WORKSHOP ON MANAGING STORMWATER FOR WATER SUPPLY PROTECTION

BMP RETROFITS FOR THE TOWN OF CANTON, MA

Presented by David Nyman
Comprehensive Environmental Inc.
December 3, 2013

Stormwater BMP Retrofits Canton, MA

- Ongoing effort to manage stormwater runoff in the Neponset River Watershed
  - Sediments
  - Phosphorus
  - Pathogens (TMDL)
- Identify and prioritize sites and a suite of BMPs for implementation as funding/project opportunities become available
- Study under 604(b) grant

Stormwater BMP Retrofits
Canton, MA

Neponset River Watershed Association

- Ian Cooke
  Executive Director
- William Guenther
  Environmental Scientist

Town of Canton

- Michael Trotta
  DPW Superintendent
- James Donovan
  Town Engineer

Technical Support

Comprehensive Environmental Inc.

Stormwater BMP Retrofits Canton, MA

- Screen BMP types, working with Town staff
  - Address the pollutants of concern
  - Meet the technical and maintenance resources available for sustainable management
- Search available database for candidate sites
  - GIS data base
  - Public records
- Field assessments to develop short list of sites and BMP options
- Conceptual designs for priority sites

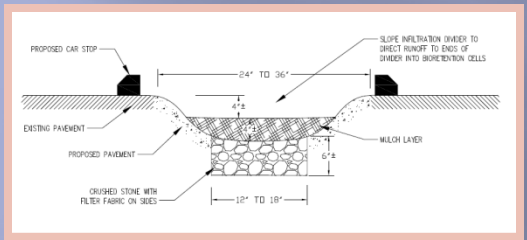
BMP Selection

- Early interaction with Town staff:
  - BMPs must meet pollutant removal objectives
  - BMPs must also be feasible to implement and maintain, within the technical resources of the community
- Preference for:
  - Low Impact Development practices
  - Surface vs. subsurface
  - Simple to inspect and maintain

BMP Selection

Table 2: List of Prioritized BMPs used for the field BMP survey in Canton, MA.

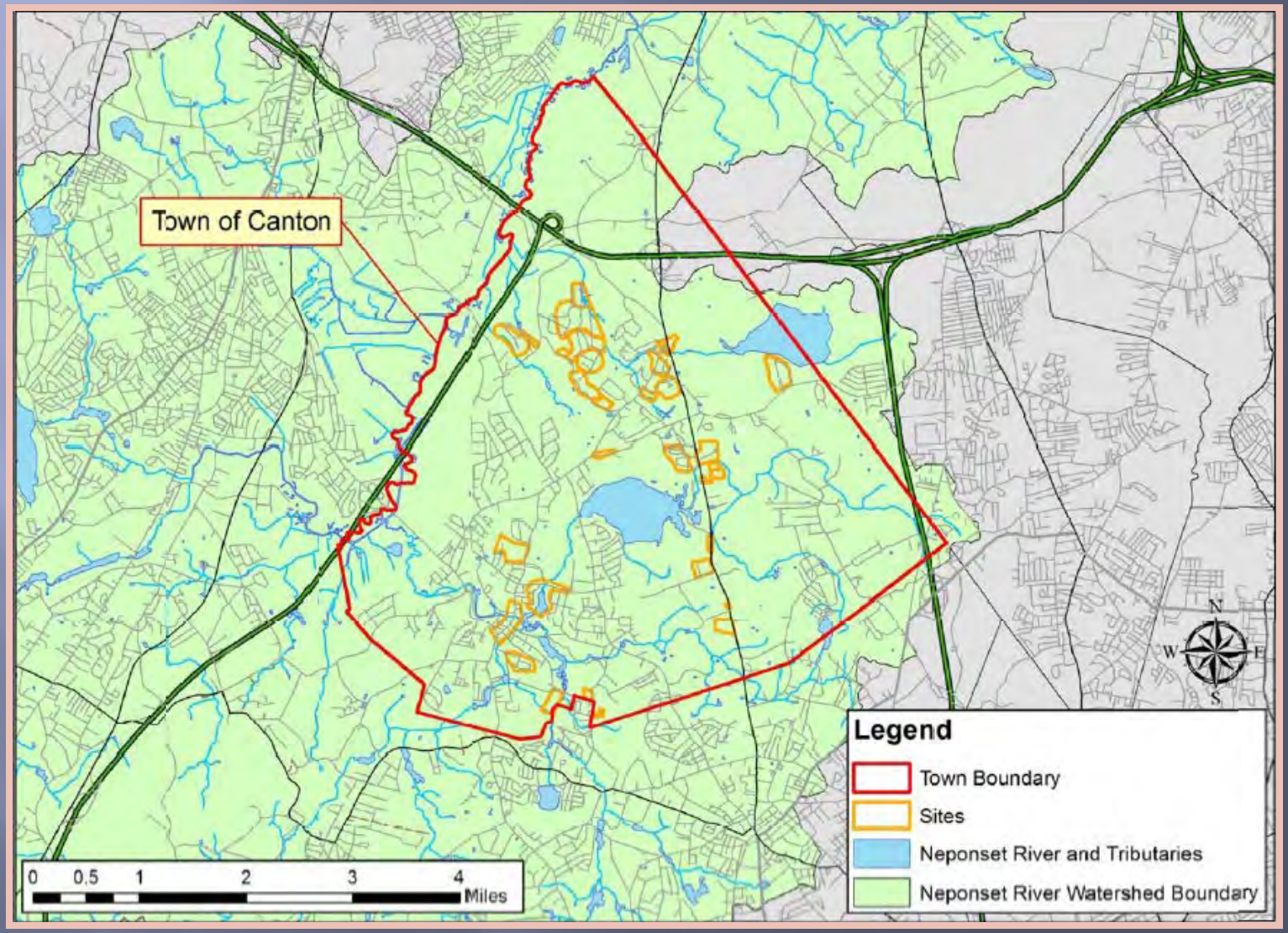
BMP Name Abbreviated	BMP Name Full	Sizing Method	Low % DA Size @ 1.2"	High % DA Size @ 1.2"	Soils	Treat Meth	Maint Difficulty	Fail Risk	Cost	Bacteria Removal
PaveDiscon	Unstructured disconnection of paved areas	per VT. disconnected length = paved length, slope <5%	100.00%	200.00%	Any	Filtration/Infiltration	Low	Low	Low	Good
InfiltBasin	Infiltration Basin	Per VT. 1-2" ponding 0.5-2.0"/hr	5.00%	10.00%	A, B	Infiltration	Low	Low	Medium	Excellent
WetBasin	Wet Basin or Large Wetland	3' ponding for wetland with 1xWQv. 5' ponding for wet pond with 2xWQv	1.50%	3.50%	C, D	Setting	Low	Low	Low	Fair
BioCell	Bioretention Cell Infiltrating	Per VT. 30" media, 6-12" ponding. 5"/day k	5.00%	10.00%	A, B	Filtration/Infiltration	Medium	Low	Medium	Excellent
CompostFilter	Compost Amended Filter Strip	assume same as biocell	5.00%	10.00%	Any	Filtration/Infiltration	Low	Low	Medium	Good
BioCellUnder	Bioretention Cell with Underdrain	5" ponding + 24" media voids. could be deeper	5.00%	10.00%	C,D	Filtration/Infiltration	Medium	Low	Medium	Excellent
PocketWet	Pocket Wetland	Low is per VT. high per 30" ponding	1.50%	4.00%	C, D	Setting	Medium	Low	Medium	Fair
SandFilterSurface	Sand/Organic Filter Surface	Per VT. 2' filter depth. 1" ponding 3.5-8.7/day k	0.55%	1.14%	Any	Filtration	Low	Low	Medium	Good
InfiltTrench	Infiltration Trench	Per VT. 3-5' stone. 0.5-2.0"/hr	5.00%	8.00%	A, B	Infiltration	Low	Medium	Medium	Excellent
GravelWet	Gravel Wetland	Per CWP. if 3' filter depth and 2' ponding. need to check this!	3.00%	5.00%	Any	Filtration	Medium	Medium	Medium	Good
TreeBox	Tree Filter Box	Per filterra. 1 per 0.25 acre. may be a bit low for 1.2"	0.36%	0.36%	Any	Filtration	Medium	Low	High	Good
SandFilterStructured	Sand/Organic Filter Surface Structured or Perimeter	Per VT. 1-2' filter depth. 6-12" ponding. 3.5-8.7/day k	0.55%	0.86%	Any	Filtration	Low	Low	High	Good
PorousPerim	Perimeter only Porous Pavement or Pavers	1 to 5	20.00%	33.00%	Any	Filtration/Infiltration	High	High	High	Excellent
PorousPave	Porous Pavement or Pavers	1 to 1	100.00%	100.00%	Any	Filtration/Infiltration	High	High	Very High	Excellent
InfiltUnder	Underground Infiltration Structures	Per VT 2-4' deep chambers. 0.5-	2.50%	5.00%	A, B	Infiltration	High	High	High	Excellent
SandFilterUnder	Sand/Organic Filter Underground	Same as surface	0.55%	1.14%	Any	Filtration	High	Medium	High	Good
LeachCB	Leaching Catch Basin	Derived from VT. 50 CF each. need 20-22/Ac	2.50%	2.50%	A, B	Infiltration	Medium	High	High	Excellent
BMPs for Rooftop Flows										
DryWell	Structured downspout disconnect to Dry Well or French Drain or Stormwater Planter	50 cf storage / 4'x4', 500-1200 SF per unit. 36-87 units per acre	2.50%	2.50%	Any	Infiltration	Low	Medium	Medium	Excellent
RoofDiscon	Unstructured downspout disconnect to lawn or rain barrel	per VT. disconnection length should equal roof length, slope <5%	100.00%	200.00%	Any	Filtration/Infiltration	Low	Low	Low	Good
RainGarden	Rain Garden	Per VT. 6" ponding. 0.5-2.0"/hr	15.00%	20.00%	A, B	Infiltration	Medium	Low	Medium	Excellent
Pre Treatment BMPs										
GrassStrip										
GravelDiaphragm										
GrassChannel										
Forebay										
GritChamber										
MulchLayer										
Other										
None										



