

APPENDIX E

VTDEC MODEL RUN SUMMARY 11-10-11



Dave Conger <dconger@dubois-king.com>

(no subject)

1 message

Schelley, Emily <Emily.Schelley@state.vt.us>

Tue, Dec 20, 2011 at 4:22 PM

To: Dave Conger <dconger@dubois-king.com>

Dave,

I did some more runs playing around with the sizing of the I-89 pond, seeing how close I can get to 4.125% reduction (which if we assume 80% compliance gets us to 3.3%). As I mentioned, I had previously done a run completely removing the pond in question, just in order to satisfy my own curiosity, which ended up going too far. So I started reducing the volume on the pond, but it wasn't doing a lot to change the flow numbers, mostly because the outlets were staying the same size. So, I played around with a couple other sizing of the ponds, and finally got close to our target number on my last iteration. I must stress that I am not really qualified to be designing ponds, and I was just playing with numbers in HydroCAD. You can see my runs and the results on the table below. I have attached the HydroCAD file of my best fit pond; I modified it so that the benefit of the upstream BMPs are included.

Modifications to I-89 Pond

Model Run	Q0.3		Q95	
	% Change in flow	% of TMDL target	% Change in flow	% of TMDL target
5th Iteration - Removed I-89 pond	-2.95%	89%	-0.43%	-6%
6th Iteration - I-89 at 50% volume	-4.60%	139%	-0.43%	-6%
7th Iteration - I-89 at 25% volume	-4.60%	139%	-0.43%	-6%
8th Iteration - I-89 at 40%, culvert 12" diameter, weir 20 ft long	-4.47%	135%	-0.43%	-6%
9th Iteration - I-89 at 30% volume, culvert 18" diameter, weir 40 ft long	-4.10%	124%	-0.43%	-6%

I had planned on calling you shortly after I sent this e-mail so we can discuss this a little more fully, but it's closing time here at the state. I am not in the office tomorrow morning, but I'll plan on calling you in the afternoon.

Emily Schelley

Environmental Analyst

Stormwater Section

NEW PHONE: [802-338-4898](tel:802-338-4898)Physical Address:



Dave Conger <dconger@dubois-king.com>

RE: Williston FRP

1 message

Schelley, Emily <Emily.Schelley@state.vt.us>

Tue, Dec 20, 2011 at 9:07 AM

To: Dave Conger <dconger@dubois-king.com>

Dave,

Sorry about the mix up about the VTrans areas; I was reading the map wrong. I re-ran the scenario, reinstating VTrans areas A&B @ 80% volume, and taking out VTrans areas C&D. I've added it as the "4th iteration" on the chart below. The flow reduction was the same as the previous run.

Model Run	Q0.3		Q95	
	% Change in flow	% of TMDL target	% Change in flow	% of TMDL target
Current Development	-0.29%	9%	-0.47%	-6%
1st Iteration – Upgrades	-2.01%	61%	-0.47%	-6%
2nd Iteration – Upgrades	-2.03%	62%	-0.47%	-6%
3rd Iteration - Proposed BMPs for MS4 owned properties	-5.26%	159%	-0.43%	-6%
4th Iteration - Potential BMP Evaluation DRAFT - 11-21-2011	-4.84%	147%	-0.43%	-6%

~Emily

From: Dave Conger [mailto:dconger@dubois-king.com]

Sent: Monday, December 19, 2011 2:22 PM

To: Schelley, Emily

Subject: Re: Williston FRP

Emily

Thanks for the model run.

See my responses to your questions below

Thanks

David

On Thu, Dec 15, 2011 at 12:50 PM, Schelley, Emily <Emily.Schelley@state.vt.us> wrote:

Dave,

I went ahead and ran this scenario because it was simple to do while I was looking over the table. The resulting reduction was 4.8%, including all the upgrades to the permitted systems. If we are assuming an 80% compliance rate, we should be aiming for 4.125% reduction and by these numbers, we have a little ways left to go. As to what is next to be cut, that is largely up to you guys, but I have a couple of notes:

- The removal of VTrans median area east of Oak Hill (VTrans areas A & B from the drainage areas you sent) probably didn't have much an effect on the flow, as these areas are treated again downstream in the I89 North area pond. **The BMP to remove from the model should be VTrans areas B & C. A&B is the BMPs described as b/t exit 12 and the rest area on the table. I understand that this will have less affect to the FRP numbers, but we actually want to keep A&B since there will be construction by VTrans and the town at this location to make both work.**
- By the same token, I was wondering if you had considered that some of the upgrades to permitted systems were draining into the I89 North Area pond. If not it was probably a bit oversized anyways. It might be able to be down sized still further without taking a big hit to the flow reduction. **If we get the VTrans median areas switched back, then this Town north area pond is where we would want to make further reductions. Not sure by how much to get us near the 4.8% number though.**

As far as adjusting the flow downwards, I don't have a good guess as to what exactly you should cut. And just so you know, I am perfectly happy to do runs. Obviously, I don't want to do 100 iterations, but this run took me about 30 minutes in all, with about 10 minutes of that being actual work.

