DRAINAGE REPORT

PROPOSED RESIDENTIAL APARTMENTS
131 FORT LEE ROAD
LOT 16, BLOCK 802
BOROUGH OF LEONIA
BERGEN COUNTY, NEW JERSEY
(JOB # 3956)
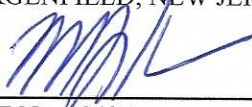
PREPARED ON:

May 5, 2021
April 5, 2022

PREPARED FOR:

FORT LEE ROAD, LLC
131 Fort Lee Road
Leonia, New Jersey 07605

HUBSCHMAN ENGINEERING, P.A.
MICHAEL J. HUBSCHMAN, P.E., P.P.
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NJPE No. 29497   NJPP No. 3200

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- Site Location and Soil Type Map
- Typical Runoff Coefficients Table
- Time of Concentration (Tc) Nomograph
- IDF Curves and Tabulation

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INTRODUCTION:

This report has been developed to demonstrate compliance of the proposed drainage improvements on the project site with the Borough of Leonia Stormwater Control Ordinance and the New Jersey Department of Environmental Protection (NJDEP) Stormwater Rules (N.J.A.C. 7:8). This project does not qualify as a major project under either of the above listed regulations since it proposes less than one acre of overall land disturbance and less than ¼ acre of net new impervious surface coverage.

The project site is located along the northerly side of Fort Lee Road (Bergen County Route 12) across form the intersection of Spring Street in the Borough of Leonia, Bergen County, New Jersey. The site is rectangular in shape, measuring 60 feet wide by 150 feet deep. The lot has an area of 9,000.00 square feet (0.207 acres). The applicant proposes to remove all existing improvement and construct a five-story residential apartment building with parking beneath. Other associated minor site improvements will also be constructed.

EVALUATION:

Storm water runoff for the site was analyzed utilizing the Modified Rational Method. The property was evaluated for the 2, 10, 25- and 100-year design storm events in the present and developed conditions. Consistent with the Stormwater Regulations in the New Jersey Residential Site Improvement Standards (RSIS), peak flow reductions to 50%, 75% and 80% were included in the Modified Rational Method analysis for the 2, 10- and 100-year design storm events respectively. The 25-year design storm was evaluated for the site in accordance with Bergen County requirements since the project site is located on a County roadway. No flow reductions are associated with the 25-year design storm event.

CONCLUSIONS:

Six (6) 6' deep, 6' diameter Seepage Pit are required to meet the design criteria. Seepage Pits location and details are shown on the Site Plan prepared for the project.

STORMWATER MANAGEMENT SUMMARY

Storm	Existing Runoff (CFS)	Allowable Percent of Existing Flow (%)	Allowable Runoff (CFS)	Post Construction Flow to Seepage Pit (CFS)	Storage Required for Developed Site (CF)	Storage Provided (CF)
2 Year	0.874	50	0.437	0.831	447	1,743
10 Year	1.160	75	0.870	1.104	186	1,743
25 Year	1.315	100	1.315	1.251	151	1,743
100 Year	1.544	80	1.235	1.470	375	1,743
Direct Runoff, 10-yr, 60 min. 2" in/hr.				0.363	1,307	1,743

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SECTION 1

PRESENT FLOW & DEVELOPED FLOW FOR 2, 10, 25 & 100 - YEAR DESIGN STORMS

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DEVELOPED SITE AREA = 9,000.00 SF 0.207 Ac
EXISTING IMPERVIOUS AREA = 8,877.00 SF 0.204 Ac
PROPOSED IMPERVIOUS AREA = 8,306.00 SF 0.191 Ac

SOIL TYPE = Urban Land - Udorthents (Boonton Series Nearby)
SOIL GROUP = C

C LAWN = 0.51
C IMPERVIOUS = 0.99

EXISTING

$$C = \frac{8,877.00 * 0.99 + 1 * 123.00 * 0.51}{9,000.00} = 0.983$$

PROPOSED

$$C = \frac{8,306.00 * 0.99 + 1 * 694.00 * 0.51}{9,000.00} = 0.953$$

1.1

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SITE EXISTING FLOW & SITE ALLOWABLE FLOW (CFS)

