8.0 Engineering Services

8.1 Engineering Services Distribution Routes

8.1.1 Mechanical Services

The proposal for the Mechanical Engineering Services Distribution is to provide an infrastructure on the site that not only meets the requirements of the Outline Development Control Plan but also allows flexibility for the future.

A base infrastructure shall be provided for all main services that can be extended to meet the changing requirements of the Hospital and Health Care needs without disruption to the normal operation of the site.

Various options have been considered within the development control plan for the distribution of the primary mechanical services.

These options include:

- A complete underground tunnel system around the site linking the Energy Centre to each building
- An above ground service corridor linking the Energy Centre to each building

It is considered however that the existing service tunnel and service spine in the main hospital building provides a suitable ‘backbone’ for the future distribution of the mechanical services.

This is considered to provide the most flexible cost effective solution.

The existing services tunnel running between the Energy Centre and the main building is to be reused as the primary service route for all mechanical services with the exception of Water and Gas which is to be routed within the ground around the perimeter of the site.

From the Tunnel the services shall rise through the vertical builders work duct to roof level to enter the horizontal service spine linking the phase 1 plant rooms.

A new services link is to be provided from the Services Spine through the Phase 1H buildings to the new development sites to the eastern side of the Hospital Site.

Temporary and permanent branches shall be provided from this primary services distribution route to connect to the various existing and new buildings.

Generally in new buildings plant rooms will be located at Basement level with local distribution through designated routes within the car park areas.

8.1.2 Electrical Services

In general, the new route of the new electrical engineering system distribution would be designed to follow the major site wide development dictated within the ODCP. This will encompass the following systems:

- 2 No. electrical medium voltage ring mains
- duct and pit system for voice and data cable infrastructure
- duct and pit system for electrical specialist systems including security system, fire alarm system and cable television, etc.

It is not intended to utilise the existing underground walkway services duct for new cable distribution as there is not sufficient space to accommodate all new electrical cables while the existing services are still in place.

8.2 Expansion Capabilities

8.2.1 Mechanical

All major items of primary plant and service mains shall be sized to cater for the final scheme requirements of the Outline Development Control Plan albeit plant may be installed on a phased basis to suit the work stages.

All primary equipment shall be designed with 25% spare capacity for future expansion.

All plant rooms and service routes within all new buildings shall be provided with space for future expansion.

Where feasible pipe work systems shall be provided with valved and capped branches in suitable locations to allow extension of the system for future development without disrupting operation.

8.2.2 Electrical

Electrical Supply

It is understood that the current capacity of the incoming MV supply cable from the Marrowbow Lane sub station (and the on-site electrical infrastructure) is 6MVA, but the current capacity of the secondary supply cable is unknown. The agreed maximum import capacity from ESB is currently 3.7MVA. From the load profiles, it is noted that the loads across the year is reasonably level due to cooling demands in Summer (Sample site load 18th April midday = 3.6MVA peak). The highest maximum demand is approx. 3.5 MVA of which approx. 1.1MVA is supported by the Hospital’s CHP plant located in the Energy Centre.

From the load assessment, it is estimated that the total revised maximum demand based on the new developments within the ODCP is in the region of 14.5MVA. This figure includes 25% spare capacity for future expansion. With the support of the existing on site 1MW CHP plant, it will require a 13.5MVA electrical supply delivered from the ESB network. The indicative electrical load profile is as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Maximum Demand required from ESB (kVA)</th>
<th>Additional Load due to New Developments (kVA)</th>
<th>Total Revised Electrical Demand from ESB (kVA)</th>
<th>Actual Electrical Load on site (inc 1 MW supported by the CHP Plant) (kVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2500</td>
<td>-</td>
<td>2500</td>
<td>3600</td>
</tr>
<tr>
<td>2011</td>
<td>-</td>
<td>1600</td>
<td>4100</td>
<td>5200</td>
</tr>
<tr>
<td>2016</td>
<td>-</td>
<td>2800</td>
<td>6900</td>
<td>8000</td>
</tr>
<tr>
<td>2021</td>
<td>-</td>
<td>4000</td>
<td>10900</td>
<td>12000</td>
</tr>
<tr>
<td>2026</td>
<td>-</td>
<td>2500</td>
<td>13400</td>
<td>14500</td>
</tr>
<tr>
<td>Beyond 2026</td>
<td>-</td>
<td>&gt;13400</td>
<td>&gt;14500</td>
<td></td>
</tr>
</tbody>
</table>

