

# TOWN OF SOUTH BETHANY

## Minutes – Canal Water Quality Committee Meeting August 12, 2014 (1:00 PM) at the South Bethany Town Hall

- **Meeting Called to Order At 1:00 PM** – Members present were George Junkin, Dave Wilson, Jim Gross, Jack Whitney, Frank McNeice, Ron Wuslich. Also present was Jim Gross, Member of Council.
- **Discussion of Diffuser Performance** – Dave Wilson Presented hand held meter readings from the Rt. 1 bulkheads for Petherton and Brandywine for comparison to assess the effectiveness of the diffusers.

### Effect of Diffusers on DO at East Petherton Canal Bulkhead

August 12, 2014

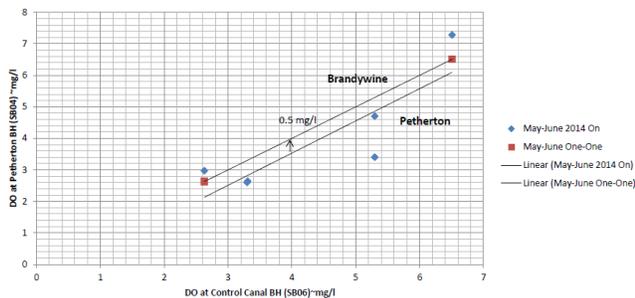
Dave Wilson

### Results to Date for Diffuser Operation in Petherton Canal for Bulkhead Sites

- Diffusers installed at 6 locations along Petherton on April 26, 2013
- DO monitored at E end Bulkhead (SB04) and mid canal to west of diffusers (SB05)
- DO monitored at E end of Brandywine (SB06) canal adjacent to Petherton as a control
- Monitoring by boat also conducted in summers of 2013 and 2014
- Diffusers ran continuously to June 29, 2014
- Diffusers turned off for month of July 2014 to assess effectiveness
- 48 data points, 23 with diffusers off and 25 with diffusers on at bulkhead locations during summers of 2012, 2013, and 2014
- All data at approximately 1 ft depth

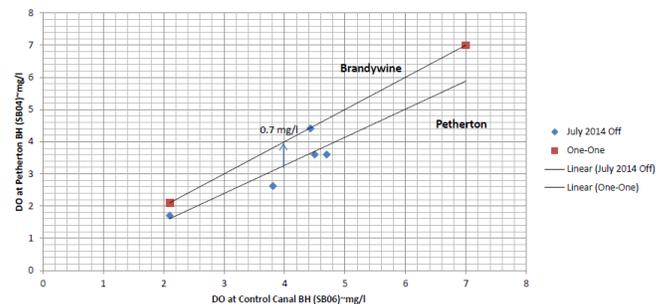
### Petherton DO Lower than Control Canal in 6 Weeks Before Diffusers Turned Off

#### DO Comparison at Bulkhead with Diffusers On May-June 2014 (6 data points)

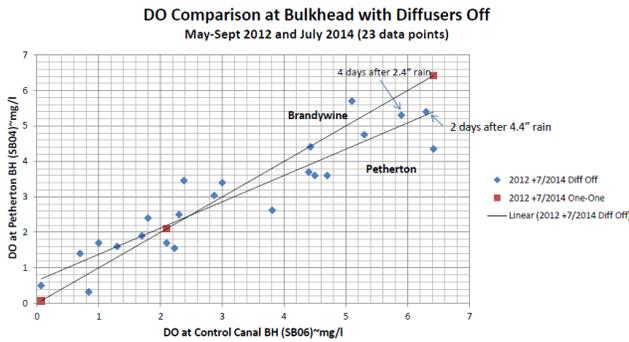


### Loss in DO Increased Slightly When Diffusers Turned Off in July

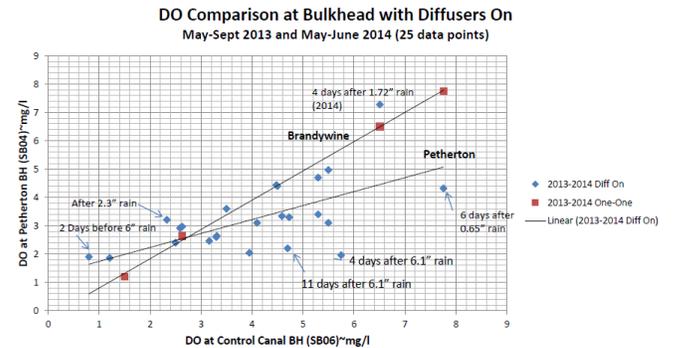
#### Comparison at Bulkhead with Diffusers Off For July 2014 (5 data points)



