

# THE BRITISH MUSEUM



## BUILDING MANAGEMENT DEPARTMENT

### *Planning & Project Management Section*

# FIRE SERVICES MECHANICAL

## HARMONISATION DOCUMENT

Issue	Revision	Date	Changed
1st	0	28.11.2000	First draft

Prepared by			Quality Assured by			Approved by		
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## FEEDBACK SHEET

Feedback is welcomed and your views are sought; the sheet below will log all feedback received which will be included in the next update.

<b>FEEDBACK RECEIVED</b>	<b>DATE</b>	<b>ANSWERS/ACTIONS</b>
Expand section 3.6 on Smoke Extract Fans	08.11.2000	Will be considered in next update
Incorporate findings from previous reports into this document and remove references as far as possible		Will consider in next update.
Move general (non Fire Services (Mechanical) to a common harmonisation document.		Will consider in next update
<i>Other items will be added as received; please send your feedback to BMD - P&amp;PM Section</i>		

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**APPENDIX A – Operating and Maintenance Manuals Procedure**

**APPENDIX B – Valve Numbering Procedure**

**APPENDIX C – Preferred Suppliers**

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**APPENDIX E – Pipework and Insulation Data Sheets**

**APPENDIX F - Drawings/Sketches**

## 1.0 INTRODUCTION

### 1.1 Background

Since the BMD P&PM Section was formed, the team have had concerns with regard to the adhoc manner in which the replacement/upgrade/development of the site infrastructure had been approached.

Consequently site-wide sketch designs were, and are being, developed to cover most aspects in order to establish an overall plan ('design'), to which all projects would be harmonised in order to reach a common goal. This 'Harmonisation' would be achieved through the publication of a series of documents, each dealing with a specific element of infrastructure.

Thus, not only would the infrastructure specific projects have a set standard, but so also would those elements of infrastructure being provided as part of the project of others.

In addition, where there are other commonalities between projects, eg documentation, procedures etc. Harmonisation documents should be developed to ensure a common approach.

This Document is one of a series of publications to be issued, and be updated annually, by BMD P&PM, for use by Project Design Teams.

• Building Management System Strategy	Issued 08/1999
• Electrical Infrastructure (EI) Harmonisation	Issued 07/2000
• Mechanical Infrastructure Harmonisation	Issued 07/2000
• Intruder Detection System Harmonisation	Issued 10/2000
• Fire Alarms and Emergency Lighting Harmonisation	Issued 07/2000
• Fire Precautions (Building) Harmonisation	Y2K draft 07/2000
• Fire Precautions (Mechanical) Harmonisation	Issued 11/2000
• Lift Harmonisation	YK2 draft 08/2000
• Museum (BMD) CAD Strategy	Issued 8 - 09/1998
• CDM Regs Harmonisation	Y2K draft 08/2000
• Procurement Strategy	Y2K draft 06/2000
• Site Works Procedures Harmonisation	Issued 07/2000
• Building Harmonisation	Y2K draft 06/2000
• Lightning Protection Harmonisation	Y2K draft 11.2000

Documents published by The British Museum Design Office (BMDO) for the guidance of project team include:-

- Gallery Lighting Control
- Illuminated Escape Signs Specification
- Aesthetic considerations and Equipment in Galleries

A Document to be published by Building Development & Planning/Architecture Project Management and planning (BDP/APMP) for guidance of project teams is:-

- The British Museum Conservation Plan

Arrangements to refer to the above documents should be made through the BMD/P&PM project representative, or through BMDO & APMP project representatives direct where represented on the project team.

**The project designer(s) retains full design responsibility; where the content of any Museum guidance document causes the designer concern over this responsibility it should be brought to the attention of the Project Manager.**

## 1.2 Roles and Responsibilities

A number of positions are referred to within this document. The roles and responsibilities of each are summarised below :

### 1.2.1 All projects

BM Project Manager	The named officer responsible for the planning and implementation of the project.
BMD Project Planner	Responsible for the planning and implementation of new building & engineering projects in the British Museum.  Responsible for being a member of the project teams led by others, providing assistance, and setting BMD required standards.
BMD Maintenance & Works Manager	Responsible for operation & maintenance of all existing buildings & engineering services within the British Museum.

BM Staff & Project Consultants

Responsible for the design and supervision of all building & engineering services associated with the particular project, complying with the guidance documents, or liaise via the Project planner, with the specific System Coordinator to fully determine the requirements of the British Museum.

