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# Engineers / Engineering Firms and the Potential for Conflicts of Interest in the Texas Regional Water Planning Process

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## **Engineers / Engineering Firms and the Potential for Conflicts of Interest in the Texas Regional Water Planning Process**

### **Abstract**

Among the potential impediments to achieving the full intent of the Texas Senate Bill 1 regional water planning process are conflicts of interest held by the planning consultants, primarily large engineering firms. The regional water planning process was designed as a much-publicized “bottom up” approach to serve diverse interest groups representing the citizenry of the region at large. Also, the legislation and implementing administrative rules laid out requirements for considering a broad array of concerns including environmental issues, costs, and progressive water management strategies, in addition to the more traditional water supply infrastructure approaches. Thus, in order for the regional water planning groups to bring their own diverse interests to bear and design a comprehensive water plan addressing the array of requirements, a premium value is attached to the provision of objective, unbiased information to the group by their consultant. Ideally, consultants are to provide a vast array of objective information addressing “engineering, socioeconomic, hydrological, environmental, legal and institutional” issues for all manner of potential water management strategies for incorporation into the regional water plans.

There appear to be two principal types of conflicts of interest which can impede the delivery of such unbiased information. I label these a) the “big ticket payoff” conflict of interest, and b) the “favored client” conflict of interest. Both of these, combined with the perhaps unavoidable predisposition of engineers towards “structural solutions,” have generally led to regional water plans with a heavy emphasis on building new infrastructure, little emphasis on progressive management of existing supplies, including water efficiency measures, and incomplete attention to environmental and cost issues. Some aspects of these conflicts of interest may be avoidable, or at least addressable, and some likely are not. In this paper I will propose alterations in the role and expertise of the primary consultant that I believe will minimize such conflicts of interest.

### **Introduction**

Senate Bill 1, passed by the 75<sup>th</sup> Texas Legislature in 1997, created the statewide regional water planning process, often referred to as the “SB 1 process”. SB 1 divided the state into sixteen planning regions, and created a much-publicized<sup>1</sup> “bottom up” approach to developing a state water plan with each locally-derived planning group composed of representatives from diverse interest groups<sup>2</sup>.

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<sup>1</sup> See page 1 of Texas Water Development Board, 2002 or Moorhouse and Elliff, 2002.

<sup>2</sup> Eleven designated interest groups were originally designated: the public, counties, municipalities, industries, agricultural interests, environmental interests, small businesses, electric generating utilities, river authorities, water districts, and water utilities. Additional interest can be added to “ensure adequate representation from the interests comprising” that region [Texas Administrative Code §357.4 (a) (11) (c)].

A principal motivator for the passage of SB 1, was a fairly severe drought in the mid 1990s, especially in the late 1995 through 1996 period, occurring amid a period characterized by a booming economy and growing population. For instance, the acute drought of 1996 caused an estimated \$5 billion in agricultural losses and led hundreds of municipalities to institute water demand management measures<sup>3</sup>.

Clearly, adequacy of water supplies was, and will continue to be, a concern in Texas. At the same time, the Texas environmental community is highly concerned about the capacity of the state's aquatic resources to sustain their ecological (and economic) roles under the combined strain of oft-recurring drought and a burgeoning population unless wise planning occurs. In the time period leading up to the passage of SB 1, extremely low streamflows were the norm throughout the state<sup>4</sup> threatening inland fish and wildlife resources. Correspondingly, the state's approximate \$2.3 billion dollar coastal economy of commercial and recreational fishing and tourism was threatened by extremely low freshwater inflows<sup>5</sup>. Groundwater resources were similarly threatened: discharges at the bellwether Comal Springs of the Edwards Aquifer in central Texas, the subject of numerous court battles and legislative efforts due to endangered species concerns, were at severely low levels<sup>6</sup>.

It was against this backdrop that the regional water planning process of SB 1 was created, and the mood was certainly that the state needed to develop a balanced long-term vision for the future of water resource management. Indeed such balance is explicitly stated in some the actual implementing rules which seem to promise something for everyone. For example:

“sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the regional water planning area.” [Texas Administrative Code, (§357.5 (a) emphasis added].