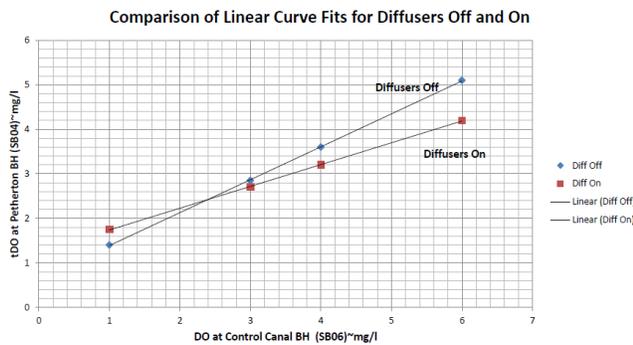
Multi Year Data Show Petherton Bulkhead DO Higher than Brandywine at Low DO levels with Diffusers Off



Rain Events in 2013 Increased Scatter with Diffusers On



Data To Date Show Diffusers Slightly Increase DO at Low Levels and Reduce DO at High Levels Bulkhead Locations



Comparative Observations at Bulkheads

- Petherton has poor circulation based on
  - Amount of more debris accumulation at east bulkhead than Brandywine
  - Bacteria count substantially higher than Brandywine
  - Substantially higher Jellyfish count in region of bulkhead than Brandywine
- Consider moving first diffuser closer to bulkhead

Today's Results Show Some Promise

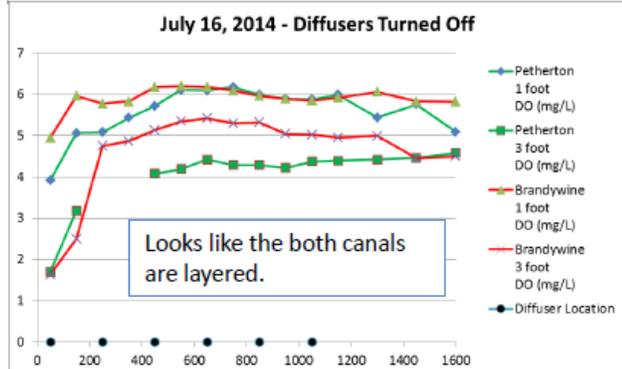
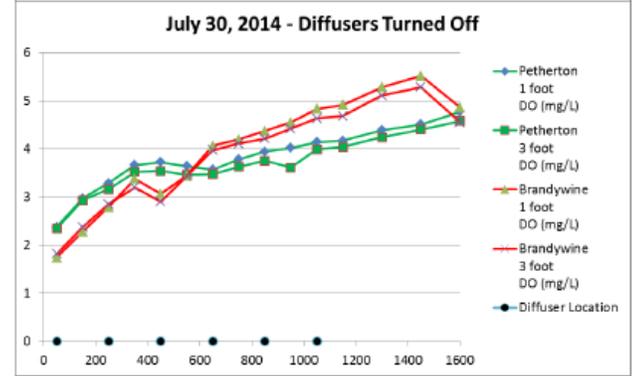
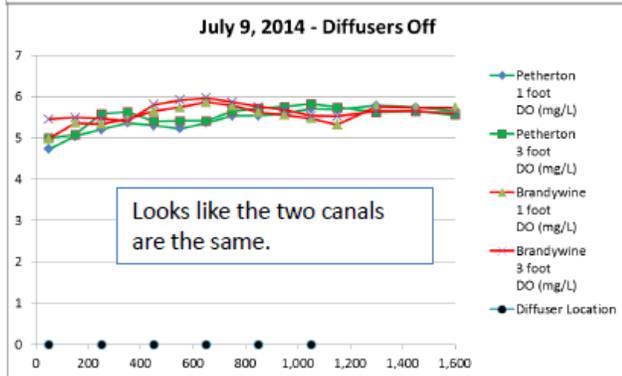
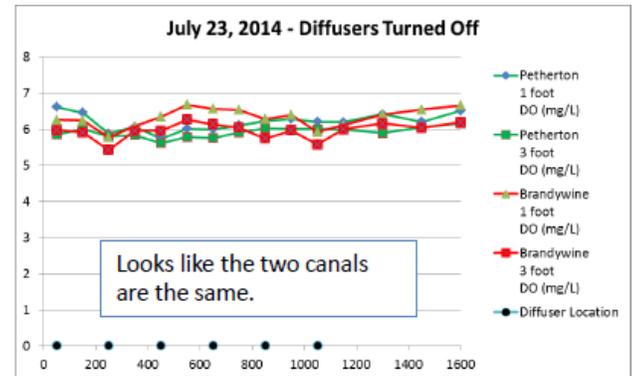
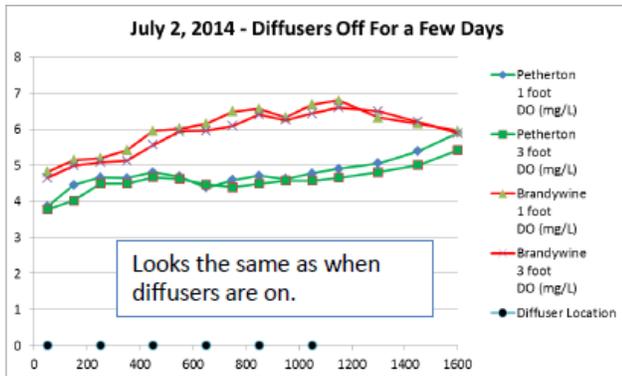
- DO measured at Anchorage, Petherton, and Brandywine bulkheads (adjacent canals) on August 12, 2014:
  - 0.23 mg/l at Anchorage
  - 2.33 mg/l at Petherton (diffusers on)
  - 0.61 mg/l at Brandywine
- Milky brown color at Anchorage and Brandywine, but not at Petherton

