



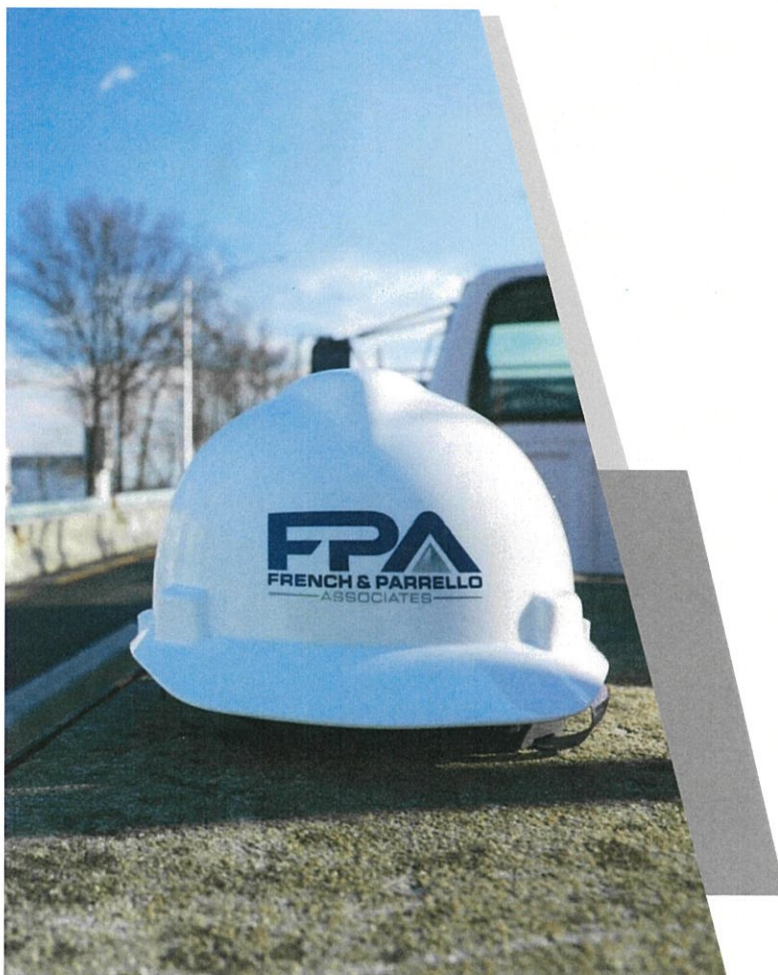
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SUPPLEMENTAL ENGINEERING REPORT
for
Flood Hazard Area Verification
and
Individual Permit

201 Walnut Avenue
Block 484, Lot 19.01
Cranford Township
Union County, New Jersey

Prepared for Applicant/Owner:

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A circular professional engineer seal for the State of New Jersey, with the name 'BAHRAM FARZANEH' and 'No. 24GE03454800' visible. A signature is written across the seal.

Bahram Farzaneh, PE, PP
NJPE License No. 24GE03454800

June 6, 2022
FPA No. 16377.001

1.0 SUPPLEMENTAL REPORT

This Supplemental Engineering Report is being submitted as an addendum to the report entitled “Engineering Report for Flood Hazard Area Verification and Individual Permit; 201 Walnut Avenue, Block 484, Lot 19.01; Cranford Township; Union County, New Jersey” dated February 4, 2021, prepared by French and Parrello Associates. The initial report was submitted on February 4, 2021 in association with a Flood Hazard Area Individual Permit under PI# 2003-21-0001.1.

This report is prepared to show compliance with the flood storage volume requirements for a regulated activity in a flood fringe based upon project modifications which involve a revised building footprint and the use of a system of box culverts underneath the proposed building structure in lieu of a crawl space for flood storage flood. Compliance with the New Jersey Flood Hazard Area Control Act Rules based upon project modifications are detailed in the following sections.

2.0 COMPLIANCE WITH N.J.A.C. 7:13-11.4 – Requirements for regulated activity in a flood fringe

Pursuant to N.J.A.C. 7:13-11.4(c)2, the regulated activity will displace no flood storage volume onsite, as calculated for both the volume between the flood hazard area design flood and the 10-year flood, and the volume between the 10-year flood and the ground. Based upon the project modifications noted above, compliance has been achieved as follows:

- a) 10-Year Storm Event: No change has been made from the initial submission; no portion of the project site falls within the 10-year floodplain and does not propose any fill below the 10-year floodplain.
- b) NJFHA Design Flood Storm Event: The project will result in 2,876.6 cubic-feet of fill and 3,063.5 cubic-feet of cut within the flood fringe area on-site, between the NJFHA Design Flood elevation and the existing ground for net increase of on-site flood storage volume of 186.9 cubic-feet (6.9 cubic-yards).

Therefore, the project will not reduce the flood storage volume on-site, as calculated for both the flood hazard area design flood and the 10-year flood. The proposed construction meets the requirements of N.J.A.C. 7:13-11.4. Detailed calculations are included with this submission.

