RainReady – Carrboro, NC
Resident Survey Results

Stormwater Advisory Commission Meeting – 2/13/2020

Center for Neighborhood Technology

CNT

resilient, sustainable and livable cities for everyone

CNT's mission is to make cities work for everyone. CNT works at the intersection of environmental sustainability, social equity, and technology—with particular attention on creating efficient and affordable solutions for low-income communities and communities of color.

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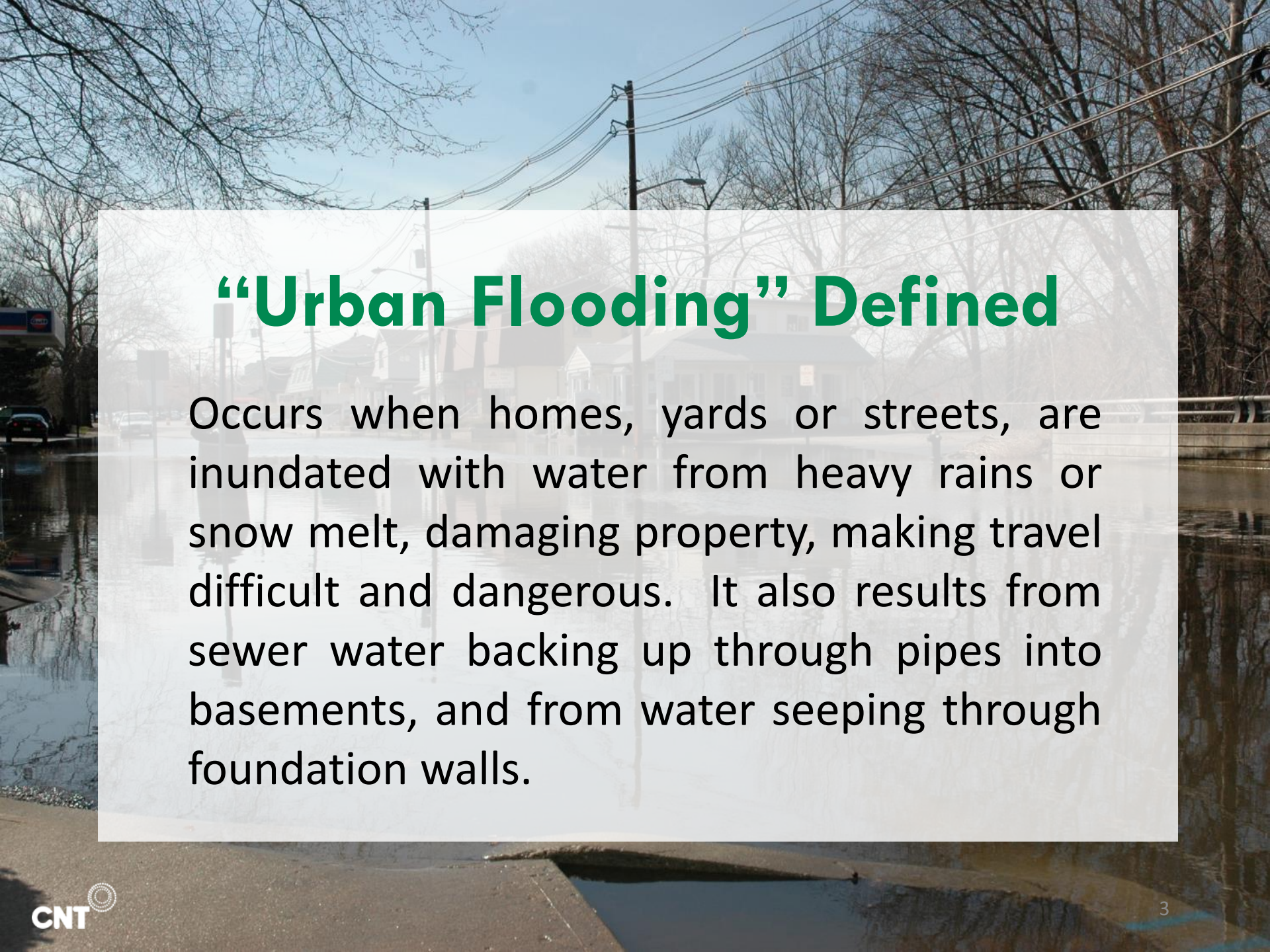
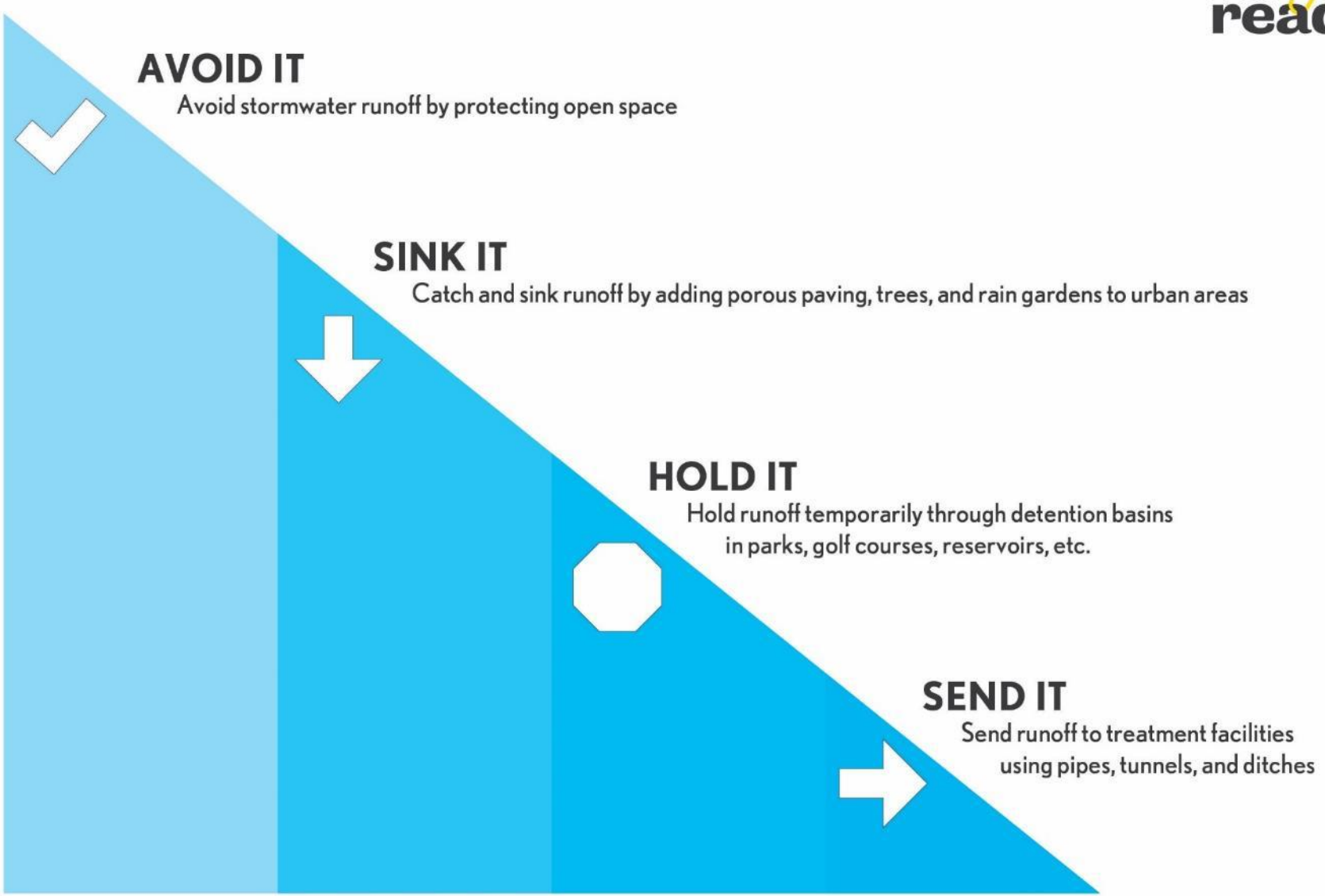


