Features in Previous Releases

The following list provides the features and improvements in the previous versions of the application.

For a list of the latest features and improvements in the current release, refer to What's New.

What's New in Version 2021.9

There are no new features included in InfoWorks ICM 2021.9 that were not available in previous versions. See the product release notes for details of any changes or improvements.

For the list of features and improvements in previous releases, refer to Features in Previous Releases.

What's New in Version 2021.8

This topic lists all the additions and improvements incorporated in InfoWorks ICM 20218 which were not available in previous versions.

2D Boundary objects for SWMM networks

2D Boundary objects can be used to define alternative boundary line conditions along a section of a 2D Zone boundary when undertaking 2D Modelling. The boundary condition defined for this object will override the 2D Zone boundary type where the boundary line and polygon boundary coincide. All of the 2D Zone boundary types (Vertical wall, Critical

condition, Supercritical condition, Dry or Normal condition) are available for 2D boundary lines as well as additional boundary line types of Inflow, Level or Level & Head/discharge.

For Inflow or Level boundary line types, the inflow or level hydrograph is associated with the 2D Boundary via an Inflow or Level event, in the same way as inflows and levels are associated with nodes. For a Level & Head/discharge type of boundary, a head unit flow must be associated with the 2D Boundary object (see below).

Head unit flow objects for SWMM networks

A Head unit flow object has been added to SWMM networks. This enables a 2D Boundary object, whose Boundary line type property is set to Level & Head/discharge, to be associated with a head unit flow table. A profile in a Level event provides the depth of water at the boundary line. This depth, minus the depth at the element(s) attached to a 2D boundary line, is used to calculate the head for each 2D boundary line face. Based on the selected head unit flow table, a unit flow or flow per length is calculated on each face, which will be scaled to the face length to obtain the resulting flow entering the 2D domain.

Importing 2D Boundary and Roughness zone objects from XPSWMM and XPStorm data

2D boundary and Roughness zone objects can now be imported from XPSWMM and XPStorm xpx files to InfoWorks or SWMM networks. See Importing XPSWMM/XPStorm Data to InfoWorks Networks and Importing XPSWMM/XPStorm Data to SWMM Networks for information about how to import data from xpx files and XPSWMM/XPStorm Conversion Notes (InfoWorks) and XPSWMM/XPStorm Conversion Notes (SWMM) for conversion information.

Importing InfoWorks IC zone – hydraulic (2D) objects from XPSWMM and XPStorm data

IC zone – hydraulic (2D) objects can now be imported from XPSWMM and XPStorm xpx files to InfoWorks networks. See Importing XPSWMM/XPStorm Data to InfoWorks Networks for information about how to import data from xpx files and XPSWMM/XPStorm Conversion Notes (InfoWorks) for conversion information.

Importing Inflow and Level events from XPSWMM and XPStorm data

Data from XPSWMM and XPStorm xpx files can now be imported to Inflow and Level events for InfoWorks and SWMM networks. See Importing Event Data for further information.

Property sheets for asset network objects

Property sheets for asset network objects were previously displayed, by default, in a tabbed modal sheet. This has changed and now, by default, they will be displayed in the Property Editor in the Object Properties Window.

You can change the default setting by removing the check from the Use property editor for asset network objects option in the General tab of the Options dialog.

Help menu

The order of the options in the Help menu has been changed so that the Help option is now the first item in the list. Previously, it was Desktop analytics but this now appears further down the list of options.

Job progress details for SWMM 2D simulations

Details of any job that includes applicable 2D SWMM network objects are now displayed in the Job progress window. Information about the Minimum 2D timestep, 2D Zone ID, Element ID, Wet area, Inundated area, Max wet area, Max inundated area, 2D volume, 2D volume error, 2D rainfall, 2D average inflow and 2D average outflow, if relevant, will now be shown in the window.

In addition, Timestep details will also be displayed for any job that includes a SWMM network.

