Nutrient Source Identification Report
Town of Medfield

Prepared By: Neponset River Watershed Association
June 14, 2021

This report is being submitted as a final grant deliverable for the MS4 Municipal Assistance Grant Program. This specific submission is not intended for regulatory compliance purposes.

Acknowledgements

This is one among twenty Nutrient Source Identification Reports prepared by the Neponset River Watershed Association (NepRWA) and the Pioneer Valley Planning Commission (PVPC). These reports are meant to provide MS4 permitted municipalities with documents they can finalize and submit to U.S. EPA as part of their Year 4 reporting requirements.

This work is made possible through a grant from the MassDEP Municipal Assistance Program. Project staff from NepRWA and PVPC appreciate the conversation and feedback provided by MassDEP and U.S. EPA staff in working through methodology to prepare these reports. Aside from producing nutrient source identification reports for 20 communities, this project also resulted in the following: lake-pond phosphorous control plan Year 4 submission requirements for two communities; documentation of approach and methods for use by other MS4 permittees across MA in meeting these Year 4 requirements; and setting of the stage for upgrading existing stormwater infrastructure in key high pollutant loading catchments.

NepRWA and PVPC staff are grateful also to the partner communities who joined them in this pilot project. Following is a list of cities and towns who participated in this project:

Agawam
Canton
Dedham
Foxborough
Granby
Longmeadow
Ludlow
Medfield
Milton
Northampton
Quincy
Randolph
Sharon
South Hadley
Southampton
Southwick
Stoughton
Westfield
Westwood
Wilbraham

Background: The Nutrient Pollution Problem

Nitrogen and phosphorous are naturally occurring plant fertilizers or "nutrients." When land is developed, and storm drain systems are installed, the amount of nitrogen and phosphorous discharged to local streams, ponds and wetlands increases significantly relative to natural stream conditions. In the urban environment, nitrogen and phosphorous come from a variety of sources including organic debris such as fallen leaves, animal and pet waste, lawn and agricultural fertilizers, malfunctioning sewers and septic systems, and atmospheric deposition from car exhaust, among other sources.

Some of these sources also occur in the natural environment. However, in the urban environment the prevalence of paved and impervious areas coupled with the availability of storm drain collection systems allows street runoff containing excess nutrient pollution to be very quickly collected and conveyed to the nearest waterbody, generally with little or no treatment—bypassing the natural processes such as soil filtration and infiltration that would capture and recycle nutrients before they reached waterways in an undeveloped landscape.

As a result, nutrient pollution from polluted stormwater runoff has become a major source of pollution across the country. Nutrient pollution increases undesirable plant and algae growth in waterways, which can be highly toxic to humans and wildlife and reduce oxygen levels in the water. This, in turn, impedes recreation and creates chronic challenges for aquatic life, sometimes leading to fish kills. In freshwater waterways phosphorous is generally the primary pollutant of concern, while nitrogen becomes the primary concern once freshwater rivers flow into saltwater estuaries and bays.

Background: Regulatory Context

Under the federal and state clean water acts, the Massachusetts Department of Environmental Protection (MassDEP) is charged with establishing water quality standards and determining whether waterways meet these designated standards. MassDEP publishes its Integrated List of Waters, also referred to at the 303d Impaired Waters List, identifying waters that do not meet standards. These waterways are referred to as being "impaired" or "water quality limited" based on one or more causes which may include nitrogen, phosphorous, "nutrient/eutrophication biological indicators" or in some cases turbidity or transparency. MassDEP is also charged with preparing waterbody-specific cleanup plans for nutrient pollution known as Total Maximum Daily Loads or TMDLs, though these are yet to be prepared for many impaired waterways.

The Town of Medfield ("the Town") is subject to the requirements of US Environmental Protection Agency's (EPA's) 2016 Massachusetts Small MS4 General Permit. One of the requirements of this permit is that communities discharging stormwater to waterways that are listed by MassDEP as impaired for phosphorous or nitrogen, or that flow into impaired waterways, and for which a total maximum daily load does not exist, shall prepare a Nutrient Source Identification Report as detailed in Appendix H of the permit. This report has been developed to satisfy this requirement of the permit.

The nutrient source identification report must be submitted with the permit year 4 annual report (year ending June 30, 2022 and report due late September 2022). The requirements include (excerpt from EPA 2016 MS4 Permit Appendix H):

1. Calculation of total MS4 area draining to the water quality limited water segments or their tributaries, incorporating updated mapping of the MS4 and catchment delineations produced pursuant to part 2.3.4.6;
2. All screening and monitoring results pursuant to part 2.3.4.7.b., targeting the receiving water segment(s);
3. Impervious area and DCIA for the target catchment;
4. Identification, delineation and prioritization of potential catchments with high [*nitrogen and/or phosphorous*] loading;
5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment.

MS4 Permit Appendix H Applicability

Portions of the Town lie both within the Neponset River Watershed and the Charles River Watershed. Of the six receiving waters identified in the Town's Notice of Intent, two have been identified as specifically impaired for phosphorus. In some cases, the Town's receiving waters also flow into another water body that is impaired for phosphorous, or waters that are listed as impaired for a cause in which phosphorous pollution is a factor such as dissolved oxygen, or eutrophication biological indicators.

The saltwater portion of the Neponset River, known as the Neponset River Estuary, is not specifically listed as impaired for nitrogen by MassDEP, but is listed as impaired for several other factors for which nitrogen pollution is a contributing factor. Furthermore, EPA has directed the City of Quincy to prepare a nutrient source identification report for nitrogen based on its stormwater discharges to the Neponset River. While EPA has not provided any clear direction to other communities in the Neponset River Watershed that are upstream of the Neponset Estuary regarding the need for a nitrogen source identification report, the possibility exists that EPA may issue such a requirement in the future. In the interest of efficiency of analysis, this report also includes an analysis of nitrogen pollution loading for all communities in the Neponset River Watershed.

Therefore, this report has been prepared in accordance with the guidelines in sections I.1.b and II.1.b of Appendix H of the 2016 Massachusetts Small MS4 General Permit.

The status of receiving waters in the Town is summarized in Table 1 below.

Table 1. Receiving Waters for the Town of Medfield

Receiving Water	Number of Outfalls	Impaired for P?	Impaired for N?	Other Impairments
Charles River (MA72-05)	207	Yes	No	Dissolved Oxygen, TSS, Chlorodane, DDT, Mercury in Fish Tissue, Nutrient/Eutrophication
Stop River (MA72-10)	86	Yes	No	E. Coli, Organic Enrichment (Sewage), Biological Indicators

Mill Brook (MA73-08)	99	No	No	Dissolved Oxygen
Mine Brook (MA73-09)	29	No	No	Dissolved Oxygen, Fecal Coliform
Flynns Pond (MA73019)	3	No	No	
Jewells Pond (MA73026)	0	No	No	

Data Sources and Analytical Methods

Several existing datasets were used to complete this work. Table 2 below lists the utilized data sets and their origin.

Table 2. Data Sources

Existing Data Set	Origin	Date Published/Updated	Link
2016 Land Cover/Land Use	MassGIS	May 2019	https://docs.digital.mass.gov/dataset/massgis-data-2016-land-coverland-use
Soil Survey Geographic (SSURGO) Database for Norfolk and Suffolk Counties, Massachusetts	USDA	June 2020	Downloaded through Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm). Hydrologic soil groups extracted using Soil Data Viewer Version 6.1 (https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053619)
Town Catchments	Town GIS Files	Current as of the publishing of this report	N/A
Massachusetts Land Parcel Database (Metro Boston Region)	MAPC	May 2019	Used to locate SCM opportunities, this shapefile contains the "Parloc_ID" field used to identify parcels. https://datacommon.mapc.org/browser/datasets/360

Impervious area is the portion of the Town that is paved, covered by buildings, or otherwise rendered unable to absorb water naturally due to development. Impervious area for the town was calculated using the MassGIS 2016 Land Cover/Land Use data layer which was published in 2019. This data layer maps impervious and pervious land cover by land use type based on aerial photography and other data sources. This was overlaid with the Town's data layer for outfall catchment areas (the area draining to each town-owned stormwater discharge point) to estimate total areas and total impervious area discharging to or upstream of nutrient-impaired waterways, as well as to estimate impervious area for each stormwater outfall catchment.

Directly connected impervious area (DCIA), also referred to as "effective impervious cover," is the amount of impervious area that is directly connected to the storm drain system. Most land in the Town was developed before the creation of modern requirements to capture, clean, slow down, and recharge stormwater runoff using stormwater control measures (SCMs). However, many new development and redevelopment projects constructed in recent years have required the installation or upgrade of SCMs, such that today some properties have no SCMs, some have SCMs that meet some modern standards, and some have SCMs that are fully compliant with modern standards. Because site-specific information about the existence of specific SCMs is not available at the parcel level, an estimate of DCIA or effective impervious cover is used to approximate the average level of SCMs installed across the watershed. Estimating DCIA can yield a more specific pollutant loading estimate for a given area. DCIA was estimated based on land use categories following EPA guidance.

To estimate the pollutant loads for nitrogen and/or phosphorous in each catchment, estimated pollutant loading rates for different combinations of land use type, land cover type, and soil type were applied in accordance with guidance in the EPA 2016 MS4 Permit. The individual loading rates for these unique subsections were summed based on catchment, which produced an overall estimated catchment pollutant loading rate.

For a more detailed description of the analytical methods used for this project, please refer to the supplement to this report, entitled "Nutrient Source Identification Report Addendum: Methods."

Note that one catchment in the Town's data set was had no entry in the identifier field. This was assumed to be a collective entry for catchments with no definitive outfall. While this catchment was included in analysis, it was removed from any rankings.

Total Area Draining to Water Quality Limited Segments (or Tributaries)

The total area of the Town is approximately 9,376 acres. Since all areas of the Town are located either in the Neponset River Watershed or the Charles River Watershed and drainage flows either directly to waters that are impaired for phosphorus or waters that are listed as impaired for a cause in which phosphorous pollution is a factor, this report included all areas of the town in the phosphorus loading evaluation. Table 3 below shows how much of the Town is located in each watershed.

Similarly, portions of the town are upstream of the Neponset Estuary and therefore drain to a segment that EPA may consider impaired for nitrogen. While EPA has not provided clear guidance indicating that the Town is subject to the requirements of Appendix H of the 2016

MS4 permit for nitrogen, this report includes the analysis for nitrogen so that the relevant data is available should EPA make such a determination in the future. Therefore, catchments located in the Neponset River Watershed were included in the nitrogen loading analysis sections of this report. Catchments located in the Charles River Watershed were not ranked with regards to nitrogen loading, but nitrogen loading estimates were made for these catchments in the process of analysis and the results are included in Table C-1 in Appendix C for reference.

Table 3. Summary of Area Draining to Water Quality Limited Segments

Receiving Water Impaired for Phosphorus	Neponset Watershed	Charles Watershed	Total
Total Area of Town (Acres)	2,127	7,249	9,376
Area Draining to Phosphorous Impaired Waters or Potentially Impaired Waters (Acres)	2,127	7,249	9,376
Area Draining to Nitrogen Impaired or Potentially Impaired Waters (Acres)	2,127	0	2,127

Impervious Area and Directly Connected Impervious Area

Table 4 below summarizes the total impervious area (IA) and estimated DCIA in the Town. It is also important to note that most of the impervious area in the Town is not owned or maintained by the Town, but by private parties or other public agencies.

Table 4. Summary of Impervious Area and DCIA

	Neponset Watershed	Charles Watershed	Total
Impervious Area (Acres)	155	786	941
Estimated DCIA (Acres)	1.4	22	23.4

Table A-1 and A-2 in Appendix A of this report provides impervious area and estimates of DCIA for the Town's catchments in the Charles and Neponset River Watersheds, respectively. Table 5 and 6 below show the same information for the ten catchments with the most impervious area in each watershed. The catchments are labeled using the Town's identifier for the outfall to which they drain. The table is sorted in descending order of total impervious area.

Table 5. Total Impervious Area and DCIA for the Ten Most Impervious Town Catchments in the Charles River Watershed

Catchment Identifier	Impervious Area (Acres)	Percent Impervious	DCIA (Acres)	Percent DCIA
OF-240	89.70	8.09 %	2.86	0.26 %
OF-201	28.03	10.16 %	1.11	0.40 %
OF-529	26.35	25.16 %	4.47	4.27 %
OF-464	15.76	39.27 %	4.12	10.27 %
OF-423	14.81	21.18 %	1.57	2.25 %
OF-265	13.61	19.09 %	1.57	2.20 %
OF-222	11.74	55.10 %	4.07	19.09 %
OF-463	11.40	44.29 %	2.39	9.29 %
OF-528	11.09	6.39 %	0.50	0.29 %
OF-146	11.02	7.30 %	0.50	0.33 %
Top 10 Catchments as a % of Town Watershed Total	31.98 %		16.99 %	

Table 6. Total Impervious Area and DCIA for the Ten Most Impervious Town Catchments in the Neponset River Watershed

Catchment Identifier	Impervious Area (Acres)	Percent Impervious	DCIA (Acres)	Percent DCIA
OF-102	31.46	6.04 %	1.02	0.20 %
OF-85	10.95	22.47 %	1.06	2.17 %
OF-470	8.16	10.34 %	0.62	0.79 %
OF-351	4.80	27.15 %	0.72	4.10 %
OF-393	4.72	21.69 %	0.98	4.52 %
OF-170	4.15	15.74 %	0.48	1.82 %
OF-300	4.00	24.65 %	0.54	3.30 %
OF-456	3.80	21.24 %	0.78	4.37 %
OF-488	3.32	25.38 %	0.44	3.37 %
OF-482	3.24	13.13 %	0.26	1.06 %
Top 10 Catchments as a % of Town Watershed Total	68.36 %		47.32 %	

Estimated Nutrient Loading from Catchments

Using the methods described in the addendum to this report, estimates of phosphorus and nitrogen loading potential were created for each of the Town's storm drain outfall catchments.

Tables B-1 and B-2 in Appendix B and C-1 and C-2 in Appendix C of this report show calculated phosphorus and nitrogen loading estimates, respectively, for all catchments in the Town. Tables 7-9 below show the five catchments with the highest estimated phosphorus and nitrogen loading, respectively. Note that, as stated earlier in this report, catchments in the Charles River Watershed were not ranked for estimated nitrogen load, but the analysis was completed in the

interest of efficiency. Results for estimated nitrogen load for Charles River Watershed catchments are available in Table C-1 in Appendix C.

Table 7. Estimated Phosphorus Loading for Five Highest-Load Town Catchments in the Charles River Watershed

Catchment Identifier	Estimated P Load (Lbs/Yr)
OF-240	328.39
OF-201	100.52
OF-529	57.67
OF-104	48.59
OF-528	45.16
Top 5 as a % of Total Town Watershed Load	28.64 %

Table 8. Estimated Phosphorus Loading for Five Highest-Load Town Catchments in the Neponset River Watershed

Catchment Identifier	Estimated P Load (Lbs/Yr)
OF-102	126.85
OF-85	28.18
OF-470	22.70
OF-351	12.96
OF-455	12.94
Top 5 as a % of Total Town Watershed Load	58.07 %

Table 9. Estimated Nitrogen Loading for Five Highest-Load Town Catchments in the Neponset River Watershed

Catchment Identifier	Estimated N Load (Lbs/Yr)
OF-102	1217.96
OF-85	225.08
OF-470	157.45
OF-517	106.69
OF-170	106.01
Top 5 as a % of Total Town Watershed Load	60.86 %

Note these are estimated loadings based on soil type, land use and estimated DCIA (e.g. typical level of SCMs in town). Actual loading may vary considerably from site to site depending on what SCMs are actually present, and regional studies such as the Charles River Phosphorous TMDL have indicated that the default DCIA assumptions used by EPA are somewhat optimistic, such that actual loading rates may be higher. However, these estimates provide a valuable guide to help identify those areas of the Town that should be the highest priorities for interventions to begin reducing pollutant loading.

Outfall Screening Monitoring Results

As of the writing of this report, outfall screening results did not identify any outfalls with significantly elevated nutrient concentrations, using the guidelines in the Center for Watershed Protection's Illicit Discharge Detection and Elimination Manual (published in October 2004) as a reference. One manhole screening found a phosphorus concentration of 0.46 mg/L, which is slightly above the Manual's suggested threshold of 0.4 mg/L. That manhole is identified as DMH-273 and is located in catchment OF-85. Up-to-date outfall screening data are included in Appendix F. As more outfall screening is completed and more data become available, they will

be included in this report and pertinent findings shall be incorporated into the determination of the highest priority catchments with respect to phosphorus and nitrogen loading.

Catchment Prioritization

As of the writing of this report, one screening at a manhole found elevated phosphorus concentrations. The catchment in which that manhole is located (OF-85) shall be added to the catchments that are suspected of high nutrients loads based on this desktop analysis. Aside from OF-85, catchments are prioritized in the order shown in Tables B-1 and B-2 (phosphorus) and C-1 and C-2 (nitrogen). When more outfall screening data become available, the list of catchments should be re-examined and the "Top 5" list should be updated based on these real-world data.

Potential Retrofit Opportunities

Town parcels were examined for potential BMP retrofit opportunities using the Neponset Stormwater Partnership's BMP Tool (NSP BMP Tool). This tool analyzes soil data, estimated pollutant loading, and various limitations of each parcel in Town to determine the locations most suitable for further field assessment of SCM opportunities to reduce chosen pollutants.

The NSP BMP Tool uses slightly different methods to estimate pollutant loading than are utilized in this report so estimated loading rates will differ. However, this does not diminish the utility of the NSP BMP Tool as a means to help identify potential retrofit sites, especially given additional features that are incorporated into the Tool.

After assessing the data, each high-loading catchment was reviewed for potential SCM sites. Five parcels were chosen and are listed in Tables 10-12 below. All parcels in these lists are Town-owned, as town-owned properties often present the fewest barriers to SCM development. These sites should be visited first when performing reconnaissance work to locate SCMs that will reduce nutrient loading in the town. Additionally, it should be noted that the NSP BMP Tool does not rank rights-of-way as Town-owned, but they are often highly desirable sites for SCMs. All rights-of-way, particularly in the high-loading catchments, should be considered in addition to individual parcels. Note that "Parloc_ID" is an attribute from the MAPC parcel data set that may be helpful in identifying the indicated parcels.

More extensive lists of Town-owned properties to be considered for SCM development is included in Appendix D and E. In these lists, they are ranked by the BMP Tool's priority score, which projects each parcel's pollutant load and considers how suited that parcel is for SCM's designed to remove the targeted pollutant. Appendix D ranks parcels for phosphorus removal and Appendix E ranks them for nitrogen removal. The larger lists in these appendices should be considered a more comprehensive collection of the parcels that should be considered first for SCM development. As Town-owned parcels are evaluated, the Town should begin considering privately-owned parcels, as well, using the NSP BMP Tool as a guide.

Table 10. High-Priority Parcels in the Charles Watershed to be Considered for SCM Development for Phosphorus Pollution

Address	Parloc_ID	Catchment	Notes
North St & 329R	F_709446_2903186	OF-240	Undeveloped parcel

Rear Deerfield Dr	F_708241_2900694	OF-240	Undeveloped parcel in residential area
Rear Hawthorne Dr	F_710005_2899063	OF-240	Large undeveloped parcel in residential area
15 Cedar Ln	F_707878_2898743	OF-240	Undeveloped parcel in residential area
3 Hawthorne Dr	F_710797_2900362	OF-240	Undeveloped parcel in residential area

Table 11. High-Priority Parcels in the Neponset River Watershed to be Considered for SCM Development for Phosphorus Pollution

Address	Parloc_ID	Catchment	Notes
Rear Plain St	F_714753_2880611	OF-470	Very large undeveloped parcel accessible by several neighborhoods
115 High St	F_715254_2883614	OF-470	Undeveloped parcel in residential area
149 High St	F_716095_2883099	OF-161	Undeveloped parcel in residential area
High St	F_716694_2882435	OF-161	Large undeveloped parcel in residential area
Rear Eastmount Rd	F_713205_2892864	OF-351	Large undeveloped parcel in residential area

*Very few Town-owned parcels were found in the Neponset River Watershed. The listed parcels represent some of the best opportunities, but they are not located in high-loading catchments. It is recommended that roadways in the high-load catchments be considered for SCM retrofit suitability.

Table 12. High-Priority Parcels in the Neponset River Watershed to be Considered for SCM Development for Nitrogen Pollution

Address	Parloc_ID	Catchment	Notes
Rear Plain St	F_714753_2880611	OF-470	Very large undeveloped parcel accessible by several neighborhoods
115 High St	F_715254_2883614	OF-470	Undeveloped parcel in residential area
149 High St	F_716095_2883099	OF-161	Undeveloped parcel in residential area
High St	F_716694_2882435	OF-161	Large undeveloped parcel in residential area
Rear Eastmount Rd	F_713205_2892864	OF-351	Large undeveloped parcel in residential area

*Very few Town-owned parcels were found in the Neponset River Watershed. The listed parcels represent some of the best opportunities, but they are not located in high-loading catchments. It is recommended that roadways in the high-load catchments be considered for SCM retrofit suitability.

These results provide a valuable starting point for the next phase of requirements in Appendix H of the 2016 MS4 Permit which are due by the end of permit year 5 (6/30/2023), which include:

- “Evaluate all permittee-owned properties identified as presenting retrofit opportunities”,
- “Provide a listing of planned structural BMPs and a plan and schedule for implementation”, and
- “Any structural BMPs installed…by the permittee…shall be tracked and the permittee shall estimate the phosphorus removal by the BMP.”