"Urban Flooding" Defined

Occurs when homes, yards or streets, are inundated with water from heavy rains or snow melt, damaging property, making travel difficult and dangerous. It also results from sewer water backing up through pipes into basements, and from water seeping through foundation walls.

Hierarchy for Stormwater Management



Some of the Problems

Pollution

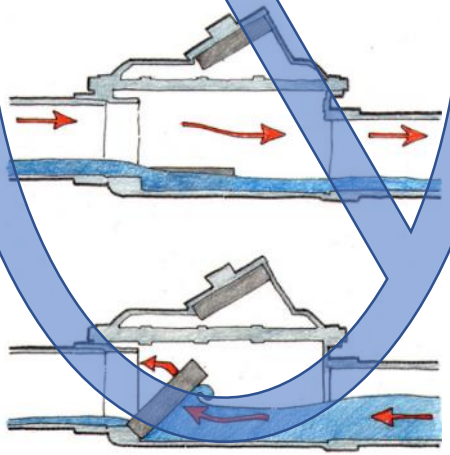
Flooded Basements

Flooded Streets

Building-Scale Grey Infrastructure

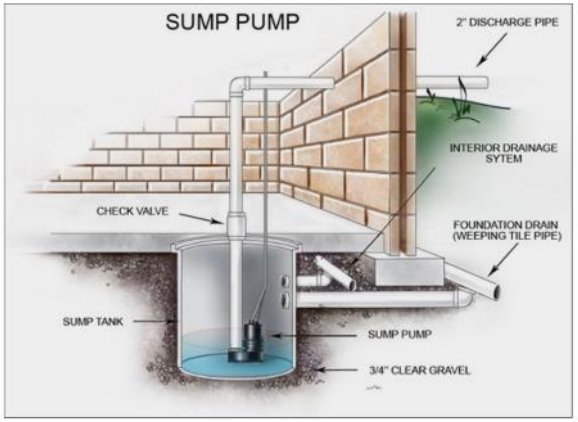
Backwater Valve

- One-way swinging valve that closes when sewage from mainline threatens to back up
- Caution: during storm events, the valve will prevent water from leaving your building so no don't flush!



Sump Pump

- Reduces basement flooding via seepage by pumping foundation drain water or pooled water on the floor out of basement
- Caution: backup with battery-power so you don't flood during power outage



Foundation Crack Repair

- Reduce seepage and mold by sealing cracks in your foundation using an epoxy injection
- Caution: focus on cracks that are horizontal or near L-shaped sections on your walls, not hairline fractures

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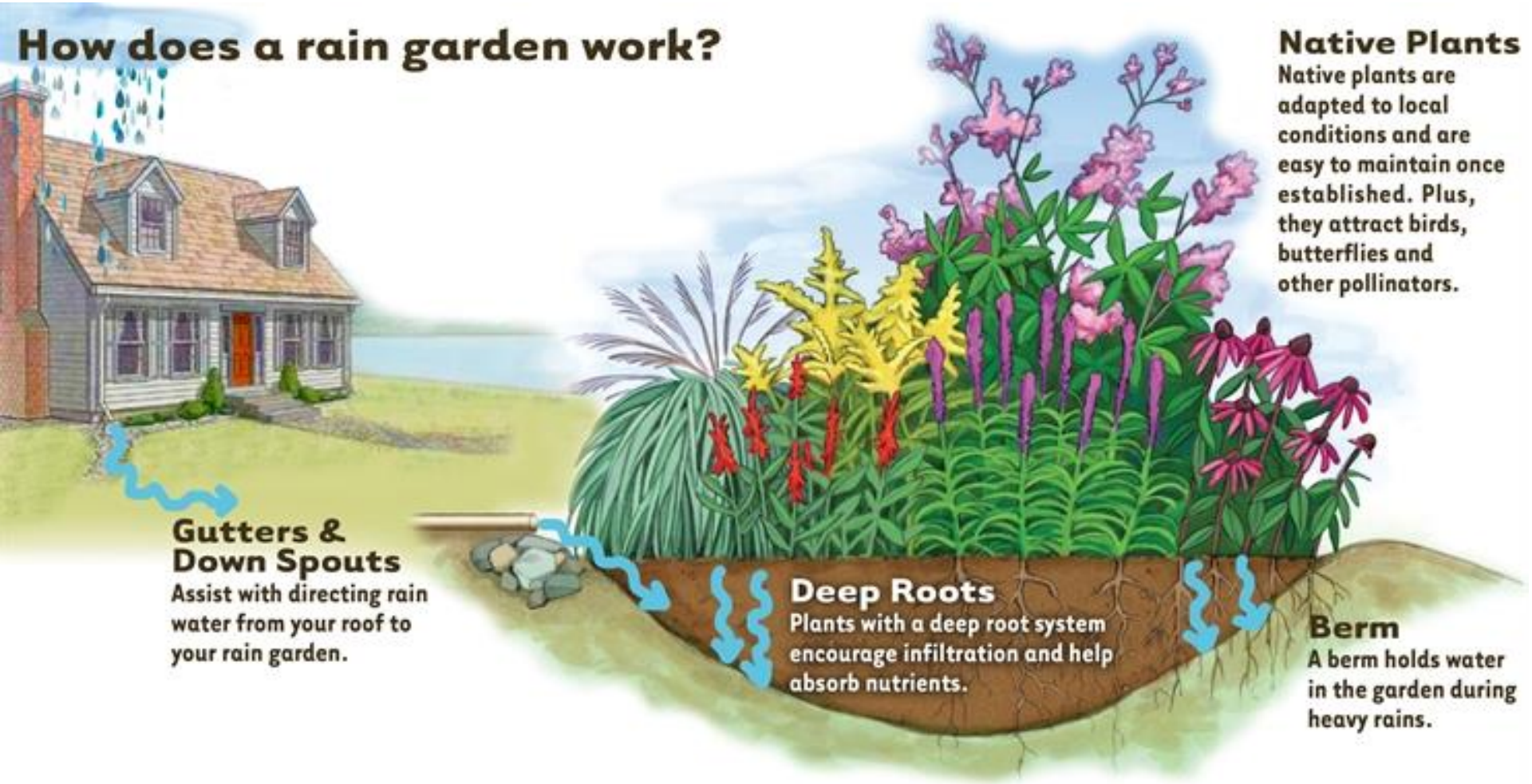
Permeable Pavement