Changes to the PRN file

The date and time on the "Start of run" record in a PRN results text report is now displayed in ISO 8601 format and includes the time zone offset from UTC. However, simulations will still report using local time.

The licence number is no longer included in the report title or header.

TCP/IP connection to a local agent via ICM Exchange

It is now possible to use TCP/IP to connect to a local agent using ICM Exchange. See the ICM Exchange documentation for further information.

Authentication required for a workgroup data server

By default, a workgroup data server now requires users to be authenticated. See the **Workgroup Data Server Administration Guide** for further information.

What's New in Version 2021.7

This topic lists all the additions and improvements incorporated in InfoWorks ICM 2021.7 which were not available in previous versions.

NOAA rainfall generator

The new NOAA ATLAS 14 Rainfall Generator can be used to download data from the NOAA's Precipitation Frequency Data Server (PFDS) to generate NOAA Atlas 14 precipitation frequency estimates for specified locations within the United States. The generated storm can be based on the NOAA ATLAS 14 or NCRS Regional systems for temporal distribution, and average recurrence intervals and durations for the NOAA design rainfall event can also be specified using the rainfall generator.

Expiry warning for Thales licences

If you are using a Thales license, a warning message will now be displayed by default when InfoWorks ICM is started, if Thales licence is within one month of its expiry date. When the license is within a week of its expiry date, the message will be shown daily.

If you do not want the warning displayed, you can either uncheck the Remind me later option on the warning dialog, or use the Licence expiry date reminder option on the General Page of the Options Dialog to disable the display of the message.

InfoWorks About box

The About box has been updated and now displays licence agreement information about your current InfoWorks ICM installation, the version number of the installed software, and the licence name, which is read from the dongle or server.

Further information, such as the licence number, the version of the operating system you are using and the name and location of the master database, which was previously displayed in the About box, is now displayed in a new Additional Information window. This window can be displayed by clicking on the new Additional Information button in the About box.

Importing SCS runoff data from XPSWMM/XPStorm to InfoWorks networks

Subcatchments that use an SCS Hydrology routing method in XPSWMM/XPStorm can now be imported to InfoWorks networks. Like other subcatchment data from an XPSWMM/XPStorm xpx file, these will also be imported as Subcatchment, Runoff surface and Land use objects in ICM.

See Importing XPSWMM/XPStorm Data to InfoWorks Networks for general information about how to import XPSWMM/XPSTORM xpx files and XPSWMM/XPStorm Conversion Notes (InfoWorks) for conversion information.

What's New in Version 2021.6.1

This topic lists all the additions and improvements incorporated in InfoWorks ICM 2021.6.1 which were not available in previous versions.

Results selectors for InfoWorks networks

A new database item, Results selector, now is available for InfoWorks networks. This item is used to limit the results generated from a run to only include the attributes you are primarily interested in. The Result Selection dialog can be used to choose which type of results (Hydraulic, Water quality or 2D results), which class of results, such as rivers and subcatchments, which type of attribute (All, Summary, Times series or Gauge) as well as the individual attributes you want results to be generated for.

The Schedule Hydraulic Run View has been updated to include a new dropbox for a results selector item. Only one results selector item can be included in a run, which becomes read-only after the run is complete. The results from a simulation that includes a results selector item can be viewed using the usual methods for viewing simulations results.

Result export to GIS for Return periods and Durations

Previously, if a Return period or Duration in a rainfall event had a value less than 1, then these values were exported as NULL when time varying and/or maximum results were exported to GIS files. This has now been rectified, and these values are now correctly exported as floating integers.

Quicker validation for mesh zones

The time required to validate a network that contains thousands of mesh zones has been reduced significantly.

Quicker pre-processing for 2D simulations

Pre-processing times for 2D simulations with large numbers of elements has been reduced by more than 90%.

Culvert inlets

The behaviour of culvert inlets has been improved to account for the presence of base flow in the barrel conduit when using Equation B. This should eliminate oscillations that sometimes prevented initialisation from finding a steady state.

Culvert outlets

The behaviour of culvert outlets has been improved to account for supercritical cases. The implementation of the switch between free flow and headloss (drowned) conditions for the culvert outlet and what happens in the free condition has changed.

The free flow condition applies if the downstream depth plus the calculated headloss is below the lower of critical (yc) or normal (yn) depth in the barrel; previously a supercritical case, where yn < yc, was not accounted for. The free flow condition now behaves the same as a free boundary between a link end and a node, whereas, the previous implementation would overestimate the depth in the barrel because it also applied a headloss to the critical depth.

The status values for a culvert outlet have been updated to reflect these changes. A value of 8 is now assigned for a subcritical free discharging culvert outlet and a value of 32 when the free flow condition is limited to the pipe full value.

Chicago rainfall generator

A new Chicago design rainfall generator is now available, which is based on the Keifer and Chu (1957) method for determining a synthetic hyetograph. See the Rainfall Generator Dialog for further information.

Malaysia HP1 (2015) rainfall generator

The minimum Duration that can be specified for a Malaysia HP1 (2015) storm has been set to 5 minutes while the maximum can be 4320 minutes, 72 hours or 3 days. A warning message will be displayed if the specified duration(s) fall outside the permitted range. See the Rainfall Generator Dialog for further information.

Desktop analytics

A new option, Desktop analytics, has been added to the Help menu. Selecting this option displays the Desktop analytics dialog, which can be used to opt in (default) or out of allowing Innovyze to collect data about your use of InfoWorks ICM. Opting in allows the data we collect to be used to help improve our products' features, performance and quality.

Default option change for GPU cards for InfoWorks 2D simulations

As it is likely that a GPU card is to be used when performing 2D simulations for InfoWorks networks, the default GPU card usage option has changed from Never to If suitable card is available in the GPU tab of the 2D Parameters Dialog. The order of the options has also been updated and the default option – If suitable card is available – is now listed first.

If a GPU card is to be used for 2D simulations, an error message will be displayed in the simulation log file if a suitable GPU card is not found.

Note: When using a GPU card for carrying out 2D calculations, it is recommended that the latest available NVIDIA driver for the GPU card is installed.

As with previous versions of ICM, the GPU status is displayed in the Job Progress Window as either Not in use or Active when a 2D simulation is running.

GPU cards for SWMM 2D simulations

A suitable GPU card can be used to improve performance of 2D simulations. There are three options for using the card – Never, If suitable card is available (default) or Always – which are set in the GPU tab of the 2D Parameters Dialog (SWMM). An error message will be displayed in the simulation log file if a suitable GPU card is not been found.

Note: When using a GPU card for carrying out 2D calculations, it is recommended that the latest available NVIDIA driver for the GPU card is installed.

When a 2D simulation is running, the GPU status will also be displayed in the Job Progress Window as either Not in use or Active.

Boundary types for SWMM 2D Zones

A new property, Boundary type, which enables you to choose what type of boundary condition (Vertical wall, Critical condition, Supercritical condition, Dry or Normal condition) is to be applied to a 2D Zone, is now available for SWMM networks. A Porous Wall or a Porous Polygon, which is collinear with the boundary of the 2D Zone, will override the boundary condition of the 2D Zone along the coincident portion of the boundary. See the 2D Zones Data Fields (SWMM) topic for further information.

Outfall type of SWMM Nodes

Previously, an outfall type of node in a SWMM network was an end node that could only have one link connected to it. In this version of ICM, an outfall node is no longer considered an end node so can now be located upstream of another node, and can also have multiple links

connected to it. This also means that the network will no longer fail validation if an outfall node is connected to more than one link.

Roughness definitions for SWMM networks

Roughness definitions are now available for SWMM networks. These are non-visual polygon objects that enable roughness to be defined as a function of depth in the mesh elements of 2D Zones. The roughness value (Manning's n) in the mesh elements will change dynamically during a simulation according to the roughness definition function.

Up to three roughness (Manning's n) and two depth thresholds parameters can be specified, which will be applied to mesh elements within any 2D Zones and/or Roughness Zones that the Roughness definition is associated with.

