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Guideline for Providing Water to High-Rise Buildings

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INTRODUCTION AND SCOPE

This proposal highlights a process that is designed to present efficient methods in supplying water to High-Rise Buildings in Male’.

DEFINITIONS

Building Type 1: Buildings with occupied floors up to a maximum of 40 feet (12.19 m) in height above ground level; generally a four storey building.

Building Type 2: Buildings with occupied floors between 40 feet to 75 feet above ground level; generally a building with five to seven storeys.

High-Rise Building: Buildings with an occupied floor more than 75 feet (22.86 m) above ground level; generally a building with eight storeys and more.

Water Collection Tank: A water tank at or below ground level for receiving water from the Water Distribution Mains at network pressure and flow. The inlet to the Water Collection Tank (WCT) will be directly from the Water Distribution Mains through a bulk meter. An automatic water flow control mechanism needs to be installed at the inlet to the tank to ensure closing of water flow the maximum tank level is reached.

The purpose of this tank is to eliminate direct suction of water from the Water Distribution Mains at excessive flow rates.

At buildings where a WCT is installed, all meter connections to all occupied floors will be taken from the WCT through a Booster System.

KEY REQUIREMENTS

Methodology of water services provision to buildings is dependent on the height of building. Three building types are considered.

1. Building Type 1
2. Building Type 2
3. High-Rise Building

(The description of the types of building are briefed under 'Definitions'.)

Providing water services to Building Type 1

- MWSC shall provide water at adequate pressure up to third floor (the highest floor of the Building Type 1, height up to 40 feet), without having to install booster pump systems.
- Service connections will be provided with or without having to lay manifolds to building.
- All water meters will be installed at ground level as per the MWSC standard guideline for providing water and sewer service.

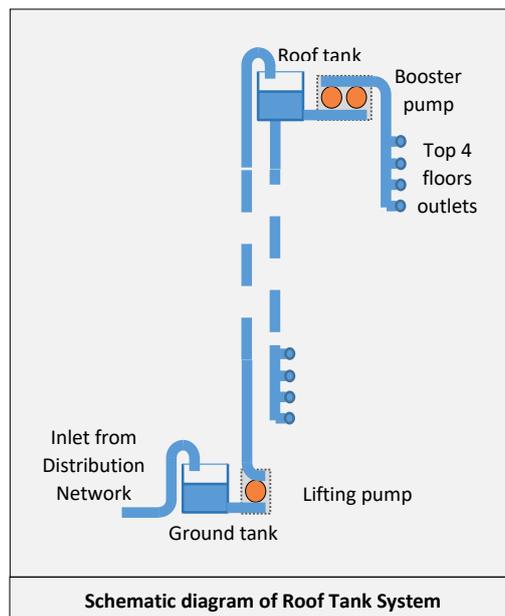
Providing water services to Building Type 2

- MWSC shall provide water at adequate pressure up to third floor (maximum 40 feet) from the manifold laid into the premise without booster system.
- Customer must install a booster system to supply water to the remaining floors (height between 40 feet to 75 feet).
- All water meters will be installed at ground level as per the MWSC standard guideline for providing water and sewer service.

Providing water services to High-Rise Buildings

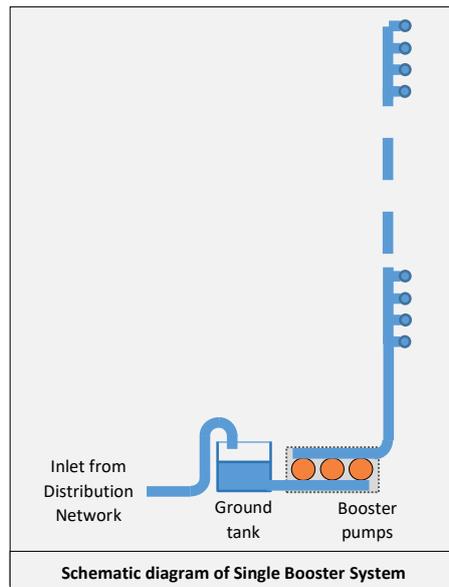
There are mainly three options for providing water service to customers of High-Rise buildings (buildings of 75 feet and above).