- Allows rainwater to percolate through pavers, preventing run off from roads, parking lots, sidewalks
- Rainwater either filters back into subsoils or is held in underground storage before reentering the sewers
- Helps solve **overland flooding** and possibly **basement backups** if enough pavers are installed

Bioinfiltration

- Includes rain gardens, bioswales, planter boxes, larger scale basins
- Usually a depressed area into which rainfall is either conveyed or falls and filters back into subsoils or is held in underground storage before reentering the sewers
- Provides water quantity and quality improvements
- Helps solve overland flooding and possibly basement backups if enough bioinfiltration systems are installed


How does a rain garden work?
Native Plants
Native plants are adapted to local conditions and are easy to maintain once established. Plus, they attract birds, butterflies and other pollinators.
Gutters & Down Spouts
Assist with directing rain water from your roof to your rain garden.
Deep Roots
Plants with a deep root system encourage infiltration and help absorb nutrients.
Berm
A berm holds water in the garden during heavy rains.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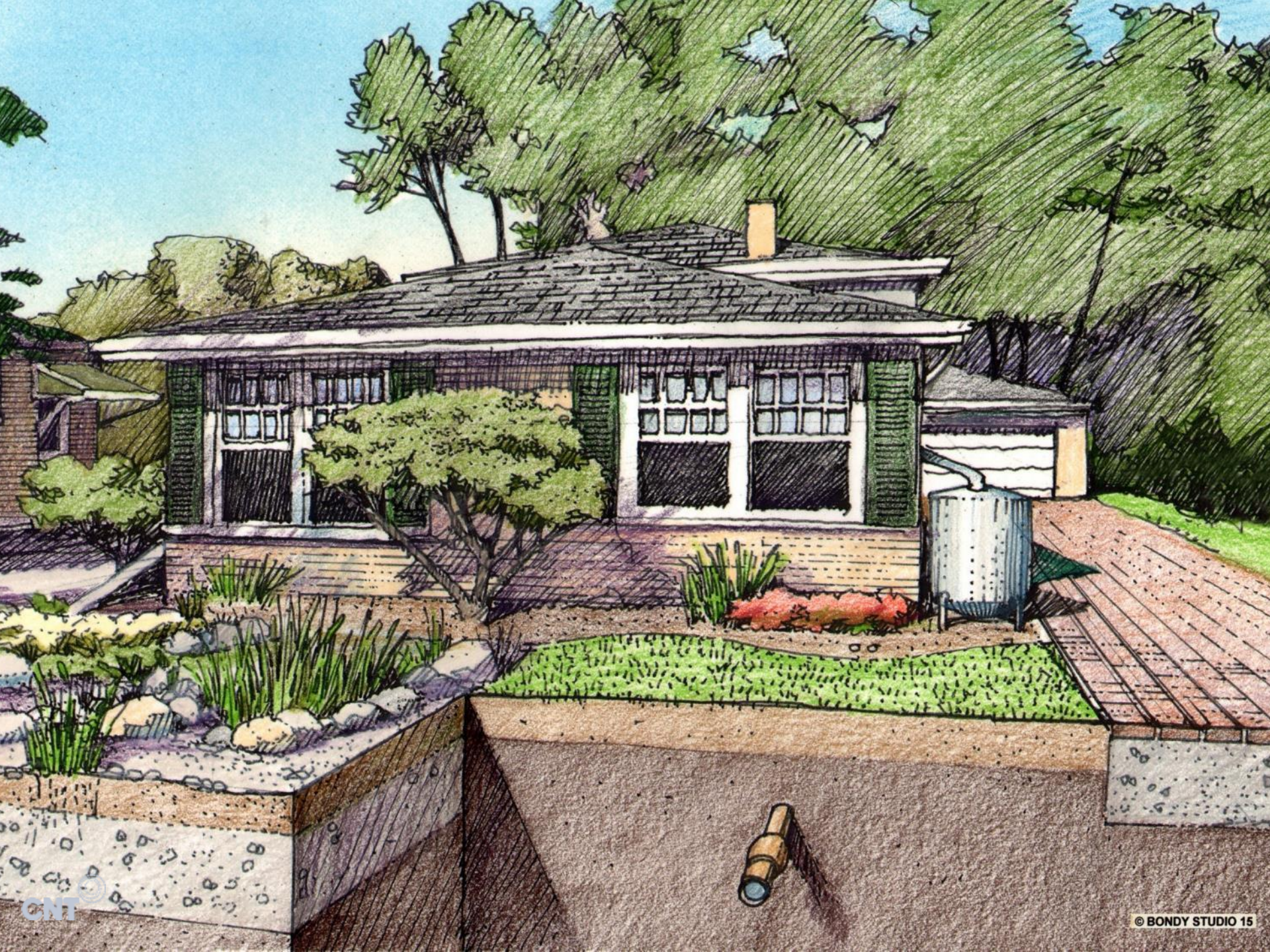
Street Trees

