



## Development of a Source, Transmission and Storage model of the Saipan Water System



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Water hours and low delivery pressure have long been a part of the daily lives of the people in the islands of the Western Pacific. In Saipan, Commonwealth Northern Marianas Islands (CNMI), large investments have been made in system improvements, but delivery problems still exist. A stated goal of the CNMI government is to provide 24-hour water to all residents served by the Commonwealth Utility Corporation (CUC) water system. This goal will be unattainable until the CUC has a complete knowledge of their water delivery capabilities and operation. Over the years the CUC water distribution system has grown and new wells have been added to the system. This physical expansion has been well documented but improvements in the hydraulic characteristics and delivery capabilities of the entire system have never been fully examined.

The Saipan water distribution system has been divided into 12 sub-regions. Each region is expected to operate somewhat independently. However, due to inadequate inflow to the system, system leakage, and lack of knowledge of the system behavior, the system is unable to provide 24-hour water services.

In the past WERI researchers developed computerized models of each of the ten sub-regions of the CUC water system using the Haestad WaterCad water system modeling program. This model includes a physical system description, details of water usage, and parameters describing system operation.

This model provided the next step needed which is to examine the entire system behavior when the main distribution lines for each of the sub-systems are connected.

The benefits from the project included a better understanding of the adequacy of the existing pumps and well systems, the adequacy of the existing storage facilities to provide for daily fluctuating demands, the ability of the well and storage system to provide sufficient flows, and a more in depth understanding of the most efficient means to move water from water supply rich regions to those that have supply shortages in order to maintain delivery of 24 hour water to all areas in the system.

The project was split into two phases. The first phase started from the 12-system water models previously developed of the Saipan Water System. These models were skeletonized to remove all but the major water sources, tanks and transmission components and joined together at the boundary points. Researchers worked closely with CUC Engineering staff to be sure all included components were correctly modeled.