

May 22, 2023

Norwich Public Utilities
Attn: Alisa Morrison
16 South Golden Street
Norwich, CT 06360

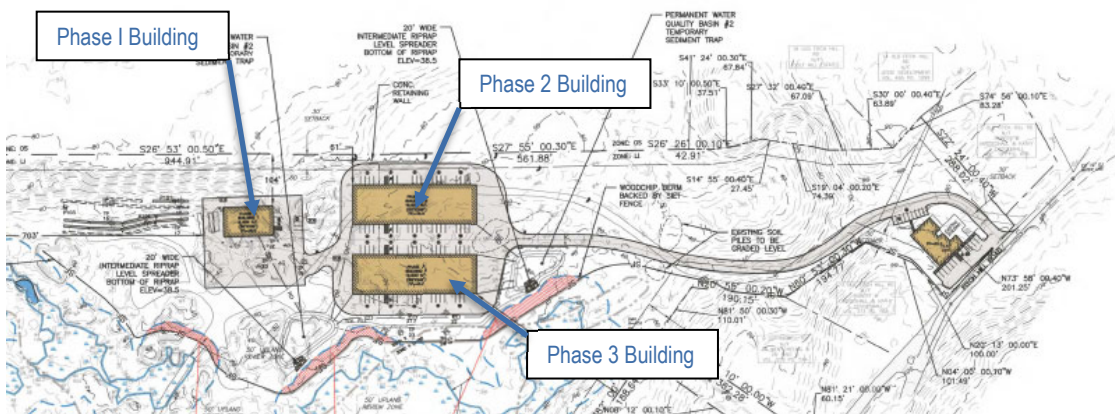
**Subject: Hydraulic Modeling/Analysis Letter Report for
69 Fitch Hill Road Development
Montville, CT**

Dear Ms. Morrison:

Per the request of Norwich Public Utilities (NPU), Dewberry Engineers Inc. (Dewberry) has prepared this letter report summarizing the results of the hydraulic analysis of the subject project utilizing NPU's existing water system computerized model. The information provided by your office was used to estimate the system's ability to deliver adequate flow for fire protection and evaluate any service impacts that the proposed development may impose on the existing water system.

Hydraulic Analysis

The proposed development is at 69 Fitch Hill Road and is expected to consist of three individual warehouse/storage type buildings with two at approximately 19,920 sf each and one at approximately 6,000 sf. There is also a planned addition of approximately 4,566 sf for office space to the existing building located on the property. Below is a screenshot of the site plan taken from the set of drawings prepared by Green Site Design LLC that was provided to Dewberry to perform the analysis.



To serve the new development, it is being proposed to extend the existing 12-inch main at the intersection of Old Fitch Hill Road and Fitch Hill Road up to the entrance of the property. From here, a new 8-inch main is proposed to connect to the new 12-inch main and extend up into the property to serve the new buildings and site (see attached Figure 1). It is proposed to construct the new development in three (3) phases with each phase to include a new building as shown above. From an

email sent to NPU from Green Site Design LLC on 05/19/23, the estimated domestic water usage and fire flow needs for the new development is as follows:

Domestic Water Usage:

- Phase 1 Building:
 - $600 \text{ GPD} / 8 \text{ hours} = 75 \text{ GPH} / 60 \text{ minutes} = 1.25 \text{ GPM} \times 6 \text{ safety factor} = 7.5 \text{ GPM}$
- Phase 2 Building:
 - $1,992 \text{ GPD} / 8 \text{ hours} = 249 \text{ GPH} / 60 \text{ minutes} = 4.15 \text{ GPM} \times 6 \text{ safety factor} = 25 \text{ GPM}$
- Phase 3 Building:
 - $1,992 \text{ GPD} / 8 \text{ hours} = 249 \text{ GPH} / 60 \text{ minutes} = 4.15 \text{ GPM} \times 6 \text{ safety factor} = 25 \text{ GPM}$

Total Domestic Peak Water Usage for Phases 1, 2 & 3 = 57.5 gpm

Fire Flow Needs:

- Phase 1 Building:
 - Needed Fire Flow (NFF) = 1,063 gpm
- Phase 2 Building:
 - NFF = 1,700 gpm
- Phase 3 Building:
 - NFF = 1,700 gpm

Total NFF for Phases 1, 2 & 3 = 4,463 gpm

To evaluate the impacts of the proposed Fitch Hill Road development to NPU's water system, we first added the proposed water main connection and supporting infrastructure to the model. We then imposed the estimated total peak water usage of 57.5 gpm for all 3 phases to the development to identify any possible loss in system pressure in the adjacent area. As shown in [attached Figure 1](#), under existing maximum day demand conditions, system pressure at the intersection of Old Fitch Hill Road and Fitch Hill Road was predicted to be 94 psi. With imposing a peak demand of 57.5 gpm within the development, system pressure at the intersection of Old Fitch Hill Road and Fitch Hill Road was predicted to remain at 94 psi. This suggests that the existing system infrastructure within the area of the development can supply the domestic water needs of the proposed development.