										Existing Flow		RSIS Factor		Allowable Flow	
Q_2	=	CiA	=	0.983	*	4.30	*	0.207	=	0.874	CFS	*	0.50	=	0.437 CFS
Q_{10}	=	CiA	=	0.983	*	5.71	*	0.207	=	1.160	CFS	*	0.75	=	0.870 CFS
Q_{25}	=	CiA	=	0.983	*	6.47	*	0.207	=	1.315	CFS	*	1.00	=	1.315 CFS
Q_{100}	=	CiA	=	0.983	*	7.60	*	0.207	=	1.544	CFS	*	0.80	=	1.235 CFS

PROPOSED FLOW (CFS)

										Proposed Flow	
Q_2	=	CiA	=	0.953	*	4.30	*	0.207	=	0.847	CFS
Q_{10}	=	CiA	=	0.953	*	5.71	*	0.207	=	1.124	CFS
Q_{25}	=	CiA	=	0.953	*	6.47	*	0.207	=	1.274	CFS
Q_{100}	=	CiA	=	0.953	*	7.60	*	0.207	=	1.496	CFS

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.870	1	10	522	------	------	------	Existing Conditions - Peak Flows
3	Rational	0.843	1	10	506	------	------	------	Proposed Conditions - Peak Flows
5	Mod. Rational	0.521	1	10	816	------	------	------	Proposed Conditions - Peak Flows

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Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020   Wednesday, 04 / 27 / 2022

Hyd. No. 1

Existing Conditions - Peak Flows

Hydrograph type	= Rational	Peak discharge	= 0.870 cfs
Storm frequency	= 2 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 522 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.98*
Intensity	= 4.225 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.003 x 0.51) + (0.204 x 0.99)] / 0.210

Existing Conditions - Peak Flows
Hyd. No. 1 -- 2 Year

Hyd No. 1

1.4

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Hydrograph Report

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Hyd. No. 3

Proposed Conditions - Peak Flows

Hydrograph type	= Rational	Peak discharge	= 0.843 cfs
Storm frequency	= 2 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 506 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.95*
Intensity	= 4.225 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows

Hyd. No. 3 -- 2 Year

Hyd No. 3

1.5

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Hyd. No. 5

Proposed Conditions - Peak Flows

Hydrograph type	= Mod. Rational		Peak discharge	= 0.521 cfs
Storm frequency	= 2 yrs		Time to peak	= 10 min
Time interval	= 1 min		Hyd. volume	= 816 cuft
Drainage area	= 0.210 ac		Runoff coeff.	= 0.95*
Intensity	= 2.613 in/hr		Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF		Storm duration	= 2.6 x Tc
Target Q	=0.437 cfs		Est. Req'd Storage	=334 cuft

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows
Hyd. No. 5 -- 2 Year

Q (cfs)   Q (cfs)

Time (min)

—— Hyd No. 5   ⬜ Mod. Rational Est. Storage = 334 cuft

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Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.144	1	10	687	------	------	------	Existing Conditions - Peak Flows
3	Rational	1.109	1	10	666	------	------	------	Proposed Conditions - Peak Flows
5	Mod. Rational	0.930	1	10	843	------	------	------	Proposed Conditions - Peak Flows

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Hydrograph Report

Hyd. No. 1

Existing Conditions - Peak Flows

Hydrograph type	= Rational	Peak discharge	= 1.144 cfs
Storm frequency	= 10 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 687 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.98*
Intensity	= 5.560 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.003 x 0.51) + (0.204 x 0.99)] / 0.210

Existing Conditions - Peak Flows
Hyd. No. 1 -- 10 Year

Q (cfs)   Q (cfs)

Time (min)

——— Hyd No. 1

1.8

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Hydrograph Report

Hyd. No. 3

Proposed Conditions - Peak Flows

Hydrograph type	= Rational	Peak discharge	= 1.109 cfs
Storm frequency	= 10 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 666 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.95*
Intensity	= 5.560 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows
Hyd. No. 3 -- 10 Year

Hyd No. 3

1.9

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Hyd. No. 5

Proposed Conditions - Peak Flows

Hydrograph type	= Mod. Rational	Peak discharge	= 0.930 cfs
Storm frequency	= 10 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 843 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.95*
Intensity	= 4.661 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Storm duration	= 1.5 x Tc
Target Q	=0.870 cfs	Est. Req'd Storage	=179 cuft