BMD Site Works Representative

Responsible for ensuring works are carried out in accordance with the contract documentation. For details of duties, refer to Site Works Procedure Harmonisation Document.

### **1.3 Sector Autonomy**

The Bloomsbury site is sub-divided into 7 autonomous building Sectors, each being separated by fire barriers having 4 hour fire integrity, as shown in principle on drawing no Z000121 in Appendix F.

Each Sector is to be regarded as far as is practical as an autonomous building for servicing purposes. Services will not normally cross boundaries from one Sector to another except at the highest level of distribution to carry the source of the service into the Sector, eg Primary Network, Site Distribution Mains etc.

Where it is proposed to cross the Sector boundary at a lower level of distribution the matter must be agreed by the Sector Coordinator, who will refer to the Fire Safety Advisor, amongst others.

Sector boundaries are defined in the Museum CAD strategy. Some boundaries differ slightly on different levels of the building. Any changes to Sector boundaries will only be made with the agreement of Building Management Department and The Fire Safety Advisor, and will be reflected by a change in the CAD Strategy master background drawings.

### **1.4 Purpose of Document**

The purpose of the Fire Services Harmonisation Document is to provide strategic and general guidance for the designers of specific projects throughout the Museum.

Although the detailed requirements for a specific project will be determined by the project design team, the strategy outlined in this Document should be followed to ensure that all projects take account the long term development plans for the fire services in the Museum and also uniformity of installation.

Projects which need to be served initially by the existing infrastructure should be designed in such a manner that they can eventually be served by the infrastructure arrangements outlined in this Document with minimal alteration to work which has been carried out.

This Document will be kept under review and developed as the need arises.

Any deviations from the principles given in this Document should be agreed with the BMD PMPM section.



The Document is arranged in the following sections:-

- Section 1 - Introduction
- Section 2 - General Requirements
- Section 3 - Design Requirements
- Section 4 - Existing Systems and Future Strategy

The section on general points covered matters which apply to more than one aspect of the Mechanical Services.

The designers of a new project should make themselves aware (via BMD project Managers) of other projects being undertaken and should seek and suggest ways of taking advantage of the other projects to assist harmonisation of the services.

## **2.0 GENERAL**

This Section covers general points which apply to more than one aspect of the fire services.

### **2.1 Standard Technical Specifications and Reference Documents**

#### **2.1.1 Standard Technical Specifications**

The materials and plant used on all installations should generally comply with the latest versions of the Standards listed below:-

Relevant BS – Fire Extinguishing Installations

LPC Rules and Technical Bulletins.

#### **2.1.2 Reference Documents**

The latest editions of the following Museum Reference Documents should be taken into account in the development of the Mechanical Services. All documents may be accessed by arrangement with BMD/P&PM.

- Electrical Infrastructure – Root Specification
- CAD Strategy
- Final Sketch Design.
- Fire Safety Plan (FSP)
  - Sector A – East Wing
  - Sector B – South Wing Phase II
  - Sector C – South Wing
  - Sector D – West Wing
  - Sector E – Inner North Wing
  - Sector F – King Edward VII Building
- Guidance Document for use with FSDs
- Specification – Firefighting Water Supplies
- Firefighting Hosereel Installation Report
- Fixed Fire Suppression Systems Report
- Fire Stopping Supplement
- BMS Harmonisation Document
- Electrical Infrastructure Harmonisation – Document

- Mechanical Services Harmonisation Document
- FAEL Harmonisation Document.

Other reference documents will be issued from time to time by the Museum.

## **2.2 Drawings**

### **2.2.1 CAD Strategy**

All drawings should conform to the BMD CAD Strategy Document.

Title blocks for all layout drawings should commence with the words:-

‘Sector’

Layout drawing title blocks should be in the format:

Sector A

Level 1 - Area A1

Pipework Layout

Drawing numbers for each project will be allocated by the Museum.

### **2.2.2 Layout Drawings**

General layout drawings, excluding plant rooms may be produced at any standard scale suitable for the particular purpose.

Plant room layout drawings should be at 1 : 50 scale or 1 : 20 scale unless particular considerations apply.

Sections and details should be drawn to a suitable scale to adequately illustrate the services requirements.

The preferred drawing size for layout drawings is A1. A0 size drawings should not be produced unless there is a compelling reason.

Layout drawings should show the 12.5m grid, room numbers, sector boundaries and the match lines between drawings. Cross references should be made to associated and continuation drawings.

All fire services plant including associated switchgear, motor control centres and electrical equipment shown on the layout drawings should be identified with their system reference.

