5. MECHANICAL AND ELECTRICAL SERVICES PROPOSALS

GENERAL
The feasibility study is for the 2 options, New Build and Refurbishment of the existing school.

The following proposals are made following several site inspections undertaken by D. Whitehouse, Electrical Engineer and J. Critchley, Mechanical Engineer and include certain assumptions regarding the capacity and availability of existing services. Desktop studies were also undertaken.

The new build Option 1 will require new incoming Utility Services with new M & E services throughout. It is assumed that the incoming Electricity supply to the existing school will be of sufficient capacity to cater for the refurbishment, a load analysis study will confirm this assumption.

Option 2 will require new gas and water Utility Services (No gas at present; cast iron water main to existing must be renewed).

The existing school was rewired in November 1997 and it is proposed to utilise the existing main switchgear and sub-main cables. The cables will be further studied to ascertain if they are LSF (Low Smoke & Fume) rated, if not then this option will be discounted.

It is proposed to utilise parts of the existing fire alarm system, further studies will be carried out to discover the practicalities of this option.

The proposed systems are defined in order to achieve the conditions outlined in the Feasibility Brief dated April 05

BREEAM:
The proposals are based upon the new build achieving a "very good" rating from BREEAM, with only certain elements of the refurbishment having to achieve this rating.

To achieve the BREEAM rating of "very good" the building design has to be approached from a holistic point of view with all elements counting to the overall score. An initial meeting with the BREEAM assessor identified areas of the design we need to concentrate on to ensure compliance.

As required by the brief and by good practice the proposals take due account of recommendations on sustainability incorporated in the NES "Greening Guide".

HEATING – CENTRAL PLANT
Existing: Basement oil fired plant comprising two 13 year old boilers; pressurised system; weather compensated controls with optimum start / stop. Oil storage tank also in basement. All to be abandoned in both options because (a) Not economical to convert to gas (b) Low thermal efficiency (c) Insufficient capacity for Option 2 (d) basement is to be filled in. Oil tank to be emptied, degassed and removed.
Options 1 & 2:
New gas fired fully modulating condensing Low-Nox plant also serving high output HWS calorifier; pressurisation plant (re-use existing); possibly re-use existing heating pumps.
Weather compensating control
Boiler turn-down ratio to match light heating demands
Building Energy Management System

HEATING – SYSTEM
Existing: original 1952 heating mains and (most) cast iron radiators; poor room temperature control; no zoning; mains run generally in largely inaccessible floor ducts: to be abandoned in Option 2.
Options 1 & 2:
New lphw heating mains running in ceiling voids to steel panel radiators (Low Surface temperature as required); individual room temperature control; heating system zoned as required for out of hours / joint use etc.

SUPPLY VENTILATION
Options 1 & 2:
To satisfy BREEAM and in accordance with Building Regulation approved document F the building will be designed to achieve correct fresh air requirements via natural ventilation to all classrooms. Mechanical supply ventilation will be supplied for the kitchen and heat recovery ventilation to internal habitable rooms.

EXTRACT VENTILATION
Mechanical extract ventilation to all toilets controlled via movement sensors and with run-on facility.
Mechanical supply / extract ventilation to Kitchen, interlocked with gas solenoid valve in accordance with BS6173:2001

WATER SERVICES
Existing water main to the school is cast iron, running to the basement; thence to a cast iron fire main in the school, metered copper potable service to the main school, Nursery and HORSA building. This service will be disconnected in both Options. HWS is served by wall mounted electric water heaters throughout the main school.
Options 1: & 2
New metered water supply with submeter in the new plant room to serve all cold water draw-offs.
HWS generated via central HWS fast recovery calorifier in the plant room to all hot water draw-offs (point-of-use TMV3 thermostatic mixing valves to all pupil's draw-offs)

MECHANICAL COOLING
At this stage (in the interest of suporting a "very good" BREEAM rating) it is to be hoped that the need for mechanical cooling can be avoided by the application of effective natural and mechanical ventilation. This would be in keeping with the general approach of the S "Greening Guide" .

The extent of IT equipment to be installed will be the main determinant of the need for mechanical cooling.

Although cooling may initially be deemed unnecessary it is recommended that the electrical loading for possible future cooling is provided.

