

هيئة كهرباء ومياه دبي  
Dubai Electricity & Water Authority



## DUBAI ELECTRICITY AND WATER AUTHORITY

### GUIDELINES FOR NEW DEVELOPMENT PROJECTS

*UPDATE - 2009*

#### POWER & WATER PLANNING (WATER TRANSMISSION PLANNING)





# DUBAI ELECTRICITY AND WATER AUTHORITY

## GUIDELINES FOR NEW DEVELOPMENT PROJECTS

### CONTENTS AMENDMENT RECORD

This Document has been issued and amended as follows:

Issue	Revision	Description	Date	Signed
1	0		23/3/2008	Amany
1	1	Updated as per DEWA New Organization	08/07/2009	Amany

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# 1 INTRODUCTION

The purpose of this document is to provide guidelines to developers and consultants on submitting project information for DEWA's review and approval. The guidelines are intended to help in understanding DEWA requirements and facilitate the preparation of Master Plans for development projects and related documents.

New development projects need to be carefully studied by DEWA in order to plan for meeting water demands and other system requirements, which may involve building new transmission and distribution networks, or even increasing production capacity.

This document may be updated or amended as may be deemed necessary.

# 2 WATER RESOURCES REQUIREMENTS

Information on large developments with high demands that are likely to require planning for additional water resources (production plants) must be submitted to DEWA at least 5 years prior to anticipated project commissioning date. (Lead time for the construction/development of water production facilities is 5 years).

# 3 STORAGE RESEVOIRS:

(a) Storage for DEWA system

DEWA has a policy to maintain bulk storage of potable water equivalent to two days of system peak demand; the developers for major projects may be requested to provide land for bulk storage within their project, depending on project size.

(b) Customers storages

The local storage for individual premises should be able to cover average demand for at least 24 hours. Provision of adequate on-site water storage facilities should be considered by the developers.

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## 4 PUMPING STATIONS

Developers are required to provide existing and proposed site topography information based on actual survey data in order to establish any pumping requirements. Higher grounds in the water transmission system might require the installation of booster pumping stations for which the standard planning and construction lead time is 2-3 years before commission.

Occasionally, developers and their consultants may be required to consider booster stations to supply water to higher grounds where presence of relatively low pressures would result in inadequate supply within the development.

## 5 TRANSMISSION SYSTEM

DEWA's water system consists of a transmission network where pipe diameters range from 550 mm to 1200 mm, and distribution network where pipe diameters range from 100 mm to 450 mm.

The approved pipe materials currently used by DEWA for the water transmission network are:

- Fibre-cement (FC) pipe CLASS 18 /24 ( subject to DEWA's approval)
- Glass fibre Reinforced Epoxy (GRE)
- All fittings (including bends, tees, reducers and flanges) used with FC and GRE water pipelines shall be of GRE material complying with DEWA's specifications.

Development of water transmission pipeline requires a lead-time of 3-4 years before completion (depending on the line length). Therefore, developers or their consultants are required to submit design details of the internal network in time for DEWA's review and approval.

## 6 DISTRIBUTION SYSTEMS

The Distribution System is planned and developed in parallel with the project's development only within road right-of-ways for which the final designs are approved and levelled accordingly. Lead time for water distribution network development is 2-3 years before commission (depending on the network area coverage).

Developer must submit his internal network design for DEWA's study and approval.

Pipe materials currently adopted are FC & GRE subject to DEWA's approval.

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## **7 SYSTEM MONITORING**

Depending on the nature and size of the project's network, developers may be required to install monitoring devices at main connection locations as per DEWA's specifications.

### **7.1 Bulk Flow Metering**

Bulk flow meters are essential for measurement and flow monitoring within the transmission and distribution systems. Bulk flow meters will be proposed at selected sites as per DEWA's specifications.

### **7.2 Pressure Transmitters**

Pressure gauges and transmitters may be required as per DEWA's specifications to monitor pressures at locations selected by DEWA.

### **7.3 Water Quality Controls**

Analyzer stations consisting of transmitters and sensor assemblies for measuring pH, residual chlorine, conductivity and temperature may be installed at specified location as per DEWA's specifications.

