

Norfolk Water System Subdivision Review

Subdivision Name: The Village at Norfolk

Owner: Paul and Patricia Kelley
25 Rockwood Road
Norfolk, MA 02056

Engineer: Outback Engineering, Inc.
165 East Grove Street
Middleborough, Massachusetts 02346

Reviewed By: Ryan J. Allgrove, P.E.

Date: May 10, 2017

At the request of the Norfolk Department of Public Works, Environmental Partners Group, Inc. has completed an assessment of the water system hydraulics associated with the proposed Village at Norfolk residential development. Village at Norfolk is located in the central area of Norfolk within the parcel of 25 Rockwood Road. This assessment is based on subdivision plans prepared by Outback Engineering, Inc. dated February 21, 2017.

Water Demand

The proposed Village at Norfolk residential development consists of thirty-two condominium units with a total of 90 bedrooms. The following table summarizes the estimated water usage for the development based on information from the Town's most recent DEP Annual Statistical Reports (ASR).

Usage Scenario	Calculation	Estimate Usage
Average Day Demand (ADD)	154 gpd / residential service x 32 Units	4,928 gpd
Maximum Day Demand (MDD)	2.2 x ADD	10,842 gpd
Peak Hour Demand (PHD)	2 x MDD	21,684 gpd

Static Pressure Requirements

Water distribution system static water pressure refers to the pressure in a main when there is no water flowing and reflects the water level in the storage tank(s). Based on DEP Guidelines and Policies for

Public Water Systems, the normal working pressure in the distribution system should be approximately 60 pounds per square inch (psi) and not less than 35 psi. The hydraulic grade line (HGL) for the Norfolk water system fluctuates between 365 feet (USGS Datum) when the tanks are full to 355 feet when the water level in the tanks is down 10 feet. In order to maintain a minimum pressure of 35 psi at a HGL of 365 feet, a water customer must be connected to the water system at an elevation no higher than 284 feet (USGS datum). Elevations greater than 284 feet will result in static pressures less than the DEP required pressure of 35 psi.

Based on the finished grade elevations (NAVD 88 datum) shown on the plans, the proposed dwellings will meet minimum DEP pressure requirements. During typical water system operations, pressures at the proposed dwellings will range from 57 psi to 73 psi.

Fire Flow Requirements

In accordance with DEP Guidelines and Policies for Public Water Systems, water system design must maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow (including fire flow conditions). The Norfolk water system hydraulic model was used to calculate the available fire flow within the Village at Norfolk at the proposed hydrant adjacent to Unit 32. Based on the proposed distribution system network with 8-inch ductile-iron piping, model simulations show that approximately 1,960 gpm fire flow is available at 20 psi residual pressure. A schematic diagram of the modeled network is provided in Figure 1. Fire flow guidelines set forth by the Insurance Services Office (ISO) for one and two family dwellings are summarized in the following table:

ISO Needed Fire Flows (one and two family dwellings)

Distance between Dwellings (feet)	Needed Fire Flow (gpm)
Greater than 100	500
31 – 100	750
11 – 30	1000
Less than 10	1500

Based on the proposed dwelling spacing, the project represents a fire flow requirement of 1,000 gallons per minute (gpm). Actual fire flow requirements should be confirmed by the developer.

Water System Materials

All water system materials shall be as per DPW specifications (latest version). Water mains to be 8-inch ductile iron pipe, class 52, conforming to AWWA C150 and AWWA C151, push on type joints with gaskets conforming to AWWA C111, double cement lined inside conforming to AWWA C104, and asphalt seal coated outside (coal tar coated outside conforming to AWWA 203 in areas where groundwater levels are above the pipe laying depth). All pipe fittings shall be ductile iron, class 350 mechanical joint conforming to AWWA C153. All fittings shall be restrained with Megalug Series 1100. Water mains shall have a minimum of five feet of cover. All gate valves shall be US Pipe Metroseal 250 or American Flow Control Model AFC2500 resilient wedge seated valves conforming to AWWA C-509, open left. Hydrants shall be American Darling (American Flow Control) B62B open right, conforming to AWWA C-502 (Dry Barrel Hydrants) and painted red.

Water service pipe shall be 1” polyethylene tubing, PE4710 with tracer wire. Copper tubing shall not be used. Corporation valves shall be Mueller 300 ball type with Mueller “CC” inlet thread and pack joint connection outlet. Curb stops shall be Mueller Mark II Oriseal Curb Valve Model P-15219N.

All material specifications shall be submitted to the Norfolk DPW for review and approval prior to installation.

Pressure Testing and Chlorination

Water mains shall be tested at minimum of 150 psi or 150% of the static pressure (whichever is greater) for a minimum of two hours. Water mains will have an allowable leakage determined by the DPW. Water mains shall be chlorinated as per AWWA standards with a minimum of 48 hours of contact time. Water mains shall be flushed until chlorine has been eliminated and sampled for total coliform by the DPW. The main shall be tested again after 24 hours of contact time with non-chlorinated water by the DPW.

Distribution System Piping

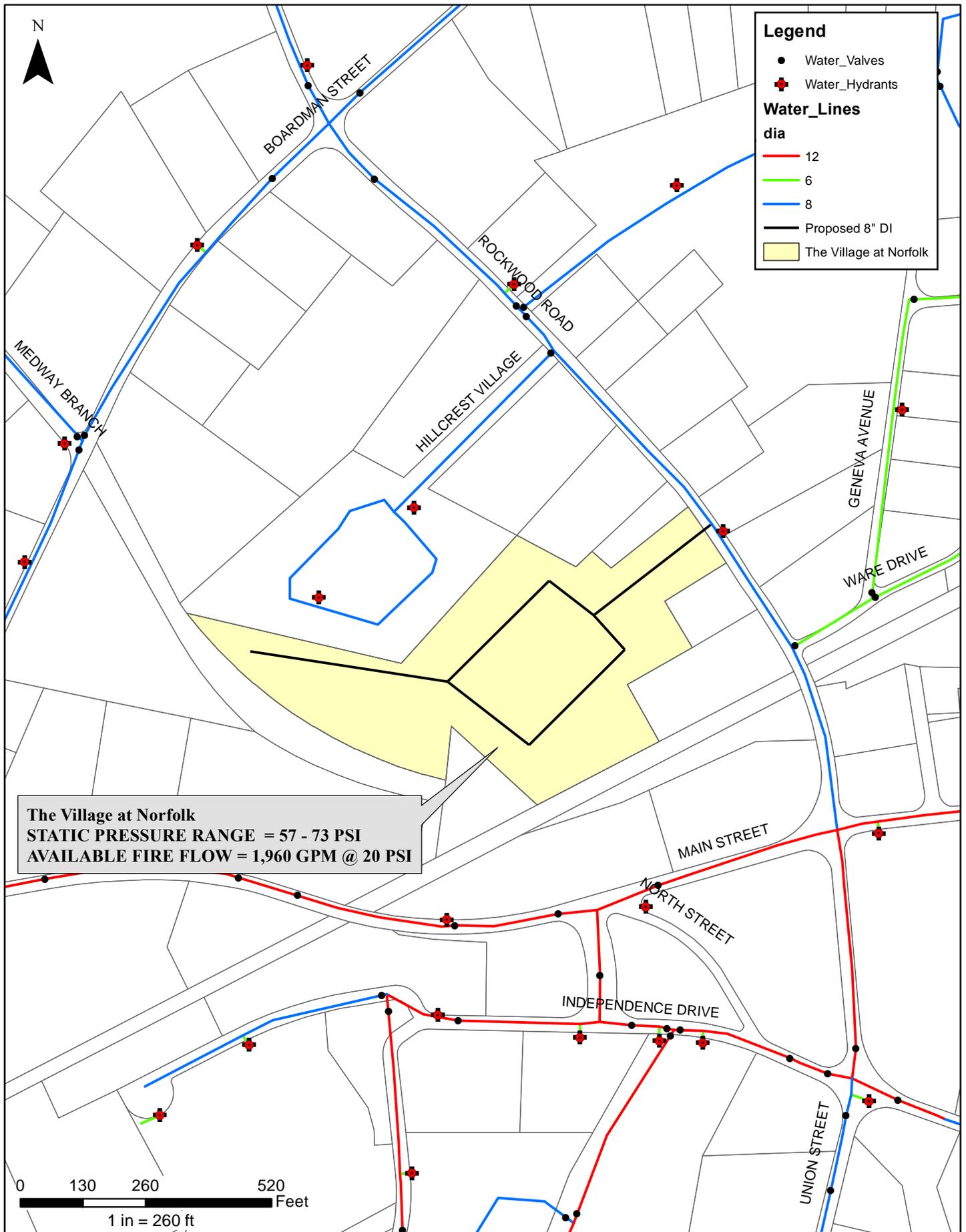
The water system of the proposed subdivision was also reviewed for discontinuities, looping, valve, and hydrant placement. The water main should not be located under any sidewalks or concrete pads. Detailed comments on the plans are attached. Please review them and respond accordingly. Shutdowns shall be limited to 4 hours and shall be coordinated with the Town's Department of Public Works.

