KAHRAMAA
كهرماء
المؤسسة العامة القطرية للكهرباء والماء
Qatar General Electricity & Water Corporation

EPP-C1

Electricity Planning Regulations for Supply

Document Control

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EP	Code of Practice	Electricity Planning Regulations for Supply
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1. Purpose

This code of practice gives an overview of the standards, regulations, criteria and conditions governing the acceptance of electricity supply applications. This document outlines for the applicants and consultants the policies that dictate the requirements for the prompt approval of electricity supply applications (whether Building Permits or Minor Service Applications) by the Distribution Planning Section for all cases where the Maximum Demand is below 5MW, and clearly defines the technical information required with the submittals to facilitate the processing of these applications.

2. Scope

This code of practice applies to all electricity supply applications (BPs and MSAs), where the maximum demand load (whether existing and/or proposed) for a plot is below 5MW, during the Planning review undertaken by the Distribution Planning Section. Consultants are required to adhere strictly to this criteria set out in this document during both the building permit application and minor service application stages.

3. Abbreviations, Definition of Terms & Key References

EN	:	Electricity Networks Affairs	KM	:	Kahramaa
EP	:	Electricity Networks Planning Department	BP	:	Building Permit
GIS	:	Electricity Network Database & GIS Section	MD	:	Maximum Demand
EPP	:	Distribution Network Planning Section	MV	:	Medium Voltage (≥1kV - ≤33kV)
CSD	:	Customer Services Department (Kahramaa)	LV	:	Low Voltage (≥25V - <1kV)
EPD	:	Design & Development Section	TX	:	Transformer
CSI	:	Installations Section	VCB	:	Vacuum Circuit Breaker
QCS	:	Qatar Construction Specifications	RMU	:	Ring Main Unit
MSA	:	Minor Service Application	O/D	:	Outdoor
S/STN	:	Substation	I/D	:	Indoor
BOFP	:	Bolt-On Feeder Pillar	RCC	:	Reinforced Cement Concrete
MME	:	Ministry of Municipality and Environment	B/W	:	Boundary Wall
MCCB	:	Moulded Case Circuit Breaker	MIC	:	Mesaieed Industrial City
FSFP	:	Free Standing Feeder Pillar	DID	:	Department of Industrial Development

Term	Description
Infrastructure Area	Large development area that is/was designed and constructed by MME and/or ASHGHAL in coordination with all utilities and includes all services to houses. This area has planning assumptions and design criteria in which applicants should adhere to.

Key References

1. Emiri Decree No. 4 of the year 1997 regarding connection fees of electricity and water supply.
2. Circular No. 10 of the year 2002 regarding connection fees of electric and water supply.
3. Circular No. 2 of the year 2006 regarding the connection fees for the supply of electricity and water to farms and beach houses.(Cancelled- as Circular 4 of year 2009 supersedes Circular No 2 of year 2006)
4. Circular No. 3 of the 2013 for DID areas.
5. Low voltage Electricity & Water Installations Regulations “Electricity Wiring Code 2016” – CS-CSI-P1/C1
6. Distribution Planning Manual (EPD-M1).
7. Guideline to Electricity Supply Approvals - EPP-P5-G2.
8. Chairman’s Circular No. 3 of year 2008 regarding the relocation/shifting of substation or cables from plots.
9. Chairman’s Circular No. 4 of year 2009 regarding connection fees for Electricity & Water supply.

4. Regulations

4.1 General Guidelines

There are two types of applications that may be submitted by customers; Building Permits and Minor Service Applications.

A **Minor Service** application is for cases that do not require a Building Permit from MME and do not involve major construction work within the plot; and is submitted at CSI for one of the following instances:

- Separate Supply
- Relocation of point of supply.
- Addition of load to existing.
- Additional meters.
- Temporary supply.
- Diversion (cables or substations).
- Supply to unplanned areas (i.e. beach/desert houses, farms, etc.).
- Supply to utilities (i.e. water meters, pumping stations, etc.).

A Minor Service application will always require the following:

- The applicant should fill in the application form with the load details, Applicant's name, PIN number, Area and contact details, C/No in case of existing service.
- Type of Service (i.e. upgrade, relocation, temporary supply, etc.).
- Policy plan from MME showing the boundaries of the plot and the PIN number.
- Maximum Demand for commercial and industrial buildings must be provided. Please refer to key reference 4 above.

In the following instances, an MSA will be rejected and the applicant will be advised to submit an electricity BP application instead:

- If the additional requirements are such that the new MD (existing + proposed) for the plot will exceed 700 Amps (or 350 Amps for congested areas) then a substation is required at the plot.
- If there is an existing substation in the plot but the additional MD cannot be met by the existing transformers requiring an additional transformer.
- If the proposed additional MD exceeds 50kW, then the MSA should be rejected unless the application is for additional industrial/agriculture load (i.e. motor load).

For farms: provided that the proposed MD does not require a substation and if there are no new buildings in the farm (verified by CSI), then BP is not required.

A **Building Permit** application will always require the following:

- The Consultant should fill in the application form with the load details, PIN number, Applicant's name, Area, Consultant's contact info/e-mail, date of expected supply and signatures/stamps as appropriate.
- DC-1 site plan including the policy plan approved by MME (special/armed forces project may be exempt from DC-1 stamp).
- Policy plan from MME showing the boundaries of the plot and the PIN number.
- Electrical site plan showing the proposed arrangements and the method of connections.
- Schematic diagram showing the load details and the size and type of the Transformer if required.
- In case of additional loads, the consultant shall provide all existing load details and a copy of any previously approved electricity building permits for the same plot.
- Maximum Demand for commercial and industrial buildings must be provided. Please refer to key reference 4 above.
- It is the consultant's responsibility to show in the submitted drawings the scope of work which will be carried by the applicant or/and the contractor.