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows
Hyd. No. 5 -- 10 Year

—— Hyd No. 5   ☐ Mod. Rational Est. Storage = 179 cuft

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Hydrograph Summary Report

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Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.314	1	10	788	------	------	------	Existing Conditions - Peak Flows
3	Rational	1.274	1	10	764	------	------	------	Proposed Conditions - Peak Flows
5	Mod. Rational	1.083	1	10	981	------	------	------	Proposed Conditions - Peak Flows

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Hydrograph Report

Hyd. No. 1

Existing Conditions - Peak Flows

Hydrograph type	= Rational	Peak discharge	= 1.314 cfs
Storm frequency	= 25 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 788 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.98*
Intensity	= 6.386 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.003 x 0.51) + (0.204 x 0.99)] / 0.210

Existing Conditions - Peak Flows

Hyd. No. 1 -- 25 Year

1.12

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Hydrograph Report

Hyd. No. 3

Proposed Conditions - Peak Flows

Hydrograph type	= Rational	Peak discharge	= 1.274 cfs
Storm frequency	= 25 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 764 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.95*
Intensity	= 6.386 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows
Hyd. No. 3 -- 25 Year

— Hyd No. 3

1.13

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Hyd. No. 5

Proposed Conditions - Peak Flows

Hydrograph type	= Mod. Rational	Peak discharge	= 1.083 cfs
Storm frequency	= 25 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 981 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.95*
Intensity	= 5.428 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Storm duration	= 1.5 x Tc
Target Q	=1.000 cfs	Est. Req'd Storage	=214 cuft

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows
Hyd. No. 5 -- 25 Year

Legend: — Hyd No. 5   ☐ Mod. Rational Est. Storage = 214 cuft

1.14

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.574	1	10	944	------	------	------	Existing Conditions - Peak Flows
3	Rational	1.526	1	10	915	------	------	------	Proposed Conditions - Peak Flows
5	Mod. Rational	1.304	1	10	1,181	------	------	------	Proposed Conditions - Peak Flows

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Hyd. No. 1

Existing Conditions - Peak Flows

Hydrograph type	= Rational	Peak discharge	= 1.574 cfs
Storm frequency	= 100 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 944 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.98*
Intensity	= 7.647 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.003 x 0.51) + (0.204 x 0.99)] / 0.210

Existing Conditions - Peak Flows
Hyd. No. 1 -- 100 Year

Q (cfs)

Hyd No. 1

Time (min)

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Hydrograph Report

Hyd. No. 3

Proposed Conditions - Peak Flows

Hydrograph type	= Rational		Peak discharge	= 1.526 cfs
Storm frequency	= 100 yrs		Time to peak	= 10 min
Time interval	= 1 min		Hyd. volume	= 915 cuft
Drainage area	= 0.210 ac		Runoff coeff.	= 0.95*
Intensity	= 7.647 in/hr		Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF		Asc/Rec limb fact	= 1/1

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows
Hyd. No. 3 -- 100 Year

Hyd No. 3

1.17

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Hyd. No. 5

Proposed Conditions - Peak Flows

Hydrograph type	= Mod. Rational	Peak discharge	= 1.304 cfs
Storm frequency	= 100 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 1,181 cuft
Drainage area	= 0.210 ac	Runoff coeff.	= 0.95*
Intensity	= 6.535 in/hr	Tc by User	= 10.00 min
IDF Curve	= NJ-RSIS.IDF	Storm duration	= 1.5 x Tc
Target Q	=1.235 cfs	Est. Req'd Storage	=243 cuft

* Composite (Area/C) = [(0.016 x 0.51) + (0.191 x 0.99)] / 0.210

Proposed Conditions - Peak Flows
Hyd. No. 5 -- 100 Year

— Hyd No. 5   Mod. Rational Est. Storage = 243 cuft

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Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020   Wednesday, 04 / 27 / 2022

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	18.2280	0.1000	0.6968	-------
2	61.4708	11.8000	0.8688	-------
3	0.0000	0.0000	0.0000	-------
5	99.7061	14.8000	0.9304	-------
10	93.2845	13.4000	0.8945	-------
25	131.5029	16.5000	0.9231	-------
50	297.9532	23.2001	1.0724	-------
100	192.6755	18.7000	0.9612	-------

File name: NJ-RSIS.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	5.86	3.64	2.75	2.25	1.93	1.70	1.53	1.39	1.28	1.19	1.12	1.05
2	5.30	4.23	3.53	3.04	2.68	2.40	2.18	1.99	1.84	1.71	1.60	1.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.20	5.03	4.24	3.67	3.24	2.90	2.63	2.40	2.22	2.06	1.92	1.80
10	6.89	5.56	4.68	4.04	3.57	3.20	2.90	2.66	2.45	2.28	2.13	2.00
25	7.74	6.39	5.44	4.75	4.22	3.80	3.46	3.17	2.94	2.73	2.55	2.40
50	8.30	6.96	5.99	5.25	4.67	4.20	3.81	3.49	3.22	2.98	2.78	2.60
100	9.19	7.65	6.55	5.74	5.10	4.60	4.19	3.84	3.55	3.30	3.09	2.90

Tc = time in minutes. Values may exceed 60.

