

Assessment of Tile Drainage Systems in the Jewett Brook Watershed:

September 2017 Monitoring Summary

JBT01 tile drain monitoring station

PROJECT NO.

15-309

PREPARED FOR:

**Matthew Vaughan** / Technical Coordinator

**Lake Champlain Basin Program**

54 West Shore Road

Grand Isle, VT 05458

SUBMITTED BY:

Dave Braun / Senior Water Resources Scientist

Stone Environmental, Inc.

535 Stone Cutters Way

Montpelier, VT 05602

[dbraun@stone-env.com](mailto:dbraun@stone-env.com)

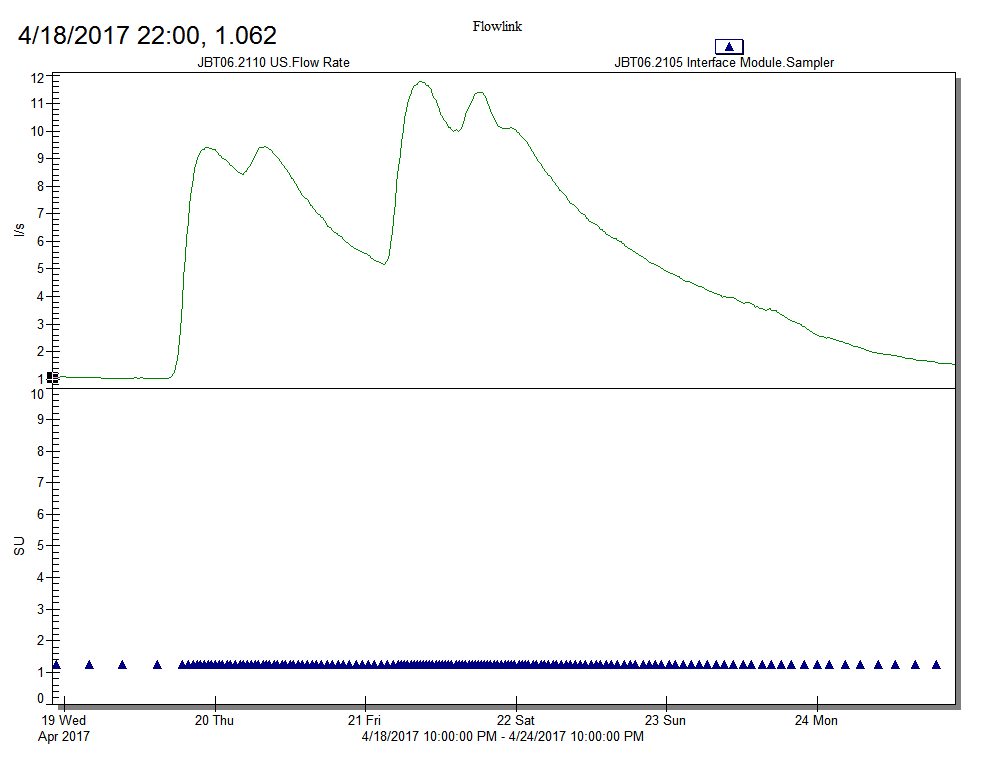
802-272-8819

September 2017 Monitoring Summary

The purpose of this report is to document monitoring activities performed last month, in September 2017, at 12 selected tile drain outlets in the Jewett Brook watershed in St. Albans, Vermont.

All 12 stations are operational. Table 1 identifies the start dates for monitoring activities at each station. The first set of weekly composite samples was collected and processed on April 11, in accordance with the project Quality Assurance Project Plan, Version 1.0, Amendment 1.

Figure 1. Example flow rate and sampling marks from Station JBT06



Every 30 minutes, flow and sampling data are transmitted to Stone’s server. These data are checked periodically to assess whether the sampling program is working as intended. Figure 1 displays an example of flow data (top panel) at station JBT06, along with the time each sample aliquot was dispensed to the sample carboys (bottom panel). Figure 2 displays flow data from the start of the monitoring period at JBT01. These data are considered representative of the pattern of flow observed across all the stations.

