Responses to WTC Comments on Expert Panel Reports

June USWG Meeting

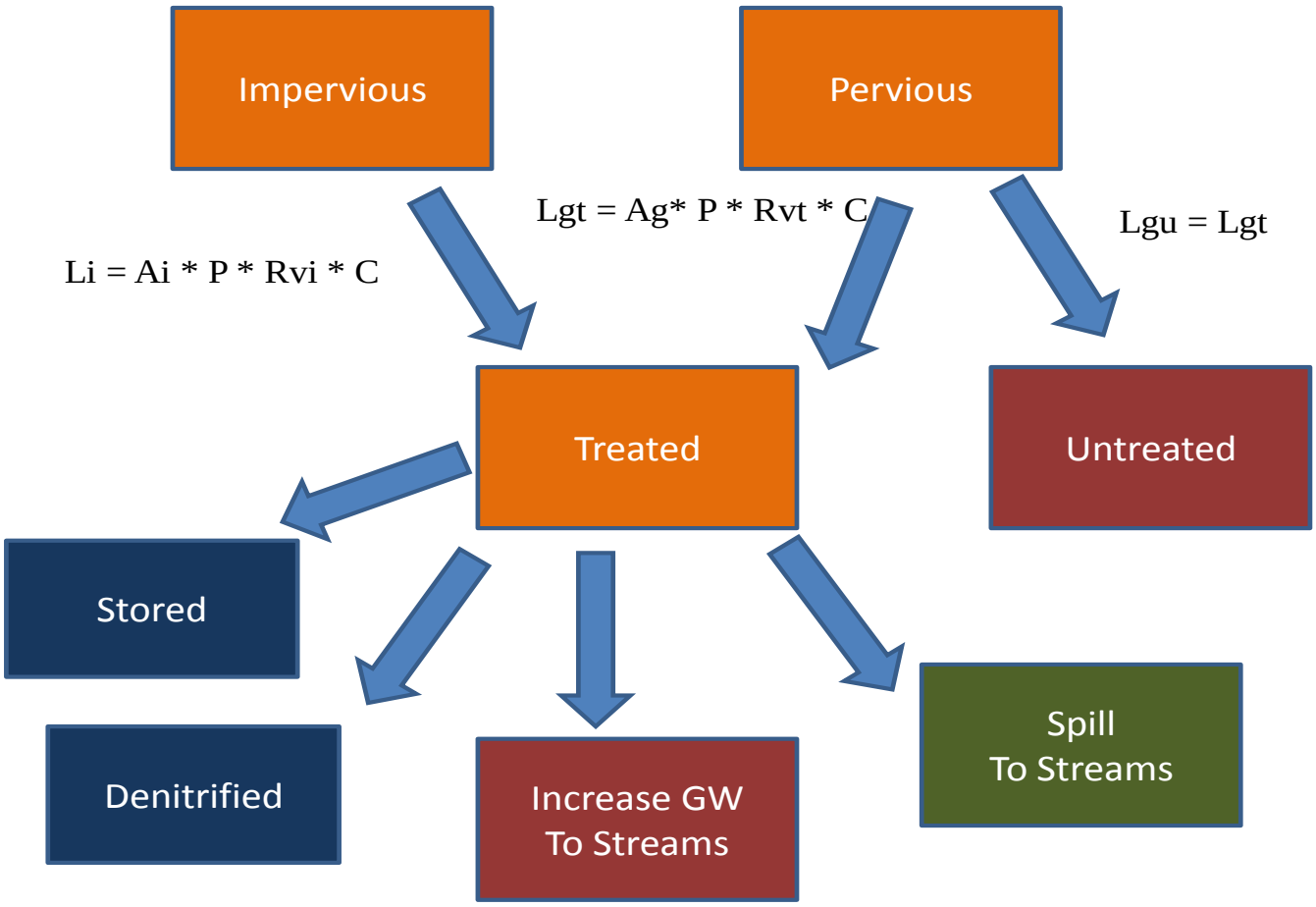
Key WTC Comments

- Revision 1. Revising TN Adjustor Curve to Reflect Base flow Nitrate Movement in Urban Watersheds.
- Revision 2. Make a Short Term and Long Term Recommendation on how the new removal rate protocols can be better integrated into CAST

