Kent Primary School IT Design Guide

Education iT Services

Kent County Council

Supporting schools through technology

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Abbreviations

Abbreviation	Meaning
KCC	Kent County Council.
IT	Information & Communication technology
RIBA	Royal Institute of British Architects
M&E	Mechanical and Electrical trade discipline
FF&E	Furniture, Fittings and Equipment
FM	Facilities Management
ITOS	IT Output Specification
RDS	Room Data Sheet
EIA	Electrical Industries Association
CAT6	EIA standard for cabling
UTP	Unshielded Twisted Pair Cable
IEE	Institute of Electrical Engineers
WAP	Wireless Access Point
POE	Power Over Ethernet
UPS	Uninterruptible Power Supply
VOIP	Voice Over Internet Protocol
PSTN	Public Switched Telephone Network
ISDN	Integrated Switched Digital Network
PABX	Private Automatic Branch Exchange
KPSN	Kent Public Service Network (School's Broadband)
IPTV	Internet Protocol Television
BMS	Building Management System
HVAC	Heating, ventilation and Air Conditioning
BOS	Building Operating System
CCTV	Closed Circuit Television
VLAN	Virtual Local Area Network
LCD	Liquid Crystal Display
HSE	Health & Safety Executive
AV	Audio-Visual
SIMS	School Management Information System from Capita Educ.
LRC	Learning Resource Centre (Library)

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Primary School's IT Design Guide

1.0 Introduction

IT is an increasingly important factor in teaching and learning. Effective IT requires a structured cabling system with data outlets in the right locations and in sufficient quantities to connect equipment and services across the school. Cabling is part of the fabric of a building and defines a building's digital potential.

Capital building projects within the Primary school estate provide opportunities to uplift IT infrastructure and make it fit for 21st century learning.

1.1 Document Scope

This document is a guide to Kent's quality expectations for integration of IT infrastructure with a primary school's built environment. It has been drafted as a reference for Primary school capital projects commissioned by Kent County Council.

Most Primary school capital projects replace buildings that are in poor condition, or where educational outcomes are compromised by the quality of a building or to adjust for planned pupil numbers rather than providing complete new schools. This IT Design Guide aims to ensure that new areas of build support a wide range of IT provision without future adaptation, and that remaining legacy networks meet minimum standards.

1.2 Intended Audience

Architects; builders; supply chain contractors and agents; IT Advisors.

2.0 IT Principles

a. IT infrastructure must support the use of a wide range of technologies in spaces that can adapt to future changes in technology and the curriculum.

b. Co-location of multi-agency services on a single site will increase as maximum use is made of estate infrastructure. IT infrastructure must be designed for shared use from the outset.

c. Personal data handling and security requires schools to operate secure networks. Physical and virtual security must to be designed into the IT infrastructure.

d. Personal ownership and use of devices by children will increase as government initiatives promote their use in education. This will increase the pressure for school networks to provide wireless connectivity and opportunities for charging.

2.1 Project Management

a. Construction Project Management will be based on the Royal Institute of British Architects (RIBA) Plan of Work.

b. The integration of IT with the building should be proactively planned and the scheme project manager held accountable for delivery.

c. The Contractor will be accountable for:

i. Working with design teams and the Authority to ensure a sound understanding and working knowledge of IT design principles at all stages.

ii. Ensuring this IT design guidance is communicated effectively to agents and supply chain contractors.

iii. Notifying the Authority where IT design guidance is not being followed.

iv. Ensuring Mechanical and Electrical (M&E) and Furniture, Fittings and Equipment (FF&E) and Facilities Management (FM) (where applicable) disciplines are integrated through the design, construction and delivery phases.

v. The Authority will provide clarifications on IT related issues.

3.0 IT Design Process

Designers and architects should consider the School's Educational Vision and Strategy for Change when designing Primary schools IT:

3.1 IT Output Specification

a. The Authority works with each school to assist them in developing their vision and strategy for change. An IT Output Specification (ITOS) will set out functional IT requirements for a school. The Contractor's design team is responsible for translating these into technical specifications, room data sheets and technical drawings.

b. Each school will provide a statement that sets out a strategy for retention, replacement or purchase of IT equipment and Furniture, Fittings and Equipment (FF&E). The effectiveness of IT is highly dependent on the furniture with which it is used, e.g. storage and trolleys for laptops, wire management desks etc.

c. Power and data cabling along with containment, fittings and enclosures (cabinets) form part of the fabric of a building, and must be appropriately located in sufficient quantities as set out in this guidance.

3.2 Design Review

Design teams will provide opportunities for the Authority and school to review proposals to ensure their designs work in practice.

3.3 IT Overlay Drawings

1:50 drawings will be overlaid with locations of IT equipment (e.g. desktop computers, trolleys, interactive whiteboards etc.). These will provide the basis for Room Data Sheets (RDS) for each space that describe floor area, layout, power, data ventilation etc. Room Data Sheets will be controlled documents that require a Notice of Change if revised.

3.4 Value Engineering and Change

a. Project's are subject to affordability! Schools will work with the Authority and its contractors to rank priorities to enable value judgements to be made.

b. Requirements may change during design and construction e.g. curriculum changes. Projects should agree with the Authority a process for managing changes, and evaluating their impact.

3.5 Continuity of service during construction

It is important to maintain continuity of education during construction. Builders are required to minimise disruption to school users and ensure availability of the IT infrastructure. This is particularly relevant during phased handovers where it may be necessary to provide temporary network connections. Disruptive works will avoid critical school dates such as national tests etc.

4.0 Structured Cabling

Structured cabling is a term that describes a standards based data cabling infrastructure capable of handling voice and data services. It includes cables, terminations, data outlets, containment (i.e. conduit, cable runways etc), enclosures and fittings.

4.1 Requirements

Newly constructed or remodelled areas require structured cabling as set out below.

a. Where the rebuilt or re-modelled floor area exceeds 30% of the total floor area of a school, the cabling in existing areas of the school should be upgraded to the same standard as new areas.

b. Structured cabling must be designed to adapt to reasonable changes to the use of IT.

c. KCC require a ratio of 1.6 data outlets per occupant in new areas. The number of occupants is the maximum staff and pupil count the space is designed to accommodate.

d. Design of the structured cabling system must be carried out by a competent person and is subject to review and sign-off by the Authority prior to installation.

e. EIA CAT6 Unshielded Twisted Pair (UTP) cable is required for distribution from each communications cabinet. A maximum cable run length of 90m must not be exceeded. Where patch leads are provided they must be CAT 6 compliant.

f. Existing cable installations of CAT 5 or better may be re-used provided they are visually in good condition and achieve acceptable test results.

g. Installation should be carried out by a manufacturer accredited installer and not mix manufacturer's products. Only tier 1 branded cable and components (e.g. Krone, Hellerman, and Siemon etc.) should be used. New installations must offer a manufacturers warranty of at least 20 years.

h. Core cabling between communications cabinets and the server room should be fibre-optic and able to support speeds up to 10 Gb. Fibre optic cables should contain at least 8 cores each, and terminations should be duplex SC or later.

i. Cables should be terminated on patch panels at the top of each cabinet and at least 60% of each enclosure must be spare to allow fitting of switches and other equipment. Horizontal cable management bars should be fitted and each enclosure provided with a clean earth (IEE regulations).

j. Space should be made available in communications cabinet areas to allow for later installation of an Un-interruptible Power Supply (UPS) to ensure continuity of service for core switches where this is specified. This is particularly important if VOIP telephony is planned.

k. Acceptance Testing must be compliant comply with relevant standards for the type of cable installed with results certified by the installation contractor.

l. The availability of a valid Manufacturer's Warranty for the data-cabling installation is a condition of acceptance for handover on completion of works. Where the certificate is unavailable on completion e.g. due to time delay between completion of cabling works and issue of certificate, a period of up to 30 days will be allowed at the discretion of the Project Manager for issue of the warranty by the relevant manufacturer.

m. Cabling documentation should be left onsite, and will include:

- Schematic showing the logical network topology.
- Site drawings showing cable runs and joints.
- Termination schedules and diagrams.