It has also been made explicit that the definition of natural resources does include living resource, ie. fish and wildlife<sup>7</sup>. A few key excerpts from the implementing administrative rules will highlight some of the diverse requirements of the SB 1 process and the need for objective information to facilitate decisions of the group<sup>8</sup>.

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<sup>3</sup> see “The Drought in Perspective 1996-1998” at [www.twdb.state.tx.us/data/drought/DroughtinPerspective.asp](http://www.twdb.state.tx.us/data/drought/DroughtinPerspective.asp).

<sup>4</sup> Inflows of freshwater to estuaries at river mouths are used here as good metrics of hydrologic conditions because they “integrate” climate and human influences on streamflows over a wide area. Freshwater inflow volume to Galveston Bay for the whole year of 1996 was at about the 20<sup>th</sup> percentile level, meaning that this volume is exceeded in 80% of years. Inflows to Corpus Christi Bay were just above the 5<sup>th</sup> percentile in 1996. (see inflow records at [http://hyper20.twdb.state.tx.us/-data/bays\\_estuaries/hydrology.html](http://hyper20.twdb.state.tx.us/-data/bays_estuaries/hydrology.html)).

<sup>5</sup> The value of the Texas costal economy is generally estimated to be about \$2 billion annually in recreational fishing and related economic activity and \$266 million in commercial fishing activity (McKinney, 2003). For an assessment of this threat with the surface water rights already granted see Johns, 2004.

<sup>6</sup> During the summer of 1996 flows at Comal Springs hovered around 100 cubic feet per second. This compares to the 200 cfs threshold below which “take” of endangered species at the springs would occur as established in 1993 by the U.S. Fish and Wildlife Service (Votteler, 2002, pgs 272-73 ).

<sup>7</sup> Texas Administrative Code § 357.4(a)(6).

<sup>8</sup> Note that some of these are also the result of modifications in subsequent legislation.

“The regional water planning group shall provide specific recommendations of water management strategies based upon identification, analysis, and comparison of all water management strategies the regional water planning group determines to be potentially feasible ...” [Texas Administrative Code §357.5 (e) (4), emphasis added]

This section goes on further to specify the requirements for recommending water management strategies:

“ cost effective water management strategies which are environmentally sensitive are considered and adopted unless the regional water planning group demonstrates that adoption of such strategies is not appropriate. “

Environmentally sensitive water management strategies are to be selected by performing

“ a quantitative reporting of environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico.”  
[Texas Administrative Code §357.7(a)(8)(A)(ii)]

Obviously, for the SB 1 process to adequately address the diversity of considerations presented above, it would have to do more than just provide a blueprint for increasing water supply infrastructure. By empowering a regionally-derived planning group, composed of representatives from at least eleven diverse interest groups, and with implementing rules addressing the complexities of modern water management, the SB 1 process at least holds the promise of developing a balanced State Water Plan. Such a plan would not only outline new supply strategies, but also focus on progressive management of existing sources and protect the state’s diverse aquatic resources from depletion and overuse.

However, as should be apparent even in these few rules, if the regional water planning groups are to strive to achieve balance among these often competing goals, they must construct a plan based upon objective information. Consideration of a whole host of factors associated with each potential water management alternative is required. Also significant, because of the broad representation in the makeup of the RWPGs, many, or perhaps most, members are not versed in the technical details of water supply development and/or environmental assessments. This is where the role of the consultant employed by the regional water planning group takes on special significance. In order to facilitate the development of a comprehensive and balanced plan, the consultant takes on the very significant role of information provider / filter.

