BUILDING SERVICES INFORMATION

VENTILATION

1. **Laboratories and Ancillary Areas**. The lab side of the Building is mechanically ventilated due to the requirement for control of air changes therefore windows cannot be opened. Generally all mechanical ventilation plant is automatically controlled through the Building Energy Management System (BEMS) to suit occupancy patterns and laboratory activity. Due to the nature of work being carried out within certain areas, however, these areas are provided with local control of their ventilation systems. The following describes the mode of operation for each of these areas:

a. **Biology Glasswash**. Air extract through the canopy mounted over the Autoclave can be adjusted by the room occupant by means of a wall mounted speed control switch.

b. **Technicians Office**. Air extract from the room can be adjusted by the room occupant by means of a wall mounted speed control switch.

c. **Cell Store Archive**. The ventilation system for this room operates automatically and continuously. No local user control is provided, however, the room user has influence over the automatic control as follows:

(1) The ventilation is set to operate constantly at low speed.

(2) When room occupancy is detected by wall mounted PIR detectors, the ventilation rate is increased.

(3) Wall mounted oxygen depletion sensors are located around the room, when these sense low oxygen levels (<19.5%) the ventilation rate is increased to its maximum.

d. **Research Waste Autoclave Room**. Air extract through the canopy mounted over the Autoclave can be adjusted by the room occupant by means of a wall mounted speed control switch.

e. **Dark Room**. Local Extract Ventilation (LEV) hoods are provided above the work bench. Air extract from these hoods can be adjusted by the room occupant by means of a wall mounted speed control switch.

f. **Spectroscopy / Balances Lab**. The ventilation system for this room generally operates automatically through the BEMS. However, a wall mounted ventilation boost control is provided to allow the user to increase the ventilation rate to suit the levels of ‘hot works’ being carried out.

g. **Chemistry Lab**. The mechanical ventilation system for the Chemistry Lab is configured through the BEMS to satisfy the operation of the 30 fume cupboards, however, in order to minimize energy consumption when the laboratory is not in full use the users have a degree of control over the air volume flow rate within the lab through the operation of the fume cupboards as follows:

(1) The 30 No. fume cupboards incorporate sash status switches, these are linked to the extract ventilation system to provide 100% air flow when sash is opened and 20% air flow when sash is closed.

(2) The fume cupboards are arranged in banks of 4, 5 & 6. Each fume cupboard bank is connected to an extract system as stated below.

(3) When all the sashes are closed on the following systems i.e FC2-FC7, FC13-FC16, FC17-FC20, FC21-FC25, FC26-FC30 & FC1, the extract fan will shut down. If any sashes are opened the extract fan will operate, which will provide 100% extract from the open fume cupboards and 20% extract from the closed fume cupboards.

(4) The overnight fume cupboards FC8-FC12 will operate 24/7 and when all sashes are closed the extract fan is not switched off. This will maintain low level extract from the fume cupboards and also extract from storage cabinets below.

(5) The Laboratory supply make up air is linked to the fume cupboard extract system through the BEMS so that when the extract rate decreases as a result of the sashes being closed, as described above, the supply air volume degreases in proportion.

h. **Chemistry Prep Room**. The 2 fume cupboards FC31 & FC32 will operate 24/7 and when both sashes are closed the extract fan is not switched off but will maintain a reduced air flow rate from the fume cupboards and also extract from the storage cabinets below.

i. **Anatomy and Medical Resource Centre**. The ventilation system for this room generally operates automatically through the BEMS. However, a ventilation boost control is provided to allow a fixed time increased ventilation rate as required. The boost switch is wall mounted within the Technician's Office and a single push will increase the ventilation rate for a fixed time period as pre programmed through the BEMS.

j. **Dissection Room**. The ventilation system for this room generally operates automatically through the BEMS. However, a ventilation boost control is provided to allow a fixed time increased ventilation rate as required. The boost switch is wall mounted within the Technician's Office and a single push will increase the ventilation rate for a fixed time period as pre programmed through the BEMS.

k. **Anatomy Dept Ancillary Rooms**. The ventilation system for these rooms generally operates automatically through the BEMS. However, a ventilation boost control is provided to allow a fixed time increased ventilation rate as required. The boost switch is wall mounted within the Technician's Office and a single push will increase the ventilation rate for a fixed time period as pre programmed through the BEMS.