Based on the above figures, the existing incoming electrical supply and MV electrical infrastructure is not capable to handle the new electrical demand. As a result, it is recommended that a new supply and electrical MV infrastructure be provided to cope with the substantial increase in the electrical demand and future growth. To provide an equivalent level of resilience of the incoming supplies, ESB has been requested to provide 2 no 15MVA supply to the site. ESB has agreed to undertake a Network studies based on the above indicative increased electrical load profile over the next 15-25 years. However, no response has been received from ESB to-date.

It should also be noted that the existing position of a number of sub stations will have an impact on the space planning of the new developments within the ODCP. They will need to be relocated temporarily, wherever required. The car park sub station H1 will be reconnected to one of the new MV ring mains.

Telecommunication

It is understood that although the current telephone exchange system can provide 2200 extensions in total, the capacity of the present telephone cable network is virtually up to its limit. There is no spare capacity
available in the existing cables for any new demands. If any new buildings require telephone facilities, then new telephone cables will need to be installed from the main distribution frame (MDF) in Phase 1C.

It is also understood that the Hospital has planned to install a complete new telephone system in the near future. The new system should take into account the demand of the new developments and future growth within the ODCP.

There is a strategy to integrate the existing telecommunication network into the data network to form a VoIP to enhance the service and capacity of the telecommunication system. The programme of the proposal is approximately 2 years.

It is noted that under the proposal for the IT rationalisation, the existing PABX room might potentially be relocated subject to the confirmation from the IT Specialist. It is considered that there is no consequential effect on the ODCP provided that the new duct and pit system is to be installed at an early stage.

### Data Communication

Fibre cables are generally contained in accessible ducts, but no up-to-date records of the cable routes or details of spare capacity are available. However, as highlighted in the above section, it is understood that an extensive IT rationalisation/upgrade work of the existing data network is to be undertaken shortly. This should take into the extent of the new developments within the ODCP. The specification and drawings prepared by the IT Specialist was planned to be issued to tender in mid June this year. It is envisaged that this project will have an impact on the ODCP. Close co-ordination between the two projects needs to be undertaken at an early stage, e.g. the potential demolition of the IMS building under the ODCP will have a significant cost and phasing implication.

### Security Systems

The diversion of the CCTV cables and new fibre cables for access control systems will be required to suit the locations of the new developments.

Consultation with the security designer is required to ensure there is a sufficient spare capacity within the security systems to meet the security requirements for the new developments.

### 8.3 Technical Flexibility Provision

#### 8.3.1 Mechanical

The works resulting from the Outline Development Control Plan recommendations must be progressed with consideration of the changing Technical Requirements of Health Care delivery and of Legislation and Good Practice.
Outline Development Control Plan

Section 8: Engineering Services

8.5.2 Electrical

Electrical Supply

All new sub stations will generally consist of an MV switchboard, transformer and LV switchboard as existing. This will facilitate full availability and flexibility of the MV or LV supplies in connecting future adjacent buildings into the electrical infrastructure. The sub Stations will be located in the following areas:

- MV Ring Main no 1
  - external area adjacent to Hospital 2 within new Radiation Oncology Centre
  - adjacent to the new Chapel
  (Note: existing sub station H1 will be upgraded and re-connected to the ring main no1.)

- MV Ring main no 2
  - external area adjacent to Site C
  - external area adjacent to Site A
  - external area between Site F2 and A+E

In principle, where future new building requires a heavy electrical demand, a local transformer room will be provided locally within the building. The following buildings/development site will warrant a dedicated transformer room:

- Future expansion area for Site C
- Future expansion area (area between Site A and A+E)
- Site D
- Future expansion area between Site E and Site D
- Site E
- Site B: Radiation Oncology Centre
- Future expansion area where the current Central Pathology Laboratory Building is located

Main LV switchroom will be provided for each building accordingly.

