

Goeke Drive, Hamilton Township Drainage Summary

Rutgers Cooperative Extension Water Resources Program

www.water.rutgers.edu

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Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.



Photos: Camden, NJ

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The Water Resources Program is one of many specialty programs under Rutgers Cooperative Extension.

Our mission is to identify and address community water resources issues using sustainable and practical science-based solutions.



Photos: Newark, NJ





Our Partnership with Hamilton Township

- Year 1 (2011 2012)
 - Assessment & Recommendation
- Year 2 (2012 2013)
 - Implementation
- Year 3 (2013 2014)
 - Mitigation
- Year 4 (2014 2015)
 - Integration







Goeke Drive Drainage Evaluation

- Existing Conditions
- Drainage Concerns
- Preliminary Analysis
- Recommendations
- Next Steps







How do we evaluate flooding?

- Characterized drainage
 area
 - Slope/topography
 - Land cover
 - Soils
- Calculated stormwater
 runoff volume
- Determined stormwater flow into and through the drainage system





Existing Conditions

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GOEKE DRIVE

HDPE PIPE DIAMETER = 18" MAX PIPE CAPACITY = 6.27 CFS SLOPE = 0.2%

CHARTER CHARTER

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HDPE PIPE DIAMETER = 24" MAX PIPE CAPACITY = 11.0 CFS SLOPE = 0.2%

Goeke Drive Drainage Area

- Total Drainage Area: 7.4 acres
- 27 Homes

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- 1,150 feet of roadway
- One pipe ultimately controls the flow on Goeke Drive: a 24" diameter pipe that flows 282 feet to a catch basin on Kerr Drive at a 0.2% slope







ALL LAND

IMPERVIOUS COVER MAP

Figure shows impervious ROOFTOPS located within the drainage area

CONTRACTOR DURING

GOEKE DRIVE

COLUMN THE

TALES DESCRIPTION

800

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12%



IMPERVIOUS COVER MAP

Figure shows impervious DRIVEWAYS located within the drainage area

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(0)

GOEKE DRIVE

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- ISTORES

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5.9%



GOEKE DRIVE

ALLER SUR

IMPERVIOUS COVER MAP

Figure shows impervious SIDEWALKS located within the drainage area

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IMPERVIOUS COVER MAP

Figure shows impervious ROADS located within the drainage area

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GOEKE DRIVE

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STATISTICS STATISTICS

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15%

Store Land



ALL LAND

IMPERVIOUS COVER MAP

Figure shows all the impervious surface in the drainage area

GOEKE DRIVE

CLUT KIT

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36%

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Total impervious cover

Drainage Area Summary

	Area		Dereentere
Drainage Type	Square Feet	Acres	Percentage
Rooftop	38,653	0.89	12.0%
Driveway	19,089	0.44	5.9%
Sidewalk	10,315	0.24	3.2%
Road and Curb	48,254	1.11	15.0%
Total Impervious	116,310	2.67	36.1%
Lawn	206,265	4.74	63.9%
Total Pervious	206,265	4.74	63.9%
Total Drainage Area	322,575	7.41	100.0%



Preliminary Results (Short/Intense Storm Event)

Rainfall over <i>TWO</i> <i>HOURS</i> (inches)	Peak Flow (cfs)	Peak Elevation Above Catch Basins
1.25	6.88	-
2.00	11.57	-
3.00	20.45	93.46'

Preliminary Results (Longer Storm Event)

Rainfall over 24 HOURS (inches)	Peak Flow (cfs)	Peak Elevation Above Catch Basins
1.25	2.65	-
2.00	4.40	-
3.00	7.51	-

Pipe that controls flow has a capacity of 11.0 cfs





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FLOOD ELEVATIONS MAP Figure showing flooding for 3.0 inches over 2 HOURS

GOEKE DRIVE

A REAL PROPERTY AND

3.00" OF RAINFALL 93.46' ELEVATION < 2 HOUR DURATION

How can we cost-effectively solve this problem?