Flow monitoring and sample collection continues at all 12 stations. Flow-paced, composite samples are collected approximately weekly. Through September, 25 sampling rounds have been performed at the tile drain monitoring sites. Flow-pacing settings are adjusted at the start of each sampling round, based on recently measured flow rates and the weather forecast. The goal is to produce a composite sample at each site of appropriate volume that is representative of that week’s flow conditions. Stone’s subcontractor, the Friends of Northern Lake Champlain, is performing the majority of the sample processing. Various maintenance activities are performed on every sample collection date, including checking/changing instrument desiccant and removing vegetation shading solar panels.

Sampling activities remained generally successful through September, although JBT06, JBT07, JBT16, and JBT19 have been frequently dry.

Composite samples collected at the tile drain monitoring stations are analyzed by the Vermont Agriculture and Environmental Laboratory for concentrations of total phosphorus (TP), total dissolved phosphorus (TDP), and total nitrogen (TN). Beginning in August and continuing through September, sample splits were collected for TN analysis on alternate weeks rather than weekly. Table 2 presents these data for all analyses classified as Approved. Results are not yet available for samples collected since August 22, 2017.

We are in the process of developing a database to allow efficient extraction and summary of interval flow data and constituent concentrations and calculated loads.

Table 1: Start dates for monitoring activities at each station

| Station | Start flow monitoring | Start autosampling |
| --- | --- | --- |
| JBT01 | 3/23/17 | 4/5/17 |
| JBT02 | 3/23/17 | 4/5/17 |
| JBT04 | 4/3/17 | 4/5/17 |
| JBT05 | 4/20/17 | 4/20/17 |
| JBT06 | 4/5/17 | 4/5/17 |
| JBT07 | 3/30/17 | 4/5/17 |
| JBT11 | 4/5/17 | 4/5/17 |
| JBT13 | 4/3/17 | 4/11/17 |
| JBT14 | 4/5/17 | 4/5/17 |
| JBT16 | 3/30/17 | 4/5/17 |
| JBT18 | 4/22/17 | 4/22/17 |
| JBT19 | 4/22/17 | 4/22/17 |

Table 2: TP, TDP, and TN concentrations in composite samples collected through Sept. 19, 2017