- Diversity Factor calculation to conform to Regulation Book (key reference 4 above) requirements.
- TX sizes/ratings (when applicable) are to be in-correlation with the LV panel(s) rating(s).LV panel shall be provided and maintained by customer in all cases.
- In case of revision(s) of approved BP(s), the copy/copies of the approved BP(s) and site plan(s) must be provided.
- A single plot with one PIN number shall not have more than one BP for it, unless the consultant submits a development plan for the whole plot showing the future planning / development and different stages of the project.

The **validity** period for approval of each type of application is defined as follows:

- MSA: is valid for a period not exceeding 12 months from date of approval; which requires the Infrastructure Preparation for Connection Purpose application must be received within the validity period.
- BP: is valid for a period not exceeding 12 months from the "*Expected Date of Completion*" provided by the applicant on the BP form; whereby if the Infrastructure Preparation for Connection Purpose application for the same BP is received after that period the applicant will be required to submit a new BP application.

4.2 Load Criteria

For all applications where the total MD load is below 5MW, the criterion whereby a substation is required by the applicant (TX + Civil) is when the Maximum Demand load of the plot including all buildings (Existing + Proposed) is above:

- 350 Amps (210kW, 247kVA) in the Industrial Area, whereby the applicant will have to provide a site for the substation and construct it.
- 350 Amps (210kW, 247kVA) in the following Areas, whereby the applicant will have to provide a substation part of his building / premises, and construct it due to lack of public substation plots as confirmed by MME. This is applicable for multi-residential such as flats, commercials buildings etc. For load less than 350A (210KW) supply shall be subject to feasibility study and network availability. Otherwise, Customer has to provide substation within his building / premises.

    - Zone 4
    - Zone 6
    - Zone 13
    - Zone 14
    - Zone 15
    - Zone 16
    - Zone 17
    - Zone 22
    - Zone 23
    - Zone 24
    - Zone 25
    - Zone 26
    - Zone 27
    - Zone 30
    - Zone 31
    - Zone 32
    - Zone 34
    - Zone 35
    - Zone 36
    - Zone 37
    - Zone 38
    - Zone 39
    - Zone 40
    - Zone 41
    - Zone 43
    - Zone 44

- Zone 45
- Zone 51
- Zone 53
- Zone 55
- Zone 56
- Zone 70
- Zone 71
- Zone 74
- Zone 90

- 700 Amps (420kW, 494kVA) in the Planned Areas, whereby the applicant will have to provide a site for a substation and construct it. Applicant will have the option to provide Tx or request KM to provide as per circular No 4 of 2009. In case Tx is provided by KM, then the increased connection charges shall be paid by Applicant as per circular No 4 of 2009.The connection shall be through an LV panel, except for cases for independent development in one plot mentioned in Item No.4.6.
- And whenever deemed necessary by Kahramaa.
- Exceptions on the above criteria may be allowed on the following cases subject to feasibility.
    - In cases where a customer has already given a substation for supply to a plot, supply to a second plot owned by him nearby can be given from the same substation up to a load of 700 Amps (subject to feasibility).
    - In cases where a plot has already one existing substation or has a reserved plot for public substation, load up to 700 Amps can be given without insisting on a substation in the plot subject to feasibility.

- Load criteria for standard residential plots shall be max 200A/120KW.

Other requirements:

- **It shall be noted that connection to a load of 400 Amp with an arrangement of 400 Amps size MCCB shall not be proposed nor approved any more. The maximum single connection size shall be for a 350 Amp MCCB rating**.

- In the case of private sub stations, an oil-type TX can be loaded up to 90% of the TX capacity; while a dry-type TX can be loaded up to 95%.It shall be the responsibility of the consultant to ensure that the proposed maximum demand will not exceed this limit.

4.3 Industrial Development Areas

For cases where applicants are allocated plots in industrial development areas such as:

- DID (Department of Industrial Development)
- MIC (Mesaieed Industrial City): the area is owned and administered by the MIC. Industrial Zones ,Special Economic Zones, Logistic Parks & Warehouse Areas managed by Manateq shall be treated as infrastructure schemes where the developer has to design and construct the Network.

In these cases, the location plan (with coordinates) produced by the concerned authority and the site plan stamped from the concerned authority shall be provided along with all the necessary documents for all BP applications in these areas and are considered the same as the policy plan and DC-1 site plan for such cases. The Compound/Tower Agreement (EPP-P5/F8) must be included in the BP submittal for MIC areas only.

All supply schemes within MIC areas owned and administered by MIC(other than Manateq) shall be executed by an EN-approved contractor hired by the applicant, Kahramaa does not execute any works within the boundaries of MIC areas.

For DID area, If BP is approved prior to circular No.4 of 2009 then

- Applicant has to revise and reapply for new BP application in order to cancel old policy and then latest BP application shall be approved under circular No 4/2009.

If applicant didn't apply for new BP application then, he has to pay the cost for material and equipment and pay the connection fees.

For DID area, If BP is approved after circular No.4 of 2009 then,

- All Equipment's and material will be provided by KM and customer will only pay the connection fees as per circular No 4 of 2009.