• Store excess water near Goeke Drive

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 Infiltrate stormwater runoff around Goeke Drive





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Green Infrastructure practices we can cost-effectively use to better manage stormwater at Goeke Drive

- Rain Gardens
- Rainwater Harvesting
- Infiltration Trench Systems
- Pervious Concrete
- Porous Asphalt
- Stormwater Curb Bump Outs







GREEN INFRASTRUCTURE EXAMPLES

Rain Garden





GREEN INFRASTRUCTURE EXAMPLES

French drain and Rain Garden



GREEN INFRASTRUCTURE EXAMPLES

Rain water harvesting - Rain Barrel system

- Collect rainwater from roof with existing downspouts into a rain barrel
- Rain barrel acts as storage that can be used at a later time





GREEN INFRASTRUCTURE EXAMPLES

Rain garden and rain harvesting system



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GREEN INFRASTRUCTURE EXAMPLES

Infiltration Trench System





GREEN INFRASTRUCTURE EXAMPLES

Pervious Concrete Apron







3 ft wide porous asphalt bottom of curb

Stone

Existing asphalt



GREEN INFRASTRUCTURE EXAMPLES

Curb Bump out

How much water do we need to manage?

To reduce flooding, 5,456 cubic feet or 40,810 gallons need to be captured and slowly released to the drainage system







HOW CAN WE ACHIEVE THIS?



Disconnect 25% of Rooftops

- Rain Barrels
- Rain Gardens







Disconnect 25% of Driveways

- Rain Gardens
- Pervious Concrete Driveway Aprons





Disconnect 20% of Roadway

- Porous Asphalt
- Infiltration Trench Systems
- Curb Bump Outs







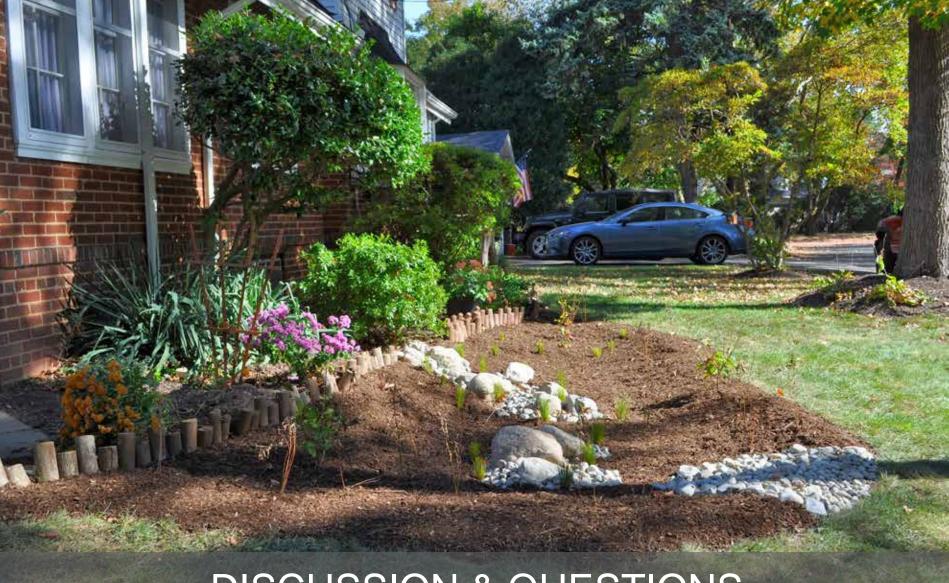
How can we reduce flooding on Goeke Drive?

Impervious Drainage Type	% to be disconnected	Total Area Disconnected (square feet)	Volumed Captured (cf)
Rooftops	25%	9,664	2,229
Driveway	25%	4,772	1,101
Roadway	20%	9,704	2,239

To eliminate the flooding during intense storms of 1.5 inches over one hour, the 5,456 cubic feet of runoff needs to be captured and released slowly to the drainage system. Disconnecting the impervious surfaces as suggested above will accomplish this.



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DISCUSSION & QUESTIONS

THE STATE UNIVERSITY OF NEW JERSEY

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