



QUICK TOUR OF FLUIDIT WATER

Aalto University – 2019-02-25

OVERVIEW

Model settings

Model component styling

- Drawing order
- Manage colors and sizes
- Manage colors and sizes based on results
- Manage component filtering
- Edit legend

Background layers:

- Insert background maps
- Add external files for reference
- Add calculated raster layers from nodes
- Manage background layer order

Scenario tree: Create a child scenario that inherits all features from mother scenario. Edits made in child scenario does not affect to mother scenario. Scenario settings.

DEM Manager: Elevation layers can be used for example to define node elevations, critical pressure levels or rim elevations of manholes

Schematics: add fixed figures and maps that are stored in schematics for later use.

Modeling toolbar: Add model components, manage current time, pan + zoom...

Fluidit Water Simulator [Base Scenario]

File Edit Model Simulate View Navigate Tools Window Help

Material: [v] |< < > >| 1.1.2017 0:00

Model Browser

- Fluidit Water Model
 - Drawing States
 - Default Visualization
 - Symbols [Symbols]
 - Label Lines [Label Lines]
 - Label Points [Label Points]
 - Reservoirs [Reservoirs]
 - Tanks [Tanks]
 - Hydrants [Hydrants]
 - Junctions [Junctions]
 - Pump Batteries [Pump Batteries]
 - Pumps [Pumps]
 - Valves [Valves]
 - Pipes [Pipes]
 - Demands [Demands]
 - Point Components [Point Component]
 - Line Components [Line Components]
 - Area Components [Area Component]
 - BasicDrawingState-1
 - BasicDrawingState-2
 - Background Layers
 - Open Street Map
 - Base Scenario
 - New Scenario
 - DEM Manager
 - Basic Elevation Model
 - Schematics
 - Schematic-1

Properties panel. Properties of selected components

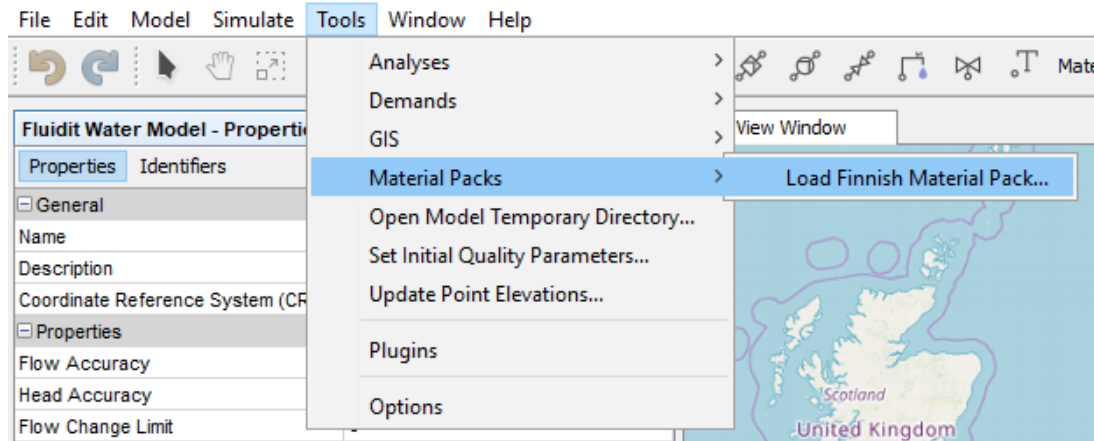
Result view Window: Self-updating component result viewer of selected components

Fluidit Water Model - Properties		Model Browser
Properties		Identifiers
General		
Name	Fluidit Water Model	...
Description		...
Coordinate Reference System (CRS)	WGS 84 / Pseudo-Mercator (EPSG:3...	
Properties		
Flow Accuracy	0,0001	
Head Accuracy	0	
Flow Change Limit	0	
Demand Model	Demand Dependant	▼
Minimum Pressure	0	
Required Pressure	0	
Pressure Exponent	0,5	
Active Scenario	Base Scenario	
Background Color	<input type="checkbox"/> [255,255,255]	...
Status Check Frequency	2	
Damping Limit	0	
Relative Diffusivity	1	
Emitter Exponent	0,5	
Friction Model	Darcy-Weisbach	▼
Maximum Status Checks	10	
Default Pump Efficiency	70	
Default Motor Efficiency	85	
Default VSD Efficiency	95	
Relative Specific Gravity	1	
Status Report Type	Full	▼
Flow Tolerance	0,0001	
Head Tolerance	0,0005	
Quality Tolerance	0,01	
Maximum Iterations	100	
Units	l/s	▼
Relative Viscosity	1	
Zero Potential Elevation	0	
Time		
Simulation Start Time	1.1.2018 0:00	
Simulation End Time	1.1.2018 23:00	
Report Results Start	1.1.2018 0:00	
Report Step	3600	
Pattern Start	1.1.2018 0:00	
Pattern Step	3600	
Quality Time Step	3600	
Hydraulic Time Step	3600	

