



September 1, 2020

Kinsey O'Shea, Development Planner
Randy Formica, Engineering Director
Town of Blacksburg
400 South Main Street,
Blacksburg, VA 24060

RE: Memo for Variances and Exceptions for Berewick

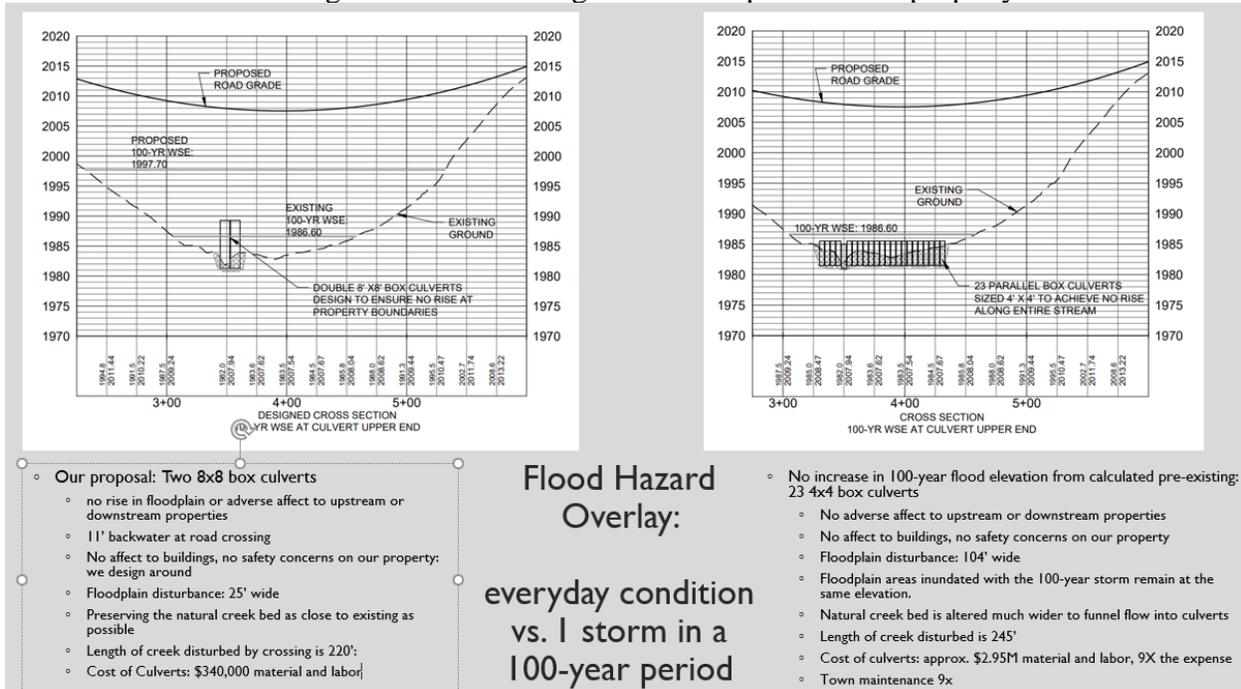
Dear Kinsey and Randy,

Please circulate this amongst the Planning and Engineering Staff as it is appropriate. This contains an explanation of the variances and exceptions that have been submitted as part of the Berewick rezoning application changes.

1. Applicant requests an exception to the Flood Hazard Overlay by Town Council for an increase in the flood height as backwater behind Road A, because of man-made improvements. This request appears permissible under Section 3246 (a), as the Applicant has not received information to the contrary. No increase in the floodplain occurs on adjacent properties upstream or downstream of Berewick. No habitable structures are within the 100-year calculated floodplain boundary, and Berewick infrastructure has been engineered to handle the increase on the property. The Flood Hazard Overlay ordinance that refers to the portion of overlay establishing floodplain boundaries draining over 100-acres, specifically allows Council to provide a variance for man-made changes that may affect the floodplain boundary. We feel it is our right to ask for this variance from Council as set forth in the ordinance.

