GOVERNMENT OF DUBAI

هيئة كهرباء ومياه دبي
Dubai Electricity & Water Authority

Power & Water Planning Division
Power Transmission Planning Department

POWER SUPPLY GUIDELINES FOR MAJOR PROJECTS

(Update – May 2017)

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Our Vision
رؤيتنا

A sustainable innovative world-class utility
مؤسسة مستدامة مُبتكرة على مستوى عالمي

Our Mission
رسالتنا

We are committed to the happiness of our stakeholders and promoting Dubai's vision through the delivery of sustainable electricity and water services at a world-class level of reliability, efficiency and, safety in an environment that nurtures innovation with a competent workforce and effective partnerships; supporting resources sustainability

نلتزم بتحقيق السعادة لكافة المعنيين وتعزيز رؤية دبي من خلال تقديم خدمات مستدامة للكهرباء والمياه بمستوى عالمي من الاعتمادية والكفاءة والسلامة ضمن بيئة محفزة للابتكار بكادر مؤهّل وشراكات فعّالة، داعمين لديمومة الموارد

Our Motto
شعارنا

For Generations to come
لأجيالنا القادمة

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Contents

1. Introduction

To ensure the availability of power, it is essential that the load projections, the time of power requirements and other factors from all the potential developers are available with DEWA well in advance.

The purpose of this document is as follows:

- To provide guidelines to all the major developers and the consultants in regard to the DEWA's power supply requirements.

- To assist the developers and the consultants in understanding the requirements for submissions of project / development Master Plan documents and to facilitate the project / development power supply on time.

2. Power Supply Master Plan Requirements

In order to avail the power supply for any project / development on time, it is necessary to submit and get approved the technical pre-requisites on time as DEWA require lead-time as indicated in Item No. 2.1.11.

2.1 Technical Requirements

The technical requirements that are necessary to be submitted to DEWA for planning any 400/132kV and 132/11kV substations, designing the 11kV Distribution Network and allocating necessary 11kV cables from the 132/11kV substations are listed below:

2.1.1 Location and layout of the development project

Location (with DLTM coordinates) and project layout shall be shown on Dubai Map.

2.1.2 Nature of the project

Description of the project along with type of land use (Residential, Industrial, Commercial, etc.) to be mentioned.

2.1.3 Total Connected Load & Expected Maximum Demand

- Total connected load (along with split up of General & Cooling load) of the project and expected peak demand.
- Realistic power requirement date / phasing.
- Split up details of the load like, Residential, Commercial, Industrial, Cooling, etc.
- Plot-wise details like type of development, total connected load, maximum demand and power requirement date for each plot reflecting respective feeding zones of 132/11kV substations.
- In case ultimate load details are not available, the load requirement up to next 5 years should be submitted.
- Details of the District Cooling Plant loads (size, location and the expected phasing of its commissioning).

2.1.4 Distribution Renewable Resources Generation (DRRG)

For project with DRRG, the submittal shall include DRRG plan (PV Rooftop Solar) which consists of;

- Planned DRRG capacity (kW) per plot and for entire project.

- Expected commissioning dates of PV solar in the project.

For more details, refer to DEWA's DRRG standard issued on DEWA website as shown in below link:

http://www.dewa.gov.ae/images/smartforms/DEWA_Standards_for_Distributed_Renewable_Resources_Generators.pdf

2.1.5 Power Factor

Power Factor is to be maintained at not less than 0.95 and any capacitor bank installation required at customer end (at 11kV level) shall be by the customer at his own cost.

2.1.6 Load Characteristics (quality of voltage, harmonics, flickering, dents, etc.)

- European Standard EN 50160 gives the main characteristics of the supply voltage to be expected at customer load supply terminals. Customers shall ensure that their equipment can adequately operate in accordance with the supply technical characteristics included in this Standard.
- Voltage drop calculation, harmonic study, fault level calculation, etc., to be submitted by the consumer for any dirty load/ private switchgear (refer to Annex-2 (page 12) : Design Requirements & Guidelines for 11kV supply.
- Installation of special equipment and devices if required to maintain the same as per the standards shall be by the consumer at his own cost.

2.1.7 Power Supply Voltage

- Dedicated / shared 132/11kV substation is required for meeting the power supply requirement of any Major Development. Large loads might require 400/132kV source at a voltage level of 400kV. The project developer should allocate plots for the required number of substations and associated corridors for necessary overhead lines/cable circuits.
- 11kV shall be the general distribution voltage.

2.1.8 Substation Plot Sizes

- 400/132kV substation: 200m x 200m
- 132/11kV substation: 50m x 60m
- 11/0.4kV substation: Refer to Distribution Substation Guidelines.

2.1.9 Location of Substation Plot

400/132kV Substation location

- The 400/132kV substation plot should have access to heavy vehicles.
- Enough space/corridors for taking 400kV overhead lines IN/OUT.
- Enough space/corridors for taking 132kV cables IN/OUT.

132/11kV Substation location

- The 132/11kV substation plot shall have access from two major roads or one major road and Sikka (min 7m wide). The longer side to face the road.
- Enough space/corridors for taking 132kV cables IN/OUT.
- Enough space/corridor for taking out 80 numbers of 11kV outgoing cables with proper duct arrangement with minimum 150mm space between the cables.
- Location of 132/11kV substations should be provided at the load centre and close to District Cooling Plants (DCP) if available.
- When a project requires more than one 132/11kV substation, the feeding zone of each substation shall be specified.

2.1.10 Site Plan for 400/132kV and 132/11kV Substation

Approved site plan /affection plan (in the ownership of DEWA) of the substation plot is required from the concerned Zoning Authority. The developer shall confirm, whether the building permit for the substation building will be issued by Dubai Municipality or other Authorities.

2.1.11 Undertaking to Clear Services within the Substation Plot

The developer to submit an undertaking letter to clear / divert all services within the plot allocated for the 132/11 kV substation and the associated 132 kV and 11 kV corridors (if any), well in advance prior to the issuance of the Project Parameter Report (PPR) and also to bear all the associated costs by the developer.

2.1.12 Corridors

400 kV overhead lines

- 50m wide corridor (double circuit tower line).

132 kV underground cables

- 2.5m wide corridor for each 132kV cable circuit.
- Minimum horizontal clearance between 132kV corridor and nearby pressure pipeline (100mm to 450mm Ø) shall be 1m (edge of the pipe to edge of the trough).
- Minimum horizontal clearance between 132kV corridor and nearby pressure pipeline (500mm to 1200mm Ø) shall be 3m (edge of the pipe to edge of the trough).
- Minimum gap of 2m shall be ensured between 132kV corridors and nearest foundation / permanent structure / plot bundary.
- 132kV cable under the dual carriageway is not acceptable. The surface above 132kV corridors shall be either soft landscaped or interlock tiled only.

11 kV underground cable

- Exclusively 11kV corridor of 7m (2x2.5m + 2m gap) width to be provided at two adjacent sides of 132/11kV substations up to the roads.
- Exclusive 11kV corridors of 2.5m width to be provided on both sides of the road around the 132/11kV substations.
- A single stretch of 11kV corridor width should not exceed 2.5m.
- A minimum clearance of 2m to be maintained between 11kV corridors / 132kV and 11kV corridors.
- Dedicated 11kV corridors to be provided from the source 132/11kV substation to the District Cooling Plant (DCP).
- The 11kV corridors under carriageway, median, curbstone and service road are not acceptable. The surface above 11kV corridors shall be either soft landscaped or interlock tiled only.
- Cross-section to be provided for each road section, dedicated 11kV corridors should be available on both sides of road.
- Duct arrangement for each road crossing is to be provided.
- In case of 132/11kV substation away from the road Right–of–Way (ROW), the party shall provide sufficient corridor from the substation boundary to the road.

2.1.13 Policy on Construction of 400kV and 132kV substations.

400/132kV substation

DEWA requires sufficient lead time to construct a 400/132kV substation.

132/11kV substation

Any 132/11kV substation for development projects shall be constructed by the project developer matching their power requirement phasing of the project, through a DEWA approved consultant and contractor. However, DEWA requires adequate lead time for arranging 132kV cables to any new 132kV substations after finalization of load requirements, substation locations, cable corridors and receiving the original affection plan of the plot for the substation in the ownership of DEWA.