All ductwork should be shown on the layout drawings by a two line plan view with the width shown to scale. Sections should be drawn to show the relationship of the ductwork to the building and to other services. Clearances from the floors, wall and equipment should be shown in critical locations.

Pipework on 1 : 100 scale layouts should be shown single line. Pipework in plant rooms may be shown in single or double line depending on the complexity of the layout.

The space requirements for maintenance access in critical locations should be shown on the layout drawings. With the exception of minor items which require infrequent attention, all equipment should be maintained from floor level or from fixed access platforms. The access platforms should be shown on the layout drawings.

### **2.2.3 Flow Diagrams**

Flow diagrams of pipework circuits should be produced for each project. The diagrams should show all major components together with all valves etc.

The location, level and grid reference of each major plant item should be stated on the flow diagrams.

### **2.2.4 Design Standards and Calculations**

All systems should be designed in accordance with LPC rules and British Standards Specifications stated therein.

## **2.3 Equipment**

### **2.3.1 Standardisation**

It is the intention of the Museum to produce a list of preferred manufacturers for the equipment and components used in fire services installations. Wherever possible the list will provide alternative manufacturers for each item of equipment.

An initial list of preferred manufacturers is given in Appendix C. The list will be extended progressively. Equipment supply of 'equal and approved' manufacture must always be allowed for in Specifications.

Where preferred manufacturers have not been selected the designer should submit a list of proposed equipment manufacturers to the Museum for agreement.

All plant items should incorporate facilities to enable the equipment to be monitored by a BMS and a fire alarm system.

### **2.3.2 Re-Use of Existing Equipment**

Existing equipment should not be re-used unless:-

- The equipment fully meets the harmonisation standards
- There is a clear economic advantage in its re-use.

### **2.4 Protective Measures**

Failure of the fire services can cause serious damage to the artefacts and the building and the designer should pay careful attention to minimising the risks of failure.

Particular attention should be paid to the following aspects:-

- Frost protection of external pipework including trace heating of fire water services
- If sprinklers are activated water may damage areas which are not affected by the fire, particularly those rooms which are directly below the area where the fire occurs. Wherever it is practicable precautions should be taken, (eg sealing service holes, providing upstands around the builderswork opening etc) to minimise water damage outside the area where the sprinklers are activated.
- In certain areas it may be necessary to provide special protection against accidental damage (ie special guards for sprinkler heads) but this should be decided on project specific basis.
- Operating and Maintenance Manuals should explain the functions of all protective and alarm systems and shall also give the procedures to be followed by both technical and non-technical staff when an alarm is activated.

### **2.5 Identification of Pipework**

Pipework should be colour coded and labelled in accordance with relevant BS.

### **2.6 Services Accommodation**

Designers should identify all services accommodation required for a project (eg plant rooms, roof space, trenches, risers etc).

In some cases three different locations will need to be identified namely existing accommodation, transitional accommodation and final accommodation.

Designers should schedule the accommodation required so that the Museum can agree the availability of space. The schedule should give the room number of the space and should state whether the space is existing, transitional or final.

## **2.7 Areas Adjacent to a Specific Project**

The Museum funding arrangements often makes it necessary to undertake projects involving a smaller isolated area of the Museum.

In order to facilitate the future development of the areas surrounding a specific project, consideration should be given to the long term development of the services infrastructure. Provision should be made where appropriate to cater for planned future development.

Wherever possible provision for future developments should be limited to aspects which do not increase the cost of the specific project. Particular examples are:-

- Space allocation for future services
- Routing of services to allow for long term development plans
- Sizing of services to take into account future developments which are likely to proceed in the relatively near future
- Arranging the services to suit the harmonisation requirements of the infrastructure.

Where provision for future developments is likely to involve an increase in the cost of a project, the matter should be referred to the Museum for a decision.

The adverse affects of a project adjacent rooms should be taken into account and proposals should be prepared for mitigating the adverse affects. For example a project may affect the natural ventilation or noise level in adjacent rooms.

## **2.8 English Heritage**

English Heritage will need to be consulted on all aesthetic matters and matters affecting the fabric of the building which is a listed Grade 1 structure. Contact with English Heritage and with the London Borough of Camden should be through the Project Manager.

The Museum is subject to the Fire Precautions (Workplace Amendment) Regulations 1999 and as such has a strict Fire Risk assessment policy. Any work planned to the Mechanical Services Systems should be referred in the first instance to BMD P&PM and Head of Security so that project implications to the risk assessment can be evaluated.