### **The Consultant and the SB 1 Process**

As shown in Figure 1, the consultant employed by the regional water planning group, with funding appropriated by the Texas Legislature and managed by the Texas Water Development Board, is central to preparing the plans. Generally, the primary consultant responsible for the regional water plan preparation is an engineering consulting firm. In this paper, I will use the terminology “engineer” and “consulting engineering firm” somewhat interchangeably. Although

the consulting engineer works directly on behalf of the regional water planning group, one should bear in mind that he or she is really working for the citizens of the entire region in the broadest sense. Thus “the client” in the case of the SB 1 consultant is actually the public at large, with the regional water planning group being the point of contact. This distinction is important because it bears heavily on the discussion of conflict of interest which follows.

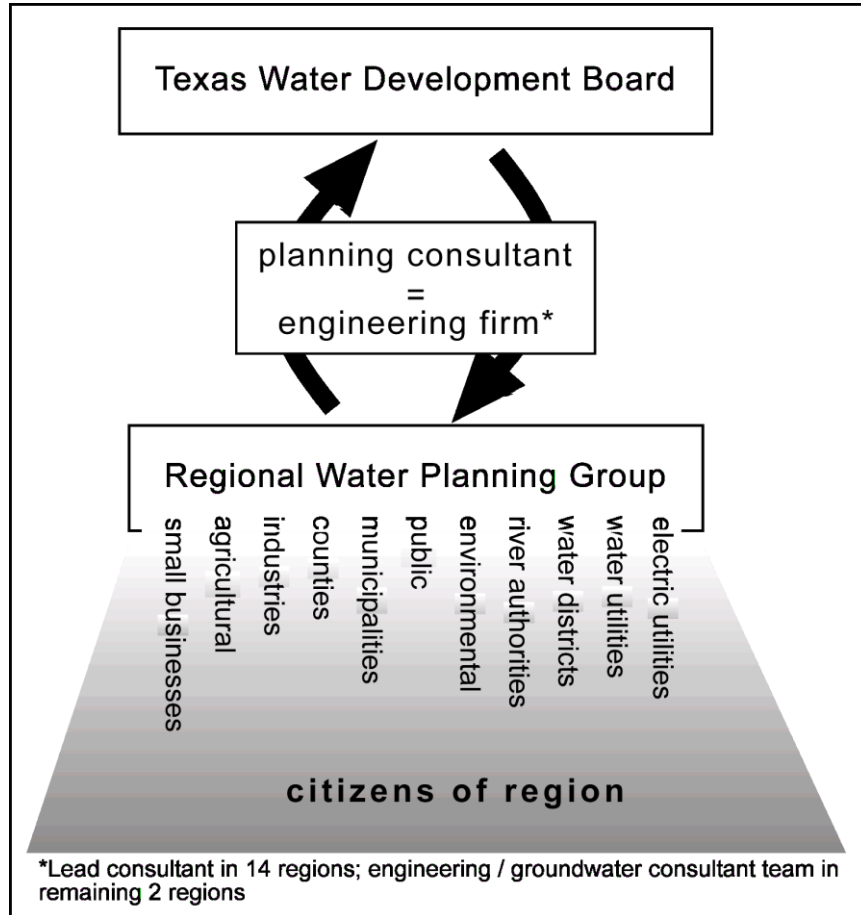


Figure 1 - The Texas regional water planning process. Consultant hired by regional planning group has primary role of providing objective information in order that group can compile a regional plan for submittal to Texas Water Development Board.

## Conflicts of Interest in the SB 1 Process

### Conflicts of Interest Defined

While the term “conflict of interest” is encountered widely and has thus achieved a fairly widespread understanding in the common vernacular, a formal definition is useful for examining the role of the consulting engineering firms in the regional water planning process.