Each new building will incorporate a generator room for a low voltage generator system to provide a standby generation supply, if required.

8.6 Water Storage

The original Strategy at the St James Hospital for Water Storage provides central site storage covering a 24 hour period within the Energy Centre utilising duplicate tanks

Currently one of these tanks has been isolated from the system and the full requirement of the site is met by the remaining operating tank. The disconnected tank is available for use and provides back up for maintenance and emergency usage

The tanks connect to cold water booster pumps within the Energy Centre which feed a boosted cold water Ring Main around the site

Individual connections are taken from the Ring Main to serve daily storage tanks and drinking water requirements within each building

This strategy is considered suitable for the future development of the site

The existing Central Storage Tank Room within the Energy Centre is to be demolished as part of the ODCP Enabling Works to provide the new vehicular access route to the FM Centre

New Cold water storage tanks replacing the existing are to be provided within the Energy Centre in the location of the existing Hopper Building

The new tanks will provide central storage for the future developed site utilising two number tanks each with a central division plate

The storage capacity will be based on the final occupancy of the site

This has currently been assessed on the following basis

<table>
<thead>
<tr>
<th>Storage Capacity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>440,000 litres</td>
<td>Total storage</td>
</tr>
<tr>
<td>900 litres/bed/day</td>
<td>Maximum litres/bed/day</td>
</tr>
<tr>
<td>488 beds</td>
<td>24 hour storage</td>
</tr>
<tr>
<td>1096 beds</td>
<td>12 hour storage</td>
</tr>
<tr>
<td>1464 beds</td>
<td>8 hour storage</td>
</tr>
</tbody>
</table>

This relates to the Central Store of water only, additional storage relating to a minimum of 8 hours storage capacity will be provided within each individual building

The tanks will connect to the existing booster equipment which will be upgraded to suit the requirements of the redeveloped site

8.7 IMT

The existing data servers are located in the IMT building. The building will be demolished under the ODCP. It is proposed that the existing services and facilities including data servers and equipment be relocated to a new FM Centre which is to be located adjacent to the Energy Centre. A comprehensive duct and pit system will be provided for the voice and data infrastructure which will link the new FM Centre to all other developments on the hospital site, wherever required.
8.8 Development Phasing Building Services

8.8.1 Mechanical Engineering Services Works

General

The Existing Mechanical Engineering Services Installations within the St James’s Hospital site are to be Modified, Extended or Renewed in a manner to suit all stages of the Development Phasing within the Development Control Plan

These works shall include the following works

- The disconnection and making safe of all redundant plant and equipment
- The diversion and renewal of the site infrastructure services to suit the proposed development areas
- The provision of new primary plant and equipment to suit the proposals
- The provision of all temporary services required to ensure the continuous operation of occupied parts of the Hospital Site
- The provision of all new services associated to the new Build and Refurbished Buildings

Where existing Services are disconnected and become redundant they must always be removed

At each stage of the development works it is essential that detailed investigation is undertaken into the existence of existing underground engineering services in the vicinity of the development site

Investigation will be undertaken utilising existing Record Drawings and retained information together with detailed survey of the specific site utilising scanning equipment and exploratory investigation

The following sections of this report describe the works to be undertaken at each stage of the Development Control Plan based on Anshen & Allen Drawing Nos. SJH-A-O-Sk0142-P03 to Sk0151-P03

Enabling Decant & Demolition Phase

Works as indicated on Faber Maunsell Drawing Series

47080/EN/SCH/MD1
47080/EN/CW/MD1
47080/EN/G/MD1
47080/EN/MD1

1. Disconnect and make safe the existing Water, Gas, Steam & Condensate and Medical Gas Services to the following Buildings to allow demolition works
   - The Vacant Assembly Building
   - The Laundry Building 47
   - The Medical records Building 23
   - The building being demolished at the end of the Phase 1C Building

2. Provide new Cold Water Storage Tanks located within the Hopper area of the Energy Centre together with associated pipe work and control connections

3. Reroute / Replace existing Boosted Cold Water Ring Main and Incoming Cold Water Main to suit the repositioned Cold water storage Tanks (Note. Existing Cold Water Booster Pumps to be retained in operation)

