Environmental Site Design In the Critical Area

LeeAnne Chandler and Nick Kelly
Critical Area Commission
January 10, 2013

ESD in the Critical Area

- Background and history
- New standards and means of compliance
- Guidance document
- Spreadsheet tool (Nick Kelly)
- Next steps

Where is the Critical Area?

- All waters of the Chesapeake Bay, the Atlantic Coastal Bays, and their tributaries to the head of tide
- All land under these waters
- All land within 1,000 feet of the landward edge of tidal waters and tidal wetlands
- Approximately 11% of the State

Overlay Zones Used to Implement

- Critical Area boundary drawn 1,000' from tidal waters and tidal wetlands
- All land within boundary classified based on land use at time of program adoption
- IDA – Intensely Developed Area
- LDA – Limited Development Area
- RCA – Resource Conservation Area

How Does the Program Work?

- State Law and regulations require each affected jurisdiction to have a Critical Area program
- Local program incorporated into local zoning code
- Project review, permitting, and enforcement is through local planning and zoning
- The Critical Area Commission (CAC), a State agency, provides oversight, technical assistance, supplemental review

Why Require Additional Analysis in the Critical Area?

- Despite several decades of stormwater management regulation, stormwater is the fastest growing nutrient source in the Bay watershed

That Last 1,000 Feet Does Matter!

- Recent research has conclusively demonstrated that both the amount of development within a watershed and its proximity to an estuary or wetlands contribute to the condition of its benthic, fish and bird communities

The 10% Rule

- There has been a stormwater management requirement specific to the Critical Area IDA since 1986
- Known as the "10% Rule" – the provision requires post-development water quality coming from a particular site to be 10% better than it was prior to development or redevelopment
- Water quality is estimated based on site imperviousness before and after development
- Phosphorus is used as the "keystone" pollutant

Evolution of the 10% Rule

- 1986 – Included in Critical Area Criteria
- 1987 – First 10% Guidance Issued by MWCOG
- 1993 – Second 10% Guidance released
- 2000 – MDE Stormwater Manual issued
- 2003 – Third 10% Guidance issued
- 2007 – Passage of the Maryland Stormwater Act
- 2008 – Passage of HB 1253 (Critical Area)
- 2009 – Updated MDE Stormwater Manual
- 2013 – NEW ESD in the Critical Area Manual and updated regulations

Phosphorus Standard For New Development

- Design for Phosphorus Removal
  - Maximum acceptable annual phosphorus load of 0.3 pounds per acre – the same as "woods in good condition"
    - Previously was 0.5 pounds per acre
  - For new development, the standard of "woods in good condition" will be met from both a hydrological standpoint as well as a nutrient standpoint
- Meets Maryland water quality standards
- Based on the Bay-wide TMDL

Phosphorus Standard For Redevelopment

- Updating definition of "redevelopment" to match MDE regulations
- If site exceeds 40% imperviousness prior to development – the redevelopment standard will apply
- The removal requirement for redevelopment will be a reduction in the pre-development phosphorus load by 25%
- While this is a higher standard than the existing 10% Rule, the increased requirement corresponds to the recent change to MDE's redevelopment standard (treating 50% of existing imperviousness rather than 20%)

Two Track Review Process

- The guidance and spreadsheet presented today apply to larger (i.e., > 5000 sq. ft.) development projects
- Another guidance document is being developed to streamline review of small projects that otherwise are not required to meet ESD to the MEP but are required to meet the Phosphorus standard in the Critical Area

Photo courtesy of Blue Water Baltimore

Compliance Spreadsheet

- Allows designers to simultaneously track both MDE ESD and Critical Area ESD Phosphorus removal requirements
- Enables designers to quickly find the most cost-effective combination of ESD practices that comply with both laws
- Replaces clumsy paper worksheets for the 10% rule

Maximizing Phosphorus Removal

- Removal efficiencies are provided for all ESD practices using research provided by the Center for Watershed Protection
- Not all ESD practices are created equally from a nutrient removal standpoint
- Efficiencies vary from a low of 20% to a high of 80%
- Analysis for Phosphorus will encourage designers to use more effective practices on a site-by-site basis

Photo courtesy of CSN

Hydrologic Soil Groups

- Site analysis of pre-development hydrologic soil groups
- Soil properties govern which ESD practices are feasible at a given site, and can strongly influence the phosphorus removal rate they can achieve
- To help address the difficulty of poor soils (C/D) within the Critical Area, guidance will include a specification for soil restoration that can be used to increase removal efficiencies

Volume Treated Helps

- The spreadsheet will automatically compute an increase in BMP efficiency once the rainfall treated exceeds 1 inch.
- It will reach an efficiency maximum at treatment of 2.7 inches of rainfall (similar to MDE ESD credit)
- Similarly, the spreadsheet will reduce the efficiency if the BMP is undersized

Photo courtesy of Robert Dexter

Coastal Plain Challenges

- The guidance document will include expanded design recommendations for ESD practices to promote more reliable phosphorus removal and withstand the unique conditions of the Maryland Coastal Plain (CSN, 2008)

Coastal Plain Challenges

Photo by Gwynne Schultz, Maryland DNR

- Guidance addresses the potential impact of sea level rise on stormwater infra-structure
- Clarifies the use of "direct tidal discharge" in addressing certain volume requirements
- Explains rules for stormwater related disturbance within the Critical Area Buffer

Consistency with MDE Regulations

- This edition conforms to the State-wide methods and equations prescribed for ESD to the MEP compliance (MDE, 2009)
- Uses the same nomenclature and practice names as outlined in the new State-wide manual

Not Just the IDA Anymore?

- While not immediately planned, the phosphorus standard may be considered for the entire Critical Area
  - Information will be gathered based on future review of IDA projects and a decision will be made
- Similarly, if the spreadsheet tool is used and it becomes evident that the Phosphorus standard is always met by ESD to the MEP, then an assessment will be done to explore eliminating the requirement

Critical Area Offset Credits

- While not official ESD practices, two Critical Area offset credits are possible
  - Reforestation
  - Soil restoration
- These would be available for use when ESD to the MEP is met but there is a deficit in phosphorus removal

Clarifying Policies

- What are the rules for measuring impervious cover?
- How do permeable pavements and green roofs affect your site's IC footprint?
- How do you define site area for new/redevelopment?
- What are the rules for working inside of the Critical Area Buffer?

Standard Review Policies

- Where do you get data on predevelopment hydrologic soil groups?
- How do you deal with projects that cross the Critical Area boundary?
- How do you handle offsite runoff?
- What constitutes a direct discharge to tidal waters?
- How close is close enough to meet standard?
- How does this guide differ from the 2009 MDE stormwater manual?

Updated Offset Policy and Fee Schedule

- Updates the 2003 Critical Area guidance on offset fees - New Rate of $32,500/lb
- More limited options for off-site compliance
- More guidance for setting up local offset fee programs
- New cost data used to present an updated offset fee structure and qualifying criteria for off-site restoration projects

Questions?

Critical Area
ESD Spreadsheet Review

Purpose

- Present the latest draft of the Critical Area Commission's Environmental Site Design (ESD) Worksheet
- Use the spreadsheet with an example project
- Receive feedback/criticism on the current spreadsheet draft

Critical Area ESD Spreadsheet

- Calculates both Maryland Department of the Environment (MDE) ESD and Critical Area ESD requirements
- Will replace existing Critical Area 10% phosphorus reduction calculations

Critical Area ESD Spreadsheet

- For projects in the Intensely Developed Area (IDA)
- For projects whose Limit of Disturbance (LOD) > 5,000 ft^2
- Additional guidance for projects with an LOD < 5,000 ft^2 to be developed

Previous 10% Phosphorus Worksheet

Worksheet A: Standard Application Process

Calculating Pollutant Removal Requirements[1]

Step 1: Calculate Existing and Proposed Site Imperviousness

A. Calculate Percent Imperviousness

1) Site Area within the Critical Area IDA, A = _____ acres

2) Site Impervious Surface Area, Existing and Proposed, (See Table 4.1 for details)

	(a) Existing (acres)	(b) Proposed (acres)
Roads		
Parking lots		
Driveways		
Sidewalks/paths		
Rooftops		
Decks		
Swimming pools/ponds		
Other		
Impervious Surface Area		

3) Imperviousness (I)

Existing Imperviousness, I_{pre} = Impervious Surface Area / Site Area
= (Step 2a) / (Step 1)
= (_____) / (_____)
= _____ %

C = Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l
A = Area of the site within the Critical Area IDA (acres)
8.16 = Includes regional constants and unit conversion factors

Step 4: Calculate the Pollutant Removal Requirement (RR)

RR = L_{post} - (0.9) (L_{pre})

= (_____) - (0.9) (_____)

= _____ lbs/year of total phosphorus

Where:

RR = Pollutant removal requirement (lbs/year)
L_{post} = Average annual load of total phosphorus exported from the post-development site (lbs/year)
L_{pre} = Average annual load of total phosphorus exported from the site prior to development (lbs/year)

New! ESD to the MEP Worksheet

- Allows tracking of both phosphorus removal and environmental site design
- Enables designers to find most cost-effective combination of ESD practices that comply with both laws
- Replaces paper worksheets!

Differs From Previous Draft Versions

- Draft presented in Spring 2011
  - One spreadsheet tab
  - Did not allow for multiple Best Management Practices (BMP) of the same type
  - Did not allow for specificity of each BMP
  - Green roofs did not have a phosphorus removal efficiency percentage
  - One phosphorus removal rate per BMP
  - Some calculations didn't match MDE computations


SPREADSHEET
ENTHUSIAST
FEBRUARY
£2.50 2012
99 PROBLEMS
[but a batch ain't one]
This week:
Values
Binary numbers
Cells
Numbers
Know your ASCII from your elbow
Has the 26-adic bijective numeration had it's day?
100'S OF FUN TEMPLATES TO CREATE YOUR OWN SPREADSHEETS AT HOME

New Draft Spreadsheet

- Multiple tabs - One for each Best Management Practice
  - Allows for multiples of the same BMP
- Allows for practice-specific parameters (surface area, ponding depth, media depth, etc.)
- Green roofs have a phosphorus removal efficiency percentage
- Phosphorus removal rate based on the amount of watershed inches treated (0-2.7 inches)
- Calculations glitch on the MDE computations fixed (thanks for the help, MDE!!!!)

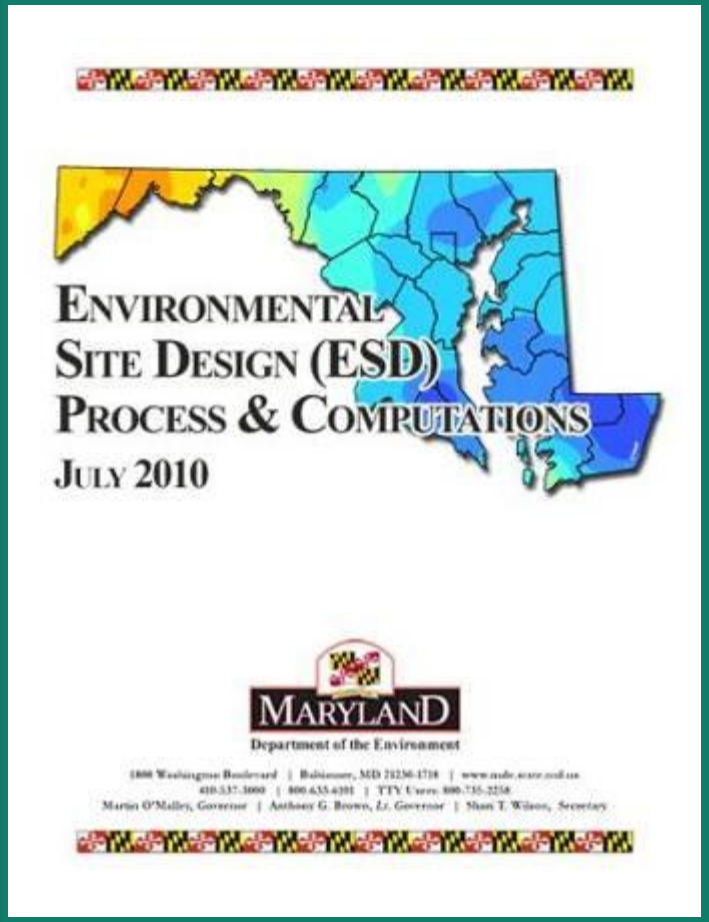
Goals of Using the Spreadsheet

- Alignment of MDE and Critical Area ESD stormwater goals
- "One spreadsheet to rule them all"
  - Saves time for engineers, reviewers, and applicants

Ultimate Goal: To Avoid This!

