

Date: Friday, January 10, 2020

To: ENGINEERING SOLUTIONS
Matt Schlicht, P.E.
50 SE 30TH ST
LEES SUMMIT, MO 64082

From: Gene Williams, P.E.
Senior Staff Engineer

Application Number: PL2019414

Application Type: Engineering Plan Review

Application Name: MAIN ORCHARD - MASTER DRAINAGE PLAN

The Development Services Department received plans for this project on December 27, 2019. We have completed our review and offer the following comments listed below.

- Resubmit three (3) full size sets of plans (no larger than 24"x36") folded to 8-½"x11", one (1) comment response letter, and one (1) digital copy following the electronic plan submittal guides as stated below.
- Revised plans will be reviewed within five (5) business days of the date received.

Engineering Review - Corrections

1. The plans show a lack of detail concerning the construction of the detention pits. Although the overall concept appears acceptable, detailed design drawings were missing. Missing items include the following: 1) a 12 inch drain pipe is shown entering the pit, without any reference to minimum slope, connection to the downspout header, pipe type, and bedding, 2) the 1 inch outlet pipe is shown without any concrete flared section at the end, which we feel is required due to the fragile nature of this small pipe, and overall longevity of the pipe where it daylights, 3) inconsistent material call-outs for the rock (i.e., the report specifies 1.5 inch to 2.5 inch clean rock, but the plan calls for 1 foot of 6 inch river rock, which does not appear to make sense), 4) a 12 inch round grate top is specified, but no other information is provided (we recommend a cast iron grate for this application), 5) plantings are specified, but no further information is supplied concerning the type of plantings, 6) 12 inch drain pipe appears to be installed near the surface, 7) the elevation view shows 12 inches (i.e., 1 foot) of topsoil, but this does not scale properly when examining the elevation view (i.e., when adding up the thickness of 1 foot of topsoil, this would force the 1 inch outlet pipe to be placed immediately beneath the topsoil, thus rendering it useless in terms of draining the clean rock within the detention pit).
2. It would appear the 1 inch outlet pipe will need to be placed at a much lower elevation than shown on the elevation view. This will increase the distance needed to reach a daylight condition.
3. A plan and profile view is required for the outlet pipe.

4. A plan and profile view is required for the 12 inch drain pipe.
5. The 12 inch drain pipe material must be specified, along with the slope.
6. the 1 inch outlet pipe must show the slope and daylight location.
7. Shouldn't the detention pit outlet pipe located on the extreme southwest lot be directed more toward the right of way? Finally, shouldn't the detention pit located on the lot immediately north of this lot be directed more northerly, to align with the existing swale?
8. A trenching and backfill detail was missing for the storm pipe.
9. Sheet C.201: It was our understanding that the detention pits were going to be placed in a sump condition. It does not appear any information in the form of contours or finish elevations were provided showing how this will be accomplished.
10. Sheet C.201: Existing elevations were provided for the lot corners, but finish elevations are also required, even if the existing elevation will not change.
11. The Engineer's Estimate of Probable Construction Costs appeared low for the following unit prices: 1) detention pit and grading. The unit price of \$1,200 appears extremely low based on the fact that these pits will consist of 12 inch stormwater pipe, grate, tees, rock, filter fabric, outlet pipe, plantings, and end of outlet pipe treatment. The estimate also appeared to be missing stormwater pipe, end treatment for outlet pipe, and plantings.

In order to calculate the Engineering Plan Review and Inspection Fee, a sealed Engineer's Opinion of Probable Construction Costs shall accompany your final submittal copies. The itemized estimate (material and installation) shall be sufficiently broken down and shall include the following items, as applicable.

- Public infrastructure, both onsite and offsite.
- Private street construction, including parking lots and driveways.
- Sidewalks located within the right-of-way.
- ADA accessible ramps.
- Sanitary sewer manholes and piping between manholes, including private mains.
- Connection of the building sanitary sewer stub to the public main.
- Waterlines larger than 2 inches in diameter, valves, hydrants, and backflow preventer with vault, if outside the building.
- Stormwater piping greater than 6 inches in diameter, structures, and detention / retention facilities - public or private.
- Water quality features installed to meet the 40-hour extended duration detention requirements.
- Grading for detention / retention ponds.

- Grading to establish proper site drainage.
- Utility infrastructure adjustments to finished grade (i.e. manhole lids, water valves, etc.).
- Erosion and sediment control devices required for construction.
- Re-vegetation and other post-construction erosion and sediment control activities.

Electronic Plans for Resubmittal

All Planning application and development engineering plan resubmittals shall include an electronic copy of the documents as well as the required number of paper copies.

Electronic copies shall be provided in the following formats

- Plats – All plats shall be provided in multi-page Portable Document Format (PDF).
- Engineered Civil Plans – All engineered civil plans shall be provided in multi-page Portable Document Format (PDF).
- Studies – Studies, such as stormwater and traffic, shall be provided in Portable Document Format (PDF).

Please contact me if you have any questions or comments.

Sincerely,

Original Signed

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Senior Staff Engineer
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cc: Development Engineering Project File