Recommendations

The Norfolk water distribution system can provide acceptable pressures to the proposed Village at Norfolk residential development. The pressures in the development benefit from their elevation and it is not anticipated that they will fluctuate significantly during high usage periods. In addition, hydraulic modeling results indicate that the Norfolk water system can also provide fire flows typically considered adequate for similar residential areas. Actual fire flow requirements for the development should be confirmed by the developer.

This development presents an opportunity for a distribution loop between the Village at Norfolk and Hillcrest Village to the north. This loop will not only reinforce fire flows but improve water quality within both developments. Provisions for the loop should be made during installation of the water main for the Village at Norfolk and the Town should pursue a connection between the two developments.

The Village at Norfolk residential development will increase the water system demand for the Town of Norfolk by approximately 4,928 gpd representing approximately 4% of the new services that the system can support through 2029 under the Town's existing Water Management Act permit, as described in EPG's 2017 Water Supply Assessment report. As described in the 2017 Report, EPG recommends that the Town continue to pursue development of a new water supply source to meet projected future demands and minimize Norfolk's dependence on existing interconnections with the communities of Wrentham and Franklin.

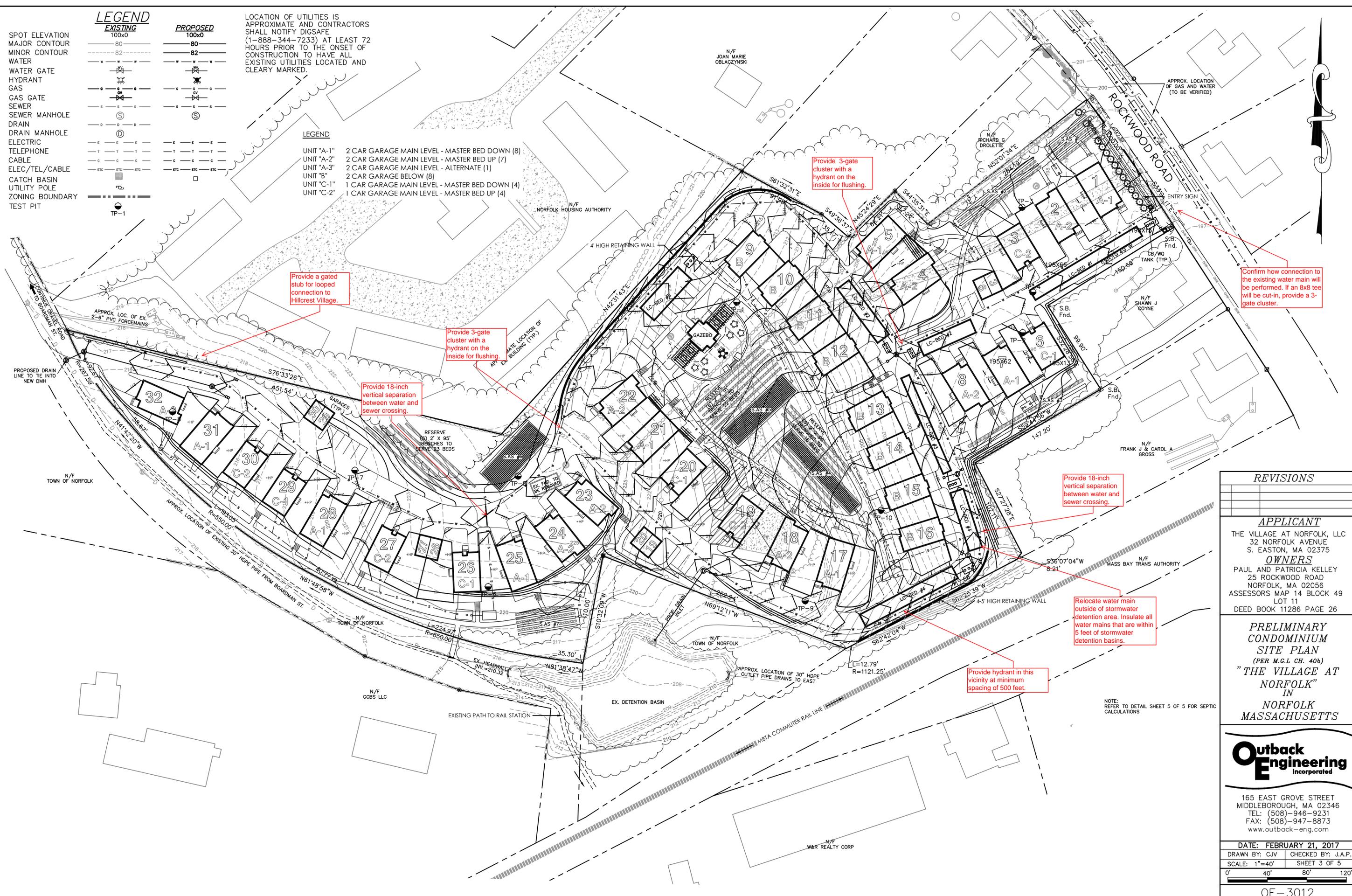


LEGEND	
EXISTING	PROPOSED
SPOT ELEVATION	100x0
MAJOR CONTOUR	80
MINOR CONTOUR	82
WATER	
WATER GATE	
HYDRANT	
GAS	
GAS GATE	
SEWER	
SEWER MANHOLE	
DRAIN	
DRAIN MANHOLE	
ELECTRIC	