Let's Test the Spreadsheet!

Spreadsheet Example



- Example: Residential Development
- Taken from MDE's ESD Process and Computations Publication (July 2010)

Figure 1. Single Family Lot – Proposed Layout

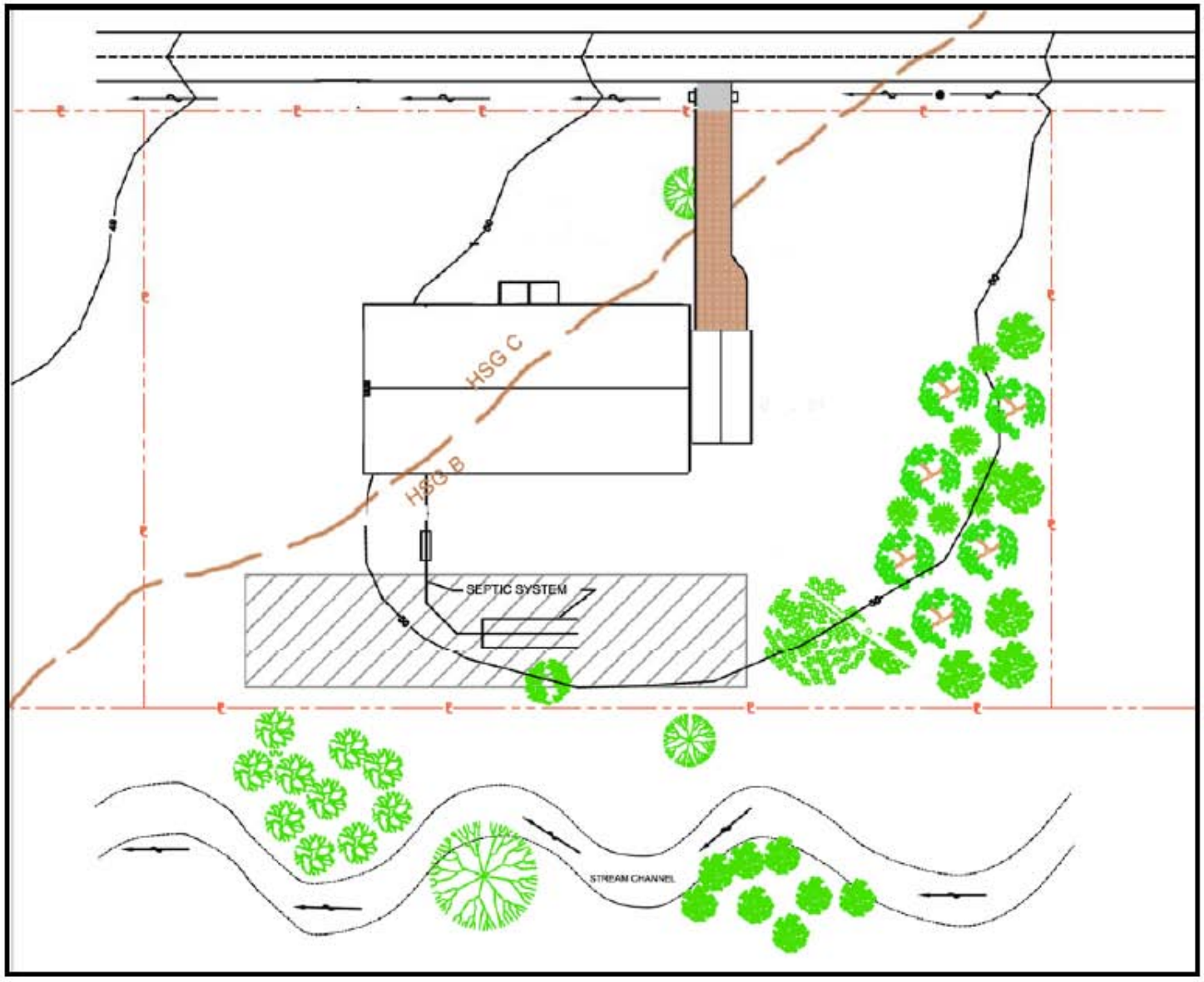
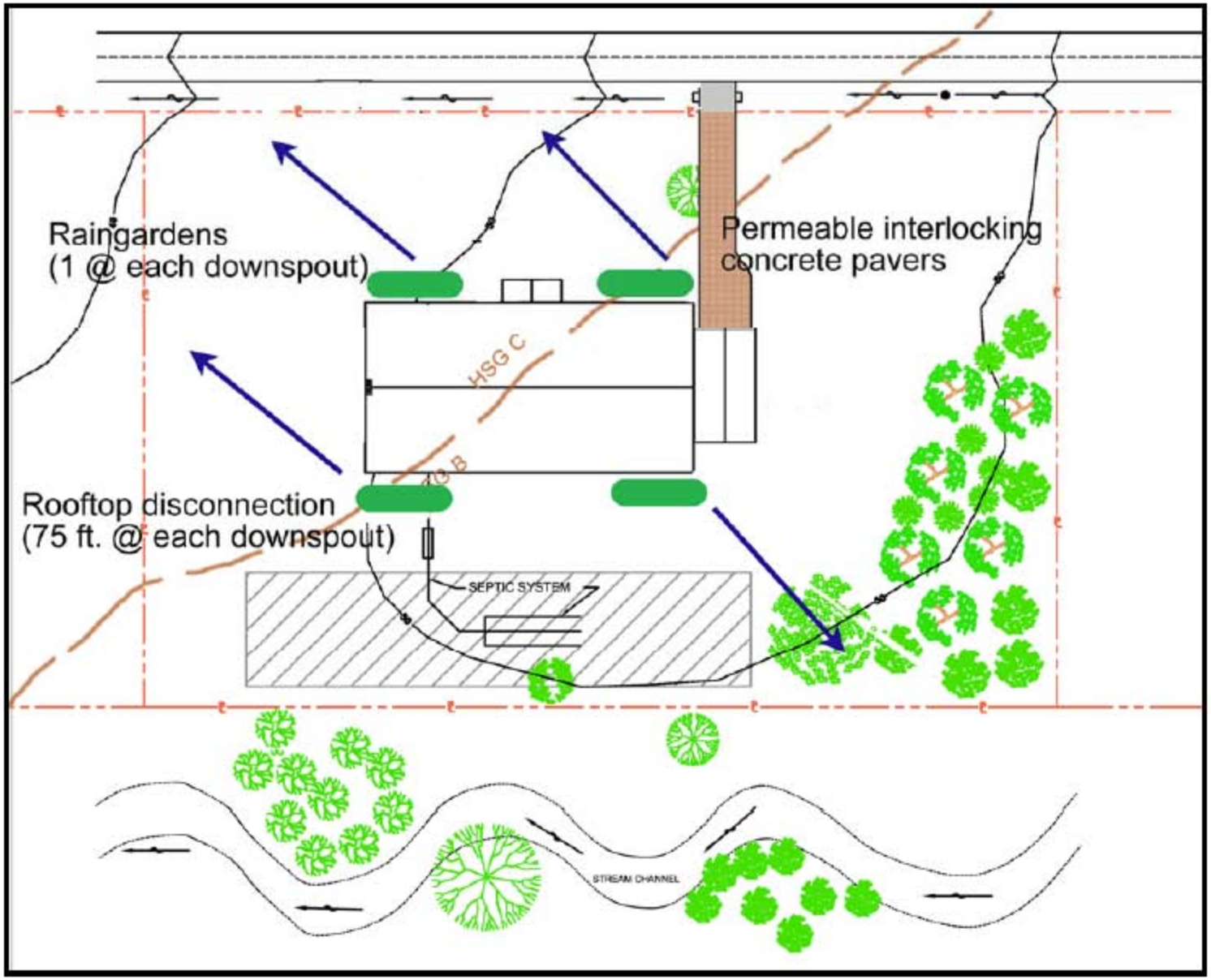


Figure 2. Concept Design Layout of ESD Practices and Techniques



Step 1 – ESD Checklist

Microsoft Excel - Maryland SW Spreadsheet Version 3_1-residential.xls

Project Name:	**McNulty's Residential Property**	
Date:	**4-Jan-13**	
	data input cells	
	calculation cells	

Step 1: Complete ESD Implementation Checklist

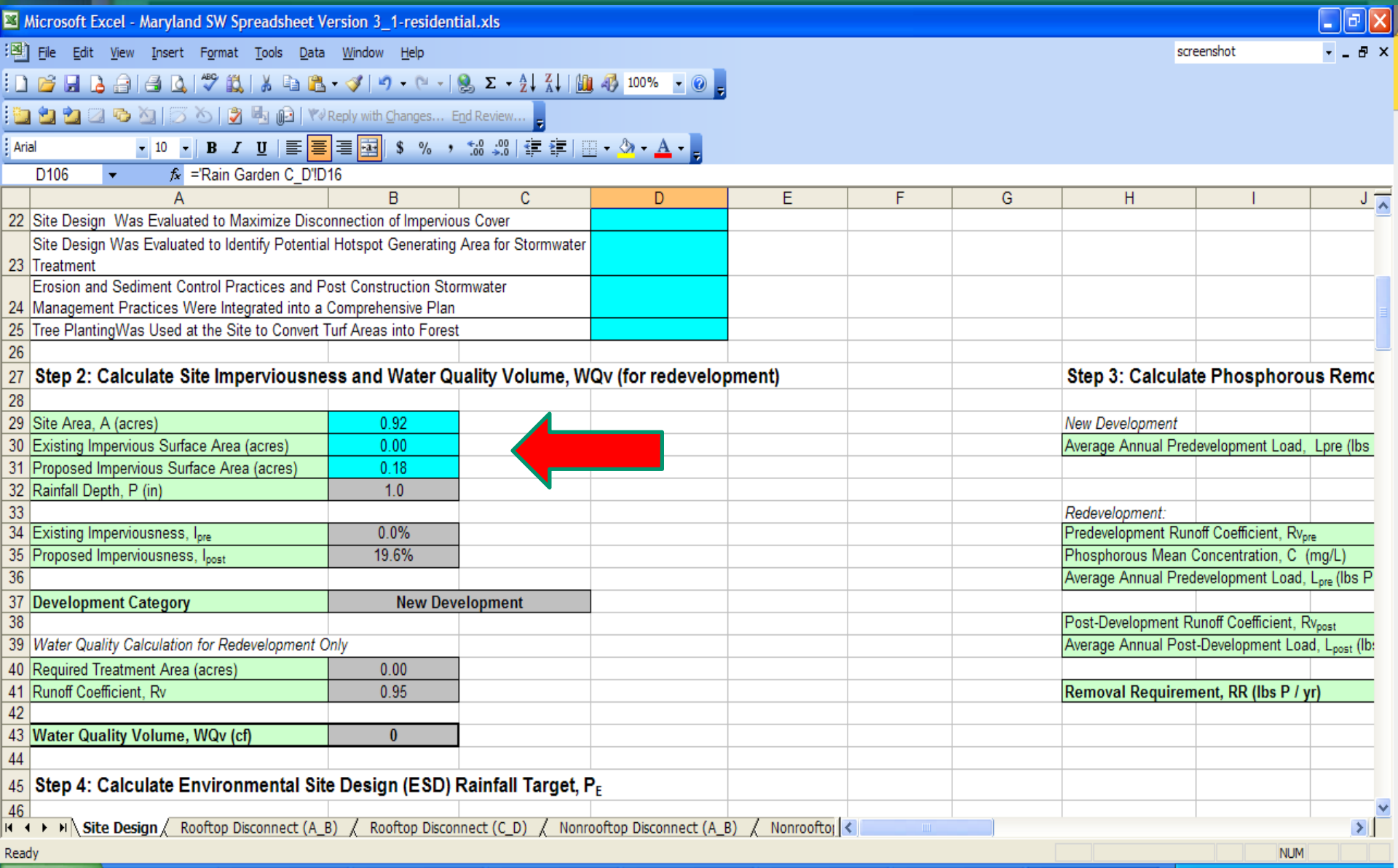
Check all of the Following ESD Practices That Were Implemented at Site	*Yes - No - N/A*
Environmental Mapping Was Conducted at Site Prior to Layout	*YES*
Natural Areas Were Conserved (e.g., forests, wetlands, steep slopes, floodplains)	*YES*
Stream, Wetland and Shoreline Buffers Were Reserved	*YES*
Disturbance of Permeable Soils Was Minimized	*YES*
Natural Flow Paths Were Maintained Across the Site	*YES*
Building Layout Was Fingerprinted to Reduce Clearing and Grading at Site	*YES*
Site Grading Promoted Sheetflow From Impervious Areas to Pervious Ones	*YES*
Site Design Was Evaluated to Reduce Creation of Needless Impervious Cover	*YES*
Site Design Was Evaluated to Maximize Disconnection of Impervious Cover	*YES*
Site Design Was Evaluated to Identify Potential Hotspot Generating Area for Stormwater Treatment	*YES*
Erosion and Sediment Control Practices and Post Construction Stormwater Management Practices Were Integrated into a Comprehensive Plan	*YES*
Tree PlantingWas Used at the Site to Convert Turf Areas into Forest	*YES*