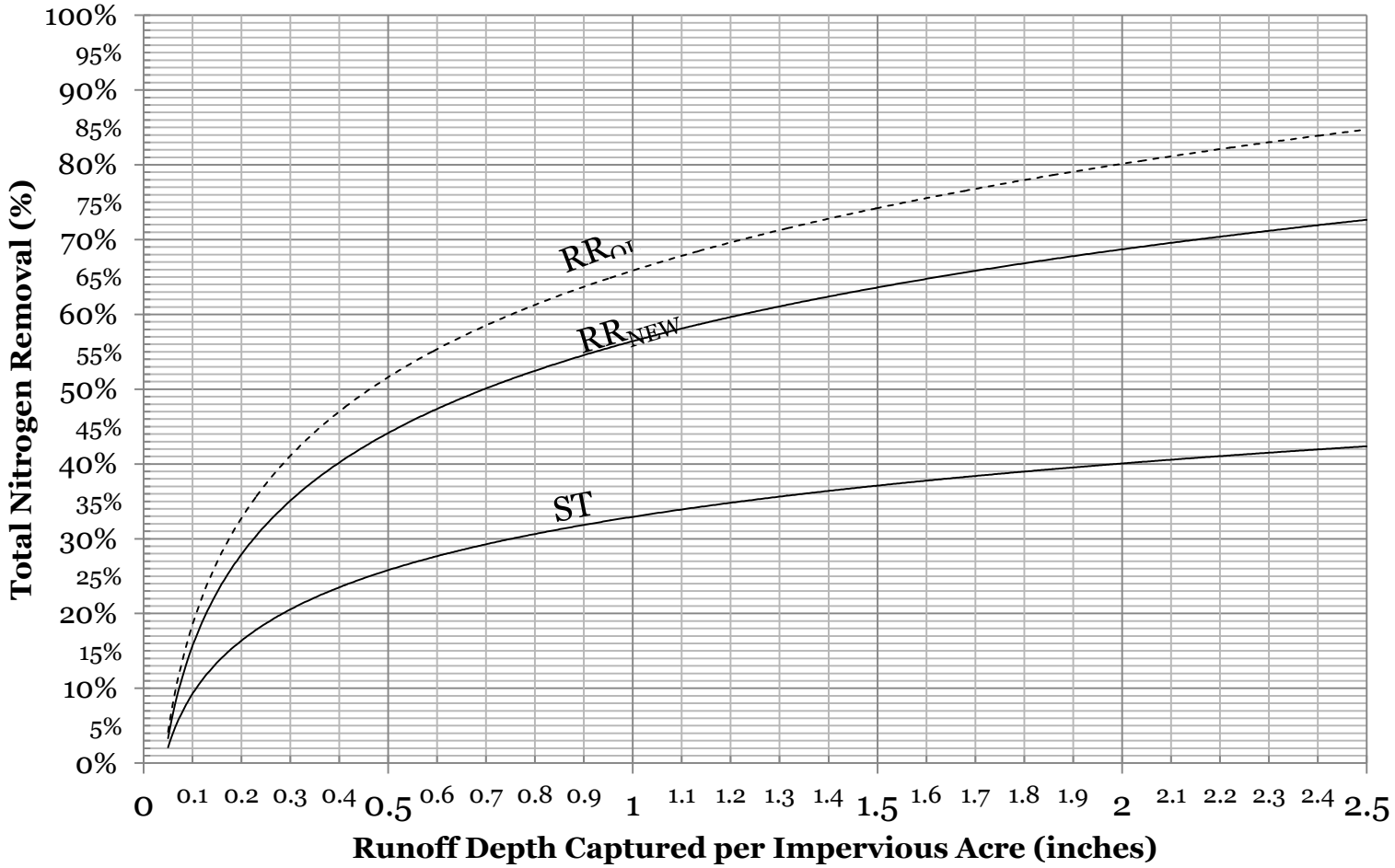
Table D-1
Edge of Stream Unit Loading Rates for Bay States Using CBWM v. 5.3.2
No Action Run, State-wide Average Loading Rates, average of regulated and unregulated MS4 areas

