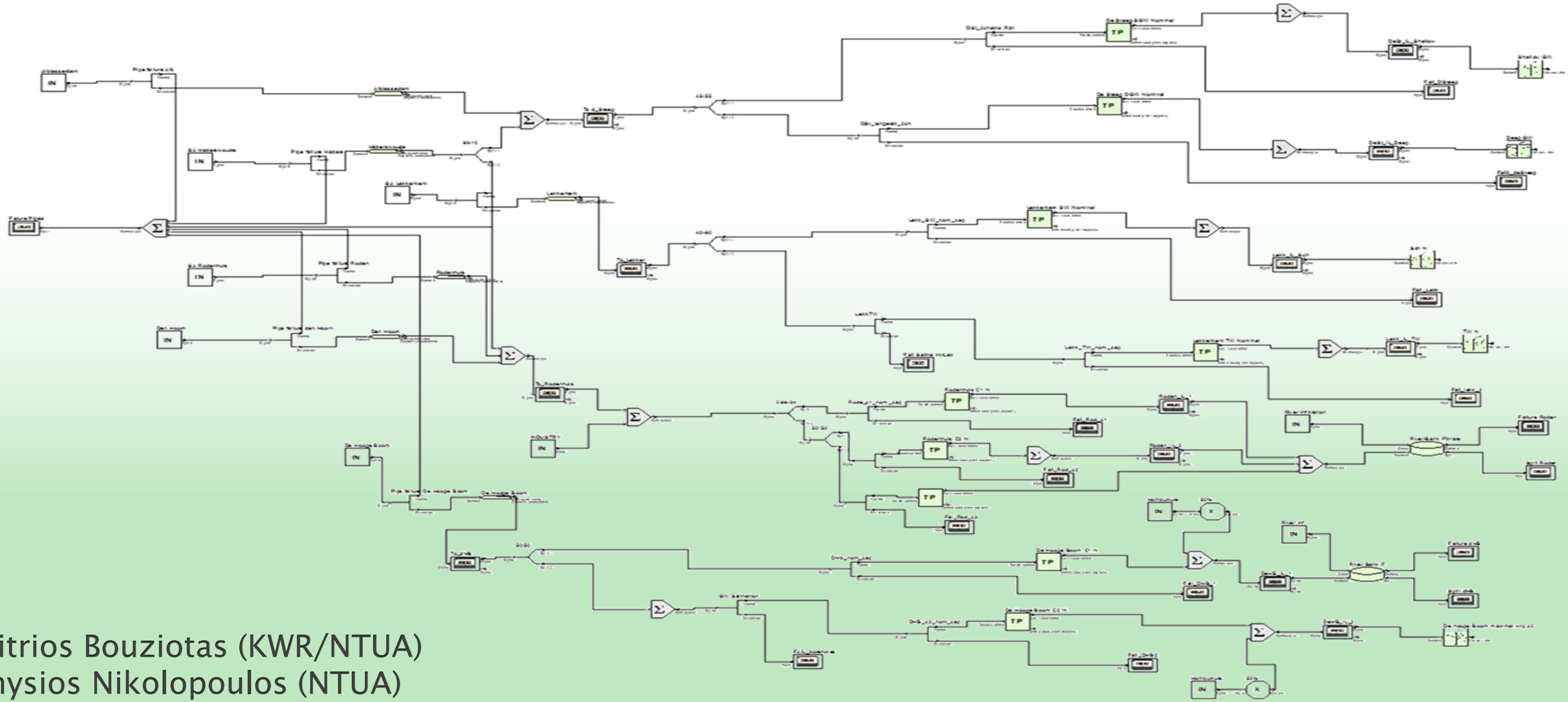
UWOT hands-on training: Part I



Dimitrios Bouziotas (KWR/NTUA)
Dionysios Nikolopoulos (NTUA)

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UWOT Download

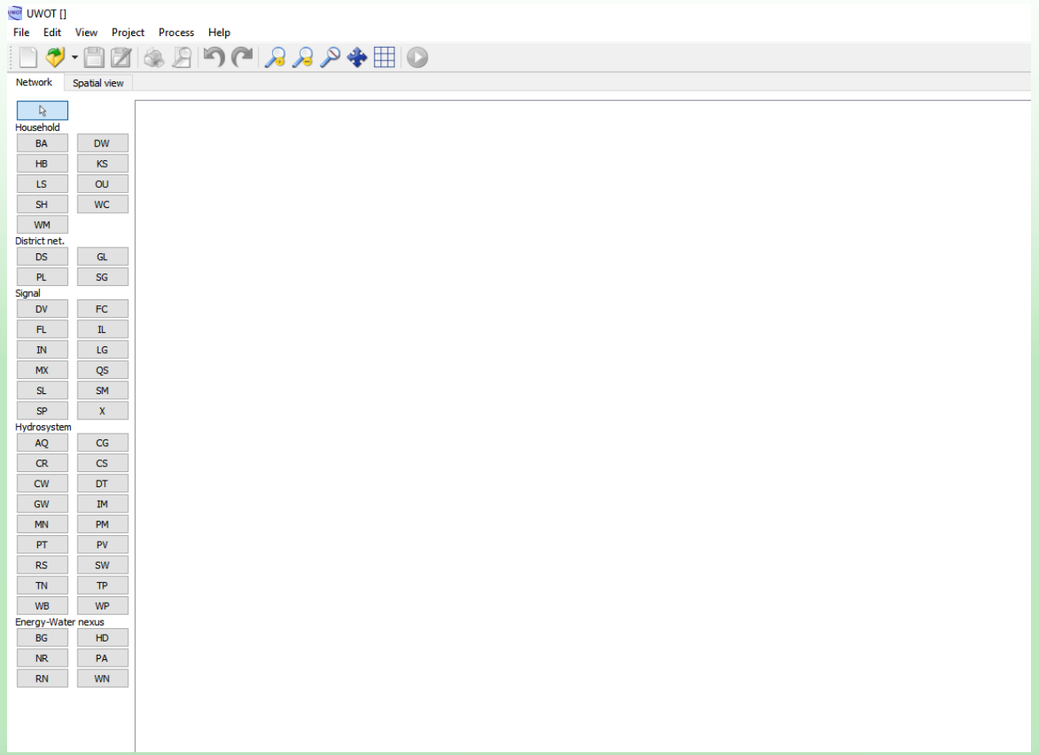
Κατεβάστε τα εξής αρχεία από το σύνδεσμο https://drive.google.com/drive/folders/1t-V6-1sDjrd4d4hvf3fsH_7Soxwx_PWP?usp=sharing ή το σχετικό link στο mycourses.ntua.gr

- *UWOT_2021.zip* : περιέχει το εκτελέσιμο του UWOT.
- *demo_timeseries.zip*: περιέχει τα αρχεία των χρονοσειρών για το demo.

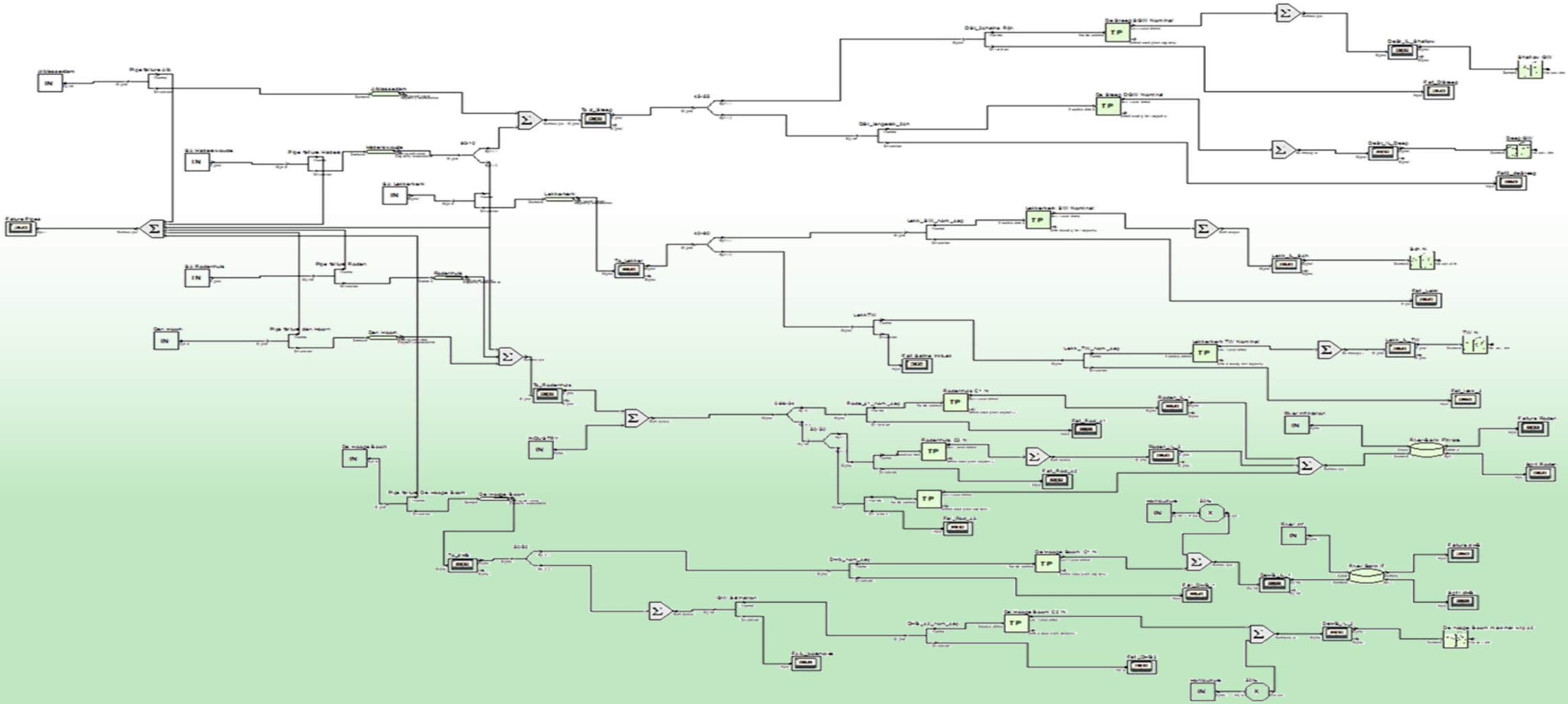
Κάντε τα unzip (σε κοινό φάκελο) & τρέξτε το *main.exe*.

