

**SECURE UNDERGROUND COLLECTION, ACCUMULATION AND
STORAGE SYSTEM FOR WATER (THE "SYSTEM")**

DESCRIPTION

Introduction

1. There is always a need for potable water supplies, particularly in cities and in certain regions for the world where there is no regular or constant water supply. Currently, water supply is obtained from sources like rivers and lakes, open reservoirs both natural and man-made, desalination and even from natural underground wells and streams. As the world's population grows, the need for potable water supply will increase. There is no efficient collection and storage of potable water from natural supplies. Even open reservoirs lose water through evaporation. Current existing sources of water supply may not be sufficient to provide for an increase in demand for potable water. Current city planning procedures and technology do not provide for such a reservoir.
2. In addition to the foregoing, in present day situations, there is always present the potential of attack, by chemical, biological and/or other means, on present water supplies.

**Summary of the concept of the Underground Collection, Accumulation and
Storage System For Water**

3. The concept calls for the construction of concrete underground tanks which would be built generally in accordance with the drawings annexed. These tanks would store water to be used as required. Using current construction technologies, the System could be built in high density urban areas, beneath buildings and occupied areas, maximizing land use and providing a secure reservoir in close proximity to

highly populated areas. The System could be made a standard for city planning techniques in the future. A variation of the Storage System could also be built under the sea-bed, in conjunction with a desalination plant. Current and future technology may also provide for the generation of electricity from the collection of water into the System. Such water as is collected would be treated, filtered and purified prior to being accumulated and stored. The System is naturally secure against physical, chemical, biological attacks and attack by other means.

4. The System can be divided into the following stages:-
 - a. the collection of rain-water from drains and canals, diversion of streams and rivers and even from desalination;
 - b. the generation of hydroelectric power from the water flows;
 - c. the treatment, filtration and purification of collected water; and
 - d. the secure accumulation and storage of such treated water to be used as and when necessary.

Collection and treatment/purification of water

5. Current and future technology relating to the collection of rain-water from existing and new drains and canals and the diversion of streams and rivers and from desalination would be applied and used in the System.
6. Current and future technology relating to the treatment, filtration and purification of water would be applied and used in the System.

Generation of hydroelectric power

7. It is envisaged that both current and future technology relating to the generation of hydroelectric power from the collection of water, particularly from low head running water flows, can be utilized and applied in the System.

Accumulation and storage of water

8. Current and future technology relating to the construction of hardened concrete storage tanks, passages, pipes, and underground facilities for the treatment/purification and power generation will be utilized and applied in the System. A typical System is envisaged at occupying an area of roughly 600m x 600m and will be built underground. Please refer to the Drawings which are described as follows:-
 - a. Drawing 1: Plan view of a typical System showing details of storage tanks, passage ways and water treatment plants;
 - b. Drawing 2: Plan view of a typical System as seen from above the ground;
 - c. Drawing 3: Isometric view of part of a typical System;
 - d. Drawing 4: detail of reinforced concrete ventilation well "B" as seen in Drawing 3;
 - e. Drawing 5: detail of reinforced concrete passageway "C" as seen in Drawing 3;
 - f. Drawing 6: Plan view of an extended System which may be built over a golf course;

- g. Drawing 7: Cross-sectional view of the extended System as seen in Drawing 6, showing ventilation wells;
- h. Drawing 8: Cross-sectional view of a typical System built below the city, showing ventilation wells, underground storage tanks and pressure tanks above the ground;
- i. Drawing 9: Cross-section view of a storage tank of the System built below a condominium project;
- j. Drawing 10: Cross-section view of a storage tank with ventilation well and space for treatment plant built below a housing estate.
- k. Drawing 11: Cross-section view of detail of reinforce concrete retaining wall as seen in Drawing 10;
- l. Drawing 12: Cross-section view of individual storage tank;
- m. Drawing 13: Cross-section view of detail A as seen in Drawing 12, showing details of construction and walkways;
- n. Drawing 14: Cross –section view of pressure tank and storage tanks;
- o. Drawing 15: Cross-section view of pressure tank showing construction method.
- p. Drawing 16: Plan view of water collection facility in the System from a river/canal.

- q. Drawing 17: Cross-section view of collection facility in the System from a river/canal.
9. The underground component of the System will comprise the following basic components:-
- a. Concrete tanks for the storage of water which will be built underground. (Please refer to Drawings 12, 13 and 14);
 - b. Hardened ventilation wells and air shafts (please refer to Drawing 4);
 - c. Pressure tanks (please refer to Drawings 1, 8, 14 & 15);
 - d. Reinforced underground passageways connecting the storage tanks which would be wide enough to act as bomb shelters during emergencies (please refer to drawing 5);
 - e. A collection point for the accumulation of collected water which may be from drains, canals, rivers (please refer to drawings 16 & 17);
 - f. a hydroelectric generation system;
 - g. a monitoring, treatment/purification filtration plant (please refer to Drawings 10 & 11);
 - h. pumps for the output of water from storage.
6. Security of System

Due to its underground nature, the System allows for the natural control of the movement of persons and allows for the monitoring persons having access to the stored water supplies by present day technology. The System also naturally limits the risk of attack by chemical and biological means.

Because of its specifications, the Storage System can also function as an underground bomb shelter.

7. Other advantages of the System

- a. The System(s) can be built below urban areas and buildings or even golf courses, eliminating the issues of transporting water from distant regions, and providing for localized reservoir for water supply.
- b. Land and building owners would be able to commercially exploit each System by charging public utilities for storage and the supply of water from the System.
- c. Depending on the size of each Storage System, it may also act to prevent flooding of rivers, canals and drains during heavy rains, particularly in tropical/sub-tropical areas.

**SECURE UNDERGROUND COLLECTION, ACCUMULATION AND
STORAGE SYSTEM FOR WATER (THE "SYSTEM")**

CLAIMS

2. The System will comprise the following stages:-
 - a. the collection of rain-water from drains and canals, diversion of streams and rivers and even from desalination;
 - b. the generation of hydroelectric power from the water flows;
 - c. the treatment, filtration and purification of collected water; and
 - d. the secure accumulation and storage of such treated water to be used as and when necessary.

2. The System will have the following components:-
 - a. Concrete tanks for the storage of water which will be built underground.
(Please refer to Drawings 12, 13 and 14);
 - b. Hardened ventilation wells and air shafts (please refer to Drawing 4);
 - c. Pressure tanks (please refer to Drawings 1, 8, 14 & 15);
 - d. Reinforced underground passageways connecting the storage tanks which would be wide enough to act as bomb shelters during emergencies (please refer to drawing 5);

- e. A collection point for the accumulation of collected water which may be from drains, canals, rivers (please refer to drawings 16 & 17);
 - f. a hydroelectric generation system;
 - g. a monitoring, treatment/purification filtration plant (please refer to Drawings 10 & 11);
 - h. pumps for the output of water from storage.
3. The System if implemented would become a new standard in city planning and is characterized by:-
- a. the underground collection, accumulation and storage of water in the manner described;
 - b. the ability to be built anywhere, including high density urban areas;
 - c. the ability to provide secure and safe supply of water for human consumption and other industrial uses;
 - d. the ability to reduce the chance of attack by chemical, biological and other means on water supplies and reserves;
 - e. the ability to collect and accumulate water from existing supply sources almost indefinitely;
 - f. the ability to treat, filter and purify water collected;

- g. serve as underground bomb shelters in times of war or natural disaster;
- h. the ability to provide hydroelectric power.