2. **Office Areas**:

a. The external façades, orientation and zoning of the building architectural layout take maximum advantage from natural ventilation for the offices. The natural ventilation is aided by the stack ventilation effect whereby the open voids rising through the central open plan areas of the office accommodation act as chimneys drawing air naturally from the outside through the office areas, up through the voids in the floor and out of the high level Automatic Opening Vents (AOVs) at roof level. To ensure this stack ventilation performs most effectively occupants are encouraged to use the opening vents incorporated into the window design.

b. The AOVs are automatically controlled through the BEMS to open on a rise in internal temperature above the BEMS control set point. The AOVs will gradually open in banks to encourage fresh air to pass through the offices and maintain the set point temperature. Should the temperature then begin to drop below the set point the louvers shall automatically close. The above operation is subject to the following interfaces:

(1) The external ambient temperature is above 15oC

(2) The wind speed is below 8m/s

(3) It is not raining

If any of the above interfaces are not met, the ventilators shall remain closed.

c. The window opening vents have 2 operations:

(1) Standard open mode i.e turn the handle and open the window as wide as required.

(2) Trickle ventilation mode: turn the handle and push to open a few mm until you find a second catch, once found turn the handle to lock.

d. Twelve opening window vents on level 2 are actuated in the event of a fire. These can be operated manually however by using the key switch adjacent.

e. The Cellular offices to the North and East are naturally ventilated, whereby the window opening vents are the primary means of ventilation. In the open plan areas, circulation area and the offices to the South and West, natural ventilation is again the primary means of ventilation, however a back- up displacement ventilation system is in place to deal with peak periods, which are out of the acceptable range.

f. In the open plan areas, circulation area and the offices to the South and West where back- up displacement ventilation system is in place, air is introduced from beneath the raised floor through circular vents. These are particularly important in ventilating the enclosed spaces and meeting rooms. The system has been balanced to ensure an even flow of air to each location and the circular vents should not be obstructed, blocked or otherwise tampered with.

HEATING

3. **Laboratories and Ancillary Areas**:

a. For laboratories and ancillary areas of the Building where heating only is required these spaces are provided with ceiling mounted radiant panels to maintain temperature, and these panels can clearly be seen incorporated into the suspended ceiling grid.

b. For laboratories and ancillary areas of the Building, where heating and comfort cooling is considered necessary, these spaces are provided with fan coil units. These units are mounted above the suspended ceiling and supply treated air through grilles to provide heating or cooling as necessary.

c. The heating and cooling systems are primarily controlled by the BEMS through a series of room temperature sensors throughout the building. The BEMS is programmed to maintain the internal temperature and will automatically adjust the boiler output to compensate for external temperature. Each room, however, is provided with an adjustable wall mounted thermostat which allows the occupant to adjust the BEMS pre-programmed temperature set point by ± 30C.

4. **Offices**:

a. The heating system is primarily controlled by the BEMS through a series of room temperature sensors throughout the building. The BEMS is programmed to maintain the internal temperature and will automatically adjust the boiler output to compensate for external temperature.

b. Office areas of the Building are heated by radiators. Radiators within individual offices are fitted with thermostatic radiator valves and by adjusting these the occupants can locally control the heat output. All thermostatic radiator valves are marked with a scale, and by

adjusting the scale marking to the valve indicator, the temperature can be adjusted within the room. The "4" comfort setting corresponds to a room temperature of approximately 20°C and offers optimum comfort and energy saving.

c. Within open plan office spaces, where more than one radiator is fitted to provide heating, these rooms are provided with an adjustable wall mounted thermostat which allows the occupant to adjust the BEMS pre-programmed temperature set point by ± 3oC. Each radiator within these types of open plan spaces are also fitted with valves, these valves are for maintenance purposes only and must remain open and should not be adjusted.

d. Should any radiator valve be closed for any reason this will result in preventing heat getting to the space, causing possible discomfort to other occupants.

e. The building has been designed to minimise the use of energy for heating and ventilation in accordance with the best environmental practice. Staff and students should use these systems in accordance with these instructions to achieve a comfortable working environment at low levels of energy consumption.