- Incredibly effective sinks. Tree canopy slow rainfall; tree roots, when given space to grow drink tremendous amounts of rainwater
- Street trees should vary in species to avoid blight/disease
- Helps solve overland flooding and possibly basement backups if trees are installed at strategic location
- Caution: when trees are planted in parkways, their root structure can sometimes grow into a sewer or water line, causing a water loss or sewer backup situation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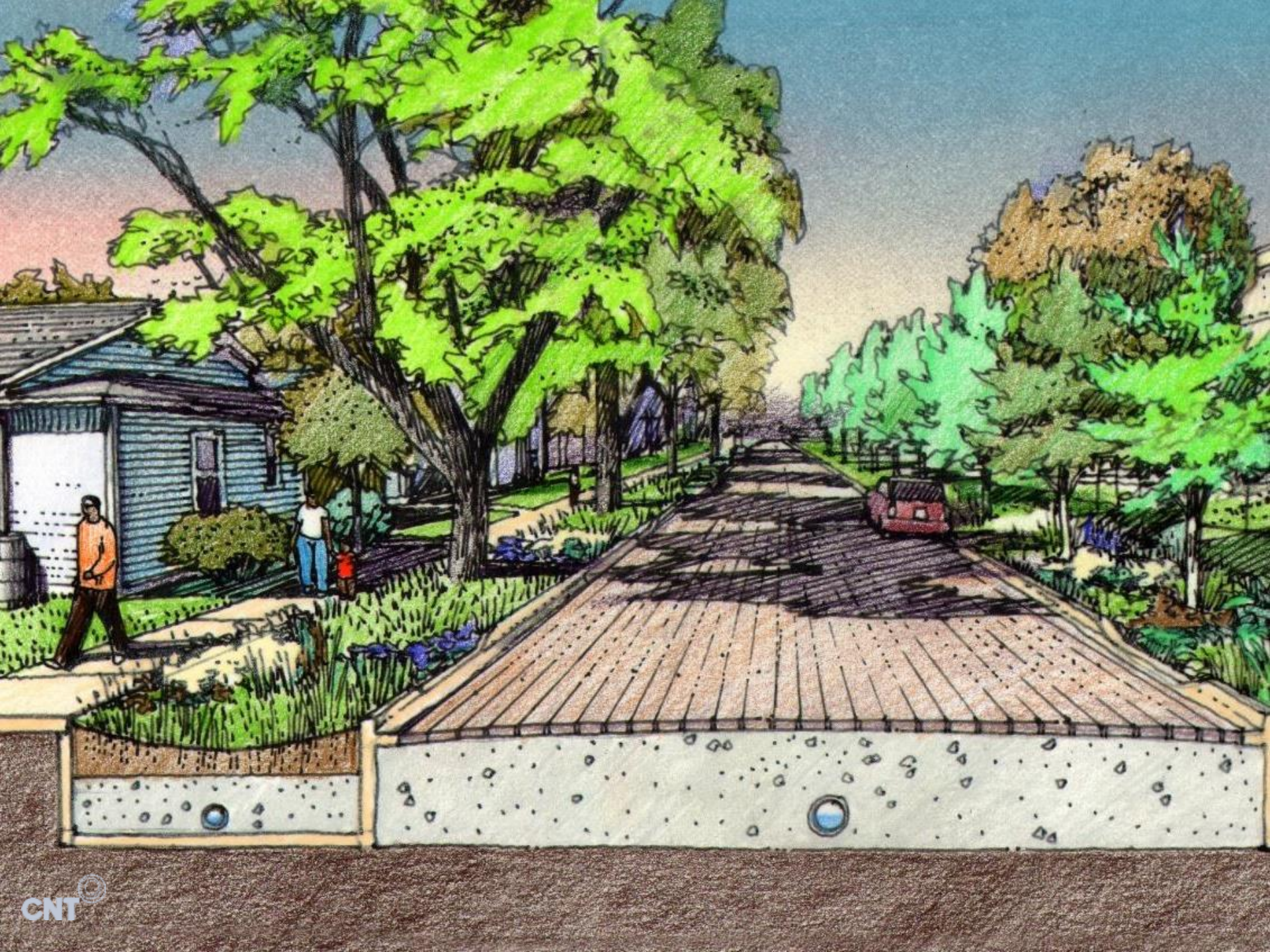

Green Infrastructure and "Co-benefits"

Benefit	Reduces Stormwater Runoff				Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality	Reduces Atmospheric CO_2	Reduces Urban Heat Island	Improves Community Livability					Improves Habitat	Cultivates Public Education Opportunities
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding								Improves Aesthetics	Increases Recreational Opportunity	Reduces Noise Pollution	Improves Community Cohesion	Urban Agriculture		
Practice																		
Green Roofs	●	●	●	●	○	○	○	●	●	●	●	●	◒	●	◒	◒	●	●
Tree Planting	●	●	●	●	○	◒	○	●	●	●	●	●	●	●	●	◒	●	●
Bioretention & Infiltration	●	●	●	●	◒	◒	○	○	●	●	●	●	●	◒	◒	○	●	●
Permeable Pavement	●	●	●	●	○	◒	●	◒	●	●	●	○	○	●	○	○	○	●
Water Harvesting	●	●	●	●	●	◒	○	◒	◒	◒	○	○	○	○	○	○	○	●

