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STATE OF NEW JERSEY  
NEW JERSEY CLEAN WATER COUNCIL

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In the matter of: :  
GREENING NEW JERSEY'S WATER INFRASTRUCTURE:  
-----x

Location: Department of Environmental Protection  
401 East State Street  
Trenton, New Jersey 08625  
Date: Friday, December 13, 2013  
Commencing from 9:15 a.m. to 11:34 a.m.

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1 H E L D B E F O R E :

2

3 PAMELA GOODWIN, ESQ., Chair

4 COMMISSIONER BOB MARTIN, NJ DEP

5 KHRIS DODSON, Associate Director, Syracuse

6 University

7 JEREMIAH BERGSTROM, LLA, Rutgers Cooperative

8 Extension Water Program

9 MARK ANDERSON, LLA, New Jersey Chapter of

10 American Society of Landscape Architects

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## A G E N D A

|   | PAGE |
|---|------|
| Welcome Opening Comments/Introductions, | 4    |
| By Pamela Goodwin                       |      |
| Keynote Speaker, By Bob Martin          | 6    |
| Khris Dodson, Associate Director,       | 21   |
| Syracuse University                     |      |
| Jeremiah Bergstrom, LLA                 | 46   |
| Brief Q and A                           | 63   |
| Break                                   | 83   |
| Commence Public Testimony               | 83   |
| Adjournment                             |      |

1 MS. GOODWIN: Good morning and thank  
2 you so much for your patience. My name is Pamela  
3 Goodwin. I chair the Clean Water Council, and  
4 first of all, thank you so much for coming out on  
5 this cold and soon to be blustery day. By way of  
6 introduction, let me say that if this were a  
7 miniseries, we would call it Infrastructure  
8 Musical Part 4. The Clean Water Council started  
9 down this path really not knowing that we would  
10 still be talking about these issues four years  
11 ago when we decided we would do a public hearing  
12 on the issue of climate change and its impacts on  
13 water.

14 And I laughed to myself because at  
15 that particular hearing, Commissioner, part of  
16 the debate was whether or not we were really  
17 experiencing climate change or just unusual  
18 weather circumstances, and I think that today,  
19 certainly after our experience with Sandy, we  
20 have all the knowledge that we are experiencing  
21 both, and what's fascinating to me about that is  
22 that conversation led us the next year into a  
23 discussion, in a very general sense, about our  
24 water infrastructure resources in the state of  
25 New Jersey and what we needed to do to start

1 bolstering them which led the next year to a  
2 hearing on how could we finance these efforts.

3 And last year when we thought we  
4 would finally be talking about green  
5 infrastructure which would segue between our  
6 discussion on climate change and what we had  
7 learned about infrastructure, Hurricane Sandy  
8 beset the state of New Jersey and Commissioner  
9 Martin specifically asked us if we couldn't focus  
10 our efforts on storm recovery issues, so in the  
11 spring of this past year we did in fact hold such  
12 a hearing and yet again we heard more and more  
13 about what we need to do to not only develop our  
14 infrastructure but to anticipate the fact that  
15 our infrastructure needs to be more resilient  
16 than it has ever been in the past, and that then  
17 brings us to today's hearing.

18 We come back to the topic at hand,  
19 green infrastructure, and we have asked our  
20 panelists to focus not simply on the topic of  
21 green infrastructure but to try to integrate all  
22 of the things that we've been focused on which  
23 includes how do you finance it, how do you adapt  
24 it in a way that makes it economically feasible,  
25 and finally, with regard to the issues at hand

1 following the storm, how do you make green  
2 infrastructure valuable given the fact that we  
3 anticipate unfortunately that the storm that we  
4 experienced last year may not be the last storm  
5 of its nature and that the impacts given the way  
6 in which we're experiencing rising seas may  
7 likewise may not be the only time that we  
8 experience such a devastating impact.

9 And with that, let me introduce our  
10 keynote speaker, Commissioner Martin.  
11 Commissioner Martin has been one of this  
12 council's biggest fans. He is somebody who gets  
13 infrastructures, gets the importance of  
14 infrastructure because it's something that he's  
15 not only done in this life, but in his past life,  
16 and I'm hoping he'll be able to reveal to you  
17 some of the things that the department has  
18 learned from Sandy and just the whole notion of  
19 reconstituting our water infrastructure. With  
20 that, Commissioner Martin.

21 MR. MARTIN: Thank you very much  
22 Pamela. Thank you to all the other members of  
23 the panel. We have a great group of people to go  
24 through and some of the best experts that will  
25 talk about a lot of the key critical things we've

1     talked about in infrastructure these days.  
2     Again, on behalf of the Governor, I'm very proud  
3     to be here. Clean Water Council is one of those  
4     council's who, again, I spend a lot of time with.  
5     There is only a few councils or commissions that  
6     I spend significant time with, and I say that  
7     because of the fact that we've got a lot of work  
8     going on at DEP.

9             We're still focusing very heavily on  
10    Sandy, but there are very key councils and  
11    commissions that play an absolute critical role  
12    in our thinking, in our policy setting that shape  
13    a lot of the input that I need and that this  
14    Department needs and this administration needs to  
15    be able to go forward, especially when you start  
16    talking about water and clean water overall, so  
17    I'm very proud to be here today, and I thank the  
18    Council for their work which continues to be high  
19    quality work and provides incredible insights to  
20    the future for infrastructure in the state.

21            In post Sandy, as you talked about  
22    before, the amount of infrastructure that was  
23    damaged in what we saw the vulnerabilities of the  
24    infrastructure in the state was significant. We  
25    had over 70 water supply systems that were

1 damaged or on emergency power or some combination  
2 of both. We saw about 100 waste water treatment  
3 plants that had significant problems and some of  
4 those went completely under water. You look at  
5 PBSC, you look at NCUA's Sayerville plant, those  
6 plants went completely under water, and it showed  
7 the vulnerabilities of the state that we need to  
8 address this and look at it in the future and  
9 look at it a different way.

10 Overall we have about 2.6 billion  
11 dollars that we know of that was caused by  
12 Superstorm Sandy to the infrastructure of the  
13 state to the water infrastructure of the state.  
14 It's a big number. That's not counting the  
15 billions of dollars necessary to bring a lot of  
16 our infrastructure up to a certain level and a  
17 level that we believe is necessary. As you know,  
18 a lot of it is old and failing and we need to  
19 focus on that long term, and again, you've heard  
20 me talk about that a lot in the past and I'll  
21 continue to talk about that. Obviously as I  
22 mentioned the vulnerabilities that we had,  
23 Superstorm Sandy got this on the radar screen for  
24 us as a building to start looking at this in the  
25 future and a different way.



1           The vulnerabilities are there and we  
2     need to start addressing the vulnerabilities. As  
3     I mention, a lot of it is old and failing  
4     infrastructure. There's been a lack of funding  
5     primarily on the federal level on this and again  
6     from the state resources to be able to fund that,  
7     it becomes difficult. Though we've been finding  
8     a lot of good ways through EIT and other  
9     mechanisms to get money out on the street for  
10    that infrastructure, but it's got to be some long  
11    term planning that ties back to that overall.  
12    Sandy has created some opportunities for us on  
13    infrastructure which is the good part of that.

14           In that, we've been able to increase  
15    both federal and state funding for rebuilding for  
16    more resiliency. We've increased the focus on  
17    the criticality of that infrastructure that is  
18    necessary to maintain that long term. We also  
19    put in our minds that there's no such thing as a  
20    quick fix on infrastructure. It's not like let's  
21    go fix it all tomorrow and it will be done, put  
22    some basic small fixes in place. There are a lot  
23    of small fixes that had to be made to make  
24    systems operational, but the bottom line is that  
25    we've recognized now this is not a let's go sort

1     it out in a year or two. It will all be done.  
2     It will all be fine.

3                 These are long term challenges that  
4     we need to work on. They require long term  
5     investments and a long term mind set. It's not a  
6     quick fix. So there are four key areas that I  
7     want to talk about this morning. First, I want  
8     to talk about long term resiliency. In  
9     conjunction with that I want to talk about asset  
10    management. Thirdly, I want to talk about long  
11    term capital investments and infrastructure, and  
12    lastly, I want to talk about green  
13    infrastructure, so let me start off with long  
14    term resiliency. Again, what we looked at for  
15    resiliency, we looked at three major components  
16    or four major components.

17                Asset management being the fourth  
18    one, but post Sandy we recognize that we need to  
19    lay out from the DEP side from the state. We  
20    need to start talking about what are the best  
21    management practices out there and where do we  
22    need to amend the rules on infrastructure in the  
23    state to make sure that we created long term  
24    resiliency. The first area we want to talk about  
25    is power resiliency. Both water supply and water

1     quality have existing regulations on the books  
2     already for back up power, but we recognize after  
3     the storm we needed to clarify the minimum  
4     requirements for back up power.

5             We need a presence of sufficient and  
6     onsite generators. We need to have extended fuel  
7     capabilities for these generators long term. We  
8     need the storage. We need to create the storage  
9     for back up sources in flood proof buildings and  
10    alternative fuel supplies. We also need to  
11    include the storage of fuel for trucks, fleets  
12    and for workers vehicles to insure that they are  
13    able to get to work. Those operations are able  
14    to work overall. We're also evaluating the merit  
15    of prestaging bulk fuel around the state.

16            We haven't decided how we're going  
17    to do that yet, but we've had several options,  
18    but again, do we start using DOT storage  
19    facilities around the state as possibilities so  
20    we have more fuel available for these kind of  
21    instances. The second major area on resiliency  
22    overall is flood proofing. Again, what we  
23    recognize that while we have a lot of standards  
24    in place, we need more specific on setting those  
25    standards or be clearer on what those standards

1 are. We want to improve the construction  
2 standards and we're considering looking at the  
3 elevation of pump stations and or the electric  
4 systems associated with waste water collection,  
5 treatment or water supply wells.

6 We're flood proofing systems and  
7 pump stations. We're talking about using the use  
8 of water tight manhole covers for collection  
9 systems within flood prone areas, and lastly,  
10 looking to expand the existence of capacity of  
11 water, sewer or stormwater lines when they're  
12 replaced. The third major area we're talking  
13 about is emergency preparedness, and again we're  
14 trying to lay this out overall within a broader  
15 plan. Our regulations require emergency response  
16 plans that need to be in place.

17 We've decided we need to clarify  
18 what those plans are better, more specific around  
19 those plans and make sure the communities and  
20 utilities have those plans in place and ready to  
21 move for storms such as Superstorm Sandy. The  
22 fourth major area, and it's part of the broader  
23 discussion that I laid out over the last four  
24 years is asset management. Again, the key  
25 component, you can talk about this as the key

1 component as water infrastructure in the state  
2 since I've taken this job. Asset management is  
3 the management of the fiscal components of  
4 drinking water and waste water systems overall.

5 A key component of asset management  
6 is looking at and managing the whole life cycle  
7 of assets, and there are five main components of  
8 that, performing an inventory in addition to the  
9 assets in someone's system, defining the level of  
10 service goals, identifying critical assets,  
11 establishing life cycle costs and developing a  
12 long term funding strategy. Asset management is  
13 absolutely critical. Large utilities around the  
14 country, primarily more private utilities and  
15 public utilities run that way.

16 We've got to look at it that way for  
17 municipal utilities, both water supply, waste  
18 water, and even in some towns we need to be  
19 looking at it from a stormwater point of view.  
20 What are we doing for the long term asset  
21 management point of view on it. Next major area  
22 I want to talk about is long term capital  
23 investments. Again, to be able to make this work  
24 long term we can't talk about investments and  
25 infrastructure on just an annual basis. We've

1 got to look out 10, 20, 30 years. Investments  
2 needs to be made over the long haul.

3 We recognize the financial pressures  
4 of trying to lay out a plan where we're going out  
5 and try to make large investments in a very short  
6 period of time. That's not the way it works.  
7 Long term capital investments means laying aside  
8 capital dollars on an annual basis and continue  
9 having a plan of how those assets are built up  
10 over a period of time. That's the way it gets  
11 done. It's not spend money when repairs are  
12 needed. You may need to do that, but we don't  
13 want to jump from repair to repair project  
14 overall. We want to invest long term over  
15 capital investments.

16 From the state's point of view, in  
17 the short run from Superstorm Sandy and our work  
18 with EIT, we've expanded our financial assistance  
19 programs to provide over 800 million dollars or  
20 money repairs for infrastructure for the state  
21 for water infrastructure of the state. We've  
22 also set up in a very short term 65 million  
23 dollars into what we're calling a statewide  
24 assistance infrastructure loan program or sale  
25 program. That allows us to get money out on the

1 street immediately for a lot of smaller projects  
2 that need to get started right away while a lot  
3 of the larger projects will work their way  
4 through both the process we have set up with DEP,  
5 EPA and EIT.

6 For Sandy financing programs, 350  
7 million dollars for clean water and drinking  
8 water has been set aside. 190 million for clean  
9 water, 38 million for drinking water. Again, the  
10 key component to that money will be principal  
11 forgiveness. About 20 percent of that money will  
12 be principal forgiveness coming from the SRF  
13 funding. Finally, the last area I want to talk  
14 about, I know that it's a big focus that we  
15 continue to talk about in this group is the green  
16 infrastructure. Green infrastructure is still  
17 new to many municipalities.

18 Again, we see blending both the gray  
19 infrastructure of building along with green  
20 infrastructure. Those two components have to go  
21 together long term. For fiscal year '14 and '15,  
22 EIT has reserved 32 million dollars to support  
23 implementation of green infrastructure for  
24 providing principal forgiveness loans up to 50  
25 percent of allowable projects both in Barnegat

1 Bay communities of combined sanitary and  
2 stormwater systems. We're requiring the asset  
3 management of green infrastructure as part of a  
4 long term control plan for CSO communities.

5 We see this as absolutely critical  
6 component for CSOs long term. Obviously these  
7 have done it. We see what New York has laid out  
8 for their plan and we recognize that green  
9 infrastructure can play a key role in addressing  
10 some of the very larger issues especially CSOs  
11 long term. Again, what we are putting out there  
12 is updating our best management practices and  
13 regulations around green infrastructure. We want  
14 to promote better understanding and a use of  
15 green infrastructure. We want to update low  
16 impact design and general design maintenance. We  
17 want to provide training to other state agencies  
18 to promote and permit for stormwater and allow  
19 for maintenance and using new technologies.

20 Again, we also see the developing  
21 using both monies that we have from SRF funding  
22 to play a key role in leveraging long term  
23 funding within green infrastructure overall.  
24 We're very committed to green infrastructure. We  
25 see it as a key component of how we're going to



1 make investments in the future. We also see it  
2 in a lot of ways as both a way in a lot of cases  
3 a lower cost way of addressing a lot of the  
4 stormwater issues that we have to address within  
5 the state of New Jersey.

6 In closing, I want to recognize that  
7 we have long term plans in place in the state of  
8 New Jersey for infrastructure. We're going to  
9 continue to come out with -- continue laying out  
10 those long term plans. We're also going to be  
11 talking about both best practices and new  
12 regulations as necessary to address  
13 infrastructure of the state. We believe it's  
14 necessary in its post Sandy era to lay out a long  
15 term game plan of how we're going to continue to  
16 rebuild the infrastructure of the state of New  
17 Jersey.

18 I want to thank the Clean Water  
19 Council for your work and your continued  
20 commitment to getting things done and focus on  
21 the efforts that we have on clean water. It's  
22 absolutely necessary. I need your input. I  
23 appreciate your guidance and direction overall  
24 and I appreciate the hearing today so we can get  
25 some additional input from some of the top

1 experts in the field. Thank you all very much.

2 MS. GOODWIN: Commissioner Martin,  
3 thank you so much for your time, and for those  
4 members of the public here, please understand  
5 that while the commissioner goes off to his other  
6 responsibilities, he has staff members here,  
7 including Michelle Putnam, who will hear  
8 everything that you have to say as well as our  
9 speakers have to say and we will distill into a  
10 report for the Department and the Commissioner as  
11 a result of this hearing.

12 Before I begin, I would be remiss in  
13 not introducing the members of the Council and  
14 thanking them for their great efforts in bringing  
15 us to this hearing, in particular, my co-chairs,  
16 Jim Cosgrove and Dan Van Abs for whom this  
17 absolutely would not be possible. So thank you  
18 so much to the two gentlemen sitting in the front  
19 row, and I'd ask everybody else to stand. I'm  
20 going to read the names of all the council  
21 members, although not everybody could be here  
22 today. Stan Cach who is in the back of the room.  
23 Stan is our department liaison. Ferdows Ali from  
24 the Department of Agriculture. George Bakun. He  
25 is a representative from the NJ AFLCIO. Jim,

1 I've introduced. Jim is a representative from  
2 the public?

3 MR. COSGROVE: New Jersey Board of  
4 Professional Educators.

5 MS. GOODWIN: Ok. Thank you. Russ  
6 Furnari. Russ, you're a public representative,  
7 are you not?

8 MR. FURNARI: State chambers.

9 MS. GOODWIN: Oh. It's good to know  
10 peoples affiliations. Tony McCracken.

11 MR. MCCRACKEN: Public.

12 MS. GOODWIN: James Requa. And you  
13 are with the?

14 MR. REQUA: DCA.

15 MS. GOODWIN: Jessica Sanchez is  
16 with the DRBC. Chris Sturm is with New Jersey  
17 Future, but are you a public representative?

18 MS. STURM: Public.

19 MS. GOODWIN: Thank you. Tony  
20 Valente from the NJ Department of Labor, and Dan,  
21 who I've introduced. Dan is a public member. He  
22 is a professor at Rutgers University. And Ray  
23 Zabihach. He is likewise a member of the public,  
24 and Lou Neely just joined us. Lou represents the  
25 League of Municipalities. Anybody else? Please

1 introduce yourself and your affiliation.

2 MS. GOLDSMITH: Amy Goldsmith, New  
3 Jersey Environmental Federation.

4 MS. GOODWIN: Are you a public  
5 member, Amy?

6 MS. GOLDSMITH: Public.

7 MS. GOODWIN: Thank you. With that,  
8 let me introduce our speakers today and explain  
9 to you the format. We'll have a panel. Each  
10 panelist will speak for about 15 minutes and then  
11 we're going to open it up to questioning the  
12 panelists. We'll then take a break. As  
13 Commissioner Martin mentioned, the council as  
14 well as the department has been very interested  
15 in green infrastructure and we looked to see how  
16 different enterprises, including the city of  
17 Philadelphia, New York, and in this particular  
18 instance, Syracuse, the county and the university  
19 have begun to engage with regard to identifying  
20 appropriate mechanisms for green infrastructure,  
21 and among the various models that we have heard,  
22 we thought that the Syracuse model made perhaps  
23 the best sense for the state of New Jersey given  
24 the way in which we are configured.

25 So I hope that you'll enjoy Khريس'

1 remarks as much as we did when we had the  
2 opportunity to meet with he and some of his other  
3 colleagues. Khris Dodson is from the University  
4 of Syracuse. He focuses on smart growth, water,  
5 waste water planning and financing infrastructure  
6 for local communities, has a Master's in  
7 environmental communications from the State  
8 University of New York in environmental studies  
9 and forestry, and without further ado, Khris,  
10 please share your remarks. Thank you.

11 MR. DODSON: So first of all, I was  
12 confused about the amount of time, so I have more  
13 slides than I probably have time for so I  
14 apologize in advance if someone drags me off with  
15 a shepard's hook and I'll go willingly. I'd also  
16 like to second everything that the commissioner  
17 said. His four points are really the four things  
18 that I work on, on a daily basis when I'm not  
19 working for Onondaga Save the Rain Program, so  
20 that's what I'm here to talk about today is  
21 Onondaga County's Green Infrastructure Program.  
22 We are a partner.

23 We do a lot of technical assistance,  
24 design public education and outreach for Onondaga  
25 County's Save the Rain Program. So anyway, I

1 call green infrastructure truly a public utility.  
2 Why? Because we don't all volunteer afternoons  
3 and evenings and Saturday mornings at the sewage  
4 treatment plant. We don't go and put chemicals  
5 into the water to disinfect it. We're not  
6 allowed to for good reason, but we can build rain  
7 gardens, we can use rain barrels. We can put  
8 green roofs on our commercial buildings, and  
9 doing so helps the public utility. We've become  
10 part of the public utility.