2.1.14 Requirement for 11kV Network/Design Approval

- Latest planning of the development (with both hard & soft copy).
- 11kV Substation location, refer to Distribution Substation Guideline for approval of 11kV substations.
- Total connected load, maximum demand and capacity for individual 11kV substation.
- Realistic power requirement date.
- Zone-wise/phase-wise load details with respective 132/11kV substations to be provided if the number of 132/11kV substations is two or more.
- In case of number of 132/11kV substations are more, project loads should be allocated to respective 132/11kV substations for effective network design (Phase wise). Also, the 132/11kV substations need to be planned for commissioning to match the power requirement date of projects.
- District cooling loads (if any) should be located adjacent to the related 132/11kV substation.
- No source metering is allowed (metering equipment to be arranged in the 11kV switchgear room).
- 11kV corridors details for all the roads within the project boundary.
- Approved cross section of all the roads (with 11kV corridor indicated) to be submitted at the time of 11kV network design request.

- Generally, in case of private switchgear, approval for single line diagram should be obtained prior to purchase.
- All the distribution network design requirements and guidelines for 11kV supply shall be strictly followed in line with the latest design guidelines of Distribution Power Division.

3. Backup Power Generators for Major Projects

3.1 As per the order of His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of UAE and Ruler of Dubai, all real estate developers, companies and other relevant stakeholders must install backup generators at major projects in Dubai.

The attached DEWA circular (Refer to Annexure-2) requires the installation of backup power generators in major buildings and landmarks such as tourist, commercial and cultural buildings in Dubai. This is to ensure that they will have necessary power in emergencies for public security and safety reasons, while also ensuring the comfort and well-being of society and the public at large.

The backup power generators should be sufficient to cover lighting, elevators, escalators, automatic doors, surveillance cameras, alarm systems and fire and safety equipments.

These generators must be properly maintained to ensure that they will work when needed in an effective and timely manner, according to best safety practices.

3.2 The real estate developers, companies and other relevant stakeholders shall ensure and provide free access to DEWA mobile generators as appropriate.

3.3 The approval process for the implementation of backup generators for Major Projects, shall be coordinated directly with DEWA Distribution Power Division/ Connection Services Department (at Al Hudeibah office).

4. Coordination and General Requirements

4.1 The main developer shall appoint a reputed consultant to prepare the infrastructure including power supply Master Plan of their Major Project development, in order to avail DEWA approval.

4.2 The developers or their consultants shall submit the documents as listed in Annexure–1 for DEWA review to Power Transmission Planning Department:
Addressed to:

Dr. Nasser Tleis
Vice President – Power Transmission Planning
Dubai Electricity and Water Authority
P O Box – 564, Dubai
Fax: 04 – 3249206

4.3 In order to schedule meetings / discussions in regard to power supply Master Plans for Major Projects, the followings may be contacted :

- **Mr. Mohamed Naceur Marzouki** (Senior Manager-System Planning Tel : 04 322 2900 Email: Mohamed.Naceur@dewa.gov.ae)
- **Mr. Vijayan Ayappan** (Dy. Manager–Planning Coordination Tel : 04 322 2909 Email: Vijayan.Ayappan@dewa.gov.ae)
- **Mr. Ahammed Sadique** (Sr. Engineer – Planning Coordination Tel : 04 322 2904 Email: Ahammed.kuttiadi@dewa.gov.ae)

4.4 The listed documents shall be submitted in three sets of hard copies and 1 set of soft copy (drawings in AutoCad/Microstation & PDF and load details in Ms Excel format).

4.5 The details as mentioned above shall be submitted well in advance to DEWA and got approved to avoid any delay in starting the project.

4.6 Once approved, DEWA expects that the developer will adhere to the plan and any minor changes in the project plan, changes in phasing, etc. shall be informed to DEWA in time and got approved. Changes on works during the execution stage shall not be entertained.

4.7 Any power supply requirement for the project shall be from the 132/11kV substation built for the project. The developer shall phase the developments and accordingly the power requirements matching the commissioning schedule of the source 132/11kV substation for the project.

4.8 During the progress of the Project, bi-annual updated information shall be submitted by the party which shall include:

a. Energized load details till date.

b. 11kV substation approvals under process (not energized).

c. HV Building NOC load applied *(not yet submitted for 11kV substations approval)* less than or more than 5MW.

d. The developer shall issue confirmation on the individual party's loads (who had applied for HV Building NOC) as a part of their Master Plan in terms of magnitude and time. Load under design/approval but not approved for HV Building NOC including the load of project shall be as per the agreement already signed between party and developer.

e. The updated information shall be submitted by the party in area maps indicating plot numbers, power requirement dates and comparison with the original information received as per the approved Master Plan of the project / development.