4. Upon completion the installation of the new water tanks the existing Cold Water Storage Tanks are to be removed allowing the demolition of the existing Tank Room

5. Reroute existing HP Gas Main serving the Energy Centre to avoid the New FM Centre Construction Site

6. Replace 2 no. existing Steam Boilers within the Energy Centre together with associated pipe work connection and controls

7. Service and repair existing Steam & Condensate equipment within the Energy Centre

8. Relocate the existing Foam Inlet serving the Energy Centre to avoid the New FM Centre Construction Site

9. Relocate the existing Oil Fill Point serving the Energy Centre to avoid the New FM Centre Construction Site

10. Provide new Water, Gas, Steam & Condensate Services connections to the New FM Centre Construction Site

11. Reroute/replace the existing MCW ring Main to allow construction of the Temp Decant Building

Phase 1A Construction Stage

Works as indicated on Faber Maunsell Drawing

47080/1A/SCH/MD1
47080/1A/CW/MD1
47080/1A/G/MD1
47080/1A/MD1

1. Provide a new Primary gas meter on the existing LP Gas Main converting local individual building Primary meters to Secondary Meters

2. Provide new Water, Gas, Steam & Condensate Services connections to the New FM Centre Site from the existing site infrastructure

3. Provide Mechanical Services Installations as required to the new FM Centre Development

4. Provide new Water, Gas, Steam & Condensate Services connections to Site H from the existing site infrastructure

5. Provide Mechanical Services Installations as required to the new Site H Development

6. Divert the existing Gas & Cold Water mains in the vicinity of the Research & MRI Building

7. Extend existing Steam & Condensate mains from existing termination point in Spine services duct above the existing Phase 1 Buildings to the Research & MRI Building

8. Provide new Water, Gas, Steam & Condensate Services and Medical Gas connections to the Research & MRI Building

9. Provide Mechanical Services Installations as required to the new Research & MRI Building

10. Provide Mechanical Services Installations as required to the new RC Church Development & On Call Building

11. Extend existing LTHW Heating from the existing Phase 1 H boiler room to serve the new Chapel & On Call Building

12. Provide Mechanical Services Installations as required to the new RC Church Development & On Call Building

13. Provide new Water, Gas, Steam & Condensate Services and Medical Gas connections to the New Temporary Radiotherapy Site from the existing site infrastructure

14. Provide Mechanical Services Installations as required to the New Temporary Radiotherapy Site from the existing site infrastructure

15. Disconnect and remove the existing Mechanical Services Installations within Hospital 1 to allow refurbishment Works

16. Provide New Mechanical Services Installations as required to the Hospital 1 Refurbishment

17. Extend the existing steam and condensate and Cold water main from the site infrastructure to serve the first floor extension to Building 10 & the New Clinical Skills Lab

18. Provide Mechanical Services Installations as required to the New first floor extension to Building 10 & the New Clinical Skills Lab

19. Extend the existing steam and condensate Medical Gases & Cold water main from the site infrastructure to serve the Theatre Expansion

20. Provide Mechanical Services Installations as required to serve the Theatre Expansion

21. Provide new Medical Gas Plant room within the FM Centre for Medical Compressed Air and Nitrous Oxide Systems to replace plant being relocated within Phase 1B

22. Provide new Medical Gas Master Alarm Panel within the FM Centre to replace plant being relocated within Phase 1B. New panel to connect to existing retained Alarm systems and extended to new systems as the development progresses

23. Provide new BMS Central Station within the FM Centre to replace plant being relocated within Phase 1B. The New Central BMS Station to connect to existing retained systems and extended to new systems as the development progresses
Phase 1B Demolition & Decanting