TELEPHONE	
CABLE	
ELEC/TEL/CABLE	
CATCH BASIN	
UTILITY POLE	
ZONING BOUNDARY	
TEST PIT	

LOCATION OF UTILITIES IS APPROXIMATE AND CONTRACTORS SHALL NOTIFY DIGSAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO THE ONSET OF CONSTRUCTION TO HAVE ALL EXISTING UTILITIES LOCATED AND CLEARLY MARKED.

LEGEND

- UNIT "A-1" 2 CAR GARAGE MAIN LEVEL - MASTER BED DOWN (8)
- UNIT "A-2" 2 CAR GARAGE MAIN LEVEL - MASTER BED UP (7)
- UNIT "A-3" 2 CAR GARAGE MAIN LEVEL - ALTERNATE (1)
- UNIT "B" 2 CAR GARAGE BELOW (8)
- UNIT "C-1" 1 CAR GARAGE MAIN LEVEL - MASTER BED DOWN (4)
- UNIT "C-2" 1 CAR GARAGE MAIN LEVEL - MASTER BED UP (4)



Provide a gated stub for looped connection to Hillcrest Village.

Provide 3-gate cluster with a hydrant on the inside for flushing.

Provide 18-inch vertical separation between water and sewer crossing.

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Provide 18-inch vertical separation between water and sewer crossing.

Relocate water main outside of stormwater detention area. Insulate all water mains that are within 5 feet of stormwater detention basins.

Provide hydrant in this vicinity at minimum spacing of 500 feet.

Confirm how connection to the existing water main will be performed. If an 8x8 tee will be cut-in, provide a 3-gate cluster.

REVISIONS

APPLICANT
THE VILLAGE AT NORFOLK, LLC
32 NORFOLK AVENUE
S. EASTON, MA 02375

OWNERS
PAUL AND PATRICIA KELLEY
25 ROCKWOOD ROAD
NORFOLK, MA 02056
ASSESSORS MAP 14 BLOCK 49
LOT 11
DEED BOOK 11286 PAGE 26

PRELIMINARY CONDOMINIUM SITE PLAN
(PER M.C.L. CH. 40B)
"THE VILLAGE AT NORFOLK"
IN
NORFOLK MASSACHUSETTS

Outback Engineering Incorporated

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DATE: FEBRUARY 21, 2017
DRAWN BY: CJV CHECKED BY: J.A.P.
SCALE: 1"=40' SHEET 3 OF 5

OE-3012