4.9 DEWA will not be responsible for any delay in commissioning due to any change/ revision of loads, which might result in re-design of 11kV cable circuits.

4.10 After approval of power supply Master Plan, the developer / consultant to submit 6 sets of final / approved power supply Master Plan (hard & soft copy) of the project, for DEWA records.

4.11 The 11kV substations, connected loads, demand loads / diversity factors, locations, networks etc. related to the LV design approval, the relevant drawings, load schedules, single line diagrams etc. shall be uploaded through on-line Getting Electricity application system (www.dewa.gov.ae).

4.12 On approval of power supply Master Plan, the plot owners / consultant may apply for power supply NOC for their plot, through E-Services for "Getting Electricity" on DEWA Website (as per normal practice), along with the main developer's letter confirming the load figures indicated in NOC application are same as that in the approved project Master Plan (Refer Annexure-3, for sample format).

4.13 On finalization of power supply Master Plan for entire or portion (Phase) of any Major Development, the project developer / consultant to approach concerned Zoning Authority as well as DEWA Infrastructure Information & Permits (II&P) Department (at Al Warsan Office) to upload the project landbase in GIS. II&P department's requirements are listed in Annexure-4.

4.14 On finalization of power supply Master Plan for entire or portion (Phase) of any Major Project, the project developer / consultant shall approach DEWA Infrastructure Information & Permits (II&P) Department to upload / update the proposed 132kV & 11kV cable ducts within the project in DEWA GIS conduit layer. Therefore, CSV file (that contain complete ducts information such as location (in DLTM coordinates), project name, no. of ducts, type of ducts etc.) to be submitted to the concerned department. The guidelines and template for the CSV file submission is enclosed *(refer to Annexure-5)*.

4.15 The project developer / consultant to obtain design / construction NOC from DEWA Infrastructure Information & Permits (II&P) Department during infrastructure-design / approval / execution stage.

5. Annexures

5.1 Annexure – 1

List of documents to be submitted

Sr. No.	Documents	Remarks
1	Key Plan showing the location and layout of the project in Dubai Map with co-ordinates.	
2	Power requirements in terms of Total connected load and expected Peak Demand.	
3	Phasing	
4	Nature of Load	
5	Details of District Cooling Loads (location / capacity, power requirement date etc)	
6	Plot-wise loads and power requirement date	Excel sheet and marked in drawing
7	Locations of proposed 132/11kV substation(s)	
8	Locations of proposed 400/132kV substation(s)	
9	400kV corridors details within the project area	
10	132kV corridors details with detailed road cross-sections	
11	11kV corridors details with detailed road cross-sections	
12	11kV ducts arrangements	
13	PV Solar requirements in terms of capacity per plot	

The above documents shall be submitted in form of 3 sets of Hard Copies + 1 Digital Copy

5.2 Annexure-2

DEWA circular regarding backup generators

GOVERNMENT OF DUBAI
حكومة دبي
Dubai Electricity & Water Authority
هيئة كهرباء ومياه دبي

المرجع: ع م / 146 /2017

التاريخ: 2017/4/25

تعميم

إلى المطورين العقاريين والاستشاريين والمقاولين
وكافة الجهات المعنية الأخرى

الموضوع: توفير مولدات كهرباء احتياطية في المباني والمرافق والمنشآت الحيوية ذات الطابع الحضاري والسياحي والتجاري في إمارة دبي

بناء على أمر صاحب السمو الشيخ محمد بن راشد آل مكتوم نائب رئيس الدولة رئيس مجلس الوزراء حاكم إمارة دبي رعاه الله، بإلزام المطورين العقاريين والشركات وكافة الجهات المعنية الأخرى التي تعمل على تنفيذ المشاريع العمرانية الكبرى والمباني والمرافق والمنشآت الحيوية ذات الطابع الحضاري والسياحي والتجاري في إمارة دبي بتوفير مولدات كهرباء إحتياطية في هذه المباني والمرافق والمنشآت لضمان تزويدها بالطاقة الكهربائية اللازمة في الحالات الطارئة لاعتبارات الأمان والسلامة العامة، وتأمين الراحة للمجتمع والجمهور اعتباراً من 25 ابريل 2017.