COLD ROOMS

5. Temp can be changed by ‘set, ‘set, adjust’, ‘set’, ‘function.

LIFTS

6. Two lifts are provided within the building. Both are installed by Otis (Ref no 188298 0800 181 363). A 13 person passenger lift located adjacent to the main entrance and the lecture theatre. A goods lift to the rear of the building. This lift is operated by swipe card, and is for the use of technical and maintenance staff only.

7. Neither of the lifts are evacuation lifts and therefore no attempt should be made to use this in the event of an emergency.

8. Lift override key is held in the main key press.

9. The telephone system in each lift is linked to a BT Landline. 1CEB5 FIREEXX4825

	Order	account	number
Alarm 1	TBW230ES / GAC 01481367	85624686	01334 478767
Alarm 1	TBW205ES / GAC 01481367	85624680	01334 476851
Lift 1	TBW248ES / GAC 01481367	85624703	01334 470219
Lift 2	TBW264ES / GAC 01481367	85624703	01334 479913

EMERGENCY INFORMATION

10. **Fire and Emergency**:

a. During fire alarm operation all sounder units and flashing beacons shall activate. Operation of the fire alarm system will also cause the following knock on effects.

b. All lifts shall return to the ground floor where they shall sit with doors open. Lifts will remain out of commission until such time as the fire alarm system has been reset.

c. Fire curtains will drop in the following areas:

(1) Inside the lecture theatre in front of the glass partition.

(2) In rooms 234 and 338 adjacent to the glass screens overlooking stair

(3) In the café area, adjacent circulation and the reception desk on the line of the slatted timber screen. Note: building users in the café/seminar room area of Level 1 should evacuate through one of the emergency exits in this part of the building, and should not attempt to penetrate the fire curtain.

d. Actuated windows located within the level 2 office area shall open.

e. Access control doors shall fail safe, allowing free egress from all rooms and areas.

f. Automatic Opening Vents (AOVs) at the top of the office block lightwells shall open.

g. Main Entrance doors shall open and all internal doors that are held on magnetic hold open devices shall release.

h. All gas supplies, other than those used within the chemistry lab fume cupboards, shall be shut off.

i. Audio Visual systems within the Lecture Theatre will be muted.

ENERGY AND ENVIRONMENT STRATEGY

11. Lighting.

a. Lecture theatre Dynalite. John Hook. 07970 238216

b. Dynalite customer services: 01483 293086 (ecsenquiries@philips.com)

c. Philips Centre, Guildford Business Park, Guildford, Surrey GU2 8XH. 01483 293086 ecsenquiries@philips.com

FIRE ENGINEERING AND VENTILATION

12. Fire Engineering Systems are in place to comply with the Fire Engineering Strategy of the building. This strategy includes the provision of Automatic Opening Vents (AOV) at the top of the Office Block lightwells, these will be used by the Fire Authority in the event of a fire, however, these also provide a key element of the Energy and Environmental Strategy of the building.

13. The AOV's are fundamental to the natural ventilation strategy of the Offices and are automatically controlled through the BEMS to open on a rise in internal temperature above the BEMS control set point. The AOVs will gradually open in banks to encourage fresh air to pass through the offices and maintain the set point temperature. Should the temperature then begin to drop below the set point the louvers shall automatically close. The above operation is subject to the following interfaces:

a. The external ambient temperature is above 15oC

b. The wind speed is below 8m/s

c. It is not raining

14. Summertime Night Purge - Natural Ventilation Mode. To aid the dissipation of excess heat built up during the day, a summertime purge programme has been built into the BEMS, thereby assisting thermal comfort in summer. If the average night time temperature of the open plan office spaces reaches 20oC, the AOVs shall open incrementally as above until fully open at 23oC. The ventilators shall remain open until the average open plan office space temperature drops to 20oC, then they shall close incrementally until fully closed at 18oC. The above operation is subject to the following interfaces:

a. The ambient temperature is above 10oC

b. The wind speed is below 12m/s

c. It is not raining

15. The cooling potential of natural ventilation is limited by the prevailing climate and by occupant expectations of thermal comfort. It is generally considered that natural ventilation systems can meet total heat loads averaged over the day of around 30–40 W·m–2 (i.e. solar plus internal gains).