If approved, this variance request would allow our backwater of varying height with an approximate maximum of 11' for a distance of less than 600 LF in exchange for no adverse impact to any property, less maintenance for the Town in stormwater culverts, as well as a better environmental scenario with less impact and disturbance for the creek. Upstream and downstream properties adjacent to us have no increase in their floodplain heights, and our property has no negatively impacted infrastructure of buildings due to the raised heights. In fact, we are safely passing the 100-year flow and throttling flood elevations over Tom's Creek Road. In requesting the variance, we acknowledge that to meet the ordinance requirements not to increase the floodplain *ANY*, would require a significant expense rendering even a by-right project infeasible. Additionally, many culverts that the Town would have to maintain would be installed and the entire creek bed would have to be widened to achieve the requirement. The result would be a significantly disturbed creek and

floodplain for all time to direct the water to the culverts keeping the same “height” on the floodplain that occurs once every 100 years. The applicant believes that some increase is inevitable with a road crossing and that one in which safety is achieved, and the creek remains in its current location relatively undisturbed outside of the culverts, is preferable environmentally to the health of the creek. Therefore, we request to make our case to increase the flood height thus establishing a new floodplain for the property.



- Applicant requests an exception to widening along Tom’s Creek Road as allowed under section 5-313 (3) to be approved by Council during a rezoning process. and has dedicated right-of-way to the Town for future widening. A road widening to 15’ on only the north side of Tom’s Creek Road (Berewick side) would either add paved shoulder to one side of the road or would cause an imbalance in the size of the lanes. To compensate, it would require the centerline striping to be re-centered, causing a jog in the road on either end of the development in already curvy sections of the road, exacerbating existing problems in horizontal curves. Dedicated right-of-way will allow the Town to design a proper road taking horizontal and vertical curvature into account for a more comprehensive design. Tom’s Creek Road currently sees between 200 to 300 vph and has capacity to carry up to 1,700 vph. Widening the road section of Tom’s Creek is not currently listed as a priority upgrade in the comprehensive plan.
- Applicant requests an exception to curb and gutter installation on Tom’s Creek Road as allowed under section 5-313 (3) to approved by Council through this rezoning. Specifically, the curb and gutter and 30’ width requirement are excepted in the Rural Residential 1 and 2 zoning districts surrounding Tom’s Creek Rd. and are requested to be excepted along Tom’s Creek for this development. Curb and gutter does not currently exist along Tom’s Creek Road and would further exacerbate flooding at the low point of Tom’s Creek Road if installed. This would concentrate flow to an already flooded point rather than sheet flowing across grassy area or into a grass channel where reduction of quantity can occur. The rural

character of the Tom's Creek Basin does not require curb and gutter, RR-1 zoning does not require it, and nor are there engineering reasons to include it as the applicant is not altering Tom's Creek Road. Berewick requests to be excepted for curb and gutter along Tom's Creek for this development as the development is contained within the same rural areas exempting it in the code. We have chosen to use curb and gutter for marketability and engineering reasons within the development but that is not the case with Tom's Creek Road.

4. Applicant requests an exception to Section 5-313(3&4) as allowed by Council during a rezoning to forgo street widening and curb and gutter improvements to Redbud Road along the frontage of five new lots on Redbud Road. The development does not project that any traffic will be using the substandard section of Redbud Road and provides an alley. Specifically section 5-313 (4) states the requirement for a 24' minimum pavement width based upon projected traffic by the development. Since an alley has been provided for the five lots to access the road at the property's existing entrance location, no traffic is projected. Adequate sight distance exists at this location and Redbud Road is already 30' wide at this location. There is no additional projected traffic from the development using the substandard portion of Redbud Road. Additional right-of-way 25' from the centerline of existing Redbud Rd. has been dedicated to the Town for future widening or altering of vertical curves. Curb and gutter is not necessary from an engineering standpoint, nor is it required in RR-1. Redbud Road does not currently have curb and gutter. A ditch section will be adequate in design to carry flows the 100' from the peak of Redbud down to a point where it can empty into the existing tributary. Additional right-of-way has been dedicated to the Town for future widening or altering of vertical curves along the frontage of Redbud Rd. The narrow road situation exists now and although our lots will front the road, they will not be utilizing the narrow portion.

5. Applicant requests an exception to Sidewalk/Trail requirement in the Subdivision ordinance Section 5-401 for a portion of trail along Tom's Creek Rd. Corridor Committee heard the reasoning contained herein and agreed with this assessment and did not ask for this portion of trail to be installed. There are no proposed lots fronting on Tom's Creek Road. All development residents will have access to the nearest bus stop at Patrick Henry Drive and Tom's Creek Road by trail west of 460 and then sidewalk on the east of 460 bypass. Residents further west of the development reside further than 1 mile from an existing bus stop but could still use the new trail as it connects to the park. A 10' wide bicycle trail is provided along Tom's Creek Road and then along Road A, internal to the development, in lieu of continuing down a 12% slope on Tom's Creek Road. This will provide connections to the existing parks and existing trail networks in the area. The proposed connection not only connects recreational bike and walking riders with the baseball park, but also provides for a much safer riding experience. Road bike riders will continue to use Tom's Creek Road and are not typically interested in using a trail off to the side. A trail along Tom's Creek Rd would be subject to flooding at least once a year and perhaps more often. The trail will suffer damage and require more maintenance for the Town once it is installed and accepted into the public system. Additionally, if the trail along Tom's Creek Rd were installed, the existing 30" culvert would have to be extended, further damaging the creek bed and disturbing the creek valley overlay and wetlands. The applicant has dedicated additional right-of-way specifically for the trail for the future when the road is re-aligned, or flooding