All fire stopping of services should be carried out in accordance with the Museum's Fire Stopping Supplement.

### **3.0 DESIGN REQUIREMENTS**

#### **3.1 Sprinkler System**

The Museum's Fire Safety Plan indicates the areas throughout the Museum which will require fixed fire suppression systems, however, these must be agreed with the Museum's Fire Safety Advisor and BMD Project Planner.

##### **3.1.1 Basic Design Requirements**

The following are the basic design requirements although these must be confirmed by Museum's Fire Safety Advisor (FSA) and the BMD Project Planner.

Regulations	Relevant BS and LPC Regulations
Risk Classification	OH3
Type of System	Wet/Life Safety (escape routes)
Density of Discharge	5 mm/min
Flow	1000 l/min
Area of Operation	216 m <sup>2</sup>
Maximum Area per Sprinkler	9 m <sup>2</sup>
Type of Sprinkler	Quick Response
K Factor of Sprinkler	K80
Sprinkler Thread Size	15 mm diameter
Sprinkler Finish	To suit application
Sprinkler Fusing Temp	68°C unless otherwise stated.

##### **3.1.2 Zoning**

The sprinkler system must be designed as a zoned installation with a maximum of 200 sprinklers/zone.

No zone shall cover more than one floor level.

Each zone shall have a zone valve/flow switch assembly with a zone check device to test the flow switch without the need to draw off water.

The final division of sprinkler zones should be as equal in size as possible.

### **3.1.3 Areas Subject to Freezing**

The wet sprinkler systems located in areas which are subject to freezing shall be insulated and electric trace heated.

### **3.1.4 Ceiling Voids**

In general, ceiling voids of 0.8m depth or less, do not require sprinkler protection.

Where ceiling voids of 0.8m depth or less contain combustible materials, it is essential that suitable vertical cavity barriers are installed at horizontal intervals of 15m.

Where sprinkler protection is provided at the ceiling level and within the void, there shall be no openings in the ceiling as this may result in an ineffective discharge into the room.

Where a ceiling void changes depth thus requiring sprinkler protection in the deeper sections, the ceiling void shall be either sprinklered throughout or sprinklered in voids of 0.8m depth or greater and cavity barriers or at least half an hour resistance between sprinklered areas.

Before deciding on the provision of sprinklers a risk assessment should be carried out to establish need for sprinklers.

### **3.1.5 Floor Voids**

Concealed spaces between floors of more than 0.8m depth shall be sprinkler protected.

Before deciding on the provision of sprinklers a risk assessment should be carried out to establish need for sprinklers.

## **3.2 Hosereel System**

### **3.2.1 Design Requirements**

Hosereel type	Chubb Multiway fixed or swing
Inlet valve	25 mm
Hose	30m long x 19 mm diameter semi rigid with a 6.5 mm diameter nozzle
Flows	0.4 l/s each to relevant BS
Inlet pressure	2.5 bar
Jet discharge	6m.



### **3.2.2 Location**

The type of hose reel supplied is dependent upon the location and the Architectural solution, which must be agreed with the BMD Project Manager.

It is preferable that the hose reel is located in a wall recess as this minimises potential damage.

## **3.3 Dry Risers**

### **3.3.1 General**

Dry risers shall be installed as agreed with the Museum's FSA and BMD Project Manager.

### **3.3.2 Design Requirements**

Dry Riser Design	Relevant BS
Dry Riser Cabinets	Thorn Norsen Type CF recessed cabinet

### **3.3.3 Location**

The type of dry riser is dependent upon the location and the Architectural solution, which must be agreed with the BMD Project Planner.

## **3.4 Gaseous Fire Extinguishing Systems**

### **3.4.1 General**

The Museum's Fire Safety Plan (FSP) indicates the areas in the Museum where gaseous fire extinguishing systems may be required, however these must be agreed with the Museum's Fire Safety Advisor (FSA) and BMD Project Manager.

### **3.4.2 Design Requirements**

The gaseous fire extinguishing system shall be designed to relevant BS requirements, industry standards and agreed with Museum's FSA and BMD Project Planner.

The gas shall be environmentally acceptable and stored in approved vessels with the necessary detection and alarms to ensure a safe installation.

The gases which are presently considered acceptable are Argonite and Inergen, however the proposed gas must be approved by the Museum's FSA and agreed with the BMD Project Planner and Conservation.

### **3.5 Fire Hydrants**

#### **3.5.1 General**

Fire hydrants shall be installed in accordance with the Museum's Fire Safety Plan. However, requirements should be agreed with Museum's FSA and BMD Project Planner.

