SUSTAIN MODELING STATUS/SCHEDULE FOR COMPLETION

- Draft Green Infrastructure model run complete for Newaukum Urban case study
    - Example below includes porous pavement BMP for roads

Optimum solution included 1,000 bioretention units and 300 porous pavement units…and no rain barrels. Total cost about $5 million to achieve a ~60% reduction in High Pulse Count.

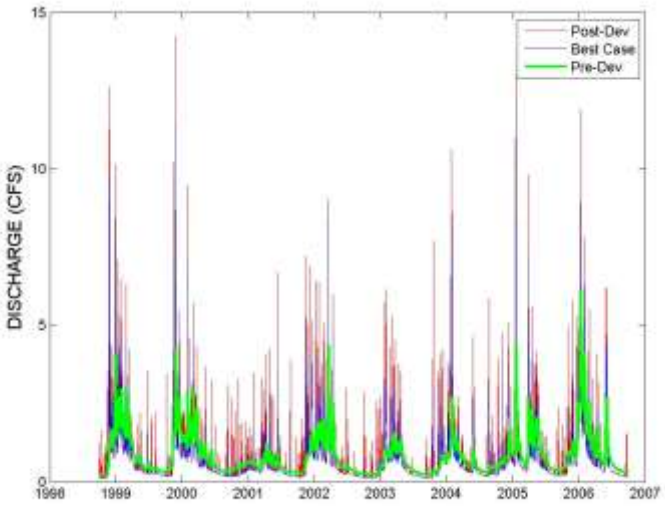

Figure above shows the SUSTAIN daily average flow predictions for existing conditions (Post-Dev), forested conditions (Pre-Dev) and an optimum scenario (Best-Case).

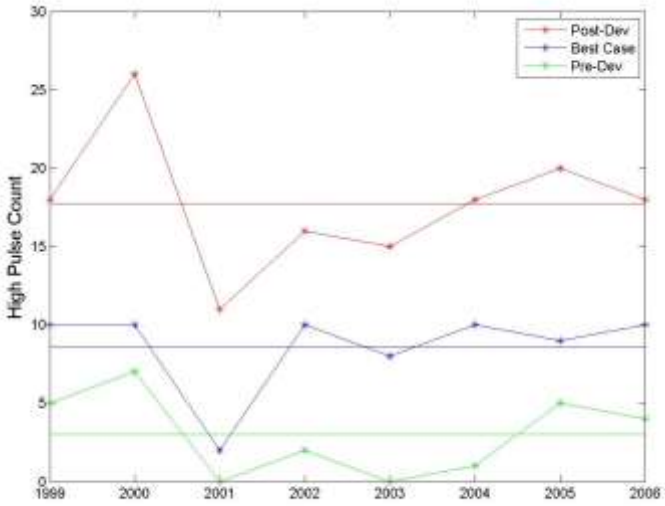

Figure above shows the SUSTAIN High Pulse Count predictions for existing conditions (Post-Dev), forested conditions (Pre-Dev) and an optimum scenario (Best-Case). [Note: Figure revised after meeting. Found and corrected error in High Pulse Count calculation. I still need to check with Tetra Tech regarding differences between SUSTAIN and my own calculation of High Pulse Count.]

Schedule for wrapping up Newaukum case study contingent on establishing BMP treatments, design, and cost estimates to be used in SUSTAIN model.