Step 2: Calculate Site Imperviousness and Water Quality Volume, WQv (for redevelopment) **Step 3: Calculate Phosphorous Remo**

Site Design | Rooftop Disconnect (A_B) | Rooftop Disconnect (C_D) | Nonrooftop Disconnect (A_B) | Nonrooftop

Ready

Step 2 – Site Imperviousness



Step 3 – Critical Area Calculations

Microsoft Excel - Maryland SW Spreadsheet Version 3_1-residential.xls

File Edit View Insert Format Tools Data Window Help

D106 ='Rain Garden C_D'!D16

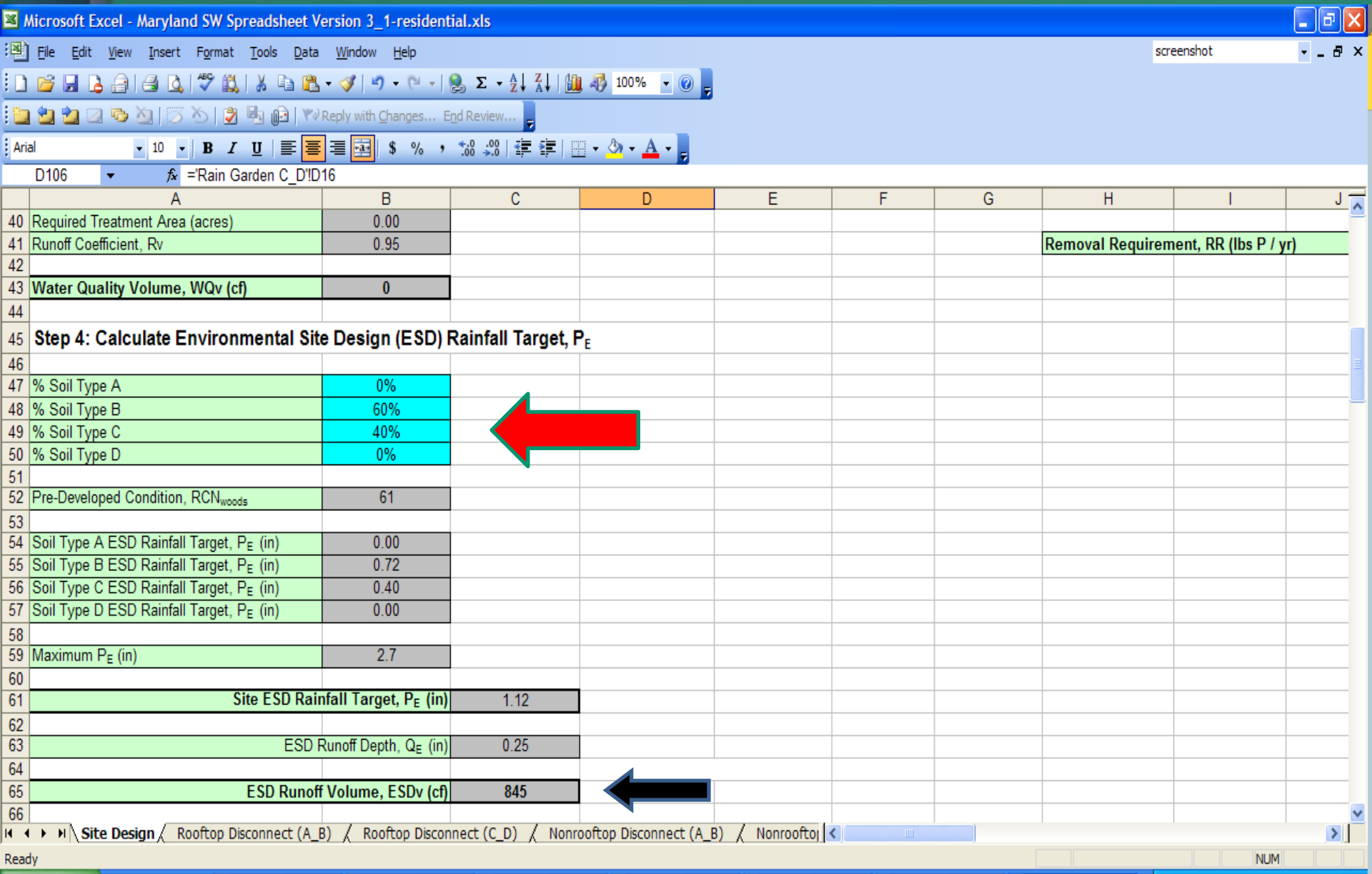
Step 3: Calculate Phosphorous Removal Requirement, RR for Critical Area Sites

New Development	
Average Annual Predevelopment Load, Lpre (lbs P / yr)	0.28
Redevelopment:	
Predevelopment Runoff Coefficient, Rv_{pre}	0.05
Phosphorous Mean Concentration, C (mg/L)	0.3
Average Annual Predevelopment Load, L_{pre} (lbs P / yr)	0.11
Post-Development Runoff Coefficient, Rv_{post}	0.23
Average Annual Post-Development Load, L_{post} (lbs P / yr)	0.51
Removal Requirement, RR (lbs P / yr)	**0.23**

Site Design | Rooftop Disconnect (A_B) | Rooftop Disconnect (C_D) | Nonrooftop Disconnect (A_B) | Nonrooftop

Ready NUM

Step 4 – ESD Rainfall Target

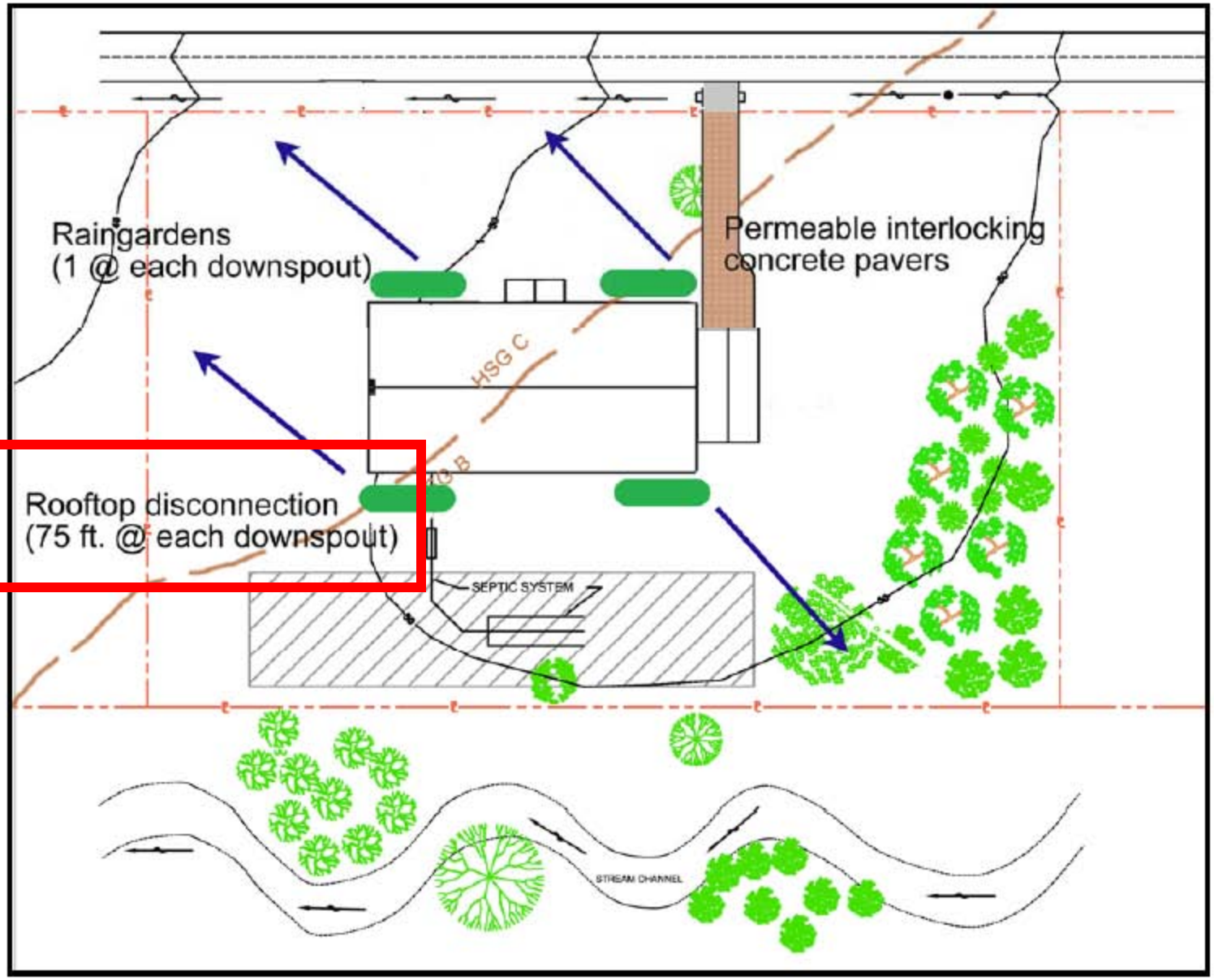


	A	B	C
40	Required Treatment Area (acres)	0.00	
41	Runoff Coefficient, Rv	0.95	
42			
43	**Water Quality Volume, WQv (cf)**	**0**	
44			
45	**Step 4: Calculate Environmental Site Design (ESD) Rainfall Target, P_E**		
46			
47	% Soil Type A	0%	
48	% Soil Type B	60%	
49	% Soil Type C	40%	
50	% Soil Type D	0%	
51			
52	Pre-Developed Condition, RCN_{woods}	61	
53			
54	Soil Type A ESD Rainfall Target, P_E (in)	0.00	
55	Soil Type B ESD Rainfall Target, P_E (in)	0.72	
56	Soil Type C ESD Rainfall Target, P_E (in)	0.40	
57	Soil Type D ESD Rainfall Target, P_E (in)	0.00	
58			
59	Maximum P_E (in)	2.7	
60			
61	**Site ESD Rainfall Target, P_E (in)**	1.12	
62			
63	ESD Runoff Depth, Q_E (in)	0.25	
64			
65	**ESD Runoff Volume, ESDv (cf)**	**845**	
66			