Works as indicated on Faber Maunsell Drawing

Phase 2B Demolition & Decanting

Works as indicated on Faber Maunsell Drawing

Phase 3A Construction

Works as indicated on Faber Maunsell Drawing

1. Strip out services in buildings to be refurbished Building 18 & Ward Block Phase 1G
2. Provide temporary heating connection between Plant Room 49 and Building 7 to allow demolition of Northern end of Building 7
3. Disconnect and remove existing Water, Gas, Steam & Condensate and Medical Gas Services as applicable from the following Buildings
   - Jonathon Swift Clinic Building 5
   - Geriatric Unit Building 6
   - Northern end of Building 7
   - Orthodontic Department Building 14
   - Anaesthetic Dental Clinic Building 15
   - Speech & Language Therapy Unit Building 35
   - Private Clinic Building 39
   - Ambulance Centre Building 43
   - The Temp radiotherapy Unit
   - The Temp On Call Building

Phase 1B Demolition & Decanting

1. Increase the capacity of the existing VIE plant adjacent to the Energy Centre to allow for the future development of the site
2. Upgrade initial sections of the existing Oxygen distribution system for the future development areas and to allow the removal of the existing VIE Plant located adjacent to Building 17
3. Extend the existing oxygen system from it’s current termination point in Phase 1H to serve the ROC Radiotherapy Unit and to connect to the existing retained supplies served by the VIE plant adjacent to Building 17 allowing removal
4. Disconnect and remove the VIE plant adjacent to Building 17
5. Connect New Central Medical Air and Nitrous Oxide Systems within the FM centre into the upgraded system
6. Disconnect and remove existing Medical Gas Installations in Medical Gas Plant Room Building 42 to allow Demolition
7. Disconnect and remove existing BMS Central Station in Technical Services Building to allow Demolition
8. Reroute existing LP Gas Main and Cold Water Main entering the SW corner of the site from Rialto Bridge to avoid the New Construction Site A
9. Disconnect and make safe the existing Water, Gas, Steam & Condensate and Medical Gas Services as applicable to the following Buildings to allow demolition works
   - Admin Planning Office Building 19
   - Dept of Clinical Nutrition Building 20
   - Hope Directorate Building 21
   - Occupational Health Dept Building 24
   - On Call Accommodation Building 25
   - Social Recreation Club Building 28
   - RC Church Building 29
   - Rheumatology Day Centre Building 30
   - General support services Building 31
   - Old Pump Room Building 32
   - Information & Management Services Building 40
   - Technical services Building 41
   - Medical Gases Building 42
   - Materials Management Building 48
   - Recycling Centre Building 50
   - Burns Unit
   - Temp Decant Building

Phase 2A Construction

1. Upgrade Medical Gas pipe work throughout the service tunnel, The main Riser Duct and the Spine duct to suit final Medical Gas requirements
2. Provide new Water, Gas, Steam & Condensate and Medical Gas Services connections to the New Private Hospital Site C from the existing site infrastructure
3. Provide Mechanical Services Installations as required to the new Private Hospital Site C Development
4. Provide new Water, Gas, Steam & Condensate and Medical Gas Services connections to the New Phase 1 ODCP Site A from the existing site infrastructure
5. Provide Mechanical Services Installations as required to the New Phase 1 ODCP Site A Development
6. Provide new Water, Gas, Steam & Condensate and Medical Gas Services connections to the New Phase 1 ODCP Site D from the existing site infrastructure
7. Provide Mechanical Services Installations as required to the New Phase 1 ODCP Site D Development
8. Provide new Water, Gas, Steam & Condensate and Medical Gas Services connections to the New Phase 1 ODCP Site B from the existing site infrastructure
9. Provide Mechanical Services Installations as required to the New Phase 1 ODCP Site B Development
10. Provide new Water, Gas, Steam & Condensate and Medical Gas Services connections to the New Community Bed Unit Development from the existing site infrastructure
11. Provide Mechanical Services Installations as required to the New Community Bed Unit Development
12. Provide new Water, Gas, Steam & Condensate and Medical Gas Services connections to the New Emergency Dept Expansion Development from the existing site infrastructure
13. Provide Mechanical Services Installations as required to the New Emergency Dept Expansion Development
14. Extend new Water, Gas, Steam & Condensate and Medical Gas Services connections from site D to Building 17
15. Disconnect and remove existing Water, Gas, Steam & Condensate and Medical Gas Services connections from Jonathon Swift Clinic and reconnect to new supplies
16. Disconnect and reconnect Jonathon Swift Clinic and reconnect to new supplies