Ακολουθήστε τα βήματα στο *UWOT_short_guide.pdf*.

Θα πρέπει να βλέπετε το user interface που εμφανίζεται και στα δεξιά.



UWOT household modeling basics



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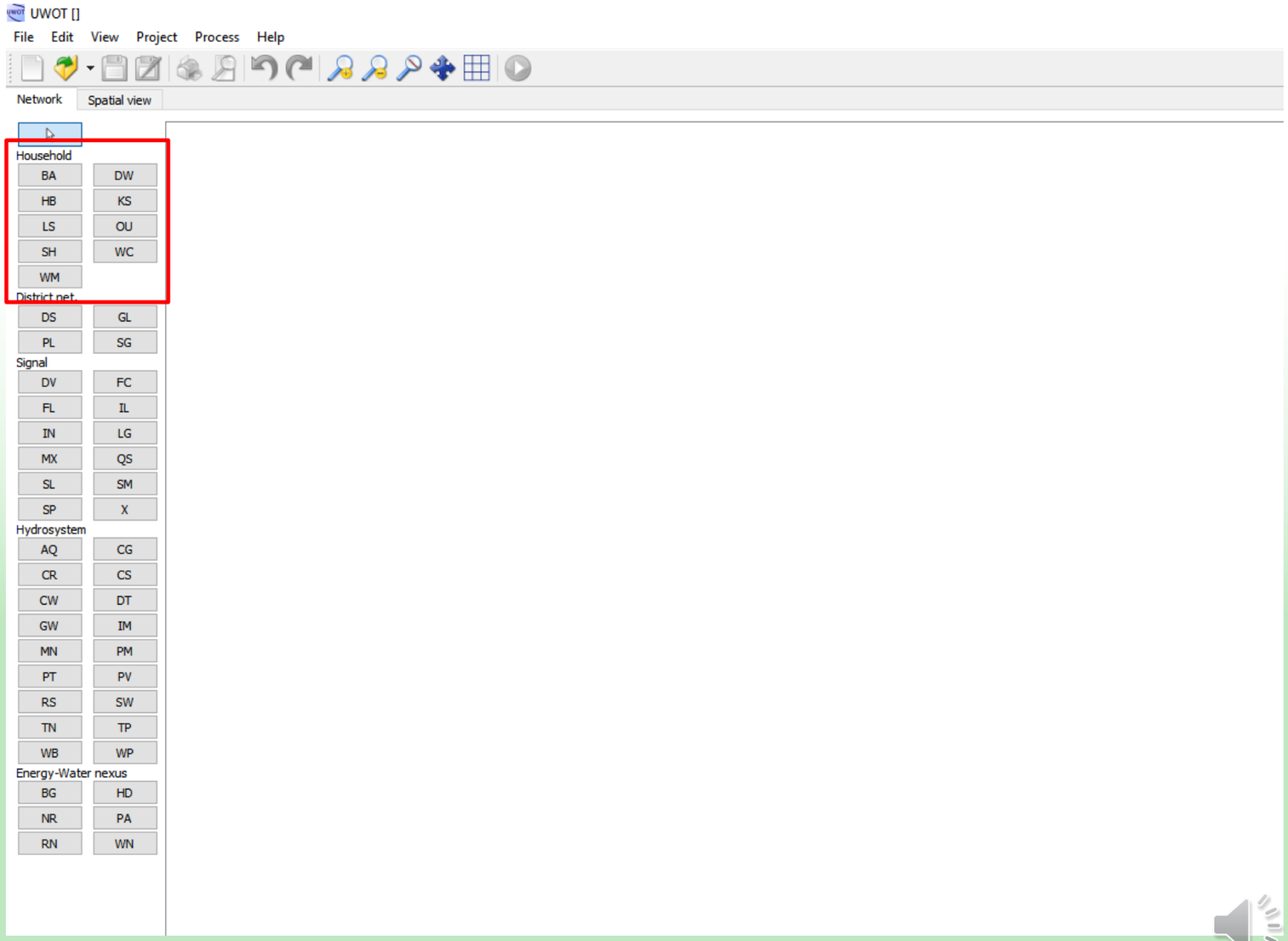
UWOT Household modelling

Household category micro-components:

BA: Bath
DW: Dish Washer
HB: Hand Basin
KS: Kitchen Sink
SH: Shower
WC: Toilet
WM: Washing Machine
OU: Outside uses
LS: Local Suds



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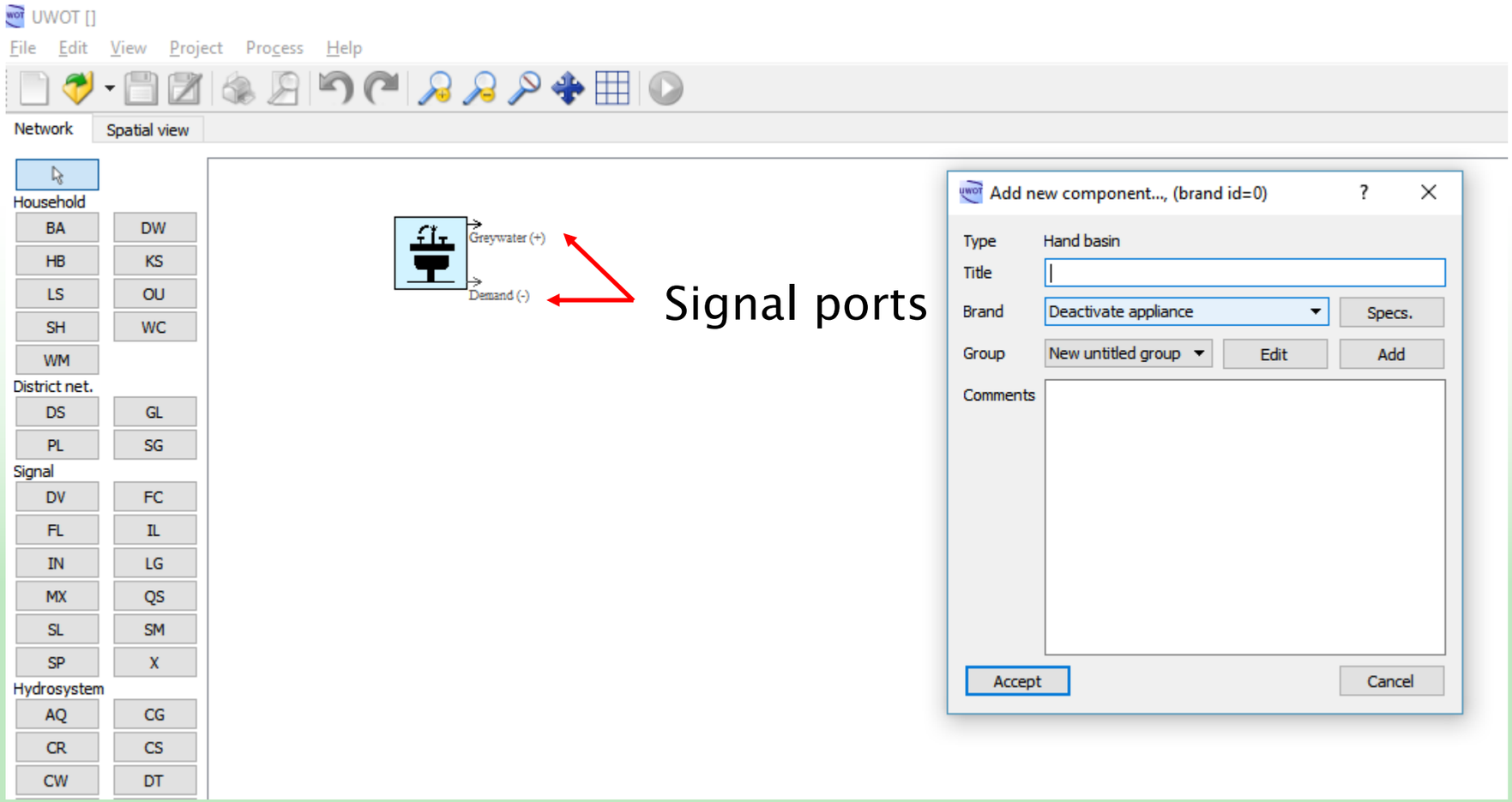
Adding Components

- *Select HB and click on the drawing space*

The HB component has two signal ports:

- Graywater (+), push signal
- Demand (-), pull signal

Components are of a specific Brand and belong to a Group.



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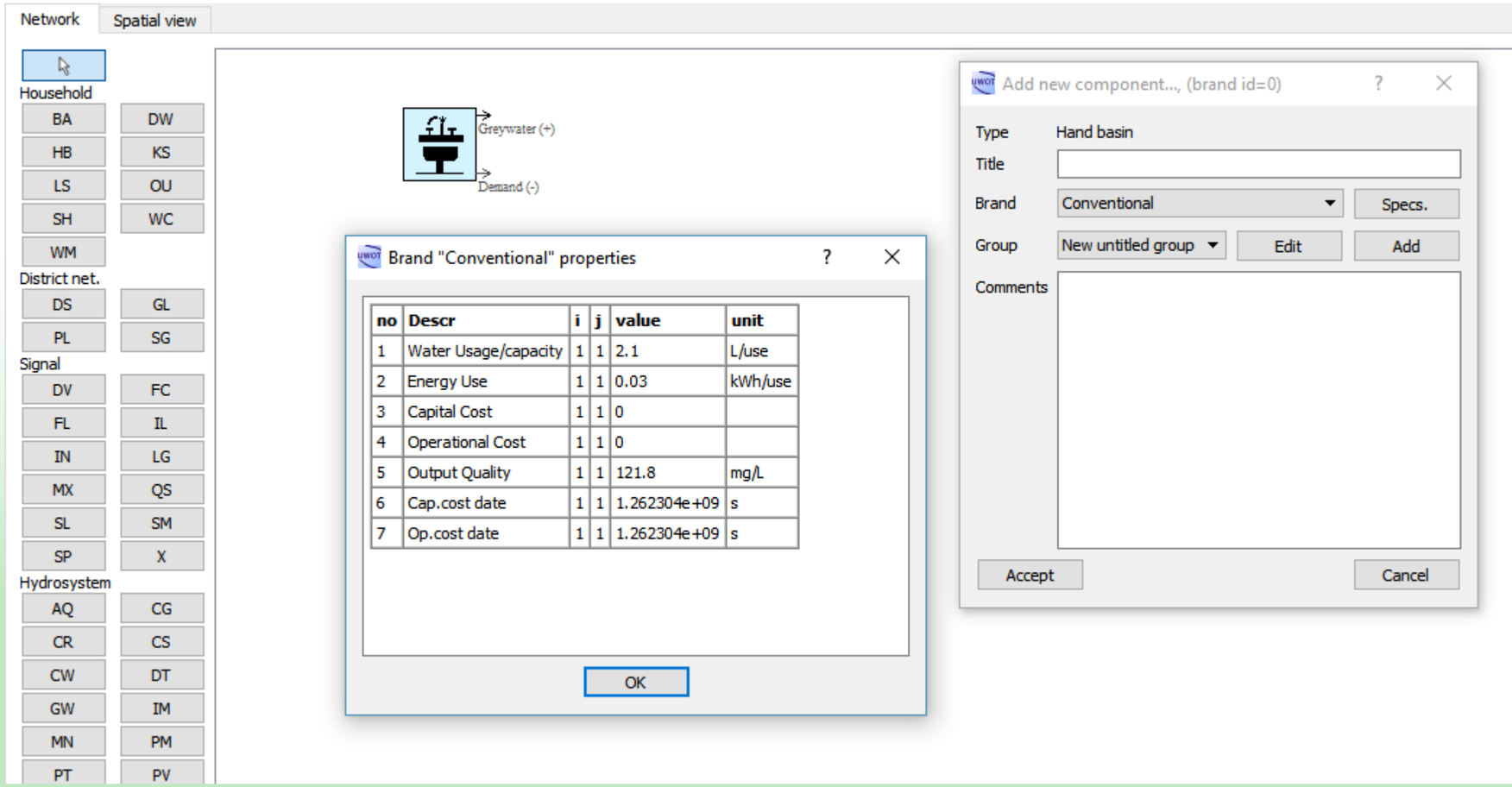
Brands & Groups

- *Select the conventional Brand from the list and inspect its Specs.*

Number of uses per person is affected by the global parameters of the component's group.

- *Click Add to attach the component to a new Group.*



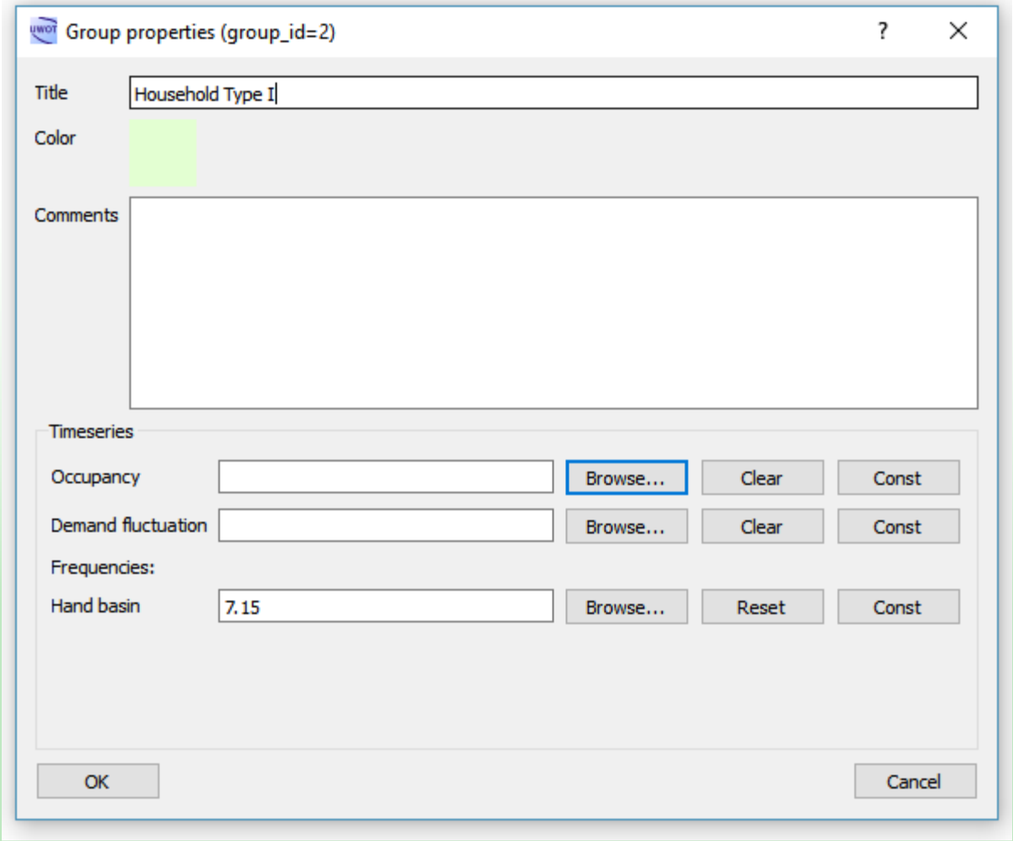
UWOT hands-on training: Part I

Group editing

❖ *Name the Title "Household Type I"*

Right now, three Time series are available for editing, which affect all components in the Group:

- Occupancy: number of people using the Groups components (i.e. #people/household)
- Demand fluctuation: Multiplier of Demand per usage of the components
- Frequencies: Number of uses per person, of a specific component



UWOT hands-on training: Part I

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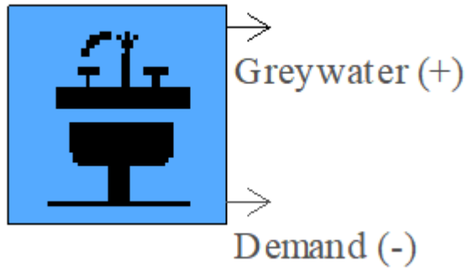

Demand signal value of the HB component in a daily time step = Occupancy× Demand fluctuation × Hand Basin Frequency.

Greywater signal value is assumed to be the same.

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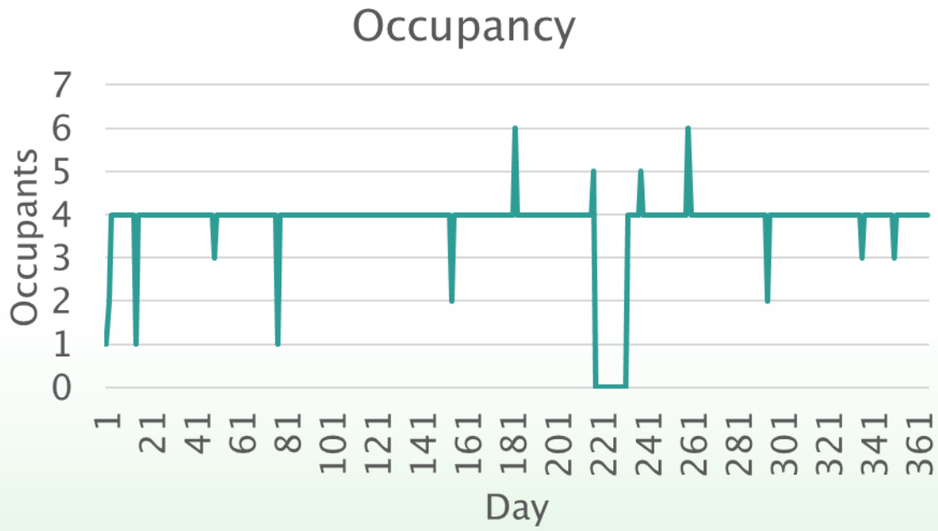
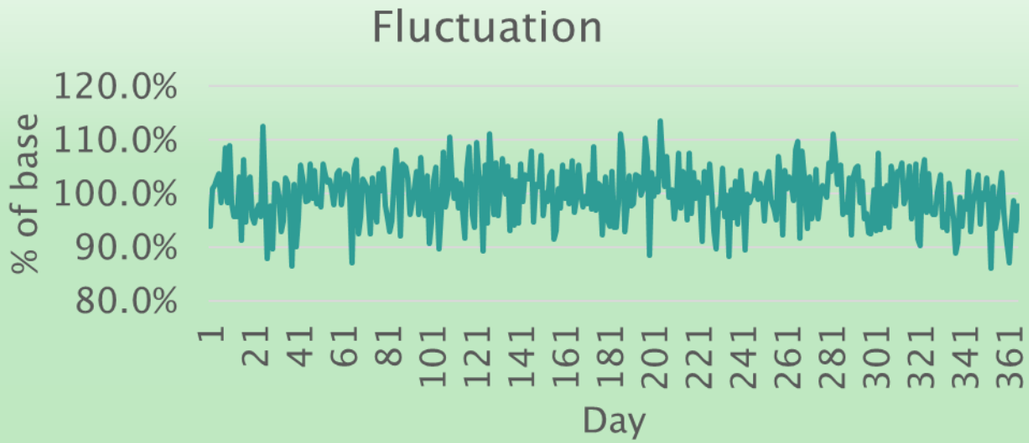
Group editing

- *Browse the training material folder and select the file "Occupancy_TS.csv" in Occupancy field*
- *Browse the training material folder and select the file "Fluctuation.csv" in Demand Fluctuation field*

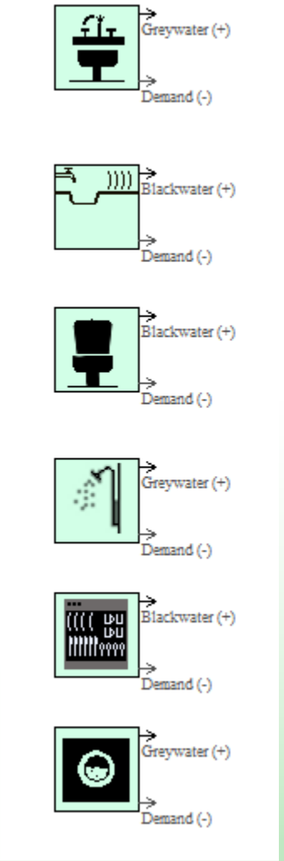




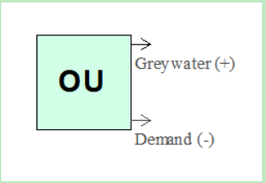
UWOT hands-on training: Part I

Add more components to define a Household type

- *Add more household UWOT components of type Kitchen Sink (KS), Toilet (WC), Shower (SH), Dish Washer (DW), Washing Machine (WM) and make sure to use the predefined "Conventional" Brand and attach them to the same Group*

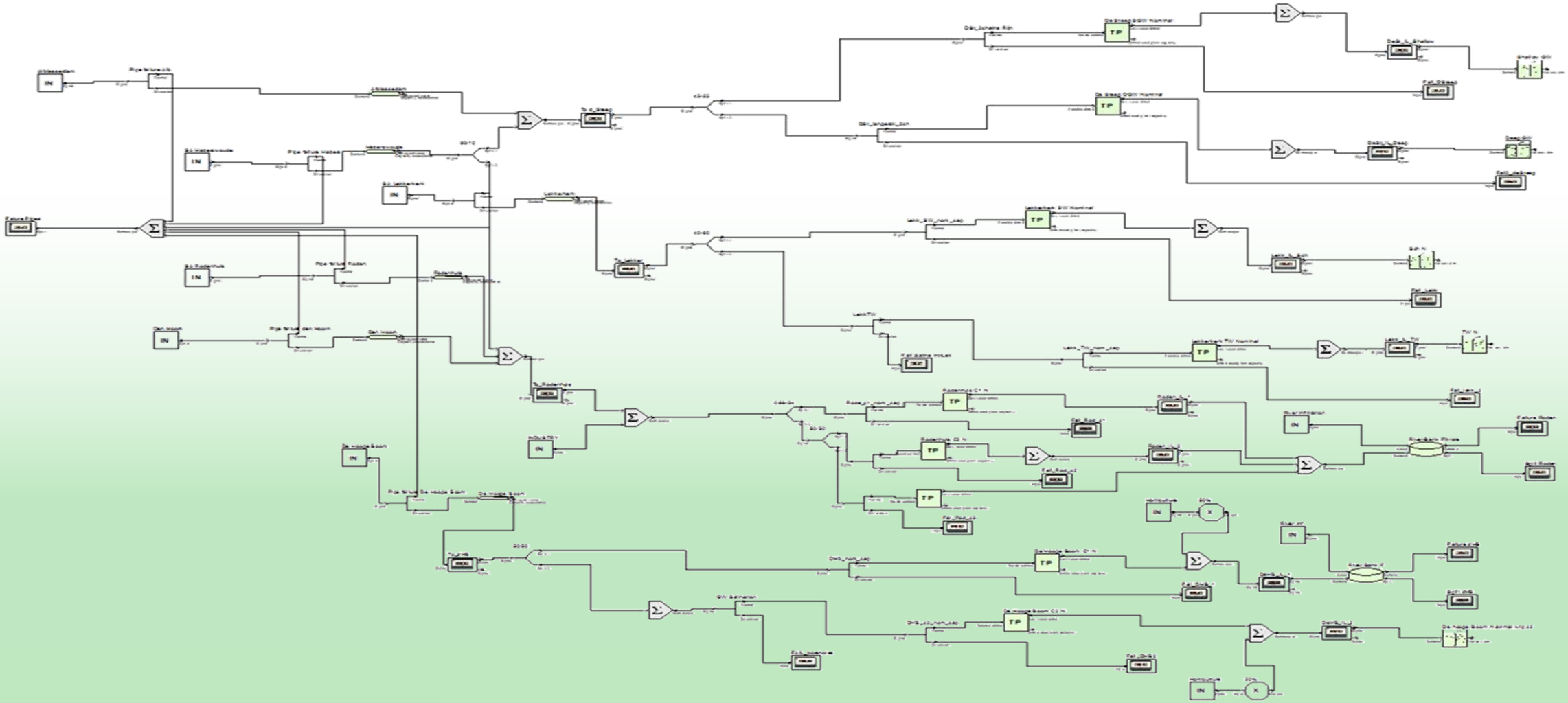


- *Add a component of type Outside Use (OU). From the predefined Brands select the "Decorative Water Feature", and browse its specs.*



- *Inspect again the group properties and see how different frequencies were automatically added, as we add more devices to a group.*

