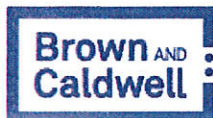


1560 Sawgrass Corporate Parkway
Suite 240
Sunrise, Florida 33323
Tel: 954-200-7233
Fax: 954-200-7212
www.browncaldwell.com

July 26, 2016



Mr. Steve Joseph, P.E.
Director
City of Hollywood
Department of Public Utilities
P.O. Box 229045
Hollywood, FL 33022-9045

Subject: Assessment of Alternatives for Backup Disposal of Concentrate
City Project No. 16-4041
Work Order No. B&C 16-03

Dear Mr. Joseph:

Brown and Caldwell (BC) has assisted the City of Hollywood in working with the FDEP to develop and agree on a feasible reuse strategy that would comply with the Ocean Outfall Rule. As the City moves forward with planning for the eventual closure of the outfall for all but peak flows, potential impacts must be anticipated and appropriately planned for. One area that will be impacted is the backup disposal of concentrate from the City's water treatment plant (WTP).

Until the construction and commissioning (in 2014) of a concentrate disposal well at the WTP that was designed for the co-disposal of concentrate and secondary effluent, the City relied exclusively on the ocean outfall for disposal of its concentrate. Since the commissioning of the concentrate disposal well, the Outfall has served as a backup disposal method. Once the outfall is closed, the City will be left with no backup method of disposing of its water treatment concentrate. Without a backup means of disposal, the City would not be able to run its nanofiltration and reverse osmosis processes during periodic mechanical integrity testing activities on the concentrate deep injection well. Furthermore, the existing effluent disposal wells at the City's wastewater treatment plant (WWTP) can not serve as an alternate means of disposal because they are not appropriately equipped, as required under the EPA Underground Injection Control Rule, to accommodate concentrate waste streams. The City's desire is to maintain the ability to co-dispose of its concentrate and wastewater effluent at the WWTP.

Mr. Steve Joseph, P.E.
City of Hollywood
July 26, 2016
Page 2

The City's most recent outfall closure plan does not specifically address the concentrate disposal needs. Consequently, the purpose of this task order is to develop and evaluate alternative methods of providing for backup disposal of concentrate once the outfall is closed. This analysis will allow concentrate disposal requirements to be addressed in an integrated and coordinated manner with other required improvements.

TECHNICAL SCOPE ELEMENTS

Task 1 – Initial Project Activities and Status Meetings

The purpose of this task is to facilitate the initial coordination, data/information collection required to support the subsequent tasks and to prepare for and participate in a kickoff meeting with City. This task includes two status review meetings that will be used to discuss progress and pertinent matters that emerge during the course of the project.

Subject to availability, information that will be furnished by the City includes, but is not limited to the following:

1. Permit application for the concentrate disposal well
2. Existing and projected concentrate flows (may be included in #1)
3. Capacity limitations and condition information for the concentrate/effluent transmission main between the WTP and WWTP
4. Historical daily concentrate flow for the past 5 to 10 years (estimated to average 1.8 to 2.3 mgd with a peak flow of 4.1 mgd with all trains running)
5. Concentrate water quality data (conductivity, pH, and other parameters)

Task 2 – Summarize Regulatory Requirements for Concentrate Disposal by Deep Well Injection

BC will document key requirements of the USEPA's Underground Injection Control (UIC) Rule that governs the use of injection wells for the disposal of wastewater effluent and concentrate. Additionally, specific permit requirements for the City's most recently approved injection well will be reviewed and summarized. The objective of this task is to document key requirements that will shape the alternatives evaluated for co-disposal of effluent and concentrate.

Task 3 – Develop Alternatives for Future Concentrate Disposal

Specific co-disposal alternatives to be investigated include:

1. No action alternative;
2. redundant well at the WTP;
3. redundant dedicated well at WWTP;
4. ability to dispose of concentrate at WWTP via non-dedicated wells.