Option 1 – Rooftop Tank System



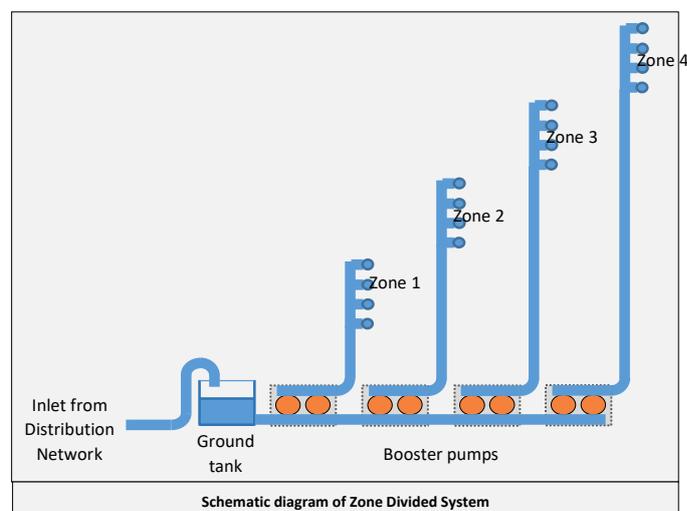
- In this system MWSC will install a single main meter to customer premise which is directly connected to the WCT.
- From the WCT water will be lifted up to the Roof Top or upper terrace level tank through a Lifting Pump.
- Supply of water to the top four floors of the building will be from the Roof Tank through a booster pump. However, supply of water to the rest of the floors will be through static pressure directly from Roof Tank without booster system. Furthermore this may require installation of pressure reduction valves to avoid undesired high pressures.
- In this method all meters will be installed at Roof Top.

Option 2 – Single Booster System



- In this system MWSC will install a single main meter to customer premise which is directly connected to the WCT.
- Supply of water to all floors of the building will be through a booster system. However, this may require installation of pressure reduction valves to avoid undesired high pressure at lower floors.
- In this method all meters will be installed at ground floor after booster system.

Option 3 – Zone Divided System



- In this system MWSC will install a single main meter to customer premise which is directly connected to the WCT.
- Internal water supply system is sub-divided into several zones with maximum of six floors per zone, irrespective of number of apartments on each floor.
- The main purpose of this system is to maintain adequate pressure without having to install pressure reduction valves.
- Supply of water for each zone will be through separate booster systems providing adequate pressure for that zone only.
- Pressure will be determined based on user outlets in each zone
- In this method all meters will be installed at ground level after the booster systems.

SPECIAL CONSIDERATIONS

Water Quality

- MWSC shall be responsible for the quality of supplied water up to the WCT. It is the building management's responsibility to ensure safe quality of water from the WCT up to the building units.

Capacity of WCT

- MWSC requires the minimum capacity of the WCT to be the building's average consumption for one day.
- This ensures that the storage tanks are filled during low peak periods and be able to cater for the building's high peak periods.
- The daily consumption levels of a building can be determined from the annexed table (Annex 1) provided by EPA.

Water Meters

- In all of the options for High-Rise Buildings, building designs should consider water meter installations for the building units at ground or roof level (whatever applicable) and have individual lines plumbed to the building units.

Meter Registration, Reading & Billing

- MWSC will install a bulk meter before the WCT and sub meters after the WCT at ground or roof top level where applicable.
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- MWSC water meters installed will be registered under the building owner or individual registered owners of apartments (building units).
- MWSC will read and bill for the sub meters. Any difference between the bulk meter and sub meters' consumption will be billed to the building management at commercial rate.

Repair and Maintenance of Main (bulk) Meters and Sub Meters

- MWSC will carry out repair and maintenance of the meters as per existing policy and procedures.

Ownership of Booster Systems & Water Sub-Meters

- MWSC shall take control of all the booster systems and Sub Meters. Maintenance of these will be carried through standard procedures.

Others

- Any issue which has not been stated in this guideline shall be resolved through MWSC's standard guideline for providing water service and or other related guidelines of MWSC.

Annex 1 – EPA Guideline for Determining Buildings’ Water Consumption

Source/ Development	Average Daily Flow L/unit	Unit
Auditorium/theater	10-15 L/day	Seat
Automobile repair garage	300 L/day	Garage
Carwash – garage	1000 L/day	Garage
Bakery	1000 L/day	Bakery
Cafeteria	100 L/day	Seat
Mosque	20 L/day	Person

Community centre	10-15 L/day	Person
Health facility		Bed
Hospital	300 L/day	Bed
Laboratory	200 L/day	Laboratory
Manufacturing - industry	As per assessment	
Office building	500 L/day	1000 square feet
Dormitory – college or residential	150 L/day	Student
Residential – boarding house	150 L/day	Bed
Residential – 1 bedroom apartment	150 L/day	Per person
Residential – 2 -3 bedrooms apartment	150 L/day	Per person
Residential – guest house with kitchen	150 L/day	Per person
Restaurant – fixed seat	800 L/day	1000 square feet
School – day care center	20 L/day	Child
School - kindergarten	20 L/day	Child
School – elementary / junior high	20 L/day	Student
School – high school	25 L/day	Student