على أن تكون قدرة هذه المولدات الاحتياطية كافية لتغطية المتطلبات الأساسية بما فيها الإنارة الكافية والمصاعد والسلالم المتحركة والأبواب الأوتوماتيكية وكاميرات المراقبة وأجهزة الإنذار والسلامة ومكافحة الحريق وغيرها، مع التأكد من الصيانة الدورية لضمان عمل هذه المولدات الاحتياطية في الحالات التي تستدعي ذلك بشكل فعّال ووقت مناسب مع مراعاة اشتراطات وإجراءات السلامة.

ولتنفيذ هذا الأمر السامي، يرجى التعاون التام مع هيئة كهرباء ومياه دبي كونها الجهة ذات الاختصاص والمسؤولة عن متابعة هذا الأمر والإشراف على تنفيذه مباشرة.

سعيد محمد الطاير
العضو المنتدب والرئيس التنفيذي

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5.3 Annexure – 3

Main Developer's load confirmation format for HV-NOC approval

Developer Letter Head

Ref: Date :

To,
Dr. Nasser Tleis
Vice President – Power Transmission Planning
Dubai Electricity & Water Authority
P.O Box: 564, Dubai

Sub: Load Confirmation for NOC Ref. ----------

Reference to the NOC ----------, we hereby confirm that the total connected load requirement of ------ MW for the plot No. ---------- by (power requirement date) ---------- is complying with the data mentioned in our latest / approved project Master Plan for ---------- Project.

Further, we confirm the type of development on the above indicated plot is ---------- (industrial / commercial / residential etc.).

For any clarification / details, please contact :

Name : ..... Tel: .....Mobile: .....

With Regards,
For and On behalf of ---------- (developer name)

(Sign. & Stamp)
Authorized signatory name & designation

5.4 Annexure – 4

Infrastructure Information & Permits Department Requirements for updating Major Project Landbase in DEWA GIS

II&P Department requires below listed in order to update Major Project Landbase in DEWA GIS ;

1. Project Layout
2. Parcels / plots along with parcel / plot IDs.
3. DEWA ESS plots with plot IDs.
4. Road Facilities ;

- Road Centre Line
- Right Of Way
- Dividers (Road medians / roundabouts)
- Road Cross-sections
- Approved corridors with clear indications of width from ROW.

Layer features are given below ;

LANDBASE DATA LAYERS			
S.N.	Layer Name	Description	Geometry Type
1	Project Boundary	The entire / phase of the project	Polygon
2	Parcel / plots	The plot boundary as designed / approved by the developer and issued to individual owner.	Polygon
3	DEWA ESS plot	The plots designed/approved by the developer for the purpose of building DEWA 11kV substations	
4	Utility corridor	The area allotted by developer within the ROW for accommodating DEWA utilities.	Polygon
5	Road_centre line	Single Carriageway : A line representing the physical centre of the roadway between road shoulders. Dual Carriageway : A line representing the physical centre of the roadway between road shoulder and median (road divider).	Line
6	Sikka / Alley	Represents a small road between buildings and generally connect two parallel streets / roads (usually less than or equal to 20 ft width)	Line
7	Road_Island	Non-pedestrian islands in the road surface, such as centre island, roundabout etc. that normally contains grass, trees, flowers or other plantations.	Polygon
8	Road_Median	The area which separates opposing lanes of traffic on divided roadways. It is also called as central reservation or divider.	Polygon

9	Right-Of-Way	The land on which the roadway and its associated facilities and appurtenances are located. Highway ROW accommodates the entire roadway (i.e. carriageway and shoulders), as well as adjacent sidewalks and the roadside corridors on which utilities are located.	Polygon
10	Pavements	A path consisting of a paved area on the side of a road for pedestrians, it is also called a sidewalk.	Polygon
11	Building / Property Line	The outline of a building. Distances from the ends and / or sides of the lot beyond which construction may not extend.	Line
12	Parking Space	Vehicle parking lot boundaries	Polygon

Data formats : The format of the data may be any common GIS format such as Shape file, ESRI Geodatabase or a common CAD format such as AutoCAD Drawing File (DWG) or MicroStation Design File (DGN). However, road cross0-sections must be provided in CAD / DGN formats only.