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT01 | 4/11/2017 | 1 | 491 | 258 | 4.81 |
| JBT01 | 4/18/2017 | 1 | 55.1 | 21.1 | 4.77 |
| JBT01 | 4/25/2017 | 1 | 77.3 | 17.6 | 5.24 |
| JBT01 | 5/2/2017 | 1 | 333 | 81.2 | 5.63 |
| JBT01 | 5/9/2017 | 1 | 208 | 44.5 | 5.29 |
| JBT01 | 5/9/2017 | 2+3 | 236 | 40.8 | 5.17 |
| JBT01 | 5/16/2017 | 1 | 26.7 | 15.4 | 4.96 |
| JBT01 | 5/23/2017 | 1 | 127 | 26.7 | 5.27 |
| JBT01 | 5/30/2017 | 1 | 19.3 | 13 | 5.13 |
| JBT01 | 6/7/2017 | 1 | 23.5 | 7.6 | 5.32 |
| JBT01 | 6/13/2017 | 1 | 23.9 | 13.9 | 5.29 |
| JBT01 | 6/22/2017 | 1 | 28.6 | 16.1 | 6.48 |
| JBT01 | 6/27/2017 | 1 | 108 | 64.4 | 22.19 |
| JBT01 | 6/27/2017 | 2 | 111 | 72.2 | 15.57 |
| JBT01 | 6/27/2017 | 3 | 63.8 | 44.1 | 8.47 |
| JBT01 | 7/5/2017 | 1 | 256 | 77.9 | 8.05 |
| JBT01 | 7/5/2017 | 2+3 | 94.6 | 46.7 | 6.27 |
| JBT01 | 7/11/2017 | 1+2 | 223 | 106 | 6.63 |
| JBT01 | 7/18/2017 | 1 | 98 | 47.5 | 5.31 |
| JBT01 | 7/26/2017 | 1 | 21.7 | 31.6 | 4.4 |
| JBT01 | 8/1/2017 | 1 | 23.8 | 20.9 | 3.69 |
| JBT01 | 8/8/2017 | 1 | 33.3 | 20.1 | NS2 |
| JBT01 | 8/22/2017 | 1 | 55.5 | 26.6 | 3.1 |
| JBT01 | 9/05/2017 | 1 | Pending | Pending | 3.81 |
| JBT01 | 9/12/2017 | 1 | 114.4 | 34 | NS1 |
| JBT01 | 9/19/2017 | 1 | Pending | Pending | 2.4 |
| NS2: TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT02 | 4/11/2017 | 1 | 976 | 678 | 7.19 |
| JBT02 | 4/18/2017 | 1 | 242 | 93.6 | 8.52 |
| JBT02 | 4/25/2017 | 1 | 491 | 142 | 8.68 |
| JBT02 | 5/2/2017 | 1 | 805 | 492 | 8.58 |
| JBT02 | 5/9/2017 | 1 | 585 | 120 | 8.52 |
| JBT02 | 5/9/2017 | 2 | 868 | 122 | 7.88 |
| JBT02 | 5/9/2017 | 3 | 868 | 156 | 8 |
| JBT02 | 5/16/2017 | 1 | 109 | 37.6 | 8.26 |
| JBT02 | 5/30/2017 | 1 | 78.5 | 30.3 | 8.83 |
| JBT02 | 6/7/2017 | 1 | 67.3 | 28.2 | 11.78 |
| JBT02 | 6/13/2017 | 1 | 48 | 28.5 | 11.69 |
| JBT02 | 6/22/2017 | 1 | 90.9 | 42.3 | 12.86 |
| JBT02 | 6/26/2017 | 1 | 137 | 61.9 | 25.34 |
| JBT02 | 6/26/2017 | 2 | 189 | 82.2 | 29.34 |
| JBT02 | 6/26/2017 | 3 | 160 | 94 | 27.34 |
| JBT02 | 6/26/2017 | 4 | 315 | 106 | 22.93 |
| JBT02 | 7/5/2017 | 1+2 | 102 | 60.5 | 9.85 |
| JBT02 | 7/11/2017 | 1 | 303 | 118 | 8.68 |
| JBT02 | 7/11/2017 | 2 | 433.5 | 196 | 7.19 |
| JBT02 | 7/18/2017 | 1 | 186.5 | 118 | 7.27 |
| JBT02 | 7/26/2017 | 1 | 73.1 | 70.4 | 8.03 |
| JBT02 | 8/1/2017 | 1 | 63.9 | 40 | 8.41 |
| JBT02 | 8/8/2017 | 1 | 50.5 | 37 | N.S.2 |
| JBT02 | 8/15/2017 | 1 | 52 | 41.3 | 7.29 |