11 We're serving the public good by  
12 doing those things to help the community that we  
13 live in, the community that we pay rates and  
14 taxes in, manage stormwater. This isn't your  
15 grandmother's rain barrel. This isn't the rain  
16 barrel you use to water the kitchen garden.  
17 We're talking about millions of gallons of  
18 stormwater annually in cities the size of  
19 Syracuse. 147,000 people live in Syracuse.  
20 We're a midsize city but mid smallish and we have  
21 to capture 250 million gallons annually of  
22 stormwater a year by 2018.

23 Why? In the last 50 years, 60 years  
24 since the advent and reliance on the automobile,  
25 we pave everything. If you look out these

1 windows and see rooftops that are impermeable,  
2 sidewalks, roads, impermeable space. When rain  
3 hits this, it doesn't absorb. I think we know  
4 that. It runs off somewhere into pipes that were  
5 built 100 years ago for the amount of stormwater  
6 we were capturing 100 years ago and it travels to  
7 the same pipe that our sanitary sewer travels  
8 through which is a euphemism really for  
9 everything we flush down the toilet, and when  
10 there is no more space in that pipe because if we  
11 paved everything, that water overflows and ends  
12 up in our local waterways becoming an  
13 environmental and public health hazard.

14                   So what is the trouble with run off?  
15 Really, other than the fact that it combines with  
16 sanitary sewer and sometimes overflows into our  
17 local waterways, it's that one drip of oil or  
18 that windshield washer fluid or that dog poop on  
19 the corner. It's that cigarette butt. It's that  
20 french fry bag. It's that water bottle, that  
21 piece of plastic, that piece of gum wrapper foil.  
22 All of these things seem innocuous when you do  
23 it. It's all right for you to toss something out  
24 the window or for your dog because you forgot  
25 your pooper scooper, to leave that there on the

1 corner.

2 But when you multiply that by every  
3 single person in your community that has that one  
4 drip a day or that one thing they drop on the  
5 ground by accident and decide not to pick up or  
6 that one pile of dog crap on the corner, it's  
7 accumulative and effective all of those things  
8 washing off of our landscapes with fertilizers  
9 and everything else that we apply to our  
10 landscape into our waterways that is really kind  
11 of disgusting and then you add sanitary to it and  
12 it becomes even more gross and I know I'm  
13 preaching to the choir here for some of you.

14 So I'm moving kind of quickly, so if  
15 you're unfamiliar with what a CSO is, combined  
16 sewer overflow which, by the way, there are 770  
17 communities in the United States that are CSO  
18 communities. This is kind of a graphic of a CSO.  
19 During dry weather, all the rain from your roof,  
20 sidewalk, driveway goes down the storm drain into  
21 our sewer system. It will go to the treatment  
22 facility and it combines with anything that comes  
23 from your house, from the dishwasher, from the  
24 toilet, from the shower.

25 But then when we have a wet weather



1 event, snow melt, rain, that stormwater and that  
2 brown water from your home, from your business,  
3 et cetera combined reaches the capacity of the  
4 system and overflow a dam into a nearby lake,  
5 stream, creek, et cetera, depending on how your  
6 system is constructed and what your nearby water  
7 bodies might be, but if we put in a vegetated  
8 swale to capture that water from your sidewalk,  
9 from your roof leaders, down spouts and from your  
10 driveways before it even hits the road.

11 If we put in porous roadway or  
12 porous parking lots, porous sidewalks, let that  
13 water go into the ground and recharge the ground  
14 water. We're reducing the reliance on that sewer  
15 system effectively increasing the capacity of it  
16 to carry the sanitary sewer that most needs  
17 treating. So you'll see here that much of the  
18 stormwater doesn't even reach the system. So  
19 types of green infrastructure, for those of you  
20 who may be unaware. We have bioswales.  
21 Essentially think about roadside ditches that are  
22 meant to be vegetated, not meant to be dug out  
23 every year by the town backhoe causing erosion,  
24 causing high speed water and sediment rushing  
25 down the sides of roads.

1                   But then to slow that water, allow  
2                   it to soak up, feed the plants, infiltrate into  
3                   the ground. Rain gardens, same thing, except for  
4                   it's more of a static space where you put water  
5                   toward, maybe from a down spout, allow that water  
6                   to recharge the ground, feed the garden instead  
7                   of running down your sidewalk, down your driveway  
8                   into the street. Rain barrels of course, green  
9                   roofs. These are great things for areas where  
10                  maybe a large building such as this one is built  
11                  from lot line to lot line. It can't do anything  
12                  else other than putting a green roof on top to  
13                  manage the stormwater that falls on that lot.  
14                  Porous pavement is great.

15                  We have a demonstration in Lake  
16                  Placid in the Adirondacks where we actually put  
17                  in porous asphalt on a high speed roadway to see  
18                  if we can actually start building porous high  
19                  speed traffic lanes. Up until this point, porous  
20                  pavement is really used for parking stalls,  
21                  sidewalks, driveways, places where you don't have  
22                  that force of speed, so we'll see how that turns  
23                  out and if that's positive. It can really make  
24                  the way we manage stormwater and our  
25                  transportation infrastructure. So Onondaga

1 County in Syracuse, a case study. This is us.

2 This is our infamous Onondaga Lake.  
3 At one time known as the most polluted lake. I'm  
4 not sure if there's any real data to say that,  
5 but it's a sense of sick pride in Syracuse, so  
6 let them have it, but this is the city of  
7 Syracuse essentially. Each one of these colors  
8 is a different sewer shed, so we've mapped all of  
9 our outflows. We've mapped all of our sump sewer  
10 sheds, which sump sewers they travel through,  
11 where this ultimately ends up, what's the  
12 service, what's the capacity and we've named them  
13 all so it's like a water shed.

14 We've looked at our built  
15 infrastructure in that same way to identify  
16 target areas where we need to do really robust  
17 green infrastructure projects such as the  
18 downtown area. Here this is very, very  
19 impervious. This area is more residential.  
20 Here, we need big projects. Here, let's give  
21 away a few rain barrels, so this is where we are  
22 right in the middle of New York and I was telling  
23 the panelists earlier, I travel a lot of work.  
24 End to end, nine hours, and so if I get to drive  
25 an hour, hour and-a-half in a day for a meeting,

1     that's awesome.

2                     And so here is another graphic, so  
3     we've numbered each one of our CSOs, combined  
4     sewer overflows. We have 49 active CSOs right  
5     now. Several years ago, I think we had more like  
6     70, so we're shutting them down pretty quickly.  
7     So we got started really there are a lot of  
8     community members in Syracuse who are really  
9     excited about green infrastructure, underground  
10    storage of stormwater and other things instead of  
11    building regional treatment facilities which are  
12    expensive, which the OMM, Operations and  
13    Maintenance costs never go down.

14                    They always go up and we're looking  
15    at alternatives. And we'll use this report from  
16    the energy sea rooftops and rivers in 2006 as an  
17    example of what we can do in Syracuse. They  
18    convinced the leadership that green  
19    infrastructure is the way to go in part because  
20    we did end up building one of those regional  
21    treatment facilities. This one, the midland data  
22    RTF cost 120 million dollars. That's the whom  
23    price tag of our green infrastructure program.  
24    One treatment plant.

25                    We needed to build four more to

1 reach our goals. In a city the size of Syracuse,  
2 it wasn't financially sustainable, and it wasn't  
3 socially and culturally sustainable either.  
4 Nobody wants to go to high school across from a  
5 sewage treatment plant. Nobody wants to go to  
6 our one thriving night district next to a sewage  
7 treatment plant, and this is where they had  
8 designed to put in a couple of these plants.

9           The community was also not  
10 interested any longer in living across the street  
11 from 12 foot wide trenches where we were building  
12 conveyance pipes and having all of these big  
13 things sit in front of their house for months on  
14 end while they spent millions of their dollars  
15 putting in conveyance to treatment facilities  
16 such as this one, which essentially chlorinates  
17 the water, removes the floatables, chlorinates  
18 the water, dechlorinates the water and dumps it  
19 right back into the creek, so it's not  
20 necessarily, it's patching the problem. It's not  
21 making it any healthier for any kind of living  
22 thing in this creek which travels the whole  
23 length of our city. Just a couple pictures.

24           This is a disturbance in anybody's  
25 neighborhood. In a belt community, a post

1 industrial community, whatever you want to call  
2 Syracuse which is not similar from Trenton,  
3 Camden, Newark or any other city in New Jersey,  
4 do we need to give people another reason to leave  
5 the city? So building five sewage treatment  
6 plants and doing this across the street might be  
7 the straw that broke the camel's back for some  
8 folks. Having overflows and sewage separations  
9 which are expensive, ugly and public health  
10 issues, more reasons to consider the alternative.

11 Having an upset constituency,  
12 leaving toilet paper in your trees in your front  
13 yard and leaving toilets in your front yard and  
14 walking down main street, another reason to think  
15 maybe something should change, and finally we had  
16 a new county executive, Joanie Mahoney, someone  
17 who was from the city and sat on the city council  
18 for quite some time before she became county  
19 executive, decided she had four days to enter  
20 into contract to build those other four treatment  
21 plants and she decided against it. She decided  
22 let's do green infrastructure instead. Let's get  
23 green infrastructure into our consent judgment  
24 and let's move forward on this quickly and we  
25 have, and that was 2008.

1                   So some highlights. I'll go through  
2                   very quickly. We've captured 100 million gallons  
3                   so far. We're monitoring so we can demonstrate  
4                   we're actually doing that. We're using the EPA  
5                   swim model to kind of model how much we're  
6                   capturing. We're also ground treating that  
7                   through the partnership with us and Syracuse  
8                   University. We built 100 projects in two  
9                   and-a-half years and they're pretty big projects,  
10                  and I'll show you a few now. We have to capture  
11                  a total of 250 million gallons of stormwater a  
12                  year by 2018. We have to do public education and  
13                  outreach and we have to do monitoring and  
14                  reporting as part of our agreement with the  
15                  federal court.

16                  We also have milestones here to  
17                  reach and we're on target to reach this one by  
18                  the end of this year which is essentially now.  
19                  That 250 million gallons though is only six  
20                  percent of our total CSO volume. It's astounding  
21                  how much water comes out of our buildings and off  
22                  of our landscape. This is kind of how we project  
23                  we're going to get to that capture every year, 35  
24                  million gallons this year, 36, 37 and then kind  
25                  of hitting toward the end of 22 building projects

1     that will manage that amount of water every year.  
2     We're mapping this.

3             You can find this on our web site,  
4     savetherain.us, and you can click on any one of  
5     those balloons and find more information about  
6     the project that is there, but this shows you the  
7     density of the projects that we have in the city.  
8     There's several things we're doing, no matter who  
9     you are, if you're a resident, a business owner,  
10    someone who works for a nonprofit, another  
11    governmental entity in town, there's a way for  
12    you to get involved in save the rain. We're  
13    placing 8500 street trees by 2018.

14            We walk around and knock door to  
15    door in residential areas. Would you like a few  
16    tree, we'll plant it for you, and you even get to  
17    pick the species. Only 25 percent of people  
18    actually say yes to that, but we do offer it.  
19    Trees drink water and unimproved streets with no  
20    curbs, that really provides a benefit. It  
21    improves streets that do have curbs. We're  
22    starting to put in curb cuts to allow that water  
23    into the right of way so trees soak it up. The  
24    green improvement fund has been super popular.  
25    We've never even advertised it.



1                   Since March of 2010, we've offered  
2 money, reimbursement money to businesses and  
3 nonprofits. You have a broken up parking lot,  
4 you have a leaky roof. You want to put some  
5 street trees in or redo your sidewalk, we will  
6 help you pay for that improvement if you do it in  
7 a way that manages all the stormwater. So we've  
8 got 120 applications. 36 of those projects have  
9 been completed. 54 are going in the ground in  
10 early 2014, are contracted for construction in  
11 2013 and the remainder will be going in, in 2014.

12                   So that's a huge number of projects  
13 and a huge public investment in the private  
14 sector and it really beautifies the community  
15 when some of these businesses have all of a  
16 sudden nice new parking lots to help with pot  
17 holes or they put green roofs on their buildings  
18 or they plant trees and put in bioswales and rain  
19 gardens. For a community, again, that's post  
20 industrial decay, this is really revitalizing it  
21 in more ways than just water management. The  
22 aesthetic value alone is pretty powerful.

23                   So here is a couple of pictures of  
24 some of those things. A parking lot that's been  
25 redone. This is porous concrete in the middle.

1 This is asphalt on either side and we've shimmed  
2 the traditional asphalt so the water will sheet  
3 flow into that porous area. We don't need to do  
4 the whole parking lot in porous. Porous is more  
5 expensive and it's unnecessary to do the whole  
6 parking lot in porous to manage just that parking  
7 lot. You can do strips and get the same bank for  
8 your buck.

9                   There's a green roof on this  
10 architecture firm, and those are also solar  
11 panels. They paid for that themselves. Another  
12 green roof on this building and then they did  
13 porous pavers which are very expensive, but they  
14 paid the difference in that cost. Porous pavers  
15 in their parking lot and driveway in this lead  
16 platinum hotel in Syracuse, so these are some  
17 examples of the green improvement program. We  
18 have the diversity of unique projects in Save the  
19 Rain. It's not just doing the parking lots and  
20 parking lots and a few green roofs here and some  
21 rain gardens and bioswales.

22                   We've done some pretty cool stuff  
23 and I'm going to go through some of them now.  
24 Jim Bayheim who is the basketball coach for  
25 Syracuse University. If you live in Syracuse,

1 the Syracuse area, you're required to know that,  
2 so I'm sharing that with you. He has the Bayheim  
3 Foundation where he builds courts, it's called  
4 Courts for Kids Program, where he builds  
5 basketball courts for inner city children so  
6 we've convinced him, and it didn't take much  
7 convincing, to build four of those in the city of  
8 Syracuse and if he paid for the cost of the  
9 traditional basketball court, we would may the  
10 difference if we could use porous pavement so it  
11 could manage the stormwater of those basketball  
12 courts.

13 Cool anecdotal information, because  
14 of the void space here, the neighbors say that  
15 the bounce is less noisy. Maybe because the void  
16 space treats the noise, so the neighbors are  
17 happier and the kids and the parents are happier  
18 too because after it rains there's no puddles.  
19 They can go right out, and play and also in a  
20 city like Syracuse where we're struggling to  
21 reinvest in our parks, having some new park  
22 infrastructure is certainly nice. The connective  
23 corridor is great.

24 This is a street right adjacent to  
25 Syracuse University that Syracuse University, the

1 City of Syracuse and Onondaga County Save the  
2 Rain Program all jointly paid for, the  
3 construction of. This green space is a bike lane  
4 which is really cool because it's separate and  
5 distinct from the vehicle traffic lane, so bikes  
6 feel very protected. We have sidewalk, porous  
7 pavers, the bike lane, the bioswale and then all  
8 of the water from lot line to lot line for this  
9 mile and-a-half strip is captured. We're  
10 capturing five million gallons of stormwater, and  
11 not only does it look much cooler and it provides  
12 alternative transportation modes for folks.

13 This is East Water Street. This is  
14 the oldest lock station on the Erie Canal right  
15 there. It's now a museum. This is our city hall  
16 which looks like a castle. This is the before  
17 picture of East Water Street and this is the  
18 after, so when you come to downtown Syracuse  
19 instead of being like, oh, yep, another  
20 northeastern city that's struggling because  
21 industry has left. Oh, isn't this charming, and  
22 so we capture again from lot line to lot line all  
23 the stormwater, porous pavers for the parking  
24 lane so that when people come in here, they're  
25 like, this is grey, this is asphalt, there's

1 something different here.

2 Oh, right it's the parking lane. It  
3 becomes an visual signifier that this is a place  
4 to park, not here. And people do try that. I'm  
5 sure they try to do it here too. They park  
6 wherever is convenient for them. We've also  
7 narrowed the crosswalk across from the museum,  
8 ADA accessibility. A narrower crosswalk means  
9 ease in crossing the street when you have the  
10 opportunity for folks who have mobility issues  
11 and it's much more attractive with the bioswales  
12 and trees. We're, as far as I know, the first  
13 and only so far professional hockey team in the  
14 country to skate on rain water so this is the  
15 Syracuse Crunch.

16 I don't know much about hockey. I  
17 guess they're NHL or AHL. You don't have to know  
18 about Syracuse Crunch. You do have to know about  
19 Syracuse basketball. There is our logo, always  
20 have to be marketing ourselves, but we capture  
21 all the rain water off the roof of this building  
22 and use that to make the ice to skate on. It  
23 makes sense. Why do we spend money to clean  
24 water to a drinking level standard only to have a  
25 bunch of guys in helmets and uniforms beat each

1 other up on it. It seems like a waste of money  
2 to skate on drinking water in my mind.

3 A couple other anecdotal pieces for  
4 this is that it actually for some reason freezes  
5 faster so we use a little bit less energy to  
6 freeze this rain water than we do potable water  
7 and the skaters actually like it. They say it  
8 freezes a little bit harder too. Anywhere you go  
9 in the northeast, parking lots look like this.  
10 If you start to manage stormwater, they can look  
11 like that so we capture all the water off this  
12 parking lot, infiltrate it into the ground using  
13 these bioswales that are in between the parking  
14 lanes, so what you see here is a very thin four  
15 foot strip maybe of garden, sunken garden.

16 What you don't see is the huge  
17 gravel beds that underlay almost the entire  
18 parking lot and those gravel beds are really used  
19 for the storage as the water slowly infiltrates  
20 into the ground. Another parking lot we have  
21 here, we've managed the whole parking lot by just  
22 doing porous around the edges, and while we were  
23 digging that parking lot up we thought ahead.  
24 People are starting to use more electric cars.  
25 We're not going to redo this parking lot again in

1 another five or 10 years. Let's put in some car  
2 charging stations, so we did.

3 Let's also, while we take down a  
4 lamp, put up new ones so the new lamps are LED,  
5 super energy efficient. A lot of our streets,  
6 we're starting to make more attractive. The  
7 before is gray and winter. The after of course  
8 is sunny and summer. It's like the acne  
9 commercials you see where the color of the photo  
10 is always off, so the after always looks much  
11 better so we've done the same thing here but we  
12 have curb cuts on this road to allow all the  
13 water off the road to go into the bioswale, run  
14 off the sidewalk into the bioswale.

15 This is an aerial just to show you  
16 the density of this one part of Syracuse of green  
17 infrastructure. This is a green roof. It's  
18 brown here because we just planted it then. This  
19 is an acre and-a-half green roof. It captures a  
20 million gallons. This is the War Memorial where  
21 the ice rink is, so we capture all the water  
22 there for the ice. This is that parking lot we  
23 managed around the edge. This is the other  
24 parking lot. We put in the median along this  
25 road, and this whole parking garage, all the rain

1     that falls on the roof of it is managed by a huge  
2     rain garden along the side of it so just that one  
3     area in Syracuse is capturing a lot of  
4     stormwater.

5                     So education and outreach is where  
6     I'm focused, but it means telling a great story  
7     and getting people engaged, and we have great  
8     projects to tell that great story with, and so we  
9     do. And we also have projects that are  
10    accessible to folks that they can walk on and  
11    walk by. We have interpretive science to let  
12    them know what they're seeing, why this space is  
13    different, and again, the before is gray and  
14    winter. The after is summer and sunny, but you  
15    see we put in rain gardens, flexy pave, porous  
16    asphalt.

17                    People are getting to see, walk on,  
18    touch, feel and live near this green  
19    infrastructure and understand what we're doing in  
20    the city and how it makes improvements. We're  
21    using our own facilities like the zoo in the city  
22    that is a park owned space and saying, hey, tens  
23    of thousands of people locally come to this zoo  
24    every year, why can't be telling them about Save  
25    the Rain while we're also telling them about the



1 animals that live here. We put in a lot of  
2 projects, rain gardens near the entrance and a  
3 lot of things within the visiting area where  
4 people can understand what a rain barrel is, what  
5 a rain garden is, how porous pavement works.