Each alternative will be characterized relative to the scope of proposed improvements, as well as the net impact, relative to infrastructure requirements and comparative cost, on the baseline (existing) alternative. For the “no action” alternative, BC will review available documents and meet with the City to discuss conceptual elements of its compliance approach for which written documentation is not presently available.

Cost estimates used in this task are not intended to be used for program implementation budgeting, but rather comparative assessment of alternatives. For this application, it is more important that unit costs are consistently applied across alternatives than for the indicated costs to address all elements of ultimately required improvements. Consequently, this sub-task will draw on typical representative costs from available sources, including City’s prior planning/implementation efforts, and provide documentation of the unit costs that will be assumed for comparative purposes.

Task 4 – Analyze Alternative Concentrate Disposal Approaches and Provide Implementation Recommendations

BC will evaluate the qualitative and quantitative considerations associated with the various concentrate disposal alternatives and provide a basis for the recommended alternative. The results of this analysis and recommendations will be documented in a project report (Task 5). Elements of the baseline outfall closure plan that are impacted by the modification will be identified together with the supporting rationale.

Mr. Steve Joseph, P.E.
City of Hollywood
July 26, 2016
Page 4

Task 5 – Prepare Project Report

BC will prepare a draft report and executive summary that presents the results of the alternative evaluation and the recommended direction. Upon receipt of comments from the City, the report will be finalized and submitted to the City in electronic format. The duration for this project will be six months.

ASSUMPTIONS

1. Cost estimates will be for alternative comparison only and based on existing planning numbers in the City's master plan documents.
2. Work in this assessment is to be based on existing and known proposed regulations as of the date of the proposal's NTP.

Very truly yours,

Brown and Caldwell



Celia D. A. Earle, Ph.D.
Vice President

cc: Albert Perez, Brown and Caldwell
Nigel Grace, Brown and Caldwell

**Table 1. Summary of Engineering Fees - City of Hollywood -
Assessment of Alternatives for Backup Disposal of Concentrate
(City Project 16-4041)**

Description	Amount
Labor Costs	\$ 42,594
Other Direct Costs	\$ 100
Total Fee	\$ 42,694

COST ESTIMATE
CITY OF HOLLYWOOD
CITY PROJECT NO. 16-4041
Assessment of Alternatives for Backup Disposal of Concentrate

	Billing Labor Rate	Vice President		Principal Hydrogeologist		Senior Engineer		Administrative Coordinator		Labor Hours	Labor Cost
		Grace/Perez		Turk		Charles		Gardner			
TASKS											
TASK NO. 1 - INITIAL PROJECT ACTIVITIES AND STATUS MEETINGS											
100	Initial Project Activities and Status Meetings		12				12		8		5,713
	Hour Subtotal		12	0			12		8	32	5,713
	Labor Cost Subtotal	\$3,048		\$0		\$1,874		\$791			
TASK NO. 2 - REGULATORY REQUIREMENT SUMMARY											
200	Regulatory Requirement Summary		12	8			8			28	5,755
	Hour Subtotal		12	8			8		0	28	5,755
	Labor Cost Subtotal	\$3,048		\$1,458		\$1,250		\$0			
TASK NO. 3 - ALTERNATIVE DEVELOPMENT											
300	Alternative Development		16	4			40		4	64	11,436
	Hour Subtotal		16	4			40		4	64	11,436
	Labor Cost Subtotal	\$4,064		\$729		\$6,248		\$395			
TASK NO. 4 - IMPLEMENTATION RECOMMENDATIONS											
400	Implementation Recommendations		20	8			40			68	12,785
	Hour Subtotal		20	8			40		0	68	12,785
	Labor Cost Subtotal	\$5,080		\$1,458		\$6,248		\$0			
TASK NO. 5 - REPORT PREPARATION											
500	Report Preparation		8	4			24		4	40	6,905
	Hour Subtotal		8	4			24		4	40	6,905
	Labor Cost Subtotal	\$2,032		\$729		\$3,749		\$395			
	Total Labor Hours		52	20		84		12		60	\$42,594
	Total Labor Cost	\$17,272		\$4,373		\$19,368		\$1,582			

