



# SLOT 2.0

## optimising sludge stream design

### The Challenge: Resilience, Increased Sludge Processing and New Processing Requirements

- AMP7 requires Water Companies to optimise their existing facilities, providing “**resilience in the round**”. They also need to innovate, whilst providing great customer service and affordable bills.
- The volume of sludge produced is increasing, with improved treatment solutions and the need to feed digesters creating greater amounts of green energy. Legislative restrictions on **disposal will only become more onerous**.
- The nature of sludge is changing, with a drive to process ever thicker sludges to increase throughput, along with the introduction of new processes resulting in novel sludge types that have rheological properties that **cannot be predicted using existing published rheology data**.

### Engineers are asking:

- How much energy is required to transport sludge within sludge treatment processes and beyond?
- What are the best pump, valve and pipeline solutions to move the sludge efficiently and in a manner that is resilient?
- Are current sludge systems operating at an optimal level? Are pumps undersized and overworked/oversized and underworked/is the pipework too big?
- What do I need to ensure my existing or new system minimises its TOTEX costs over 20, 30, 40 years evaluation, what is the impact?

### How SLOT 2.0 helps:

- SLOT 2.0 enables engineers to produce an accurate asset design, reducing risk of asset failure and maximising TOTEX via an intuitive, easy to use online platform. The ability to predict sludge rheological properties based on type, dry solids and temperature with calculations derived from the **world's largest collection of rheograms**. Users can also:
- **quickly compare results** for different fluid rheological properties and combinations of pumps, pipework and components, plotting system curves against pump curves to **determine the optimum pump selection and operating points**
- plot fluid flow curves and the hydraulic grade line against the system elevation profile to **check the feasibility of the pump operating points**.

Feature	Benefit	SLOT	SLOT 2.0	SLOT 2.1
Pressure Loss Calculations using both Newtonian and Non Newtonian Fluid Models	<ul style="list-style-type: none"> <li>• Greater system design accuracy than TR185 based calculations and tools.</li> <li>• Enables more precise, cost and energy efficient system selection.</li> </ul>	✓	✓	✓
Frictional Pressure Losses in Straight Pipes for Laminar and Turbulent Flow for Newtonian and Non Newtonian Fluids		✓	✓	✓
Frictional Pressure Losses in Fittings Such as Elbows, Expanders, Orifices, Reducers, Tees and Other Components		✓	✓	✓
Frictional Pressure Loss for Valves (Isolation and Control)		✓	✓	✓
Pump Start Up (Flow Rate and Pressure Required to Overcome Static Yield Stress)		✓	✓	✓
System Operating Point, Graphical Visualisation		✓	✓	✓
Pressure Profiling and Hydraulic Grade Line		✓	✓	✓
Intuitive and Resilient Microsoft Azure Cloud Based Software	Modern, secure, digital, robust cloud based platform with intuitive user interface experience. End to end encrypted data in transit and at rest.		✓	✓
System Curve Generation and Interrogation	Improved editable curve generation with multiple data points for greater user system analysis.		✓	✓
Explicitly Determines System Operating Point	Indication of optimum system operating point for each system configuration.		✓	✓
Library of Editable Standard Pumps and Valves	User defined and edited pump and valve component selection. Edit component attributes on the fly.		✓	✓
Library of Client Specific Framework Pumps and Valves	Populate tool with preferred or framework pumps and valves including curves, performance details and item cost. Makes the software bespoke to the user.		✓	✓
Exportable System Curves and Calculations	Use the exportable function to add curves in to design submissions and client reports for added detail, clarity and in support of project funding.		✓	✓
System Generated Schematic Auto CAD Drawings	Easily demonstrate what a system looks like to clients and can be sent to vendors for pricing purposes.			✓
Component Drag and Drop Configuration	Quickly and easily build the system with losses calculated in real time. Easily add, remove or change components on the fly.			✓
3D Generated System Walk Through	Export 3D file for inclusion in overall project 3D to demonstrate potential clashes and optimise design lay out.			✓
Pressure Loss for Valves (Isolation and Control) Percentage Open and Closed	Determine impact of system control via valve positioning on pumps and absorbed energy.			✓
Component Capital Cost Calculation	Capital costing as the system is built in real time. Establish pricing for tendering purposes.			✓
Pump Absorbed Power Calculations	Calculate energy cost of system configurations over a given period of asset operation.			✓
System Whole Life Cost Analysis/Totex	Whole system asset life cost comparison between differing system configurations in TOTEX.			✓
System Carbon Calculator	Convert system configuration in to a translatable carbon impact.			✓