



King County

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MEMORANDUM

DATE: September 17, 2008

TO: King County Council Capital Budget Committee

FROM: Cheryle A. Broom, ^{OMB} County Auditor

SUBJECT: Brightwater Project Quarterly Oversight Report

Attached is the fifth Brightwater Project Construction Phase Oversight Monitoring Consultant Report prepared by R.W. Beck, the Oversight Monitoring Consultant (OMC), issued under the mandated Capital Projects Oversight Program. This report provides an updated review of the status of cost, risk, and schedule for the Brightwater project based on the Wastewater Treatment Division's (WTD) monthly construction progress reports through June 2008. In addition, to improve on the timeliness of information available to the council, this report shows a greater emphasis on progress and emerging issues that have arisen since that time. Included are progress updates from monthly Brightwater Oversight Management Staff Group meetings and bi-weekly WTD project staff and OMC meetings as of the report date. The report also documents WTD's progress in implementing the recommendations from the last OMC quarterly report and offers three new recommendations for WTD.

In this report, the OMC reinforces their opinion that project costs are more likely to be in the \$1.843 to \$1.849 billion range, or \$41 to \$47 million higher than the WTD 2008 trend report estimate. Since the last quarterly report, the OMC has reviewed in detail several cost areas that would need to be covered by project contingency, which in their opinion, was reduced too low with the last trend report cost estimate. The new information and analysis is documented in this report and results in a new recommendation.

The concerns about conveyance schedule delays continue since the last quarterly report. WTD's most recent schedule report (June 2008) shows a 78-day delay in the overall critical path. The East Tunnel is on the critical path and has achieved improved boring production rates in July and August that are not reflected in this schedule. The secondary

critical path involves the Central Tunnel, which continues to show boring production rates below the planned rate.

Through June, the number and value of claims and change orders on the Brightwater Project continues to be relatively low. Claims and change orders are at 14 percent and 5 percent, respectively, of the construction contingency on conveyance and treatment plant contracts. However, the OMC reports that with construction progress at 43 percent on the conveyance system and 24 percent on the treatment plant (measured as a percent of contract value earned) a substantial portion of the construction work is yet to be accomplished. The report documents the emerging issue of risk sharing for diesel cost escalation that will increase construction contingency use.

The report also explores three timely management issues where oversight attention has been focused. The first is WTD's use of risk registers to identify, address, and manage risks. The OMC makes a new recommendation for further risk analysis in preparation for the 2009 Trend Report. The second is WTD's excellent progress on development of detailed plans for start-up, testing, and commissioning of the entire Brightwater Project as a proactive risk management strategy. The third is the proposal to incorporate the construction of the Environmental Education and Community Center and Treatment Plant landscaping work into the GC/CM contract with Hoffman, following an evaluation of contracting options for the work.

The OMC documents WTD's satisfactory ongoing efforts to address previous recommendations made to help better manage cost and schedule risks on the project. In addition, the OMC makes three new oversight recommendations for WTD to:

1. Continue to update and refine mitigation plans and strategies to manage the East Tunnel delay while focusing more effort on the implications of a substantial Central Tunnel delay.
2. Provide updates regarding amendments related to diesel pricing risk sharing for OMC review and monitoring.
3. In the upcoming 2009 Trend Report, pay particular attention to budgeting contingencies in light of: 1) actual 2008 costs for consultants and staff; 2) ability to actually ramp down staffing and consultant efforts at the end of job; 3) the potential for delay of individual contracts and the overall project; 4) actual status of buyout savings; and 5) other potential risks.

We appreciate the collaborative efforts of WTD, council staff, and the R.W. Beck consultant team which continue to promote effective oversight of the Brightwater project consistent with council intent.

No formal presentation of this quarterly report has been scheduled for the Capital Budget Committee. A presentation will be made to the Regional Water Quality Committee on

October 1, 2008. We are available to brief you on this report upon request and would work with council staff to coordinate including representatives from WTD for those briefings. Should you have questions or comments on the report, please contact Tina Rogers, the Capital Projects Oversight Manager, or me.

CB:TR:SB:yr

Attachments: Brightwater Project Construction Phase Oversight Monitoring Consultant Report, R.W. Beck, (Quarter Ending June 30, 2008)

cc: Metropolitan King County Councilmembers
Ron Sims, County Executive
Theresa Jennings, Director, Department of Natural Resources and Parks (DNRP)
Christie True, Division Director, Wastewater Treatment Division, DNRP
Bob Cowan, Budget Director, Office of Management & Budget (OMB)
Dave Lawson, Internal Audit Supervisor, Executive Audit Services, OMB
David Jochim, Vice President, R.W. Beck, Inc.
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Capital Budget Committee
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Regional Water Quality Committee

Brightwater Project Construction Phase
Oversight Monitoring Consultant Report
(Quarter Ending June 30, 2008)

King County
Brightwater Project Oversight Services
Contract No. P43024



In association with



Brightwater Project Construction Phase
Oversight Monitoring Consultant Report
(Quarter Ending June 30, 2008)

King County
Brightwater Project Oversight Services
Contract No. P43024



In association with



Brightwater Project Construction Phase Oversight Monitoring Consultant Report

Quarter Ending June 30, 2008

Final as of September 16, 2008

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This report has been prepared for the use of the client for the specific purposes identified in the report. The conclusions, observations and recommendations contained herein attributed to R. W. Beck, Inc. (R. W. Beck) constitute the opinions of R. W. Beck. To the extent that statements, information and opinions provided by the client or others have been used in the preparation of this report, R. W. Beck has relied upon the same to be accurate, and for which no assurances are intended and no representations or warranties are made. R. W. Beck makes no certification and gives no assurances except as explicitly set forth in this report.