3.0 COMPLIANCE WITH N.J.A.C. 7:13-12.2 – Stormwater Management

The project proposes a net increase in impervious cover of (0.278 acres), which is greater than a 0.25 acre increase. The overall lot area is 0.847 acres; therefore, the overall site disturbance will be less than 1 acre. Due to the increase in impervious cover, the project will be a major development and will require compliance with the NJAC 7:8 New Jersey Stormwater Management Rules (NJSMR). Detailed compliance with the NJSMR is presented in the revised Stormwater Management Report submitted with this application.

4.0 COMPLIANCE WITH N.J.A.C. 7:13-12.5 – Requirement for a Building

In a proactive effort to mitigated potential future flooding impacts, the project proposes to raise the lowest floor of the multi-residence building from the previously approved 62.4 which is 1.4' above the NJ Flood Hazard Area Design Flood elevation, to 63.5 which is 2.5 feet above the NJ Flood Hazard Area Design Flood elevation, and 1 foot above the FEMA 500 year water surface elevation. Therefore, the project meets the requirements of N.J.A.C. 7:13-12.5 (i).

Loss of Flood Hazard Area Volume due to Building Features (Fill of Flood Hazard Area)

Building Feature	Feature Area (SF)	Average Water Depth (ft)	Fill Volume (CF)	Fill Volume (CY)
Stair 1	88.4	0.70	61.9	2.29
Stair 2	105.3	1.15	121.1	4.49
Stair 3	118.0	1.65	194.7	7.21
Stair 4	118.0	1.65	194.7	7.21
Stair 5	108.3	2.15	232.8	8.62
ADA Ramp and Planters	485.5	2.50	1,213.8	44.95
Building Perimeter Walls	670.7	1.20	804.8	29.81
Building Columns	48.0	1.10	52.8	1.96
TOTAL			2,876.6	106.54

Gain/Loss of Flood Hazard Area Volume within Cross Sections due to Culverts (Cut/Fill of Flood Hazard Area)

First Section	Second Section	First Section Cut (SF)	Second Section Cut (SF)	First Section Fill (SF)	Second Section Fill (SF)	Average Cut (SF)	Average Fill (SF)	Total Cut (CF)	Total Fill (CF)	Net (CF)
0+00	0+20	40.4	31.5	8.2	35.1	36.0	21.7	719.0	433.0	286.0
0+20	0+40	31.5	33.9	35.1	62.8	32.7	49.0	654.0	979.0	-325.0
0+40	0+60	33.9	37.7	62.8	61.5	35.8	62.2	716.0	1,243.0	-527.0
0+60	0+80	37.7	45.0	61.5	54.4	41.4	58.0	827.0	1,159.0	-332.0
0+80	1+00	45.0	49.9	54.4	53.8	47.5	54.1	949.0	1,082.0	-133.0
1+00	1+20	49.9	48.3	53.8	50.8	49.1	52.3	982.0	1,046.0	-64.0
1+20	1+40	48.3	52.5	50.8	34.9	50.4	42.9	1,008.0	857.0	151.0
1+40	1+60	52.5	53.8	34.9	2.6	53.2	18.8	1,063.0	375.0	688.0
TOTALS								6,918.0	7,174.0	-256.0

Gain of Flood Hazard Area Volume beyond Cross Sections due to Culverts (Cut of Flood Hazard Area)

Section	Culvert Length (LF)	Culvert Width (ft)	Culvert Height (ft)	Height Above FHA (ft)	Volume Above FHA (CF)	FHA Volume Gained (Cut Volume) (CF)
1	42	15	1.5	0	0	945
2	43	12	1.5	0	0	774
3	97	12	1.5	0.25	145.5	1600.5
TOTAL						3319.5

Summary of Net Volume Change to FHA Flood Storage Area

Calculation Item	VOLUME (CF)	VOLUME (CY)	GAIN/LOSS?	NET/FILL?
Volume Change to FHA due to Building Features	-2,876.6	-106.5	LOSS	FILL
Volume Change to FHA due to Culverts within Cross Sections	-256.0	-9.5	LOSS	FILL
Volume Change to FHA due to Culverts beyond Cross Sections	3319.5	122.9	GAIN	CUT
TOTAL NET VOLUME CHANGE TO FHA FLOOD STORAGE VOLUME	186.9	6.9	GAIN	CUT

SmartVent Layout and Sizing

	Length (ft)	Width (ft)	Flood Coverage (SF)	Accessible to Flood Out?	Multi-Frame SmartVents	Smart Stacker SmartVents	SmartVents	Flood Coverage (SF)	Remaining Width (ft)	
Culvert 1	150	12	1800	Yes	4	0	0	3200	1.00	
Culvert 1a	---	8	---	Yes	0	0	5	1000	1.23	
Culvert 2	130	10	1300	Yes	3	1	0	2800	0.40	
Culvert 3	55	12	660	Yes	2	0	0	1600	6.50	
Culvert 4	74	10	740	No	---	---	---	---	---	
Culvert 5	156	12	1872	No	---	---	---	---	---	
Culvert 6	144	15	2160	No	---	---	---	---	---	
Culvert 7	9	5	45	No	---	---	---	---	---	
Total Flood Coverage Needed			8577	Total Flood Coverage Provided				8600		

SmartVent Sizing

Product	Width (in.)	Height (in.)	Flood Coverage (SF)
Multi-Frame SmartVents	33	16.375	800
Smart Stacker SmartVents	16.25	16.375	400
SmartVents	16.25	8.25	200