

Additional Information (Questions and Answers)

1) QUESTION: *What was the rationale behind preparing a further annotated report?*

ANSWER: The revised report was to address any limitations or incomplete aspects of the draft report dated October 2015. In meeting our responsibilities of due diligence and as a research institution, we wanted to ensure the revised report offered scientifically-sound and objective conclusions and recommendations. To that end, we requested the input of a science-expert panel (hereafter Science Review Panel) to provide further clarification to assist the sponsor (the City of San Antonio/City of Fair Oaks Ranch) in making decisions. As this report will be used to help address water issues and planning, we wanted to ensure it not only met the scope of work, but also the guidelines of the institution and the scientific community in general. Our goal in preparing this report has been to provide the best and most accurate product possible within the agreed-upon time. This report builds on the October 2015 draft and retains its methodology, but also annotates any limitations or subjectivity the panel identified in that draft. It also provides suggestions and examples of how the methodology and metrics of previous drafts might be made more objective and appropriate for making assessments.

As with any technical report, this one depends on the accuracy and scientific validity of the data and metrics used. It is intended to serve as a technical resource for decision-makers regarding water projects and water issues addressed in the report.

2) QUESTION: *Who is responsible for this final report?*

ANSWER: This report is a collaborative effort of the Texas Water Resources Institute (TWRI) and the Texas A&M Institute of Renewable Natural Resources (IRNR), both part of the Texas A&M University System. The primary investigator for the draft report, Dr. Calvin Finch, began the report work as director of the Texas A&M Water Conservation Technology Center -- a joint center of the Texas Water Resources Institute and Texas Center for Applied Technology. He continued that work as a project manager for the Texas A&M Institute of Renewable Natural Resources. In May 2015, Dr. Finch retired. Since September, further work on the report has been facilitated by Dr. Roel Lopez, director of both TWRI and IRNR.

3) QUESTION: *There was some hold-up on the preparation this report. What was the reason for the delay?*

ANSWER: Some of the data needed to fully assess and validate some of the analyses or assumptions made in the earlier draft were not readily available and obtaining this additional data took time. Also, as the primary investigator for the initial report retired before it was given a full review, due diligence required we obtain further feedback and input from the report sponsor. In addition, we put the October 1 draft through a scientific peer review process, which identified areas where it could benefit from the application of different metrics and the additional scientific data to support some of the conclusions. Previous comments by the report sponsor, key individuals, San Antonio Water System and others further validated the need to take the time to revise the earlier draft to provide an even more thorough and objective analysis. For additional information, see *Report History* section of the report.

4) QUESTION: What were the technical expectations of this report as relates to the sponsor, TWRI/IRNR and the scientific peer reviewers?

ANSWER: The scope of the work was for a comprehensive, long-range report that assesses the water security of the City of San Antonio, City of Fair Oaks Ranch and extraterritorial jurisdiction in specified areas. It was to include reviewing existing data on city policies, regulations and initiatives involving the cost and water quantity/quality from various regional sources for the period 2015-2060.

While the October 2015 draft of the report did this, some areas of that draft report were limited. Per the input of the Science Review Panel, the October 1 draft did not incorporate the most recent data or the most appropriate metrics. The panel identified where more recent data or improved metrics might be used to develop more comprehensive, accurate and objective project assessments. Employing well-defined and systematic parameters that do not bias results and interpretation is a necessity in scientific research. This includes confirming that methodologies and metrics are valid and reliable, and that the study could be replicated by the science community to confirm the results. The revised report shows how a more scientifically standardized structure employing more appropriate metrics and more consistent methodology would improve report accuracy and appropriateness, plus better synthesize information for the sponsor to use in making decisions.

5) QUESTION: What were the academic qualifications of the science panel that conducted the peer review and what was involved in the process?

ANSWER: The panel consisted of five well-respected water experts, each with more than 20 years of post-doctoral experience in various fields related to water and water issues (e.g., water economics, water policy, water engineering), as well as a strong publication record (e.g., each with more than 50 peer-reviewed journal articles). Particular attention was given in selecting expert reviewers to avoid individuals with any conflict of interests (both historical or current) specifically related to the Vista Ridge project (i.e., parent company, sub-contractors, etc.).

In general terms, the scientific peer-review process involves submitting a body of work to a group of qualified, unbiased scientists who independently examine the work's objectives, methodology, findings, conclusions and recommendations for scientific correctness within the professional field. The report was given a "blind" review, which is the most common type of review used within the scientific community. In this review, a panel objectively critiques the work and offers professional insights as to considerations and areas of improvement or revision. Use of a "blind" review allows for a high degree of candor and objectivity.

