CLA Engineers, Inc.

Civil • Structural • Survey

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

April 17, 2025

Meredith Badalucca, Assistant Planner
Town of Montville
310 Norwich-New London Tpke., Uncasville, CT 06382
Via Email: mbadalucca@montville-ct.org

RE: Site Plan Application 25SITE2 Review
145 Route 32 & 18 Powerhouse Road ("Madison Place")
CLA-7873G

Dear Meredith:
CLA Engineers, Inc. (CLA) has received the application materials for the above referenced project as emailed to our office and located on the Town Form Repository:
https://www.townofmontville.org/form-repository/25-site-2-145-route-32-multi-family-development/

CLA has performed a review of the application documents and offer the following comments:

Engineering Report
Previous Comment #2: The existing condition Drainage Area "A" travel time: The sheet flow component appears to be longer than 100' and the slopes appears to less than 8.8%, potentially in the range of 2.5-3%. This should be reviewed. And recalculated.

Applicants Response: Response: Please see page 54 in the Engineering Report. The first 100 feet has been calculated utilizing the Sheet Flow criteria. The remainder of the flow path has been calculated using concentrated flow per standard practice. The entire segment slope has been calculated based on the aggregate slope between the beginning high point and the ending point of concern.

New Comment

- **In our opinion the sheet flow length for this watershed travel path is longer than the 100' used in the calculations. Please see attached SK1 an excerpt of the DA-EX watershed map from the Engineering Report. In our opinion the sheet flow component would extend to the top of slope at approximately contour 105, adding another ±60 to the sheet flow component. Limiting this length to 150' would not be unreasonable in accordance with the DOT Drainage Manual Section 6.C.4 (attached).**

- **An aggregate slope should not be used for the entire travel path time of concentration calculation. The actual slope of the land for each segment of the travel path should be used. In this case, sheet flow is the largest component of the time of concentration, and the actual land slope is approximately 2% vs the 8.8% used in the calculations. Using the actual land slope may substantially change the calculations.**

Previous Comment #3: The existing and post development travel times are identical in the calculations but are depicted differently in the mapping. Actual ground slopes should be used in the calculations.

Applicants Response: While there is minor grading in some areas, the aggregate slopes from each endpoint do not change from the pre existing to post existing development conditions.

New Comments

- **Please see the comment above regarding using the actual land slope for each segment when calculating travel times.**

- **Please see attached SK1 and SK2, excerpts from DA-EX and DA-PR indicating two different flow path length for the travel flow path. These differences are not reflected in the calculations (See highlighted summaries attached).**

- **As shown on SK1 and SK2 there appears to be a substantial difference in ground slope for each of the sheet flow components. As previously noted, in this case the sheet flow is the largest component in the time of concentration calculation, and land slope will have impact to those calculations.**

