

Appendix D

Model Calibration

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Appendix D Model Calibration

D.1 Introduction

Calibration of a hydraulic model is necessary to provide confidence in the model results. Model calibration involves comparing the diurnal curve patterns collected from flow monitoring to the predicted diurnal curves from the hydraulic model. Changes are made to the assumed diurnal patterns for the various land uses (residential, commercial, etc.) to adjust the model output to match the flow monitoring results. While eight different flow monitoring sites were used and data was collected from each, a total of six locations were used for final calibration. **Table D-1** lists each monitoring location and its status during calibration.

Table D-1 – Flow Monitoring Site

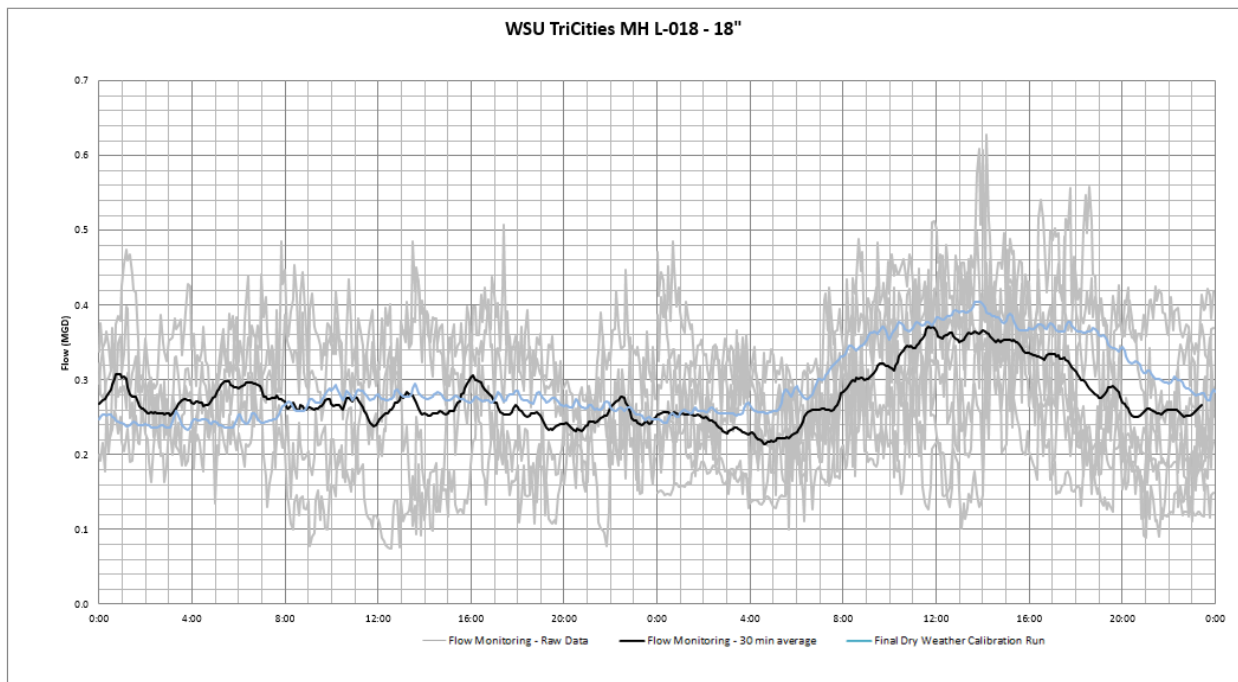
Site Name (Location)	Calibration Status and Reasoning
WSU Tri-Cities (COR MH# L-018, 18-inch interceptor pipe located west of University Drive, outside of City R-O-W)	Included
Pike (COR MH# J-218, 30-inch interceptor pipe located on Pike Ave, N of McMurray St.)	Included
I-182 (COR MH# A-071, 54-inch North Richland trunk pipe crossing I-182, manhole located south of eastbound lanes in grassy area)	Included
Chamna (COR MH# A-103, 24-inch Southwest Richland interceptor pipe located in Chamna Preserve Area)	Included
Columbia Park Trail (COR MH# A-66, 30-inch Southeast Richland interceptor pipe located in gravel parking area off Columbia Park Trail)	Included
Keene (COR MH# P-373, 12-inch Keene collector located east of int. of Keene and Elementary)	Included
Stevens (COR MH# H-019, 15-inch pipe on west side of Stevens Dr, north of McMurray St)	Not Included Site determined not usable. Flow velocity too low, ranges from 0.30 – 0.50 fps.
Lawless (COR MH# C-048, 10-inch pipe located in Lawless Park west of Lawless Dr.)	Not Included Site determined not usable. Flow depth too low, ranges from 0.50-in – 2.0-inch depth.