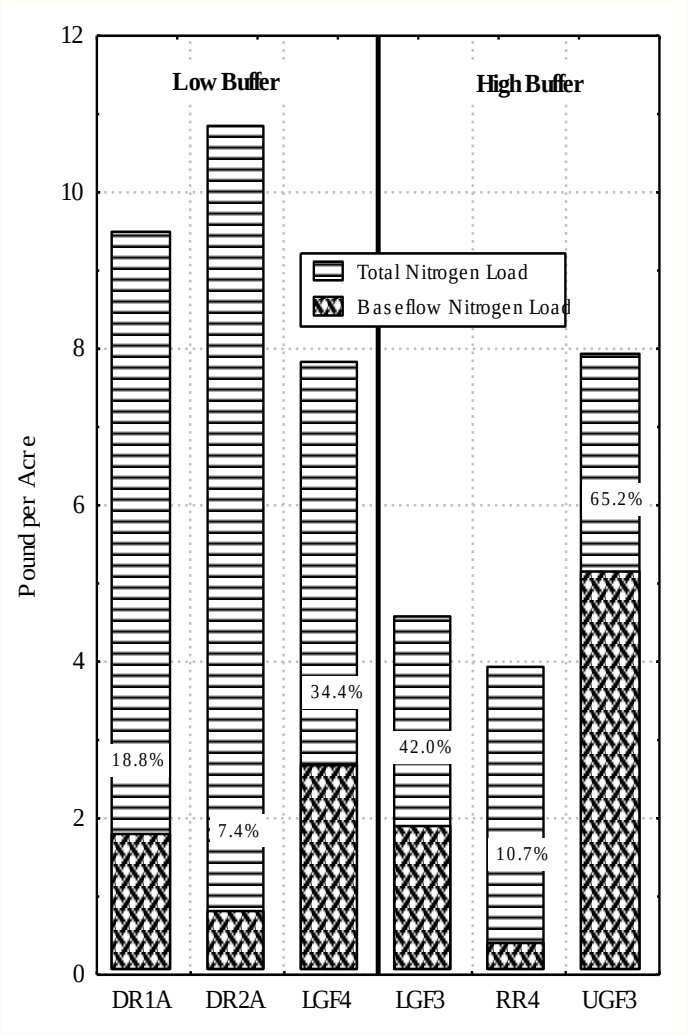
BAY STATE	Total Nitrogen		Total Phosphorus		Suspended Sediment	
	Pounds/acre/year				Pounds/acre/year	
	IMPERV	PERV	IMPERV	PERV	IMPERV	PERV
DC	13.2	6.9	1.53	0.28	1165	221
DE	12.4	8.7	1.09	0.25	360	42
MD	15.3	10.8	1.69	0.43	1116	175
NY	12.3	12.2	2.12	0.77	2182	294
PA	27.5	21.6	2.05	0.61	1816	251
VA	13.9	10.2	2.21	0.60	1175	178
WV	21.4	16.2	2.62	0.66	1892	265

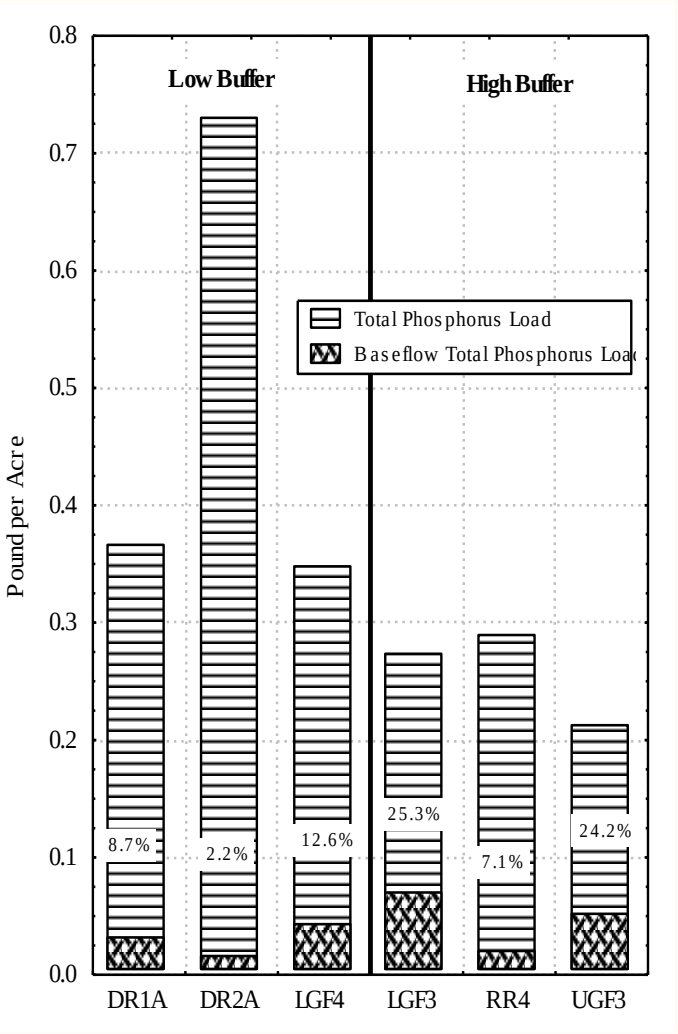
Source: Spreadsheet output provided by Chris Brosch, CBPO, 1/4/2012

