INQUIRY INTO WATER AUGMENTATION

Organisation:

Innovyze

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General Purpose Standing Committee No 5 Parliament of NSW

Dear Committee Members,

Augmentation of water supply for rural and regional NSW

Innovyze are a software provider that have been working in the urban and regional water sector for over 20 years. We offer a range of out of the box, industry leading software tools that will assist authorities to:

- Undertake strategic planning of their water/sewer/drainage networks to identify system deficiencies and determine optimal augmentation option(s)
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- Real time prediction of levels of service in water supply networks (and identification of system losses)
- Real time flood forecasting using BOM (or alternate) radar forecasts
- Calculation of the flood damage caused by specific events, or provide an estimated annual damage cost
- Asset Management of all relevant assets

I believe we have software products that would assist you to meet your requirements as described in the Terms of Reference and have provided brief summaries of each of the dot points on the following pages.

Good predictions do require good underlying data and knowledge – however this can be very expensive to obtain, and is often considered "too hard". With proven techniques to infer data, or by using statistical modelling, it can be possible to start the journey, identifying where additional data is critical to the success of the project, and optimising the capital expenditure.

Some of the regional councils in NSW, and many of the consultants, are skilled in the use of these tools for strategic planning, but the use could be extended further into the asset management and real time network operations areas.

Please don't hesitate to contact me if you have any questions.

Yours sincerely

Ann Pugh

Sales Manager, Innovyze Pty Ltd

Strategic Planning of wet infrastructure

Innovyze supply a comprehensive range of hydraulic and hydrologic modelling solution that will enable analysis and management of collection and distribution network models more efficiently and accurately than ever before.

InfoWorks ICM (Integrated Catchment Modeling) is the first truly integrated modeling platform to incorporate both urban and river catchments. With full integration of 1D and 2D hydrodynamic simulation techniques, both the above- and below-ground elements of catchments can be modeled to accurately represent all flow paths. InfoWorks ICM enables the hydraulics and hydrology of natural and man made environments to be incorporated into a single model.



InfoWater offers direct ArcGIS integration enabling engineers and GIS professionals to work simultaneously on the same integrated platform. It allows you to command powerful GIS analysis and hydraulic modeling in a single environment using a single dataset. You can now create, edit, modify, run, map, analyze, design and optimize your water network models and instantly review, query and display simulation results from within ArcGIS.

InfoWater 2D is a breakthrough geospatial water distribution network management solution for accurate two-dimensional (2D) above-ground modeling of water spill from main breaks. It greatly extends the core features of InfoWater with new power to predict the extent, duration, volume and impact of water spill from catastrophic main breaks for rapid, effective response management.



Comprehensive Management, Analysis and Modeling of Real-Time Data and Events

Representing a new paradigm for smart water network operations and management, Infinity System combines a powerful server-side database for the collection and storage of time-series data and comprehensive data modeling with high-performance analytics, enabling control room operators, engineers and planners to continuously drive innovation and make the best possible decisions about their water, wastewater, stormwater, river and combined networks.



Using high-performance data mining, predictive modeling and analytics, forecasting and optimization, Infinity System is engineered to help water utilities meet the growing demand for intelligent use of real-time data to gain rapid, highly accurate insights; pinpoint critical events; respond to varying operating conditions such as fluctuations in demand and changing weather patterns; predict future events; make forward-looking and proactive decisions; select the best courses of action; mitigate negative impacts; and monitor assets to efficiently deliver the quality of service customers expect. It also better equips utilities to understand their water and energy usage, set realistic targets for both water and energy conservation, and monitor progress toward those goals.



Real Time Water Supply

Innovyze has developed IWLive to meet the needs of water utilities to operate their distribution systems to the very highest standards, by making powerful modeling technology, found in InfoWorks WS and InfoWater, instantly accessible to water distribution system operators. IWLive equips the control room with tools that are both predictive and more reactive. It issues regularly updated warnings to draw the operator's attention to problems that may occur in the coming minutes, hours, or days. The control room operator can see the predicted severity of problems and the time of onset in one easy to use interface. For example, given a low reservoir level data provided by a SCADA system integrated with the system, IWLive will model the outcomes on the water distribution system and will translate abstract level data into specific customer low pressure warnings that may not occur for another 24 hours.

Beyond automatic prediction, IWLive can also enable the control room operator to evaluate problem-solving approaches by simulating the closure of valves or a change in a pump's operating schedule. Additional tools enhance this process. For example the "Isolate Asset Tool" allows an operator to quickly identify and close all the valves in a model to isolate a broken asset. IWLive quickly produces a second simulation that can be compared with the first to determine the level of improvement, the problems that remain and the customers who will be affected.

The IWLive interface is fully optimized for operator use. It allows operators to see a map of all water infrastructures for which they are responsible, including appropriate background maps. Highlighted color coding shows predicted problem areas; a single click produces a detailed map showing pipes, valves, pumps, reservoirs and other water assets. Animation of the map shows the development of the problem; graphs show simulated pressures and reservoir levels.