Conclusions from Bulkhead Data to Date

- Diffusers slightly increase DO at very low levels (<2.5 mg/l)
- Diffusers reduce DO at high levels (>4 mg/l)
- Rain events seem to negatively affect DO with diffusers on
- Need to look at continuous monitor 2013 data to track effect of rain events on Petherton DO (1.5" on July 11 and 4.6" on July 12 vs 1.72" on May 16 2014)
- Consider moving first diffuser closer to east bulkhead

The slide above (Today's Results Show ...) shows what the diffusers can really do. The description above, relative to the Anchorage and Brandywine Canals, is what happened in the Russell Canal last year when we had a fish kill. The Petherton Canal that was well stirred by diffusers would not have presented the environment that could cause a fill kill.

George Junkin presented a comparison of the continuous monitors at Petherton and Brandywine for the month of July when the diffusers were turned off.



So what is the conclusion?  
 July 2 says that Brandywine is not a good control. But was it still influenced by the diffusers being on a few days earlier? July 9 and 23 say that Brandywine is a good control.

- The consensus was
  - The Brandywine Canal is probably a reasonable control for the diffuser test.
  - The diffusers tend to cause the DO to be higher in the diffuser canal when the DO levels are low (<2.5mg/L).
  - The diffusers tend to cause the DO to be lower in the diffuser canal when the DO levels are high (>4mg/L).
  - It is speculated that the diffusers do eliminate stratification that could cause fish kills.
  - Since there was not an algal bloom this year, we cannot assess whether the diffusers would cause there to be less algae in the diffuser canal.

- Jack Whitney presented an approach to improve circulation in the canals

**Canal Water Quality Proposal**  
August 12, 2014

It is a well know fact that there are only two reasonable ways that South Bethany can impact and control canal water quality:

1. Control the nutrients going into the canals; and
2. Increase canal circulation.

Control of nutrients into the canals is being addressed with various projects now.

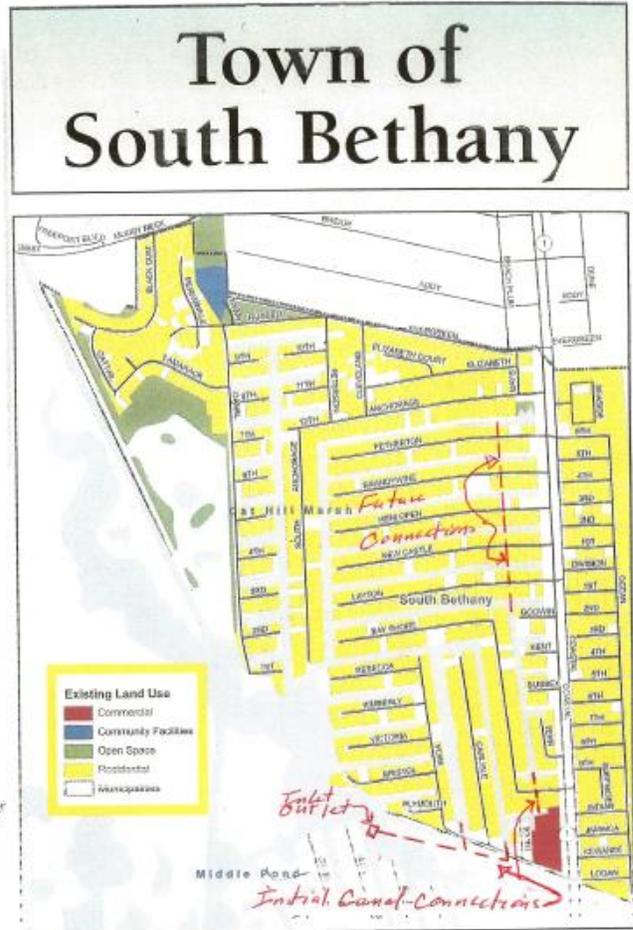
One of the other possible ways to increase circulation of water in the canals (rather than connect these to the Ocean - the tidal pump) would be to construct outfalls at the ends of the Carlyle and York canals and attach these canals to the outside bay area through the use of underground piping. This would dramatically increase the water circulation in these canals.