● Yes ◒ Maybe ○ No

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Planning

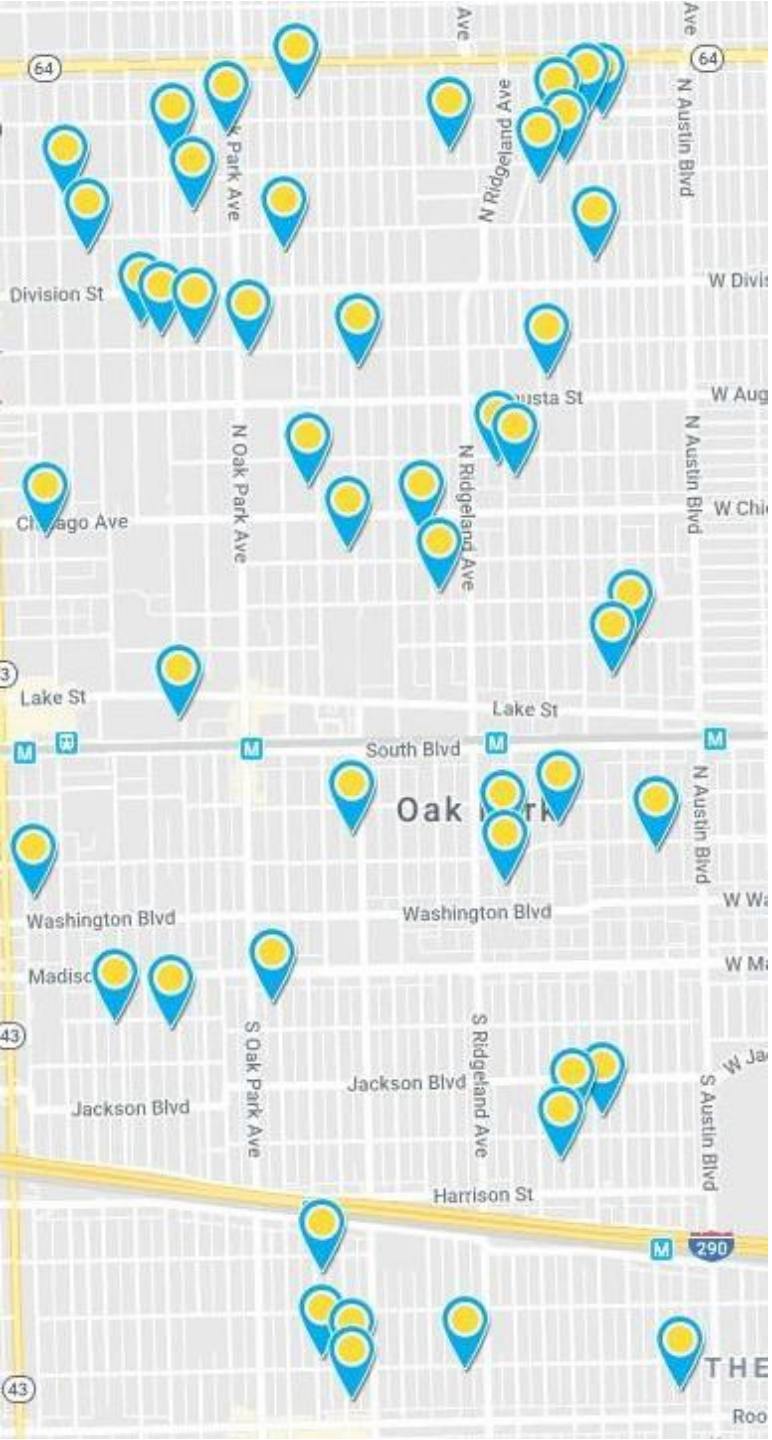
A resident-driven, community-wide stormwater management planning service

Assistance Program

A "one-stop shop" home flood risk management service

Customized Solutions

- Regrading
- Downspout disconnection
- Dry wells
- Rain gardens
- Backwater valves
- Porous paving



RainReady Oak Park (IL)

Completed Installations

- 36 Rain Gardens or Bioswales
- 4 Dry Wells
- 6 Depavings

Stormwater Management

Estimated **724,000 gallons of rain** diverted from Oak Park's sewer system

My RainReady

Virtual Home Assessment Tool

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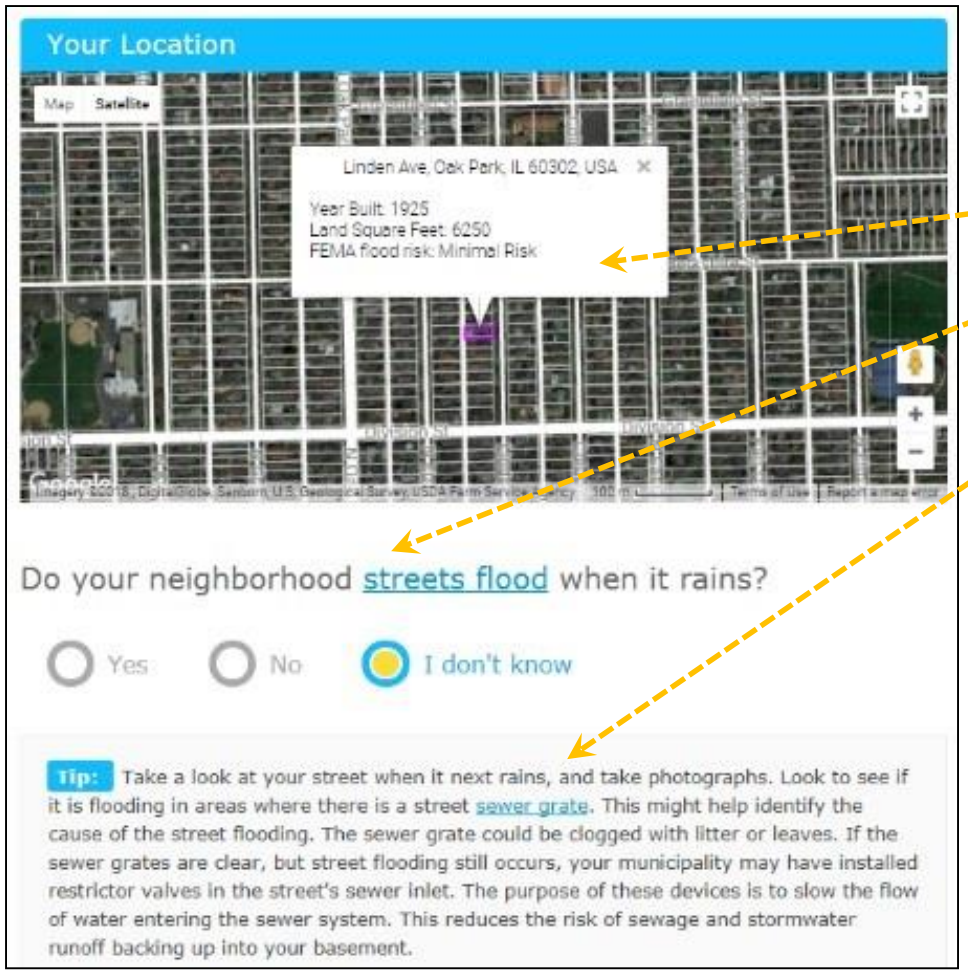
My RainReady



- Parcel-specific data
- Guided flood risk questionnaire
- Flood protection tips for homeowners
- Customized recommendations report based on questionnaire answers
- Freely available to all
- Web: myrainready.cnt.org

