Invoice

Moffatt & Nichol
P.O. Box 22648
Long Beach, CA 90801-5648
Phone: (562) 590-6500

Robert Law
De Maximis Inc.
186 Center Street, Suite 290
Clinton, NJ 08809

January 26, 2013
Invoice No: 63756

Project 6664 Lower Passaic River Restoration Modeling Work - Initial Tasks

Professional Services from November 25, 2012 to December 29, 2012

Additional Tasks

Targeted Remedy Support
Professional Personnel

	Hours	Rate	Amount	
Engineer/Scientist III				
Canizares, Rafael	20.00	185.00	3,700.00	
Engineer/Scientist II				
Mathew, Rooni	20.00	169.00	3,380.00	
Support Staff Engineer				
Manian, Dinesh	12.00	100.00	1,200.00	
Totals	52.00		8,280.00	
Total Labor				**8,280.00**
			Total this Task	**$8,280.00** ✓
			Total Additional Tasks	**$8,280.00**

LPR/NB Modeling **TOM 6**

Task 01 Coordination and Meetings
Professional Personnel

	Hours	Rate	Amount	
Engineer/Scientist III				
Canizares, Rafael	73.00	191.00	13,943.00	
Engineer/Scientist II				
Mathew, Rooni	9.00	169.00	1,521.00	
Support Staff Engineer				
Manian, Dinesh	8.00	100.00	800.00	
Totals	90.00		16,264.00	
Total Labor				**16,264.00** ✓
			Total this Task	**$16,264.00**

Task 02 Data Analysis and Monitoring Design Coordination for Use in Numterical Model
Professional Personnel

	Hours	Rate	Amount
Engineer/Scientist III			
Canizares, Rafael	22.50	191.00	4,297.50
Engineer/Scientist II			
Mathew, Rooni	6.50	169.00	1,098.50
Support Staff Engineer			
Manian, Dinesh	32.00	100.00	3,200.00
Totals	61.00		8,596.00

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Total Labor					**8,596.00** ✓
				Total this Task	**$8,596.00**

Task 03 System Understanding

Professional Personnel

	Hours	Rate	Amount	
Engineer/Scientist III				
Canizares, Rafael	34.50	191.00	6,589.50	
Support Staff Engineer				
Manian, Dinesh	48.00	100.00	4,800.00	
Totals	82.50		11,389.50	
Total Labor				**11,389.50** ✓
			Total this Task	**$11,389.50**

Task 05 LPR/NB Sediment Transport Modeling

Professional Personnel

	Hours	Rate	Amount	
Engineer/Scientist III				
Canizares, Rafael	1.00	191.00	191.00	
Engineer/Scientist II				
Mathew, Rooni	51.00	169.00	8,619.00	
Support Staff Engineer				
Manian, Dinesh	52.00	100.00	5,200.00	
Totals	104.00		14,010.00	
Total Labor				**14,010.00** ✓
			Total this Task	**$14,010.00**

Task 06 LPR/NB Organic Carbon Modeling

Professional Personnel

	Hours	Rate	Amount	
Engineer/Scientist III				
Canizares, Rafael	1.00	191.00	191.00	
Engineer/Scientist II				
Mathew, Rooni	3.50	169.00	591.50	
Staff Engineer/Scientist				
Xiong, Yi	53.75	117.00	6,288.75	
Totals	58.25		7,071.25	
Total Labor				**7,071.25** ✓
			Total this Task	**$7,071.25**

Task 07 LPR/NB Contaminant Fate and Transport Modeling

Professional Personnel

	Hours	Rate	Amount	
Engineer/Scientist II				
Mathew, Rooni	40.00	169.00	6,760.00	
Staff Engineer/Scientist				
Xiong, Yi	.50	117.00	58.50	
Totals	40.50		6,818.50	
Total Labor				**6,818.50** ✓
Reimbursable Expenses				
Miscellaneous			108.86	
Total Reimbursables			**108.86**	**108.86** ✓
			Total this Task	**$6,927.36**

Task 09 Transfer of material and training of CPG's augmented modeling team

Professional Personnel

	Hours	Rate	Amount
Engineer/Scientist II			
Mathew, Rooni	13.00	169.00	2,197.00
Staff Engineer/Scientist			

