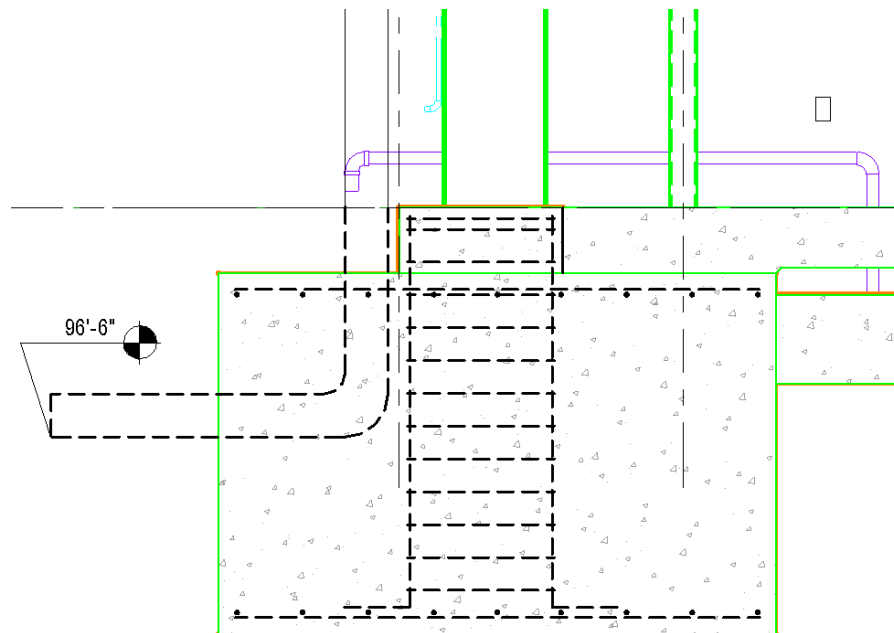


October 03, 2024

RE: Drain Penetration through Footings – Structural Perspective
Lee's Summit Municipal Airport
2525 NE Douglas St
Lee's Summit, MO 64064
Olsson Project No. 022-04268

To Whom It May Concern,

A question has been raised concerning the penetration of certain roof drain extensions through the exterior column footings on the south side of the new hangar building detailed in Olsson Project Number 022-04268. Most of these penetrations extend vertically straight through the footing and then turn 90° to run away from the building beneath the footings. But for the two extra thick foundations, found on Grid N and Grids 4 and 5, the pipe extends partway through the foundation and then makes the turn inside the footing. An approximate sketch of this condition is shown below:



Based on our review of the elevations involved, neither condition need have a significant effect on the reinforcing bar layout – the biggest change required would be to shift one or two bars in the horizontal mats in order to make space for the penetration. Additionally, the penetration is far enough from the vertical rebar cage that minimum clear distances for the bars will be maintained.

The effect that these pipe penetrations will have on the footings is minimal. Footing sizes are driven either by bearing pressure on the soil or uplift resistance resisted by the weight of the foundation. The impact of the pipe penetration on these two mechanisms is negligible, and the concrete itself will have no issues distributing stress around the pipe.



From a structural perspective, there is little concern for the penetration of these drains through the footings. The impact on the footings is minimal whether the pipe is embedded directly or if it is wrapped in a compressible wrap to allow for limited movement. Considerations beyond the scope of the pipe's effect on the footing are outside the scope of a structural review.

Should you have any questions or wish to discuss this letter report in more detail, please feel free to contact me.

Sincerely,



10/3/2024

James E. Rongish, PE
Project Engineer / Structural