Phase 3A Construction

1. Replace the dismantled Steam Boiler Within the Energy Centre together with it’s associated pipe work connections and controls and bring into operation with the 2 new boilers
2. Replace one of the remaining existing steam boilers together with it’s associated pipe work connections and controls and bring into operation with the 3 other new boilers
3. Remove the remaining existing steam boiler together with it’s associated pipe work connections and controls and bring into operation with the 3 other new boilers
4. Extend Steam & Condensate Mains Site B to connect to existing supplies serving the IBTS Lab, Hospital 2 Building 18, and the Steam manifold Room in the Path Lab
5. Extend Steam & Condensate Mains Site E to connect to Phase 2 ODCP Site E
6. Extend the Steam & Condensate Build to connect to the radiology site to Building 16
7. Disconnect and Remove existing Steam & Condensate serving the Building 16
8. Disconnect and Remove existing Steam & Condensate serving the IBTS Lab, Hospital 2 Building 18, and the Steam...
The provision of all temporary services required to ensure the continuous operation of occupied parts of the Hospital Site

The provision of all new services associated to the new Build and Refurbished Buildings

Section 8: Engineering Services

Phase 3B Demolition & Decanting
Works as indicated on Faber Maunsell Drawing

1. Reroute and replace the existing cold water main in the south east corner of the site
2. Disconnect and remove the existing gas connections to the following buildings:
   - Physiotherapy Department Building 34
   - Hospital 7 Building 27
3. Disconnect and remove the existing medical gases connection to Hospital 7 Building 27
4. Disconnect and remove the existing steam & condensate connection to Hospital 7 Building 27
5. Disconnect and remove the existing steam & condensate connection to Building 5, 27 & 22
6. Disconnect and remove the existing boosted cold water connections to the following buildings:
   - Hospital 7
   - Building 27
   - Physiotherapy Department Building 34
   - Heating Plant Room Building 49

Phase 4A Construction
Works as indicated on Faber Maunsell Drawing

1. Provide new steam & condensate connection to Site F1 and Site F2
2. Reroute existing HP gas around Development Site A
3. Provide new boosted cold water main connection to Site F1 and Site F2
4. Provide new medical gases connection to Site F1 and Site F2
5. Provide new mechanical services installations as required to the new site F1 and Site F2 accommodation

Phase 4B Demolition & Decanting - Future Vision

1. Disconnect and remove existing mechanical services connections to and installation within all existing building being proposed for demolition
2. Provide permanent connection of steam and cond. to site A and remove temp services

Phase 5A Construction - Future Vision

1. Provide new steam & condensate services, boosted cold water main services, gas and medical gases services connections to all future expansion sites as required

8.8.2 Electrical Engineering Services Works

General

The existing electrical engineering services installations within the St. James's Hospital site are to be modified, extended or renewed in a manner to suit all stages of the Development Phasing within the Development Control Plan.

These works shall include the following works:

- The disconnection and making safe of all redundant plant and equipment
- The diversion and renewal of the site infrastructure services to suit the proposed development areas
- The provision of new primary plant and equipment to suit the proposals
- The provision of all temporary services required to ensure the continuous operation of occupied parts of the Hospital Site
- The provision of all new services associated to the new build and refurbished buildings

Where existing Services are disconnected and become redundant they must always be removed

At each stage of the development works it is essential that detailed investigation is undertaken into the existence of existing underground engineering services in the vicinity of the development site

Investigation will be undertaken utilising existing Record Drawings and retained information together with detailed survey of the specific site utilising scanning equipment and exploratory investigation

The following sections of this report describe the works to be undertaken at each stage of the Development Control Plan based on Anshen Allen Drawing Nos. SJK- A-O-Sk0090-P01 to Sk10101-P01. These should be read in conjunction with Faber Maunsell’s relevant drawings.