“A person has a conflict of interest when the person is in a position of trust which requires her to exercise judgment on behalf of others (people, institutions, etc.) and also has interests or obligations of the sort that might interfere with the exercise of her judgment, and which the person is morally required to either avoid or openly acknowledge.”(Case Western Reserve University, no date, [www.onlineethics.org](http://www.onlineethics.org))

A similar definition, but somewhat more focused on engineering is:

“A conflict of interest is any situation in which (1) a person (for example, an engineer) is in a relationship with another person (for example, a client or employer) requiring him to exercise judgment on behalf of that other person and (2) there is a good reason to believe that, though competent to provide that judgment, he may not do it as he should because of some special interest, obligation, or other concern of his.” (Davis, 1998, pg. 101)

As pointed out by Davis (1991) it is necessary to consider in some detail the context of “judgment” that is to be exercised on behalf of the client. To this author, it would seem that in the SB 1 process the engineer must routinely exercise judgment about a host of subjective variables influencing water management strategy evaluations, judgment regarding evaluation techniques, and judgment about priorities of effort and level of detail. Some of the critical judgments would seem to be decisions about how to evaluate water management strategies, including estimating probable cost, environmental impacts, reliability, etc. and how to convey this objectively to the regional water planning group.

The engineer is left with considerable latitude in the interpretation of the administrative rules governing the evaluation of water management strategies. For instance the previously cited requirement for a “quantitative reporting of environmental factors” leaves ample room for judgment. To assess a potential water management strategy’s effects on environmental flows for instance, should the engineer tabulate changes in median monthly flow, or should it be minimum daily flows in some subset of months, or some combination of this and other relevant metrics? Should the analysis stop there or should there be an attempt to add a biologic significance to anticipated changes in flow? Similarly, in the analysis of water efficiency measures, a critical determinant of unit cost of saved water is the presumed adoption rate of any given measure, such as advanced lawn watering controllers. Such adoption rates are difficult to predict, but are critical to determining the cost and therefore feasibility of such strategies.

These are just a few of the hundreds of instances in the planning process where there is latitude in the evaluation process and “independent professional judgment” is needed on the part of the engineer in the selection of methods, execution of analyses, and transmission of information to the regional water planning group and the public at large. As McFarland (1991) put it “the obligation of engineers to protect the public does not mean that they or any elite group, should decide what risks are worth taking or how they are to be distributed. Engineers should rather help the public make responsible, well-informed decisions on these issues” (pg 171). Although McFarland was specifically focusing on engineers in the nuclear power industry, his conclusions are applicable more broadly, if “risk” in the context here is thought of as the risk of making the

wrong choice about a water management strategy with public finance, environmental, and socioeconomic implications.

Most professional societies, including those associated with the engineering profession, have a Code of Ethics. Often these tend to focus on an individual engineer's responsibilities to serve employers and clients with competence and integrity. (McFarland, 169). It is essential to understand though that a conflict of interest is not about competence, but about the ability to deliver unbiased judgment (Davis, 1991, 1998). More recent Codes of Ethics have elaborated on responsibilities to public safety, health, and welfare more generally, but some studies have indicated a continuing lack of in-depth ways of addressing ethical implications of members' work (McFarland, 170).

*The Source of Conflicts of Interest in the SB 1 Process*

I have identified two principle sources or modes of conflict of interest that may impede the full exercise of "independent professional judgment" on the part of the engineering consultant in the SB 1 process. As shown on Figure 2, these are what I will refer to as a) the "big ticket payoff" conflict of interest, and b) the "favored client" conflict of interest modes.