Appendix A: Impervious/DCIA Summary by Catchment

Table A-1. Impervious and DCIA Amounts for All Town Catchments in the Charles River Watershed, Sorted by Impervious Area

Catchment Identifier	Impervious Area (Acres)	Percent Impervious	DCIA (Acres)	Percent DCIA
OF-240	89.70	8.09	2.86	0.26
	34.26	43.10	8.67	10.91
OF-201	28.03	10.16	1.11	0.40
OF-529	26.35	25.16	4.47	4.27
OF-464	15.76	39.27	4.12	10.27
OF-423	14.81	21.18	1.57	2.25
OF-265	13.61	19.09	1.57	2.20
OF-222	11.74	55.10	4.07	19.09
OF-463	11.40	44.29	2.39	9.29
OF-528	11.09	6.39	0.50	0.29
OF-146	11.02	7.30	0.50	0.33
OF-353	10.88	29.50	2.30	6.24
OF-144	10.27	45.50	3.14	13.89
OF-104	10.12	5.44	0.87	0.47
OF-244	9.91	6.80	1.12	0.77
OF-75	9.08	33.60	1.79	6.63
OF-301	9.05	28.46	1.14	3.60
OF-208	8.90	22.98	1.27	3.29
OF-157	7.87	13.55	0.62	1.06
OF-312	7.77	18.03	0.75	1.74
OF-227	7.67	30.87	1.65	6.63
OF-345	7.30	28.28	1.66	6.42
OF-537	6.55	29.97	1.32	6.02
OF-148	6.42	15.01	0.60	1.41
OF-424	6.34	30.35	1.19	5.69
OF-388	6.14	18.88	0.54	1.65
OF-356	6.01	35.44	1.82	10.73
OF-149	5.65	2.91	0.16	0.08
OF-142	5.49	47.34	2.88	24.82

OF-355	5.44	19.51	0.69	2.49
OF-273	5.10	12.81	0.47	1.18
OF-377	4.82	34.02	1.74	12.29
OF-390	4.57	27.19	0.60	3.59
OF-283	4.51	16.66	0.46	1.69
OF-315	4.44	4.53	0.18	0.18
OF-344	4.28	15.37	0.68	2.43
OF-191	3.99	17.60	0.43	1.90
OF-167	3.93	24.25	0.61	3.73
OF-38	3.92	52.50	1.26	16.94
OF-373	3.90	28.06	0.92	6.62
OF-209	3.86	25.91	0.73	4.88
OF-199	3.82	16.46	0.34	1.47
OF-212	3.77	5.76	0.17	0.26
OF-116	3.77	13.05	0.44	1.53
OF-409	3.70	11.19	0.39	1.17
OF-400	3.69	9.90	0.25	0.66
OF-511	3.67	9.20	0.40	0.99
OF-346	3.59	43.89	0.98	11.93
OF-339	3.51	28.21	0.72	5.82
OF-368	3.40	26.32	0.82	6.33
DMH-58	3.40	23.45	0.67	4.64
OF-359	3.36	34.28	1.19	12.17
OF-323	3.29	7.28	0.16	0.35
OF-259	3.28	14.03	0.37	1.59
OF-113	3.23	11.70	0.41	1.48
OF-174	3.13	18.30	0.39	2.28
OF-202	3.10	9.83	0.47	1.49
OF-48	3.09	12.97	0.28	1.15
OF-288	2.91	33.39	0.68	7.85
OF-125	2.90	5.32	0.16	0.29
OF-502	2.84	21.53	0.50	3.76

OF-198	2.81	21.07	0.45	3.34
OF-109	2.80	33.28	0.71	8.43
OF-16	2.79	25.10	0.57	5.12
OF-305	2.78	37.66	0.79	10.64
OF-9	2.78	21.39	0.41	3.12
OF-280	2.77	26.86	0.50	4.86
OF-408	2.76	20.16	0.32	2.33
OF-184	2.66	19.18	0.38	2.75
OF-105	2.64	36.31	0.76	10.51
OF-389	2.59	34.19	0.77	10.10
OF-372	2.59	8.66	0.21	0.71
OF-425	2.54	72.94	1.01	28.97
OF-354	2.51	23.83	0.40	3.78
OF-503	2.50	46.27	0.49	9.14
OF-179	2.47	23.67	0.50	4.77
OF-302	2.43	79.68	1.42	46.56
OF-193	2.35	22.66	0.35	3.35
OF-156	2.34	31.36	0.47	6.35
OF-132	2.30	55.37	1.07	25.72
OF-204	2.29	21.34	0.38	3.50
OF-182	2.22	30.27	0.44	6.02
OF-414	2.17	15.32	0.27	1.87
OF-6	2.12	19.68	0.42	3.88
OF-365	2.11	33.89	0.80	12.87
OF-513	2.11	83.34	1.84	72.78
OF-203	2.11	4.52	0.12	0.25
OF-205	2.10	21.93	0.28	2.93
OF-486	2.04	42.97	0.58	12.24
OF-40	1.98	9.33	0.25	1.18
OF-289	1.95	23.18	0.72	8.52
OF-331	1.94	17.20	0.29	2.59
OF-108	1.92	10.15	0.16	0.84

OF-333	1.87	31.03	0.41	6.84
OF-13	1.85	20.99	0.34	3.88
OF-190	1.83	26.72	0.36	5.28
OF-207	1.83	15.79	0.19	1.65
OF-461	1.73	9.94	0.15	0.87
OF-489	1.68	31.69	0.38	7.13
OF-287	1.68	79.45	0.95	45.07
OF-526	1.68	31.76	0.43	8.11
OF-165	1.62	18.94	0.24	2.78
OF-106	1.61	61.02	0.51	19.43
OF-223	1.57	48.42	0.51	15.55
OF-490	1.57	18.73	0.23	2.69
OF-493	1.54	26.42	0.28	4.77
OF-347	1.51	18.60	0.43	5.23
OF-147	1.50	15.34	0.22	2.24
CB-2098	1.49	62.63	1.18	49.57
OF-371	1.42	49.90	0.63	21.94
OF-189	1.42	25.26	0.24	4.25
OF-396	1.41	26.13	0.31	5.69
OF-445	1.41	71.02	1.15	58.04
OF-475	1.39	41.87	0.76	22.75
OF-374	1.39	37.43	0.55	14.95
OF-506	1.38	18.52	0.25	3.29
OF-47	1.38	29.89	0.37	7.94
OF-317	1.37	15.50	0.22	2.44
OF-303	1.37	19.26	0.50	7.05
OF-444	1.36	58.69	0.62	26.84
OF-416	1.34	13.26	0.19	1.89
OF-521	1.32	46.16	0.54	18.89
OF-12	1.26	8.82	0.13	0.91
OF-229	1.26	32.25	0.37	9.43
OF-501	1.24	30.87	0.33	8.31

OF-446	1.22	87.56	0.62	44.38
OF-206	1.20	34.32	0.48	13.83
OF-536	1.20	75.54	1.04	65.65
OF-406	1.18	13.51	0.24	2.79
OF-336	1.17	31.65	0.25	6.83
OF-67	1.17	12.78	0.11	1.23
OF-294	1.12	51.78	0.50	23.30
OF-484	1.09	20.28	0.24	4.53
OF-533	1.09	49.82	0.65	29.96
OF-261	1.07	15.77	0.23	3.41
OF-340	1.02	25.95	0.20	5.07
OF-500	1.02	28.76	0.24	6.87
OF-274	1.02	31.02	0.35	10.61
OF-376	1.01	66.68	0.67	44.47
OF-399	0.98	49.62	0.41	20.50
OF-286	0.98	19.38	0.25	4.97
OF-410	0.98	21.52	0.17	3.83
OF-477	0.97	47.16	0.56	27.18
OF-492	0.94	22.76	0.19	4.62
OF-81	0.93	44.92	0.53	25.59
OF-100	0.92	89.15	0.85	82.58
OF-512	0.91	42.89	0.49	23.09
OF-168	0.87	23.52	0.16	4.39
OF-404	0.85	34.61	0.23	9.41
OF-324	0.84	11.01	0.12	1.58
OF-210	0.84	7.07	0.11	0.93
OF-375	0.82	36.87	0.27	11.98
OF-285	0.82	31.39	0.22	8.39
OF-224	0.82	30.82	0.24	9.03
OF-540	0.81	5.24	0.08	0.50
OF-278	0.78	7.35	0.11	1.02
OF-22	0.78	24.91	0.25	7.98

OF-394	0.78	11.00	0.18	2.55
OF-272	0.77	37.99	0.19	9.57
OF-523	0.77	22.93	0.20	5.89
OF-367	0.77	39.10	0.32	16.48
OF-152	0.76	35.23	0.27	12.67
OF-49	0.76	38.92	0.21	10.77
OF-304	0.75	44.86	0.34	20.46
OF-263	0.73	41.72	0.19	10.98
OF-69	0.71	24.29	0.20	6.96
CB-1791	0.71	24.87	0.17	5.84
OF-214	0.71	15.01	0.19	4.06
OF-337	0.69	37.23	0.26	14.04
OF-234	0.69	42.65	0.24	14.86
OF-195	0.68	19.61	0.17	5.01
OF-230	0.66	19.71	0.16	4.71
OF-58	0.66	10.28	0.07	1.12
OF-397	0.66	43.67	0.38	25.35
OF-153	0.66	26.51	0.24	9.84
OF-66	0.65	37.64	0.18	10.54
OF-84	0.64	29.59	0.25	11.53
CB-353	0.62	69.66	0.31	35.30
OF-200	0.62	25.53	0.21	8.49
OF-211	0.61	31.61	0.20	10.31
OF-7	0.61	57.47	0.32	30.42
OF-342	0.59	22.92	0.14	5.53
OF-178	0.58	38.74	0.17	11.18
OF-192	0.58	31.79	0.22	11.95
OF-357	0.58	39.71	0.26	17.80
OF-417	0.58	26.90	0.22	10.45
OF-279	0.57	6.26	0.10	1.07
OF-514	0.56	50.95	0.25	22.75
CB-2306	0.52	48.16	0.32	29.88

OF-343	0.51	36.70	0.17	12.20
OF-481	0.50	45.44	0.23	20.90
OF-379	0.50	60.18	0.30	35.96
OF-318	0.49	9.11	0.06	1.07
OF-522	0.49	35.85	0.19	13.68
CB-2063	0.49	35.03	0.13	9.61
OF-497	0.47	38.97	0.16	13.32
OF-532	0.46	21.83	0.21	9.94
OF-341	0.45	13.33	0.07	2.01
OF-330	0.45	37.52	0.27	22.97
DMH-55	0.44	82.95	0.40	75.55
OF-260	0.43	42.36	0.27	26.89
OF-413	0.43	23.83	0.10	5.61
OF-218	0.42	7.97	0.06	1.06
CB-808	0.41	24.70	0.21	12.27
OF-366	0.40	64.16	0.23	36.70
OF-252	0.39	27.59	0.19	13.57
OF-449	0.39	72.15	0.30	55.02
OF-402	0.38	33.09	0.09	7.78
OF-254	0.36	3.90	0.07	0.77
OF-25	0.35	43.55	0.23	28.74
CB-736	0.35	29.96	0.13	11.23
OF-237	0.35	3.83	0.05	0.53
OF-14	0.35	88.57	0.20	51.71
OF-487	0.34	20.05	0.06	3.71
OF-313	0.33	5.24	0.03	0.46
OF-245	0.32	8.53	0.07	1.94
OF-472	0.32	25.28	0.11	8.50
CB-878	0.31	5.06	0.03	0.48
OF-94	0.31	85.07	0.21	57.25
OF-360	0.28	53.49	0.13	25.04
OF-236	0.28	3.83	0.05	0.75