6 We put on green roof on the elephant  
7 barn and we tell people about that. We've done a  
8 lot of work there at the zoo for folks. If you  
9 went to our zoo and you didn't see anything Save  
10 the Rain, then you were walking around with your  
11 eyes closed. We're out there all the time doing  
12 public events. We have this great house which is  
13 really a shed on a truck bed with a green roof on  
14 it, porous pavement, sidewalk, little rain  
15 barrels that we use when we go out for events in  
16 the parade and we also do tabling and things like  
17 that.

18 It really means being enthusiastic  
19 and it means being targeted and strategic.  
20 Having a message, having a way for different  
21 people to get engaged based on who they are and  
22 where they're coming from. We do workshops for  
23 all types of folks. We tell Realtors why Save  
24 the Rain is a valuable thing, why they should be  
25 pitching this to people who are interested in

1 buying in our community. We employ youth to do  
2 demonstration projects. We train professionals  
3 like landscape architects and engineers. If  
4 you're part of our community, help us help you  
5 with Save the Rain.

6 If you're an engineer and you want  
7 to get engaged, let us train you on how to get  
8 engaged in this program. We have a rain barrel  
9 program. We've given away about 1200 rain  
10 barrels so far in three years for free to city  
11 Syracuse residents, and when the time is right,  
12 we let them paint the rain barrels. It's part of  
13 an art festival. We hire an artist to come in  
14 and help them. They make creative designs if  
15 they like, and then we also do demonstration  
16 projects, let people know what it can look like.

17 So this is a residence across the  
18 street from a park diagonal from an elementary  
19 school, high visibility, high traffic, put in a  
20 rain garden, porous pavement, roof leaders over  
21 here, rain barrels on the other side and signage  
22 so people know what changed here, what's  
23 different and why we did it. Some other  
24 demonstration projects we did at a community  
25 center. Someone's driveway, porous concrete. It

1 really means working with everyone. So we have  
2 the youth group that I didn't talk too much  
3 about, but they're young kids from a  
4 socioeconomically challenged community in  
5 Syracuse.

6 We pay them fair wage, I think 12 or  
7 15 dollars to build green infrastructure and to  
8 teach their peers about green infrastructure.  
9 Not only do they learn the soft skills of getting  
10 up and going to work at 9 o'clock and working  
11 until five without texting, but they learn  
12 marketable skills to go out and work for a  
13 landscape architect or a landscaping company.  
14 Here we have the city of Syracuse mayor, the  
15 Onondaga County executive and the EPA Region 2  
16 administrator, Judith Enck, at a meeting we had a  
17 couple years ago and then researchers at  
18 Syracuse University, again, monitoring  
19 demonstrating.

20 We are capturing what we model that  
21 we capture. It really brings people together,  
22 get people outside learning, feeling better about  
23 their community, making the community more  
24 attractive together, and the last couple sides  
25 are some pictures of some of the pieces that

1 we've created as part of our public education and  
2 outreach for this program. In two languages,  
3 English and Spanish. We have crossword puzzles  
4 and mazes for the adults and other information  
5 for everybody else. We have E news here, 2,000  
6 subscribers, Facebook, blah, blah, blah, all that  
7 social media crap.

8 We're really doing great with it.  
9 It's my job. I shouldn't be so deprecating, but  
10 social media tires me and then we're getting a  
11 good recognition, both locally and also  
12 nationally, so Governing Magazine, which I'm sure  
13 you all read, named Joanie Mahoney the eco  
14 adversary public official of the year in 2011.  
15 This really gets her kudos at home. The cover of  
16 Municipal Sewer and Water, I'm sure you all  
17 subscribe. She was on the cover last year. This  
18 gets her kudos at home. It makes it easier for  
19 her to keep moving forward with this program.

20 And now rooftops to rivers 2 which  
21 was our original kind of inspiration. Now, we're  
22 in it this past year so that makes us feel kind  
23 of proud. Last few things. The other day we won  
24 the New York State DEC which is like the DEP,  
25 Water and Quality Excellence Award. We are

1 capturing all of the water off of the Carrier  
2 Dome where the basketball team plays. Capturing  
3 that water to flush the toilets during games.  
4 Again, why do we use drinking water? Why do we  
5 pay to clean water to drinking level just to  
6 flush it down the toilet? Why can't we use what  
7 falls from the sky for free?

8 We are advising the White House  
9 Council on Environmental Quality. We won the  
10 U.S. Water prize, and just last month in Newark,  
11 the city of Newark and the city of Camden both  
12 came to the first annual national GI Summit held  
13 in Syracuse this October with more than 30 other  
14 communities around the country including LA,  
15 Portland, Denver, Chicago, DC, Boston, New York  
16 City, Syracuse obviously, to talk about green  
17 infrastructure and how we can make this kind of a  
18 force in all of our communities and really get  
19 out there and hit the ground running.

20 I apologize I did in fact take more  
21 time than was allotted to me. I'm happy to take  
22 any questions when the Q and A time comes. Here  
23 is my contact information and I yield the floor.

24 MS. GOODWIN: So I doubt that  
25 anybody here has any question why we wanted you

1 to hear that. That was fabulous and  
2 inspirational so we look forward to your  
3 questions and comments and a perfect segue into  
4 Jeremiah Bergstrom who is also here with Mark  
5 Anderson I might add, and Mark will be available  
6 for comment, but he will not be speaking. Both  
7 of them are licensed landscape architects in the  
8 state of New Jersey and Jeremiah works for the  
9 Rutgers Cooperative Extension Water Resources  
10 Program and represents NJASLA and has served on  
11 NJDEP Strong Water Advisory Committee, but in  
12 particular I want him to talk to you about, or  
13 ask him to talk to you about what kinds of  
14 programs similar to the ones that you've seen  
15 here or initiatives I should say are working, can  
16 work, should be working here in New Jersey.  
17 Thank you.

18 MR. BERGSTROM: Welcome everyone,  
19 and we want to thank you for being part of this  
20 discussion here and thank the Clean Water Council  
21 for this opportunity and I look forward to  
22 sharing with you our thoughts, our ideas, our  
23 projects, our programs that we've piloting  
24 throughout the state and also hearing from you  
25 about New Jersey's Water Infrastructure. Where

1 do we begin? I'd like to begin with this. New  
2 Jersey needs a community based approach to  
3 designing and building infrastructure that  
4 leverages the resources of our landscape and  
5 environment.

6           These green systems can provide  
7 communities with real savings, strengthen local  
8 economies, make communities more resilient and  
9 create healthier more livable communities while  
10 protecting critical water resources. Just a  
11 quick introduction for those of you who do not  
12 know who I am. I work for Rutgers Cooperative  
13 Extension, the outreach arm of Rutgers, the State  
14 University of New Jersey. I've been working for  
15 four years there. More specifically, I work for  
16 the Water Resources Program, a speciality program  
17 of RCE focused on addressing New Jersey's water  
18 resources issues.

19           The Water Resources Program is led  
20 by Dr. Christopher Obropta and we have been  
21 partnering with communities and organizations  
22 throughout New Jersey for more than 12 years.  
23 Our mission is to identify and address community  
24 water resources issues using sustainable and  
25 practical science based solutions. I am also a

1 licensed landscape architect and Mark Anderson  
2 has joined me here today to represent NJ ASLA,  
3 the New Jersey Chapter of the American Society of  
4 Landscape Architects. We and our colleagues in  
5 are committed to balancing the needs of the  
6 environment and the human community in our design  
7 projects throughout the state of New Jersey.

8 Together, Rutgers Cooperative  
9 Extension and NJASLA are excited to help lead the  
10 discussion of green infrastructure for New  
11 Jersey. Rutgers Water Resources Program has been  
12 actively engaged in partnerships throughout New  
13 Jersey for the past four years promoting and  
14 building green infrastructure. In communities  
15 across the state from Camden County to Hudson  
16 County, from Bergen County to Sussex County and  
17 many, many more. We are working to educate as  
18 well as build awareness about the need to look at  
19 infrastructure differently and we hope that our  
20 experience and expertise can assist you, the  
21 Clean Water Council and New Jersey as we chart a  
22 path for greening New Jersey's water  
23 infrastructure.

24 New Jersey communities are  
25 struggling, struggling with a range of water



1 resource and water infrastructure issues. From  
2 residents in urban and environmental justice  
3 communities living with polluted waterways and  
4 combined sewers backing up into parks, streets  
5 and basements every time it rains, to suburban  
6 townships experiencing frequent nuisance flooding  
7 while struggling to manage and maintain hundreds  
8 of stormwater management basins, clean tens of  
9 thousands of inlets and outlets along with  
10 hundreds of miles of storm sewer pipes, to our  
11 shore communities looking to rebuild and find  
12 ways to minimize damage from future storms.

13               These are the issues New Jersey is  
14 facing every day and hopefully we can help lay  
15 the foundation for creative, innovative and cost  
16 effective strategies for New Jersey communities  
17 as we all invest in infrastructure for the  
18 future. How did we get here? As we've seen  
19 already, we begin to build our great cities and  
20 towns, we needed to get water away from our  
21 homes, schools, roads and businesses. We  
22 designed and constructed an incredible network of  
23 infrastructure to do just that. Now that network  
24 of treatment facilities, pipes, inlets, outlets  
25 and basins carries nearly every drop of water

1 from our rooftops, our driveways, our parking  
2 lots, sidewalks and roadways directly to our  
3 rivers, lakes and streams.

4 The result of this work has left New  
5 Jersey with a host of issues including limited  
6 resources for maintaining our existing  
7 infrastructure, impaired water quality as a  
8 result of nonpoint source pollution and degraded  
9 quality of life for many residents in flood prone  
10 and urban environmental justice neighborhoods.  
11 Our gray infrastructure network of pipes, pumps,  
12 basins and treatment plants needs to be  
13 reinforced. We need to stop, look around and  
14 leverage the landscape and the resources  
15 available to us in the environment as we plan  
16 infrastructure for the future.

17 By managing stormwater where it  
18 falls, near its source, through healthy  
19 landscapes, soils and innovative structural  
20 measures, we can begin to reduce the burden on  
21 our existing infrastructure systems and improve  
22 and protect water quality. Integrating green  
23 strategies into the next phase of infrastructure  
24 upgrades and improvements throughout New Jersey  
25 will help to maximize the impacts of our limited

1 resources by not only improving water management,  
2 but enhancing the quality of life in our  
3 communities and protecting the environment.

4           Where are we now? Communities are  
5 struggling with water infrastructure in a variety  
6 of ways and are looking for cost effective  
7 innovative solutions. Over the past several  
8 years we have met with community leaders in the  
9 City of Camden, Hamilton Township in Mercer  
10 County, the City of Hoboken, the City of Newark,  
11 Patterson, Little Falls, Montclair, West Orange,  
12 Saddle Brook in Bergen County and Bayonne in  
13 Hudson County. These communities are ready and  
14 willing to consider green infrastructure tools  
15 like green roofs, tree plantings, bioretention,  
16 permeable paving and water harvesting. And use  
17 these tools in their community to better manage  
18 stormwater, address flooding and protect water  
19 resources.

20           Green can work. Many communities  
21 throughout the country are figuring out how to  
22 make it work. We can look to these communities  
23 for guidance and direction. But New Jersey does  
24 not have the same level of financial resources  
25 available and we have to do things a little bit

1 differently. New Jersey needs to start by taking  
2 a community based approach. We need to invest in  
3 identifying the specific needs of New Jersey's  
4 communities and the opportunities for maximizing  
5 water management. These communities can then  
6 develop individual programs to address these  
7 needs building grass roots support and a  
8 sustainable, resilient future for our State's  
9 infrastructure.

10 This unique approach will provide  
11 New Jersey with a plan for infrastructure that we  
12 can sustain. Green infrastructure will look  
13 different for each community. In suburban  
14 townships, the infrastructure may include a  
15 municipal led program to naturalize and modify  
16 existing stormwater basins to promote  
17 infiltration and groundwater recharge as well.  
18 The green infrastructure also may include  
19 residential rain barrel and rain garden programs  
20 for homeowners or it may include repaving parking  
21 lots and fire lanes with pervious paving  
22 solutions.

23 In our urban core, it may include  
24 converting brownfields to greenfields to capture  
25 and manage stormwater runoff reducing pressures

1 on the combined sewer system. It may include  
2 renovating vacant lots to serve as community  
3 gardens and harvesting rainwater or creating  
4 pocket parks with rain gardens and pervious  
5 concrete sidewalks. These and other green  
6 infrastructure projects have been successfully  
7 demonstrated in communities throughout New  
8 Jersey. This is not infrastructure as we have  
9 known it. Leveraging is key.

10 New Jersey needs to leverage the  
11 landscape as well as leverage available  
12 intellectual, human and financial resources to  
13 better manage stormwater and to make green  
14 infrastructure accessible to all communities.  
15 This will require change. Planning, design,  
16 engineering and construction of green  
17 infrastructure in New Jersey will require a  
18 paradigm shift in the way we think about our  
19 communities in our infrastructure. Hamilton  
20 Township in Mercer County has begun investing in  
21 this new approach.

22 Over the past three years, the  
23 township in partnership with Rutgers Cooperative  
24 Extension has assessed current water resources  
25 issues, evaluated existing infrastructure and

1 charted a course for improving stormwater  
2 management that includes all community  
3 stakeholders and available resources in the  
4 solution. As we move forward, we need to keep in  
5 mind that an effective way to implement green  
6 infrastructure in New Jersey is through this  
7 community based process. Successful green  
8 infrastructure programs rely on support from a  
9 range of stakeholders and constituents.

10 The projects we have shown were the  
11 result of partnerships between design  
12 professionals, community leaders, nonprofit  
13 organizations and local residents. Nowhere has  
14 this been more successful in New Jersey than in  
15 Camden. The Camden SMART, Stormwater Management  
16 and Resource Training, initiative has been paving  
17 the way for green infrastructure in Camden for  
18 nearly four years. This unique partnership has  
19 been able to leverage Federal Resources through  
20 USEPA, State Resources through NJDEP,  
21 intellectual resources, through Rutgers  
22 Cooperative Extension, resources from the city,  
23 nonprofit organizations including Cooper's Ferry  
24 partnership and New Jersey Tree Foundation as  
25 well as other local resources through numerous

1 community development and civic organizations.

2 We all rely on infrastructure. A  
3 community driven approach ensures a sustained  
4 commitment to constructing and maintaining green  
5 infrastructure now and in the future. New Jersey  
6 communities need to work with multiple  
7 professionals and multiple organizations to  
8 effectively and successfully build green  
9 infrastructure that protects and enhances the  
10 quality of our environment as well as the quality  
11 of life for our citizens. Where do we go from  
12 here? Some of these may be a little redundant.  
13 We've already heard today. Hopefully if all  
14 three of us say the same thing, maybe it will  
15 stick.

16 How can we leverage the landscape  
17 and have green infrastructure for everyone in New  
18 Jersey? These seven actions are what we want to  
19 share that will help promote green infrastructure  
20 throughout New Jersey. First, commit to  
21 maintaining New Jersey's existing infrastructure  
22 while investing in new gray and green facilities.  
23 We have not invested enough in maintaining our  
24 existing infrastructure and are now facing the  
25 consequences. In many communities we need to get

1 existing infrastructure operating effectively to  
2 clearly understand what the opportunities and  
3 needs are for green infrastructure.

4                   Whether maintenance includes repair  
5 and replacement of concrete structures in  
6 hundreds of stormwater basins that are 25 to 30  
7 years old or including replacing outdated pumps  
8 with new technology that can minimize combined  
9 sewer overflows or if it is simply cleaning  
10 sediment and leaves from inlets and pipes, it  
11 must be done. We need to invest in and commit to  
12 maintaining the existing infrastructure we have  
13 as well as the new infrastructure we build.  
14 Through a coordinated and consistent program of  
15 investment in stormwater infrastructure, New  
16 Jersey can keep costs down and make green  
17 infrastructure a cost effective component of our  
18 future.

19                   We need to demonstrate the value of  
20 green through consistent statewide policies,  
21 plans, regulations, permits and enforcement. New  
22 Jersey must continue to be vigilant and explore  
23 innovative ways to better protect our water  
24 resources. We need a consistent message woven  
25 into and through our policies, regulations, state



1 planning efforts, permits and enforcement actions  
2 that recognizes green infrastructure as a viable  
3 component of our state's future water  
4 infrastructure network. New Jersey needs to  
5 recognize the value of its trees, its landscapes,  
6 its natural areas and soils in protecting our  
7 waters, our economy and our communities.

8 While a number of environmental  
9 partners including the Riverkeeper and Baykeeper  
10 continue to elevate our awareness of these  
11 issues, we all need to engage in better  
12 protecting and preserving our valuable natural  
13 resources. We need to develop community informed  
14 green infrastructure plans and programs for each  
15 unique municipality in New Jersey. Whether your  
16 community has a separate storm sewer system and  
17 is struggling to address nuisance flooding,  
18 inflow and infiltration or your community has a  
19 combined sewer system with overflows discharging  
20 untreated waste into waterways, streets and  
21 backing up into homes.

22 Every New Jersey community needs to  
23 identify what green infrastructure will look like  
24 for the individual community. One size does not  
25 fit all. Passaic Valley Sewerage Commission has

1 recognized this need. PVSC in partnering with  
2 Rutgers Cooperative Extension is leading an  
3 initiative to inform the 48 communities it serves  
4 about the opportunities for green infrastructure  
5 and is providing resources necessary to develop  
6 individual plans for the 48 communities served.  
7 These communities will be provided with this  
8 assistance to commit to taking the first steps in  
9 implementing green infrastructure projects and  
10 programs.

11 We need to make available funding  
12 accessible to communities and leverage funds  
13 wherever possible. Funding needs to be made  
14 accessible for those communities prepared to  
15 embrace green infrastructure. While funding may  
16 be available to cover the costs of new  
17 infrastructure, these dollars are not always  
18 readily available to communities. Securing  
19 public monies can be a heavy lift and communities  
20 looking to take the first step with green  
21 infrastructure will need an incentive and  
22 assistance to move ideas and plans into action.  
23 We need this funding to enable local communities  
24 to take action.

25 We need to make green infrastructure

1 an effective part of every tax payer funded  
2 capital infrastructure project. Green  
3 infrastructure needs to be a part of every tax  
4 payer funded capital infrastructure project.  
5 What funding we do have dedicated to green  
6 infrastructure should be leveraged wherever  
7 possible. When we are building publicly funded  
8 schools, roads, treatment plants and parks, green  
9 needs to be part of the equation, part of the  
10 discussion.

11 It's frustrating to go to a public  
12 meeting or a town meeting or a partner meeting  
13 and hear about new schools being built in the  
14 community, public dollars, and green is not part  
15 of that equation. We need to overcome these  
16 hurdles and include green infrastructure and  
17 innovative infrastructure for upgrades in all our  
18 publically funded projects. We've recently  
19 partnered with local entities to help leverage  
20 limited available grant dollars to successfully  
21 install rain gardens in the public right of way  
22 in Haddonfield or Camden County and also a  
23 pervious asphalt parking lot in the community of  
24 Clark, Union County.

25 Base funding for the planned capital

1 improvements was provided by the local  
2 municipality while additional green measures were  
3 funded with available grants. Significant cost  
4 savings for green infrastructure can be realized  
5 when projects are planned and constructed through  
6 a cooperative partnership including both gray and  
7 green. In these cases, without this partnership,  
8 these two efforts would not have been able to be  
9 completed with available grant dollars. We need  
10 to provide incentives for homeowners and  
11 businesses to adopt green infrastructure. These  
12 incentives will encourage individual property  
13 owners and businesses to adopt green  
14 infrastructure strategies.

15 To see impacts and improvements in  
16 water resources, we need widespread adoption of  
17 green infrastructure by more than just government  
18 entities. This will require innovative ideas and  
19 programs. Programs like the New Jersey Water  
20 Supply Authority rain garden rebate program for  
21 homeowners. New Jersey Water Supply recently  
22 piloted this program in partnership with Rutgers  
23 Cooperative Extension providing technical  
24 assistance to homeowners willing to install rain  
25 gardens. Homeowners worked with professionals to

1 develop a rain garden design specifically for  
2 their home.

