**Logical data model (ER diagram) for water usage time series:**

A logical data model was designed to represent all of the data and the associated metadata from the residential water use monitoring site. The design is based upon a relational database model. “Crows Foot” type notation was used to develop the entity-relationship diagram (Figure A1). Four entities each containing several attributes were identified to develop the model. In the center of the data model there exists the timeseries entity. Very fine resolution (time support, and spacing each being of 1 sec) water usage data will be collected to capture the variability of water usage. Knowing the limitation that the server cannot receive data at 1 sec interval, each time series constituting of 60 observations will be sent to the server. Each time series (primary key being timeseries\_id) will be bounded by a starting timestamp and an ending timestamp. Time will be recorded in UTC and an offset (negative 7 hours) will be applied to arrive at MDT. Every time series will have an attribute called “timeseires\_dst with a value of 0 (n) or 1 (yes) indicating whether it is subject to day light saving or not. The entity “timeseries” is related to “datavalue” entity with “zero to many” relationship, which means that each datavalue belongs to one and only one timeseries while each tiemseries will have zero to many (upto 60) datavalues. Each datavalue will have an index and a timestamp as attributes and will contain the observed water usage value.

**Physical data model in MySQL:**

The logical data model was exported to MySQL relational database management system. Four objects (e.g., datavalue, sites, timeseries, and variable) were exported in MySQL workbench to generate a script. The script was then executed on the DB server to create the database.