MEMORANDUM

To: Board of the Hudson River – Black River Regulating District

From: Michael A. Clark, P.E., Executive Director
Robert P. Leslie, General Counsel
Richard J. Ferrara, Chief Fiscal Officer
Robert S. Foltan, P.E., Chief Engineer

CC: File

Date: 07/06/2012 (For the July 10 Board Meeting)

Re: 2012 Hudson River Area / Great Sacandaga Lake Apportionment

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March 2010 Apportionment

In March 2010 the Regulating District Board completed an apportionment of costs based on the benefit derived from the regulation of the Hudson River and the operation of the Great Sacandaga Lake.

The March 2010 apportionment analysis identified the type of benefit derived by operation of Great Sacandaga Lake, the group of beneficiaries which are benefited by operation of the Great Sacandaga Lake, and the methodology by which a proportion of benefit would be determined to establish an assessment of cost to be levied among the members of the beneficiary group.

The Regulating District Board concluded that flood protection is the most direct and clearly defined benefit to the beneficiaries derived from the operation of the District's river regulating reservoirs, and that the 100-year flood should serve as the basis for an apportionment analysis.

Recognizing that flood protection benefits are received by both the properties in the floodplain as well as the greater community, the Board adopted an apportionment among five counties that lie within the flood protected 100-year flood plain. The five counties included Albany, Rensselaer, Saratoga, Washington, and Warren.

The Apportionment utilized a graphic information (GIS) system, *ArcGIS*, to conduct a mapping analysis of the properties in the five counties that derive flood protection benefits from the operation of the Great Sacandaga Lake. The chosen methodology used flood inundation data, New York State Office of Real Property Services[1] data, and United States Geological Survey topographic maps to identify flood protected properties within 100-year flood plain. The District created an inventory of flood protected properties and property values, within each town, city, and village, for each county.

Finally, the apportionment analysis quantified the benefit derived from flood protection based on the value of properties within the 100-year "without GSL" flood plain. Property value data, supplied by ORPTS and the County Assessors and adjusted to "market value" through application of equalization rates, served as the basis for a proportion of benefit derived by each county. A complete account of the apportionment calculation completed in early 2010 is summarized in a January 7, 2010 memorandum from Regulating District staff to the Board.

2012 Apportionment Analysis

In response to the May 10, 2010 Appellate Division, Third Department court decision described in General Counsel's July 5, 2012 memorandum to the Board, Regulating District staff calculated the 2012 apportionment to reflect a separation of the benefit derived by the State from the benefit derived by the counties, in order to determine an amount "chargeable to the state."

Regulating District staff selected a property value based methodology to calculate an amount chargeable to the State, similar to that used in March 2010 to apportion benefit among the five counties. The 2012 apportionment analysis compared the value of State-owned and State-maintained flood protected real property, roadways, and bridges with non-state-owned properties in the floodplain, consistent with the court decision, as the basis for the calculation of the State's portion of benefit. Here, as was the case in the 2010 Apportionment, the value derived by the State's use of water for operation of the canal system was considered de minimis.

Value of Flood Protected State Real Property

The Regulating District calculated value of State-owned flood protected properties by extracting the value of state-owned real property from the March 2010 Apportionment's flood protected

[1] Now known as the NYS Office of Real Property Tax Services "ORPTS"

real property inventory. Staff then created a summation of the value of State-owned flood protected property. Staff then completed a recalculation of the value of real property in each county receiving a flood protection benefit (non-state property receiving flood protection). The value of State-owned real property receiving flood protection in the 100-year flood plain is $175,555,884. The value of the non-state real property receiving flood protection in the 100-year flood plain is $3,909,444,919.

Value of Flood Protected State Roads

The methodology then required a calculation of the value of State flood protected roads by applying a unit value ($/mile) to a total length of State roadway within the 100-year flood plain. The New York Sate Department of Transportation (DOT) completed an analysis of the length of roads and calculated a total of 46.4 miles of State roads maintained within the 100-year flood plain.

