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Re: Roberts Court Extension (CGS § 8-30g Affordable Housing Development)
430 Mohegan Ave. Parkway & 23B Old Norwich Rd. (Map 76 Lots 10164 & 5600)
Waterford, CT 06385

DRAINAGE REPORT

This project is for an affordable housing development, which includes construction of a new 20-foot wide and 797± linear foot long private looped road off the end of Roberts Court, construction of 20 residential buildings (16 single-family houses and 4 duplexes for a total of 24 dwelling units), installation of a storm sewer system, stormwater management areas, low impact development (LID) features, implementation of best management practices (BMP) and other associated improvements.

The existing site is a 5.22-acre parcel of land that fronts on Mohegan Avenue Parkway (CT Route 32) toward the east and the cul-de-sac of Roberts Court toward the north. There are remains of an old shed on the northwest corner of the site and there is a sanitary sewer system and easement along the northeast property line. Other than that, the site is currently undeveloped woodlands, more or less. The on-site topography generally drains toward the east where there is a depression and a low-point near the southeast corner of the property. At the low-point in the depression there is a culvert inlet with a small 0.06-acre pocket of isolated inland wetlands around it. The culvert extends under Mohegan Avenue Parkway (CT Route 32) and daylights to a ditch on the opposite side of the road.

The total existing and proposed watershed area is 16.5 acres and includes the entire site and approximately 11.3 acres of off-site area. The contributing off-site drainage area consists of undeveloped woodlands toward the south owned by Connecticut College, developed residential properties within the surrounding neighborhoods, and a portion of the Mohegan Avenue Parkway

right-of-way. The design points are the culvert inlet at the low-point as previously described (Design Point #1) and a point near the northwest corner of the property (Design Point #2).

Based on NRCS soil mapping, the underlying soils throughout the existing and proposed watershed consists of Canton & Charlton, Paxton & Montauk, and Sutton soils. All of these soils are classified as fine sandy loams or fine sandy loams that are very stony. The NRCS hydrologic soil group rating is B for Canton & Charlton soils, C for Paxton & Montauk soils, and B/D for Sutton soils. The B/D rating indicates that the Sutton soils are soil group B when they are drained and soil group D when they are undrained. Soil group D was used for the wetland pocket due to the undrained or saturated condition.

On-site soil testing was conducted in July 2023. Eight deep test pits were dug throughout the area of the proposed development, including three test holes within the vicinity of the stormwater management areas. The holes were dug between 7 to 9.5 feet deep and were observed by Robert Russo, C.P.S.S. The results showed that the underlying soils are a fine or very fine sandy loam or a silt loam with sand, gravel, cobbles, or stones near the bottom of the test holes, which is consistent with the NRCS soil mapping.

While soil testing, Mr. Russo obtained three soil samples within the vicinity of the stormwater management areas and CLA Engineers, Inc. conducted permeability tests and sieve analysis. The infiltration rates are 0.25 inches per hour within the area of the smaller stormwater quality basin (Basin #1B) and 0.58 and 0.29 inches per hour (0.44 average) within the area of the large stormwater quality basin (Basin #1C). The infiltration rates are consistent with NRCS soil mapping.

The NRCS TR-55 methodology was utilized to evaluate the existing and proposed stormwater runoff conditions using the embedded AutoCAD HydraFlow Hydrographs computer program. All times of concentration were computed using the TR-55 methodology as recommended by the ConnDOT Drainage Manual. The Town of Waterford recommends using the 24-hour NRCS Type III rainfall distribution for all storms. All rainfall amounts used in this analysis were taken from the Hydrometeorological Design Studies Center of the National Oceanic and Atmospheric Administration (NOAA) National Weather Service and published in NOAA Atlas 14 Volume 10:

Precipitation-Frequency Atlas of the United States, Northeastern States, last revised on September 30, 2015. Refer to the plans entitled "Watershed Mapping" enclosed within this report for all watershed information.

Included with this report are HydraFlow supporting computations and hydrographs for the existing and proposed conditions. Detailed summaries of the computational results for the 2, 10, 25, 50, and 100-year storm events. The results indicate that the proposed peak rate of runoff and the volume of runoff at the design points will decrease for the 2- through 100-year storms. See tables in the enclosed drainage report.

The stormwater basins will be wet bottom basins that will capture the majority of the development and will slowly infiltrate the water into the underlying soils over the course of several days. Additionally, the outlet control structures within the basins will slowly release runoff over time to reduce the peak rate of runoff. The basins will provide at least 1-foot of freeboard up to the top of the basin berms. Refer to the attached summary tables for tabulated results for peak rates of runoff, volume of runoff and water surface elevations for the pre- and post-development conditions.

Grassed swales are provided on the northeast, south and west sides of the property (Swale 1A, 1B and 1C, respectively) and were analyzed using the rational method and the FHWA "Hydraulic Toolbox". The swales will have a 3-foot wide bottom with 2:1 (max.) side slopes. The swales will have permanent check dams at 75-foot (max.) intervals to slow velocity and will be seeded and stabilized with biodegradable erosion control blankets.

The proposed project includes several LID features and best management practices (BMP) to mitigate impacts of stormwater runoff and reduce the pollutant content of stormwater discharge. These methods include, but are not limited to: breaking up areas of impervious surfaces, draining roof gutter downspouts directly to the ground or splash blocks, avoiding concentrated point discharges, encouraging overland flow, using open swales, using pervious walkways and patios, inhibiting erosion by using pre-formed scour holes at pipe outfalls, minimizing the removal of existing trees to the extend possible, introducing new landscaping, and maintaining existing drainage patterns.

In summary, the proposal is for an affordable housing development that will include a storm sewer system, stormwater management areas, LID features, and BMP techniques that will mitigate and enhance the stormwater runoff generated from the proposed development. The post-development stormwater runoff reaching the design points will be less than the pre-development conditions.