

February 25, 2020

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RE: Altitude Business Centre – In N Out 100-year only analysis

Proactive Engineering was requested to review the approach and viability of the preliminary drainage concept proposed by the In N Out design. The In N Out site is currently in the Site Approval phase.

Proactive was provided the following information from Galloway for review:

- 1) Drainage Map Exhibit with areas and tables that show Galloway vs. Proactive Water Quality Design Capture Volume (DCV) Sizing and 100-year Detention Volume
- 2) ADS Design Stormtech to capture both water quality and 100-year storm flow volumes
- 3) ADS Stage Storage for UIB DA 4 calculations
- 4) Orifice Calculation for UIB DA 4 outlet flows

Drainage Map Exhibit

The Design Capture Volume (DCV) Sizing Comparison Table shows the original Proactive design and the proposed Galloway design. The proposed areas have variations from the original design areas. However, the overall Galloway proposed areas are slightly higher than the original Proactive calculations which is more conservative than Proactive.

The Onsite/Offsite Detention Comparison Table shows that the areas are slightly different but the 100-year Detention Volume is the same at 195,034 CF.

The map shows the Q100 flows match the approved drainage report at the two Points of Connection into Line H within the Mayhew Avenue Right of Way.

ADS Design Stormtech Plans

The ADS Stormtech Plans consist of 14 sheets that show the proposed capture volumes at each of the Drainage Areas DA 2, DA 3, DA 4, DA 5, DA 6, DA 7 and DA 8. Those plans show that the DCV Volumes within the Galloway proposed design are addressed in those calculations and are similar to the Proactive Report.

ADS Stage Storage for UIB DA 4 calculations

DA 4 is the only Stormtech structure that includes water quality treatment and storm flow volume detention. The original proposed design was underground water quality treatment with above ground detention. The Galloway design has water quality treatment and storm flow detention underground. The proposed design shows the DA 4 DCV Volume of 41,969 and the Detention Volume of 195,034 for a total required volume of 237,003 CF. This is greater than the Proactive Engineering which appears adequate. The required volume will be slightly below elevation 575.50. UIB DA 4 has capacity to handle the combined volumes.

Orifice Calculation for UIB DA 4

The orifice calculation using Haestad Methods shows a restriction at the centroid elevation of 570.00 with a diameter of 0.82 feet. That restriction will result in a maximum outlet of 7.0 cfs which is the same as the approved Proactive Hydrology Report outlet flow.

Conclusion

The Galloway approach meets the intent of the approved Proactive Final Drainage Report for the 100-year storm event and the Water Quality Management Plan Report for storm water treatment. Galloway has flexibility and capacity within UIB DA 4 to handle the 2-year, 10-year and 25-year storm events by providing additional and/or modifying the restriction outlet orifice(s). The additional storm events and flood routing could be deferred to the final design stage of the project.

Sincerely,



Thomas E. Braun, PE
Principal