

Overview

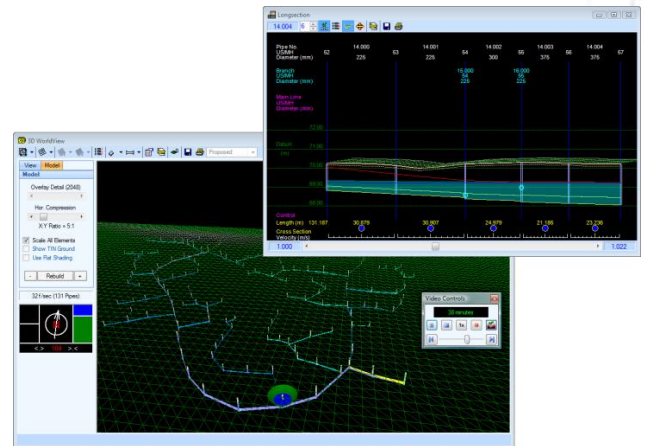
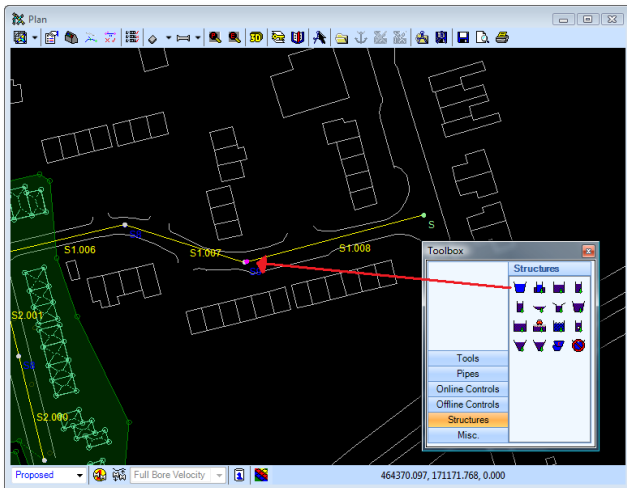
Pipe design is only the first stage of creating a fully integrated drainage network. Designs must be modelled and analysed against stringent parameters to evaluate their performance.

Simulation has been designed to fulfil these requirements by providing full hydrograph analysis to test networks for overloading conditions during extreme rainfall events.

Description

Ancillaries

- ⊙ Define controls and storage structures by dragging and dropping onto the plan
- ⊙ Specify a range of online and offline controls (eg orifice, depth/flow, pump, weir)
- ⊙ Loop pipes within the network and allow reverse flow
- ⊙ Free flow, surcharged, drowned and combined flow regimes for all online and offline controls
- ⊙ Include input hydrographs from other sub-catchments, storage ponds and streams
- ⊙ Specify time area diagrams or model inflow from green roofs
- ⊙ Include foul sewage and infiltration



Analysis

- ⊙ Automatic storm generation of both FSR and FEH rainfall from 15 minutes to 7 days duration and return periods up to 1000 years in the UK and Ireland
- ⊙ Specify rainfall profiles directly for international use or undertake continuous analysis of time series rainfall
- ⊙ Support for up to 10 profiles of measured rainfall for any single network
- ⊙ Scale rainfall to model climate change
- ⊙ The actual manhole sizes are used in the analysis and not assumed sizes based on pipe diameters
- ⊙ Take into account the effects of storage in surcharged manholes and from surface flooding
- ⊙ Specify individual inlet coefficient and manhole headloss
- ⊙ Model multiple drowned (surcharged) outfalls for designs discharging into tidal systems
- ⊙ Apply the Hot Start option to preload the network with water
- ⊙ Storage in the network and surrounds can be factored (MADD factor)

Results

- ⊙ Display a summary of maximum water levels (indicating whether each manhole is OK, surcharged or flooded) and maximum flows
- ⊙ View full hydrographs minute by minute at any manhole location, either in tabular or graphical form