For the *Cities of San Antonio and Fair Oaks Ranch Water Policy Analysis*, a peer review was completed October 2015, with comments and recommendations focusing on key areas where the draft report could be enhanced. The panel's review results are provided in the final report and are shown as highlighted comment box insets. These offer an additional perspective for decision-making and are intended to help the reader better understand the report as a tool in decision-making (see Appendix A in report for full Science Review Panel commentary).

6) QUESTION: What are some of the areas in the draft version peer reviewers pointed to as needing further attention? What did they suggest for revision?

ANSWER: The peer reviewers identified five general category areas where the October 1 draft report could be bolstered as a technical document and tool for informed decision-making. Included within each category are specific recommendations:

-- Risk Analyses Metrics: These were assessed as being too subjective and needing additional measures or metrics, such as reliability of water supply. The panel also questioned the use of 3-point scaling using 0, – and + designations.

Suggestion: Original “risk” labels should not be heavily weighted, but instead questions posed by the scientific panel in evaluating projects should be given greater weight. It also noted future policy analyses should consider a revised metric that clearly defines and measures the parameters and offers greater spread for ranking projects in decision-making. (NOTE: In response to this suggestion, a new rubric focused on measuring project uncertainty was developed. See Appendix B of report)

-- Water Grade: The panel also concluded the grade approach was too subjective and did not offer a “translation of actions”. The panel agreed subjectivity influenced the metric used and the labeling of issues.

Suggestion: Future report actions should identify relevant and appropriate “water issues” and consider a revised metric by which to grade those issues. It also recommended the revised metric should be equally applied across all water issues.

-- Methodology Used in Assessment: A separate and distinctive methods section is missing.

Suggestion: The panel recommended adding a report introduction and distinctive methods section to more clearly show report purpose and how values were calculated. It also noted that more description as to how values and grades were determined would have been more helpful, along with outlining appropriate and scientifically sound methodology that would be applied consistently and equally throughout report.

-- Vista Ridge Project: A primary concern of the Sponsor was whether the recommendations offered in the previous report provided a balanced and sufficiently broad view of the project, particularly given the previously listed categories related to “risk.” A specific review of the project was conducted by the panel, which noted specific key points to consider that were not part of the previous draft report. Those additional considerations as means of providing a more objective and broader view of this project are found in the Appendix A of report.

Suggestion: The panel offered questions for the City of San Antonio in making future decisions about the project.

-- Report Data Used. The panel also noted the report should avoid “self-citation” and the use of non-peer-reviewed literature, along with correcting any factual discrepancies or overstatements.

Suggestion: The report should be supported by appropriate citations and that any conclusions should avoid opinionating and be supported by scientifically sound data.

7) QUESTION: Why did you retain the previous risk and water grade assessments in the revised version?

ANSWER: This was done in the interest of time. It would have taken two to three months to revise the report using different methods and metrics and to integrate those and all other concerns and issues into a comprehensive report. Although the science panel noted the previous methods were too subjective and additional measures or metrics were needed, time did not allow for fully addressing and integrating these suggested changes. Instead, we retained the original designations, but indicated certain caveats. Among them were that the original “risk” labels should not be heavily weighted, but instead questions posed by the scientific panel in evaluating projects should be given greater weight. Furthermore, a supplemental water project assessment using more appropriate measures was conducted to illustrate the importance of a well-defined ranking criteria (see Appendix B of report to review supplemental assessment).

Relating to water grades, the panel agreed future report actions should identify relevant and appropriate “water issues” and consider a revised metric by which to grade those issues. It also recommended that any revised metrics related to assessments be applied equally across the board. Guidelines were suggested as to how to do this and develop a new grading rubric, but there was not sufficient time to do this for the revised report. A rapid grade validation for each of the water issues also was conducted by the Science Review Panel, and included in the report (see Appendix C of report for explanation of water issue grade validation).

8) QUESTION: How and what method was used for water grading?

ANSWER: As part of the project, the Cities of San Antonio and Fair Oaks Ranch requested the assignment of grades for water management activities or issues within their communities. The original authors assessed water management activities/issues within five broad categories: water planning, water management, water quality, regulatory agencies, and water costs. The grade assignment served to provide insight into the discussion of whether the communities are prepared in terms of water supply and where issues may exist to improve that preparation. The grade assignments in the October 2015 were admittedly opinions of the authors and are based, in some cases, on limited information. Grades in the previous drafts and their working descriptions were:

A -- Exemplary, recognized as a leading example, and accomplishing the goals for the effort.