Signal summation/mixing

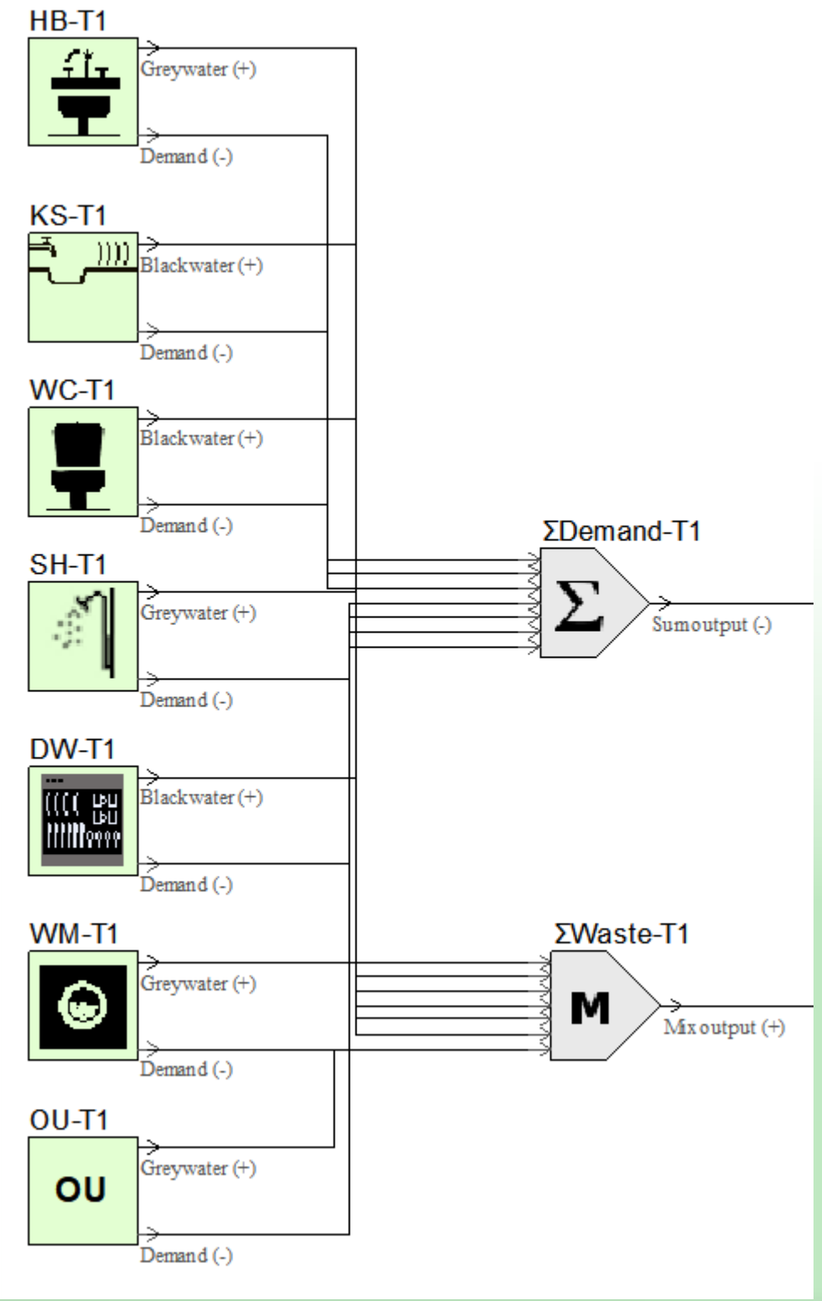


UWOT hands-on training: Part I

Basic signal routing (summation)

- *Add a Summation (SM) component from the signal panel. This signal is used with pull signals (-) and sums only quantities.*

- *Connect the Demand output of every component by right-clicking, selecting "Connect Demand (-)" and then left-clicking on the Summation component and selecting "Connect to Input(-)"*

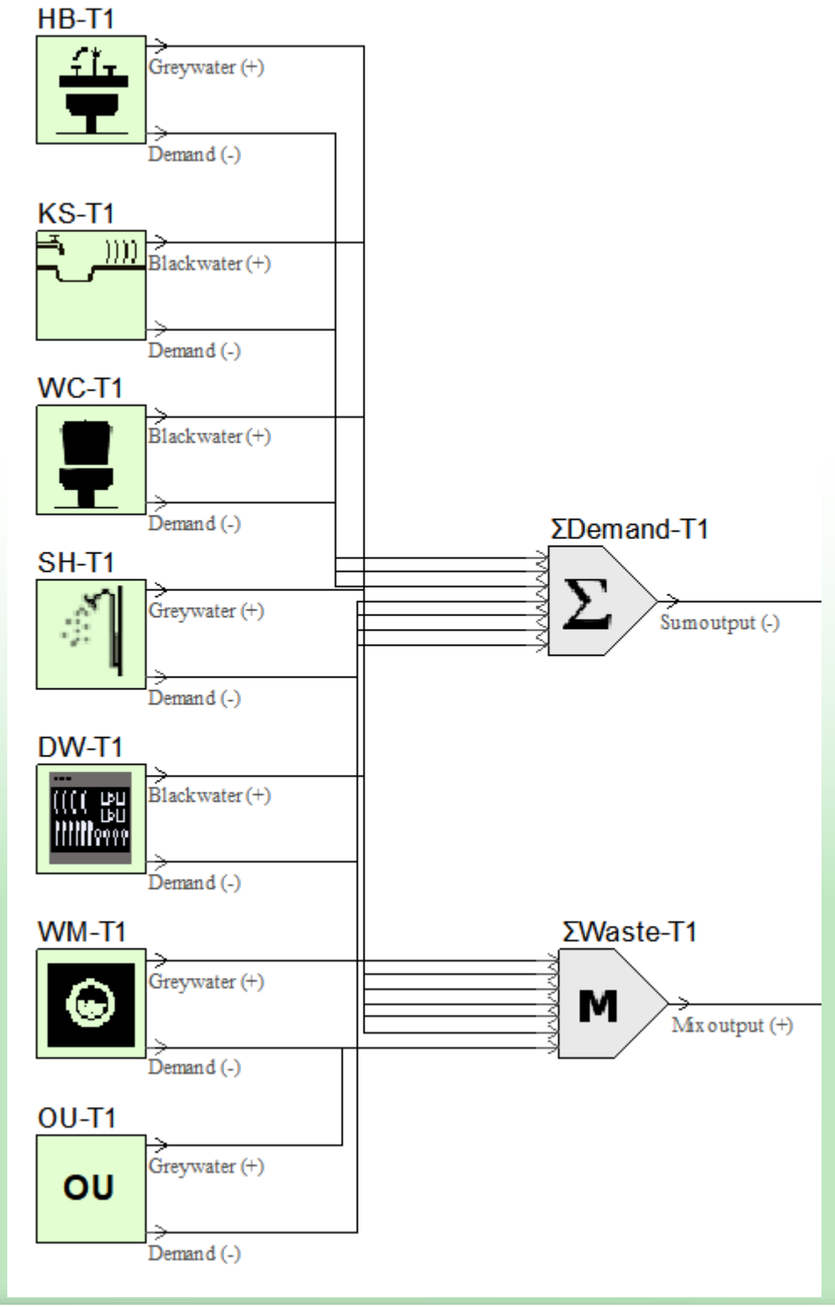


UWOT hands-on training: Part I

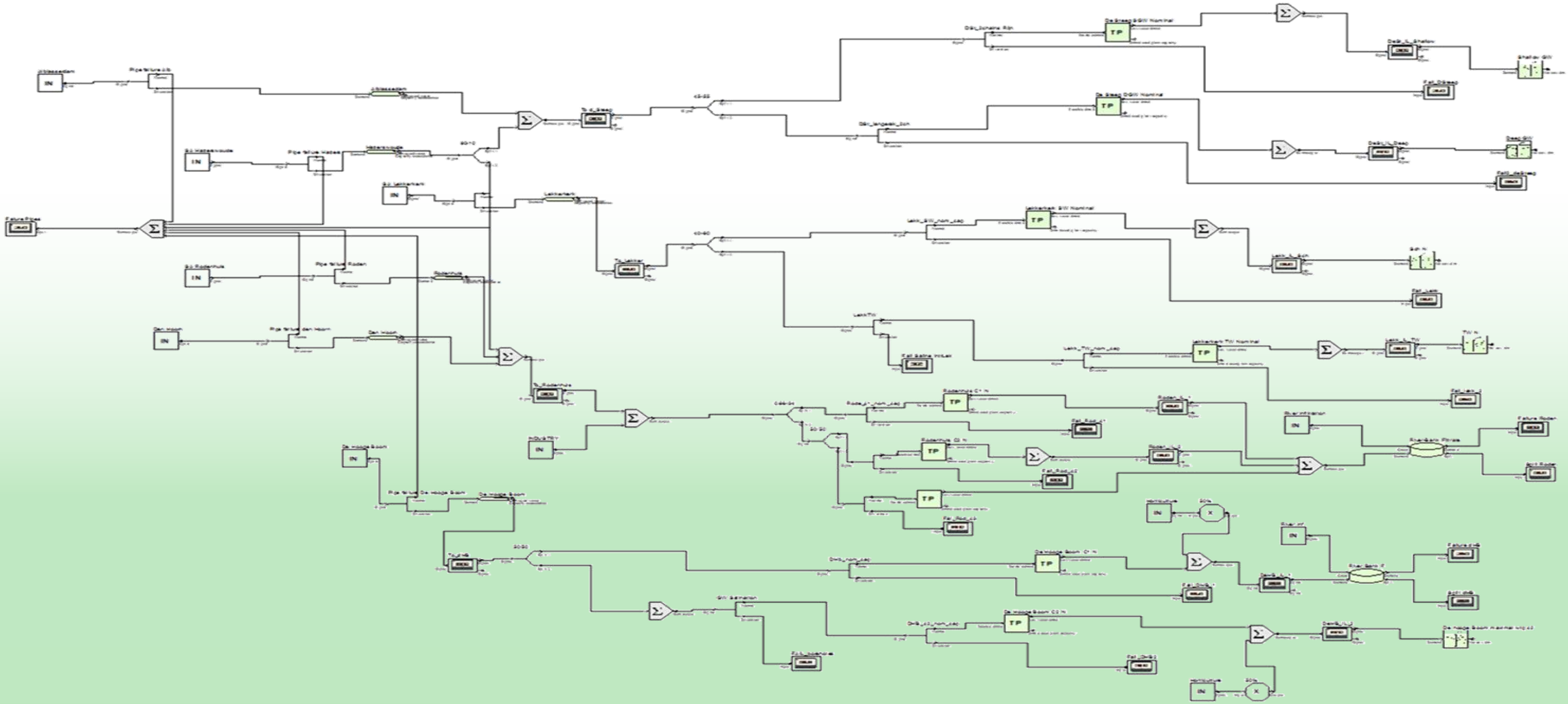
Basic signal routing (mix)