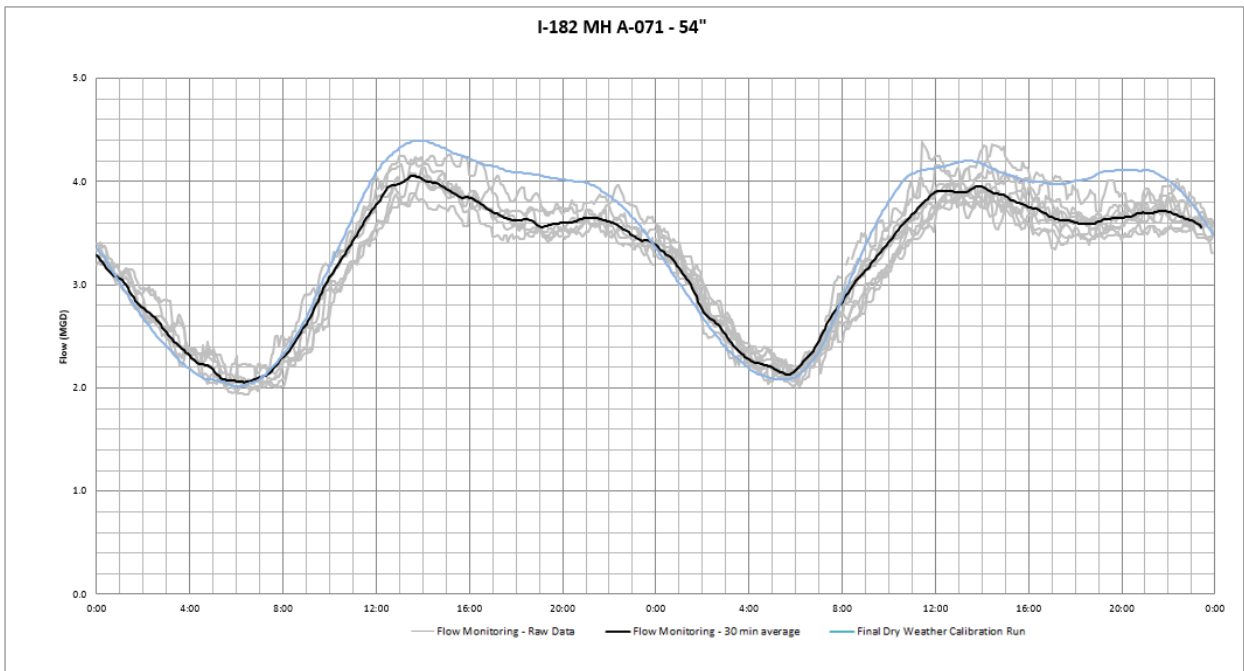
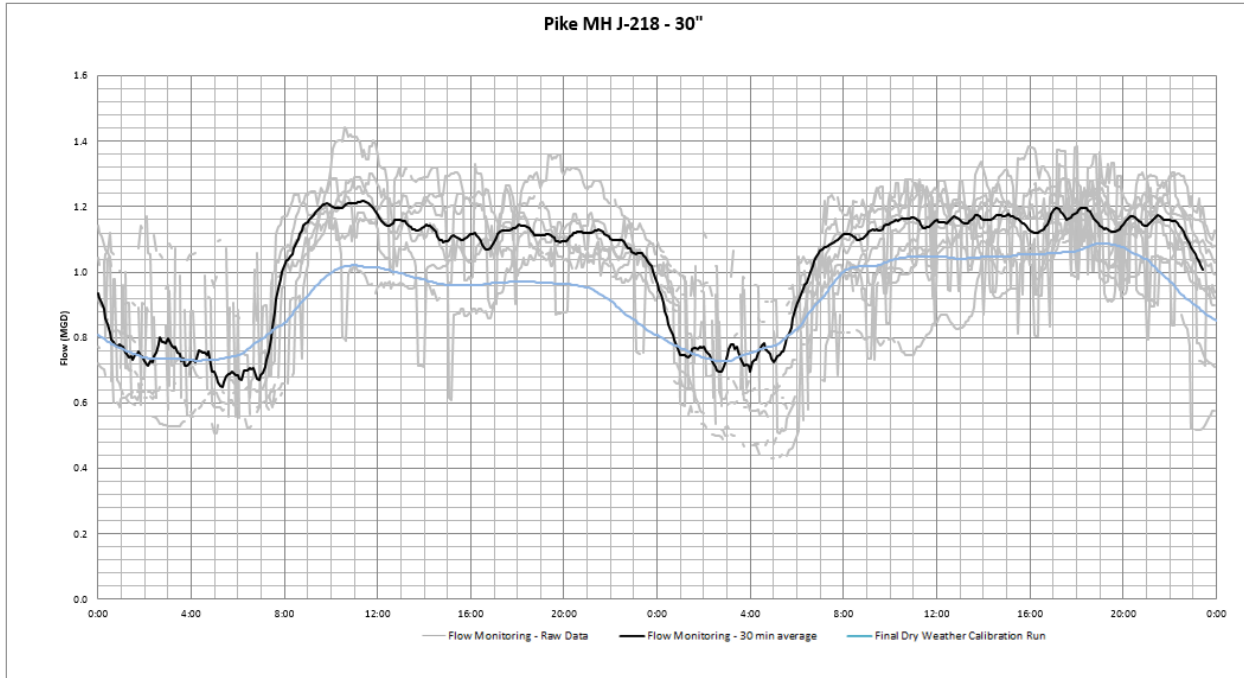
This model was calibrated to six locations in the system where flow monitoring was performed. For the SRSR project (as described in **Section 6.2.2.1**) sewer flows were monitored at two locations, south of the Yakima River, between July 20th and August 8th, 2013. Six additional locations were selected and sewer flows were monitored between

