

WATER TRANSMISSION PLANNING GUIDELINES FOR DEVELOPMENT PROJECTS

(2018 UPDATE)



POWER & WATER PLANNING DIVISION
WATER TRANSMISSION PLANNING DEPARTMENT



DUBAI ELECTRICITY AND WATER AUTHORITY

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	First Issue	23/03/2008	Amany
1	1	Updated as pre DEWA New Organization	02/02/2009	Amany
1	2	Updated for year 2010	13/10/2009	Amany
2	0	Document is separated for guidelines of WTP only and updated for the year 2010.	22/2/2010	Amany
2	1	Categorized demand updated	27/2/2011	Amany
2	2	Distribution System (Section 6), Demand Requirements (Section 11) updated and (section 9) sustainability statement added.	28/10/2013	WSP
3	0	Several enhance on the document, inclusion of DEWA's vision and mission.	08/06/2015	WSP
4	0	Document Enhancement	16/06/2016	WSP
5	0	Updated demand per capita consumption rates, list of contacts information, checklist added and inclusion of "Sustainable Development" section.	02/04/2018	WSP



Our Vision

رؤيتنا

A sustainable innovative world-class utility

مؤسسة مستدامة مبتكرة 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 مؤهل وشراكات فعالة، داعمين لديمومة الموارد.

Our Motto

شعارنا

For Generations to come

لأجيالنا القادمة

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1 INTRODUCTION

The purpose of this document is to provide guidelines to Developers and Consultants submitting projects' Master plans for DEWA's Water Transmission Planning Department review and approval. These guidelines are intended to help understanding DEWA requirements and facilitate the approval process of development projects' Master Plans

Figure 1, illustrates the Development Projects Master Plan Approval Process

The completeness and quality of submitted Master Plan information by Developers and Consultants are vital for DEWA's timely provision of water services to the development project.

The developer / consultant shall submit estimated year-wise water requirements for the project taking into consideration the expected occupancy based on DEWA's category-wise consumption rates listed in item 9 below. If different rates need to be used, adequate justification should be provided.

The water services required for a development project depend primarily on its water requirements. The network size and other services are dictated by the project size, location, may vary from a small extension of existing network to a completely new transmission & distribution network. Expansion in desalination capacity may also be required.

The following sub-sections provide brief descriptions of DEWA's water supply system and the lead times required before commissioning new water supply facilities. This include detailed list of water usage categories and typical ranges of acceptable water demand rates. The final page provides a list of required documents that should accompany any development project's master plan submission, for Water Transmission Planning Department review and approval.

DEWA preserves the right to amend or update this document as deemed necessary.