4.4 Infrastructure Areas (Existing)

In a building permit case for an infrastructure area, the load is to be restricted to the existing MCCB size. No upgrading of service or additional load which will necessitate upgrading of cable or MCCB is allowed**.** These are areas developed by Ashghal/MME in consultation with KM. The following are the infrastructure areas.

- West Bay (Zones 61, 62, 63, 64, 65, 66 & 67)
- Old Airport (Zone 45)
- Al Thumama (Zone- 47 where applicable)

In addition to the above mentioned, any vacant plot with an existing advance service cabinet shall be deemed as infrastructure area and in such cases MD load should be restricted to 120KW/200 A.

***** The list above may be expanded based on MME/ASHGAL advice at anytime without prior notice.

4.5 Non-Planned Areas (Farms, Camel Race, Beach/Desert Houses, etc.)

The following conditions apply for the respective cases:

- In a case of a building permit for a farm, beach house, 'izba', country or desert house, the site plan showing the coordinates of the plot is required along with all other requirements. For these cases**,** connection fees will be as per the provisions of Chairman's Circular No. 4 of 2009.
- In the case of an application for a Camel Race Course, supply will be subject to approval from the camel race committee.
- In the case of new construction in farms, customer shall submit approval from the Ministry of agriculture, Land Ownership Certificate, concerned municipality and DC-1 approval from MME and valid farm possession card along with BP application. In the case of supply to existing facilities in the farm, customer shall apply through minor service application to customer service department.
- Supply to farms up to a maximum demand of 150 kW will be through new pole mounted transformer. For maximum load more than 150 kW, customer shall provide standard type substation. In case of distributed loads above 150 kW in large plots, separate supply through another pole mounted Transformer will be considered only if the supply required is more than 300 meters from the existing or proposed pole mounted transformer.
- In unplanned areas (BP/MSA) shall be approved with the condition that it is subjected to the approval of supply Scheme from other department/ authorities.(MME/MOE etc)

**Note: The connection fee may be changed at anytime without prior notice.*

4.6 Independent Developments in One Plot

In a building permit case where the maximum demand is beyond 700 Amps and the proposal is for totally independent developments (i.e. Residential villas, etc.), the method of connection in this case can be through Electric room / service cabinets, wherever supply through LV panel is not appropriate subjected to Network feasibility. Customer shall pay as per Circular No. 4 of 2009.

4.7 Supply to Compounds

Supply to any development in a compound shall be governed by the provisions of the Chairman's Circular No. 4 of 2009. All works within the compound for providing supply (i.e. construction of substation, excavation for trenches, laying of cables, jointing and termination, backfilling, reinstatement, etc.) shall be arranged by the customer through an approved contractor. This will also include the cable loops between MV switchgear and transformer and transformer to consumer panel. KM shall provide all MV equipment's and MV cables required. The Customer shall arrange for the supply and install of all single cores and LV cables, earth bore and substation earthing, and shall provide hard and soft copies of the routing and layout of all cables inside the compound along with building permit application.

4.8 Substation Requirements

The following requirements are for guidance only and should be considered as the minimum permissible substation sizes. The substation requirements for the different cases are as follows:

In case of buildings:

- The substation location must be inside the building(in line with the external face of the building that facing to the roads)

In case of compounds:

- If the substation is Indoor or Outdoor, the location of the substation to be in line with Boundary wall of the Plot subject that the Elevation of the substation must be matching with that of the main B/W & Building (design, material, color, etc.).
  - with .
  - The load requirements are up to 1600 kVA, the consultant shall propose an Outdoor Substation as per item no. 4.9.1/4.9.2 (in a case where there is no future needs for a 2nd TX, if there is a future need then indoor substation conditions are applied).
  - The load requirements are in the order of 2 TXs, the consultant shall propose an Indoor Substation with MV room for 6 Panels (4 × Feeder VCB + 2 × TX VCB).
  - The load requirements are in the order of 3 TXs, the consultant shall propose an Indoor Substation with MV room for 9 Panels (4 × Feeder VCB + 3 × TX VCB + 1 × Bus section).
  - The load requirements are in the order of 4 TXs, the consultant shall propose an Indoor Substation with MV room for 10 Panels (4 × Feeder VCB + 4 × TX VCB + 1 × Bus section).
  - The load requirements are in the order of 5 TXs, the consultant shall propose an Indoor Substation with MV room for 13 Panels (4 × Feeder VCB + 5 × TX VCB + 2 × Bus section).
  - In case where Indoor type s/stn is required with single transformer, consultant shall propose the required no of MV panels as advised by KM.
  - In the case of a foreseen future load, it is the responsibility of the consultant to ensure that necessary provisions are in place.
  - The distance between the LV room and the TX room shall be such that the length of the single core cables from the TX to the LV panel shall not exceed 10m.
  - The distance from a Remote S/Stn to the MV room shall be such that the cable length shall not exceed 200m. The owner shall provide the inter-trip cable and a 240V UPS if the length of this cable exceeds 75m.
  - All dry type Tx to have LV panel arrangement.

**Note: A Bus-section panel counts for two panels*.

If the proposed Substation is in basement the type of Substation shall be Indoor and the transformer(s) shall be dry type, and it is the responsibility of the consultant to provide all the necessary undertakings. The consultant shall propose an RCC (Reinforced Cement Concrete) trench/tunnel for the incoming Kahramaa MV cables.