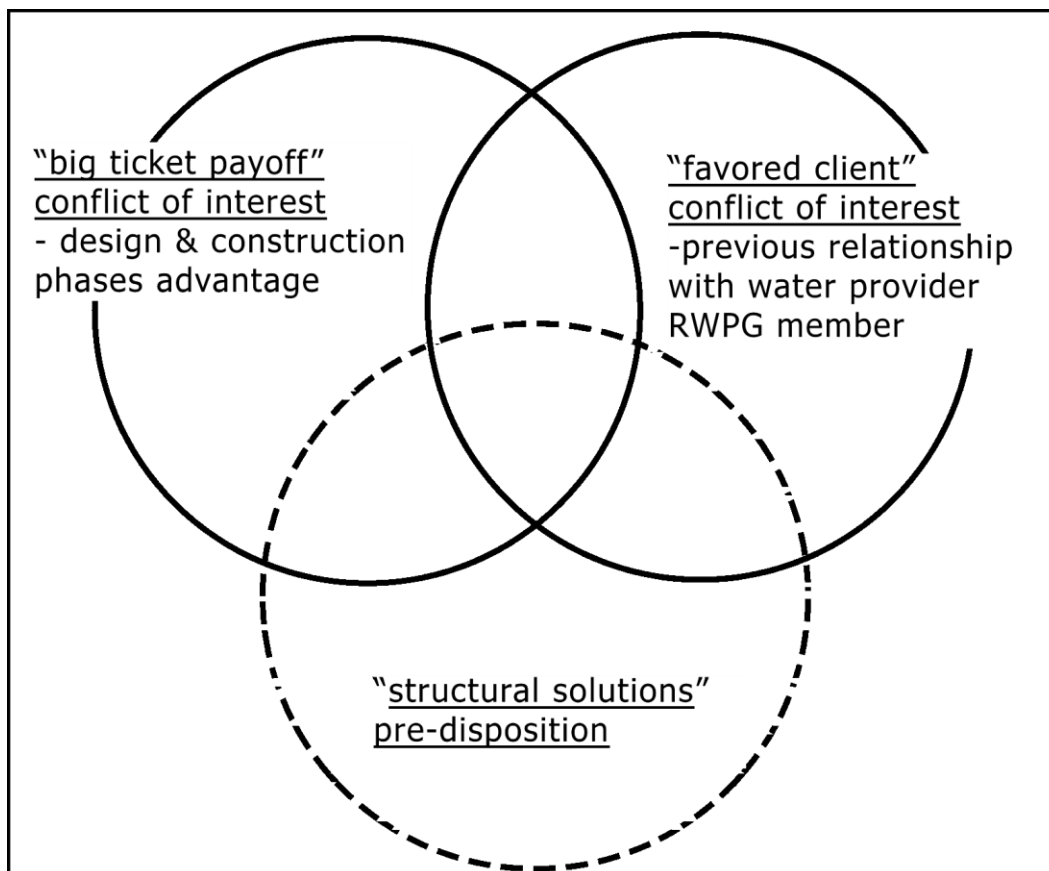


Figure 2 - A conceptual model of types of conflicts of interest affecting engineers and engineering firms in the Texas regional water planning process.

### “Big Ticket Payoff” Conflict of Interest

As detailed by the American Society of Civil Engineers (ASCE, 1968), consulting engineering services, broadly conceived, can be thought of as falling into four phases: a) the feasibility or study phase, b) preliminary design, c) detailed design, and d) construction management. Although there is some overlap among them, the later three entail the production of blueprints and other working drawings about a specific project. Thus, all of the work associated with the regional water planning process established by Senate Bill 1 is encompassed in that first “study” phase.

It is widely accepted that participating in the early “study” phase will increase the chances of being selected for the subsequent design and construction phases of a project that is to be implemented (American Society of Engineers, pg. 8). With regard to the SB 1 planning process, such a general expectation of later “preferred selection” in the design and construction phases of an infrastructure project is widely acknowledged verbally (anonymous, Texas Water Development Board, 2005). As I will show below, the revenue accruing to a consulting engineering firm for a single “big ticket” infrastructure-based water supply project, such as one of the many dams or long distance pipelines proposed in the first round of SB 1 planning, would dwarf the initial revenue from preparing the actual regional water plan. Thus, the implication with this type of conflict of interest is that the desirability of the “big ticket payoff” may skew the judgment of the engineer, if the engineer is with a so-called “full service” consulting firm that also pursues contracts entailing preliminary design, and/or detailed design, and/or construction management. Such effects on judgment could bias the analyses or portrayal of infrastructure-based projects that would later require design and construction phase contracts. This could be an absolute bias in the sense that some or all infrastructure projects may be portrayed inaccurately (equals too favorably) as measured by cost effectiveness, reliability, or environmental impact and permitting issues. The bias could also be a comparative bias where such measures are inaccurately portrayed vis-à-vis other strategies entailing non-construction actions by the public or water suppliers.