If more than one roughness value is specified for the roughness definition, the additional roughness values are set at specific depth thresholds. For roughness definitions with multiple roughness values, the roughness is defined as a smoothed step function where the transition between roughness values follows a cubic spline.

See the Roughness Definitions and Roughness Definition Data Fields (SWMM) topics for further information.

A new Roughness definition field has also been added to the properties for 2D Zones and Roughness Zones that allows you to select a Roughness definition object to be used when generating a mesh for a zone. Previously, the Roughness (Manning's n) field provided the roughness information; this field has been retained for backwards compatibility and will only be enabled if no roughness definition object is selected in the Roughness definition field.

Water quality results for SWMM Statistics templates

Water quality results can now be included in a Statistics template for a SWMM network. The Attribute field is now editable when the list water quality attributes box is checked, allowing you to specify the name of a pollutant whose water quality result attributes are to be included in a statistical report. When the template is used to generate the statistical report, the specified water quality attributes are displayed in the units that were specified for the pollutants. If any of the specified water quality attributes are not included in the report, these will be listed in the log file that is produced when the report is generated.

Importing links from XPSWMM/XPStorm data to InfoWorks networks

Previously, the US invert level in ICM for an InfoWorks conduit or channel was imported as the value of the XPSWMM/XPStorm ZP1 field minus the value of the Z (US node) field, and

the DS invert level as the value of the ZP2 field minus the value of the Z (DS node) field. These have been updated and only the values of the ZP1 and ZP2 fields are now imported to the US invert level and DS invert level for conduits and channels.

Similarly, the Invert level for an orifice or a sluice was imported as the value of the XPSWMM/XPStorm ZP field minus the value of the Z (US node) field. This has also been updated and only the value of the XPSWMM/XPStorm ZP field is now imported as the Invert level for an orifice.

The Initial level for an ICM user-defined control imported from XPSWMM/XPStorm data was previously set to 0. This has also been updated and now the Initial level is imported as the value of the XPSWMM/XPStorm Z (US node) field.

See XPSWMM/XPStorm Conversion Notes (InfoWorks) for further information.

Importing subcatchment data from XPRAFTS

You can now choose whether or not XPRAFTS First and Second Subcatchments should be imported into ICM as one combined subcatchment or as two individual subcatchments. The Import XPRAFTS dialog has been updated to include a Combine 1st and 2nd subcatchments into a single polygon (default) and a Split 1st and 2nd subcatchments to separate polygons option.

The subcatchments can only be combined if the polygon geometry for both subcatchments is the same and if neither of their runoff surface type is set to Impervious=100 or Pervious=0 in the XPX file being imported.

When the XPRAFTS First and Second Subcatchments are imported as a combined subcatchment, only properties from the First Subcatchment are normally imported. However, two runoff surfaces will be created; one for each subcatchment. See the Importing XPRAFTS Data for further information.

Assimilation deprecation

This database item has been deprecated to accommodate expanding functionality in other areas. Any existing Assimilation items will still be visible in the Explorer Window but no new Assimilation items can be added to the database or used in a new or existing run.

What's New in Version 2021.5

This topic lists all the additions and improvements incorporated in InfoWorks ICM 2021.5 which were not available in previous versions.

12D TIN Ground Models

TIN ground models can now be imported from 12DA files with USC-2, BOM text encoding as well as from 12DA files with the original encoding.

Recycle bin

In previous releases, InfoWorks ICM counted of the number of items contained in the recycle bin and displayed this number, in brackets, to the right of the recycle bin icon. However, as the counting operation could impact on the performance of InfoWorks ICM, particularly if the bin contained a hierarchy of large database items, this no longer occurs, and an asterisk (*) is now displayed to the right of the recycle bin icon if the bin contains any deleted items.