Precip. file name: Bergen-24hr.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.41	0.00	4.30	5.19	6.42	7.30	8.67
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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SECTION 2

SEEPAGE PIT VOLUME

SEEPAGE PIT CALCULATIONS

6' Diameter,   3' Deep

PIT VOLUME

$6' (\pi)(6^2/4)$ $=$ 84.82

STONE AROUND PIT

3' OF STONE, 40% VOIDS

		HEIGHT =
INNER DIA.	= 6'	3'
OUTER DIA.	= 6.5'	
STONE DIA.	= 12.5'	

$0.4(6')(\pi)(12.5^2-6.5^2)/4$ $=$ 107.44

STONE AT BOTTOM

2' OF STONE, 40 % VOIDS

$0.4(2')(\pi)(12.5^2/4)$ $=$ 98.17

290.44 cf

*USE TWO (2) SEEPAGE PITS WITH STONE

6 * 290.44 cf = 1,742.64 cf

Conclusion: Use Six (6) Seepage Pits to be provided.

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SECTION 3

DIRECT RUNOFF CALCULATIONS

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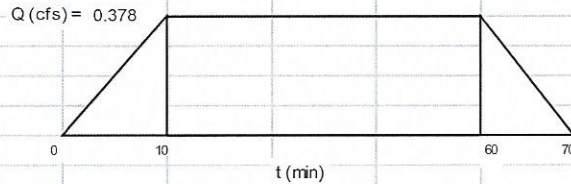FILE # 3956

DIRECT RUNOFF: 10 YEAR, 60 MINUTE, 2"/HOUR

TOTAL AREA   =   8,306 0.0   SF   0.191 Ac

PROPOSED RUNOFF COEFFICIENT
C ROOF   =   0.99

PROPOSED FLOW
Q for 60 MIN = CiA =   0.990   (2.0)   (0.191)   =   **0.378** cfs

CONCLUSION

Q (cfs) = 0.378

t (min)

Storage = 2 x 0.5 x 10 min x 60 sec/mi   0.378 cf/sec +
50 min/hr x 60 sec/min x   0.378 cf/sec

=   1,359   cu. ft.   (Required Storage)

1,359   cu. ft.   x $\frac{1}{290}$ Seepage Pi cu. ft.   =   5   Minimum Required Seepage Pit(s).

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APPENDIX 1

- Site Location and Soil Type Map
- Typical Runoff Coefficients Table
- Time of Concentration (Tc) Nomograph
- IDF Curves and Tabulation

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Soil Map—Bergen County, New Jersey
(131 Fort Lee Road, Leonia NJ)

Map Scale: 1:291 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator   Corner coordinates: WGS84   Edge tics: UTM Zone 18N WGS84

USDA   Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

5/5/2021
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Soils (SSURGO)

Rec	Map Unit Symbol	Map Unit Name
1	UR	Urban Land - Udorthents

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Recommended Coefficient of Runoff Values
for Various Selected Land Uses

