REPORT ON INDEPENDENT EXAMINATION OF MEASURE A
REVENUE ESTIMATE COMMUNICATIONS

By: John C. Hueston

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I. EXECUTIVE SUMMARY

In 2016, the Board of Directors of the San Diego Association of Governments (“SANDAG”) endorsed Measure A, which sought to establish a new half-cent sales retail sales tax for the San Diego region. The supporters of Measure A campaigned for its passage with the representation that the additional sales tax would generate roughly $18 billion in revenue, which would be used for transportation needs throughout the region. The estimates of potential revenue from the passage of Measure A were inflated, a fact that was discovered by the press in October 2016. The following month, Measure A was defeated at the polls.

The SANDAG Board of Directors has commissioned this independent inquiry to determine which individuals within SANDAG knew that the revenue estimates were overstated, when those individuals gained that knowledge, and with whom that information was shared.

A. THE MEASURE A FORECASTING ERROR

SANDAG is the San Diego region’s primary public planning, transportation, and research agency. Since its inception, SANDAG has developed its regionwide plans and projects using its Demographic and Economic Forecasting Model (“DEFM”). DEFM is a computer program that takes local, regional, and national data and generates a comprehensive forecast for the San Diego region. DEFM relies in part on third-party data to produce these forecasts. In 2004, SANDAG staff incorrectly inputted third-party data into DEFM, which caused it to forecast an inflated growth rate for regional income. This inflated regional income forecast led, in turn, to an inflated projection for taxable retail sales in the region. The inflated retail sales projection caused SANDAG to overestimate the projected revenue from the passage of Measure A (the “Measure A forecasting error”).

Approximately every three years, SANDAG uses DEFM to generate a new regional growth forecast, which consists of a regional forecast and a subregional forecast. The regional growth forecast is then used throughout the agency and for many other parts of the Regional Transportation Plan that SANDAG is required by law to adopt every four years. Each new regional growth forecast that SANDAG generates with DEFM is known as a Series. After SANDAG introduced the aggregation error into DEFM in 2004, it was first incorporated into DEFM Series 11, which SANDAG’s Board of Directors adopted on September 8, 2006. During the Series 11 regional growth forecast, no member of SANDAG’s modeling team, which is responsible for updating DEFM, noticed the aggregation error, or realized that it had inflated the growth rates for income and taxable retail sales. Nor did the expert review panel, which reviews certain parts of each DEFM update—including income—notice these problems. Indeed, despite the aggregation error, the income forecast for Series 11 was highly similar to that of Series 10.

After Series 11, a number of important personnel from the modeling team retired, and SANDAG was left with no full-time in-house personnel who could operate DEFM. SANDAG nonetheless decided to use DEFM for the Series 12 regional growth forecast. As with Series 11, no one working on Series 12 noticed that its income and taxable retail sales forecasts were unreasonably inflated. The expert review panel also did not notice. Although the Series 12 income and taxable retail sales forecasts were similar to those of Series 10 and Series 11, Series 12 was
the first Series to be projected 40 years into the future, rather than 20. The Board adopted Series 12 on February 26, 2010.

After Series 12, a lack of expertise with SANDAG caused certain staff members to recommend use of a different forecasting model. Marney Cox, the Chief Economist declined to do so, and SANDAG therefore continued to use DEFM for Series 13.

As with Series 12, no one who worked in-house full-time at SANDAG knew how to operate DEFM for Series 13. When the Series 13 DEFM update was submitted to the expert review panel, they found that the income forecast—which had been inflated by the aggregation error—was unreasonable. So the panel recommended that a part-time staff member adjust the numbers. The staff member did so, which also affected the taxable retail sales forecast, causing both to grow rapidly until 2040 and then level off. As a result, the adjustment did little to diminish the effects of the aggregation error.

After completion of the Series 13 regional forecast, two analysts working on a subsequent subregional forecast realized that the income forecast was too high to be properly allocated. But rather than go back and fix the regional income forecast, they adjusted it again only for the subregional forecast. One of the analysts wrote a set of instructions explaining their modification and asserting that the Series 13 income forecast had “known problems.”

In February 2015, SANDAG hired Dmitry Messen to update the DEFM computer program. As soon as he arrived, Messen decided that he was going to develop a new model, tentatively known as Series 14, rather than update DEFM. Several months later, in July 2015, Chief Economist Cox used the Series 13 taxable retail sales forecast to generate the projected sales tax revenue for Measure A (then known as Quality of Life), a half-cent sales tax ordinance that SANDAG planned to use for future transportation projects. Because of the aggregation error, Cox calculated that Measure A would generate $18 billion in sales tax revenue over forty years. The next month, SANDAG hired Ray Major as Chief Economist. The plan was for Major to shadow Cox over the next year so that Major could learn how to do the job.

Major’s first important task as Chief Economist was to update the TransNet Plan of Finance. TransNet (also known as “TransNet 2”) was a half-cent sales tax that voters approved in 2004 and which ran from 2008 to 2048. While trying to update the Plan of Finance long-term forecast, Major determined that its revenue projections were unreasonably optimistic. After learning that the long-term forecast was calculated using Series 13’s taxable retail sales projections, Major began working with Messen to determine why. Messen and Major quickly determined that DEFM’s taxable retail sales forecast was based on DEFM’s income forecast, which was also connected to wage growth. Major and Messen then realized that DEFM projected that wages would grow by double the historical average. At this point, Major and Messen both felt that the taxable retail sales and income forecasts were incorrect. Although Major, Messen, and others knew that the taxable retail sales forecast was used in the Plan of Finance, it is likely that none of them realized that Cox had also used it for Measure A.

Major and others who were concerned about the income and taxable retail sales forecasts arranged a meeting with Gary Gallegos, SANDAG’s Executive Director, and Kim Kawada, SANDAG’s Chief Deputy Executive Director, in December 2015. Although the purpose of the
meeting was to discuss Messen’s new Series 14 model, the presenters planned to use the problems with Series 13’s income and taxable retail sales forecasts as a reason why SANDAG should abandon DEFM. During the meeting, it is very likely that slides were shown demonstrating the unrealistic income and taxable retail sales forecasts under DEFM. At the meeting, Marney Cox vociferously defended the forecasts and ultimately persuaded Gallegos and Kawada that the forecasts were reasonable. By the end of the meeting, the plan was to continue working on Messen’s new model, rather than to investigate the income and taxable retail sales numbers, or abandon their use. After the meeting, in early January 2016, Major submitted the Plan of Finance using the Series 13 taxable retail sales forecast. He also learned that Cox had used the taxable retail sales forecast to calculate Measure A. However, Major did not tell Gallegos, Kawada, or others; Major has asserted that he did not speak up because he believed that Gallegos would not have trusted his opinion over Cox’s.

SANDAG employees did not begin investigating the Series 13 forecasts again until October 2016. By then, Measure A was already on the November 8, 2016 ballot. After SANDAG received questions from the Voice of San Diego, Major and others renewed their investigation into the income and taxable retail sales forecasts. Although Major had known that Cox had used DEFM to calculate the Measure A revenue forecast, the others had not. However, once they learned this, they all believed that the forecast was wrong.

On October 24, 2016, the Voice of San Diego published two articles suggesting that the Measure A forecast might be overstated. At this point, Gallegos and Kawada began holding daily meetings with Cox, Major, and others. The purpose of these meetings was to discover whether there was an actual error in the Measure A forecast, since Cox still refused to agree that it could be wrong. Gallegos declined to concede an error until either Cox agreed or others discovered the source of the problem. Finally, on November 10, two days after the election at which Measure A failed to pass, staff members discovered the source: the aggregation error that had been introduced during Series 11.

B. SANDAG’S RESPONSE TO THE DISCOVERY OF THE MEASURE A FORECASTING ERROR

During our investigation into the Measure A forecasting error, we discovered several lapses in judgment in SANDAG’s response to the discovery of the forecasting error. Because these flaws were closely related to the subject of our investigation, we have included them in the report.

On October 28, 2016, SANDAG held an executive team meeting, during which John Kirk, SANDAG’s General Counsel, advised those in attendance that they should delete draft documents before retaining them for 60 days, otherwise they would need to keep them for two years. Although Kirk was restating SANDAG’s publicly-disclosed record retention policy, his reminder, in light of recent press inquiries and anticipated requests for documents, suggested to some employees that they should delete more than just draft documents. As a result, some employees may have deleted non-draft documents related to the forecasting error.

A few days later, on November 1, 2016, Kurt Kroninger, Director of Technical Services at SANDAG, created a folder known as “Hana Tools.” He then instructed all SANDAG staff investigating the Measure A forecasting error to store in Hana Tools all the documents they
generated as part of the search. Kroninger believed that all these documents were “drafts” under SANDAG Board policy and California law, and thus could be deleted within sixty days. Thus, Hana Tools was to serve as a central location where these documents could be stored and then mass deleted so they wouldn’t be released as part of a public records request. We believe that Kirk approved this use of Hana Tools. Although we have been informed that none of the documents on Hana Tools were in fact deleted, we lack forensic data to confirm this assertion.

On January 6, 2017, Ron Roberts published an editorial in the Voice of San Diego on the Measure A forecasting error. In it, he stated that SANDAG did not know before the election that DEFM could have caused the Measure A forecast to be overestimated. He also stated that when SANDAG staff became concerned about the Series 13 taxable retail sales forecast a year before the election, they did not realize that this forecast could affect TransNet. The following month, Gallegos sent a letter to the SANDAG Board in which he repeated Roberts’s claim that, a year before the election, SANDAG staff had not realized that the taxable retail forecast could affect TransNet. These cited statements were, at best, insufficiently transparent.

II. OVERVIEW OF EXAMINATION PROCEDURES

A. SCOPE OF WORK

On March 10, 2017, the Executive Committee of the SANDAG Board of Directors voted to form an ad hoc subcommittee to solicit and evaluate proposals from law firms to conduct an independent examination of the agency’s Measure A revenue estimate communications. On March 14, 2017, the subcommittee released a Request for Proposals, in which it identified the relevant scope of work as requesting an outside law firm to perform:

[A]n independent examination of the files, documents, emails, and all other communications related to the error in the forecasting model and determine which individuals knew that the revenue estimate was overstated, when those individuals gained that knowledge, who that information was shared with, and if it was not shared with decision makers, why.

On April 14, 2017, the SANDAG Board of Directors selected John C. Hueston, of Hueston Hennigan LLP, to conduct an independent examination of the agency’s communications regarding the revenue forecast for Measure A and deliver a report to the SANDAG Board of Directors.

B. WITNESSES INTERVIEWED

In connection with our review, we interviewed the following individuals (some of them more than once), either in person or by telephone:

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<td>Terry Beckhelm</td>
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<td>Kirby Brady</td>
<td>Former Senior Research Analyst</td>
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<td>Marney Cox</td>
<td>Former Chief Economist</td>
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Each witness participated in the interview process on a voluntary basis. Witnesses were free to decline to answer any question, although none ever did. We did not provide witnesses with proposed questions prior to interview.

C. MATERIALS REVIEWED

In addition to witness interviews, we collected and reviewed a broad range of materials during the course of our investigation, including the following:

- Emails and Attachments: We reviewed emails and attachments sent and received between relevant individuals at SANDAG. After reviewing the initial tranche of roughly 2,700 emails released to the Voice of San Diego, we made several more requests. In total, we have received over 50,000 emails from SANDAG, and have reviewed several thousand using targeted keyword searches.
- Outlook Meetings and Appointments: We reviewed Outlook meetings and appointments that involved relevant individuals at SANDAG during 2015 and 2016.

- Hana Tools: We reviewed the contents of Hana Tools by doing targeted searches within the stored documents.

- Recent Public Records Act Requests: We reviewed the scope of recent PRA requests to determine whether we should request additional documents.

- Other Materials: We reviewed pertinent news articles and commentary, as well as documents from SANDAG on Measure A, TransNet, DEFM, the Regional Transportation Plan, and the Seven-Point Plan. We also reviewed documents provided to us by witnesses.

D. ADDITIONAL ISSUE OUTSIDE SCOPE OF WORK: THE TRANSNET SHORTFALL

In addition to the Measure A forecasting error, news organizations such as the Voice of San Diego have also raised questions about a potential $17 billion shortfall in TransNet’s revenue forecast, caused in part by rising construction costs that SANDAG may have failed to disclose. A number of witnesses raised this issue as one of significant concern. We have not investigated this issue since it falls outside the scope of our authorized work and because TransNet was calculated using a version of DEFM that did not contain the aggregation error.

III. BACKGROUND

This investigation centers on DEFM, the forecasting model that SANDAG used to generate revenue forecasts for TransNet and Measure A, SANDAG’s sales tax ordinances for funding transportation projects.

A. DEFM

DEFM is a computer-based forecasting model that SANDAG used from the late 1970s until 2016. DEFM forecasts more than 700 demographic and economic variables, such as population, housing, and labor force projections. DEFM also forecasts future rates of income and taxable retail sales. Fundamentally, DEFM is a series of simultaneous nonlinear structural equations. By feeding national, state, and local data into DEFM, SANDAG produces a forecast for the entire San Diego region. SANDAG historically relied on DEFM to provide the regional growth forecast for SANDAG’s Regional Transportation Plan (“RTP”), which SANDAG is required by law to update every four years. The regional growth forecast consists of both a regional forecast and a subregional forecast.

When conducting a new regional growth forecast, employees from SANDAG’s modeling department would gather and analyze data to update its data sets, reset the equations within DEFM, and then run the model. These “runs” would produce a regional forecast, which the modelers would analyze to ensure the projections were reasonable. After this was done, SANDAG would convene an expert panel, which would provide recommendations on the forecast, including as to
whether certain projections should be adjusted to be more reasonable. Because DEFM produces hundreds of variables, the expert panel would not review the entire forecast—only the most important variables. Their recommendations were also non-binding, as the expert panel did not have authority to veto the forecast.

Once SANDAG finalized DEFM’s regional forecast, it would present it to the SANDAG Board for approval. If the Board approved, SANDAG would then use the regional forecast data to generate a subregional forecast. The subregional forecast is based on the DEFM forecast but generated using different models. The forecasts from DEFM and the subregional models are also used in a number of other models and projections that go into the RTP, such as for transportation and land use. Ultimately, the Board must adopt the finished regional growth forecast, as well as the RTP.

Each time SANDAG updates DEFM for a new regional growth forecast, the update is referred to as a new “Series.” Series 13—the thirteenth DEFM update—was produced for the most recent RTP, which the Board adopted on October 9, 2015. SANDAG uses these Series to conduct a variety of forecasts, including the revenue forecasts for TransNet and Measure A. But although SANDAG updated the DEFM forecast roughly every four years, the actual DEFM computer program has only received a handful of updates since the 1970s, most recently in 2003. At this point, SANDAG no longer uses DEFM and is developing a forecasting model to replace it.

B. TRANSNET

TransNet is a half-cent sales tax that voters approved in 2004 and which runs from 2008 to 2048. TransNet is the continuation of an earlier sales tax that ran from 1988 to 2008. The revenue from TransNet is used to fund a variety of transportation-related projects throughout the San Diego region. SANDAG forecasted that TransNet would generate roughly $14 billion in revenue over forty years. SANDAG conducted this forecast using data from the DEFM Series 10 forecast. To help plan for current and future TransNet projects, SANDAG produces an annual “TransNet Plan of Finance.” Among other things, the Plan of Finance includes a short- and long-term sales tax revenue forecast. Although the short-term forecast is not calculated using DEFM, the long-term forecast is, at least in part. Ray Major calculated the long-term forecast for the 2015 TransNet Plan of Finance using data from DEFM Series 13’s taxable retail sales forecast.

C. MEASURE A

Measure A was a half-cent sales tax, similar to TransNet, that would have run for forty years and funded transportation-related projects. SANDAG devised Measure A and projected that it would generate roughly $18 billion in revenue. Marney Cox calculated the Measure A forecast in July of 2015 using data from DEFM Series 13’s taxable retail sales forecast. Measure A failed to pass on November 8, 2016.

IV. THE MEASURE A FORECASTING ERROR

After Measure A failed to pass, SANDAG revealed that it was based on a flawed forecast and would not have generated $18 billion in revenue. Subsequently, the Voice of San Diego released emails and other documents suggesting that SANDAG employees and executives knew that the Measure A revenue forecast was inaccurate roughly one year before the vote. This section
of the report first details all the relevant facts beginning with the cause of the forecasting error through the present day. Then it presents specific findings identifying who knew that the forecast was inaccurate, when they knew it, and what they did with that information, as well as recommendations on how to prevent the recurrence of similar problems.

A. SUMMARY OF FACTS REGARDING THE MEASURE A FORECASTING ERROR

1. The Source Of The Forecasting Error Is Introduced Into DEFM After Series 10

In 2003, after SANDAG completed the DEFM Series 10 update, it began looking for a new source for national forecast data, which is one of the drivers of the DEFM forecast. Previously, SANDAG had purchased its national data from IHS Global Insight, but had become concerned about its cost and accuracy. As a result, SANDAG decided in 2004 to use Moody’s Economy.com as its national driver. The data that SANDAG acquired from Moody’s included both historical data for San Diego as well as future projections for entire United States.

After switching to Moody’s, SANDAG staff needed to prepare the data for use in DEFM. While inputting the data into a DEFM worksheet, a SANDAG staff member made what is, essentially, a copy-paste error. The purpose of the DEFM worksheet was to aggregate historical data from various industries in San Diego into DEFM’s 50 economic sectors. The copy-paste error affected three of these sectors. In short, a SANDAG employee copied the annual output of one of these aggregated sectors into the annual output of one or more of the several subsectors that comprised it. As one example, the DEFM worksheet properly recorded that the San Diego food manufacturing industry’s annual output in 1978 was $262 million. However, it then recorded that industry’s 1979 output as $3.2 billion. This was the total output for the entire San Diego manufacturing industry—of which food manufacturing was only a subsector. A similar error occurred in the two other sectors.

Because these historical errors compounded into the present day, they affected DEFM’s projections. In DEFM, labor productivity, or output, is connected to income, so that if DEFM forecasts increased productivity, it will also forecast increased wages. Similarly, a higher income forecast will also lead to a higher taxable retail sales forecast. As a result, once this data was used in DEFM, it began generating overestimated income and taxable retail sales forecasts, including for Measure A.

SANDAG staff did not discover the source of these overestimated forecasts—the aggregation error—until November 10, 2016.

2. DEFM Series 11 Is The First To Include The Forecasting Error

The SANDAG Board adopted the Series 11 regional growth forecast on September 8, 2006. This was the first regional growth forecast to include the aggregation error. Although the error

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1 EXHIBIT 1—SANDAG, SR13 TRETS Model Presentation (Jan. 2017).
overestimated Series 11’s income and taxable retail sales forecast, the SANDAG modeling team never noticed.

Jeff Tayman supervised the Series 11 update as SANDAG’s Director of Technical Services (an executive-level position). According to Tayman, he would always check DEFM’s income variable when producing a regional growth forecast. Beth Jarosz, who worked with Tayman and later ran the DEFM update process, confirmed that income would have been checked, and said that it also would have been submitted to the expert panel for review. Based on the notes from the Series 11 expert review panel, there is no indication that it found anything wrong with the income forecast. ² Tayman noted, however, that the taxable retail sales forecast received less scrutiny. Because it was so closely tied to income, if the income forecast was reasonable, then taxable retail sales was assumed to be reasonable as well. Daniel Flyte, a Senior Research Analyst at SANDAG who was present for several regional growth forecasts, said that taxable retail sales would not have been presented to the expert panel.

Witnesses gave a number of explanations for why the aggressive income and taxable retail sales forecasts didn’t raise any red flags during Series 11. Multiple witnesses thought it might have been because Series 11 was only a 20-year forecast—whereas Series 12 and 13 were forty-year forecasts—so it wouldn’t have been as obvious how optimistic the data was. Jarosz added that the San Diego economy was thriving at this point, which would have made the forecast seem more reasonable. And although he wasn’t present during the update, Clint Daniels, Principal Research Analyst at SANDAG, pointed out that SANDAG’s income and taxable retail sales forecasts have been fairly consistent from Series 10 through Series 13, even though Series 10 did not include the aggregation error. ³ However, Terry Beckhelm, who was responsible for running DEFM during Series 11, felt that the team overlooked the aggressive forecasts simply because they paid less attention to the regional growth forecast after Series 10. According to Beckhelm, this was because the subregional forecast became much more important than the regional due to a lack of space for the region’s population growth.

3. SANDAG Loses Staff Expertise On DEFM After Series 11

Another reason witnesses gave for why the aggressive forecasts were not noticed during Series 11 was because SANDAG was in the midst of losing many of its most valuable DEFM-related employees. Most notably, Tayman and Beckhelm, who were each heavily responsible for producing the regional growth forecast, both retired in 2006. At the time, Tayman had 25 years of forecasting experience at SANDAG, while Beckhelm had over thirty years of forecasting experience at SANDAG and other organizations.

During a DEFM update, Beckhelm would supervise the maintaining and running of the actual DEFM computer program. This was a challenging, time-consuming, and specialized task due to the complexity of the model and the age of the operating system, and Beckhelm was one of

³ EXHIBIT 3—SANDAG, Taxable Retail Sales Per Capita from series 10 to 13.
the few employees at SANDAG who knew how to do it. As for Tayman, many witnesses recalled that he was intently focused on ensuring the accuracy of the forecast.

Beckhelm and others recalled that before Beckhelm left, he repeatedly warned SANDAG that continued use of DEFM required SANDAG either: (1) to find someone else who could run it; or (2) to ask Regional Economic Research, Inc. (“RER”), a company that had worked on the DEFM software, to rewrite it. Around this time, however, RER was acquired by another company, Itron, and was no longer willing to work on DEFM. And though in 2008 SANDAG did hire Daniels, who had a background in software development and city planning, Daniels did not have deep experience in demographic and economic forecasting, and had no experience with DEFM.

After Tayman retired, SANDAG initially replaced him with Kevin Murphy, who worked for a similar agency in Seattle. Although Murphy had significant experience with data analysis and modeling, he stayed for less than a year before returning to Washington. After Murphy left, Gallegos promoted Kurt Kroninger, who was then SANDAG’s IT Manager, to Director of Technical Services. Although many witnesses noted that Kroninger was a skilled IT professional, he did not have experience with DEFM or demographic and economic forecasting generally.

4. DEFM’s Aggressive Income Forecast Is Not Questioned During Series 12

The SANDAG Board adopted the Series 12 regional growth forecast on February 26, 2010. Series 12 was the first forecast that SANDAG included a 40-year projection. Although Gallegos had wanted Tayman to generate a forty-year forecast for previous regional growth forecasts, he had refused, arguing that the data wouldn’t be accurate that far into the future. However, Kroninger agreed to do it for Series 12. Even though Beckhelm had retired, he agreed to continue to work for SANDAG on a part-time basis and run DEFM for Series 12. Beckhelm said that if he hadn’t agreed, SANDAG wouldn’t have been able to complete the forecast using DEFM, since no one else knew how to operate it.

Although the aggregation error was still present in Series 12, and caused DEFM’s income and taxable retail sales forecasts to be overly optimistic, once again no one realized there was a problem. Ed Schafer, who was the project manager for Series 12, said that the income forecast would have been presented to the expert panel. Based on the expert panel’s notes, they did not question the Series 12 income forecast. When asked, Schafer could not explain why no one noticed the aggressive income or taxable retail sales forecasts. As Daniels pointed out, however, the Series 12 income and taxable retail sales forecast was consistent with Series 10—before the aggregation error was introduced. Jarosz, who worked closely with Beckhelm on Series 12, agreed that this would likely have made the Series 12 income forecast appear more reasonable.

That said, a number of witnesses pointed out that three DEFM outputs are, for political reasons, by far the most important: population, housing and jobs. As a result, these outputs would receive much more scrutiny than others, including income. For instance, Kroninger said that during a regional growth forecast, these were the outputs he was concerned about.