OF-308	0.28	53.29	0.20	38.91
OF-476	0.27	32.74	0.08	9.56
OF-412	0.27	38.82	0.11	15.99
OF-181	0.25	35.54	0.10	14.63
CB-1404	0.25	64.96	0.19	50.56
OF-215	0.24	56.50	0.18	41.73
OF-271	0.24	42.96	0.11	20.58
OF-411	0.23	20.32	0.06	5.57
CB-935	0.23	7.83	0.05	1.57
OF-524	0.23	19.45	0.06	5.14
OF-401	0.23	37.85	0.13	21.52
OF-509	0.22	22.41	0.07	6.88
OF-216	0.22	34.30	0.12	19.18
OF-485	0.21	23.04	0.10	11.06
OF-527	0.20	40.85	0.07	14.61
OF-319	0.20	15.78	0.04	3.11
CB-2180	0.19	10.42	0.04	2.10
OF-298	0.18	93.48	0.17	90.39
CB-282	0.18	15.65	0.05	4.10
OF-329	0.17	41.93	0.08	20.38
OF-538	0.17	29.46	0.08	12.86
OF-494	0.17	37.94	0.06	14.01
OF-295	0.16	98.40	0.16	97.61
CB-84	0.15	37.74	0.09	23.13
OF-491	0.15	48.42	0.06	18.90
OF-258	0.15	100.00	0.15	99.97
OF-510	0.15	9.89	0.03	1.91
OF-221	0.14	25.49	0.07	12.87
OF-534	0.14	93.74	0.14	90.75
OF-42	0.14	93.72	0.13	90.73
OF-270	0.14	46.96	0.06	19.49
OF-450	0.13	49.14	0.08	28.64

OF-256	0.13	97.27	0.13	95.94
CB-1400	0.13	91.81	0.12	87.26
CB-354	0.12	55.53	0.08	38.46
OF-281	0.12	70.19	0.10	57.96
OF-131	0.12	96.32	0.09	77.14
CB-901	0.11	35.77	0.07	20.39
OF-235	0.11	3.61	0.02	0.66
OF-508	0.11	27.94	0.04	9.06
OF-249	0.11	6.63	0.03	1.69
OF-480	0.11	29.13	0.08	21.53
OF-217	0.11	11.41	0.02	2.04
OF-525	0.10	56.93	0.08	42.03
OF-432	0.10	86.98	0.10	81.12
OF-246	0.10	4.08	0.02	0.82
OF-233	0.10	14.83	0.03	4.97
OF-483	0.09	75.64	0.08	65.41
CB-2147	0.09	91.32	0.07	71.82
OF-169	0.09	53.32	0.06	35.55
OF-435	0.09	97.59	0.09	96.41
OF-177	0.09	99.86	0.09	98.05
OF-448	0.09	95.38	0.09	93.15
CB-102	0.09	24.68	0.03	9.43
OF-516	0.08	45.27	0.04	21.79
OF-452	0.08	42.69	0.04	18.59
CB-1401	0.08	31.08	0.04	14.42
CB-545	0.08	27.03	0.03	9.74
OF-282	0.08	37.88	0.04	21.65
OF-253	0.08	1.96	0.01	0.28
CB-2217	0.08	31.91	0.03	14.45
OF-243	0.08	63.20	0.06	50.25
OF-451	0.07	23.48	0.02	7.45
OF-479	0.07	98.81	0.07	99.05

CB-1199	0.06	99.93	0.06	99.89
OF-430	0.06	5.22	0.01	0.94
OF-307	0.06	90.11	0.06	85.54
OF-443	0.05	100.00	0.05	100.00
CB-1403	0.05	100.00	0.05	99.85
CB-104	0.05	7.26	0.01	1.39
CB-1852	0.05	44.03	0.03	26.23
OF-242	0.05	91.61	0.04	87.68
OF-361	0.05	60.38	0.04	46.91
CB-737	0.04	43.17	0.02	20.16
OF-231	0.04	1.25	0.00	0.09
OF-447	0.04	88.40	0.04	86.01
OF-299	0.04	95.87	0.04	93.87
CB-2303	0.04	17.60	0.02	7.38
OF-441	0.03	61.99	0.03	48.81
OF-241	0.03	90.75	0.03	86.45
OF-403	0.03	32.11	0.01	12.38
CB-1964	0.03	60.09	0.02	42.22
OF-297	0.02	99.05	0.02	98.58
OF-478	0.02	46.11	0.02	39.69
OF-238	0.02	0.11	0.00	0.00
OF-296	0.02	93.91	0.02	91.01
CB-1872	0.02	67.76	0.02	55.78
OF-141	0.02	49.10	0.01	34.41
OF-427	0.02	98.14	0.02	97.22
OF-251	0.02	99.22	0.02	98.83
OF-306	0.02	73.27	0.01	38.54
OF-292	0.01	94.32	0.01	91.60
OF-496	0.01	25.17	0.01	11.13
OF-293	0.01	92.49	0.01	88.95
CB-103	0.01	74.92	0.01	64.85
OF-139	0.01	45.13	0.01	28.95

CB-1871	0.01	100.00	0.01	100.00
CB-352	0.01	15.55	0.00	6.10
OF-255	0.01	93.71	0.01	90.72
CB-2146	0.01	29.22	0.00	14.11
OF-247	0.01	1.44	0.00	0.12
OF-250	0.01	68.76	0.00	57.01
OF-88	0.00	42.20	0.00	27.12
OF-239	0.00	0.33	0.00	0.02
OF-442	0.00	94.18	0.00	91.40
CB-2064	0.00	72.03	0.00	61.14
OF-248	0.00	0.98	0.00	0.10
CB-1861	0.00	17.34	0.00	7.22
OF-505	0.00	16.18	0.00	5.40
CB-840	0.00	2.39	0.00	0.37
CB-2097	0.00	100.00	0.00	100.00
CB-1402	0.00	0.00	0.00	0.00
CB-2258	0.00	0.00	0.00	0.00
OF-232	0.00	0.00	0.00	0.00
OF-291	0.00	0.00	0.00	0.00
OF-499	0.00	0.00	0.00	0.00
OF-535	0.00	0.00	0.00	0.00

Table A-2. Impervious and DCIA Amounts for All Town Catchments in the Neponset River Watershed, Sorted by Impervious Area

Catchment Identifier	Impervious Area (Acres)	Percent Impervious	DCIA (Acres)	Percent DCIA
OF-102	31.46	6.04	1.02	0.20
OF-85	10.95	22.47	1.06	2.17
OF-470	8.16	10.34	0.62	0.79
OF-351	4.80	27.15	0.72	4.10
OF-393	4.72	21.69	0.98	4.52
OF-170	4.15	15.74	0.48	1.82

OF-300	4.00	24.65	0.54	3.30
OF-456	3.80	21.24	0.78	4.37
OF-488	3.32	25.38	0.44	3.37
OF-482	3.24	13.13	0.26	1.06
OF-455	3.24	7.52	0.21	0.48
OF-185	2.81	26.12	0.63	5.88
OF-392	2.18	18.36	0.46	3.87
OF-348	2.00	23.40	0.34	4.04
OF-176	1.96	24.38	0.45	5.57
OF-175	1.81	25.20	0.49	6.90
OF-268	1.62	17.48	0.29	3.19
OF-269	1.59	19.83	0.30	3.68
OF-173	1.51	25.22	0.27	4.60
OF-32	1.34	29.63	0.40	8.76
OF-519	1.22	28.83	0.26	6.23
OF-350	1.17	42.29	0.39	13.99
OF-188	1.12	13.51	0.10	1.26
OF-309	1.06	15.14	0.16	2.31
OF-517	1.04	1.99	0.04	0.08
OF-369	1.03	9.71	0.12	1.09
OF-161	1.03	5.42	0.11	0.57
OF-338	1.00	34.52	0.28	9.63
OF-311	0.88	20.72	0.18	4.24
OF-380	0.87	19.48	0.16	3.58
OF-405	0.83	35.14	0.19	8.27
OF-322	0.80	15.14	0.22	4.09
OF-186	0.77	42.48	0.24	13.07
OF-267	0.49	11.50	0.12	2.83
OF-382	0.42	18.60	0.11	4.83
CB 355	0.38	43.77	0.11	12.97
OF-220	0.37	42.40	0.17	20.09
OF-370	0.32	24.83	0.09	6.86

OF-219	0.26	40.91	0.15	22.62
OF-171	0.25	35.91	0.12	16.90
OF-172	0.18	35.29	0.08	15.09
OF-187	0.17	52.39	0.10	32.12
OF-386	0.17	68.47	0.14	54.86
OF-515	0.16	50.69	0.08	24.81
CB-207	0.15	22.75	0.05	7.26
OF-128	0.12	57.01	0.06	30.38
CB-208	0.07	14.67	0.03	5.24
OF-469	0.01	3.74	0.00	0.44
CB-1073	0.00	0.00	0.00	0.00
CB-355	0.00	0.00	0.00	0.00

Appendix B: Estimated Phosphorus Loading Summary by Catchment

Table B-1. Estimated Phosphorus Loading for All Town Catchments in the Charles River Watershed

Catchment Identifier	Estimated P Load (Lbs/Yr)
OF-240	328.39
OF-201	100.52
	71.87
OF-529	57.67
OF-104	48.59
OF-528	45.16
OF-146	44.73
OF-244	42.14
OF-149	39.67
OF-265	36.18
OF-423	32.96
OF-464	29.72
OF-157	25.86
OF-208	24.49
OF-315	23.43
OF-312	23.36
OF-222	23.22
OF-463	22.58
OF-301	22.11
OF-353	21.03
OF-125	20.19
OF-144	19.41
OF-148	18.57
OF-75	18.13
OF-227	16.13
OF-212	15.87
OF-388	15.58
OF-409	15.03
OF-345	14.42
OF-273	14.33
OF-191	13.39
OF-323	12.82
OF-537	12.81
OF-356	12.61
OF-424	12.46
OF-199	12.19
OF-400	12.14
OF-142	11.99
OF-283	11.87
OF-116	11.39
OF-355	11.24
OF-344	11.09
OF-259	11.02
OF-203	10.51
OF-511	10.47
OF-202	10.25
OF-390	10.09
OF-113	9.97
OF-48	9.91
OF-209	9.84
OF-174	9.20
OF-377	9.06
OF-167	8.79
OF-502	7.99
OF-372	7.96
DMH-58	7.94
OF-408	7.88
OF-9	7.71
OF-414	7.68
OF-198	7.66

OF-184	7.63
OF-373	7.60
OF-368	7.58
OF-38	7.57
OF-108	7.46
OF-40	7.15
OF-339	6.97
OF-346	6.85
OF-359	6.47
OF-207	6.31
OF-179	6.29
OF-16	6.17
OF-6	5.73
OF-13	5.69
OF-461	5.67
OF-288	5.65
OF-331	5.60
OF-193	5.55
OF-280	5.54
OF-305	5.46
OF-109	5.41
OF-204	5.35
OF-503	5.31
OF-147	5.24
OF-105	5.08
OF-205	5.04
OF-354	4.99
OF-389	4.98
OF-425	4.87
OF-182	4.86
OF-132	4.65
OF-156	4.65