If the Data is unable to provide in ESRI shape file format, below are few guidelines should be followed when preparing CAD / DGN data for submission to DEWA.

Each Feature class (Layer) and / or its sub-types need to be in a separate layer/level in the CAD / DGN file.

- Each CAD layer / level must represent only one class of feature.
- Each text representing information about plot/road/etc and should fit well inside it.
- All data attributes (tabular data) for a corresponding CAD ID will be also be found and documented in an associated MS Excel spreadsheet. A worksheet for each CAD layer will be created. The worksheet should contain the CAD ID (ex: handle which must be unique) and one or more fields that contain the associated attribute data.

Topological Rules :

- Ellipse and Spline shall not be used at all.
- Overlapping, self-intersecting and zero length are not allowed.
- Where two polylines logically join, intersecting features within the same layer these shall be snapped at the point of intersection.
- Lines should run continuously from Point object to Point object. All line features shall be of a continuous line-type, such that each individual line feature (i.e each segment) is only broken at the ends where a node/structure is located.
- Lines should not be broken for the purpose of annotations. Annotation for each layer shall be placed in annotation layers as specified in the template file.
- Straight lines must be represented by only the beginning and ending x- and y-coordinate points. The exception to this is a line where the coordinates differ only in

the z values (ex: developed from multiple traverses on the same bearing). Lines stings must not cross back on themselves or have a zero length (i.e points).

- Polyline features that logically join shall be snapped to each other at the joining ends. This is, no dangles (overshoots and undershoots) are allowed.
- All polyline features shall be created as closed polylines.
- All edges on polygon features must be snapped together at the vertices. Gap in polygon boundaries will not be accepted.
- Polygon features in the same layer cannot overlap each other.
- The completed CAD drawing file should contain text in standard fonts that can be read without third-party software.

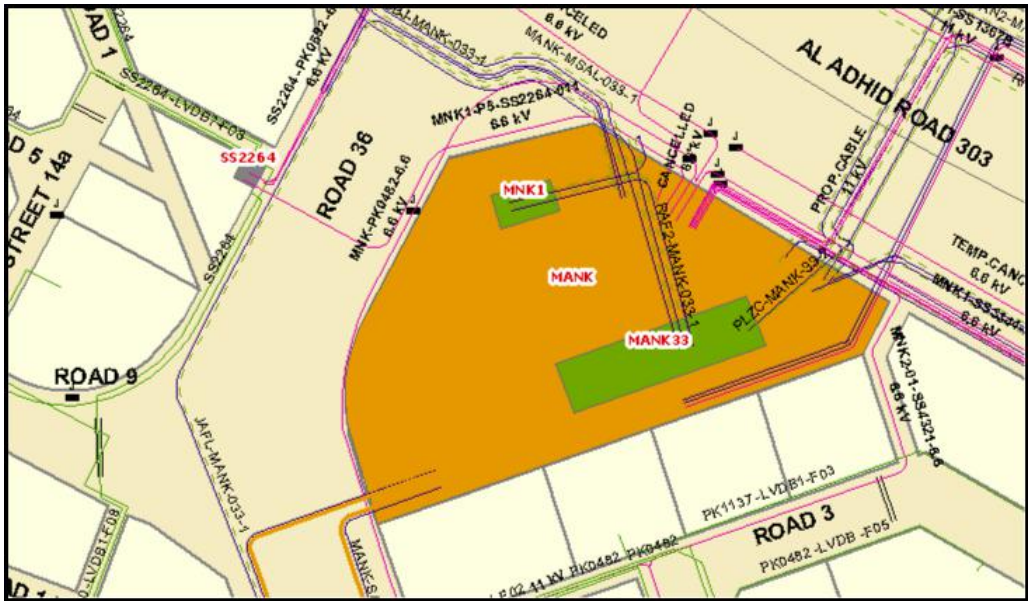
Coordinate System : Features in DEWA GDS compliant files must be represented in real world locations as referenced by Dubai Local Transverse Mercator Projection (DTLM) parameters as given below :

