Model adaptation in a central controller for a sewer system

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For small sewer systems that combine foul water and storm water sewer functions in flat terrain, central control of the sewer system may have problems during dry weather. These systems are a combination of local gravity flow networks connected by pumps. Under those conditions the level in the wet well (local storage at the pumping station) should be kept below the entrance pipe but above the top of the intake of the pump. The pumps are dimensioned to cope with the combined flow of foul water and precipitation run off so their capacity is relatively large when compared with the volume available in the wet well. Under local control this is not a major problem because the effective controller time step is very short. For central control the control time step can become a problem. Especially when there is uncertainty about the relation between level and volume in the wet well. In this paper we describe a way to dynamically adapt the level to volume relation based on dry weather behaviour. This is important because a better estimate of this volume will reduce the number of on/off cycles for the pumps. It will also allow detection and correction for changes in pump performance due to aging.