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Group Tours and Education

CNT Carrboro Project Scope

Process

- Gather Existing Conditions
  - Review public data
  - Survey Residents
  - Interview Town Staff
- Recommend Program Design
  - Develop retrofit templates
  - Estimate costs and benefits
  - Identify engagement needs
  - Define priority targets
  - Identify evaluation measures
  - Conduct case study

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Resident Survey Results

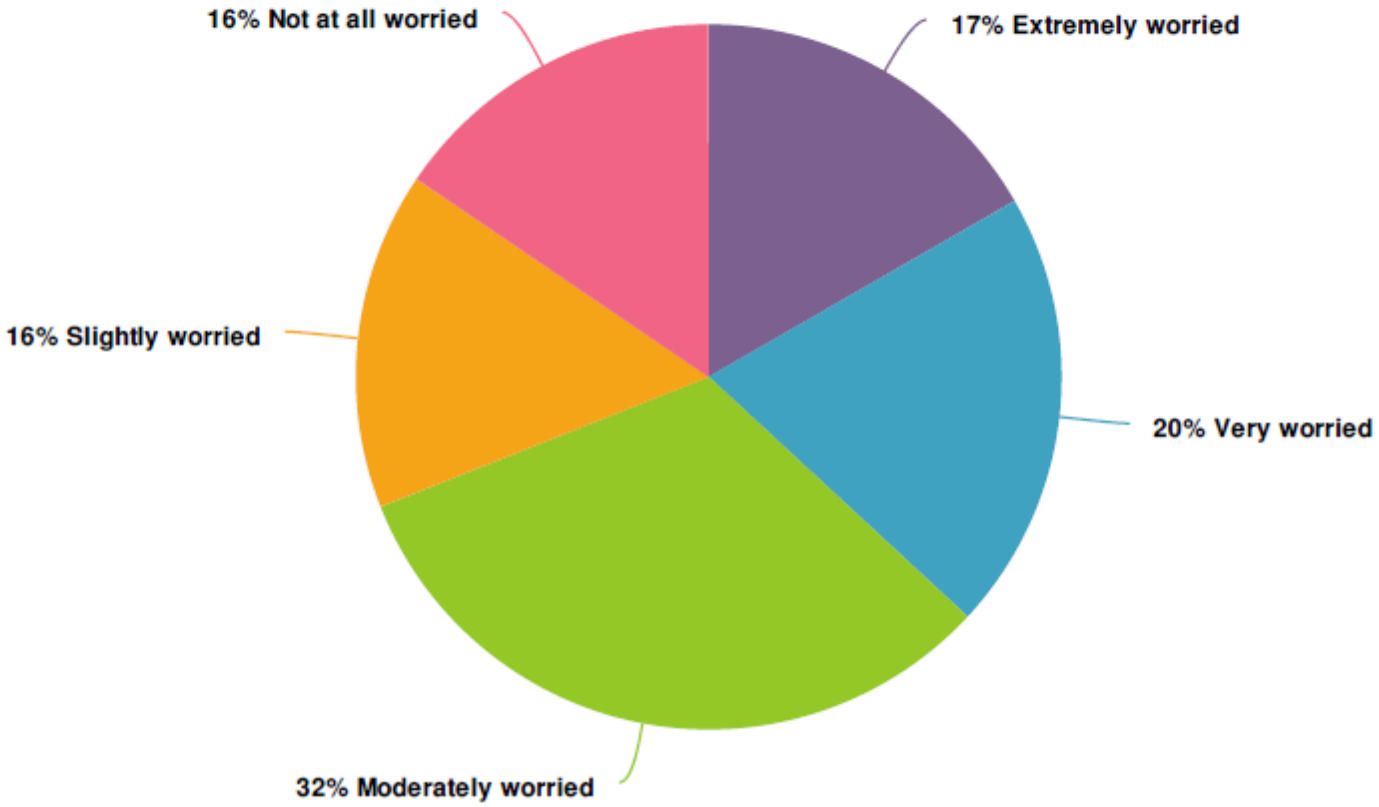
Survey Goals

- Understand
  - flooding impacts and concerns,
  - knowledge of flood risks and solutions,
  - attitudes towards green infrastructure,
  - familiarity with home renovation projects,
  - desired type of assistance, and
  - ability to invest in building-scale flood mitigation measures.

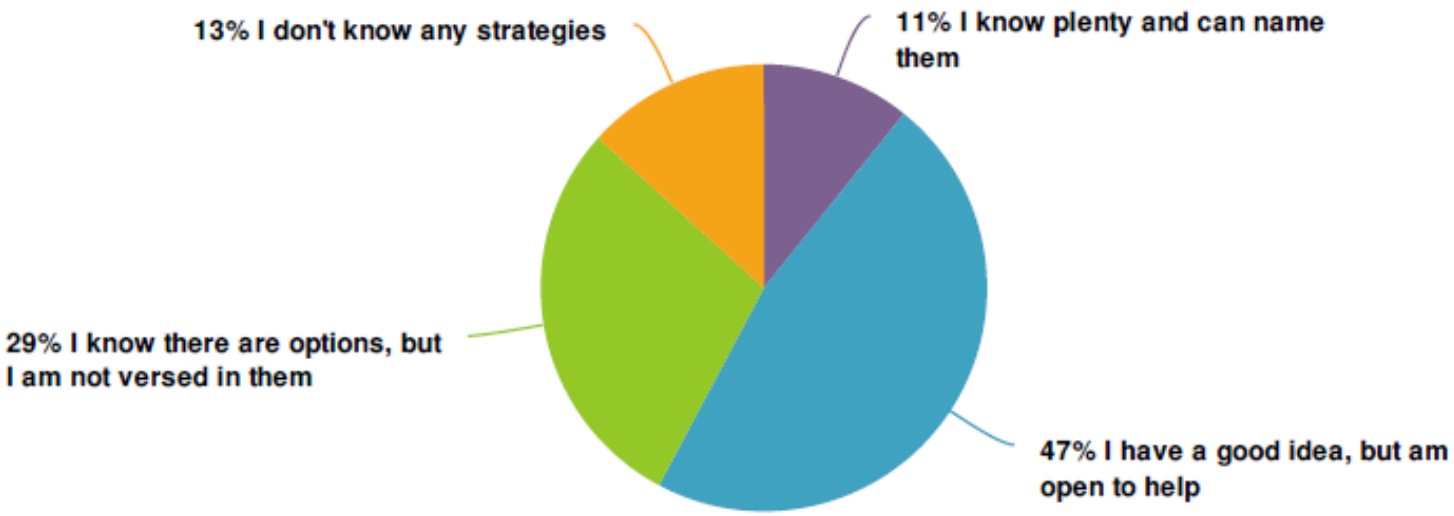
Survey Methods

- Online or on paper
- Fielded December–January, 2020
- Town staff went door-to-door to bolster response
- 28 questions
- 83 people completed (1/3 of households in study area [watershed above Main Street])