Depending on the feasibility, this connection to the outside bay could possibly be extended to the highway canal and maybe to the other east west canals which attach to the South Anchorage canal. However, none of this could be accomplish without the design and construction of a canal model, necessary for use as a basis of design for some or all of these connections.

This proposal is to request financial grant (and minimal) Town funds be requested to develop the necessary South Bethany (SB) Canal Model and determination of the feasibility of constructing part or all of the possible canal connections to increase canal circulation.

The benefit of the SB Canal Model would be to provide a tool which can be used to determine the feasibility of constructing part or all of the necessary underground connection to effect additional canal circulation and enhance the water quality of the South Bethany Canals. This would provide a more eco-friendly way of enhancing circulation at a substantially lower cost (without the other associated risks) of a tidal pump.

A map is attached with an indication of possible canal connections that could be made to enhance water quality in many of the South Bethany canals.



There was consensus among all present that the Town should go after a grant to have a mathematical model of the canal system developed to enable analyses be performed to assess the effectiveness that the above approach would have on circulation with or without the use of pumps. George was given an action item to discuss the approach and possible grant opportunities with the CIB.

- Dave Wilson then presented a summary of water quality monitoring activities over the past few years

2014 Highlights To Date	Recommended DO Correlation to Transfer Monitoring Site from SB09 to Bulkhead at S End of Carlisle (17 Data Pts)
<ul style="list-style-type: none"> <li>• Number of sites expanded from 10 to 15               <ul style="list-style-type: none"> <li>- Three continuous monitor sites (Petherton, Brandywine, Anchorage)</li> <li>- Two baseline sites for oyster program in York Canal (S bulkheads of Carlisle and York canals)</li> </ul> </li> <li>• Recommend replacing monitoring at J Whitney house (SB09) with S end of Carlisle canal bulkhead               <ul style="list-style-type: none"> <li>- Use DO correlation developed from data at J Whitney house (SB09) and S end of Carlisle canal at bulkhead</li> <li>- Only site with a deadend on a north-south canal</li> <li>- Site captures stormwater from York Beach Mall</li> </ul> </li> <li>• Recommend discontinuing hand meter sampling at Brandywine and Petherton continuous monitoring sites               <ul style="list-style-type: none"> <li>- Maintain monitoring at Anchorage CM site until end of September</li> </ul> </li> <li>• Result will reduce number of sites from 15 to 12 until end of September, then 11 sites</li> </ul>	

## DO Improvement So Far in 2014 Cooler and Drier To Date

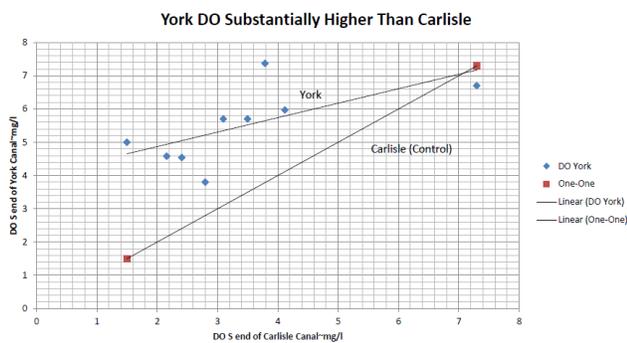
2011-2014 S Bethany Canal DO Summary Number of Mornings DO < 4 mg/l Jun-Aug									
Site	2011		2012		2013		2014*		
	#Sample	#<4mg/l	#Sample	#<4mg/l	#Sample	#<4mg/l	#Sample	#<4mg/l	
SB01 (E. End of Anch)	13	100%	13	85%	13	100%	10	70%	
SB02 (Mid Anchor.)	13	62%	13	62%	13	31%	10	10%	
SB04 (E. End Peth.)	13	92%	13	77%	13	92%	10	70%	
SB05 (Mid Peth.)	13	54%	13	38%	13	8%	10	0%	
SB06 (E End Brandy.)	N/A		13	62%	13	46%	10	40%	
SB07 (Mid Layton)	13	62%	13	46%	13	8%	10	0%	
SB09 (S End of Carl.)	13	85%	13	85%	13	62%	10	40%	
SB10E (E End of Russ)	13	77%	13	85%	13	77%	10	60%	
SB10W (W. End Russ)	13	69%	13	77%	13	62%	10	30%	
SB12 (S End of Jeff.)	13	54%	13	38%	13	0%	10	0%	
Total Rainfall Jun-Aug		14.8"		13.5"		20.19"		6.04"	
Avg Temp Jun-Aug		75.3F		75.7F		73.7F		72.6"	
#Days>90F		17		22		14		7"	
#Wks > 9 sites									
<4mg/l		6		5		0		0	
First Date All Sites <4mg/l		14-Jun		10-Jul		N/A		N/A	