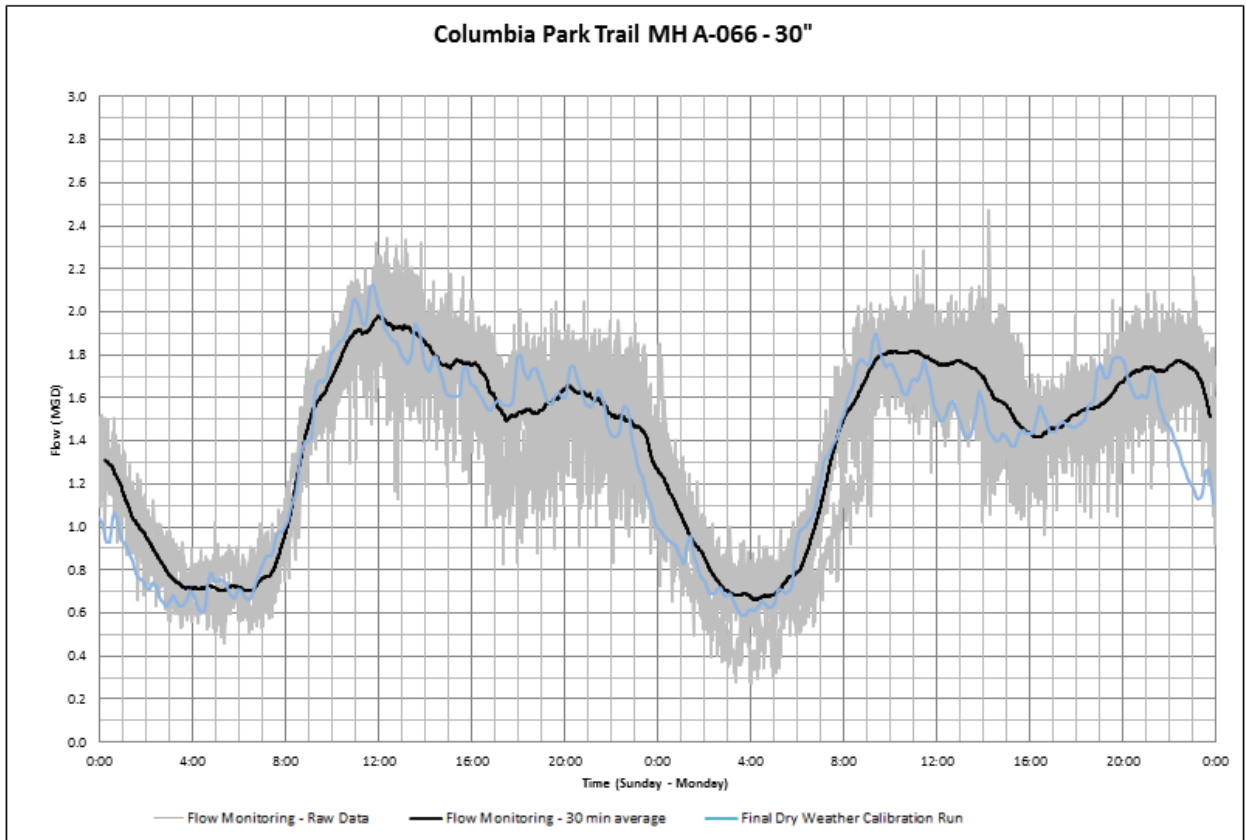
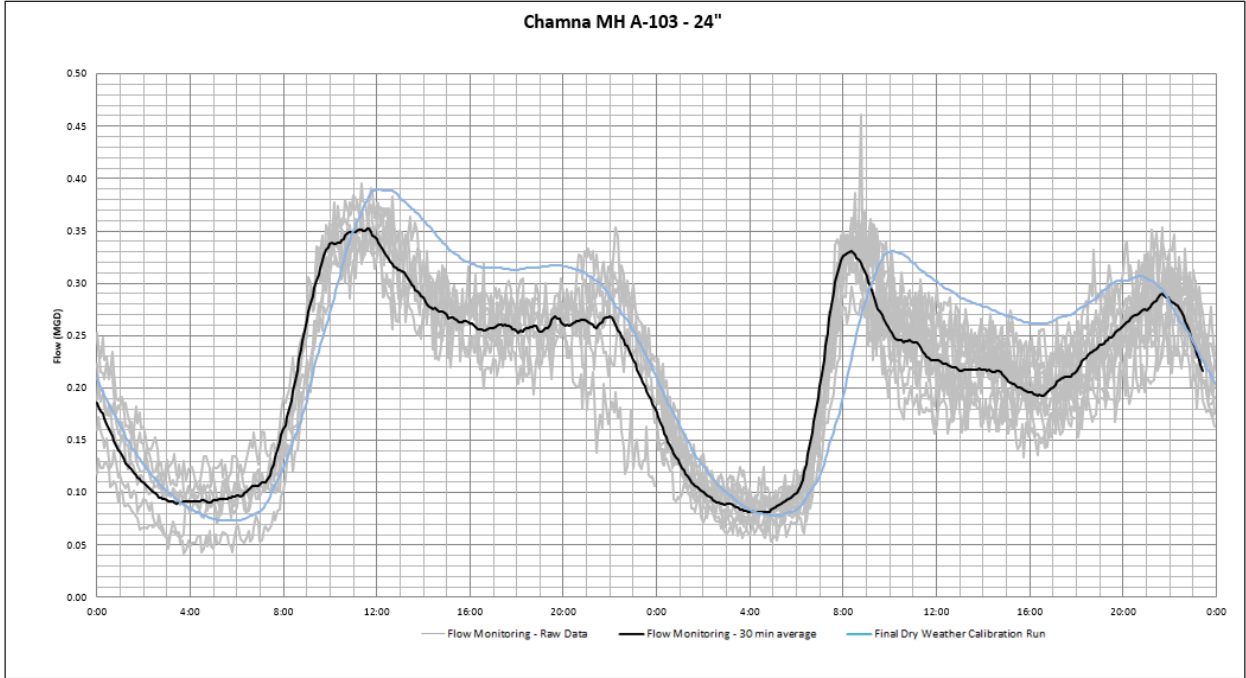
March 26th and May 12th, 2014. At each location, the City installed their flow monitoring equipment in the collection system manholes. The City has two types of monitoring equipment: a Flo-Dar sensor and an ISCO sensor. At the Pike, I-182, and Col. Park Trail locations, the City positioned the Flo-Dar sensor in a cradle mount above the manhole channel. At the remaining locations, the City positioned the ISCO sensors upstream of the manhole channel using mounting rings that were adjusted to the inside diameter of the pipe. Flow depth and flow velocity readings were collected every 5 minutes. Using this data and the pipe diameter, the measured flow was calculated using the continuity equation ($Q=A*V$).