Enabling Demolition Phase

Refer to Faber Maunsell Drawing No 47080/ED/E01 and 47080/ED/T/E01
- Remove all redundant power, voice, data and all other electrical specialist systems entering the buildings to be demolished
- Relocate existing sub station A2/A4
- Re-provide all outgoing circuits from the sub station A2/A4 accordingly
- Re-route ESB’s no3 incoming supply to sub A2/A4
- Divert underground cables as necessary

Phase 1A - Construction

Refer to Faber Maunsell Drawing No 47080/1A/E/E01, 47080/1A/SCH/E01 and 47080/1A/T/E01
- Apply MIC increase from 3.7MVA to 4.5MVA
- Construct a new electrical sub station compound to accommodate SJH’s new MV switchroom, future transformer room and HV intake room, together with future ESB’s HV room
- Provide power supply to the new developments from the existing network
Outline Development Control Plan

- Provide a new duct and pit system for voice and data systems
- Test and changeover the existing data system from existing to new
- Provide a new duct and pit system for all other electrical specialist systems

Phase 1B - Decanting & Demolition
Refer to Faber Maunsell Drawing No 47080/1B/E/ED01 and 47080/1B/T/ED01
- Remove all redundant power, voice, data and all other electrical specialist systems entering the buildings to be demolished
- Divert any obstructed underground cables as necessary

Phase 2A - Construction
Refer to Faber Maunsell Drawing No 47080/2A/E/ED01, 47080/2A/SCH/ED01 and 47080/2A/T/ED01
- Upgrade ESB’s incoming MV cables
- Provide a temporary supply to live up the new SJH’s MV switchboard
- Provide new MV ring main no 1 and 2 with associated new sub stations
- Provide a dedicated ESB’s MV electrical supply to the Private Hospital from the street
- Extend the new duct and pit system for voice and data systems to serve the new buildings
- Extend the new duct and pit system for all other electrical specialist systems to the new buildings

Phase 2B - Decanting & Demolition
Refer to Faber Maunsell Drawing No 47080/2B/E/ED01 and 47080/2B/T/ED01
- Remove all redundant power, voice, data and all other electrical specialist systems entering the buildings to be demolished
- Divert any obstructed underground cables as necessary

Phase 3A - Construction
Refer to Faber Maunsell Drawing No 47080/3A/E/ED01 and 47080/3A/T/ED01
- Obtain HV supply from ESB
- Provide new SJH’s transformers and HV switchgear/switchboard
- Extend duct and pit systems for electrical specialist systems to the new developments
- Provide electrical engineering systems to the new buildings

Phase 3B - Decanting & Demolition
Refer to Faber Maunsell Drawing No 47080/3B/E/ED01 and 47080/3B/T/ED01
- Remove all redundant power, voice, data and all other electrical specialist systems entering the buildings to be demolished
- Divert any obstructed underground cables as necessary

Phase 4A - Construction
Refer to Faber Maunsell Drawing No 47080/4A/E/ED01 and 47080/4A/T/ED01
- Construct new sub stations
- Connect the new sub stations to the new MV ring Main no 1 and 2 respectively
- Provide electrical engineering systems to the new buildings
- Re-feed any electrical circuits as required

Phase 4B - Decanting & Demolition
Refer to Faber Maunsell Drawing No 47080/4B/E/ED01 and 47080/4B/T/ED01
- Remove the existing MV ring on site
- Remove all redundant power, voice, data and all other electrical specialist systems entering the buildings to be demolished
- Divert any obstructed underground cables as necessary

Phase 5A - Construction
Refer to Faber Maunsell Drawing No 47080/5A/E/ED01 and 47080/5A/T/ED01
- Provide electrical engineering systems to the new buildings
- Re-feed any electrical circuits as required
9.0 Civil and Structural

The following section outlines the civil and structural considerations of the preferred option. The phasing as described in this section is supported by drainage drawing series No. 47080D/01/D/C01. This section is supported by the risk register and infrastructure matrix located in the appendices for further information relating to each site.

9.1 Foul Water Drainage

The proposed principal of the foul water drainage is to make a transition from the current philosophy of draining towards the Drimnagh Sewer to draining towards the proposed pumping station at the southwest side of the site. The pumping station will discharge towards the Grand Canal Sewer approximately 1km to the south of the site.

The main site drainage at the critical phases is shown on drawings 47080/C/01 to 04.

