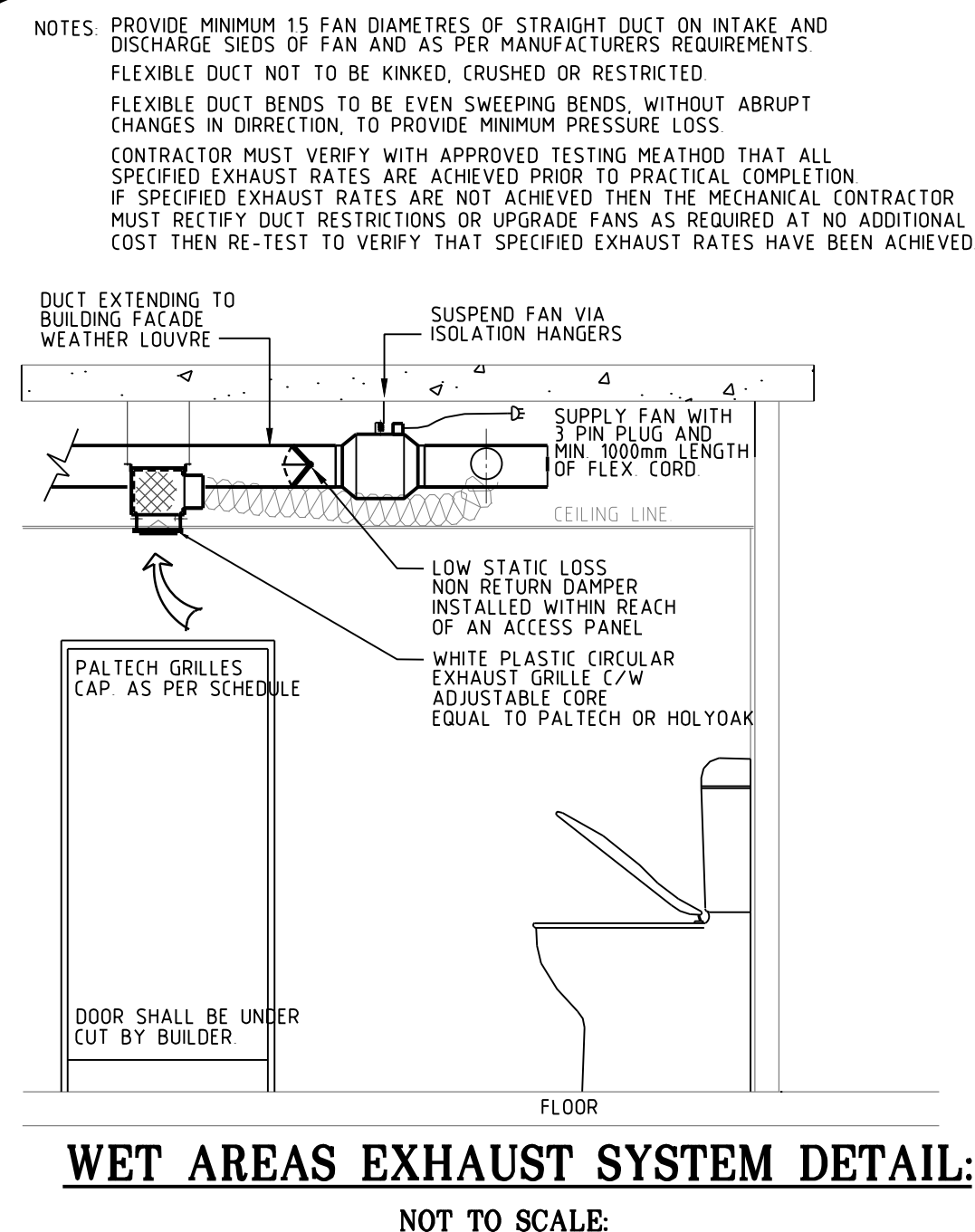
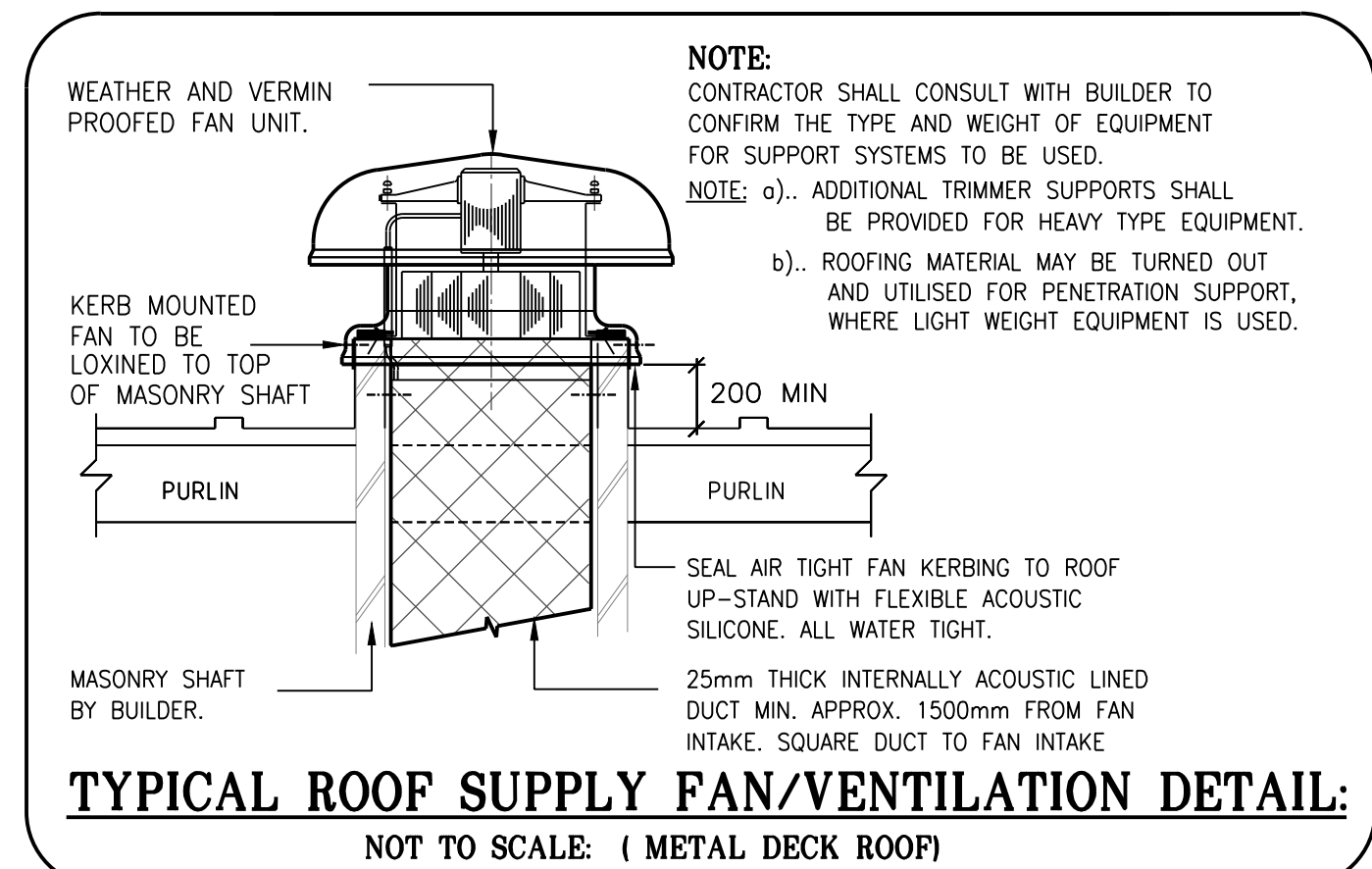
TYPE	L/S	SIZE	NR
TYPE A	<130	150 x 600	<30
TYPE B	131-160	210 x 600	<30
TYPE C	161-180	250 x 600	<30
TYPE D	181-220	310 x 600	<30
TYPE E	221-300	450 x 600	<30
TYPE F	301-370	610 x 600	<30