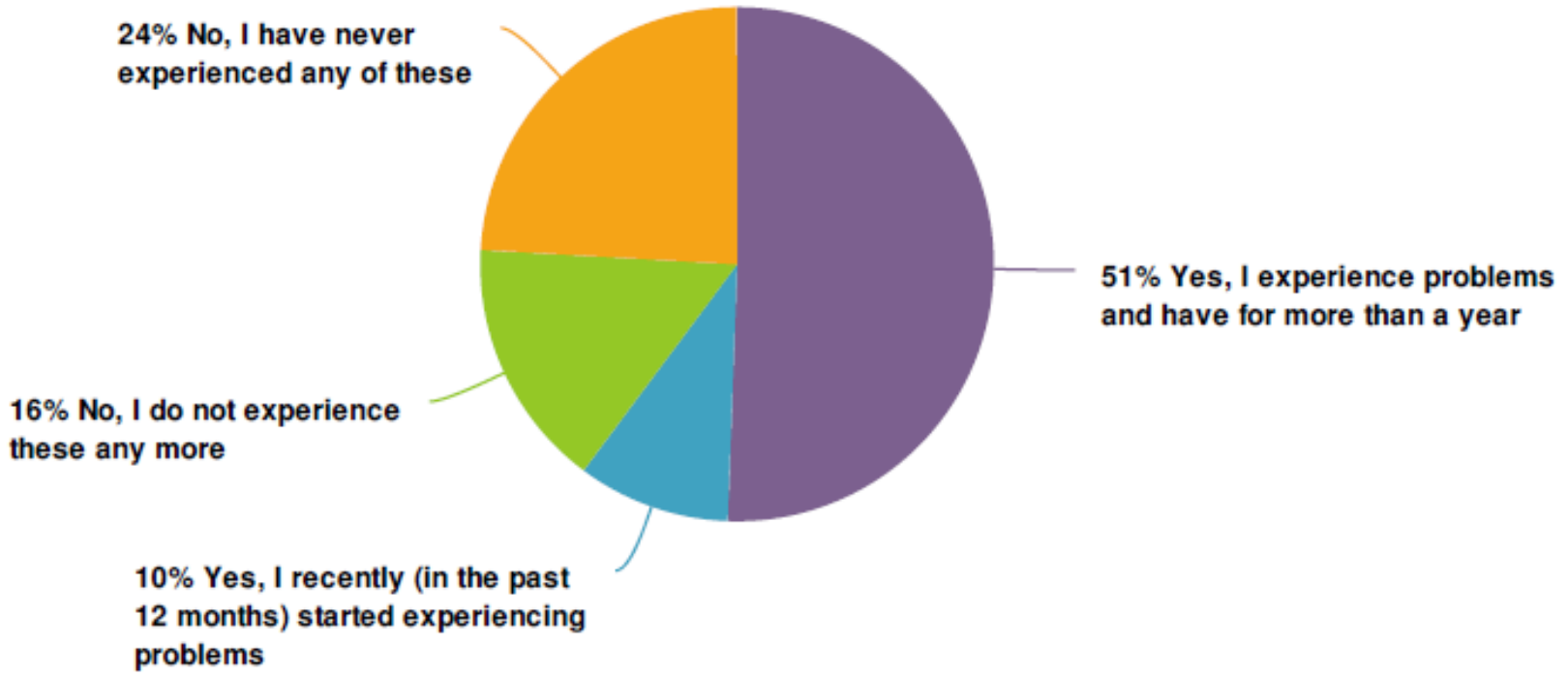
2. How worried are you about the impact of flooding on your property?



3. How much do you know about strategies for reducing the risk of flooding at your home?



4. Do you experience flooding on your property? This could include issues such as water entering your home, crawl space, basement, garage, or shed from a creek or the street, sewage backup, or persistent yard ponding.



	No, I have never experienced any of these	No, I do not experience these any more	Yes, I recently (in the past 12 months) started experiencing problems	Yes, I experience problems and have for more than a year
I don't know any strategies	6	0	0	5
I know there are options, but I am not versed in them	5	2	3	14
I have a good idea, but am open to help	7	8	4	21
I know plenty and can name them	2	3	1	2

5. What kind of flooding do you currently experience?

Value	Percent	Responses
Flowing under doors and/or windows	4.1%	2
Seeping through walls (for example, through cracks or joints)	4.1%	2
Backing up through drains (floor drains, bathtubs, sinks, etc.)	2.0%	1
Water entering crawl space, basement, garage, or shed	40.8%	20
Overflowing from a creek or water body	42.9%	21
Overflowing from the street	26.5%	13
Persistent yard ponding	65.3%	32
Flash flood	34.7%	17
Other - Write In	22.4%	11

7. What kind of weather causes flooding at your property?

Value	Percent	Responses
A normal rain event	14.6%	7
An intense rain event	97.9%	47
A hurricane or tropical storm	79.2%	38

8. How much have you spent on addressing repairing or replacing flood-damaged property, since you have lived at your home?