If the proposed Substation has a basement underneath the type of Substation may be Indoor or Outdoor and the transformer(s) shall be dry type.

If the TX room is located in the basement, the TX shall be dry type, and it is the responsibility of the consultant to provide all the necessary undertakings. The consultant shall propose RCC trench/tunnel for the incoming Kahramaa MV cables.

In the case of a Bus-Duct from the TX secondary to the LV panel, it is the responsibility of the consultant to provide an undertaking for the supply and replacement (if required); and the TX must be dry-type.

It is the responsibility of the consultant to study safety, fire, noise and electromagnetic hazards from any electrical equipment and installations, and propose suitable measures through a proper design to mitigate such risks.

General points on Substation Ventilations;

Natural Ventilation system can be used for any new cases but for cases where Air conditioning system is proposed, Kahramaa does not have any objection to use air conditioning system .

Proposed A/C system must be linked to central AC system if available. The proposes AC system must be under the responsibility of the client. The client must submit an undertaking letter, stating that delivery, installation, operation and maintenance of the AC system are Client's responsibility.

Note :

A/C system will be accepted only subject to,

- Location of Substation
- Type of protection relays with the Switchgear Panel or the Communication System.

4.9 Civil Requirements

The following requirements are for guidance only and customer shall get the latest civil requirements from KM's civil Section.

4.9.1 O/D Substations – Plot Size < 1000m^2:

In cases where the plot total size is less than 1000 square meters and the substation is inside the proposed building where the proposed TX is an oil type TX where the substation is located in the Ground floor (no basement beneath), the specifications should be as follows:

- The required S/STN consists of :
  - RMU + Oil Type TX.
- RMU Should be placed on RCC Trench (2.4 L * 0.8~1.0 W * 1.5 D) m in parallel with main door of substation, No Plinth is allowed ,RCC floor and cable tunnels to be provided around RMU Trench for equipment and cables entry
- Side Set back of the RMU Place from the nearest wall should be not less than (0.80 m).
- Width of the Place of RMU should be (0.8 m).
- Distance between the RMU Trench and TX plinth should not be less than (1.5 m).
- The width of the TX plinth should be (0.8 m).
- The set back of the TX plinth to the nearest wall should not be less than (1.5 m).
- All the Floors, Trenches & TX plinths top levels should be (+0.70 m from the Road facing the S/STN which is assumed 0 level).
- The bottom level of TX plinth should be at (-0.90 m) minimum from the assumed road 0 level.
- The total length of the plinth should not be less than (3.2 m) for TX plinth, with front set back not less than (0.80 m).
- The orientation of the TX Plinth where having BOFP must be rotated to keep the BOFP facing to the road directly, 80cm set back must be kept between the TX plinth and internal face of opposite wall, **U** shape plinth must be used for delivery purpose.

- Area around TX plinths must be back-filled area covered with aggregate (in case of using Oil Type TX), It can be concrete floor where a trench must be provided with size (0.8m * 1.5m (MV Side) & 0.8 *1.2 (LV side)) (in case of using Dry Type TX).
- The height should not be less than (3.65 m) from the top of the Floor /Plinth.
- A separate door for the RMU beside the designated door for the TX is required.
- The doors' dimensions should be :
    - RMU door dimensions should be (1.5 m × 2.6 m) - Sand Trap Type
    - TX door dimensions should be (2.4 m × 2.6 m) - Sand Trap Type
    - All the doors should be facing the main road.

General Notes:

- Crane and cable access to be available always.
- No services inside substation.
- In case of an LV room the finished floor level to be very smooth and the tolerance not to be more than (±3mm) maximum.
- Consultant (not contractor) to contact Kahramaa Civil Unit before starting the construction of substation with Original Approved Drawings (copies are not accepted) for getting permission from KM to supervise all construction stages of substation , (Form of Consultant Supervision of Construction to be used in this regard- ED-EDC-P6/F1)
- Undertaking of responsibility of the Structural design is to be submitted to KM at BP stage. Please refer to BP application form.
- Elevation drawings to be submitted to KM before starting the construction of the substation.
- Substation rooms' height is (3.65m) minimum.
- Substation levels based on the front road level = +/-0.00.
- LV room details to be designed & checked by the consultant.
- TX Plinth details to be designed & checked by the consultant (if the TX is dry type).
- Elevation of the substation must be matching with that of the main building (design, material, colour, etc.).

4.9.2 O/D Substations – Plot Size > 1000m^2:

In cases where the plot total size is equal to or more than 1000 square meters and the substation is inside the proposed building where the proposed TX is an oil type TX, where the substation is located in the Ground floor (no basement beneath), the specifications should be as follows:

- The required S/STN consists of :
    - RMU + Feeder Switch + Oil Type TX.
- RMU & F.Swt. Should be placed on RCC Trench (3.3 L * 0.8~1.0 W * 1.5 D) m in parallel with main door of substation, No Plinth is allowed ,RCC floor and cable tunnels to be provided around RMU & F.Swt Trench for equipment and cables entry
- Side Set back of the RMU & F.Swt Place from the nearest wall should be not less than (0.80 m).
- Width of the Place of RMU should be (0.8 m).
- Distance between the RMU Place and the Feeder Switch Place should be (0.30 m).
- Width of the Feeders Switch Place should be (0.65 m).
- Distance between the RMU & F.Swt. Trench and TX plinth should not be less than (1.5 m).
- The width of the TX plinth should be (0.8 m).
- The set back of the TX plinth to the nearest wall should not be less than (1.5 m).
- All the Floors, Trenches & TX plinths top levels should be (+0.70 m from the Road facing the S/STN which is assumed 0 level).
- The bottom level of TX plinth should be at (-0.90 m) minimum from the assumed road 0 level
- The total length of the plinth should not be less than (3.2 m) for TX plinth, with front set back not less than (0.80 m).
- The orientation of the TX Plinth where having BOFP must be rotated to keep the BOFP facing to the road directly, 80 cm set back must be kept between the TX plinth and internal face of opposite wall, **U** shape plinth must be used for delivery purpose.