3           Once the homeowners complete  
4 installation of the rain garden, they can submit  
5 for a rebate to offset costs of the project.  
6 Ideas like Assembly Bill A4003 introduced this  
7 past April sponsored by Assemblyman Eustice,  
8 Wilberly, Gusciora and Barnes. This Bill poses  
9 to establish a capture, control and conserve  
10 reward rebate program for the state to encourage  
11 property owners to implement certain techniques  
12 to conserve water or control stormwater runoff.  
13 Both of these approaches are ways New Jersey can  
14 provide incentives for the private sector to  
15 invest in Green Infrastructure practices.  
16 Everyone needs to be involved as part of the  
17 solution.

18           And finally, as Commissioner Martin  
19 indicated, New Jersey needs to identify long term  
20 strategies to provide consistent and reliable  
21 funding for construction and maintenance of both  
22 gray and future green stormwater infrastructure.  
23 To protect our investment in green  
24 infrastructure, New Jersey needs to identify long  
25 term funding strategies that will provide

1 consistent and reliable funding to continue  
2 development of new infrastructure as well as  
3 maintenance of existing infrastructure.

4           The City of Hoboken has been very  
5 active in developing plans for green  
6 infrastructure as it looks to address impacts of  
7 its combined sewer system on the quality of life  
8 of its residents. Through a number of grant  
9 funded efforts, Hoboken has been able to prepare  
10 community informed plans for green  
11 infrastructure, designs for demonstration green  
12 infrastructure projects and outline green  
13 strategies to be incorporated into its Master  
14 Plan. We see these as the first steps New Jersey  
15 can take to help communities across the State  
16 move forward with greening our water  
17 infrastructure.

18           In closing, we hope that the ideas  
19 and examples we shared here today help to elevate  
20 the discussion and generate innovative strategies  
21 to move us forward. Rutgers Cooperative  
22 Extension and the NJ Chapter of the American  
23 Society of Landscape Architects appreciate this  
24 opportunity to participate in this very important  
25 discussion and we look forward to being part of

1 the solution. Please let us know how we can best  
2 use the experience and expertise we bring to the  
3 table to help New Jersey.

4 We look forward to hearing all of  
5 our ideas today and continuing the dialogue  
6 forging ahead in greening our water  
7 infrastructure. I would like to end where I  
8 began. New Jersey needs a community based  
9 approach to designing and building infrastructure  
10 that leverages the resources of our landscape and  
11 environment. These green systems can provide  
12 communities with real savings, strengthen local  
13 economies, make communities more resilient and  
14 create healthy, more livable communities while  
15 protecting critical water resources. Thank you.

16 MS. GOODWIN: Thank you very much,  
17 Jeremiah. Let me now open it up from questions  
18 from the audience. Chris.

19 MS. STURM: It seems like one of the  
20 biggest to giving green infrastructure is money.  
21 I'm curious what's motivated the huge investments  
22 that Syracuse has been able to make if it's the  
23 EPA kind of consent decree and recognition that  
24 the county has to do something and it's just a  
25 matter of how. New Jersey cities in general have

1 not faced that kind of regulatory stick.

2 MR. DODSON: We did have the  
3 regulatory stick and it was a matter of how we  
4 needed to go. Do we need to continue to build  
5 these regional treatment facilities at a cost  
6 that is excessive for a community of our size or  
7 did we want to try to find a sustainable  
8 approach, and when I say sustainable, I don't  
9 mean the green idea of sustainability. I mean  
10 the economic long term, the longevity of the  
11 fiscal longevity of being able to afford this  
12 infrastructure 20 or 30 years from now. I think  
13 we decided the green infrastructure, and don't  
14 get me wrong, we do have a combination of green  
15 and gray in Syracuse, but adding the green in a  
16 significant way would really improve our fiscal  
17 stability in the long term.

18 MS. STURM: And you had to increase  
19 rates or bonds to pay for both the green and the  
20 gray?

21 MR. DODSON: No. We have increased  
22 rates but it hasn't been, we haven't bonded but  
23 it wasn't because of the green infrastructure.  
24 It was because rates had not been increased in  
25 some time to support, so a good example of



1 Onondaga County. We are 450,000 strong. In  
2 1960, we were 450,000 strong, but we take up  
3 three times the amount of land space today than  
4 we did in 1960, so the rates haven't increased to  
5 support the infrastructure that is now beginning  
6 to age to the point where it needs substantial  
7 reinvestment.

8 So the rates are being increased  
9 because of that, the size of our infrastructure,  
10 not because of the green infrastructure. The  
11 money that we're using for green infrastructure  
12 is actually money saved for those regional  
13 treatment facilities that we were going to build  
14 and never did.

15 MS. GOODWIN: Other questions? Dan.

16 MR. VAN ABS: Everything I heard  
17 today was awesome. I have a question with regard  
18 to I heard on the last presentation there was an  
19 effort on the state level for homeowners to get  
20 some kind of rebate on infrastructure  
21 improvements. I was wondering on a federal level  
22 is there a push to offer cap incentives or  
23 rebates for those type of improvements as well.

24 MR. BERGSTROM: I can't really speak  
25 to the federal push right now. I am not aware of

1 anything. The most recent documentation that's  
2 out about green infrastructure initiatives and  
3 the push from USDPA is available. They have a  
4 recent document on there for the strategies for  
5 the coming year that was issued for October.  
6 Funding is an issue and how that's going to move  
7 forward is going to be, it's up to debate, but I  
8 haven't seen a push directly for property owners  
9 and home owners incentives at the federal level  
10 at this point.

11 MR. DODSON: There is nothing that's  
12 coming down the pipe line that I'm aware of in  
13 the near future though I was at a meeting in DC  
14 yesterday at the Environmental Finance Advisory  
15 Board, and they developed a report which should  
16 be available on-line on the EPA's website. I  
17 forget the name of what it's called, but  
18 essentially, the 32nd summary of that 46 page  
19 report is let's make SRF money truly available,  
20 let's make an allocation of SRF money  
21 specifically available for green infrastructure  
22 for stormwater. New York is already doing that  
23 with some of its discretionary money for green  
24 infrastructure. We have the green innovation  
25 grant program which is really cool. It will be

1 great to see other states have the same money.

2 PUBLIC QUESTION: I was mainly  
3 wondering what hurdles you had to overcome with  
4 regard to green roofs, structural standards and  
5 where I can get more information on how you help  
6 folks design for green roofs because we currently  
7 don't have the resources for that.

8 MR. DODSON: Our deputy county  
9 executive for physical services, Matt Molay, was  
10 insistent that we share everything, full  
11 transparency, so when we have engineers design a  
12 project, we ask them to put their DWG files on  
13 their websites which is essentially the raw  
14 design file which any engineer could then  
15 manipulate so you could find the design  
16 specifications, the construction bid documents  
17 and all those things for all of our projects at  
18 our web site savetherain.us.

19 If you go to the top you'll find  
20 green projects and just click on that and click  
21 on a project that looks good to you and then all  
22 those documents are available for download.  
23 There is probably more information than you want,  
24 and if you want to contact me for more questions  
25 or anything else, let me know. We have about 18

1 dozen green roofs on the web site right now so  
2 you can look at different sizes and shapes and  
3 formats.

4 PUBLIC QUESTION: Syracuse gets a  
5 lots of snow. How does that impact those parking  
6 lots and those green aspects and particularly the  
7 Carrier Dome that collects that water that's a  
8 big roof, how do you deal with that snow in the  
9 gray time of the year?

10 MR. DODSON: What snow? We have a  
11 really, a nice little unknown gem in Syracuse.  
12 It's the State University of New York College of  
13 Environmental Science and Forestry. They are a  
14 wonderful asset. I work for Syracuse University,  
15 but I'm an alum of student ESF, and I think ESF  
16 is more of an asset to us, Save the Rain than  
17 Syracuse University is when it comes to helping  
18 us design things for our cold climate, so first  
19 of all, there is the New Hampshire Stormwater  
20 Research Center at the University of New  
21 Hampshire.

22 They are 25 years of data, millions  
23 of data points on porous pavement technologies,  
24 28 different kind of variables of porous pavement  
25 technologies demonstrating that this stuff really

1 does work in cold climates and this is how you  
2 should treat it and maintain it. My point of  
3 bringing up ESF is they have great botanists  
4 there who can identify just the right kind of  
5 trees, shrubs and forbes and grasses and  
6 perennials that are not only native but salt  
7 resistant, so when we can, which is more often  
8 than not, we plant native salt resistant plants  
9 in areas.

10 The good news though is that porous  
11 pavement, at least in Syracuse, it is gray a lot.  
12 We'll get dumped on with like three feet of snow,  
13 wake up in the morning, they plow it, the sun  
14 comes out for a hot second just enough to melt  
15 it. It drains through and then we don't get that  
16 black ice problem later in the day and the next  
17 day when they need to come out and salt and  
18 resalt and resalt, plow, salt, melt, drain, done,  
19 so the city is using much less salt on these  
20 porous pavement applications as well so it does  
21 in fact also then benefit the core plants.

22 MS. GOODWIN: I have a question with  
23 respect to maintenance both with regard to the  
24 porous pavement and roof gardens because the  
25 complaint that I have heard is regard with to

1 porous pavement there is additional maintenance,  
2 leaves, whatnot. Dirt, otherwise it loses its  
3 effectiveness and then with regard to roof  
4 gardens, there is a weaning issue that at some  
5 point it becomes, I was told they are difficult  
6 to manage and I know several people who have  
7 removed their roof gardens, so how do you address  
8 those two things?

9 MR. DODSON: First of all, there is  
10 maintenance. We have to maintain anything that  
11 we own, so it's a different kind of maintenance.  
12 I'm not going to lie. It was a very steep  
13 learning curve for some of the DPW guys on how to  
14 plow, when to plow, please don't plow, don't push  
15 all the snow into that corner because that's a  
16 rain garden now. We have to move the snow  
17 somewhere, and if you want us to plow it, we have  
18 to put it somewhere, and they're coming up with a  
19 new strategy for where to put that snow. In some  
20 instances we put it in a truck and drive it away  
21 and dump it somewhere else now.

22 Because of the compaction of that  
23 snow damages the rain gardens. We do rent two  
24 times a year, the county, when I say we, I really  
25 mean the county. We rent two times a year a

1 vacuum truck that we go around and vacuum all of  
2 the parking lots. Once in the spring after all  
3 the sediment and stuff has been pushed by the  
4 plow and remaining leaves and trash kind of gets  
5 stuck onto the parking lot. We vacuum that up,  
6 and once again in the fall when the leaves fall.

7 We also then loan that out to the  
8 private parking lot so they can do the same so we  
9 can insure that what they've built is the  
10 structure that we've funded continues to work for  
11 all of us, and then there's one small analogy.  
12 What if this corner of this parking lot gets  
13 clogged and it no longer allows water because we  
14 do have this consistent dumping of leaves or  
15 sediment or leaves or whatever, but the rest of  
16 it drains fine so maybe we have this one clogged  
17 part, but the rest of its working and it's maybe  
18 it's not that big a deal.

19 And then finally the green roofs, we  
20 have a 17,000 square foot green roof on our  
21 building that I work in. We have a tree, an  
22 aspen growing on it and it is a transitional  
23 species and we went out and kind of took a  
24 trowel, very careful so you don't damage the root  
25 and pull it out, but the weeding is certainly a

1 problem, but two times a year we pull out the  
2 crown vetch, the other kind of weedy species and  
3 the occasional tree that grows, but the benefit  
4 of that we have a landscaping crew that goes out  
5 and does that. There are OSHA specifications  
6 that do make it difficult with some green  
7 infrastructure designs.

8               These guys have to be harnessed so  
9 they don't fall off of the roof, so when you  
10 build a green roof, you have to also build a  
11 fence, but after a couple of years, once that  
12 sedum really takes hold, usually people grow  
13 sedum on green roofs, it's a very thick ground  
14 cover that makes it hard for a lot of other  
15 things to take root, so each year the grounds  
16 crew has to visit fewer and fewer times and fewer  
17 and fewer hours each time.

18              Alternatively, our green roofs slant  
19 in a way that down to the ground, so sometimes  
20 it's nice to come in, in the morning and find a  
21 raccoon sitting outside the window next to my  
22 desk and we do find that and it's kind of  
23 interesting. Problem, opportunity, joy, whatever  
24 you want to call it.

25              MR. BERGSTROM: Maintenance is the



1 second question I usually get asked. The first  
2 one is how are we going to pay for it. The  
3 second one is how are we going to maintain it.  
4 The bottom line is most communities, we have  
5 introduced green infrastructure into it, those  
6 communities have the resources available to do  
7 the maintenance, it's just a different kind of  
8 maintenance. Green infrastructure doesn't  
9 necessarily require, it doesn't need to require  
10 additional equipment or specialized work.

11 Most of it, and the majority of it  
12 is scheduling, planning and having one or two  
13 trained staff available that know how to evaluate  
14 what is needed and identify the right weeds or  
15 identify when we go out and clear out the  
16 sediment of the systems. And more importantly,  
17 most of the communities are struggling to  
18 maintain existing infrastructure as it is or not  
19 maintaining it the way we should and we need to  
20 reinvest in maintaining infrastructure and then  
21 plan for additional maintenance for new  
22 strategies.

23 MS. GOODWIN: Jeremiah, what if one  
24 of the state proposals which would incentive  
25 homeowners, how is the individual home owner

1 going to conduct this maintenance?

2 MR. BERGSTROM: Individual  
3 homeowners, for the most part, strategies of  
4 individual home owners are going to be  
5 responsible for rain barrels, rain gardens or  
6 strategies that they can very quickly, very  
7 easily provide.

8 MS. GOODWIN: What about roof tops  
9 and what about impervious driveways?

10 MR. BERGSTROM: Those are all  
11 strategies that they can deal with on their own.  
12 For the most part, maintenance for green roofs is  
13 minimal. I've seen very few residential  
14 infrastructure for that. For the most part,  
15 green roofs are commercial type systems for long  
16 term investment and for impervious driveways,  
17 impervious paving, they don't require a lot of  
18 maintenance. They don't require anything  
19 specific other than keeping it clean and making  
20 sure that we don't have leaves building up on it  
21 and then breaking out and moving any sediment  
22 that would flow onto it. It's not extensive and  
23 it can be done by an individual or a standard  
24 landscaped contractor with the specialized  
25 training, not requiring specialized equipment.

1 PUBLIC QUESTION: Are construction  
2 officials generally amenable to this  
3 installation, and are there standards that are in  
4 place that make it easy to put these things in?

5 MR. BERGSTROM: Here in New Jersey  
6 or Syracuse?

7 PUBLIC QUESTION: Both.

8 MR. DODSON: Quickly, you know,  
9 people are resistant to change, and frankly, guys  
10 who have been doing the same thing for 20 or 30  
11 years don't want to change because they want  
12 their countdown to retirement calendar. So  
13 change is difficult. Usually when they do make  
14 that change, then they're amenable and they  
15 continue with that new direction. And then  
16 finally, to the design piece, New York RDEC,  
17 similar to the DEP created green infrastructure  
18 stormwater design manual which has been kind of  
19 held as the standard for green infrastructure EMG  
20 design in New York State. There is some  
21 alteration to it and I think the DEC is going to  
22 revise it, but they put that out in 2010 and  
23 that's really what most people use when they're  
24 designing green infrastructure.

25 MR. BERGSTROM: In New Jersey, no,

1 construction officials are not amenable to this  
2 for the most part. There is a lot of education  
3 that has to be done, and where we are effectively  
4 moving forward with green infrastructure, they  
5 have been engaged in the conversation, in the  
6 plan from the very beginning. They bring to the  
7 table what resources they have available and then  
8 we're able to create that plan for that community  
9 with strategies they are comfortable with or feel  
10 like they can maintain and move forward.

11 Not every town is going to want to  
12 put in green roofs and extensive impervious  
13 paving solutions. Maybe they don't need to.  
14 Maybe there are other strategies that their  
15 facility crews are available for maintaining and  
16 able to maintain so it needs to be tailored.  
17 Green infrastructure needs to be tailored to the  
18 individual community and the needs of the  
19 communities, and a lot of education has to be  
20 done from the local leadership down through the  
21 staff, officials and to the residents themselves.

22 PUBLIC QUESTION: In New Jersey is  
23 there a guidance that is available that supports  
24 green infrastructure and these officials?

25 MR. BERGSTROM: Not yet.

1                   MR. DODSON: The New York manual is  
2                   available on-line.

3                   MR. VAN ABS: It seems if we're  
4                   going to get beyond pilot projects and test cases  
5                   that we need municipalities that have actual  
6                   management objectives when they're trying to  
7                   achieve a specific thing. In the case of  
8                   Syracuse, that specific thing was getting EPA  
9                   satisfied with the planning, and that's been true  
10                  of Philadelphia, New York and other places. Are  
11                  there places where municipalities have really  
12                  ramped up on green infrastructure because of  
13                  local driven objectives as opposed to regulatory  
14                  objectives, where they have a very clear sense of  
15                  what they're looking to achieve and not just to  
16                  do a pilot project?

17                  MR. BERGSTROM: The two communities  
18                  in New Jersey that I would say are on the  
19                  forefront of that could would be Camden, city of  
20                  Camden and also the community of Cranford. We've  
21                  been working with the city of Camden for four  
22                  years. In the city of Camden, a combined sewer  
23                  system discharges untreated affluent throughout  
24                  city streets and parks on a frequent basis. As  
25                  much of an inch of rain, they have overflows in

1 some areas of that city and they have seen this  
2 and the community has seen this issue as a threat  
3 to the health of the community and they are  
4 embracing green infrastructure citywide.

5 We have 20 to 30 projects already in  
6 place and we're trying to figure out how to move  
7 forward with another 20 or 40 or 50 projects that  
8 will begin to alleviate the pressures on the  
9 combined sewer system in the city of Camden.

10 Community of Cranford recently adopted an  
11 ordinance, a very stringent stormwater ordinance.  
12 The recent there is they want to address the  
13 flooding issues, the results of Hurricane Irene.  
14 They adopted this ordinance, even discussed it  
15 with the mayor. Up there he's very eloquent on  
16 that. He spoke a little bit down in the  
17 municipalities at a presentation I attended.

18 They adopted an ordinance that says  
19 anyone who is adding an addition in the city or  
20 in the community of Cranford that would include  
21 400 square feet of new impervious cover or more  
22 must manage all the stormwater run off generated  
23 from that 400 square feet of impervious cover  
24 onsite through green infrastructure strategies.  
25 You're not allowed to create or generate

1 additional stormwater runoff through the sewer  
2 system.

3 PUBLIC QUESTION: Jeremiah, just to  
4 address something you said. You said in New  
5 Jersey we currently have no guidance on green. I  
6 want to correct you. We do have the BMP that  
7 does include green infrastructure issues. Lisa  
8 Schaffer from my staff is currently revising that  
9 and we will be putting that out and get some  
10 feedback, but also right there on the screen the  
11 green infrastructure web page that we are using  
12 to promote and push green so that people can see  
13 it does work just like Khris had with the  
14 Syracuse model. If people can see it does work,  
15 we're hoping that they'll take the initiative to  
16 incorporate it.

17 MS. BERGSTROM: Got it.

18 MS. GOODWIN: We've got time for one  
19 more question, this woman right here.

20 PUBLIC QUESTION: I'd like to know a  
21 little bit about the interaction between the rate  
22 increases for the gray infrastructure and the  
23 green infrastructure program. Did instituting  
24 that program make the rate increases more  
25 palpable? Was there any kind of interaction

1     between those two?

2                   MR. DODSON:   It's kind of  
3     complicated.   So we were going to build these  
4     several treatment facilities probably for  
5     hundreds of millions of dollars total.   The green  
6     infrastructure program is probably a third of  
7     that so you could say we realized a total of two  
8     thirds savings by doing green instead of building  
9     those treatment facilities, but the rate increase  
10    is really because of deferred payment for the  
11    existing infrastructure.   The issue really comes  
12    down to the fact that all of the green  
13    infrastructure would save two dozen token  
14    projects in the suburbs.