Value	Percent	Responses
$	62.3%	38
None, I haven't spent anything	37.7%	23

Totals: 61

AVERAGE* $6,308
MEDIAN $3,000
*two outliers were removed

9. What does flooding assistance look like to you?

Value	Percent	Responses
A checklist or similar resource that I can use to self-diagnose flooding issues and identify common solutions	51.2%	42
Step-by-step instructions for building a home rain garden and other DIY solutions	43.9%	36
A list of vetted professionals and contractors who can design and install flood management solutions	41.5%	34
A home inspection conducted by a knowledgeable professional that can recommend solutions	48.8%	40
A professional flood management landscape design prepared specifically for my home	45.1%	37
Financial assistance to repair existing water damage	25.6%	21

9. What does flooding assistance look like to you?

Value	Percent	Responses
A reimbursement to cover up to 30% of the cost of installing flood mitigation solutions	19.5%	16
A reimbursement to cover up to 50% of the cost of installing flood mitigation solutions	23.2%	19
A reimbursement to cover up to 80% of the cost of installing flood mitigation solutions	35.4%	29
An up-front partial matching grant to install a flood mitigation solution at your home	31.7%	26
An up-front grant to install a flood mitigation solution at your home (no cost to you)	46.3%	38
Other - Write In (Required)	26.8%	22

10. How much would you be willing to invest in your home to reduce the risk of flood damage?

Value	Percent	Responses
$	67.6%	48
None ($0)	32.4%	23

Totals: 71

AVERAGE* $4,529
MEDIAN* $2,000
*four responses recoded to be read as numbers

11. Home maintenance and insurance solutions

	I've done this.	I would do this if I had financial assistance.	I would do this if I had technical assistance.	I would do this if I had both financial & technical assistance.	I'm not interested in this.	I don't know what this is.	Responses
Regrading around my property Count Row %	21 33.3%	4 6.3%	10 15.9%	13 20.6%	14 22.2%	1 1.6%	63
Repairing gutters and downspouts Count Row %	50 72.5%	5 7.2%	3 4.3%	4 5.8%	7 10.1%	0 0.0%	69
Repairing/improving the drainage ditch on my property Count Row %	27 42.9%	6 9.5%	4 6.3%	17 27.0%	9 14.3%	0 0.0%	63
Purchasing NFIP flood insurance Count Row %	8 13.6%	6 10.2%	1 1.7%	6 10.2%	25 42.4%	13 22.0%	59
Totals Total Responses							69

13. Natural solutions

	I've done this.	I would do this if I had financial assistance.	I would do this if I had technical assistance.	I would do this if I had both financial & technical assistance.	I'm not interested in this.	I don't know what this is.	Responses
Rainwater harvesting (Cistern/Rain barrels) Count	25	6	5	10	14	3	63
Row %	39.7%	9.5%	7.9%	15.9%	22.2%	4.8%	
Rain garden Count	10	3	8	18	13	9	61
Row %	16.4%	4.9%	13.1%	29.5%	21.3%	14.8%	
Dry well or French drain Count	29	3	4	12	12	5	65
Row %	44.6%	4.6%	6.2%	18.5%	18.5%	7.7%	
Disconnecting downspouts from the storm sewer system Count	14	0	3	4	18	21	60
Row %	23.3%	0.0%	5.0%	6.7%	30.0%	35.0%	

15. Plumbing solutions

	I've done this.	I would do this if I had financial assistance.	I would do this if I had technical assistance.	I would do this if I had both financial & technical assistance.	I'm not interested in this.	I don't know what this is.	Responses
Sewage backflow prevention device (check valve, backwater valve, or overhead sewer) Count Row %	5 7.7%	2 3.1%	3 4.6%	6 9.2%	23 35.4%	26 40.0%	65
Sump pump Count Row %	16 23.9%	0 0.0%	2 3.0%	6 9.0%	36 53.7%	7 10.4%	67
Totals Total Responses							67

17. Dry flood-proofing solutions, to keep water out of your home

	I've done this.	I would do this if I had financial assistance.	I would do this if I had technical assistance.	I would do this if I had both financial & technical assistance.	I'm not interested in this.	I don't know what this is.	Responses
Altering entryway to prevent water from entering under door Count Row %	11 17.7%	3 4.8%	3 4.8%	3 4.8%	36 58.1%	6 9.7%	62
Sealing cracks and openings in foundation and walls Count Row %	18 29.0%	5 8.1%	7 11.3%	7 11.3%	21 33.9%	4 6.5%	62
Flood-proofing building mechanicals Count Row %	10 15.9%	6 9.5%	5 7.9%	10 15.9%	11 17.5%	21 33.3%	63
Totals Total Responses							63

19. Wet flood-proofing solutions, to manage water in your home

	I've done this.	I would do this if I had financial assistance.	I would do this if I had technical assistance.	I would do this if I had both financial & technical assistance.	I'm not interested in this.	I don't know what this is.	Responses
Water-resistant building materials (such as mold-resistant dry wall) Count Row %	5 8.2%	6 9.8%	4 6.6%	6 9.8%	31 50.8%	9 14.8%	61
Storm (flood) vents Count Row %	3 4.9%	3 4.9%	4 6.6%	4 6.6%	21 34.4%	26 42.6%	61
Elevating or removing building mechanicals and valuables from flood-prone areas Count Row %	6 10.0%	6 10.0%	6 10.0%	6 10.0%	31 51.7%	5 8.3%	60
Totals Total Responses							61

21. Other solutions to mitigate your property from flooding

	I've done this.	I would do this if I had financial assistance.	I would do this if I had technical assistance.	I would do this if I had both financial & technical assistance.	I'm not interested in this.	I don't know what this is.	Responses
Elevating my building Count Row %	5 7.9%	2 3.2%	1 1.6%	4 6.3%	46 73.0%	5 7.9%	63
Demolishing my basement, garage, shed, or other building Count Row %	3 4.9%	0 0.0%	1 1.6%	2 3.3%	51 83.6%	4 6.6%	61
Totals Total Responses							63

23. Using natural solutions, such as those previously mentioned, is a good strategy for managing neighborhood flooding.

Value	Percent	Responses
Yes, When can we start	36.4%	24
Yes, but let's understand it more	30.3%	20
I'm not sure	13.6%	9
No, what we have works	7.6%	5
No, it's not a viable solution	12.1%	8

Totals: 66

24. My neighbors think using natural solutions, such as those previously mentioned, is a good strategy for managing neighborhood flooding.

Value	Percent	Responses
Yes, they want to get started	21.0%	13
Yes, but they want to understand it more	29.0%	18
They aren't sure	22.6%	14
No, what they have works for them	3.2%	2
No, they don't think it's a viable solution	21.0%	13
They aren't sure what natural solutions are	3.2%	2

Totals: 62

Conclusions

- Respondents report a baseline of understanding
- Most people have a desire to learn more and take action
- 2/3 are interested in pursuing natural solutions
- There is an interest, overall, in receiving some support or pursuing a community approach.

Discussion

Discussion Questions

- Are any of the survey results surprising to you?
- Based on what you've heard, are there any conclusions that you would add? Modify?
- Would anyone in the room like to share their flooding experience?
- Based on these survey results, and your personal experience with Carrboro, what sort of residential assistance program would you recommend for the town?
- How can we work on the problem together?