OF-365	4.64
OF-333	4.38
OF-302	4.36
OF-190	4.33
OF-506	4.23
OF-406	4.15
OF-486	4.11
OF-317	3.95
OF-189	3.91
OF-513	3.77
OF-289	3.73
OF-416	3.59
OF-526	3.48
OF-540	3.48
OF-347	3.34
OF-165	3.32
OF-396	3.31
OF-489	3.29
OF-490	3.20
OF-12	3.17
OF-501	3.11
OF-493	3.08
OF-287	3.07
OF-303	3.06
OF-223	3.01
OF-484	2.99
OF-324	2.93
OF-254	2.91
OF-58	2.91
OF-410	2.86
OF-106	2.84
OF-210	2.82

OF-47	2.80
OF-444	2.73
CB-2098	2.69
OF-261	2.68
OF-206	2.66
OF-371	2.63
OF-374	2.60
OF-394	2.59
OF-475	2.57
OF-521	2.56
OF-500	2.53
OF-445	2.53
OF-67	2.48
OF-238	2.47
OF-229	2.44
OF-313	2.43
OF-523	2.37
OF-336	2.31
OF-318	2.29
OF-340	2.29
OF-286	2.26
OF-446	2.16
OF-274	2.16
OF-536	2.14
OF-477	2.14
OF-237	2.08
OF-404	2.07
OF-81	2.06
OF-294	2.04
OF-22	2.00
OF-533	1.98
OF-278	1.96

OF-218	1.95
OF-279	1.95
OF-168	1.90
OF-492	1.88
OF-399	1.86
OF-376	1.82
OF-214	1.78
OF-285	1.77
OF-272	1.77
OF-236	1.75
OF-69	1.74
OF-512	1.67
OF-100	1.64
OF-367	1.63
OF-195	1.62
OF-152	1.62
OF-375	1.60
OF-224	1.57
OF-49	1.53
CB-878	1.52
OF-192	1.51
OF-263	1.43
OF-304	1.43
CB-1791	1.42
OF-234	1.37
OF-200	1.35
OF-337	1.33
OF-230	1.33
OF-341	1.32
OF-153	1.26
OF-397	1.24
OF-417	1.24

OF-84	1.23
OF-66	1.20
OF-211	1.19
OF-342	1.18
CB-2306	1.17
OF-178	1.17
OF-357	1.14
OF-7	1.12
OF-514	1.12
OF-522	1.11
CB-353	1.09
OF-497	1.07
OF-402	1.02
OF-343	1.00
OF-487	1.00
OF-245	0.98
OF-379	0.95
OF-481	0.94
OF-532	0.92
CB-2063	0.91
CB-935	0.90
OF-413	0.89
OF-366	0.88
OF-449	0.85
OF-330	0.84
OF-260	0.84
OF-252	0.82
CB-808	0.81
DMH-55	0.79
OF-472	0.78
OF-524	0.78
OF-319	0.71

OF-411	0.71
CB-736	0.69
OF-235	0.65
OF-25	0.64
OF-253	0.64
OF-509	0.63
OF-14	0.62
CB-2180	0.59
OF-510	0.58
OF-94	0.57
OF-181	0.55
OF-401	0.54
OF-231	0.54
OF-360	0.53
OF-476	0.53
OF-216	0.52
OF-412	0.52
OF-308	0.51
OF-271	0.47
OF-246	0.47
OF-215	0.46
CB-1404	0.45
OF-217	0.42
OF-485	0.42
OF-527	0.41
OF-249	0.39
CB-282	0.38
OF-329	0.34
CB-84	0.33
OF-494	0.32
OF-538	0.32
OF-298	0.32

OF-221	0.30
OF-508	0.30
OF-232	0.30
CB-901	0.30
OF-491	0.29
OF-295	0.28
OF-270	0.28
OF-430	0.27
OF-258	0.26
OF-480	0.26
OF-534	0.25
OF-450	0.25
OF-233	0.25
OF-42	0.25
CB-354	0.23
OF-256	0.23
CB-1400	0.23
OF-281	0.22
OF-131	0.21
OF-525	0.20
OF-451	0.20
OF-499	0.19
OF-452	0.19
OF-432	0.18
OF-169	0.18
CB-545	0.17
OF-483	0.17
CB-102	0.17
CB-2147	0.17
OF-435	0.16
OF-177	0.16
OF-448	0.16

OF-479	0.16
CB-2217	0.16
OF-516	0.15
CB-1401	0.15
OF-282	0.15
OF-239	0.14
OF-243	0.14
CB-2303	0.13
CB-104	0.12
CB-1199	0.11
OF-307	0.10
OF-443	0.10
CB-1403	0.10
CB-1852	0.09
OF-447	0.09
CB-737	0.09
OF-242	0.08
OF-361	0.08
OF-403	0.08
OF-291	0.07
OF-299	0.07
OF-247	0.06
OF-441	0.06
OF-241	0.06
CB-1964	0.06
OF-248	0.06
OF-478	0.05
OF-297	0.04
OF-296	0.04
CB-1872	0.04
OF-141	0.04
OF-427	0.03

OF-251	0.03
OF-496	0.03
OF-306	0.03
OF-292	0.03
CB-1871	0.02
OF-293	0.02
CB-103	0.02
OF-139	0.02
CB-352	0.02
CB-2146	0.02
OF-255	0.02

OF-535	0.02
OF-250	0.01
OF-88	0.01
CB-1861	0.01
OF-442	0.01
CB-2064	0.01
OF-505	0.01
CB-840	0.00
CB-1402	0.00
CB-2097	0.00
CB-2258	0.00

Table B-2. Estimated Phosphorus Loading for All Town Catchments in the Neponset River Watershed

Catchment Identifier	Estimated P Load (Lbs/Yr)
OF-102	126.85
OF-85	28.18
OF-470	22.70
OF-351	12.96
OF-455	12.94
OF-170	12.76
OF-517	11.00
OF-300	10.79
OF-393	10.75
OF-456	8.95
OF-482	8.54
OF-488	7.53
OF-185	5.97
OF-392	5.32
OF-269	4.66
OF-369	4.59
OF-348	4.56
OF-268	4.18
OF-176	4.12
OF-161	4.09
OF-188	3.71
OF-175	3.64
OF-173	3.25
OF-350	2.71
OF-309	2.66
OF-32	2.63
OF-519	2.56
OF-380	1.97
OF-311	1.96
OF-338	1.94
OF-405	1.78
OF-322	1.69
OF-186	1.48
OF-267	1.35
OF-382	0.86
CB 355	0.76
OF-220	0.70
OF-370	0.64
OF-219	0.49
OF-171	0.48
OF-172	0.35
OF-187	0.31
OF-386	0.31
CB-207	0.30
OF-515	0.29
OF-128	0.22
CB-208	0.16
OF-469	0.04
CB-1073	0.00
CB-355	0.00

Appendix C: Estimated Nitrogen Loading Summary by Catchment

Table C-1. Estimated Nitrogen Loading for All Catchments in the Charles River Watershed

Catchment Identifier	Estimated N Load (Lbs/Yr)
OF-240	2522.48
OF-201	872.01
	580.91
OF-149	521.19
OF-528	474.96
OF-529	443.71
OF-104	347.92
OF-244	321.18
OF-265	320.16
OF-146	301.54
OF-315	292.91
OF-423	270.25
OF-464	237.30
OF-157	230.70
OF-208	209.78
OF-312	202.68
OF-125	187.85
OF-212	180.57
OF-222	168.47
OF-301	166.18
OF-463	164.97
OF-353	161.19
OF-203	160.40
OF-144	149.48
OF-409	138.45
OF-273	134.05
OF-75	133.45
OF-148	131.96
OF-388	130.55
OF-227	117.11
OF-191	116.94
OF-202	113.71
OF-345	108.52
OF-259	105.90
OF-323	105.01
OF-537	96.99
OF-400	96.69
OF-199	95.24
OF-424	93.78
OF-283	92.69
OF-356	88.08
OF-209	84.00
OF-355	83.45
OF-142	80.66
OF-390	79.95
OF-48	79.53
OF-174	79.32
OF-511	76.58
OF-40	74.12
OF-344	72.79
OF-167	71.80
OF-377	70.72
OF-116	69.30
OF-9	67.43
OF-408	66.78
OF-414	66.27
DMH-58	65.24
OF-113	65.17

OF-198	64.14
OF-502	62.90
OF-184	62.48
OF-108	61.22
OF-373	57.96
OF-207	56.78
OF-38	56.32
OF-368	54.24
OF-179	53.60
OF-372	53.41
OF-339	53.24
OF-346	51.99
OF-13	49.76
OF-461	49.35
OF-359	49.28
OF-16	48.63
OF-6	47.44
OF-331	47.00
OF-503	44.13
OF-193	43.01
OF-288	42.71
OF-204	42.39
OF-280	41.60
OF-109	41.20
OF-147	41.18
OF-205	40.70
OF-305	40.57
OF-182	39.23
OF-105	38.56
OF-317	38.27
OF-389	38.08
OF-354	37.73

OF-425	36.04
OF-333	35.68
OF-406	34.98
OF-190	34.95
OF-156	34.47
OF-302	34.43
OF-189	34.19
OF-506	34.16
OF-132	32.94
OF-540	31.88
OF-210	31.87
OF-365	31.01
OF-513	29.87
OF-486	29.61
OF-416	29.53
OF-289	29.41
OF-484	28.35
OF-324	28.26
OF-238	27.58
OF-526	27.00
OF-396	26.42
OF-394	26.09
OF-165	24.95
OF-489	24.83
OF-287	24.54
OF-501	24.47
OF-12	24.39
OF-490	24.17
OF-58	23.64
OF-410	23.45
OF-347	23.29
OF-493	23.06

OF-106	22.98
OF-223	22.69
OF-206	22.60
OF-261	21.95
OF-318	21.58
CB-2098	21.27
OF-303	21.00
OF-313	20.97
OF-371	20.51
OF-47	20.39
OF-374	20.23
OF-475	20.19
OF-445	20.02
OF-521	19.91
OF-500	19.74
OF-444	19.47
OF-67	18.91
OF-286	18.79
OF-229	18.63
OF-523	18.60
OF-340	17.85
OF-404	17.63
OF-336	17.29
OF-446	17.25
OF-274	17.14
OF-536	17.01
OF-22	16.63
OF-218	16.58
OF-294	16.13
OF-533	15.68
OF-168	15.13
OF-285	15.08

OF-278	15.02
OF-237	14.78
OF-214	14.76
OF-399	14.68
OF-376	14.38
OF-69	14.36
OF-492	14.25
OF-477	14.06
OF-152	14.00
OF-272	13.81
OF-81	13.49
CB-878	13.22
OF-512	13.20
OF-195	13.18
OF-100	12.98
OF-236	12.29
OF-375	12.05
OF-224	12.05
OF-192	11.94
OF-49	11.83
OF-367	11.43
OF-263	11.27
OF-66	11.23
OF-234	11.12
OF-341	11.03
OF-304	10.91
OF-200	10.87
CB-1791	10.67
OF-279	10.59
OF-230	10.18
OF-337	10.10
OF-417	10.04