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Xiong, Yi	79.25	117.00	9,272.25	
Totals	92.25		11,469.25	
Total Labor				**11,469.25**
			Total this Task	**$11,469.25** ✓
			Total this Phase	**$75,727.36**
			TOTAL THIS INVOICE	**$84,007.36**

Please remit payment of this invoice to:

Moffatt & Nichol
ABA #121000248
Account #4159349729
Swift #WFBIUS6WFFX
Wells Fargo Bank
111 W. Ocean Blvd., Suite 300
Long Beach, CA 90802 USA

Billing Backup

Moffatt & Nichol

Invoice 63756 Dated 1/26/2013

Project 6664 Lower Passaic River Restoration Modeling Work - Initial Tasks

Additional Tasks

Targeted Remedy Support

Professional Personnel

			Hours	Rate	Amount	
Engineer/Scientist III						
1548	Canizares, Rafael	12/1/2012	8.00	185.00	1,480.00	
1548	Canizares, Rafael	12/1/2012	8.00	185.00	1,480.00	
1548	Canizares, Rafael	12/8/2012	4.00	185.00	740.00	
Engineer/Scientist II						
2219	Mathew, Rooni	12/1/2012	8.00	169.00	1,352.00	
2219	Mathew, Rooni	12/1/2012	7.00	169.00	1,183.00	
2219	Mathew, Rooni	12/1/2012	2.00	169.00	338.00	
2219	Mathew, Rooni	12/1/2012	2.50	169.00	422.50	
2219	Mathew, Rooni	12/1/2012	.50	169.00	84.50	
Support Staff Engineer						
2301	Manian, Dinesh	12/1/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/1/2012	4.00	100.00	400.00	
Totals			52.00		8,280.00	
Total Labor						**8,280.00**
				Total this Task		**$8,280.00**
				Total Additional Tasks		**$8,280.00**

LPR/NB Modeling **TOM 6**

Task 01 Coordination and Meetings

Professional Personnel

			Hours	Rate	Amount	
Engineer/Scientist III						
1548	Canizares, Rafael	12/1/2012	2.00	191.00	382.00	
1548	Canizares, Rafael	12/1/2012	4.00	191.00	764.00	
1548	Canizares, Rafael	12/1/2012	4.00	191.00	764.00	
1548	Canizares, Rafael	12/1/2012	4.00	191.00	764.00	
1548	Canizares, Rafael	12/8/2012	1.00	191.00	191.00	
1548	Canizares, Rafael	12/8/2012	8.00	191.00	1,528.00	
1548	Canizares, Rafael	12/8/2012	8.00	191.00	1,528.00	
1548	Canizares, Rafael	12/8/2012	4.00	191.00	764.00	
1548	Canizares, Rafael	12/8/2012	6.00	191.00	1,146.00	
1548	Canizares, Rafael	12/15/2012	2.00	191.00	382.00	
1548	Canizares, Rafael	12/15/2012	8.00	191.00	1,528.00	
1548	Canizares, Rafael	12/15/2012	8.00	191.00	1,528.00	
1548	Canizares, Rafael	12/22/2012	4.00	191.00	764.00	
1548	Canizares, Rafael	12/22/2012	8.00	191.00	1,528.00	
1548	Canizares, Rafael	12/22/2012	2.00	191.00	382.00	
Engineer/Scientist II						
2219	Mathew, Rooni	12/8/2012	8.00	169.00	1,352.00	
2219	Mathew, Rooni	12/22/2012	1.00	169.00	169.00	
Support Staff Engineer						
2301	Manian, Dinesh	12/8/2012	8.00	100.00	800.00	
Totals			90.00		16,264.00	
Total Labor						**16,264.00**
				Total this Task		**$16,264.00**

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Task 02 Data Analysis and Monitoring Design Coordination for Use in Numterical Model