To get an idea whether the “big ticket payoff” premise for conflict of interest is plausible, it is instructive to examine the magnitude of such an anticipated payout in the later design and construction phases of a typical project that might result from the SB 1 process. In this case, the absolute magnitude of any given infrastructure project is hard to appreciate on a stand-alone basis, so I will make a comparison to a representative revenue that a consulting engineering firm may garner for the regional water planning process itself.

According to the TWDB website, the cost for funding the entire water planning process for all sixteen regions for 2002-2006 is on the order of \$18 million<sup>9</sup>. This funding is apportioned to each region on the basis of population and other factors. In approximate terms then, the budgets for preparing an entire regional water plan range from several hundred thousand to a million plus dollars.

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<sup>9</sup> see <http://www.twdb.state.tx.us/rwpg/twdb-docs/rwp%20one%20pager.htm>.



There is a multitude of very large infrastructure projects proposed in the 2001 set of regional water plans, which are reappearing in the recently issued draft 2005 versions (called Initially Prepared Plans), with estimated total price tags in the \$800 million to \$2 billion range<sup>10</sup>. Of that total price, about 60 percent is comprised of the capital construction cost. The difference between the total project cost and capital construction cost is comprised of standard estimates of other major cost components, including land purchases, interest during construction, and archaeological surveys. The remaining, and usually largest category, is the so-called “engineering, legal cost, and contingencies” which for the purposes of SB 1 planning is simply calculated as 30-35% of the capital construction cost<sup>11</sup>. While engineering costs are embedded within this category, it is possible to get a more refined estimate of these. According to generally accepted cost estimating procedures (see ASCE 1968, pg 33) engineering fees should equal about 8% to 10% of project capital construction cost<sup>12</sup>. Thus, it is entirely plausible that just one major project that could result from the SB 1 water planning exercise would have engineering fees on the order of \$40 million to \$120 million. This compares to the original regional water plan preparation cost itself in the few hundred thousand to a million plus dollars range. Thus, the engineering contracts that might result from a single infrastructure project recommended in a regional water plan, that moves to the design and construction phases, could be one to two orders of magnitude greater than the revenue from the original plan preparation.

The drawback of such increased “preferred selection” in subsequent phases has been long-recognized for its potential to create conflicts of interest in the early “study” phase. Consider this from the American Society of Civil Engineers:

“The Consulting Engineer who has made preliminary investigations in a manner satisfactory to the Client normally is best qualified to perform the engineering services in the design and construction phases, unless he is also acting as an advisor to the Client under circumstances that may involve a conflict of interest.”  
(ASCE, 1961, pg. 8)

More on this in the solutions section that follows.

#### “Favored Client” Conflict of Interest

In the “favored client” mode of conflict of interest, the engineer’s judgment may be biased due to a long-standing previous or currently active professional relationship with a water supplier who is also a member of the regional water planning group. This would typically be a municipality, water district, river authority, or other supplier of water for whom the consulting engineering firm has contracted for professional services separately from the SB 1 process. Although it

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<sup>10</sup> Such large projects are in many of the regional plans. Two examples are given here for illustrative purposes, without intent to impugn any certain region or its consultant. Region L’s Lower Guadalupe Water Supply Project estimated total cost are \$784 million. (Table 4C.7-4, of 2006 South Central Texas Regional Water Planning Area 2006 Initially Prepared 2006 Regional Water Plan). The Region C Marvin Nichols Reservoir and pipelines carries an estimated total price tag of \$2.092 billion (Table U-20 of Initially Prepared 2006 Region C Water Plan). Both measured in 2<sup>nd</sup> quarter 2002 prices.

<sup>11</sup> as per Texas Water Development Board’s Exhibit B Guidelines for Regional Water Plan Development, available at <http://www.twdb.state.tx.us/rwpg/main-docs/docs-main.asp>.