#### **3.5.2 Design Requirements**

Underground fire hydrants shall be screw down type to relevant BS standard suitable for a working pressure of 15 bar.

The hydrants shall be designed in accordance with relevant BS.

The pipework shall be designed as follows:-

Underground main – MDPE to relevant BS.

Branch connections to hydrants - Galvanised steel, heavy grade tube to relevant BS  
Screwed fitting to relevant BS or galvanised mechanical joints to relevant BS.

#### **3.5.3 Location**

The location of the underground fire hydrant must be agreed with the Museum's FSA and BMD Project Planner.

### **3.6 Smoke Extract Fans**

#### **3.6.1 General**

The requirement of smoke extract fans is to remove smoke and gases rapidly from the areas served and assist in maintaining smoke-free escape routes.

The design of smoke extract systems must be agreed with Museum's FSA and BMD Project Planner.

#### **3.6.2 Fans**

Fans which are used for smoke extract purposes must meet the Loss Prevention Council approval and shall have test certificates showing the fans meet relevant BS for high temperature operation.

The fans may be roof mounted, in-line axial or bifurcated design.

#### **3.6.3 Controls**

The smoke extract fans should be controlled by the Fire Officer from a designated fire panel at an agreed location.

## **4.0 EXISTING SYSTEMS AND FUTURE STRATEGY**

### **4.1 Existing Sprinkler Systems**

#### **4.1.1 Pumps and Water Storage**

A sprinkler pump house has been completed in year 1999 and is operational.

The pumps consist of 1 No electric pump and 1 No diesel pump for the nominal rating of 2700 l/min at 2 bar pressure and 1350 l/min at 4.4 bar.

An electric jockey pump is installed to maintain the system pressure.

The water storage is provided by two concrete tanks of 80 m<sup>3</sup> minimum water stored capacity each.

#### **4.1.2 Mains Distribution**

A 200m galvanised steel pipe sprinkler main has been installed from the pump room to the northern road area, installed on the building external wall.

A 200 mm galvanised steel branch pipe is connected from the main to serve the Great Court sprinkler system which will be completed in year 2000.

The sprinkler main is presently isolated in the northern road for future extension.

### **4.2 Existing Hosereel System**

#### **4.2.1 Existing Installation**

The present hose reel installation through the Museum provides coverage to limited areas of the Museum.

The hosereels are connected to the fire/domestic water ring main.

Surveys have indicated that domestic water supplies are connected to the hosereels risers and some risers are below the relevant BS requirements of 50 mm minimum bore pipe.

#### **4.2.2 Location of Existing Hosereels**

The location of the existing hosereels are shown on the drawings included in the Museum's 'Firefighting Hose Reel Installation Review' issued in June 1996.

#### **4.2.3 Sector G (Great Court)**

A branch connection from the new sprinkler main on the northern perimeter road supplies the hosereels in Sector G.

### **4.3 Existing Hydrants**

#### **4.3.1 Existing Installation**

The existing hydrants are connected from the fire/domestic water ring main on the outer ring road.

#### **4.3.2 Location of the Existing Hydrants**

The location of the existing hydrants are shown on the water main drawings which show water supply layout within roadways and forecourt.

### **4.4 Future Strategy on Fire Services**

#### **4.4.1 Principles of Fire Services Strategy**

Museum's Fire Safety Plan shows the areas within the Museum which require fire protection. These drawings are included within the Fire Precautions (Building) Harmonisation Document.

The fire protection systems will consist of:-

- Sprinkler systems
- Hosereels systems
- Hydrants
- Dry risers
- Gaseous extinguishing systems.

#### **4.4.2 Fire Services Primary Systems**

The fire services strategy is to provide the following ring mains around the British Museum site.

- Sprinklers ring main
- Hosereels ring main
- Hydrants ring main.

The sprinklers ring main will be supplied from the present sprinkler storage tanks and pumps located in the NE area of the site.

The hosereels ring main will be supplied from a booster pump set connected to the external fire/domestic water main.

The hydrants ring main will be connected to the external fire/domestic water main at the NW and SW areas of the site.

### **4.5 New Sprinklers**

### 4.5.1 Installation Strategy

Museum's Fixed Fire Suppression Report dated Jan 98 indicates the areas throughout the Museum which require wet sprinkler systems.

The principle of installation is:-

- To implement the ring main as soon as possible
- To install the sprinklers in areas with prioritisation Category 1 first to Category 5 as last
- To connect new sprinklers to the existing domestic/fire water main until the new sprinkler ring main is available.