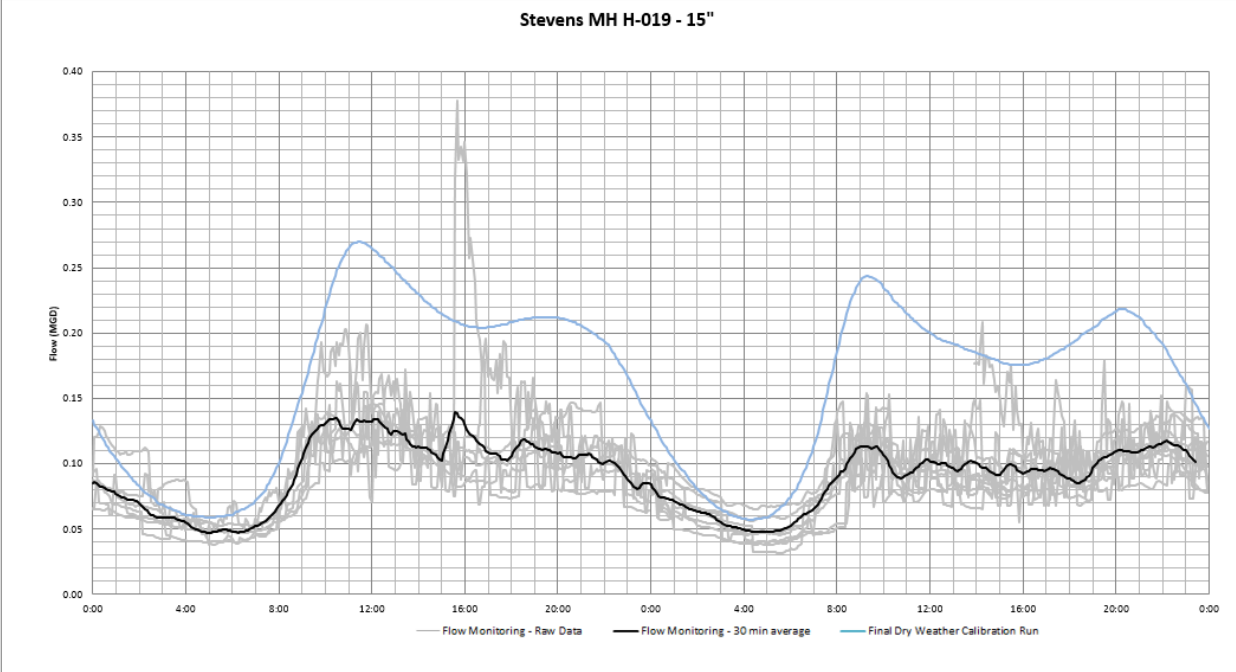
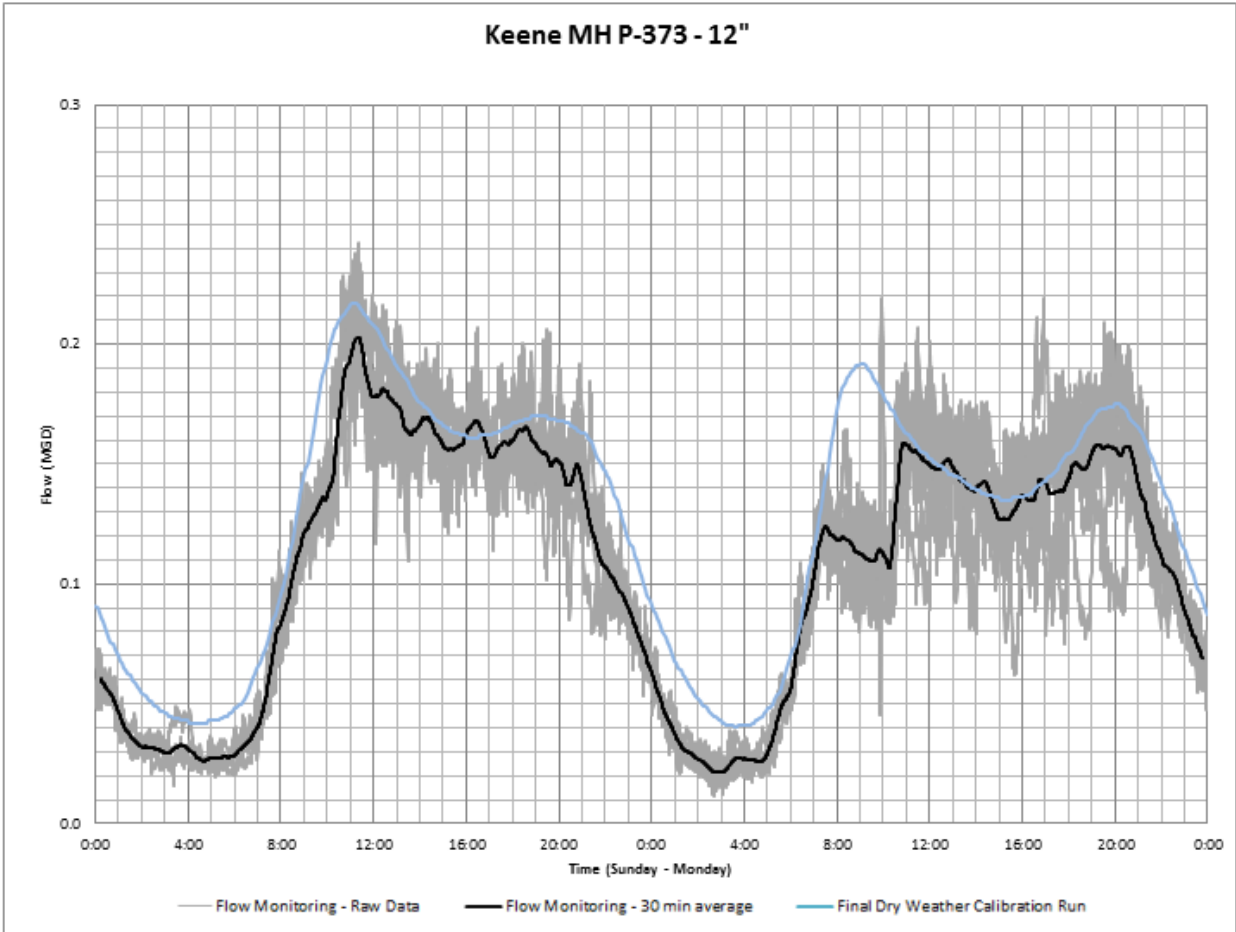
Model calibration was completed for both dry weather and wet weather conditions. An explanation of each approach is included in **Section 6.2.4**. The following graphs plot flow versus time for both the flow monitor results and the selected model run from final calibration. To observe the difference between both weekend and weekday flows, the graphs plot flows over a two-day period. Graphs for wet weather flow include the design storm (3 hour short duration storm with 2 year return) used for the final Existing Model calibration.