16. Achieving acceptable summer conditions requires three main features in the design and use of the building:

a. good solar control to prevent excessive solar gains entering the occupied space.

b. modest levels of internal gains (people, small power loads and lighting loads).

c. acceptance that during peak summer conditions, temperatures in the space will exceed 25 °C for some periods of time; air temperatures may be higher still, but, such higher air temperatures will be offset by cooler mean radiant temperatures and enhanced air movement.

WATER USE

17. **Water metering**. The water meters on the main incoming water supply associated with the leak detection system are used to monitor and manage water consumption. In addition to these sub meters are provided on main sub circuits to main Laboratory areas and Toilet facilities. All water meters are linked to the BEMS to allow monitoring of water consumption.

18. **Rain water harvesting system**. A rainwater harvesting system is provided. This system collects rainwater from the roof and uses it to meet toilet flushing needs of the building, hence reducing the demand on potable fresh water. The rainwater is transferred from the roof through pipework to a 60,000litre underground storage tank. From this underground tank the rainwater is pumped to header tanks located within the rooftop plantrooms. These tanks are also connected to the mains water supply as back-up cover during periods of low rainfall. From these header tanks the rainwater is distributed to serve all flushing cisterns. A connection is also taken to serve a bib tap outlet located within the Loading Bay / Goods Entrance for plant and landscape irrigation purposes.

19. **Reporting Provision**. Building faults should be reported in the first instance to the Building Manager, Dr John Smith, on 463696 or on jsgs@st-andrews.ac.uk. In his absence, faults may be reported to the Janitor (when present) on 461853, or directly to the Estates Helpdesk on 463999 or maint2@st-andrews.ac.uk.

MISC SYSTEMS

20. **Zip Hydrotaps**. The two taps in the kitchens are under a repair contract from Zip Hydrocare. Their service desk is 01362 852244. The contract is M08270. The engineer is Ian on 07827 309797.

21. **Moving walls**. Style Movable partition specialists. Townhouse Business Centre, 10 Bank Street, Tillicoultry. FK13 6DP. 01259 750600 / 07967 739425. www.style-partitions.co.uk

SECURITY

22. **Keys**.

23. **Swipe systems**. Lead contractor is Alan Thomson of Aspex UK Ltd. 39 Deerdykes View, Westfield, Cumbernald, G68 9HN. 01236 720061. 07826 915537. alan@aspex-uk.co.uk

24. **Electric Locks**. TS UK. Note settings on the lock which dictate which side it can be opened from and also polarity switches which dictate whether it fails open or shut. Call Roddy MacLean at TS-UK on 07813 212006 / 01236 724086 / roddy@ts-uk.co.uk

COMBINED HEAT AND POWER UNIT PHYSICS BOILER ROOM

25. The combined heat and power plant installed in the Physics Building boiler room is a gas fired generator producing 500kw of electricity and 550kw of heat. Electrically the unit is connected to the university High Voltage network. In the event of a mains power failure there are essential power circuits in the Medical Sciences Building (MSB) which will be automatically fed from this power supply. The CHP will act as the primary heat source for both buildings.
In the MSB the system is connected to an absorption chiller installed in the roof plant room which will meet the cooling load of the building, the heat from the CHP will also meet the building heating and hot water loads. The boiler plant, installed in the MSB roof plant room, will act as back up heat sources to meet required top up heat loads. Any required top up cooling load will be supplied by the air cooled chiller which is meeting the cooling load at the moment

The CHP is also connected to the Physics boiler pipework, the hot water from the CHP will be used as a primary heat source to provide heating and hot water. The existing boilers will be used as back up heat sources.

If there is still heat in the system and we cannot use it the heat can be dissipated to atmosphere via the air cooled units adjacent to the boiler room.

In the event of the CHP being serviced or failing the power supply to the MSB will be entirely from the mains, with no back up to essential circuits. The heating to the MSB and Physics will be provided by the existing boilers.