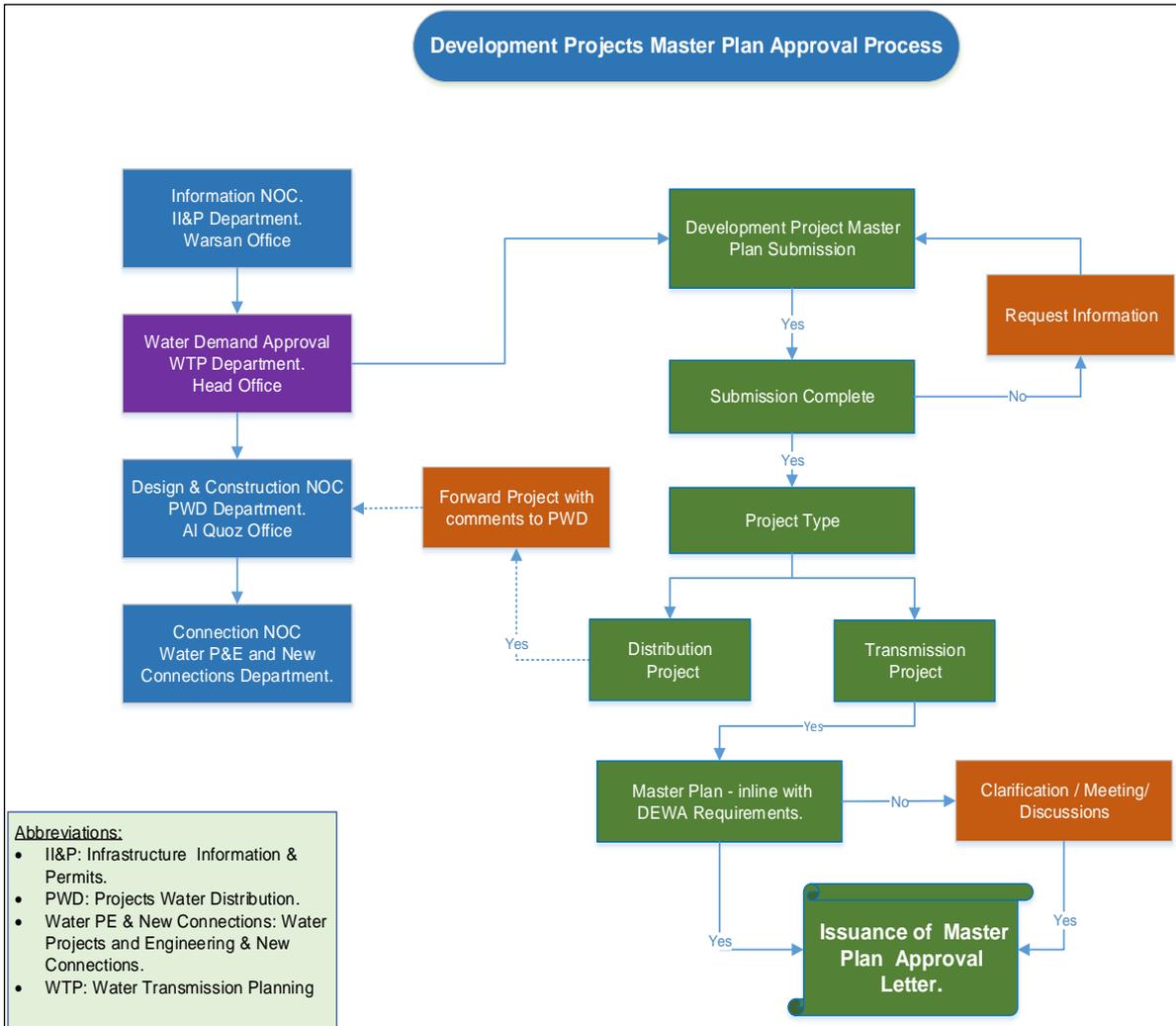


Figure 1. Development Projects Master Plan Approval Process

2 WATER RESOURCES REQUIREMENTS

High water demands by New development projects', might trigger the requirement for planning additional water resources (productions plants). Developers and Consultants are required to submit their Projects Master plans including water demand requirements, at least 5 years prior to the anticipated projects completion dates.

3 STORAGE RESERVOIRS:

(a) Bulk Storage for DEWA system

DEWA policy for System's potable bulk storage is aiming to maintain a potable water bulk storage that is equivalent to two days of Water System's peak demand. In some cases, if required, new projects developers are requested to provide a plot of land for additional bulk storage within their project's area, this is depending on the system requirements.

(b) Customers storage

The local storage for individual premises should be sufficient to cover at least 24 hours of average demand. 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 if applicable) site topography information, based on actual site survey data, to facilitate hydraulic analysis and establish the need for pumping as required. Higher land within the water transmission system might require the installation of a new pumping station for which, a plot of land within the development area may be required. The standard planning and construction lead-time for pumping stations are around 3 years.

In addition, if required depending on the development site location and topography, developers may be requested to consider booster stations while designing for the project's water supply network in order to supply water to higher grounds.

5 TRANSMISSION PIPELINES

DEWA's water **transmission** system consists of pipelines with diameters ranging from 600 mm to 1200 mm. The approved pipe materials currently used by DEWA for the water transmission network are:

- Glass fibre Reinforced Epoxy (GRE) PN10 (subject to DEWA's approval)

- All fittings (including; bends, tees, reducers and flanges) used with FC and GRE water pipelines shall be of GRE material complying with DEWA specifications.

If required, the developer may be requested to provide additional water utility corridors within the development plot to accommodate the required water transmission pipelines.

Development of water transmission pipelines requires a lead-time of 3-4 years before completion (depending on the length and complexity of proposed network). Therefore, developers and their consultants should submit projects Master Plan and design details, including the internal network layout and design well ahead of time, for DEWA's review and approval.