| JBT02 | 8/22/2017 | 1 | 307.5 | 141 | 5.81 |
| JBT02 | 8/30/2017 | 1 | 142.2 | 63.2 | N.S.2 |
| JBT02 | 9/05/2017 | 1 | Pending | Pending | Pending |
| JBT02 | 9/12/2017 | 1 | 674 | 106 | N.S.2 |
| JBT02 | 9/19/2017 | 1 | Pending | Pending | 6.36 |
| NS2: TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT04 | 4/11/2017 | 1 | 798 | 120 | 4.89 |
| JBT04 | 4/18/2017 | 1 | 115 | 38.6 | 4.33 |
| JBT04 | 4/25/2017 | 1 | 133 | 45.4 | 4.86 |
| JBT04 | 5/2/2017 | 1 | 500 | 79.2 | 5.43 |
| JBT04 | 5/9/2017 | 1 | 303 | 52.9 | 4.19 |
| JBT04 | 5/9/2017 | 2+3 | 404 | 58.8 | 4.23 |
| JBT04 | 5/16/2017 | 1 | 68.8 | 22.2 | 3.8 |
| JBT04 | 5/23/2017 | 1 | 109 | 23.6 | 4.35 |
| JBT04 | 5/30/2017 | 1 | 90.2 | 18.1 | 4.37 |
| JBT04 | 6/7/2017 | 1 | 114 | 10.7 | 5.65 |
| JBT04 | 6/13/2017 | 1 | 42.9 | 19.6 | 5.19 |
| JBT04 | 6/22/2017 | 1 | 108 | 49.5 | 5.39 |
| JBT04 | 6/27/2017 | 1 | 184 | 52.4 | 29.19 |
| JBT04 | 6/27/2017 | 2 | 135 | 49.6 | 27.59 |
| JBT04 | 6/27/2017 | 3 | 115 | 65.3 | 16.71 |
| JBT04 | 6/27/2017 | 4 | 73.6 | 50.1 | 11.85 |
| JBT04 | 7/5/2017 | 1 | 270.5 | 53 | 13.07 |
| JBT04 | 7/5/2017 | 2+3 | 132 | 52.6 | 7.29 |
| JBT04 | 7/11/2017 | 1+2 | 261.5 | 51.5 | 8.25 |
| JBT04 | 7/18/2017 | 1 | 125.5 | 38.4 | 5.79 |
| JBT04 | 7/26/2017 | 1 | 39.5 | 50.4 | 4.36 |
| JBT04 | 8/1/2017 | 1 | 30.5 | 24.1 | 3.81 |
| JBT04 | 8/8/2017 | 1 | 35.2 | 20.6 | N.S.2 |
| JBT04 | 8/15/2017 | 1 | 29.8 | 22.6 | 2.92 |
| JBT04 | 8/22/2017 | 1 | 465 | 228 | 5.89 |
| JBT04 | 8/30/2017 | 1 | 71 | 23.5 | N.S.2 |
| JBT04 | 9/05/2017 | 1 | Pending | Pending | 3.19 |
| JBT04 | 9/12/2017 | 1+2 | 698 | 32.4 | N.S.2 |
| JBT04 | 9/19/2017 | 1 | Pending | Pending | 1.29 |
| NS2: TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT05 | 4/25/2017 | 1 | 68.7 | 53.7 | 24.78 |
| JBT05 | 5/2/2017 | 1 | 226 | 108 | 20.6 |
| JBT05 | 5/9/2017 | 1 | 132 | 82.9 | 23.56 |
| JBT05 | 5/16/2017 | 1 | 33.6 | 26.6 | 21.68 |
| JBT05 | 5/23/2017 | 1 | 60 | 38.4 | 14.84 |
| JBT05 | 5/30/2017 | 1 | 38.4 | 37 | 10.52 |
| JBT05 | 6/6/2017 | 1+2 | 34.1 | 21.4 | 8.1 |
| JBT05 | 6/13/2017 | 1+2+3 | 67.6 | 49.6 | 12.68 |
| JBT05 | 6/22/2017 | 1 | 61.2 | 40.6 | 14.48 |
| JBT05 | 6/27/2017 | 1+2 | 345 | 285.3 | 34.73 |
| JBT05 | 6/27/2017 | 3+4 | 408 | 357 | 27.73 |
| JBT05 | 6/30/2017 | 1 | 79.7 | 57.2 | 24.83 |
| JBT05 | 6/30/2017 | 2 | 595 | 452 | 21.23 |
| JBT05 | 6/30/2017 | 3 | 210 | 181 | 23.63 |
| JBT05 | 7/5/2017 | 1 | 134 | 100 | 24.58 |