The Regulating District staff recommends the Board select a unit value of $1,500,000 per mile to represent the value of State roadways within the 100-year flood plain. The use of unit cost per highway mile is a professionally accepted standard for highway project preliminary budgeting. Staff chose $1.5 Million per roadway-mile based on an analysis of representative project construction costs. A replacement value of $1,500,000 per mile is in the range used by various state's Department of Transportation to estimate new construction or total replacement of a 2-lane minor arterial, or rural state highway. The section "Sensitivity Analysis for Road and Bridge Value" discusses the range of replacement costs considered. Applying the unit value of $1.5 Million per mile to total miles (46.4 miles), the value of State roadways receiving flood protection in the 100-year flood plain is $69,600,000.

Value of Flood Protected State Bridges

Regulating District staff conducted a map and aerial photography assessment of State bridges within the 100-year flood plain to create an inventory of bridge deck surface area. The State maintains a total of 19 State bridges with a total deck surface area of 953,519 square feet (sq. ft.) within the 100-year flood plain.

Staff recommends that the Board calculate the value of State flood protected bridges by applying a unit value for replacement ($/sq. ft. of bridge deck surface area) to the total surface area of State bridges within the 100-year flood plain.

Staff recommends that the Board select a unit value for replacement of $300/sq. ft. to represent the value of State bridges within the 100-year flood plain. The use of square-footage of bridge deck is a professionally accepted standard for bridge project preliminary budgeting. Staff chose $300 per square-foot of bridge deck based on an analysis of representative bridge replacement costs. Applying the unit value per square foot of $300, to the total bridge deck area (953,519 sq. ft.), the value of State bridges receiving flood protection in the 100-year flood plain is $286,055,700.

Sensitivity Analysis for Road and Bridge Value

Unit value highway construction costs used to calculate roadway replacement value are dependent upon rural or urban conditions, terrain, intersections, traffic maintenance during construction, climate, availability of construction materials, availability of labor, and the overall economy. The potential range for the unit value of 46.4 miles of State roadway in the 100-year flood plain is from $46.40 Million to $148.48 Million. The sensitivity of the State share of this Apportionment to variation in the unit cost per mile is -0.46% / +1.54%.

Representative Highway Construction Costs

State / Other Entity	Average Budgeting Costs per Mile of Road	Comments
Arkansas DOT	$2.3 Million Per Mile	Interstate
Florida DOT	$2.2 Million per Mile	2-lane Arterial
Washington State DOT	$1.0 Million per *Lane*-Mile	2-Lane Minor Arterial
Federal Highway Administration (FHWA)	$1.0 Million to $3.2 Million per Mile	FHWA's "Highway Economic Requirement System", 2006

The range of bridge replacement unit costs considered varies from $230 to $395 per sq. ft. of bridge deck. The sensitivity to unit price of the Value of State Bridges within the 100-year Hudson River floodplain can be represented as: 953,519 sq.ft. (total area State bridges in floodplain) x ($395 - $230) = $157.33 Million in total variation. This analysis suggests that the sensitivity to variation in unit replace costs of the total value of State flood-protected bridges is between $219.31 Million and $376.64 Million. This Apportionment calculates the flood

protected value of State bridges based on $300 per sq. ft., and a total value of $286,055,770. The sensitivity of the State Share of this Apportionment to variation in flood-protected bridge value within the range tabulated is -1.34% / +1.76%.

Representative Bridge Construction Costs

STATE/OTHER ENTITY	COST PER Square-Foot of Bridge Deck
NYSDOT - Batchellerville Bridge Over Great Sacandaga Lake	$396 per sq.-ft. Batchellerville Bridge square foot cost - Actual: Contract award: $46 million Length: 3,078 ft. Width: 37.88 ft. Cost per sq. ft. = $46,000,000/(3,078 x 37.88) = $395 per sq. ft.
FHWA - National Average Adjusted for Inflation	$230 per sq.-ft.

Calculation of State Percent of Benefit "Chargeable to the State"

The total value of the all State flood protected property is the sum of the value of the real property, roads, and bridges receiving flood protection.

Value of State Real Property	$175,555,884
Value of State Roads	$69,600,000
Value of State Bridges	$286,055,700
Total Value of All State Property	$531,211,584

Table 1A summarizes the total value of all State flood protected property and the value of county real property which receives flood protection.

Value of State Real Property	$175,555,884
Value of State Roads	$69,600,000
Value of State Bridges	$286,055,700
Total Value of All State Property	$531,211,584
Total Value of County Property (non-state)	$3,909,444,919
Total Value of All Property	$4,440,656,503

The percent of benefit derived by the State is established by proportioning the total value of State flood protected property and total value of all flood protected property. Based on the values provided above and shown in Table 1A, the percent of benefit "chargeable to the State" is

11.96% of Regulating District cost of operation and expenses after other, non-assessment, income.

County Apportionment

Table 1B contains a calculation of the counties proportion of benefit using non-State flood protected property values for each county.

Table 1A - *Portion of Flood Protection*

State Portion of Flood Protection ("Chargeable to the State")

A County	B Total Value of Non-State Real Property Receiving Flood Protection Benefit [1]	C Value of State Real Property Receiving Flood Protection Benefit [2]	D Value of State Roads Receiving Flood Protection Benefit [3]	E Value of State Bridges Receiving Flood Protection Benefit [4]	F Total Value of All Property Receiving Flood Protection Benefit
Albany	$1,482,824,786	$120,797,946			
Rensselaer	$867,551,045	$14,610,360			
Saratoga	$1,139,605,893	$26,209,828			
Washington	$152,256,062	$8,502,873			
Warren	$267,207,133	$5,434,877			
Total	$3,909,444,919	$175,555,884	$69,600,000	$286,055,700	$4,440,656,503

Value of State Real Property	$175,555,884
Value of State Roads	$69,600,000
Value of State Bridges	$286,055,700
Total Value of All State Property	$531,211,584
Percent Chargeable to State	**11.96%**

Table 1B - *Portion of Flood Protection*

County *Portion of Flood Protection*

A County	B Total Value of Non-State Property Receiving Flood Protection Benefit	C County Apportionment of Benefit (%)
Albany	$1,482,824,786	37.92929%
Rensselaer	$867,551,045	22.19116%
Saratoga	$1,139,605,893	29.15007%
Washington	$152,256,062	3.89457%
Warren	$267,207,133	6.83491%
	$3,909,444,919	100.00%

Notes

1 ORPS and County Real Property Assessment Data

2 State owned land, buildings, parks from ORPS and Real Property Assessment Data

3 State owned roads

4 State owned bridges

Hudson River 100-Year Floodplain without GSL
Summary of State Real Property (not including roads and bridges)

	Total Value of Non-State Real Property Receiving Flood Protection Benefit	Value of State Real Property Receiving Flood Protection Benefit [1]	Total Value of Real Property Receiving Flood Protection Benefit [2]
County			
Albany	$1,482,824,786	$120,797,946	$1,603,622,732
Rensselaer	$867,551,045	$14,610,360	$882,161,405
Saratoga	$1,139,605,893	$26,209,828	$1,165,815,721
Washington	$152,256,062	$8,502,873	$160,758,935
Warren	$267,207,133	$5,434,877	$272,642,010
Counties	$3,909,444,919		
State of New York		$175,555,884	
Total Value			$4,085,000,803

Note

1. Excludes roads and bridges
2. State and Non-State owned real property

Hudson River 100-Year Floodplain without GSL

Albany County	B Assessed Value	C Equalization Rate (2009)	D Full Market Value (Col B / Col C)
County (less NYS)			
City of Albany	$482,577,056	98.00%	$492,425,567
City of Cohoes	$26,134,189	56.00%	$46,668,195
City of Watervliet	$223,902,600	64.15%	$349,029,774
Town of Bethlehem	$151,766,135	93.00%	$163,189,392
Town of Coeymans	$119,508,069	99.25%	$120,411,153
Town of Colonie	$99,179,951	65.75%	$150,844,032
Town of Green Island	$8,621,809	5.38%	$160,256,673
	$1,111,689,809		$1,482,824,786
State of New York			
City of Albany	$114,811,300	98.00%	$117,154,388
City of Cohoes	$1,107,100	56.00%	$1,976,964
City of Watervliet	$0	64.15%	$0
Town of Bethlehem	$0	93.00%	$0
Town of Coeymans	$0	99.25%	$0
Town of Colonie	$7,000	65.75%	$10,646
Town of Green Island	$89,090	5.38%	$1,655,948
State property values	$116,014,490		$120,797,946

Hudson River 100-Year Floodplain without GSL

Rensselaer County	**B** Assessed Value	**C** Equalization Rate (2009)	**D** Full Market Value (Col B / Col C)
County (less NYS)			
City of Rensselaer	$96,625,911	28.50%	$339,038,284
City of Troy	$51,220,771	13.22%	$387,449,100
Town of East Greenbush	$11,097,326	100.00%	$11,097,326
Town of North Greenbush	$16,453,393	26.25%	$62,679,592
Town of Schaghticoke	$9,331,760	23.00%	$40,572,870
Town of Schodack	$3,237,900	100.00%	$3,237,900
Village of Castleton-on-Hudson	$13,170,021	56.10%	$23,475,973
	$201,137,082		$867,551,045
State of New York			
City of Rensselaer	$486,810	28.50%	$1,708,105
City of Troy	$144,900	13.22%	$1,096,067
Town of East Greenbush	$2,723,449	100.00%	$2,723,449
Town of North Greenbush	$0	26.25%	$0
Town of Schaghticoke	$1,780,140	23.00%	$7,739,739
Town of Schodack	$1,343,000	100.00%	$1,343,000
Village of Castleton-on-Hudson	$0	56.10%	$0
State property values	$6,478,299		$14,610,360

Hudson River 100-Year Floodplain without GSL

Saratoga County	**B** Assessed Value	**C** Equalization Rate (2009)	**D** Full Market Value (Col B / Col C)
County (less NYS)			
City of Mechanicville	$16,231,746	70.0%	$23,188,209
Town of Corinth	$11,403,267	97.0%	$11,755,945
Town of Hadley	$88,115,700	72.0%	$122,382,917
Town of Halfmoon	$32,057,212	59.0%	$54,334,258
Town of Moreau	$90,062,407	31.8%	$283,215,116
Town of Northumberland	$22,964,100	100.0%	$22,964,100
Town of Saratoga	$11,339,200	64.0%	$17,717,500
Town of Stillwater	$56,184,799	91.0%	$61,741,537
Town of Waterford	$73,163,174	33.8%	$216,459,095
Village of Corinth	$131,631,000	97.0%	$135,702,062
Village of Schuylerville	$12,188,662	64.0%	$19,044,784
Village of South Glens Falls	$23,682,256	30.8%	$76,990,429
Village of Stillwater	$67,253,025	91.0%	$73,904,423
Village of Waterford	$6,829,465	33.8%	$20,205,518
	$643,106,013		$1,139,605,893
State of New York			
City of Mechanicville	$105,000	70.0%	$150,000
Town of Corinth	$0	97.0%	$0
Town of Hadley	$0	72.0%	$0
Town of Halfmoon	$420,100	59.0%	$712,034
Town of Moreau	$5,877,000	31.8%	$18,481,132
Town of Northumberland	$622,300	100.0%	$622,300
Town of Saratoga	$1,041,600	64.0%	$1,627,500
Town of Stillwater	$182,400	91.0%	$200,440
Town of Waterford	$0	33.8%	$0
Village of Corinth	$0	97.0%	$0
Village of Schuylerville	$14,000	64.0%	$21,875
Village of South Glens Falls	$0	30.8%	$0
Village of Stillwater	$180,000	91.0%	$197,802
Village of Waterford	$1,418,500	33.8%	$4,196,746
State property values	$9,860,900		$26,209,828

Hudson River 100-Year Floodplain without GSL

Washington County	B Assessed Value	C Equalization Rate (2009)	D Full Market Value (Col B / Col C)
County (less NYS)			
Town of Easton	$641,130	2.0%	$32,878,462
Town of Fort Edward	$24,090,548	83.0%	$29,038,751
Town of Greenwich	$14,171,500	100.0%	$14,171,500
Village of Fort Edward	$35,459,053	83.0%	$42,742,349
Village of Hudson Falls	$33,425,000	100.0%	$33,425,000
	$107,787,231		$152,256,062
State of New York			
Town of Easton	$1,900	2.0%	$97,436
Town of Fort Edward	$6,847,300	83.0%	$8,253,737
Town of Greenwich	$151,700	100.0%	$151,700
Village of Fort Edward	$0	83.0%	$0
Village of Hudson Falls	$0	100.0%	$0
State property values	$7,000,900		$8,502,873

Hudson River 100-Year Floodplain without GSL

Warren County	**B** Assessed Value	**C** Equalization Rate (2009)	**D** Full Market Value (Col B / Col C)
County (less NYS)			
City of Glens Falls	$72,765,056	73.0%	$99,678,159
Town of Lake Luzerne	$77,166,450	83.0%	$92,971,627
Town of Queensbury	$56,663,584	76.0%	$74,557,347
	$206,595,090		$267,207,133
State of New York			
City of Glens Falls	$186,500	73.0%	$255,479
Town of Lake Luzerne	$1,701,000	83.0%	$2,049,398
Town of Queensbury	$2,378,800	76.0%	$3,130,000
State property values	$4,266,300		$5,434,877

Hudson River 100-Year Floodplain without GSL
Summary of Value of Roads

Road Miles within 100-year flood plain		Unit Value ($/mile)	Value
Total	131.7 miles		
Non-State	85.3 miles		
State	46.4 miles	$1,500,000	$69,600,000

Hudson River 100-Year Floodplain without GSL
Summary of Value of Bridges

Bridge Name & Route	Location	Bridge ID	Owner	Deck Area (sq. ft.)	Value
SR 197/28 Reynolds Rd	Moreau / Fort Edward	1039840/4039850	NYS DOT	22764	$6,829,200
SR 29 / Ferry St	Saratoga / Easton	1073800/4020700	NYS DOT	24390	$7,317,000
SR 9N / Lake Ave	Lake Luzrne	1006730	NYS DOT	15408	$4,622,400
I-87	Moreau / Queensbury		NYS DOT	104320	$31,296,000
US 9 / Main St	Glens Falls / S. Glens Falls		NYS DOT	38828	$11,648,400
US 4	Northumberland	4001020	NYS DOT	14482	$4,344,600
SR 125 / Stillwater Bridge	Stillwater / Schaghticoke	4029210	NYS DOT	31860	$9,558,000
SR 67 / Howland Ave	Mechanicville		NYS DOT	20052	$6,015,600
US 4 and 126th St / Broad St	Waterford	4000950	NYS DOT	32970	$9,891,000
SR 470 / 112th St	Cohoes	4093220	NYS DOT	32970	$9,891,000
US 4 / Broadway @ canal	Fort Edward		NYS DOT	13212	$3,963,600
US 4 east of Griffin Island	Fort Edward		NYS DOT	6171	$1,851,300
US 4 over Fish Creek, west of Hudson	Schuylerville		NYS DOT	13212	$3,963,600
SR 7	Green Isl / Troy		NYS DOT	152040	$45,612,000
SR 2	Troy		NYS DOT	48180	$14,454,000
SR 378 / High St	Menands / North Greenbush		NYS DOT	82500	$24,750,000
US 90	Albany		NYS DOT	68000	$20,400,000
US 9 / 20	Albany		NYS DOT	123360	$37,008,000
US 90	Selkirk		NYS DOT	108800	$32,640,000
					$286,055,700

Unit value for replacement ($ per square foot of deck surface): **$300**