### **7.4 Water SCADA requirements**

DEWA's requirements for integrating the newly developed network of major projects with DEWA's SCADA system should be discussed and approved by DEWA's Projects Dept. / Operation and Maintenance Dept.

## **8 SERVICE CONNECTIONS**

As per DEWA's policy, separate house connection pipes in all premises should be metered. In case of buildings, a main meter is installed on the main inlet pipe before the under-ground storage tank and sub-meters are installed on the roof of the building on the discharge side of the elevated storage tanks. Developers should provide house connections, proposed layouts and materials used for DEWA's approval.

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## 9 WATER DEMAND

As demand and its phasing represent the most crucial element for the whole water transmission network planning process, developers are required to provide timely submission of the following information to DEWA:

1. Reasonably Projected Demand Figures along with yearly phasing up to ultimate build-out, occupancy phasing until 100% is achieved and phasing by percentage of land used.
2. Reasonable Demand Phasing throughout the development planning period. Each planning phase should be represented by commissioning dates rather than construction start dates. For Mega Projects, information for each phase should include the relevant small projects and their demands.
3. There are six major demand categories established for DEWA system:
  - RESIDENTIAL
  - COMMERCIAL
  - GOVERNMENT & PUBLIC PREMISES
  - INDUSTRIAL
  - LABOUR CAMPS
  - DISTRICT COOLING – water not provided by DEWA for new projects

Developers should as reasonably as possible map project demand types with DEWA established demand categories. This is required in order to facilitate incorporating the same into the demand forecast process.

4. Base information and calculations used to determine the water demands such as population, land use and district cooling estimates.
5. DEWA does not supply potable water for:
  - a. Construction purposes (particularly if there is no existing developed network at the project area).
  - b. Water features (lagoons, etc.).
  - c. Irrigation / landscape purposes.
  - d. District cooling water for new projects (in compliance with Executive Order No.27).

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## 10 PEAKING FACTOR

A peaking factor in the range of 1.2 - 1.5 should be used to accommodate for the daily variation in demand. This factor will vary depending on the nature of the development and is driven by the demand categories adopted.

## 11 DEMAND REQUIREMENTS

The following Table outlines general typical ranges of water consumption (rates which may be used as a guide for calculating water demands for development projects. However, the consultant / developer should accurately calculate the demand required with due consideration to the nature of the development project.

CATEGORY	Demand Range (L/Cap. Day)
RES. BUILDINGS	250-400
COMMERCIAL BUILDINGS	60-100
VILLAS	250-400
LABOUR ACCOM./ WORKERS	80-150
RESTAURANT (per meal)	10-15 l/d per meal
MOSQUES	10-60
HOTELS (per room including workers, visitors)	300-500
WORKSHOPS/ MACHINERY	60
SHOPS	60-80
OFFICES	60-80
SCHOOLS	60-80
PUBLIC AMENITIES	10-60
RETAIL	60-80
VISITORS	14-45
MIXED USED (Commercial)	60-80
MIXED USED (Residential)	250-400
ENTERTAINMENT AND LEISURES	60
THEATER	10-60
TOWN CENTER	60-80
MEDICAL (per bed)	60-80
HEADQUARTERS	60-80
UNIVERSITY	60-80
LABORATORY	60-80
MANUFACTURING	60-80
BASED METAL CHEMICAL ZONE	100
LOGISTIC, ACADEMIC & BUSINESS ZONE	60-80
MINERALS	80
NURSERY	60-80
LOCAL PLAZA	60-82
OTHER	60-82
EVENTS	10-60
GUARDHOUSE	60-80
CLUBHOUSE/SWIMMING POOL	100

Source: Standard practises and submitted master plans for major developments.

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## 12 NETWORK DESIGN CRITERIA AND HYDRAULIC MODELING

For every developer network models should be the basis for network design, including pipe sizing, layout, and connectivity.