9.2 Surface Water Drainage

The proposed principle of the surface water drainage is to continue to discharge into the Drimnagh Sewer. Additional surface water attenuation can be provided through oversized pipes. Full negotiations with DCC will have to be completed with regards to the required attenuation. DCC have suggested that it may be required for an additional surface water drainage connection to be installed, discharging towards the Camac River. This connection could exit the site to the northeast at the James’s Street entrance.

9.3 Drimnagh Sewer

The Drimnagh Sewer will remain operational for the early phases. During phase 4, the site F buildings span across the sewer. At this stage it should be considered to divert the Drimnagh Sewer to the pumping station. This will enable the unrestricted development of site F.

9.4 General Structural Philosophy

9.4.1 Key Considerations

Key considerations to developing the Civil and Structural Engineering design are:

- Adaptable open spaces
- Provide future flexibility for equipment maintenance and clinical operation
- Adaptation for anticipated future development in clinical practice and treatment methodologies
- Economics for the proposed structural grid
- Robustness and resistance to vibration
- Flexibility for first and second-generation builders’ works in connection with services
- Integration of services
- Buildability to facilitate construction
- Maximise elements suitable for repetitive construction
- Provide a sustainable design and construction solution to minimise the impact on the environment
- Provide a design solution to meet the needs for future development
- Due regard for site conditions including soil strata, groundwater, topography, site constraints, and continued beneficial access to surrounding buildings
- Health, safety and welfare of workforce and patients during construction
- Future maintenance and installation of equipment, plant and building fabric
- Coordinated design solution
- Architectural/Aesthetic qualities
- Repetitive construction

9.4.2 Structural Form

It is recommended that the clinical buildings should be of reinforced concrete flat slab construction.

Flat slab construction is particularly suited to hospital development through the following advantages:

- Simple service distribution
- Vibration performance
- Acoustic performance
- Permits future adaptability
- Considered fast method of construction
- Cost effective
- Inherent fire resistance

9.4.3 Service Distribution

Flat soffits provide straightforward service distribution. Vertical service distribution though riser cores should be positioned with no surrounding concrete stability walls. This will allow services to exit in all directions and enhance the flexibility of future services provision.

9.4.4 Vibration Requirements

Hospitals demand high vibration performance of the structure from the following areas:

- Night wards
- Operating theatres
- Sensitive scanning equipment

Vibration should be placed on ground floors where possible. However, because of the limited building footprints, sensitive equipment will have to be provided on suspended floors. Design of the concrete slab will have to ensure that the stringent vibration requirements are taken into consideration.

Vibration is not readily controlled as it propagates through buildings and it is also almost impossible to predict with any certainty, so vibration control is usually best undertaken at source. There are two basic types of sources of vibration likely to be present within the hospital – controlled sources (such as building services plant and equipment), and uncontrolled sources (such as people and trolley movement).

It is usual to isolate the vibration source rather than treating the receiver. In the case of controlled sources, such as building services systems where the frequency of vibration is readily predicted, vibration isolation can be readily implemented at source. All building services plant will be mounted on appropriate anti-vibration mounts and fixings to prevent these being sources of unwanted vibration. Where appropriate, inertia bases and the resilient fixing of distribution services will also be included to complement these anti-vibration measures.

Sources of uncontrolled vibration, such as people, activities and trolley movements, do not have predictable frequencies of excitation. Consequently, it is far harder to achieve the required standards set down as there are a number of variables to consider.

9.4.5 Structural Grid

Each site is tightly constrained by existing buildings which will largely dictate the footprint shape. The emphasis on the general structural philosophy of the new buildings should be of simplicity and regularity with structural spans between 7 to 8m. This approach leads to a more flexible building suitable for the future development needs of the hospital.

9.4.6 Future Adaptability and Flexibility

Hospital building use is likely to change significantly within the design life of the structure and beyond the period of the ODCP. Two reasons for this are development in medical practices and advances in medical equipment. Changes are likely to require structural modifications. The building should be designed to accommodate specific needs whilst providing the flexibility required for the building to be developed within the overall site strategy.

Each structure should be designed for the following:

- Allowance for future slab penetrations and modified loading regimes
- Potential future vertical expansion
- Potential future horizontal expansion