15                   All of the green infrastructures  
16    happening within the city of Syracuse, though the  
17    whole sanitary sewer district which is all of our  
18    essentially the whole suburban and urban part of  
19    our county pay the same sewer rate.   So there's  
20    this kind of tension between the city and the  
21    suburban caucus and the legislature.   There's  
22    also this perception that the rate increase is in  
23    part due to the save the rain program, so it's  
24    part of this tension between what are we  
25    investing in and who is paying for it versus what



1 have we invested and not paid for in the past and  
2 are only now beginning to pay for, so I don't  
3 know if that answered your question but that's of  
4 kind of where we're at.

5 PUBLIC QUESTION: Doesn't the green  
6 infrastructure help everybody ultimately?

7 MR. DODSON: Yes, all county  
8 taxpayers, all county rate payers are paying for  
9 Save the Rain and realize the benefit of the  
10 savings of the program to this point.

11 MS. GOODWIN: Thank you so much.  
12 Stan, looks like you have something to say.

13 MR. CACH: My question goes to both  
14 to Khris, Jeremiah and Mark. In EPAs green  
15 infrastructure guidance, it speaks to capture  
16 (inaudible) up to 10 percent. I'm curious in  
17 your collective respective experiences, what have  
18 you experienced and can you talk a little bit  
19 about the cost of that type of project.

20 MR. DODSON: In Syracuse we capture  
21 95 percent of our stormwater either through gray  
22 or green methods and so that's essentially and it  
23 depends on geography, so for us that is about the  
24 first stinch of every rain storm which that first  
25 stinch is 95 percent of all rain events in

1     Syracuse and we're pretty happy capturing that  
2     amount because that's a pretty robust amount of  
3     stormwater to capture, and then once you start  
4     looking at capturing the first inch and-a-half or  
5     two inches, there is an economic term for it but  
6     it starts to become prohibitively more expensive  
7     to get those incremental increases, so everything  
8     we design is at one inch if not more.

9                     MR. BERGSTROM: Cost effectively,  
10    we're looking at the first inch and a quarter of  
11    rain that Water Quality defined for New Jersey.  
12    The VMP that Jim mentioned, that is the 90th  
13    percentile storm here in the state of New Jersey.  
14    We're capturing that much rain. We can do that  
15    cost effectively. Where possible, we are also  
16    looking at designing these systems and that's an  
17    inch and a quarter over two hours. We're also  
18    looking at with rain guards and bioretention  
19    systems, where we can capture a little bit more.

20                    Looking at being able to capture up  
21    to the two year storm which is about three inches  
22    of rain over the course of 24 hours, by designing  
23    a little bit larger in a county for infiltration,  
24    some of these VMPs can actually make these  
25    systems a little more resilient as we will most

1     likely get more intense and more frequent storm  
2     events over the course of the year, but both of  
3     these we have been able to design cost  
4     effectively in New Jersey.

5                   MS. GOODWIN:   Thank you.   We will  
6     now take a break and when we return, we'll open  
7     the floor to public testimony.   Let me remind  
8     you, if you have not signed up to deliver  
9     testimony and you would like to do so, please  
10    leave your name at the desk up front.   Thank you.

11                   (Whereupon a break was taken.)

12                   MS. GOODWIN:   We have three people  
13    who have signed up to speak.   I'll call them by  
14    name, and then if anyone else is in the room,  
15    wishes to give testimony, please let us know.  
16    Typically we allow five minutes.   We'll be a  
17    little bit lenient here, but not much because  
18    everybody needs to keep moving.   Likewise, if you  
19    have written testimony, you can leave it with us.  
20    If not, within the next two weeks, it will be  
21    incorporated into the record.   We have from  
22    United Water, Elizabeth Watson and Chris Len, and  
23    I don't know if they intend to speak collectively  
24    or individually.

25                   MS. WATSON:   Good morning, everyone.

1 My name is Elizabeth Watson and this is George  
2 Lavatelli. We're from United Water. I'm  
3 managing manager and George is senior project  
4 manager. We have been working on a few hydro  
5 power projects for all types of renewal energy,  
6 but given that we're a water company, hydro  
7 definitely fits within the framework of our  
8 business. As such, we're been reviewing  
9 legislation for net metering in New Jersey and  
10 found that there's some opportunities to open up  
11 legislation to allow net metering for hydro power  
12 projects.

13 So surprisingly New Jersey is one of  
14 only five states in the country that does not  
15 allow hydro power to be net metered. If you  
16 don't know what net metering is, it's basically  
17 producing power on a site and crediting it  
18 towards an electricity use at that site. It  
19 could be site specific or as the state of New  
20 York has done, it can be remote net meter, so  
21 hydro power on one site is produced and it's  
22 credited towards another site that is using  
23 power, that needs the power, and if you think  
24 about the way hydro systems are typically set up  
25 in the landscape, when we have an opportunity to

1 gain hydro power.

2           So for example, maybe in a  
3 distribution system where there is pipes going  
4 downhill, you can gather the hydro power from  
5 that or when it's dammed as part of a water  
6 reservoir or stormwater protection, you usually  
7 don't need the electricity on that site. If  
8 you're having water flow down hill, you don't  
9 need to pump it. The sites where you need the  
10 electricity are pumping. Pumping uses about 90  
11 percent of the electricity used in a water  
12 distribution treatment system.

13           So we're proposing New Jersey  
14 considers opening up net metering for hydro,  
15 specifically allowing remote net metering, and it  
16 would be similar, we're hoping something similar  
17 to the New York legislation that was just passed,  
18 and what it would do, it would allow projects  
19 like George and I have been working on, reopening  
20 the Dundee Dam hydro project. There is also  
21 several other similar projects around the state  
22 that are not financially feasible because of this  
23 restriction on that metering.

24           So it really -- we're not even  
25 asking for a huge grant or anything like that.

1 It's really just bringing hydro to the same level  
2 as net metering as other renewal technologies.  
3 Any other comments that you have?

4 MR. LAVATELLI: I just wanted to say  
5 we're speaking on behalf of the Dundee Water  
6 Power and Land Company which is co-owned 50 50 by  
7 North Jersey District Water Supply Commission and  
8 United Water, and we got permission from them to  
9 come speak today.

10 MS. WATSON: Than you for your  
11 consideration. Any questions, comments,  
12 concerns?

13 MS. GOODWIN: Thank you. Chris, I  
14 apologize. Chris is with the Newark Baykeeper.

15 MR. LEN: I'm Chris Len. I'm the  
16 staff attorney for Hackensack Riverkeeper and New  
17 York New Jersey Baykeeper, and our job is to look  
18 after the biological ecological integrity so the  
19 discussions we're having today are very important  
20 to the kind of work that we do in our groups, so  
21 I'm pleased the Council is holding this hearing  
22 and taking comments from people like me and  
23 thinking about these issues very carefully.

24 It's nice to see green  
25 infrastructure becoming more and more important

1 in New Jersey. I feel like it's only been a  
2 couple years since the idea of green  
3 infrastructure was pretty novel to regulators who  
4 regulated in New Jersey, and now that we're  
5 considering it as a cost effective solution to a  
6 lot of our stormwater problems, I think that's a  
7 great advancement in the way that we look at  
8 these issues. Thinking about this, in  
9 particularly our groups have been involved in CSO  
10 work trying to get better permits, better control  
11 for sewer overflows.

12 It occurred to me that first of all,  
13 you have to start to do something before you can  
14 finish it and New Jersey has allowed itself the  
15 starting of these programs for far too long and  
16 to the extent that we're starting them now, I  
17 think that's great, but if you look at a town  
18 like Portland, Oregon or Providence, Rhode Island  
19 or Atlanta, Georgia where many years ago they  
20 started to address their CSO problems through  
21 gray and green infrastructure. Portland, I  
22 believe, has one or fewer CSOs anymore in a year  
23 and it rains a lot there.

24 I know, I went to law school there  
25 and it rained on me 200 days out of the year, so

1     their great advantage over us is simply that they  
2     started working on it 20 or so years ago and now  
3     that they've finished they have solved the  
4     problem and I'm encouraged now that it seems like  
5     we're starting to work on it as well. I was at  
6     the League of Municipalities and heard from the  
7     Camden Sewer District that they had a pipe that  
8     was made of wood and it was tongue and groove  
9     constructed and it was still holding up except  
10    that when you have tongue and groove construction  
11    to transport water, it all comes out of the pipe  
12    and they lost something like 20 percent of their  
13    flow just because of tongue and groove pipe  
14    construction.

15                   And I think that's a great example  
16    of what has become of our infrastructure because  
17    if it's underground and there's not political  
18    regulatory pressure to change things, then it's  
19    easy to not change things. I've heard about  
20    wooden pipes in Newark, and it's up in our area  
21    as well and that's the sort of thing that we  
22    really need to address and why haven't we  
23    addressed it? Because we lack the incentive  
24    necessary to make these things happen, and I  
25    think there's four different incentives that



1     cause people who have to make these decisions to  
2     make better decisions.   There's regulatory  
3     incentives.   There's economic incentives.  
4     There's political incentives and environmental  
5     incentives.

6                   As far as regulatory incentives go,  
7     I think it's a great sign that the Department of  
8     Environmental Protection is working on new and  
9     individual CSOs.   Having read many of the eight  
10    that they've put out so far with what I would  
11    imagine something like 15 to 20 to go, they are a  
12    great improvement and they have requirements for  
13    green infrastructure that I think are going to  
14    move a lot of what we've been talking about  
15    forward if we get those drafts issued and that  
16    still remains an open question.

17                   For economic incentives I would like  
18    to address express our service report for the  
19    stormwater utility bills that Senator Smith has  
20    put through.   There's not going to be very much  
21    change about these things until it becomes more  
22    or less expensive to change than doing things the  
23    same way, and when we allow stormwater discharge  
24    into our rivers funded by taxpayer dollars and  
25    with the costs accrued to all of us who use our

1 public use land that divorces the economic  
2 incentive to the people who make decisions of  
3 stormwater infrastructure and put all the costs  
4 on the people in the state.

5 By having stormwater utility and  
6 allowing towns, if they choose to, to charge for  
7 stormwater contribution system, then that can  
8 both fund stormwater improvements and cause  
9 incentives for people to do common sense easily  
10 done things to keep water at storm infrastructure  
11 like simply grading your parking lot towards the  
12 field rather than the storm system. We also  
13 think that that should be applied to all  
14 municipalities and not just the CSO  
15 municipalities because the stormwater  
16 infrastructure problems in this state are not  
17 limited to CSO municipalities.

18 We have problems in Bergen County  
19 with flooding, and the reason that it floods  
20 well, first of all, it's because the climate is  
21 changing, but second of all it's because we paved  
22 so much of the state, and if we can have  
23 stormwater adjustments to our infrastructure to  
24 keep the water out of the rivers, maybe we can  
25 reduce the flooding and not just the CSO. For

1 political incentives, our organization, we find  
2 it very (inaudible) with their waterways and we  
3 find that when people are once again experiencing  
4 Meadowlands from the bay from baykeepers that  
5 they come to understand the value of the resource  
6 and can start managing changes.

7 And sometimes the regulators will  
8 respond more quickly to political incentives than  
9 regulatory ones, and so we think it's important  
10 that this council not support any further changes  
11 of the DEP makes that keep people away from their  
12 waterways. Our organizations about their public  
13 access rules in large part because the rules  
14 memorialize the inability for people in the  
15 northern state. We think the council should ask  
16 for more and greater access capabilities for  
17 people in New Jersey.

18 And finally, one thing it just makes  
19 the least amount of sense and I want to talk for  
20 a minute about New Jersey Oyster Restoration  
21 Research in area waters. After Sandy one of the  
22 bigger parts of Governor Cuomo's report on the  
23 storm was the necessity to reestablish oysters in  
24 New York waters. Oysters, first of all, they  
25 filter water. They are themselves green

1 infrastructure. One oyster can filter 50 gallons  
2 of water a day. They take in polluted water  
3 especially water filled with nutrient bearing  
4 pollutants and they turn it into oyster flesh and  
5 oyster shell and they build reaches. They have  
6 clean water come out the other side. They build  
7 structure.

8 The structure provides habitat for  
9 sea life commercially and environmentally  
10 important sea life, but at the same time, they  
11 create structures within the water that can be  
12 important for storm surge and Governor Cuomo saw  
13 the importance of this and how economical it  
14 could be to simply allow oysters to return to  
15 waters. Unfortunately in New Jersey what we have  
16 done is perpetuate bands by the DEP of oyster  
17 restoration research in most waters in New York  
18 Bay.

19 That just doesn't make sense, and at  
20 one point the department said there was poaching  
21 but the department has told us since that there  
22 are now patrols to meet FDA standards, and the  
23 idea that this important research continues to be  
24 band when it can be amongst the most cost  
25 effective ways to prevent future storm damage and

1 to clean waters is silly. And we hope that the  
2 council will support the overturning of this band  
3 and that the DEP should overturn it. Instead of  
4 working against us, work with us to restore  
5 oysters to area waters as quickly as possible.  
6 Thank you very much.

7 MR. SONKIN: Good morning. My name  
8 is Joel Sonkin. I'm the city chief of Energy and  
9 Environment. The city of Newark has been  
10 committed to green infrastructure. We see it as  
11 being a solution to a number of our problems.  
12 Specifically aging water infrastructure, urban  
13 key island air quality issues, flooding and just  
14 general. In the past year, we've passed a new  
15 stormwater ordinance and are in the process of  
16 passing a new Master Plan, both of which  
17 exclusively encourages green infrastructure as a  
18 solution. We're also undertaking a number of  
19 site specific green infrastructure interventions.

20 While we appreciate the site  
21 specific work, one of the things that we're  
22 really focusing on is trying to get more systemic  
23 green infrastructure work done. One of the  
24 things we're doing to accomplish that is our  
25 planning staff is currently working on developing

1 a standard manual for green infrastructure best  
2 practices. That is something where we've been  
3 developing a manual of plug in play green  
4 infrastructure interventions for both  
5 municipalities and private sector views that  
6 would document kind of the space required,  
7 stormwater treated, the amount of the water  
8 treated for square footing that we would be able  
9 to kind of use for ourselves and also give to  
10 prospective developers.

11 This is probably something that we  
12 probably cannot develop alone, so any sort of  
13 state assistance. My guess is this has some  
14 broad applicability to our cities that would like  
15 to do some green infrastructure that lack the  
16 technical expertise that would. One other area  
17 in which we feel that we would need state  
18 assistance to do more global green infrastructure  
19 work is kind of a much discussed our inability to  
20 charge storage water impact fees. I recognize  
21 that's not popular among a number of people, but  
22 our challenge is really absent being able to  
23 charge stormwater fees separate and apart from  
24 traditional water.

25 We are never going to be able to do

1     it on a broad scale, and particularly the  
2     challenge we have is the way that we currently  
3     manage stormwater is through traditional water  
4     and sewer or through the general fund. In both  
5     cases there is a significant amount of a lack of  
6     equity where basically small businesses and  
7     homeowners are being an asked to subsidize  
8     parking lots and passive storage that contributes  
9     a significant amount of stormwater to our system  
10    but pays nothing to the system we support so we  
11    urge the state to help with that. Thank you very  
12    much.

13                   MS. GOODWIN: Thank you. That  
14    concludes today's hearing. By way of follow up,  
15    the council also prepares a report to the  
16    department and the commissioner. When that is  
17    available, it will be posted on our web site and  
18    again, I thank you.

19                   MR. CACH: We'll accept comments  
20    until December 31st.

21                   MS. GOODWIN: Written comments  
22    accepted until December 31st. Thank you so much.  
23    Be safe.

24                   (Hearing concluded at 11:34 a.m.)  
25

## C E R T I F I C A T E

I, LAUREN BUTTERFIELD (License No. XIO2211),  
a Certified Court Reporter and Notary Public of  
the State of New Jersey, do hereby certify the  
foregoing to be a true and accurate transcript of  
my original stenographic notes taken at the time  
and place hereinbefore set forth.

*Lauren M. Etier*

LAUREN BUTTERFIELD-ETIER, CCR



Dated: January 8, 2014.



| A                     |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <b>a4003</b> 61:6     | <b>actively</b> 48:12 | <b>advantage</b> 88:1 | 92:14                 |
| <b>able</b> 6:16 7:15 | <b>actual</b> 77:5    | <b>advent</b> 22:24   | <b>allowable</b>      |
| 9:6,14 11:13          | <b>ada</b> 37:8       | <b>adversary</b>      | 15:25                 |
| 11:13 13:23           | <b>adapt</b> 5:23     | 44:14                 | <b>allowed</b> 22:6   |
| 54:19 60:8            | <b>add</b> 24:11 46:5 | <b>advertised</b>     | 78:25 87:14           |
| 62:9 63:22            | <b>adding</b> 64:15   | 32:25                 | <b>allowing</b> 85:15 |
| 64:11 76:8            | 78:19                 | <b>advising</b> 45:8  | 90:6                  |
| 76:16 82:20           | <b>addition</b> 13:8  | <b>advisory</b> 46:11 | <b>allows</b> 14:25   |
| 83:3 94:8,22          | 78:19                 | 66:14                 | 71:13                 |
| 94:25                 | <b>additional</b>     | <b>aerial</b> 39:15   | <b>alteration</b>     |
| <b>abs</b> 18:16      | 17:25 60:2            | <b>aesthetic</b>      | 75:21                 |
| 65:16 77:3            | 70:1 73:10            | 33:22                 | <b>alternative</b>    |
| <b>absent</b> 94:22   | 73:21 79:1            | <b>affiliation</b>    | 11:10 30:10           |
| <b>absolute</b> 7:11  | <b>address</b> 8:8    | 20:1                  | 36:12                 |
| <b>absolutely</b>     | 17:4,12               | <b>affiliations</b>   | <b>alternatively</b>  |
| 13:13 16:5            | 47:23 51:18           | 19:10                 | 72:18                 |
| 17:22 18:17           | 52:6 57:17            | <b>affluent</b> 77:23 | <b>alternatives</b>   |
| <b>absorb</b> 23:3    | 62:6 70:7             | <b>afford</b> 64:11   | 28:15                 |
| <b>accept</b> 95:19   | 78:12 79:4            | <b>aflcio</b> 18:25   | <b>alum</b> 68:15     |
| <b>accepted</b> 95:22 | 87:20 88:22           | <b>afternoons</b>     | <b>amenable</b> 75:14 |
| <b>access</b> 91:13   | 89:18                 | 22:2                  | 76:1                  |
| 91:16                 | <b>addressed</b>      | <b>age</b> 65:6       | <b>amend</b> 10:22    |
| <b>accessibility</b>  | 88:23                 | <b>agencies</b> 16:17 | <b>amendable</b> 75:2 |
| 37:8                  | <b>addressing</b> 9:2 | <b>aging</b> 93:12    | <b>american</b> 2:10  |
| <b>accessible</b>     | 16:9 17:3             | <b>ago</b> 4:11 23:5  | 48:3 62:22            |
| 40:10 53:14           | 47:17                 | 23:6 28:5             | <b>amount</b> 7:22    |
| 58:12,14              | <b>adirondacks</b>    | 43:17 87:19           | 21:12 23:5            |
| <b>accident</b> 24:5  | 26:16                 | 88:2                  | 32:1 65:3             |
| <b>accomplish</b>     | <b>adjacent</b> 35:24 | <b>agreement</b>      | 82:2,2 91:19          |
| 93:24                 | <b>adjournment</b>    | 31:14                 | 94:7 95:5,9           |
| <b>accrued</b> 89:25  | 3:13                  | <b>agriculture</b>    | <b>amy</b> 20:2,5     |
| <b>accumulative</b>   | <b>adjustments</b>    | 18:24                 | <b>analogy</b> 71:11  |
| 24:7                  | 90:23                 | <b>ahead</b> 38:23    | <b>andahalf</b> 27:25 |
| <b>accurate</b> 96:6  | <b>administra...</b>  | 63:6                  | 31:9 36:9             |
| <b>achieve</b> 77:7   | 7:14                  | <b>ahl</b> 37:17      | 39:19 82:4            |
| 77:15                 | <b>administrator</b>  | <b>air</b> 93:13      | <b>anderson</b> 2:9   |
| <b>acne</b> 39:8      | 43:16                 | <b>ali</b> 18:23      | 46:5 48:1             |
| <b>acre</b> 39:19     | <b>ado</b> 21:9       | <b>alleviate</b> 78:8 | <b>anecdotal</b>      |
| <b>action</b> 58:22   | <b>adopt</b> 60:11,13 | <b>allocation</b>     | 35:13 38:3            |
| 58:24                 | <b>adopted</b> 78:10  | 66:20                 | <b>animals</b> 41:1   |
| <b>actions</b> 55:18  | 78:14,18              | <b>allotted</b> 45:21 | <b>annual</b> 13:25   |
| 57:1                  | <b>adoption</b> 60:16 | <b>allow</b> 16:18    | 14:8 45:12            |
| <b>active</b> 28:4    | <b>adults</b> 44:4    | 26:1,5 32:22          | <b>annually</b> 22:18 |
| 62:5                  | <b>advance</b> 21:14  | 39:12 83:16           | 22:21                 |
|                       | <b>advancement</b>    | 84:11,15              | <b>answered</b> 81:3  |
|                       | 87:7                  | 85:18 89:23           | <b>anticipate</b>     |

|   |  |   |   |
|---|--|---|---|
| 5:14 6:3<br><b>anybody</b> 19:25<br>45:25<br><b>anybodys</b> 29:24<br><b>anymore</b> 87:22<br><b>anyway</b> 21:25<br><b>apart</b> 94:23<br><b>apologize</b><br>21:14 45:20<br>86:14<br><b>applicability</b><br>94:14<br><b>applications</b><br>33:8 69:20<br><b>applied</b> 90:13<br><b>apply</b> 24:9<br><b>appreciate</b><br>17:23,24<br>62:23 93:20<br><b>approach</b> 47:2<br>52:2,10<br>53:21 55:3<br>63:9 64:8<br><b>approaches</b><br>61:13<br><b>appropriate</b><br>20:20<br><b>april</b> 61:7<br><b>architect</b><br>43:13 48:1<br><b>architects</b><br>2:10 42:3<br>46:7 48:4<br>62:23<br><b>architecture</b><br>34:10<br><b>area</b> 10:24<br>11:21 12:12<br>12:22 13:21<br>15:13 27:18<br>27:19 34:3<br>35:1 40:3<br>41:3 88:20<br>91:21 93:5<br>94:16<br><b>areas</b> 10:6 | 12:9 26:9<br>27:16 32:15<br>57:6 69:9<br>78:1<br><b>arm</b> 47:13<br><b>art</b> 42:13<br><b>artist</b> 42:13<br><b>aside</b> 14:7<br>15:8<br><b>asked</b> 5:9,19<br>73:1 95:7<br><b>asking</b> 85:25<br><b>asla</b> 48:2<br><b>aspects</b> 68:6<br><b>aspen</b> 71:22<br><b>asphalt</b> 26:17<br>34:1,2 36:25<br>40:16 59:23<br><b>assembly</b> 61:6<br><b>assemblyman</b><br>61:7<br><b>assessed</b> 53:24<br><b>asset</b> 10:9,17<br>12:24 13:2,5<br>13:12,20<br>16:2 68:14<br>68:16<br><b>assets</b> 13:7,9<br>13:10 14:9<br><b>assist</b> 48:20<br><b>assistance</b><br>14:18,24<br>21:23 58:8<br>58:22 60:24<br>94:13,18<br><b>associate</b> 2:5<br>3:7<br><b>associated</b><br>12:4<br><b>associates</b><br>1:19<br><b>astounding</b><br>31:20<br><b>atlanta</b> 87:19<br><b>attended</b> 78:17<br><b>attorney</b> 86:16 | <b>attractive</b><br>37:11 39:6<br>43:24<br><b>audience</b> 63:18<br><b>authority</b><br>60:20<br><b>automobile</b><br>22:24<br><b>available</b><br>11:20 46:5<br>50:15 51:25<br>53:11 54:3<br>58:11,16,18<br>59:20 60:3,9<br>66:3,16,19<br>66:21 67:22<br>73:6,13 76:7<br>76:15,23<br>77:2 95:17<br><b>award</b> 44:25<br><b>aware</b> 65:25<br>66:12<br><b>awareness</b><br>48:18 57:10<br><b>awesome</b> 28:1<br>65:17<br><hr/> <b>B</b> <hr/> <b>b</b> 2:1<br><b>back</b> 5:18 9:11<br>11:2,4,9<br>18:22 29:19<br>30:7<br><b>backhoe</b> 25:23<br><b>backing</b> 49:4<br>57:21<br><b>bag</b> 23:20<br><b>bakun</b> 18:24<br><b>balancing</b> 48:5<br><b>balloons</b> 32:5<br><b>band</b> 92:24<br>93:2<br><b>bands</b> 92:16<br><b>bank</b> 34:7<br><b>barn</b> 41:7<br><b>barnegat</b> 15:25 | <b>barnes</b> 61:8<br><b>barrel</b> 22:15<br>22:16 41:4<br>42:8 52:19<br><b>barrels</b> 22:7<br>26:8 27:21<br>41:15 42:10<br>42:12,21<br>74:5<br><b>base</b> 59:25<br><b>based</b> 41:21<br>47:2,25 52:2<br>54:7 63:8<br><b>basements</b> 49:5<br><b>basic</b> 9:22<br><b>basically</b><br>84:16 95:6<br><b>basins</b> 49:8,25<br>50:12 52:16<br>56:6<br><b>basis</b> 13:25<br>14:8 21:18<br>77:24<br><b>basketball</b><br>34:24 35:5,9<br>35:11 37:19<br>45:2<br><b>bay</b> 16:1 91:4<br>92:18<br><b>bayheim</b> 34:24<br>35:2<br><b>baykeeper</b> 57:9<br>86:14,17<br><b>baykeepers</b><br>91:4<br><b>bayonne</b> 51:12<br><b>bearing</b> 92:3<br><b>beat</b> 37:25<br><b>beautifies</b><br>33:14<br><b>becoming</b> 23:12<br>86:25<br><b>bed</b> 41:13<br><b>beds</b> 38:17,18<br><b>began</b> 63:8<br><b>beginning</b> 65:5 |
|---|--|---|---|

|  |                                     |                                     |                                      |
|--|-------------------------------------|-------------------------------------|--------------------------------------|
| <b>begun</b> 20:19<br>53:20                | 86:18                               | <b>broader</b> 12:14<br>12:22       | <b>butterfield</b><br>96:3           |
| <b>behalf</b> 7:2<br>86:5                  | <b>bio retention</b><br>51:15 82:18 | <b>broke</b> 30:7                   | <b>butterfiel...</b><br>96:14        |
| <b>believe</b> 8:17<br>17:13 87:22         | <b>bioswale</b> 36:7<br>39:13,14    | <b>broken</b> 33:3                  | <b>buying</b> 42:1                   |
| <b>belt</b> 29:25                          | <b>bioswales</b><br>25:20 33:18     | <b>brook</b> 51:12                  | <hr/>                                |
| <b>benefit</b> 32:20<br>69:21 72:3<br>81:9 | 34:21 37:11                         | <b>brown</b> 25:2<br>39:18          | <b>C</b><br><hr/>                    |
| <b>bergen</b> 48:16<br>51:12 90:18         | 38:13                               | <b>brownfields</b><br>52:24         | <b>c</b> 96:1,1                      |
| <b>bergstrom</b> 2:7<br>3:9 46:4,18        | <b>bit</b> 38:5,8<br>51:25 78:16    | <b>buck</b> 34:8                    | <b>cach</b> 18:22                    |
| 65:24 72:25                                | 79:21 81:18                         | <b>build</b> 22:6<br>28:25 30:20    | 81:13 95:19                          |
| 74:2,10 75:5                               | 82:19,23                            | 35:7 43:7                           | <b>calendar</b> 75:12                |
| 75:25 76:25                                | 83:17                               | 48:18 49:19                         | <b>call</b> 4:7 22:1<br>30:1 72:24   |
| 77:17 79:17                                | <b>black</b> 69:16                  | 55:8 56:13                          | 83:13                                |
| 82:9                                       | <b>blah</b> 44:6,6,6                | 64:4 65:13                          | <b>called</b> 35:3<br>66:17          |
| <b>beset</b> 5:8                           | <b>blending</b> 15:18               | 72:10,10                            | <b>calling</b> 14:23                 |
| <b>best</b> 6:24<br>10:20 16:12            | <b>blustery</b> 4:5                 | 80:3 92:5,6                         | <b>camden</b> 30:3<br>45:11 48:15    |
| 17:11 20:23                                | <b>bmp</b> 79:6                     | <b>building</b> 8:24<br>15:19 26:10 | 51:9 54:15                           |
| 63:1 94:1                                  | <b>board</b> 19:3<br>66:15          | 26:18 28:11                         | 54:15,17                             |
| <b>better</b> 12:18<br>16:14 39:11         | <b>bob</b> 2:4 3:6                  | 28:20 29:11                         | 59:22 77:19                          |
| 43:22 51:17                                | <b>bodies</b> 25:7                  | 30:5 31:25                          | 77:20,21,22                          |
| 53:13 56:23                                | <b>bolstering</b> 5:1               | 34:12 37:21                         | 78:9 88:7                            |
| 57:11 87:10                                | <b>bonded</b> 64:22                 | 47:3 48:14                          | <b>camels</b> 30:7                   |
| 87:10 89:2                                 | <b>bonds</b> 64:19                  | 52:7 59:7                           | <b>canal</b> 36:14                   |
| <b>beyond</b> 77:4                         | <b>books</b> 11:1                   | 63:9 71:21                          | <b>cant</b> 13:24<br>26:11 40:24     |
| <b>bid</b> 67:16                           | <b>boston</b> 45:15                 | 74:20 80:8                          | 45:6 65:24                           |
| <b>big</b> 8:14 15:14<br>27:20 29:12       | <b>botanists</b> 69:3               | <b>buildings</b> 11:9<br>22:8 31:21 | <b>cap</b> 65:22                     |
| 31:9 68:8                                  | <b>bottle</b> 23:20                 | 33:17                               | <b>capabilities</b><br>11:7 91:16    |
| 71:18                                      | <b>bottom</b> 9:24<br>73:4          | <b>builds</b> 35:3,4                | <b>capacity</b> 12:10<br>25:3,15     |
| <b>bigger</b> 91:22                        | <b>bounce</b> 35:15                 | <b>built</b> 14:9<br>23:5 26:10     | 27:12                                |
| <b>biggest</b> 6:12<br>63:20               | <b>break</b> 3:11<br>20:12 83:6     | 27:14 31:8                          | <b>capital</b> 10:11<br>13:22 14:7,8 |
| <b>bike</b> 36:3,7                         | 83:11                               | 59:13 71:9                          | 14:15 59:2,4                         |
| <b>bikes</b> 36:5                          | <b>breaking</b> 74:21               | <b>bulk</b> 11:15                   | 59:25                                |
| <b>bill</b> 61:6,8                         | <b>brief</b> 3:10                   | <b>bunch</b> 37:25                  | <b>capture</b> 22:21<br>25:8 31:10   |
| <b>billion</b> 8:10                        | <b>bring</b> 8:15<br>63:2 76:6      | <b>burden</b> 50:20                 | 31:23 36:22                          |
| <b>billions</b> 8:15                       | <b>bringing</b> 18:14<br>69:3 86:1  | <b>business</b> 25:2<br>32:9 84:8   | 37:20 38:11                          |
| <b>bills</b> 89:19                         | <b>brings</b> 5:17<br>43:21         | <b>businesses</b><br>33:2,15        | 39:21 43:21                          |
| <b>biological</b>                          | <b>broad</b> 94:14<br>95:1          | 49:21 60:11                         | 52:24 61:9                           |
|  |                                     | 60:13 95:6                          | 81:15,20                             |
|  |                                     | <b>butt</b> 23:19                   |                                      |

|  |  |   |   |
|--|--|---|---|
| 82:3,19,20<br><b>captured</b> 31:2<br>36:9<br><b>captures</b> 39:19<br><b>capturing</b> 23:6<br>31:6 36:10<br>40:3 43:20<br>45:1,2 82:1<br>82:4,14<br><b>car</b> 39:1<br><b>careful</b> 71:24<br><b>carefully</b><br>86:23<br><b>carrier</b> 45:1<br>68:7<br><b>carries</b> 49:25<br><b>carry</b> 25:16<br><b>cars</b> 38:24<br><b>case</b> 27:1 77:7<br><b>cases</b> 17:2<br>60:7 77:4<br>95:5<br><b>castle</b> 36:16<br><b>caucus</b> 80:21<br><b>cause</b> 89:1<br>90:8<br><b>caused</b> 8:11<br><b>causing</b> 25:23<br>25:24<br><b>ccr</b> 96:14<br><b>center</b> 1:21<br>42:25 68:20<br><b>certain</b> 8:16<br>61:11<br><b>certainly</b> 4:19<br>35:22 71:25<br><b>certified</b> 1:20<br>96:4<br><b>certify</b> 96:5<br><b>cetera</b> 25:3,5<br><b>chair</b> 2:3 4:3<br><b>challenge</b><br>94:22 95:2<br><b>challenged</b><br>43:4<br><b>challenges</b> | 10:3<br><b>chambers</b> 19:8<br><b>change</b> 4:12,17<br>5:6 30:15<br>53:15 75:9<br>75:11,13,14<br>88:18,19<br>89:21,22<br><b>changed</b> 42:22<br><b>changes</b> 91:6<br>91:10<br><b>changing</b> 90:21<br><b>chapter</b> 2:9<br>48:3 62:22<br><b>charge</b> 90:6<br>94:20,23<br><b>charging</b> 39:2<br><b>charming</b> 36:21<br><b>chart</b> 48:21<br><b>charted</b> 54:1<br><b>chemicals</b> 22:4<br><b>chicago</b> 45:15<br><b>chief</b> 93:8<br><b>children</b> 35:5<br><b>chlorinates</b><br>29:16,17<br><b>choir</b> 24:13<br><b>choose</b> 90:6<br><b>chris</b> 19:16<br>63:18 83:22<br>86:13,14,15<br><b>christopher</b><br>47:20<br><b>cigarette</b><br>23:19<br><b>circumstances</b><br>4:18<br><b>cities</b> 22:18<br>49:19 63:25<br>94:14<br><b>citizens</b> 55:11<br><b>city</b> 20:16<br>22:20 27:6<br>29:1,23 30:3<br>30:5,17,17<br>32:7 35:5,7 | 35:20 36:1<br>36:15,20<br>40:20,21<br>42:10 43:14<br>45:11,11,16<br>51:9,10,10<br>54:22 62:4<br>69:19 77:19<br>77:21,22,24<br>78:1,9,19<br>80:16,20<br>93:8,9<br><b>citywide</b> 78:4<br><b>civic</b> 55:1<br><b>clarify</b> 11:3<br>12:17<br><b>clark</b> 59:24<br><b>clean</b> 1:2 4:3<br>4:8 7:3,16<br>15:7,8 17:18<br>17:21 37:23<br>45:5 46:20<br>48:21 49:8<br>74:19 92:6<br>93:1<br><b>cleaning</b> 56:9<br><b>clear</b> 73:15<br>77:14<br><b>clearer</b> 11:25<br><b>clearly</b> 56:2<br><b>click</b> 32:4<br>67:20,20<br><b>climate</b> 4:12<br>4:17 5:6<br>68:18 90:20<br><b>climates</b> 69:1<br><b>clogged</b> 71:13<br>71:16<br><b>closed</b> 41:11<br><b>closing</b> 17:6<br>62:18<br><b>coach</b> 34:24<br><b>cochairs</b> 18:15<br><b>cold</b> 4:5 68:18<br>69:1<br><b>colleagues</b> | 21:3 48:4<br><b>collection</b><br>12:4,8<br><b>collective</b><br>81:17<br><b>collectively</b><br>83:23<br><b>collects</b> 68:7<br><b>college</b> 68:12<br><b>color</b> 39:9<br><b>colors</b> 27:7<br><b>com</b> 1:25<br><b>combination</b><br>8:1 64:14<br><b>combined</b> 16:1<br>24:15 25:3<br>28:3 49:4<br>53:1 56:8<br>57:19 62:7<br>77:22 78:9<br><b>combines</b> 23:15<br>24:22<br><b>come</b> 5:18 17:9<br>36:18,24<br>40:23 42:13<br>69:17 72:20<br>86:9 91:5<br>92:6<br><b>comes</b> 24:22<br>31:21 45:22<br>68:17 69:14<br>80:11 88:11<br><b>comfortable</b><br>76:9<br><b>coming</b> 4:4<br>15:12 41:22<br>66:5,12<br>70:18<br><b>commence</b> 3:12<br><b>commencing</b><br>1:13<br><b>comment</b> 46:6<br><b>comments</b> 3:4<br>46:3 86:3,11<br>86:22 95:19<br>95:21 |
|--|--|---|---|

|                                     |                                  |                                   |                                  |
|-------------------------------------|----------------------------------|-----------------------------------|----------------------------------|
| <b>commercial</b><br>22:8 74:15     | <b>community</b><br>22:12,13     | 42:25 53:5                        | 14:8 15:15                       |
| <b>commercially</b><br>92:9         | 24:3 28:8                        | 56:5                              | 17:9,9,15                        |
| <b>commercials</b><br>39:9          | 29:9,25 30:1                     | <b>conduct</b> 74:1               | 56:22 57:10                      |
| <b>commission</b><br>57:25 86:7     | 33:14,19                         | <b>configured</b><br>20:24        | 62:1 64:4                        |
| <b>commissioner</b><br>2:4 4:15 5:8 | 42:1,4,24                        | <b>confused</b> 21:12             | 75:15                            |
| 6:10,11,20                          | 43:4,23,23                       | <b>conjunction</b><br>10:9        | <b>continued</b><br>17:19        |
| 18:2,5,10                           | 47:2,23 48:6                     | <b>connective</b><br>35:22        | <b>continues</b> 7:18            |
| 20:13 21:16                         | 51:8,17 52:2                     | <b>consent</b> 30:23              | 71:10 92:23                      |
| 61:18 95:16                         | 52:13 53:2                       | 63:23                             | <b>continuing</b><br>63:5        |
| <b>commissions</b><br>7:5,11        | 54:2,7,12                        | <b>consequences</b><br>55:25      | <b>contract</b> 30:20            |
| <b>commit</b> 55:20                 | 55:1,3 57:13                     | <b>conserve</b> 61:9              | <b>contracted</b><br>33:10       |
| 56:11 58:8                          | 57:16,18,22                      | 61:12                             | <b>contractor</b><br>74:24       |
| <b>commitment</b><br>17:20 55:4     | 57:24 59:14                      | <b>consider</b> 30:10             | <b>contributes</b><br>95:8       |
| <b>committed</b><br>16:24 48:5      | 59:23 62:10                      | 51:14                             | <b>contribution</b><br>90:7      |
| 93:10                               | 63:8 64:6                        | <b>consideration</b><br>86:11     | <b>control</b> 16:4              |
| <b>committee</b><br>46:11           | 76:8,18                          | <b>considering</b><br>12:2 87:5   | 61:9,12                          |
| <b>common</b> 90:9                  | 77:20 78:2,3                     | <b>considers</b><br>85:14         | 87:10                            |
| <b>communicat...</b><br>21:7        | 78:10,20                         | <b>consistent</b><br>56:14,20,24  | <b>convenient</b><br>37:6        |
| <b>communities</b><br>12:19 16:1,4  | <b>compaction</b><br>70:22       | 61:20 62:1                        | <b>conversation</b><br>4:22 76:5 |
| 21:6 24:17                          | <b>company</b> 43:13             | 71:14                             | <b>converting</b><br>52:24       |
| 24:18 45:14                         | 84:6 86:6                        | <b>constituency</b><br>30:11      | <b>conveyance</b><br>29:12,15    |
| 45:18 47:7,8                        | <b>complaint</b><br>69:25        | <b>constituents</b><br>54:9       | <b>convinced</b><br>28:18 35:6   |
| 47:9,21                             | <b>complete</b> 61:3             | <b>constructed</b><br>25:6 49:22  | <b>convincing</b><br>35:7        |
| 48:14,24                            | <b>completed</b> 33:9            | 60:5 88:9                         | <b>cool</b> 34:22                |
| 49:3,11,16                          | 60:9                             | <b>constructing</b><br>55:4       | 35:13 36:4                       |
| 51:3,4,13,20                        | <b>completely</b> 8:4            | <b>construction</b><br>12:1 33:10 | 66:25                            |
| 51:22 52:4,5                        | 8:6                              | 36:3 53:16                        | <b>cooler</b> 36:11              |
| 53:7,14,19                          | <b>complicated</b><br>80:3       | 61:21 67:16                       | <b>cooperative</b><br>2:7 46:9   |
| 55:6,25 57:7                        | <b>component</b><br>12:25 13:1,5 | 75:1 76:1                         | 47:12 48:8                       |
| 58:3,6,7,12                         | 15:10 16:6                       | 88:10,14                          | 53:23 54:22                      |
| 58:14,18,19                         | 16:25 56:17                      | <b>contact</b> 45:23              | 58:2 60:6,23                     |
| 58:23 62:15                         | 57:3                             | 67:24                             | 62:21                            |
| 63:12,13,14                         | <b>components</b><br>10:15,16    | <b>continue</b> 8:21              | <b>coopers</b> 54:23             |
| 73:4,6,17                           | 13:3,7 15:20                     |                                   |                                  |
| 76:19 77:17                         | <b>concerns</b> 86:12            |                                   |                                  |
|                                     | <b>concluded</b><br>95:24        |                                   |                                  |
|                                     | <b>concludes</b><br>95:14        |                                   |                                  |
|                                     | <b>concrete</b> 33:25            |                                   |                                  |