BMP Candidates (examples)

- Infiltration Basin
- Infiltration Trench
- Leaching Catch Basin
- Porous Pavement
- Pavement Disconnection
- CAVFS
- Wet Basin
- Bioretention
  - Infiltrating
  - Underdrained
- Pocket Wetland
- Gravel Wetland
- Tree Box Filter
- Sand/Organic Filter
- Various Pre-treatment measures

GIS Analysis: Candidate Sites



Initial Screening of Candidate Sites

- Desktop analysis of available data:
  - Identified 33 sites based on desktop analysis
  - Identified potential for 63 individual BMPs
- Initial site reconnaissance with Town staff:
  - Site feasibility based on qualitative assessment of available space and site conditions
  - Site availability (public, easement, private)
- Short list of sites with qualitative ratings
- Top 10 locations advanced to conceptual evaluation

Conceptual Assessment of Candidate Sites

- Site reconnaissance with engineering team
- Rating of the site/BMP options
- Prioritization of the top 10 sets advanced from the initial analysis



Conceptual Assessment of Candidate Sites

Canton BMP Ranking Prioritization

BMP ID #	Catchment Name	Sedimentation	Proximity to Waterbody	Potential BMP		Maintenance Requirements	Ease of Implementation	Land Use	Available Land	Priority	
4	Galvin Middle School	5	1	Infiltration	5	3	3	5	5	**27**	HIGH
27	Hansen Elementary School	3	1	Infiltration	5	5	3	5	5	**27**	HIGH
	Ponkapoag Parking Lot	5	3	Infiltration	5	3	3	5	3	**27**	HIGH
24	High School	3	3	Infiltration	5	3	3	5	5	**27**	HIGH
23	Crowells Market	5	3	Wetland	3	3	3	5	1	**23**	MED
10	Pequot Way	1	3	Infiltration	5	5	3	5	1	**23**	MED
20	Walnut Knolls	3	1	Wetland	3	3	3	3	5	**21**	MED
32	Dan Road	1	1	Infiltration	5	5	3	5	1	**21**	LOW
25	99 Restaurant	1	1	Infiltration	5	1	5	5	1	**19**	LOW
29	Town Center	1	1	Infiltration	5	5	1	5	1	**19**	LOW

Explanation of Ranking:

Sedimentation (from field observations): Severe Sedimentation = 5 ; Moderate Sedimentation = 3 ; Mild Sedimentation = 1

Proximity to Waterbody: Outlets directly = 5 ; Within 100' = 3 ; >100' = 1

Potential BMP: Infiltration/Filtering Practice = 5 ; Extended Detention/Wetland Treatment = 3 ; Peak Discharge Control = 1

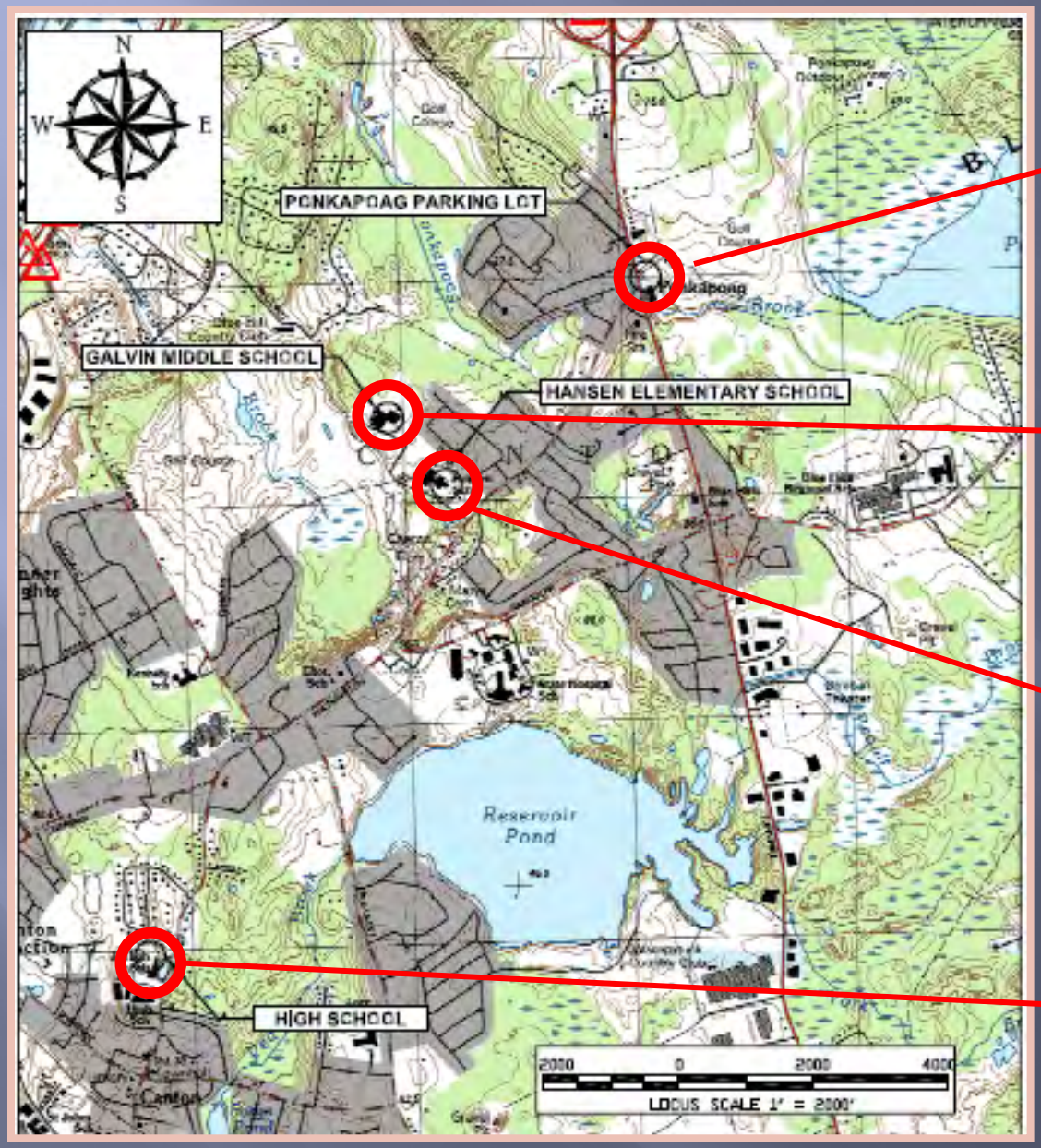
Maintenance Requirements (CEI estimate): Low frequency, easy access, easy tasks = 5 ; Moderate frequency, several tasks = 3 ; High frequency, difficult access with equipment = 1

Ease of Implementation (CEI estimate): Easy, low number of issues = 5 ; Moderate, possible equipment maneuvering and landscape issues = 3 ;
Difficult, possible property/right-of-way (ROW) issues and road closures = 1