- Area around TX plinths must be back-filled area covered with aggregate (in case of using Oil Type TX), It can be concrete floor where a trench must be provided with size (0.8m * 1.5m (MV Side) & 0.8 *1.2 (LV side)) (in case of using Dry Type TX).
- The height should not be less than (3.65 m) from the top of the Floor /Plinth
- A separate door for the RMU + Feeder Switch beside the designated door for the TX is required.
- The doors dimensions should be:
    - RMU + Feeder Switch door dimensions should be (2.4 m X 2.6 m) - Sand Trap Type
    - TX door dimensions should be (2.4 m x 2.6 m) - Sand Trap Type
    - All the doors should be facing the main road.

General Notes:

- Crane and cable access to be available always.
- No services inside substation.
- In case of an LV room the finished floor level to be very smooth and the tolerance not to be more than (±3mm) maximum.
- Consultant (not contractor) to contact Kahramaa Civil Unit before starting the construction of substation with Original Approved Drawings (copies are not accepted) for getting permission from KM to supervise all construction stages of substation , (Form of Consultant Supervision of Construction to be used in this regard- ED-EDC-P6/F1)
- Undertaking of responsibility of the Structural design is to be submitted to KM at BP stage. Please refer to BP application form.
- Elevation drawings to be submitted to KM before starting the construction of the substation.
- Substation rooms' height is (3.65m) minimum.
- Substation levels based on the front road level = +/-0.00.
- LV room details to be designed & checked by the consultant.
- TX Plinth details to be designed & checked by the consultant (if the TX is dry type).
- Elevation of the substation must be matching with that of the main building (design, material ,color, etc.).

4.9.3 Substation in the Ground Level (I/D) - Load requires more than 1 TX:

- The required S/STN consists of :
  6 MV VCBs + 2 TXs

Medium Voltage Room:

- MV room size is (6.9m * 7.1m), for 6 VCBs and in case of any additional VCBs add (0.8 m) per VCB to the Width.
- MV room height is (3.65m).
- MV room Trench size (1.0m width * 1.8m depth) along the 6.9m (width of the MV. room).
- Setback of the back side of MV trench is (1.5m) minimum.
- MV room floor level is (+0.70m) from the facing road level.
- Two doors must be provided for the MV room (Galvanized steel door – Solid Type). The main door size is (1.5m width * 2.85m high). The 2nd door (escape door) size is (1.0m width * 2.2m high). Both doors must lead to an open area.
- Natural ventilation opening size is (0.5m * 1.2m) Galvanized steel ventilators (sand trap type) at high level, and it could be provided with cooling system.

Transformer Room:

- TX room size depends on number of transformers.
- TX plinth size is (0.8m * 2.1m).
- TX plinth top level is (+0.70m) and the bottom level is (-0.9m) from the road level.
- Setback from the both side of the TX plinth to the nearest wall in parallel with the TX plinth should be not less than (1.5m).
- Setback from the nearest wall (opposite to the TX plinth) should not be less than (0.8m).

- Distance between the two transformer plinths is (1.0m) if they are in one line.
- Distance between the two transformer plinths is (2.6m) if they are in parallel.
- TX rooms must be ceiled rooms, either fixed ceiling or (removable ceiling in case of having FSFP only) with clear height not less than (3.65m).
- The floor of TX room must be back-filled area (in case of using Oil Type TX.), it can be concrete floor where a trench must be provided with size (0.8m * 1.5m (MV Side) & 0.8 *1.2 (LV side)) in case of using Dry Type TX.
- Two doors must be provided for the TX room. The main door size is (1.0m * 2.2m) Galvanized Steel Door – Sand Trap Type - in case of having Removable Ceiling, or Galvanized Steel Door – Sand Trap Type - (2.4m * 2.6m high) in case of having Fixed Ceiling for each TX. The 2nd door must open to the LV room; the size is (1.0m * 2.2m) Galvanized Steel Door – Solid Type. In case of any additional TXs, a separate door for each TX should be provided.

General Notes:

- Crane and cable access to be available always.
- No services inside substation.
- MV room floor finish to be epoxy coated.
- Finished floor level to be very smooth and the tolerance not to be more than (±3mm) maximum.
- Consultant (not contractor) to contact Kahramaa Civil Unit before starting the construction of substation with Original Approved Drawings (copies are not accepted) for getting permission from KM to supervise all construction stages of substation, (Form of Consultant Supervision of Construction to be used in this regard - ED-EDC-P6/F1)
- Substation rooms' height is (3.65m) minimum.
- Undertaking of responsibility of the Structural design is to be submitted to KM at BP stage. Please refer to BP application form.
- Elevation drawings to be submitted to KM before starting the construction of the substation
- Substation levels based on the front road level = +/-0.00.
- LV room details to be designed & checked by the consultant.
- TX room details to be designed & checked by the consultant (if the TX is dry type).
- Elevation of the substation must be matching with that of the main building (design, material , colour, etc.).