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Brightwater Project Construction Phase
Oversight Monitoring Consultant Report
Quarter Ending June 30, 2008

Final as of September 16, 2008

Executive Summary

OVERVIEW

This Executive Summary presents highlights of the Oversight Monitoring Consultant's (OMC's), quarterly briefing on the Brightwater Project. Major conclusions of this quarterly report include:

- Developments since our previous quarterly report have reinforced our opinion that project costs are more likely to be in the \$1.843 to \$1.849 billion range, or about \$41 to \$47 million higher than WTD's *2008 Trend Report* estimate.
- WTD is projecting hydraulic completion on February 22, 2011 with the Project accepting wastewater for treatment on May 23, 2011. This represents a 78 day delay in the overall critical path – about the same amount of delay reported in our last quarterly report. The secondary critical path is showing a 38-day delay.
- Major risk issues include: unforeseen conditions during tunneling; delay and contract coordination risks.

Overall Program Costs: Developments since our previous quarterly report have reinforced OMC's opinion that WTD's *2008 Trend Report* under-estimated project costs by \$41 to \$47 million (see Table ES-1). Our opinion in part reflected our concern that WTD had reduced project contingencies¹ from the levels in its *2007 Trend Report* (i.e., for Conveyance, the project contingency was reduced from \$18.2 to \$6.2 million and for the Treatment Plant, the project contingency was reduced from \$4 million to \$2 million). In our review of the *2007 Trend Report* we also provided an opinion that we believed the \$4 million contingency for the Treatment Plant was low.

¹ Brightwater includes both construction contingencies and project contingencies. The construction contingencies are applied to each construction contract and cover the typical risks associated with construction, such as changed subsurface contingencies. In our opinion, WTD's construction contingencies for Conveyance (\$68.6 million) and the Treatment Plant (\$33.1 million) are generally appropriate. However, we believe the project contingencies, which cover additional risks such as those associated with coordination of multiple construction contracts, are low.

Table ES-1. Estimated Project Costs (nominal \$M)

	WTD 2004 Baseline 3% Infl. 5% Infl (\$Millions)	WTD 2007 Trend (\$Millions)	WTD 2008 Trend (\$Millions)	OMC Estimate Based on Review of 2007 Trend (\$Millions)	OMC Draft Estimate Based on Review of 2008 Trend (\$Millions)
Conveyance	\$1,021 - \$1,106	\$ 928	\$ 927	\$ 946 - \$ 952	\$942 - \$944
Treatment Plant	\$640 - \$684	\$ 840	\$ 875	\$ 882 - \$ 911	\$901 - \$905
Total	\$1,660 - \$1,790	\$1,767	\$1,802	\$1,827 - \$1,862	\$1,843 - \$1,849

At mid-year, we reviewed the status of Treatment Plant GC/CM contract buyout savings, actual consultant and staff costs, and WTD's data on end of job costs for two other major capital projects. Based on this review, it appears that the project contingency for the Treatment Plant will not be adequate to cover changes in buyout savings and staffing / consultant costs from those included in the *2008 Trend Report*. For Conveyance, construction management costs are exceeding budgeted levels and, if they continue, could consume most of the Conveyance project contingency. Further delays would also increase costs above projections in the *2008 Trend Report*.

Schedule. WTD is reporting the estimated hydraulic completion date for the project as February 22, 2011, and that the Project will start accepting wastewater for treatment as May 23, 2011. This represents a 78 day delay in the overall critical path – about the same amount of delay reported in our last quarterly report. The overall critical path runs through East Tunnel contract, to the Influent Pump Station (IPS), and then to Treatment Plant start-up.

The critical path delay is driven by delays with the East Tunnel which, in turn potentially delay the date for turning over the portal site to the Influent Pump Station contractor (Kiewit). The East Tunnel contractor has added a full-time maintenance shift and is working most Saturdays to help makeup time. July and August tunneling production data indicates that the contractor has been successful in making up some time. In addition, WTD has executed a no cost change order with Kiewit that provides additional time (to mid-January 2009) before WTD is contractually obligated to turn over the portal site to Kiewit. With the additional time, and if current production rates continue, it is possible that WTD could meet its contractual obligation to turn over the portal site to Kiewit.

Both the Central Tunnel and West Tunnel contracts are also showing delay. The West Tunnel is not on the critical path; however a secondary critical path runs through the Central Tunnel to startup activities. As of June 30, 2008, the secondary critical path delay was reported as 38 days. WTD reports that delays for both tunnel boring machines at the Central Tunnel are due to problems with the contractor's slurry separation plant and ground conditions, and that these problems have persisted through July and August. As of the end of August 2008, BT-2 was about 39 percent complete (versus a planned completion of about 58 percent) while BT-3 was about 14 percent complete (versus a planned completion of about 21 percent). If current production (140 feet per week for BT-2 and 195 feet per week for BT-3 versus planned rates of

about 260 feet per week) continues, the total days of delay for both machines could be substantial. In addition, BT-2 exits at the same portal site used by BT1 and the IPS contractor. Delays could potentially interfere with the IPS contractor's work.