Land Use (from MassGIS): Majority Commercial = 5 ; Majority Residential = 3 ; Majority Forest = 1

Available Land (from project research): Within Town ROW or on Town owned land = 5 ; On available land that will not require easements = 3 ; Private property or easements = 1

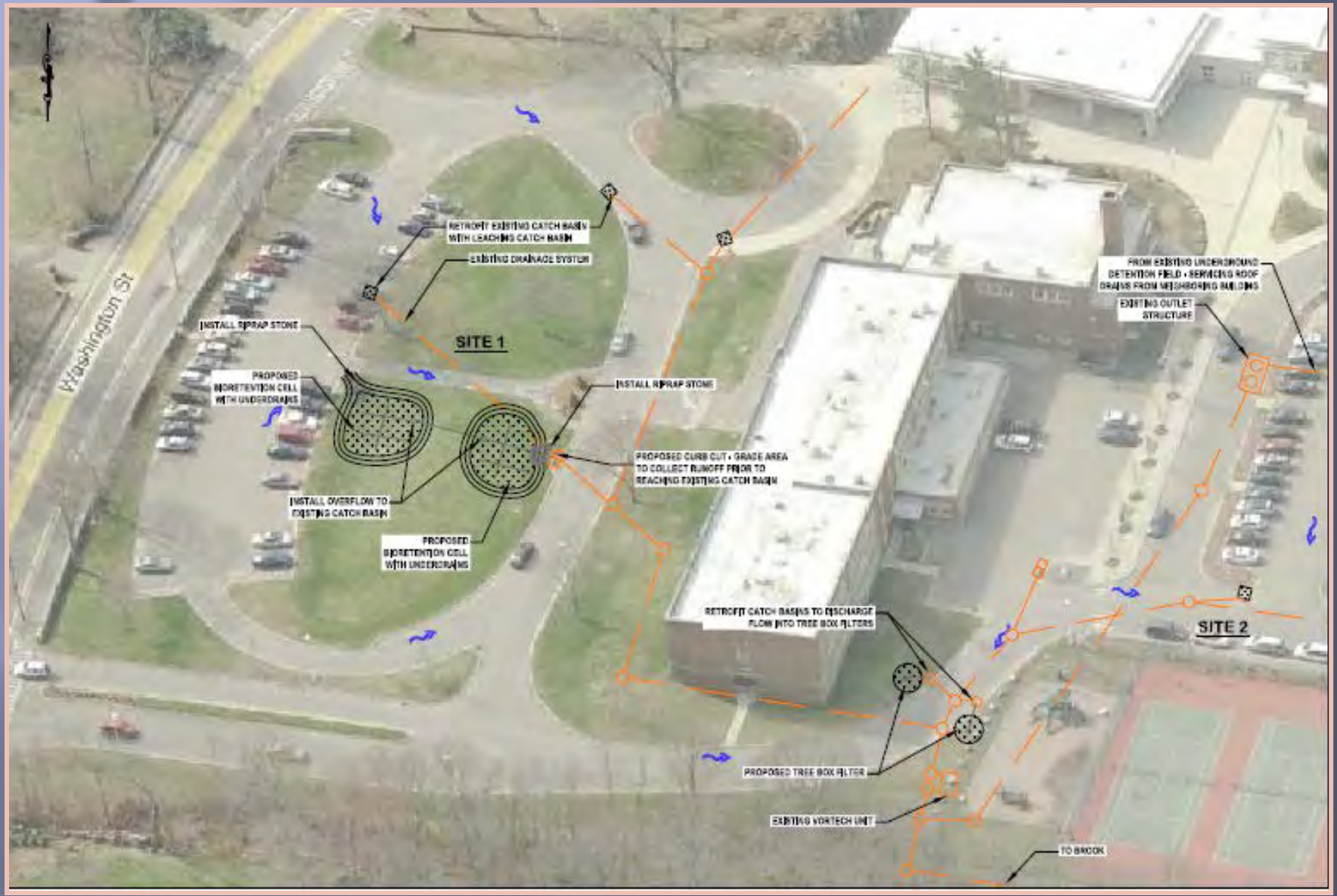
Characterize Top Four Sites



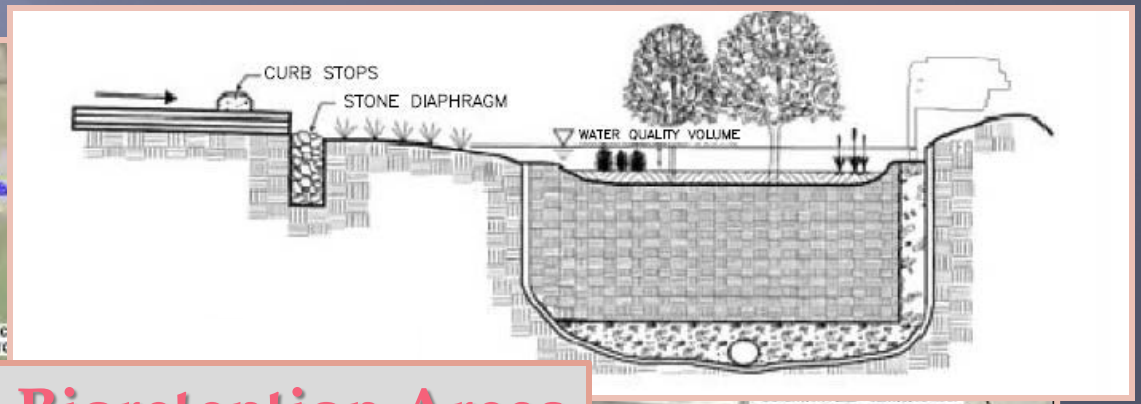
Characterize Top 4 Sites

Top 4	ID #	Catchment Name	Address	Location	Drainage Area (Acres)	Proposed BMP Type	1" WQv	WQv Provided	Workable Available Land (sf)	Soils Type	Hydrologic Soils Group	Approximate Depth to Groundwater
X	4	Galvin Middle School	55 Pecunit St.	Site 1 – Parking Lot	2.3	Pocket Wetland System	4,674	6,000	3,000	Urbanland	–	< 5 Feet
				Site 2 – East Entrance Road	0.5	Infiltration Trenches	741	780	650	Urbanland	–	> 5 Feet
				Site 3 – Entrance Circle	1.0	Bioretention Cell	791	960	600	Urbanland	–	> 5 Feet
X	27	Hansen Elementary School	25 Pecunit St.	Site 1 – East Parking Lot	1.3	Bioretention Cell	2,472	2,400	1,500	Urbanland	–	> 5 Feet
				Site 2 – Bus Circle	2.2	Bioretention Cell	4,748	4,900	3,500	Urbanland	–	> 5 Feet
				Site 3 – Baseball Field Parking Lot	0.4	Bioretention Cell	762	1,100	1,000	Urbanland	–	> 5 Feet
X		Ponkapoag Parking Lot	2173 Washington St.	Site 1 – Parking Lot Enterance	1.3	Bioretention Cell with Underdrains	3,808	2,720	1,600	Udorthents, loamy	–	> 5 Feet
				Site 2 – Back Grass Area	2.8	Treatment Wetland System	7,795	8,000	4,000	Udorthents, loamy	–	< 5 Feet
X	24	High School	900 Washington St.	Site 1 – Washington St. Entrance	2.4	Bioretention Cell with Underdrains	5,082	4,560	2,400	Charlton-Hollis-Urban Land Complex	C	> 5 Feet
				Site 2 – Back Parking Lot	3.2	Infiltration Trenches / Tree Boxes / Leaching Structures	1,859	1,200	1,000	Udorthents, loamy	–	> 5 Feet
				Site 3 – Back Access Road	1.0	Pocket Wetland System	1,955	1,875	1,250	Woodbridge Fine Sandy Loam	B	< 3 Feet
				Site 4 – Field Parking Lot	3.6	Pocket Wetland System	3,899	3,900	2,600	Udorthents, loamy	–	< 1 Foot