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A number of witnesses also commented that during the Series 12 update, less time was spent ensuring that the forecasts were accurate. Jarosz said that she felt rushed during the update, and that the team was understaffed. Schafer agreed that after Tayman left, less time was spent checking the reasonableness of DEFM’s inputs and outputs, which he felt was due in part to lack of staffing. He said that he spoke to Daniels about this. Flyte said that he would raise the understaffing issues during his annual reviews. He also felt that because Beckhelm was working remotely, the Series 12 update was of a lower quality than past regional growth forecasts. Beckhelm was more explicit: he said that the focus on accuracy disappeared after Tayman left.

Kroninger claimed that he was not satisfied with Beckhelm working only part-time on DEFM; however, he asserted that the team wasn’t yet facing serious staffing problems during Series 12. Yet Kroninger also recalled that he told SANDAG senior executives on multiple occasions that they couldn’t retain Beckhelm indefinitely, and would need to fashion a permanent solution. Although Gallegos knew that Beckhelm was continuing to work part-time, he believed that SANDAG was training staff members to replace him.

5. SANDAG’S Staffing Problems Worsen After Series 12

While working closely with Beckhelm on Series 12, Jarosz had learned how to run DEFM. As a result, Daniels and Kroninger had planned for her to manage the regional growth forecast for Series 13. However, in December 2010, Jarosz moved to Florida for family reasons.

Once Jarosz departed, Kroninger said he frequently expressed to Gallegos and others that SANDAG required more than one person to replace Jarosz. According to Kroninger, he and Daniels tried several times to hire new employees, but were unable to find a satisfactory candidate. Kroninger also said that although Jarosz had been training Kirby Brady, who had come to SANDAG as an intern in 2009, she did not yet have the experience or in-depth knowledge of DEFM to replace Jarosz.

Gallegos denied receiving notice that SANDAG staff lacked expertise regarding DEFM. Gallegos believed that Kroninger felt Brady was ready to replace Jarosz as the person in charge of the regional growth forecast, although he wasn’t sure if this meant she was also expected to run DEFM. Gallegos said that he had asked Kroninger whether Brady was ready, and was relying on Kroninger to inform him of issues. Renee Wasmund, who was the Chief Deputy Executive Director at the time, said that she never heard concerns about the regional growth forecast being understaffed. In response, Daniels said that he was certain that Gallegos and Wasmund knew that there were serious issues regarding lack of personnel and expertise on DEFM at the time. But he also said he had reason to believe that some of the concerns he raised to Kroninger were not elevated to Gallegos or his chief deputies—first Wasmund and then later Kim Kawada.

6. SANDAG Continues To Use DEFM For Series 13

In 2011, Daniels made a strong push for moving away from DEFM. He said this was necessary because Beckhelm would often complain that they didn’t have enough people on the team, was increasingly less interested in working part-time, and Jarosz was living in Florida. So Daniels spoke with Gallegos about transitioning from DEFM and instead purchasing a third-party forecasting model, such as REMI, for Series 13. According to Daniels, using REMI would give
them more flexibility to hire an economist or demographer with REMI experience, since the model was broadly used. Daniels said that Gallegos told him to coordinate with Marney Cox, SANDAG’s Chief Economist (an executive-level position), to come up with a plan.

Cox had a very long tenure at SANDAG, and witnesses frequently described him as possessing a great deal of influence over staff and other executives. In particular, a number of witnesses commented that Gallegos relied heavily on Cox’s opinion, and would often listen to him over others. In addition, a number of witnesses described Cox as having been closely involved with the early development of DEFM, and said he couldn’t accept criticism of the model. But while Cox had run DEFM through the 1980s, he had become increasingly less involved with it over the years.

At the meeting with Cox, Daniels said that he told him how understaffed they were on the regional growth forecast, that Beckhelm no longer wanted to work part-time, and that Jarosz was living in Florida. As a result, Daniels said, they should no longer use DEFM. But Cox disagreed. Daniels said that after the meeting, Cox told Gallegos that they shouldn’t switch away from DEFM, and Gallegos sided with Cox.

For his part, Cox remembered continuous tension at SANDAG about whether they should abandon DEFM. And he acknowledged that when the issue came up, he would say, in no uncertain terms, that they needed to stick with DEFM, rather than rely on a third-party model that they couldn’t control. Similarly, Gallegos said that it was SANDAG’s legacy to produce its own model, which it knows and understands. Schafer and Jarosz also recalled the debates over REMI, but explained that switching to it would have presented its own problems, for example it was much less flexible, and so was less capable of being tailored to the San Diego region.

7. Jarosz Manages The Series 13 Regional Forecast From Florida

By 2012, SANDAG had been unable to replace Jarosz and had decided to use DEFM for the Series 13 regional growth forecast, which it needed to complete as part of the latest RTP. As a result, Jarosz ended up in charge of the Series 13 DEFM update even though she was living in Florida and working as a professor at the same time. Jarosz said that although she wanted to run the forecast, she also knew that SANDAG needed her because it had no one else in-house who could do it. Daniels, Schaefer, and Kroninger all agreed that they had no choice but to rely on Jarosz to get the forecast done. Nonetheless, they each expressed discomfort with the situation. Schafer in particular mentioned that one of the big issues with Jarosz in Florida was that there was less collaboration and sharing of information.

Jarosz ended up completing most of the work on the regional forecast independently. She said that during the update, she continued to be concerned about a lack of staffing, particularly for the accuracy checks. Jarosz said that the only people quality-controlling DEFM were her, Beckhelm, and Brady. In comparison, she said that in the past there would have been at least five people working on a regional forecast, which other witnesses confirmed. However, when asked

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5 EXHIBIT 6—Outlook Appointment from Clint Daniels, Principal Research Analyst, SANDAG, to Kurt Kroninger, Former Director of Technological Services, SANDAG, and Marney Cox, Former Chief Economist, SANDAG (Sept. 7, 2011, 11:00 PST).
about working with Jarosz, Brady said that she had not worked on the Series 13 regional forecast at all, and Beckhelm said that he mostly worked on the subregional forecast.

8. **Jarosz Adjusts The Series 13 Income Forecast In Response To The Expert Panel’s Recommendation**

When Jarosz presented the Series 13 regional forecast to the members of the expert panel, they recommended that she adjust the income forecast “to correct for compounding growth in the latter years of the forecast.”6 Tayman served on the Series 13 expert panel and remembers that the income forecast looked much too aggressive at the time. Jarosz thought that the reason the expert panel became concerned with the Series 13 income forecast (but said nothing about the Series 12 income forecast which was just as optimistic) was because by Series 13 the recession had already lasted for several years.7 Thus, the forecast may have seemed less reasonable.

In response to the expert panel’s recommendation, Jarosz “updated the income model by capping growth rates in output by sector.”8 In other words, she reduced DEFM’s labor productivity forecasts starting at the year 2040. Because productivity affects income, these caps caused the Series 13 income forecast to level off at 2040 as well.9 They also caused Series 13’s taxable retail sales forecast to level off.10 Jarosz said that the methodology she used was called “trend extrapolation,” and entailed determining the average annual growth rate from the past and applying it to the future. Jarosz couldn’t remember why she made the adjustment at the year 2040, but said she would have discussed with the expert panel where to make the adjustment and by how much. Tayman and Jarosz both said that it’s common to make adjustments to a forecast so that it will be more reasonable, especially late in a forecast when one may not have time to investigate the source of the problem. Tayman felt, however, that Jarosz should have adjusted the forecast closer to the present date so that it would be closer to the U.S. income forecast.11 Tayman also said that when such an adjustment is made, it’s important to determine why the original forecast was unreasonable.

Jarosz believes that, at the time, she would have considered investigating the source of the aggressive income forecast, but would have been unable to because of inadequate staffing. And she said that she and others would have felt comfortable with the adjustment, since the Series 13 forecast was in line with past income forecasts, including Series 10. Daniels agreed with this point, and also said that updating the DEFM model was extremely time-consuming, since it would frequently break. As a result, if some aspect of the forecast didn’t seem like a major problem, they wouldn’t investigate it.

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6 EXHIBIT 2—SANDAG, supra note 2, at 11.
7 EXHIBIT 5—Beth Jarosz, supra note 4, at 10.
8 EXHIBIT 2—SANDAG, supra note 2, at 11; EXHIBIT 7—SANDAG, SD Output per Worker by Industry.
9 EXHIBIT 5—Beth Jarosz, supra note 4, at 10.
10 Id. at 11–12.
11 Id. at 10.
Jarosz said that she would have shown the adjustment to SANDAG executives, including Gallegos and Cox. And in fact, she did create a presentation to the “SANDAG Executive Team,” which contained slides showing how she capped the Series 13 income forecast. Gallegos had no recollection of being shown the adjustment. And Cox, who disagreed with it, said that he didn’t learn about it until later.

9. Flyte And Brady Further Adjust The Series 13 Regional Income Forecast For The Subregional Models

Jarosz severed her relationship with SANDAG in February of 2013. She said that she departed both because she would not be returning to San Diego and because of the staffing and quality control issues on DEFM. Jarosz said she told Gallegos about her concerns during her exit interview.

After Jarosz left, Brady and Flyte were responsible for completing Series 13’s subregional forecast. Beckhelm helped as well, although only part-time. The subregional forecast is based on the DEFM regional forecast data. As Schafer described it, the subregional forecast allocates the results of the regional forecast throughout the many jurisdictions that comprise the region. While working on the subregional forecast, Brady realized that DEFM’s Series 13 regional income forecast—which Jarosz had already adjusted once—was still too high to be properly allocated. She then worked with Flyte, who devised a method of reducing the regional income forecast for use in the subregional forecast. However, neither Brady nor Flyte went back and readjusted the DEFM regional income forecast or investigated why it was so high. As a result, the subregional income forecast was different than the DEFM Series 13 regional income forecast. At Brady’s urging, Flyte later documented what they had done in Confluence, an internal database SANDAG staff uses to store information about SANDAG’s various modeling tools.

On the Confluence page, Flyte wrote:

The [Series 13] income distribution from DEFM has known problems, and is therefore not used as a control. Upon staff review, it was determined that the real household median income target is much higher than would be expected.

Flyte said that when he adjusted the subregional income forecast, he was not aware that Jarosz had already capped the regional income forecast. Although Brady attended the expert panel that recommended that Jarosz adjust the regional income forecast, she had no memory of this recommendation. Flyte claimed that it hadn’t occurred to him to investigate or adjust the regional forecast since neither he nor Brady was responsible for the regional forecast. Nor, he said, would they have known how to do so, since they weren’t competent with DEFM. He also said that they were under a tight deadline to complete the subregional forecast. Brady agreed that they were under a tight deadline, and said that since the regional forecast had already been completed, it was

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12 EXHIBIT 5—Beth Jarosz, supra note 4.
14Id. at 1.
too late go back and fix it. Brady also said that, at this point, they didn’t know there was an actual flaw in the regional income forecast.

Although Flyte said that Daniels had instructed them to inspect the subregional income forecast and was aware of the adjustment, Daniels disagreed. Daniels admitted that he was unsure whether he had asked Flyte and Brady to look into the forecast. But he was certain that Flyte and Brady never told him that they had adjusted the subregional income forecast in this manner. Daniels said he didn’t learn about it or see the Confluence page until November 2016, when he and others were trying to find the source of the Measure A forecasting error. Daniels said that had he known about the adjustment at the time it was made, he would have made sure that the regional forecast was updated. When asked about the situation, Tayman felt similarly to Daniels: that at this point, the SANDAG team should have gone back and fixed the regional forecast.

Although Cox used the Series 13 regional taxable retail sales forecast—which is directly connected to the regional income forecast—for projects including the TransNet Plan of Finance and the Measure A revenue forecast, no one ever told him that Flyte and Brady readjusted income for the subregional forecast. Flyte said he never told Cox because he didn’t know who within SANDAG used the income or taxable retail sales forecasts. Had he known, he said he would have told them what he had done. Flyte also acknowledged that Kroninger was unaware of the adjustment.

### 10. Cox Calculates The Measure A Revenue Forecast In July 2015

In January of 2015, Cox emailed Daniels and asked for the taxable retail sales forecast from DEFM Series 13, which Daniels provided. At the time, Daniels did not know why Cox wanted the data, and he never asked. In fact, many witnesses said that Cox was highly independent at SANDAG, such that staff members within SANDAG’s modeling group, which was responsible for updating DEFM (among other models), wouldn’t necessarily know how or if Cox was using the DEFM forecast data. Cox himself agreed with this. Cox also said, however, that he frequently had difficulty obtaining data from the modeling group. Ray Major, who became Chief Economist after Cox, had the same issue.

Looking back, Daniels now believes that, given the timing of Cox’s request, it was likely that he wanted to use this data to calculate the revenue forecast for Measure A, which was then known as “Quality of Life” or “QoL.” Cox did ultimately use the Series 13 taxable retail sales forecast to calculate the $18 billion Measure A revenue forecast, most likely in July of 2015. When asked about it, he said that he was not trying to reach a particular target when he produced the forecast—he just ran the numbers and ended up with $18 billion. Kawada and Gallegos agreed

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15 **EXHIBIT 9**—E-mail from Marney Cox, Former Chief Economist, SANDAG, to Clint Daniels, Principal Research Analyst, SANDAG, at 1 (Jan. 21, 2015, 10:52 PST).

16 **EXHIBIT 10**—SANDAG, 2015-07 QoL Sales Tax revenue forecasts from Marney – jnu (Jul. 16, 2015) (stored internally in M:\Planning\Quality of Life Measure\2015 Q of L\2015 QoL Finance\2015-07 QoL Sales Tax revenue forecasts from Marney - jnu.xlsx). Column G shows how Measure A’s $18 billion projected retail sales revenue was calculated. *Id.*
that they didn’t have a target revenue goal ahead of time; it was only after Cox conducted the
forecast that they started evaluating what projects they could build.

11. SANDAG Hires Ray Major And Dmitry Messen

In February 2015, SANDAG hired Dmitry Messen to modernize the DEFM model. Messen had previously run an economic modeling department at a public agency in Houston. According to Gallegos, the plan was to update SANDAG’s forecasting model in time for Series 14. Messen said that from when he was first hired, he believed that DEFM was not an ideal model for San Diego because it was driven by econometrics, rather than demographics. Flyte, who worked closely with Messen, said that he also wanted to make a much simpler model than DEFM, which involved 700 hundred variables, many of which weren’t used and only a handful of which were important. As a result, Messen decided to build a totally new, demographically-based model, rather than update DEFM. Messen knew that Cox was heavily invested in DEFM and would not agree with the direction in which he was taking the model, so he shared his ideas very gently in a meeting with Cox and Flyte a few months after Messen began.

In August 2015, SANDAG hired Major to replace Cox as Chief Economist. The plan was for Major to shadow Cox for a period of time so that he could learn how to take over Cox’s responsibilities. Major said that from the moment he was hired, he was aware that Gallegos and Cox were concerned about switching to a demographic-based forecasting model and wanted him to be involved in the process.

12. SANDAG Staff Conclude That The DEFM Series 13 Taxable Retail Sales Forecast Is Unreasonable

After Major arrived at SANDAG, his first substantial project was updating the TransNet Plan of Finance for 2015. The Plan of Finance is an annual public report on the TransNet sales tax measure, and contains a short- and long-term forecast of TransNet’s revenue collection. The short-term forecast, which only projects five years into the future, is not based on DEFM. However, the long-term forecast is based, at least in part, on DEFM’s taxable retail sales forecast, and the further it projects into the future, the more heavily it is affected by that forecast. At first, Major didn’t understand how the long-term Plan of Finance forecast was calculated, but he knew it was based on DEFM, so he began looking into the Series 13 taxable retail sales forecast. Once he did so, Major became concerned that it was projecting an unrealistically high level of taxable retail sales revenue. He then asked Messen to look into the problem.

In response, Messen began emailing Major his findings. On November 13, Messen emailed Major a number of graphs demonstrating the connection between the Series 13 taxable retail sales forecast and its wage and income forecasts. On November 20, Messen emailed Major an explanation of how, in the new model he was developing, increased personal money income causes increased taxable retail sales revenue. He further explained that increased income comes

17 EXHIBIT 11—E-mail from Dmitry Messen, Senior Regional Models Analyst, SANDAG, to Ray Major, Chief Economist, SANDAG (Nov. 13, 2015, 10:46 PST).

18 EXHIBIT 12—E-mail from Dmitry Messen, Senior Regional Models Analyst, SANDAG, to Ray Major, Chief Economist, SANDAG, at 1 (Nov. 20, 2015, 08:44 PST).
from, among other things, an increase in the average wage. This began a conversation between Major and Messen that concluded with Major realizing that Series 13 was forecasting a wage growth rate of roughly twice the historical average. Major was concerned, and responded first “OMG” and then “WTF” to this information. When asked about the emails, Major said that at this point he was already very uncomfortable with the numbers coming out of DEFM. Messen also acknowledged that the forecast presented a significant discrepancy that he found problematic.

Major and Messen continued to meet to determine, in Major’s words, “how defm calculated series 13 [t]axable retail sales and why it is so aggressive.”19 Others, including Daniels, Flyte, and Senior Economist Jim Miller became involved in or at least aware of the investigation. By the time that Major emailed Messen and Flyte on November 24, asking them a question regarding the “suspect variables,” Major, Messen, and Flyte each recalled that they already believed that the Series 13 income and taxable retail sales forecasts were unreasonable.20 Ultimately, Major decided that the aggressive forecasts needed to be shown to SANDAG’s executives, including Gallegos and Kawada. After speaking with Messen, Daniels agreed that the executives needed to be informed, because if DEFM was producing an inaccurate forecast, it could cause a number of problems. But Daniels also felt that this was another opportunity to inform the executives that DEFM was no longer serving SANDAG well.

Thus, after speaking with Kroninger—Daniels’s boss—Daniels emailed Gallegos’s assistant, Tessa Lero, and asked her to set up a meeting in December to update Gallegos and Kawada on Messen’s new model, which Daniels termed “the DEFM re-build.”21 In the email, Daniels listed Cox as “optional” because he knew that Cox strongly disagreed with the direction in which he and Messen were taking the model. In line with Daniels’s email, most witnesses recalled that the main purpose of the December meeting was to update executives on their progress with the new model, not to simply inform them of DEFM’s aggressive income and taxable retail sales forecasts. Instead, these were to be presented as a reason to abandon DEFM.

13. SANDAG Staff Prepare For The DEFM Update Presentation

In preparation for the meeting with Gallegos and Kawada, Major, Messen, Flyte, Miller, and Daniels held a number of pre-meetings. By this point, Major had spoken with Cox about the aggressive income and taxable retail sales forecasts, and Cox completely disagreed that the forecasts were inaccurate. Major recalled that once Cox confirmed that the equations within DEFM were still correct, Cox asserted unequivocally that the forecast was reasonable. Thus, Major said that if they didn’t come to the meeting with proof, they would not be able to out-argue Cox, given his stature at SANDAG and influence with the other executives.

19 EXHIBIT 13—E-mail from Ray Major, Chief Economist, SANDAG, to Dmitry Messen, Senior Regional Models Analyst, SANDAG (Nov. 23, 2015, 07:33 PST).

20 EXHIBIT 14—E-mail from Ray Major, Chief Economist, SANDAG, to Dmitry Messen, Senior Regional Models Analyst, SANDAG, and Daniel Flyte, Senior Research Analyst, SANDAG (Nov. 24, 2015, 06:49 PST).

21 EXHIBIT 15—E-mail from Clint Daniels, Principal Research Analyst, SANDAG, to Tessa Lero, Assistant to Gary Gallegos, SANDAG, and Kurt Kroninger, Former Director of Technical Services, SANDAG (Nov. 30, 2015, 09:23 PST).
Witnesses generally agreed that, during the leadup to the meeting, they believed that the cause of the high income and taxable retail sales forecasts was the data SANDAG had acquired from Moody’s Economy.com. The reasons were twofold: first, the Moody’s definition of income included non-money sources, such as the value of one’s home; and second, DEFM’s aggressive wage growth forecast was based on a similarly aggressive Moody’s forecast. But regardless of the source of the problem, by this time Major, Messen, Flyte, Kroninger, Daniels, and Miller all admitted that, in one way or another, they believed that the forecasts were wrong. Although none of them knew that Cox had used the taxable retail sales forecast to calculate Measure A’s projected revenue, they were all generally aware that this forecast was used in the TransNet Plan of Finance, even though many of them didn’t know exactly how.

Witnesses gave similar answers when we asked them how they didn’t yet realize that the Measure A forecast was calculated with DEFM. First, although several witnesses had by then already heard of Measure A (or, more accurately, Quality of Life), they were not actively working on it, and so it was not at the forefront of their minds. Second, witnesses generally said that they weren’t aware of the actual $18 billion Measure A revenue forecast until SANDAG announced it in 2016.

14. Daniels And Messen Fail To Persuade Gallegos, Kawada, And Cox That The Income And Taxable Retail Sales Forecasts Are Unreasonable

The DEFM update presentation took place on December 14, 2015.22 Gallegos, Kawada, Major, Messen, Daniels, Kroninger, and Cox all attended. Messen and Daniels presented, and Messen developed the slideshow and wrote the notes on the slides. Recollections vary regarding other meeting details.

Daniels showed four particular slides during the meeting:

(1) “Taxable Retail Sales Per Capita,” which shows that Series 13 projects that per capita taxable retail sales revenue will rise far above the historical record of $18,000 before being capped at around 2040.23 A note at the bottom reads: “Very hard to explain this one. Must be a drastic increase in income.”

(2) “Total Income Per Capita,” which shows income rising far above historical levels before being capped at around 2040.24 A note at the bottom reads: “Yes, very positive income outlook.”

(3) “Projected TransNet Revenues,” which shows that according to the Plan of Finance forecast, by 2048 TransNet will have collected more sales tax revenue in total than it would have even if it collected $18,000 (the historical record) per person per year.25

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22 EXHIBIT 16—Outlook Appointment from Tessa Lero, Assistant to Gary Gallegos, SANDAG, to Gary Gallegos, Executive Director, SANDAG, et al. (Dec. 14, 2015, 16:00 PST).
23 EXHIBIT 17—SANDAG, Taxable Retail Sales Per Capita, at 1 (3 in the original).
24 Id. at 2 (4 in the original).
25 EXHIBIT 17—SANDAG, supra note 22, at 3 (14 in the original).
Daniels recalled that he spent most of the meeting arguing with Cox over whether the forecast shown on the “Taxable Retail Sales Per Capita” slide was reasonable, with Cox arguing that it was. Daniels said that he was trying to persuade Gallegos and the other executives that the data did not support Cox’s argument. Daniels recalled that Cox may have said at this meeting that “I guess I’m just more optimistic about the future of San Diego than you are.” Several others also remember Cox saying something along these lines, although they weren’t sure whether it was at this meeting. In addition, Daniels remembered that they discussed the TransNet Plan of Finance revenue forecast. Most significantly, Daniels specifically remembered that Cox assured those present that he had not used the Series 13 taxable retail sales forecast in the Measure A revenue forecast. Daniels said that because of Cox’s assurance, and because SANDAG was retiring DEFM, they decided at the end of the meeting to stop investigating the Series 13 taxable retail sales and income forecasts and to continue working on Messen’s model.

