

**Memorandum**

April 13, 1995

To: Jim Morgan, Regional Parks and Greenspaces, METRO

From: Scott Wells, CE/PSU, 725-4276, FAX 725-4298

Re: Evaluation of pollutant impacts on Smith/Bybee Lakes of a no-dam option

Thank you for summarizing our conversation in your letter of April 13. I will organize your request into work tasks below with an estimated cost. As you mentioned, we could easily amend my existing contract with METRO, as we have done before.

**Work tasks:**

1. Reorganize model simulation including Smith/Bybee Lake done in 1991/1992 with re-calibrated Lower Slough model (only the water quality parameters were re-calibrated, all hydraulic variables have remained the same).

2. Set-up model simulations for the following runs:

Run number	Run name	Comments
1	Base - high	high water period (min. of 30 days) with major CSO events (tracer concentration 0), no landfill leachate flow, and Willamette River tracer concentration of 0
2	Base - low	low water period (min. of 30 days in summer) with a CSO event (tracer concentration 0), no landfill leachate flow, and Willamette River tracer concentration of 0
3	CSO - high	high water period (min. of 30 days) with major CSO events (tracer concentration of 100 mg/l), no landfill leachate flow, and Willamette River tracer concentration of 0
4	CSO - low	low water period (min. of 30 days in summer) with major CSO events (tracer concentration of 100 mg/l), no landfill leachate flow, and Willamette River tracer concentration of 0
5	Willamette - high	high water period (min. of 30 days) with major CSO events (tracer concentration 0), no landfill leachate flow, and Willamette River tracer concentration of 100 mg/l
6	Willamette - low	low water period (min. of 30 days in the summer) with major CSO events (tracer concentration 0), no landfill leachate flow, and Willamette River tracer concentration of 100 mg/l

Run number	Run name	Comments
7	Landfill - high	high water period (min. of 30 days) with major CSO events (tracer concentration 0), landfill leachate flow (flow rate, Q, to be distributed along boundary of landfill, Q to be determined, with tracer concentration of 200 mg/l), and Willamette River tracer concentration of 0
8	Landfill - low	low water period (min. of 30 days in the summer) with major CSO events (tracer concentration 0), landfill leachate flow (flow rate, Q, to be distributed along boundary of landfill, Q to be determined, with tracer concentration of 200 mg/l), and Willamette River tracer concentration of 0
9	Loading - high	high water period (min. of 30 days) with major CSO events, determine typical concentration of pollutant to be modeled from CSOs, landfill, and Willamette River
10	Loading - low	high water period (min. of 30 days) with major CSO events, determine typical concentration of pollutant to be modeled from CSOs, landfill, and Willamette River

3. Run model alternatives on workstations

4. Analyze model results

a. Evaluation and comparison of time series records of concentrations in the Lakes and the Slough at several control points for each simulation, for example:

Lower Columbia Slough and North Slough

LOM: Lombard Street bridge

CNN: Lower Columbia Slough at entrance to North Slough

SJB: St. John's Landfill bridge

ENS: East end of North Slough

NPB: North Portland bridge

VNB: Vancouver bridge

Smith and Bybee Lakes

To be determined - 3pts.

b. Computer animation results of pollutant movement in the Lower Columbia Slough, North Slough, and Smith and Bybee Lakes for each simulation.

c. Statistical frequency distribution of average pollutant concentrations in Smith Lake, Bybee Lake, North Slough, and the Lower Columbia Slough as represented as a fraction of the system volume with a given concentration.

5. Prepare draft and final report (detailed description of model set-up and analysis of model simulations)

6. Project management, project meetings, etc.

**Estimated cost:**

Task number	Task name	Personnel cost	Supplies, etc.	15% overhead	Estimated cost
1	Model set-up	500	100	90	690
2	Alternatives set-up	2,000		300	2,300
3	Model simulations	750		112.5	862.5
4	Analysis	3,000		450	3,450
5	Reports	1,700	350	307.5	2,357.5
6	Project management	700	100	120	920
	Totals	8,650	550	1,380	10,580

Note that personnel cost includes salary and benefits; supplies include report reproduction, computer supplies, and project Xeroxing, etc., and the 15% overhead is the standard PSU rate for local government agencies.

**Estimated time schedule:**

May 1, 1995: Project start, organization of project, refinement of model simulation runs to be accomplished

May 15, 1995: Original model updated

May 30, 1995: Model alternatives set-up for running

June 7, 1995: Model alternatives run on computer

June 15, 1995: Model evaluation of results complete; Meeting at METRO to review evaluation results

June 30, 1995: Draft final report submitted for review

July 15, 1995: Final report submitted

This time schedule is conservative. I would like to finish this work earlier. If you wish to proceed with this work as outlined above, I would suggest an amendment to the existing contract extending the time of completion to June 30, 1996 (to extend to the end of the next fiscal year). The representative numbers for the landfill, CSOs, and the Willamette River may not be available in a timely fashion, hence the final report may not be completed on the above time schedule.



**METRO**

April 13, 1995

Scott Wells  
PSU Dept. of Civil Engineering  
P.O. Box 751  
Portland, OR 97207-0751

Dear Scott:

There is an immediate need to evaluate the potential impact on the water quality of Smith and Bybee Lakes if the dam and flow control structure currently separating the lakes from North Slough is removed. Removal of the dam with possible replacement with a water control structure that would allow unobstructed flow between the lakes and slough is being considered as a preferred management option. I am requesting that you consider conducting numerical modeling runs using the hydrodynamic/water quality model you have calibrated for the Columbia Slough system. The bathymetric data you have for Smith and Bybee Lakes should be adequate for these simulations.

The pollutants of concern are bacteria ( until CSO's are removed), nutrients, and metals. Any organics of concern is unknown at this time. Use of a conservative tracer may be the most appropriate approach, allowing us to look at transport without degradation, adsorption or other mechanisms for reducing the potential impact.

Our current understanding is that potential significant pollutant sources that may affect the lakes upon restoring its connection to the slough are (1)municipal stormwater/CSO, (2) landfill leachate via groundwater, and (3)Willamette River water. To evaluate the relative impact of these sources, I suggest the following possible model runs:

Existing Conditions

Runs 1 to 3 Using conservative tracer (i.e. chloride or electrical conductivity), simulate the relative contribution of each of the three sources, mentioned above, to the lakes after removal of the dam at east end of North Slough. This may be done by using realistic estimates of tracer loading from each contributor, eliminating two contributing sources while the other input is allowed.



**Run 4**

Using the best available data, simulate actual known loading rates. Willamette River and Columbia Slough data is probably adequate. However, the groundwater loading from the landfill directly into the Columbia and North Slough is in question at this time. I understand Shuguang Li will have more accurate estimates very soon. Perhaps when we are ready for this run, we will have those new estimates.

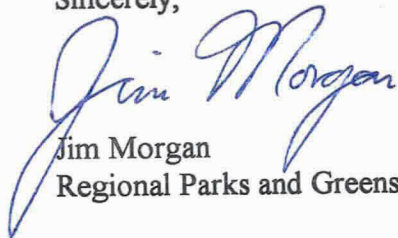
Model runs should be done under both winter high-flow and summer low-flow conditions. The appropriate simulation period may be a minimum of a month, possibly two. Winter conditions should include at least one major CSO event. Summer low-flow period should include the period when the lakes would be, essentially, mudflats.

Unfortunately, there is a sense of urgency in determining these potential impacts upon exercising the management option. Please provide me with a cost estimate and schedule associated with the efforts described above. I will do all that I can to assist you in your efforts, particularly in providing any input data.

We can use the existing contract between PSU and Metro, writing a contract extension for this work. Thank you for your interest and participation in advising us on this water quality issues.

I anticipate seeing you at the Smith and Bybee Lakes Technical Advisory Committee meeting on Friday, May 5, from 9 to 11 a.m. in Room 101 at Metro.

Sincerely,

A handwritten signature in blue ink that reads "Jim Morgan". The signature is written in a cursive style with a large, sweeping initial "J".

Jim Morgan  
Regional Parks and Greenspaces