Finally, delays to either the East Tunnel or to the Central Tunnel pose the potential risk that the Treatment Plant could be ready for clean-water testing and ultimately for treating wastewater before Conveyance is completed.

Risks. Looking forward, major risk issues include: unforeseen conditions during tunneling; as noted above, delay and coordination risks related to the East Tunnel; Central Tunnel, and IPS work at the North Creek portal; delay risks associated with the Central Tunnel; coordination and integration of work under two different prime contractors at the Treatment Plant; and delays in Treatment Plant startup caused by Conveyance delays. WTD's work on startup planning should help manage and mitigate some of the risk of schedule divergence between the Treatment Plant and Conveyance.

PROGRESS ON PREVIOUS OMC RECOMMENDATIONS

OMC made four recommendations in its previous quarterly report. Two were related to cost and two were related to understanding the impacts and managing the risks of delay. In our opinion, WTD has made reasonable progress in implementing these recommendations.

NEW OMC RECOMMENDATIONS

Three additional OMC recommendations are offered at this time:

1. WTD should continue to update and refine its mitigation plans and strategies to manage the East Tunnel delay while focusing more effort on the implications of a substantial Central Tunnel delay.
2. WTD should provide updates regarding amendments related to diesel pricing risk sharing for OMC review and monitoring.
3. In its upcoming 2009 Trend Report, we recommend that WTD pay particular attention to budgeting contingencies in light of: 1) actual 2008 costs for consultants and staff; 2) ability to actually ramp down staffing and consultant efforts at the end of job; 3) the potential for delay of individual contracts and the overall project; 4) actual status of buyout savings; and 5) other major potential risks such as the potential for the Treatment Plant to be ready for clean-water testing and ultimately for treating waste water before Conveyance is completed. To the extent possible, major specific risks should be quantified in terms of costs and probabilities of occurrence and evaluated to inform the proposed project contingencies. This work should be completed early enough to allow for a review from the OMC and to inform the cost projections in the WTD's upcoming *2009 Trend Report*.

Brightwater Quarterly Report

BACKGROUND

This report is a briefing on the Brightwater Project provided by the Project's Oversight Monitoring Consultant (OMC). The OMC's last report was dated June 16 2008, and covered the period through March 31, 2008. Overall, this quarterly report relies on information provided through WTD's *June 2008 Monthly Report, Conveyance Construction and Treatment Plant Construction Reports*. However, where more up-to-date information was available, we have also considered it in preparing this report.

Since our last quarterly report, work has progressed on both Conveyance and the Treatment Plant as described below.

Conveyance

- Work on the Marine Outfall contract is proceeding ahead of schedule. The two outfall pipelines were barged to Point Wells during the first half of September, connected and set in place. Work is now continuing on-shore and is planned to be completed in November 2008. This will include work to limit the potential for existing on-site contamination to migrate off-shore.
- The West Tunnel Boring Machine (BT-4) has been delivered and assembled. Jet grouting to stabilize ground conditions has commenced, and mining was initiated on September 10, 2008. Through August 2008, mining was about 130 days behind schedule but not on the critical path.
- The Central Tunnel mining is proceeding, with two tunnel boring machines: one eastbound (BT-2) and one westbound (BT-3). Based on tunneling progress data provided by WTD through August 31, 2008, both BT-2 and BT-3 are behind plan. WTD reports that problems in the slurry separation plant and ground conditions have contributed to these delays. On BT-2, ground conditions have necessitated a number of "interventions" which require pressurizing the area ahead of the machine with compressed air. Due to groundwater conditions, pressurizations for BT-2 have been very high (on the order of 40 psi). During one such "intervention," compressed air eventually discharged to Horse Creek (August 6, 2008), causing increased turbidity. WTD is now discussing mitigation plans with the Department of Ecology.
- Tunneling by the East Tunnel contractor continues to be behind schedule and on the critical path. Based on a schedule update dated June 30, 2008, the East Tunnel contractor was projecting meeting Milestone 1 on February 10, 2009, a 79-day delay in its contract date (November 24, 2008) for achieving Milestone 1 – the date for the portal site to be turned over to the IPS contractor. However, tunneling progress in July and August has been ahead of plan.
- Kiewit Pacific Company, the IPS contractor has revised its proposed baseline schedule for the IPS, and continues with submittals and Requests for Information (RFIs) related to the IPS work. WTD has issued a no-cost change order to Kiewit to establish January 14, 2009 as the latest date for turning over the portal site (Milestone 1) to Kiewit.

Treatment Plant

- Hoffman (liquids GC/CM contract) continues work on the head-works, grit removal system, primary treatment, and foundations for the aeration tanks and membranes. Work on pipe encasements and concrete coatings is beginning.
- Work by Kiewit Pacific (solids contract) continues including concrete work on the digesters, wall forms for the Energy Building, and foundations for the truck load out area.