| JBT05 | 7/11/2017 | 1+2 | 565 | 493 | 23.7 |
| JBT05 | 7/18/2017 | 1 | 138 | 104 | 29.55 |
| JBT05 | 7/26/2017 | 1 | 51.5 | 85.8 | 23.8 |
| JBT05 | 8/1/2017 | 1 | 42.8 | 37.6 | 21.61 |
| JBT05 | 8/8/2017 | 1+2 | 46.6 | 51.1 | N.S.2 |
| JBT05 | 8/15/2017 | 1 | 32.2 | 26.1 | 10.63 |
| JBT05 | 8/22/2017 | 1 | 124.8 | 44.4 | 15.31 |
| JBT05 | 8/30/2017 | 1 | 91.1 | 28.55 | N.S.2 |
| JBT05 | 9/05/2017 | 1 | Pending | Pending | 10.41 |
| JBT05 | 9/12/2017 | 1 | 133 | 67.6 | N.S.2 |
| JBT05 | 9/19/2017 | 1 | Pending | Pending | 11.76 |
| NS2: TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT06 | 4/11/2017 | 1 | 195 | 131 | 33.47 |
| JBT06 | 4/18/2017 | 1 | 192 | 76.3 | 20.71 |
| JBT06 | 4/25/2017 | 1 | 117 | 70.1 | 24.03 |
| JBT06 | 5/2/2017 | 1 | 321 | 164 | 25.2 |
| JBT06 | 5/9/2017 | 1 | 150 | 100 | 28.2 |
| JBT06 | 5/9/2017 | 2 | 135 | 98.1 | 13.54 |
| JBT06 | 5/16/2017 | 1 | 180 | 96.2 | 26.04 |
| JBT06 | 5/23/2017 | 1 | 327 | 65.2 | 21.04 |
| JBT06 | 5/30/2017 | 1 | 67.7 | 37.8 | 22.52 |
| JBT06 | 6/7/2017 | 1 | 138 | 88.9 | 25.87 |
| JBT06 | 6/13/2017 | 1 | 47.4 | 36.4 | 25.95 |
| JBT06 | 6/22/2017 | 1 | 45.9 | 27.3 | 23.12 |
| JBT06 | 6/27/2017 | 1 | 412 | 192 | 42.67 |
| JBT06 | 6/27/2017 | 2 | 210 | 157 | 48.27 |
| JBT06 | 6/27/2017 | 3 | 416 | 222 | 46.63 |
| JBT06 | 6/27/2017 | 4 | 234 | 183 | 49.83 |
| JBT06 | 6/30/2017 | All4 | 266.4 | 174 | 33.83 |
| JBT06 | 7/5/2017 | 1 | 134 | 109 | 34.82 |
| JBT06 | 7/11/2017 | 1+2 | 228 | 137 | 26.5 |
| JBT06 | 7/18/2017 | 1 | 128.4 | 106 | 32.55 |
| JBT06 | 7/26/2017 | 1 | 39.1 | 90.2 | 27.4 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT07 | 4/11/2017 | 1 | 708 | 159 | 7.52 |
| JBT07 | 4/18/2017 | 1 | 45 | 14.1 | 4.81 |
| JBT07 | 4/25/2017 | 1 | 103 | 27.4 | 5.79 |
| JBT07 | 5/2/2017 | 1 | 279.6 | 58 | 6.72 |
| JBT07 | 5/9/2017 | 1 | 126 | 41.4 | 6.17 |
| JBT07 | 5/9/2017 | 2+3 | 230 | 54.2 | 6.59 |
| JBT07 | 5/16/2017 | 1 | 19.7 | 12.9 | 5.21 |
| JBT07 | 5/23/2017 | 1 | 24.4 | 11.9 | 5.08 |
| JBT07 | 5/30/2017 | 1 | 21.1 | 14.2 | 5.29 |
| JBT07 | 6/7/2017 | 1 | 17 | 6.98 | 5.57 |
| JBT07 | 6/13/2017 | 1 | N.S.1 | 13.1 | 5.35 |
| JBT07 | 6/22/2017 | 1 | 39.3 | 17.1 | 8.16 |
| JBT07 | 6/26/2017 | 1 | 242 | 177 | 45.18 |
| JBT07 | 6/26/2017 | 2 | 555 | 357 | 45.18 |
| JBT07 | 6/26/2017 | 3 | 204 | 182 | 31.59 |
| JBT07 | 6/26/2017 | 4 | 389.2 | 230 | 23.59 |
| JBT07 | 6/30/2017 | 1 | 79.7 | 60.8 | 12.67 |