4.9.4 Substation above the Ground Level (Transformers only):

- The required S/STN consists of :
  6 MV VCBs + 2 TXs
  Only Remote Transformers are allowed above ground level; the MV room is not allowed above the ground level.

Medium Voltage Room

- MV room size is (6.9m * 7.1m), for 6 VCBs and in case of any additional VCBs add (0.8 m) per VCB to the Width.
- MV room height is (3.65m).
- MV room Trench size (1.0m width * 1.8m depth) along the 6.9m (width of the MV. room).
- Setback of the back side of MV trench is (1.5m) minimum
- MV room floor level is (+0.70m) from the outside area facing to the MV room.
- Two doors must be provided for the MV room (Galvanized steel door – Solid Type). The main door size is (1.5m width * 2.85m high). The 2nd door (escape door) size is (1.0m width * 2.2m high). Both doors must lead to an open area.
- Natural ventilation opening size is (0.5m * 1.2m), Galvanized steel ventilators (sand trap Type) at high level, and it could be provided with cooling system.

Transformer Room:

- As per Kahramaa rules and regulations, any TX to be installed above the Ground level must be Dry Type. It is the responsibility of the consultant to design the TX room while respecting the following:
  - Provide one separate door for each Transformer (2.4m * 2.6m), Galvanized Steel Door – Solid Type.
  - Provide one door from TX Room to LV Room (1.00m *2.2m), Galvanized Steel Door – Solid Type.
  - TX room floor level to be (+0.20m) from outside area facing the TX room.
  - Trench size to be (0.8m * 1.5m (MV Side) & 0.8 *1.2 (LV side)) in the TX room.
  - Clear height to be (3.65m).
- The design of the Transformer Room shall comply with Kahramaa design rules and regulations.

General Notes:

- Crane, equipment and cable access to the substation to be always available.
- No services inside substation.
- MV room floor finish to be epoxy coated.
- Finished floor level to be very smooth and the tolerance not to be more than (±3mm) maximum.
- Consultant (not contractor) to contact Kahramaa Civil Unit before starting the construction of substation with Original Approved Drawings (copies are not accepted) for getting permission from KM to supervise all construction stages of substation , (Form of Consultant Supervision of Construction to be used in this regard- ED-EDC-P6/F1)
- LV room details to be designed & checked by the consultant.
- TX room details to be designed & checked by the consultant.
- Substation rooms' height is (3.65m) minimum.
- Undertaking of responsibility of the Structural design is to be submitted to KM at BP stage. Please refer to BP application form.
- Substation levels based on the level of the area in front of the substation = +/-0.00.
- Substation and transformer rooms must be provided with a cooling and equipped with all necessary handling tools (i.e. cranes, forklift, trolleys, etc.).
- A complete fire hazards study shall be done by consultant whereby the consultant shall propose a suitable firefighting system for the electrical substation and transformers rooms.
- Consultant shall provide "method statement" with the building permit application with a clear drawing showing method of delivery and replacement of the electric equipment's in the substation i.e. transformers and MV switch gears.
- Consultant must provide with the BP application a signed Substation Above Ground Agreement (EPP-P5/F12).
- All Electrical works should be carried out under the supervision and instructions of Kahramaa.

4.9.5 Substation in the Basement Level (I/D):

- The required S/STN consists of :
  6 MV VCBs + 2 TXs

Medium Voltage Room:

- MV room size is (6.9m * 7.1m), for 6 VCBs and in case of any additional VCBs add (0.8 m) per VCB to the Width.
- MV room height is (3.65m).
- MV room Trench size (1.0m width * 1.8m depth) along the 6.9m (width of the MV. room).
- Setback of the back side of MV trench is (1.5m) minimum
- MV room floor level is (+0.2m) from the outside area facing to the MV room.
- Two doors must be provided for the MV room (Galvanized steel door- Solid Type). The main door size is (1.5m width * 2.85m high). The 2nd door (escape door) size is (1.0m width * 2.2m high). Both doors must lead to an open area.

- Natural ventilation opening size is (0.5m * 1.2m), Galvanized steel ventilators (sand trap Type) at high level, and it could be provided with cooling system.

Transformer Room:

- As per Kahramaa rules and regulations, any TX to be installed below the Ground level must be Dry Type. It is the responsibility of the consultant to design the TX room while respecting the following:
  - Provide one separate door for each Transformer (2.4m * 2.6m), Galvanized Steel Door – Solid/Sand Trap Type.
  - Provide one door from TX room to LV room (1.00m * 2.2m), Galvanized Steel Door – Solid Type.
  - TX room floor level to be (+0.20m) from outside area facing the TX room.
  - Trench size to be (0.8m * 1.5m (MV Side) & 0.8 *1.2 (LV side)) in the TX room.
  - Clear height to be (3.65m).
- The design of the Transformer Room shall comply with Kahramaa design rules and regulations.