D.2 Dry Weather Calibration

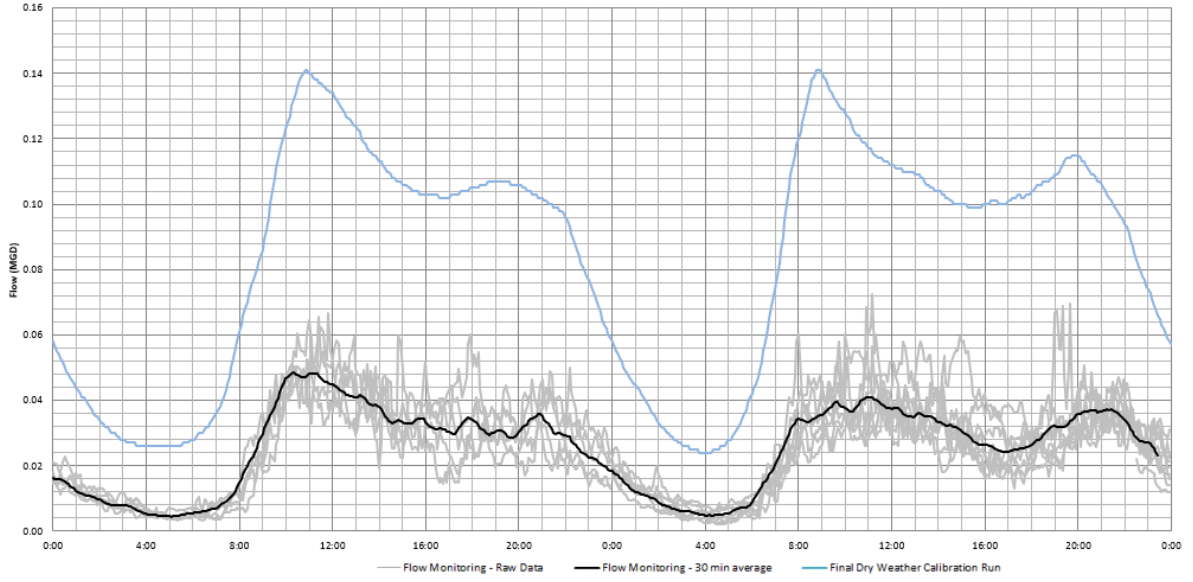








Lawless MH C-048 - 10"



D.3 Wet Weather Calibration