High School

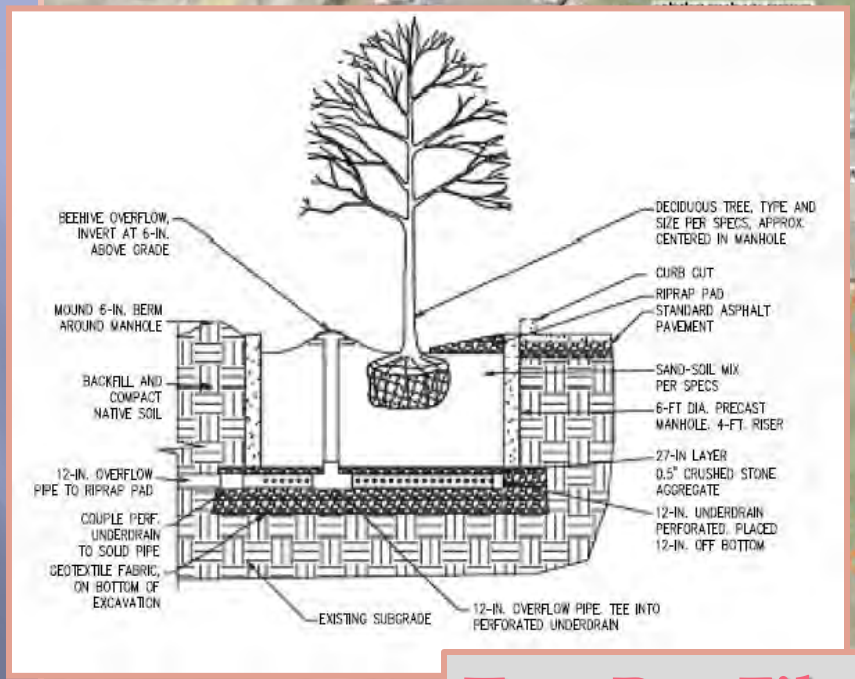

Washington St
RETROFIT EXISTING CATCH BASIN WITH LEACHING CATCH BASIN
EXISTING DRAINAGE SYSTEM
INSTALL RIPRAP STONE
SITE 1
PROPOSED BIORETENTION CELL WITH UNDERDRAINS
INSTALL RIPRAP STONE
PROPOSED CURB CUT - GRADE AREA TO COLLECT RUNOFF PRIOR TO REACHING EXISTING CATCH BASIN
INSTALL OVERFLOW TO EXISTING CATCH BASIN
PROPOSED BIORETENTION CELL WITH UNDERDRAINS
FROM EXISTING UNDERGROUND DETENTION FIELD + SERVICING ROOF DRAINS FROM NEIGHBORING BUILDING
EXISTING OUTLET STRUCTURE
RETROFIT CATCH BASINS TO DISCHARGE FLOW INTO TREE BOX FILTERS
SITE 2
PROPOSED TREE BOX FILTER
EXISTING VORTECH UNIT
TO BROOK

High School



Bioretention Areas

High School



Tree Box Filters

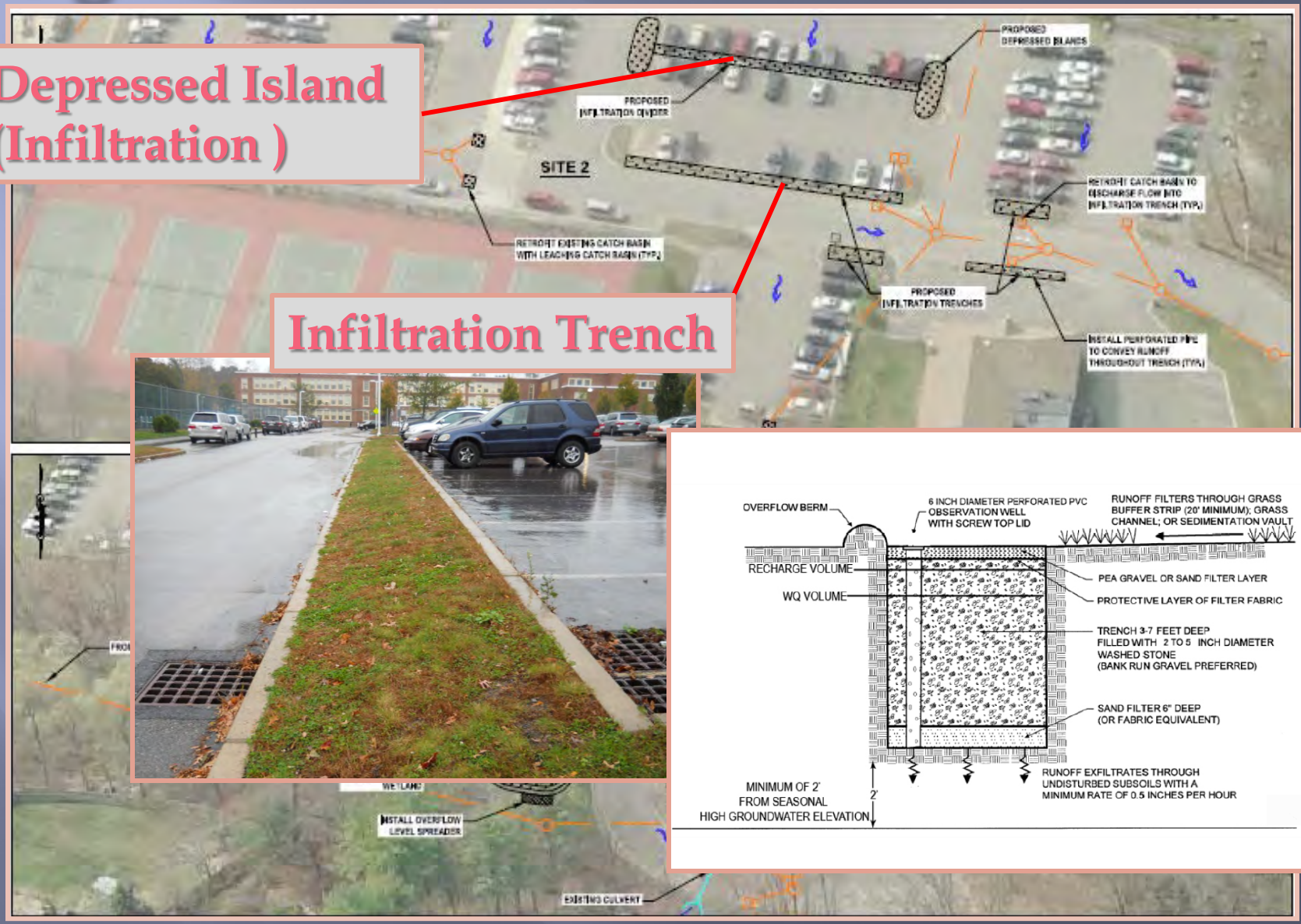
High School


SITE 2
PROPOSED DEPRESSED ISLANDS
PROPOSED INFILTRATION DIVIDER
RETROFIT EXISTING CATCH BASIN WITH LEACHING CATCH BASIN (TYP.)
RETROFIT CATCH BASIN TO DISCHARGE FLOW INTO INFILTRATION TRENCH (TYP.)
PROPOSED INFILTRATION TRENCHES
INSTALL PERFORATED PIPE TO CONVEY RUNOFF THROUGHOUT TRENCH (TYP.)
SITE 3
EXISTING VORTECH UNIT
EXISTING INFILTRATION BASIN
FROM SHEET D-1
EXISTING BROOK
INSTALL SEDIMENT FOREBAY
INSTALL NEW DEEP SUMP CATCH BASIN
PROPOSED POCKET WETLAND
INSTALL OVERFLOW LEVEL SPREADER
EXISTING VORTECH UNIT
EXISTING CULVERT