issues are fixed. Any trail installed now along Tom's Creek Rd will have to be removed or relocated to accommodate the CIP for flood control at this location. The trail currently provided within the development serves the same connection to the park with a continuous asphalt surface and would be redundant if the Tom's Creek trail or sidewalk is required to be installed by the applicant.

6. Applicant requests a variance from the Sanitary Sewer Specifications section 1.22 Capacity Analysis for calculating maximum daily flows in utilizing more appropriate factors for effluent sewer rather than those used for conventional sewer. Specifically utilizing the Orenco "Effluent Sewer Design Manual, A design Aid for STEP and STEG Systems" recommendations of daily per capita flow value of 50 gallons per day per person and a peaking factor of 2.0. This design manual is used widely across the world as a reference for effluent sewer design and more accurately reflects the Town of Blacksburg's STEP/STEG system and its design, operation, and maintenance. Since the system is constructed without manholes and is constructed water tight, and tanks are water tested at the plant, and vacuum tested in place, it stands to reason that the effluent system is more water tight than that of a conventional system. Additionally, wet weather flows are not seen in the system as illicit connections do not exist, as they do in manholes or cleanouts in a conventional system. Therefore, I&I or wet weather flows are not considered. In effluent systems, the peaks are based on peak daily flows rather than hourly flows because tanks can provide surge capacity for flow modulation. The manual recommends a daily per capita flow of 50 gpd per person. In Blacksburg, it has been a standard assumption to assume 2.7 people per household. Still, even though tanks modulate the peaks, a recommended peaking factor of 2.0 is recommended by the Manual.

Berewick Max Daily Flow = $84 * (2.7 \text{ cap/HH}) * (50 \text{ gal/cap/day}) * 2.0 \text{ peaking factor} = 22,680 \text{ gpd}$.

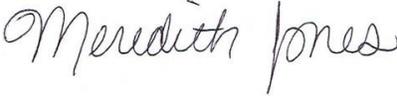
This analysis already includes a peaking factor; therefore, it is not necessary when examining the Brookfield pump station to apply another 2.5 peaking factor. The pumping station appears to have the ability to take on an additional 44,500 gallons of additional flow ($17,799 * 2.5$) if the 2.5 redundant peaking factor of the station is pulled out of the calculation. Another way to evaluate is if the pump station peaking factor of 2.5 is already added in, leaving an available capacity of 17,799 gpd, then half of the applicant's flow, 11,340 gpd, would be going to the station. If we remove our peaking factor and just use the Town's pump station peaking factor, then it appears our flow would fit in the station. To apply a 2.0 peaking factor to our development average daily flow, and then to the Brookfield pump station, is essentially applying a 5.0 factor which is not the intent of the Sanitary Sewer Specifications of Health Department. While the applicant is requesting this variance now, we acknowledge that the Preliminary Engineering Report will address calculations relating to Brookfield Pump station. However, the maximum daily flow of 22,680 gpd is important in the proportion of contribution that the applicant will proffer for downstream capacity improvements on the three sections of line.

Reference: "Effluent Sewer Design Manual", Rev. 3.0, July 2017, Orenco Systems pgs. 8-10

7. Applicant requests a variance to the standard alley dead end T-turn around in the Subdivision Ordinance, Div. 3, Section 5-310(b.). The applicant shows a T-turnaround with dimensions that extend 15' beyond the 18' wide alley in both directions. Since the Berewick alley will not permit buses or garbage trucks, no large vehicles are expected on the alley. As such a 15'

extension beyond the alley is provided in two directions. Residents may use this or will use their driveways with radii adjacent to the alley for turnaround purposes.

Respectfully Submitted,

A handwritten signature in cursive script that reads "Meredith Jones". The signature is written in black ink and is positioned below the typed name.

Meredith Jones, P.E., VP Eden & Associates P.C.