COST ANALYSIS

Developments Since Our Last Report Reinforce OMC's Opinion that Project Costs Will be Higher than Projected by WTD

Table 1 summarizes forecast Project Costs from the OMC's previous quarterly report.

Table 1. Estimated Project Costs (nominal \$M)

	WTD 2004 Baseline 3% Infl. 5% Infl (\$Millions)	WTD 2007 Trend (\$Millions)	WTD 2008 Trend (\$Millions)	OMC Estimate Based on Review of 2007 Trend (\$Millions)	OMC Estimate Based on Review of 2008 Trend (\$Millions)
Conveyance	\$1,021 - \$1,106	\$ 928	\$ 927	\$ 946 - \$ 952	\$942 - \$944
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Total	\$1,660 - \$1,790	\$1,767	\$1,802	\$1,827 - \$1,862	\$1,843 - \$1,849

In that report, we provided an opinion that WTD's *Brightwater Cost Update, Current Conditions and Trends, January 2008 (2008 Trend Report)* likely underestimated costs by about \$41 to \$47 million. This in part reflected our concern that WTD had reduced project contingencies from the levels in its *2007 Trend Report* (i.e., for Conveyance the project contingency was reduced from \$18.2 to \$6.2 million and for the Treatment Plant the project contingency was reduced from \$4 million to \$2 million. Further, in our review of the 2007 Trend Report we also provided an opinion that we believed the \$4 million contingency for the Treatment Plant was low.²) In addition, we stated our concern that some of WTD's cost projections (i.e. for Treatment Plant buyout savings and end of job "soft costs") were based on optimistic assumptions. We continue to believe that overall project costs are more likely to be in the range of \$1.843 to \$1.849 billion.

Further analysis of buyout savings, end of job costs, and "soft costs" are described in more detail below.

² In our review of WTD's 2008 Trend Report, we agreed that WTD's construction contingencies (\$68.6 million for Conveyance and \$33.1 for the Treatment Plant) were generally appropriate.

Treatment Plant Buyout Savings to Date Are below WTD's 2008 Trend Report Estimate

WTD's GC/CM contract with Hoffman³ for the Treatment Plant includes provisions for returning much of the buyout savings to WTD. Buyout savings represent the cumulative difference between the negotiated Maximum Allowable Construction Cost (MACC) and the actual bids awarded to subcontractors. Thus, the amount of buyout savings can fluctuate up and down depending on the outcome of each subcontract bidding process. In addition, buyout savings can be used to cover certain items set forth in the GC/CM contract (see Appendix A.)

As of December 31, 2007 cumulative buyout savings totaled \$28.0 million. WTD projected that all of these savings would accrue to WTD in its *2008 Trend Report*. However, since then, subcontract bid packages 7e (liquids building electrical), 11 (exterior closure and finishes), 12a (site fencing), 12b (site paving), 12c (site concrete), 12d (site metals) and 12e (site landscape maintenance) have been bid. As of September 3, 2008, the Buyout Savings balance is about \$25.4 million (about \$2.6 million less than the *2008 Trend Report* assumption) based on awarded subcontracts and of use of buyout savings in 2008. (There was only one bid for package 12c (site concrete) and it was over four times the MACC estimate. As a result WTD has not awarded this contract and has directed Hoffman to re-bid the work and to make additional efforts to market the work to the subcontractor community. Package 12d (site metals) received no bids and will also be re-bid.

Based on Mid-2008 Costs to Date, It Appears that 2008 Consultant and Staffing Costs Will Exceed WTD's Projections

WTD's *2008 Trend Report* estimate for 2008 consultant and staff costs was approximately \$30 million and covered ongoing engineering during construction, construction management, legal and other professional services, and WTD and other King County staff costs and allocations.

The OMC reviewed the status of these cost categories at mid-year 2008 to determine how closely actual costs were tracking WTD's 2008 Trend Report projections. Based on this review, we conclude that 2008 consultant and staff costs may be \$2 to \$4 million that projected by WTD due to the following factors:

- Approximately 54 percent of 2008's Conveyance consultant / staff budget was spent in the first half of 2008, primarily because of higher than budgeted construction management consultant costs for the tunnels and because of Kenmore and Ballinger Way odor control design costs that were not identified in the *2008 Trend Report* as 2008 costs. Specifically, at mid-year about 85 percent of the 2008 budget (\$5.2 million) for the tunneling construction management consultant had been expended. In our opinion, it is likely that spending at this rate will continue or could possibly increase as West Tunnel mining activity commences. This will likely be partially off-set by savings on construction management for the Marine Outfall, which was under-budget at mid-year. WTD currently projects that the construction

³ The GC/CM contract currently includes negotiated costs for the North Mitigation Area, Site Preparation, and Liquids work.

management budget for the Marine Outfall will be under spent by about \$100,000. In our opinion, there is potential for additional Marine Outfall construction management savings beyond WTD's current projection.

- Approximately 36 percent of 2008's Treatment Plant budget for consultants and staff was spent in the first half of 2008. WTD reports that this is primarily because construction management and engineering services consultant work was ramping up as Treatment Plant construction accelerated. WTD estimates that expenditures in the second half will increase but that total expenditures for the year will be below budget.

Based on our mid-year review, we believe actual 2008 consultant and staff costs are more likely to be in the \$32 million to \$34 million range, or \$2 to \$4 million in excess of the *2008 Trend Report* estimate. In addition, there is some potential for this to continue for a year or two more until work on various parts of the Project begins to ramp down.

End of Job Cost Estimates Appear to be Optimistic

In our review of WTD's *2008 Trend Report*, we stated that WTD's "end of job" assumptions regarding staffing and consultant effort might be optimistic and recommended that WTD review actual end of job costs from some of its other large construction contracts. Three primary factors could drive "end of job" costs to be higher than WTD's projections: 1) monthly "burn rates" for staff and consultant time including ramp-downs could be underestimated (see review of mid-year costs above); 2) the project could be delayed, thereby incurring additional months of staff and consultant time; and 3) if Conveyance and the Treatment Plant significantly diverge, there is the possibility that Treatment Plant testing and operations would have to await completion of Conveyance.

WTD provided the OMC with actual end-of-job cost information for the West Point Treatment Plant and the Denny Way Combined Sewer Overflow project. In addition, WTD provided its own analysis of how Brightwater end-of-job cost projections compared with these other projects. End of job costs were defined as those incurred between 12 months prior to Substantial Completion and the end of the project.

WTD provided information comparing the Treatment Plant with the West Point Project and Conveyance to the Denny Way CSO project. As shown in Table 2, below, this information showed that both the Treatment Plant and Conveyance were substantially lower, on a percentage basis, than actual costs accrued on the West Point and Denny Way projects. However, WTD also provided information explaining some of these reasons for these differences. For example, West Point involved modifications and expansion to an existing plant, and there were significant end of job efforts associated with implementing a new asset management system. In addition, WTD reports that there were accounting system changes which may have resulted in some non-labor costs for West Point being included in the labor category. In addition, WTD has stated that it expects to achieve economies of scale on Brightwater Conveyance which is significantly larger than Denny Way.

Table 2. End-of-Job Consultant and Staff Cost Review

	Brightwater Conveyance	Denny Way CSO Project
Project Cost (Excluding Land)	\$927 million	\$139 million
Consulting and Staff Costs, as % of Project Cost		
Reported by WTD (For Brightwater Including Project Contingency)	2.5%	3.2%
If Brightwater Project Contingency is Excluded	1.8%	3.2%

	Brightwater Treatment Plant	West Point Project
Project Cost (Excluding Land)	\$770 million	\$542 million
Consulting and Staff Costs, as % of Project Cost		
Reported by WTD (For Brightwater Including Project Contingency)	2.1%	5.2%
If Brightwater Project Contingency is Excluded	1.9%	5.2%

We agree with WTD that, on a percentage basis, Conveyance and the Treatment Plant will likely have lower end-of-job costs than West Point and Denny Way. However, in our opinion, Brightwater end of job costs are unlikely to be as low as currently projected by WTD. Further, in making its comparisons, WTD assumed that **all** of the project contingency for the Treatment Plant (\$2 million) and for Conveyance (\$6.2 million) would be incurred to cover non-budgeted additional staffing and consultant costs. We believe it is more reasonable to assume that some of the project contingency will be used to cover other costs.

Further, WTD’s analysis is based on the assumption that there is no further slippage to the project schedule (i.e. that hydraulic completion is achieved in early 2011). Additional schedule slippage would likely be accompanied by continued consultant and staff expenditures as well as the possibility of claims. If current consultant and staff “burn rates” are sustained, each month of schedule slippage could result in up to an additional \$2 to \$3 million additional consultant and staff expense. If delays were isolated to a few construction contracts, the additional costs would likely be lower.

Other Cost Issues

Diesel Pricing Exposure

Diesel prices have risen substantially in 2008 and are affecting the cost of many King County capital projects. Because of this, King County has developed a countywide approach to risk sharing for diesel price increases. WTD’s contracts for the Marine Outfall and Treatment Plant GC/CM already contained risk sharing provisions for diesel escalation. As a result of the new countywide policy, WTD is now in the process of issuing change orders for certain Brightwater Conveyance contracts consistent with this countywide approach.

The current status is shown in Table 3. As shown in that table, WTD’s current net risk exposure due to the countywide policy for diesel escalation is about \$200,000. This is in addition to

escalation risk sharing (diesel and other commodities) contract provisions of about \$3.8 million for Conveyance and approximately \$3 million for the Treatment Plant that were already in place.

Several factors could result in WTD negotiating additional risk sharing provisions for diesel escalation:

- The amendments executed in August 2008 for the East and Central tunnels were specifically related to costs for hauling excavated materials;
- WTD is planning to negotiate a similar risk sharing provision for hauling excavated materials with the West Tunnel contractor; and
- WTD is evaluating other areas where diesel pricing risk sharing might be appropriate consistent with the new countywide policy.

If risk sharing provisions are triggered, they will be administrated by change orders and the increased contract costs will be covered by the construction contingencies. Overall the current total escalation risk sharing provisions (for diesel and other commodities), if triggered, would account for about 6 percent of the construction contingency for Conveyance and about 9 percent for the Treatment Plant.

Table 3 Diesel Price Exposure

Contract	Price Exposure	Notes
East Tunnel	\$100,000	Executed in August 2008 consistent with new countywide policy.
Central Tunnel	\$100,000	Executed in August 2008 consistent with new countywide policy. Includes provisions for potential future amendments at the sole discretion o of the County.
West Tunnel	None	Planned to reflect new countywide policy but awaiting information from the contractor.
IPS	None	None planned due to minimal off-site transport costs
Marine Outfall	\$500,000	\$500,000 escalation provision in original DB Contract covered fuel and other materials.
Liquids/Earthworks	\$250,000	In original Liquids Phase work for earthworks.
Treatment Plant Solids Package	None	None planned because earthwork was completed under Hoffman's contract which included its own risk sharing provisions.
Total	\$950,000	
Current Net Increase Due to Countywide Policy	\$200,000	

Change Order Status

The most recent claim and change order data is from WTD's July 31, 2008 construction reports. As of that date, the value of claims and change orders on the Brightwater Project is reported as follows:

- Conveyance construction progress is approximately 43 percent, measured as percent of contract value earned by construction contractors, while executed Conveyance change orders are approximately 14 percent of WTD's conveyance construction contingency. Including pending (negotiated but not executed) and estimates of potential (not yet negotiated) change orders could increase this to a maximum of about 26 percent.
- Treatment Plant construction progress is approximately 24 percent, measured as percent of contract value earned by construction contractors, while executed Treatment Plant change orders are approximately 5 percent of WTD's construction contingency. Including pending (negotiated but not executed) and estimates of potential (not yet negotiated) change orders could increase this up to a maximum of about 8 percent.

Change orders to date represent relatively low percentages of the construction contingencies, but it is important to note that a significant amount of the tunneling remains to be completed, and WTD's claims exposure cannot yet be fully known.

SCHEDULE ANALYSIS

Overall schedule concerns for the Brightwater Project include: 1) East Tunnel delay, which is on the critical path for the overall program; 2) Central Tunnel delay, which is on the secondary critical path for the overall program; and 3) the potential the Treatment Plant to be ready for clean water testing (and ultimately wastewater treatment) significantly before Conveyance facilities, potentially resulting in a need to "mothball" the Treatment Plant for a period of time. These issues are discussed in more detail below. The Marine Outfall is ahead of schedule and well outside of the critical path. The West Tunnel has been delayed due to a delay in receipt of its tunnel boring machine (BT-4) but is not on either the primary or secondary critical paths. The Treatment Plant work shows little or no float relative to the contractors' original plans but is also not on the critical path.

Critical Path Risk Associated with East Tunnel Delay is Reduced but Not Abated

The current program critical path runs through East Tunnel mining operations to the IPS, and then to start-up / commissioning. WTD's most recent schedule report (June 2008) indicates a 78-day delay in the overall critical path, resulting in an estimated date for hydraulic completion (ability to accept and circulate water) of February 22, 2011 and an estimated start of commissioning of May 23, 2011. These results are essentially unchanged from our last quarterly report.

The delay is being driven by mining production delays for the East Tunnel. WTD's most recent schedule report (June 2008) shows that completion of Milestone 1 (the turnover of the portal site

to the IPS contractor) is 78 days delayed from the East Tunnel's contract completion date of November 24, 2008. This delay, unless reduced, will impact the IPS contract start date.

However, several events provide additional insight on the degree of schedule risk associated with the East Tunnel:

- First, the East Tunnel contractor has assigned a full time maintenance shift and is working most Saturdays to help make-up time;
- Second, actual mining progress in July and August 2008 has been significantly ahead of planned production (averaging about 360 feet per week versus a planned rate of about 264 feet per week);
- Finally, WTD has executed a no-cost change order with the IPS contractor that extends its contract date for having access to the portal site from November 24, 2008 to January 14, 2009.

If the East Tunnel contractor continues to mine 350 feet per week (just under the July / August mining production rate), we estimate Milestone 1 could be achieved by the January 14, 2009 revised date in the IPS contract. Considerable uncertainty remains, however, over the ability of the East Tunnel contractor to achieve these production rates on a sustained basis. In addition, it is important to note that achieving the January 14, 2009 date would reduce but not eliminate the overall 78-day critical path delay.

Delay Risk for the Central Tunnel is Increasing

Delays at the Central Tunnel have increased since our last quarterly report. As of WTD's most recent schedule report (June 2008), both tunnel boring machines (BT-2 and BT-3) were behind plan, and WTD reported that problems in the slurry separation plant and ground conditions were contributing to these delays. These problems have persisted through July and August, 2008. For example, July / August actual weekly mining production for BT-2 averaged about 140 feet versus a planned mining rate of 258 feet per week.) For BT-3, actual July / August production averaged about 195 feet per week versus a planned mining rate of 261 feet per week.

These conditions, were they to continue, could pose significant risks for the following reasons:

- As of the end of August 2008, BT-2 was about 39 percent complete (versus a planned completion of about 58 percent). Planned production is about 258 feet. If current production (135 feet per week) continues, BT-2 could be substantially delayed. In addition, BT-2 exits at the same portal site used by BT1 and the IPS contractor.
- BT3 involves about 20,000 feet of mining with varying soils and high groundwater pressures. As of the end of August 2008, BT-3 was only about 14 percent complete (versus a planned completion of about 21 percent). Planned production for BT3 is about 261 feet per week. If current production (195 feet per week) continues, the total days of delay could be substantial.

- An overall program secondary critical path runs through the Central Tunnel to startup activities. The total secondary critical path delay is reported as 38-days as of June 30, 2008.

OVERALL MANAGEMENT ISSUES

Risk Management

During planning, design, and construction, WTD has used risk registers for the Treatment Plant and Conveyance to identify, address, and manage risks. The risk registers identified risks, categorized and classified them, and identified potential risk mitigation actions.

During planning and design, risk categories were relatively generic. (For example, “tunneling delay due to change in ground conditions.”) As construction has proceeded, the specific risks that are likely to be encountered have become more defined. (For example, specific reasons and amounts of delay have been assessed for certain tunnel contracts.) Thus, during construction, while the risk registers generally capture major project risks in broad terms, they do not necessarily detail the particular risks being encountered.

As a result, during construction WTD has been conducting more detailed analysis and contingency planning to address specific risks outside of the more summary-level risk register format. For example, WTD has conducted risk planning sessions related to the potential for tunneling delays. In addition, WTD’s startup planning activities (see below) include assessments and planning activities for mitigating and managing potential risks associated with startup and commissioning.

We continue to be of the opinion that WTD should update these registers on a regular basis. The risk register for the Treatment Plant was updated in August 2008, and the risk register for Conveyance was updated in September 2008. We are also recommending further risk analysis to inform WTD’s development of its 2009 Trend Report (see “New Recommendations”, below.)

System Startup Planning

WTD continues with the development of detailed plans for start-up, testing and commissioning of the entire integrated Brightwater Project. Planning includes protocols for integrating operations staff, training, start-up and commissioning procedures as well as specific plans for running clean water and waste water through the facilities to test various systems.

In August 2008, the OMC was provided with an update on WTD’s system startup planning activities. Key issues that are being investigated and that could have significant benefits in terms of overall project risk management include:

- **A detailed evaluation of clean water testing by the IPS team:** This evaluation is examining the extent to which the IPS and Treatment Plant can be tested independently and how much the original scheduled time for testing might be compressed.

- **A plan for startup and operations of the odor control systems.** This includes an assessment of startups at other facilities to identify specific risk elements and “lessons learned”. WTD’s intent is to provide a “life cycle plan” that addresses all aspects of this system’s operation including monitoring and response.
- **Startup Risk Assessment, including Mothballing and Reactivating the Treatment Plant.** WTD’s overall plan calls for a formal risk assessment in the first quarter of 2010. This assessment would consider the likelihood of a significant divergence between Conveyance and the Treatment Plant. The results of this assessment potentially would trigger development of a detailed mothballing and reactivation plan for the Treatment Plant.

In addition, WTD’s system startup planning addresses development of the project electronic O&M manual and its integration with I&C systems. In our opinion, WTD continues to make excellent progress in working on start-up issues and risks.

EECC and Landscape Contracting for the Treatment Plant

WTD is proposing to incorporate work for construction of the Environmental Education and Community Center (EECC) and Treatment Plant landscaping into the GC/CM contract with Hoffman. (According to WTD, this work was always planned to be part of Hoffman’s work, which is consistent with the 2008 Trend Report.) WTD has also evaluated an alternative contracting option for the EECC work. Option 1 would involve negotiating an amendment with Hoffman; Option 2 would involve packaging the work for bid with WTD staff and CDM providing construction management services.

WTD’s evaluation recommends amending Hoffman’s contract for several reasons. For example, Implementing Option 2 would result in a third general contractor on-site and would increase the potential for site conflicts. In addition, implementing Option 2 would necessitate repackaging the work into a form appropriate for public bidding, and would necessitate additional staff and construction management consultant effort. WTD’s evaluation concludes that either option could provide opportunities for medium to smaller contractors.

WTD has proceeded to obtain updated estimates for the EECC and landscaping from Hoffman, has had independent estimates prepared by its construction management consultant, and is in the process of reconciling the two estimates.

We have reviewed the evaluation prepared by WTD as well as information from the cost reconciliation process that is currently underway, and have provided our comments to WTD and the King County Auditor’s Capital Project Oversight staff. In general, we agree with WTD’s evaluation but believe the potential for site conflicts, costs of repackaging, and additional staff / construction management consulting costs (all of which favor Option 1) are likely somewhat overstated. Lower estimates would not, however, likely change the overall conclusions of the evaluation.

It is also important to note that WTD's evaluation covered only certain aspects of the EECC costs (so called 'shell and core costs' but not costs for other items such as tenant improvements.) In addition, WTD's evaluation did not include the Brightwater site landscaping work. According to WTD's 2008 Trend Report, the construction costs (excluding tenant improvements, BOC storage, and sales tax) for the EECC was about \$6.3 million and for landscaping was about \$7.3 million. These Trend Report numbers are lower than the current estimates from Hoffman. Final costs have yet to be negotiated.

It is also important to note that WTD's GC/CM contract with Hoffman specifically calls for most (90 percent) of the buyout savings to be returned to the County once the buyout process for the entire Project (i.e. for all of the work to be accomplished by Hoffman) is 90 percent complete; that is, after 90 percent of the work has been awarded to subcontractors (see Appendix A). With the Environmental Education Community Center (EECC) and landscaping, the buyout process is now approximately 85 percent complete. If this work is competitively bid rather than included in Hoffman's work, the buyout process would exceed 90 percent. In that event Hoffman's contract would be reduced by about 90 percent of the current buyout savings (about \$22.9 million) via a deductive change order. The remaining \$2.5 million would be available to fund allowable items under the contract with Hoffman (see Appendix A).

FOLLOW-UP ON PREVIOUS OMC RECOMMENDATIONS

Our previous quarterly reports have included recommendations to help WTD better manage cost and schedule risks on the Brightwater Project. The following discussions report on the status of recommendation from our last quarterly report and on any ongoing issues from previous reports.

- **WTD should continue updating and refining mitigation plans and strategies to manage the East Tunnel delay and, potentially, other Conveyance project delays.** WTD continues to monitor the East tunnel delay and progress as well as the situation with the other tunnels. Due to the potential for extended delay, we recommend that future efforts also be focused on the Central Tunnel.
- **WTD should review its other historical large construction contracts to determine if adjustments to final year (2011) staffing and consultant assumptions are warranted. WTD should provide the results to the OMC for review.** WTD has provided this information, and we have reviewed it in this quarterly report.
- **In addition to the East Tunnel, other contracts should continue to be monitored closely and evaluated to determine if the delays are indicative of other underlying problems that could pose cost risks later in the job.** As stated above, due to the potential for extended delay, we recommend that future efforts also be focused on the Central Tunnel.
- **WTD should conduct regular briefings with the OMC to review the status of change orders and claims including the aggregate potential exposure associated with**

pending change orders where a cost has not yet been submitted by the contractor and an ongoing assessment of the processing time for resolving change orders and claims. WTD has addressed this issue by providing estimates of pending change order costs in its monthly reports.

- **WTD should continue to develop the Master Integrated Schedule, keep it up to date, and evaluate it on an ongoing basis.** All Contractor baseline schedules have been accepted. A revision is underway on the IPS to reflect the amended date for Milestone 1. WTD reports all baseline schedule information will have been incorporated into the Master Integrated Schedule as of its July 2008 Monthly Report.
- **Ensure coordination of the GC/CM and Solids package contractors at the Treatment Plant site by closely reviewing schedules and mandating communication protocols between WTD and those contractors.** Weekly coordination meetings are being held between the GC/CM and Solids contractors. WTD continues to report that contractors are working cooperatively to resolve any potential schedule and site access conflicts.

FINDINGS AND NEW RECOMMENDATIONS

Based on the evaluations included in this quarterly report, make the following recommendations:

1. WTD should continue to update and refine its mitigation plans and strategies to manage the East Tunnel delay while focusing more effort on the implications of a substantial Central Tunnel delay.
2. WTD should provide updates regarding amendments related to diesel pricing risk sharing for OMC review and monitoring.
3. In its upcoming 2009 Trend Report, we recommend that WTD pay particular attention to budgeting contingencies in light of: 1) actual 2008 costs for consultants and staff; 2) ability to actually ramp down staffing and consultant efforts at the end of job; 3) the potential for delay of individual contracts and the overall project; 4) actual status of buyout savings; and 5) other major potential risks such as the potential for the Treatment Plant to be ready for clean-water testing and ultimately for treating waste water before Conveyance is completed. To the extent possible, major specific risks should be quantified in terms of costs and probabilities of occurrence and evaluated to inform the proposed project contingencies. This work should be completed early enough to allow for a review from the OMC and to inform the cost projections in the WTD's upcoming *2009 Trend Report*.

Appendix A

TREATMENT PLANT GC/CM CONTRACT PROVISIONS FOR BUYOUT SAVINGS

WTD's contract with Hoffman (Contract no. C38138C as amended and restated) includes provisions for sharing buyout savings with King County as follows:

- After 90 percent of the work for the entire project (i.e. the entire GC/CM contract) has been awarded to subcontractors, Hoffman can carry a maximum of 10 percent of unused Project Buyout Savings. Hoffman's contract is reduced by 90% of the Buyout Savings (or more by mutual agreement) via a deductive change order.
- After 100 percent of work has been awarded, Hoffman can carry a maximum of 5 percent of the unused Project Buyout Savings.
- Upon Substantial Completion, Hoffman's contract is reduced by 100% of any remaining Buyout Savings via a deductive change order.

In addition, if the cumulative amount is positive (i.e. there is a net savings), Buyout Savings can be used to cover certain items specifically identified in the GC/CM contract, including:

- **Bid Package Shortfalls.** If the Buyout Savings carries a positive balance, the balance can be used to cover shortfalls on a given subcontractor package where the low bid exceeds the estimate for the package.
- **Unit Pricing Differences.** Under certain circumstances, if the number of units required to complete a work item is different from the estimate that bids were based on, the resulting cost differences are added or withdrawn from Project Buyout Savings.
- **Omitted Items of Work.** If subcontractor bid packages fail to include necessary work items, Project Buyout Savings can, with limitations, be used to cover only the direct cost of adding the work.