### 4.5.2 Prioritisation Strategy

The recommended prioritisation strategy for the installation of new sprinklers are as follows:-

#### Sprinkler Ring Main Implementation Strategy

Contract Package	Area
1	North Road Ring Mains
2	West Road Ring Mains
3	East Road Ring Mains
4	Links to Forecourt Ring Mains

#### Fixed Fire Suppression Systems Installation Implementation Strategy

Contract Package	Priority Rating (Based on Fire Risk)	Area
1	2a, 2b	Sector E, Level 1
2	2a, 2b, 2c, 4	Sector F, Level 1 and 2 (West)
3	2a, 3	Sector D, Level 1
5	1, 2a	Sector C, Level 1 West
6	2b	Sector A, Level 1
7	2a	Sector C, Level 1 East
8	2a, 2b, 5	Sector B, Level 1
9	3, 4, 5	Sector E, Remaining Floors
10	2a, 2b, 3, 4, 5	Sector F, Remaining Floors
11	4, 5	Sector D, Remaining Floors
12	4, 5	Sector C, Remaining Floors
13	3, 5	Sector B, Remaining Floors
14	5	Sector A, Remaining Floors

**Note: The above priority ratings is currently under review and this review may result in sprinklers in some areas not being necessary. The above table will be**

**amended after the review but in the meantime, if a new project arises, Museum's FSA should be consulted.**

The prioritisation categories are:-

1. Highest contribution to management of consideration criteria
2. Essential contribution to management of consideration criteria
3. Important contribution to management of consideration criteria
4. Requirement subject to Museum definition from a protection of property/content perspective
5. Area use changed/alternative satisfactory fire safety provision made – delete requirement.

#### **4.6 New Hosereels**

##### **4.6.1 Installation Strategy**

Museum's 'Fire fighting hosereels installation review' dated June 1996 indicates the proposed hosereels layout throughout the Museum.

The principle of installation is:-

- To implement the ring main as soon as possible
- To install the hosereels in areas with prioritisation Category 1 first to Category 5 last
- To connect new hosereels to the existing domestic/fire water main, until the new hose reel main is available and 'live'
- To install the hose reel booster pump set as soon as possible to ensure adequate water pressure at each hose reel.

##### **4.6.2 Prioritisation Strategy**

The recommended prioritisation strategy for the installation of new hosereels are as follows:-

##### **Hose Reel Installation Implementation Strategy**

Contract Package	Area	Ring Main Conns.
1	Sector E	2 No.
2	Sector F	6 No.
3	Sector C	4 No.
4	Sector A	1 No.
5	Sector B	5 No.
6	Sector D	2 No.

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### **Hose Reel Ring Main Implementation Strategy**

Contract Package	Area
1	Hose Reel Booster Pump
2	North Road Ring Mains
3	East Road Ring Mains
4	South Road Ring Mains
5	West Road Ring Mains

## **4.7 New Hydrants**

### **4.7.1 Installation Strategy**

The principle of installation is:-

- To implement the new hydrant ring main as soon as possible
- When the new hydrant ring main with new hydrants are complete and 'live', the existing hydrants shall be blanked-off.

### **4.7.2 Prioritisation Strategy**

The recommended prioritisation strategy for the installation of new hydrants are as follows:-

### **Hydrants and Ring Main Implementation Strategy**

Contract Package	Area
2	North Road Ring Mains (including connection to external water main)
3	East Road Ring Mains
4	South Road Ring Mains (including connection to external
5	West Road Ring Mains

## **4.8 Gaseous Fire Extinguishing Systems**

### **4.8.1 Installation Strategy**

Museum's 'Fixed fire Suppression Systems' Report dated January 1998 indicates the areas throughout the Museum which may require Gaseous Fire Extinguishing Systems.

As the gaseous systems are self-contained and do not require external supplies except for the alarm system, which should be connected to the fire alarm panel, therefore there is no prioritisation strategy.

The installation strategy shall be based on the risk criteria.

## **4.9 Change-Over Arrangements**

### **4.9.1 General**

As stated in the previous Clauses 4.1 to 4.8, the fire services in the Museum require extensive upgrading to meet the Fire Safety Plan. New and existing fire services will operate together until the installation strategy is complete.

### **4.9.2 Sprinkler System**

The sprinkler pumps are 'alive' and supply part of the north road ring main as shown on Drawing M000003.

Sector G sprinklers will be complete and 'alive' in Year 2000.