4.2 Wireless

a. EiS Kent requires cabling to support the installation of wireless access points (WAP's) during the life-cycle of the building. This requires:

   i. 2 No. data outlets mounted at height in each internal teaching space with adjacent power outlets, (note: Adjacent power may not be required if 'Power over Ethernet' (POE) switches are fitted).

   ii. Sufficient data outlets mounted at height in internal circulation spaces to provide full wireless cover with adjacent power outlets, (note: Adjacent power may not be required if 'Power over Ethernet' (POE) switches are fitted).

b. Under no circumstances should provision for a wireless network substitute wired data outlets.

c. Existing areas of the school should be cabled for wireless coverage as described above regardless of whether 30% floor area is being re-modelled.

4.3 Digital Signage

Digital signage provides passive communication that is less intrusive than public address systems. It can be used to reinforce messages such as healthy eating during breaks, broadcasting events or providing other content. It is anticipated that digital signage may in future be available from external service providers at a reduced cost on the basis that messages from government departments and other agencies are broadcast.

a. Power and data outlets need to be provided in suitable locations as identified by the school, even if digital signage isn't being installed immediately.

4.4 Telephony

a. Telephony should share the structured cabling where possible. Exceptions to this are where existing telephone cabling is in place feeding un-refurbished areas of a site, or where emergency telephones are required.

b. It is likely that legacy PABX switches will remain in service unless near end-of-life. If replacement is being considered it should be able to serve Voice over Internet Protocol (VOIP) handsets.

c. Incoming telephony should be served from Public Switched Telephone Network (PSTN) lines. ISDN may be appropriate where multiple lines are required.

d. Analogue telephone lines may be required in key locations to ensure business continuity in the event of a complete failure of IT. This may include:

- School admin office.
- Server Room.
- Lift emergency phones (if fitted).

5.0 Power and Data distribution

a. The Mechanical and Electrical (M&E) contractor will take into account a school's vision and legacy strategy when deciding on either counter-sunk floor boxes or wall mounted power and data.

b. It is important to establish the location, quantity and type of data and power outlet as soon as possible and to mark them on drawings. Once agreed they become part of the fabric of the building and change can be expensive. Flexibility is best achieved through an appropriate mix of floor and dado outlets designed to accommodate furniture and other fittings as well as IT. It is recognised that sunken floor boxes are unlikely to be fitted into existing floors, and where this is the case consideration should be given to providing wire-management desks to ensure full use of space.

c. Where laptop trolleys are proposed, parking spaces must be planned and adjacent data and power provided. Trolleys should be able to be securely anchored when not in use, so parking spaces need to be sufficiently sturdy to allow anchor fittings.

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6.0 Server Room

Where a new or substantial build school is planned, a dedicated server room should be included in the design brief.

6.1 Location

a. Ideally the room should have no windows and be located on a first floor to reduce the risk of flooding caused by pipe bursts etc., and near staff areas to allow casual observation. There should be a clear route to the server room for safe movement of equipment with doors that provide enough clearance for racks to be installed.

b. The server room should be located near the technician's workspace / office. Ideally the server room should be in a location that minimises fibre cable-run distances to communications enclosures.

6.2 Dimensions

a. The minimum floor area for the server room should be 9 square metres. This accommodates 2 x 42U cabinets 800mm (W) x 1000mm (D) x 2000mm (H), incoming services and power. This space should not be reduced, reallocated or otherwise compromised without consultation. 1m access and ventilation space is required behind the cabinets, 1.5m in front, and 0.5m on top. Larger schools may require more allocated space.

b. The weight of individual cabinets will not exceed 500Kg when fully loaded. Server room doors must allow for the delivery and manoeuvring of cabinets during commissioning and maintenance. Cabinets will be secured to the floor to avoid the risk of toppling.

6.3 Power

a. The server room requires a dedicated clean single phase power supply terminated in a distribution board within the server room.

b. Mains supply should not be shared with other equipment such as power sockets or lighting circuits.

c. Server cabinets require a dedicated clean earth. Each rack requires 2 x 10way 40A power distribution units, connected to the server room distribution board.

6.4 Ventilation

Equipment in the server room can reach a heat load of 10Kw, the server room environmental conditions must be monitored and retained within 20-50% humidity (non-condensing) and a temperature range between 10-25°C. (See 6.7 below).

