

February 14, 2012
#11-22



Derek Rayner, Senior Civil Engineer
City of Calistoga Public Works Department
414 Washington Street
Calistoga, CA 94515

Re: Brian Arden Winery, Silverado Trail, Calistoga, CA, APN 011-050-030

Dear Mr. Rayner:

Bartelt Engineering is in receipt of Delta Consulting and Engineering's (Delta) revised Hydrology & Drainage Report dated February 1, 2012 for the Brian Arden Winery. We also hold the review memorandums from Mr. Joe Gaffney of Green Valley Consulting Engineers dated January 28 and February 6, 2012 and Mr. Bryan Jackson of Delta Consulting and Engineering's response to Mr. Gaffney dated February 1, 2012.

What remains of great concern to us is the preservation of historical flow patterns throughout the watershed after the Brian Arden Winery project is constructed. After our review of the revised design plans, communications and reports it appears that this still has yet to be achieved. We have the following comments regarding the project as it is currently proposed:

1. Very small amounts of discharge have been observed leaving the site during the most recent rain events. Historic flows leave the subject property primarily as sheet flow across the east property line and not as point discharge at the southeastern corner as the Delta report suggests. Under the proposed post-construction condition, flows are being broken up, redirected and allowed to release as concentrated point discharges which have higher flow rates than the pre-construction conditions.
2. We are unable to find information in the Delta report on how the different Time of Concentration (T_c) values were calculated under each storm event. At the very least, we would like maps showing the storm water path of travel through the watersheds and the associated calculations of the individual travel time (T_t) values and final T_c 's used in the Delta report for each condition.
3. We have concerns with the hydrographs provided in the Delta report. It is best practice that when summarizing the impacts a potential development may have on a watershed, each of the pre- and post-development condition hydrographs are displayed as single curvilinear lines.

The TR-55 documentation states that the method “can be used for a heterogeneous watershed that is divided into a number of homogeneous subwatersheds.” Therefore, each of the different areas (upper, site, basin, etc.) are actually individual “subwatersheds” with corresponding hydrographs.

Although showing each subwatershed’s hydrograph individually may be helpful to the design engineer when analyzing the different elements of a complex drainage system, a watershed hydrograph showing the summation of each subwatershed hydrograph is warranted. The hydrograph should be constructed using values obtained at the watershed’s ultimate discharge location, clearly showing the rate and duration, and include data from all areas generating runoff (subwatersheds) that contribute to the watershed. The upper subwatershed should not be removed from the pre- or post-construction analysis.

We request that pre- and post-construction hydrographs of each storm event at the ultimate discharge location of the entire watershed (upper and site) be provided for comparison.

4. Section 8.4.1 of the Federal Highway Administration’s (FHWA) Urban Drainage Design Manual discusses the method used to calculate the required storage volume as shown by Figure 5, on page 6 of the Delta report, as a preliminary volume estimating tool. Direct hydrograph volume comparisons should be utilized to determine the actual required volume.
5. *Figure 3: Pre-Construction Hydrograph, 100 Year Design Storm* on page 4 of the Delta report does not match the *100 Year Design Storm Pre-Construction Peak Flow at Southern corner of Property, Q_{PEAK} @ $t=8.58$ -Hours* hydrograph in Appendix H.
6. Each of the hydrograph output pages in the Delta report have an annotation stating that each subwatershed’s peak discharge rate occurs at the same time; however, this is highly improbable.

For instance, under post-construction conditions during the 10 year design storm, the annotation states that each subwatershed’s peak discharge occurs at 8.33 hours. However, by observing each subwatershed’s plotted hydrograph line, one can clearly see the peak discharge rates occur at different times. Furthermore, the time of peak discharge rate for the detention basin seems to be closer to 10 hours rather than the annotated 8.33 hrs. Is the annotation of the overall watershed’s time to peak value rather than the individual subwatershed’s?

7. In addition to the graphs, output tables should be provided for review. Such tables will provide discharge rates, stage-storage volumes relationships, water surface elevations (WSE) and maximum stage (STG) values for the structures that we can compare with the Delta report’s assumptions and summaries.
8. Attempts to meter the post-construction flows to pre-construction values have resulted in an increase in the duration of flows for all storm events. The proposed project will discharge at rates that peak sooner, last longer and will be greater overall than current conditions. This

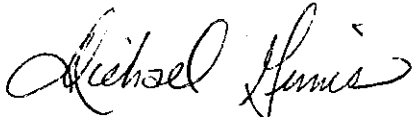
will have an impact on the hydraulics of the regional downstream conveyance structures (ditches, swales, streams, etc) because the site will maintain a higher flow rate for a longer time which will subsequently increase the regional watershed's peak flow. Has a regional watershed impact analysis been conducted for this project? How will the downstream conveyance structures be affected by the increased flow?

9. We continue to be concerned about the overall maintenance of the storage chambers and underground vault. How do the storage chambers maintain their functionality over the lifetime of the project?
10. Additional calculations should be provided to aid in the understanding and validation of the proposed design as well as the design engineer's assumptions.
 - a. Calculations showing drainage inlet capacities should be provided,
 - b. Calculations showing conduit sizing should be projected; and,
 - c. Orifice calculations for the subsurface system should be presented.
11. The *Mean Seasonal Precipitation* map found in the Sonoma County Water Agency's (SCWA) Flood Control Design Criteria (FCDC) manual (Plate No B-3) require interpolation between isohyetal lines when appropriate. Therefore, the "K" factor value used in the Delta report should be revised.
12. The *Metering Box Design Calculations* spreadsheets, found in Appendix H of the Delta report, are unclear where the input values for "Peak Flow, Q" were obtained from and therefore unclear how the metering box plates were sized.
13. In Appendix H of the Delta report, the tables that compare each design storm's peak runoff rates at the south corner of the property for the pre- and post-construction condition do not match the values used in the *Metering Box Design Calculations* spreadsheets.
14. In Appendix H, *Metering Box Detail* of the Delta report, the dimensions of the steel plate (A, B & C) as shown in the table exceed the annotated dimensions directly above it.
15. What is Napa County's position on the proposed drainage structure in the road side ditch along Silverado Trail? Will the County accept a drainage structure operating under pressure (head)? Will the County accept a system that will become silted in over time and will eventually fail in its proposed function? Will the County accept a system that will allow standing water and that could create a vector breeding situation?
16. We request further explanation about the design for the parking area with chip seal and the adjacent drive lane. The design seems to imply that the flow from these areas is directed as sheet flow to the south, into a rock lined swale and then captured by two catch basins. Flow is then allowed to discharge out of a 4 inch PVC pipe at the invert of one of the catch basins into a concrete valley gutter and eventually onto the driveway. The design does not seem to address either storm water quality or quantity regulations for this area. Furthermore, calculations for the 3 inch reducer within the catch basin have not been provided to make sure the flow out of the basin is limited to pre-construction rates.

While we recognize the level of effort by the applicant that has gone into proving this development project can be constructed, we feel that the design team should investigate the concerns we have brought forth and provide additional information to the City of Calistoga prior to approval of the Use Permit Application currently under review by the City.

If you have any questions or comments regarding our comments, please feel free to contact me at (707) 258-1301 at your earliest convenience.

Sincerely,

A handwritten signature in cursive script that reads "Michael Grimes".

Michael Grimes, P.E.
Project Engineer

MG:sd

cc: Chuck Meibeyer, Meibeyer Law Group
Mark Aubert