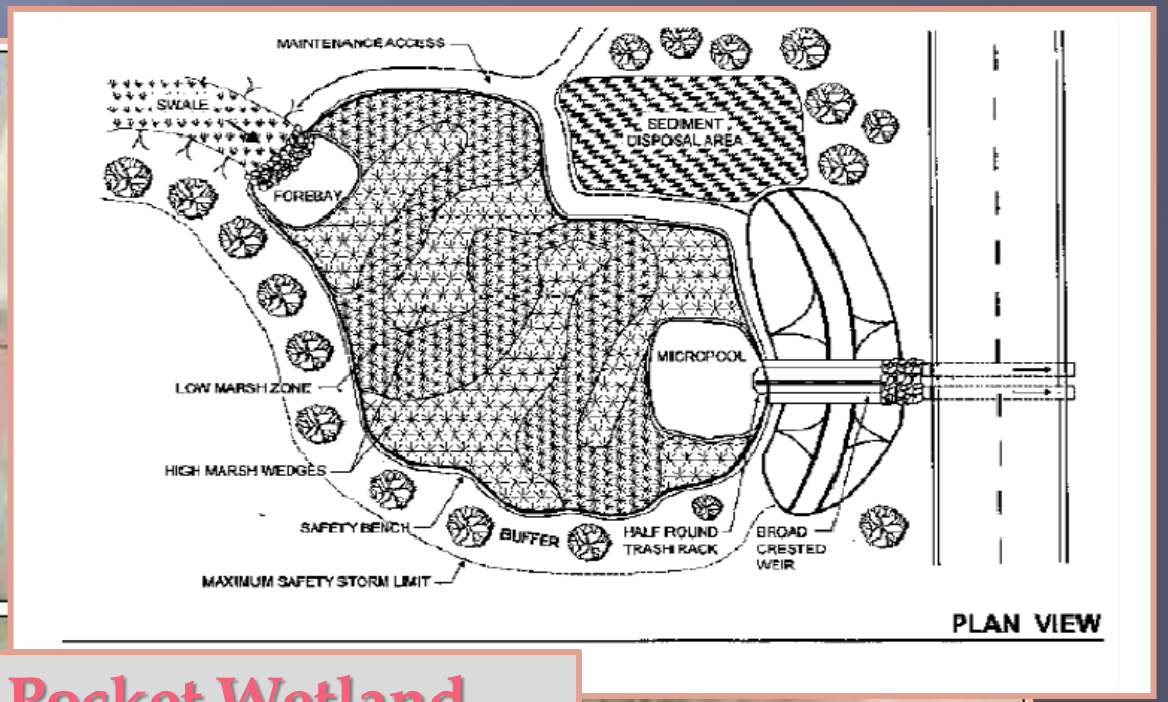
High School

Depressed Island (Infiltration)