6.5 Security

The server room should be fitted with a good quality lock and should not be available for storage. Doors should be sufficiently wide-opening to allow racks and equipment to be taken through.

6.6 Fire

Fire suppression systems require two forms of detection to prevent accidental discharge and must be of a type that does not damage electrical equipment. Sprinkler systems must not be used.

6.7 Carbon Reduction

Information and Communication Technology (IT) is recognised as a significant user of energy and natural resources. The Carbon Reduction Commitment (CRC) places a statutory duty on Public Authorities to reduce CO2 emissions through what is effectively a carbon tax. Kent's largest CO2 emitters are schools at 56%, followed by street-lighting at 28%.

Cooling needs to be fit for purpose. Typical equipment racks are designed to intake cool air at the bottom and vent at the top. Blowing cold air down on to rising hot air increases energy consumption.

Equipment should be arranged so that rack air intakes do not draw hot air from other equipment.

6.8 Kent Public Service Network (KPSN)

Most Kent schools receive their broadband Internet service from Kent Public Service Network (KPSN). Where an incoming KPSN service may need to be provided, temporarily moved or re-located on a site, the contractor should make contact as early as possible to allow for any orders that may need to be placed with British Telecom:

Broadband Support Tel: 01622 206040

KPSN terminates in the server room and requires a containment route from external duct.

6.9 Internet Protocol Television (IPTV)

If IPTV is provided, a suitable coaxial cable should be provided from the antenna or dish to the server room. Coaxial cable should be lightning protected. The exception to this is where Cable TV is provided.

6.10 IT Technician Space

School should be designed so as to avoid co-locating technician work areas in server rooms. Movement in and out of a room with environmental controls significantly increases energy use. Technicians should be able to access systems remotely.

a. Technicians require a space separate from the server room as office, work and storage space. The standard size of this space should be no less than $8m^2$.

b. Technician rooms should contain a desk and ideally be located adjacent to the server room. The office should contain at least 8 x data and 8 x power outlets mounted above desk height.

7.0 Printing Strategy

One of three printing strategies is likely to be adopted by a school.

Local printer in each space – often preferred by teachers as it offers local control and immediacy. Where colour inkjet printers are provided, consumable costs are very high. Even with laser printers there is considerable evidence that uncontrolled local printers result in high wastage.

Each learning space should be provisioned with a power and a data outlet as a default to allow local printers to be installed if required.

'Zoned' - shared printers provided in communal spaces where printing is collected by users. This has the disadvantage that children may be unsupervised whilst collecting their work, so location of the printer is important. This is suitable for open plan or shared spaces. Most zoned printers allow tracking of a users printing and considerably reduce waste and cost over the life-cycle of the printer. Zoned print solutions often support 'pull' printing; where a user walks to a printer at a convenient time and uses a card / token / smartcard or enters PIN code to release their printing. This is an important feature as children often click on 'print' and when nothing happens may keep clicking, adding to waste. Kent recommends that zone printing is only considered where 'pull' printing is installed.

Combined photocopier / printers - provides zoned photocopying and printing. Considerations are as above.

a. Where high throughput photocopiers or printers are installed, care needs to be taken to ensure adequate ventilation and fume extraction. In addition their locations must not block or restrict circulation areas or disabled access.

b. If a zoned approach is adopted, each location must be provided with a power and a data outlet.

8.0 Laptop Storage and Charging

Typical mobile devices used in schools currently include laptops and mini-notebooks. In addition the Home Access initiative may encourage schools to allow children to bring privately owned devices into school.

Schools may wish to provide secure storage and charging to allow children to use devices during social or lesson time, and this may require space and power outlets to be provided to accommodate either a storage unit or trolley.

a. Where trolleys are proposed, it is important to consider the rooms in which they will be used as they must encounter no steps or steep gradients, and are too heavy to lift. Trolleys can be hard to push due to their own weight and the weight of the devices. For this reason we do not recommend the use of trolleys designed to hold more than 16 standard laptops. This can be varied where lightweight or mini-notebook devices are used provided a risk assessment has been carried out and recorded.

b. Parking spaces must be provided for each trolley. These spaces must provide a secure docking point where the trolley can be locked when the school is unattended. In each room where the trolley will be used, a space should be allocated with adjacent power and data.