| JBT07 | 6/30/2017 | 2+3 | 700 | 327 | 18.55 |
| JBT07 | 7/5/2017 | 1 | 119 | 88.6 | 11.62 |
| JBT07 | 7/11/2017 | 1 | 47.3 | 21 | 11.05 |
| JBT07 | 7/18/2017 | 1 | 69.9 | 54.9 | 15.37 |
| JBT07 | 7/26/2017 | 1 | 82.5 | 37.3 | 9.14 |
| JBT07 | 8/1/2017 | 1 | 29.4 | 25.1 | 6.96 |
| JBT07 | 8/22/2017 | 1 | 226 | 135.7 | 3.37 |
| JBT07 | 8/30/2017 | 1 | 52 | 32.6 | N.S.2 |
| JBT07 | 9/12/2017 | 1 | 168.5 | 89.5 | N.S.2 |
| JBT07 | 9/19/2017 | 1 | Pending | Pending | 3.06 |
| N.S.1:Broken at lab NS2:TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT11 | 4/11/2017 | 1 | 39.5 | 57.8 | 3.35 |
| JBT11 | 4/18/2017 | 1 | 11.5 | 16.2 | 2.59 |
| JBT11 | 4/25/2017 | 1 | 14.7 | 9.73 | 2.45 |
| JBT11 | 5/2/2017 | 1 | 46.5 | 16.1 | 2.04 |
| JBT11 | 5/9/2017 | 1 | 28.8 | 12 | 1.63 |
| JBT11 | 5/9/2017 | 2 | 39 | 12.9 | 1.53 |
| JBT11 | 5/16/2017 | 1 | 31.2 | 23.1 | 1.24 |
| JBT11 | 5/23/2017 | 1 | 234 | 28.8 | 1.24 |
| JBT11 | 5/30/2017 | 1 | 18.1 | 9.58 | 0.81 |
| JBT11 | 6/7/2017 | 1 | 18.6 | 6.46 | 0.91 |
| JBT11 | 6/13/2017 | 1 | 49.7 | 17.2 | 1.29 |
| JBT11 | 6/22/2017 | 1 | 68.8 | 26.4 | 0.77 |
| JBT11 | 6/27/2017 | 1 | 61.5 | 29.2 | 1.48 |
| JBT11 | 6/27/2017 | 2 | 89.8 | 48 | 1.59 |
| JBT11 | 6/27/2017 | 3 | 77.1 | 51.4 | 1.54 |
| JBT11 | 6/27/2017 | 4 | 81.4 | 44 | 1.51 |
| JBT11 | 6/30/2017 | 1 | 30.3 | 17.9 | 1.11 |
| JBT11 | 6/30/2017 | 2 | 24.8 | 17.9 | 1.01 |
| JBT11 | 6/30/2017 | 3 | 24 | 16.8 | 1.05 |
| JBT11 | 6/30/2017 | 4 | 23.3 | 16 | 1.06 |
| JBT11 | 7/5/2017 | 1 | 21.2 | 16.8 | 1.16 |
| JBT11 | 7/11/2017 | 1 | 28.1 | 19.5 | 1.3 |
| JBT11 | 7/18/2017 | 1 | 33.5 | 64.4 | 1.22 |
| JBT11 | 7/26/2017 | 1 | 15.4 | 26 | 0.96 |
| JBT11 | 8/1/2017 | 1 | 59.1 | 35.2 | 1.23 |
| JBT11 | 9/05/2017 | 1 | Pending | Pending | 1.13 |
| JBT11 | 9/12/2017 | 1+2 | 419.5 | 411 | N.S.2 |
| JBT11 | 9/19/2017 | 1 | Pending | Pending | 1.2 |
| NS2:TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT13 | 4/18/2017 | 1 | 63.8 | 23.2 | 6.12 |
| JBT13 | 4/25/2017 | 1 | 113 | 26.1 | 6.44 |
| JBT13 | 5/2/2017 | 1 | 560 | 41.1 | 5.25 |
| JBT13 | 5/9/2017 | 1+2 | 120 | 35.7 | 6.1 |
| JBT13 | 5/16/2017 | 1 | 35295 | N.S.1 | 217.21 |
| JBT13 | 5/23/2017 | 1 | 3720 | 2525 | 17.2 |
| JBT13 | 5/30/2017 | 1 | 2975 | 2070 | 14.08 |
| JBT13 | 6/7/2017 | 1 | 3585 | 2240 | 19.08 |
| JBT13 | 6/13/2017 | 1 | 815 | 489.5 | 7.97 |
| JBT13 | 6/22/2017 | 1 | 912 | 585 | 8.94 |
| JBT13 | 6/27/2017 | 1 | 525 | 218 | 21.83 |