Isolating valves will be installed on branch pipes from the ring main to enable sprinkler systems to be connected in the future.

### **4.9.3 Hosereel System**

Part of the north road sprinkler mains has been installed with a temporary branch connection to Sector G hosereels.

Sector G hosereels will be 'live' in Year 2000.

As the new hose reel main is progressively installed, valves will be provided on the branch connections to enable new hosereels to be connected in the future.

The existing hosereels are connected to the fire/domestic water ring main.

When a section of the hose reel ring main is 'live' the change-over arrangements will be as follows:-

- Existing hosereels disconnected and isolated from the existing branch pipe
- New and replacement hosereels connected to the dedicated hose reel ring main branch pipe
- The existing branch pipe to be removed to a suitable isolating valve



- If domestic water services are connected to the existing fire/domestic water branch pipe, then supplies must be maintained until the new cold water ring main is 'alive'.

A risk analysis should be carried out for the loss of service during the changeover interval.

#### **4.9.4 Hydrants System**

When new sections of the hydrant ring mains are installed, these will include new hydrants.

The existing hydrants are connected to the domestic/fire ring main.

When a section of the new hydrant ring main is 'alive' the existing hydrants will be isolated and removed.

## **APPENDIX A**

### **HEALTH AND SAFETY FILE/OPERATING AND MAINTENANCE MANUALS**

This file shall be compiled as required in CDM Harmonisation Document.

## APPENDIX B

### VALVE NUMBERING PROCEDURE

#### B1 Basic Requirements

Each valve to have a unique number.

- Valve labels to contain minimum information necessary to enable the valve to be identified from a valve schedule
- Valve Schedules to give comprehension information on each valve
- Numbering system to be capable of development to serve future projects
- Valve labels to be readable in cramped/dirty locations
- Valve label to be coloured to easily distinguished service.

#### B2 Pipework

The following pipework services shall be covered by the valve numbering system.

Full Name of Service	Abbreviation to be Used in Drawings	Abbreviations to be Used on Valve Label
Sprinklers	S	S
Hosereels	HR	HR
Dry riser	DR	DR
Gas suppression	GS	GS

#### B3 Valve Labels

Valve labels should give the following information:-

Service

Location of valve

Valve number.

The service should be identified by the abbreviation given in the schedule.

The location valve should preferably be given by the number of the room in which the valve is fitted.

Valves which are not fitted in numbered room should generally be identified by DIS/Level (DIS is the abbreviation for Distribution).

Valves in each room should be numbered sequentially starting at 1. The valve

numbering should not differentiate between manual and motorised valves.

Distribution valves on each level should be numbered sequentially stated at 101. Number 1 to 100 are reserved for existing distribution valves if required.

Drain valves and check valves/non-return valves should not normally be numbered.

Examples of valve label information are given at the end of Appendix B.

Valve labels numbered and letters should be as large as possible and not less than 10mm high.

Valve labels shall be circular (50 mm diameter) and should be attached to the valve by a brass key ring or chain.

Samples of valve labels should be submitted to the Museum for approval.

#### **B4 Valve Schedule**

A valve schedule should be produced for each project. The information given on the valve schedule should be generally as shown on the Example Schedule given at the end of Appendix B.

#### **B5 Information to be Shown on Drawings and Flow Diagrams**

The information on the valve labels shall be shown on record drawings and flow diagrams and on framed copies of flow diagrams mounted in plant room.

#### **B6 Allocation of Valve Numbers**

These use of room numbers as part of the valve identification procedure should make it unnecessary for the Museum to allocate numbers to valves fitted in specific rooms. Where a room contains existing numbered valves, the Designer of new project should refer to the existing valve schedules for the room before numbering valves. The pipework distribution systems will need to be extended and modified through their lives to cater for new projects. To avoid valve numbering errors, the Museum will allocate valve numbers for all distribution systems, based on information provided by the project designers.