We then estimated the available fire flows at the proposed connection to NPU's water system under existing maximum day conditions without the development and with the estimated peak water usage for the development while maintaining a system residual pressure of 20 psi. As shown in [attached Figure 1](#), without the development, the available fire flow at the connection to the proposed development as represented by junction NJ-1285 was predicted to be about 2,800 gpm. With adding the proposed development's peak water usage to the model, the available fire flow at junction NJ-1285 was predicted to be about 2,750 gpm. Given this minimal reduction in fire flow, the model suggests that NPU's water system should be able to maintain similar fire protection within the area when serving the proposed development.

Lastly, we estimated the available fire flows that NPU's existing water system can provide at three locations along the proposed 8-inch water main being installed to supply each of the buildings under existing maximum day conditions while maintaining a system residual pressure of 20 psi. As shown in [attached Figure 1](#), the available fire flows at the three modeled locations as represented by junctions

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FHJ-002, FHJ-003 and FHJ-004 were predicted to be 2,300 gpm, 2,075 gpm and 2,050 gpm, respectively. Based on the modeled results, NPU's existing water system should be able to effectively deliver the individual fire flows needed for each building.

Conclusions

Based on the results of our analysis, the proposed development at 69 Fitch Hill Road is predicted to have minimal system impact on service pressures and available fire flows within the area. The model also shows that NPU's existing system is predicted to satisfy the estimated individual fire flow requirements for each of the buildings to be constructed in phases. As such, the existing system should be able to support the domestic and fire protection needs of the proposed development.

It should be noted that in the email dated 05/19/23, the total needed fire flow for the fully phased development was indicated to be 4,463 gpm which represents the total needed fire flow for each individual building on the property. This would be a worst-case scenario as it assumes that all three buildings would be on fire concurrently. The NPU should verify how the fire flow needs of the fully phased development should be assessed with the Norwich Fire Department. Based on the results of the analysis, the water system was predicted to provide a maximum available fire flow of 2,300 gpm which is obviously less than the noted total of 4,463 gpm.

Depending on the final criteria to be used for determining adequate fire protection, additional fire protection measures such as building sprinkler systems, or a fire pump may need to be installed by the developer. Given the type and size of buildings to be constructed, it is likely that these structures are already being provided with sprinkler systems which may reduce the needed fire flows to be provided on-site by NPU's water system.

If there are any questions or further evaluation necessary, please feel free to contact me at pcalderazzo@dewberry.com

Sincerely,



Peter Calderazzo, PE
Associate

Attachments

Figure 1 – 69 Fitch Hill Road Development

FIGURE NO. 1

**NORWICH PUBLIC UTILITIES
69 FITCH HILL ROAD
PROPOSED DEVELOPMENT
SYSTEM ANALYSIS**

**DATE: MAY 22, 2023
SCALE: 1" = 250'**



**PHASE 1:
NFF = 1063 GPM
USAGE = 7.5 GPM**

**NODE FHJ-004:
AFF @ 20 PSI =
2050 GPM**

**PHASE 3:
NFF = 1700 GPM
USAGE = 25 GPM**

**PROPOSED PHASE 1
BUILDING**

**NODE FHJ-003:
AFF @ 20 PSI =
2075 GPM**

**PHASE 2:
NFF = 1700 GPM
USAGE = 25 GPM**

**PROPOSED PHASE 2
BUILDING**

**PROPOSED PHASE 3
BUILDING**

**NODE FHJ-002:
AFF @ 20 PSI =
2300 GPM**

**PROPOSED
BUILDING
ADDITION**

**PROPOSED 8"
WATER MAIN**

**NODE NJ-1285:
EX. SYSTEM PRESSURE = 94 PSI;
W/ PEAK FLOW OF 57.5 GPM
SYSTEM PRESSURE = 94 PSI**

**PROPOSED 12"
WATER MAIN
EXTENSION**

**NODE NJ-1285:
W/O DEVELOPMENT:
AFF @ 20 PSI = 2800 GPM
W/ DEVELOPMENT:
AFF @ 20 PSI = 2750 GPM**