Professional Personnel

			Hours	Rate	Amount	
Engineer/Scientist III						
1548	Canizares, Rafael	12/8/2012	2.00	191.00	382.00	
1548	Canizares, Rafael	12/8/2012	2.00	191.00	382.00	
1548	Canizares, Rafael	12/15/2012	.50	191.00	95.50	
1548	Canizares, Rafael	12/15/2012	2.00	191.00	382.00	
1548	Canizares, Rafael	12/22/2012	2.00	191.00	382.00	
1548	Canizares, Rafael	12/22/2012	14.00	191.00	2,674.00	
Engineer/Scientist II						
2219	Mathew, Rooni	12/8/2012	4.00	169.00	676.00	
2219	Mathew, Rooni	12/15/2012	1.50	169.00	253.50	
2219	Mathew, Rooni	12/22/2012	1.00	169.00	169.00	
Support Staff Engineer						
2301	Manian, Dinesh	12/1/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/1/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/8/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/29/2012	8.00	100.00	800.00	
Totals			61.00		8,596.00	
Total Labor						**8,596.00**
				Total this Task		**$8,596.00**

Task 03 System Understanding

Professional Personnel

			Hours	Rate	Amount	
Engineer/Scientist III						
1548	Canizares, Rafael	12/1/2012	10.00	191.00	1,910.00	
1548	Canizares, Rafael	12/8/2012	5.00	191.00	955.00	
1548	Canizares, Rafael	12/15/2012	8.00	191.00	1,528.00	
1548	Canizares, Rafael	12/15/2012	9.50	191.00	1,814.50	
1548	Canizares, Rafael	12/22/2012	2.00	191.00	382.00	
Support Staff Engineer						
2301	Manian, Dinesh	12/8/2012	16.00	100.00	1,600.00	
2301	Manian, Dinesh	12/22/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/22/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/29/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/29/2012	8.00	100.00	800.00	
Totals			82.50		11,389.50	
Total Labor						**11,389.50**
				Total this Task		**$11,389.50**

Task 05 LPR/NB Sediment Transport Modeling

Professional Personnel

			Hours	Rate	Amount
Engineer/Scientist III					
1548	Canizares, Rafael	12/15/2012	1.00	191.00	191.00
Engineer/Scientist II					
2219	Mathew, Rooni	12/1/2012	.50	169.00	84.50
2219	Mathew, Rooni	12/1/2012	1.00	169.00	169.00
2219	Mathew, Rooni	12/1/2012	2.00	169.00	338.00
2219	Mathew, Rooni	12/8/2012	4.00	169.00	676.00
2219	Mathew, Rooni	12/15/2012	1.00	169.00	169.00
2219	Mathew, Rooni	12/15/2012	3.50	169.00	591.50
2219	Mathew, Rooni	12/15/2012	2.00	169.00	338.00
2219	Mathew, Rooni	12/15/2012	.50	169.00	84.50
2219	Mathew, Rooni	12/15/2012	4.00	169.00	676.00
2219	Mathew, Rooni	12/22/2012	6.00	169.00	1,014.00
2219	Mathew, Rooni	12/22/2012	3.50	169.00	591.50
2219	Mathew, Rooni	12/22/2012	5.00	169.00	845.00
2219	Mathew, Rooni	12/22/2012	2.00	169.00	338.00
2219	Mathew, Rooni	12/22/2012	6.00	169.00	1,014.00

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2219	Mathew, Rooni	12/29/2012	10.00	169.00	1,690.00	
Support Staff Engineer						
2301	Manian, Dinesh	12/1/2012	4.00	100.00	400.00	
2301	Manian, Dinesh	12/1/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/8/2012	8.00	100.00	800.00	
2301	Manian, Dinesh	12/22/2012	4.00	100.00	400.00	
2301	Manian, Dinesh	12/22/2012	16.00	100.00	1,600.00	
2301	Manian, Dinesh	12/22/2012	4.00	100.00	400.00	
2301	Manian, Dinesh	12/29/2012	8.00	100.00	800.00	
Totals			104.00		14,010.00	
Total Labor						**14,010.00**
				Total this Task		**$14,010.00**