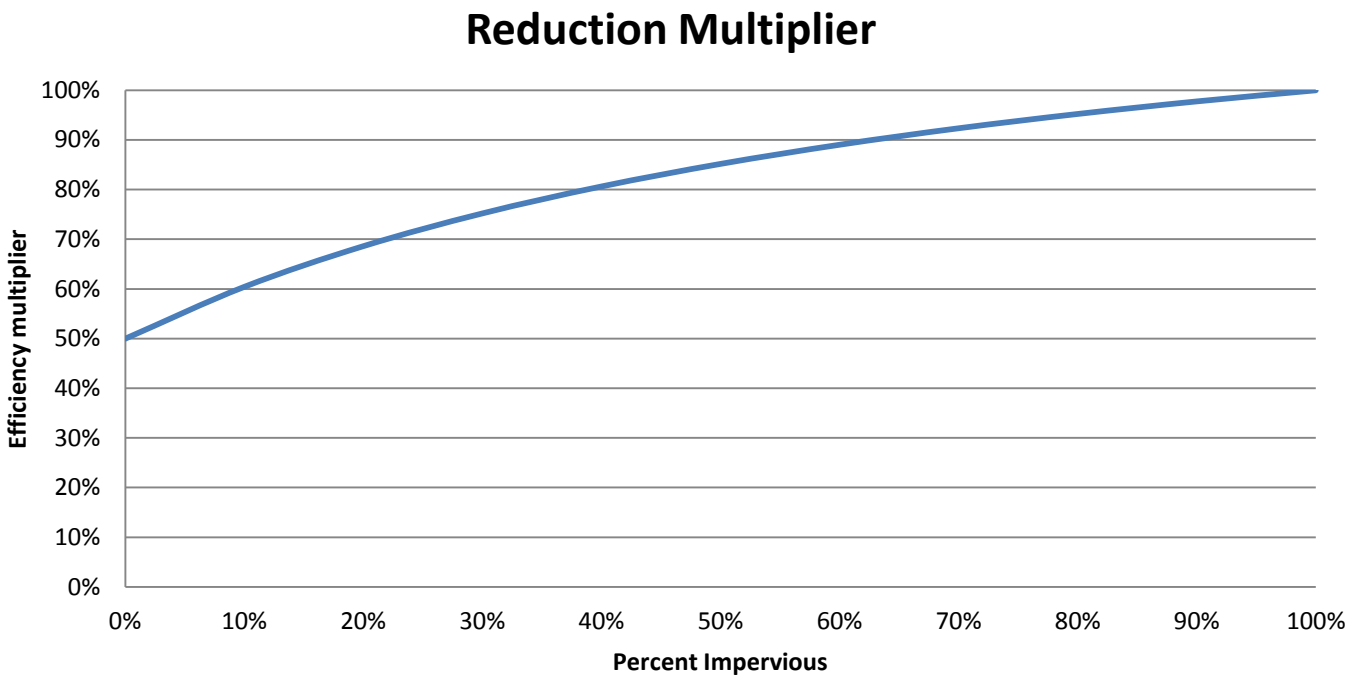

Impervious
Pervious
Li = Ai * P * Rvi * C
Lgt = Ag* P * Rvt * C
Lgu = Lgt
Treated
Untreated
Stored
Denitrified
Increase GW
To Streams
Spill
To Streams