| JBT13 | 6/27/2017 | 2 | 384.8 | 137 | 12.71 |
| JBT13 | 7/5/2017 | 1 | 312 | 143 | 28.87 |
| JBT13 | 7/5/2017 | 2 | 87.1 | 70.5 | 14.03 |
| JBT13 | 7/11/2017 | 1 | 350.4 | 191 | 12.15 |
| JBT13 | 7/18/2017 | 1 | 95.3 | 94.8 | 16.97 |
| JBT13 | 7/26/2017 | 1 | 127 | 118 | 10.2 |
| JBT13 | 8/8/2017 | 1 | 248 | 148 | N.S.2 |
| JBT13 | 8/15/2017 | 1 | 336 | 196 | 5.29 |
| JBT13 | 8/22/2017 | 1 | 274.5 | 138.5 | 7.74 |
| 1. Broken at lab  2. TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT14 | 4/11/2017 | 1 | 248 | 66.5 | 7.43 |
| JBT14 | 4/18/2017 | 1 | 70.5 | 33.2 | 8.25 |
| JBT14 | 4/25/2017 | 1 | 145 | 51.5 | 7.62 |
| JBT14 | 4/25/2017 | 2 | 46.3 | 35.2 | 8.22 |
| JBT14 | 5/2/2017 | 1 | 342 | 59.3 | 7.2 |
| JBT14 | 5/9/2017 | 1+2 | 177 | 51.1 | 7.12 |
| JBT14 | 5/16/2017 | 1 | 4335 | 1640 | 51.21 |
| JBT14 | 5/23/2017 | 1 | 690 | 183 | 9.66 |
| JBT14 | 5/30/2017 | 1 | 78.2 | 75.7 | 7.72 |
| JBT14 | 6/7/2017 | 1 | 138 | 143 | 19.95 |
| JBT14 | 6/13/2017 | 1+2 | 73.6 | 60.1 | 9.89 |
| JBT14 | 6/22/2017 | 1 | 189 | 132 | 11.88 |
| JBT14 | 6/27/2017 | 1 | 482 | 208 | 31.95 |
| JBT14 | 6/27/2017 | 2 | 618 | 345 | 22.75 |
| JBT14 | 6/27/2017 | 3 | 246 | 216 | 19.91 |
| JBT14 | 6/30/2017 | 1 | 436 | 210 | 56.87 |
| JBT14 | 6/30/2017 | 2 | 220 | 162 | 34.23 |
| JBT14 | 7/5/2017 | 1 | 95.9 | 86.4 | 16.81 |
| JBT14 | 7/5/2017 | 2 | 90.4 | 74.1 | 14.07 |
| JBT14 | 7/11/2017 | 1 | 103 | 87.4 | 13.35 |
| JBT14 | 7/18/2017 | 1 | 88.3 | 102 | 14.87 |
| JBT14 | 7/26/2017 | 1 | 69.4 | 79.3 | 12.9 |
| JBT14 | 8/1/2017 | 1 | 59.7 | 73.6 | 11.8 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT16 | 4/11/2017 | 1 | 105 | 72.7 | 5.77 |
| JBT16 | 4/18/2017 | 1 | 28.2 | 22.4 | 5.12 |
| JBT16 | 4/25/2017 | 1 | 28.5 | 21.5 | 4.48 |
| JBT16 | 5/2/2017 | 1 | 256.2 | 25.5 | 3.89 |
| JBT16 | 5/9/2017 | 1+2 | 31.3 | 13.7 | 2.79 |
| JBT16 | 5/16/2017 | 1 | 19.4 | 13.3 | 2.89 |
| JBT16 | 5/23/2017 | 1 | 26.2 | 17 | 2.96 |
| JBT16 | 5/30/2017 | 1 | 26.7 | 17.7 | 2.62 |
| JBT16 | 6/7/2017 | 1 | 25.9 | 9.56 | 3.68 |
| JBT16 | 6/13/2017 | 1 | 29.4 | 17.4 | 3.44 |
| JBT16 | 6/22/2017 | 1 | 85.9 | 32.9 | 5.81 |
| JBT16 | 6/26/2017 | 1+2 | 89.2 | 44.1 | 21.99 |
| JBT16 | 7/5/2017 | 1 | 41 | 28.9 | 14.85 |
| JBT16 | 7/5/2017 | 2+3 | 34.3 | 27.6 | 12.43 |
| JBT16 | 7/11/2017 | 1 | 32.8 | 29.8 | 9.75 |
| JBT16 | 7/18/2017 | 1 | 35.4 | 22.3 | 8.4 |
| JBT16 | 7/26/2017 | 1 | 45.9 | 51.7 | 8.87 |