6 DISTRIBUTION SYSTEMS

DEWA's water **distribution** system consists of pipelines with diameters ranging from 150 mm to 450 mm.

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.

New development projects submission reviewed and classified as Distribution Project will be forwarded to Projects Water Distribution Section under PE (W) Department, and the developer/consultant will be notified accordingly.

Developers must submit their project's internal network design for DEWA's Projects and Engineering Department study and approval. Please consult with PE (W) department for further assistance.

Pipe material currently adopted is GRE, subject to DEWA's approval.

The developer is requested to provide corridors within the development plot for the installation of water distribution pipelines.

7 SYSTEM MONITORING

Depending on the nature and size of the project's network, developers will be advised on the requirements for monitoring devices at main connections, 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 Monitoring

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.

7.4 Water SCADA Requirements

DEWA's requirements for integrating newly developed network for new projects into DEWA's SCADA system should be discussed and agreed upon by DEWA's Projects Department, and Operations & Maintenance Department.

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 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 pipe materials proposed for DEWA's approval.

9 WATER DEMAND

9.1 General

Project demand and its phasing represent the most critical elements for the whole water transmission network planning process, developers are requested to provide the following information, for DEWA's review ahead of time in order to ensure timely provision of required water services:

1. Reasonably Projected Demand Figures (MIGD) along with yearly phasing up to ultimate build-up for each phase of the project as applicable.
2. Projected Yearly occupancy percentage rates until full capacity.
3. Detailed Land Use information and coloured land used layout

DEWA Reference Water Demand Categories: Developers are advised to map their project demand to the following DEWA established demand categories types as applicable.

- Residential
 - Commercial
 - Government & public premises
 - Industrial
 - Labour camps
 - District cooling (For reference purposes only)
 - Irrigation, (For reference purposes only)
 - Water features, if any.
4. Digital calculations worksheets based on information used to estimate the total water demands, such as population, land use and district cooling demands, etc.
 5. DEWA does not supply potable water for non-domestic purposes as per Executive Order No 27 for year 2008 including:
 - a. Construction purposes (particularly at projects' areas with No Existing network).

- b. Water features without human contact (lagoons, fountains, etc. for landscaping and beautification purposes).
 - c. Irrigation / landscaping purposes.
 - d. District cooling purposes.
 - e. Firefighting (Except for initial filling of fire water tanks)
6. DEWA encourages all developers to adopt innovative and sustainable solutions in all aspects of their development projects design.

9.2 Peak Factor

A peak factor value in the range of 1.25 - 1.30 should be used while designing the water network in order to accommodate the daily variation in demand. This factor may vary, depending on the nature of the development and the demand categories adopted.

9.3 Consumption Rates

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

Per Capita Consumption Rates

DEWA Reference

Demand Use Category	Demand rates Range (L/Cap. Day)
Based metal chemical zone	100
Day Clinic (per medical practitioner)	300 - 450
Clubhouse/recreation	100
Commercial buildings	60-100
Entertainment & leisure	60
Events	10-50
Guardhouse	60-75
Headquarters	60-80

Demand Use Category	Demand rates Range (L/Cap. Day)
Hotels (per employee)	60-80
Hotels (per guest)	200-300
Laboratory	60-80
Labour accommodation / Workers	80-150
Local plaza	60-82
Logistic, academic & business zone	60-75
Manufacturing	60-80
Medical (per bed)	350-450
Minerals	80
Mixed used commercial	60-80
Mixed used residential	250-350
Mosques	10 - 60
Nursery / Child Care Centre	50-70
Offices	45-60
Public amenities	10 - 50
Residential buildings (flat)	225-300
Restaurant (per meal)	10-15 l/d per meal
Retail	60-80
Schools	40-60
Shops	45-60
Theatre	10-50
Town Center	60-80
University	45-60
Villas	250-350
Visitors	14-40
Workshops/ Machinery/Warehouse	60

Source: Standard Practices & Submitted Master Plans for New Development Projects.

10 NETWORK DESIGN CRITERIA AND HYDRAULIC MODELLING

A hydraulic model should be built for every development project, and used as a basis and tool for network design.

