

Minimum specifications guideline for a Greenfield Hyper Scale Data Centre

3000W/m² power density, total of 18MW IT capacity.

STRICTLY CONFIDENTIAL

Fully Revised Version

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GENERAL INFORMATION

1.1 INTRODUCTION

The primary mission of this document is to establish design and operational standards and policies that will provide safeguards and enhanced system availability.

1.2 DOCUMENT PURPOSE

The purpose of this DESIGN STANDARDS document is to define the different criticality classifications of the various DC facilities and provide specific design, and commissioning and operational criteria for such facilities.

1.3 DOCUMENT INTENDED USE

The DESIGN STANDARDS document is intended to be used by internal and external project management administrators, project architects and engineers, as well as facility managers.

This document is to be referenced for specific guidelines, standards and specifications for the design, construction, and commissioning of a New Greenfield Data Centre in Japan.

1.4 DOCUMENT APPLICATIONS

This document pertains to the critical building infrastructure which supports well designed Data Centre spaces.

1.5 DOCUMENT AVAILABILITY

The FULL document is available in from Imtiaz.issadeen@gmail.com . Please email to discuss.

1.6 PROJECT PERFORMANCE STANDARDS

1.6.1 General

The project design team shall confer with the project management team to define the scope of work to be included in the construction documents.

The design team shall prepare construction drawings and specifications that comply with all codes, applicable laws, regulations, ordinances, and requirements of governmental authorities and/or agencies having jurisdiction.

Conflicts that arise between codes, applicable laws, regulations, ordinances and/or requirements of governmental authorities, and/or agencies and these standards shall be directed to project management team for resolution. In general, the design shall accommodate the most stringent requirement.

The design team shall obtain all necessary documents to produce detailed construction drawings and specifications in sufficient clarity to obtain required permits and construct the work.

In addition to standard printed copies, the design team shall provide copies of the construction drawings in AutoCAD, PDF and specifications in Microsoft Word.

1.6.2 Design Services

The design team shall manage, coordinate, and be responsible for the design of the following disciplines:

- Architectural
- Civil
- Structural
- Mechanical
- Plumbing
- Fire Protection
- Public Address system / Emergency PA System
- Electrical
- Data points list for Building Automation, Monitoring and Controls
- Basic BEMS design.

The design team shall provide technical and administrative services during the construction and acceptance testing phases of the work. These services shall be sufficient to ascertain to the design team's satisfaction that the work is being completed in accordance with the design intent.

The construction documents shall include (but not be limited) to the following:

Equipment plans indicating facilities equipment location. The design team shall evaluate layouts and efficiency of the proposed design.

A third party will further evaluate the plans prior to approval.

Scale drawings for the Data Centre Halls, showing possible Hot Aisle Cold Aisle layouts as well as electrical equipment and air conditioning units. These drawings shall include all power outlet locations with a schedule to indicate receptacle types and Ampere ratings.

Reflected ceiling plans shall show light fixtures (including egress and exit lights), speakers, smoke detectors and gas discharge heads.

Finishes schedule will provide full details describing colour and materials for all architectural finishes, wall coverings, floor coverings, wall and floor paints etc.

Mechanical plans showing main building HVAC systems, which are to service the relevant areas, the duct and piping connection points. Where possible flow rates and duct sizes shall be indicated.

All areas that require twenty-four hour operation, such as the DC Hall, UPS room etc. shall be identified

and a brief written description of the proposed system shall be provided. The nominal life span of the equipment is to be recorded.

All exhaust fans, pumps, and operating systems to be installed shall be identified with sequences of operation described in the relevant schedule.

Air conditioning units shall be located and briefly described. Provisions for meeting outdoor air criteria shall be described.

A lighting layout shall be provided showing the location of all light fixtures and indicating lumen levels (average maintained) for each room. The layout shall denote functional fixture types including nightlights, battery backed lights and general purpose lights.