ALL GRILLES TO BE CHEVRON BLADE TYPE, COLOUR TO SUIT ARCHITECTURE

## FLEXIBLE DUCT SCHEDULE

AIR FLOW (L/S)	MIN DIAMETER
0 - 50	150φ
51 - 100	200φ
101 - 160	250φ
161 - 260	300φ
261 - 400	350φ
401- 550	400φ

ALL FLEXIBLE DUCT WORK TO BE FOUR ZERO RATED AND ACOUSTIC TYPE



## LEGEND:

- DENOTES GALVANISED SHEET IRON DUCTWORK INTERNALLY ACOUSTICALLY LINED WITH HIGH DENSITY INSULATION FACED WITH 10 % OPEN AREA ALUMINIUM FOIL FIXED TO DUCTWORK WITH SPEED CLIPS OR EQUAL WITHIN BUILDING STRUCTURE - MIN R 2.0 R-VALUE EXPOSED TO WEATHER - MIN R 3.0 R-VALUE ALL TO COMPLY WITH LATEST EDITION OF N.C.C.
- DENOTES UN-INSULATED GALVANISED SHEET IRON DUCTWORK UNLESS OTHERWISE INDICATED
- ACOUSTIC TYPE FLEXIBLE DUCT (4-ZERO RATED) TO COMPLY WITH LATEST EDITIONS OF AS/NZ 1668.1, AS 1668.2, N.C.C., AS 4254, UL1817, GOVERNING AUTHORITIES, ETC.  
( a ) FLAME INDEX NOT GREATER THAN '0'  
( b ) SMOKE DEVELOPMENT INDEX NOT GRATER THAN '0'  
( c ) HEAT EVOLVED INDEX NOT GRATER THAN '0'  
( d ) IGNITABILITY INDEX NOT GRATER THAN '0'
- KITCHEN/BATHROOM EXHAUST P.V.C. DUCTWORK MUST COMPLY WITH LATEST EDITION OF: AS/NZ 1260, N.C.C. & GOVERNING AUTHORITIES, ETC.  
( a ) FIRE RETARDANT  
( b ) CANNOT SUPPORT COMBUSTION  
( c ) SELF EXTINGUISHING  
ALL DUCT RUNS SHALL BE GRADED TO RANGE HOOD
- DENOTES CEILING MOUNTED ROUND EXHAUST AIR GRILLE COMPLETE WITH ACOUSTIC CUSHION HEAD BOX, SPIGOT, V.C.D., ETC
- DENOTES CEILING MOUNTED EXHAUST AIR EGG CRATE GRILLE COMPLETE WITH ACOUSTIC CUSHION HEAD BOX, SPIGOT, V.C.D., ETC  
FIRST SIZE IS NECK DIMENSION  
SECOND SIZE IS FACE DIMENSION
- DENOTES CEILING MOUNTED 4-WAY SUPPLY AIR GRILLE COMPLETE WITH ACOUSTIC CUSHION HEAD BOX, SPIGOT, V.C.D., ETC  
FIRST SIZE IS NECK DIMENSION  
SECOND SIZE IS FACE DIMENSION
- CEILING CONCEALED DUCTED TYPE AIR-CONDITIONING UNIT.
- WEATHER AND VERMIN PROOFED AIR COOLED REVERSE CYCLE CONDITIONING UNIT. UNIT TO BE BRACKETED TO WALL
- OUTDOOR CONDENSING UNIT SHALL BE MOUNTED ON MIN 10 mm WAFFLE PAD LOXINED TO STRUCTURE
- DENOTES WALL MOUNTED THERMOSTAT T-STAT TO BE COMPLETELY FULLY PROGRAMMABLE 365 DAY TIME CLOCK/DAY LIGHT SAVINGS, PUBLIC HOLIDAY, ETC. (PROVIDE TAMPER PROOF COVER) T-STAT TO BE INITIALLY SET @ 22.5°C db
- DENOTES FIRE DAMPER FIRE DAMPER TO HAVE SAME RATING AS INTEGRITY (i.e. MIN STRUCTURAL ADEQUACY/INTEGRITY/INSULATION) MATERIAL WHERE INSTALLED. FIRE DAMPER TO MAINTAIN SAME AS WHERE INSTALLED WHERE CURTAIN TYPE FIRE DAMPERS ARE INSTALLED THE CURTAIN MUST BE KEPT CLEAR OF AIR PATH ONTO FANS/DUCTWORK
- DENOTES CEILING MOUNTED ACCESS PANELS PROVIDED BY BUILDER THE MECHANICAL CONTRACTOR MUST PROVIDE THE REQUIRED INFORMATION ie: SIZE, TYPE, ETC., AND TO CO-ORDINATE WITH THE BUILDER AND ARCHITECT FOR FINAL LOCATIONS
- DENOTES DOOR RELIEF AIR GRILLES SUPPLIED BY MECHANICAL CONTRACTOR AND INSTALLED BY BUILDER
- DENOTES DOMESTIC TYPE KITCHEN RANGE HOOD PROVIDED BY BUILDER. MECHANICAL CONTRACTOR TO DUCT RANGE HOOD EXHAUST AIR TO ATMOSPHERE
- DENOTES WALL MOUNTED EXHAUST AIR FAN CONTROL SWITCH AND "NEON INDICATORS" ON ENGRAVED SWITCH PLATE KITCHEN FAN "FAN-ON - VSD - FAN-OFF"  
NOTE: ALL KITCHEN EXHAUST AIR FANS 1000l/s AND OVER TO BE FURNISHED WITH VARIABLE SPEED DRIVES ALL ROOM FAN CONTROLS ADJACENT EQUIPMENT TO WIRED TO SUIT
- DENOTES INLINE FAN C/W NRD
- ROOF MOUNTED EXHAUST COWL
- DENOTES CEILING MOUNTED FAN WITH PLENUM BOX
- DOORS TO BATHROOM, WATER CLOSET, ENSUITE, LAUNDRY, ETC., UNDERCUT BY BUILDER
- UPVC DRAIN LINE INSTALLED ON GRADE & SIZED TO SUIT MANUFACTURERS REQUIREMENTS
- REFRIGERATION LINES (LIQUID & GAS) INSULATED WITH ARMAFLEX PROVIDE UV PROTECTION WHERE EXPOSED TO WEATHER
- TUNDISH/TERRACE OUTLET DRAIN POINT

T1 TENDER ISSUE AS 07.08.17

issue rev. description by date



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Contractors must verify all dimensions at the job before commencing any work or preparing shop drawings.

Contractors must locate all air registers pipework outlets, light fittings, power outlets, sprinkler heads, etc. from the Architects reflected ceiling plans and other detailed drawings.

Do not scale. All dimensions to be checked on site.

This drawing is available in electronic format at a cost of \$125 payable by this subcontractor

project title

**1 VINE STREET  
HEIDELBERG, VIC 3084**

service

**MECHANICAL SERVICES**

**EQUIPMENT SCHEDULES,  
LEGEND & DETAILS**

drawing title

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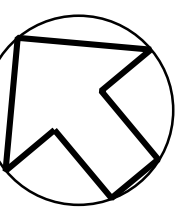
designed ASG checked ASG

drawn AS/AV date MAY 2017

job number 1939

issue T1

drawing 8 of 8



**M8**