- *Add a Mix (MX) component from the signal panel. This signal is used with push signals and sums quantities and mixes qualities (by a flow weighted average).*

- *Connect the Greywater/Blackwater output of every component by right-clicking, selecting "Connect Greywater/Blackwater (+)" and then left-clicking on the Mix component and selecting "Connect to Input(+)"*



Household roofs/impervious areas



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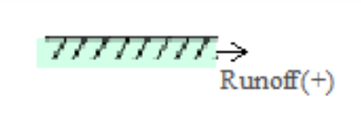
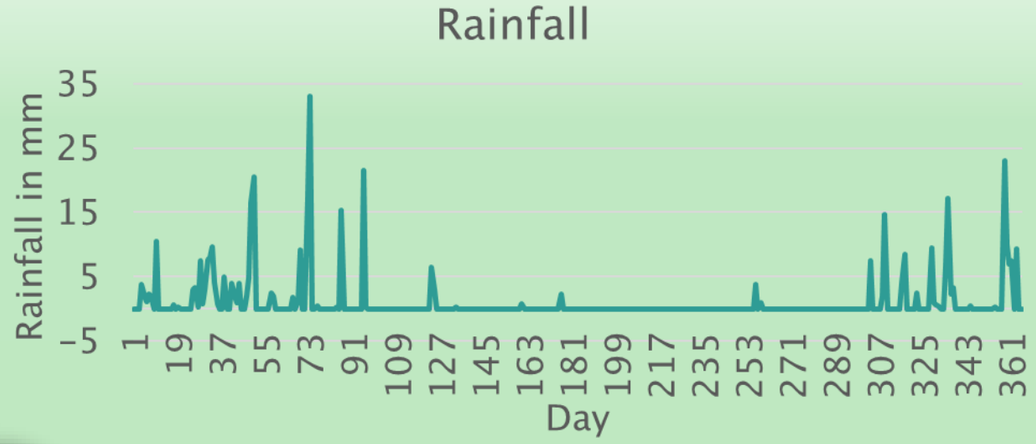
Household Impervious areas

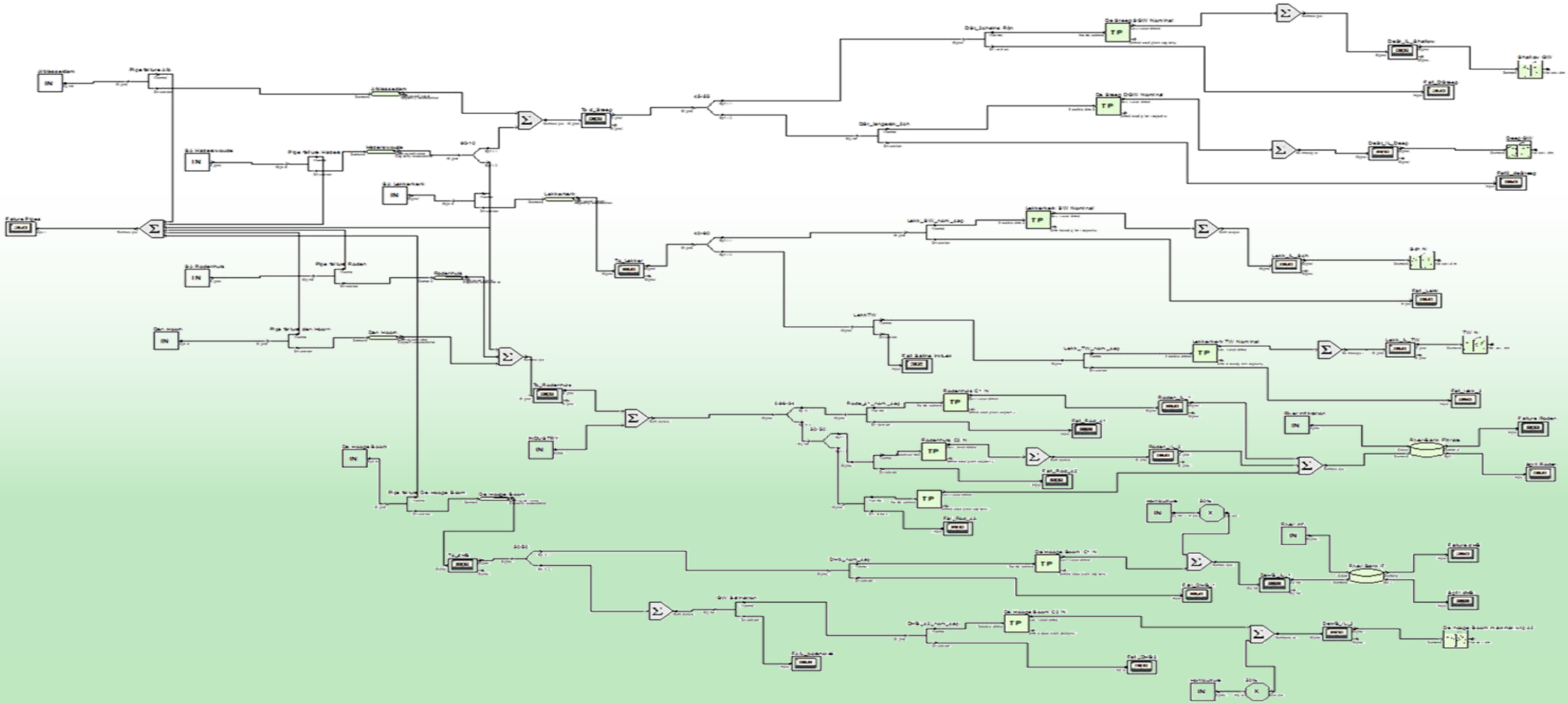
- *Add an Impervious Area (IM) from the hydrosystem panel that corresponds to the impervious areas of this Household Type, define the area in m² as 100 and select the predefined "10% evaporates Brand"*



- *Edit the Group. A new automatically created Rainfall time series is created. Browse the training material folder for the "Rainfall_TS.hts" file.*