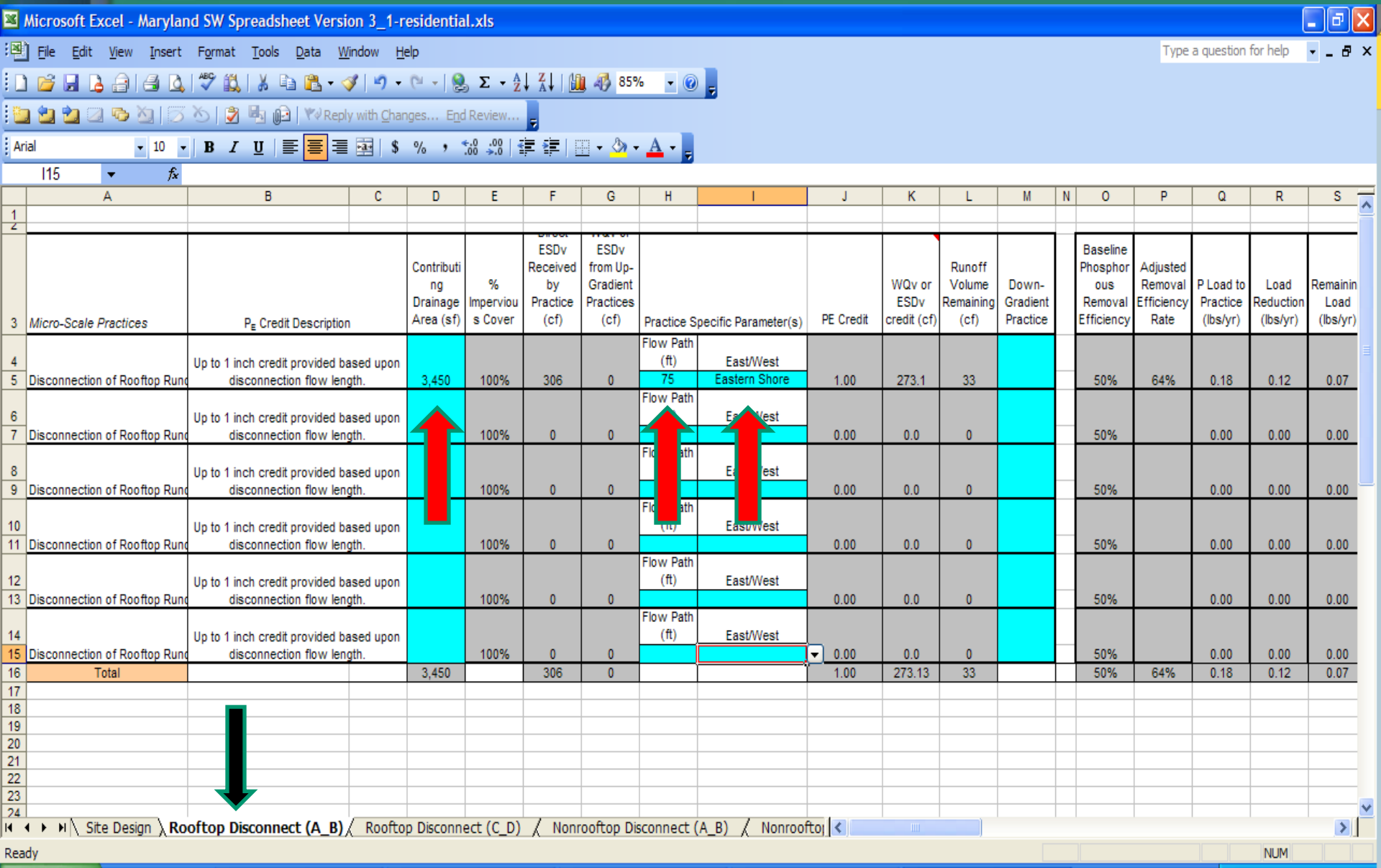
Bored Yet?


STOP LOOKING SO BORED ALL THE TIME!
LIFE ISN'T THAT BAD...THE LEAST YOU CAN DO IS LOOK INTERESTED!
LOOKING BORED IS EASIER ON THE EYES..
SCHULZ
12-20-10

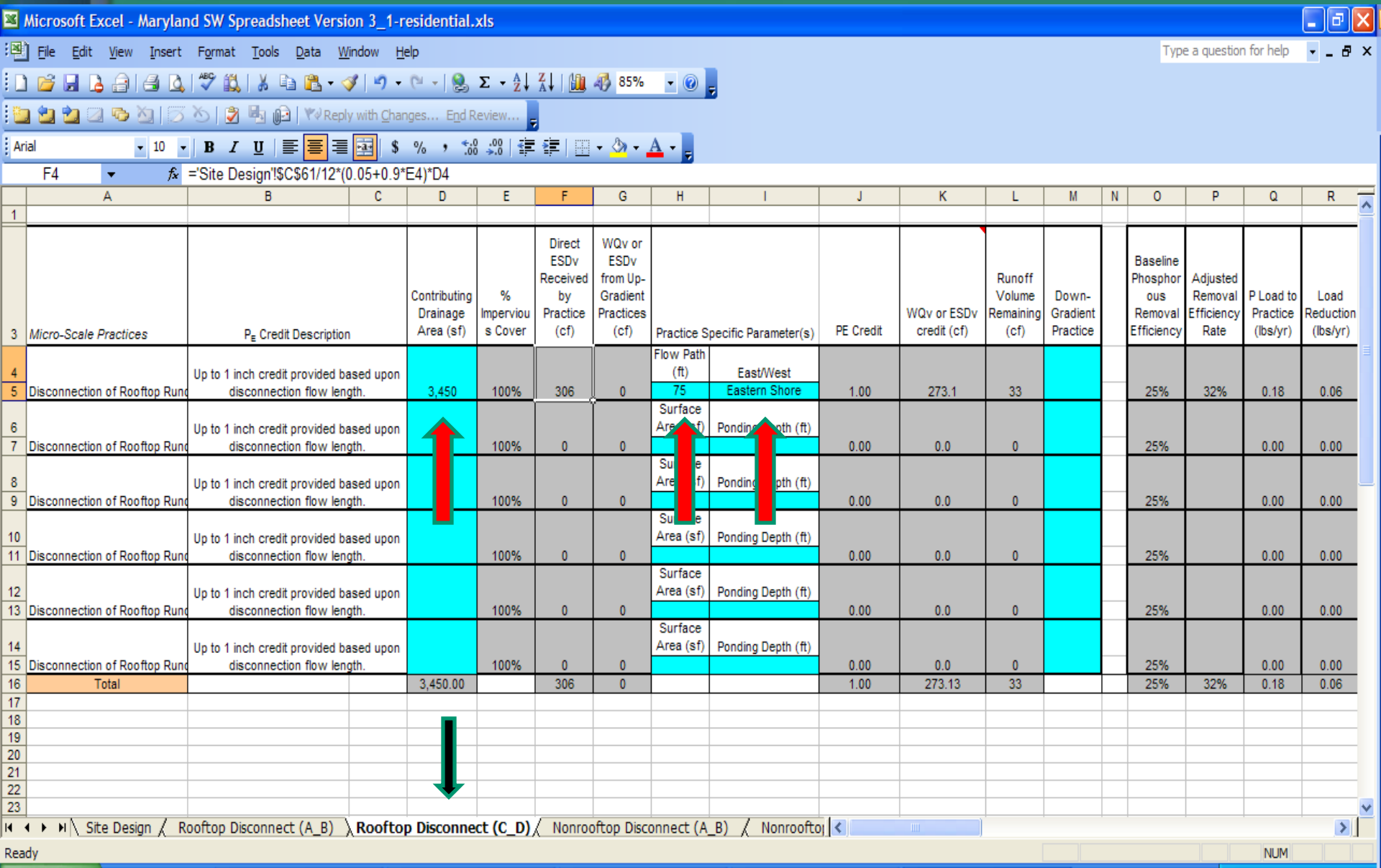
Figure 2. Concept Design Layout of ESD Practices and Techniques



Step 5 - Rooftop Disconnect (A/B)



Step 5 - Rooftop Disconnect (C/D)



Microsoft Excel - Maryland SW Spreadsheet Version 3_1-residential.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

Reply with Changes... End Review...

Arial 10

F4 ='Site Design'!C61/12*(0.05+0.9*E4)*D4

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1																		
3	*Micro-Scale Practices*	P_E Credit Description		Contributing Drainage Area (sf)	% Impervious Cover	Direct ESDv Received by Practice (cf)	WQv or ESDv from Up-Gradient Practices (cf)	Practice Specific Parameter(s)		PE Credit	WQv or ESDv credit (cf)	Runoff Volume Remaining (cf)	Down-Gradient Practice		Baseline Phosphorous Removal Efficiency	Adjusted Removal Efficiency Rate	P Load to Practice (lbs/yr)	Load Reduction (lbs/yr)
4								Flow Path (ft)	East/West									
5	Disconnection of Rooftop Runo	Up to 1 inch credit provided based upon disconnection flow length.		3,450	100%	306	0	75	Eastern Shore	1.00	273.1	33			25%	32%	0.18	0.06
6								Surface Area (sf)	Ponding Depth (ft)									
7	Disconnection of Rooftop Runo	Up to 1 inch credit provided based upon disconnection flow length.			100%	0	0			0.00	0.0	0			25%		0.00	0.00
8								Surface Area (sf)	Ponding Depth (ft)									
9	Disconnection of Rooftop Runo	Up to 1 inch credit provided based upon disconnection flow length.			100%	0	0			0.00	0.0	0			25%		0.00	0.00
10								Surface Area (sf)	Ponding Depth (ft)									
11	Disconnection of Rooftop Runo	Up to 1 inch credit provided based upon disconnection flow length.			100%	0	0			0.00	0.0	0			25%		0.00	0.00
12								Surface Area (sf)	Ponding Depth (ft)									
13	Disconnection of Rooftop Runo	Up to 1 inch credit provided based upon disconnection flow length.			100%	0	0			0.00	0.0	0			25%		0.00	0.00
14								Surface Area (sf)	Ponding Depth (ft)									
15	Disconnection of Rooftop Runo	Up to 1 inch credit provided based upon disconnection flow length.			100%	0	0			0.00	0.0	0			25%		0.00	0.00
16	Total			3,450.00		306	0			1.00	273.13	33			25%	32%	0.18	0.06
17																		
18																		
19																		
20																		
21																		
22																		
23																		

Site Design | Rooftop Disconnect (A_B) | **Rooftop Disconnect (C_D)** | Nonrooftop Disconnect (A_B) | Nonrooftop