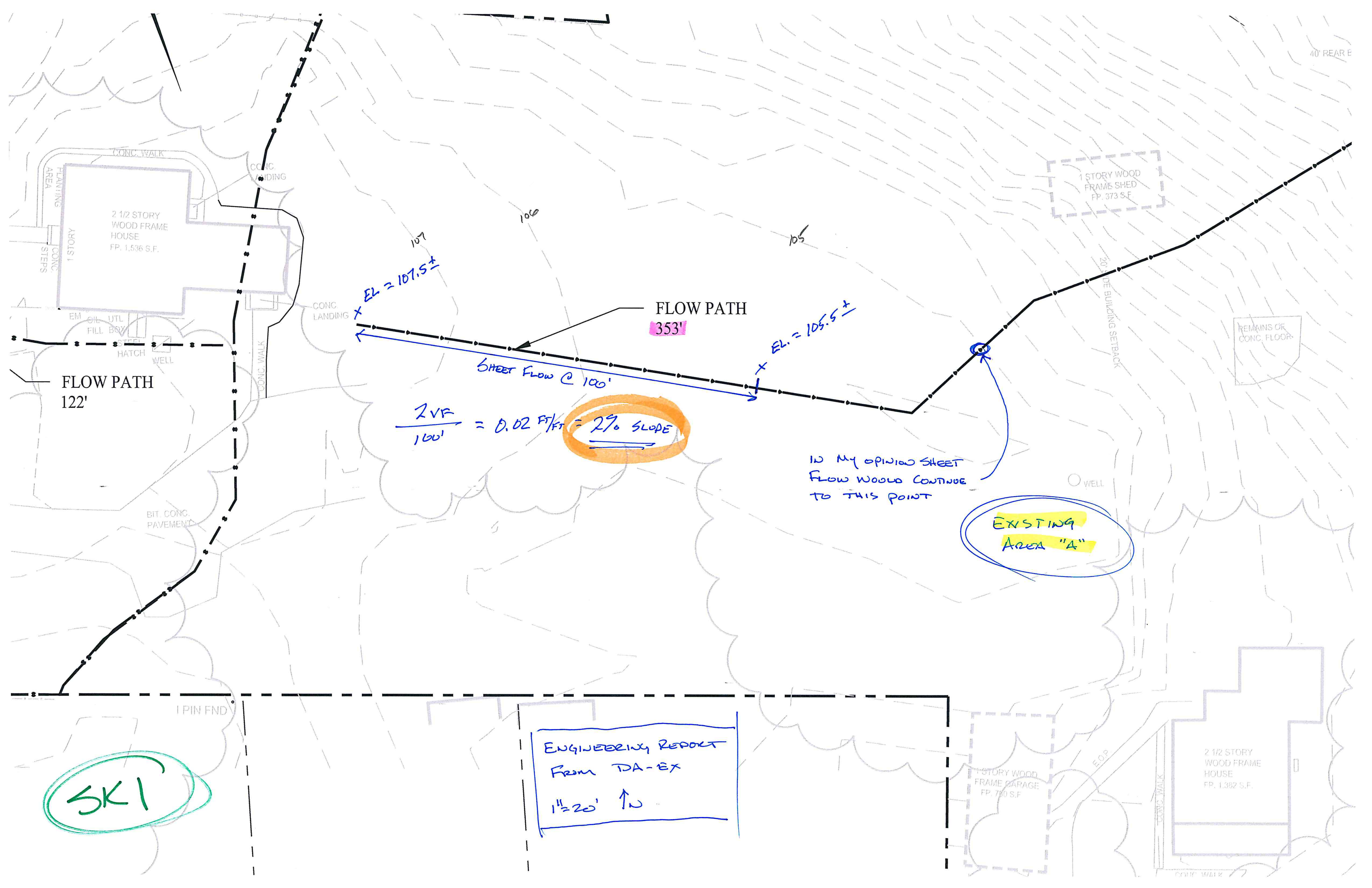
The concern with the times of concentration calculations is that the existing conditions peak stormwater flow rates may be lower than calculated in the Report and the post development may be higher than calculated in the Report; therefore, additional subsurface storage may be needed.

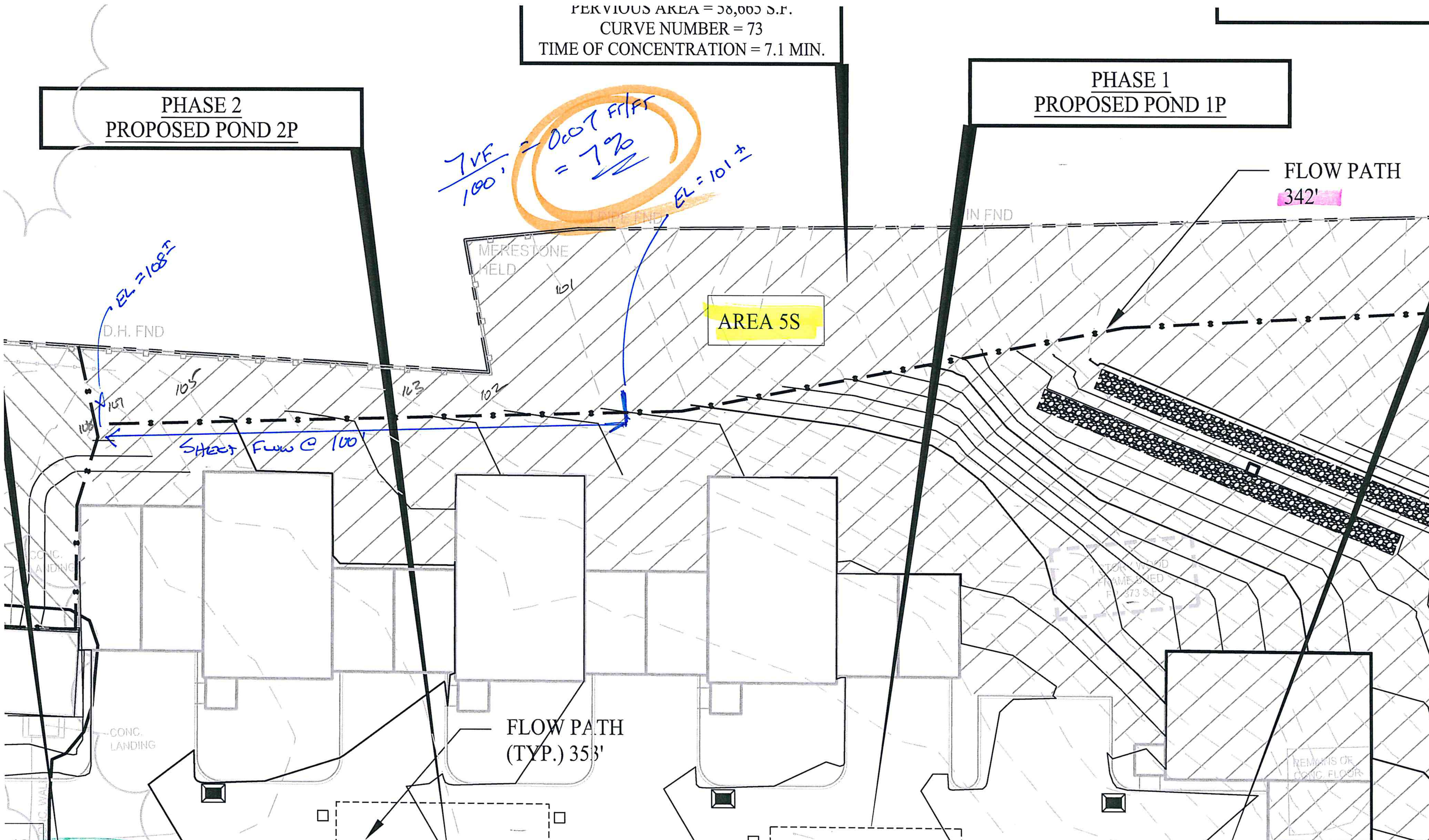
All other previous comments have been addressed.

Thank you for the opportunity to provide this review. Please feel free to call me at our office or email khaubert@claengineers.com with any questions.

Very truly yours,
CLA Engineers, Inc.

Kyle Haubert, P.E.


CONC. WALK
PLANTING AREA
2 1/2 STORY WOOD FRAME HOUSE FP. 1,536 S.F.
1 STORY
CONC. STEPS
CONC. LANDING
CONC. LANDING
EM
OIL FILL
UTL BOX
HATCH
WELL
CONC. WALK
FLOW PATH 122'
BIT. CONC. PAVEMENT
107
106
105
EL = 107.5±
FLOW PATH 353'
EL. = 105.5±
SHEET FLOW @ 100'
2VF / 100' = 0.02 FT/FT = 2% SLOPE
IN MY OPINION SHEET FLOW WOULD CONTINUE TO THIS POINT
EXISTING AREA "A"
1 STORY WOOD FRAME SHED FP. 373 S.F.
20' SIDE BUILDING SETBACK
REMAINS OF CONC. FLOOR
40' REAR
WELL
I PIN FND
ENGINEERING REPORT FROM DA-EX
1"=20' ↑N
1 STORY WOOD FRAME GARAGE FP. 750 S.F.
EOP
CONC. WALK
2 1/2 STORY WOOD FRAME HOUSE FP. 1,382 S.F.
SK1



SK2

ENGINEERING REPORT
FROM DA-PR
1" = 20' ↑N

6.C.4 Sheet-Flow Travel Time, T_t

Sheet flow is a shallow mass of runoff on a plane surface with the depth uniform across the sloping surface. **Typically flow depths will not exceed 30mm (1 in). Such flow occurs over relatively short distances, rarely more than about 91.4m (300 ft), but most likely less than 46m (150 ft).** Sheet flow rates are commonly estimated using the NRCS TR-55 (1986) variation of the kinematic wave equation:

$$T_t = \frac{0.091(nL)^{0.8}}{P_2^{0.5} S^{0.4}} \qquad \left(T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} S^{0.4}} \right) \qquad \textbf{(6.C.2)}$$

Where T_t = travel time, h
n = Manning's roughness coefficient (values of n can be obtained from Table C.1)
L = flow length, m (ft)
S = slope of the hydraulic grade line (land slope), m/m (ft/ft)
P_2 = 2 year, 24 hour rainfall depth, mm (in) (See Table B-1.)