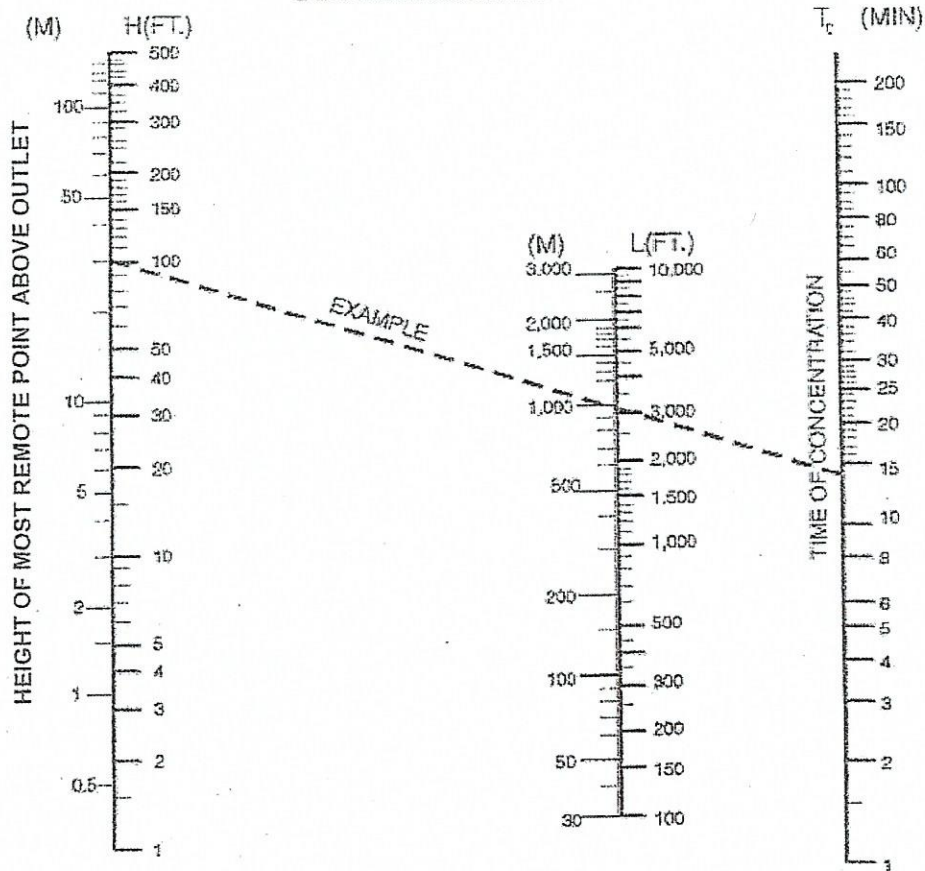| Land Use	Description	Hydrologic Soils Group			
		A	B	C	D
Cultivated Land	without conservation treatment	0.49	0.67	0.81	0.88
	with conservation treatment	0.27	0.43	0.67	0.67
Pasture or Range Land Meadow	poor condition	0.38	0.63	0.78	0.84
	good condition	---	0.25	0.51	0.65
	good condition	---	---	0.41	0.61
Wood or Forest Land	thin stand, poor cover, no mulch	---	0.34	0.59	0.70
	good cover	---	---	0.45	0.59
Open Spaces, Lawns, Parks, Golf Courses, Cemeteries					
Good Condition	grass cover on 75% or more	---	0.25	0.51	0.65
Fair Condition	grass cover on 50% to 75%	---	0.45	0.63	0.74
Commercial and Business Area	85% impervious	0.84	0.90	0.93	0.96
Industrial Districts	72% impervious	0.67	0.81	0.88	0.92
Residential Average Lot Size (acres)	average % impervious				
1/8	65	0.59	0.76	0.86	0.90
1/4	38	0.29	0.55	0.70	0.80
1/3	30	---	0.49	0.67	0.78
1/2	25	---	0.45	0.65	0.76
1	20	---	0.41	0.63	0.74
Paved Areas	parking lots, roofs, driveways, etc.	0.99	0.99	0.99	0.99
Streets and Roads	paved with curbs & storm sewers	0.99	0.99	0.99	0.99
	gravel	0.57	0.76	0.84	0.88
	dirt	0.49	0.69	0.80	0.84

NOTE: Values are based on NRCS (formerly the SCS) definitions and are average values.

Source: Technical Manual for Land Use Regulation Program, Bureau of Inland and Coastal Regulations, Stream Encroachment Permits, New Jersey Department of Environmental Protection

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Figure 7.1

<u>TIME OF CONCENTRATION</u>

Example
Height = 100 ft.
Length = 3000 ft.
Time of Concentration = 14 Min.

Notes:

Use Nomograph T_c for natural basins with well-defined channels, for overland or bare earth, and for mowed grass roadside channels.

For overland flow, grassed surfaces, multiply T_c by 2.

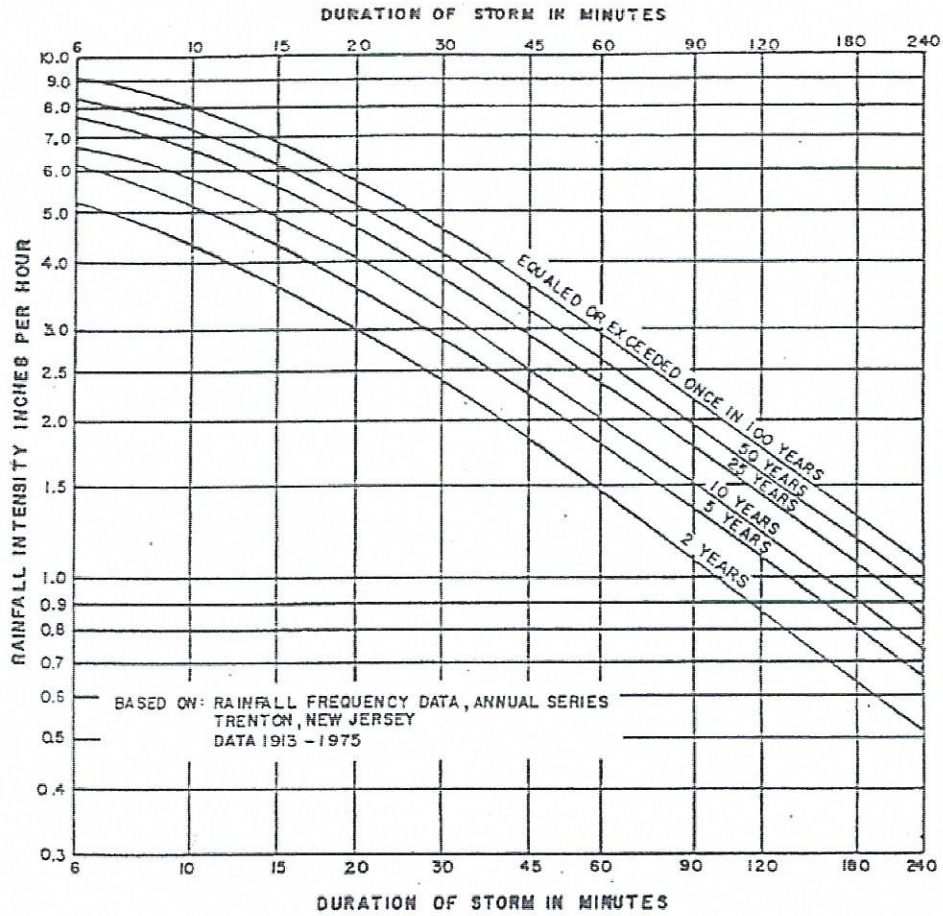For overland flow, concrete or asphalt surfaces, multiply T_c by 0.4.

For concrete channels, multiply T_c by 0.2 overland flow.

Based on a study by P.Z. Kirpich, *Civil Engineering*, Vol.10, No.6, June 1940, p. 362.

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N.J.A.C. 5:21-7.2

FIGURE 7.2 RAINFALL INTENSITY CURVES

Note: Adapted from Figure 2.1-2 in the NJDEP *Technical Manual for Stream Encroachment Permits*.

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Northern New Jersey
One Year Storm

Recurrence Frequency = 1

DURATION (Minutes)	INTENSITY (inches/hour)
6	3.7
10	3.59
15	2.95
20	2.13
30	1.98
45	1.42
60	1.22
90	0.79
120	0.76

NJDEP Curve
2 Year Storm

Recurrence Frequency = 2

DURATION (Minutes)	INTENSITY (inches/hour)
6	5.2
10	4.3
15	3.55
20	3
30	2.4
45	1.8
60	1.49
90	1.1
120	0.92

NJDEP Curve
10 Year Storm

Recurrence Frequency = 10

DURATION (Minutes)	INTENSITY (inches/hour)
6	6.8
10	5.71
15	4.74
20	4
30	3.35
45	2.5
60	2
90	1.5
120	1.34

NJDEP Curve
25 Year Storm

Recurrence Frequency = 25

DURATION (Minutes)	INTENSITY (inches/hour)
6	7.7
10	6.47
15	5.38
20	4.6
30	3.88
45	3
60	2.54
90	1.8
120	1.6

NJDEP Curve
100 Year Storm

Recurrence Frequency = 100

DURATION (Minutes)	INTENSITY (inches/hour)
6	9
10	7.6
15	6.33
20	5.8
30	4.68
45	3.8
60	3.17
90	2.3
120	2.02