General Notes:

- Crane, equipment and cable access to the substation must be available always.
- Access hatch (3*3)m to be provided in basement ceiling to ground floor in open to sky area for equipment delivery / replacement purposes , otherwise customer (Client) must submit undertaking letter to propose alternative way for delivery / replacement of equipment under his full responsibility .
- No services inside substation.
- MV room floor finish to be epoxy coated.
- Finished floor level to be very smooth and the tolerance not to be more than (±3mm) maximum.
- Consultant (not contractor) to contact Kahramaa Civil Unit before starting the construction of substation with Original Approved Drawings (copies are not accepted) for getting permission from KM to supervise all construction stages of substation, (Form of Consultant Supervision of Construction to be used in this regard - ED-EDC-P6/F1)
- LV room details to be designed & checked by the consultant.
- TX room details to be designed & checked by the consultant.
- Substation rooms' height is (3.65m) minimum.
- Undertaking of responsibility of the Structural design is to be submitted to KM at BP stage. Please refer to BP application form.
- Substation levels based on the level of the area in front of the substation = +/- 0.00. Substation location should not be below basement level 1.
- Consultant shall provide "method statement" with the building permit application with a clear drawing showing method of delivery and replacement of the electric equipment's in the substation (i.e. transformers and MV switchgear).
- Provide direct access to the MV room from the ground floor through door and staircase with KM locks.
- If natural ventilation is not available substation must be provided with a cooling system
- All S/STN should be equipped with all necessary handling tools (i.e. cranes, forklift, trolleys, etc.).
- A complete fire hazards study shall be done by consultant whereby the consultant shall propose a suitable firefighting system for the electrical substation and transformers rooms.
- Consultant shall provide design concept and statement along with clear drawings for the drainage system design showing effective and complete protection for the substation from water flood.
- Client must submit to KM an undertaking letter for responsibility of (providing, installation, operation & maintenance) of drainage system
- Consultant must provide with the BP application a signed Substation in Basement Agreement (EPP-P5/F13).

- All Electrical works should be carried out under the supervision and instructions of Kahramaa.

4.9.6 General Civil Requirements:

In case of the substation being located inside the building (above, in or below ground level) the Consultant has to undertake the Structural Design responsibility of the substation and to make sure that this design is complying with the approved Architectural drawings, and sign the relevant undertaking on the BP application form.

Client should assign Consultant to supervise all construction stages of substation.

Assigned Consultant must contact Kahramaa Civil Unit before starting the construction of substation with Original Approved Drawings (copies are not accepted) for getting permission from KM to supervise all construction stages of substation. (Form of Consultant Supervision of Construction to be used in this regard), please refer to the form of Consultant Supervision of Construction - ED-EDC-P6/F1)

Cable Trays:

- Cable trays shall comply with the following
  - Made of galvanized steel.
  - Suitable strength and rigidity.
  - Side rails or equivalent structural members.
- Cable trays should not have any sharp edges, burrs or projections that could damage the cables.
- Cable trays shall be corrosion resistance but if not the system should be protected from corrosion.
- Cable trays shall include fitting for changes in direction and election of runs.
- Cable trays should be protected from any physical damage and additional protection should be provided wherever required.
- Cable trays specifications should be in compliance with QCS.

4.10 Network Existing Inside Plots

In some cases an existing electricity network cable(s) is found passing through the plot of a BP, which will be studied as per procedure requiring the information detailed above. The BP shall be approved for procedure purposes provided it meets all Kahramaa requirements and on the condition that the applicant will not start any construction prior to diversion of the cables from plot and written clearance from Kahramaa. It is the responsibility of the consultant to inform the applicant as above. In case of EHV network passing inside the plot, special conditions will apply.

4.11 Safety Requirements

In case of the usage of oil type transformer the following instructions are to be complied with:

- The Transformer Room shall be located where the equipment inside can be naturally ventilated.
- The walls, floors and roof of the TX room shall be constructed of material that has adequate structure strength for the load imposed there on, with a minimum fire resistance of 3 hours; in a case where the TX room is protected by automatic sprinklers, water sprays, Carbon-dioxide or Halon protection system that is approved by Kahramaa.
- The transformer room shall be provided with tight fitting doors that have a minimum fire rating of 3 hours, and 1 hour if the TX is protected with automatic sprinklers, water sprays, Carbon Dioxide or Halon.
- Ventilation opening shall be located as far as possible from doors, fire escape windows and combustible materials. And the area of these shall not be less than (3.00 m^2) per 1000 kVA.
- All cable ducts/opening shall be sealed with fire resistance material.

- Clear emergency escape signs should be installed in the S/STN and must show the escape path. These signs shall be connected to an emergency lighting system inside the building and exit signs must be available from the MV & TX rooms all the way to outside the building.

All the above should be in compliance with QCS standards and specifications.

5. Annexes

Safety requirements for Substations as per Qatar Civil Defense – Loss prevention Design Department.

Loss Prevention Protection as per QCDD Requirements.		Loss Prevention System Distribution Network substations / Date: 22.08.2016
	SUBSTATIONS – Electricity Distribution Networks	Page 4 of 8

Department: Qatar Civil Defence - Loss Prevention Design Department.

Serial No	Type of Substation	Equipment's	Type of structure / Civil Work	Loss Prevention Requirements	Remarks
2.	II - Consumer Distribution Substations				
2.1	Indoor Distribution Substations	V.C.B - O.C.B + Tx. (Oil Type - Dry Type) + F.P + M.V Panel	Substation Building can be Located outside consumer building or inside it (Ground Floor or Basement) , subject to the project type	1- A/G & U/G both MV Panel Room will be protected by FM200 System + 1No's FE (CO2 or Clean Agent, 10LBS). 2- A/G Transformer Room 2No's of FE (Dry Chemical , 10 LBS). 3- U/G Transformer will be protected by FM200 System + 1No's FE (Dry Chemical, 10 LBS) 4- Exit & Safety Signs in Arabic + English Both Formats. 5- All penetrations will be sealed by Fire resistance material 6- Mechanical Sleeves (Fire Rated, Gas sealed & Water Proof) to be provided at all cable entries and exits of wall.	