<sup>12</sup> Legal and administrative about 2% to 3% and contingencies between 10% and 25%.

would be possible, if somewhat painstaking, to assemble data on the frequency of this overlap, this is beyond the scope of this paper. Anecdotal evidence does support this potential mode of conflicts of interest though. In this author's observation, many of the large consulting engineering firms that are prominent in the SB 1 process have a very established track record of previous work with water supply clients that are represented directly on the regional water planning group, often a river authority, municipality, or large water utility district.

Somewhat similar to the "big ticket payoff" mode, this type of conflict of interest may skew engineering judgment to bias the analyses or portrayals of certain infrastructure projects. However, while the previous mode may have acted equally on the entire class of infrastructure-based water supply projects, in this case a certain subset of those would be more prone to biased treatment. Specifically, those that are favored by the regional water planning group member with whom the engineer, or his or her firm, has the separate professional relationship with could be more prone to this bias. This author is aware of at least three instances in which the regional water planning group's consulting engineering firm is working on the advanced feasibility study of a SB 1-origin project, but under contracts totally *outside* of the regional water plan process. Obviously, it is very unlikely that the consultant would then deliver unfavorable opinion, data, or other information about such a project *within* the SB 1 process.

#### Structural Solutions Pre-disposition of the Engineer

Also, I have shown in Figure 2 the associated predisposition of engineers towards "structural solutions." These may constitute in some sense a true conflict of interest, in that this could obviously interfere with judgment, as discussed above, about the value and desirability of non-structural water supply alternatives. However, in the context of SB 1 planning, such an impediment seems quite distinct from the other modes of conflict of interest and much less avoidable. The proposed means of addressing the "big ticket payoff" and "preferred client" modes presented below will also help with this potential problem.

### **Solutions / Improvements to the Process**

Four possible alterations to the current SB 1 process are proposed which could help address the issue of potential conflicts of interest held by the consulting engineering firms.

#### Explicit Divulgence of Conflicts of Interest

Conflicts of interest are not necessarily an ethical failure on the part of an engineer; in fact, some may be unavoidable. In such a case, the real question is what action should be taken so that the client is aware of the risk associated with the potential for impaired judgment on the part of the hired professional. Generally, the recommended actions on the part of the professional (in this case the consulting engineering firm) are to either end the professional relationship subject to the conflict, or, at least, to fully divulge the potential conflict<sup>13</sup>.

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<sup>13</sup> see Davis, 1991, pgs. 320-321.

Divulging the potential for conflict of interest is one way at least to allow the client, in this case the public at large, to know of the possible judgment issues that could exist. The professional relationship would be maintained, but there would be no deception that the engineer's judgment is free of potential conflicts. As Davis puts it "to have a conflict of interest is bad, but to have one without putting the client on notice is worse."<sup>14</sup>

#### *Different Type of Engineering Firm in Lead Role*

A second potential manner of addressing conflicts of interest in the SB 1 process would be to restrict the type of engineering firm that can function as the primary consultant to the regional water planning groups. There are a number of engineering firms that essentially participate only in projects that would fall in the "study" category. They are not "full service" in that the firm does not pursue the later stages of design and construction management, and thus would be free of the potential problems of the "big ticket payoff" conflict of interest. The potential for "favored client" conflict of interest would still remain.

#### *Non-engineering Primary Consultant*

Another method of addressing the conflict of interest issue would entail a more drastic alteration to the current SB 1 client-consultant relationship. In this case the primary consultant would be restricted only to professional planning firms or firms that specialize in facilitated stakeholder processes. Obviously, engineering expertise would still be needed in the SB 1 process, but the role of the consulting engineering firms would be relegated to a secondary role in terms of providing directed input only on infrastructure-based water supply alternatives. The input would be evaluated and cross-checked by the primary consultant along with other input on non-structural solutions and management strategies received from non-engineering specialist, or perhaps "study-only" engineering firms.