Default flags for SWMM Conduits upstream and downstream elevations

A default data flag (#D) can now be set for the Upstream elevation and the Downstream elevation properties for a conduit in a SWMM network. If set, the Upstream elevation will be populated with the value specified for the Invert elevation of the upstream node that the conduit is connected to, and the Downstream elevation will be populated with the Invert elevation value of the downstream node that the conduit is connected to.

Spatially varying rainfall for 2D mesh elements in SWMM networks

Spatially varying rainfall and evaporation can now be applied to 2D mesh elements when carrying out 2D simulations for a SWMM network. To facilitate this, four new properties have been added to 2D zone objects:

- an Apply rainfall etc directly to mesh elements box that, if checked, ensures that rainfall profiles and their corresponding evaporation profiles are applied to 2D mesh elements in the 2D zone
- an Apply rainfall etc field that lets you choose if the application of rainfall and evaporation will be applied to the entire mesh or only to mesh elements outside of the applicable subcatchment boundary
- a Rainfall profile field that enables you to specify which rainfall profile is to be applied to the mesh elements in the 2D zone
- a Rainfall percentage field that allows to specify the percentage of the rainfall depth that will fall directly onto the ground within the 2D zone

See 2D Zone Data Fields for further information about these properties, and Spatially Varying Rainfall in SWMM Networks, Using Spatial Rainfall in SWMM Simulations and Rain Gauge Boundaries for further information about how spatially varying rainfall is applied to 2D mesh elements in SWMM networks.

Porous Walls for SWMM networks

Porous Walls can now be added to SWMM networks. These are lines that represent walls with a specified porosity and height and are included as part of the mesh generation process when creating a 2D mesh.

See Porous Wall Data Fields (SWMM) for information about defining porous walls for SWMM networks.

Importing XPSWMM/XPStorm data to InfoWorks networks

The types of InfoWorks network objects for which network data from XPSWMM and XPStorm xpx files can be imported to has been extended, and now includes Subcatchment, Runoff surface, Land use, Build-up/washoff land use, and RTK hydrograph types of subcatchment objects as well as Orifice, Sluice, Flap valve and User-defined Control types of link objects. 2D network data from xpx files can also be imported to Polygon, Porous polygon, Mesh zone, Mesh level zone and 2D zone types of polygon objects in ICM.

See Importing XPSWMM/XPStorm Data to InfoWorks Networks and XPSWMM/XPStorm Conversion Notes (InfoWorks) for further information.

2D zone rendering in the 3D Network Window

Previously, if the 3D Network Window displayed a network which contained 2D zones with mesh level zones, then the transition between a mesh level zone that contained an elevation factor, and one that did not, was not being rendered smoothly when the Smoothed option was selected in the 3D Network Window Properties dialog. This has now been corrected and the transition between the mesh level zones will now be smooth.

Pollutant units displayed for SWMM results

The units used for modelling pollutants in SWMM networks are now included in the applicable simulation results grid windows and property sheets for links, nodes and subcatchments. These will also be displayed in the grid or graph views of the results. To enable the display of the units, two new units for quantifying pollutants, PCC (Pollutant count/l) and PCU (Pollutant ug/l), have been added to the list of units available for ICM. These are in addition to the PC (Pollutant mg/l) unit that is still available.

Water quality results for SWMM networks

Water quality results for pollutants in SWMM networks are now, by default, displayed in groups of time-varying and maxima results in the applicable simulation results property sheets for links, subcatchments and nodes (note that maxima results for nodes are not currently calculated for SWMM networks). In the results grid windows, the time-varying and maxima water quality results for each pollutant are displayed adjacent to each other. You can change the layout of the results in the object property window or the grid window if required.

Importing 2D objects from XPSWMM/XPSTORM to SWMM 2D zones

XPSWMM/XPStorm 2D polygon data, in xpx format files, which has its Default Area Type is set to 'Inactive' will be imported as a 2D Zone object in SWMM networks.

See Importing XPSWMM/XPStorm Data to SWMM Networks for general information about how to import XPSWMM/XPSTORM xpx files and XPSWMM/XPStorm Conversion Notes (SWMM) for conversion information.