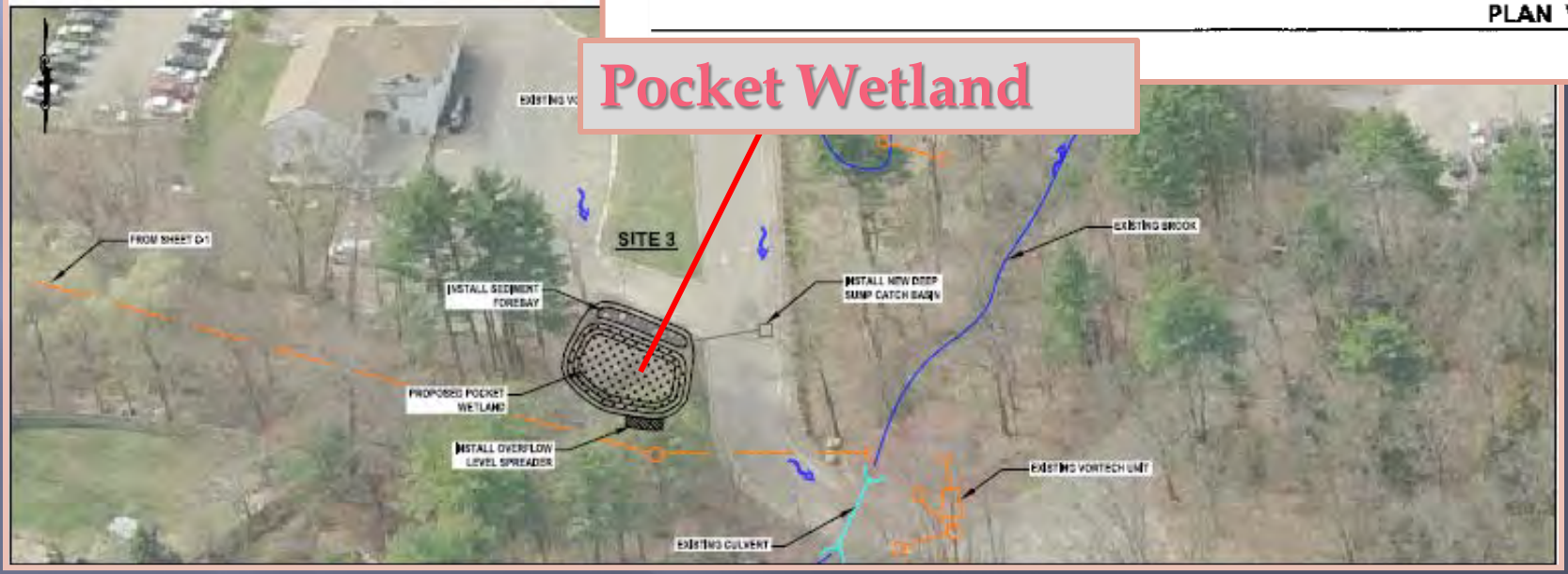
Infiltration Trench



High School



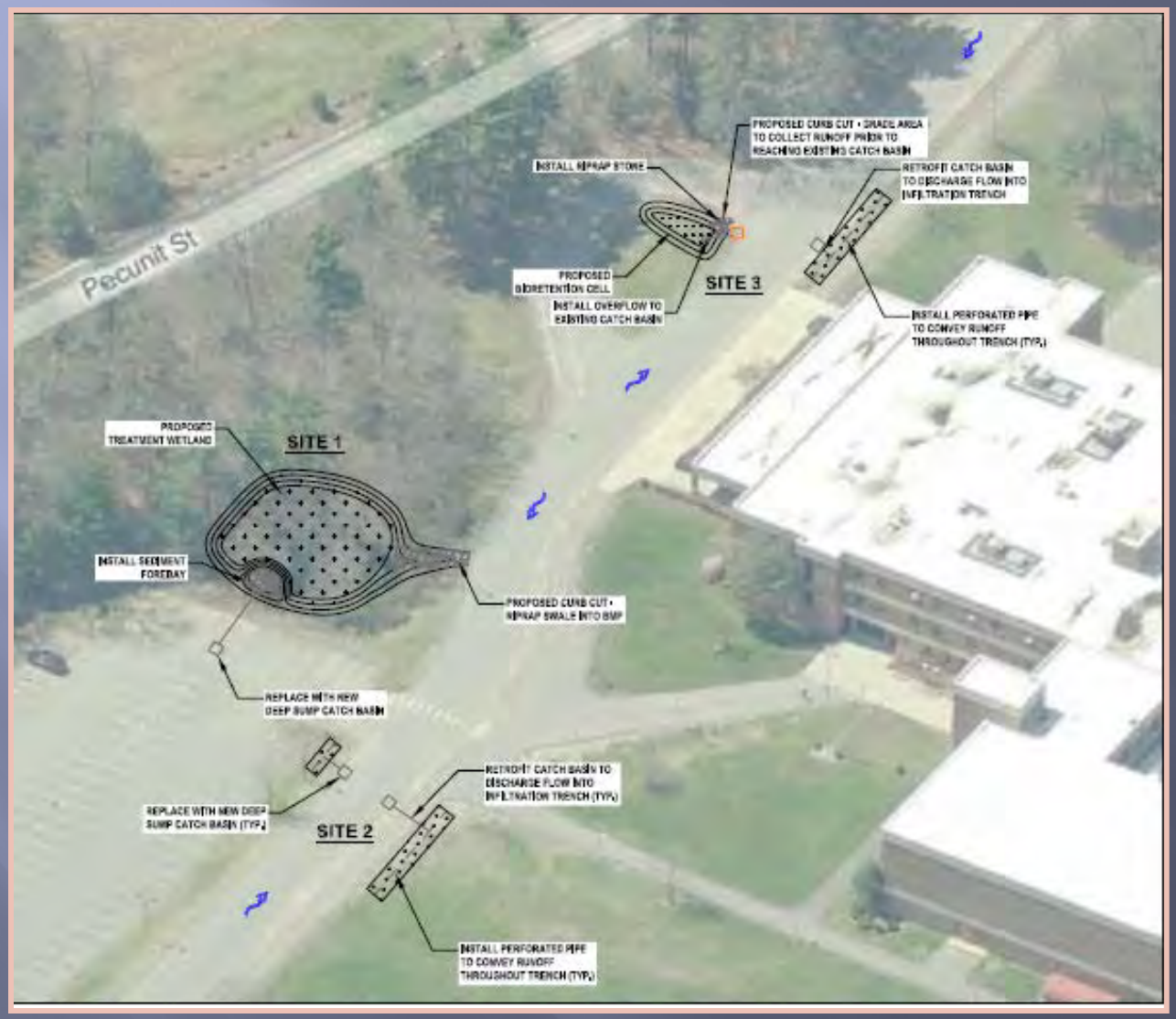
Pocket Wetland



High School

Pocket Wetland

Galvin Middle School



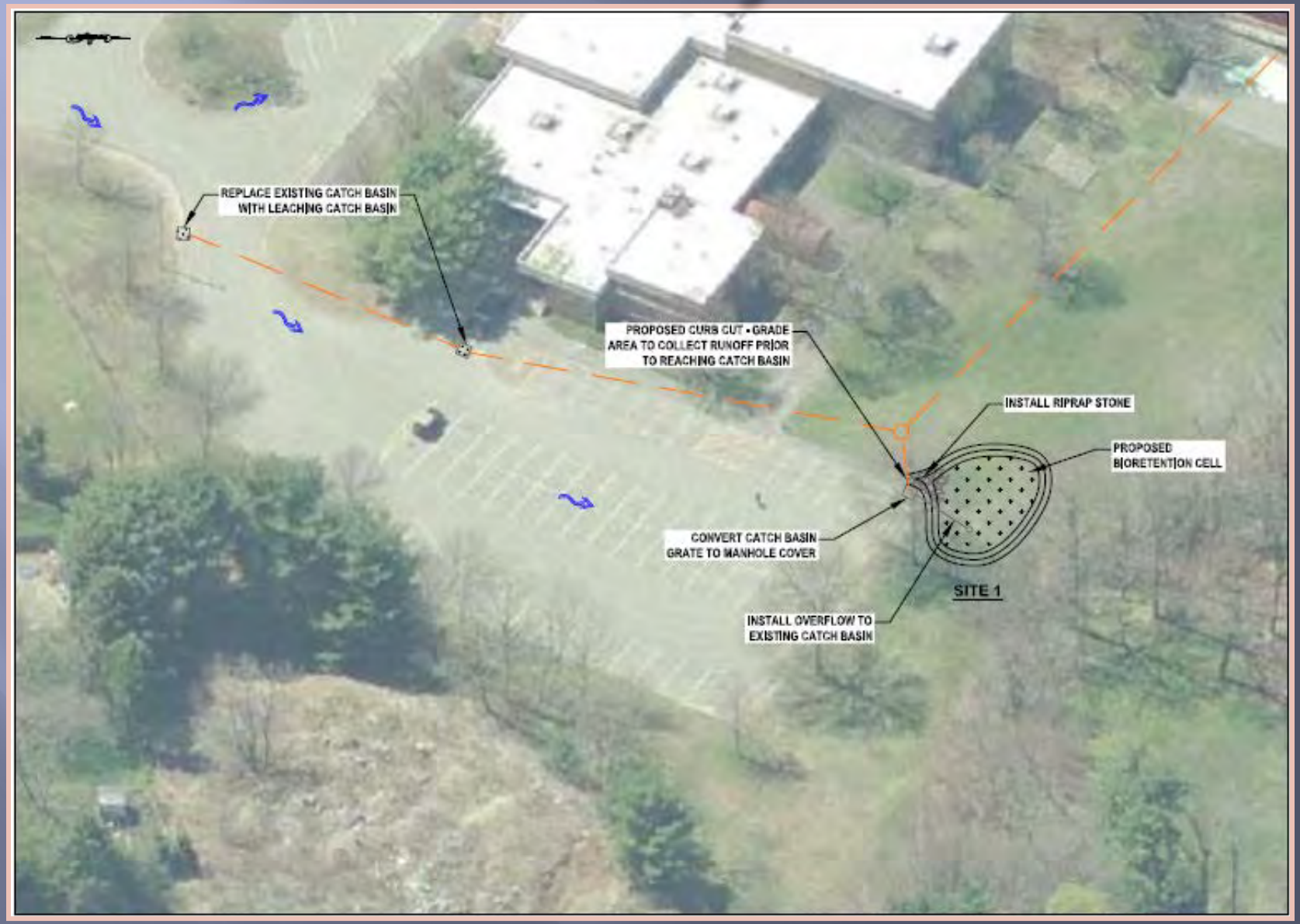
Galvin Middle School

Pocket Wetland

Infiltration Trench

Bioretention Area

Hansen Elementary School



Hansen Elementary School

REPLACE EXISTING CATCH BASIN WITH LEACHING CATCH BASIN

PROPOSED CURB CUT - GRADE TO COLLECT RUNOFF PRIOR TO REACHING CATCH BASIN

INSTALL RIPRAP STONE

PROPOSED BIORETENTION CELL

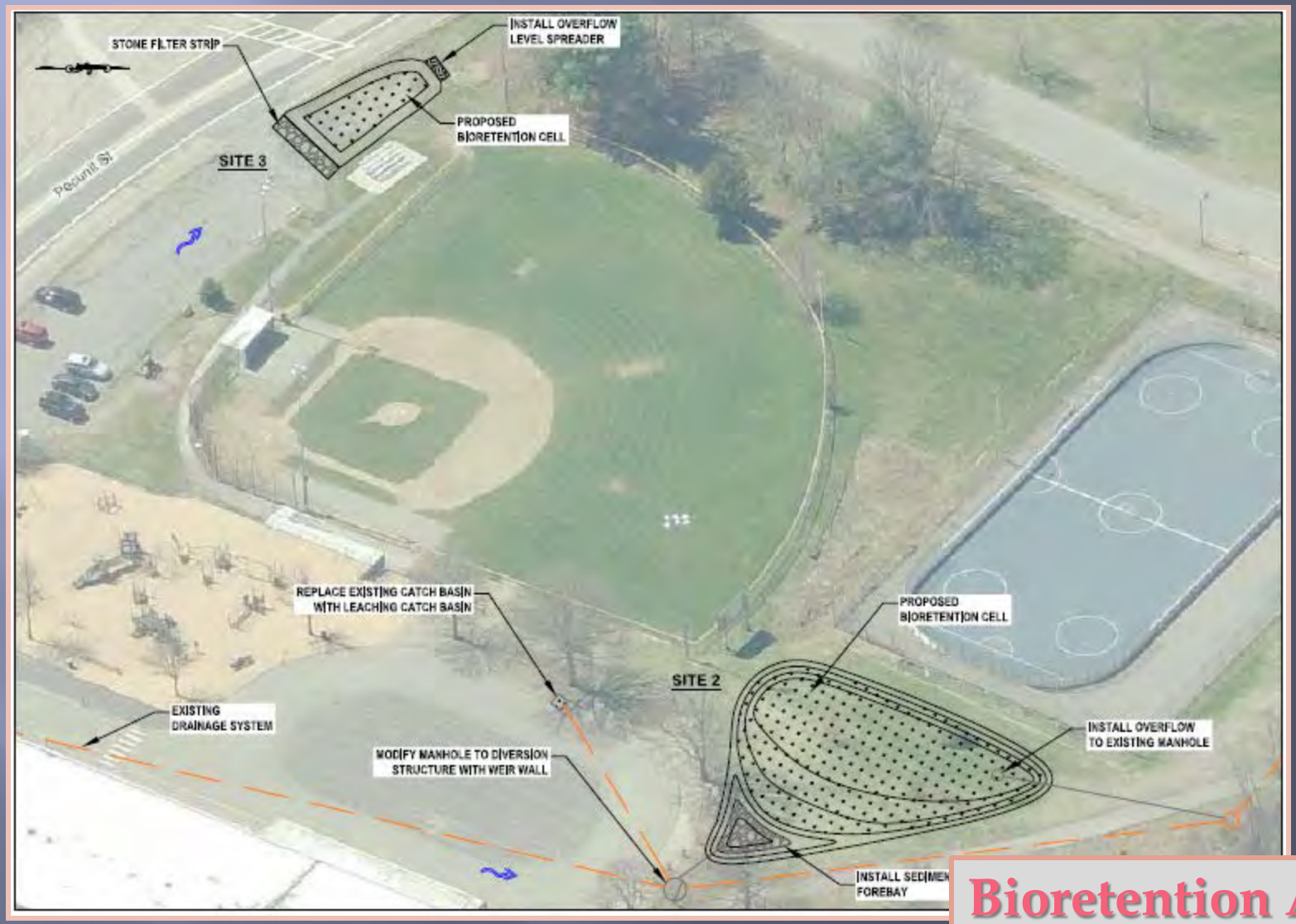
CONVERT CATCH BASIN GRATE TO MANHOLE COVER