From: Dave Conger [mailto:dconger@dubois-king.com]
Sent: Tuesday, December 13, 2011 2:49 PM
To: Schelley, Emily
Subject: Re: Williston FRP

Sorry about that. This is the table for you to look at.

On Tue, Dec 13, 2011 at 2:16 PM, Schelley, Emily <Emily.Schelley@state.vt.us> wrote:

Dave,

Are you sure that you sent the right attachment? You sent me a pdf'd map of the town/VTrans drainage

areas.

Emily Schelley

Environmental Analyst

Stormwater Section

NEW PHONE: [802-338-4898](tel:802-338-4898)

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Winooski, VT, 05404

Mailing Address:

103 S Main Street - Bldg 10 North

Waterbury, VT 05671

From: Dave Conger [mailto:dconger@dubois-king.com]

Sent: Tuesday, December 13, 2011 2:00 PM

To: Schelley, Emily

Subject: Williston FRP

Emily

Here were the reductions or removals that we had in mind for the Town and VTrans BMPs. I did try to keep in mind the location of each BMP in the watershed so as not to reduce too much in the areas with higher impact to Allen Brook flows.

In either case, the reductions incorporate a factor of safety for the expired permits as well as the Town/VTrans sites. For the Town/VTrans sites this probably isn't as necessary since we will control what is built at each location.

Let me know what you think.

Thanks again

David Conger P.E.

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FROM: Emily Schelley, VTDEC
TO: Town of Williston, VTrans, Dubois & King
CC: Padraic Monks & Jenn Callahan, VTDEC
DATE: November 10, 2011

SUBJECT: Modeling Results from Upgraded and Proposed BMPs in the Allen Brook Watershed

The draft Vermont Municipal Separate Storm Sewer System Permit (MS4 permit) requires MS4 communities that drain to waters that are impaired for stormwater runoff to develop a Flow Restoration Plan (FRP) for these waters. In anticipation of this requirement, the Town of Williston and the Vermont Agency of Transportation (VTrans) have been working in cooperation to identify best management practices (BMPs) that will achieve compliance with the flow targets set forth in the Total Maximum Daily Load (TMDL) for Allen Brook.

TMDL Targets

The flow targets (Table 1) were set forth in the *Total Maximum Daily Load to Address Biological Impairment for Allen Brook* (September 2008).

Table 1: TMDL Targets

TMDL Target (Waste Load Allocation including future growth)	Q0.3	Q95
	-3.30%	7.40%

TMDL targets are expressed in % change in flow. To assess the effects of various management options on watershed flow, the Vermont Department of Environmental Conservation (VTDEC) has developed a watershed model for the Allen Brook watershed using the Vermont Best Management Practice Decision Support System (BMPDSS). For modeling purposes, percent reductions in flow are compared to the flow under base conditions, which for the purpose of this exercise are considered to be the conditions of the watershed prior to the adoption of the 2002 Vermont Stormwater Management Manual. Therefore, any BMPs that were built prior to the adoption of the manual are included in the base scenario.

Model Runs

In addition to a “base scenario” model run, VTDEC has updated the Allen Brook watershed model to reflect development and BMPs that have been built since the adoption of the 2002 manual. The hydrologic benefits from these BMPs are counted as credit towards the TMDL targets.

In anticipation of the of the new requirements under the proposed MS4 permit, Dubois & King Consulting Engineers, representing the Town of Williston and VTrans, provided VTDEC with preliminary designs for upgraded and new BMPs. VTDEC then added these treatment practices to the BMPDSS to assess the change in flows (Table 2).

Table 2: BMPDSS Modeling Results

Model Run	Q0.3		Q95	
	% Change in flow	% of TMDL target	% Change in flow	% of TMDL target
Current Development	-0.29%	9%	-0.47%	-6%
1st Iteration – Upgrades	-2.01%	61%	-0.47%	-6%
2nd Iteration – Upgrades	-2.03%	62%	-0.47%	-6%
3rd Iteration - Proposed BMPs for MS4 owned properties	-5.26%	159%	-0.43%	-6%

Explanation of Model Runs:

- Current Development: This model scenario represents the current development of the watershed, based on best available information.
- 1st Iteration – Upgrades: This model iteration includes upgrades to expired permitted systems, as presented to representatives of the Town of Williston, VTrans, and Dubois & King at an October 21st, 2011 meeting at the Town of Williston offices.
- 2nd Iteration – Upgrades: It was discovered that the expired permits along Hurricane Lane in Williston were not included in the 1st iteration of upgrades modeling. This model run included upgrades to 5 additional BMPs.
- 3rd Iteration – Proposed BMPs for MS4 owned properties: As the previous model iterations failed to meet the TMDL targets, Dubois & King provided additional BMPs for inclusion in the BMPDSS, located on land controlled by the Town of Williston or VTrans.