

# Getting to 10%: Watershed Restoration through Low Impact Development Retrofits in an Urban Environment

## The UNH Stormwater Center, the City of Dover and NHDES



### Proposal Goals

These efforts have reduced the Effective Impervious Cover (EIC) from 30% to 17%, a total reduction in EIC of 13%.

*The project goal now is to reduce EIC in the watershed through filtration and infiltration practices and a further reduction of an additional EIC by 7.6% down to a total EIC for the watershed to 9.5%.*

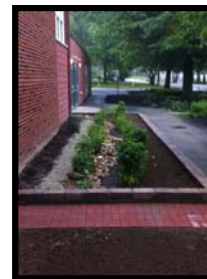
### Innovative BMPs



Roosevelt St Bio 6/2014



Upper Horne St Bio 7/31/2014  
- Credit Steve Brewer



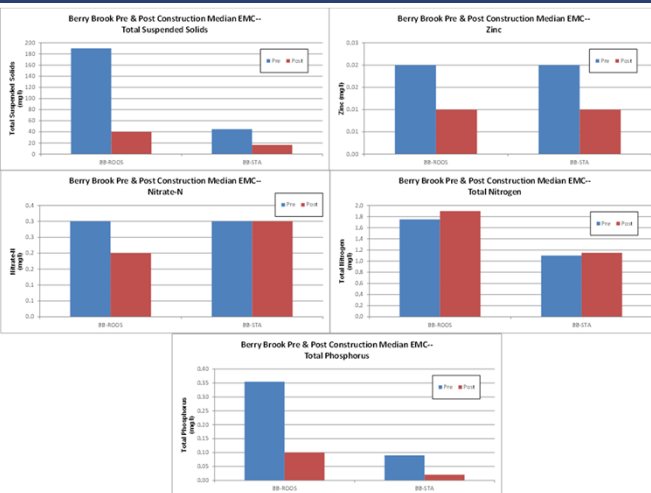
Horne St School 6/2010

### Watershed at a Glance

Poster #	BMP Location	BMP Type	Drainage Area (ac)	IC Treated (ac)
1	Central Avenue	Subsurface Gravel Wetland	11.0	9.6
2	Upper Watershed	Engineered Wetland and Floodplain	13.5	2.0
3	Page Avenue	Vegetated Bio-Swale	5.2	1.9
4	Crescent Avenue	Vegetated Swale	3.0	1.3
5	Upper Watershed	Stream Restoration	-	-
6	Lowell Avenue	Bioretention	2.6	1.1
7	Roosevelt Avenue	Infiltration Basin & Bioretention	2.9	1.1
8	Glencrest Avenue	Bioretention	6.8	2.3
9	Horne Street	Bioretention 1	12.2	3.7
10	Horne Street Elementary School	Bioretention 1 (north)	0.15	0.15
11	Horne Street Elementary School	Bioretention 2 (south)	0.11	0.07
12	Horne Street Elementary School	Tree Filter	0.26	0.26
13	Horne Street	Bioretention 2	4.2	1.6
14	Snow Avenue	Bioretention	4.2	1.6
15	Snow Avenue	Vegetated Swale	-	-
16	Hillcrest Avenue	Rain Garden	0.2	0.2
17	Station Drive	Culvert Removal & Bridge Installation	-	-
18	Lower Watershed	Stream Restoration	-	-
<b>TOTALS</b>			<b>66.2</b>	<b>26.89</b>

Currently the watershed is at 15% EIC  
Down from 30%!

### Long-term Monitoring – water quality



Water quality monitoring during two phases of the project at two locations upstream (Roosevelt St) and Downstream (Station Dr).

The blue bar is pre-project at 30% IC the red bar is mid-project at 17% IC

Water quality is improving from pre to mid project as well as from upstream to downstream

### Bioretention Design and Installations

Year	Annual Load 'L <sub>i</sub> ' #/year	Effluent Load 'L <sub>e</sub> ' #/year	Annual PL Removed #/year
<b>2011 BMPs</b>			
TSS #/year	16757.6	1317.0	28465.7
TP #/year	65.4	13.4	98.1
TN #/year	409.7	71.3	634.2
<b>2012 BMPs</b>			
TSS #/year	7531.9	244.8	11243.6
TP #/year	27.1	4.4	35.3
TN #/year	115.9	29.0	139.0
<b>2014 BMPs</b>			
TSS #/year	2719.1	88.4	2630.7
TP #/year	10.9	1.2	9.7
TN #/year	59.8	6.0	53.8
<b>Project Totals</b>			
TSS #/year			<b>42,340</b>
TP #/year			<b>143</b>
TN #/year			<b>827</b>

### Long-term Monitoring – water volumes