Projection :
Transverse Mercator
Parameters :
Longitude of Origin 55:20:00:00 d:m:s
Latitude of Origin 0:00:00:000 d:m:s
False Easting 500,000.000 m
False Northing 0.000 m
Scale Factor along Longitude of Origin 1.0000
Geodetic Datum: WGS84
Ellipsoid WGS84 (standard parameters)
Equatorial Radius: 6378137.000 m
Polar Radius: 6356752.314 m
Eccentricity: 0.0818191908426215
Flattening: 0.00335281066474746
Flattening Inverse: 298.257223563002
Units and Formats :
Geographic Units: d:m:s
Format: Long/lat. Precision: 4, Positive N,E
Projection Units: m
Format: Easting/Northing Precision: 3
Height Units: m Precision: 3
Geocentric Units: m Precision: 3
Distance Units : m Precision: 3
Angular Units: deg Precision: 6

5.5 Annexure – 5

Infrastructure Information & Permits Department Requirements for updating Proposed Ducts within Major Project Landbase in DEWA GIS

Digital Drawing Submission Requirements
For
Conduit System



Index :

1. Introduction

DEWA requires drawings to be submitted in standardized digital format. This will enable DEWA to process the applications more efficiently. The intent is that the required hardcopy and digital submission be produced from the same digital source without significant modification. ***The hardcopy maps will continue to be the official documents.***

This document describes the standards to be followed when submitting digital drawings to DEWA. Any questions concerning these standards or exceptions to these standards due to special circumstances should be referred to DEWA IT Department for further clarification.

2. General requirements

All digital drawings submitted to DEWA must confirm to the following requirements.

2.1 Documentation

The following documentation is required when submitting digital drawings to DEWA

- Document describing the content of digital data, including project details. Example:

Project Name:	Palm Island
File Name(s):	132kV_ThePalm.shp, 33kV_ThePalm.shp, etc
Date:	July 1, 2004
Company Name:	Contractor LLC
Contact Person:	John Doe
Contact Phone:	+971 50 555 5555
Contact E-mail:	John.Doe@contractor.co.ae
Format:	SHP/DWG2000/DXF/DGNv7
Layers submitted:	Layer1, 2,3,6,23,25,34
Thumbnail images of drawings	

- Digital drawing files (ESRI Shapefiles/DGN/DWG/DXF files)
- Comma Delimited File (CSV) sheet describing attributes of features included in the CAD drawings. This document is not required if digital drawing is submitted in ESRI shapefile format.

All documentation, including drawings, shall be submitted on CD-ROM media only.

2.2 Co-ordinate System

All drawings co-ordinates must be projected using the Dubai Local Transverse Mercator projection (DLTM).

Projection:
Transverse Mercator

Parameters:
Longitude of Origin 55:20:00:00 d:m:s
Latitude of Origin 0:00:00.000 d:m:s
False Easting 500,000.000 m
False Northing 0.000 m
Scale Factor along Longitude of Origin 1.0000
Geodetic Datum: WGS84
Ellipsoid WGS84 (Standard parameters)
Equatorial Radius: 6378137.000 m
Polar Radius: 6356752.314 m
Eccentricity: 0.0818191908426215
Flattening: 0.00335281066474746
Flattening Inverse: 298.257223563002

Units and Formats:
Geographic Units: d:m:s
Format: Long/lat. Precision: 4, Positive N,E
Projection Units: m
Format: Easting/Northing Precision: 3
Height Units: m Precision: 3
Geocentric Units: m Precision: 3
Distance Units: m Precision: 3
Angular Units: deg Precision: 6

2.3 Accuracy of co-ordinates in digital drawings

The accuracy of the co-ordinates submitted to DEWA shall be clearly mentioned on the submitted drawings or in attached documentation.

2.4 Digital drawing format standards

All drawing submitted to DEWA must be delivered in one of the following standardized drawing formats

Preferred drawing format by DEWA
ESRI Shape files (*.shp) are preferred by DEWA
Trial-pit details containing cross-section drawings shall be submitted in any CAD format as specified below.

Other acceptable drawing formats
MicroStation design files (.dgn) up to Version 7
AutoCAD drawing files (.dwg) up to AutoCAD 2000
ASCII, binary and partial drawing interchange files (.dxf) that comply with DXF standards

2.5 Map Orientation

All drawings shall be delivered in a non-rotated orientation (North facing up).

2.6 2D versus 3D drawings

All drawings are to be submitted as two dimensional (2D) graphic files. Three-dimensional Drawings are not acceptable except if specified by DEWA.

3. Digital standards for Electricity Conduit System

The following standards shall be followed when submitting Electricity Conduit System Drawings.