OF-153	9.84
OF-397	9.57
OF-84	9.51
OF-178	9.13
OF-211	9.04
OF-342	8.99
CB-353	8.82
OF-7	8.81
OF-522	8.67
OF-357	8.46
OF-497	8.19
OF-514	8.06
OF-402	7.97
OF-487	7.80
OF-254	7.77
CB-2306	7.49
OF-343	7.47
OF-481	7.28
CB-2063	7.19
CB-935	7.15
OF-379	7.11
OF-413	7.04
OF-510	6.98
OF-532	6.91
OF-472	6.80
OF-260	6.78
OF-319	6.61
CB-2180	6.58
OF-330	6.50
DMH-55	6.29
CB-808	6.23
OF-524	6.15

OF-411	6.08
OF-509	6.05
OF-252	5.78
OF-366	5.65
OF-245	5.57
OF-449	5.51
OF-235	5.17
CB-736	5.16
OF-25	5.10
OF-14	4.93
OF-231	4.86
OF-216	4.72
OF-401	4.66
OF-181	4.64
OF-94	4.51
OF-217	4.34
OF-499	4.24
OF-360	4.05
OF-476	4.01
OF-308	3.97
OF-412	3.91
OF-271	3.71
OF-215	3.66
CB-1404	3.56
OF-527	3.15
OF-485	3.13
OF-249	2.90
CB-282	2.77
OF-232	2.74
OF-329	2.72
OF-508	2.59
OF-538	2.56

OF-298	2.52
CB-84	2.48
OF-494	2.42
OF-253	2.26
OF-295	2.24
CB-901	2.23
OF-270	2.21
OF-246	2.17
OF-491	2.16
OF-221	2.15
OF-258	2.08
OF-534	2.01
OF-233	2.00
OF-42	1.96
OF-430	1.92
OF-450	1.86
OF-256	1.82
CB-1400	1.80
OF-451	1.79
CB-354	1.76
OF-281	1.70
OF-525	1.69
OF-131	1.66
OF-480	1.61
OF-239	1.58
OF-452	1.56
OF-169	1.48
OF-432	1.46
CB-545	1.40
OF-483	1.34
CB-2147	1.32
CB-102	1.29

OF-435	1.28
OF-177	1.27
OF-448	1.25
OF-516	1.22
CB-1401	1.20
CB-2303	1.16
OF-282	1.14
CB-2217	1.14
OF-243	1.09
OF-479	0.96
CB-104	0.95
CB-1199	0.88
OF-307	0.83
OF-443	0.76
CB-1403	0.76
CB-1852	0.70
OF-242	0.66
OF-361	0.66
CB-737	0.65
OF-403	0.61
OF-447	0.54
OF-299	0.54
OF-441	0.50
OF-241	0.45
CB-1964	0.41
OF-297	0.35
OF-478	0.32
OF-141	0.30
OF-296	0.29
OF-291	0.26
CB-1872	0.26
OF-427	0.24

OF-251	0.24
OF-306	0.23
OF-247	0.22
OF-496	0.21
OF-292	0.20
OF-248	0.20
OF-293	0.17
OF-139	0.17
CB-352	0.17
CB-103	0.16
CB-1871	0.16
CB-2146	0.15

OF-255	0.14
OF-535	0.13
OF-250	0.07
OF-88	0.07
OF-442	0.06
CB-2064	0.06
CB-1861	0.05
OF-505	0.04
CB-840	0.03
CB-1402	0.01
CB-2258	0.00
CB-2097	0.00

Table C-213. Estimated Nitrogen Loading for All Catchments in the Neponset River Watershed

Catchment Identifier	Estimated N Load (Lbs/Yr)
OF-102	1217.96
OF-85	225.08
OF-470	157.45
OF-517	106.69
OF-170	106.01
OF-455	104.63
OF-351	101.38
OF-393	85.82
OF-300	84.40
OF-482	65.81
OF-456	64.91
OF-488	58.53
OF-185	46.36
OF-392	43.18
OF-269	37.68
OF-348	36.06
OF-369	36.05
OF-268	33.42
OF-176	32.00
OF-188	31.04
OF-161	30.72
OF-175	28.22
OF-173	25.96
OF-350	21.37
OF-519	20.06
OF-32	19.80
OF-309	18.75
OF-311	16.28
OF-380	15.39
OF-338	14.70
OF-405	13.95
OF-322	13.25
OF-186	11.66
OF-267	9.46
OF-382	6.42
CB 355	5.88
OF-220	5.36
OF-370	4.84
OF-219	3.82
OF-171	3.68
OF-172	2.67
OF-386	2.47
OF-187	2.44
CB-207	2.27
OF-515	2.27
OF-128	1.76
CB-208	1.17
OF-469	0.31
CB-1073	0.01
CB-355	0.00

Appendix D: Town-Owned Parcels Sorted by the NSP BMP Tool's Phosphorus Priority Ranking

Table D-1. Town-Owned Parcels Sorted by BMP Tool Priority Score for Phosphorus Removal

Address	Parloc_ID	Use Description	BMP Tool Priority Score (Max Score = 1)
HIGH ST	F_713664_2887021		1
0 HIGH ST	F_714303_2886555		1
NOON HILL RD	F_707558_2884747		1
REAR ORCHARD ST	F_701967_2882985		1
84 R HARDING ST	F_703237_2898667	Municipal, Federal, or State	0.994696795
NOON HILL ST	F_708669_2883256		0.992391054
115 HIGH ST	F_715254_2883614		0.987548997
REAR PLAIN ST	F_715348_2881796		0.987548997
SCHOOL ST	F_706892_2898006		0.987548997
1 ICE HOUSE RD.	F_703417_2898120		0.987548997
CAUSEWAY ST	F_704503_2885480		0.98270694
REAR HAWTHORNE DR	F_710005_2899063		0.98270694
KENNEY RD	F_709148_2896852		0.98270694
2 ICE HOUSE RD.	F_702608_2898113	Commercial	0.98270694
39 SPRING ST	F_708401_2891890		0.98270694
NOON HILL ST	F_708814_2882219		0.944431635
ELM ST	F_716734_2887274		0.944431635
PLAIN ST	F_716720_2881595		0.944431635
3 ICE HOUSE RD.	F_701962_2898645		0.944431635
REAR PLAIN ST	F_714753_2880611		0.932672354
NOON HILL ST	F_709590_2882330		0.932672354
PLAIN ST	F_716747_2879421		0.922065944
HIGH ST	F_716694_2882435		0.922065944
3 HAWTHORNE DR	F_710797_2900362		0.922065944
ELM ST	F_715302_2887388		0.916762739

NORTH ST & 329R	F_709446_2903186		0.916762739
COLE DR	F_715652_2880947		0.914456998
OFF HIGH ST	F_716820_2880841		0.914456998
SOUTH ST	F_708350_2884456		0.914456998
REAR HIGH ST	F_715119_2886232		0.914456998
13 SURREY RUN	F_704681_2899383		0.914456998
NOON HILL RD	F_708875_2885248	Municipal, Federal, or State	0.905925755
CHARLES RIVER	F_700139_2879928		0.905925755
BRIDGE ST	F_701104_2895725		0.90454231
MILLBROOK RD	F_715715_2895157		0.90454231
REAR ELM ST	F_715802_2888323		0.90454231
149 HIGH ST	F_716095_2883099		0.896241642
REAR PHILIP ST	F_716631_2890609		0.845054185
ORCHARD ST	F_703691_2882134		0.845054185
NOON HILL	F_705383_2880456		0.845054185
REAR DEERFIELD DR	F_708241_2900694		0.845054185
NOON HILL	F_707414_2882235		0.845054185
REAR HIGH ST	F_717076_2882041		0.845054185
NOON HILL	F_704392_2882095		0.845054185
STOP RIVER	F_705345_2882404		0.845054185
REAR WALDEN CT	F_711727_2900209		0.845054185
EASTMOUNT RD	F_713383_2892739	Industrial	0.845054185
NOON HILL	F_704221_2880903		0.80401199
10 RIDGE RD	F_710555_2881238		0.80401199
CAUSEWAY ST	F_704605_2883005		0.80401199
NOON HILL	F_705403_2881544		0.80401199
17 ELM ST	F_713738_2888271		0.798708785
21 RIDGE RD	F_711424_2881157		0.796633618

ELM ST	F_714889_2889774		0.796633618
34 COLONIAL RD	F_705938_2901075		0.796633618
15 CEDAR LN	F_707878_2898743		0.774729075
NORTH ST & 329R	F_708965_2902741		0.76942587
NORTH ST & 329R	F_709114_2902843		0.76942587
17 SURREY RUN	F_704755_2899492		0.76942587
OFF FLINT LOCKE LN	F_712319_2900082		0.756974867
625 MAIN ST	F_706129_2893345		0.753977404
ROCKY LN	F_711523_2881572		0.74821305
OFF SOUTH ST	F_709168_2879829		0.739220659
ROCKY LN	F_710900_2882474		0.739220659
9 INDIAN HILL RD	F_708352_2880015		0.701637076
E SPRING ST	F_710471_2889757		0.701637076
REAR EASTMOUNT RD	F_713205_2892864		0.694950427
2 R LAKEWOOD TERR	F_711538_2880858		0.631542541
HILLTOP CIR	F_711514_2882870		0.631542541
REAR PHILIP ST	F_716568_2890938		0.631542541
JUNIPER LN	F_710606_2887061		0.631542541
HIGH ST	F_711305_2887141		0.631542541
CAUSEWAY ST	F_704291_2883135		0.631542541
REAR PHILIP ST	F_716374_2891236		0.631542541
WOOD END LN	F_717280_2896473		0.631542541
MAIN ST	F_707229_2891236		0.631542541
20 RIDGE RD	F_711417_2880903		0.59349781
OFF ROLLING LN	F_713000_2894856		0.59349781

3 INDIAN HILL RD	F_708752_2879679		0.580355084
REAR WEST & ADAMS STS	F_705506_2895165		0.580355084
83 BLACKSMITH DR	F_704537_2900085		0.580355084
HARDING ST	F_705898_2900601		0.580355084
OFF PLAIN ST	F_714203_2881926		0.559372838
HIGH ST	F_714845_2885818		0.559372838
107 R ELM ST	F_716708_2888676		0.556836523
5 INDIAN HILL RD	F_708580_2879821		0.556836523
7 INDIAN HILL RD	F_708469_2879934		0.556836523
2 INDIAN HILL RD	F_709002_2879914		0.556836523
REAR PLAIN ST	F_717128_2879933		0.556836523
	LOCmapc_392516		0.556836523
REAR HIGH ST	F_712011_2887009		0.556836523
REAR LAND	F_716656_2886099		0.556836523
DEERFIELD DR	F_708255_2899874		0.556836523
0 UNKNOWN	F_708174_2892620		0.556836523
54 HATTERS HILL RD	F_712037_2897339		0.556836523
PHEASANT RD	F_704589_2901181		0.556836523
DALE ST	F_705058_2893003		0.556836523
84 BLACKSMITH DR	F_704602_2899877		0.556836523
LAUREL DR	F_707553_2891328		0.556836523
GROVE ST	F_704573_2894926		0.556836523
GROVE ST	F_704762_2894787		0.556836523
WEST MILL ST	F_702922_2896899		0.51925294