Where cooling is necessary it will be necessary to locate suitable outdoor/condensing units. Since roof plant space is not available two options could be considered.

a) Ducted units within the plant room.

b) High-level wall mounted units on the wall above the upper floor, on the hall side beneath the roof.

ELECTRICAL POWER

New Build

It is proposed to make an application to the Supply Authority for a new 3 phase supply, location of switch room/meter room to be decided during detailed design stage.

Refurbishment

It is proposed to utilise the existing incoming main.

A desk top load analysis of the future load will be undertaken and communication with the supply authority, to establish that the incoming supply is adequate for the proposed. It is proposed to include new mains switchgear and digital check meters, to satisfy the requirements of AD L2, with distribution boards as required. Generally distribution boards shall be 3 phase to enable the load to be evenly distributed over the 3 phases.

If final circuits from distribution boards extend to more than 20m, then sub-distribution boards shall be provided.

A new main earth bar shall be provided to bond all incoming main services and building fabric, if appropriate.

General lighting and power wiring shall be installed in accordance with BS 7671 utilising twin and earth/single core LSF insulated cable, clipped to galvanised tray/basket, contained within trunking, within the ceiling void, final drops contained in non-metallic rigid/galvanised steel conduit, contained within the building fabric where appropriate.

Separate containment systems shall be provided for: -

- power & lighting
- fire
- data/telecom/intruder

All wall mounted accessories shall be mounted in accordance with DDA compliance, between 450mm and 1200mm AFFL.

General CDM regulations shall be adhered to when considering the siting of any electrical equipment.

LIGHTING

High efficiency fluorescent luminaires using T5 / TC-DEL lamp technology to be provided to all areas to satisfy recommended lighting levels from CIBSE Code for Lighting (2002) and BS EN 12665: 2002. High frequency electronic ballasts shall be used throughout, incorporating 0-10V dimmable ballasts where appropriate/applicable. Limiting energy consumption shall be at forefront of the lighting design.

Luminaires to classrooms, offices, areas shall be linear fluorescent with an indirect/direct element, suspended.

Luminaires to circulation: toilet: store: areas shall be linear fluorescent with polycarbonate fire rated diffuser.

Luminaires to kitchen: plant areas shall be linear fluorescent with Ipxx, polycarbonate fire rated diffuser.

Lighting to areas containing Display Screen Equipment (DSE) shall be provided with lighting compliant with CIBSE LG3: 1996 including Amendment 2001, The visual environment for display screen use.

Lighting control system to be used, incorporating dimming, daylight linking and presence detection where applicable.

Emergency lighting designed to satisfy requirements of BS5266: 1999, BS EN 60598-2-22 and ICEL: 1001. Emergency lighting to be incorporated in general lighting where possible by use of integral conversion ballast units and or stand-alone self-contained lighting units. Testing of emergency luminaires shall be either local from secret key switch located within normal lighting switch, or from central accessible location.

Final exits to be indicated by the use of illuminated pictogram/direction exit signs.

External luminaires shall be wall mounted, vandal resistant controlled via time clock and photocell.

SECURITY SYSTEMS
New build & Refurbishment
A new intruder detection and alarm system shall be provided to all areas of the building.

The intruder detection and alarm system shall meet the requirements of DD243:2002 and all amendments. Off-site monitoring shall be provided via a dedicated BT Redcare line.
Local door access controls shall be provided.

FIRE ALARM SYSTEMS
New build
A new fire detection and alarm system shall be provided to all areas of the building.

The fire detection and alarm system shall meet the requirements of BS5839:2002, to the classification of a category L2 system. Wiring to be in red LSF coated MICC/Fire Rated cable contained on a dedicated cable tray/basket within suspended ceilings.

Refurbishment
A part new fire detection and alarm system shall be provided to all areas of the building.

The fire detection and alarm system shall meet the requirements of BS5839:2002, to the classification of a category L2 system. Wiring to be in red LSF coated MICC/Fire Rated cable contained on a dedicated cable tray/basket within suspended ceilings.

TELECOMMS/DATA/IT/CCTV
Containment systems and necessary power supplies **only** shall be provided for these systems. Cable trays / baskets shall be installed above suspended ceilings and conduit drops / dado trunking shall be provided for containment of final accessories. All systems shall be suitable for CAT 6 data cabling.