#### **B7 Colouring of Valve Labels**

The colours of valve labels should be as follows:-

Service	Label (Colour Reference)	Lettering
Fire service	Red (04E 53)	White

## **B8     Valve Label Example**

## B8. Valve Schedule Examples

Information on Valve Label			Purpose	Type	Location	Reference Drawing	Size mm	Manufacturer	Model No	Comment
Service	Location	No.								
S	C/1/108	1	Isolation of flow to Sprinklers Zone 6	Manual Butterfly Valve	Room C/1/108 Sprinkler Zone 6	M100010	100	Angus	BE 25233	
HR	C/1/108	1	Isolation of Flow to Hosereel	Gate valve	Room C/1/108	M100010 M 100011	25	Angus	T32919	
DR	A/1/038	1	Isolation to dry riser Valve 1	Gate valve	Area A/1/038	M100012	65	Angus	M4534	
		1								

## APPENDIX C

### PREFERRED SUPPLIES

Equipment	Preferred Suppliers				
<b>FIRE SERVICES</b>					
<b>Sprinklers</b>					
Complete sprinkler Installations above £50,000	Matthew Hall	Hayden Young Fire Engineering	Crown House Engineering	Hall Fire Protection	Gordonson Fire Protection
Complete sprinkler Installations above £50,000	Angus Fire Armour	Crown House Engineering	Ellis Tylin	Haden Young Fire Engineering	Matthew Hall
Sprinkler valve sets	Angus Fire Armour				
Sprinkler heads	Angus Fire Armour	Reliable Sprinkler Co	Lansdale - Viking		
<b>Gas suppression Systems</b>	Ginge-Kerr	Hygood	Sure Fire Systems	Wormald	Protec
Hosereels	Chubb Multi-way type				
Manual fire extinguisher Systems	Chubb				

## APPENDIX C

### PREFERRED SUPPLIERS (continued)

Equipment	Preferred Suppliers				
Manual Gaseous Extinguisher	Chubb				
Manual Foam extinguisher systems	Chubb				
Manual Dry powder extinguisher systems	Chubb				
<b>Vaves and Hydrants</b>					
Isolating valves	Angus				
External hydrants	Angus				
Landing valves	Angus				
Dry riser valves	Angus				
Foam inlet valves	Angus				



## APPENDIX C

### PREFERRED SUPPLIERS (continued)

Equipment	Preferred Suppliers				
<b>AUTOMATIC CONTROLS</b>  Controls, BMS system and interface equipment	Trend				
<b>ELECTRICAL EQUIPMENT</b>  Refer to Electrical Infrastructure Harmonisation Document and FAEL Harmonisation Document					

## **APPENDIX D**

### **ROOM DATA SHEETS FOR FIRE SERVICES**

#### **GUIDANCE NOTES**

##### **D1 Introduction**

These Guidance Notes should be read in conjunction with the Mechanical Services Harmonisation Document.

A Room Data Sheet should be prepared for each room in the Project to define the design criteria.

The headings in the Guidance Notes relate to the headings on the Room Data Sheets.

##### **D2 General Information**

- The room dimensions, area and volume are intended to assist the early basic planning stages of the project. A high level of accuracy will not be required

An average room height will generally be adequate

- The daily occupied hours should be standard working hours unless a significant number of people work outside these hours
- If there is a significant difference between the average and peak number of occupants the approximate duration of the peak should be stated.

##### **D3 Approval of Room Data Sheets**

The Room Data Sheets are the basis of the fire services design and the sheets should be approved and signed off by all interested parties.

## ROOM DATA SHEET FOR FIRE SERVICES

Room	Room Data Sheet
Name	RDS Ref
Number of Reference	Issue Date
Sector	Revision
Level	

Length m		Width m		Height m	Area m <sup>2</sup>	Volume m <sup>3</sup>
Daily Occupied Times During Occupied Hours °C				Occupancy Days/Week	Number of Occupants	
Start	Finish	Hours/Day		Average	Peak	
Other General Information:						

Winter Design Temp	Minimum Temp during Unoccupied Hours °C	External Design Temp °C Dry Bulb

## Sprinklers

Number Installed	Type	Type Rating	Location

Sprinkler Control Valve Ref No	Zone Valve Ref No	Risk Classification

## Hosereels

Ref No	Type	No	Location

## Gaseous Fire Suppression Systems

Ref No	Type	Gas Type

## Gas Discharge Heads

No Installed	Type	Gas Volume per Head	Gas Pressure	Location

## Gas System

Valve Ref No	Gas Storage Valve	Location of Gas Storage Vessels

## APPENDIX E

### PIPEWORK AND INSULATION DATA SHEETS

#### E1. Pipework Materials Data Sheet

Services	Range	Tube	Fittings
Fire Services	Up to 50 mm	Black mild steel heavy weight	Screwed fittings
	65 mm to 150 mm	Black mild steel heavy weight	mechanical joints
	150 mm and above	Carbon steel, Seamless heavy	Welded

#### E3. Schedule of Items to be Insulated

- Wet fire services pipework external or in non-heated areas likely to reach frost conditions.

**APPENDIX F - DRAWINGS/SKETCHES**