   Example dimensions are given below for a typical trolley that accommodates 16 laptops.

Dimensions	
Width	1140mm
Height	1130mm
Depth	510mm
Weight	135kg

9.0 Building Management Systems (BMS)

9.1 General Requirement

a. KCC recognises the value of BMS' in lowering CO^2 emissions and reducing running costs. Integrated BMS brings diverse building control systems (e.g. HVAC, fire alarms, intruder and access control, CCTV and lighting control and metered services monitoring) together in a single infrastructure and management console. Interoperable BMS ensures a common data exchange protocol and cable infrastructure is used between compatible automation and control systems.

b. Cabled infrastructure must provide sufficient data outlets in locations where BMS interfaces are likely to be fitted.

c. It is not anticipated that fire systems will be run through the data cable infrastructure, therefore CAT A fire safe data-cabling is not required.

d. We propose an open standard protocol such as LON is agreed between system providers to ensure interoperability and support Service Centre connectivity through standards based Building Operating System (BOS) interfaces.

9.2 Access and Security

a. Access / exit control systems requirements will be specific to each scheme, and should be designed and specified by a competent person.

b. Where a system requires a smartcard or touch-down token these should be of a type that can be used for other purposes, such as electronic catering, attendance etc.

c. Systems should be compatible with BMS standards where possible.

9.3 CCTV

CCTV should use the structured cabling infrastructure where Layer 3 (VLAN) switches are either already installed or being fitted as part of the works, otherwise they should be cabled separately.

10.0 Spaces

A contractor's design team will work with the Headteacher, curriculum leads, teachers and staff, and the Authority to produce a design brief that describes the school's vision for learning 'Learning Pattern' adjacency diagrams and detailed notes for each area of

accommodation within the school. This may be include visualisations of internal accommodation, furniture and suggested architecture. A design brief will set out:

- Existing Site information
- Learning Vision showing spaces and approaches
- Proposed 'Masterplan'
- Adjacency and zoning
- Planning Concepts

Schools are required to make IT available to serve their communities. In order to achieve this it is important to have clear adjacency and zoning plans that co-locate facilities required for community access, such as IT areas, art and design etc. Welfare facilities will also need to be accessible from within these zones.

The following sections set out requirements for specific spaces.

10.1 Admin Office

a. Each admin office will be provided with three power and three data outlets per occupant (based on maximum occupancy); one for computer, one for telephony and one for networked peripherals.

b. Two power outlets will be provided for each data outlet fitted.

c. One separate PSTN analogue direct telephone line should be provided for use in the event of failure of the IT.

10.2 General Learning Spaces

a. requirements:

i. 1 No. Telephone outlet – location to be agreed and marked on drawings.

ii. 1 No. Presentation / audio-visual installation – to include an adjacent position for connecting a computer or laptop.

This may be one of the following (see appendix for illustrations):

- Interactive whiteboard and projector (Most common).
- Plasma screen (with or without interactive overlay).
- Projector and screen.
- Interactive Panel
- Interactive Touch Screen.

iii. 1 No. Teacher base – desk / location from which to work.1 No. Printer data outlet – location to be agreed and marked on drawings. *(Note: this may be combined with the presentation position or provided as additional).*

iv. Sufficient data outlets (see structured cabling section above) for guidance.

b. Load bearing

i. Walls upon which presentation technology will be mounted should be designed to support a 50" plasma screen weighing 45 Kg load using anchor fittings. Where hydraulic or electric height adjusters are used

the load can increase considerably, and it will be necessary to obtain the mounted weight from the manufacturer.

ii. The Health & Safety Executive (HSE) advise that interactive whiteboards should be fitted with short-throw projectors to reduce user exposure to the light beam. These are either mounted as part of an 'all-in-one' board, or through a separate wall mounted boom. Where such a boom is used, mountings need to be able to support the additional turning moment.

iii. Interactive whiteboards should not be fitted to walls with a doorway to a circulation space. 'All-in-one' boards have mounts fitted to the boom arm to allow the projector to absorb an impact. This is a safety feature that reduces the risk of damage or injury. As a consequence, if a door is slammed the boom will move to absorb the impact causing a shake in the projected image. Whilst this usually corrects itself, it can be annoying and indicates poor wall construction. 'All-in-one' boards are fitted with a safety device that allows a projector to drop safely if a person swings on the boom. The exact load varies between boards, and should be noted on installation.