ELECTRICAL ASSUMPTIONS
New Electrical incoming mains to be provided. New build
Existing electrical incoming mains to be utilised. Refurbishment
No CCTV included.
Door Access included to main entrance and nursery area.
Portable Induction Loops included.

CONTROL SYSTEMS

New build & Refurbishment

Lighting to classrooms and offices shall be controlled via passive infra red/ microwave movement detectors, dimmable daylight linked, with wall mounted light switches for off control.

Lighting to toilets and corridors shall be controlled via passive infra red/ microwave movement detectors, daylight linked where feasible.

Lighting to stores and ancillary areas shall be controlled via time delay off light switches.

Lighting to plant and kitchens areas shall be controlled via light switches.

LIST OF PREFERRED MANUFACTURERS	
ITEM	MANUFACTURER
LUMINAIRES	COOPER LIGHTING SITECO LIGHTING
ACCESSORIES	MK
FIRE ALARMS	PROTEC or TO MATCH EXISTING SYSTEM
INTRUDER ALARMS	PROTEC or TO MATCH EXISTING SYSTEM
MAINS DISTRIBUTION AND DISTRIBUTION BOARDS	SQUARE D
ISOLATORS	CRAIG AND DERRICOT
CABLES • POWER • FIRE ALARMS	BASEC APPROVED SINGLE CORE or TWIN AND EARTH FIRE RATED "SOFT SKIN" as PIRRELLI FP 200 GOLD or TO MATCH EXISTING.

6. ROOM DATA SHEETS

The Feasibility Study has been carried out making direct reference to the Room Data Sheets contained within the Feasibility Brief. The Room Layouts are to be developed during the Capital development.

7. EXCLUSIONS AND CONDITIONS

The Feasibility Study has been completed in accordance with all directions received. However, due to the nature of this and all Feasibility Studies, the ADU has made a number of assumptions in the absence of data from various sources and surveys. These are described below.

ELECTRICAL EQUIPMENT SURVEY

The project electrical engineer has carried out an on-site inspection of the existing electrical main equipment and existing services and a desktop study has taken place. The authority's Building Maintenance Unit has also been consulted to benefit from their day-to-day knowledge.

ELECTRICAL LOAD TEST

An electrical load test and corresponding analysis report will measure and record existing electrical consumption over time, identifying peaks and troughs in consumption across 1 or 3 phases. The process will determine whether the existing electrical distribution is appropriately phased as well as identifying whether there is capacity for further development.
A previous load analysis conducted on April 2004 was used to form the basis of this feasibility report.

MECHANICAL SERVICES SURVEY

The project mechanical engineer has carried out an on-site inspection of the existing mechanical Services. A desk-top study has also taken place, with reference made to the authority's asset management plan database information. The authority's Building Maintenance Unit has also been consulted to benefit from their day-to-day knowledge. Enquiries made to gas and water Utility Authorities for proposed new services to both Options 1 and 2.

MEASURED BUILDING SURVEY

The feasibility study drawings were initially based upon the authority's centrally stored Asset Management drawings.
A measured building survey was commissioned and determined the accurate site conditions. Information from the survey was super - imposed onto the existing feasibility drawings. A measured survey was also commissioned for the existing school and its elevations.

TOPOGRAPHICAL SITE SURVEY

A measured site survey was commissioned to determine accurate site conditions, including levels, contours, fixtures, etc.

BELOW GROUND SERVICES AND DRAINAGE SURVEYS

The feasibility study drawings have been based upon the authority's centrally stored Asset Management drawings. These drawings do not contain any services or drainage information. The ADU has carried out desk-top surveys, sourcing data from historically held micro-fiche records , the topographical survey identified drainage manholes.The ADU is not responsible for the accuracy of these drawings and can not therefore guarantee that the illustrated proposals are achievable exactly as illustrated or strictly within the cost estimate offered.
The ADU recommends that as part of the post feasibility capital project, a drainage survey is commissioned to determine accurate site conditions.

ASBESTOS SURVEY

In preparing the feasibility study, the ADU referred to the existing type 2 asbestos survey for Stockton Heath Primary School carried out by Casella Hazmat dated Aug 2002. The costs for project related asbestos removal and / or management are based on information contained within that report. The ADU is not responsible for the accuracy of the asbestos removal / management costs provided by the third party surveyor. Should these isolated costs prove to be incorrect, the ADU will report the cost difference to the client.
A revised report was issued by BES Consulting Asbestos Report on 30/09/05. The implications of this report were not included in the feasibility cost plans, because the findings of the two reports were very similar.