SITE 1

INSTALL OVERFLOW TO EXISTING CATCH BASIN

Bioretention Area

Hansen Elementary School



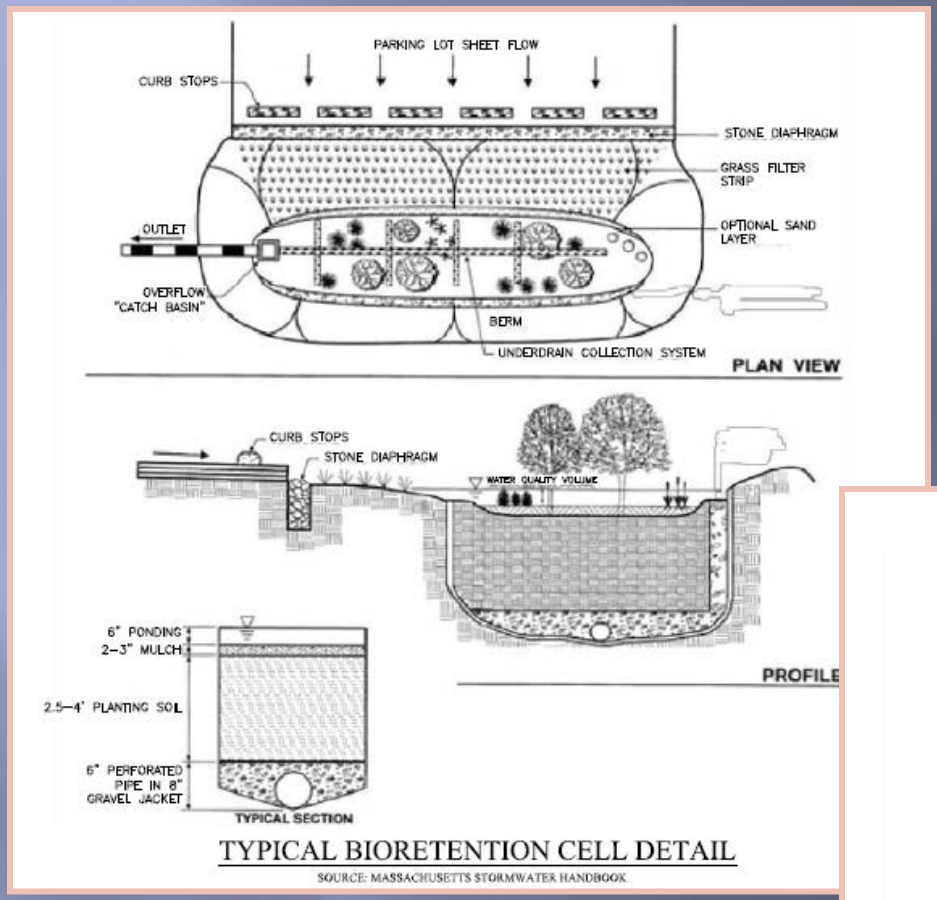
Bioretention Areas

Ponkapoag Parking Lot

Ponkapoag Parking Lot

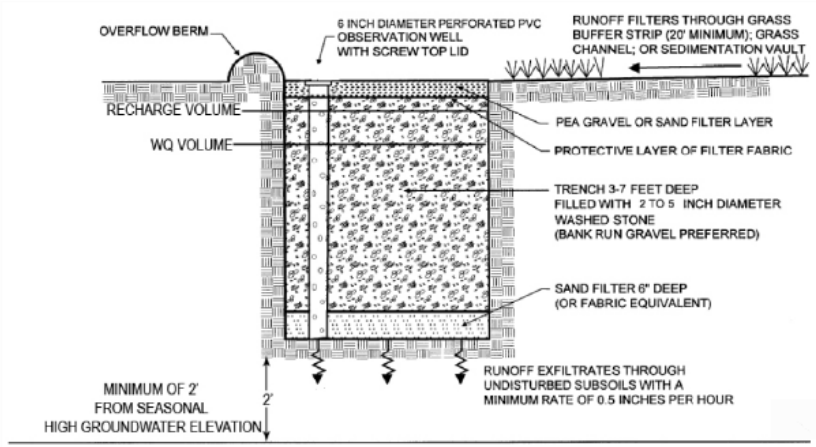
Bioretention Area

Conceptual Design



TYPICAL BIORETENTION CELL DETAIL

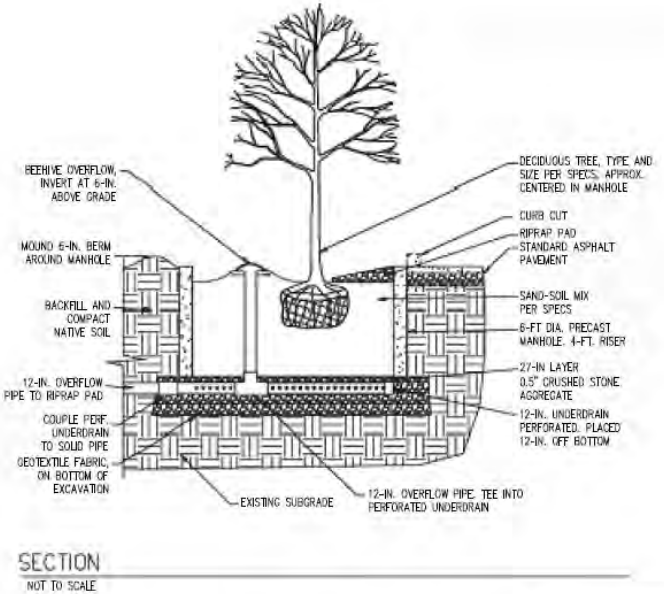
SOURCE: MASSACHUSETTS STORMWATER HANDBOOK



TYPICAL INFILTRATION TRENCH DETAIL

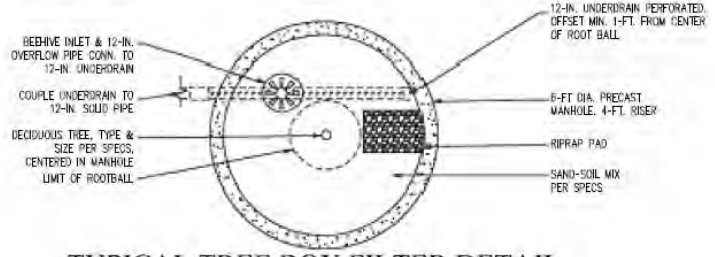
SOURCE: MASSACHUSETTS STORMWATER HANDBOOK

Conceptual Design



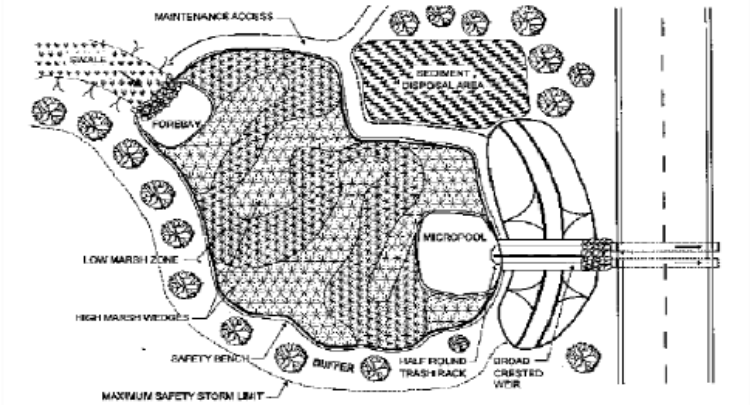
SECTION

NOT TO SCALE



TYPICAL TREE BOX FILTER DETAIL

SOURCE: MASSACHUSETTS STORMWATER HANDBOOK



TYPICAL POCKET WETLAND DETAIL

SOURCE: MASSACHUSETTS STORMWATER HANDBOOK

Conceptual Design

Conceptual Design

Conceptual Design

Conceptual Design Performance Evaluation

CEI Spreadsheet Model: Using the "Simple Method"

Pollutant Loading

Galvin Middle School - Pollutant Load Calculations

Runoff and Pollutant Load Calculations

No.	Catchment Name	Landuse ID	Landuse	(A) Area (acres)	Sanded?	Sanded Area (acres)	(Ia) % Impervious	(R) Runoff (in)	Annual Runoff (cf)	(L) Annual TSS (lbs)	(L) Annual TP (lbs)	(L) Annual TN (lbs)	(L) Annual FC (billion colonies)
1	Galvin Middle - Site 1	5	Forested	0.04	No	0.000	5	4.0	577	2	0.00	0.1	0.0
2	Galvin Middle - Site 1	4	Institution	2.11	Yes	0.844	60	24.7	189,120	5,400	2.71	24.7	187.8
3	Galvin Middle - Site 1	9	Recreational Park	0.13	No	0.000	15	7.7	3,654	11	0.02	0.5	0.0
6	Galvin Middle - Site 2	4	Institution	0.28	Yes	0.112	60	24.7	25,096	717	0.36	3.3	24.9
7	Galvin Middle - Site 2	9	Recreational Park	0.24	No	0.000	15	7.7	6,745	21	0.04	0.9	0.0
11	Galvin Middle - Site 3	5	Forested	0.62	No	0.000	5	4.0	8,948	28	0.06	1.0	0.8
12	Galvin Middle - Site 3	4	Institution	0.30	Yes	0.120	60	24.7	26,889	768	0.39	3.5	26.7
13	Galvin Middle - Site 3	7	Residential-Low Density	0.07	Yes	0.004	10	5.9	1,489	21	0.03	0.3	1.2
Total				3.79		1.080			262,518	6,967	3.6	34.2	241.5

Coefficients for Use in Pollutant Load Calculations

Landuse[1]	Landuse ID (used for V-lookup)	% Impervious	(C) TSS (mg/l)	(C) TP (mg/l)	(C) TN (mg/l)	*Fecal Coliform (colonies/100 mL)	Landuse[1]
Commercial	1	85	44	0.15	1.85	9306	
Industrial	2	75	42	0.11	4.01	1467	
Multifamily	3	60	100	0.4	2.2	10000	
Institution	4	60	100	0.23	2.1	3500	
Forested	5	5	51	0.11	1.74	300	
Residential-High Density	6	40	102	0.64	3.81	16901	
Residential-Low Density	7	10	34	0.27	3.18	2950	
Residential-Med. Density	8	30	49	0.41	3.5	12360	
Recreational Park	9	15	50	0.1	2.1		
Roadway/Parking Lot	10	98	150	0.25	2.3	1700	
Urban Open	11	11	51	0.11	1.74	5000	

[1] High density residential (>4 acre lots), Medium density residential (1/4 to 1/2 acre lots), Low density residential (>1 acre lots), Multifamily (>7 dwellings per acre).

P - Annual Rainfall	46.5	inches; user specified
P_j	90%	%; default
Sanding Rate	500	lbs/acre; default
Sanding Applications	10	times/year; default

Pollutant Removal

Galvin Middle School - Pollutant Removal Calculations

Pollutant Removal Calculations

No.	Catchment Name	BMP ID	BMP Type	BMP Drainage Area (acres)	BMP Removal Efficiency** TSS Removal (%)	TP Removal (%)	TN Removal (%)	Fecal Coliform Removal (%)	Quantity of Pollutant Removed: Annual TSS Removed (lbs)	Annual TP Removed (lbs)	Annual TN Removed (lbs)	Annual Fecal Coliform Removed (billion colonies)
1	Galvin Middle - Site 1	9	Constructed Wetlands	0.040	80%	50%	38%	60%	1.5	0.0	0.0	0.0
2	Galvin Middle - Site 1	9	Constructed Wetlands	2.110	80%	50%	38%	60%	4,320	1.4	9.4	113
3	Galvin Middle - Site 1	9	Constructed Wetlands	0.130	80%	50%	38%	60%	9.1	0.0	0.2	0.0
Total									4,330	1.4	10	113
6	Galvin Middle - Site 2	7	Infiltration Trench	0.280	80%	55%	55%	90%	573	0.2	1.8	22.4
7	Galvin Middle - Site 2	7	Infiltration Trench	0.240	80%	55%	55%	90%	16.8	0.0	0.5	0.0
Total									590	0.2	2	22.4
11	Galvin Middle - Site 3	1	Bioretention Cell	0.620	90%	60%	40%	70%	26	0.0	0.4	0.5
12	Galvin Middle - Site 3	1	Bioretention Cell	0.300	90%	60%	40%	70%	691	0.2	1.4	18.7
13	Galvin Middle - Site 3	1	Bioretention Cell	0.070	90%	60%	40%	70%	19	0.0	0.1	0.9
Total									735	0.3	1.9	20.1
								Total Removal =	5,655	1.9	14	155

BMP Removal Efficiencies**

BMP Type	BMP ID (used for V-lookup)	TSS Removal (%)	TP Removal (%)	TN Removal (%)	Fecal Coliform Removal (%)	BMP Type
Bioretention Cell	1	90%	60%	40%	70%	Bioretention Cell
Forebay**	2	25%	8%	3%	12%	Forebay**
Sand Filter	3	80%	30%	30%	70%	Sand Filter
Dry Well**	4	90%	55%	40%	90%	Dry Well**
Permeable Pavers**	5	90%	40%	40%	95%	Permeable Pavers**
Vegetated Swale**	6	85%	48%	30%	60%	Vegetated Swale**
Infiltration Trench	7	80%	55%	55%	90%	Infiltration Trench
Infiltration Basin	8	80%	65%	65%	90%	Infiltration Basin
Constructed Wetlands	9	80%	50%	38%	60%	Constructed Wetlands

Pollutant Removal of BMPs in Series Equation:

If removal from the 1st BMP is >80%, the 2nd BMP efficiency shall be 50% of its normal efficiency.

If removal from the 1st BMP is <80%, the 2nd BMP efficiency shall be 75% of its normal efficiency.

Example: TSS load of 100lbs. 1st BMP removal 85%, 2nd BMP removal 40%.

TSS Removal = 100lbs * 85% = 85 lbs in 1st BMP

TSS Removal = (100lb-85lb) * (40% * .5) = 3 lbs in 2nd BMP

Net TSS Removal = 88 lbs

Conceptual Design Performance Evaluation

Site	BMP	Annual Removal Rates		
		TSS (lbs)	TP (lbs)	Bacteria (col's)
Galvin Middle School	Site 1 – Pocket wetland Site 2 – Infiltration trenches Site 3 – Bioretention cell	5,655	1.9	$155x10^9$
Hansen Elementary School	Site 1 – Bioretention cell Site 2 – Bioretention cell Site 3 – Bioretention cell	8,267	3.0	$262x10^9$
Canton High School	Site 1 – Bioretention cell Site 2 – Infiltration trenches, tree boxes, leaching structures Site 3 – Pocket wetland Site 4 – Pocket wetland	10,967	3.9	$287x10^9$
Ponkapoag Lot	Site 1 – Bioretention cell Site 2 – Treatment wetland	10,550	2.5	$826x10^9$

Conceptual Design Cost Evaluation

Hansen Elementary School				
Site 1 - Bioretention Cell				
Site Preparation	1.0	Lump	$2,000.00	$2,000
Leaching Catch Basin	2.0	Each	$6,500.00	$13,000
Convert Catch Basin Grate to Manhole Cover	1.0	Each	$2,500.00	$2,500
Bioretention Cell	1,500.0	sf	$30.00	$45,000
Outlet Piping	20.0	lf	$25.00	$500
Engineering	1.0	Lump	$6,500.00	$6,500
BMP Total				**$69,500**
Operation & Maintenance per Year				$1,000

Conceptual Design Cost Evaluation

Table 5: Summary table of data produced for this project by CEI.

Town **Canton, MA**

Site	BMP	Area of BMP (ft^2)	1" WQv (cf)	WQv Treated (cf)	% 1" WQv treated	Construction Cost	Annual O/M Cost
Galvin Middle School							
Site 1	Pocket Wetland	3000	4,671	6,000	128.45%	$102,400	$985
Site 2	Infiltration Trenches	650	741	780	105.26%	$34,300	$550
Site 3	Bioretention Cell	600	791	960	121.37%	$35,050	$1,550
Hansen Elementary School							
Site 1	Bioretention Cell	1500	2,472	2,400	97.09%	$69,500	$1,000
Site 2	Bioretention Cell	3500	4,748	4,900	103.20%	$129,750	$1,000
Site 3	Bioretention Cell	1000	762	1,100	144.36%	$34,000	$1,000
Ponkapoag Lot							
Site 1	Bioretention Cell with underdrains	1600	3,808	2,720	71.43%	$71,900	$1,000
Site 2	Treatment Wetland System	4000	7,795	8,000	102.63%	$124,900	$985
Canton High School							
Site 1	Bioretention Cell with underdrains	2400	5,082	4,560	89.73%	$106,500	$1,000
Site 2	Infiltration Trenches/ Tree Boxes/ Leaching Structures	1000	1,859	1,200	64.55%	$113,700	$1,325
Site 3	Pocket Wetland System	1250	1,955	1,875	95.91%	$58,400	$985
Site 4	Pocket Wetland System	2600	3,899	3,900	100.03%	$104,700	$985

Next Steps:

- Status: Design and Implementation Pending
  - Depends on funding opportunities (changing)
  - May depend on terms of MS4 permit
- Partnership opportunities with source water protection ?
- Potential opportunities with other surface water protection?
  - Pending regulations under SWMI Framework?

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