Typical actual weights are as follows:

Device	**Make**	**Model**	**Weight (kg)**
Whiteboard	Smartboard – All-in-one	660i	16Kg
Whiteboard	Promethean – All-in-one		30Kg
Projector	Hitachi	CPA100	5.9Kg*
Plasma	Hitachi 50"	TH-50P	45Kg

c. Audio-Visual (AV)

There is now a wide choice of interactive audio-visual equipment (see Appendix). School leaders should take the opportunity to re-consider their choice of AV technology. Interactive whiteboards in particular present a number of challenges, including:

- Difficult for young children to reach parts of the board – disabled access may also be an issue. Safety may be compromised if clearance between floor and projector reduces below 2 metres.
- Exposure to high intensity light beam is a recognised hazard, and new installations must now use short throw projectors to reduce exposure.
- Projectors require low ambient light and this may require blinds or light dimmers to be fitted.
- Children may swing on projector booms (where fitted).

KCC educational IT advisers make the following recommendations as best practice:

i. Where children need to interact with presentation technology, it must be at the correct height. It is not acceptable to lift children to enable them to reach parts of the screen.

ii. Exposure to projector light beams should be eliminated or reduced wherever possible in line with HSE guidance. Shadows are also obstructive and detract from teaching and learning. For this reason only short throw projectors should be used on new installations.

iii. Rooms should not need to be excessively darkened in order to view a projected image other than for very short periods as this has a negative impact on learning.

iv. Where a large screen is needed (e.g. hall, or large teaching space), consider using an interactive panel or touch screen monitor at desk height if interactivity is required. This will improve accessibility.

v. Projector and screen installations (i.e. where no interactive whiteboard is to be fitted) may be ceiling mounted provided there are no plans to teach from within the projected light beam.

vi. Where legacy interactive whiteboards are re-fitted into new spaces, old projectors should be disposed of and replaced with new short-throw beam mounted types to comply with HSE revised guidance.

vii. Projectors must be mounted such that there is a clearance of at least 2 metres from floor level to the lowest part of a projector.

viii. Dado trunking fitted to walls where interactive whiteboards are to be fitted should no higher than 60cm from top surface of trunking to floor level. This is to allow for boards to be fixed at a height that allows access by young children. *(Note: boards must not be mounted so low that a built-in projector becomes a hazard. In these cases alternative technology should be used).*

ix. Voice reinforcement may be needed where large learning spaces are planned. Schools will identify locations where speakers are to be located so that containment and draw cords can be provided.

x. Adjacent (i.e. left or right) to each teacher presentation screen (e.g. whiteboard or plasma) should be a labelled face-plate providing the following user connections:

- VGA, S-Video and composite and USB Socket (for interactive whiteboard).

- 2 input ‘In-trunking’ audio amplifier and speakers.

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- Dual data outlet.

d. Power and Heat Loading

i. Power requirements and heat outputs of IT equipment will influence M&E design and building energy usage. Each school will set out the maximum quantities of proposed device types in each space and their planned locations. For the purpose of calculating heat loading this should be then be multiplied by 1.2.

ii. Heat outputs of desktop devices are significantly higher than mobile devices. In terms of usage cycle, extensive processor and hard drive activity produces more heat than a device that is idle. Manufacturer heat outputs are provided for devices under maximum load and by multiplying these figures by 0.7 the heat output for a device under average load is calculated. (Note this only applies to PCs & Printers)

iii. Wet areas should be clearly identified on the 1:50 drawings, and no IT or power provided in these locations.

An example of heat outputs for typical devices is provided below.

Devices	Heat (Watts)	Average duty cycle (Watts)
Desktop PC / 19" LCD	122	115
Laptop	36	29
Wireless Access Point	100	70
Projector	240	168
Printer (Network)	400	280
Telephone	10	7
Plasma Display (50”)	1.2K	840

The following table provides approximate heat output for equipment that may be provided in communications cabinets.

Equipment	Total Heat Output (w)
UPS (3375W)	**3300W**
Edge Switch (160W)	**160W**

10.3 IT Rich learning Spaces

I. Schools may decide on a dedicated IT suite equipped with sufficient desktop computers for a class to use. Additional power and data will be needed and consideration given to furniture with 'wire management' features. The use of dado style trunking can limit the way a space is used, and it may be appropriate to consider floor boxes and provision of purpose built desks and furniture.

II. Most desktop computers require two power outlets each, one for the base unit and one for the monitor. Y leads are available, but need to be specified at purchase.

III. If existing computers are to be moved into a new IT suite, Cathode Ray Tube (CRT) Monitors should be disposed of and replaced with Liquid Crystal Display (LCD) types of at least 17" screen size. CRT displays consume considerably more energy, and the change will pay for itself. The reduced heat load will provide a more comfortable learning environment and reduce the need for air conditioning or forced cooling.

IV. Other general requirements are as stated in 'general learning spaces' above.

10.4 Dining, Social and Circulation

I. Most dining, social and circulation areas are also used for teaching and learning. Such areas should include wired and wireless provision, with sufficient power outlets to allow a range of devices to be charged or used.

II. If considering electronic catering systems, provision will need to be made for power and data. Although not within the scope of this document, consideration should be given to ensuring that common protocols are used, especially of considering a link to the school management Information System for retrieval of pupil data (e.g. SIMS).

III. See also the section on digital signage.

10.5 Sports & Assembly Halls

I. Provision should be made to support the installation of a high lumens projector together with adjacent power outlet. Secure anchor points must be provided in ceilings, and capable of supporting a projector and associated protective caging up to a weight of 35KG. In addition a separate anchor point is required for a safety chain to be provided, and this should be tested to 150 KG pull pressure.

II. data outlets per hall will be required to support Wireless Access Points, Digital Signage and a presenter console.

III. A speaker location should be provided with a connection to the projector suitable for use by a laptop.

IV. Although outside of the scope of this IT guidance, audio facilities and voice reinforcement may be required.

10.6 Libraries / Learning Resource Centres (LRC's)

I. Libraries / LRC's in primary schools require sufficient floor boxes to provide six power and six data outlets to an agreed location for the library management system. Dependent on the planned FF&E, power and data will need to be provided to a number of locations within the space to site desktop computers. Consideration should be given to providing floor boxes where possible to provide maximum use of internal space. There are a number of excellent products on the market that provide 'bollards for power and data that work with specific FF&E solutions.

II. If the library is to be used by the public, additional power and data should be provided for entry exit systems (theft prevention etc.).

III. Increasingly, libraries are becoming shared public spaces, and may require network separation. In this case specialist guidance should be sought.

10.7 Staffroom

I. A strategy needs to be agreed within the schools vision for the use of the staff area. Schools are likely to choose one of the following options dependent on available space:

- Retain this area for rest and relaxation – limited to providing 1 No. telephone outlet, 1 No. high level data outlet to allow fitting of a wireless access point (WAP) and 2 No. wall-mounted data outlets, all with associated power.
- Provide work areas for lesson preparation – in addition to the above each work area will require an additional 1 No data outlet and additional power.

10.8 Meeting Rooms

Where provided, each meeting room will require 1 No. telephone outlet, 1 No. high level data outlet, and 1 No. wall-mounted data outlet and associated power.

11.0 Multi-agency sites

a. Capital projects may locate a number of external agencies on the same site, either to rationalise community services or as part of a wider social policy planning obligation under s106 of the Town and Country Planning Act (1990). Where occupation of a site consists solely of public sector or charitable agencies, we recommend the following principles:

i. Single integrated structured cabling system across the site connecting to Kent Public Service Network (KPSN) broadband connectivity.

ii. Single managed service for network and cabling infrastructure to include cables, switches and data outlets. Layer 3 switches provide network management protocols to allocate Virtual Local Area Network (VLAN's), but this requires a single management point.

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iii. Single server room accessible by technical support operatives from all agencies on site and with rack space allocations for those agencies.