With increasingly complex water distribution systems, utilities are rapidly realizing the need to harness the power of hydraulic modeling in the control room. IWLive provides an affordable solution tailored to the day-to-day needs of system operators, whilst at the same time meeting the primary needs of a utility to supply a clean and reliable supply of water in the most cost-effective manner.



Real time Flood Forecasting

ICMLive (or SWMMLive) offers state-of-the-art in real-time operational forecasting of urban and rural catchments. ICMLive provides water utilities and river authorities timely, accurate and reliable forecasts of what will happen within a catchment, based on past and current observations of a multitude of parameters along with future rainfall predictions. ICMLive combines the comprehensive integrated catchment modeling capabilities of InfoWorks ICM with sophisticated real-time operational forecasting, early warning, and emergency management, while SWMMLive utilises InfoSWMM's hydraulic and hydrologic capabilities.

Advances in computer simulation and hardware have made real-time operation of stormwater, wastewater, river and combined systems a reality. ICMLive allows both large and small utilities and water authorities to manage their systems more efficiently and effectively than ever before. A powerful risk assessment and real-time decision making tool, it enables managers and operators to consider the influence of a full range of catchment factors in the management of flooding and the reduction of unregulated discharges; the optimization of storage and existing infrastructure, leading to savings on capital works; and the optimization of pumps to lower energy costs and reduce CO2 emissions.



Calculation of Flood Damages

A revolutionary risk-based analysis extension, InfoWorks ICM RiskMaster enables InfoWorks ICM to accurately compute both the damage caused by specific flood events and expected annual flood damage. Calculations are based on the hydraulic, hydrologic and economic data for any number of simulated damage receptors including residential, commercial and industrial properties. These powerful predictive analysis capabilities provide InfoWorks ICM users with both a quantification of the current flood risk associated with their collection systems and a long-term planning framework for making the most effective decisions on flood risk management and alleviation strategies.

Traditionally, flood management policies have been based on the design standard approach, where policy makers decide on an appropriate protection level to be achieved (degree-of-protection) in designing and managing their collection systems. In contrast, flood management policies based on risk focus on the consequences of flood events and the best alleviation measures over a given time period.

With its powerful risk-based analytics, InfoWorks ICM RiskMaster expands the modeling power of InfoWorks ICM to let users accurately assess and better manage their collection systems and protect properties from flood events. Rather than expecting the collection system to simply service a specific loading level, the new extension directly takes into account all types of events based on their probability of occurrence. It combines the inundation results of multiple events with a database of receptors (properties) and their vulnerability, based on the probability of occurrence. The outcome is an estimate of the economic impact of floods in terms of Expected Annual Damage (EAD) value, and a database of inundation depths ordered by return period, showing the predicted flood recurrence for each receptor. The results can be displayed in both tabular and graphical format. They provide a comprehensive view of the hydraulic system performance and the consequences of flood events. This critical information is invaluable to engineers and stakeholders in alleviating the impact of flooding by making informed, cost-effective decisions that improve the design, maintenance, rehabilitation and management of their collection systems.



Asset Management

InfoMaster is a complete ArcGIS-based asset integrity management and capital planning software for water and wastewater networks. It leverages existing GIS and IT investments with advanced modeling and sophisticated predictive analytics to give utilities a cost effective business intelligence and data collection platform for more informed, action-oriented decision making. With versions designed for the desktop, Web, and iOS mobile devices, InfoMaster enables day-to-day operational management and long-term network planning for users throughout the organization.

A highly advanced and powerful analytical asset management tool, InfoMaster uses state-of-the-art mathematical models to predict when a water or sewer pipe will fail, helping utilities determine the most cost-effective solution for avoiding or correcting the problem. In this way, users can ensure the best distribution of dollars spent on replacement and repair of underground pipes. It marks the first time utilities have been able to manage and control the flow of both data and water for better, faster and more accurate decision making.



InfoNet is a purpose-built Infrastructure Management System (IMS) for water distribution, wastewater collection and stormwater networks ensuring informed, swift and cost-effective decision making both for day-to-day operational management and for long-term network planning. Designed for operations managers, engineers and planners in the water industry, InfoNet enables users to manage, integrate, validate, analyze, and report on their network data to provide accurate, auditable, up-to-date information and report on network infrastructure and performance, presented in easy to use formats.

InfoNet enables planners and engineers to plan, construct, rehabilitate and maintain their water and sewer networks with a risk-based approach that leads both to greater efficiency and also to compliance with legal requirements to identify and safeguard critical assets. InfoNet makes substantial enhancements to the hydraulic model build process through its seamless integration with the InfoWorks modeling suite. Automatic verification, inference and data tracking allow the quick creation of hydraulic models and maintain the full range of network information to enhance engineering decisions. Planners can apply InfoNet's analytical toolset to a consolidated and complete network data store to make logical, prioritized and cost effective decisions about its future.

