City of Hollywood

Assessment of Impact of Elevated Groundwater Chloride Levels on Wastewater Effluent

Scope of Services

City Project #13-9734

June 11, 2014

Coastal areas with elevated chloride levels in the ground water have had a sustained and significant impact on effluent quality. The primary objective of this task order is to quantify the scope of impact by identifying the areas of the collection system most impacted and quantifying the amount of brackish groundwater that contributes to overall effluent flow. This data will be used to support discussions with FDEP to explore conceptual action plans for accounting for and managing these influences.

The proposed scope is divided into two phases. Phase 1 will focus on quantification of brackish groundwater influences. Phase 2 will address development of an approach for accounting for its impact on effluent quality.

Technical Scope Elements

Phase 1 – Quantify Brackish GW Contribution to Effluent Flow

This task will provide for detailed sampling and data analysis to estimate the proportion of brackish groundwater intrusion into the Hollywood system with the objective of refining the estimate of the contribution of this flow to the base condition effluent flow rate. Major subtasks include:

- Groundwater chloride sampling
- Collection basin sampling
- Estimation of Base Condition Contribution

The following sub-tasks detail activities proposed hereunder and offers suggestions on potential division of responsibilities between CONSULTANT and CITY.

1.1 Preliminary Activities and Project Administration

This task provides for kickoff related activities that are required in support of the overall effort. It is anticipated that activities may include:

a. Project kickoff activities – project planning, and participation in a kickoff call with CITY.

b. Project administration activities inclusive of project management and oversight of team activities.

1.2 Collection Basin Sampling

In this subtask, chloride data will be used to estimate the proportion of flow in affected subbasins that may be from coastal brackish groundwater contributions. This will be accomplished by measuring chloride levels in basins potentially affected by brackish groundwater and doing targeted groundwater sampling to estimate chloride levels in the vicinity of the affected areas of the collection system.

a. CONSULTANT Responsibilities
   I. Prepare a preliminary screening sampling plan to characterize chloride levels in basins H-11, H-12, H-13, H-15, H-15W, H-16, H-17, H-18, and H-31, with targeted sampling in other subbasins to establish a reference background chloride level. The plan will identify sampling locations (wetwells and manholes), target dates, and time intervals for chloride sampling. The objective is to prioritize basins for further analysis and to develop a targeted groundwater sampling strategy.
   II. Meet with City to discuss/review preliminary screening plan.
   III. Compile and analyze test data. Evaluate test results furnished by City. Based on the data collected, locations for groundwater sampling (refer to Subtask 1.3) will be selected.
   IV. Compile and reduce data from the City.
b. CITY Responsibilities
   I. Furnish GIS atlases showing the layout and invert elevations for the gravity collection system in target collection basins.
   II. Conduct field sampling and chloride testing in conformance with the screening test plan.
   III. Conduct field sampling and flow monitoring in conformance with the supplemental testing plan.
   IV. Deploy data loggers to estimate lift station flow data, where required.

1.3 Groundwater Chloride Sampling

a. CONSULTANT Responsibilities
   I. Review readily available groundwater chloride data in the eastern part of the City's service area. The groundwater sampling portion of the Supplemental Test Plan will reflect existing available test sites and additional locations to be tested.
   II. Compile and analyze data received from groundwater sampling.
   III. Limited assistance with identification of permitting requirements. Any actual permitting activity may be done under the permitting allowance.
b. City Responsibilities
   I. Provide as-needed field support during sampling.
   II. The CITY will use an on-call test well drilling contractor, to install the temporary sampling wells and collect samples. Analytical work will be conducted by City.

1.4 Base Condition Impact Analysis

The objective of this sub-task is to establish a refined estimate of the impact of brackish coastal ground water on existing flows of domestic sewage being treated at the Hollywood South Region WWTP and to arrive at agreement with the FDEP on the methodology and result of our flow estimation method. This task will analyze data for Hollywood's system and based on assumed similarity, extrapolate the findings to Dania Beach and Hallandale Beach. Should system-specific estimation be required for any Large User, required work would be conducted under a separate task order.

a. CONSULTANT Responsibilities

I. Prepare a mass balance for Hollywood's retail system that estimates the brackish groundwater contribution to plant flows based on measured groundwater chloride levels.

II. Conduct an analysis of historical flows and chloride levels that are representative of the CITY's flow contributions. Develop a rational approach for using the findings to estimate the brackish coastal groundwater contribution to the CITY's influent wastewater stream.

III. Estimate (based on assumed similarity) the existing systemwide volumetric contribution of brackish coastal groundwater from other coastal Large Users that contribute to the system.

IV. Prepare a Technical Memorandum that details the analysis method, data analysis, quantification of brackish coastal groundwater contribution on CITY's flows.

V. Submit the TM for review by the CITY and FDEP. Participate in a pre-submittal meeting with the CITY, incorporate updates and submit the updated TM to the FDEP for review.

VI. Participate in a review conference call with FDEP and CITY to discuss the findings and receive comments.

Phase 2 – Actions to Mitigate Impact of Elevated Chloride Levels on Effluent

This phase will be activated depending on the outcome of Phase 1 activities. This task will develop alternative action plans that establish a rational basis for FDEP consideration of various mechanisms whereby the CITY may be able to significantly reduce its costs for compliance with the requirements of the OO Rule. The objective is to make a strong case to do this by first identifying actions that analysis indicates are allowable within existing interpretation of OO Rule and other pertinent regulations. The next tier actions will provide reasonable and practical actions that hold promise of achieving FDEP staff support but would require legislative changes to implement. Major subtasks include:

- Unique Characteristics of Hollywood's Brackish Groundwater Influences
- Summarize Requirements of Pertinent Regulations
- Develop Approach and Rational Basis for Alternative Actions
- Adjustments Allowed Under Existing Law and Supporting Basis
- Modifications that Require Legislative Changes

The following sub-tasks detail activities proposed hereunder and offers suggestions on potential division of responsibilities between CONSULTANT and CITY.

2.1 Unique Characteristics of Hollywood's Brackish Groundwater Influences

a. This subtask will provide an overview of Hollywood's service area, identify areas that are subject to coastal brackish groundwater and describe characteristics of the system that are unique to the CITY and pose a challenge not typically encountered by other systems to a comparable degree. The objective will be to identify citable sources of analysis that underscore challenges related to low lying levels, tidally influenced local flooding, relative proportion of system within impacted areas). CITY shall furnish supporting studies and available data for review and summary by CONSULTANT.

2.2 Summarize Requirements of Pertinent Regulations

a. A review of existing regulations will be conducted with the objective of identifying conditions and background that addresses the intent of the rules relative to the considerations being proposed by the CITY. The pertinent findings will be concisely summarized in a tabular format together with an indication of the relevance of each provision to the CITY's position.

2.3 Develop Approach and Rational Basis for Regulatory Action

a. Based on the results of the Regulatory review and past efforts with the FDEP, CONSULTANT shall prepare an updated list of alternative actions to further consideration.
b. A "brainstorming meeting" will be held with the CITY to review and expand upon the top potential alternative/actions that would be subject to further development.
c. General technical principles on which the analysis will be developed will be prepared to provide graphic illustration of the key actions, where practical. This activity is intended to support the planned action by detailing the component elements in a qualitative manner. Quantitative technical analyses are not being considered hereunder.
d. CONSULTANT shall develop a concise description that articulates the approach and supporting rationale for each. The potential impacts on the CITY's compliance requirements will be estimated together with a synopsis of regulatory alignment, impact on the environment and the CITY's customers. The description is expected to be one to two pages long.

2.4 Adjustments Allowed Under Existing Law and Supporting Basis

a. The objective of this subtask is to refine and articulate the strongest case for FDEP to approve measures that are in the CITY's best interest. Anticipating that alternate actions may provide overlapping results, a single preferred alternative will be selected and refined.
b. CONSULTANT shall meet with CITY to preliminary review the basis for selection of the preferred alternative. Remaining alternatives will be identified and presented as further supporting considerations for the preferred alternative. This approach is intended to

provide clarity of focus and to align all cogent arguments behind an alternative action that is believed to have the best likelihood of achieving FDEP support and approval.

c. A Technical Memorandum will be prepared for submittal and consideration by the FDEP. A draft will initially be submitted to the CITY for review and updated prior to being submitted to the FDEP. The TM will identify potential demonstration investigation that may be considered to provide supporting evidence to facilitate their decision making process.
d. CONSULTANT shall participate in a meeting/call with FDEP and the CITY to discuss the submittal and receive comments. Internal meeting minutes will be prepared documenting the feedback received. CONSULTANT and CITY shall meet to discuss and agree on required follow-up action.

2.5 Modifications that Require Legislative Changes

a. Alternative actions from Subtask 2.4 that are supported by FDEP but are beyond their authority or willingness to approve will be prioritized for legislative intervention. A meeting will be held with the City to identify and agree on specific modifications to target.
b. Develop proposed modifications to the existing rule that minimize the recommended changes while creating the interpretive flexibility for Agency approval.
c. A Technical Memorandum will be prepared for submittal and consideration by the FDEP. A draft will initially be submitted to the CITY for review prior to being submitted to the FDEP.
d. CONSULTANT shall participate in a meeting/call with FDEP and the CITY to discuss the submittal and receive comments. CONSULTANT and CITY shall meet to discuss and agree on required follow-up action (inclusive of demonstration needs).

Phase 3 – Contingency Allowance

This task includes additional efforts that may be required to bring this assessment to a successful conclusion. Work items in this subtask shall be authorized (either in writing or via e-mail) on an "as-needed" basis by the City and are not included in the base fee for this project. Work under this allowance may include additional coordination with regulatory agencies, permitting and related activities, expanded sampling activities, additional data generation/review/analysis, more in-depth system characterization, development of new actions, estimating the impact of historical flow and developing a concept for how it may be considered by FDEP, or any other supplemental activities that may facilitate achieving the City's goals.

Assumptions

1. Recommended collection system flow testing and groundwater analysis will be conducted by the City.
2. City shall provide GIS support where required to conduct supporting spatial analysis or to develop maps from existing data files.
3. Proposed tasks do not include activities required to support the development and deployment of a political strategy. It is assumed that required support would be authorized via a separate task order.

Project Schedule

BC will complete the proposed services within 180 calendar days from the receipt of notice to proceed. Subsequent assessment report revisions will be prepared within 14 calendar days of the receipt of consolidated written comments from the City.

Compensation

BC will perform the proposed services for a not to exceed fee of $120,784. A contingency allowance of $28,641 may be authorized, in writing, by the City for up to a total contract amount of $149,425. Please see Exhibit A for the cost breakdown.

Assessment of Impact of Elevated Groundwater Chloride Levels on Wastewater Effluent - (City Project 13-9734)

Description		Amount
Labor Costs	$	120,634
Other Direct Costs	$	150
Contingency	$	28,641
Total Fee, No Contingency	**$**	**120,784**
Total Fee, With Contingency	**$**	**149,425**

COST ESTIMATE
CITY OF HOLLYWOOD
CITY PROJECT NO. 13-9734
Assessment of Impact of Elevated Groundwater Chloride Levels on Wastewater Effluent

TASKS	Vice President	Senior Engineer	Designer	Administrative Coordinator	Labor Hours	Labor Cost
Billing Labor Rate	$254.00	$156.19	$116.85	$98.87		
	Grace/Perez/ Earle	Charles	Hellyer	Gardner		
TASK NO. 1 - QUANTIFY BRACKISH GW CONTRIBUTIONS TO EFFLUENT FLOW						
1.1 Preliminary Activities	14	16		2	**32**	**6,253**
1.2 Collection Basin Monitoring	18	40	4	2	**64**	**11,485**
1.3 Groundwater Chloride Monitoring	14	24	4	2	**44**	**7,970**
1.4 Base Condition Impact Analysis	44	100	16	2	**162**	**28,862**
Hour Subtotal	90	180	24	8	**302**	
Labor Cost Subtotal	$22,860	$28,114	$2,804	$791		**54,570**
TASK NO. 2 - STRATEGY TO MITIGATE IMPACT OF ELEVATED CHLORIDES ON EFFLUENT						
2.1 Unique Characteristics of Hollywood's Brackish GW Influences	12	24	8	2	**46**	**7,929**
2.2 Summarize Requirements of Pertinent Regulations	6	32		2	**40**	**6,720**
2.3 Develop Approach and Rational Bases for Alternative Strategies	62	56		2	**120**	**24,692**
2.4 Adjustments Allowed Under Existing Lay and Supporting Basis	44	44		2	**90**	**18,246**
2.5 Modifications that Require Legislative Changes	8	40		2	**50**	**8,477**
Hour Subtotal	132	196	8	10	**346**	
Labor Cost Subtotal	$33,528	$30,613	$935	$989		**66,065**
TASK NO. 3 - Contingency Allowance						
3.1 As-Needed Services	68	66	4	6	**144**	**28,641**
Hour Subtotal	68	66	4	6	**144**	
Labor Cost Subtotal	$17,272	$10,309	$467	$593		**28,641**
Total Labor Hours - Without Contingency	**222**	**376**	**32**	**18**	**648**	
Total Labor Cost - Without Contingency	**$56,388**	**$58,727**	**$3,739**	**$1,780**		**$120,634**
Total Labor Hours - With Contingency	**290**	**442**	**36**	**24**	**792**	
Total Labor Cost - With Contingency	**$73,660**	**$69,036**	**$4,207**	**$2,373**		**$149,275**

OTHER DIRECT COSTS SUMMARY

	UNIT	NO. OF UNITS	UNIT COST	TOTAL COST
1.0 MISC. POSTAGE, FEDEX, SUPPLIES	UNIT	1	$ 150.00	$150
SUBTOTAL OTHER DIRECT COSTS				**$150**
TOTAL ODCS				$150