



Hunter Water Australia Pty. Limited
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Utilising Modelling Projects to Consolidate System Data- A Knowledge Management Exercise

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Improving System Knowledge

Modelling projects generally involve a large amount of data gathering and consolidation. Whilst the primary output is a model that is used for analysis of the water or wastewater network, the wealth of knowledge contained within the input data is frequently neglected. Failure to consolidate this knowledge when the opportunity presents itself can lead to the same hunt, gather and steal exercise every time the project is revisited.

Hunter Water Australia have developed several systems to not only compile and consolidate the knowledge in an accessible, understandable format, but also to allow the client to utilise this knowledge for other projects and as general reference tools.

This poster outlines three key tools that were primarily developed to assist the system modeller in understanding the network and assets. It was subsequently realised that they provided a means to consolidate system knowledge within the water supply authority.

System Connectivity Schematics represent the key trunk infrastructure and the relative locations of key system assets.

Hydraulic Profile Schematics show the hydraulic relationship between system components.

Pumping Station Databases consolidate important station details including pump curves, and provide a consistent format and location to store and access these details.

Water supply systems often exhibit great complexity.

Shoalhaven Water's water supply system was shown in a far clearer manner by eliminating reticulation and only showing key control and valving components.

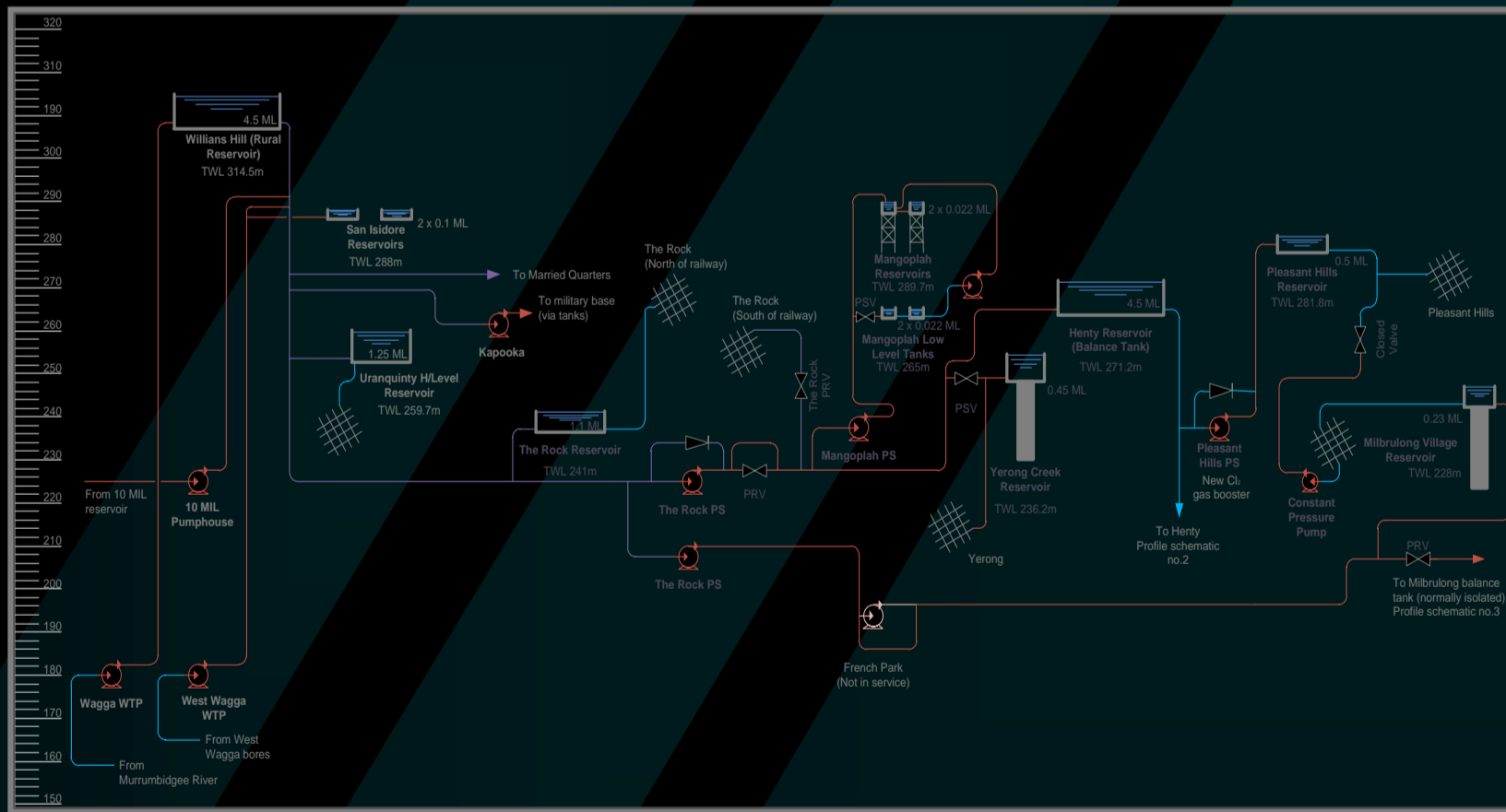
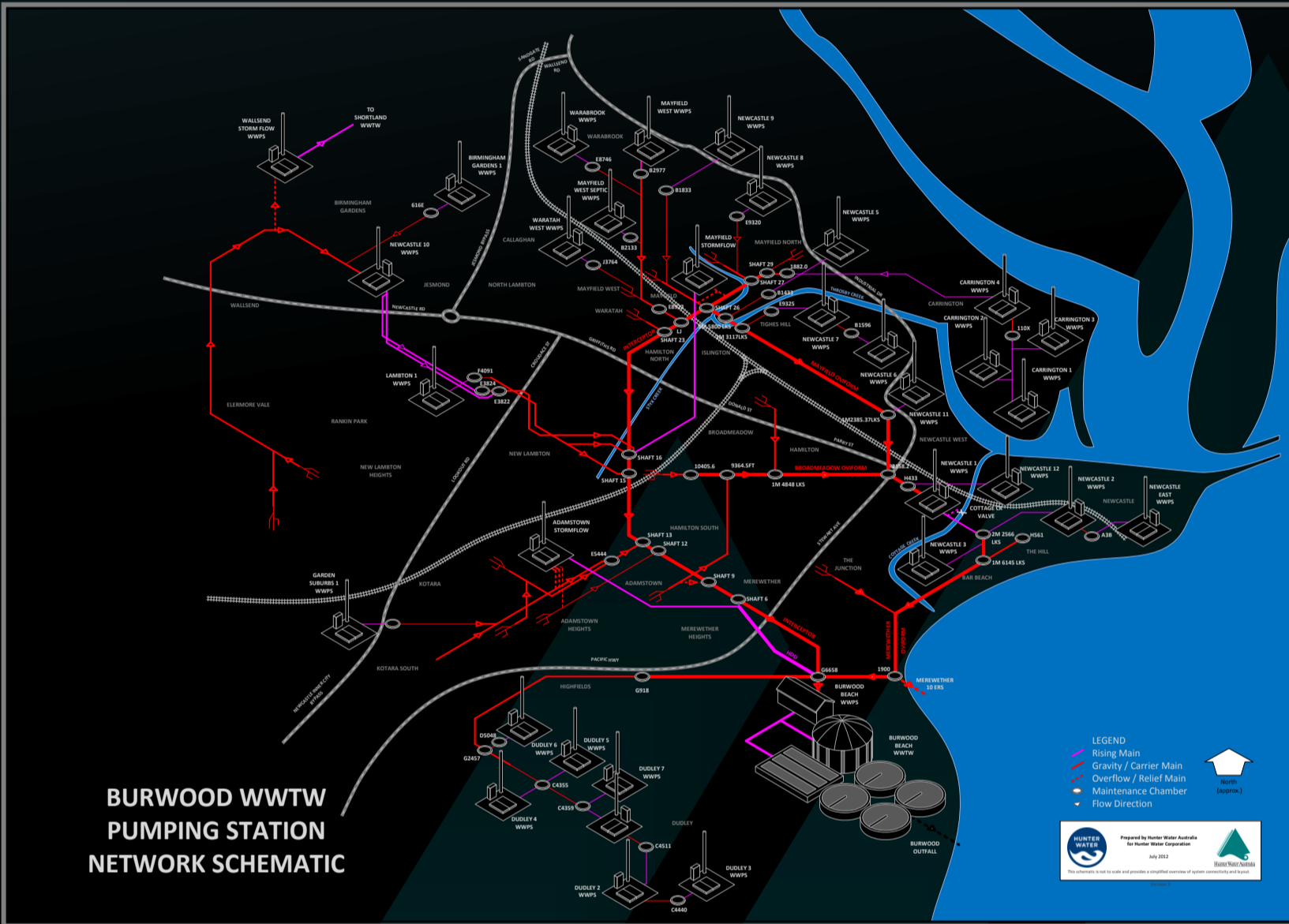
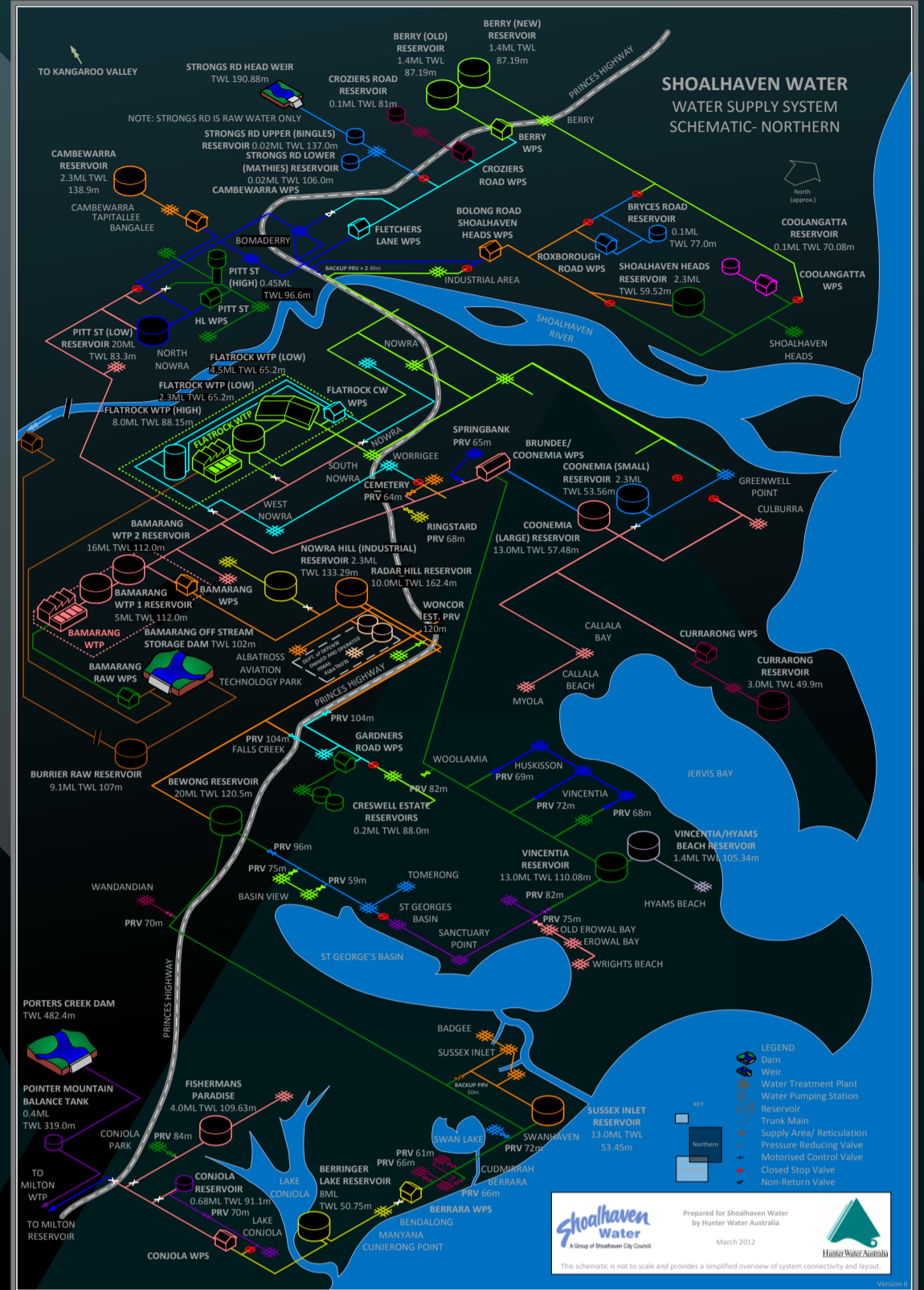
In addition to this, important information such as reservoir capacities and Top Water Levels allows Shoalhaven Water staff to quickly visualise reservoir and pumping station interactions and hierarchy.

An isometric perspective gives contextual locations whilst simplifying pipe connectivity.

The individual zonings are colour coded and correspond with zone colours in the GIS and hydraulic model for easy correlation.

Separate parts of the network are hyperlinked for easy navigation, and individual assets may also be linked to other relevant information e.g. photos, valving diagrams etc.

This schematic was produced using Microsoft Visio®. Schematic reproduced with permission from Shoalhaven Water.



Pumping Station Databases

Hunter Water Corporation operates a water supply system which contains over 75 pumping stations. Each pumping station generally has multiple pumps. Hunter Water Corporation previously kept copies of pump curves in various locations, including Operation and Maintenance Manuals and as photocopies in "Pump Curve Folders" with no specific location or protocol for quality assurance.

Hunter Water Australia created a Pumping Station Database which enables pumping station and pump curve information to be stored in a digital format for ease of input into modelling (both hydraulic and energy) software. The database "back-end" allows open integration with future asset management software. This database contains hyperlinks to original (.pdf) pump curves. It also allows retention of "out of service" or "decommissioned" pump information, and provides the ability to track a curve's current status and source accuracy.

This database was produced using Microsoft Access®. Screenshot reproduced with permission from Hunter Water Corporation.

Conclusions

Retention of data acquired during a system modelling project is just as important as the initial acquisition process. Other datasets which are useful (but not discussed here) include Pumping Station/Reservoir/Valve operational procedures and customer meter data (especially large users).

Acknowledgements: Hunter Water Australia would like to acknowledge Shoalhaven Water, Riverina Water County Council and Hunter Water Corporation for allowing inclusion of system data. Reproduction of images without permission is prohibited.

Hunter Water Corporation's largest wastewater collection network delivers wastewater to the Burwood Beach Wastewater Treatment Works.

The network has been progressively designed, built, and augmented over a time period spanning more than 100 years. Network components range from reticulation pipes through to large brick arch tunnels, with multiple pumping stations, overflow relief mains, and pumped bypasses.

Hunter Water Corporation uses a comprehensive GIS to manage the network assets, however there had never been a simplified overview map to enable engineers and planners to clearly identify and describe the system connectivity.

This schematic shows all major network assets, including pumping station and large pressure and gravity sewer mains. The schematic shows major system connectivity including receiving access chambers from rising mains and major trunk sewer junctions. It is presented over a crude base map which enables general locations of assets to be quickly identified. Once again, the schematic is simplified by attempting to adhere to an isometric layout.

Hunter Water Corporation's network schematics have also been used as a base diagram for location of assets within the ClearSCADA/ViewX user interface.

The schematic has been used to describe proposed system augmentations and is a good tool for education and familiarisation of new staff members with the existing wastewater collection system.

This schematic was produced using Microsoft Visio®. Schematic reproduced with permission from Hunter Water Corporation.

Hydraulic Profile Schematics

Riverina Water County Council supplies an area extending over 100km south west of Wagga Wagga. The system consists of rural towns connected by lengthy trunkmains.

The vast distances mean that there is a high potential for significant headlosses throughout the trunk network

In addition to providing supply security, multiple supply sources also provide an increased level of complexity when dealing with system operations.

Hydraulic Profile schematics improve the clarity of system operations and interactions, whilst assisting with identification of areas where there is potential for less energy intensive supply options. Reservoir top and bottom water levels and diameters are shown to scale for easy reference.

This schematic was produced using Microsoft Visio®. Schematic reproduced with permission from Riverina Water County Council