#### *Phase Participation Restrictions*

The final proposed manner of addressing the conflicts of interest problems in the SB 1 process is both the least intrusive and, in another sense, the most extreme. No alteration of the current client-consultant relationship would be necessary; all manner of engineering firms would be allowed to be the primary consultant. However, there would be restrictions placed upon the field of eligible participants in the subsequent design and construction phases of any infrastructure project that ensues from the SB 1 process. Some form of restriction, perhaps total, would be placed on the level of participation that the firm completing the SB 1 "study" phase evaluations could have in the later phases. This would avoid both of the previously discussed modes of conflicts of interest because the firm would have no motivation to bias the characteristics on any infrastructure project, such as cost, socioeconomic impacts, environmental impacts, or reliability.

### **Conclusions**

There is great potential for conflicts of interest to impede the Texas regional water planning process from achieving its full intent. Because of the diverse interests represented in the makeup of the regional water planning groups and legislative requirements to consider a broad array of environmental, costs, and socioeconomic issues, a premium value is attached to the provision of

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<sup>14</sup> *ibid.*

objective, unbiased information to the group by their consultant. However, as currently configured, with “full service” engineering firms being the dominant type of consultant to the regions, great potential exist for conflicts of interest that could impede the full exercise of independent judgment on evaluations of many water management strategies. This is due primarily to the potentially large financial gains that such firms may enjoy as projects move from the conceptual level of SB 1 planning into the more lucrative design and construction phases. There is a broadly held expectation that acting as consultant in the “study” phase that comprises SB 1 planning will enhance the chances of being selected for those later project phases. Thus the engineer’s judgment about issues of cost, reliability, and socioeconomic and environmental impacts of infrastructure-based water management strategies may be fundamentally conflicted because of his/her firm’s potential financial gain later from a project portrayed favorably in the SB 1 process. These possible conflicts of interest should be addressed for they may constitute a great disservice to the citizens of Texas by interfering with the development of a truly balanced, fiscally sound, and representative state water plan.

## **Bibliography**

- American Society of Civil Engineers. 1968. *Consulting Engineering: A Guide for the Engagement of Engineering Services*.
- Davis, Michael. 1991. *Conflict of Interest*. pgs. 317-326 in Ethical Issues in Engineering. (Deborah G. Johnson, editor). Prentice-Hall.
- Davis, Michael. 1998. *Thinking Like an Engineer: Studies in the Ethics of a Profession*. Oxford University Press.
- Johns, Norman. 2004. *Bays in Peril: A Forecast for Freshwater Flows to Texas Estuaries*. National Wildlife Federation, Austin, TX.
- McFarland, Michael C. 1991. *The Public Health, Safety, and Welfare: An Analysis of the Social Responsibilities of Engineers*. pps 159-174 in Ethical Issues in Engineering. (Deborah G. Johnson, editor). Prentice-Hall.
- McKinney, Larry D. 2003. *Why Bays Matter*. Texas Parks and Wildlife Magazine, pg. 24-25, July.
- Moorhouse, Maggie and Elliff, Scott. 2002. *Planning Process for Public Participation in Regional Water Resources Planning*. Journal of the American Water Resources Association, pgs. 531-540, Vol. 38, No. 2.
- Texas Water Development Board, 2002. *Water for Texas – 2002*. Austin, TX.
- Votteler, Todd. 2002. *Raiders of the Lost Aquifer? Or, the Beginning of the End to Fifty Years of Conflict over the Texas Edwards Aquifer*. Tulane Environmental Law Journal, pgs. 257-334, Summer 2002.

## **Other Reference Materials**

- anonymous, Texas Water Development Board, personal communication, Aug. 15<sup>th</sup>, 2005.
- Case Western Reserve University, no date. *The Online Ethics Center for Engineering and Science, Glossary of Terms*, <http://onlineethics.org/cases/nspe/index.html>
- Region C Water Planning Group. 2005. *Initially Prepared 2006 Region C Water Plan*.
- South Central Texas Regional Water Planning Group. 2005. *Initially Prepared 2006 Regional Water Plan, Vol. II*.
- Texas Administrative Code online at [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC).