Stormwater Calculations

PROPOSED BUILDING EXPANSION
1143-1147 West Front Street
Plainfield, New Jersey 07063

prepared for

F&C Professional Aluminum Railing Corp.
1143 West Front Street
Plainfield, New Jersey 07063

August 3 , 2020

C2EM URBAN, LLC
Consulting Engineers

391 Littleton Avenue ● Newark ● New Jersey 07103
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cover+19 sheets

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JOB F&C PROFESSIONAL ALUM. RAIL CORP.
SHEET NO. 1 OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

EXISTING SITE AREA. TOTAL = 28693 SF.

UNDEVELOPED AREA = 11937 SF.

STORMWATER SYSTEM TO HANDLE RUNOFF FROM SECTION OF SITE THAT WAS UNDEVELOPED AND ON WHICH NEW BUILDING EXPANSION WILL TAKE PLACE.

AREA OF INTEREST = 11937 SF + 1291 SF = 13,228 SF

TOTAL AREA OF NEW BUILDING = 9635 SF.

EXISTING CONDITION:

TOTAL STUDY AREA = 13,228 SF. = 0.304 AC.

IMPERVIOUS (PAVEMENT) = 1291 SF.

PERVIOUS (UNDEVELOPED = 11,937 SF.

DEVELOPED CONDITION: TOTAL STUDY AREA = 13,228 SF.

IMPERVIOUS (BUILDING) = 9635 SF

PERVIOUS (PLANTED). = 3,593 SF.

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JOB
SHEET NO. 2 OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

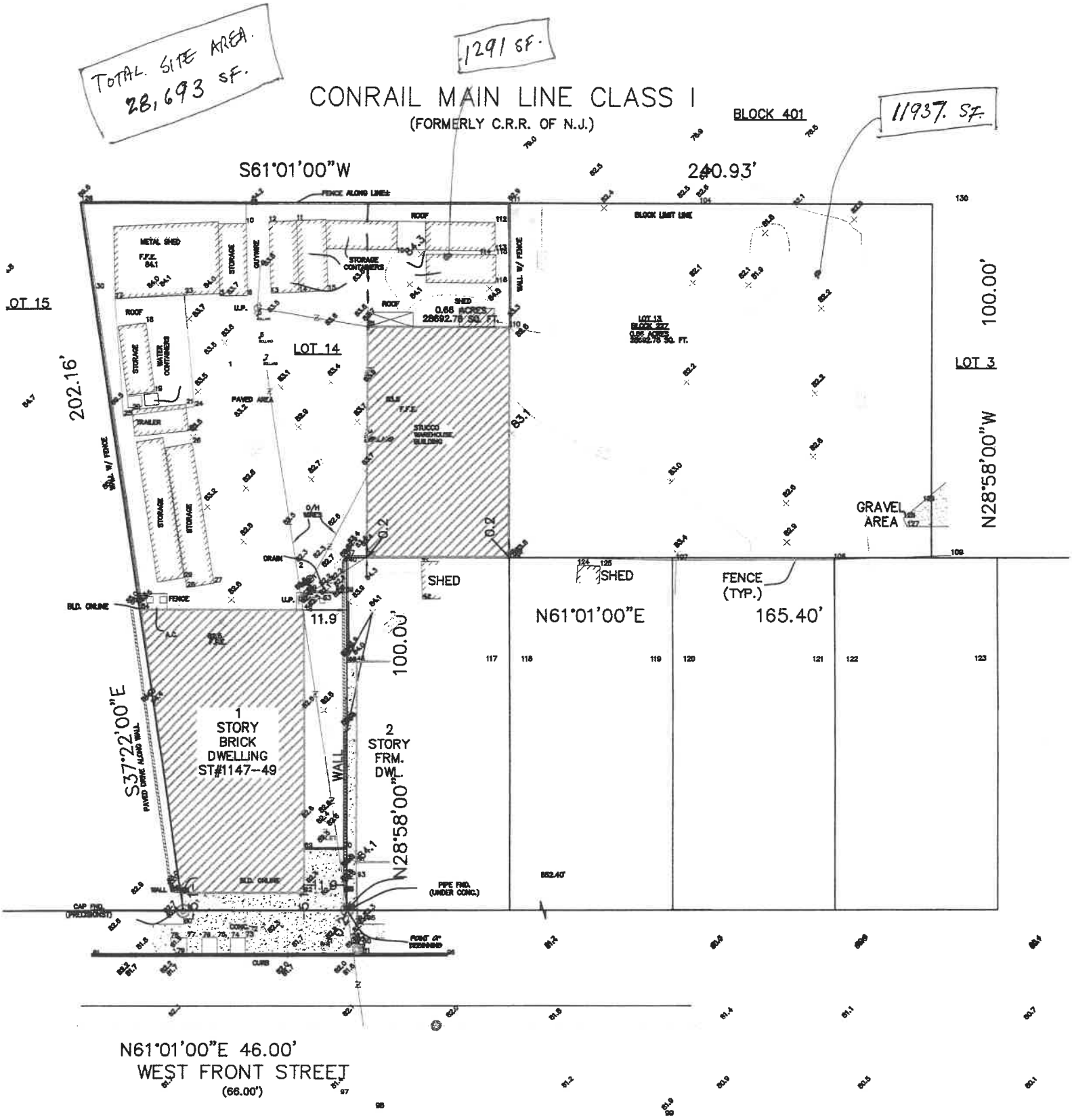
STORAGE SYSTEM: UNDERGROUND STONE FILLED RETENTION TRENCH.
PERCOLATION TEST TO BE DONE PRIOR TO CONSTRUCTION

TRENCH SIZE 150'L x 7'W x 4.5'D.
GROSS VOLUME = 4725 FT³
NET VOLUME @ 0.40 VOID RATIO = 1890 FT³

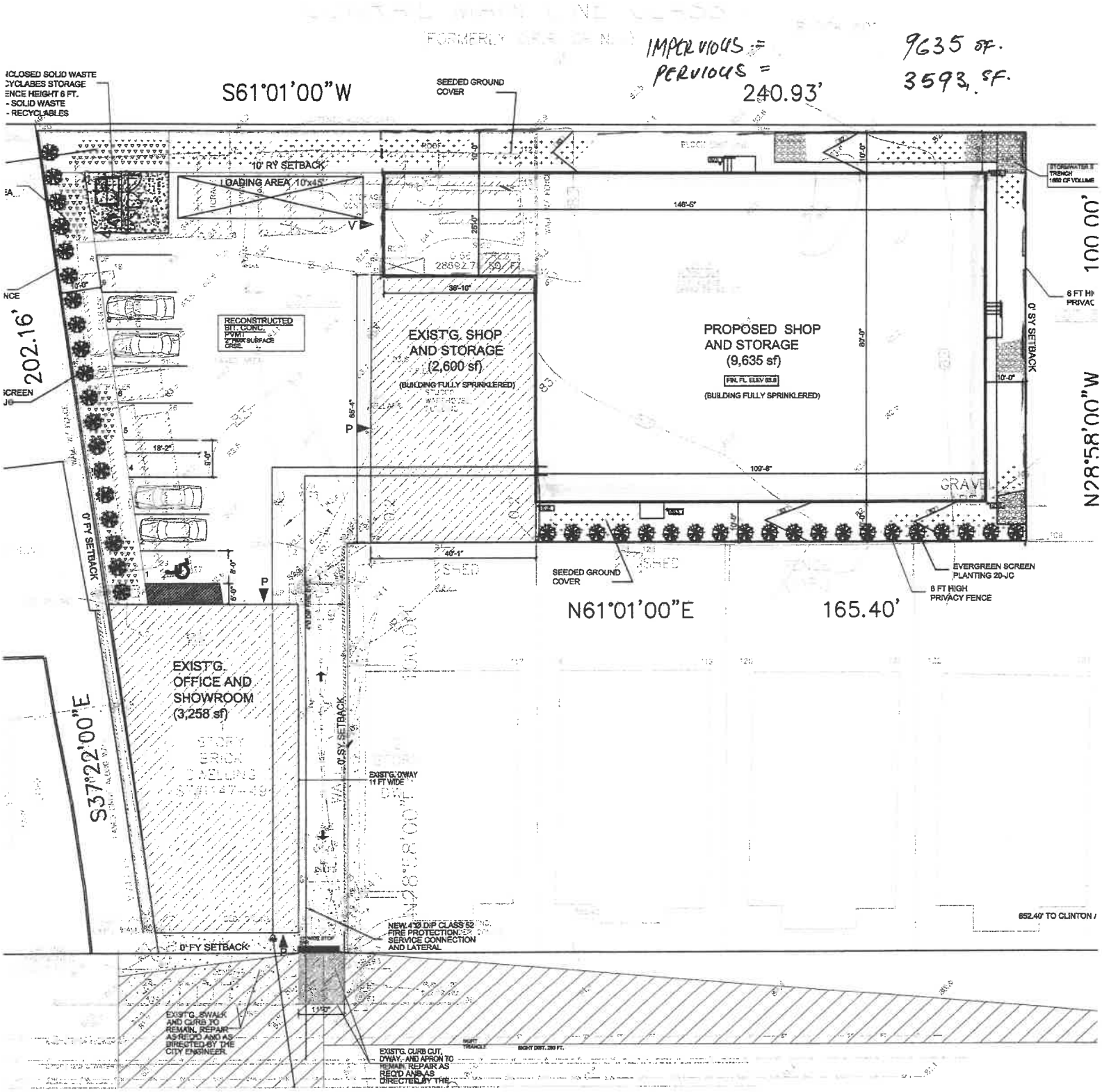
1. TRENCH TO ACCOMMODATE EXCESS RUNOFF FROM ALL DESIGN STORMS.

DESIGN STORM.	DURATION.	PRE DEVELOPED RUN OFF VOLUME (FT³)	POST DEVELOP RUNOFF VOLUME (FT³)	STORAGE REQ. (FT³)
2 YR	10 MIN	187	504	317
10 YR	10 MIN	246	630	383.
100 YR	10 MIN.	316	809	492
2 YR	60 MIN	400	1079	678
10 YR	60 MIN	576	1472	896.
100 YR	60 MIN.	827	2113	1286.

NOTE: STORAGE VOLUME WILL ACCOMMODATE ALL ALL EVENTS EXCEPT 100 YR 60 MIN.
(SEE ATTACHED CALCULATIONS)


TOTAL SITE AREA.
28,693 SF.
1291 SF.
11937 SF.
CONRAIL MAIN LINE CLASS I
(FORMERLY C.R.R. OF N.J.)
BLOCK 401
S61°01'00"W
240.93'
FENCE ALONG LINE±
BLOCK LIMIT LINE
METAL SHED
F.F.E. 84.1
STORAGE
OUTWIRE
STORAGE CONTAINERS
ROOF
SHED
0.66 ACRES
28692.78 SQ. FT.
WALL W/ FENCE
LOT 15
LOT 14
LOT 13
BLOCK 327
0.66 ACRES
28692.78 SQ. FT.
LOT 3
100.00'
202.16'
WATER CONTAINERS
TRAILER
PAVED AREA
BLD. F.F.E.
STUCCO WAREHOUSE BUILDING
83.1
N28°58'00"W
GRAVEL AREA
O/H WIRES
DRAIN
SHED
FENCE (TYP.)
BLD. ONLINE
FENCE
11.9
N61°01'00"E
165.40'
100.00'
S37°22'00"E
1 STORY BRICK DWELLING ST#1147-49
2 STORY FRM. DWL.
WALL
N28°58'00"W
PAVED DRIVE ALONG WALL
BLD. ONLINE
PIPE FND. (UNDER CONC.)
CAP FND. (PREDIGHOST)
POINT OF BEGINNING
CURB
N61°01'00"E 46.00'
WEST FRONT STREET
(66.00')

IMPERVIOUS = 9635 SF.
PERVIOUS = 3593 SF.



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NOAA's National Weather Service
Hydrometeorological Design Studies Center
Precipitation Frequency Data Server (PFDS)

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NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: NJ

Data description

Data type: Precipitation intensity | Units: English | Time series type: Partial duration

Select location

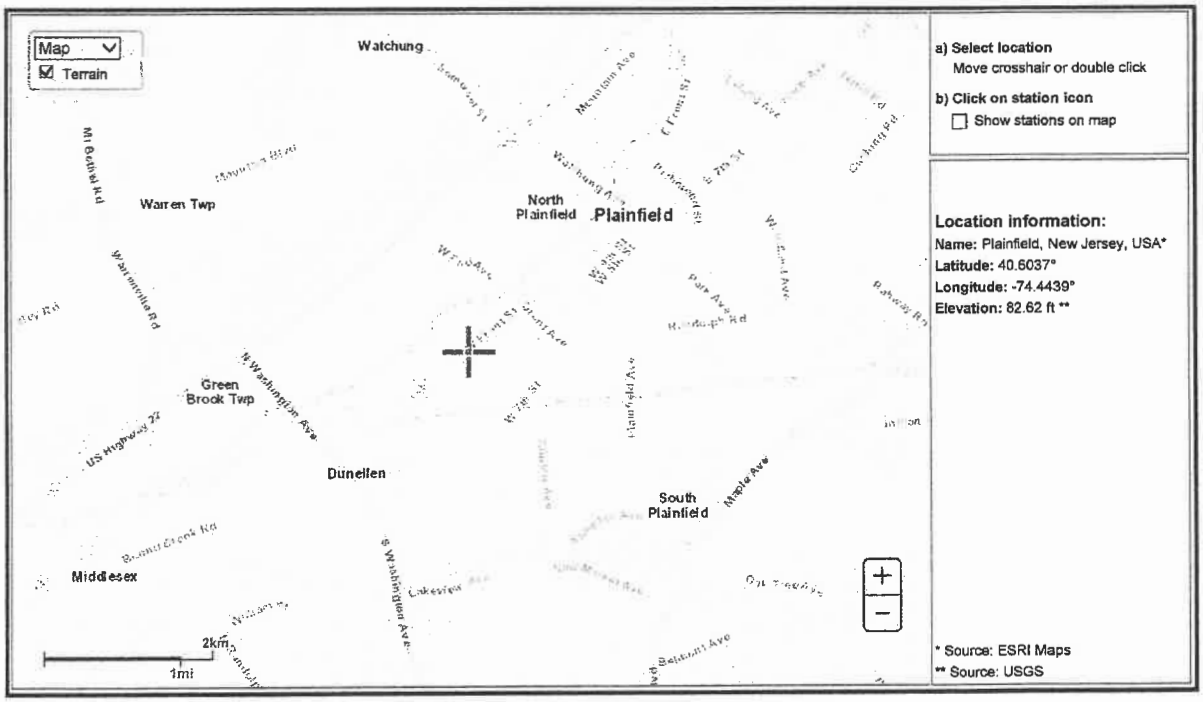
1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: [ ] Longitude: [ ] Submit

b) By station (list of NJ stations): Select station

c) By address 1147 W Front St, Plainfield, NJ, 0706

2) Use map (if ESRI interactive map is not loading, try adding the host: **https://js.arcgis.com/** to the firewall, or contact us at hdsc.questions@noaa.gov):



NJ RainMac

NJ.	10	60
2YR	4.2.	1.45
10YR	5.8	2.0
100 YR.	8.0	2.9.

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 2, Version 3

PF tabular | PF graphical | Supplementary information | Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Average recurrence interval (years)

Duration	1	2	5	10	25	50	100	200	500	1000
5-min	4.01 (3.65-4.42)	4.78 (4.36-5.26)	5.65 (5.14-6.22)	6.29 (5.70-6.91)	7.06 (6.37-7.75)	7.61 (6.83-8.34)	8.14 (7.27-8.94)	8.62 (7.66-9.47)	9.22 (8.12-10.1)	9.65 (8.45-10.6)
10-min	3.20 (2.92-3.52)	3.82 (3.48-4.20)	4.52 (4.11-4.98)	5.03 (4.56-5.53)	5.63 (5.08-6.18)	6.05 (5.44-6.64)	6.46 (5.78-7.10)	6.83 (6.07-7.51)	7.28 (6.42-8.02)	7.60 (6.65-8.39)
15-min	2.67 (2.43-2.94)	3.20 (2.92-3.52)	3.82 (3.46-4.20)	4.24 (3.84-4.66)	4.75 (4.29-5.22)	5.11 (4.59-5.61)	5.45 (4.87-5.98)	5.74 (5.11-6.31)	6.11 (5.39-6.73)	6.36 (5.57-7.02)
30-min	1.83 (1.67-2.01)	2.21 (2.01-2.43)	2.71 (2.46-2.98)	3.07 (2.78-3.38)	3.52 (3.18-3.87)	3.85 (3.46-4.22)	4.17 (3.73-4.58)	4.47 (3.98-4.91)	4.86 (4.29-5.36)	5.15 (4.51-5.68)
60-min	1.14 (1.04-1.25)	1.39 (1.26-1.53)	1.74 (1.58-1.91)	2.00 (1.81-2.20)	2.34 (2.12-2.57)	2.61 (2.34-2.86)	2.87 (2.57-3.16)	3.14 (2.79-3.45)	3.49 (3.08-3.84)	3.76 (3.29-4.15)
2-hr	0.697 (0.629-0.773)	0.849 (0.768-0.942)	1.08 (0.972-1.20)	1.25 (1.13-1.39)	1.50 (1.34-1.66)	1.70 (1.52-1.88)	1.91 (1.69-2.11)	2.12 (1.87-2.35)	2.43 (2.11-2.69)	2.67 (2.29-2.96)
3-hr										

6

	0.517 (0.469-0.576)	0.630 (0.571-0.702)	0.801 (0.724-0.891)	0.934 (0.842-1.04)	1.12 (1.00-1.24)	1.27 (1.13-1.41)	1.42 (1.26-1.58)	1.59 (1.39-1.76)	1.81 (1.57-2.01)	1.99 (1.71-2.22)
6-hr	0.333 (0.301-0.371)	0.405 (0.366-0.450)	0.513 (0.463-0.569)	0.602 (0.541-0.665)	0.728 (0.648-0.803)	0.834 (0.738-0.918)	0.947 (0.830-1.04)	1.07 (0.928-1.18)	1.24 (1.07-1.37)	1.39 (1.18-1.53)
12-hr	0.204 (0.185-0.228)	0.248 (0.224-0.276)	0.316 (0.285-0.351)	0.374 (0.335-0.414)	0.458 (0.408-0.506)	0.532 (0.469-0.586)	0.611 (0.533-0.673)	0.700 (0.603-0.771)	0.831 (0.703-0.915)	0.943 (0.785-1.04)
24-hr	0.116 (0.108-0.126)	0.140 (0.130-0.153)	0.180 (0.167-0.196)	0.214 (0.197-0.232)	0.265 (0.242-0.287)	0.309 (0.280-0.334)	0.358 (0.321-0.388)	0.412 (0.366-0.448)	0.494 (0.431-0.538)	0.564 (0.486-0.616)
2-day	0.068 (0.063-0.074)	0.082 (0.076-0.090)	0.105 (0.096-0.115)	0.124 (0.113-0.136)	0.152 (0.138-0.166)	0.176 (0.159-0.192)	0.201 (0.181-0.220)	0.230 (0.204-0.252)	0.271 (0.237-0.299)	0.306 (0.264-0.339)
3-day	0.048 (0.044-0.052)	0.058 (0.053-0.063)	0.074 (0.068-0.080)	0.087 (0.079-0.095)	0.106 (0.096-0.115)	0.121 (0.110-0.132)	0.139 (0.125-0.151)	0.157 (0.140-0.172)	0.184 (0.162-0.203)	0.207 (0.179-0.229)
4-day	0.038 (0.035-0.041)	0.046 (0.042-0.050)	0.058 (0.053-0.063)	0.068 (0.062-0.074)	0.082 (0.075-0.090)	0.094 (0.086-0.103)	0.107 (0.097-0.117)	0.121 (0.108-0.132)	0.141 (0.124-0.155)	0.158 (0.137-0.174)
7-day	0.025 (0.024-0.028)	0.031 (0.028-0.033)	0.038 (0.035-0.041)	0.044 (0.041-0.048)	0.053 (0.049-0.057)	0.060 (0.055-0.065)	0.068 (0.061-0.074)	0.076 (0.068-0.083)	0.088 (0.078-0.096)	0.098 (0.085-0.107)
10-day	0.020 (0.019-0.022)	0.024 (0.023-0.026)	0.030 (0.028-0.032)	0.034 (0.032-0.037)	0.041 (0.037-0.044)	0.046 (0.042-0.049)	0.051 (0.047-0.055)	0.057 (0.051-0.062)	0.065 (0.058-0.071)	0.071 (0.063-0.078)
20-day	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.020 (0.018-0.021)	0.022 (0.021-0.023)	0.025 (0.024-0.027)	0.028 (0.026-0.030)	0.031 (0.028-0.033)	0.033 (0.031-0.036)	0.037 (0.034-0.040)	0.040 (0.036-0.043)
30-day	0.011 (0.011-0.012)	0.014 (0.013-0.014)	0.016 (0.015-0.017)	0.018 (0.017-0.018)	0.020 (0.019-0.021)	0.022 (0.020-0.023)	0.023 (0.022-0.025)	0.025 (0.023-0.026)	0.027 (0.025-0.029)	0.028 (0.026-0.030)
45-day	0.010 (0.009-0.010)	0.011 (0.011-0.012)	0.013 (0.012-0.014)	0.014 (0.014-0.015)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.019 (0.018-0.020)	0.020 (0.019-0.021)	0.021 (0.020-0.023)	0.022 (0.021-0.024)
60-day	0.009 (0.008-0.009)	0.010 (0.010-0.011)	0.012 (0.011-0.012)	0.013 (0.012-0.013)	0.014 (0.013-0.015)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.019 (0.017-0.020)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Precipitation frequency estimates Submit

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National Oceanic and Atmospheric Administration
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Office of Water Prediction (OWP)
1325 East West Highway
Silver Spring, MD 20910
Page Author: HDSC webmaster
Page last modified: April 21, 2017

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STORM WATER DETENTION CALCULATIONS

Project Information:

Project:	Proposed Building Expansion F&C Professional Aluminum Railing Corp.
Address:	143-147 West Front Street
Block/Lot:	Block 227 Lots 13, 14
City:	City of Plainfield
County:	Union
State:	New Jersey

By: Maurice A. Brown, P.E GE 29919
(Print Signature) N.J. License #

1. HYDROLOGY

Design Storm — 2 Year Return Frequency Design Storm -10 min. Duration
3.82 " Per Hour Intensity

Rational Formula Q=CIA

2. PRE-DEVELOPMENT Qe

Surface Type	Area (A)	C	%	(CxA)
Buildings		0.90	0.00%	0.0000
Pavement			0.00%	0.0000
Concrete	0.00	0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt	1,291.00	0.85	9.76%	0.0830
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	0.00	0.20	0.00%	0.0000
Other -Unimproved	11,937.00	0.20	90.24%	0.1805
	13,228.00		Weighted "C"	**0.2634**

Pre-developed Runoff Qe = 0.2634 3.82 13,228.00 / 43,560.00 **0.3056** cfs

3. POST-DEVELOPMENT Qp

Surface Type	Area (A)	C	%	(CxA)
Buildings	9635.00	0.90	72.84%	0.6555
Pavement			0.00%	0.0000
Concrete		0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt		0.85	0.00%	0.0000
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	3,593.00	0.20	27.16%	0.0543
Other (Green Roof)		0.50	0.00%	0.0000
	13,228.00		Weighted "C"	**0.7099**

Post-developed Runoff Qe = 0.7099 3.82 13,228.00 **0.8235** cfs

43,560.00

4. REQUIRED DETENTION

Runoff Volume Per Modified Rational Method

V = Peak Runoff Rate x Storm Duration

Storm Duration =	0.17	Hrs
Pre Developed Runoff Volume	187	cubic feet
Post Developed Runoff Volume	504	cubic feet
Storage Required	317	cubic feet

STORM WATER DETENTION CALCULATIONS

Project Information:

Project:	Proposed Building Expansion F&C Professional Aluminum Railing Corp.
Address:	143-147 West Front Street
Block/Lot:	Block 227 Lots 13, 14
City:	City of Plainfield
County:	Union
State:	New Jersey

By: Maurice A. Brown, P.E — GE 29919
(Print Signature) — N.J. License #

1. HYDROLOGY

Storm of Record — 10 Year Return Frequency Design Storm - 10 min. Duration
5.03 " Per Hour Intensity

Rational Formula Q=CIA

2. PRE-DEVELOPMENT Qe

Surface Type	Area (A)	C	%	(CxA)
Buildings		0.90	0.00%	0.0000
Pavement			0.00%	0.0000
Concrete	0.00	0.20	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt	1,291.00	0.85	9.76%	0.0830
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	11,937.00	0.20	90.24%	0.1805
Other -Pool		0.20	0.00%	0.0000
	13,228.00		Weighted "C"	**0.2634**

Pre-developed Runoff Qe = 0.2634 × 5.03 × (13,228.00 / 43,560.00) = **0.4024** cfs

3. POST-DEVELOPMENT Qp

Surface Type	Area (A)	C	%	(CxA)
Buildings	9635.00	0.85	72.84%	0.6191
Pavement			0.00%	0.0000
Concrete		0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt		0.85	0.00%	0.0000
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	3,593.00	0.20	27.16%	0.0543
Other (Green Roof)		0.50	0.00%	0.0000
	13,228.00		Weighted "C"	**0.6734**

Post-developed Runoff Qe = 0.6734 × 5.03 × (13,228.00) = **1.0287** cfs

43,560.00

4. REQUIRED DETENTION

Runoff Volume Per Modified Rational Method

V = Peak Runoff Rate x Storm Duration

Storm Duration =	0.17	Hrs
Pre Developed Runoff Volume	246	cubic feet
Post Developed Runoff Volume	630	cubic feet
Storage Required	383	cubic feet

STORM WATER DETENTION CALCULATIONS

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City:	City of Plainfield
County:	Union
State:	New Jersey

By: Maurice A. Brown, P.E — GE 29919
(Print Signature) — N.J. License #

1. HYDROLOGY

Storm of Record — 100 Year Return Frequency Design Storm - 10 min. Duration
6.46 " Per Hour Intensity

Rational Formula Q=CIA

2. PRE-DEVELOPMENT Qe

Surface Type	Area (A)	C	%	(CxA)
Buildings		0.90	0.00%	0.0000
Pavement			0.00%	0.0000
Concrete	0.00	0.20	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt	1,291.00	0.85	9.76%	0.0830
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	11,937.00	0.20	90.24%	0.1805
Other -Pool		0.20	0.00%	0.0000
	13,228.00		Weighted "C"	**0.2634**

Pre-developed Runoff Qe = 0.2634 6.46 13,228.00 / 43,560.00 **0.5168** cfs

3. POST-DEVELOPMENT Qp

Surface Type	Area (A)	C	%	(CxA)
Buildings	9635.00	0.85	72.84%	0.6191
Pavement			0.00%	0.0000
Concrete		0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt		0.85	0.00%	0.0000
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	3,593.00	0.20	27.16%	0.0543
Other (Green Roof)		0.50	0.00%	0.0000
	13,228.00		Weighted "C"	**0.6734**

Post-developed Runoff Qe = 0.6734 6.46 13,228.00 **1.3211** cfs

43,560.00

4. REQUIRED DETENTION

Runoff Volume Per Modified Rational Method

V = Peak Runoff Rate x Storm Duration

Storm Duration =	0.17 Hrs
Pre Developed Runoff Volume	316 cubic feet
Post Developed Runoff Volume	809 cubic feet
Storage Required	492 cubic feet

STORM WATER DETENTION CALCULATIONS

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Block/Lot: Block 227 Lots 13, 14
City: City of Plainfield
County: Union
State: New Jersey

By: Maurice A. Brown, P.E GE 29919
(Print Signature) N.J. License #

1. HYDROLOGY

Design Storm 2 Year Return Frequency Design Storm -60 min. Duration
1.39 " Per Hour Intensity

Rational Formula Q=CIA

2. PRE-DEVELOPMENT Qe

Surface Type	Area (A)	C	%	(CxA)
Buildings		0.90	0.00%	0.0000
Pavement			0.00%	0.0000
Concrete	0.00	0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt	1,291.00	0.85	9.76%	0.0830
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	0.00	0.20	0.00%	0.0000
Other -Unimproved	11,937.00	0.20	90.24%	0.1805
	13,228.00		Weighted "C"	**0.2634**

Pre-developed Runoff Qe = 0.2634 1.39 13,228.00 / 43,560.00 **0.1112** cfs

3. POST-DEVELOPMENT Qp

Surface Type	Area (A)	C	%	(CxA)
Buildings	9635.00	0.90	72.84%	0.6555
Pavement			0.00%	0.0000
Concrete		0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt		0.85	0.00%	0.0000
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	3,593.00	0.20	27.16%	0.0543
Other (Green Roof)		0.50	0.00%	0.0000
	13,228.00		Weighted "C"	**0.7099**

Post-developed Runoff Qe = 0.7099 1.39 13,228.00 **0.2996** cfs

43,560.00

4. REQUIRED DETENTION

Runoff Volume Per Modified Rational Method

V = Peak Runoff Rate x Storm Duration

Storm Duration =	1	Hrs
Pre Developed Runoff Volume	400	cubic feet
Post Developed Runoff Volume	1079	cubic feet
Storage Required	678	cubic feet

STORM WATER DETENTION CALCULATIONS

Project Information:

Project:	Proposed Building Expansion F&C Professional Aluminum Railing Corp.
Address:	143-147 West Front Street
Block/Lot:	Block 227 Lots 13, 14
City:	City of Plainfield
County:	Union
State:	New Jersey

By: Maurice A. Brown, P.E — GE 29919
(Print Signature) — N.J. License #

1. HYDROLOGY

Storm of Record — 10 Year Return Frequency Design Storm - 60 min. Duration
2 " Per Hour Intensity

Rational Formula Q=CIA

2. PRE-DEVELOPMENT Qe

Surface Type	Area (A)	C	%	(CxA)
Buildings		0.90	0.00%	0.0000
Pavement			0.00%	0.0000
Concrete	0.00	0.20	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt	1,291.00	0.85	9.76%	0.0830
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	11,937.00	0.20	90.24%	0.1805
Other -Pool		0.20	0.00%	0.0000
	13,228.00		Weighted "C"	**0.2634**

Pre-developed Runoff Qe = 0.2634 2 13,228.00 / 43,560.00 **0.1600** cfs

3. POST-DEVELOPMENT Qp

Surface Type	Area (A)	C	%	(CxA)
Buildings	9635.00	0.85	72.84%	0.6191
Pavement			0.00%	0.0000
Concrete		0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt		0.85	0.00%	0.0000
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	3,593.00	0.20	27.16%	0.0543
Other (Green Roof)		0.50	0.00%	0.0000
	13,228.00		Weighted "C"	**0.6734**

Post-developed Runoff Qe = 0.6734 2 13,228.00 **0.4090** cfs

43,560.00

4. REQUIRED DETENTION

Runoff Volume Per Modified Rational Method

V = Peak Runoff Rate x Storm Duration

Storm Duration =	1	Hrs
Pre Developed Runoff Volume	576	cubic feet
Post Developed Runoff Volume	1472	cubic feet
Storage Required	896	cubic feet

STORM WATER DETENTION CALCULATIONS

Project Information:

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State:	New Jersey

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1. HYDROLOGY

Storm of Record — 100 Year Return Frequency Design Storm - 60 min. Duration
2.87 " Per Hour Intensity

Rational Formula Q=CIA

2. PRE-DEVELOPMENT Qe

Surface Type	Area (A)	C	%	(CxA)
Buildings		0.90	0.00%	0.0000
Pavement			0.00%	0.0000
Concrete	0.00	0.20	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt	1,291.00	0.85	9.76%	0.0830
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	11,937.00	0.20	90.24%	0.1805
Other -Pool		0.20	0.00%	0.0000
	13,228.00		Weighted "C"	**0.2634**

Pre-developed Runoff Qe = 0.2634 2.87 13,228.00 / 43,560.00 **0.2296** cfs

3. POST-DEVELOPMENT Qp

Surface Type	Area (A)	C	%	(CxA)
Buildings	9635.00	0.85	72.84%	0.6191
Pavement			0.00%	0.0000
Concrete		0.85	0.00%	0.0000
Brick		0.80	0.00%	0.0000
Asphalt		0.85	0.00%	0.0000
Drives and Walks		0.80	0.00%	0.0000
Lawns and Landscaped	3,593.00	0.20	27.16%	0.0543
Other (Green Roof)		0.50	0.00%	0.0000
	13,228.00		Weighted "C"	**0.6734**

Post-developed Runoff Qe = 0.6734 2.87 13,228.00 **0.5869** cfs

43,560.00

4. REQUIRED DETENTION

Runoff Volume Per Modified Rational Method

V = Peak Runoff Rate x Storm Duration

Storm Duration =	1	Hrs
Pre Developed Runoff Volume	827	cubic feet
Post Developed Runoff Volume	2113	cubic feet
Storage Required	1286	cubic feet

C2EM URBAN, LLC
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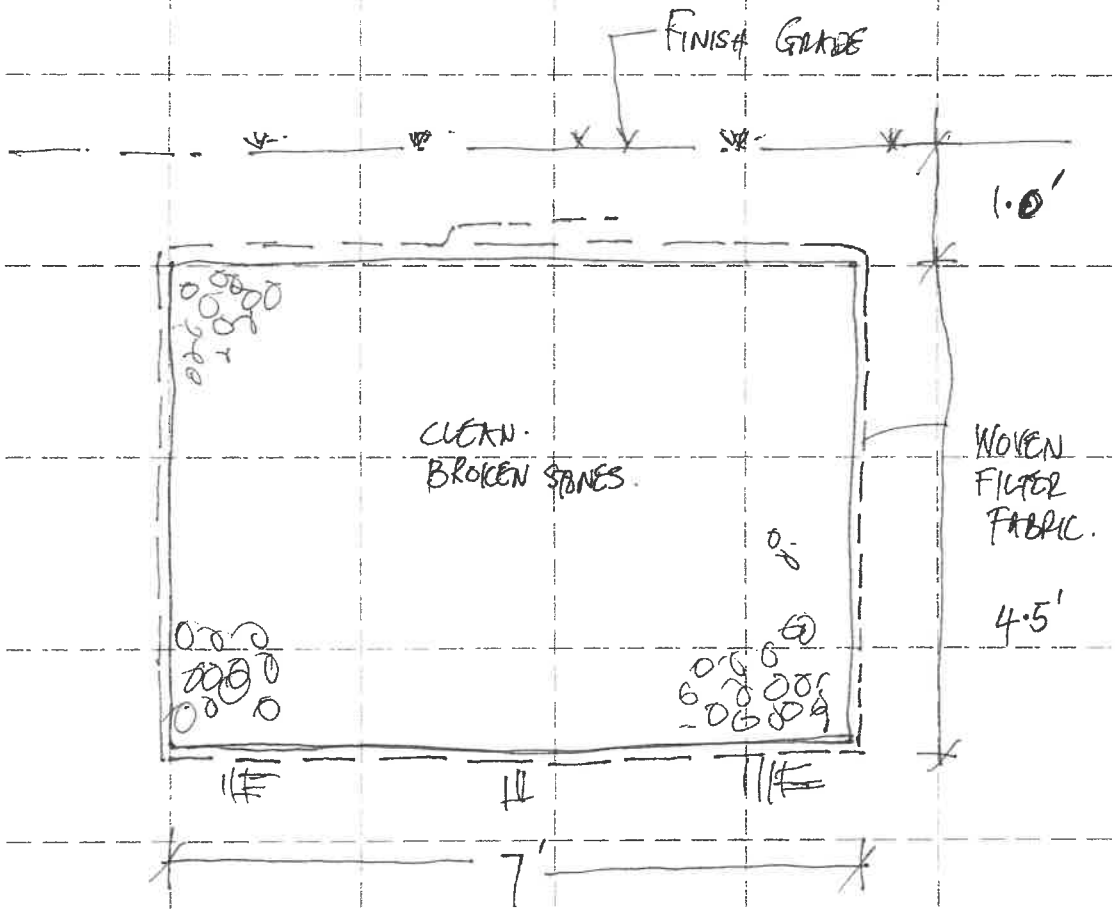
JOB
SHEET NO. 19 OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

RETENTION TRENCH DETAIL.