GRANITE ST	F_714492_2881602		0.516716624
END SAW MILL LN	F_716414_2894967		0.516716624
42 HATTERS HILL RD	F_712202_2897018		0.516716624
NORTH ST	F_707241_2896856		0.516716624
REAR GREEN ST	F_710227_2895358		0.516716624
NORTH ST & 329R	F_709364_2902859		0.516716624
HATTERS HILL RD	F_711988_2897432		0.516716624
85 COLONIAL RD	F_704696_2899708		0.516716624
44 HOSPITAL RD	F_701817_2899713		0.510260549
DALE ST	F_706841_2895889		0.505187918
REAR ELM ST	F_715075_2889736		0.505187918
POUND ST	F_711887_2892836		0.505187918
COLONIAL RD	F_705072_2899751		0.505187918
9 SURREY RUN	F_704480_2899177		0.505187918
55 NO MEADOWS RD	F_706171_2894527		0.505187918
REAR HARDING ST	F_704457_2898840		0.505187918
BRIDGE ST	F_700967_2894235		0.505187918
HIGH ST	F_715155_2886542		0.480055338
50 HATTERS HILL RD	F_712092_2897231		0.424948121
3 BRIAR HILL RD	F_715694_2880028	Single family residence	0.370071478
8 INDIAN HILL RD	F_708598_2880179		0.368457459
END SAW MILL LN	F_716584_2894878		0.368457459

UPHAM RD	F_708285_2893241		0.368457459
55-59 GREEN ST	F_709504_2894871		0.361540235
6 INDIAN HILL RD	F_708700_2880077		0.343324879
PLEASANT CT	F_709444_2891549		0.34171086
4 INDIAN HILL RD	F_708868_2879959		0.303666129
7 SURREY RUN	F_704354_2899294		0.303666129
NORTH ST	F_707107_2897139		0.303666129
46 HATTERS HILL RD	F_712147_2897124		0.296748905
93 PLEASANT ST	F_710306_2891063		0.293520867
ELM ST	F_715751_2888058		0.216970256
100 BIRCH RD	F_717930_2896669		0.201060641
NORTH ST	F_707552_2896592		0.144800553
BRIDGE ST	F_701393_2894103		0.132810699
NORTH ST	F_707551_2894808		0.114825917
135 NO MEADOWS RD	F_702412_2897022		0.112750749
OFF WEST ST	F_702651_2895849		0.112750749
124 NORTH ST	F_707623_2895185		0.112750749
7 FRAIRY ST	F_708241_2893413		0.112750749
30 POUND ST	F_710887_2892850		0.112750749
459 MAIN ST	F_708981_2893302		0.112750749
15 JANES AVE	F_709078_2893482		0.112750749
NORTH ST	F_708847_2893304		0.112750749
458 - 460 MAIN ST	F_709108_2893052		0.112750749
CAUSEWAY ST	F_705563_2887608		0.022826839
NOON HILL	F_708213_2885972		0.022365691
REAR LAND	F_716663_2886401		0.020521098
REAR LAND	F_716456_2886728		0.019368227

STOP RIVER AREA	F_708919_2886712		0.018676504
STOP RIVER	F_707279_2886428		0.018676504
REAR CAUSEWAY ST	F_706094_2887105		0.018676504
OFF ELM ST	F_716997_2886546		0.018676504
ELM ST	F_715853_2887170		0.018676504
MAIN ST	F_704757_2891063		0.018676504
0 UNKNOWN	F_705210_2891507		0.018676504
45 HATTERS HILL RD	F_712316_2897286		0.00391976
49 HATTERS HILL RD	F_712210_2897405		0.00391976
18 SURREY RUN	F_704606_2899659		0.00391976
14 SURREY RUN	F_704518_2899610		0.00391976
MAIN ST	F_704522_2891585		0.001383445
REAR ELM ST	F_715667_2886649		0.000461148
ELM ST	F_715796_2887705		0.000461148

Appendix E: Town-Owned Parcels Sorted by the NSP BMP Tool's Nitrogen Priority Ranking

Table E-1. Town-Owned Parcels Sorted by BMP Tool Priority Score for Nitrogen Removal

Address	Parloc_ID	Use Description	BMP Tool Priority Score (Max Score = 1)
8 INDIAN HILL RD	F_708598_2880179		1
3 INDIAN HILL RD	F_708752_2879679		0.999077703
5 INDIAN HILL RD	F_708580_2879821		0.999077703
7 INDIAN HILL RD	F_708469_2879934		0.999077703
ROCKY LN	F_710900_2882474		0.999077703
REAR LAND	F_716656_2886099		0.995157943
9 INDIAN HILL RD	F_708352_2880015		0.994927369
NOON HILL	F_704221_2880903		0.990315887
CAUSEWAY ST	F_704605_2883005		0.990315887
ORCHARD ST	F_703691_2882134		0.985243256
	LOCmapc_392516		0.985243256
149 HIGH ST	F_716095_2883099		0.985243256
SOUTH ST	F_708350_2884456		0.982245792
GRANITE ST	F_714492_2881602		0.98155407
REAR HIGH ST	F_712011_2887009		0.98155407
NORTH ST	F_707241_2896856		0.98155407
9 SURREY RUN	F_704480_2899177		0.98155407
7 SURREY RUN	F_704354_2899294		0.98155407
NORTH ST	F_707107_2897139		0.98155407
CHARLES RIVER	F_700139_2879928		0.977864884
NORTH ST & 329R	F_709114_2902843		0.976942587
44 HOSPITAL RD	F_701817_2899713		0.975789716
BRIDGE ST	F_701104_2895725		0.974406272
REAR ELM ST	F_715802_2888323		0.974406272
REAR HIGH ST	F_717076_2882041		0.974406272
E SPRING ST	F_710471_2889757		0.974406272
REAR ELM ST	F_715075_2889736		0.974406272
REAR HARDING ST	F_704457_2898840		0.974406272

BRIDGE ST	F_700967_2894235		0.974406272
NOON HILL ST	F_708814_2882219		0.965644455
OFF ROLLING LN	F_713000_2894856		0.965644455
PLAIN ST	F_716720_2881595		0.965644455
OFF FLINT LOCKE LN	F_712319_2900082		0.965644455
NORTH ST & 329R	F_709446_2903186		0.965644455
NORTH ST & 329R	F_708965_2902741		0.962416417
POUND ST	F_711887_2892836		0.962416417
115 HIGH ST	F_715254_2883614		0.959418953
21 RIDGE RD	F_711424_2881157		0.958496657
55-59 GREEN ST	F_709504_2894871		0.958496657
REAR PLAIN ST	F_714753_2880611		0.958496657
COLE DR	F_715652_2880947		0.958496657
OFF HIGH ST	F_716820_2880841		0.958496657
NOON HILL ST	F_709590_2882330		0.958496657
REAR WEST & ADAMS STS	F_705506_2895165		0.958496657
HARDING ST	F_705898_2900601		0.958496657
ELM ST	F_716734_2887274		0.940050726
3 BRIAR HILL RD	F_715694_2880028	Single family residence	0.940050726
10 RIDGE RD	F_710555_2881238		0.940050726
HIGH ST	F_715155_2886542		0.940050726
NOON HILL	F_705403_2881544		0.940050726
84 R HARDING ST	F_703237_2898667	Municipal, Federal, or State	0.940050726
CAUSEWAY ST	F_704503_2885480		0.921604796
REAR HAWTHORNE DR	F_710005_2899063		0.921604796
REAR PHILIP ST	F_716631_2890609		0.921604796

NOON HILL	F_705383_2880456		0.921604796
REAR DEERFIELD DR	F_708241_2900694		0.921604796
NOON HILL	F_707414_2882235		0.921604796
HIGH ST	F_713664_2887021		0.921604796
NOON HILL	F_704392_2882095		0.921604796
STOP RIVER	F_705345_2882404		0.921604796
REAR WALDEN CT	F_711727_2900209		0.921604796
REAR EASTMOUNT RD	F_713205_2892864		0.921604796
EASTMOUNT RD	F_713383_2892739	Industrial	0.921604796
6 INDIAN HILL RD	F_708700_2880077		0.751671662
REAR GREEN ST	F_710227_2895358		0.751671662
NOON HILL ST	F_708669_2883256		0.750057644
15 CEDAR LN	F_707878_2898743		0.737606641
0 HIGH ST	F_714303_2886555		0.716854969
NOON HILL RD	F_707558_2884747		0.716854969
REAR ORCHARD ST	F_701967_2882985		0.716854969
625 MAIN ST	F_706129_2893345		0.716854969
2 INDIAN HILL RD	F_709002_2879914		0.655061102
46 HATTERS HILL RD	F_712147_2897124		0.655061102
NOON HILL RD	F_708875_2885248	Municipal, Federal, or State	0.65436938
ROCKY LN	F_711523_2881572		0.649296749
OFF SOUTH ST	F_709168_2879829		0.581507955
MILLBROOK RD	F_715715_2895157		0.581507955
50 HATTERS HILL RD	F_712092_2897231		0.581507955
HIGH ST	F_716694_2882435		0.578279917

83 BLACKSMITH DR	F_704537_2900085		0.578279917
17 ELM ST	F_713738_2888271		0.57620475
REAR PLAIN ST	F_715348_2881796		0.57620475
SCHOOL ST	F_706892_2898006		0.57620475
1 ICE HOUSE RD.	F_703417_2898120		0.57620475
54 HATTERS HILL RD	F_712037_2897339		0.565828914
13 SURREY RUN	F_704681_2899383		0.565828914
84 BLACKSMITH DR	F_704602_2899877		0.565828914
OFF PLAIN ST	F_714203_2881926		0.55891169
3 ICE HOUSE RD.	F_701962_2898645		0.55891169
PLAIN ST	F_716747_2879421		0.547613558
KENNEY RD	F_709148_2896852		0.547613558
2 ICE HOUSE RD.	F_702608_2898113	Commercial	0.547613558
39 SPRING ST	F_708401_2891890		0.547613558
DALE ST	F_706841_2895889		0.547613558
3 HAWTHORNE DR	F_710797_2900362		0.547613558
55 NO MEADOWS RD	F_706171_2894527		0.547613558
4 INDIAN HILL RD	F_708868_2879959		0.421489509
MAIN ST	F_707229_2891236		0.417569749
ELM ST	F_715302_2887388		0.416647452
93 PLEASANT ST	F_710306_2891063		0.415725156
20 RIDGE RD	F_711417_2880903		0.385289371
2 R LAKEWOOD TERR	F_711538_2880858		0.383214203
HILLTOP CIR	F_711514_2882870		0.383214203
REAR PHILIP ST	F_716568_2890938		0.383214203
JUNIPER LN	F_710606_2887061		0.383214203