SUBSTATIONS – Electricity Distribution Networks (Public & Consumers)

Loss Prevention Protection as per QCDD Requirements.		Loss Prevention System
		Distribution Network substations / Date: 22.08.2016
	SUBSTATIONS – Electricity Distribution Networks	Page 5 of 8

Department: **Qatar Civil Defence - Loss Prevention Design Department.**

Serial No	Type of Substation	Equipment's	Type of structure / Civil Work	Loss Prevention Requirements	Remarks
2.2	Outdoor Distribution Substations	Outdoor Switchgears (R.M.U (Oil or SF6) - F. Swt. - Tx. Swt.) + Tx. (Oil Type - Dry Type) + F.P + M.V Panel	Substation Building can be Located outside consumer building or inside it (Ground Floor) , subject to the project type	1- MV Swt. Room will be protected by FM200 System + 1No's FE (Clean Agent or CO2, 10LBS). 2- A/G Transformer Room 2No's of FE (Dry Chemical, 10 LBS) + Fire Alarm System. 3- U/G Transformer will be protected by FM200 System + 1No's FE (Dry Powder, 10 LBS). 4- Exit & Safety Signs in Arabic + English Both Formats 5- All penetrations will be sealed by Fire resistance material 6- Mechanical Sleeves (Fire Rated, Gas sealed & Water Proof) to be provided at all cable entries and exits of wall.	
2.3	Package Substations	R.M.U (Oil or SF6) + Tx. (Oil Type) + F.S.F.P	Substation (Steel Enclosure Only) to be Located outside consumer building , sometimes inside building (Ground Floor) in very limited cases where suitable height should be available (5~6)m	N/A	

SUBSTATIONS – Electricity Distribution Networks (Public & Consumers)

Loss Prevention Protection as per QCDD Requirements.		Loss Prevention System
		Distribution Network substations / Date: 22.08.2016
	SUBSTATIONS – Electricity Distribution Networks	Page 6 of 8

Department: **Qatar Civil Defence - Loss Prevention Design Department.**

Serial No	Type of Substation	Equipment's	Type of structure / Civil Work	Loss Prevention Requirements	Remarks
2.4	Switching Stations	Indoor Switchgears (V.C.B - O.C.B) or Outdoor Switchgears (R.M.U (Oil or SF6))	Substation Building can be Located outside consumer building or inside it (Ground Floor) , subject to the project type	1- MV Swt. Room 2No's of FE (Clean Agent or CO2 , 10LBS) 2- Exit & Safety Signs in Arabic + English Both Formats 3- All penetrations will be sealed by Fire resistance material 4- Mechanical Sleeves (Fire Rated, Gas sealed & Water Proof) to be provided at all cable entries and exits of wall. – Note this point 4 is not applicable the area where cables are entering in substation by sand backfill & underground excavated.	
2.5	Remote Stations (G.M.T)	Ground Mounted Tx. (Oil Type - Dry Type) + F.P + M.V Panel	Substation Building can be Located outside consumer building or inside it (Ground Floor or Basement or High Floor) , subject to the project type	1- A/G Transformer Room 2No's of FE (Dry Chemical, 10 LBS) + Fire Alarm System. 2- U/G Transformer will be protected by FM200 System + 1No's FE (Dry Powder, 10 LBS). 3- Exit & Safety Signs in Arabic + English Both Formats 4- All penetrations will be sealed by Fire resistance material 5- Mechanical Sleeves (Fire Rated, Gas sealed & Water Proof) to be provided at all cable entries and exits of wall.	

SUBSTATIONS – Electricity Distribution Networks (Public & Consumers)

Serial No	Type of Substation	Equipment's	Type of structure / Civil Work	Loss Prevention Requirements	Remarks
2.6	Remote Stations (P.M.T)	Pole Mounted Tx. (Oil Type) 200 Kva	No Civil Building (On Pole Only)	N/A	

Note: All below notes to be revised

1- TXs Capacity can be (500-800-1000-1250-1600) KVa.
2- In consumer substation if Transformer is not part of main building & it's 15meter away from main building then only 2No's of FE (Dry Chemical Type, 10 LBS) and safety signs will be provided, For example Schools etc.
3- 3hr Fire Rate Doors will be installed in b/w two partitions according QCDD requirements.
4- Fire Rated Doors will be provided in FM200 protected rooms according QCDD requirements.
5- With ventilated doors / rooms Fire curtains will be provided in FM200 protected rooms and these curtains will be interlocked with FM200 system.
6- Substations Design specification of Fire Fighting and Fire Alarm Detection system shall be compliance to Qatar Civil Defence.
7- Dry powder fire extinguishers shall be based on potassium bicarbonate – urea complex to comply with AFPA 10.

Abbreviations:

A/G	Above Ground
U/G	Under Ground
B/W	Between
N/A	Not applicable
V.C.B	Vacuum Circuit Breaker
O.C.B	Oil Circuit Breaker
RMU	Ring Main Unit
F.Swt.	Feeder Switch
TX.Swt.	Transformer Switch
TX	Transformer

FP	Feeder Pillar
FSFP	Free Standing Feeder Pillar
BOFP	Bolt On Feeder Pillar
MV	Medium Voltage