Results (cont'd)

- Real time animation of water levels in longitudinal section and in 3D Worldview
- Print design data and results in pre-defined or custom reports and export to a wide range of formats such as Excel and HTML
- Produce fully customised longsections and output to printers, plotters or AutoCAD®

Pipe Number	USMH Name	USCL (m)	Water Level (m)	Surcharge Depth (m)	Flooded Volume (m³)	Flow Cap.	Overflow (%)	Pipe Flow (%)	Status
1.000 1		45.292	44.181	-0.061	0.000	0.28		52.0	OK
1.001 2		45.526	44.156	0.082	0.000	0.36		52.8	SURCHARGED
1.002 3		45.593	44.144	0.116	0.000	0.68		107.8	SURCHARGED
1.003 4		45.536	44.085	0.244	0.000	1.84		105.9	SURCHARGED
1.004 5		45.766	43.548	-0.081	0.000	0.99		171.2	OK
1.005 6		45.813	43.378	-0.089	0.000	1.80		169.0	OK
2.000 7		45.191	44.921	0.300	0.000	2.96		154.8	FLOOD RISK
2.001 8		46.151	44.898	-0.406	-0.006	2.87		124.8	WATERLOGGED
1.006 7		44.508	43.237	-0.127	0.000	0.25		259.8	OK
1.007 8		43.808	43.227	-0.023	0.000	0.15		220.4	OK
1.008 9		43.208	43.201	0.001	0.041	0.42		150.3	FLOOD

With Other Modules

Simulation uses networks created in System 1, DrawNet or MDCAD.

The following extensions are also available if the relevant modules are licensed:

APT

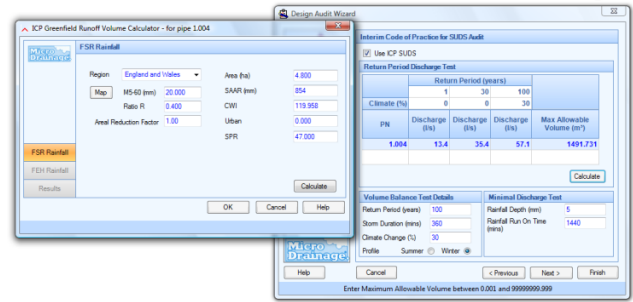
- APT extends Simulation with the same enhancements it adds to System 1
- A full Network Editor allowing throttle pipes and back falls to be manually input
- Use of Rainfall Wizards to allow a series of storms, return periods and sensitivities (climate change) to be analysed in one run with a critical summary produced showing the worst storm for each node
- Design Audit Wizard assesses the network against 14 individual tests for good engineering practice and produces a full audit trail. Includes checks for runoff and volume balance
- Define FSR, FEH and ReFH Unit Hydrographs to allow combined urban and rural catchments to be analysed

Source Control

- Include infiltration structures; systems can be dragged and dropped on the plan

CASDeF

- CASDeF is a simulation design method that progressively calculates exact solutions to alleviate flooding and overflow activations
- CASDeF can optimise pipe sizing, control sizing and storage design which reduces costs and time saving at the design phase, as well as final construction costs



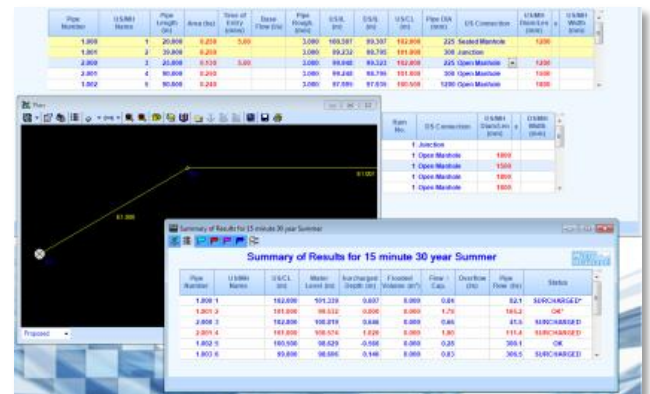
FloodFlow

- Full 2D flow analysis routes the flood volume produced by normal 1D simulation analysis across the terrain model or to analyse the above and below ground elements as a single model

Additional Features in WinDes W.12.6

The new STH Hydro-Brake® from Hydro International has been incorporated into WinDes.

The ability to mark a connection as a sealed manhole, junction or a standard open manhole is now feasible. This removes the requirement to insert a dummy manhole.



Merge networks enables an updated network to be loaded over the top of an existing network, preventing the loss of any simulation ancillary data. The objective is to replicate lost SWS/SIM links for third party applications.

Copy and Paste into spreadsheets for easier data input such as;

- Manhole coordinates
- Utility forms
- CRP, IDF & rainfall profiles
- Depth flow relationship

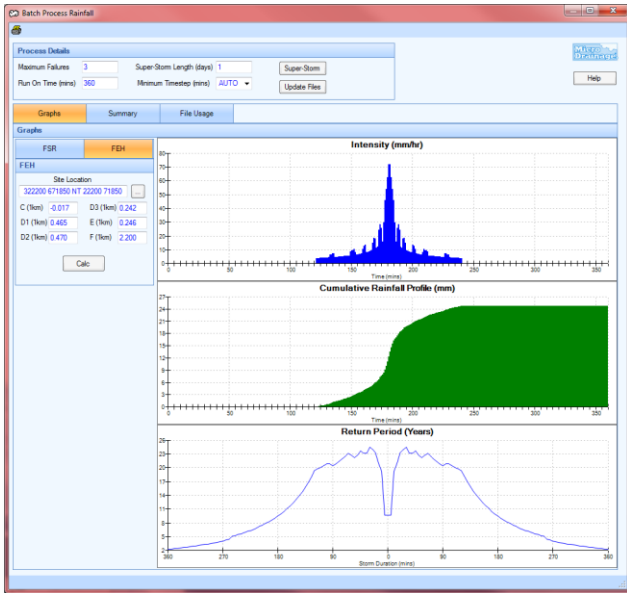
Update MH Cover from the TIN. When importing a drainage network with a TIN it will not force updated cover levels for manholes outside the TIN extents.

Additional Features in WinDes W.12.6 (cont'd)

Compress Rainfall/Hydrographs allows the user to load in large sets of data and break them up into individual files in order to remove any values below a set threshold e.g. X mm of rainfall or X l/s of flow.

Super-Storm creates a single all encompassing 'Super-Storm' from a set of rainfall files so that the key criteria of both Peak Intensity and Total Volume are preserved. It is possible to view the resulting storm to see which aspects were taken from each file and compare this with either Flood Studies Report (FSR) or Flood Estimation Handbook (FEH) rainfall data to view the equivalent Return Period.

Batch Process Rainfall enables the user to automatically set a batch of rainfall files.



WinDes can now support larger pipe numbers, from 1.000 to 9999.999 in a single network.

WinDes will now detect if a file is already in use, to prevent file locking issues and avoid any errors when saving.

Support Material

WinDes is supplied with a hard-copy manual which includes worked examples. All the modules benefit from extensive online help including 'How Do I' tutorials for frequently asked questions.

All Micro Drainage software is backed up by a comprehensive support and maintenance program.

Training

Training Course B covers Storage, Attenuation & Simulation.

Training Course F covers designing and modelling Sustainable Drainage Systems (SUDS).

Contact Details

For further information about WinDes, training and workshops visit www.microdrainage.co.uk, call +44 (0)1635 582555 or email info@microdrainage.co.uk.

If you have been struggling to keep abreast of the latest guidance, rules and regulations visit the Micro Drainage Blog at <http://pipedup.wordpress.com>



WinDes W.12.6, keeping you up to date and industry compliant.