MODEL PROPERTIES

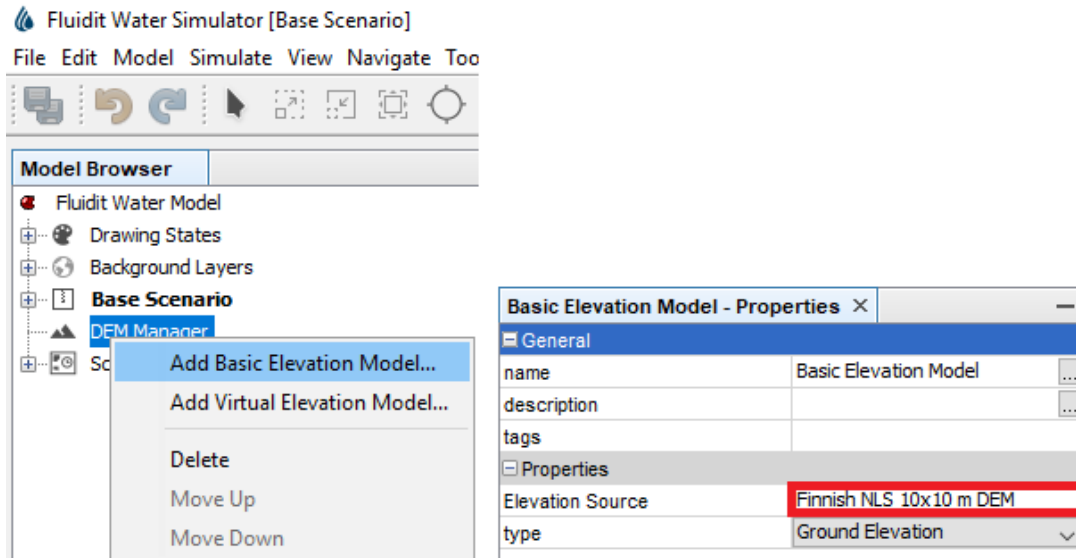
- Things to set up
 - **Units:** the most common approach is to use l/s everywhere – flows and demands in l/s, pressures in meters of water column [m], diameters in mm, roughness in mm
 - **Friction model:** Darcy-Weisbach (general friction loss equation)
 - **Coordinate reference system:** the default, global Pseudo-Mercator system is not really metric – use ETRS89-GKxxFIN coordinate systems in Finland
 - **Simulation time settings:** Start time, end time, report start, report step (in seconds) and hydraulic time step (in seconds)

LOAD FINNISH MATERIAL PACK



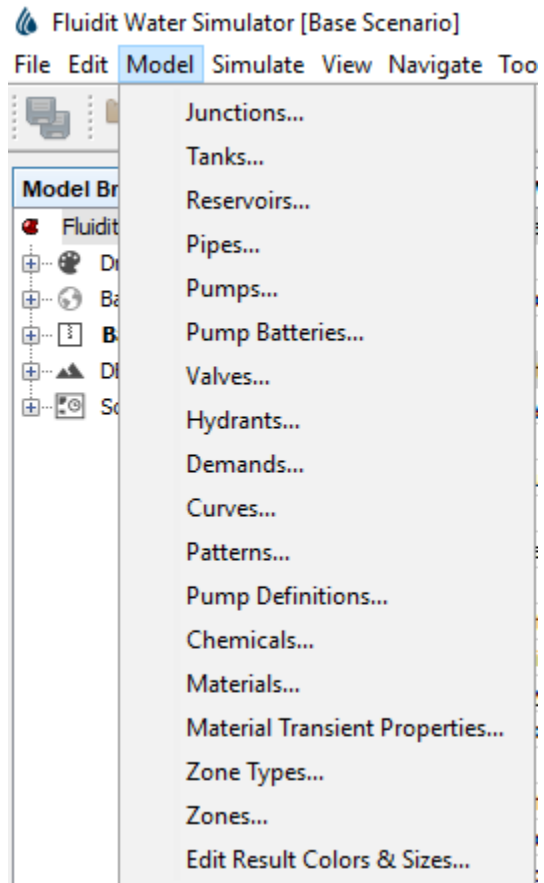
- The Finnish Material Pack includes the common pipe sizes and materials in use in Finland
- Most of materials include rough construction costs
- Materials can be inspected and modified via Model -> Materials... menu

ADD AN ELEVATION MODEL



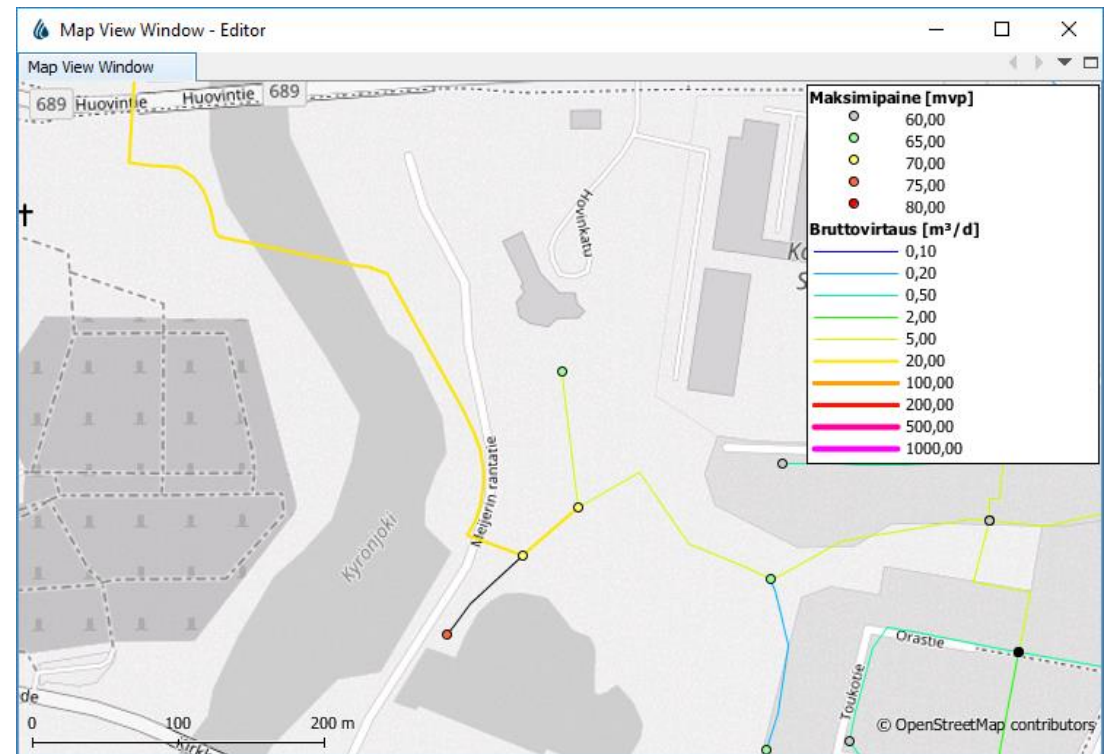
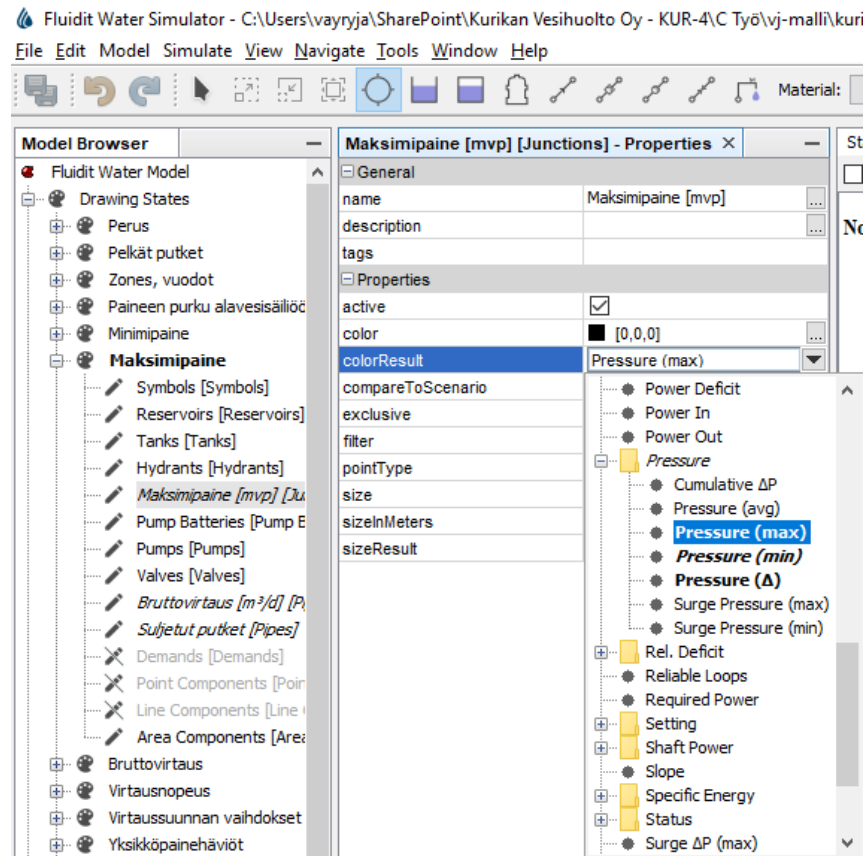
- Newly created nodes will automatically get elevation (z) from the DEM
- Elevations can be updated later from Tools->Update Point Elevations... (updates selected / all nodes and other points)
- Finnish NLS 10x10 m and 2x2 m grids are available – neither covers the whole country

OPEN LIST OF COMPONENTS IN TABLE



Nodes	averageDe...	boundary	dailyDemand	demands	description	emitter	ignoreForG...	minimumHead
Junc-3873	0,029	<input type="checkbox"/>	2,501	3	...	0	<input type="checkbox"/>	◆
Junc-15466	0,006	<input type="checkbox"/>	0,479	2	...	0	<input type="checkbox"/>	◆
Junc-19854	0,008	<input type="checkbox"/>	0,734	4	...	0	<input type="checkbox"/>	◆
Junc-21324	0	<input type="checkbox"/>	0	0	...	0	<input type="checkbox"/>	◆
Junction-71	0,021	<input type="checkbox"/>	1,786	5	...	0	<input type="checkbox"/>	◆
Junc-10875	0,002	<input type="checkbox"/>	0,175	2	...	0	<input type="checkbox"/>	◆
Junc-22755	0,017	<input type="checkbox"/>	1,458	6	...	0	<input type="checkbox"/>	◆
Junc-5739	0,01	<input type="checkbox"/>	0,894	3	...	0	<input type="checkbox"/>	◆
Junction-70	0	<input type="checkbox"/>	0	0	...	0	<input type="checkbox"/>	◆
Junc-6828	0	<input type="checkbox"/>	0	0	...	0	<input type="checkbox"/>	◆
Junc-20769	0,016	<input type="checkbox"/>	1,422	4	...	0	<input type="checkbox"/>	◆
Junc-13403	0,015	<input type="checkbox"/>	1,279	5	...	0	<input type="checkbox"/>	◆
Junc-18032	0,032	<input type="checkbox"/>	2,781	2	...	0	<input type="checkbox"/>	◆
Junc-19875	0,009	<input type="checkbox"/>	0,781	2	...	0	<input type="checkbox"/>	◆
Junc-14934	0	<input type="checkbox"/>	0	0	...	0	<input type="checkbox"/>	◆
Junc-20253	0,021	<input type="checkbox"/>	1,855	2	...	0	<input type="checkbox"/>	◆
Junc-4294	0,002	<input type="checkbox"/>	0,198	1	...	0	<input type="checkbox"/>	◆

DISPLAY RESULT COLORS



MAIN TOOLBARS



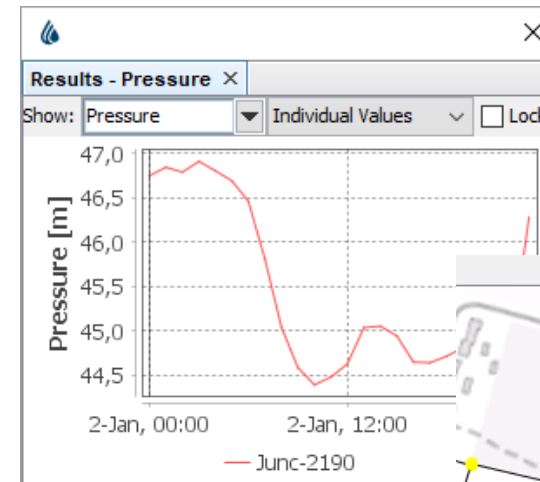
SELECT	PAN, ZOOM	COMPONENTS: JUNCTION, RESERVOIR, TANK, HYDRANT, PIPE, PUMP BATTERY, PUMP, VALVE, GEOCODED DEMAND	PIPE SIZE & MATERIAL	CHANGE TIME STEP BACK OR FORWARD
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CONTROLLING THE MAP VIEW & DRAWING COMPONENTS

- Pan with middle mouse button or arrow keys
- Zoom using mouse scroll or + and -
- Double-ESC always activates the selection tool
 - Select by clicking or dragging
 - Holding CTRL adds to current selection
 - SHIFT+CTRL removes from current selection
 - Selection is reflected in component tables
- Component properties from selection are displayed dynamically in properties window. Double clicking on component opens properties in a new window
- Right clicking opens context menu
- First draw nodes: choose desired tool and click on map
- Choose pipe size and material (also activates the pipe drawing tool)
 - Start from a node by clicking or CTRL click to create a junction automatically
 - Clicking adds vertices
 - Backspace removes last vertex
 - Esc cancels
 - End by clicking on another node or CTRL click to create a new junction or split existing link
 - It's possible to zoom and pan while drawing

VIEWING SIMULATION RESULTS

- On map using controls in Drawing states / Visualizers + Model->Edit Colors and Sizes...
- Most important results in tool tips
- Graphically using *Result View Window* or component context menu: *Show Result*
- Tabularly using:
 - Statistics from *Window->Selected Components (F2)*
 - Results from component property window *Results-tab*
- More complex analysis possible using *Schematics*



Junction:	Junc-17715
Daily Deficit:	2.1373854E-8 m ³ /d
Daily Demand:	0.98652524 m ³ /d
Daily Full Demand:	0.9616438 m ³ /d
Daily Leak:	0.024881398 m ³ /d
Deficit (max):	1.1641532E-9 l/s
Demand:	0.0053938488 l/s
Demand (avg):	0.011418116 l/s
Demand (max):	0.016932694 l/s
Demand (min):	0.0023526784 l/s
Elevation:	73.65534 m
Head:	115.774666 m
Head (avg):	114.42655 m
Head (max):	115.94102 m
Head (min):	113.362526 m
Pressure:	42.119324 m
Pressure (avg):	40.77121 m
Pressure (max):	42.285675 m
Pressure (min):	39.70718 m
Pressure (Δ):	2.578495 m
Rel. Deficit (avg):	2.415276E-6 %
Rel. Deficit (max):	1.0840206E-5 %
Reliable Loops:	1.0

Properties	Results	Identifiers
Lehtisenlähde (min) [%]	0	
Mujunkangas [%]	0	
Mujunkangas (avg) [%]	0	
Mujunkangas (max) [%]	0	
Mujunkangas (min) [%]	0	
Mustalammi [%]	0	
Mustalammi (avg) [%]	0	
Mustalammi (max) [%]	0	
Mustalammi (min) [%]	0	
Power Deficit [W]	-0	
Pressure [m]	47,723	
Pressure (avg) [m]	46,459	
Pressure (max) [m]	47,878	
Pressure (min) [m]	45,476	
Pressure (Δ) [m]	2,401	
Rel. Deficit [%]	Minimum pressure	

CREATING A HYDRAULIC PROFILE (GRADE LINE)

- Open Profile View Window
- Select start node by clicking it
- Select end node by CTRL clicking it
- Now that you have two nodes selected, right clicking the map view shows *Find Best* and *Find Shortest Route* between nodes – select either
- Selects all links between the nodes
- Left click on the profile and choose properties to change what is shown