The following criteria should be considered by developers during their network design:

- Maximum Pipeline Velocity is 1.0 m/s for Distribution lines & 1.5 m/s for Transmission lines.
- The minimum pressure at the connection points of DEWA transmission network is around 1.5 Bar and this should be initially assumed (subject to DEWA confirmation) for the design of the distribution network.
- Minimum expected pressure is around 1.0 Bar within the developer distribution network.
- Maximum pressure is around 4 Bar *at lowest point within the Transmission network*.
- A minimum of two connections to the water transmission system should be considered for better network management. Pressures assumed at each 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 controls.
- Depending on the size of the development project, zoning should be considered in the design, as applicable subject to DEWA's approval.
- Hydraulic Model demands should correspond to the Demand figures submitted in the demand calculation sheets.
- The developer/ consultant should submit peak conditions Network Models for each main phase of the development as applicable.
- Models should be created using DEWA's adopted software (InfoWorks) or any EPANET compatible software.
- Network Models should be geo-referenced to the actual physical Geographic location's based on Dubai standard DM coordinate system known as "DLTM".

- If the new development project expands through major phases, it is required to submit separate models representing each phase, as well as one overall network model for the whole project as appropriate.
- The network design layout should consider looping of the system, wherever possible, for better water circulation and increased system reliability.
- DEWA will review the models in contrast with its requirements and planning criteria, as required, and make recommendations for changes accordingly.

11 SUSTAINABLE DEVELOPMENT

DEWA has embarked on its sustainability journey with the goal of becoming a World Class Innovative Sustainable Utility. A tremendous amount of effort is being put into this at all levels, and this includes a strategy that adopts a triple bottom concept covering the social, economic and environmental aspects, which are at the heart of sustainable development.

The Developers/Consultants should take into consideration all of these aspects, using all available tools and resources to optimize the designs, and minimize the need for future network modifications, while considering the requirements for a safe and reliable water supply.

12 ANNEXURES

12.1 REQUIRED DOCUMENTS:

Developers/ consultants, should submit the documents as per the attached list for DEWA / Water Transmission Planning Department.

Addressed to:

Mr. Boualem Belhadj

Senior Manager – Water Transmission Planning

Dubai Electricity & Water Authority

P.O. Box 564

Dubai, U.A.E.

Tel.: 04-32-22700, Ext. # 22700, Fax.: 04-3249206

boualem.belhadj@dewa.gov.ae

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 & Civil Division, Projects & Engineering Department, Water Projects Department in Al Quoz Office. Design should be as per DEWA - P&E(W) Standards.

12.2 CORRIDOR AND PLOT REQUIREMENTS:

Should any requirements for plots and/or corridors within the project area arise, the developer will be advised and provisions should be made accordingly.

12.3 LIST OF CONTACT INFORMATION AND SUBMISSION CHECKLIST:

The attached Checklist (Attachment-1) should be duly filled and signed and included with the submission by the consultant. In order to schedule meetings/discussions with regards to Water Supply Master Plans for New Development Projects, the following person (s) may be contacted:

Mrs. Amany Mahmoud Rezk

Manager - Water System Planning

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Mr Jenry Vergara Matanguihan

Dy. Manager - Water Master Planning

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Sr. Personal Assistant

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Attachment - I

New Development Project Masterplan Submission Checklist

<u>S.No.</u>	<u>Document Description</u>	<u>Remarks</u>
<u>1</u>	Copy of the valid DEWA's Information NOC issued for the project.	
<u>2</u>	Coloured Hard copy Location map and layout of the project as well as soft copy in CAD or GIS system shapefile format in DLTM coordinate system.	
<u>3</u>	The complete project Master Plan Report.	
<u>4</u>	Project's water demand calculation sheets, year wise phased total demand, plot wise / zone wise or phase wise demands " all calculations should be provided in MS Excel spreadsheet format including all formulas used along with supporting data files".	
<u>5</u>	Land use wise demand calculations including percentage of land use types and year wise percentage of expected occupancy.	
<u>6</u>	Consumption rates and factors used to calculate Average, as well as, Peak Demands along with justification of the same, as applicable.	
<u>7</u>	Availability Statements for plots / corridors required for the development as per DEWA requirements.	
<u>8</u>	Digital and hard copies of internal network design indicating proposed take off points, year required and expected pressure at each of them. (PDF & CAD format)	
<u>9</u>	Epanet compatible hydraulic model file(s) developed for the network study geo-referenced to the actual Dubai coordinate system (DLTM)	

Date & Signature