Ready NUM

Step 5 – Non-Structural Practices

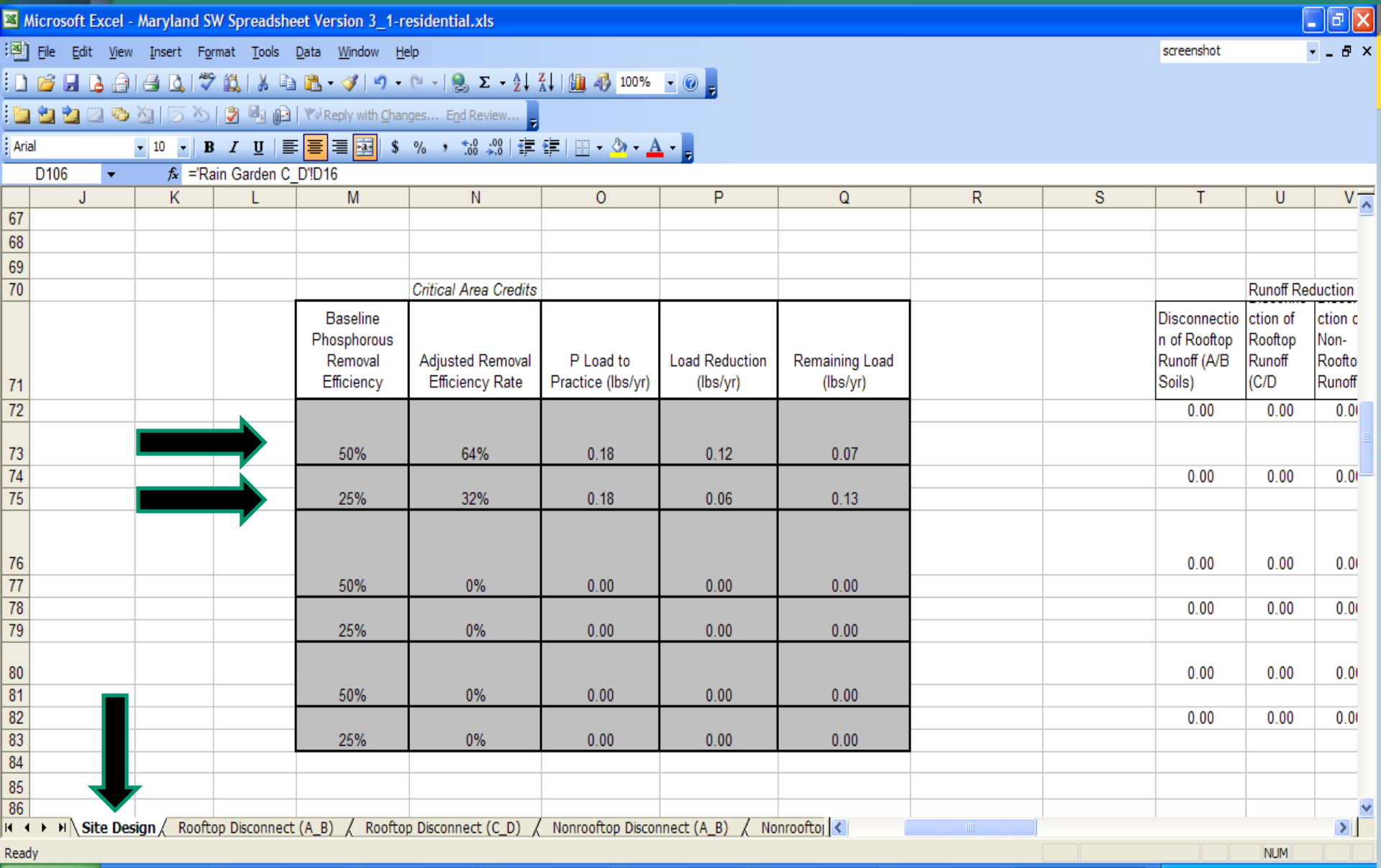
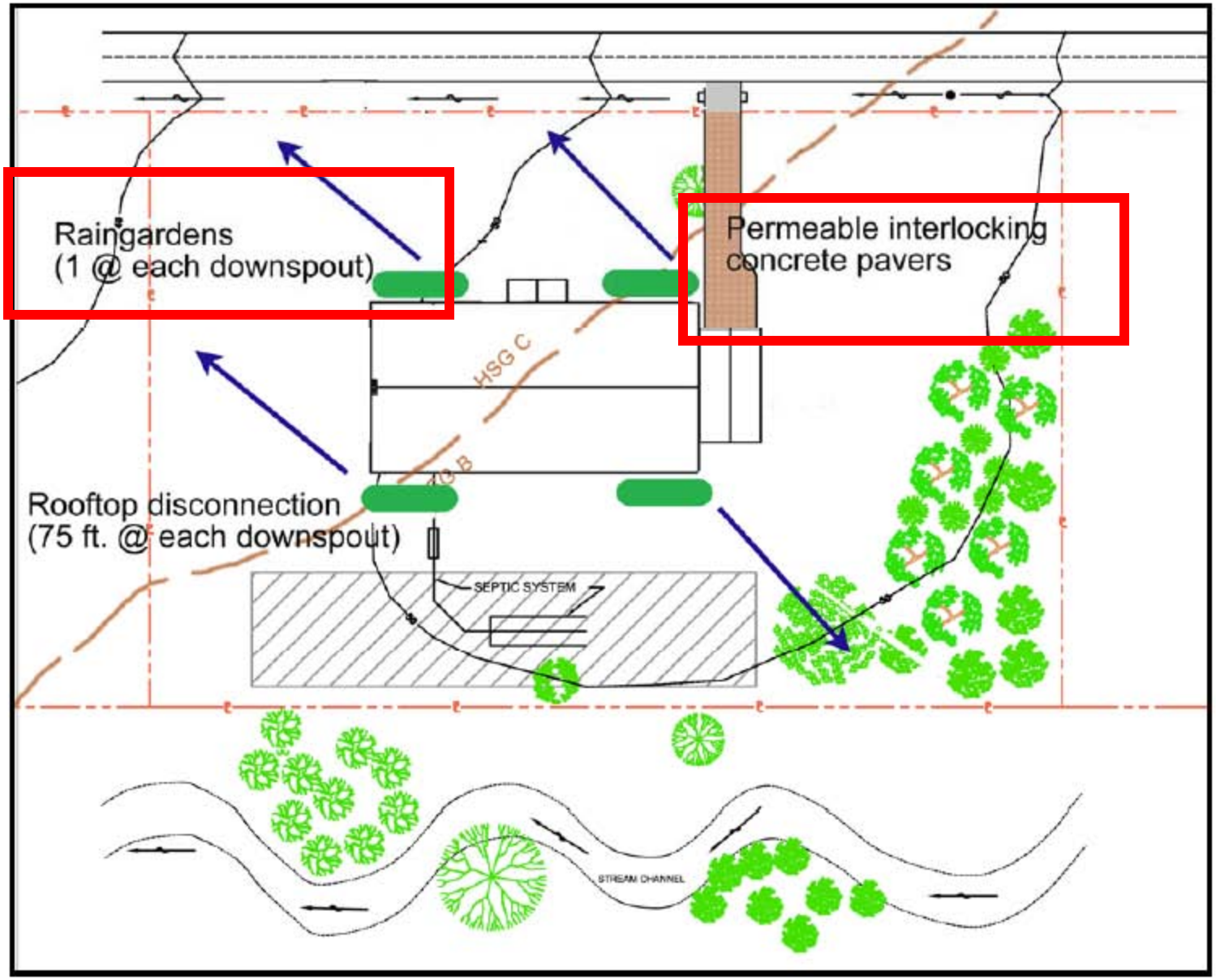
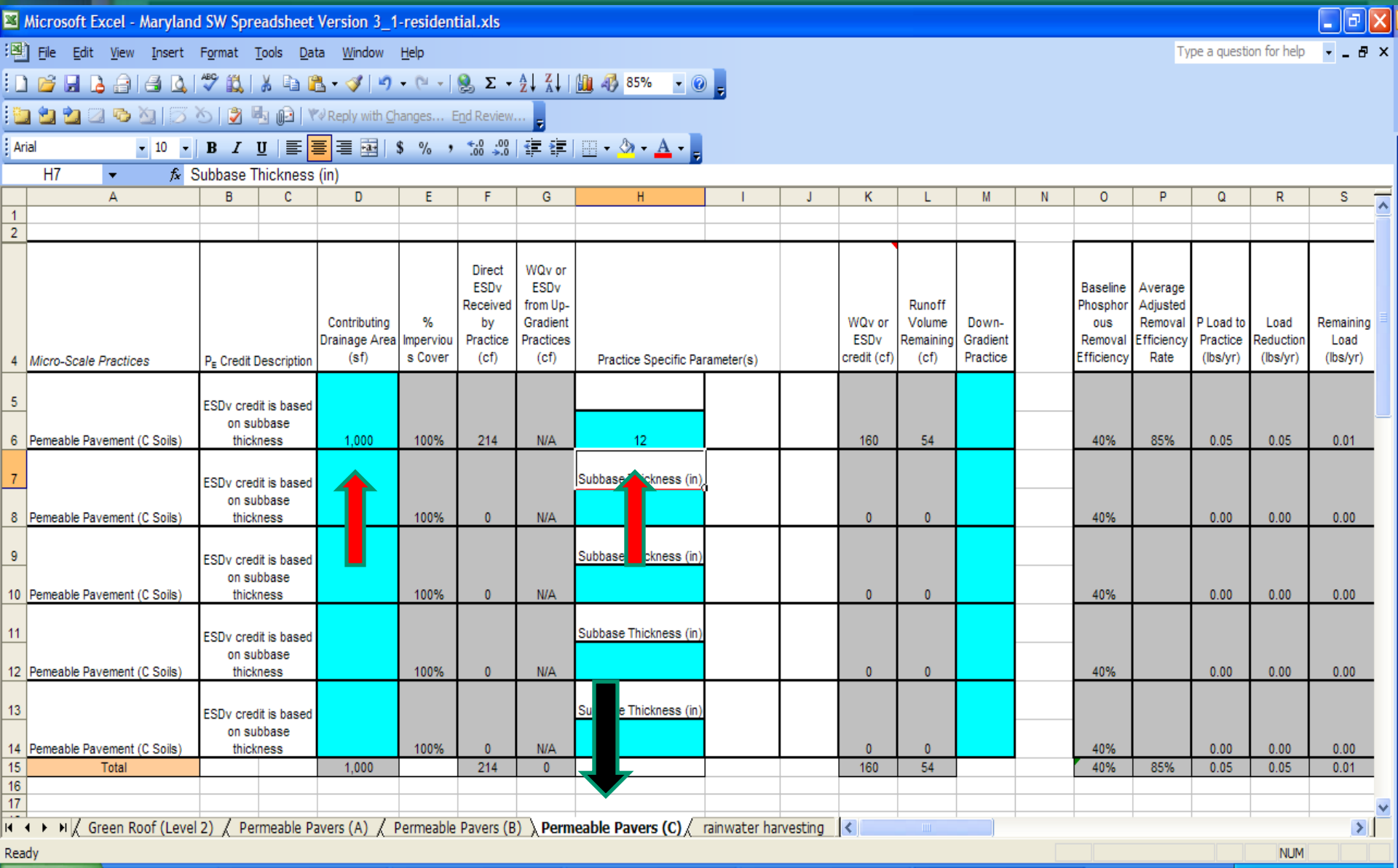


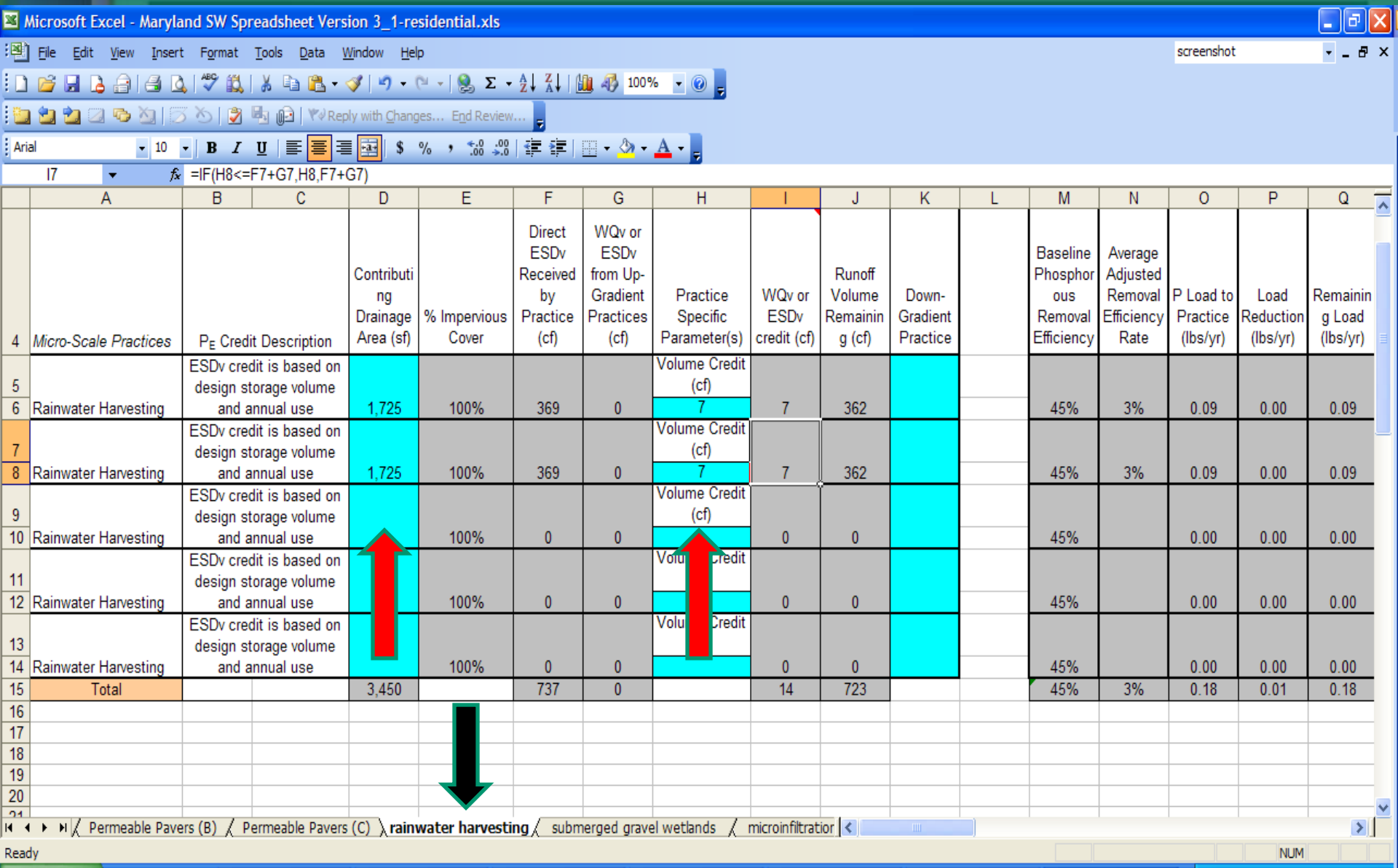
Figure 2. Concept Design Layout of ESD Practices and Techniques



Step 6-Permeable Pavement (C)

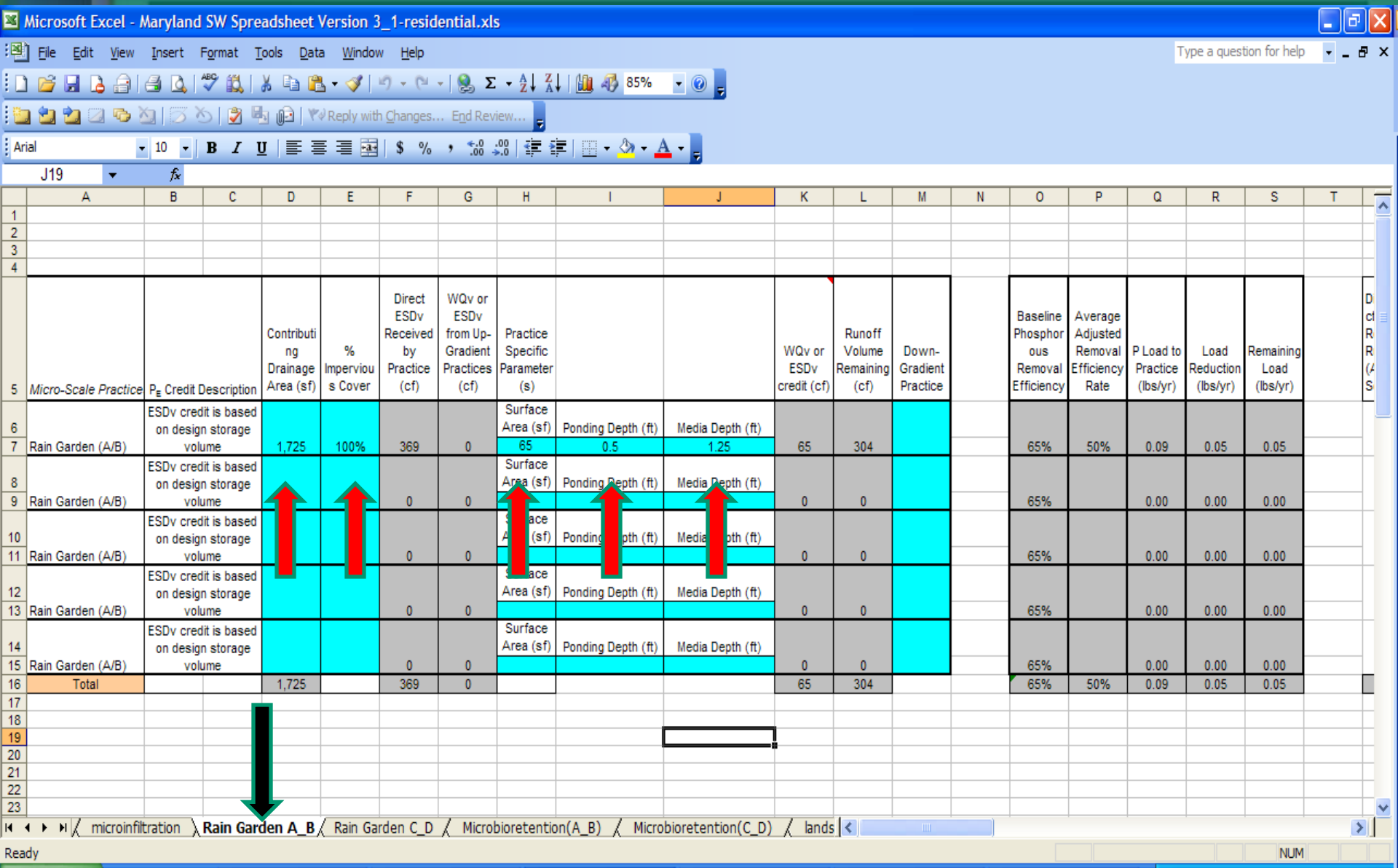


Step 6- Rainwater Harvesting

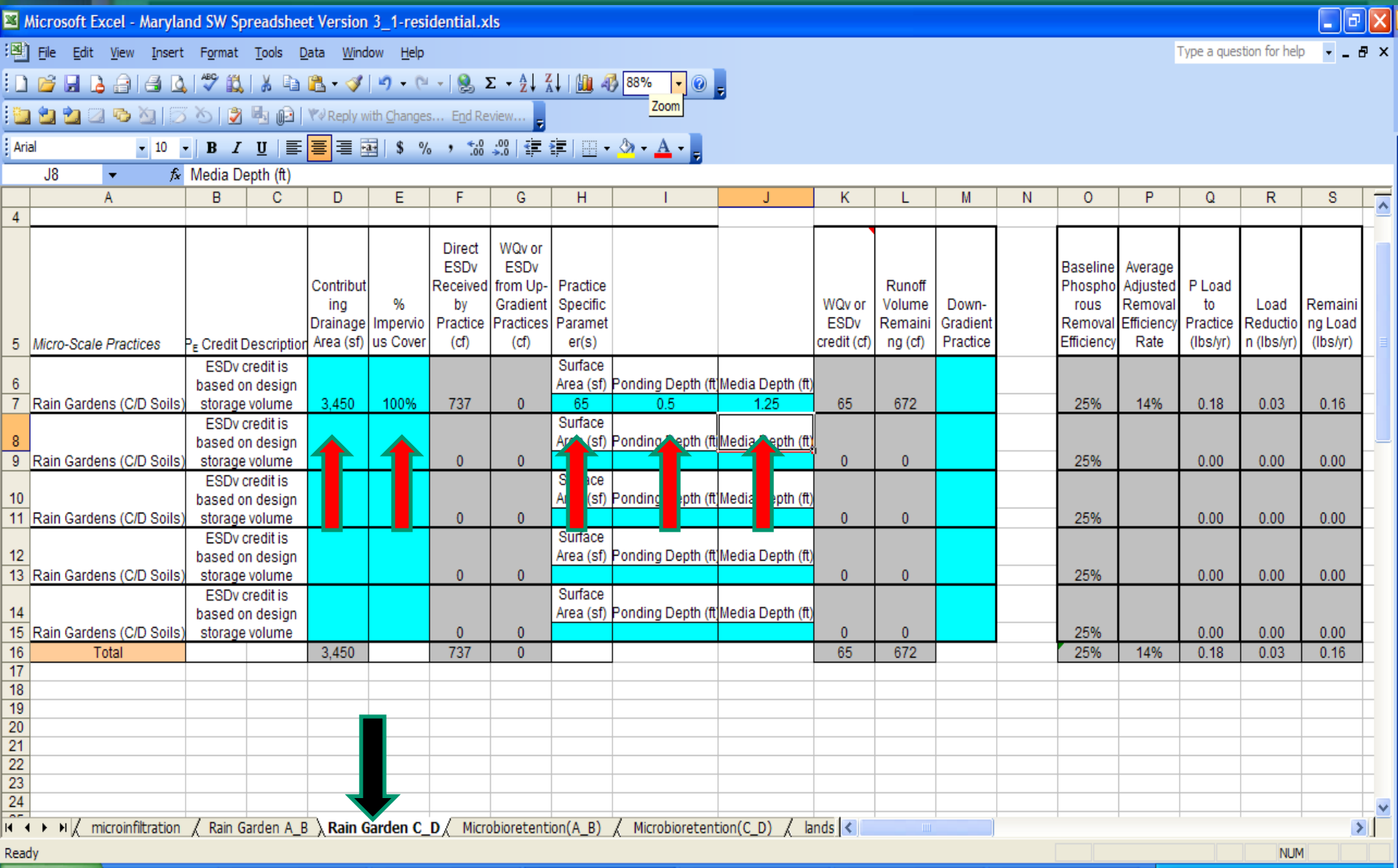


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
4	*Micro-Scale Practices*	P_E Credit Description		Contributing Drainage Area (sf)	% Impervious Cover	Direct ESDv Received by Practice (cf)	WQv or ESDv from Up-Gradient Practices (cf)	Practice Specific Parameter(s)	WQv or ESDv credit (cf)	Runoff Volume Remaining (cf)	Down-Gradient Practice		Baseline Phosphorous Removal Efficiency	Average Adjusted Removal Efficiency Rate	P Load to Practice (lbs/yr)	Load Reduction (lbs/yr)	Remaining Load (lbs/yr)
5		ESDv credit is based on design storage volume						Volume Credit (cf)									
6	Rainwater Harvesting	and annual use		1,725	100%	369	0	7	7	362			45%	3%	0.09	0.00	0.09
7		ESDv credit is based on design storage volume						Volume Credit (cf)									
8	Rainwater Harvesting	and annual use		1,725	100%	369	0	7	7	362			45%	3%	0.09	0.00	0.09
9		ESDv credit is based on design storage volume						Volume Credit (cf)									
10	Rainwater Harvesting	and annual use			100%	0	0		0	0			45%		0.00	0.00	0.00
11		ESDv credit is based on design storage volume						Volu Credit									
12	Rainwater Harvesting	and annual use			100%	0	0		0	0			45%		0.00	0.00	0.00
13		ESDv credit is based on design storage volume						Volu Credit									
14	Rainwater Harvesting	and annual use			100%	0	0		0	0			45%		0.00	0.00	0.00
15	Total			3,450		737	0		14	723			45%	3%	0.18	0.01	0.18
16																	
17																	
18																	
19																	
20																	

Step 6-Rain Gardens (A/B)

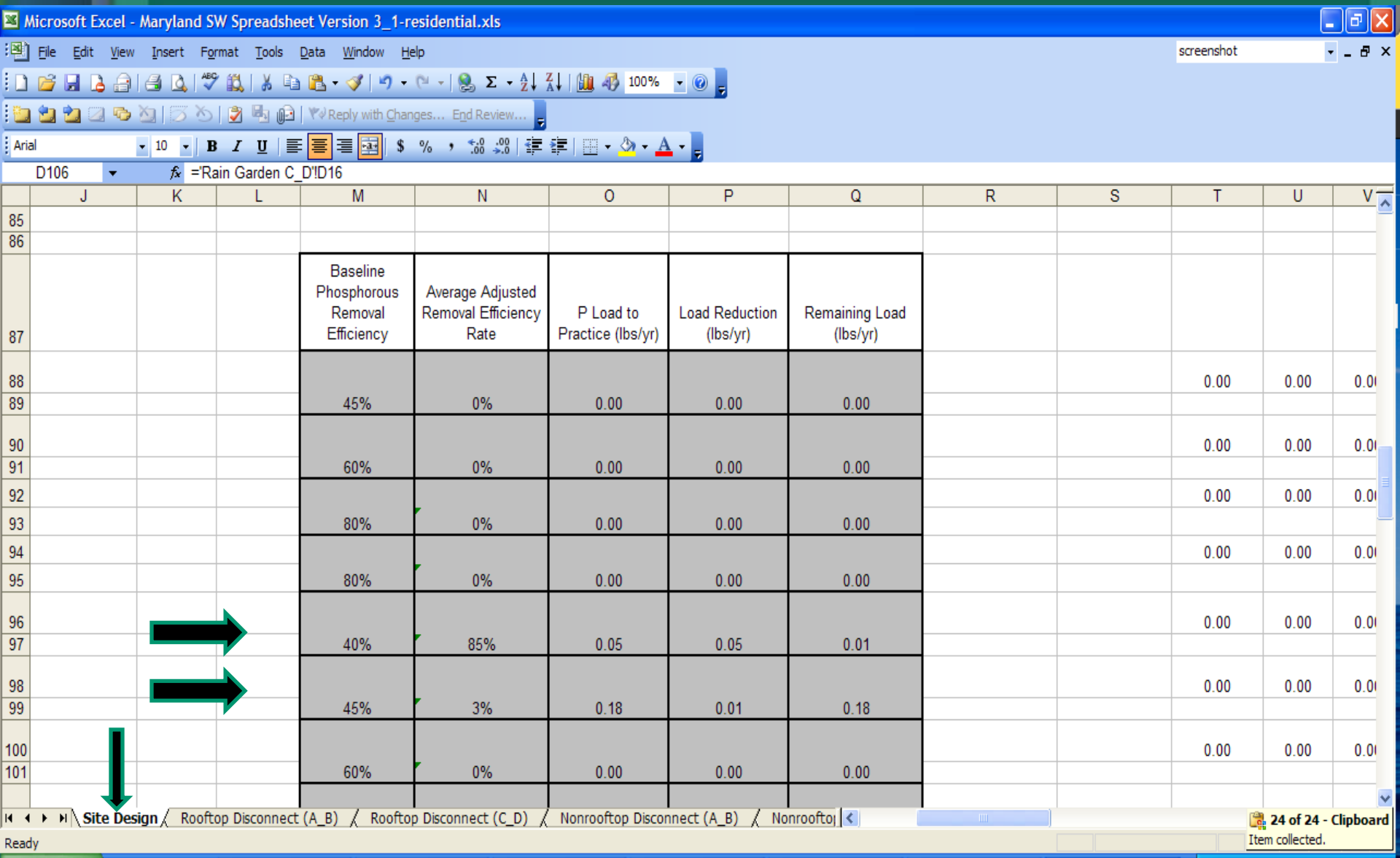


Step 6-Rain Gardens (C/D)

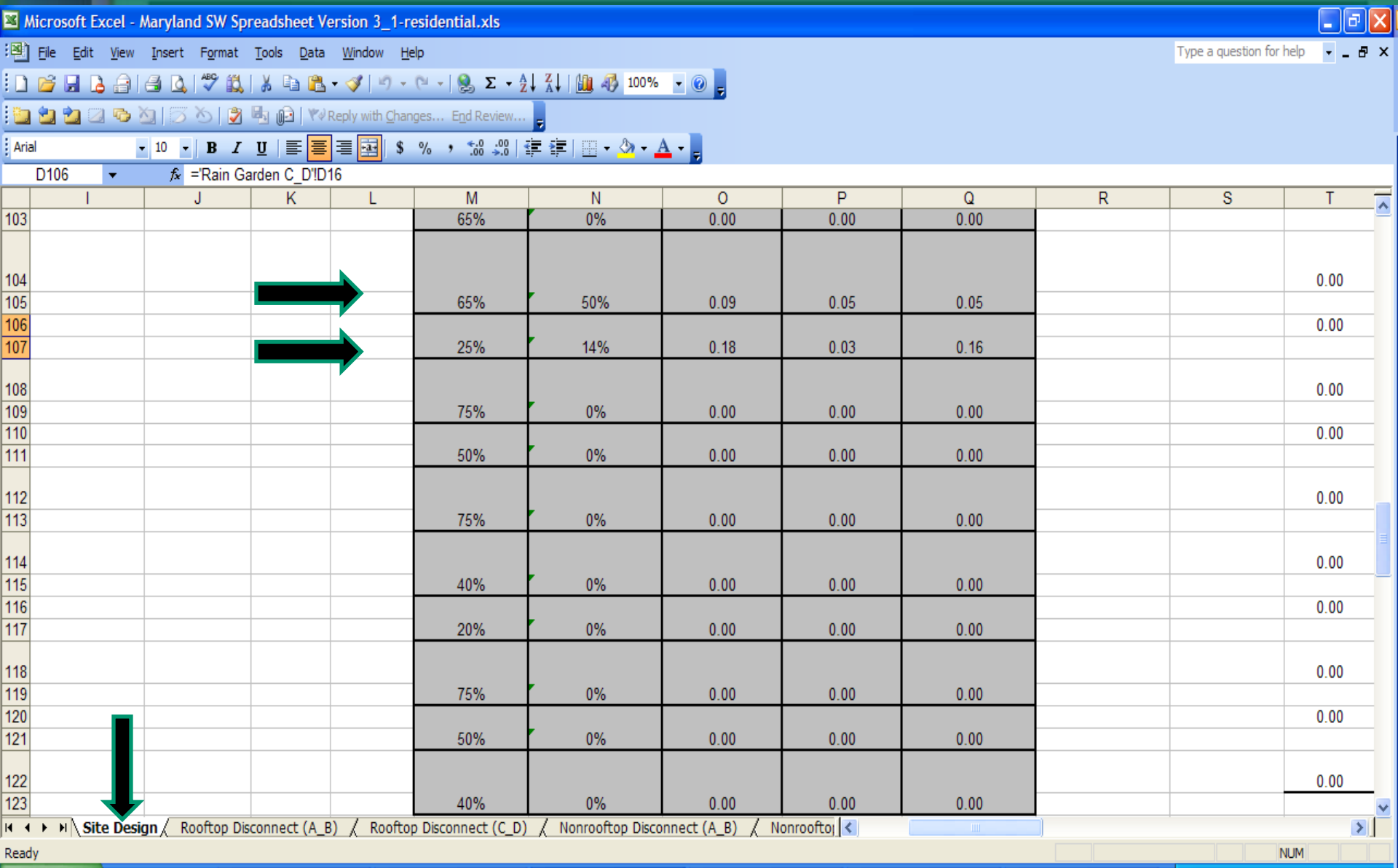


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
4																			
5	*Micro-Scale Practices*	P_E Credit Description		Contributing Drainage Area (sf)	% Impervious Cover	Direct ESDv Received by Practice (cf)	WQv or ESDv from Up-Gradient Practices (cf)	Practice Specific Parameter(s)			WQv or ESDv credit (cf)	Runoff Volume Remaining (cf)	Down-Gradient Practice		Baseline Phosphorous Removal Efficiency	Average Adjusted Removal Efficiency Rate	P Load to Practice (lbs/yr)	Load Reduction (lbs/yr)	Remaining Load (lbs/yr)
6		ESDv credit is based on design						Surface Area (sf)	Ponding Depth (ft)	Media Depth (ft)									
7	Rain Gardens (C/D Soils)	storage volume		3,450	100%	737	0	65	0.5	1.25	65	672			25%	14%	0.18	0.03	0.16
8		ESDv credit is based on design						Surface Area (sf)	Ponding Depth (ft)	Media Depth (ft)									
9	Rain Gardens (C/D Soils)	storage volume				0	0				0	0			25%		0.00	0.00	0.00
10		ESDv credit is based on design						Surface Area (sf)	Ponding Depth (ft)	Media Depth (ft)									
11	Rain Gardens (C/D Soils)	storage volume				0	0				0	0			25%		0.00	0.00	0.00
12		ESDv credit is based on design						Surface Area (sf)	Ponding Depth (ft)	Media Depth (ft)									
13	Rain Gardens (C/D Soils)	storage volume				0	0				0	0			25%		0.00	0.00	0.00
14		ESDv credit is based on design						Surface Area (sf)	Ponding Depth (ft)	Media Depth (ft)									
15	Rain Gardens (C/D Soils)	storage volume				0	0				0	0			25%		0.00	0.00	0.00
16	Total			3,450		737	0				65	672			25%	14%	0.18	0.03	0.16
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			

Step 6-Micro-scale Practices

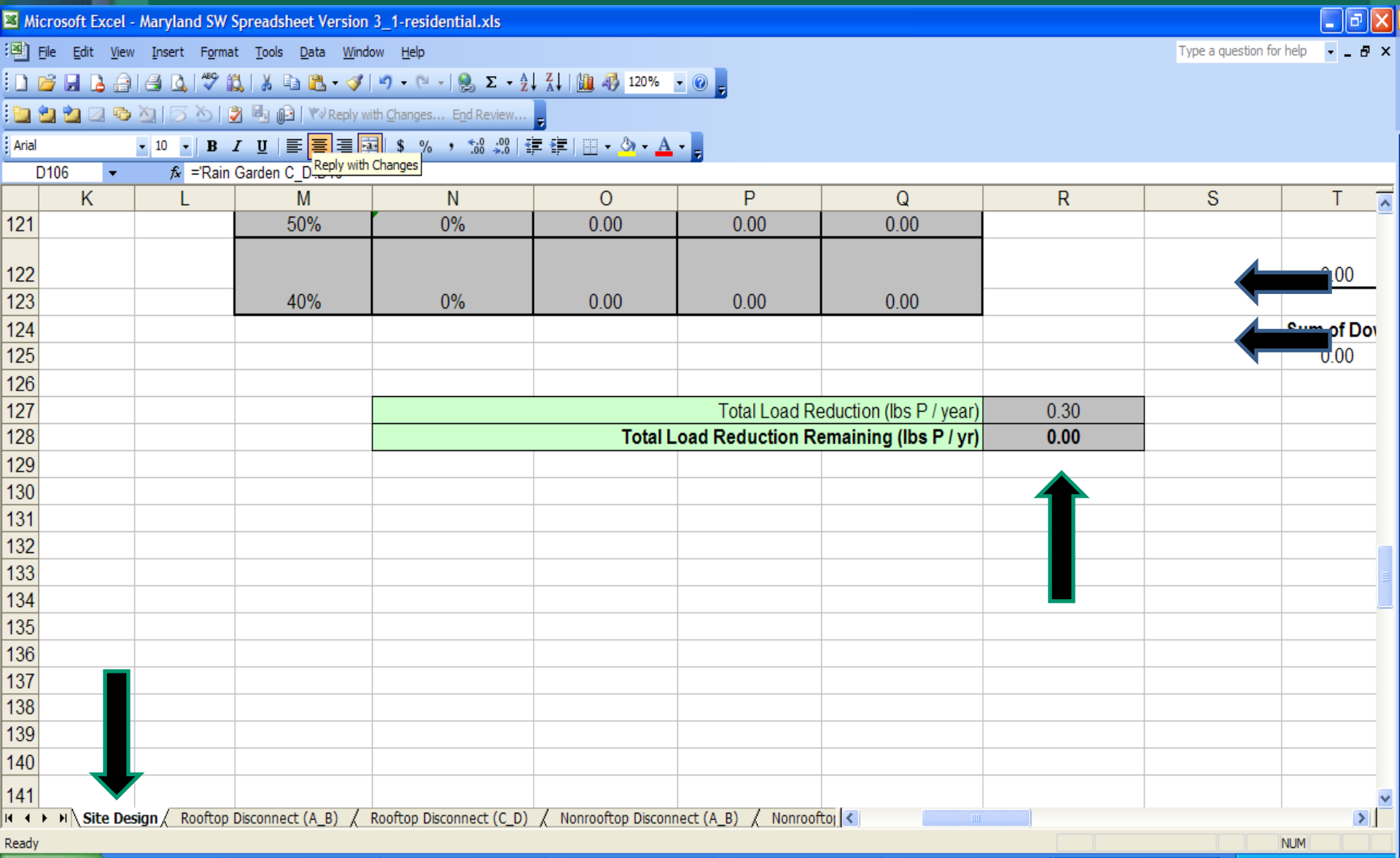


Step 6-Micro-scale Practices

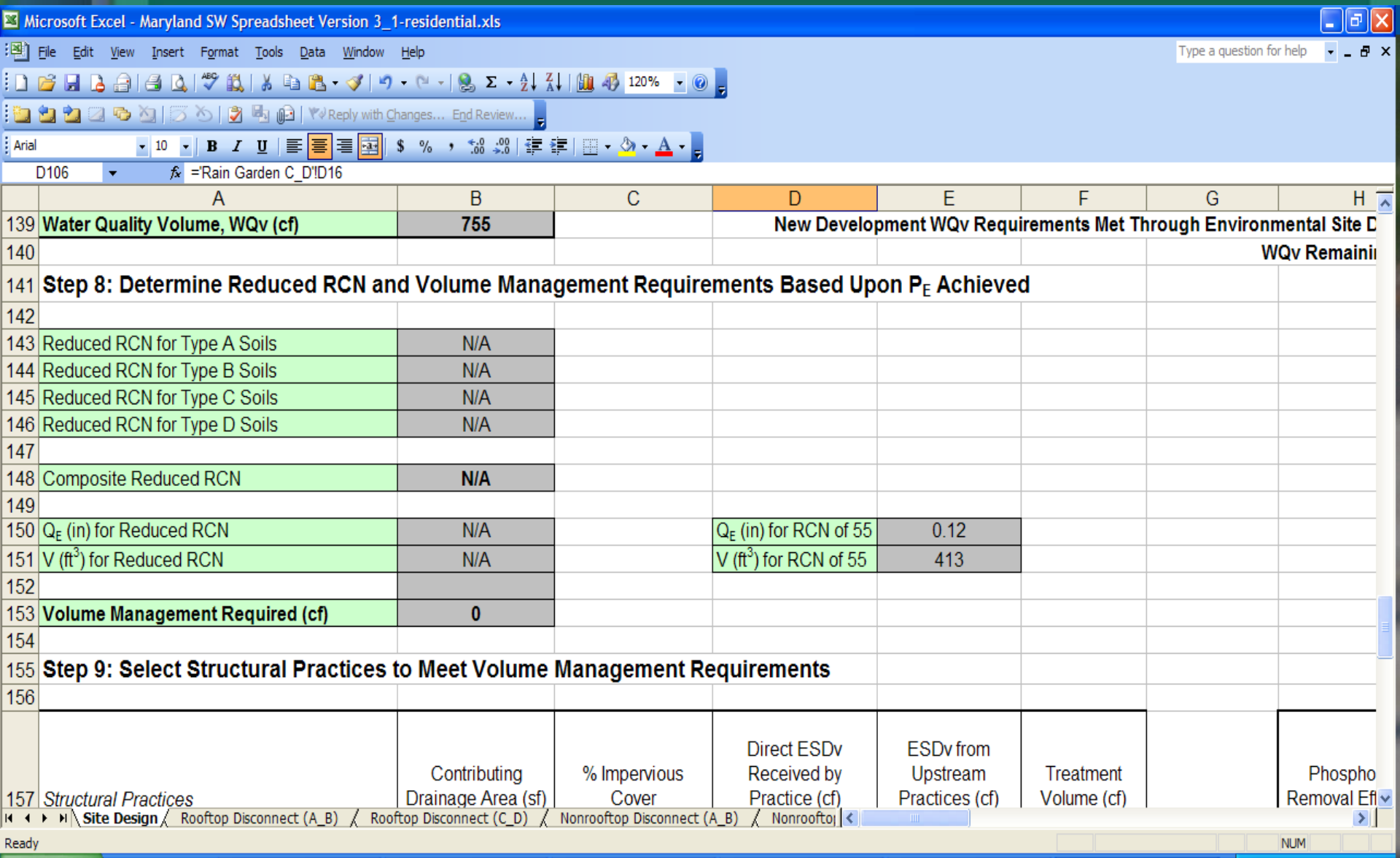


	M	N	O	P	Q	T
103	65%	0%	0.00	0.00	0.00	
104						0.00
105	65%	50%	0.09	0.05	0.05	
106						0.00
107	25%	14%	0.18	0.03	0.16	
108						0.00
109	75%	0%	0.00	0.00	0.00	
110						0.00
111	50%	0%	0.00	0.00	0.00	
112						0.00
113	75%	0%	0.00	0.00	0.00	
114						0.00
115	40%	0%	0.00	0.00	0.00	
116						0.00
117	20%	0%	0.00	0.00	0.00	
118						0.00
119	75%	0%	0.00	0.00	0.00	
120						0.00
121	50%	0%	0.00	0.00	0.00	
122						0.00
123	40%	0%	0.00	0.00	0.00	

Step 7 –Compliance Check

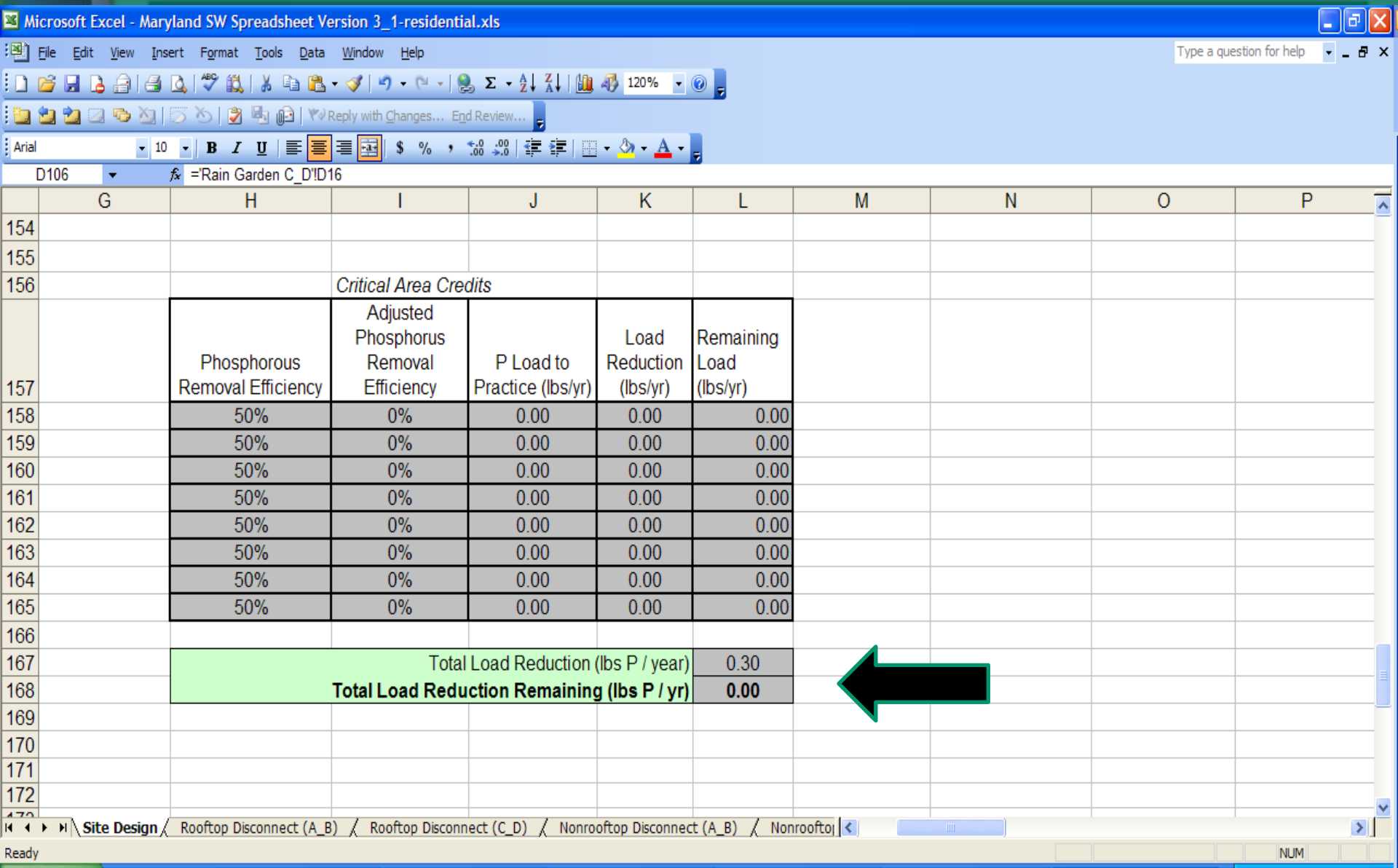


Step 8 –Reduced RCN



	A	B	C	D	E	F	G	H
139	**Water Quality Volume, WQv (cf)**	**755**						**New Development WQv Requirements Met Through Environmental Site D**
140								**WQv Remaini**
141	**Step 8: Determine Reduced RCN and Volume Management Requirements Based Upon P_E Achieved**							
142								
143	Reduced RCN for Type A Soils	N/A						
144	Reduced RCN for Type B Soils	N/A						
145	Reduced RCN for Type C Soils	N/A						
146	Reduced RCN for Type D Soils	N/A						
147								
148	Composite Reduced RCN	**N/A**						
149								
150	Q_E (in) for Reduced RCN	N/A		Q_E (in) for RCN of 55	0.12			
151	V (ft^3) for Reduced RCN	N/A		V (ft^3) for RCN of 55	413			
152								
153	**Volume Management Required (cf)**	**0**						
154								
155	**Step 9: Select Structural Practices to Meet Volume Management Requirements**							
156								
157	*Structural Practices*	Contributing Drainage Area (sf)	% Impervious Cover	Direct ESDv Received by Practice (cf)	ESDv from Upstream Practices (cf)	Treatment Volume (cf)		Phospho Removal Ef

Step 9 –Structural Practices



Critical Area Credits

Phosphorous Removal Efficiency	Adjusted Phosphorus Removal Efficiency	P Load to Practice (lbs/yr)	Load Reduction (lbs/yr)	Remaining Load (lbs/yr)
50%	0%	0.00	0.00	0.00
50%	0%	0.00	0.00	0.00
50%	0%	0.00	0.00	0.00
50%	0%	0.00	0.00	0.00
50%	0%	0.00	0.00	0.00
50%	0%	0.00	0.00	0.00
50%	0%	0.00	0.00	0.00
50%	0%	0.00	0.00	0.00

Total Load Reduction (lbs P / year)	0.30
Total Load Reduction Remaining (lbs P / yr)	**0.00**

Summary of Example

- MDE and Critical Area ESD met in this case
- If Critical Area ESD was not met, other options can be used:
  - Use BMPs with higher phosphorus removal rates
  - Plantings
  - Fee in Lieu
  - Additional Best Management Practices

We're Looking For Feedback!

- Critical Area staff met with a handful of local stormwater reviewers
  - Mostly positive feedback
  - Some minor tweaks to the spreadsheet considered
- Looking for more feedback from YOU!
- Email comments to nkelly@dnr.state.md.us

Questions?

Next Steps

- Collect comments and suggestions from stakeholders
- Finalize current draft of guidance document & spreadsheet
- Continue working on guidance for projects of less than 5000 sq. ft.
- Draft new regulations– potentially incorporating guidance by reference
- Regulatory process

Regulatory Process

- Once new regulations are drafted, they will be distributed for an informal review by the local jurisdictions
- A vote of the Critical Area Commission is required to publish the regulations as draft in the Maryland Register
- Once public comment period is over, another vote is required to publish the regulations as final

Look for updates:
www.dnr.state.md.us/criticalarea/