Total Nitrogen Removal for RR and ST Practices




Low Buffer
High Buffer
Total Nitrogen Load
Baseflow Nitrogen Load
Pound per Acre
0
2
4
6
8
10
12
18.8%
7.4%
34.4%
42.0%
10.7%
65.2%
DR1A
DR2A
LGF4
LGF3
RR4
UGF3


Low Buffer
High Buffer
Total Phosphorus Load
Baseflow Total Phosphorus Load
Pound per Acre
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
8.7%
2.2%
12.6%
25.3%
7.1%
24.2%
DR1A
DR2A
LGF4
LGF3
RR4
UGF3



$$N_{adj} = RR_{NEW} \times (1 - P/2)$$

$$N_{adj} = ST \times (1 - P/2)$$

Where P = pervious fraction of site area

Design Examples – New Retrofit Facility Bioretention Area

- A bioretention area is built in parkland as a retrofit, classified as a **RR** practice
- The retrofit storage is estimated to be 1.67 acre-feet
- Treats runoff from 50 acre residential neighborhood with 40% impervious cover

Design Examples – New Retrofit Facility

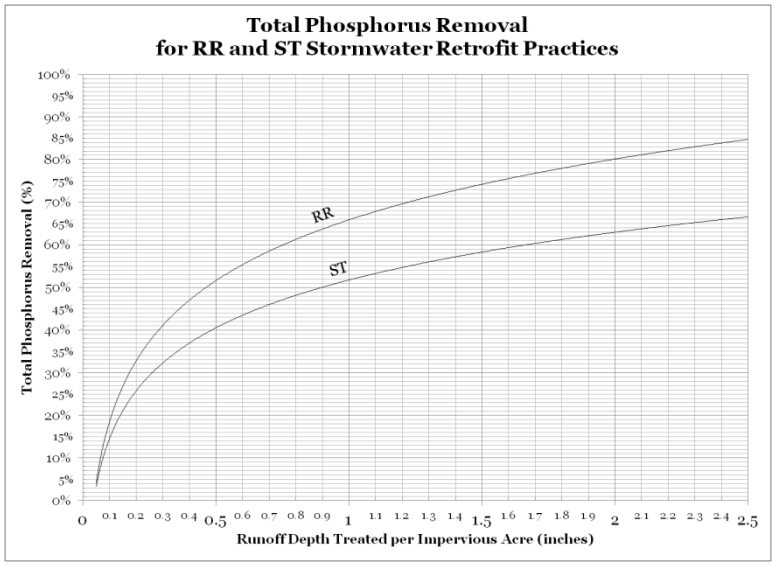
- Using the Standard Retrofit Equation:

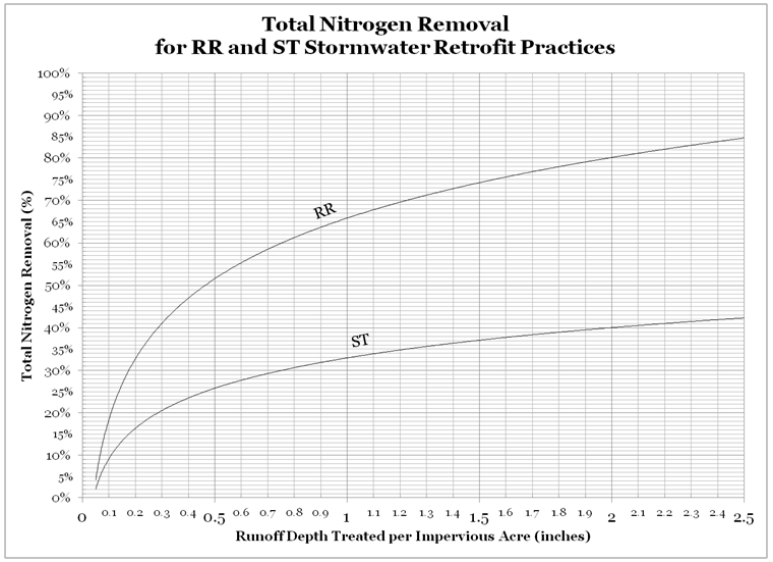
$$= \frac{(RS\,)(12)}{IA}$$

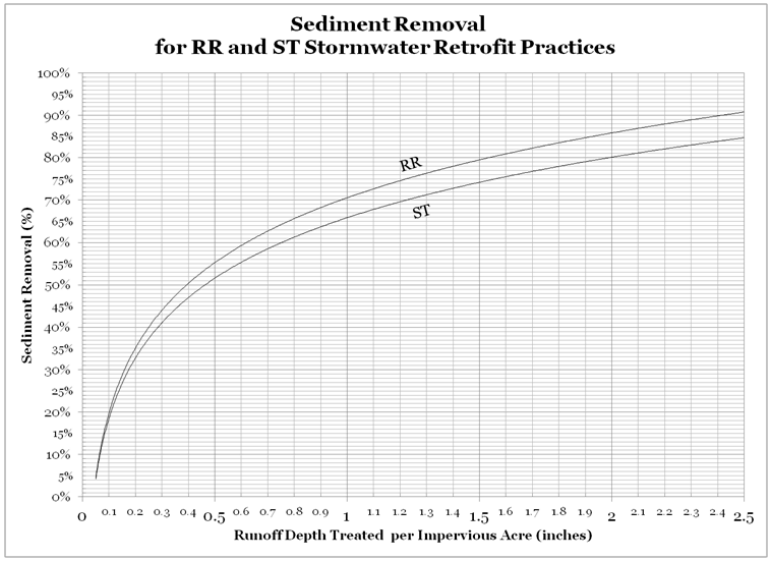
- RS = Retrofit Storage ≈ 1.67 ac-ft
- IA = Impervious Area = 20 acres

$$\frac{(1.67\,)(12)}{20} = \mathbf{1.0\ \boldsymbol{inch}}$$

Design Examples - New Retrofit Facility







Pollutant Removal Efficiencies of the practice

TP	TN	TSS
69%	65%	66%

Example of Revised TN Rate

- Base TN removal rate using new curve drops from 68% to 57%
- Pervious Cover Adjustment: (1- 0.6/2) = 0.7
- 57% * 0.7 = 40%
- Drops from 68 % to 40% in this example
- TP and TSS rates remain the same

Design Examples
Low Density Residential

- Development of 25 acre site in ½ acre lot residential subdivision in Pennsylvania
- Predevelopment conditions: 50% forest, 50% meadow + 100% *C* soils
- Post-development land cover: 25% impervious, 50% turf, 25% forest
- Will use a mix of **RR** practices

Design Examples
Low Density Residential

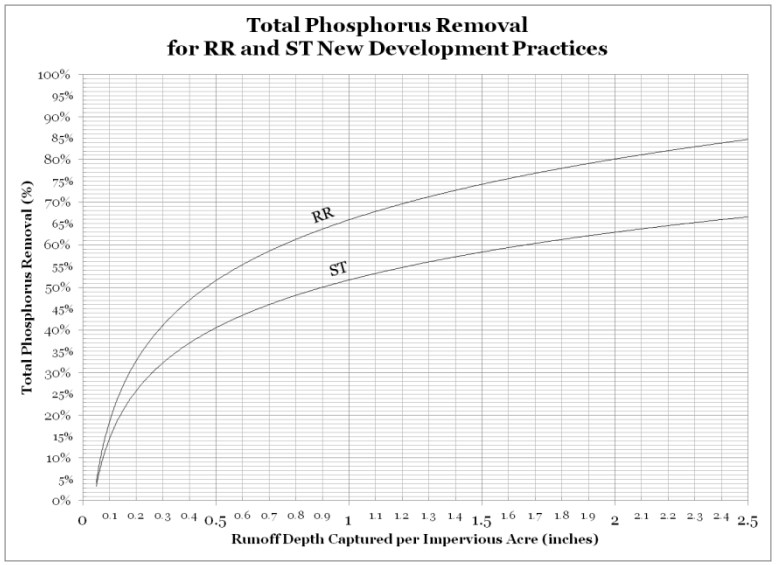
- Using the New Development Equation:

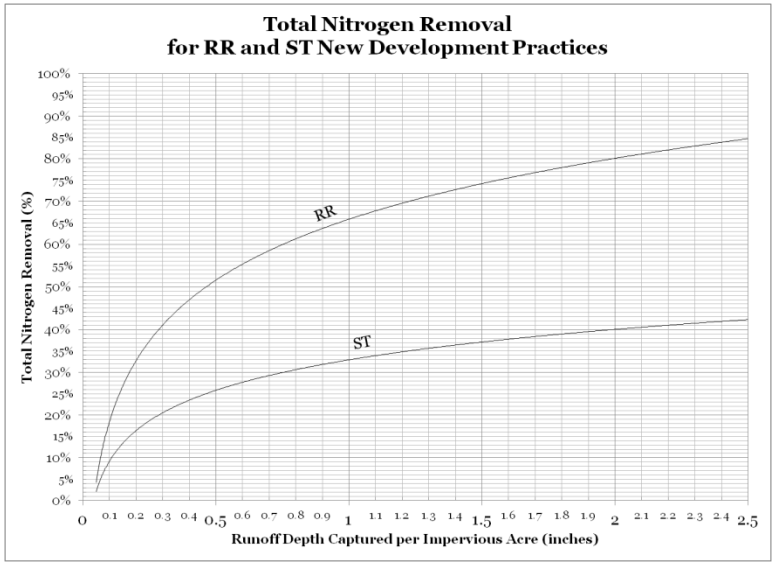
$$= \frac{(EP)(12)}{IA}$$

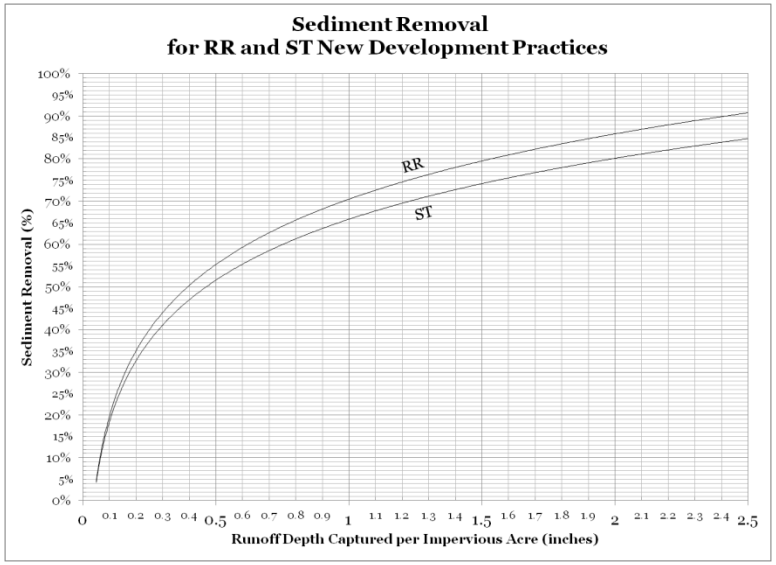
- EP = Engineering Parameter = 1.16 ac-ft
- IA = Impervious Area = 6.25 acres

$$\frac{(1.16\ )(12)}{6.25} = \mathbf{2.23\ inch}$$

Design Examples
Low Density Residential







Pollutant Removal Efficiencies of the practice

TP	TN	TSS
82%	82%	88%

Example of Revised TN Rate

- Base TN removal rate using new curve drops from 82% to 71%
- Pervious Cover Adjustment: (1- 0.5/2) = 0.75 (forest cover excluded)
- 71% * 0.75 = 53%
- Drops from 82% to 53% in this example
- TSS and TP rates remain the same

BMP Restoration Credit

- qualifying condition that the proposed restoration activities be significant enough to achieve the intent of the original water quality design criteria in the era it was built (e.g., sediment cleanouts would need to be sufficient to recover the full water quality storage capacity that was originally approved for the BMP, under historically less stringent standards, regardless of whether the BMP was reported in the CBWM input deck.