Task 06 LPR/NB Organic Carbon Modeling

Professional Personnel

			Hours	**Rate**	**Amount**	
Engineer/Scientist III						
1548	Canizares, Rafael	12/15/2012	1.00	191.00	191.00	
Engineer/Scientist II						
2219	Mathew, Rooni	12/15/2012	.50	169.00	84.50	
2219	Mathew, Rooni	12/22/2012	.50	169.00	84.50	
2219	Mathew, Rooni	12/22/2012	1.50	169.00	253.50	
2219	Mathew, Rooni	12/22/2012	1.00	169.00	169.00	
Staff Engineer/Scientist						
2403	Xiong, Yi	12/1/2012	1.00	117.00	117.00	
2403	Xiong, Yi	12/8/2012	.50	117.00	58.50	
2403	Xiong, Yi	12/8/2012	1.00	117.00	117.00	
2403	Xiong, Yi	12/22/2012	1.75	117.00	204.75	
2403	Xiong, Yi	12/22/2012	8.00	117.00	936.00	
2403	Xiong, Yi	12/22/2012	8.00	117.00	936.00	
2403	Xiong, Yi	12/22/2012	8.00	117.00	936.00	
2403	Xiong, Yi	12/29/2012	4.50	117.00	526.50	
2403	Xiong, Yi	12/29/2012	7.00	117.00	819.00	
2403	Xiong, Yi	12/29/2012	8.00	117.00	936.00	
2403	Xiong, Yi	12/29/2012	6.00	117.00	702.00	
Totals			58.25		7,071.25	
Total Labor						**7,071.25**
				Total this Task		**$7,071.25**

Task 07 LPR/NB Contaminant Fate and Transport Modeling

Professional Personnel

			Hours	**Rate**	**Amount**	
Engineer/Scientist II						
2219	Mathew, Rooni	12/1/2012	2.00	169.00	338.00	
2219	Mathew, Rooni	12/8/2012	3.00	169.00	507.00	
2219	Mathew, Rooni	12/8/2012	4.00	169.00	676.00	
2219	Mathew, Rooni	12/8/2012	4.00	169.00	676.00	
2219	Mathew, Rooni	12/15/2012	3.00	169.00	507.00	
2219	Mathew, Rooni	12/15/2012	4.00	169.00	676.00	
2219	Mathew, Rooni	12/15/2012	1.00	169.00	169.00	
2219	Mathew, Rooni	12/15/2012	4.50	169.00	760.50	
2219	Mathew, Rooni	12/22/2012	2.00	169.00	338.00	
2219	Mathew, Rooni	12/22/2012	1.00	169.00	169.00	
2219	Mathew, Rooni	12/22/2012	1.50	169.00	253.50	
2219	Mathew, Rooni	12/22/2012	.50	169.00	84.50	
2219	Mathew, Rooni	12/22/2012	3.50	169.00	591.50	
2219	Mathew, Rooni	12/29/2012	1.00	169.00	169.00	
2219	Mathew, Rooni	12/29/2012	2.00	169.00	338.00	
2219	Mathew, Rooni	12/29/2012	3.00	169.00	507.00	
Staff Engineer/Scientist						
2403	Xiong, Yi	12/8/2012	.50	117.00	58.50	
Totals			40.50		6,818.50	
Total Labor						**6,818.50**

Reimbursable Expenses

Miscellaneous

AP	183607	12/28/2012	Quill Corporation / INV #8038357 / Invoice:	108.86	
		Total Reimbursables		**108.86**	**108.86**
				Total this Task	**$6,927.36**

Task 09 Transfer of material and training of CPG's augmented modeling team

Professional Personnel

			Hours	Rate	Amount	
Engineer/Scientist II						
2219	Mathew, Rooni	12/1/2012	4.00	169.00	676.00	
2219	Mathew, Rooni	12/1/2012	.50	169.00	84.50	
2219	Mathew, Rooni	12/1/2012	1.00	169.00	169.00	
2219	Mathew, Rooni	12/8/2012	2.00	169.00	338.00	
2219	Mathew, Rooni	12/15/2012	1.00	169.00	169.00	
2219	Mathew, Rooni	12/15/2012	.50	169.00	84.50	
2219	Mathew, Rooni	12/22/2012	1.50	169.00	253.50	
2219	Mathew, Rooni	12/22/2012	1.00	169.00	169.00	
2219	Mathew, Rooni	12/22/2012	1.50	169.00	253.50	
Staff Engineer/Scientist						
2403	Xiong, Yi	12/1/2012	8.00	117.00	936.00	
2403	Xiong, Yi	12/1/2012	3.00	117.00	351.00	
2403	Xiong, Yi	12/8/2012	7.50	117.00	877.50	
2403	Xiong, Yi	12/8/2012	4.50	117.00	526.50	
2403	Xiong, Yi	12/8/2012	4.50	117.00	526.50	
2403	Xiong, Yi	12/8/2012	1.00	117.00	117.00	
2403	Xiong, Yi	12/8/2012	6.00	117.00	702.00	
2403	Xiong, Yi	12/15/2012	9.00	117.00	1,053.00	
2403	Xiong, Yi	12/15/2012	5.00	117.00	585.00	
2403	Xiong, Yi	12/15/2012	6.00	117.00	702.00	
2403	Xiong, Yi	12/15/2012	8.00	117.00	936.00	
2403	Xiong, Yi	12/22/2012	.25	117.00	29.25	
2403	Xiong, Yi	12/22/2012	8.00	117.00	936.00	
2403	Xiong, Yi	12/22/2012	6.00	117.00	702.00	
2403	Xiong, Yi	12/29/2012	2.50	117.00	292.50	
Totals			92.25		11,469.25	
Total Labor						**11,469.25**
				Total this Task		**$11,469.25**
				Total this Phase		**$75,727.36**
				Total this Project		**$84,007.36**
				Total this Report		**$84,007.36**