Kawada recalled that there was actually more than one meeting. She believed that at the December 14, 2015 meeting, the discussion had mainly been about Messen’s new model, and that the aggressive forecast was mentioned only briefly at the end. At this meeting, she remembered there being a heated discussion between Cox and Daniels about Messen’s decision to stop using DEFM, and she also remembered that she and Gallegos interceded and said they wouldn’t yet agree to Messen’s proposed update. Kawada thought that the second meeting took place roughly a month or two later, and that while it was again about Messen’s update—since they hadn’t been able to reach a decision during the first meeting—there was more discussion about the aggressive Series 13 forecast. Kawada recalled seeing the “Taxable Retail Sales Per Capita” slide at the second meeting, and said that Cox argued that it presented a reasonable forecast. Kawada said Cox argued that the growth rate in the slide had occurred before and could occur again, and that it was still early enough in the forecast that others couldn’t prove it wouldn’t happen. She also remembered that they discussed how the aggressive forecasts had been “capped” during Series 13 on the recommendation of the expert panel, which concerned her. Kawada remembered that they discussed how the forecast could affect the Plan of Finance, but she does not recall Measure A ever being mentioned. She did recall Cox saying that he could achieve the same growth forecast without using DEFM, which convinced her that they didn’t need to change the forecast, especially since they were already rebuilding the model. Ultimately, Kawada said, she had felt that she could rely on Cox’s arguments despite the evidence to the contrary, since he had been valuable in explaining economic issues in the past and there was no reason to question him.

Gallegos’s only recollection of the meeting was that it involved a discussion about whether to switch from DEFM’s econometric-driven forecasting model to Messen’s demographic-driven model. He did not remember seeing any of the slides during the meeting, and did not remember the income or taxable retail sales forecasts being discussed. Gallegos did acknowledge that he knew DEFM played a role in calculating the Plan of Finance, but he didn’t know exactly how.

Major recalled that he was disappointed that the meeting was more focused on Messen’s new model than it was about the Series 13 income and taxable retail sales forecasts. He also said

26 Id. at 4 (10 in the original).
he wasn’t certain which slides were shown, or whether they discussed the taxable retail sales forecast. But he was positive that they discussed the income forecast—albeit in the context of moving away from DEFM. Major disagreed with Kawada that there was a second meeting in the months after December 2015; he said that they didn’t meet about the aggressive forecasts again until October 2016. Major also remembered that Cox had said that he could reach the forecast results without using DEFM, but he doesn’t remember him ever saying that he didn’t use DEFM to calculate the Measure A forecast. Major said that at the end of the meeting, there was essentially a group decision to continue working on Messen’s update, and that no order was given to keep investigating the Series 13 forecasts. Finally, Major said it was reasonable that Gallegos might have little recollection of the meeting, as it would not have been a significant event given his other responsibilities.

Kroninger recalled that during the meeting, Cox had argued that the income and taxable retail sales forecasts were reasonable, as was the Plan of Finance, and that the only reason they were aggressive was because they were based on Moody’s data—which itself was aggressive. Cox argued that Moody’s was a reliable source, so the results of the forecast were sound. Further, Kroninger recalls that Cox argued that he would perform his own quality control on the Plan of Finance, ensuring its accuracy. Kroninger said that Gallegos was confident in Cox and was persuaded by his arguments. As a result, Kroninger said, Gallegos essentially told them to come up with a plan on their own, and did not order them to fix or further investigate the Series 13 forecasts. Kroninger recalled that at the end of the meeting, all present agreed that they should focus on completing the model for the next forecast. He said that this was a reasonable plan, since it would have been unusual to change an already-completed regional growth forecast. However, he also said that this was the first time he was aware of a fundamental DEFM output being called into question.

Messen recalled that at the meeting they did discuss the “Taxable Retail Sales Per Capita,” “Total Income Per Capita,” and “Taxable Retail Sales” slides. He also said that he asked Cox whether the taxable retail sales forecast could affect the Plan of Finance, and Cox told him that he didn’t use DEFM to calculate the Plan of Finance. Messen acknowledged, however, that he couldn’t be sure if he had asked Cox about the Plan of Finance or about Measure A. Flyte, who was not at the meeting but was closely involved in preparing for it, said he heard from multiple people afterwards that Cox had said DEFM is not used for any downstream forecast.

When asked about the meeting, Cox recalled that he was deeply opposed to the direction in which Messen was taking the new model. He felt that it was too simplistic, and that they should be updating DEFM rather than creating a new model. Cox didn’t recall anyone asking whether the income or taxable retail sales forecasts could affect TransNet or Measure A. And Cox agreed that he would have argued that the forecasts were reasonable at the meeting, and that he could achieve them without using DEFM. He said that he never would have stated that DEFM wasn’t used to calculate the Measure A forecast, and that if he said that DEFM wasn’t used in the Plan of Finance, he would have only been referring to the short-term Plan of Finance. Like Kawada, Cox also thought that there might have been a second meeting.27

27 After the interview, Kawada told us that she had been unable to locate a second meeting on her calendar. We have gone through SANDAG Outlook calendars for January, February, and March of 2016, spoken with the participants of any relevant meeting we found, and could not find a
Major, Flyte, Daniels and others confirmed that, as a result of the meeting, they did not continue investigating the aggressive Series 13 forecasts until October of 2016.

15. **Major Uses The Series 13 Taxable Retail Sales Forecast For The 2015 Plan Of Finance**

After the December presentation, Major finished the 2015 Plan of Finance, which was scheduled for Board approval in February 2016. On January 5, 2016, José Nuncio, TransNet Department Director, asked Major whether he had “received the green light to start using the revised TransNet long term forecast?” Major told us that he had been hoping to use Series 14 for the Plan of Finance since he believed the Series 13 taxable sales forecast was unreasonable. But because Series 14 wasn’t ready, he continued to use Series 13. As a result, when Major submitted the Plan of Finance in early 2016, he used the Series 13 taxable retail sales forecast to calculate the Plan of Finance’s long-term forecast.

Major felt that he had no choice. He said that, at this point, he was still heavily relying on Cox to train him as Chief Economist. And he knew that Cox would not agree to change the Plan of Finance forecast since he believed that the Series 13 taxable retail sales forecast was reasonable. According to Major, Cox was not someone he could challenge at SANDAG. Major also said that if he didn’t use Series 13 for the Plan of Finance, he would be calling into question SANDAG’s 2015 RTP—which the Board had approved—since it included the taxable retail sales forecast. When asked why he didn’t speak to Gallegos about this, Major said that he hadn’t yet gained Gallegos’s trust so he wouldn’t have listened to him. Other witnesses stated that it took a long time before Gallegos trusted Major’s opinion.

16. **Major Learns That Cox Used The Series 13 Taxable Retail Sales Forecast For Measure A**

On January 8, 2016, Nuncio emailed Major the spreadsheet that Cox used to calculate the Measure A $18 billion revenue forecast. Major then forwarded it to Cox and asked “[w]hat is the second meeting that fit Kawada’s description. Kawada noted that the meeting took place in Conference Room 8B, and that Messen was not present for the second meeting, because he was picking his son up from the airport. Messen said that this event actually occurred on December 20, 2016, so we believe that Kawada was referring to the meeting described in EXHIBIT 18, at which Daniels presented Messen’s updated model. EXHIBIT 18—SANDAG, Update on Series 14 Regional Growth Forecast Methods (Dec. 20, 2016). As for Cox’s recollection of a second meeting, given his description of what occurred after that meeting—namely, a forensic investigation of the Series 13 forecasts—it seems more likely that he was referring to one of the meetings that took place in October 2016.

28 EXHIBIT 19—SANDAG, Executive Team Meeting Agenda, at 2 (Jan. 11, 2016).
29 EXHIBIT 20—E-mail from Jose Nuncio, TransNet Program Director, SANDAG, to Ray Major, Chief Economist, SANDAG, at 1 (Jan. 5, 2016, 15:14 PST).
30 EXHIBIT 21—E-mail from Jose Nuncio, TransNet Program Director, SANDAG, to Ray Major, Chief Economist, SANDAG (Jan. 8, 2016, 09:51 PST).
the source of the population and taxable retail numbers in this spreadsheet.” Neither Nuncio nor Major could remember exactly why Major had asked for the spreadsheet, but Major said it was probably related to his work on the Plan of Finance. He said it was not related to his investigation of the aggressive Series 13 forecasts in November and December of 2015. Major acknowledged that when he received this document, he understood that Cox had used the Series 13 taxable retail sales forecast to calculate Measure A’s $18 billion revenue forecast. He said that the reason he was asking Cox for the source of the numbers is because DEFM is “run” more than once during a regional growth forecast—i.e. it generates more than one set of outputs before it is finalized—and Major wanted to know which run Cox used for Measure A. Major said that Cox likely responded to him in person, rather than by email, which was common. Major did not share this spreadsheet with Gallegos, Kawada, Flyte, Daniels, Messen, Miller, or Kroninger, and did not otherwise inform them that Cox had used the Series 13 taxable retail sales forecast for Measure A.

We asked Major why he didn’t tell anyone that Measure A’s $18 billion revenue projection was based on Series 13’s taxable retail sales forecast, which he believed was unrealistic. In response, Major gave many of the same reasons listed above. He also said that there would have been no benefit to telling Gallegos and Kawada. At this point, he had no data to back up his belief that the forecast was wrong, only his professional opinion. Therefore, according to Major, it wouldn’t have made sense for Gallegos and Kawada to trust him over Cox, since Major had only worked at SANDAG since August, while Cox had worked there for decades.

17. SANDAG Renews Its Investigation Into The Series 13 Forecasts In Response To Questions From The Voice Of San Diego

On July 8, 2016, the SANDAG Board approved Measure A, placing it on the November 8, 2016 ballot. Three months later, on October 11, 2016, Andrew Keatts, a reporter for the Voice of San Diego, emailed SANDAG a number of questions about a shortfall in TransNet revenue that SANDAG disclosed in a public report. He also asked whether there had been “any significant changes made to the revenue projection model that produced these TransNet 2 expectations, and the model used to produce Measure A’s $18 billion expectation.”

According to Flyte, at about the time Keatts submitted these questions, Flyte and others renewed their investigation into the source of the aggressive Series 13 forecasts. They began by reviewing their investigation from the previous year. To that end, Messen emailed Major the slides they had created for the presentation in December of 2015. Major also emailed Daniels the spreadsheet that Cox had used to calculate the Measure A revenue forecast. This was when

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31 EXHIBIT 22—E-mail from Andrew Keatts, Reporter, Voice of San Diego, to David Hicks, Communications Manager, SANDAG (Oct. 11, 2016, 09:30 PST).

32 Id. at 2-3.

33 EXHIBIT 23—E-mail from Dmitry Messen, Senior Regional Models Analyst, SANDAG, to Ray Major, Chief Economist, SANDAG, and Daniel Flyte, Senior Research Analyst, SANDAG (Oct. 18, 2016, 13:30 PST).

34 EXHIBIT 24—E-mail from Ray Major, Chief Economist, SANDAG, to Clint Daniels, Principal Research Analyst, SANDAG (Oct. 18, 2016, 15:25 PST).
Daniels and others learned that Cox had indeed used Series 13’s taxable retail sales forecast for Measure A.

Flyte said that by this point, he and others at SANDAG knew the Measure A forecast was wrong. At the time, Flyte felt that SANDAG should simply admit that it was erroneous. Flyte shared this sentiment with Major, but said that Major was still in Cox’s shadow and couldn’t communicate directly with Kawada and Gallegos. Daniels agreed that by this time they knew there was a problem with the Measure A forecast, even though they didn’t know the source. In Daniels’s opinion, they had known since December of 2015. When asked about the situation, Major said he was concerned about the Voice of San Diego’s questions, because he felt that it was still unknown what had caused the income and taxable retail sales forecasts to be so aggressive. But Major also felt that they couldn’t announce that the Measure A forecast was wrong until they knew for sure—and until they knew what the revenue total should have been.

On October 24, 2016, the Voice of San Diego published a pair of articles suggesting that the Measure A forecast might be inflated. Once the articles were published, Gallegos and Kawada began holding daily meetings with Major, Daniels, Flyte, Cox, and Miller, among others, to discover whether there was an error in the forecast. Gallegos said this was because Cox continued to argue that the forecast was optimistic but acceptable, while others were saying it was wrong. Gallegos said that those in the latter camp were still arguing the forecast was wrong because it incorporated Moody’s definition of income and its aggressive job growth forecast. But Gallegos said this wasn’t enough for him. If the forecast really was wrong, Gallegos wanted to know for sure.

Major recalled that by this point, they were meeting for hours each morning and working all day to find the source of the error. Although he acknowledged that he didn’t believe in the forecast, he knew they wouldn’t be able to convince Gallegos until they found something conclusive, and would never be able to convince Cox.

Miller, although not as closely involved in the investigation, also believed that DEFM’s Series 13 taxable retail sales forecasts were unreasonable. On November 3, 2016, he emailed Sanchita Mukherjee, a former Economic Research Analyst at SANDAG who was then on maternity leave. In the email, Miller wrote that “we are pre-occupied with the recent revelation that our revenue forecasts from DEFM are insanely optimistic (for a few reasons too boring to get

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36 EXHIBIT 27—E-mail from Jim Miller, Senior Economist, SANDAG, to Sanchita Mukherjee, Former Economic Research Analyst, SANDAG (Nov. 3, 2016, 13:41 PST).
Miller added that he was “keeping [his] head down.” Mukherjee responded that she would “keep [her] head down as well.” When asked about the email, Miller said that although they had known the taxable retail sales forecasts were optimistic since December 2015, he hadn’t realized they were “insanely optimistic” until after the Voice of San Diego published its articles in October 2016. He also said that at this point, he still believed that the “reasons” the forecasts were so optimistic was because they were based on Moody’s data. Miller said that by “keeping [his] head down,” he meant that he was not speaking to the press, which he believed was based on advice from SANDAG communications staff. Mukherjee said she had only been minimally involved in the discussions over the aggressive forecasts in 2015, and felt that she couldn’t contribute to solving the problem, which was why she said she would keep her head down too.

18. SANDAG Discovers The Source Of The Measure A Forecasting Error

During the daily meeting on the morning of November 8, 2016—election day—Daniels gave a presentation that he believed showed clearly that there was an error in the Measure A forecast. At this point, Daniels and others had realized that the DEFM taxable retail sales forecast was based on DEFM’s labor productivity forecast, since labor productivity affects income which affects taxable retail sales. In Daniels’s presentation, the sixth slide showed the historical growth rate in productivity of the San Diego transportation and warehousing industrial sector, as compared to the United States as a whole. Daniels said that this growth rate couldn’t be correct, since transportation and warehousing is actually a shrinking industry in San Diego. The seventh slide of the presentation was a spreadsheet that showed the numerical growth rate in productivity of that sector, which was so extreme that Daniels and others believed it had been inputted incorrectly. Yet at the same time, the spreadsheet also showed that employment in the industry was actually falling. Daniels said that while this could happen, it would be extremely unlikely.

However, this presentation still did not persuade Cox, who argued at length that the discrepancy between falling job growth and rising productivity could have been caused by the use of drones. Multiple interviewees remembered this happening, and all said it was immediately apparent that this argument was absurd. For example, as Major explained, the data in question was historical, so it would not have incorporated the introduction of drone technology. Nonetheless, Major also said that because Cox was still denying that the forecast was wrong, and because they still hadn’t found the actual source of the error, Gallegos told them to keep searching.

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37 EXHIBIT 27—E-mail from Jim Miller, supra note 35.
38 Id.
39 Id.
40 EXHIBIT 31—SANDAG, Labor Productivity, at 1.
41 Id. at 2. Column AI shows the sector’s rising productivity rate. In fact, the productivity data was not typed in wrong—it was based off the aggregation error introduced during Series 11.
42 Id. Column AQ shows the sector’s falling employment rate. Unlike the productivity data, the falling employment data was accurate. According to Daniels, it had come from a different vendor than Moody’s and was unaffected by the aggregation error.
Two days later, on November 10, 2016, Daniels and Flyte finally discovered the source: the aggregation error that was introduced during Series 11 into Moody’s historical productivity data.

B. FINDINGS REGARDING THE MEASURE A FORECASTING ERROR

The purpose of our investigation was to determine who knew that the Measure A forecast was overstated, when they knew it, and what they did with that information. To that end, this section first presents our findings on those specific questions. Then it presents several instances—before 2015—when SANDAG staff and executives missed opportunities to identify and fix the source of the Measure A forecasting error. Finally, the report provides recommendations to prevent the recurrence of similar problems.

1. Who Knew That The Measure A Forecast Was Overstated, When Did They Know It, And What Did They Do With That Information?

(a) Gary Gallegos

At the December 14, 2015 meeting, Daniels and Messen informed Gallegos that the Series 13 income forecast was unreasonable. And they informed him that the taxable retail sales forecast was unreasonable as well. At this meeting, Cox disagreed with them, and argued to Gallegos and Kawada that the forecasts were reasonable. Although Gallegos does not remember this occurring, it is highly likely that he deferred to Cox despite Daniels’s and Messen’s strong arguments and evidence to the contrary. Gallegos seems to have placed too much trust in Cox over the years, and to have been overly influenced by his opinion, which is likely what happened here as well.

Although Gallegos most likely did not know at this point that the Series 13 forecasts would affect Measure A, he should have known—based on what witnesses have said occurred during the presentation—that these forecasts would affect the TransNet Plan of Finance. Because Gallegos sided with Cox, SANDAG staff stopped investigating the Series 13 income and taxable retail sales forecasts. Had Gallegos not done so, but instead ordered staff to either investigate or stop using these forecasts, it is likely that Major would not have used Series 13 to calculate the Plan of Finance and that the forecasting error would have been discovered sooner. In addition, even though Cox had already calculated the Measure A revenue forecast, it would not have been too late to change it had SANDAG discovered the error sooner.

After the Voice of San Diego articles issued on October 24, 2016, seemingly all of Gallegos’s employees except for Cox were telling him that the Measure A revenue forecast was wrong. Indeed, Ron Roberts, SANDAG Chair, said he received a call from Gallegos after the articles came out—either in late October or early November—in which Gallegos told him that he was concerned that SANDAG’s revenue projections were off. Nonetheless, it seems that Gallegos was unwilling to announce that the Measure A forecast was wrong until Cox agreed or until his team found the source of the error. Gallegos appears to have relied excessively on Cox and erred in not conceding at an earlier stage that there was some sort of error.
(b) **Kim Kawada**

Kawada, like Gallegos, also learned in December 2015 that the Series 13 income and taxable retail sales forecasts were probably unreasonable. However, like Gallegos, she relied on Cox’s arguments despite the persuasive, data-driven evidence to the contrary. Although Kawada most likely did not know at this point that the forecasts could affect Measure A, she did know that they would affect the Plan of Finance. Had Kawada insisted that the forecasts be further investigated or no longer used, it is possible that the effects of the forecasting error could have been prevented—both on the TransNet Plan of Finance and on Measure A.

Also like Gallegos, Kawada should have known that the Measure A forecast was wrong by late October 2016, when Cox was the only person still arguing that it was right. And indeed, Flyte has said that he believes Kawada realized earlier than Gallegos that Cox’s arguments were flawed. Much like Gallegos, Kawada was in a difficult situation at this point, but had she convinced Gallegos to reveal that the Measure A forecast was erroneous, SANDAG may not have forfeited as much public trust.

(c) **Marney Cox**

Although Cox never believed that the Measure A revenue forecast was flawed, and, in fact, still believes it could be right to this day, he bears much of the responsibility for what occurred. When Cox used the Series 13 taxable retail sales forecast to calculate Measure A’s projected revenue, most likely in July of 2015, he was unaware of the data error within DEFM that caused the inaccurate forecast. By November and December of 2015, however, Major, Daniels, Flyte, and Messen had informed him that the taxable retail sales forecast was highly unrealistic. Nonetheless, it appears that Cox simply refused to accept that DEFM could be producing an inaccurate number, even though he knew that the DEFM update team had been understaffed and working remotely for years, and knew that Jarosz had capped the Series 13 income forecast because it was too optimistic.

Although we can’t be certain what exactly Cox said during the December 14, 2015 meeting, it’s clear that he argued against there being any problem with the Series 13 forecasts, despite being presented with compelling historical evidence. Had Cox been more willing to consider whether the forecasts were wrong, and did not argue so stridently against that position, then Gallegos and Kawada might have asked for additional investigation into the forecasts. Further, had Cox mentioned that he had actually used Series 13 to calculate the Measure A forecast, then Gallegos and Kawada may have felt more urgency to investigate Series 13. Several witnesses have said that Cox stated that he didn’t use DEFM for Measure A, or didn’t use it for the TransNet Plan of Finance. We found Cox to be earnest and forthright in our interviews, and conclude that he did not knowingly make any false representations about his use of DEFM.

Cox’s intransigence in October 2016 also seems to have been a large part of the reason why SANDAG did not admit sooner that the Measure A forecast was overstated. In sum, it is apparent that Cox had longstanding and deep credibility at SANDAG. His opinions were accorded great weight and throughout the relevant time periods he passionately defended DEFM and denied that it was problematic. Cox’s standing within SANDAG and his fierce defense of DEFM muffled dissenting voices and delayed discovery of the Measure A forecasting error.
By November 2015, Major had concluded that the Series 13 income and taxable retail sales forecasts were incorrect. Although he argued privately with Cox, he did not strongly oppose him during the December 2015 meeting. Major said that there would have been no benefit to doing so, since Cox reacted poorly to being publicly confronted, and Gallegos wouldn’t yet have trusted Major’s opinion. At this point, however, Major knew that Series 13 was used for the Plan of Finance long-term forecast, so he had an obligation to ensure that that forecast was accurate. Had he joined Daniels and Messen in arguing against Cox, it’s possible that Gallegos and Kawada would have been more likely to listen to them. Indeed, Major even complained that he wished Daniels would have focused more on the unrealistic Series 13 forecasts during the meeting, rather than on Messen’s model for Series 14. Major had the opportunity to rectify this, and ensure that Gallegos and Kawada understood that the Series 13 taxable retail sales forecast was likely incorrect and would be used in the Plan of Finance. But he did not, and instead submitted the Plan of Finance with a long-term forecast whose results he did not agree with.

In January 2016, Major learned that Cox had indeed used the Series 13 taxable retail sales forecast to calculate Measure A’s projected revenue. Although Major felt unable to contradict Cox, and was certain that Gallegos wouldn’t listen to him, he also knew that SANDAG was promising the public a revenue forecast that Major believed was highly unrealistic. Thus, he had a responsibility to do what he could to prevent that from happening. Major argued that it would have caused difficulties had SANDAG used something other than the Series 13 taxable retail sales forecast for Measure A, since the Board had already approved Series 13. But those difficulties would surely have been minimal compared to what SANDAG faced after it was revealed that the Measure A forecast was overstated.

Like Gallegos and Kawada, Kroninger most likely didn’t learn that the Series 13 taxable retail sales forecast was used to calculate the Measure A revenue forecast until October of 2016. Nonetheless, he knew or should have known—based on what Daniels told him—that the Series 13 income and taxable retail sales forecasts were unrealistic. And by this point he almost certainly knew that the taxable retail sales forecast was used in the Plan of Finance. At the time, Kroninger was Director of Technical Services at SANDAG, which is an executive-level position. As a result, he stood on equal footing with Cox. We find that he should have used his position to argue to Gallegos and Kawada that the Series 13 forecasts should either not be used in the Plan of Finance, or should be further investigated. Although Kroninger said it would have been unusual to change an already completed regional growth forecast, he also said that this was the first time he had ever seen one of DEFM’s outputs called into question.

In addition, Kroninger should have done far more to determine how else Series 13’s income and taxable retail sales forecasts were being used, such as in Measure A’s revenue projection. For instance, Kroninger repeatedly said that until Major began working on the Plan of Finance, he had no idea that it used DEFM. However, Tayman told us that when he was Director of Technical Services, he was aware of how DEFM’s outputs were used within SANDAG, and that this was important information to know. Once Kroninger became Director, he also became responsible for DEFM, and should have made himself aware of who was using its outputs, and how. Had
Kroninger done so, he might have realized that Cox had used Series 13’s taxable retail sales forecast for Measure A, and could have alerted Gallegos and Kawada.

By October 2016, Kroninger likely understood that the Measure A revenue forecast was overstated, and played a role in the search for the source of the forecasting error.

