To: TVWD Board of Commissioners

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RE: **Technical Memorandum 4 – Non-Financial Evaluation – *FINAL***

1.0 INTRODUCTION

The purpose of this memorandum is to summarize the non-financial criteria evaluation process, present the criteria as accepted by the TVWD Board of Commissioners (Board), and present the evaluations of each water supply option. The Commissioners and staff of TVWD developed the criteria and evaluations presented herein.

2.0 EVALUATION PROCESS

The overall approach to the non-financial criteria evaluation of the water supply options consisted of the following steps:

1. Develop evaluation criteria reflecting the values of the TVWD Board and TVWD's customers.
2. Evaluate each of the water supply options according to the criteria.
3. Use the results of the non-financial criteria evaluation to help inform the TVWD Board and aid in their decision regarding a preferred supply strategy.

This memorandum describes Steps 1 and 2, criteria development and evaluation of the four supply options. A proposed decision framework for incorporating the evaluations in the Board's decision process is presented in TM 6. The TVWD Board's decision on a preferred water supply strategy scheduled for April 2013.

Key milestones in the evaluation process were as follows:

- July 10, 2012 Board Work Session – Draft criteria based on TVWD's 2007 Supply Plan were presented to the TVWD Board for feedback.
- September 4, 2012 Board Special Meeting – Revised criteria, reflecting the Board's input, were presented to the TVWD Board for further review. These became the final evaluation criteria described in Section 4.0 below.
- October 2, 2012 Board Work Session – Evaluations by TVWD staff of the supply options according to the final criteria were presented to the Board.
- November 8, 2012 Board Work Session – The Board provided further input on the staff's evaluation ratings of supply options and proposed updated ratings were identified.
- December 4, 2012 Board Work Session – Proposed final evaluation ratings, reflecting input from both the Board and TVWD staff, were presented to the Board.

- January 8, 2013 Board Work Session – A framework for applying the evaluations in a decision making process was presented to the TVWD Board.

3.0 EVALUATION CRITERIA

The final criteria used for the evaluation of the long-term water supply options are summarized in Table 1. As noted above, these criteria were initially proposed based on TVWD's 2007 Water Supply Decision. The 2007 criteria were reviewed and updated by TVWD staff. These updated criteria were then reviewed and further refined by the TVWD Board.

Table 1. Long Term Water Supply Non-Financial Criteria

Criteria		Description
1	Demand Uncertainty	Ability of the supply to provide additional capacity if demands are greater than projected and accommodate demands less than forecast through phasing and/or scaling improvements.
2	Source Reliability	Ability of the source to deliver required capacity at all times, including consideration of available water resources, existing water rights, natural variation, seismic vulnerability and possible effects of climate change.
3	Source Redundancy	Ability to meet the goal of all areas served by at least two sources of supply.
4	Implementation Risk	Risks of project implementation delays and/or cost increases due to unplanned factors such as permitting risk, schedule delays, complexity of required partnering agreements and/or project complexity.
5	Public Acceptance	Public perception of each of the sources of supply including requirements of industrial and commercial customers as well as general public.
6	Community Impacts	Impacts on the community due to large infrastructure construction projects.
7	Metzger Fluoridation	Ability to continue non-fluoridated supply to Metzger.
8	Finished Water Quality	Ability of the source to meet or exceed existing and anticipated regulatory requirements and aesthetic standards.
9	Sustainability	Anticipated sustainability of source based on energy requirements, infrastructure requirements and environmental impacts.
10	Governance	Ability of the District to establish and preserve policies for initial construction and on-going maintenance of capital assets.

4.0 EVALUATION APPROACH

Each long-term water supply option was evaluated according to each criterion on a three-tier scale, defined as:

- "+"– The option is beneficial, relative to the other options, with respect to the evaluation criterion.

- "0" – The option is neutral (neither beneficial nor detrimental), relative to the other options, with respect to the evaluation criterion.
- "-" – The option is detrimental, relative to the other options, with respect to the evaluation criterion.

This simplified scale was selected over a more numeric approach to improve transparency and create information that is more representative of the benefits and risks of each supply option. In a numeric approach, each option is scored on a numerical (e.g., 1 to 5) scale for each criterion and also assigned a weighting. The product of the scorings and the weightings provides an overall score for ranking of options.