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Appendix – Audio-visual – stimulus materials

(note: this appendix does not constitute a catalogue of approved suppliers or recommended equipment. Each illustration aims to illustrate a functional approach.)

"Teacher Wall"

Designed to incorporate an interactive whiteboard (IWB), laptop-charging and resource storage all in one unit and all behind closed, locked doors.

Integrated storage system combats the problem of trailing cables, as well as providing a backdrop for a whiteboard and teaching space.

Accommodates most display types.

Interactive Whiteboard

Health & Safety Executive (HSE) have published new guidance, and now recommend the use of short-throw projectors to reduce exposure to light beams. All-in-ones meet this requirement as the projector is integral to the board. This also reduces shadows.

Consider whether children will be able to reach the usable area of the board. Height adjustable mountings are available (see below); however there should be at 2M clearance from the bottom of the projector to floor level to prevent hazards to teachers. As the height is lowered the projector may become a hazard.

There are also concerns about children's cognition being affected by the need for low ambient lighting when projector's are in use.

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Projector and Screen

A good choice in large spaces (e.g. halls), and are available in various sizes.

Interactivity can be provided by using desktop mounted touch-screen monitors or interactive tablets (see below). They provide a large image and with desktop touch technology can allow easy access by children. They can also be retracted when not in use, so are less intrusive.

(There are concerns about children's cognition being affected by the need for low ambient lighting when projector's are in use).

Plasma

Plasma screen technology offers a higher brilliance than projectors, reducing the need to darken the room. Prices continue to drop, so they are becoming good value. For classroom use screen size should be at least 42"

Interactivity can be provided by using touch-screen monitors or interactive tablets (see below). With desktop touch technology can allow easy access by children.

Also available are overlays that provide an interactive surface.

Height adjustable mounts can be obtained and these do not require 2M clearance as is the case with interactive whiteboards.

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Height Adjustment

There are numerous mobile and fixed height adjustment mountings and trolleys available in the market, some powered and others manual.

Care needs to be taken to ensure that when all-in-one boards are mounted on height adjustable fittings they don't become a hazard when lowered. (i.e. head injury).

Also consider how easy they are to adjust. If manual systems are used, they can require some manual effort.

Laptop Shelf

If considering any technology that moves, it is necessary to consider the travel of cables. Laptop selves are cheap solutions that allow cables to be permanently attached to a USB port replicator or docking station.

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Interactive Panels

PolyVision 17” walk and talk interactive panel

Interactive panels allow the user to interact with the screen using a stylus and a desktop screen. This puts interactivity within the reach of children and allows teachers to face their class whilst projecting an image on to a screen that can be mounted high enough for all to see without obstruction.

Interactive panels eliminate problems with shadows and can remove the risk of excess light beam exposure. Prices are comparable with interactive whiteboard systems and often cheaper.

These can be used with projectors or plasma screens and are a versatile choice

Clever Tab 19” tablet Monitor

Hitachi Interactive Panel

SMART Sympodium 17”.

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Touch Screens

32" NEC SAW serial LCD touch screen has superb price / performance ratio and covers consumer and value, public and commercial applications.

19" IntelliTouch LCD Desktop Touchmonitor

If using a stylus is a problem, and you want a screen that responds to touch, the new generation of touch-screen is ideal. They are brighter and cheaper than SMART overlays and just as versatile. The robust screens are designed for public access signage so are strong and unlikely to be damaged by use. They can be fitted into furniture or desks if required, and are available up to 32” screen size.

These are perfect for young children, and can be mounted at an angle at desk height.

Desktop touch monitors are similar to interactive panels but use fingers instead of a stylus. They plug into the computer or laptop through a USB connector so are easy to use.

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Multi-touch - iTable (New)

New on the market are multi-touch interactive systems. They operate like a large iPhone or iTouch, and users can use both hands at the same time to move things around the screen.

There are no styli or overlays, and they can be adjusted into the vertical position for class use, tipped and lowered for console use, or laid flat as a virtual desk.

These are about the same cost as an interactive whiteboard and projector installation. The system runs most normal software, and provides extra software that uses the special features of multi-touch.

Our passion in EiS Kent is to make a real difference in education and ultimately children's lives by providing innovative solutions and outstanding support services.

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