(f) Clint Daniels, Daniel Flyte, Dmitry Messen, and Jim Miller

By December 2015, Daniels, Flyte, Messen, and Miller all believed—with varying degrees of confidence—that the Series 13 taxable retail sales and income forecasts were unreasonable, although Miller was much less involved than the others. At that point, they did not know that Cox had used the taxable retail sales forecast to calculate Measure A’s projected revenue, but they knew or should have known that Major needed to use it in the Plan of Finance. Although they did attempt to convince Gallegos and Kawada that the Series 13 forecasts were unreasonable, they still could have done more.

Although it’s almost certain that Daniels and Messen argued at the December meeting that the Series 13 forecasts were unrealistic, the meeting focused primarily on Messen’s Series 14 update. Daniels and Messen should have spent more time on the problems that the unrealistic forecasts themselves presented—and how these problems would affect SANDAG—rather than simply using them as a reason to move away from DEFM. Had they done so, Gallegos and Kawada may have asked them to investigate the forecasts sooner, rather than in October 2016. Daniels and Messen did do this in part, by explaining that the unrealistic forecasts affected the Plan of Finance. But they, like Kroninger, should have investigated how else SANDAG used Series 13’s income and taxable retail sales forecasts. In doing so, they may have learned that Cox used Series 13’s taxable retail sales forecast to calculate Measure A’s revenue forecast. In addition, it appears that SANDAG used Series 13’s income forecast in a variety of ways. Daniels and Messen could have used this information to persuade Gallegos and Kawada that Series 13’s income and taxable retail sales forecasts either needed to be investigated or abandoned.

Even though Flyte and Miller were not at the presentation, they too should have investigated how SANDAG used Series 13’s income and taxable retail sales forecasts. Flyte, in particular, should have done this, since he was well aware that the income forecast was too high—indeed, he had known this since at least 2013. Moreover, Flyte certainly should have shown everyone else the Confluence page he created in which he described Series 13’s income forecast as having “known problems.”43 Although this would not have convinced Cox, it may have persuaded Gallegos and Kawada that the Series 13 income and taxable retail sales forecasts were unreasonable.

By October 2016, Daniels, Flyte, Messen, and Miller were all confident that the Measure A revenue forecast was overestimated. At this point, each of them believed that the Measure A forecast was incorrect, and at least Daniels and Flyte were involved in searching for the source of the problem.

43 EXHIBIT 8, supra note 13, at 10.
2. Missed Opportunities To Identify And Fix The Source Of The Measure
A Forecasting Error

(a) SANDAG Executives Fail to Provide Sufficient Staffing and Expertise for the Series 12 and 13 Regional Growth Forecasts

In the years following 2006, when Tayman, Beckhelm, and a number of other long-term staff members retired, SANDAG was undoubtedly in a difficult position. However, it appears that despite warnings from outgoing staff members, SANDAG executives did not properly prepare for and execute the transition.

Although SANDAG seems to have found an adequate replacement for Tayman in Kevin Murphy, once Murphy left after a year, Gallegos elevated Kroninger to a position for which he did not have the requisite experience. By all accounts, Kroninger is a highly skilled IT professional, but he is not an economist. It is possible that Gallegos did not realize the expertise that was needed to conduct a regional growth forecast, or how closely involved Tayman was in ensuring the forecast’s accuracy. In any case, after the promotion, Kroninger was largely uninvolved in the regional growth forecast, beyond ensuring that the population, housing, and jobs outputs were reasonable. Nearly every witness who worked on the regional growth forecast both before and after Tayman left said that, during the latter period, far less time went into checking the accuracy of the forecast as a whole.

When Beckhelm retired, SANDAG could have stopped using DEFM for its regional growth forecasts, since he was seemingly the only person at the agency who knew how to run it. However, it did not do so, likely because Gallegos, Cox, and others felt that it was important for SANDAG to use DEFM. Many witnesses extolled the virtues of DEFM: that it was sophisticated, highly adjustable, and tailored for San Diego. But if SANDAG was going to keep using DEFM—by far its most important forecasting model, since it fed into all the other models—then it needed to ensure that it had sufficient personnel to operate it. SANDAG does not seem to have done so. During Series 12, SANDAG was forced to rely on Beckhelm working part-time from retirement to run DEFM, since seemingly no one else at SANDAG knew how. Similarly, for Series 13, SANDAG was forced to rely on Jarosz, even though she was living in Florida and working another job at the same time.

Although some witnesses, such as Jarosz, felt that the team working on the Series 12 regional growth forecast was understaffed, others felt differently. But nearly all witnesses who were involved with Series 13 agreed that they did not have nearly enough people working on it. Indeed, it seems fairly likely that Jarosz not only ran DEFM on Series 13, but was also almost solely responsible for ensuring the accuracy of the forecast. In comparison, previous forecasts—at least before Series 12—generally had a team of five or more people. Although Jarosz said that Brady and Beckhelm also helped check the accuracy of the Series 13 regional forecast, both recalled that their responsibilities were almost entirely focused on the subregional forecast. The predictable result was that Jarosz did not have enough time to ensure that Series 13 produced a reasonable forecast, and that when problems arose with the income projection, she did not adequately solve them. Similarly, when Flyte and Brady discovered that the Series 13 income projection was too aggressive for the subregional forecast, they too didn’t have time—or, possibly,
the expertise—to fix it. This led directly to SANDAG’s overestimation of the Measure A revenue forecast.

It is difficult to say whose fault it was that the team running DEFM became so understaffed. Daniels said that he frequently spoke to Kroninger about the lack of staffing, and Kroninger said he raised the issue on multiple occasions with the executive team. But Gallegos said he was not made aware of the problem at the time. In addition, Cox was highly resistant to moving away from DEFM, even though he was most likely aware of at least some of the staffing problems. But regardless of where the blame lies, SANDAG had an obligation to ensure the reasonableness of its regional growth forecast, which it relies on for the legally-required RTP. By continuing to use DEFM without providing sufficient personnel to update it, SANDAG did not fulfill that obligation.

(b) Jarosz Inadequately Adjusts the Series 13 Income Forecast and Does Not Investigate the Cause

Although Jarosz may have been doing SANDAG a favor by agreeing to run DEFM for Series 13, and seems to have had little if any support, she likely could have done more to ensure the accuracy of the forecast. When the expert review panel informed Jarosz that the income projection was too aggressive, she had two choices: investigate why it was so aggressive and then fix it, or make a reasonable adjustment. At the time, Jarosz was working almost independently on the Series 13 regional forecast, and was under time pressure to finish it so that SANDAG could produce the subregional forecast. Thus, it is understandable that she did not have the resources to investigate the cause of the aggressive income forecast.

However, multiple witnesses agreed that Jarosz’s actual adjustment to the forecast was inadequate: rather than adjusting income at 2040, she should have done so much earlier, and reduced it further. Jarosz said that she would have discussed her adjustment with the expert panel, and, indeed, the expert panel only recommended that she “adjust[] income to correct for compounding growth in the latter years of the forecast.” Nonetheless, had Jarosz adjusted the income forecast to allow for a more reasonable rate of growth, the Measure A revenue forecast may not have been so grossly overstated.

(c) Flyte and Brady Adjust the Series 13 Subregional Income Forecast and Do Not Investigate the Cause

Flyte and Brady also had an opportunity to prevent SANDAG from overstating the Measure A revenue forecast, although it is unclear how at fault they truly were. When Flyte and Brady realized that the Series 13 income forecast could not be reasonably allocated into the subregional models, they decided to adjust the subregional forecast but keep the regional forecast the same.

But multiple witnesses said that this correction was not enough, and that Flyte and Brady should have fixed the regional forecast as well. Flyte and Brady argued, however, that the regional forecast was already complete, and they lacked the time and expertise to fix it, since they needed

44 EXHIBIT 5— Beth Jarosz, supra note 4, at 10.
45 EXHIBIT 2—SANDAG, supra note 2, at 11 (emphasis added).
to finish the subregional forecast and Jarosz had already left. Flyte also said that Daniels was aware of what they had done, which Daniels strongly denies. But regardless of what Daniels knew, Flyte and Brady still should have done more to ensure that the regional forecast was accurate. On the instruction page in which Flyte explained the adjustment, he described the regional forecast as having “known problems.” Thus, he and Brady should have attempted to fix those problems. If they could not do so, they should have at least determined who within SANDAG used the income and taxable retail sales forecasts (as Flyte knew they were connected), and informed them of the problems.

3. Recommendations for Best Practices

(a) Maintain Internal Expertise Over SANDAG’s Forecasting Model

A large part of the reason why SANDAG overstated the Measure A revenue forecast was because it had few if any in-house employees who understood and could operate DEFM. SANDAG seems to be well aware of this problem, and is correcting it by developing a new, potentially simpler forecasting model. Nonetheless, simply developing a new model is not enough. SANDAG must also ensure that, going forward, it maintains broad employee knowledge over the model, so that if it loses a staff member who previously ran the model, it has others who can take his or her place.

(b) Ensure That SANDAG’s Forecasting Model is Quality-Controlled

Another reason that SANDAG failed to prevent the Measure A forecasting error was because its Series 12 and 13 regional growth forecasts lacked sufficient quality controls. This appears to have been, first, a staffing problem: SANDAG did not provide enough people, or the right people, to run its forecasts. And it was also likely a problem with DEFM, which SANDAG employees could not adequately quality control both because they did not understand it, and because it produced so many outputs that only a small number could be checked. Therefore, going forward, SANDAG needs to ensure that the team working on its regional growth forecasts has both the knowledge and resources to ensure that the forecasts are reasonable.

(c) Prevent “Siloing” Between Interrelated SANDAG Departments

Finally, SANDAG must ensure that staff members who should be working together are working together. When staff members became convinced that the Series 13 taxable retail forecast was unrealistic, none of them knew that Cox had used that forecast to calculate the Measure A revenue forecast. Similarly, this was the first time that many of them realized that DEFM was used in the Plan of Finance. Indeed, it appears that the modeling department, which produces SANDAG’s forecasting models, was largely disconnected or siloed from SANDAG employees who used those models—Cox in particular.

Going forward, SANDAG must ensure that its modeling department works closely with the SANDAG employees who use the outputs of those models. That way, if a problem arises with one of those outputs, members of the modeling department will know how the output is being used, enabling them to prevent the production of an unreasonable forecast. SANDAG appears to be taking a step in the right direction by making Major both Chief Economist and Director of
Technical Services, however it must ensure that Major is not overtaxed and can still make certain that SANDAG’s regional growth forecasts are accurate.

V. SANDAG’S RESPONSE TO THE DISCOVERY OF THE MEASURE A FORECASTING ERROR

During our investigation into the Measure A forecasting error, we identified several problems that arose in connection with SANDAG’s response to the discovery of the Measure A forecasting error. Because these problems are closely related to our investigation, we have included a factual summary of what occurred as well as findings and recommendations for best practices.

A. SUMMARY OF FACTS REGARDING SANDAG’S RESPONSE TO THE DISCOVERY OF THE MEASURE A FORECASTING ERROR

1. SANDAG Employees Are Instructed To Delete Draft Documents

On October 28, 2016, SANDAG staff held an executive team meeting that included Gallegos, Daniels, Major, Kawada, and Cox, as well as John Kirk and Shelby Tucker, SANDAG’s General Counsel and Associate General Counsel.46 The purpose of the meeting was to discuss SANDAG’s record retention policy in light of public records requests it had recently received from the Voice of San Diego. Under that policy, preliminary drafts that are not deleted within 60 days must be kept for two years.47 Although the meeting happened to occur on the day SANDAG received the Voice of San Diego’s public records request for all Series 13-related emails, this was a coincidence, as the meeting had been scheduled for that date since October 24, 2016. A number of witnesses agreed that during this meeting, they were instructed to delete documents that did not fall into SANDAG’s record retention policy. However, witnesses’ recollections varied as to who gave the instruction and what it entailed.

Major said that Kirk had instructed them that if they kept any documents for sixty days, then they would need to keep them for two years. Major recalled that there was a discussion about how they should delete documents that they didn’t need, in light of concerns that early versions could be taken out of context. Nonetheless, Major said that they weren’t being told to search for documents and get rid of them. However, he also acknowledged that Kirk never instructed them during this meeting not to mass-delete documents, nor did he tell them not to delete documents regarding their investigation into DEFM. As a result of the meeting, Major said that he got rid of draft versions of various documents, as well as old emails, but did not delete anything important.

46 EXHIBIT 28—Outlook Appointment from Tessa Lero, Assistant to Gary Gallegos, to Gary Gallegos, Executive Director, SANDAG, et al. (Oct. 28, 2016, 14:30 PST).

Kawada also said that the meeting involved a discussion about how draft documents should be deleted according to SANDAG’s record retention schedule, so that they wouldn’t be misconstrued. However, she couldn’t remember if Kirk led the discussion. Gallegos recalled the meeting, and said that during it they had had a general discussion about SANDAG’s record retention policy, and draft documents in particular.

We asked Kirk about the meeting, and he confirmed that they discussed how draft documents needed to be deleted within sixty days, otherwise they would have to be kept for two years under SANDAG’s record retention policy. He also said that he probably instructed those present that if they had early drafts that they didn’t want to be subject to production for a public records request, then they needed to delete them within sixty days.

Daniels recalled the meeting differently than everyone else. He said that during it, Gallegos had instructed them to delete documents every two weeks so that they wouldn’t get picked up by a public records request. When asked about the instruction, Daniels agreed that Gallegos may have told them to delete draft documents, rather than all documents. In addition, Daniels said that at one of the daily meetings during their search for the forecasting error, Gallegos told them to stop communicating by email, and to instead use their phones or speak in person. Flyte also recalled this happening.

On October 31, 2016, after Gallegos instructed employees to stop communicating by email, Flyte sent an email to Daniels and Major titled “SR13 DEFM Income Model.” In it, he explained some of his latest research on the source of the forecasting error. After receiving this email, Daniels told Flyte to print it out and then delete it. Daniels said he told Flyte to do this in response to Gallegos’s instruction. Although Flyte never deleted the email, Daniels said that SANDAG employees did delete emails during this time period.

2. SANDAG Employees Are Instructed To Store Documents Related To The Forecasting Error In “Hana Tools”

On November 1, 2016, Kroninger created a new folder named “Tools” on SANDAG’s “Hana” server, which became known as “Hana Tools.” On Kroninger’s instructions, SANDAG staff who were investigating the forecasting error used this folder, known as “Hana Tools,” to store all documents they created as part of their search.

Kroninger said that Hana Tools served a number of purposes. As a central location where staff members could store documents, exchange them, and collaborate, it eliminated the need to use email. And because Kroninger created Hana Tools in an obscure location—SANDAG did not ordinarily use the Hana server for storage—it would enable the team to keep their project confidential. As Kroninger explained, he wanted to limit access to Hana Tools to a small group of staff members, and was concerned about leaks. Further, Kroninger said that Hana Tools could

48 EXHIBIT 35—E-mail from Daniel Flyte, Senior Research Analyst, SANDAG, to Clint Daniels, Principal Research Analyst, SANDAG, and Ray Major, Chief Economist and Director of Technical Services, SANDAG, at 1 (Oct. 31, 2016, 12:15 PST).

49 EXHIBIT 30—SANDAG, Hana Tools.
not be reached through SANDAG’s intranet search function, which SANDAG staff use to search for documents pertaining to a public records request.

Perhaps most importantly, Kroninger believed that all documents created as part of the search for the forecasting error were “draft” or “working” documents, since team members were creating them to solve a problem they didn’t yet fully understand. Kroninger said that once they had identified the forecasting error and written a report on it, that report would no longer be a draft document. However, according to Kroninger, everything leading up to the report would be a draft, and therefore could be deleted within sixty days. Thus, Kroninger explained that he created Hana Tools so that all the draft documents it contained could be mass-deleted within the sixty-day time limit. The reason this was necessary, Kroninger said, was so that the team could feel free to brainstorm and trade ideas while searching for the forecasting error. He believed they would feel more constrained if all the documents they created as part of the search were discoverable.

Kroninger said, however, that they did not hide the creation of Hana Tools from the SANDAG legal team. He said he told Kirk that he wanted to create a location where they could store documents used in the search for the forecasting error, and then mass delete them within sixty days. Although Kirk did not remember this specifically, he said that Kroninger’s understanding of “drafts” seemed consistent with SANDAG policy and that he probably would have approved the request. Major also believed that Kirk approved the creation of Hana Tools, but insisted that it had to be searchable and discoverable. Kroninger did not recall ever asking Kirk whether Hana Tools needed to be searchable. And although Major believed that Hana Tools was searchable, Bill Mount, SANDAG’s IT Manager, said that in fact it was not. However, he said it was reasonable that Major would have believed this, since a search of the intranet reaches Hana data that is not actually stored on the Hana server.

Although Hana Tools was not searchable, Kroninger said that if the team stored any documents on it that were responsive to a discovery or public records request—and those documents were not drafts—SANDAG would have needed to release them. Tucker agreed with this. And she said that regardless of whether Hana Tools was searchable, this shouldn’t have affected whether the documents stored on it were released. Tucker explained that when SANDAG receives a public records request, she may do a preliminary search for documents, but she largely relies on SANDAG staff to supply the responsive documents.

Kroninger said he believed that either Gallegos or Kawada knew about Hana Tools and was comfortable with it being a location to store and then mass-delete draft documents. When asked about it, Gallegos said he only learned of Hana Tools recently and had no understanding of its purpose. Kawada also said that she had not heard the name “Hana Tools” until recently, although she remembered that during the search for the forecasting error, Kroninger had told her that he would create a folder that the team could use to share documents. Kawada said she was never told that the purpose of the folder was to defeat public records requests. Major explained that it was common to set up a folder with limited access when a team was working on a project. Mount agreed, but said that normally, even if some users didn’t have access to a particular folder, it was always searchable.

As of June 5, 2017, the date we first inspected the contents of Hana Tools, there were 317 files located on it. Although many of the documents were created in 2016 and 2017, many others
date back much further, some to 2006. Kroninger explained that, in addition to documents created as part of their search, they also stored copies of relevant documents that SANDAG employees created in the past. Kroninger said that the original versions of these documents were stored elsewhere, and would not have been deleted.\(^50\)

Although Hana Tools was intended as a way to mass-delete documents, Major and Kroninger said no documents were ever deleted from it. However, according Mount, this cannot be confirmed. Because SANDAG never backed up the Hana Tools folder, it may be impossible to tell whether any documents were ever deleted.

3. **Ron Roberts And Gary Gallegos Respond To The Measure A Forecasting Error**

On January 6, 2017, Ron Roberts published an editorial in the Voice of San Diego. Among other topics, Roberts discussed the Measure A forecasting error.\(^51\) Most notably, Roberts presented the following rhetorical question and answer:

Had SANDAG concluded before the election that there were problems with its model that could have resulted in the $18 billion Measure A revenue forecast being overestimated?

No – before the election, SANDAG technical staff had not discovered how, or if, the agency’s computer model could have caused an overestimation of the Measure A revenue forecast.\(^52\)

Roberts also made the following statement regarding TransNet:

SANDAG staff recognized more than a year ago that the model’s taxable retail sales estimates appeared aggressive, but it was not immediately clear why. Nor was it clear what, if any, impact that might have on the TransNet revenue estimates.\(^53\)

When asked about the editorial, Roberts said that he took full responsibility for the final draft, but did not write the original and had no personal knowledge of the details. David Hicks, Communications Manager at SANDAG, wrote the original draft of the editorial, and said that, in doing so, he had researched what happened with the Measure A forecasting error. Hicks said the basis for the Measure A question and answer quoted above was that SANDAG staff had not yet discovered the source of the forecasting error before the election, and Cox did not agree that the

\(^{50}\) For instance, **EXHIBIT 5**, Jarosz’s presentation that contained slides on the capped income forecast, was stored on Hana Tools even though Jarosz created it in 2013. We have confirmed that this document was still stored in another location on SANDAG’s system.


\(^{52}\) *Id.* at 5.

\(^{53}\) *Id.* at 3.
The forecast was wrong. As for the statement about TransNet, Hicks said that he had not known that SANDAG staff had raised an issue about the TransNet Plan of Finance during the December 2015 presentation.

One month later, on February 6, 2017, Keatts published an article in the Voice of San Diego, in which he released Major and Messen’s emails from November 2015.\textsuperscript{54} In the article, Keatts suggested that Gallegos and Kawada knew as of December 2015 that the Series 13 taxable retail sales forecast would affect TransNet and Measure A.

The following day, Gallegos issued a letter to the SANDAG Board responding to the article.\textsuperscript{55} The letter was also sent to SANDAG employees and later released in the Voice of San Diego. In the letter, Gallegos made a number of statements regarding the forecasting error, although the following two caused particular concern among some witnesses. First, he wrote that “[a]t no point did any staff member go to management and connect a concern about taxable retail sales estimates to the forecast for Measure A or raise a concern that the Measure A forecast might be overestimated.”\textsuperscript{56} Second, he wrote that during the December 2015 meeting, “[t]here was no connection drawn between [DEFM’s taxable retail sales forecast] and the bigger picture revenue forecast for TransNet or Measure A.”\textsuperscript{57}

During the interview, Gallegos told us that Major had worked on the portion of the letter regarding the “bigger picture revenue forecast for TransNet.” Gallegos said that only now does he realize that Major had been working on the Plan of Finance at the time of the December 2015 meeting. When asked about this portion of the letter, Major said that “TransNet” referred to the $14 billion TransNet revenue forecast calculated in 2004, not the annual Plan of Finance. Hicks, who was also responsible for drafting the letter, agreed with Major.

A number of witnesses were unhappy with SANDAG’s public relations response to the Measure A forecasting error, having found it to be somewhat dishonest. In particular, we showed a number of witnesses Gallegos’s letter, and most agreed that Daniels and Messen had drawn a clear connection between the Series 13 taxable retail sales forecast and the TransNet Plan of Finance.


\textsuperscript{56} Id. at 1.

\textsuperscript{57} Id. at 2
B. FINDINGS AND RECOMMENDATIONS REGARDING SANDAG’S RESPONSE TO THE DISCOVERY OF THE MEASURE A FORECASTING ERROR

1. SANDAG Executives and Legal Counsel Should Not Have Instructed Staff to Delete Draft Documents Before the Vote on Measure A

It is almost certain that on October 28, 2016, SANDAG executives and/or legal counsel instructed employees to delete documents. It is less certain what exactly the instruction entailed, although it is highly likely that Kirk, and possibly Gallegos, instructed employees to delete draft documents so they would not be included in a public records request. Although such an instruction is permissible under California law and SANDAG Board policy, it should not have been given at this time. SANDAG executives knew that the Voice of San Diego was then investigating the Measure A revenue forecast, and they had, at the very least, reason to believe that the forecast was incorrect. Further, they knew or should have known that many of their staff members were certain that the forecast was incorrect. Thus, giving this instruction had a number of negative effects.

(a) Findings

First, perhaps because the agency was already in a panic, several staff members may have misunderstood the instruction and deleted documents that they should have retained. For example, Daniels seems to have believed that they were told to delete all documents every two weeks. He also said that Gallegos told them to “stop talking” and understood this as an instruction that, going forward, if they sent emails about the forecasting problem, they should delete them. Daniels and others were uncomfortable with these instructions, as they felt that SANDAG was attempting to avoid public accountability. Nonetheless, Daniels told Flyte to delete an email (although Flyte did not), and was confident that others deleted emails as well. Tucker, SANDAG’s Associate General Counsel, said that under SANDAG Board policy, sent emails are not draft documents and should not have been deleted. Further, these emails, if they were about official SANDAG business, may well have be subject to public disclosure under the Public Records Act.

Second, deleting documents—even draft documents—at the very moment that SANDAG executives knew the Voice of San Diego was investigating the Measure A forecasting error, and knew there was some basis for the investigation, raises the specter of impropriety. It is reasonable that SANDAG executives and staff would be concerned that draft documents could be misconstrued if released. And it is true that SANDAG constantly receives public records requests and is often the focus of local news stories. Thus, SANDAG should certainly inform its employees of its record retention policy and explain in training sessions when it is appropriate to delete draft

58 Supra note 46.

59 City of San Jose v. Superior Court, 2 Cal. 5th 608, 616 (2017) (“Employees' communications about official agency business may be subject to CPRA regardless of the type of account used in their preparation or transmission.”).
documents. However, in this particular situation, SANDAG should not have done so. The vote on Measure A was a significant event, was less than two weeks away, and SANDAG executives and staff were concerned that the Measure A revenue forecast might have been incorrect. An instruction to delete documents in this setting could easily be construed by employees as a thinly-guised instruction to delete possibly responsive documents.

(b) Recommendation

Going forward, SANDAG legal counsel should hold a regularly-scheduled meeting with executives and staff instructing them on the agency’s record retention policy. Training sessions on SANDAG’s retention policy should not be delayed until after a crisis emerges. That way, SANDAG employees will already be familiar with the policy should any crisis arise in the future, and will know which documents they must preserve, and which they can delete.

2. SANDAG Executives and Legal Counsel Should Not Have Approved the Creation and Use of Hana Tools

When Kroninger created Hana Tools on November 1, 2016, he admittedly did so as a way to avoid public records requests. It also seems highly likely that Kirk approved the use of Hana Tools (even if he didn’t know what it was called) as a location to store and then mass delete draft documents created in the search for the forecasting error. Although Kroninger believed that Gallegos or Kawada also approved of using Hana Tools in this manner, we have been unable to confirm this assertion. It is less likely, however, that Kirk, Gallegos, or Kawada knew about the other concerning aspects of Hana Tools: that it was non-searchable, and wasn’t backed up.

(a) Findings

Although SANDAG Board policy does provide that draft documents may be deleted within sixty days, Kroninger’s understanding of the term “draft,” which he seemingly communicated to Kroninger, was extraordinarily expansive. In essence, it included all documents SANDAG employees created in the search for the Measure A error forecasting up until they wrote a final report describing their findings. Although it is possible that all such documents could be deemed drafts, it is also possible that some would not be—or would still be subject to disclosure regardless. Indeed, the relevant law specifically states that draft documents are only exempt from disclosure “provided that the public interest in withholding such records clearly outweighs the public interest in disclosure.” As Kroninger expressed, there was a public interest in withholding the documents within Hana Tools, because this would enable the team searching for the forecasting error to be more unconstrained in trying out ideas that might fail. At the same time, however, there is certainly a strong public interest in knowing more about SANDAG’s response to the Measure A forecasting error. Therefore, Kroninger and Kirk should not have preemptively assumed that all documents within Hana Tools were drafts that were not subject to disclosure.

In addition, there are two other aspects of Hana Tools, that Kirk likely did not know about, and which are also concerning.

60 Cal. Gov't Code § 6254(a).
First, Hana Tools was hidden on a non-searchable server that SANDAG did not ordinarily use for storage. Although Kroninger said that he was never trying to hide Hana Tools from SANDAG’s legal team, he also said that because he didn’t want its contents to be subject to public records requests, he did not want the location to be searchable. It is possible that in doing this he was mostly concerned about leaks from within SANDAG, and thus wanted to hide the location from most SANDAG employees. However, according to Mount, Kroninger could instead have created a location on SANDAG’s main drive and required certain permissions for employees to use it. This, too, would seem to have solved the problem of leaks. As with the timing of the instruction to delete draft documents, the location of Hana Tools also raises the specter of impropriety.

Second, although several witnesses assured us that no documents were ever deleted from Hana Tools—despite its purpose as a document deletion folder—this cannot be confirmed, as the folder was never backed up. Although there are a number of documents on Hana Tools that SANDAG employees would presumably have deleted if they were going to delete any, it is also possible that some additional documents were deleted. While we don’t have any reason to doubt the honesty of the witnesses who told us no documents were deleted—since they were forthcoming in all other respects—the fact that the drive was never backed up does call this assertion into question.

(b) **Recommendation**

In the future, if SANDAG chooses to implement a policy whereby it will store and then mass-delete draft documents related to a particular project, it should disclose this policy publicly, much as it has done with other aspects of its record retention policy. Further, the location of this folder must be searchable and disclosed to legal counsel. However, we find such a policy inadvisable, as it would be difficult if not impossible to know, in advance, that every document created for a particular project was both a draft and not subject to disclosure.

3. **SANDAG Executives Should Have Been More Forthcoming in Their Responses to the Measure A Forecasting Error**

After reviewing Roberts’s editorial and Gallegos’s letter to the SANDAG Board, we find that they include several points which are insufficiently transparent.

(a) **Findings: Roberts’s Editorial**

First, the following statement in Roberts’s editorial was excessively wordsmithed:

Had SANDAG concluded before the election that there were problems with its model that could have resulted in the $18 billion Measure A revenue forecast being overestimated?
No – before the election, SANDAG technical staff had not discovered how, or if, the agency’s computer model could have caused an overestimation of the Measure A revenue forecast.61

Although Gallegos and Cox had not concluded before the election that the Measure A forecast was overestimated, nearly everyone else involved had. Although it’s arguable that these staff members didn’t yet know that there were problems with SANDAG’s model (i.e., DEFM) that could have resulted in an overestimation, they at least believed that DEFM was producing an unrealistic output due to aggressive data from Moody’s. Similarly, even though it’s true that SANDAG staff did not discover the source of the forecasting problem until after the election, the more important point is that, by October 2016, most SANDAG staff involved in the problem believed that the forecast was wrong.

Roberts also stated the following regarding TransNet:

SANDAG staff recognized more than a year ago that the model’s taxable retail sales estimates appeared aggressive, but it was not immediately clear why. Nor was it clear what, if any, impact that might have on the TransNet revenue estimates.62

This, too, is not entirely accurate. Although Major and Hicks argued that the 2004 TransNet forecast is somehow different than the TransNet Plan of Finance, that is, at best, true only in the narrowest sense. Like the 2004 TransNet forecast, the TransNet Plan of Finance includes a long-term forecast that projects future revenue from the TransNet sales tax. The reason why Major first became concerned about the Series 13 taxable retail sales forecast was because he was working on the TransNet Plan of Finance—which used that forecast—and strongly believed its long-term revenue estimates were unrealistic.

(b) Findings: Gallegos’s Letter

Gallegos’s letter contains the same wordsmithing issues regarding the TransNet Plan of Finance. In it, he writes that during the December 2015 meeting, “[t]here was no connection drawn between [DEFM’s taxable retail sales forecast] and the bigger picture revenue forecast for TransNet or Measure A.”63 However, even Gallegos admitted during our interview that he now realizes that Major had been concerned about the effect that DEFM could have on the Plan of Finance.

Gallegos’s statements about Measure A are somewhat murkier, however. Because we can’t be certain whether Cox said during the December 2015 meeting that he did not use DEFM to calculate the Measure A forecast, we also can’t be certain whether staff drew a “connection” between the taxable retail sales forecast and Measure A. The same is true for Gallegos’s statement that “[a]t no point did any staff member go to management and connect a concern about taxable retail sales estimates to the forecast for Measure A or raise a concern that the Measure A forecast

61 Roberts, supra note 49, at 5.
62 Id. at 3.
63 Gallegos, supra note 53, at 1
might be overestimated.”64 If in fact no one brought up Measure A during the December 2015 meeting, then we have seen no indication that staff ever raised any issue regarding the Measure A forecast to Gallegos or Kawada until October 2016.

(c) **Recommendation**

Going forward, SANDAG should be more transparent in its public relations responses to issues like the Measure A forecasting error. As a government agency, SANDAG has a responsibility to be honest and straightforward with the public. By failing to adequately explain how and why it overestimated the Measure A revenue forecast, SANDAG lost employee morale and forfeited the public’s trust.

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64 *Id.* at 2.
Historical Output Aggregation

EXHIBIT 2
Summary of Expert Review Panel Involvement in SANDAG Regional Growth Forecasts

(Series 10, 11, 12, and 13)

SERIES 10

Panel members:

Bob Yamada / Tim Bombardier  San Diego County Water Authority
Stuart McMenamin  Regional Economic Research
Ray Major  Claritas
Midr Cox  Millicent Cox, LLC
Gary Moss  San Diego Workforce partnership
Kelly Cunningham  San Diego Chamber of Commerce
John Weeks  San Diego State University
Joan Anderson  University of San Diego
Cheryl Mason  Economic Development Department
Joey Perry  City of San Diego
Robert Dye  San Diego Gas & Electric
Richard Carson  University of California San Diego
Dennis Turner  City of Carlsbad
Mary Heim  Department of Finance, Demographics Research Unit
Curt Gonzales / Nick Ortiz  San Diego County
Carlo Graizbord  IMPLAN
Irola Nam  IMPLAN

SANDAG Staff

Ed Schafer
Charles Rynerson
Jeff Tayman
Beth Jarosz
Marney Cox
Matt Eary
Terry Beckhelm

September 5, 2001 Meeting Issues Raised

Migration – a general desire for better understanding of the drivers of migration and the characteristics of migrants was expressed. The model will not resolve this, an outside study is needed. Due to uncertainties regarding immigration policies and other effects, low and high migration rate scenarios should be run.

Point forecast – concern was raised over presenting a “point forecast” to the Board. Too much uncertainty to warrant a point forecast, which gives a false sense of security. Should a range be presented? Local governments can’t build a range of infrastructure. But the uncertainty in the projections is more a time uncertainty than a population uncertainty (i.e. we will get to 3.5 million; it’s just a matter of when).
Housing – will the region be able to keep up with the housing demand being projected? Growth management policies and lack of developable land may interfere with this. The model is unconstrained by these factors.

The model will be rerun taking the latest DRI forecast and the committee’s concerns into account. We will reconvene in three weeks.
October 4, 2001 Meeting Model Changes

The DRI-WEFA 25 Year Focus, Summer 2001 Trend Projection for the US was used to update the model. This projection predates the events of 9/11. So far the short range forecasts are not picking up any changes, and the effects are hard to predict. We must keep an eye on the short term forecasts and adjust our forecast as necessary.

New Bureau of Labor Statistics labor force participation rate estimates and projections were incorporated into the model.

Mortality rates were adjusted to reflect increases in life expectancy as suggested by the committee.

Fertility rates were adjusted downward due to changes in birth data from 1999 to 2000.

The old (Series 9) model was updated with the proposed Series 10 assumptions and rerun for 1998-2000. The 2000 forecast was very similar to the 2000 population estimate.

October 4, 2001 Meeting Concerns Raised

Migration – reiteration of desire for greater sensitivity to drivers of migration, and possible effects of 9/11. This will be included in the model revision RFP next year.

Pop and Housing – This forecast will be the first in which the jurisdictions will find it challenging to accommodate projected growth. The Boards will be presented with the unconstrained forecast and several constrained scenarios, and will choose the preferred option.
April 5, 2005 Meeting Main Issues Raised

Housing availability / vacancy rates – State of California Housing and Community Development has released new projections showing a need for faster increase in local housing supplies. Should the baseline forecast incorporate these projections?


As a result of the concerns raised, the model was adjusted and rerun resulting in (i) raising the annual population increase from 41,090 to 46,410, (2) raising the average annual housing increase from 14,040/year to 14,270/year, and (3) raising average increase in civilian jobs from 14,570 to 19,930.

May 3, 2005 Meeting Main Issues Raised

There now (in the new draft forecast) seems to be a disconnect between population growth and housing growth, driving household size up and vacancy rates down.

The employment projections appear to be better in line with Global Insight now, but the unemployment rates seem too low. The question in, who fills these jobs? There are commuters coming in from outside the region.
Both draft forecasts showed significant growth in the “Other” job sector (not classified in the wage and salary industry structure). We should hold growth in that sector down.
As a result of the concerns raised, the model was adjusted and rerun resulting in (1) lowering the annual population increase from 46,410 to 41,300, (2) slightly raising the average annual housing increase from 14,270/year to 14,300 (this combined with the lowered pop resulted in higher vacancy rates and lower household size), and (3) slightly lowering average increase in civilian jobs from 19,930 to 19,700 (primarily from lowering the growth rate in the “Other” category). This also resulted in raising the unemployment rate to a more reasonable level (from 2.0% to 4%).

May 8, 2005 Meeting

The working group expressed approval for the Draft 3 Forecast, which will be used as the baseline for the Series 11 Regional Growth Forecast.
April 10, 2009 Meeting Main Issues Raised

Headship Rates – As population ages we should expect to see headship rates rise for that demographic (household size falls). Also, headship rates for Hispanic population have been historically low. We should expect to see those rise toward parity with white pop.

Labor Force Participation – Older pop is working longer and younger pop are waiting longer to join the workforce.

Housing availability – sufficient capacity in the region negates the need for the interregional commute model. But capacity does not mean those units will be built.

December 15, 2009 Meeting Main Issues Raised (changes from April meeting were implemented and presented)

Observations of the panel: DOF domestic migration rates seem high, our forecast is 2% below, makes sense. Housing affordability is affecting headship rates. In regard to interregional commuting, there is capacity within the region to house the workforce, but people may choose to live outside the region and commute in.
Main Issues Raised (09/20/2012) and Outcomes (02/04/2013)

Fertility Rates - SANDAG assumes a convergence to the White population by 2050. The expert review panel requested additional information that this was an appropriate assumption.

SANDAG staff provided additional historical information indicating that fertility rates are converging towards the white average in the last 30 years.

Life Expectancy - The expert review panel requested that SANDAG test the model with other life expectancy assumptions (especially those from US Census Bureau projections). Some models have a 4-5 year increase in life expectancy.

SANDAG updated tables with new life expectancy data, now almost exactly the same as US Census Bureau projections for 2050 (except where SANDAG projections are slightly higher because local survival rates are slightly higher than national average).

Domestic Migration Model – Expert review panel requested that SANDAG consider alternative approaches to calibrating and estimating the migration model.

SANDAG updated the model estimation to use 1990 – present data in lieu of 1970 – present data.
Domestic Migration Model – Expert review panel recommended reviewing Jim Chang’s work on using PUMS to estimate out-migrants.

- Revised based on new estimates of 2010 migration distribution (forward-aged the non-military population from 2000 Census, added foreign migrants, and compared with 2010 counts to reverse-estimate domestic migration)

Household Size and Headship Rates – The expert review panel requested that SANDAG complete additional research on historical household size and headship rates.

- SANDAG completed additional research on household size and headship rates by race and sex. No changes to the model assumptions were indicated.

Housing Stock – The expert review panel recommended hold mobile homes constant through the forecast period.

- SANDAG in coordination with the local jurisdictions held mobile homes consistent where general plans would allow.

Residential Data – The expert review panel requested additional information on housing characteristics like units permitted and household size by ethnicity / race.

- SANDAG provided additional data where it was available to the expert review panel. No changes to the model assumptions were indicated.

Housing Price – The expert review panel recommended updating the housing price model to reflect trends since 1990.

- SANDAG updated the housing model to reflect trends back to 1990.

Income – The expert review panel recommended adjusting income to correct for compounding growth in the latter years of the forecast.

- SANDAG updated the income model by capping growth rates in output by sector.

Job Growth and Unemployment – The expert review panel cautioned that unemployment rates may fall slower than the forecast would indicate.

- SANDAG reviewed the unemployment projections and concluded that slow population growth was the major driver of falling unemployment. No changes to the model assumptions were indicated.
EXHIBIT 4
Real Income per Capita
2010$
EXHIBIT 5
Series 13
Regional Growth Forecast

SANDAG Executive Team
January 14, 2013
Components of Population Change

- Births
- Deaths
- Int’l Mig
- Dom Mig

Domestic Migration
Series 13: (430,035)
Series 12: (97,660)
Difference: (332,375)
Population Comparison

2008: (98,863)
2010: (86,036)
2012: (91,369)

2050
Series 13: 4,112,886
Series 12: 4,384,867
Difference: (272,051)
Population: Rate of Change

- Pop Change
- Sr12 Pop Change


Rate of Change: 0.0%, 0.5%, 1.0%, 1.5%, 2.0%, 2.5%
Housing Comparison

2008: 0
2012: 331

2050
Series 13: 1,506,748
Series 12: 1,529,090
Difference: (22,342)
Vacancy Rates and Home Prices
Jobs Comparison

2008: (1,128)
2010: (13,685)
2012: (26,252)

2050
Series 13: 1,806,779
Series 12: 1,898,769
Difference: (91,991)
Unemployment
Per Capita Income Comparison

Control Income Growth
Taxable Retail Sales Per Capita
Taxable Retail Sales

Series 13: $2,815,435,295
Series 12: $3,357,454,043
Difference: ($ 542,018,748)
## Summary

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<th>Category</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>Percentage</th>
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<td>4,112,816</td>
<td>969,387</td>
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<td>1,506,748</td>
<td>340,930</td>
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<tr>
<td>Single Family</td>
<td>703,101</td>
<td>768,378</td>
<td>65,277</td>
<td>9%</td>
</tr>
<tr>
<td>Multi Family</td>
<td>420,147</td>
<td>703,116</td>
<td>282,969</td>
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<tr>
<td><strong>Jobs</strong></td>
<td>1,346,969</td>
<td>1,806,779</td>
<td>459,810</td>
<td>34%</td>
</tr>
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</table>

- Review Age / Sex / Ethnicity Breakdown
- Await Final DOF Forecast
- Final Expert Panel Review Meeting
EXHIBIT 6
Kurt / Marney:
Beth, Ed, and Daniel have been exploring the potential of moving off of DEFM for Series 13, because Itron is no longer supporting the DEFM framework. Our choices for Series 13 and the future are to:

1. Do nothing and stay with an ever more stale DEFM model
2. Bring DEFM in-house, update code base, and maintain
3. Go out to bid and hope to get REMI

We want to discuss with you and get your thoughts. We need to make a decision by the end of September at the very latest. See attached email for more information.
In advance of our meeting on Monday…. Please review the attached document. In particular, review the matrix showing model requirements and let me know if I have missed any key variables.

Have a lovely day!

Beth Jarosz
t: 619-699-6997

-----Original Appointment-----
From: Jarosz, Beth
Sent: Tuesday, August 16, 2011 2:37 PM
To: Jarosz, Beth; Daniels, Clint (cdan@sandag.org); Schafer, Ed; Flyte, Daniel; Sun, Wu
Subject: regionwide forecast model update options
When: Monday, August 29, 2011 10:00 AM-11:30 AM (UTC-08:00) Pacific Time (US & Canada).
Where: #Conf Room 8C

DEFM? REMI? Other?

For minimum model requirements, please see:
M:\RES\estimates & forecast\SR13 Forecast
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<th>Needed for</th>
<th>DEFM</th>
<th>REMI</th>
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</thead>
<tbody>
<tr>
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<td>O</td>
<td>1</td>
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<tr>
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<td>UDM, PASEF, PopSyn</td>
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<tr>
<td>GQ – military</td>
<td>UDM, PASEF, PopSyn</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>GQ – civilian, college</td>
<td>UDM, PASEF, PopSyn</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>GQ – civilian, other</td>
<td>UDM, PASEF, PopSyn</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Housing units</td>
<td>UDM, PASEF, PopSyn, Other (RHNA)</td>
<td>X</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Jobs (civ, mil, by industry)</td>
<td>UDM **</td>
<td>X</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Households</td>
<td>UDM, PopSyn, Other (RHNA)</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Households by income</td>
<td>UDM, PopSyn</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Households by size</td>
<td>UDM, PopSyn</td>
<td>O</td>
<td></td>
<td>O</td>
<td>2</td>
</tr>
<tr>
<td>Households by children</td>
<td>UDM, PopSyn</td>
<td>O</td>
<td></td>
<td>O</td>
<td>2</td>
</tr>
<tr>
<td>Population by race/ethnicity</td>
<td>PASEF, PopSyn</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Population by age</td>
<td>PASEF, PopSyn</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Population by sex</td>
<td>PASEF, PopSyn</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Population by crosstab race, age, sex</td>
<td>PASEF, PopSyn, Other</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Labor force</td>
<td>Other</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Home price</td>
<td>PECAS, Other</td>
<td>X</td>
<td>X</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Income by source</td>
<td>PECAS, Other</td>
<td>X</td>
<td>X</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Output by industry</td>
<td>PECAS, Other **</td>
<td>X</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Inflation (CPI, GDP defl.)</td>
<td>Other (incl. TransNet)</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Taxable retail sales</td>
<td>Other (incl. TransNet)</td>
<td>X</td>
<td></td>
<td>?</td>
<td>1</td>
</tr>
<tr>
<td>College enrollment</td>
<td>PECAS</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>K-12 enrollment</td>
<td>PECAS</td>
<td>X</td>
<td></td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>Export / Import totals by industry</td>
<td>PECAS</td>
<td>O</td>
<td>X</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

X = in the model, O = model development or update needed, ** = technical update (updating industry structure and market indices)

Level of importance: 1 = must have, 2 = could do off-model in-house, 3 = wish list, but not mandatory

### Regional Model Options

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Keep DEFM</strong></td>
<td></td>
</tr>
<tr>
<td>Long history of successful modeling</td>
<td>Heavy lift of in-house code work</td>
</tr>
<tr>
<td>Would keep Series 13 in line with prior forecasts</td>
<td>Written in C... would need to be converted?</td>
</tr>
<tr>
<td><strong>Move to REMI</strong></td>
<td></td>
</tr>
<tr>
<td>Becoming the &quot;industry standard&quot;</td>
<td>Only 4 race/ethnic groups</td>
</tr>
<tr>
<td>Occupation and trade flow data not currently in DEFM</td>
<td>No gender detail on race/ethnic/age data</td>
</tr>
<tr>
<td>No housing, household, or household population projections (note: REMI aware of the shortcoming, has a post-processor for Michigan DOT, and is working</td>
<td></td>
</tr>
</tbody>
</table>
toward building that into model)
No projections of households by income
Inconsistent with prior forecasts

<table>
<thead>
<tr>
<th>REMI plus a dynamic household simulation model</th>
<th>Level of effort/time to build a household simulation model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverages benefits of REMI</td>
<td>Provides needed demographic and household detail</td>
</tr>
<tr>
<td>Level of effort/time to build a household simulation model</td>
<td>Inconsistent with prior forecasts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Purchase a forecast from IHS, Moody’s or other vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple and credible solution</td>
</tr>
<tr>
<td>Provides needed demographic and household detail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work with a local consultant on a SANDAG forecast (e.g. Steve Levy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple and credible solution</td>
</tr>
<tr>
<td>Provides needed demographic and household detail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Develop a new model (partner with university or private consultant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimately the most flexible solution</td>
</tr>
<tr>
<td>Provides needed demographic and household detail</td>
</tr>
</tbody>
</table>

Other MPOs’ experience:

- Detroit: REMI with PUMS-based technique for turning population into household population and households
- ARC: REMI with “Detroit” method
- Mid-Region (New Mexico): REMI with household size and vacancy rates applied to project households and housing
- MAG: ___
- SCAG: Steve Levy at the Center for Continuing Study of the California Economy
- SACOG: Steve Levy at the Center for Continuing Study of the California Economy
- Houston: In-house fully micro-simulated population projection

Useful links:

- [http://www.yorkshirefutures.com/resources/regional-econometric-model](http://www.yorkshirefutures.com/resources/regional-econometric-model)
- [http://www.riks.nl/projects/SimDelta](http://www.riks.nl/projects/SimDelta)

Future model update “wish list”

- Dynamic microsimulation model
- Integrated feedback between regionwide model and PECAS (using IMPLAN factors)
EXHIBIT 7
EXHIBIT 8
Income Calibration and Tuning

Created by Daniel Flyte, last modified on Oct 17, 2014

This page describes the steps necessary to estimate the Series 13 Subregional Income model (SR13IncomeCalibration), including how to tune (or override) model parameters at runtime. Income model estimation and tuning is an essential step in developing detailed subregional characteristics. For a detailed specification of the income calibration model, refer to the SR13 Income Calibration Technical Document.

The income tuning process is an iterative process which involves running the UDM Detailed Characteristics model, evaluating the LUZ income distributions and medians, modifying parameters and/or tuning switches, and repeating.

NOTE: The SR13 income distribution from DEFM has known problems, and is therefore not used as the control. Upon staff review, it was determined that the real household median income is much higher than would be expected. Therefore, a modified 2050 median income target was generated by taking the average of the DEFM 2050 median income and the percent change in real median household income from 1970 to 2010 using the cumulative CPI-U from BLS. The real change was approximately 5% over that period. Increasing the base year income by 5% and averaging that with the DEFM 2050 modeled income resulted in a new regionwide real median household of $83,300.

Step-by-step guide

The instructions listed here assume that the DEFM regionwide income series has been created and validated.

1. Execute the SR13IncomeCalibration program. This estimates each of the three parameters used to generate households by income interval for each LUZ. These parameters are stored in the table dbo.luz_income_parms. Specifically, these are the standard deviation factor, [sd]; the exponential smoothing term [nla]; and the median income parameter. These parameters specify the adjusted log-normal curve that the model fits.

2. Populate the table dbo.luz_dc_inc_ovr. This table provides tuning overrides whereby users may specify alternative parameter specifications at an LUZ level. Additionally, the user may override the calculation of the income distribution using an income switch. The switch takes one of three values. For nearly all LUZs, we will use the default switch of 3. The following SQL statement shows how to populate this table for the first increment.

   INSERT dbo.luz_dc_inc_ovr (scenario, increment, luz, income_median, [sd], [nla], income_switch)
   SELECT 0, 2012, luz, inc_median, 0, 0, 3
   FROM dbo.luzbase
   WHERE scenario = 0
   AND increment = 2012

3. Open UDM and click on the Detailed Characteristics button to open the Detailed Characteristics program. Check the first Overrides box so as to apply LUZ income parameter overrides. Specify the increment and scenario, and click Run.
The first execution essentially provides a Detailed Characteristics model with no changes from the original income model parameters. This is an important baseline to evaluate the resulting LUZ income distributions and medians. It also helps to evaluate the degree to which the regional modeled median income matches the DEFIM regionwide target.

4. Next, execute the following query to evaluate the change in LUZ median income between the base year and the first increment.

```sql
SELECT m1.luz, g.alias, m1.inc_median as base_yr_inc, m2.inc_median as fcst_yr_inc, m2.hh as newHH, m2.hh - m1.hh as diffHH,
CASE
  WHEN m1.inc_median = 0 THEN 0 ELSE ROUND((CAST(m2.inc_median as float)/CAST(m1.inc_median as float) - 1) * 100, 2) END as pctIncChange
FROM dbo.luzbase m1,
    dbo.luzbase m2,
    data_cafe.dbo.geography_zone g
WHERE m1.increment = 2012
  AND m2.increment = 2020
  AND m1.luz = m2.luz
  AND g.geo_type_id = 64
  AND g.zone = m1.luz
  AND m1.scenario = 1
  AND m2.scenario = 1
ORDER BY pctIncChange desc
```

5. This query returns the base base year median, the forecast median, the forecast year households, numeric...
change in households between the base year and first increment, and the percent change in income. Inspect
the results for extreme gains or losses in median income. Also, since the query returns 0 for LUZs in which
the base year income is 0 (because there are no households present), be sure to check the LUZs whose
percent change is 0. Most often, when a previously unpopulated LUZ generates new households during the
increment, the resulting median income and distribution is extreme. Therefore, we will need to override the
income model switch in the overrides table. Take note of any LUZ fitting these characteristics.
6. Next, check the modeled regionwide median income against the DEFM regional control. To do that, execute
the following query. (Note: the query assumes that the first increment is 2020.)

```sql
SELECT 'udm', SUM(i1) i1, SUM(i2) i2, SUM(i3) i3, SUM(i4) i4, SUM(i5) i5, SUM(i6) i6, SUM(i7) i7, SUM(i8) i8, SUM(i9) i9, SUM(i10) i10,
    dbo.compute_median_inc(SUM(i1), SUM(i2), SUM(i3), SUM(i4), SUM(i5), SUM(i6),SUM(i7), SUM(i8),
    SUM(i9), SUM(i10))
FROM dbo.luzbase
WHERE increment = 2020
AND scenario = 0
UNION ALL
SELECT 'defm', i1, i2, i3, i4, i5, i6, i7, i8, i9, i10, dbo.compute_median_inc(i1, i2, i3, i4, i5, i6,i7, i8, i9, i10)
FROM dbo.reg_fcst
WHERE year = 2020
AND scenario = 0
```

This query returns the modeled income distribution and median for the first increment followed by the DEFM
distribution and median. This query executes a stored procedure dbo.compute_median_inc, which calculates
the median for interval data.
7. Compare the modeled regionwide median against the DEFM regionwide median income control. The UDM
(or modeled) median should be lower than that of DEFM. Since we do not presently control to the DEFM

### Related articles

- Income Calibration and Tuning
EXHIBIT 9
Hi Marney,

The attached spreadsheet has taxable retail sales in 000s (TRetS) and real taxable retail sales (R_Trets) from Series 13.

Regards,

Kirby

Kirby Brady
Associate Research Analyst
Regional Models

(619) 699-6924

www.sandag.org

Kirby:

Can you work with Marney to get him the information he is looking for? Thanks.

Clint Daniels
Manager of Regional Models
ph: 619.699.6946

Hi Clint, can you point me (link) to the correct and most recent regional growth forecast (series 13) data file. I need to get the annual taxable retail sales forecasts from the DEFM output. Thanks.
EXHIBIT 10
<table>
<thead>
<tr>
<th>Year</th>
<th>Tirable Sales (nominal $)</th>
<th>Tirable Sales (Real 2015 $)</th>
<th>1/12 cent Sales Taxes BOE fees (nominal $)</th>
<th>BOE fees (Real 2015 $)</th>
<th>1/14 Cent Sales Taxes BOE fees (nominal $)</th>
<th>BOE fees (Real 2015 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$67,069,068,665</td>
<td>$62,100,990,431</td>
<td>$331,991,930</td>
<td>$72,242,916</td>
<td>$66,831,635,043</td>
<td>$66,350,744,112</td>
</tr>
<tr>
<td>2022</td>
<td>$81,753,728,915</td>
<td>$71,754,326,637</td>
<td>$403,456,290</td>
<td>$85,924,387</td>
<td>$70,400,375,112</td>
<td>$68,924,387,112</td>
</tr>
<tr>
<td>2023</td>
<td>$85,572,866,625</td>
<td>$74,316,326,527</td>
<td>$423,586,205</td>
<td>$90,242,387</td>
<td>$71,554,375,112</td>
<td>$70,242,387,112</td>
</tr>
<tr>
<td>2024</td>
<td>$89,382,034,895</td>
<td>$77,154,616,520</td>
<td>$443,676,250</td>
<td>$94,100,375</td>
<td>$72,654,375,112</td>
<td>$71,500,375,112</td>
</tr>
<tr>
<td>2025</td>
<td>$93,282,576,803</td>
<td>$79,041,616,520</td>
<td>$463,766,290</td>
<td>$98,000,375</td>
<td>$73,654,375,112</td>
<td>$72,854,375,112</td>
</tr>
<tr>
<td>2026</td>
<td>$97,182,576,003</td>
<td>$80,941,616,520</td>
<td>$483,856,290</td>
<td>$102,000,375</td>
<td>$74,654,375,112</td>
<td>$74,200,375,112</td>
</tr>
</tbody>
</table>

Total - through first 10 years: $3,354,840,067

Total - through first 20 years: $7,530,778,745

Total - through first 30 years: $12,565,513,358

Total - through first 40 years: $16,133,783,172
EXHIBIT 11
Sure. I haven’t really formatted and labeled everything properly. Let me know if you need presentation-level quality, I can do that.

Can you send me the graphs of the taxable sales that you showed yesterday?

Ray Major
Chief Economist
(619) 595-5668
San Diego Association of Governments (SANDAG)
401 B Street, Suite 800, San Diego, CA 92101
www.sandag.org
From: Major, Ray  
Sent: Friday, November 20, 2015 8:50 AM PST  
To: Messen, Dmitry  
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

wtf

Ray Major  
Chief Economist  
(619) 595-5668  
San Diego Association of Governments (SANDAG)  
401 B Street, Suite 800, San Diego, CA 92101  
www.sandag.org

From: Messen, Dmitry  
Sent: Friday, November 20, 2015 8:47 AM  
To: Major, Ray  
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

I can think of another popular 3 letter acronym

From: Major, Ray  
Sent: Friday, November 20, 2015 8:45 AM  
To: Messen, Dmitry  
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

omg

Ray Major  
Chief Economist  
(619) 595-5668  
San Diego Association of Governments (SANDAG)  
401 B Street, Suite 800, San Diego, CA 92101  
www.sandag.org

From: Messen, Dmitry  
Sent: Friday, November 20, 2015 8:44 AM  
To: Major, Ray  
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

Yes (1.31%)
Average wage in SR13 (in constant 2014 dollars)
2012: $58,852
2050: $96,523

From: Major, Ray
Sent: Friday, November 20, 2015 8:39 AM
To: Messen, Dmitry
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

And series 13 forecasts 1.3%?

Ray Major
Chief Economist
(619) 595-5668
San Diego Association of Governments (SANDAG)
401 B Street, Suite 800, San Diego, CA 92101
www.sandag.org

From: Messen, Dmitry
Sent: Friday, November 20, 2015 8:35 AM
To: Major, Ray
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

Yes (0.69)

From: Major, Ray
Sent: Friday, November 20, 2015 8:34 AM
To: Messen, Dmitry
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

Is .7 the average increase over the past 40 years?

Ray Major
Chief Economist
(619) 595-5668
San Diego Association of Governments (SANDAG)
401 B Street, Suite 800, San Diego, CA 92101
www.sandag.org

From: Messen, Dmitry
Sent: Friday, November 20, 2015 8:31 AM
To: Major, Ray
Subject: RE: Annual growth rate Taxable Retail Sales (TRS)

Use the tab named “QCEW”
Remember the chart you showed yesterday that had the annual % change by year and rolling average? Can you send me that data? I can calculate it from there, I know it's confusing.

Ray Major
Chief Economist
(619) 595-5668
San Diego Association of Governments (SANDAG)

Could you please clarify? Annual growth in population and TRS? Actual (historical data)?

I would like to calculate the number of years we had over 1.3 growth, and how many between 1.3 and .8 and how many below. 8 (I'm assuming .8 is the average of the series)

Sent from my Verizon Wireless 4G LTE smartphone
TRS is in constant dollars (in current dollars, the rate would be slightly higher).

In the new model (SR14?), the absolute increase in TRS follows the increase in personal money income. In turn, the increase in personal money income has 3 sources:
1. Increase in real average wage
2. Increase in the number of jobs (more people → more jobs)
3. Increase in the volume of unearned personal income (more people → more unearned income)
EXHIBIT 13
From: Major, Ray
Sent: Monday, November 23, 2015 8:22 AM PST
To: Messen, Dmitry
Subject: RE: Series 13

Sounds great I'll send you a calendar invite

Sent from my Verizon Wireless 4G LTE smartphone

-------- Original message --------
From: "Messen, Dmitry" <Dmitry.Messen@sandag.org>
Date: 11/23/2015 8:04 AM (GMT-08:00)
To: "Major, Ray" <Ray.Major@sandag.org>
Subject: RE: Series 13

Sure. How about mid to late afternoon today?

Can we meet sometime this week? I'd like to get a better idea about how defm calculated series 13 Taxable sales and why it is so aggressive.

Sent from my Verizon Wireless 4G LTE smartphone
From: Messen, Dmitry  
Sent: Wednesday, December 2, 2015 2:48 PM PST  
To: Major, Ray  
Subject: RE: Forecasts  


yes

From: Major, Ray  
Sent: Wednesday, December 02, 2015 2:48 PM  
To: Messen, Dmitry  
Subject: RE: Forecasts  

Ok I'm available now. Should I stop by?

---

Ray Major  
Chief Economist  
(619) 595-5668  
San Diego Association of Governments (SANDAG)

401 B Street, Suite 800, San Diego, CA 92101  
www.sandag.org  

---

From: Messen, Dmitry  
Sent: Wednesday, December 02, 2015 2:47 PM  
To: Major, Ray  
Subject: RE: Forecasts  

If you have a few minutes I'd like show you what I have on this.

---

From: ray.major [mailto:ray.major@cox.net]  
Sent: Tuesday, November 24, 2015 6:49 AM  
To: Flyte, Daniel; Messen, Dmitry  
Subject: Forecasts  

Hey guys, I think it would strengthen out argument if we did the same comparison on the three big variables, housing, pop and employment. So if we show that historically the three variables grew at x% each, and the forecast shows y%, we can then see how different the rest of defm is from history to forecast. I would assume they would be reasonable close. That would make the.. .05% vs 2.0% growth in the suspect variables look, we'll, in a word suspicious. ;)

---

Sent from my Verizon Wireless 4G LTE smartphone
EXHIBIT 15
Tessa:

Sometime before Christmas, I would like to schedule an hour with Gary to provide an update on the DEFM re-build. We have a working framework in place, and we would like to brief Gary on development and some initial results. We are ready to go whenever Gary is available. The list of attendees is:

Gary Gallegos
Kim Kawada
Kurt Kroninger
Ray Major
Clint Daniels
Dmitry Messen
Muggs Stoll (Optional)
Marney Cox (Optional)

Thanks.

Clint Daniels
Manager of Regional Models
Technical Services
San Diego Association of Governments (SANDAG)
401 B Street, Suite 800
San Diego, CA 92101
ph: 619.699.6946
www.sandag.org
EXHIBIT 16
To:  
Subject: Update on the DEFM re-build  
Attachments: Update on the DEFM re-build

----------

Subject: Update on the DEFM re-build  
Location: #Conf Room 8A

Start: Mon 12/14/2015 4:00 PM  
End: Mon 12/14/2015 5:00 PM

Recurrence: (none)

Meeting Status: Accepted

Organizer: Lero, Tessa

Required Attendees: Gallegos, Gary; Kawada, Kim; Kroninger, Kurt; Major, Ray; Daniels, Clint; Messen, Dmitry

Optional Attendees: Stoll, Muggs; Cox, Marney
EXHIBIT 17
Very hard to explain this one. Must be a drastic increase in income
Yes, very positive income outlook
### Projected TransNet Revenues (Min 2010 $)

<table>
<thead>
<tr>
<th></th>
<th>SR13</th>
<th>$14k Scenario</th>
<th>$1Gk Scenario</th>
<th>$1Bk Scenario</th>
<th>SANDAG POF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-2020</td>
<td>1,612</td>
<td>1,406</td>
<td>1,607</td>
<td>1,808</td>
<td>1,512</td>
</tr>
<tr>
<td>2021-2030</td>
<td>3,255</td>
<td>2,528</td>
<td>2,890</td>
<td>2,325</td>
<td>3,037</td>
</tr>
<tr>
<td>2031-2040</td>
<td>4,014</td>
<td>2,701</td>
<td>5,087</td>
<td>3,473</td>
<td>3,745</td>
</tr>
<tr>
<td>2041-2048</td>
<td>3,726</td>
<td>2,239</td>
<td>2,559</td>
<td>2,879</td>
<td>3,476</td>
</tr>
<tr>
<td>2015-2048</td>
<td>12,607</td>
<td>8,875</td>
<td>10,142</td>
<td>11,410</td>
<td>11,771</td>
</tr>
</tbody>
</table>

### Surplus (Deficit) Relative to SANDAG POF (Min 2010 $)

<table>
<thead>
<tr>
<th></th>
<th>SR13</th>
<th>$14k Scenario</th>
<th>$1Gk Scenario</th>
<th>$1Bk Scenario</th>
<th>SANDAG POF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-2020</td>
<td>99</td>
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My team met earlier this week with Marney and Ray to discuss a path forward for the Series 14 Regional Growth Forecast. The meeting resulted in two key action items. Based on the schedule to produce the forecast in time for the RTP process, the group agreed the tools developed thus far are adequate, of sound methods, and sufficient to complete a region-wide forecast. The group also determined that additional enhancements are desired to address some economic policy simulation questions that may arise in the future. We propose to address these additional enhancements in the FY 2018 OWP.

I’ve provided a brief summary of the key issues below. I will be reaching out to schedule a meeting with you to discuss in more detail and solicit your feedback and direction for moving forward.

**Series 14 Regional Growth Forecast**

The forecasting methods are adequate to produce a region-wide forecast of population, housing, jobs, and other key socioeconomic factors. The methods developed by Dmitry and the regional models team are demographically driven, but the tool is sensitive to alternative economic scenarios. For example, we can develop scenarios change the mixture of industrial sectors, increase or decrease overall jobs and the impact on population, and the jobs and high-level transportation impacts of limiting housing supply. The methods by which the outcomes are measured in the methods are different from historical versions of DEFM as it was documented, but my team and I believe these new methods are no less valuable for policy makers than other structural economic models.

During our meeting earlier this week, we compared the new methods using historic trends to the national forecasts like IHS and Moody’s and Series 13. The new methods, using historical trends, produce a forecast for population and jobs similar to Series 13 but lower than the national forecasts. We believe there are valid reasons for the differences from the national forecast including our greater understanding of the local housing supply. We will share these results in more detail when we next meet.

**Expert Review Panel**

We’ve also started to work on materials for an expert review panel. The materials include information on every input variable, the sources used to derive historical estimates, and the key areas where the variable impacts model outputs. Once we have an opportunity to discuss the current framework in more detail, and, if you are comfortable with our approach, we will develop a list of potential panelist to participate. Marney has suggested that we use a smaller group of well-respected economist and demographers for the expert panel, and we send them information ahead of time to read and prepare. He believes, and I agree, this would result in a more robust discussion of the assumptions and outcomes of the results.

We may use different panelist throughout the forecast process based on the policy issues at hand. For example, the panel reviewing the region-wide forecast may be a more focused group of economist and demographers may
work best. However, local planners and real estate experts may be more relevant as we develop the sub-regional forecast.

Based on the discussions we've had over the past several months, I’d like to also discuss whether we need to have an independent audit of our forecasting methods and the application of the forecast in work programs at SANDAG. In my mind, this would involve hiring an independent audit firm like KPMG, Deloitte, EY, or similar type of firm. This independent audit would be less about the assumptions in our model, but the fitness of the methods and appropriate usefulness of the outputs in programs like the Plan of Finance. This audit could also conduct more robust stress testing of our products that rely on the regional growth forecast.

**Longer Term (Structural) Economic Modeling**

Over the longer term, the team agreed to expand the economic and structural relationships in the model. This means developing additional features to align more closely with prior documented version of DEFM or REMI. Over the next couple of months, my team, in coordination with the economists, will develop a work plan to develop structural economic model for the San Diego and greater Southern California / Northern Baja California mega-region, and we will include this in the FY 2018 Overall Work Program Draft Budget.
EXECUTIVE TEAM MEETING

Monday – JANUARY 11, 2016

Conference Room 8A

9:00 a.m. – Introduction of New Employee:

None

9:00 a.m. – 9:30 a.m. - Meeting Follow-Ups and Agenda Settings
(Executive Team Plus Necessary Committee Coordinators)

1. **Meeting Follow-Up**
   
   a. Executive Committee meeting, Friday, January 8, 2016 (Robyn Wapner)

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   b. Board Policy meeting, Friday, January 8, 2016 (Victoria Stackwick) - **NONE**

2. **Agenda Settings**

   a. ITOC meeting, Wednesday, February 10, 2016 (Ariana zur Nieden)
   
   b. Executive Committee meeting, Friday, February 12, 2016 (Robyn Wapner)
   
   c. Board of Directors meeting, Friday, February 26, 2016 (Victoria Stackwick/Robyn Wapner)
   
   d. Board Retreat, Wednesday to Friday, March 9-11, 2016 (Colleen Windsor)

9:30 a.m. - 10:10 a.m. - Special Discussion Items
(Executive Team Plus Discussion Leaders/Support)

Contracts Management System – briefing on scope (Susan Paez/Greg Tatar) – 10 min

Super Circular Presentation (Kim Monasi) – **PowerPoint**

10:10 a.m. – 10:20 a.m. - Review of Potential New Grant Opportunities

10:20 a.m. - 10:30 a.m. – Intergovernmental Review

10:30 a.m. - 10:40 a.m. - Service Bureau Contract Reviews

10:40 a.m. - 11:30 a.m. - Strategy Session and Department Reports

11:30 a.m. – 11:40 a.m. - Staffing Needs Discussion (Executive Director, Chief Deputy Executive Director, and Department Directors Only)
+4. **TransNet ENVIRONMENTAL MITIGATION PROGRAM**
**ANNUAL STATUS REPORT (Keith Greer)**

The ITOC will be provided with the annual status update on the implementation of the *TransNet* Environmental Mitigation Program.

- **Power Point:**
- **Speaking Point:**
- **Recurring Item:**
- **Written Report:**
  - Large Document (50+ pages)
  - Hard Copy Mail Out

+5. **TransNet PROGRAM REVENUE ESTIMATES**
(Marney Cox/Ray Major?, Sookyung Kim)

SANDAG provides revenue estimates for various types of funds, including *TransNet* to the transit agencies, to local agencies for the local streets and roads program and the non-motorized program to support both ongoing operations and capital projects. Each year, SANDAG provides an estimate for the upcoming fiscal year as well as a projection for the next four fiscal years to allow the transit and local agencies to plan for capital projects and determine operating subsidies. The SANDAG Transportation Committee and the Board of Directors are scheduled to approve the estimates for the period FY 2017 to FY 2021 for the *TransNet* program as well as other federal, state, and local funds at their respective February 2016 meetings.

- **Power Point:**
- **Speaking Point:**
- **Recurring Item:**
- **Written Report:**
  - Large Document (50+ pages)
  - Hard Copy Mail Out

+6. **TransNet ENVIRONMENTAL MITIGATION PROGRAM**
**ANNUAL STATUS REPORT (Keith Greer)**

The Independent Taxpayer Oversight Committee will be provided with the annual status update on the implementation of the *TransNet* Environmental Mitigation Program.

- **Power Point:**
- **Speaking Point:**
- **Recurring Item:**
- **Written Report:**
  - Large Document (50+ pages)
  - Hard Copy Mail Out
EXHIBIT 20
From: Nuncio, Jose  
Sent: Tuesday, January 5, 2016 3:26 PM PST  
To: Major, Ray  
Subject: RE: Sales tax request

Got it, thanks. This is helpful.

From: Major, Ray  
Sent: Tuesday, January 05, 2016 3:16 PM  
To: Nuncio, Jose  
Subject: RE: Sales tax request

The long term forecast has not been vetted, and we are expecting it to be part of series 14, released mid-year. Until then, we are sticking with series 13.

Ray Major  
Chief Economist  
(619) 595-5668  
San Diego Association of Governments (SANDAG)  
401 B Street, Suite 800, San Diego, CA 92101  
www.sandag.org

From: Nuncio, Jose  
Sent: Tuesday, January 05, 2016 3:14 PM  
To: Major, Ray  
Subject: Sales tax request

Ray,

Have you received the green light to start using the revised TransNet long term forecast we discussed? If so, can you please send me the latest, in escalated form, less BOE fees, that SANDAG would collect on an annual basis for the 40-year period of 2017 and 2056?

If not available or it still needs to be vetted, please let me know. We are running some financial capacity analysis, and I need the figures in the next day or so.

Thanks,

José

José A. Nuncio, P.E.  
TransNet Department Director
What is the source of the population and taxable retails numbers in this spreadsheet?

Ray Major
Chief Economist
SANDAG

Begin forwarded message:

From: "Nuncio, Jose" <Jose.Nuncio@sandag.org>
Date: January 8, 2016 at 9:51:12 AM PST
To: "Major, Ray" <Ray.Major@sandag.org>
Subject: $18B file

See link to file.

M:\Planning\Quality of Life Measure\2015 Q of L\2015 QoL Finance\2015-07 QoL Sales Tax revenue forecasts from Marney - jnu.xlsx

I have used column G for the 2015$ dollars (less BOE fees). Cell G53 shows the $18B total through the 40 year program.

José

José A. Nuncio, P.E.
TransNet Department Director
San Diego Association of Governments
401 “B” Street, Ste. 800
San Diego, CA 92101
Phone (619) 699-1908
EXHIBIT 22
From: Helen Gao  
Sent: Wednesday, October 12, 2016 3:13 PM PDT  
To: Nuncio, Jose  
Subject: FW: Question  
Attachments: TransNet Revenue_2016.xls

Helen Gao  
Senior Public Information Officer  
SANDAG  
(619) 699-1950  
401 B Street, Suite 800, San Diego, CA 92101

From: David Hicks  
Sent: Tuesday, October 11, 2016 2:55 PM  
To: Helen Gao  
Subject: FW: Question

David Hicks  
Communications Manager  
SANDAG  
(619) 699-6939  
401 B Street, Suite 800, San Diego, CA 92101

From: Andrew Keatts  
Sent: Tuesday, October 11, 2016 9:30 AM  
To: David Hicks  
Subject: Question
Hi David,

I’ve attached one of the spreadsheets that was sent to me as part of my request. It also includes another sheet with some of the findings I pulled together and wanted to run by you.

I pulled the actual revenues collected through TransNet 2 so far and compared them to the projected revenues. By my count, SANDAG is about 27%, or $530 million, short of expectations in the first eight years of the program. I showed how I came to that conclusion in the spreadsheet, and want to get the agency’s response to it.

In the ITOC report, there’s a different conclusion, which suggests it’s more like an 11.7% shortfall.

Here are my questions.

Could you help me understand why the conclusions I drew from the DEFM file you sent me are different from the conclusion offered in the ITOC report? I’m trying to understand how I came to a 27% shortfall and you all have it more like 12%.

Based on this delta –whether 11.7% or 27% -- what is the new expected revenue total under TransNet 2, from the original $14 billion number?

Which projects from TransNet 2 are not happening due to the revenue shortfall?

Have there been any significant changes made to the revenue projection model that produced these TransNet 2 expectations, and the model used to produce Measure A’s $18 billion expectation?

Thanks. I’m working quickly on this so would appreciate a response by the end of the day tomorrow.

Andrew Keatts
Reporter
619-325-0529

Voice of San Diego is a member-based nonprofit news organization.
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EXHIBIT 23
I can explain what’s what

Charts in M:\TEMP\dme
EXHIBIT 24
EXHIBIT 25
The San Diego Association of Governments is on track to collect billions of dollars less than officials said it would from a sales tax hike voters approved 12 years ago, throwing into question whether it will have the money to pay for many of the projects that measure promised.

The causes of the shortfall, unreported until now and only disclosed in a complex budget analysis [1], could also jeopardize many of the promises in another sales tax hike SANDAG is pushing on this November's ballot, Measure A.

SANDAG leaders obscured the size of the shortfall in the one place they disclosed it. They have not told the public of risks that they won't get the $18 billion they say Measure A would generate over 40 years, meaning some of the promised projects in the ballot measure may not get funding.

"It's very significant, because voters are being misled, possibly deliberately or certainly with negligence," said Peter Kiernan, an attorney with Schiff Harden who specializes in public finance and infrastructure and who worked as special counsel on those issues for the city and state of New York.

"If your revenue modeling is proven wrong, you have an obligation to change it. And if they're not willing to admit that it's been proven wrong, then they're not looking at the facts," he said.

Voters in 2004 approved an extension of TransNet, a half-cent sales tax to fund freeway widenings, light rail expansion, habitat preservation, bike lanes and road improvements across the county. The tax went into effect four years later. So far, SANDAG has collected 25 percent less revenue under TransNet than it promised voters on the ballot.

If sales tax revenue grows at the rate it has grown since the end of the recession, TransNet would end up bringing in around $9 billion for transportation projects – or $5 billion less than voters were told.

SANDAG officials acknowledge they have not made any substantial changes to the agency’s forecasting methodology [3] since then — including in the forecast used to project $18 billion in new revenue from Measure A, another half-cent sales tax increase facing voters on this November's ballot.

Campaigns for and against Measure A are focusing on how the $18 billion it's expected to raise will be spent – whether enough of it goes toward transit, for instance, or if North County receives its fair share. It turns out there are serious questions over whether the $18 billion they're fighting over will materialize at all.

A SANDAG official also confirmed that money from Measure A could be used to backfill any shortfall from the previous tax – though he said he's confident that won't be necessary. But there's a chance that voters weighing in on Measure A could be approving a tax to pay for projects that were already supposed to have funding, not the new projects that are the subject of the current campaign.

A Major Revenue Shortfall

When SANDAG started collecting the extension of TransNet tax in 2008, the economy had cratered from the Great Recession and revenues were already way below expectations.

Tax returns improved after the recession ended – though not enough to approach initial estimates. For the last two years, tax revenue growth has actually declined, meaning the gap between SANDAG's initial revenue expectations and reality has widened recently.
SANDAG began collecting a half-cent of sales tax throughout the county in 2009 after voters approved extending the tax for regional transportation projects. The recession cratered the revenue projections, and they still haven’t recovered. It’s now on pace to bring in just $9 billion, from an initially projected $14 billion total.

To date, SANDAG is $500 million short of the $1.9 billion it expected to collect by now. If revenues grow at the average rate they have since the recession, they’d collect $9 billion over 40 years, not the $14 billion promised to voters. That would mean $5 billion less to spend on new regional transportation projects.

SANDAG’s chief economist Ray Major said the revenue shortfall is merely a function of the recession.

“While revenue receipts tend to fluctuate in the short term, in the long term, peaks and valleys tend to even each other out,” Major said in a written response. “Currently, we are just a decade into the TransNet extension so it’s premature to conclude that by the end of the measure, we would be short of funds to complete our projects.”

Marney Cox, the agency’s special projects director and former chief economist, said SANDAG doesn’t know how much money it now expects to collect through TransNet. He said it’s immaterial whether it brings in the projected $14 billion, the $9 billion it’s on pace for or some number in between.

“At this point in time, it’ll be sufficient to pay for all the projects, so you can put whatever number you want on it,” Cox said.

The Problems with the Recession Explanation

SANDAG claims the primary reason for its lagging revenue is the Great Recession. Other experts aren’t so sure.

Throughout the country, state and local governments are noticing slow sales tax growth, and project the sluggishness will continue. A survey of state forecasts from the Rockefeller Institute of Government, a public policy research group within the State University of New York, said states anticipate a slowdown in sales tax growth in 2016 and 2017.

That’s why outside experts aren’t as comfortable as SANDAG that the low sales tax returns will take care of themselves over the next 30 years.

“It is multiple items that are leading to a really weak recovery in sales taxes,” said Lucy Dadayan, a senior policy analyst at the Rockefeller Institute. “It’s observed all across the country. (SANDAG’s) claim about this being from the recession is partially true, but it’s also a changing nature of our reality.”

Dadayan said sales taxes since the recession haven’t rebounded nearly as fast as income taxes. She said it is possible consumer behavior changed due to the recession, but states are also losing out due to low gas prices and an increase in online shopping. That’s meant many states and local governments no longer get a cut of their residents’ purchases.

SANDAG’s Cox said San Diego has seen sales tax collections fall for two region-specific reasons, too. The collapse of the Peso has cut down cross-border spending, he said. And as the housing market pushed some residents to relocate to southern Riverside County, he said, some of their daily shopping now happens outside the county as well.

SANDAG’s forecasting model didn’t account for any of those things in 2002. And they haven’t been incorporated into the model that was used to project that Measure A would generate $18 billion.

Cox said that’s a good thing.

“You have to be patient about trends,” he said. “We end up being a little patient before we recommend permanent changes to the way we do things.”
Voice of San Diego SANDAG's Last Tax Hike Is on Track to Fall Billions Short – and Measure A Could Too - Voice of San Diego

3/5


7/25/2017

Back and are now at about their 2007 peak.

"We were out there getting as many projects under contract as possible, because prices were exceedingly low," he said. "The fall in prices is the most important thing, because our purchasing power was elevated."

The other reason Cox is adamant that SANDAG will still meet its promises to voters is that the agency aggressively took advantage of lower construction costs so they don't have to deal with the federal government.

"The federal-state-local relationship is just being completely upended," Puentes said. "A major reason a lot of places are raising money at the ballot locally is to compete with other regions for a finite amount of money."

For one, it counts on political compromises at the federal level, even while the two parties are as far apart on policy as they've ever been.

Kiernan agreed.

"To continue building the planned transportation infrastructure, they'll have to take money from elsewhere," he said. "That's if they continue projects as planned, as opposed to just abandon them."

"It really isn't complicated," said Robert Puentes, president of the Eno Center for Transportation, a think tank focused on transportation policy that is currently monitoring regional transportation sales taxes across the country. "They have to roll back their ambitions, and they have to manage public trust. Eighty percent of these ballot measures passed because people are willing to invest in infrastructure when it's transparent. If those promises aren't met, it's going to whittle away at public confidence."

"We ask a lot out of individuals to make these decisions, and it's harder to ask them to do that without giving them all the information," said Sarah Swanbeck, executive director at UC Berkeley's Center on Governing and Investing in Our Future, who is currently working on a transparency in budgeting project.

One additional source of money that could make sure projects promised in 2004 are still finished is the new revenue from Measure A, if it's approved.

Cox acknowledged that could happen, though he said he doesn't think it would – for two main reasons.

One is that SANDAG received more in state and federal funding for its projects than it assumed it would under TransNet. That's meant building more projects than officials might have expected so far, given the size of the shortfall.

But counting on that going forward is risky, multiple experts agreed.

For one, it counts on political compromises at the federal level, even while the two parties are as far apart on policy as they've ever been.

"The federal-state-local relationship is just being completely upended," Puentes said. "A major reason a lot of places are raising money at the ballot locally is so they don't have to deal with the federal government."

For another, it means competing with other regions for a finite amount of money.

"You can say, 'We'll try to do this' and have a reasonable amount of certainty, but it's still discretionary money, so there's no way of knowing you'll get it," Kiernan said. "The secretary of transportation can either be fired, or become the secretary of the treasury. And even if you get the money you want, it may not be the year that you want it."

Local money that you control is better than federal or state money that you don't. In fact, SANDAG says as much in the ballot language for Measure A, which it describes as "a 40-year, half-cent sales tax ($308 million annually) that Sacramento cannot take away."

The other reason Cox is adamant that SANDAG will still meet its promises to voters is that the agency aggressively took advantage of lower construction costs in the early years of the measure, hoping to get more done with every dollar it spent.

"We were out there getting as many projects under contract as possible, because prices were exceedingly low," he said. "The fall in prices is the most important thing, because our purchasing power was elevated."

Indeed, the state's construction cost index fell nearly a quarter from 2007 to 2009 and stayed low through 2012. But construction costs have come roaring back and are now at about their 2007 peak.
In the end, Cox’s argument for why voters should expect SANDAG to complete all the projects it promised in 2004, without dipping into the new money potentially secured by Measure A boils down to: Trust us.

The 2004 vote was an extension of TransNet, which was first approved in 1987. SANDAG built all but four projects in that measure, and those four projects were put into a lockbox and prioritized in the extension. One of those is the trolley extension from Old Town to University Town Center, which broke ground Saturday, just shy of 30 years after it was initially approved.

“The true measure of this is, when you ask taxpayers to extend the program, and two-thirds of them say yes, and so they must have thought we did pretty good,” Cox said.

But Measure A is different. Voters have to approve a 40-year tax with 40 years of new spending, without the benefit of seeing how the TransNet extension performed in the end.

Cox thinks SANDAG will be able to make up for the missing TransNet revenue by 2048 and build all the projects it promised.

He thinks voters should take a leap of faith that he’s right.

The Problem for Measure A

There’s reason to believe Measure A itself won’t bring in the $18 billion voters are being promised, regardless of what happens with TransNet.

The forecast the agency used to produce that total – which didn’t undergo any major changes since 2002, despite SANDAG’s revenue shortfall – has an aggressive view of how much San Diegans are going to spend in the coming decades.

The agency’s forecast says the amount that the average San Diegan spends per year, adjusted for inflation, is going to rise and keep rising for the foreseeable future, surpassing the highest point it ever reached since 1970 and nearly doubling the county’s historic average.

Taxable Sales Per San Diego Resident

The typical San Diegan has spent on average about $15,000 a year on goods subject to the sales tax, going back to 1970. But SANDAG’s projections, which were used to determine that Measure A would bring in $18 billion over the next forty years, anticipate that number increasing by more than 30 percent in the coming decades, far exceeding the all-time high.

Source: San Diego Association of Governments
EXHIBIT 26
With Measure A, SANDAG Is Counting on San Diegans to Spend Like They’ve Never Spent Before

SANDAG expects you – yes, you! – to spend a lot more than you have been on items like clothing, cars and appliances. And it expects you to keep spending more well into the future.

The agency is promoting Measure A, a countywide sales taxes hike that would pay for regional transportation projects. It has said the measure will bring in about $18 billion over 40 years.

But for Measure A to meet the $18 billion number that’s being touted in mailers and in the official ballot language, the typical San Diego resident would need to spend more money on items subject to the local sales tax than at any time since 1970, even accounting for inflation.

In other words, SANDAG’s promise to collect $18 billion, and thus build $18 billion worth of projects, relies on incredibly aggressive growth projections [1].
SANDAG’s former chief economist and current director of special projects, Marney Cox, defended that aggressive growth projection.

Taxable sales have grown by big margins in San Diego before, Cox said. In the 1970s and again in the 1990s, sales grew even more quickly than the agency currently envisions.

“[The chart doesn’t show higher rates of growth than we’ve seen],” Cox said. “[It’s consistent with what we’ve seen in the region in the past].”

The current expectations would also rely on San Diego far surpassing the overall high point in spending, though.

Other experts disagreed with Cox. Robert Puentes, president of the ENO Center on Transportation – a think tank that’s currently monitoring regional transportation taxes like Measure A – called the chart showing ever-escalating spending by San Diego residents "extraordinary."
Lucy Dadayan, a researcher at the policy-focused Rockefeller Institute of Government who is studying a national decline in sales tax revenue growth, cautioned that it’s unreasonable to expect growth beyond the historical average, which is what SANDAG is expecting. She said most forecasts should anticipate returns slightly below the historic level to be conservative.

“It’s better to collect more money than to underperform,” she said.

But the driver of those aggressive growth projections is pretty simple, too. SANDAG’s forecast expects San Diegans to keep getting richer. That's why it assumes we’ll all have so much more disposable income to spend on things that generate revenue for new transportation projects.

For instance, the agency’s current forecast expects the number of households in San Diego making more than $200,000 a year, adjusted for inflation, to nearly double by 2050. Households making between $150,000 and $200,000 would increase 75 percent. Those making between $125,000 and $150,000 would increase 62 percent. Those making less than $15,000 a year, and those making between $15,000 and $30,000, meanwhile, would decrease by 9 percent and 3 percent, respectively.

Cox said there’s nothing wrong with those expectations, because the idea that high-income households would represent nearly 30 percent of the overall growth in the county is consistent with other national growth forecasts.

If it sounds counterintuitive, Cox said you need to keep in mind what’s happening to the demographics of the country. People are wealthier at the end of their working lives than the beginning. So as the Baby Boomers shift into retirement, we should expect to see the share of upper-income households increasing, if only because those Baby Boomers are getting older.

"It’s a distribution thing,” he said. "It’ll go away.”

But it’s also possible that the way SANDAG measures household income is itself contributing to the expectation that we'll soon experience a record level of personal spending.

SANDAG's measure of household income doesn’t just include the wages of the people who live in one home. It also includes things like the value of their home and the interest earned from things like IRAs.

That’s not all that uncommon — the federal government’s Bureau of Economic Analysis also measures income that way. But the Census Bureau, in its estimate of household income, only accounts for the money you actually earn.

A 2004 paper by analysts from both the Bureau of Economic Analysis and the Census Bureau found that the BEA’s measure tends to make the country seem wealthier than the Census Bureau’s measurement, and the difference is mostly due to the additional measures of income it includes.

It also found that the Census Bureau’s measurement “better measures current capacity to spend.” That makes sense: An increase in your home value improves your financial position, but it doesn’t necessarily mean more spending money in your pocket.

That could be a problem for SANDAG, which uses its household income expectations to figure out how much money people will have to spend, and therefore how much SANDAG will be able to collect in sales taxes.

If that’s the case, it would mean SANDAG has systematically overstated how much spending will occur in the county going forward, and make it much less likely that the boom in local spending required for the agency to collect $18 billion from Measure A will ever materialize.

Nonetheless, Cox stands by the agency’s numbers and the expectation that Measure A will bring in $18 billion for new transportation projects.

If he’s wrong, and county voters don’t reach unprecedented levels of personal spending, many of the projects included in Measure A won’t be built unless the agency can find another way to pay for them – like another sales tax increase.

Article printed from Voice of San Diego: http://www.voiceofsandiego.org
EXHIBIT 27
Thanks, Jim. Ah! I see...trouble with DEFM's Series 13 revenue forecasts. Yes, I would keep my head down as well.

Good luck with the new intern...hope everything works out well.

Regards,
Sanchita

---

Glad all is well! I can only imagine the joys, frustrations, fears, and highs of parenthood. Especially at this stage, when it’s all so new. I’m confident you’re doing great.

Don’t even think about coming back from work early, unless you really want to. Enjoy this time as much as possible.

We have not gotten new employment center data, but we are pre-occupied with the recent revelation that our revenue forecasts from DEFM are insanely optimistic (for a few reasons too boring to get into). Voice of San Diego is writing about it. I’m just keeping my head down. New intern starts on the 14th.

Get rest!

- Jim
EXHIBIT 28
PRA/Communications follow up discussion

Lero, Tessa

When: Friday, October 28, 2016 2:30 PM-3:30 PM  
Location: Conf Room GA

We couldn't find this meeting in the calendar. It may have been moved or deleted.
EXHIBIT 29
RECORDS MANAGEMENT

These procedures are intended to ensure the safekeeping of SANDAG records with administrative, legal, fiscal, programmatic or historical value; provide ease of access to SANDAG records by staff; provide ease of access to SANDAG records by members of the public in accordance with SANDAG’s Public Records Request Guidelines; ensure compliance with Government Code section 60201 et seq., and provide the necessary guidance to ensure proper records management, including retention and disposition.

SANDAG’s records are a valuable resource. This policy provides procedures to ensure SANDAG’s records are maintained in a consistent, orderly, secure and accessible manner.

Procedures

1. Policy Statement

1.1 Records kept by a SANDAG employee because they are necessary or convenient to the discharge of that employee’s duties for SANDAG are public records. Any and all records generated in the course of SANDAG business are the property of SANDAG, unless otherwise agreed to in a contract document. Public records include, but are not limited to, correspondence, memoranda, emails, phone logs, reports, maps, tapes, contracts, project files, photographic files, digital imagery data, prints, charts, drawings, machine-readable records, videos, and audio recordings. Persons to whom this policy applies should pay particular attention when using e-mail or other less formal forms of communication to ensure that matters discussed are handled with due care and reviewed for professionalism, accuracy and objectivity as they are discoverable public records that can be used as evidence in litigation.

1.2 Records must be maintained in accordance with the SANDAG Records Retention Schedule until their retention period expires, after which the records should be disposed of promptly and appropriately. The periods shown in the Records Retention Schedule are minimum time periods that do not start until the document and/or project is complete. Records can be maintained for time periods in excess of the retention period in the schedule if the records are still needed for reference, but should be disposed of as soon as possible to conserve storage space.

2. Applicability

This policy applies to all persons, including employees, consultants, and contractors, responsible for the generation and/or maintenance of SANDAG records.

3. Public Records

3.1 Records that pertain to “housekeeping” matters that will not be needed for future reference may be disposed of immediately. For example, preliminary drafts, notes,
and interagency and intra-agency memoranda that have been retained for less than 60 days and that are no longer needed for use or reference should be disposed of immediately.

3.2 All records that are kept for more than 60 days for use or reference by an employee, and that are not otherwise exempt, must be treated as a public record. All public records must be kept for a minimum of two years after the date they are finalized. Some records must be kept for longer than two years and the retention period for most records is contained in the Records Retention Schedule. The time periods shown in the Records Retention Schedule should be followed unless a document needs to be retained for a longer time period than that shown because the custodian believes the record is still needed for reference. All of the time periods shown for retention begin no sooner that the date the record is put in its final form.

3.3 Records that are purely personal in nature such as shopping lists, personal email, or correspondence from a friend should not be treated as public records. In order to prevent a claim that such records are subject to disclosure, and to prevent an unnecessary burden on SANDAG resources, however, records unrelated to SANDAG business should be purged from SANDAG computers and files.

3.4 After a public record has been maintained for the required time period it should be disposed of promptly. If records contain confidential or trade secret information, steps should be taken to ensure the records are not disclosed when they are destroyed.

3.5 At least once each year the Records Retention Schedule will be reviewed and revised as needed. The Schedule will be circulated to the department and division directors for recommended changes and additions and reviewed by the Office of General Counsel. Changes to the Records Retention Schedule must be approved by the Executive Director and Office of General Counsel.

3.6 Retention periods for records required for current litigation, audit, or environmental review must be suspended and the records maintained in their original condition and format until the matter is resolved.

Records that have been saved in electronic format do not need to be maintained in hardcopy unless otherwise stated in the Records Retention Schedule.

4. Project File Maintenance

The project manager(s) for a project and Contracts and Procurement personnel (“project team members”) shall maintain centralized files for each project. The project files should not contain preliminary drafts, working papers, notes, or “housekeeping” memoranda or emails that are not needed for future use or reference. The contents of the file for each project shall be set forth in the SANDAG Procurement Manual, which shall be reviewed and updated on a regular basis.
5. **Records Containing Confidential or Trade Secret Information**

Records created at or received by SANDAG containing confidential or trade secret information must be marked as such and filed in a location where the records will be secure and inaccessible to third parties. Staff should take all necessary steps to ensure that such records are not copied or disclosed to third parties. Once a record is submitted to SANDAG by a company or individual it immediately becomes a public record unless that party has expressly designated the record or portion thereof as confidential, proprietary, or trade secret. For example, unless a proposal or price list from a consultant or contractor is clearly marked as confidential or trade secret it will automatically become a public record. Note, however, that even if a consultant or contractor marks a document as “confidential,” “proprietary,” or “trade secret” this will not necessarily exempt the document from disclosure under the California Public Records Act or other applicable laws.

6. **Public Records Requests**

6.1 Responses to records requests shall be fully compliant with the California Public Records Act and all other applicable laws.

6.2 All records requests received from members of the public shall be treated as urgent and immediately referred to the Office of General Counsel. Timing on responses to public records requests is very important. Under the law a response generally must be provided to the requester within ten (10) calendar days.

6.3 SANDAG’s Public Records Request Guidelines shall be available to view on the SANDAG website, and shall be consistent with this policy and applicable law.

Adopted June 2003
Amended December 2004
Amended December 2006
Amended January 2017
EXHIBIT 31
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EXHIBIT 32
SANDAG Can Still Deliver on TransNet Promises

THE GIST

SANDAG intends to put into place additional quality control of its forecasting process. Regardless, SANDAG has a proven track record of being able to take advantage of opportunities to bring in matching funds and deliver on its promises to voters in the San Diego region.

A TransNet-funded construction project at the I-5 Genesee Avenue Interchange

Image courtesy of SANDAG

By Ron Roberts | January 6, 2017

Questions have been raised by Voice of San Diego about the San Diego Association of Governments’ ability to continue improving our region’s transportation system, as well as the agency’s conduct in sharing information with the public about its efforts.
Before answering those specific questions, a little background is important. SANDAG – which is overseen by a board of elected officials from all of the region’s 18 cities and the county – administers our region’s voter-approved TransNet half-cent sales tax for transportation.

Using this local source of revenue since 1988, SANDAG and its partner agencies have successfully attracted state and federal matching funds to complete more than 650 projects. And in the first eight years of the 40-year TransNet Extension program, the agency has finished or started construction on 40 percent of the projects promised to voters.

Nevertheless, as we continue to grow, there are increasing needs in the region. Recognizing this, the SANDAG board placed Measure A on the November ballot seeking an additional half-cent sales tax to fund transit, open space, highway, bike/pedestrian and local infrastructure improvements. Fifty-eight percent of voters supported the measure, but it fell short of the two-thirds majority needed to pass.

Starting a few weeks before the election, Voice raised a series of questions related to the TransNet program and about how much revenue Measure A would likely generate. Here, fundamentally, are the three primary questions and my responses to them:

Has SANDAG overestimated the revenue it is likely to receive from the existing TransNet program?

Maybe, but we won’t know for sure until 2048.

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SANDAG uses a complex computer model to forecast population, jobs and housing growth. This model looks out over long periods of time and is tied to state Department of Finance estimates. The model then uses a multi-step process to forecast taxable retail sales in the future, factoring a large number of inputs into a series of equations. Small changes in any of the inputs may have little impact in the short run, but can potentially multiply into bigger effects as the model projects out over decades.

The taxable retail sales number generated by this model is one element that is used later in a budgeting process to estimate future TransNet revenue.
SANDAG staff recognized more than a year ago that the model’s taxable retail sales estimates appeared aggressive, but it was not immediately clear why. Nor was it clear what, if any, impact that might have on the TransNet revenue estimates. Staff started the initial work of updating the model. They planned to address the taxable retail sales issue as part of a larger effort to refresh the model, which is budgeted this fiscal year.

VOSD raised questions about the TransNet revenue forecast [here](http://www.voiceofsandiego.org/topics/politics/sandags-last-tax-hike-is-billions-short-and-measure-a-could-be-too/) in late October as part of its election coverage of Measure A. Rather than wait, SANDAG staff dug into the issue, focusing their efforts on the taxable retail sales number that came from the computer model. After a month of work, staff concluded that the model overestimated taxable retail sales. Those overestimates will be corrected [here](http://www.voiceofsandiego.org/topics/government/sandag-admits-to-overestimating-what-itd-collect-from-tax-hike/) as part of the update to the model.

In the meantime, an independent methodology using a consensus of three national forecasts was developed so that it could be used in budgeting for the TransNet program while the SANDAG model is being updated. This more conservative forecast estimated that TransNet will bring in approximately $17.3 billion between now and 2048, roughly $3.3 billion less than previously forecast (in year-of-collection dollars).

This new forecast is lower than the previous one used in SANDAG’s budgeting for the TransNet program, but – by the very nature of forecasting – it is difficult to conclude that it will turn out to be more accurate in the long run. Fundamentally, the new forecast results in a 3.9 percent average annual growth rate in TransNet revenue, a half a percent lower than the previous forecast. If sales tax revenue grows annually at just one-tenth of 1 percent faster than the new forecast predicts, the region would collect an additional $250 million in revenue over the remainder of the program.

To add perspective, if we looked independently at each of the three national forecasts used to create the consensus forecast, TransNet revenue estimates would range from $16.1 billion to $20.1 billion.

Can SANDAG still complete the projects it promised to voters back in 2004 when they extended TransNet for another 40 years?

Yes, if SANDAG continues to attract federal and state matching funds at a similar rate as it has in the past.

The agency’s ability to complete projects depends on much more than just TransNet, which is a single revenue source in a very large capital improvement program. Project costs, the availability of matching funds and the state of the economy also are enormous factors.

The increasing price tags for the projects may be the biggest challenge. As planners and engineers have looked more closely at the projects, estimated costs have increased. For example, State Route 78 will cost more to widen than initially expected because we now know it will be necessary to replace the bridges that pass over the highway. As a result of these recent updates to cost estimates, the expected total to complete the projects included in the TransNet extension have increased by about $8.4 billion (from $19.4 billion to $27.8 billion).
Overall, SANDAG needs to attract approximately $3 in outside funds for every $1 generated locally by TransNet to complete the program over the coming 30 years. That ratio is similar to the track record SANDAG has with the TransNet program over the past 30 years.

To be exact, the ratio needed is 3.4-to-1. That is, it will be if all the projections we’re relying on – population, inflation, costs, revenue estimates, etc. – over the next three decades turn out to be correct. With changes to any of these factors – such as the increased federal investment in infrastructure being discussed by the incoming administration – that ratio could change significantly.

Had SANDAG concluded before the election that there were problems with its model that could have resulted in the $18 billion Measure A revenue forecast being overestimated?

No – before the election, SANDAG technical staff had not discovered how, or if, the agency’s computer model could have caused an overestimation of the Measure A revenue forecast.

SANDAG staff prepared a revenue forecast for Measure A more than a year before the election, estimating that it would bring in $18 billion over 40 years (in constant 2015 dollars).

After the revenue forecast was prepared, staff recognized in late 2015 that taxable retail sales forecasts produced by the agency’s computer model seemed aggressive. Staff decided to address the issue as part of a planned update to the model.
Over the past five years, SANDAG has been working on a program to update its computer modeling capabilities. The next model slated to be updated – the Demographic and Economic Forecasting Model, used to help forecast population, jobs, housing and economic changes – was generating the estimate of taxable retail sales. SANDAG staff did some initial work to start updating this model. And, going forward, the agency planned to continue to work on a full update, including the source code, data, and econometric equations that drive the model. As part of that larger process, staff planned to address the model’s taxable retail sales estimates.

A few weeks before the election, Voice of San Diego raised the question of whether the sales tax revenue forecasts for the existing TransNet program and for the proposed Measure A sales tax were too high. SANDAG technical staff dug into the agency’s very complex computer model sooner than planned. After a month of intensive investigation, it was discovered that the growth rates of economic output for certain employment sectors used in the model were aggregated incorrectly from the source data, causing overestimations of taxable retail sales. Those taxable retail sales figures were used in revenue forecasting for TransNet and Measure A. By this time, the general election was over.

In the wake of the election, SANDAG board members asked for a status report on the existing TransNet extension program. In December, staff presented an update, including what has been accomplished to date, as well as updated cost estimates for the projects yet to be completed, a review of the many ups and downs in sales tax revenue and a more conservative sales tax revenue forecast based on the consensus of three national forecasts.

The bottom line question: What are the next steps, and can SANDAG deliver the projects in the TransNet extension ordinance?

SANDAG intends to put into place additional quality control of its forecasting process. Even with an updated model and additional quality assurance, the agency will continue to reassess its revenue forecast every year and make adjustments for both the short-term and long-term financial outlook.

It is through this disciplined approach that SANDAG has been able to deliver projects year after year. I remain confident that many opportunities will present themselves over the remaining 32 years in the TransNet program to bring in matching funds. SANDAG has a proven track record of being able to take advantage of those opportunities and deliver on its promises to voters in the San Diego region.

*San Diego County Supervisor Ron Roberts is chairman of the SANDAG Board of Directors.*

This article relates to: Must Reads (http://www.voiceofsandiego.org/category/must-reads/), Opinion (http://www.voiceofsandiego.org/category/topics/opinion/), SANDAG (http://www.voiceofsandiego.org/category/sandag/)
‘OMG,’ ‘WTF’: Emails Show SANDAG Knew Forecasts Were Wrong, Went to Voters With False Promise Anyway

THE GIST

Emails obtained by VOSD reveal that top SANDAG officials were told the agency’s economic forecasts — and therefore the numbers it showed voters about last year’s Measure A — were way off almost a year before the 2016 election. Instead of acting, the agency continued to rely on numbers they’d been told were faulty, misleading voters in the process and keeping important information from potential watchdogs.

By Andrew Keatts (http://www.voiceofsandiego.org/author/andrewkeatts/) | February 6, 2017

When SANDAG asked voters to approve Measure A in November, it told the public the proposed sales tax would bring in $18 billion. The agency knew the measure would bring in far less than that – but it dangled the $18 billion number in front of voters anyway.
Emails obtained by Voice of San Diego reveal that staff at the San Diego Association of Governments panicked when they discovered the agency’s economic forecasts had significant errors that overstated how much revenue a sales tax would raise for transportation projects.

Once the agency’s chief economist understood the scope of the agency’s forecasting failure, he responded colorfully.

“Omg,” Ray Major wrote in an email to the staffer who identified the problem.

In a second response, he took it a step further: “Wtf.”

Staff members then prepared a presentation describing the errors they had discovered, and the dramatic implications they carried for the regional planning agency.

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After receiving the presentation, SANDAG’s executive director and other high-ranking officials did nothing. They didn’t pass the information to the agency’s board of directors, composed of elected officials from around the county. They didn’t alert the oversight committee created specifically to make sure a tax-and-spending program approved by voters in 2004 was making good on its promises.

Instead, the agency continued to rely on the forecast it had been told was faulty, misleading voters in the process and keeping important information from potential watchdogs.

Four months after receiving the staff presentation, SANDAG approved putting a tax measure on the ballot that promised to raise $18 billion for transportation projects. That total relied on the forecast that officials had already been told had major problems.

Likewise, officials did not use the new information to adjust their plans for TransNet, the tax voters approved in 2004 to fund regional transportation projects. Nowhere in TransNet’s plan of finance or in documents given to that measure’s oversight committee did SANDAG acknowledge that its own modeling team and chief economist had discovered the spending total approved by voters – and therefore the list of projects promised to voters – was no longer realistic.

Voters rejected Measure A. If it had passed, SANDAG would have been able to use the new money to plug TransNet’s shortfall. Now, the agency has disclosed it has a funding shortfall of billions of dollars and no clear way (http://www.voiceofsandiego.org/topics/opinion/sandag-can-still-deliver-transnet-promises/) to address it. The agency is already discussing another potential tax hike.
In an interview, the agency’s director and chief deputy director acknowledged that they did not act on the information presented to them in any way, or alert the board of directors or watchdog group to the new information. They said they instead planned to make the necessary changes when they were scheduled to next adopt a new forecast.

In the meantime, though, they asked voters to approve a tax measure that they knew was based on bad, and potentially outright false, information. The overstated revenue total, whether or not it was intentional, allowed the agency to build a larger project list, which would appeal to more voters by offering projects that might entice them directly.

Voice of San Diego revealed the problems with SANDAG’s forecast in October (http://www.voiceofsandiego.org/topics/politics/sandags-last-tax-hike-is-billions-short-and-measure-a-could-be-too/), weeks before voters (http://www.voiceofsandiego.org/topics/politics/with-measure-a-sandag-is-counting-on-san-diegans-to-spend-like-theyve-never-spent-before/) weighed in on the measure. The agency insisted at the time that it was still on track to build everything it had promised voters in 2004 with TransNet and that the new tax hike, Measure A, would raise as much as they were telling voters.

They’ve since acknowledged the measure wouldn’t have generated $18 billion. But it turns out they not only knew that in November – they knew it nearly a full year earlier, and months before they finalized the measure that went before voters.

In November 2015, Dmitry Messen, a modeling staffer at SANDAG, sent Major a chart demonstrating how much the typical San Diego resident had spent on taxable items in the county going back to 1970, and how SANDAG’s long-term forecast expected that to change in the future.

In a series of emails (http://www.voiceofsandiego.org/wp-content/uploads/2017/02/WTF_OMG_Emails.pdf), Major eventually recognized there was a big problem. He asked Messen to confirm that he understood the situation accurately: Is it really true, he asked, that wages had historically increased by just .69 percent each year on average, and yet the agency’s forecast was expecting them to grow by 1.3 percent annually in the future?

Yes, Messen said. That’s correct.

That’s when Major responded: “Omg.”

“I can think of another popular 3 letter acronym,” Messen said in an email.

“Wtf,” Major concluded.

The next month, Major and other modelers put together two presentations for SANDAG officials, emails show (http://www.voiceofsandiego.org/wp-content/uploads/2017/02/Presentation_Emails.pdf). One was about why the agency’s projections for income and taxable sales were so high (http://www.voiceofsandiego.org/wp-content/uploads/2017/02/Why-Income-and-TRS-are-High-in-SR13.pptx). The other was simply titled “Presentation for Executive Team (http://www.voiceofsandiego.org/wp-content/uploads/2017/02/Presentation-for-the-Executive-Team.pptx).”
Together, the presentations paint a clear picture: SANDAG’s forecasts have indefensible expectations for how rich San Diegans will become in the coming years, thus creating unsustainable expectations for how much money everyone will spend. That has translated into unreasonable revenue expectations for the agency’s spending programs.

In April, four months after SANDAG executives learned of the problems with the revenue forecast, the agency’s board of directors approved putting the $18 billion spending plan before voters.

One slide in the presentation specifically shows that a more reasonable set of expectations would mean TransNet would collect much less money. The agency also creates a spending plan based on just the next few years, instead of the full 40-year period of the tax, and the presentation showed that too was expecting too much money.

Yet SANDAG never explicitly disclosed these findings anywhere. In fact, in a report to TransNet’s oversight board this summer, SANDAG provided a lengthy explanation for why it was not concerning that the agency had collected much less money than anticipated. That explanation was written nine months after SANDAG staff discovered that its forecast wasn’t reliable, but contained no mention of that discovery.

Emails show that explanation was written by the agency’s former chief economist, Marney Cox.

“Marney did the calculations and wrote the paragraph below. It was his model,” Major wrote to another staffer, of the explanation that was eventually provided to the oversight board.

The agency’s director and chief deputy director, Gary Gallegos and Kim Kawada, said they did not act on any of the information presented to them about their forecast because Cox argued that though the projections were aggressive, they were not impossible.

Gallegos and Kawada also said the connection between forecasting taxable retail sales and the revenue they could generate from a tax measure was not immediately clear – even though the faulty forecast’s impacts on TransNet revenue was specifically spelled out in the report provided to them.

That’s why the $18 billion projection for the tax measure that became Measure A was never amended and the agency presented the number to voters despite concerns from SANDAG’s own internal experts.

“I hear what you’re saying, in terms of how the optics look, but I don’t think it’s that,” Kawada told me. “The mistake was we relied on our longtime economist to give us our revenue projections for Measure A. It wasn’t until we sat down with Ray Major, as the new chief economist coming in with fresh eyes, going ‘Hey this doesn’t make sense.’”

“Marney probably thought until the end that we were going to get those dollars,” Gallegos said.

Kawada and Gallegos said SANDAG officials were going to make changes the next time they updated the forecast but were jolted into action earlier than planned when Voice of San Diego published its investigation into the revenue problems facing both TransNet and Measure A.
“Once we realized what (Voice of San Diego) highlighted ... we started bringing people together and forcing that conversation,” Gallegos said. “It was a pretty intensive month and a half look at people trying to figure out what’s causing this.”

Why did it take a reporter presenting the information to spur action when their own staff members had alerted them to the problem a year earlier?

“It really was, to be honest with you, I know you said, ‘I’m not an economist, I’m a layperson’ but it took [the Voice of San Diego investigation] for us to go, ‘OK guys, if you’ve told us this, then we need to take a time out, stop everything,’” Kawada said.

This ignores, however, that the second slide in the presentation included a chart that is virtually identical to one published by Voice of San Diego before November’s election, which uncovered that the ballot measure would be hard-pressed to raise the $18 billion it was promising voters.

The chart shows how much people would have to buy in San Diego over coming decades to to make good on the projection that the tax on purchases would raise $18 billion.


“Very hard to explain this one,” read a note appended to the slide in the presentation.

SANDAG leaders saw this chart twice. It was only when it was reported publicly did the agency react to it in any way.

The revenue total on the ballot is important because it is used to derive the list of projects promised to voters. That list is politically crucial, because the measure needs to win the support of special interest groups and elected officials with disparate concerns (http://www.voiceofsandiego.org/topics/land-use/fact-check-north-county-wants-its-fair-share-of-sandag-tax/), each jockeying to ensure the measure achieves their priorities. It’s crucial on the ballot, too, since polling data shows voters tend to look at the list to ensure there are projects that will ease their commute or that correspond to their priorities.

After Voice of San Diego’s October investigation, SANDAG had its modeling, demographics and economics staffers working almost entirely on identifying and fixing the problem. It took a month and a half, and the agency then disclosed in vague terms that they indeed had a revenue problem.
It has since adopted a new forecast – derived by averaging three national forecasts from third-party agencies – which significantly curtailed revenue expectations. The new forecast means TransNet could raise $4 billion less than voters were told in 2004.

**Correction:** An earlier version of this story said SANDAG’s flawed forecast showed taxable sales were expected to grow at twice their historic average in the coming decades. SANDAG’s forecast showed expected wages to grow at twice their historic average.

EXHIBIT 34
Clarification of Recent Press Reports on Measure A Revenue Forecast

February 7, 2017

Press reports published in the past few days have raised questions about when SANDAG staff and management knew about problems associated with the agency’s sales tax revenue forecasts and whether they failed to take timely action to disclose potential issues to the public before the November 8 election on Measure A.

Much of what has been written has been taken out of context, and we would like to take the opportunity to fill in key pieces of information missing from media reports.

The eye-catching emails quoted by the press, and attributed to then newly hired Chief Economist Ray Major, pertained specifically to the income growth rate, one of numerous factors used to estimate taxable retail sales in the agency’s Demographic and Economic Forecasting Model (DEFM). Major noticed that the projected income growth rate was much higher than the historical income growth rate. Those emails were not related to the Measure A revenue forecast, as some of the press reports have implied.

In fact, Major was not involved in the Measure A revenue forecast. At the time he wrote the emails, he was just a couple of months into his job. He was looking at DEFM with a set of fresh eyes and started asking questions in the course of preparing a plan of finance update.

The Measure A revenue forecast was created by the agency’s previous chief economist, Marney Cox, who was working independently of Ray and the staff in charge of the forecasting model. Cox and Major had different opinions about whether the taxable retail sales estimates were overly aggressive, with Cox believing they were within reason. And at no point did any staff member go to management and connect a concern about taxable retail sales estimates to the forecast for Measure A or raise a concern that the Measure A forecast might be overestimated.

As part of public records requests, SANDAG turned over thousands of emails and documents to reporters interested in the agency’s revenue forecasting process. None of the records revealed any efforts by staff or management to cover up or mislead anyone about TransNet or Measure A revenue estimates.

Some of you may recall staff made a presentation on December 16, 2016 to the Board of Directors (Item 14) explaining errors that occurred in the agency’s calculation of taxable retail sales estimations. At that same meeting they presented a new interim methodology (a more conservative methodology) for forecasting TransNet revenues.

Here are some additional points not made clear by some press reports:

- Some of the press reports cited a December 2015 meeting between staff and agency executives as evidence that SANDAG leaders knew the Measure A forecast was wrong and simply failed to take action. The meeting in question took place in December 2015, and the topic was updating DEFM. This meeting took place as part of an ongoing conversation
about the need to update DEFM, and because then newly hired Chief Economist Ray Major had been assigned to update the TransNet Plan of Finance as one of his first tasks. Major raised questions about projected income growth rates and taxable retail sales growth rates produced by DEFM being higher than the historical growth rates. The modeling team looked into the issue and concluded (which turned out later to be incorrect) that the underlying data from Moody’s and the Bureau of Economic Analysis (BEA) was aggressive. There was no connection drawn between that and the bigger picture revenue forecast for TransNet or Measure A.

- Staff had already begun the long and very detailed process of updating DEFM as part of a larger effort to update the agency’s models. So when Major raised his concerns, staff took what they felt was a reasonable course of action: they committed to developing a new forecasting methodology that would address the issue as part of the next major forecasting effort (Series 14 Growth Forecast).

- With management’s support to rebuild DEFM, staff’s energy focused on updating the model with a new base code, new algorithms, and data sources. There was no further analysis conducted on the precise nature of the problem with taxable retail sales. (For further details, please see SANDAG Chair and Supervisor Ron Roberts’ op-ed published in the Voice of San Diego on January 6, 2017.)

In October 2016, when the Voice of San Diego published its first article about the TransNet revenue forecast, SANDAG Executive Director Gary Gallegos directed staff to dig deeper into the DEFM model and data sources to identify the root cause of what was driving taxable retail sales estimates. After an intense effort, technical staff discovered in November that there were aggregation errors in the model that resulted in optimistic forecasts of taxable retail sales. Again – those estimates were among many inputs used to forecast revenue for TransNet and Measure A.

Staff then developed an alternative (and more conservative) forecasting method to use while the DEFM model is being rebuilt and will develop future forecasts with a range of outcomes that capture the inherent uncertainty associated with forecasting. In addition, SANDAG recently reorganized its management team, combining the chief economist and technical services director positions into a single role to provide more integrated and robust oversight of the SANDAG forecasting process.

Ultimately, forecasting is about making an educated guess about the future based on a set of variables. Variables are dynamic because the world is constantly changing.

Gary L. Gallegos
Executive Director, SANDAG
EXHIBIT 35
Ray,

I decomposed the DEFM personal income model with the econometric package used to estimate it for SR10-13 (MetrixND). The two largest components of growth in personal income are from civilian pay and military pay (both of which approximately double in real terms between 2010 and 2050). The civilian pay model is represented by the following regression:

\[ CPay = 41393.674 + WEAdj \times 0.159 + PayUS \times 5.430 + L \times 0.0317 \]

Here are some findings:

- Although income fits the historical time series well, the Moody's forecast to which it's tied goes off the tracks pretty badly, and this looks to have been a problem for at least the past three forecasts.

- As the SR13 documentation states, civilian pay is a function of SD labor force (L, derived from the demographic model and cohort-specific labor force participation rates), the US Payroll from Moody's Economy.com (PayUS, in millions of current dollars), and a derived variable that represents total SD wages adjusted by the mix of employment (WEAdj).

- The model is a multiple regression on an estimation dataset between 1990 and 2012. The overall model fit is actually quite good based on the estimation data set, with a high \( R^2 \) of 0.998, a high F statistic, and strong goodness of fit. The root mean square error is $852, and the MAPE is 1.25%. Here is a plot of the actuals vs predicted and the unstandardized residuals (I don’t know to get MetrixND to give standardized residuals).
The largest contributor to civilian pay is the exogenous Moody’s US Payrolls variable. It has a strong positive coefficient, it is highly significant (p < .001), and has a low standard error. For every one unit change in PayUS, there is a $5.43 change in CPay, all else being equal.

Contrary to the model documentation for Series 10 through 13, personal income is NOT a function of wages adjusted by the mix of employment. Rather, at some point post DEFM 99, output was replaced for wages. This is very surprising to me, since nowhere are we actually using wages.

I discovered some very surprising implications from Moody’s forecast.

- Looking at its 40 year forecast of USPay, along with other Moody’s forecast of output, real productivity from wage and salary sectors declines by nearly 40% between 2010 and 2050. The same trend is observed across each sector to a varying degree.
- Moody’s US payrolls forecast assumes real average annual growth of nearly 2% between 2010 and 2050. As Dmitry’s charts previously showed, our best 20 year or longer real wage growth rate was around 1%. The 1970-2010 real CAGR was much less than 1%.
- Moody’s also suggests an average real wage increase of nearly 57% between 2010 and 2050—from $50k to $77k. In other words, the high payrolls growth is not offset by large employment growth, resulting in very optimistic average wages. As a result, DEFM follows the same trend.

As far as I know, the Moody’s inputs to DEFM are in their raw, unadjusted format. The forecast inputs from them for SR11, SR12 and SR13 are all very similar.

- Military Pay is simply an identity function of derived average wages (from SD total payrolls) multiplied by uniform military counts.
- Household incomes are derived from base year median income adjusted to the change by increment in total personal income, and each of the 10 HH income intervals is correspondingly adjusted (upward, significantly here).

I think I’ve got it fully traced out now, and I’m happy to go through any of this in detail with you.

Daniel

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