|                             |                            |                       |                       |
|-----------------------------|----------------------------|-----------------------|-----------------------|
| <b>coordinated</b><br>56:14 | 43:15 48:15<br>48:16,16,16 | <b>crew</b> 72:4,16   | 71:24 92:25           |
| <b>coowned</b> 86:6         | 51:10,12,13                | <b>crews</b> 76:15    | <b>damaged</b> 7:23   |
| <b>core</b> 52:23           | 53:20 59:22                | <b>critical</b> 6:25  | 8:1                   |
| 69:21                       | 59:24 63:24                | 7:11 13:10            | <b>damages</b> 70:23  |
| <b>corner</b> 23:19         | 65:1 67:8                  | 13:13 16:5            | <b>dammed</b> 85:5    |
| 24:1,6 70:15                | 70:24,25                   | 47:10 63:15           | <b>damn</b> 85:20     |
| 71:12                       | 80:19 81:7,8               | <b>criticality</b>    | <b>dan</b> 18:16      |
| <b>corporate</b> 1:21       | 82:23 90:18                | 9:17                  | 19:20,21              |
| <b>correct</b> 79:6         | <b>countys</b> 21:21       | <b>crossing</b> 37:9  | 65:15                 |
| <b>corridor</b> 35:23       | 21:25                      | <b>crosswalk</b> 37:7 | <b>data</b> 27:4      |
| <b>cosgrove</b> 18:16       | <b>couple</b> 29:8,23      | 37:8                  | 28:21 68:22           |
| 19:3                        | 33:23 38:3                 | <b>crossword</b> 44:3 | 68:23                 |
| <b>cost</b> 17:3            | 43:17,24                   | <b>crown</b> 72:2     | <b>date</b> 1:12      |
| 28:22 34:14                 | 72:11 87:2                 | <b>crunch</b> 37:15   | <b>dated</b> 96:17    |
| 35:8 49:15                  | <b>course</b> 26:8         | 37:18                 | <b>day</b> 4:5 24:4   |
| 51:6 56:17                  | 39:7 54:1                  | <b>cso</b> 16:4 24:15 | 27:25 44:23           |
| 60:3 64:5                   | 82:22 83:2                 | 24:17,18              | 49:14 69:16           |
| 81:19 82:9                  | <b>court</b> 1:20          | 31:20 87:9            | 69:17 92:2            |
| 82:15 83:3                  | 31:15 35:9                 | 87:20 90:14           | <b>days</b> 7:1 30:19 |
| 87:5 92:24                  | 96:4                       | 90:17,25              | 87:25                 |
| <b>costs</b> 13:11          | <b>courts</b> 35:3,4       | <b>csos</b> 16:6,10   | <b>dc</b> 45:15 66:13 |
| 28:13 56:16                 | 35:5,12                    | 28:3,4 87:22          | <b>dca</b> 19:14      |
| 58:16 61:5                  | <b>cover</b> 44:15,17      | 89:9                  | <b>deal</b> 68:8      |
| 89:25 90:3                  | 58:16 72:14                | <b>culturally</b>     | 71:18 74:11           |
| <b>couldnt</b> 5:9          | 78:21,23                   | 29:3                  | <b>debate</b> 4:16    |
| <b>council</b> 1:2          | <b>covers</b> 12:8         | <b>cuomo</b> 92:12    | 66:7                  |
| 4:3,8 7:3,18                | <b>cranford</b> 77:20      | <b>cuomos</b> 91:22   | <b>dec</b> 44:24      |
| 17:19 18:13                 | 78:10,20                   | <b>curb</b> 32:22     | 75:21                 |
| 18:20 20:13                 | <b>crap</b> 24:6 44:7      | 39:12                 | <b>decay</b> 33:20    |
| 30:17 45:9                  | <b>create</b> 11:8         | <b>curbs</b> 32:20,21 | <b>december</b> 1:12  |
| 46:20 48:21                 | 47:9 63:14                 | <b>curious</b> 63:21  | 95:20,22              |
| 86:21 91:10                 | 76:8 78:25                 | 81:16                 | <b>dechlorinates</b>  |
| 91:15 93:2                  | 92:11                      | <b>current</b> 53:24  | 29:18                 |
| 95:15                       | <b>created</b> 9:12        | <b>currently</b> 67:6 | <b>decide</b> 24:5    |
| <b>councils</b> 6:12        | 10:23 44:1                 | 79:5,8 93:25          | <b>decided</b> 4:11   |
| 7:4,5,10                    | 75:17                      | 95:2                  | 11:16 12:17           |
| <b>countdown</b>            | <b>creating</b> 53:3       | <b>curve</b> 70:13    | 30:19,21,21           |
| 75:12                       | <b>creative</b> 42:14      | <b>cuts</b> 32:22     | 64:13                 |
| <b>counting</b> 8:14        | 49:15                      | 39:12                 | <b>decisions</b> 89:1 |
| <b>country</b> 13:14        | <b>credited</b> 84:22      | <b>cycle</b> 13:6,11  | 89:2 90:2             |
| 37:14 45:14                 | <b>crediting</b>           |                       | <b>decree</b> 63:23   |
| 51:21 84:14                 | 84:17                      | <b>D</b>              | <b>dedicated</b> 59:5 |
| <b>county</b> 20:18         | <b>creek</b> 25:5          | <b>d</b> 2:1 3:1      | <b>deferred</b> 80:10 |
| 27:1 30:16                  | 29:19,22                   | <b>daily</b> 21:18    | <b>defined</b> 82:11  |
| 30:18 36:1                  | <b>crest</b> 1:21          | <b>dam</b> 25:4       | <b>defining</b> 13:9  |
|                             |                            | <b>damage</b> 49:12   | <b>definitely</b>     |

|                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 84:7                  | 62:11 72:7            | <b>dirt</b> 70:2      | 70:9 75:8             |
| <b>degraded</b> 50:8  | <b>desk</b> 72:22     | <b>discharge</b>      | 77:1 80:2             |
| <b>deliver</b> 83:8   | 83:10                 | 89:23                 | 81:7,20               |
| <b>demonstrate</b>    | <b>devastating</b>    | <b>discharges</b>     | <b>doesnt</b> 23:3    |
| 31:3 56:19            | 6:8                   | 77:23                 | 25:18 73:8,9          |
| <b>demonstrated</b>   | <b>develop</b> 5:13   | <b>discharging</b>    | 81:5 92:19            |
| 53:7                  | 52:6 57:13            | 57:19                 | <b>dog</b> 23:18,24   |
| <b>demonstrating</b>  | 58:5 61:1             | <b>discretionary</b>  | 24:6                  |
| 43:19 68:25           | 94:12                 | 66:23                 | <b>doing</b> 13:20    |
| <b>demonstration</b>  | <b>developed</b>      | <b>discussed</b>      | 22:9,12 30:6          |
| 26:15 42:2            | 66:15                 | 78:14 94:19           | 31:4 32:8             |
| 42:15,24              | <b>developers</b>     | <b>discussion</b>     | 34:19 38:22           |
| 62:11                 | 94:10                 | 4:23 5:6              | 40:19 41:11           |
| <b>density</b> 32:7   | <b>developing</b>     | 12:23 46:20           | 44:8 66:22            |
| 39:16                 | 13:11 16:20           | 48:10 59:10           | 75:10 80:8            |
| <b>denver</b> 45:15   | 62:5 93:25            | 62:20,25              | 89:22 93:24           |
| <b>dep</b> 2:4 7:8    | 94:3                  | <b>discussions</b>    | <b>dollars</b> 8:11   |
| 10:19 15:4            | <b>development</b>    | 86:19                 | 8:15 14:8,19          |
| 44:24 75:17           | 55:1 62:2             | <b>disgusting</b>     | 14:23 15:7            |
| 91:11 92:16           | <b>diagonal</b> 42:18 | 24:11                 | 15:22 28:22           |
| 93:3                  | <b>dialogue</b> 63:5  | <b>dishwasher</b>     | 29:14 43:7            |
| <b>department</b> 1:9 | <b>didnt</b> 35:6     | 24:23                 | 58:17 59:14           |
| 6:17 7:14             | 41:9 43:2             | <b>disinfect</b> 22:5 | 59:20 60:9            |
| 18:10,23,24           | <b>difference</b>     | <b>distill</b> 18:9   | 80:5 89:24            |
| 19:20 20:14           | 34:14 35:10           | <b>distinct</b> 36:5  | <b>dome</b> 45:2 68:7 |
| 89:7 92:20            | <b>different</b> 8:9  | <b>distribution</b>   | <b>dont</b> 14:12     |
| 92:21 95:16           | 8:25 20:16            | 85:3,12               | 22:2,4 26:21          |
| <b>depending</b> 25:5 | 27:8 37:1             | <b>district</b> 29:6  | 34:3 37:16            |
| <b>depends</b> 81:23  | 40:13 41:20           | 80:17 86:7            | 37:17 38:16           |
| <b>deprecating</b>    | 42:23 52:13           | 88:7                  | 64:8,13 67:7          |
| 44:9                  | 68:2,24               | <b>disturbance</b>    | 69:15 70:14           |
| <b>deputy</b> 67:8    | 70:11 73:7            | 29:24                 | 70:14 71:24           |
| <b>design</b> 16:16   | 88:25                 | <b>ditches</b> 25:21  | 72:9 74:17            |
| 16:16 21:24           | <b>differently</b>    | <b>diversity</b>      | 74:18,20              |
| 48:6 53:15            | 48:19 52:1            | 34:18                 | 75:11 76:13           |
| 54:11 61:1            | <b>difficult</b> 9:7  | <b>divorces</b> 90:1  | 81:2 83:23            |
| 67:6,11,14            | 70:5 72:6             | <b>document</b> 66:4  | 84:16 85:7,8          |
| 67:15 68:18           | 75:13                 | 94:6                  | <b>door</b> 32:14,15  |
| 75:16,18,20           | <b>digging</b> 38:23  | <b>documentation</b>  | <b>dot</b> 11:18      |
| 82:8 83:3             | <b>direction</b>      | 66:1                  | <b>doubt</b> 45:24    |
| <b>designed</b> 29:8  | 17:23 51:23           | <b>documents</b>      | <b>downhill</b> 85:4  |
| 49:22                 | 75:15                 | 67:16,22              | <b>download</b> 67:22 |
| <b>designing</b> 47:3 | <b>directly</b> 50:2  | <b>dodson</b> 2:5 3:7 | <b>downtown</b> 27:18 |
| 63:9 75:24            | 66:8                  | 21:3,11 64:2          | 36:18                 |
| 82:16,22              | <b>director</b> 2:5   | 64:21 66:11           | <b>dozen</b> 68:1     |
| <b>designs</b> 42:14  | 3:7                   | 67:8 68:10            | 80:13                 |

|                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <b>dpw</b> 70:13      | 90:9                  | <b>either</b> 29:3    | <b>engineers</b> 42:3 |
| <b>dr</b> 47:20       | <b>east</b> 1:10      | 34:1 81:21            | 67:11                 |
| <b>drafts</b> 89:15   | 36:13,17              | <b>electric</b> 12:3  | <b>english</b> 44:3   |
| <b>drags</b> 21:14    | <b>easy</b> 75:4      | 38:24                 | <b>enhances</b> 55:9  |
| <b>drain</b> 24:20    | 88:19                 | <b>electricity</b>    | <b>enhancing</b> 51:2 |
| 69:18                 | <b>eco</b> 44:13      | 84:18 85:7            | <b>enjoy</b> 20:25    |
| <b>drains</b> 69:15   | <b>ecological</b>     | 85:10,11              | <b>ensures</b> 55:3   |
| 71:16                 | 86:18                 | <b>elementary</b>     | <b>enter</b> 30:19    |
| <b>drbc</b> 19:16     | <b>economic</b> 64:10 | 42:18                 | <b>enterprises</b>    |
| <b>drink</b> 32:19    | 82:5 89:3,17          | <b>elephant</b> 41:6  | 20:16                 |
| <b>drinking</b> 13:4  | 90:1                  | <b>elevate</b> 57:10  | <b>enthusiastic</b>   |
| 15:7,9 37:24          | <b>economical</b>     | 62:19                 | 41:18                 |
| 38:2 45:4,5           | 92:13                 | <b>elevation</b> 12:3 | <b>entire</b> 38:17   |
| <b>drip</b> 23:17     | <b>economically</b>   | <b>elizabeth</b>      | <b>entities</b> 59:19 |
| 24:4                  | 5:24                  | 83:22 84:1            | 60:18                 |
| <b>drive</b> 27:24    | <b>economies</b> 47:8 | <b>eloquent</b> 78:15 | <b>entity</b> 32:11   |
| 70:20                 | 63:13                 | <b>embrace</b> 58:15  | <b>entrance</b> 41:2  |
| <b>driven</b> 55:3    | <b>economy</b> 57:7   | <b>embracing</b> 78:4 | <b>environment</b>    |
| 77:13                 | <b>edge</b> 39:23     | <b>emergency</b> 8:1  | 47:5 48:6             |
| <b>driveway</b> 24:20 | <b>edges</b> 38:22    | 12:13,15              | 50:15 51:3            |
| 26:7 34:15            | <b>educate</b> 48:17  | <b>emg</b> 75:19      | 55:10 63:11           |
| 42:25                 | <b>education</b>      | <b>employ</b> 42:1    | 93:9                  |
| <b>driveways</b>      | 21:24 31:12           | <b>enable</b> 58:23   | <b>environmental</b>  |
| 25:10 26:21           | 40:5 44:1             | <b>enck</b> 43:16     | 1:9 20:3              |
| 50:1 74:9,16          | 76:2,19               | <b>encourage</b>      | 21:7,8 23:13          |
| <b>drop</b> 24:4      | <b>educators</b> 19:4 | 60:12 61:10           | 45:9 49:2             |
| 49:25                 | <b>effective</b> 24:7 | <b>encouraged</b>     | 50:10 57:8            |
| <b>dry</b> 24:19      | 49:16 51:6            | 88:4                  | 66:14 68:13           |
| <b>due</b> 80:23      | 54:5 56:17            | <b>encourages</b>     | 89:4,8                |
| <b>dug</b> 25:22      | 59:1 87:5             | 93:17                 | <b>environmen...</b>  |
| <b>dump</b> 70:21     | 92:25                 | <b>ends</b> 23:11     | 92:9                  |
| <b>dumped</b> 69:12   | <b>effectively</b>    | 27:11                 | <b>epa</b> 15:5 31:4  |
| <b>dumping</b> 71:14  | 25:15 55:8            | <b>energy</b> 28:16   | 43:15 63:23           |
| <b>dumps</b> 29:18    | 56:1 76:3             | 38:5 39:5             | 77:8                  |
| <b>dundee</b> 85:20   | 82:9,15 83:4          | 84:5 93:8             | <b>epas</b> 66:16     |
| 86:5                  | <b>effectiveness</b>  | <b>enforcement</b>    | 81:14                 |
| <b>dwg</b> 67:12      | 70:3                  | 56:21 57:1            | <b>equation</b> 59:9  |
|                       | <b>efficient</b> 39:5 | <b>engage</b> 20:19   | 59:15                 |
| <b>E</b>              | <b>effort</b> 65:19   | 57:11                 | <b>equipment</b>      |
| <b>e</b> 2:1,1,1 3:1  | <b>efforts</b> 5:2,10 | <b>engaged</b> 40:7   | 73:10 74:25           |
| 44:5 96:1,1           | 17:21 18:14           | 41:21 42:7,8          | <b>equity</b> 95:6    |
| <b>earlier</b> 27:23  | 57:1 60:8             | 48:12 76:5            | <b>era</b> 17:14      |
| <b>early</b> 33:10    | 62:9                  | <b>engineer</b> 42:6  | <b>erie</b> 36:14     |
| <b>ease</b> 37:9      | <b>eight</b> 89:9     | 67:14                 | <b>erosion</b> 25:23  |
| <b>easier</b> 44:18   | <b>eit</b> 9:8 14:18  | <b>engineering</b>    | <b>esf</b> 68:15,15   |
| <b>easily</b> 74:7    | 15:5,22               | 53:16                 | 69:3                  |