HIGH ST	F_711305_2887141		0.383214203
ELM ST	F_714889_2889774		0.383214203
REAR PHILIP ST	F_716374_2891236		0.383214203
WOOD END LN	F_717280_2896473		0.383214203
BRIDGE ST	F_701393_2894103		0.383214203
17 SURREY RUN	F_704755_2899492		0.383214203
34 COLONIAL RD	F_705938_2901075		0.383214203
END SAW MILL LN	F_716584_2894878		0.240488817
UPHAM RD	F_708285_2893241		0.240488817
HIGH ST	F_714845_2885818		0.239566521
NORTH ST	F_707551_2894808		0.239566521
END SAW MILL LN	F_716414_2894967		0.233110445
42 HATTERS HILL RD	F_712202_2897018		0.233110445
NORTH ST & 329R	F_709364_2902859		0.233110445
HATTERS HILL RD	F_711988_2897432		0.233110445
85 COLONIAL RD	F_704696_2899708		0.233110445
WEST MILL ST	F_702922_2896899		0.229882407
107 R ELM ST	F_716708_2888676		0.227576666
REAR PLAIN ST	F_717128_2879933		0.227576666
135 NO MEADOWS RD	F_702412_2897022		0.227576666
OFF WEST ST	F_702651_2895849		0.227576666
DEERFIELD DR	F_708255_2899874		0.227576666
PLEASANT CT	F_709444_2891549		0.227576666
124 NORTH ST	F_707623_2895185		0.227576666
0 UNKNOWN	F_708174_2892620		0.227576666
7 FRAIRY ST	F_708241_2893413		0.227576666
100 BIRCH RD	F_717930_2896669		0.227576666
PHEASANT RD	F_704589_2901181		0.227576666
30 POUND ST	F_710887_2892850		0.227576666
459 MAIN ST	F_708981_2893302		0.227576666

DALE ST	F_705058_2893003		0.227576666
LAUREL DR	F_707553_2891328		0.227576666
15 JANES AVE	F_709078_2893482		0.227576666
NORTH ST	F_708847_2893304		0.227576666
458 - 460 MAIN ST	F_709108_2893052		0.227576666
GROVE ST	F_704573_2894926		0.227576666
GROVE ST	F_704762_2894787		0.227576666
ELM ST	F_715751_2888058		0.086465299
REAR HIGH ST	F_715119_2886232		0.085773576
REAR LAND	F_716663_2886401		0.083928983
COLONIAL RD	F_705072_2899751		0.083928983
CAUSEWAY ST	F_705563_2887608		0.083237261
REAR LAND	F_716456_2886728		0.083237261
NOON HILL	F_708213_2885972		0.079086926
STOP RIVER AREA	F_708919_2886712		0.079086926
STOP RIVER	F_707279_2886428		0.079086926
REAR CAUSEWAY ST	F_706094_2887105		0.079086926
OFF ELM ST	F_716997_2886546		0.079086926
ELM ST	F_715853_2887170		0.079086926
NORTH ST	F_707552_2896592		0.079086926
MAIN ST	F_704757_2891063		0.079086926
0 UNKNOWN	F_705210_2891507		0.079086926
45 HATTERS HILL RD	F_712316_2897286		0.039428176
49 HATTERS HILL RD	F_712210_2897405		0.039428176
18 SURREY RUN	F_704606_2899659		0.039428176
14 SURREY RUN	F_704518_2899610		0.039428176
MAIN ST	F_704522_2891585		0.032741526
REAR ELM ST	F_715667_2886649		0.019137653
ELM ST	F_715796_2887705		0.019137653

CAUSEWAY ST	F_704291_2883135		0.01729306

Appendix F: Town Outfall Screening Data

Table W-1
Outfall Dry Weather Sampling
Surface Water Results Summary
9/25/2019

Sample Identification:	UNITS	IDDE PRIORITY SOURCE	IDDE PRIORITY STANDARD	Outfall Number					
				OF-28	OF-42	OF-73	OF-85	OF-484	OF-541
Receiving Waterbody				Stop River	Vine Brook	Stop River	Mill Brook	T.B.D.	T.B.D.
Watershed				Charles	Charles	Charles	Neponset		
Date Sampled:				9/25/2019	9/25/2019	9/25/2019	9/25/2019	9/25/2019	9/25/2019
FIELD SCREENING									
Field pH	su units	Center for Watershed Protection	> 5	6.89	6.78	7.10	7.25	7.10	6.72
Field pH	su units	Charles River TMDL	6.5 - 8.3	6.89	6.78	7.10	7.25	7.10	6.72
Temperature	°C	314 CMR 4.00 for Class B Warm Water	< 28.3	18.21	18.11	17.46	18.56	15.71	15.64
Field Specific Conductance	µs/cm °C	Center for Watershed Protection	< 2000	12.4	14.8	15.10	-5.7	-2.4	31.0
Dissolved Oxygen	%	314 CMR 4.00 for Class B Warm Water	> 43.22%	54.3%	90.30%	**40.00%**	71.00%	91.00%	**24.00%**
Dissolved Oxygen	mg/L	314 CMR 4.00 for Class B Warm Water	> 5	-	-	-	-	-	-
Turbidity	NTU			15.62	15.67	28.45	38.77	29.42	27.45
Salinity	ppt			343.0	301.0	215.0	204.0	1324.0	13.0
LABORATORY TESTING									
Ammonia as N (SM19-22 4500 NH3 C)	mg/L	EPA New England Bacterial Source Tracking Protocol	< 0.5	ND	ND	0.53	0.53	ND	ND
Chlorine, Free (SM21-22 4500 CL G)	mg/L	EPA 2018 General Permit	< 0.02	ND	ND	0.041	ND	ND	0.83
Chlorine, Residual (SM21-22 4500 CL G)	mg/L	EPA 2018 General Permit	< 0.02	ND	0.036	0.087	0.024	ND	0.59
Coliform, Fecal (SM 9223B - COLILERT)	MPN/100 mL	Neponset River TMDL	≤ 200	7.5	7.4	100	**370**	86	140
Coliform, Total (SM 9223B - COLILERT)	MPN/100 mL			>2419.6	2400	>2419.6	>2419.6	>2419.6	4900
Phosphorus, Total (SM 21-22 4500 P E)	mg/L			ND	ND	.11	ND	ND	0.22
Total Suspended Solids (SM21-22 2540D)	mg/L			ND	2.6	27	2.4	ND	240
E. Coli (SM 9223B - COLILERT)	MPN/100 mL		< 235	14	11	140	2400	91	180
Enterococci (ENTEROLERT)	present/absent			Present	Present	Absent	Present	Absent	Present
Surfactants - Methylene blue active substances (SM5540 C-1)	mg/L	EPA New England Bacterial Source Tracking Protocol	< 0.25	0.06	0.06	0.10	0.06	0.12	0.07

Notes:

Any outfalls that are found during screening to contain one or more of the following signs of sewage contamination will automatically be re-prioritized to the top of the high priority outfalls for catchment investigation:

√ Olfactory or visual evidence of sewage;

√ Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, AND bacteria levels greater than the applicable water quality criteria for receiving water (235 CFU or MPN for E. coli or 61 CFU or MPN for Enterococcus); or

√ Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L AND detectable levels of chlorine.

Table W-1
Outfall/DMH Dry Weather Sampling
Surface Water Results Summary
6/26/2020

				Outfall Number			IDDE Drainage Manholes					
Sample Identification:		**IDDE PRIORITY**	**IDDE PRIORITY**	OF-85	OF-265	OF-526	DMH-266	DMH-267	DMH-273	DMH-274	DMH-927	DMH-938
Receiving Waterbody	**UNITS**	**SOURCE**	**STANDARD**	Mill Brook								
Watershed				Neponset	Charles	Charles						
Date Sampled:				6/26/2020	6/26/2020	9/25/2019	6/26/2020	6/26/2020	6/26/2020	6/26/2020	9/25/2019	6/26/2020
FIELD SCREENING												
Field pH	su units	Center for Watershed Protection	> 5	6.57	7.49	7.66	6.61	Dry	6.06	5.70	6.59	Dry
Field pH	su units	Charles River TMDL	6.5 - 8.3	6.57	7.49	7.66	6.61	Dry	6.06	**5.70**	6.59	Dry
Temperature	°C	314 CMR 4.00 for Class B Warm Water	< 28.3	16.83	18.73	11.92	19.21	Dry	18.48	17.62	16.12	Dry
Field Specific Conductance	µs/cm °C	Center for Watershed Protection	< 2,000	194	258	271	215	Dry	153	151	180	Dry
Dissolved Oxygen	%	314 CMR 4.00 for Class B Warm Water	> 43.22%	74.2%	97.90%	99.20%	**13.40%**	Dry	51.40%	**12.40%**	93.20%	Dry
Dissolved Oxygen	mg/L	314 CMR 4.00 for Class B Warm Water	> 5	7.18	9.16	10.69	**1.23**	Dry	**4.77**	**1.18**	9.16	Dry
Turbidity	NTU			Below	Below	Below	Below	Dry	Below	Below	Below	Dry
Salinity	ppt			Below	Below	Below	Below	Dry	Below	Below	Below	Dry
LABORATORY TESTING												
Ammonia as N (SM19-22 4500 NH3 C)	mg/L	EPA New England Bacterial Source Tracking Protocol	< 0.5	0.40	ND	ND	**2.10**	Dry	0.40	ND	**0.53**	Dry
Chlorine, Free (SM21-22 4500 CL G)	mg/L	EPA 2018 General Permit	< 0.02	**0.021**	**0.040**	ND	**0.400**	Dry	ND	**0.044**	**0.400**	Dry
Chlorine, Residual (SM21-22 4500 CL G)	mg/L	EPA 2018 General Permit	< 0.02	**0.027**	**0.030**	ND	**0.340**	Dry	**0.370**	**0.045**	**0.450**	Dry
Coliform, Fecal (SM 9223B - COLILERT)	MPN/100 mL	Neponset River TMDL	≤ 200	15	28	ND	**2,000**	Dry	20	1	13	Dry
Coliform, Total (SM 9223B - COLILERT)	MPN/100 mL			2000	>2419.6	870	>2419.6	Dry	1400	1600	>2419.6	Dry
Phosphorus, Total (SM 21-22 4500 P E)	mg/L			ND	0.17	ND	ND	Dry	0.46	ND	ND	Dry
Total Suspended Solids (SM21-22 2540D)	mg/L			4	ND	ND	220	Dry	360	ND	100	Dry
Turbidity (EPA 180.1)	NTU			31	1.5	ND	36	Dry	580	ND	270	Dry
E. Coli (SM 9223B - COLILERT)	MPN/100 mL		< 235	3.1	22	1.0	67	Dry	13	ND	5.1	Dry
Enterococci (ENTEROLERT)	Present/Absent			Absent	Absent	Absent	Present	Dry	Present	Absent	Absent	Dry
Salinity (SM2520B)				ND	ND	ND	ND	Dry	ND	ND	ND	Dry
Surfactants - Methylene blue active substances (SM5540 C-1)	mg/L	EPA New England Bacterial Source Tracking Protocol	< 0.25	0.09	0.05	<0.05	**1.79**	Dry	0.11	<0.05	0.08	Dry

Notes:

Any outfalls that are found during screening to contain one or more of the following signs of sewage contamination will automatically be re-prioritized to the top of the high priority outfalls for catchment investigation:

√ Olfactory or visual evidence of sewage;

√ Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, AND bacteria levels greater than the applicable water quality criteria for receiving water (200 CFU or MPN for E. coli or 61 CFU or MPN for Enterococcus); or

√ Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L AND detectable levels of chlorine.