| JBT16 | 8/1/2017 | 1 | 54.7 | 39.1 | 8.52 |
| JBT16 | 8/15/2017 | 1 | 159 | 32.6 | 6.41 |
| JBT16 | 8/22/2017 | 1 | 81.9 | 59.9 | 6.67 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT18 | 4/25/2017 | 1 | 87.4 | 46.1 | 1.16 |
| JBT18 | 5/2/2017 | 1 | 170 | 42.3 | 1.26 |
| JBT18 | 5/9/2017 | 1 | 140 | 40.1 | 1.13 |
| JBT18 | 5/9/2017 | 2 | 77.5 | 37.5 | 0.99 |
| JBT18 | 5/9/2017 | 3 | 159 | 32.5 | 1.06 |
| JBT18 | 5/9/2017 | 4 | 199 | 38.6 | 1.1 |
| JBT18 | 5/16/2017 | 1 | 80.8 | 35.9 | 0.71 |
| JBT18 | 5/23/2017 | 1 | 49.7 | 16 | 0.78 |
| JBT18 | 5/30/2017 | 1 | 89.1 | 23 | 0.95 |
| JBT18 | 6/6/2017 | 1 | 46.5 | 8.59 | 0.79 |
| JBT18 | 6/13/2017 | 1 | 160 | 31.1 | 1.25 |
| JBT18 | 6/22/2017 | 1 | 71.2 | N.S.1 | 1.33 |
| JBT18 | 6/30/2017 | 1 | 260.5 | 57.2 | 2.04 |
| JBT18 | 6/30/2017 | 2 | 234 | 71.5 | 1.9 |
| JBT18 | 6/30/2017 | 3 | 206 | 58.9 | 1.61 |
| JBT18 | 6/30/2017 | 4 | 142 | 57.9 | 1.38 |
| JBT18 | 7/5/2017 | 1+2+3+4 | 143 | 74.4 | 0.98 |
| JBT18 | 7/11/2017 | 1 | 135 | 59.5 | 1.06 |
| JBT18 | 7/18/2017 | 1 | 166 | 183 | 1.15 |
| JBT18 | 7/26/2017 | 1 | 66.5 | 40 | 1.1 |
| JBT18 | 8/1/2017 | 1 | 43.3 | 28.2 | 0.83 |
| JBT18 | 8/8/2017 | 1 | 34.5 | 16.1 | N.S.2 |
| JBT18 | 8/22/2017 | 1 | 75.9 | 33.1 | 2.18 |
| 1. Broken at lab  2. TN analyzed on alternate weeks | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station | Sampling date | Carboy | TP (µg/L) | TDP (µg/L) | TN (mg/L) |
| JBT19 | 4/25/2017 | 1 | 27.2 | 31.7 | 1 |
| JBT19 | 5/2/2017 | 1 | 56 | 21.1 | 1.1 |
| JBT19 | 5/9/2017 | 1 | 40.1 | 29.1 | 0.76 |
| JBT19 | 5/9/2017 | 2 | 20.9 | 12.2 | 0.61 |
| JBT19 | 5/9/2017 | 3+4 | 55.2 | 20.4 | 0.82 |
| JBT19 | 5/16/2017 | 1 | 17.6 | 12.6 | 0.45 |
| JBT19 | 5/23/2017 | 1 | 54.6 | 22.1 | 1 |
| JBT19 | 5/30/2017 | 1 | 21.8 | 10.4 | 0.49 |
| JBT19 | 6/13/2017 | 1 | 81.1 | 23.1 | 0.91 |
| JBT19 | 6/22/2017 | 1 | 151 | N.S.1 | 1.24 |
| JBT19 | 6/30/2017 | 1 | 163 | 73.7 | 2.04 |
| JBT19 | 6/30/2017 | 2 | 52.2 | 39.4 | 0.88 |
| JBT19 | 6/30/2017 | 3+4 | 51.8 | 40.9 | 0.94 |
| JBT19 | 7/5/2017 | 1+2+3+4 | 41.4 | 31.3 | 0.71 |
| JBT19 | 7/11/2017 | 1 | 45.3 | 21.8 | 0.57 |
| JBT19 | 7/18/2017 | 1 | 79.3 | 74.2 | 1.05 |
| JBT19 | 7/26/2017 | 1 | 29.3 | 27.5 | 0.73 |
| JBT19 | 8/1/2017 | 1 | 32.8 | 18.7 | 0.58 |
| JBT19 | 8/8/2017 | 1 | 111 | 22.6 | N.S.2 |
| 1. Broken at lab  2. TN analyzed on alternate weeks | | | | | |

Figure 2. Flow rate at the JBT01 tile drain monitoring station