



**Belleayre Mountain Ski Center UMP-DEIS**

**Appendix P  
Stream S5 Flow & Cathedral Glen  
Brook Aquatic Base flow  
Requirements**

**February, 2012**

Prepared by:

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# **Estimated Flow of Stream S5 (tributary to Cathedral Glen Brook)**

## **Summary**

The spring fed perennial stream S5 originates uphill of the railroad tracks, flows along the railroad tracks, and discharges to the Cathedral Glen Brook below the existing Cathedral Glen dam outlet. Estimated flow in the Stream S5 tributary to Cathedral Glen Brook is 1.0 CFS. The flow was measured on February 9, 2012 adjacent to the abandoned rail road tracks using the Float Method.

## **Description**

The Float Method was used to estimate the flow in the spring stream. The cross sectional area of the stream was measured. The velocity of the water was estimated by timing how long and object took to float over a measured distance. The flow was calculated by multiplying the cross sectional area by the velocity.

A 25 foot section of stream adjacent to the abandoned rail road tracks was used. The stream in this location has a consistent slope, width, and depth. Three cross sectional areas were estimated. Stream depths were measured at six inch intervals. The stream depths and widths were averaged. The floats were released three times at both edges and center of the stream. The float times were averaged.

The flow was measured on Thursday, February 9<sup>th</sup>, 2012. The weather was sunny and the temperature was approximately 40 degrees. There was no snow pack in the watershed other than snow from snowmaking. The last significant precipitation event was on Jan. 26<sup>th</sup>, two weeks prior. The test results should not have been skewed by runoff from previous storm events or snow melt.

Three other stream/spring locations that also discharge to the Cathedral Glen Brook were also observed. A smaller stream discharges below the test location. Another spring drains to the Crystal Brook near the open field and below the dam approximately 500 yards. A larger stream also discharges to Cathedral Glen Brook near the open field and approximately 50 feet above the abandoned pool.

## Results

Cross Section Depth inches	#1	#2	#3
0'	0	0	0
.5'	3	2.25	2.5
1.0'	2.25	2.25	2.75
1.5'	2.5	1.75	2.5
2'	2.75	2.25	2.75
2.5'	2.25	1.5	2
3'	0	1.75	1.25
3.3'		0	0
Avg Depth	1.82	1.47	1.72
Width	3	3.25	3.33
Float Time	13.5	12.5	12.8

Overall Average Depth; 1.67 inches

Average Width; 3.20 feet

Cross Sectional Area; 0.52 feet

Average Float Time; 12.93 seconds

Length of Run; 25 feet

Velocity; 1.93 feet per second

**The flow in the spring fed stream is estimated to be 1.01 cubic feet per second.**

## Photographs



**Location of Float Method Test**



**Stream Headwater/Spring location approx 50 feet above test location**



**Stream downstream of test site. Drains to Cathedral Pond Outlet.**



**Spring located near field**



**Stream near field and approx 50 feet above abandoned swimming pool.**

**Andrew Niles - Re: Cathedral Glen Drainage Area**

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**From:** Mark Woythal  
**To:** Niles, Andrew  
**Date:** 1/9/2012 11:37 AM  
**Subject:** Re: Cathedral Glen Drainage Area  
**CC:** Drumm, Brian; Flaherty, Michael; Jacobson, Roy; Tarrier, Brennan

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Andy,

I'm glad that I can help you with the passby flow issue at Cathedral Glen. The numbers below were developed using the Catskill regression equation that will be part of the Natural Flow Regime Methodology, which is incorporated in the draft TOGS for the instream flow water quality standard. This stream would be considered a Class 1 stream based on its small drainage area and that it holds naturally-spawning brook trout, requiring P50 (monthly flow exceedence values) flows during July through October, and P70 from November through June. The necessary passby flows at the Cathedral Glen dam are in the second row of the table below. The numbers are presented as continuous flows in cubic feet per second. The top row are the actual computations, and the lower row present rounded numbers that are practical from a compliance/operational viewpoint. Please give me a call at your convenience for any additional explanations.

Regards,  
Mark

	J	F	M	A	M	J	J	A	S	O	N	D
Calculated	1.1	0.9	1.6	2.2	1.2	0.6	0.5	0.4	0.4	0.9	1.2	1.4
Operational	1.0	1.0	1.5	2.0	1.0	0.5	0.5	0.5	0.5	1.0	1.0	1.0

>>> Andrew Niles 1/9/2012 9:25 AM >>>  
Mark,

I went over the plans for the Belleayre UMP with Mike Flaherty and Brian Drumm last Friday. There is an existing dam and snowmaking reservoir on the Cathedral Glen stream at belleayre. The drainage area is appx. 0.9 square miles for the dam. I am wondering if you could tell us what the minimum base flow for the stream below the dam would be using the aquatic baseflow method?

thanks - Andy