\* Thru Aug 5

## High Bacteria Count in Anchorage and Petherton Even with Reduced Rainfall to Date for 2014

Swimming Standard for Geometric Mean < 35 Colonies/100mL									
Site	8/23/2011 Count		8/26/2012		8/22/2013		7/22/2014		Col/100m
	#Samples	Colonies/100mL	#Samples	Col/100mL	#Samples	Col/100mL	#Samples	L	
SB01 (E End of Anch)	8	86	10	40	9	105	7	313	
SB04 (E End of Peth)	8	189	10	132	9	426	7	301	
SB07 (Mid Layton)	8	34	10	31	9	170	7	88	
SB06 (E End of Brand)	N/A		8	75	9	63	7	12	
Rainfall Apr-Aug		12.84"		21.34"		25.35"		12.0"	

## High DO Baseline for Canal Selected for Oyster Program



## Summary for 2014 Monitoring To Date

- Recommend reducing number of sites from 15 to 12 by end of September
  - Replace Whitney house (SB09) with S end of Carlisle
  - Discontinue hand monitoring at Petherton and Brandywine Continuous Monitor sites
  - Continue monitoring Anchorage CM site until end of September
- DO levels improved over 2013 so far
  - Weather is drier and cooler
  - Deadends of Anchorage, Petherton, and Russell East continue to have lowest DO
- Bacteria levels high at Anchorage and Petherton deadends
  - 9 times recommended level for swimming
  - Despite relatively dry weather to date compared to 2013
- U of Delaware has nutrient analysis for 2012 on the “to do” list
- High DO baseline for canal selected for oyster program

The committee accepted Dave’s recommendation to reduce the number of hand held sites. It was agreed to replace the site behind Jack Whitney’s house (SB09) with the south end of Carlisle Canal and to eliminate readings at the continuous monitors since the hand held meters and continuous monitor data correlated very well; and to continue to monitor the south end of York Canal as a baseline for the oyster program.

### • Oyster Gardens

- There has not been any recent activity relative to oyster gardening.
- Dave Wilson reported that last September EJ picked up one of his two baskets and replaced it with a basket of spat. So he now has one basket with about 2 or 3 years old oysters and 1 basket of one year old oysters
- The CIB has been very busy with the large oyster cage grant for the York Canal and the commercial aquaculture program.

### • Homeowner Education

- There was concern expressed that commercial grass cutters and others were blowing grass clippings into the canal. This is addressed in the Town rules and in one of our

flyers. “If you use a lawn service, it is your responsibility to make sure they know town rules that protect our canals; ‘no property owner shall permit or cause any cuttings or clippings from vegetation to be dropped, blown, or otherwise deposited into the canals.’” We obviously must do more to educate homeowners. It is a difficult task.

- It was suggested that we send out a package of flyers yearly to help educate the homeowners.
- It was mentioned that new homeowners do get a package of flyers in a welcome bag.

- **Ron Wuslich and the Inland Bays Foundation (IBF)**

- Ron discussed the difference between the IBF and the CIB. The CIB educates and dose science things, they cannot advocate, lobby or litigate. The IBF is a 501 c 3 organization that can advocate, lobby and litigate. Both are working to clean up the Inland Bays.
- Ron discussed his meetings with Collin O’Mara and with state legislators.
- He discussed his concern that the Pollution Control Strategy (PCS) published by DNREC was mostly voluntary and was not very effective. He would like to see Delaware focus as much energy on the Inland Bays as they are being forced to focus on the Chesapeake Bay tributaries by EPA.

- **The meeting adjourned at 2:50 PM.**