DEWA's Water Network design criteria are based on previous experience and on recommendations by material manufacturers. The following criteria should be considered by developers during the hydraulic analysis for network design:

- Maximum Pipeline Velocity is 1.0 m/s for Distribution lines & 1.5 m/s for Transmission lines. *[Design velocity for distribution and transmission main should also be specified]*
- Minimum Pressure: 1 Bar at highest point within the developer network.
- Maximum Pressure: 4 Bar *at lowest point within the Transmission network.*
- *A minimum number of connections should be adopted for better network management.* Pressures assumed at connection points should satisfy the design criteria above for the adopted network layout. However, these pressures will be reviewed by DEWA and changes if necessary will be recommended as appropriate, including additional pumping or pressure reduction requirements.
- Zoning and pressure control of the network if applicable should be considered.
- The model demand should correspond to the figures submitted in the demand sheets.
- The developer or their consultant is expected to submit peak hour Network Models for each main phase of the development as applicable.
- Models should be in EPANET or any other compatible software.
- Network Models should be geo-referenced to the actual physical location coordinates using the standard DM coordinate system known as "DLTM".
- If the development expands through major phases, it is required to submit separate models representing each phase.
- DEWA will review the models in contrast with its requirements and planning information, and recommendation for changes will be made accordingly.
- The network layout should consider looping the system wherever possible for better water circulation and system reliability.

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## 13 REQUIRED DOCUMENTS:

Developers or their consultants should submit the following documents for the review of Planning Water Transmission Department.

Addressed to:

Mr. Yousef Jebril.  
Executive Vice President – Power & Water Planning  
P.O. Box 564  
Dubai, U.A.E.  
Fax 04-3249206

- 1 Hard copy of the Location map and layout of the project as well as soft copy in CAD or shapefile format in DLTM coordinate system.
- 2 A Master plan study for the project.
- 3 Project's water demand calculation, total demand phased year wise, plot / zone wise demand - all calculations should be provided in MS Excel (1997-2003) format spreadsheet along with supporting files.
- 4 Land use demand calculations including % of land use types and year wise % of occupancy envisaged by the developer.
- 5 Factors used to calculate Average as well as Peak Demand along with the justification of the factors used.
- 6 Statement of availability of plots / corridors as per DEWA requirements.
- 7 Digital as well as hard copies of internal network design.
- 8 Hydraulic modelling file(s) developed for the network geo-referenced to the actual coordinate system (DLTM)

Upon receipt Water Transmission Planning Approval for submitted water demands and main connections, developers or their consultants should submit the following information to DEWA's water projects Department approval:

Addressed to:

Mr. Branly Nassour.  
Vice President - Water Projects & Engineering  
P.O. Box 564  
Dubai, U.A.E.  
Fax 04-3244922

- 1 Project's demands table as approved by Water Transmission Planning Dept.
- 2 Expected date of connection to DEWA main lines.

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The following is to be observed during the project's network design:

1. For pipes of 450 mm dia. and above, butterfly valves (BFV) should be used & gate valves (GV) should be used for pipes less than 450 mm in diameter. For BFV of 450 mm, chamber > 1.75 meter must be noticed in corridors and depth from F.R.L to the crown of top level 450 mm pipe = 1.50 meter minimum.
2. Road Cross-Sections (Distance = 0.9 to 1.2 from B.L till C.L. of water pipes for distribution, details of DEWA corridor if any & also details of connection with DEWA main lines & corridor for this connection (cross section)
3. Check locations of valves distributed along network to suit operation and Maintenance standards.
4. Space between valves along straight lines should be from 500 to 1000 m, air valves 800 m and wash out valves 1500 m.
5. Provide corridors for pipes in the following order
  - i. 5 meters for 1200 mm & 900 mm pipes
  - ii. 3 meters for 600 mm pipes
  - iii. 1.75 meters for 450 mm pipes
  - iv. 1 meter for less than 450 mm pipes.
6. Valves or fittings should never be placed under carriage way.
7. Water lines shall not be under carriage way or parking areas.
8. Approximate location of the house connections should be shown on the drawings.
9. Clear notice on the drawings saying that air valves locations will be in highest locations (for transmissions lines only) & wash out valves will be in low locations as per site conditions & engineer's decision however, wash out valves should be always shown on drawings at end cap location.
10. BOQ for NOC with related drawings attached as per DEWA standards.