SUB SOIL SURVEY

A sub soil survey was commissioned from which the ground conditions have been based.

CONTAMINATED LAND SURVEY

A sub soil survey was commissioned from which the ground conditions have been based
The brief reports that no records of any industrial past site activities have been found. The main finding is a Roman road, which will require site sterilisation of the building's footprint.

ACCESS & THE DDA

In preparing this Feasibility Study, the ADU has referred to the relevant Kasway Access Audit. The new building provides accessibility as required by the Building Regulations, BS 8300 and the draft Warrington Access Standard. It should be noted that the Feasibility proposals do not aim to resolve any specific access issues throughout the school / property. Should further requirements be identified, the ADU would be happy to extend the scope of works to incorporate further access related elements of work.

ACCURACY OF ESTIMATED COSTS

The feasibility costs provided here are only as accurate as the information provided and produced. The notes immediately above explain that further information is to be sourced and made available in post feasibility project development. Where such further information shows that any one or any number of the assumptions made during the feasibility study were incorrect, it is possible that cost corrections will be required. Costs will also fluctuate if the scope of the project works is varied, reduced or extended at the direction of the client after signing off the feasibility study as formally approved.
The ADU works to an established procedure to keep clients informed of all cost and design related changes throughout the course of all projects. The client will be asked to formally approve all post feasibility design and cost changes as they become apparent.

8. CONCLUSIONS

Through the feasibility brief, the ADU was made aware that the client had identified a provisional project budget of £3.9m, further finance has since been identified.

9. RECOMMENDATIONS

Subject to the client confirming the availability of funds, the ADU recommends the approval of the feasibility study for new build scheme with a steel frame: Option 1B and as illustrated on the accompanying drawings.

The steel frame option retains the originally proposed programme period in the brief to a one-year build period although more expensive. The steel frame option reduces risk of delay due to poor weather and also provides future flexibility.

CLIENT APPROVAL

The client is asked to read and consider this Feasibility Study report including all attachments. The ADU would be happy to explain any of the proposals where the offered documents are not easily understood.

Two sets of the feasibility drawings and documents listed in section 11 below are attached to this report. All drawings and documents incorporate a table for completion by the client.

The ADU asks the client to sign and date one set of drawings and documents as approved, then return them to the ADU at Palmyra House in the envelope provided. The client is advised to retain the second set of drawings and documents for their own records.

In signing the drawings and documents as approved, the client must understand that this will be construed as acceptance of the illustrated and priced scope of works. This will effectively freeze the scheme. Any request for subsequent changes to the scope of the works must be issued in writing. It is important to understand that such revisions will result in changes to the post feasibility project programme. It is also important to note that post approval changes may incur additional costs, in terms of professional fees, direct costs and construction costs.

11. DRAWINGS & DOCUMENTS

The following drawings have been prepared to illustrate the feasibility proposals:
Development drawings:
Architectural drawings: Warrington Borough Council Architects Design Unit
EFEA 96/ 10
EFEA 96/ 11 Rev b
EFEA 96 / 12 Rev e
EFEA96 / 13 Rev d
EFEA96 / 15 Rev d

Structural drawings: The Gilbraithe Partnership
Option B - 2839/sf/sch/1,2839/sf/sch/2, 2839/sf/sch/3,
Option A - 2839/sch/1,2839/sch/2, 2839/sch/3

The following documents have been prepared to illustrate the feasibility proposals:

The Brief
Cost Plans
An Archaeological Brief and Evaluation
Site Investigation Report
Structural Report on Proposed Refurbishment and Extension of Existing School Building
Inspection report of the North Boundary Wall to the Playground
Preliminary Feasibility Stage Report by the Planning Supervisor
Draft Travel Plan
Casella Hazmat Asbestos Report (Aug 2002)
BES Consulting Asbestos Report (30/09/05)
Programme
BREEAM Pre Assessment Report
Mechanical Services Report
Electrical Services Review
Electrical Load Analysis

12. FEASIBILITY BRIEF

The Feasibility Study has been prepared by S.Manfredi dated 9th November 05 in response to the issued Feasibility Brief.