HDR | ONE COMPANY *Many Solutions*℠

# Memo

| | | | |
|---|---|---|---|
| To: | Brazos G Regional Water Planning Group | | |
| From: | Cory Shockley, PE<br>David Dunn, PE | Project: | Brazos G 2011 Regional Water Plan |
| CC: | Trey Buzbee, Brazos River Authority | | |
| Date: | February 10, 2009 | Job No: | 00010478-001 |

**RE:** Modeling Assumptions for Determining Surface Water Supplies for 2011 Brazos G Regional Water Plan

The Texas Water Development Board (TWDB) has mandated that the Water Availability Models (WAMs) maintained by the Texas Commission on Environmental Quality (TCEQ) be used for determining surface water supplies for regional water plans. The TCEQ WAMs, which have been developed for all river basins in Texas, simulate the management and use of streamflow and reservoirs over a historical period of record, adhering to the prior appropriation doctrine, which governs Texas' water right priority system. The TCEQ WAMs are the fundamental tools used to determine surface water availability for water rights permitting, and contain information about water rights in each respective river basin.

The TCEQ's Brazos River Basin WAM (TCEQ Brazos WAM) contains information on all water rights in the Brazos Basin. Embedded within this model are certain assumptions that the TCEQ specifies when analyzing water right reliabilities. These assumptions are not necessarily the most appropriate to apply to the regional water planning process, and can be changed by modifying model parameters when the model is used for water planning purposes. The following assumptions are recommended by HDR for the Brazos G Regional Water Plan and will require approval by the TWDB for use in developing the 2011 Brazos G Regional Water Plan.

The WAM containing the necessary modifications to the TCEQ WAM incorporating these assumptions will be referred to as the "Brazos G WAM." These assumptions include the following items.

- The latest version of the TCEQ Brazos WAM will be obtained from the TCEQ. This model will contain the latest approved water rights through December 2008. This is to ensure that the latest version of the Brazos WAM is being utilized during the analysis.

- The Brazos G WAM will include a certain level of current and future return flows (wastewater treatment plant effluent) discharged by entities located throughout the basin that are permitted to discharge in excess of 0.9 million gallons per day (MGD). These return flows are based on historical discharges and projected future discharges assuming an aggressive plan for future reuse of each entity's effluent. These return flow amounts were reviewed and acknowledged by each entity during the development of the 2006 Plan and were used during the development of the 2006 Plan following approval the TWDB.

- The TCEQ WAM assumes all diversions from storage occur lakeside and does not take into account BRA contracts located throughout the basin. Therefore the Brazos G WAM will be modified with all BRA contracts located and modeled at their actual diversion locations and able to receive releases from multiple reservoirs, if applicable. This will provide a better estimate of streamflows at various points in the basin.

- The Brazos G WAM uses Year 2000 and Year 2060 elevation-area-capacity information for all reservoirs greater than 5,000 acft storage capacity, and as-permitted capacities for all others.

- The Brazos G WAM includes three subordination agreements between entities in the Brazos Basin:

  - Possum Kingdom Reservoir water rights are subordinated to Lake Alan Henry;

  - Possum Kingdom Reservoir water rights are subordinated to the City of Stamford's California Creek pump-back operation into Lake Stamford; and

  - Lake Waco is subordinated to the City of Clifton's 1996 priority date water right.

The period of record for the Brazos WAM is 1940 – 1997. During the Phase 1 studies, HDR developed a subset of the Brazos WAM that extends the period of record through June 2008 for a portion of the upper Brazos Basin including the Clear Fork of the Brazos River. This version of the Brazos G WAM will be used to determine surface water supplies for that portion of the upper Brazos Basin. This is consistent with the methodology used during the 2006 Plan, when the subset model was used to extend hydrology through June 2004 for this portion of the basin.

These assumptions are recommended to be used throughout the regional planning process for model analyses that determine surface water availability to existing rights, and also for analyses to determine the potential supplies available from new water management strategies.

These assumptions will require the approval of the TWDB in order to be incorporated into the TCEQ Brazos WAM to formulate the Brazos G WAM. HDR requests that the Brazos G Regional Water Planning Group direct HDR and the Brazos River Authority to request approval from the TWDB to utilize these assumptions.