Memorandum

MIAMI-DADE COUNTY

Date: December 4, 2007

Agenda Item No. 8(R)(1)(B)

To: Honorable Chairman Bruno A. Barreiro and Members, Board of County Commissioners

From: George M. Burgess County Manager

Subject: Quantification of groundwater flows to evaluate the impact of countywide wellfield pumpages on the regional canal system

RECOMMENDATION

It is recommended that the Board of County Commissioners (Board) adopt the attached resolution approving a Joint Funding Agreement between Miami-Dade County and the U.S. Geological Survey (USGS) to conduct a "Quantification of Ground-water Flows in Support of Simulation of Surface and Groundwater Flows to Biscayne Bay." This is a requirement of the County's 20-Year Consumptive Use Permit, which is scheduled to be issued by the South Florida Water Management District (District) on November 15, 2007; to quantify the impact the countywide wellfield pumpages may have on the regional canal system.

SCOPE OF AGENDA ITEM

The impact of this agenda item is countywide, as it is a required component of the approved monitoring network design of the 20-Year Consumptive Use Permit (CUP) the County is seeking from the District.

FISCAL IMPACT/FUNDING SOURCE

The fiscal impact of this agenda item is $2,702,870.00 which is the portion of this Joint Funding Agreement to be funded by Miami-Dade Water and Sewer Department (MDWASD). The funding source is renewal and replacement funds and water connection charges.

TRACK RECORD/MONITOR

The USGS is a federal agency that is regarded as the national expert in the field of groundwater studies. MDWASD's Water Resources Section will monitor this agreement.

BACKGROUND

Based on the Agreement executed between the District and Miami-Dade County on May 10, 2006, MDWASD is required to submit data which measures the velocity and quantity of groundwater flows from Southern Florida's regional canal system by installing meters in the ground of the canals to account for the volume of water withdrawn from the regional canal system. The County will have the ability to account for the volume of water withdrawn from the regional canal system, and therefore, will be able to offset the water quantity withdrawn with the appropriate aquifer re-charge project as required by the Agreement. At this time, there is no methodology available to demonstrate in quantitative terms the actual impact to the regional canal system, therefore, the County will be required to offset increased allocations under the 20-Year CUP using a one to one ratio. For example, a 20 million gallons per day

(MGD) increase in water allocation from the District would assume a 20 MGD impact to the regional canal system. In this case, the County must provide 20 MGD in an offset project such as canal or aquifer recharge with reclaimed water.

MDWASD proposed a monitoring network to the District to conduct this study. The District approved the monitoring network along with a USGS project. The purpose of the USGS project is to select technology that can best measure the groundwater flow in the Biscayne Aquifer. The installation of flowmeters, the collection of groundwater flow and velocity data, and the analysis of data will be used to estimate rates and volumes of groundwater flow within the Biscayne Aquifer. This USGS project will provide the needed data to quantify the impacts to the regional canal system resulting from the County's wellfield operations.

This will benefit the County as it will reduce the amount of offset project water that will need to be treated and used to recharge the regional system. Data gathered and analyzed as part of this USGS project will be submitted to the District as it is a requirement of the next five year review of the 20-year CUP in November 2012.

Assistant County Manager

MEMORANDUM

(Revised)

TO: Honorable Chairman Bruno A. Barreiro and Members, Board of County Commissioners

DATE: December 4, 2007

FROM: R. A. Cuevas, Jr. County Attorney

SUBJECT: Agenda Item No. 8(R)(1)(B)

Please note any items checked.

_____ "4-Day Rule" ("3-Day Rule" for committees) applicable if raised

_____ 6 weeks required between first reading and public hearing

_____ 4 weeks notification to municipal officials required prior to public hearing

_____ Decreases revenues or increases expenditures without balancing budget

_____ Budget required

_____ Statement of fiscal impact required

_____ Bid waiver requiring County Manager's written recommendation

_____ Ordinance creating a new board requires detailed County Manager's report for public hearing

_____ Housekeeping item (no policy decision required)

_____ No committee review

Approved _____ Mayor

Veto _____

Override _____

Agenda Item No. 8(R)(1)(B)

12-04-07

RESOLUTION NO. _____

RESOLUTION APPROVING A JOINT FUNDING AGREEMENT BETWEEN MIAMI-DADE COUNTY AND U.S. GEOLOGICAL SURVEY TO CONDUCT A QUANTIFICATION OF GROUNDWATER FLOWS IN SUPPORT OF SIMULATION OF SURFACE AND GROUNDWATER FLOWS TO BISCAYNE BAY IN MIAMI-DADE COUNTY, FLORIDA IN THE AMOUNT OF $2,702,870

WHEREAS, this Board desires to accomplish the purposes outlined in the accompanying memorandum, a copy of which is incorporated herein by reference,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA, that the County Mayor or his designee is hereby authorized, for and on behalf of Miami-Dade County, to execute the Joint Funding Agreement between Miami-Dade County and the United States Geological Survey in the amount of $2,702,870, in substantially the form attached hereto and made a part hereof; and to exercise the provisions contained therein.

The foregoing resolution was offered by Commissioner , who moved its adoption. The motion was seconded by Commissioner and upon being put to a vote, the vote was as follows:

Bruno A. Barreiro, Chairman
Barbara J. Jordan, Vice-Chairwoman

Jose "Pepe" Diaz	Audrey M. Edmonson
Carlos A. Gimenez	Sally A. Heyman
Joe A. Martinez	Dennis C. Moss
Dorrin D. Rolle	Natacha Seijas
Katy Sorenson	Rebeca Sosa
Sen. Javier D. Souto	

The Chairperson thereupon declared the resolution duly passed and adopted this 4th day of December, 2007. This resolution shall become effective ten (10) days after the date of its adoption unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

MIAMI-DADE COUNTY, FLORIDA
BY ITS BOARD OF
COUNTY COMMISSIONERS

HARVEY RUVIN, CLERK

By:_____
Deputy Clerk

Approved by County Attorney as
to form and legal sufficiency:

Henry N. Gillman

QUANTIFICATION OF GROUND-WATER FLOWS IN SUPPORT OF SIMULATION OF SURFACE- AND GROUNDWATER FLOWS TO BISCAYNE BAY, MIAMI-DADE COUNTY

Kevin J. Cunningham (principal investigator), USGS, Fort Lauderdale, FL

Background

In Miami-Dade County, accurate simulations of surfacewater and groundwater flows from the Everglades wetlands to Biscayne Bay are needed to understand the potential impact that wellfield withdrawals have on freshwater flows to the bay and to manage the freshwater resources of the Biscayne aquifer to meet minimum flows and levels. Past studies have shown that seepage across the boundary between canals and the Biscayne aquifer is quantitatively poorly known, as well as groundwater flow around water-control structures that span the cross-sectional areas of canals. The volume of this flux is most likely very large and needs to be accounted for to best simulate surfacewater and groundwater flows.

Horizontal groundwater flow meters installed within monitoring wells along side of canals hold the most promise for use in estimating seepage at a point between a canal and the aquifer. Vertical flowmeter measurements within the monitoring wells can be used to provide a more accurate estimate of flow velocity/direction vectors with preferential groundwater passageways and matrix. Three types of horizontal groundwater flow measuring devices are currently available for measuring flow velocity and direction: horizontal heat-pulse flowmeter, acoustic Doppler velocimeter, and colloidal borescope. However, since in Miami-Dade County horizontal flowmeters are a technology that is virtually untested, it is uncertain which flowmeter type would most accurately acquire horizontal groundwater flow velocities and directions.

Objective

The purpose of this proposal is (1) to investigate horizontal flowmeter technologies and select the type that can best measure the groundwater flow in the heterogeneous karst Biscayne aquifer; (2) acquire point measurements of horizontal groundwater flow velocities and directions between canals and the Biscayne aquifer at a number of reaches along canals, around water-control structures that span canals, and in the area of hydraulic influence near water-supply wellfields; and (3) use the flowmeter data to estimate rates and volumes of groundwater flow within the Biscayne aquifer; (4) acquire water level data and water quality data near wellfields; and (5) create a real-time data distribution network, including website.

Approach

Project will be conducted in four phases: (1) Conduct a feasibility test to determine the horizontal flowmeter type best suited for acquisition of horizontal groundwater flow velocities and directions within the heterogeneous karst Biscayne aquifer. (2) Along several canal reaches between the Everglades wetlands and Biscayne Bay, in Miami-Dade County, construct 3-well monitoring well clusters completed in the major groundwater flow zones of the lower, middle, and upper part of the Biscayne aquifer, as well as one completion within the aquifer matrix. Each monitoring well will be instrumented with a horizontal flowmeter and pressure/temperature transducer to measure groundwater flow velocities and directions, and water levels and groundwater

temperature. Prior to installation of the horizontal flowmeter, vertical borehole flowmeters will measure direction of vertical flow within the monitoring wells. The USGS owns a heat-pulse flowmeter, electromagnetic flowmeter, and spinner flowmeter that can be used for this task. For each monitoring well the horizontal flowmeters and transducers will require installation, calibration, and post-installation support. Flowmeter measurements will be compared and calibrated to field-scale tracer test results. Monitoring wells will also be installed at several wellfields to measure water quality and water levels. (3) Use the flowmeter velocity and directional data to calculate rates and volumes of groundwater seepage along canals and at water control structures, and rates and volumes of flow near wellfields. (4) Data generated by instrumentation will be monitored in real time and display on a data website, and a final report will be published.

Benefits

Results of this project will provide quantitative information needed to improved simulation, monitoring, and assessment of the response of the surfacewater and groundwater system to hydrologic changes caused by the effect of increased water-supply needs, changes in land use, proposed coastal rock mines, and seepage-management pilot project implementation. These improved simulations will support technical needs of a number of active CERP projects, including the Biscayne Bay Coastal Wetlands Project, L31N/L30 Seepage Management Pilot Project, Everglades National Park Seepage Management Project, Water Conservation Area 3 Decompartmentalization and Sheetflow Enhancement Project, and Lake Belt In-Ground Reservoir Technology Pilot Project.

Schedule

This project will begin in FY 2008 with the initiation of the comparative flowmeter investigation. The USGS report will be delivered to Miami-Dade County by the end of FY 2011.

Task	FY08				FY09			
	ND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS
1. Test and select best flowmeter type suitable for deployment	XX	XXX	XXX	XXX	-	-	-	-
2. Drill coreholes, log, and construct monitor wells	-	-	-	-	XXX	XXX	XXX	XXX
3. Construct DCPs and install flowmeters								

Task	FY10 OND	JFM	AMJ	JAS	FY11 OND	JFM	AMJ	JAS
1. Test and select best flowmeter type suitable for deployment (lab and field testing)	-	-	-	-	-	-	-	-
2. Drill coreholes, log, and construct monitoring wells	XXX	XXX	XXX	XXX	-	-	-	-
3. Construct DCPs and install flowmeters	XXX	XXX	XXX	XXX	-	-	-	-
4. Begin collection of WQ/WL data	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
5. Real-time data collection and dissemination via website	-	-	-	-	XXX	XXX	XXX	XXX
6. Report preparation and publish report	-	-	XXX	XXX	XXX	XXX	XXX	XXX

Cost per fiscal year (Begins October 1 and ends September 30)

Cooperator	FY2008	FY2009	FY2010	FY2011	Total
USGS Required Funds for Project	$623,350	$864,350	$758,550	$456,620	**$2,702,870**
Miami-Dade County Contracts Required for Project	$120,500	$746,500	$871,000	$42,000	**$1,780,000**
Total	**$743,850**	**$1,610,850**	**$1,629,550**	**$498,620**	**$4,482,870**

Miami-Dade County contracts required for project:

1. Drilling and construction of wells
2. Purchase and construction of stage recorders
3. Basic data-collection-platform (DCP) construction
4. Purchase and horizontal flowmeter installation and hookup to DCP
5. Purchase and installation of transducers
6. Well and stage recorder surveys
7. Website construction with real-time data display
8. Field modem service contracts
9. Permitting of wells and stage recorders

ORIGINAL

Page 1 of 2

Form 9-1366
(Oct. 2005)

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement

Customer #:	FL016
Agreement #:	08E0FL203003
Project #:	8-2080-
TIN #:	59-6000573
Fixed Cost Agreement	☑ Yes ☐ No

FOR
WATER RESOURCES INVESTIGATION

THIS AGREEMENT is entered into as of the 1st day of October, 2007, by the U.S. GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the MIAMI-DADE COUNTY, party of the second part.

1. The parties hereto agree that subject to availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation QUANTIFICATION OF GROUND-WATER FLOWS IN SUPPORT OF SIMULATION OF SURFACE- AND GROUNDWATER FLOWS TO BISCAYNE BAY, MIAMI-DADE COUNTY, herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50; and 43 USC 50b.
2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) includes In-Kind Services in the amount of $0.00.

		by the party of the first part during the period		
(a)	$0.00	October 01, 2007	**to**	September 30, 2011
		by the party of the second part during the period		
(b)	$2,702,870.00	October 01, 2007	**to**	September 30, 2011

(c) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

(d) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.
4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.
5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.
6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.
7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.

Page 2 of 2

Form 9-1366 continued	U.S. Department of the Interior U.S. Geological Survey Joint Funding Agreement	Customer #: Agreement #: Project #: TIN #:	FL016 08E0FL208003 8-2080- 59-6000573

8. The maps, records, or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records, or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program and, if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at costs, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records, or reports published by either party shall contain a statement of the cooperative relations between the parties.
9. USGS will issue billings utilizing Department of the Interior Bill for Collection (form DI-1040). Billing documents are to be rendered **QUARTERLY**. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717; Comptroller General File B-212222, August 23, 1983).

U.S. Geological Survey
United States
Department of the Interior

USGS Point of Contact

Name: Jean Happel
Address: 3110 S.W. 9th Avenue
Ft. Lauderdale, FL 33315
DUNS #: 137784026
Telephone: 954.377.5932
Email: jhappel@usgs.gov

Signatures

By _____ Date 8/23/07
Name: Dr. Barry Rosen
Title: FISC Director

By _____ Date _____
Name:
Title:

By _____ Date _____
Name:
Title:

MIAMI-DADE COUNTY

Customer Point of Contact

Name: Virginia Walsh, P.G.
Address: 3071 S.W. 38th Avenue
Room 554-10
Miami, FL 33146
Telephone: 786.552.8266
Email: WALSHV@miamidade.gov

Signatures

By _____ Date _____
Name:
Title: County Manager

By _____ Date _____
Name:
Title:

By _____ Date _____
Name:
Title:

Approved by County Attorney as to form and legal sufficiency: