Public Utilities

San Pasqual Valley Groundwater Sustainability Plan
Technical Peer Review Meeting October 8, 2020
Comment Tracking Table

Commenter Name	Commenter Organization	Comment Received	Subject	Line #s or Figure #	Comment
Peter Quinlan	Dudek, Rancho Guejito	10/23/2020	Meeting		The change in format for the public comment at the end of each meeting seemed to work well. The increased oversight by the meeting facilitator kept the meeting on track. The last TPR meeting finished ahead of schedule and with full participation and input from the TPR members and other participants.
Peter Quinlan	Dudek, Rancho Guejito	10/23/2020	Comments		All written comments submitted by TPR members should be provided to the other members when they are submitted rather than being summarized 3 months later. Documents and data used by the GSA in conjunction with development of the GSP are public record and should be made available to the TPR. It would be helpful, for example, if the time series of future precipitation were available in an excel file rather than simply presented in as a graph in the PDF of the Powerpoint presentation.
Peter Quinlan	Dudek, Rancho Guejito	10/23/2020	Future Climate Scenarios	Handout 2	The precipitation and other climate change projections used in the modeling predict that there will be prolonged drought in the basin. The projections do not reflect past climate patterns or precipitation and have been characterized as unlikely to occur. Using them could result in unnecessary restrictions on groundwater use. Being conservative does not require using scenarios that are characterized as unlikely to occur. From: CLIMATE, DROUGHT, AND SEA LEVEL RISE SCENARIOS FOR CALIFORNIA'S FOURTH CLIMATE CHANGE ASSESSMENT Page 1 "One requirement of the climate simulations and scenarios provided to the Fourth Assessment is to enable investigation of extreme, highly damaging climate changes that are possible but unlikely— e.g., low probability, high consequence outcomes. Two examples are provided, exploring extreme drought and high sea level rise. To explore extreme drought in a warmer future, two 20-year drought scenarios were produced from the downscaled meteorological and hydrological simulations: one for the earlier part of the 21st century, and one for the latter part." No decisions about management actions or potential projects should be made based on the results of model simulations without factoring in how unlikely it is that the theoretical results will occur. Management actions and projects will have actual costs. They should be based on observed data, not model simulations of unlikely future conditions.
Peter Quinlan	Dudek, Rancho Guejito	10/23/2020	Calibration	Power Point page 15	The quantitative calibration should include the vertical gradients. Nate Brown indicated that water levels in the alluvium will be quantified using standard statistics, but that the vertical gradients among the alluvium, residuum, and non-weathered granitic rock (as measured in the 3 USGS observation well clusters) will only be used as a qualitative check on model calibration. Under this approach, it will not be possible to draw conclusions about the degree of hydraulic connection if the model development does include quantitative assessment of model error in reproducing the vertical gradient observed in the nested observation wells with.
Peter Quinlan	Dudek, Rancho Guejito	10/23/2020	Model	Power Point page 29	It is unclear whether Jacobs intends to simulate pumping from the layers of the model that represent the un-weathered granitic rock. The table showed parcel 42 as irrigated by water from Rancho Guejito wells 3, 4, and 5 which extract water from the granite beneath the basin, but showed parcel 43 as not irrigated although it is irrigated by wells extracting water from the granite laterally outside the basin boundaries, but within the model domain. If pumping from the un-weathered granitic rocks is simulated, all pumping within the domain must be simulated for the result to be valid.
Peter Quinlan	Dudek, Rancho Guejito	10/23/2020	Model		I am concerned about the proposed use of the external boundary of the model as a no flow boundary. During the meeting, Nate Brown stated that the external boundary of the model domain would be treated as a no flow boundary. This is likely to cause the model to generate unreliable results if pumping from the non-weathered granitic rock is simulated in the calibration period and future scenarios.
Peter Quinlan	Dudek, Rancho Guejito	10/23/2020			The fractures in the non-weathered granitic rock occur within and outside of the model domain. Fractures connected to areas outside the domain provide recharge to the non-weathered granitic rock within the domain. It is not clear whether Jacobs intends to simulate pumping outside of the DWR Bulletin 118 basin boundaries in the model layers representing the non-weathered granitic rock. If Jacobs does simulate pumping from the non-weathered granitic rock, they must do it for all wells within the model domain in order for the model results to be valid.
Will Halligan	LSCE	11/6/2020	Handout No. 2		From reading the title on this handout, I was expecting to see a summary of the comments received on the TPR No. 4 Handouts and Presnetation. What was presented appears to be incomplete and does not include my comments on Handout no. 3 and the Presentation.
Will Halligan	LSCE	11/6/2020	Handout 3	Pages 1 and 2	The climaate change memo is somewhat confusing as it does not mention the DWR climate chage guidance document and does not differentiate between the transient approach and the DWR historical period approach in the background portion of the memo. Is this memo planned on being included as an Appendix to the GSP? If so, then it needs to summarize the DWR approach and tool versus the approach recommended by Jacobs. The projected time frame of 2020 through 2069 seems more appropriate for a GSP submittal in January 2020 versus this one which is Januaryt 2022. Why sin't the projected water budget through 2072? Most critically overdrafted basins GSPs have projected water budgets through 2070. The memo does not clearly articulate why the preferred approach is better than the DWR approach, even with hteh pros and cons summarized in teh Table later in teh memo. The memo does not describe how the preferred method incorporates variations in climate change (2030 and 2070 DWR approaches) that is in the DWR BMP. The DWR BMP has a 2030 climate change model and three different 2070 models. Are these the same four GCMs that the Jacobs preferred approach is using? If so then is seems as if you are comparig apples to organges by commingling the 2030 climate change model with the three 2070 GCMs.

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Will Halligan	LSCE	11/6/2020	Handout 3	Table 1	The table conveys that DWR will ensorse the recommended approach. Has the local DWR representaive been informed of this approach and have they provided a preliminary "endorsement"? In my experience, it is very difficult to get any DWR representative to provide such an endorsement for an approach which is not consistent with DWR best management practices. The decision not to develop a 50 year historical period of record to be used in the projection based on the fact that there is not 50 years worth of data should not present a large hurdle or a lot of extra work. Many basins have this same issue and have developed a 50 year record using a repeat of wet, dry, and average years during the time frame data is available in which to populate the years where data is not available.
Will Halligan	LSCE	11/6/2020	Handout 4	map	This map is titled "Management Areas". Is it the intent to formally define and describe management areas in the GSP? Is the basis for that decision solely based on areas of the basin which are in the City's or County's jurisdiction rather than on whether there is a need to have PMAs located in those particular managment areas? I would recommend not formally defining managment areas in the GSP.
Will Halligan	LSCE	11/6/2020	Handout 4a	PDF Page 3 and Table 1 on PDF Page 4	I had assumed from the text on page 3 that the ratios were developed for each month of the simulation period, however, you used a single ratio value for every January, the same ratio value for every February, etc. How much variability is there within the same month (different years) and does this approach produce its own bias? This approach also seems to mute the highs and lows that may occur during wet and dry periods, therebyinfluencing the groundwater model's ability to simulate wet period gw level highs and drought period gw level lows. There are not that many months in the simulation period. Why not have a ratio caluculated for each month in the entire simulation period versus using the average approach?
Will Halligan	LSCE	11/6/2020	Handout 4a	PDF Page 3 and Table 2	The water year adjustment factor (step 2) is somewhat confusing and the text would benefit from a better explanation of why this is necessary. Rather, the hreader is left to interpret the numbers on Table 2 to get a sense of the fact that the BCM does not represent critical year types well at all. I am assuming that there is likely little to no flow in these streams in critical years (which his why the factors are close to zero). The factors for teh other year types seem to result in most year types (except for above normal) to need to have increased amounts of runoff to be representative of observed flows. All of this need for a two step process to manipulate the BCM output casts doubt on why use that tool in the first place versus developing relationships in observed runoff between different watersheds in order to fill in months and years where there is a lack of observed data in some of the streams.
Will Halligan	LSCE	11/6/2020	Handout 4a	Exhibit 2	What is the explanation for why you are using calendar years and water years intermixed in Exhibits 2, 3, and 4? Also, what is the explanation of why the "final" adjusted value and the observed values for the "wet" years of 2005 and 2011 being different. As in one wet year has the observed being higher than the final and the other wet year shows teh opposite relationship. This does not show up on the other two streams. Also, the portion of the three exhibits that show the monthly relationship is onfusing in that it does not explain what year type is being shown, nor is there an explanation of the year in which the observed data is obtained from (unless the observed data is a monthly average?). It wouild be more informative to see monthly results for all year types for each stream to see how well this approach works in all year types in the three watersheds shown.
Will Halligan	LSCE	11/6/2020	Handout 5	Well Parcel Map	Very busy map. I was not able to locate parcel no. 35 as it may be hidden behind other labels. Does this include ALL wells that supply water to lands within the basin? Regardless of whether those wells penetrate the fractured bedrock or bedrock. I want to make sure because if the wells that are represented do not represent the soucrce of all water used in the basin then that discrepancy impacts how the basin is currently (or historically) operated. For those half dozen or so parcels classified as "not irrigated", does that mean just in the "current" time (2020) or historicallyy as well?
Will Halligan	LSCE	11/6/2020	Handout 5	Land Use Maps	Is that large parcel bordering the east boundary of the basin near Guejito an avocado land use? If so, does the model simulate that land use and the sources of water that are used to irrigate it? I did not see that parcel in the well/parcel map. Does the existence of that irrigated parcel influence groundwater and surface water conditions within the basin?
Will Halligan	LSCE	11/6/2020	Presentation	Slide 10 (Page 5?)	There are often two numbers on the slides, one at the lower right and the other on the lower left so I am not sure which one to reference in these comments. Regardless, this is the slide that summaried the comments received on TPR Meeting no. 4. As I mentioned in the TPR Meeting no. 5, this slide did not seem to present or address any of the comments I submitted . I know that there can often be a level of effort involved to address all the comments you received, ohwever, it seems as if the comments received from teh TPr members should at least be noted/recognized or something so that a TPR member feels like there is some purpose to having a TPR process in the first place.
Will Halligan	LSCE	11/6/2020	Presentaiton	Slide 13	As mentioned in the meeting, the vertical exageration conveyed with the model layering in this figure gives the impression that the actual model layering has very steep slopes which can result in numerical convergence and other issues. This cross section figure couild benefit from showing the model domain extent and how the domain boundary is simulated (no flow boundary?) I know that may be a sensitive topic, however,it will be a comment that will likely be provided at some point in teh GSP review process.
Will Halligan	LSCE	11/6/2020	Presentation	Slide 15	The qualitative calibration part of the slide seems pretty quantitative to me if you are using observed heads from the multiple completion wells to evaluate vertical gradients. Is it qualititative bacause you are just going to "eye ball it" or are you going to actually calculate vertical gradienits from teh measured data and compare to the model data? Also, will there be any streamflow calibration to gages located in the basin? Seems as if that would be a good idea in order to dial in streamflow.
Will Halligan	LSCE	11/6/2020	Presentation	Slide 17	Is there a water budget component that covers surface water outflow from the basin? I do not see it on the "example" water budget chart. I am assuming these example charts include all the budget components you are planning to show in the GSP (correct?). I am not a fan of stacked bar charts in general because it can be challenging to get a sense of trends on individual budget omponents over time. However, if you do use them, it is helpful to have budget components that are adjacent to each other to have contrasting colors rather than use the rainbow approach that is being used.

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Will Halligan	LSCE	11/6/2020	Presentation	Slide 21	If the historical water budget period is 2005 through 2019 water year, then what is your current water budget year: 2020? If it is 2020, then the land use used for the baseline projected water budget should be the current water budget land use not the last year of the histroical water budget. In any case, why have a different year for land use than for groiundwater pumping (2019 and 2020)? that does not make sense and is not explained as to the reason for that difference. Depending on the increase in consumptive use due to climate change in the future along with your "freezing" of the number of wells, how do you know that the existing footprint of wells can all handle the increase in discharge that is required to handle the increase in consumptive use? It will be interesting to see if you potential have a wetting/drying situation going on with the Farm Process with your wells needing to pump more and how that relates to teh well construction and model layer distribution.
Will Halligan	LSCE	11/6/2020	Presentation	Slide 24	by assigning Lake Hodges to the GHB, will you run into issues when reporting your land surface budget and/or surface water budgets? Or will you do a zone budget approach and parse out that data for water budget output purposes? An explanation of how the general head can simulate groundwater/surface water interaction on the sides and bottom of Lake Hodges is requested. I am curious as to how you will be able to have leakage from Lake Hodges in layer 1 to the underlying layer 2 using the GHB approach versus using the River package os imiilar surface water package where you can readily isolate the budget terms and prepsent gw/sw interaction on all sides.
Will Halligan	LSCE	11/6/2020	Presentation	Slide 27	The CU posted on the chart for the various crops seems pretty low in general. Will you be providing Kc and Etref values for review. I would have thought the CU for pasture grass should essentially equal Etref as the Kc should be close to 1. The majority of the crops are around 2 af/year which seems generally low .
Will Halligan	LSCE	11/6/2020	Presentation	Slide 36	I support the concept of adaptive management, however, I think that the County and City should focus on "management actions" to address adaptive management as those actions are generally more nimble and can be implemented quickly as monitoirng data and analysis indicate. However, including projects as an adaptive management tool may be more difficult to implment at teh drop of a hat as is suggested. Projects take many years of planning, design, permitting, CEQA, and construction to implement and are not generally a go right off the bat. Once they are in place then that may be some flexibility depending on the paroject.