	Rain Barrel	Bioretention	Porous Pavement
	~70 gal	100 ft^2	120 ft^2
Total Cost (User Defined)	$15/cu ft	$45/sq ft	$15/sq ft
Design Drainage Area	0.005 ac (215 ft^2)	0.1 ac (4,356 ft^2)	120 ft^2
Infiltration Model (Green-Ampt, Horton, Holtan) [INFILTM]	na	0 (Green-Ampt)	0 (Green-Ampt)
Pollutant Removal Method (1st Order Decay, K-C' method – Kadlec and Knight Method) [POLREMM]	0 (1st Order Decay)	0 (1st Order Decay)	0 (1st Order Decay)
Pollutant Routing Method (Completely Mixed, CSTRs in series) [POLROTM]	1 (Completely Mixed)	1 (Completely Mixed)	1 (Completely Mixed)
Dimensions Tab			
Number of Units	Optimize	Optimize	Optimize
Diameter/Length (ft) **[LENGTH]**	2 (diameter)	20 (length)	20 (length)
Width (ft) **[WIDTH]**	na	5	6
Exit Type **[EXITTYPE]**	2 (0.61)	2 (0.61)	na
Orifice Diamter (in) **[DIAM]**	0.75	0	na
Orifice Height (Ho, ft) **[OHEIGHT]**	0.2	0	na
Release Type **[RELEASETYPE]**	2 (Rain Barrel)	3 (Others)	3 (Others)
Number of dry days **[DDAYS]**	1	na	na
Number of People **[PEOPLE]**	na	na	na
Weir Type **[WEIRTYPE]**	2 (Triangular)	1 (Rectangular)	1 (Rectangular)
Weir Height (Hw, ft) **[WEIRH]**	3	0.5 (steep slopes) 1.0 (flat)	0.1
Rectangular Weir Crest Width (B, ft) **[WEIRW]**	Na	5 (not limiting)	6
Triangular Weir Angle (theta, deg) **[THETA]**	100	na	na
Substrate Properties Tab			
Depth of Soil (Ds, ft) **[SDEPTH]**	na	1.5	4
Soil Porosity (0-1) **[POROSITY]**	na	0.4	0.4
Soil Field Capacity **[FCAPACITY]**	na	0.25	0.3
Soil Wilting Point **[WPOINT]**	na	0.15	0.15
Initial Surface Water Depth (ft) **[WATDEP_I]**	na	0	0

	Rain Barrel	Bioretention	Porous Pavement
	~70 gal	100 ft^2	120 ft^2
Initial Moisture Content (0-1) **[THETA_I]**	na	0.15	0.15
Saturated Soil Infiltration (in/hr) **[FINFILT]**	na	3	10
ET Multiplier **[ET_MULT]**	na	1	1
Route Infiltration to Aquifer	na	No(?)	No (?)
Consider Underdrain Structure **[UNDSWITCH]**	na	1 (Yes)	1 (Yes)
Storage Depth (Du, ft) **[UNDDEPTH]**	na	0.5	1
Media Void Fraction (0-1) **[UNDVOID]**	na	0.5	0.5
Background Infiltration (in/hr) **[UNDINFILT]**	na	1	1
Route Underdrain/Outlet to:	Rain Garden	Outlet/Wet Pond	Outlet/Wet Pond
Infiltration Parameters Tab			
Green-Amp Infiltration Parameters			
Suction Head (in) **[SUCTION]**	na	3.0	3.0
Initial Deficit (fraction) **[IMDMAX]**	na	0.3	0.3
Horton Infiltration Parameters			
Maximum Infiltration (in/hr) **[MAXINFILT]**	na	na	na
Decay Constant (1/hr) **[DECAYCONS]**	na	na	na
Drying Time (day) **[DRYTIME]**	na	na	na
Maximum Volume (in) **[MAXVOLUME]**	na	na	na
Holtan Infiltration Parameters			
Vegetative Parameter A **[AVEG]**	na	na	na
Monthly Growth Index **[GIi]**	na	na	na
Water Quality Parameters Tab (for TSS)			
Decay factor (1/hr) **[QUALDECAY1]**	0.01	0.01	0.01
K (ft/yr) **[QUALK1]**	3280	3280	3280
C* (mg/L) **[QUALC*1]**	12	12	12
Underdrain Removal Rate (fraction, 0-1) **[QUALPCTREM1]**	na	0.1	0.1

REVIEW OF ASSUMPTIONS BEING MADE

- BMP treatment train
- BMP design details
- BMP cost estimates (to include annualized cost of design, construction, and O&M?)
- Need wet pond design to develop Green + Gray BMP treatment train

Next Steps?

- Help with BMP design and costs for use in SUSTAIN
- SUSTAIN after Newaukum urban? Where to next?