Brief Notes on Electrical Services and Lighting Systems

1. **Main Supply and Distinction**
   - load assessment:
     - locations and types of loads expected (voltage, frequency, phase)
     - load estimation based on floor area or consumer units
     - major load centres and electrical equipments (identify and focus on them)
     - allow for diversity or future expansion
   - design of distribution substation (transformer Tx room)
     - electricity supply provided by establishing a substation at the building or by direct cables from existing low voltage network
     - location of transformer room(s)
     - design requirements of HEC or CLP have to be satisfied

2. **Low Voltage (L.V.) Distribution**
   - main consumer L.V. switchroom (usu. next to Tx room)
   - L.V. distribution system:
     - for landlord services (e.g. A/C, pumps, lifts, escalators, public lighting)
     - for tenant services (domestic flats, shops & restaurant)
     - distribution methods of rising main:
       - by busbar risers or cables
     - distribution to end-users (final circuit):
       - via electrical wiring
       - metering arrangements
       - provision of distribution boards, circuiting, socket outlet, switches, protection devices (e.g. MCBs and RCBs)
     - earthing & bonding requirements (see Supply Rules)
   - considerations for tenancy fitting-out works after occupation
   - L.V. schematic diagram: shows locations of load centres and distribution methods

3. **Essential (Emergency) Power Supply**
   - assessment of essential loads to be supplied to (e.g. fire services pumps, fireman’s lift, emergency lighting)
   - design of standby emergency generator
     - location, capacity required, operation
     - to comply with FSD’s requirements (see FSD’s COP)

4. **Lighting System**
   - design criteria
     - lighting (illuminance) level in lux for each area of the building
     - selection of luminaries for different usage and applications
   - simple lighting calculations (lumen method)
• lighting (switching) control and lighting circuiting
• emergency lighting (separate circuitry may be required)
• outdoor lighting (e.g. floodlighting and neon lights)
• coordination with architectural and interior design

5. **Other Minor Systems**

• lightning protection system
• telephone services
• TV aerial services
• CCTV, PABX, CABD

6. **Design Considerations**

• relationships with and implications from other Building Services systems
  - electrical design always come after others because it has to obtain ratings and demand of equipment from other services systems
  - coordination of electrical services with other trades and with architectural design
• space requirements: (estimate space required and make adjustments later on)
  - for Tx room and emergency generator
  - for rising main, meter room
  - for distribution boards (in cupboards, in corridor or on walls)
• accessibility of equipment (e.g. access tom Tx room by HEC/CLP personnel)
• estimated costs for electrical services systems and other B.S. systems

**Useful References:**

For electrical supply and distribution system

- Electrical Ordinance (Cap. 406) and its related regulations.
- Supply Rules (from HEC or CLP)
- Guide to Connection of Supply (from HEC)
- Code of Practice 101 - Distribution Substation Design (from CLP)
- IEE Wiring Regulations for Electrical Installations 16th Edition
- FSD’s Code of Practice for Minimum Fire Services Installation and Equipment

For lighting system: