



# DUBAI ELECTRICITY AND WATER AUTHORITY

## GUIDELINES FOR NEW DEVELOPMENT PROJECTS

*UPDATE - 2010*

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





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### WATER TRANSMISSION PLANNING 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 pre DEWA New Organization	02/02/2009	Amany
1	2	Updated for year 2010	13/10/2009	Amany
2	1	Document is separated for guidelines of WTP only and updated for the year 2010.	22/2/2010	Amany

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# 1 INTRODUCTION

The purpose of this document is to provide guidelines to developers and consultants while submitting projects' information for DEWA's Water transmission Planning Department review and approval. The guidelines are intended to help understanding DEWA requirements and facilitate the preparation of development projects' Master Plans and other required documents.

For each new development project, the developer or consultant shall submit to DEWA the estimated water demand planned for the project from its inception through to its completion and full occupancy. This information will be incorporated into DEWA's database for projected water demands. This database is used by DEWA engineers to plan the scope and probable timing of augmentations which will be required to the existing system. Depending on the scope, the additional facilities required will range from an extension of part of an existing distribution network, to a complete transmission and distribution network for a new zone, and to the construction of a new desalination plant that will augment available water resources.

The following subsections provide brief descriptions of the several components of the DEWA water supply system, the lead times required for the commissioning of major facilities, demand categories and typical demand ranges, etc. The final page provides a list of the documents which should accompany a submission for review and study by the Water Transmission Planning Department

This document may be updated or amended as deemed necessary.

# 2 WATER RESOURCES REQUIREMENTS

Major development projects having considerably high water demands that are likely to trigger the requirement of planning for additional water resources (productions plants) should submitted their water demand requirements at least 5 years prior to the anticipated project completion date. (Lead-time for the construction/development of water production facilities is 5 years).

# 3 STORAGE RESEROIRS:

- (a) Storage for DEWA system

DEWA policy is aiming to maintain water system potable water bulk storage equivalent to two days of system's peak demand; on this ground

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developers of major projects may be requested to provide land for bulk storage within their project's area, as required and 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.

## 4 PUMPING STATIONS

Developers are required to provide existing and proposed site topography information, based on actual survey data, to facilitate hydraulic analysis and establish the need for booster pumping. Higher land within the water transmission system might require the installation of a new system booster pumping stations for which the standard planning and construction lead-time is 2-3 years before commissioning of system.

Occasionally, developers and their consultants are requested to consider booster stations while designing for the project's water supply network in order 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 vary from 550 mm to 1200 mm, and distribution network where pipe diameters range vary 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 pipelines requires a lead-time of 3-4 years before completion (depending on the line length). Therefore, developers and their

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consultants should submit projects design details including the internal network design well ahead of 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 commissioning depending on the length and complexity of the proposed network).

Developers must submit their project's internal network design for DEWA's Projects and Engineering Department study and approval. Please refer PE(W) Developer's Guide

Pipe materials currently adopted are either FC or GRE, subject to DEWA's approval.

## **7 SYSTEM MONITORING**

Depending on the nature and size of the project's network, developers may 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 along the transmission and distribution systems. Bulk flow meters shall be proposed at selected locations 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 shall be installed at specified locations as per DEWA's specifications.

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#### 7.4 Water SCADA requirements

- DEWA's requirements for integrating newly developed network for major projects into DEWA's SCADA system should be discussed and agreed by DEWA's Projects Dept. & Operation and Maintenance Dept.

### 8 SERVICE CONNECTIONS

- As per DEWA's policy, separate house connection pipes for each premise should be metered. In case of buildings, a main meter is installed on the main inlet pipe before the underground 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 pipe materials proposed for DEWA's approval.

### 9 WATER DEMAND

As demand and its phasing represent the most crucial element for the whole water transmission network planning process, developers are requested to keep the following list of information available for DEWA's review ahead of time in order to cater for different lead times needed for each type of development:

1. Reasonably Projected Demand Figures along with yearly phasing up to ultimate build-out, occupancy phasing until 100% is achieved and phasing wise percentage of land used.
2. Reasonable Demand Phasing throughout the project's development period. Each phase should be represented by expected occupancy commissioning dates and occupancy saturation date, rather than construction starting and completion dates. For Mega Projects, information for each phase should include similar information on the relevant individual projects and their demands.
3. There are six major demand categories recognized by DEWA Planning system:
  - RESIDENTIAL
  - COMMERCIAL
  - GOVERNMENT & PUBLIC PREMISES
  - INDUSTRIAL

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- LABOUR CAMPS
  - DISTRICT COOLING – water not provided by DEWA for new projects

Developers should map their project demand types, as applicable, using the DEWA established demand categories. This is required 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 demands, etc.
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).

## **10 PEAKING FACTOR**

A peaking factor in the range of 1.2 - 1.5 should be used while designing for the network in order to accommodate the daily variation in demand. This factor varies depending on the nature of the development and derived by the demand categories adopted.

## **11 DEMAND REQUIREMENTS**

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

DEWA's Reference for Demand Categories

CATEGORY	Demand Range (L/Cap. Day)
RESIDENTIAL BUILDINGS	250-400
COMMERCIAL BUILDINGS	60-100
VILLAS	250-400
LABOUR ACCOMMODATION / 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 & LEISURE'S	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 & 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 network material manufacturers. The following criteria should be considered by developers during their network design:

- Maximum applied 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 expected Pressure is @ 1.0 Bar at highest point within the developer (distribution) network.
- Maximum Pressure is @ 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 network pressure control as applicable should be considered in the design.
- Hydraulic Model demands should correspond to the Demand figures submitted in the demand calculation sheets.
- The developer or their consultant should submit peak hour Network Models for each main phase of the development as applicable.
- Models should be created using DEWA's adopted software or any EPANET compatible software.
- Network Models should be geo-referenced to the actual physical Geographic location's 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. As well as one overall network model as appropriate.
- DEWA will review the models in contrast with its requirements and planning information, and as required, recommendations for changes will be made accordingly.
- The network design 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 and study 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 Coloured Hard copy of the Location map and layout of the project as well as soft copy in CAD or GIS system shapefile format in DLTM coordinate system.
- 2 The complete Master Plan study for the project.
- 3 Project's water demand calculation sheets, year wise phased total demand, plot / zone or phase wise demands “ all calculations should be provided in MS Excel (1997-2003) spreadsheet format including all formulas used along with supporting data files”.
- 4 Land use wise demand calculations including percentage of land use types and year wise percentage of occupancy envisaged by the developer.
- 5 Factors used to calculate Average as well as Peak Demands along with justification of the same.
- 6 Availability Statements for plots / corridors required by the development as per DEWA requirements.
- 7 Digital as well as hard copies of internal network design indicating proposed take off points and expected pressure at each of them.
- 8 All Hydraulic modelling file(s) developed for the network study geo-referenced to the actual coordinate system (DLTM)
- 9 Updated submittals for the above-mentioned documents are required in case of any changes in the demand requirements or network design.

Upon receipt of Water Transmission Planning Approval for submitted water demands and main connections, developers or their consultants should submit application for network design approval to DEWA's Water Projects Department “please refer to PE (W) Guidelines”.