TR-55 recommends an upper limit of L=91.4m (300 ft) for using Equation 6.C.2, although others have suggested that 91.4m (300 ft) is too long of a flow length for Connecticut so **engineering judgement should be used when selecting the flow length.**

Travel time is the ratio of flow length to flow velocity:

$$\mathbf{T_t = L/(3600V)} \qquad \textbf{(6.C.3)}$$

Where: T_t = travel time, h
L = flow length, m (ft)
V = average velocity, m/s (ft/s)
3600 = conversion factor from seconds to hours.

Summary for Subcatchment 5S: Areas not Routed to Retention

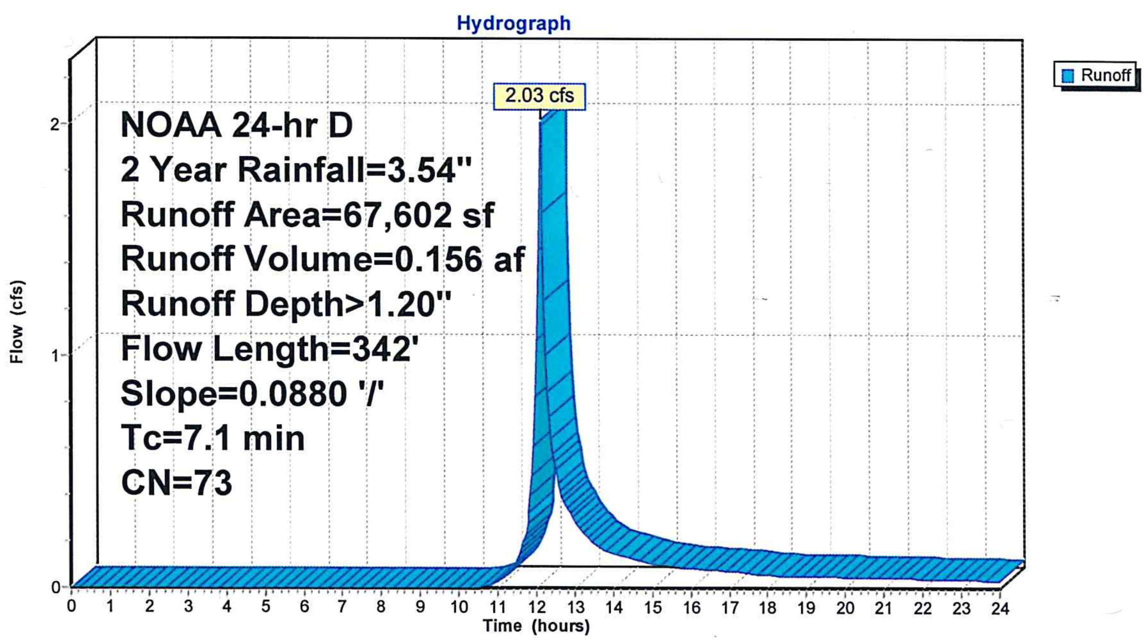
Runoff = 2.03 cfs @ 12.15 hrs, Volume= 0.156 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
NOAA 24-hr D 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	8,937	98	Buildings
	58,665	69	50-75% Grass cover, Fair, HSG B
	67,602	73	Weighted Average
	58,665		86.78% Pervious Area
	8,937		13.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0880	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
1.9	242	0.0880	2.08		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.1	342	Total			

Subcatchment 5S: Areas not Routed to Retention



Summary for Subcatchment 1S: Existing Conditions Basin A Powerhouse Road

Runoff = 2.36 cfs @ 12.15 hrs, Volume= 0.184 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
NOAA 24-hr D 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	1,382	98	House
*	1,696	98	Driveway
*	764	98	Garage
*	246	98	Concrete Slab
*	373	98	Shed
*	221	98	Walks
*	200	98	House Basin B
*	1,169	98	Driveway Basin B
	82,223	69	50-75% Grass cover, Fair, HSG B
	88,274	71	Weighted Average
	82,223		93.15% Pervious Area
	6,051		6.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0880	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
1.9	242	0.0880	2.08		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.1	342	Total			

Subcatchment 1S: Existing Conditions Basin A Powerhouse Road