From household to district level



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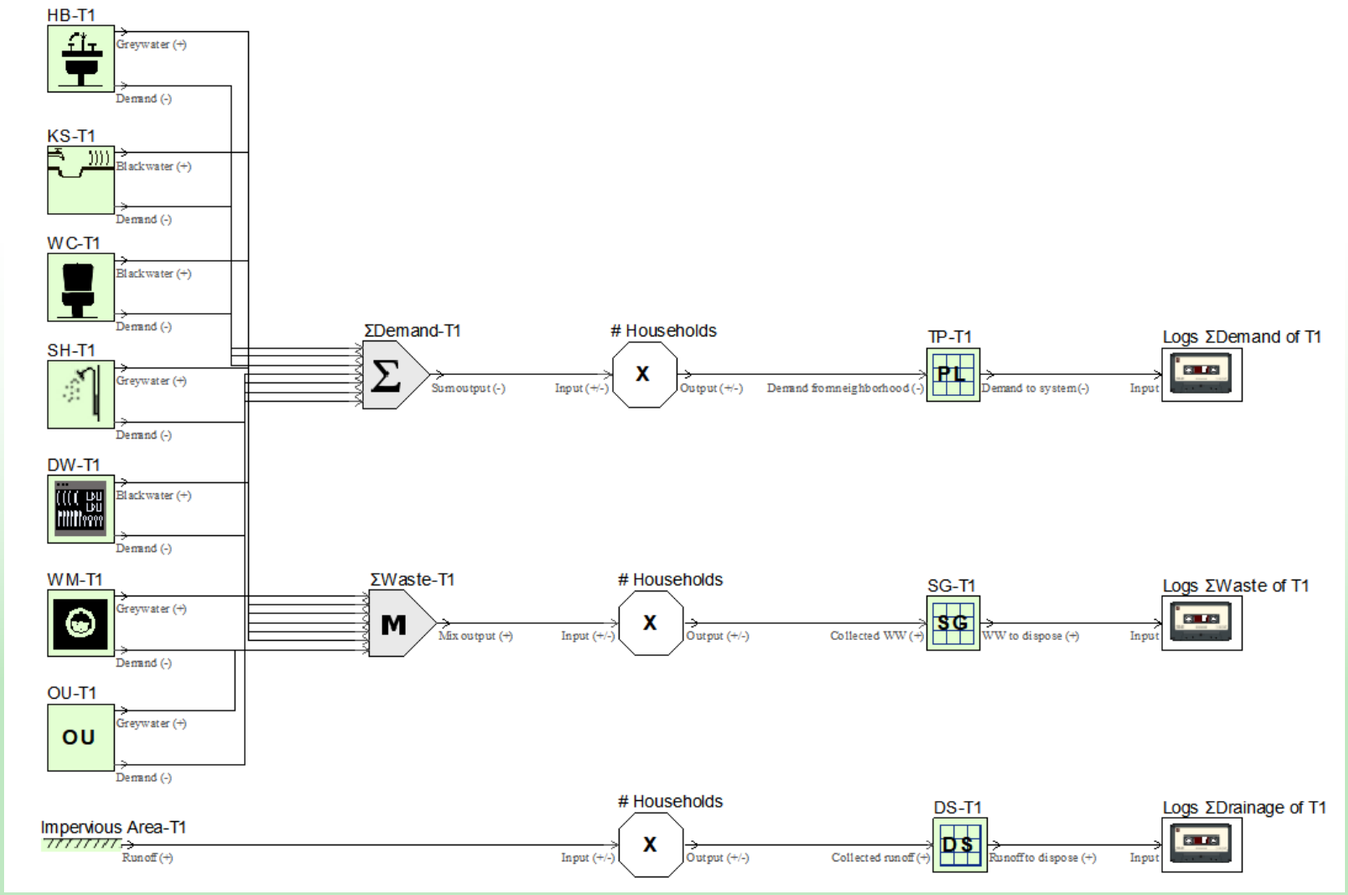
Define a district

- *Right-click on the SM, MX and IM components and select delete the respective type connections.*
- *Add three Multiplication (X) components from the signal panel. Use a constant value of 250, to represent households in the district.*
- *Connect each of the SM, MX and IM to a X and then each X to PL, SG, DS.*
- *Perform a simulation again.*



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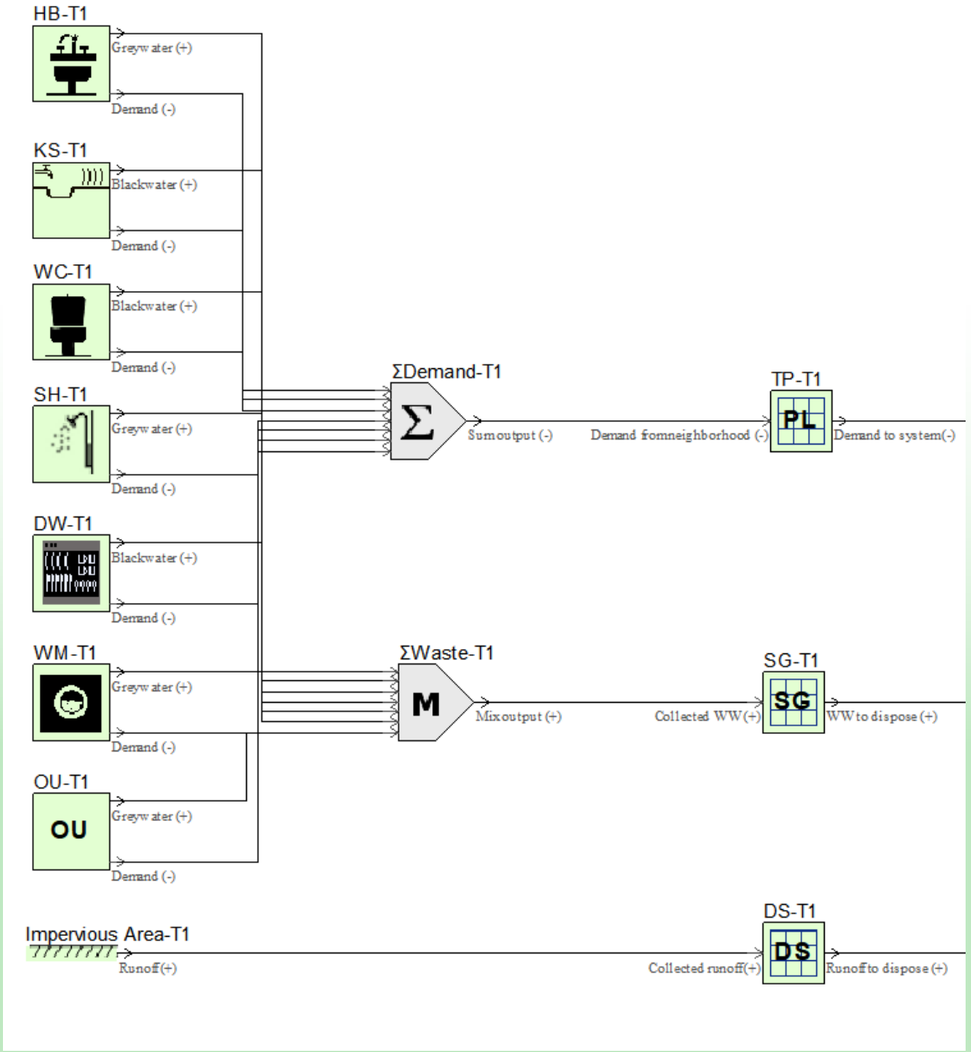
Tertiary network connections

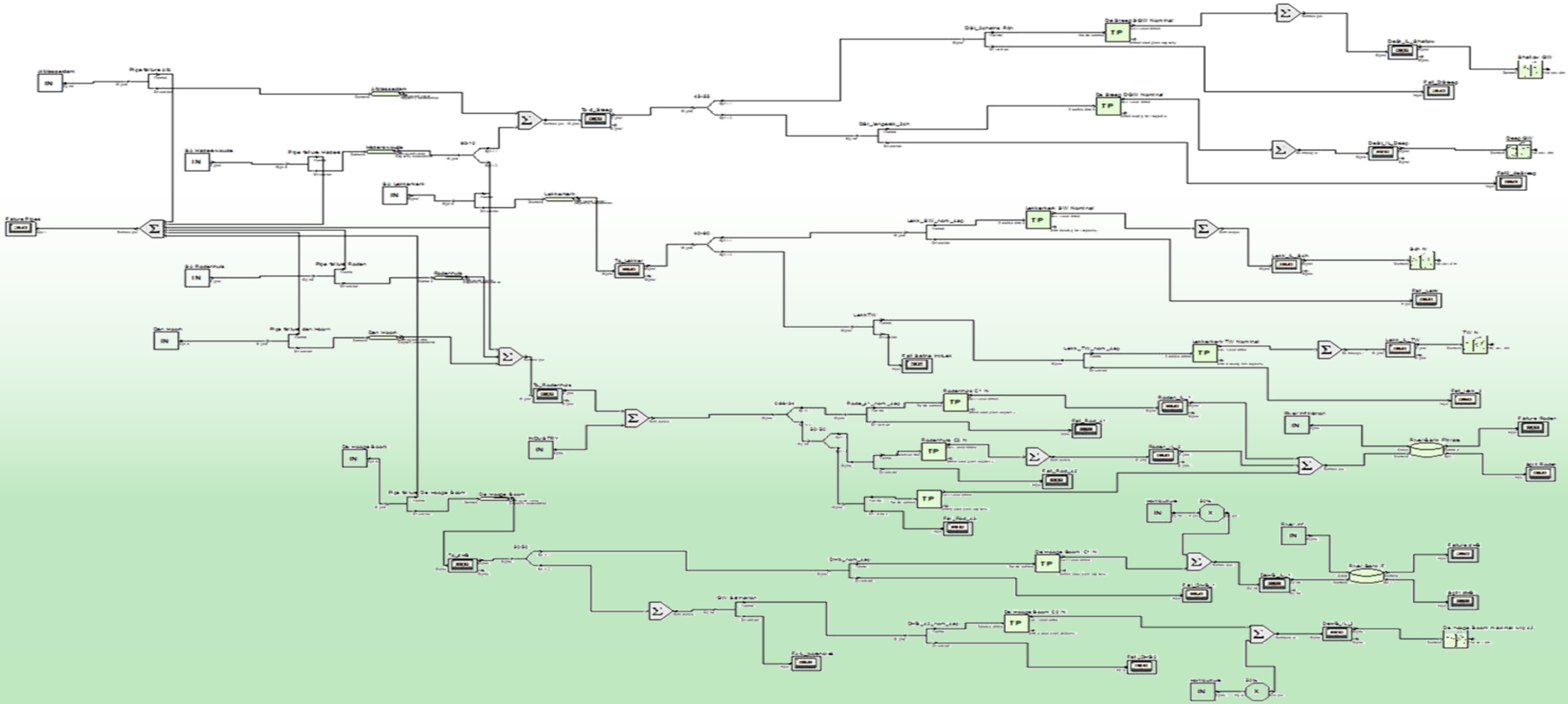
- *Add from the District network panel the Tertiary potable network (PL), Sewage collection (SG) and the Storm drains collection (DS) components. Make sure all belong to the same Group and select the predefined Brand "PE".*

These represent the water losses and energy use from the tertiary networks of a district.

- *Connect the SM component to PL, the MX to the SG and the IM to the DS.*



Basic Loggers and Simulation

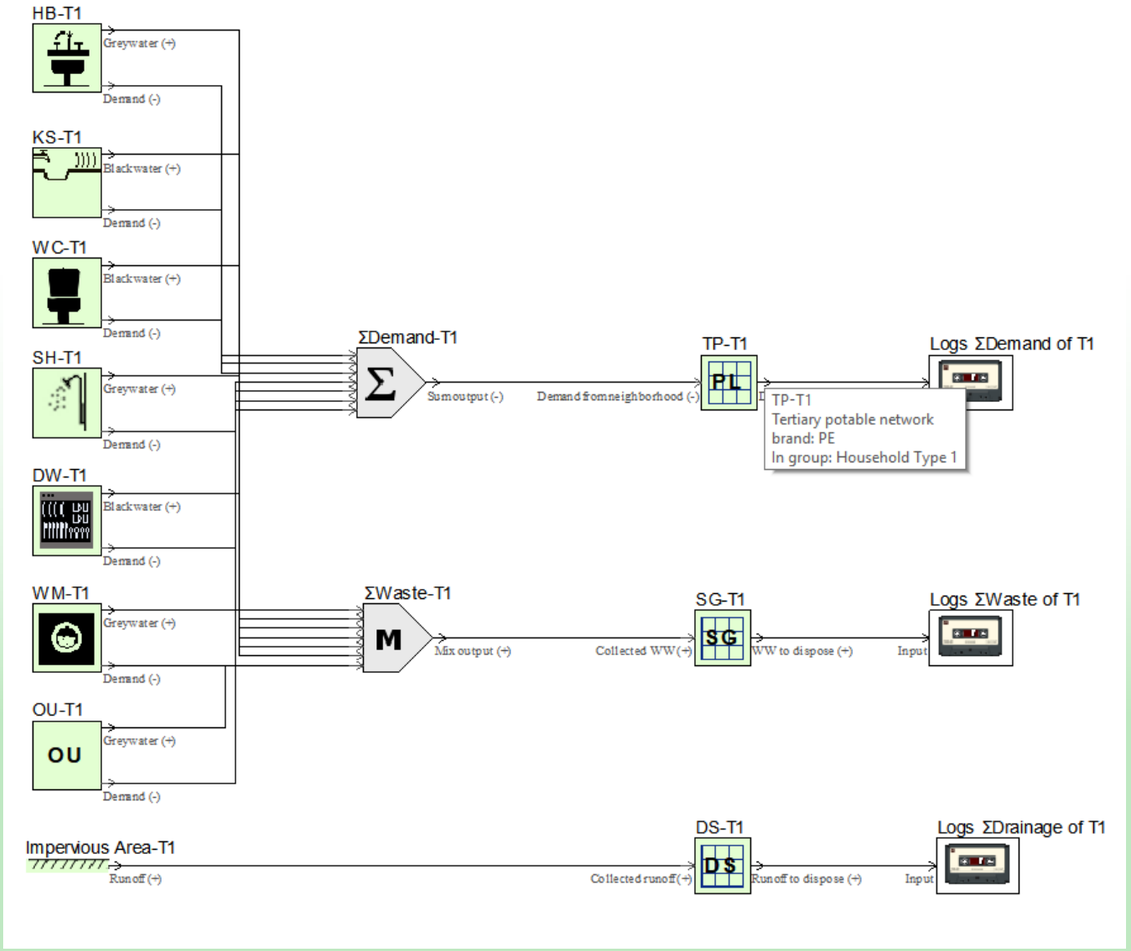


UWOT hands-on training: Part I

Logging signals

- *Add three Logger (LG) components.*
- *Connect each of the PL, SG, DS to a LG.*

These are used as final recipients that log incoming signals.



Before simulating

- *Check the group properties again to view all requested timeseries and parameters.*

- *Save your UWOT topology in the file "part1.uwot"*

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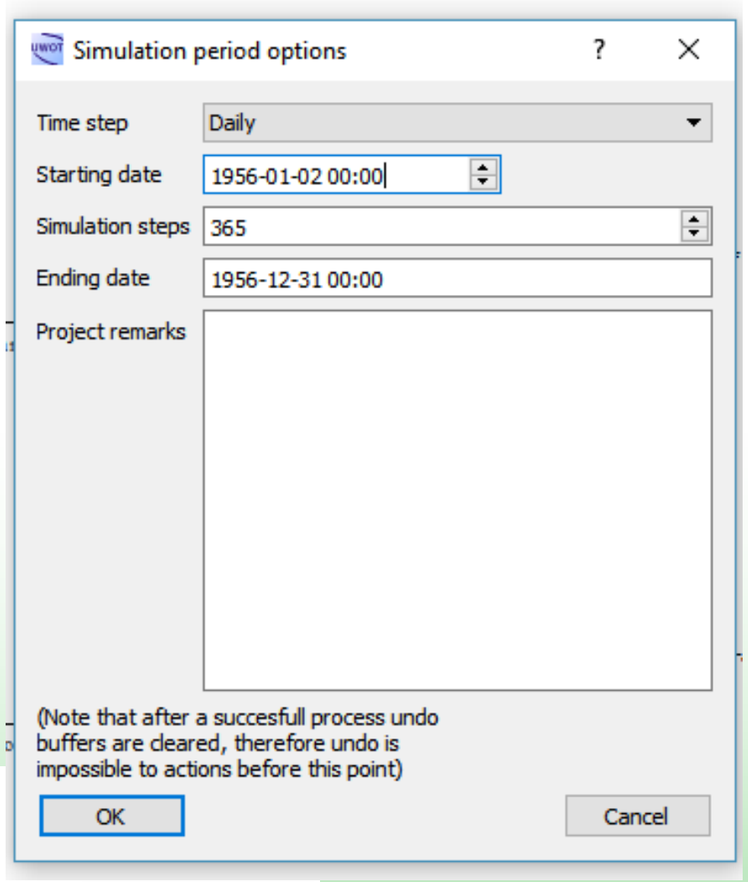
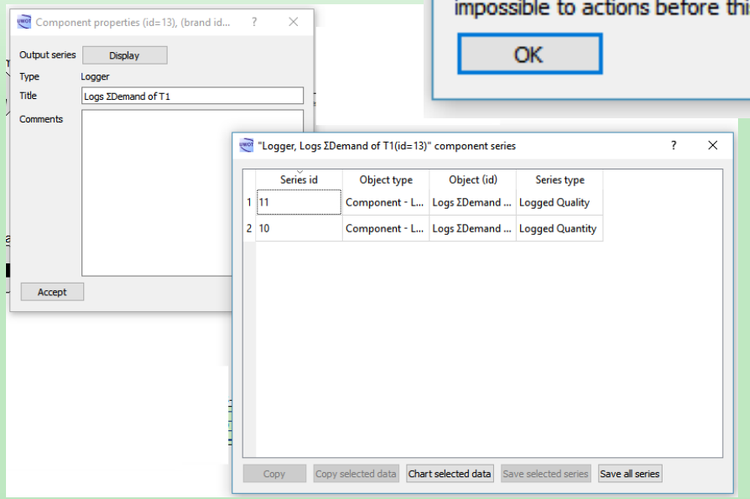
Perform a simple UWOT simulation

- *Click the Process button on the toolbar and hit OK to perform a simulation.*
- *You cam view all logged signals by double-clicking loggers, clicking the Output Timeseries Display button and selecting the Logged Quantity or Quality type.*

The loggers have captured the water cycle of a specific household (Demand, Waste, Runoff)





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