Will Halligan	LSCE	12/3/2020	Bedrock Wells	In response to Peter Quinlan's comment on 1/24/2020.	Page 2, Peter Quinlan, last comment on page: Peter uses the word “isolate” in reference to well construction features that “isolate” the well from pumping from the alluvium and rediduum. It is important to understand what well construction features he considers he is referencing that provides “isolation”. If the wells he is referencing are constructed with sanitary seals (cement type goruts) that extend from the ground surface downward through the alluvium and residuum at a minimum, then that would lead to some degree of isolation of the well pumping groundwater from the alluvium and residuum. However, if the well construction only includes the well casing that extends through the alluvium and residuum and the underlying perforations (well screen) spans a depth interval below the residuum, then that alone would not prevent that well from drawing water from the overlying alluvium and residuum, unless the sanitary seal extends through those overlying units. Bottom line is that it is important to understand more of the details of the well construction features than what Peter mentioned in his comment before concluding any sort of isolation.
Will Halligan	LSCE	12/3/2020	Land Use	In response to Matt Wiedlin's comment on 5/29/2020.	Page 4, first comment. With the revisions to land use that the modeling team had to conduct due to incompleteness and inaccuracies from published datasets, will those revised/updated land use datasets be provided for review at some point?
Will Halligan	LSCE	12/3/2020	Pumping Rates	In response to Will Halligan's comment on 7/16/2020.	Page 4, second comment. With the absence of pump test or pump efficiency testing data, anecdotal information from AC members, etc. can be used to get a sense of what pumping rates may be for large capacity wells in the basin. This information can be used to see if the discharge volumes expected from such wells that serve large parcels is sufficient to meet the parcels water demands. That could be a form of a cross check proposed by Matt that could be utilized by the modeling team.
Peter Quinlan	Dudek, Rancho Guejito	12/4/2020	No Flow Boundary	In response to Modeling Team responses to Peter Quinlan's comment on 10/23/2020.	The current model boundary does coincide with the location of reliable stream gauges. However, where the boundary aligns with the gauge locations, the boundary does not correspond with the watershed boundaries and associated groundwater divides. There are approximately 14,000 acres of watershed upstream of the gauge on Guejito Creek. The watershed divide is approximately 10 miles north of the gauge. None of this area will receive recharge through the FMP package in the model, nor will the recharge to the granitic rocks in this area be represented in the model because of the no-flow boundary located at the gauge. There is a much greater watershed (8 to 10 times the area of the Guejito Creek watershed) upstream of the gauge on Santa Isabel Creek that is similarly excluded from the model domain. Excluding this recharge to the layers of the model representing the granitic rock will impact the validity of model results. I am not suggesting that the model domain be extended to include these areas of the watershed, rather I suggest that some alternative to the no-flow boundary be adopted to incorporate the recharge to the granitic rock that occurs in these areas and migrates into the basin.

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Peter Quinlan	Dudek, Rancho Guejito	12/4/2020	Uncertainty	In response to Modeling Team responses to Peter Quinlan's comment on 1/24/2020.	The modeling team has highlighted the fact that, in general, earth system models are inherently difficult or impossible to verify (Oreskes et al, 1994). In the context of groundwater modeling, this is largely due to the fact that the hydrogeological environment is of unknowable complexity and that natural and anthropogenic stresses interact non-linearly across the system. The modeling team's assessment of calibration as a historical matching exercise is appropriate. However, incorporating the entire historical record into the calibration efforts can introduce systematic biases that may impact projections (e.g. Oreskes and Belitz, 2001; Hunt et al., 2019). The incorporation of a validation period provides a direct method of how the calibrated parameter distribution may bias predictions moving into the future. In addition to demonstrating an adequate match to historical observations over at least the last 10 years, I recommend that the modeling team assess and characterize how biases in the model calibration process may impact projected water levels and historical estimates of sustainable yield. The stochastic methods suggested by the modeling team to generate uncertainty bounds on estimates of sustainable yield are robust, but (as noted) expensive. I do not suggest that the modeling team pursues the development of dozens to hundreds of calibrated model realizations. Instead, the modeling team may consider using simpler methods, such as linear uncertainty propagation (e.g. see PEST ++) or stochastic methods that do not rely on calibrated models to generate an ensemble of sustainable yield estimates. Non-calibrated model results can be weighted using calibration statistics, such as RMSE, to assess confidence in the model's estimates of groundwater storage change and predicted water levels. I believe that this uncertainty quantification effort supports the modeling team's proposed sensitivity analyses that will identify the locations, processes, and parameters that are the dominant influence of model predictions.