The challenge of using a numeric approach for the water supply decision is two-fold. First, individuals rarely perceive the final outcome or result of a complicated numerical matrix as a whole, which means to agree with the outcome they need to agree with all of the individual entries. This tends to focus individuals on the specific criteria scores that are of interest to them, whether or not those scores had a big impact on the outcome. Though this approach is technically transparent in that none of the scorings are hidden, the process can easily feel non-transparent. Second, weightings assigned to each of the criteria need to reflect their relative value. Numeric approaches are much more appropriate when the criteria are primarily based on quantifiable categories such as land area, distance, etc. Numeric methods are less appropriate when the criteria are largely based on individual's values. Different people have different values; hence there is not one "right" set of weightings.

The goal of using the three-tier scale is to highlight the *relative* advantages and disadvantages of each option compared to the other options, while using supporting text to accurately describe the relative merits. This process does not result in an overall "score" for each option, but highlights the relative merits of the various supply options to support development of the preferred water supply strategy. This approach is consistent with the approach taken by TVWD in past water supply evaluations.

5.0 EVALUATION OF SUPPLY OPTIONS

The evaluations of the four long-term water supply options according to each of the criteria are summarized in Tables 2 through 5 (Portland, Mid-Willamette, TBWSP and Northern Groundwater respectively). Each table includes:

- Information on TVWD staff's rationale for their evaluation in each criterion, as presented at the October 2, 2012 Work Session.
- TVWD staff evaluations for each criterion on the three-tier scale as presented at the October 2, 2012 Work Session.
- Evaluations by individual Commissioners for each criterion on the three-tier scale, as presented at the November 8, 2012 Work Session.
- Final evaluations for each criterion, as presented at the December 4, 2012 Work Session reflecting the consensus opinions of the TVWD Commissioners and staff.

Table 2. Portland Supply – Non-Financial Criteria Evaluation									
Criteria		**Staff Comments & Evaluation Rationale**	**Evaluation Ratings**						
			Staff	**Individual Commissioners**					**Final**
1	Demand Uncertainty	Ability to change purchase quantity over time; ability to adjust timing of investment in future WCSL2 based on demand; existing WCSL and future WCSL2 are fixed capacity; uncertain if Portland would approve future increases in contracted firm capacity.	+	+	0	+	+	+	+
2	Source Reliability	Significant excess capacity in Bull Run and groundwater at this time; vulnerability to wildfire; no backup power for groundwater; Portland may terminate agreement with 5-yr notice.	0	-	0	0	-	0	0
3	Source Redundancy	Existing source – doesn't add redundancy.	0	0	0	0	-	0	0
4	Implementation Risk	Most capacity exists; significant implementation risk for construction of WCSL2 in ~ 2030.	0	-	0	0	-	0	0
5	Public Acceptance	Strong positive public perception for Bull Run; neutral to negative perception for Portland groundwater.	+	0	+	+	0	+	+
6	Community Impacts	Most infrastructure exists; significant adverse public impacts of construction of WCSL2 in highly urbanized area.	0	0	0	0	0	0	0
7	Metzger Fluoridation	Assumes Portland proceeds with fluoridation; no ability to affect this decision or control dose.	-	-	-	-	-	-	0
8	Finished Water Quality	Inconsistent finished water quality due to unfiltered source; WQ challenges for industrial processes; variable water quality and high turbidity limits ability to use for ASR recharge; adverse impacts of blending chlorinated and chloraminated supplies in distribution system.	0	-	0	0	-	0	0
9	Sustainability	Most infrastructure exists; gravity supply minimizes pumping requirement; lowest energy requirement of source options.	+	0	+	+	0	+	+
10	Governance	No ownership; existing Portland agreement limits influence or control of wholesalers.	-	-	-	-	-	-	-

Table 3. Mid-Willamette Supply – Non-Financial Criteria Evaluation									
Criteria		**Staff Comments & Evaluation Rationale**	**Evaluation Rating**						
			Staff	**Individual Commissioners**					**Final**
1	Demand Uncertainty	Large initial investment in fixed-capacity pipeline; WTP size is partially scalable; potential to obtain additional water rights and/or build second pipeline for future expansion.	0	+	0	0	+	0	0
2	Source Reliability	Water demand is small fraction of flow in Willamette River; significant storage and flow regulation in federal storage projects; assumes backup power for partial capacity of new WTP.	+	+	+	+	+	+	+
3	Source Redundancy	Provides new source of supply for region.	+	+	+	+	+	+	+
4	Implementation Risk	Limited implementation risk; water rights, intake and raw water pipeline in place; requires construction of new WTP, pipeline and terminal storage reservoir.	+	+	0	+	+	+	0
5	Public Acceptance	Previous adverse public perception; successfully used by Wilsonville for over 10 years and now in use by Sherwood; acceptance by large industrial customer (Coca-Cola).	0	+	0	0	0	0	0
6	Community Impacts	Limited impacts of pipeline construction in generally rural area; existing WTP site in industrial/commercial area.	0	0	0	0	0	0	0
7	Metzger Fluoridation	Creates opportunity to provide non-fluoridated supply to Metzger in future; opportunity for TVWD to control fluoride level.	0	0	0	0	-	0	0
8	Finished Water Quality	Filtered supply provides consistent water quality for industrial processes and ASR recharge; consistent and compatible chlorination practice minimizes blending issues.	+	+	+	+	+	+	+
9	Sustainability	Moderate energy intensity - consistent with TBWSP option.	0	+	0	0	0	0	0
10	Governance	TVWD would have ownership position in supply assets; new partnership agreement with Hillsboro.	+	+	+	+	+	+	+

Table 4. Tualatin Basin Water Supply Project – Non-Financial Criteria Evaluation									
Criteria		**Staff Comments & Evaluation Rationale**	**Evaluation Ratings**						
			Staff	**Individual Commissioners**					**Final**
1	Demand Uncertainty	Large initial investment in fixed capacity of dam; WTP size is partially scalable; no opportunity for future expansion of source.	-	-	-	-	+	-	-
2	Source Reliability	Assumes pump back is in place to meet hydrologic uncertainty of Scoggins watershed; initial demands exceed proposed capacity; uncertain capacity of backup power for expanded WTP.	+	+	0	+	0	+	+
3	Source Redundancy	Does not add new source; enhances capacity of existing source.	0	0	0	0	0	0	0
4	Implementation Risk	Very high uncertainty of federal commitment; significant permitting risks for new intake on Tualatin River for pump back; significant permitting risk due to potential impacts to Endangered Species Act (ESA) listed species (butterfly and lupine); some but not all water rights in place; requires construction of WTP expansion and new terminal storage reservoir.	-	-	-	-	-	-	-
5	Public Acceptance	Generally accepted source; acceptance by large industrial customers.	0	0	0	0	0	0	0
6	Community Impacts	May require significant supply restrictions during construction of dam improvements; limited impacts of construction of dam and WTP in generally rural area; fixes existing seismic deficiency.	+	+	-	+	+	+	0
7	Metzger Fluoridation	Creates opportunity to provide non-fluoridated supply to Metzger in future; opportunity for TVWD to control fluoride level.	0	0	0	0	-	0	0
8	Finished Water Quality	Filtered supply provides consistent water quality for industrial processes and ASR recharge; consistent and compatible chlorination practice minimizes blending issues.	+	+	+	+	0	+	+
9	Sustainability	Extensive mitigation required for potential environmental impacts to ESA-listed species (butterfly & lupine) and elk habitat; moderate energy intensity - consistent with Willamette supply.	-	-	0	-	-	-	-
10	Governance	TWVD would have ownership position in larger group of TBWSP partners for dam; TVWD would expand ownership position in existing JWC agreement for WTP expansion.	0	0	0	0	-	0	0

Table 5. Northern Groundwater Supply – Non-Financial Criteria Evaluation									
Criteria		**Staff Comments & Evaluation Rationale**	**Evaluation Ratings**						
			Staff	**Individual Commissioners**					**Final**
1	Demand Uncertainty	Large initial investment in fixed-capacity pipeline; well field and WTP size is partially scalable; potential to obtain additional water rights and/or build second pipeline for future expansion.	0	0	0	0	+	0	0
2	Source Reliability	Water demand is small fraction of potential groundwater capacity; assumes backup power for partial capacity of new WTP.	+	+	+	+	0	+	+
3	Source Redundancy	Provides new source of supply for region.	+	+	+	+	0	+	+
4	Implementation Risk	Moderate implementation risk; requires new water rights, wells, WTP, terminal storage reservoir and extensive pipelines.	0	-	0	0	-	0	-
5	Public Acceptance	Uncertain public perception; moderate risk of adverse public perception due to influence of Columbia River (e.g., Hanford) and downstream of Portland Harbor Superfund site.	-	-	-	-	0	-	-
6	Community Impacts	Limited impacts of pipeline construction in generally rural area; proposed water treatment plant site in rural area; potential adverse impact by agricultural interests and Scappoose residents due to proposed groundwater use.	0	0	0	0	0	0	0
7	Metzger Fluoridation	Creates opportunity to provide non-fluoridated supply to Metzger in future; opportunity for TVWD to control fluoride level.	0	0	0	0	-	0	0
8	Finished Water Quality	Filtered supply provides consistent water quality for industrial processes and ASR recharge; consistent and compatible chlorination practice minimizes blending issues.	+	0	0	+	+	+	0
9	Sustainability	High energy intensity due to pumping and treatment requirements – highest energy requirement of source options	-	-	-	-	-	-	-
10	Governance	TVWD would have ownership position in supply assets; new partnership agreement with Hillsboro	+	+	+	+	+	+	+

Individual commissioners and staff identified several notable comments and concerns during the course of the evaluations, including the following:

- Portland Option
  - Reliability - Two commissioners expressed concerns that the Portland supply is highly dependent on the Bull Run source that can be subject to reduced reliability due to storm events, wild fire and/or pest infestation. The final rating of "0" reflects that watershed managers work to minimize these risks and other options face similar threats (although at lower consequence since the Bull Run supply is unfiltered).
  - Redundancy – One commissioner expressed concern that the Portland option does not have reliable back-up capacity in that Portland's groundwater source lacks back-up power. The final rating of "0" reflects that this is an existing source of supply and, as such, does not change the existing level of redundancy in TVWD's overall supply system.
  - Implementation Risk – Two commissioners expressed concern that the WCSL2 pipeline included in this option has high implementation risks due to required construction in the highly urbanized Portland area. The final rating of "0" was based on consideration that these risks are comparable to pipeline construction included in other options.
  - Public Acceptance – Two commissioners expressed concern that the public may be less accepting of the Portland option due to the recent fluoridation issue and the unfiltered source. The final rating of "+" reflects that, as an existing supply, the Portland supply has consistently received favorable ratings by the public.
  - Metzger Fluoridation – All commissioners expressed concern that Portland may proceed with fluoridation, which would result in providing a fluoridated supply to Metzger. The final rating of "0" reflects that all of the supply options assume Metzger would be supplied from the Portland source; thus, there is no difference between the four options.
  - Finished Water Quality – Two commissioners expressed concern that as an unfiltered supply, the Portland option has lower water quality based on analytical test results. The final rating of "0" takes into account that the Portland source has consistently met regulatory standards (Portland's recent Total Coliform events have been the result of distribution contamination that would not affect water quality of the supply option).
  - Sustainability – Two commissioners expressed concern that the Portland option is no more sustainable than the other options. The final rating of "+" reflects that Portland's primary source is a gravity supply; thus, this option has the lowest energy consumption as compared to the other options.
- Mid-Willamette Option
  - Demand Uncertainty – Two commissioners noted that the Mid-Willamette option might provide greater flexibility to meet future demands. The final rating of "0" reflects that the existing intake and proposed pipelines would have a fixed maximum capacities and could becoming "stranded assets" if demands are less than planned or may require significant additional capital cost if demands are greater than planned. In contrast, the Portland option provides additional flexibility in establishing the timing and capacity of future supply improvements.

  - Implementation Risk – One commissioner noted that key portions of this option have relatively high risks (for example, there are critical unknowns related to the alignment for the finished water pipeline). In light of this concern, the rating was revised to "0."
- Tualatin Basin Water Supply Project
  - Reliability – Two commissioners expressed concern that the capacity of the expanded dam exceeds the hydrologic capacity of the watershed and would rely on successful operation of the new intake and pump back system. The final rating of "+" reflects that hydrologic modeling indicates a high level or reliability so long as the pump back system is operated successfully.
  - Community Impacts – One commissioner noted that construction of the seismic upgrades and the expanded reservoir will result in significant impacts to the area surrounding the reservoir. In light of the extensive recreational use of the reservoir, the rating was revised to "0."
- Northern Groundwater
  - Implementation Risk – Two commissioners noted there are significant unknowns associated with this option. In light of this concern, the rating was revised to "-."
  - Finished Water Quality – Two commissioners noted that this is an unproven source with notable undocumented concerns related to water quality as a result of its location downstream of multiple Superfund sites and the Hanford Nuclear Reservation. The final rating of "0" reflects these concerns.

The final evaluation ratings for all four options are summarized in Table 6.

Table 6. Summary of Final Evaluation Ratings of Water Supply Options

Criteria		Portland	Mid-Willamette	TBWSP	Northern Groundwater
1	Demand Uncertainty	+	0	-	0
2	Source Reliability	0	+	+	+
3	Source Redundancy	0	+	0	+
4	Implementation Risk	0	0	-	-
5	Public Acceptance	+	0	0	-
6	Community Impacts	0	0	0	0
7	Metzger Fluoridation	0	0	0	0
8	Finished Water Quality	0	+	+	0
9	Sustainability	+	0	-	-
10	Governance	-	+	0	+