Electrical plans showing electrical distribution required to support the following:

- Super High voltage systems including GIS and VCBs
- Generator Standby Power Systems
- Uninterruptible Power Supply (UPS) Systems
- Maintenance by pass system
- Overload by pass system.
- Building and Energy Monitoring Systems
- Emergency lighting system per Code must have 90 minutes minimum battery run time.
Note Generator time is not to be confused with battery time.
- Emergency exit sign locations.

There shall be NO single point of failure anywhere in this building.

There shall be NO Emergency Power Off (EPO) in this building.

The design team shall be responsible for verifying and quantifying that the main building electrical system has the capacity to support additional electrical/mechanical requirements.

The design must provide for sufficient VCBs cabinets to service additional electrical equipment that may be required during the life of the building. As an assumption, allow 10% extra.

1.7 PROJECT DOCUMENTS

1.7.1 Request for Proposal

Your response to this RFP should be based on the information contained within this document.

1.7.2 Basis of Design

The design team shall be responsible to develop the required documentation.

- Expected levels of redundancy which define from the Tier level

- A definition of the base and spare capacity of the mechanical and electrical systems
- Expected future maintenance requirements
- Specific configuration details pertinent to the project

1.7.3 Standards Conformance and Variance

For each project, a Standards Conformance and Variance Checklist must be submitted to the Project Manager. This checklist is a tool for tracking design conformance and variances in design criteria as established in this document. This document lists the minimum design requirement for each mission-critical facility classification. It is understood that each site will have unique circumstances which may necessitate a variance from the criteria listed in this document.

Due to the possibility of such variances, the Standards Conformance and Variance Checklist provide a means of documenting and substantiating each variance.

A “waiver” is a formal sign-off to acknowledge that criteria that differ to the standards set forth in this document has been used. The document should be based upon this document, with similar format and wording.

1.7.4 Close-Out Documents

At project completion the following documentation will be provided to the Chief Design & Build

- A Basis of Design document (BOD)
- Specific deviations from the original schematic Basis of Design, including any scope changes from the original BOD
- A completed Standards Conformance and Variance document
- A complete set of as-built blueprints
- Portions of the project which were deferred
- Minimum of 75 photos taken by a reputed architectural photographer in print in an Album and in TIFF format on DVD.

DEFINITIONS

2.1 CAPACITY, RATING AND REDUNDANCY

2.1.1 Rating

“Rating” is the performance rating of a piece of equipment as defined by the manufactures nameplate.

2.1.2 Capacity

For the purposes of this document “Capacity” is defined as the defined useable portion of the manufacturer’s nameplate rating of a system defines the “Capacity” of a system to be lower than the system rating to provide a safety margin to handle variations in load expected during normal operation of

a system. Design team shall size all systems based on the capacity values as defined in this standard.

2.1.3 "N" System

An "N" System is the minimum system configuration which will deliver the required system Capacity without redundant components.

2.1.4 "N+1" Redundancy

"N+1" Redundancy is the minimum system configuration which will deliver the required system capacity and includes one (1) spare power conversion device (i.e. pumps, fans, UPS modules, generators). In an N+1 system the energy delivery paths (i.e. pipes, ductwork, wire) shall be redundant or fully looped.

2.1.5 "N x 4" Redundancy

N x 4 Redundancy is when 4 independent UPS units are provided per 1000m² DC Hall of 3000kW IT load. Each UPS will supply power to the racks in the pattern that will be shown during engineering discussions. This is generally known as "**Distributed redundancy**". See sketch on next page.

2.1.6 Other levels of Redundancy

Systems with two (2) spare energy conversion devices shall be defined as N+2 and so on. For all Mission Critical Facilities systems the "+1" component must automatically support the critical load in the event of a redundant component failure. When an ATS or STS is used to provide two power sources, this will be called a Block Redundant UPS configuration.

2.1.7 "2N" Redundancy

"2N" Redundancy (System + System) is a system configured as two (2) "N" systems operating in parallel each with the minimum number of power converters required to deliver the required total system capacity when working singularly.

THE REST OF THIS VALUABLE DOCUMENT HAS BEEN DELETED.

IF YOU WISH TO RECEIVE THE FULL DOCUMENT PLEASE EMAIL ME TO DISCUSS THE MATTER.

THANK YOU

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