B -- Effective, generally accomplishes goal for effort, but not exemplary, lacking in one area.

C -- Seems to be accepted by local ratepayers without any special recognition outside. Meets goals, but not exemplary.

D -- Does not meet goals and effort to correct not adequate.

E -- Failure to meet goals without much effort to address or correct.

The Science Review Panel found the water grading rubric to be too subjective in the assignment of a letter grade. It recommended the replacement of subjective measures with both quantitative

and qualitative metrics when assigning a grade. This would also allow several individuals to review and score water issues and obtain an average score in the analyses.

In reviewing the grade distribution for the October 1 report, grades range from A to D. Due to the subjective nature of the current grading rubric, the panel recommend the following interpretation by the sponsors for water grades: A or B = maintain activities/effort; C or D = opportunity for improvement or area of potential gain. In addition, a rapid grade validation for each of the water issues also was conducted by the Science Review Panel, and included in the report (see Appendix C of report for explanation of water issue grade validation).

9) QUESTION: In the July and October 2015 versions of the report, what was the meaning of a “high-risk” project as it applied to projects such as Vista Ridge?

ANSWER: Risk, in terms of these earlier draft reports, is defined as characteristics of water-supply resources that have some degree of unreliability, threat or challenge. Assigning a numerical “risk” value reflected the estimated degree of unreliability, threat or challenge for that water resource. Risk factors used in the previous drafts include total water, cost of water, water ownership, length of contract, distance, endangered species, water treatment required, contamination threat, sensitivity to drought, regulatory agencies and other factors.

The basic risk factors the original authors evaluated for each water resource attempted to capture variability and/or unpredictability of that water resource.

However, the Science Review Panel concluded the risk scale was limiting in that it unintentionally overly favored or penalized some risk characteristics. Thus, the term “high-risk” as it applies in this report and in the previous draft is a relative term that has limited meaning in comparing projects.

10) QUESTION: Per the recommendations of the peer reviewers, what would be a better way to address the “risk” aspects of the projects assessed in the previous report?

ANSWER: Risk factors used in the previous drafts include total water, cost of water, water ownership, length of contract, distance, endangered species, water treatment required, contamination threat, sensitivity to drought, regulatory agencies and other factors. While reviewers agreed most of these factors were relevant, they disagreed on the weight some of them were given in the assessments, as well as the subjective nature of those assessments. They concluded the previous risk scale unintentionally overly favored or penalized some risk characteristics.

The Science Review Panel developed an Illustrative Water Report Grading Rubric for using an “uncertainty index” for project evaluation (see Appendix B of report). The uncertainty factors for making “risk” assessments are project costs, ownership of water, length of contract, reliability of supply, total water contribution, endangered species, treatment required, contamination threat and regulatory certainty, plus a section for other issues specific to that project. It also includes a description of the uncertainty factor and offers a rating based on these more objective and science-based assessment of these factors. Average risk assessment scores range from 0-1 (represented in the rubric for each measure as 0-1). In this evaluation, the lower the overall

rating (i.e., 0 = low uncertainty) the higher the degree of certainty in a project -- and the higher the rating the lower the degree of certainty.

11) QUESTION: Does this new report show a different “risk” valuation for the projects?

ANSWER: Due to time constraints, we did not change the risk values assigned the projects in the October 2015. However, the scientific peer reviewers suggested these “risk” labels should not be heavily weighted in the overall project valuation. The review noted that some metrics used previously in determining the valuation of this project needed further examination (e.g., in the Visa Ridge project, distance of potential water resource from the city and concerns on pipe length and water treatment may have been overemphasized). There also were aspects of project valuation reviewers believed were not sufficiently supported by verifiable data.

The revised report identifies those issues and annotates -- using highlighted insets -- where the science panel noted the previous draft could be enhanced by additional and supporting data. While time did not allow for addressing all the recommendations of the science peer review panel, the Science Review Panel were able to develop an Illustrative Water Report Grading Rubric (see Appendix B in report) based on its recommendations. The revised methodology and metrics used in identifying, describing and rating these “uncertainty factors” provides for a more objective and appropriate project assessment.

12) QUESTION: Where will the revised report be available for reading?

ANSWER: The final report will be available for use by Nov. 6 and presented to the City Council on Nov. 12. The finished report will be posted on the Texas Water Resources Institute website at <http://twri.tamu.edu> and the Texas A&M Institute of Renewable Natural Resources website at <http://irnrr.tamu.edu/>.