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MOFFATT & NICHOL

104 West 40th Street
14th floor
New York, NY 10018

(212) 768-7454
Fax (212) 768-7936

Detailed Description of work done by M&N personnel associated to the LPR/NB Modeling Program Task Order Memoranda 6 - Scope of Work for the period 11/25/2012 to 12/29/2012 M&N Project No. 6664

Hydrodynamics Principal Investigator - Rafael Cañizares.

Task 1 – Project Management	• Internal coordination with Deltares and M&N • Calls and Coordination with Project Coordinator including prepare material such as Dash Board reports. • Prepare and review invoices including revision of Deltares budget and invoices • Coordination with Project Coordinator and AQEA • review Scope, coordination with PC • Attend MSC meeting • Attend TC meeting • Prepare and Attend meetings including Calls • Prepare TC and MSC meetings, including calls. • Prepare December 6 MSC meeting notes • Attend call on projection simulations. • Prepare Invoices, review summary of MSC, Coordinate with H.Winterwerp schedule for Collaboration meeting • Prepare invoices. Review and coordinate with Deltares invoices • Projection runs call. Internal coordination for computers
Task 2 – Data Analysis	• Attend SSP2 Call • Attend Call on GSD data Collection • Discussion with Deltares on completion of tasks for bathy analysis • Review historical photos. prepare material to request quote for historical photos • Review historical surveys to develop a list of historical dredged depths and last dredging events at different areas of the LPR
Task 3 – System Understanding	• Shoals analysis, RM4.2 and RM7.5 • Review of data on navigation LPR. Drafts, channel depths,. • Call with AQEA on path forward CFT model, • Initial Analysis of Propeller Scour at the mouth of the LPR • Attend CSM call. • Coordinate CSM ST with H. Winterwerp
Task 5 – LPR/NB Sediment Transport Modeling	• Review comments on ST technical memo

Task 6 – LPR/NB Organic Carbon Modeling	• Discussion with L.Postma to follow up with OC simplification

Rooni Mathew.

Task 1 – Project Management	• MSC meeting • Review & edit Dec 6 MSC meeting notes
Task 2 – Data Analysis	• Develop criteria for addnl. cores • Conference call w AQEA/Integral to discuss SSP2 locations • Develop Tidal 1 & locations for CWCM event • Develop Tidal 2 locations for High-Volume sampling event
Task 5 – LPR/NB Sediment Transport Modeling	• Discuss MSC meeting agenda w R.Canizares • Finalize and send ST model status memo to TC for review • Review initial run w WY2012, debug results, follow-up w OSI on EPA questions. • Write VMADCP data from Spring PWCM • Review ST model status and future plans with R.Canizares, • Respond to HQI questions on bathy update procedure • Conference call with Integral/AECOM/AQEA to discuss water column grain size distribution measurements • Develop. WY2012 flux vs Q plots, • Develop /review annual bathy changes for WY9596-1112 • Discuss and prioritize with R.Canizares list of tasks for ST model refinement • Relaunch ST run for WY2012 w new timestep.inp and rev. HD output • Revise timestep.inp for WY2012 & redo hydro, sens. w no DD clays for WY0102 to test RCATOX class driven tidal pumping • Coordination with Integral/AECOM for WC GSD info request • Discuss remediation inputs and codes with HQI • Revise and finalize ST status memo • Process revised WY2012 results, discuss status w DM, review class-specific mass balance calculation for WY0102 w D.Manian • Coordinate WC GSD sampling w Integral/AECOM, review. • Revise ST memo with AQEA comments • Review final class-specific mass balances & send to AQEA, • Review sampling locations for WC GSD measurements • Debug class-specific mass balance calculations

	• Finalize edits to ST memo, review model results figures
Task 6 – LPR/NB Organic Carbon Modeling	• Implement remediation in AOC simplification, coordinate with J.v.Beek • Review AOC code changes for consistent erosion depths in CFT & ST models • Review comparison of RCATOX with AOC and Ver 1 OC simplification, review with AQEA • Review RCATOX w AOC w/o erosion limitors, extract ST bathy change for debugging AOC erosion depths
Task 7 – LPR/NB Contaminate Fate and Transport Modeling	• Review proposed locations for SSP2 • Conference call with AQEA to review topics and AQEA presentation for MSC meeting • Review plots for AQEA • Review AQEA MSN presentation with R.Canizares, compare to MN CWCM plots, review current conditions mapping to model grid and calculate target areas %reduction. based on model ICs • Review/discuss CPG MNR runs with Y.Xiong and send to AQEA, • Develop plots for AQEA, review projection inputs • Develop plans for remediation in AOC • Conference call w AQEA/dmi/Integral to discuss projection runs, review projection runs list, review/test current conditions file_sedic.inp, • Develop avg. IC by R.McCready & inside/outside channel • Review color-coded time-series plots inside/outside navigation channel in upper/lower miles for AQEA, • Conference call with AQEA to discuss class-specific foc sens runs • Review mass bal. codes for AQEA • Review/QC model ICs using AQEA current cond. surface, SWAC % reduction calculation • Review plots development for AQEA • Review process to develop file_sedic.inp using current condition surface with Y.Xiong • Conference call with AQEA to discuss projection runs • Discuss projection runs with Wen Ku • Develop plans for additional computer servers • Discuss WY2012 RCATOX results with P.Oates • Develop OC linkage for sensitivity with no DD BC clays • Follow-up w CH2M on target remedy questions • Review remediation inputs from EPA, discuss w CH2MHill review/edit projection runs table • Coordinate remediation runs inputs w CH2MHill • Launch ST sensitivity runs for tidal pumping sensitivity • ST linkage code changes for AQEA sensitivity runs for tidal

	pumping
Task 9 – Transfer of material and training of CPG's augmented modeling team	• Conference call with AQEA to discuss post-processing tools and Long-term calibration files transfer, review tools for transmittal to AQEA, run scripts for generating OC linkage file for Long-term calibration period, follow-up with AQEA on 1995 ICs • Develop transmittal of post-processing tools for AQEA • Discuss post-processing tools request and Long-term calibration files request with P.Oates and with R.Canizares • Compile HD/OC linkage files for transfer to AQEA for Long-term calibration run, WY2011, and prelim. WY2012 • Coordination with AQEA on Long-term run files, send PS and NPS loadings • Respond to AQEA questions on OC linkage • Conference call with AQEA to discuss their OC linkage issues, code changes for sensitivity runs, review RCA error message • Review RCATOX mass balance and flux tabulation code for AQEA • Transfer HD/ST model outputs requested by AQEA

Dinesh Manian

Task 1 – Project Management	• Processing results and preparing plots for MSC meeting presentation on FFS critique
Task 2 – Data Analysis	• Investigating anomalous (average Grp3) concentrations in non-cyclical areas and cyclical areas (high Grp4); Delineating prelim estimated areas of low percent fines based on observed sedimentation • Plotting relationship between surface concentration data and the estimated sedimentation since 1966 to most recent bathy • Plotting variability of historical bathy data within the navigation channel; Adding the Time of sampling of contaminant core together with the context of local bathy evolution seen from bathy surveys
Task 3 – System Understanding	• Adding new bathy transects (1989) at all contaminant core locations; Updating google-earth database • NB system understanding: Revisiting NB source tracking runs to compute correct sediment mass balances • NB system understanding: Phase difference between LPR and HA, and NB circulation patterns by plotting velocity and salinity data from Spring PWCM • NB system understanding: sediment mass balance in NB source tracking runs

Task 5 – LPR/NB Sediment Transport Modeling	• Analyzing model instability in long-term ST run • QA/QC of preliminary WY 2012 run; • Processing WY 2012 simulation • Mass balance of each sediment class in the bed • Sediment mass balance by reach for every size class in the model (provide to AQEA) • Sensitivity to size class (clay or silt) of upstream load in the calibration run • revising figures for CPG ST status memo

Yi Xiong

Task 6 – LPR/NB Organic Carbon Modeling	• Re-start the AOC-YEARLY run from Year9900. • Check CPG RCA_AOC run results to see if the run is ok. • Manually zip the YEAR0809 carbon linkage file generated by AOC, and resume the last year AOC simulation. • Check the RCA_AOC_noLimitor_0.9, and compare the bed thickness and averaged concentrations. • Compare RCA_AOC and RCA_CARBON results based on time series averages and color-coded profiles; Work on AOC_FINE and PROG_CARBONFORRCA.f codes. • Compare RCA_AOC_noLimitor, RCA_AOC, and RCA_CARBON results in terms of sediment bed thickness; run the AOC and RCATOX code. • Modify the AOC_FINE hseds.f subroutine. Recompile the AOC_FINE code and Run AOC with no limitor. • Check the AOC model in terms of sediment bed; Revise the AOC code and re-run the AOC model • Check the test run results; Check the model inputs; change the input file and re-run AOC and RCA_AOC. • Do AOC and our carbon testing, output the bed thickness time series. • Run testing and check the 6" average and bed thickness results. Compare the average and bed thickness results with previous scenarios. Make new foc test run.
Task 7 – LPR/NB Contaminate Fate and Transport Modeling	• Resume the CPG RCATOX run from 0102
Task 9 – Transfer of material and training of CPG's augmented modeling team	• Work on CPG codes and scripts and their transfer. • Work on CPG grid WY2011 2 Excel plots and 2 color profiles to Support AQEA modeling. • Make the Fortran program and dataset to calculate area-weighted conc. for Passaic river CPG cells. • Provide AQEA averaged time series, vertical profiles, and excel files for 60-year projection runs. • Provide AQEA modified 2011 vertical profiles and

	spreadsheet. Also, fix the 2011 CPG simulation to the 15-year results to plot 16-year time series. • Review the Passaic river interpolation shape file from AQEA. • Work on Passaic river AQEA interpolated data using ArcGIS. • Answer AQEA questions regarding mass balance and bed flux output files. • Answer AQEA questions regarding water column mass balance and bed flux output files. CPG Newark bay profile. Send AQEA the 2011 file_sedic.inp. • Consider AQEA's mass and flux balance questions; do tests on RCAF55 and RCAF11.MB. • Sediment/Contaminant modeling meeting with AQEA. Work on file_sedic.inp. Run the first two chunks. Set up program to read the testing run results so as to verify the initial condition. • Answer AQEA ps/nps question. • Make RCATOX mass balance read program; • Confirm the mass balance outputs; • Answer AQEA's questions; Work on Particle Mixing depth changes for sensitivity study; Set up all bed cells thickness program for AQEA. • Particle depth mixing sensitivity run, show the 10 year results of the sensitivity runs.

Detailed Description of work done by M&N personnel associated to the LPR/NB Modeling Program Additional Task – Target Remedy Support for the period 11/25/2012 to 12/29/2012 M&N Project No. 6664

Hydrodynamics Principal Investigator - Rafael Cañizares.

Target Remedy Support	• Prepare and participate for on Target remedy meeting (SWAC) • Participate in Calls with AQEA and Integral • Complete RM 7.5 analysis and presentation

Rooni Mathew.

Target Remedy Support	• Attend SWAC meeting • Develop presentation for target remedy/SWAC TC meeting on Nov 28, • Conference call with Integral/AQEA, review COPC data in cyclical areas • Discuss target remedy next steps with AQEA via email,

	review RM 7.5 shoals bathy analysis, review additional analysis with 1995 bathy and impact of shoreline changes on channel bathy • Finalize presentation for SWAC meeting • Follow-up on next steps for target remedy work with AQEA/Integral

Dinesh Manian.

Target Remedy Support	• Analyzing historical Single beam and MB data together with contaminant core profiles using Open Earth • Building Open Earth database with latest SB and MB bathymetries and contaminant data

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