3.1. Requirements for data delivered in ESRI Shape format

The following shape files shall be delivered, whichever are applicable:

FeatureClass (Layername)	Shape (Featuretype)	Subtype	Attributes
Conduit System	Polyline	1-Duct Bank, 2-Trench, 3-Truf	DuctType, NumDuct, Depth, NoOccupied.

Other attributes to be present in all the above-mentioned ESRI shape files:

- Subtype (Containing Subtype value as mentioned in Subtype column)
- State
- Created by (Supplier of drawing)
- Creation Date
- Modified By
- Modification Date
- Consultant / Contractor Name
- Project Name
- Contract number
- Description
- Duct size
- Material
- Number of ducts
- Type of duct
- Remarks (if any)

Subtype, State, Duct Size, Material, Number of Ducts and Type of ducts shall be entered as coded values as listed in appendix 1.

ESRI Shape file templates can be delivered as and when requested for.

3.2. Requirements for data delivered in CAD (DGN/DXF/DWG) format

The following specification shall be applicable for CAD drawings:

3.2.1 General Requirements

- New Conduits should be placed as Lines on Layer 48. Ducts should be labeled with Duct Type and State on the CAD file.
- All new Conduits (Line features) must be clearly distinguishable from existing features by symbology and labels (Existing/New/Proposed).

- For each feature the following spatial data is required: StartPoint, EndPoint and TurningPoints if applicable). Features must have x,y co-ordinates as label text near the respective location on the drawing. These co-ordinates shall be on level 10.
- All drawings delivered to DEWA shall have an attached CSV file containing all features, their X,Y location (StartPoint, EndPoint and TurningPoints) and shall include attributes ***(same attributes as mentioned in 2)*** specified in a tabular form. Sample CSV template available in Appendix 2. Subtype, State, Duct Size, Material, Number of Ducts and Type of ducts shall be entered as coded values as listed in appendix 1
- An additional reference number can be added (if required) to enable relationships between the graphics in CAD and attributes in CSV.
- Trial-pit details containing cross-section drawings shall include XY co-ordinates; direction of cross section view; Z coordinates relative to sea level and ground.

Appendix 1, Specification of coded values for various fields

Subtype

Code	State
1	Duct Bank
2	Trench
3	Turf

State

Code	State
2	Proposed
3	Cancelled
4	In service
5	Approved for Construction
6	Constructed/As laid

Type of Duct

Code	Conduit Nominal Voltage
5	132kV
26	33-11kV
27	LV

Encasement Type

Code	Encasement Type
BF	Back Fill
CCRT	Concrete
UNK	Unknown

Duct Size

Code	Duct Size
2	2”
4	4”
6	6”
12	12”
18	18”
24	24”
30	30”
36	36”
42	42”
48	48”

Duct Number

Code	Actual value	Code	Actual value	Code	Actual value
2	UNKNOWN	14	3x6	41	19
4	1	11	6x4	42	20
5	2	15	10	43	21
6	3	26	2x5	44	22
7	4	27	2x15	45	23
16	16	28	2x24	46	25
17	6	29	2x10	47	26
9	18	30	2x20	48	27
24	5	31	2x25	49	28
25	7	32	2x30	50	29
1	IV(1)	33	2x35	51	30
3	IV(3)	34	2x40	40	4x4
39	IV(39)	35	2x45	21	3x16
12	1x6	36	2x50	19	2x8
8	2x4	23	3x12	20	2x12
13	2x6	22	3x8	37	11
10	3x4	38	13		

Appendix 2, Sample CSV File Template

RefNo	1	2	3
X1	561938.4	500020	500400
Y1	2751476	2785460	2770000
X2	562382.3	500010.1	500600.1
Y2	2751237	2785480	2770100
X3			500030.5
Y3			2770000
X4			500061
Y4			2770080
SubtypeCD	1	1	1
State	2	4	5
Consultant_Name_M	Parsons	Parsons	Parsons

contd…

Contract_number_M	Duct_ size_F	Material	Number _ducts_ F	Type_of _duct_F	No of Ducts Used	Encas ement Type	Remarks
MSD1/419/DM1/022	4	uPVC	8	27		BF	
MSD1/419/DM1/022	12	uPVC	9	5		UNK	
MSD1/419/DM1/022	6	uPVC	10	26		CCRT	