|   |   |  |  |
|---|---|--|--|
| <b>especially</b><br>7:15 16:10<br>92:3                                       | <b>existing</b> 11:1<br>50:6,21<br>52:16 53:25<br>55:21,24<br>56:1,12 62:3<br>73:18 80:11 | <b>facilities</b><br>11:19 28:11<br>28:21 29:15<br>40:21 49:24<br>55:22 64:5<br>65:13 80:4,9 | <b>fees</b> 94:20,23<br><b>feet</b> 69:12<br>78:21,23              |
| <b>esq</b> 2:3  |   |  | <b>fence</b> 72:11   |
| <b>essentially</b><br>25:21 27:7<br>29:16 31:18<br>66:18 67:13<br>80:18 81:22 | <b>expand</b> 12:10<br><b>expanded</b> 14:18  | <b>facility</b> 24:22<br>76:15   | <b>ferdows</b> 18:23<br><b>ferry</b> 54:23                         |
| <b>establish</b> 61:9   | <b>expensive</b><br>28:12 30:9  | <b>facing</b> 49:14<br>55:24   | <b>fertilizers</b><br>24:8   |
| <b>establishing</b><br>13:11  | <b>expanding</b> 34:5,13 82:6<br>89:22  | <b>fact</b> 5:11,14<br>6:2 7:7<br>23:15 45:20<br>69:21 80:12                                 | <b>fewer</b> 72:16,16<br>72:16,17<br>87:22                         |
| <b>et</b> 25:3,5  | <b>experience</b><br>4:19 6:8<br>48:20 63:2   | <b>failing</b> 8:18<br>9:3   | <b>field</b> 18:1<br>90:12   |
| <b>euphemism</b> 23:8   | <b>experienced</b><br>6:4 81:18   | <b>fair</b> 43:6   | <b>figure</b> 78:6   |
| <b>eustice</b> 61:7   | <b>experiences</b><br>81:17   | <b>fall</b> 71:6,6<br>72:9   | <b>figuring</b> 51:21  |
| <b>evaluate</b> 73:13   | <b>experiencing</b><br>4:17,20 6:6<br>49:6 91:3   | <b>falls</b> 26:13<br>40:1 45:7<br>50:18 51:11   | <b>file</b> 67:14  |
| <b>evaluated</b><br>53:25   | <b>expertise</b><br>48:20 63:2<br>94:16   | <b>fans</b> 6:12   | <b>files</b> 67:12   |
| <b>evaluating</b><br>11:14  | <b>experts</b> 6:24<br>18:1   | <b>far</b> 31:3 37:12<br>37:13 42:10<br>87:15 89:6<br>89:10                                  | <b>filled</b> 92:3   |
| <b>evenings</b> 22:3  | <b>explain</b> 20:8   | <b>fascinating</b><br>4:21   | <b>filter</b> 91:25<br>92:1  |
| <b>event</b> 25:1   | <b>explore</b> 56:22  | <b>faster</b> 38:5   | <b>finally</b> 5:4,25<br>15:13 30:15<br>61:18 71:19<br>75:16 91:18 |
| <b>events</b> 41:12<br>41:15 81:25<br>83:2                                    | <b>express</b> 89:18  | <b>fda</b> 92:22   | <b>finance</b> 5:2,23<br>66:14                                     |
| <b>everybody</b><br>18:19,21<br>44:5 81:6<br>83:18                            | <b>extended</b> 11:6  | <b>feasible</b> 5:24<br>85:22  | <b>financial</b> 14:3<br>14:18 51:24<br>53:12                      |
| <b>example</b> 28:17<br>64:25 85:2<br>88:15                                   | <b>extension</b> 2:8<br>46:9 47:13<br>48:9 53:24<br>54:22 58:2<br>60:23 62:22             | <b>federal</b> 9:5,15<br>31:15 54:19<br>65:21,25<br>66:9                                     | <b>financially</b><br>29:2 85:22                                   |
| <b>excellence</b><br>44:25  | <b>extensive</b><br>74:22 76:12   | <b>federation</b><br>20:3  | <b>financing</b> 15:6<br>21:5                                      |
| <b>excessive</b> 64:6   | <b>extent</b> 87:16   | <b>feed</b> 26:2,6   | <b>find</b> 32:3,5<br>49:11 64:7<br>67:15,19<br>72:20,22<br>91:1,3 |
| <b>excited</b> 28:9<br>48:9   | <b>eyes</b> 41:11   | <b>feedback</b> 79:10  | <b>finding</b> 9:7   |
| <b>exclusively</b><br>93:17   |   | <b>feel</b> 36:6<br>40:18 44:22<br>76:9 87:1<br>94:17  | <b>fine</b> 10:2<br>71:16  |
| <b>executive</b><br>30:16,19<br>43:15 67:9                                    |   | <b>feeling</b> 43:22   | <b>finish</b> 87:14  |
| <b>existence</b><br>12:10   |   |  | <b>finished</b> 88:3   |
|   |   |  | <b>fire</b> 52:21  |
|   |   |  | <b>firm</b> 34:10  |

|  |   |  |   |
|--|---|--|---|
| <b>first</b> 4:4 10:7<br>10:24 21:11<br>37:12 45:12<br>55:20 58:8<br>58:20 62:14<br>68:18 70:9<br>73:1 81:24<br>81:24 82:4<br>82:10 87:12<br>90:20 91:24<br><b>fiscal</b> 13:3<br>15:21 64:11<br>64:16<br><b>fit</b> 57:25<br><b>fits</b> 84:7<br><b>five</b> 13:7 30:5<br>36:10 39:1<br>43:11 83:16<br>84:14<br><b>fix</b> 9:20, 21<br>10:6<br><b>fixes</b> 9:22, 23<br><b>fleets</b> 11:11<br><b>flesh</b> 92:4<br><b>flexy</b> 40:15<br><b>floatables</b><br>29:17<br><b>flood</b> 11:9, 22<br>12:6, 9 50:9<br><b>flooding</b> 49:6<br>51:18 57:17<br>78:13 90:19<br>90:25 93:13<br><b>floods</b> 90:19<br><b>floor</b> 45:23<br>83:7<br><b>flow</b> 34:3<br>74:22 85:8<br>88:13<br><b>fluid</b> 23:18<br><b>flush</b> 23:9<br>45:3, 6<br><b>focus</b> 5:9, 20<br>8:19 9:16<br>15:14 17:20<br><b>focused</b> 5:22 | 40:6 47:17<br><b>focuses</b> 21:4<br><b>focusing</b> 7:9<br>93:22<br><b>foil</b> 23:21<br><b>folks</b> 30:8<br>36:12 37:10<br>40:10 41:8<br>41:23 67:6<br><b>follow</b> 95:14<br><b>following</b> 6:1<br><b>foot</b> 29:11<br>38:15 71:20<br><b>footing</b> 94:8<br><b>forbes</b> 69:5<br><b>force</b> 26:22<br>45:18<br><b>forefront</b><br>77:19<br><b>foregoing</b> 96:6<br><b>forestry</b> 21:9<br>68:13<br><b>forget</b> 66:17<br><b>forging</b> 63:6<br><b>forgiveness</b><br>15:11, 12, 24<br><b>forgot</b> 23:24<br><b>format</b> 20:9<br><b>formats</b> 68:3<br><b>forth</b> 96:8<br><b>forward</b> 7:15<br>30:24 44:19<br>46:2, 21 54:4<br>62:16, 21, 25<br>63:4 66:7<br>76:4, 10 78:7<br>89:15<br><b>found</b> 84:10<br><b>foundation</b><br>35:3 49:15<br>54:24<br><b>four</b> 4:10 10:6<br>10:16 12:23<br>21:17, 17<br>28:25 30:19<br>30:20 35:7 | 38:14 47:15<br>48:13 54:18<br>77:21 88:25<br><b>fourth</b> 10:17<br>12:22<br><b>framework</b> 84:7<br><b>frankly</b> 75:9<br><b>free</b> 1:24<br>42:10 45:7<br><b>freeze</b> 38:6<br><b>freezes</b> 38:4, 8<br><b>french</b> 23:20<br><b>frequent</b> 49:6<br>77:24 83:1<br><b>friday</b> 1:12<br><b>front</b> 18:18<br>29:13 30:12<br>30:13 83:10<br><b>frustrating</b><br>59:11<br><b>fry</b> 23:20<br><b>fuel</b> 11:6, 10<br>11:11, 15, 20<br><b>full</b> 67:10<br><b>fund</b> 9:6 32:24<br>90:8 95:4<br><b>funded</b> 59:1, 4<br>59:7, 18 60:3<br>62:9 71:10<br>89:24<br><b>funding</b> 9:4, 15<br>13:12 15:13<br>16:21, 23<br>58:11, 13, 15<br>58:23 59:5<br>59:25 61:21<br>61:25 62:1<br>66:6<br><b>funds</b> 58:12<br><b>furnari</b> 19:6, 8<br><b>further</b> 21:9<br>91:10<br><b>future</b> 7:20<br>8:8, 25 17:1<br>19:17 49:12<br>49:18 50:16 | 52:8 55:5<br>56:18 57:3<br>61:22 66:13<br>92:25<br><hr/> <b>G</b> <hr/> <b>g</b> 3:1<br><b>gain</b> 85:1<br><b>gallons</b> 22:17<br>22:21 31:2<br>31:11, 19, 24<br>36:10 39:20<br>92:1<br><b>game</b> 17:15<br><b>games</b> 45:3<br><b>garage</b> 39:25<br><b>garden</b> 22:16<br>26:6 38:15<br>38:15 40:2<br>41:5 42:20<br>52:19 60:20<br>61:1, 4 70:16<br><b>gardens</b> 22:7<br>26:3 33:19<br>34:21 40:15<br>41:2 53:3, 4<br>59:21 60:25<br>69:24 70:4, 7<br>70:23 74:5<br><b>gather</b> 85:4<br><b>gem</b> 68:11<br><b>general</b> 4:23<br>16:16 63:25<br>93:14 95:4<br><b>generally</b> 75:2<br><b>generate</b> 62:20<br>78:25<br><b>generated</b><br>78:22<br><b>generators</b><br>11:6, 7<br><b>gentlemen</b><br>18:18<br><b>geography</b><br>81:23<br><b>george</b> 18:24 |
|--|---|--|---|

|                      |                       |                      |                       |
|----------------------|-----------------------|----------------------|-----------------------|
| 84:1,3 85:19         | 89:13,20              | 60:6 61:22           | 59:8,14,16            |
| <b>georgia</b> 87:19 | 94:25                 | 64:15,20             | 60:2,4,7,11           |
| <b>getting</b> 17:20 | <b>golden</b> 1:21    | 68:9 69:11           | 60:13,17              |
| 40:7,17 43:9         | <b>goldsmith</b> 20:2 | 79:22 81:21          | 61:15,22,23           |
| 44:10 77:8           | 20:2,6                | 87:21                | 62:5,10,11            |
| <b>gi</b> 45:12      | <b>good</b> 4:1 9:8   | <b>great</b> 6:23    | 62:12 63:11           |
| <b>give</b> 27:20    | 9:13 19:9             | 18:14 26:9           | 63:20 64:9            |
| 30:4 83:15           | 22:6,11               | 26:14 35:23          | 64:13,14,15           |
| 94:9                 | 44:11 64:25           | 40:6,7,8             | 64:19,23              |
| <b>given</b> 6:2,5   | 67:21 69:10           | 41:12 44:8           | 65:10,11              |
| 20:23 42:9           | 83:25 93:7            | 49:19 67:1           | 66:2,21,23            |
| 84:6                 | <b>goodwin</b> 2:3    | 69:3 87:7,17         | 66:24 67:4,6          |
| <b>giving</b> 63:20  | 3:5 4:1,3             | 88:1,15 89:7         | 67:20 68:1,6          |
| <b>global</b> 94:18  | 18:2 19:5,9           | 89:12                | 71:19,20              |
| <b>go</b> 6:23 7:15  | 19:12,15,19           | <b>greater</b> 91:16 | 72:6,10,13            |
| 9:21,25              | 20:4,7 45:24          | <b>green</b> 5:4,19  | 72:18 73:5,8          |
| 15:20 21:15          | 63:16 65:15           | 5:21 6:1             | 74:12,15              |
| 22:4 24:21           | 69:22 73:23           | 10:12 15:15          | 75:17,19,24           |
| 25:13 28:13          | 74:8 79:18            | 15:16,19,23          | 76:4,12,17            |
| 28:14,19             | 81:11 83:5            | 16:3,8,13,15         | 76:24 77:12           |
| 29:4,5 31:1          | 83:12 86:13           | 16:23,24             | 78:4,24 79:5          |
| 34:23 35:19          | 95:13,21              | 20:15,20             | 79:7,11,12            |
| 38:8 39:13           | <b>governing</b>      | 21:21 22:1,8         | 79:23 80:5,8          |
| 41:15 43:12          | 44:12                 | 25:19 26:8           | 80:12,15              |
| 55:11 59:11          | <b>government</b>     | 26:12 27:17          | 81:5,14,22            |
| 64:4 67:19           | 60:17                 | 28:9,18,23           | 86:24 87:2            |
| 71:1 73:15           | <b>governmental</b>   | 30:22,23             | 87:21 89:13           |
| 89:6,11              | 32:11                 | 32:24 33:17          | 91:25 93:10           |
| <b>goals</b> 13:10   | <b>governor</b> 7:2   | 34:9,12,17           | 93:17,19,23           |
| 29:1                 | 91:22 92:12           | 34:20 36:3           | 94:1,3,15,18          |
| <b>goes</b> 18:5     | <b>grading</b> 90:11  | 39:16,17,19          | <b>greenfields</b>    |
| 24:20 72:4           | <b>grandmothers</b>   | 40:18 41:6           | 52:24                 |
| 81:13                | 22:15                 | 41:13 43:7,8         | <b>greening</b> 1:5   |
| <b>going</b> 7:8     | <b>grant</b> 59:20    | 45:16 47:6           | 48:22 62:16           |
| 11:16 14:4           | 60:9 62:8             | 48:10,14             | 63:6                  |
| 16:25 17:8           | 66:25 85:25           | 50:22 51:14          | <b>grey</b> 36:25     |
| 17:10,15             | <b>grants</b> 60:3    | 51:15,20             | <b>groove</b> 88:8,10 |
| 18:20 20:11          | <b>graphic</b> 24:18  | 52:12,18             | 88:13                 |
| 31:23 33:9           | 28:2                  | 53:5,13,16           | <b>gross</b> 24:12    |
| 33:11 34:23          | <b>grass</b> 52:7     | 54:5,7,17            | <b>ground</b> 24:5    |
| 38:25 43:10          | <b>grasses</b> 69:5   | 55:4,8,17,19         | 25:13,13              |
| 65:13 66:6,7         | <b>gravel</b> 38:17   | 55:22 56:3           | 26:3,6 31:6           |
| 70:12 73:2,3         | 38:18                 | 56:16,20             | 33:9 38:12            |
| 74:1,4 75:21         | <b>gray</b> 15:18     | 57:2,14,23           | 38:20 45:19           |
| 76:11 77:4           | 39:7 40:13            | 58:4,9,15,20         | 72:13,19              |
| 80:3 85:3            | 50:11 55:22           | 58:25 59:2,5         | <b>grounds</b> 72:15  |

|   |  |   |   |
|---|--|---|---|
| <b>groundwater</b><br>52:17<br><b>group</b> 6:23<br>15:15 43:2<br><b>groups</b> 86:20<br>87:9<br><b>grow</b> 72:12<br><b>growing</b> 71:22<br><b>grows</b> 72:3<br><b>growth</b> 21:4<br><b>guards</b> 82:18<br><b>guess</b> 37:17<br>94:13<br><b>guidance</b> 17:23<br>51:23 76:23<br>79:5 81:15<br><b>gum</b> 23:21<br><b>gusciora</b> 61:8<br><b>guy</b> 1:19<br><b>guys</b> 37:25<br>70:13 72:8<br>75:9 | <b>harvesting</b><br>51:16 53:3<br><b>hasnt</b> 64:22<br><b>haul</b> 14:2<br><b>havent</b> 11:16<br>64:22 65:4<br>66:8 88:22<br><b>hazard</b> 23:13<br><b>health</b> 23:13<br>30:9 78:3<br><b>healthier</b><br>29:21 47:9<br><b>healthy</b> 50:18<br>63:14<br><b>hear</b> 18:7 46:1<br>59:13<br><b>heard</b> 5:12<br>8:19 20:21<br>55:13 65:16<br>65:18 69:25<br>88:6,19<br><b>hearing</b> 4:11<br>4:15 5:2,12<br>5:17 17:24<br>18:11,15<br>46:24 63:4<br>86:21 95:14<br>95:24<br><b>heavily</b> 7:9<br><b>heavy</b> 58:19<br><b>held</b> 45:12<br>75:19<br><b>hell</b> 6:16<br><b>helmets</b> 37:25<br><b>help</b> 22:12<br>33:6,16 42:4<br>42:4,14 48:9<br>49:14 50:25<br>55:19 59:19<br>62:15,19<br>63:3 67:5<br>81:6 95:11<br><b>helping</b> 68:17<br><b>helps</b> 22:9<br><b>hereinbefore</b><br>96:8 | <b>hes</b> 6:14 78:15<br><b>hey</b> 40:22<br><b>high</b> 7:18<br>25:24 26:17<br>26:18 29:4<br>42:19,19<br><b>highlights</b><br>31:1<br><b>highway</b> 1:22<br><b>hill</b> 85:8<br><b>hire</b> 42:13<br><b>hit</b> 45:19<br><b>hits</b> 23:3<br>25:10<br><b>hitting</b> 31:25<br><b>hoboken</b> 51:10<br>62:4,9<br><b>hockey</b> 37:13<br>37:16<br><b>hold</b> 5:11<br>72:12<br><b>holding</b> 86:21<br>88:9<br><b>holes</b> 33:17<br><b>home</b> 25:2<br>44:15,18<br>61:2 66:9<br>73:25 74:4<br><b>homeowners</b><br>52:20 60:10<br>60:21,24,25<br>61:3 65:19<br>73:25 74:3<br>95:7<br><b>homes</b> 49:21<br>57:21<br><b>hook</b> 21:15<br><b>hope</b> 20:25<br>48:19 62:18<br>93:1<br><b>hopefully</b><br>49:14 55:13<br><b>hoping</b> 6:16<br>79:15 85:16<br><b>host</b> 50:5<br><b>hot</b> 69:14 | <b>hotel</b> 34:16<br><b>hour</b> 27:25,25<br><b>hours</b> 27:24<br>72:17 82:17<br>82:22<br><b>house</b> 24:23<br>29:13 41:12<br>45:8<br><b>hudson</b> 48:15<br>51:13<br><b>huge</b> 33:12,13<br>38:16 40:1<br>63:21 85:25<br><b>human</b> 48:6<br>53:12<br><b>hundreds</b> 49:7<br>49:10 56:6<br>80:5<br><b>hurdles</b> 59:16<br>67:3<br><b>hurricane</b> 5:7<br>78:13<br><b>hydro</b> 84:4,6<br>84:11,15,21<br>84:24 85:1,4<br>85:14,20<br>86:1 |
| <hr/> <b>H</b>  |  |   | <hr/> <b>I</b>  |
| <b>h</b> 2:1<br><b>habitat</b> 92:8<br><b>hackensack</b><br>86:16<br><b>haddonfield</b><br>59:22<br><b>hall</b> 36:15<br><b>hamilton</b> 51:9<br>53:19<br><b>hampshire</b><br>68:19,21<br><b>hand</b> 5:18,25<br><b>happen</b> 88:24<br><b>happening</b><br>80:16<br><b>happier</b> 35:17<br>35:17<br><b>happy</b> 45:21<br>82:1<br><b>hard</b> 72:14<br><b>harder</b> 38:8<br><b>harnessed</b> 72:8        |  |   | <b>ice</b> 37:22<br>39:21,22<br>69:16<br><b>id</b> 18:19 21:15<br>47:1 79:20<br><b>idea</b> 64:9 87:2<br>92:23<br><b>ideas</b> 46:22<br>58:22 60:18<br>61:6 62:18<br>63:5<br><b>identify</b> 27:15<br>47:23 57:23<br>61:19,24<br>69:4 73:14<br>73:15<br><b>identifying</b>  |

|   |  |   |   |
|---|--|---|---|
| 13:10 20:19<br>52:3<br><b>ill</b> 8:20 21:15<br>31:1,10<br>83:13<br><b>im</b> 6:16 7:2,17<br>18:19 21:18<br>21:20 24:12<br>24:14 27:3<br>34:23 35:2<br>37:4 40:6<br>44:12,16<br>45:21 63:21<br>66:12 68:15<br>70:12 81:16<br>84:2 86:15<br>86:15,21<br>88:4 93:8<br><b>imagine</b> 89:11<br><b>immediately</b><br>15:1<br><b>impact</b> 6:8<br>16:16 68:5<br>94:20<br><b>impacts</b> 4:12<br>6:5 50:25<br>60:15 62:6<br><b>impaired</b> 50:7<br><b>impermeable</b><br>23:1,2<br><b>impervious</b><br>27:19 74:9<br>74:16,17<br>76:12 78:21<br>78:23<br><b>implement</b> 54:5<br>61:11<br><b>implementa...</b><br>15:23<br><b>implementing</b><br>58:9<br><b>importance</b><br>6:13 92:13<br><b>important</b><br>62:24 86:19<br>86:25 91:9 | 92:10,12,23<br><b>importantly</b><br>73:16<br><b>improve</b> 12:1<br>50:21 64:16<br><b>improvement</b><br>32:24 33:6<br>34:17 89:12<br><b>improvements</b><br>40:20 50:24<br>60:1,15<br>65:21,23<br>90:8<br><b>improves</b> 32:21<br><b>improving</b> 51:1<br>54:1<br><b>inability</b><br>91:14 94:19<br><b>inaudible</b><br>81:16 91:2<br><b>incentive</b><br>58:21 73:24<br>88:23 90:2<br><b>incentives</b><br>60:10,12<br>61:14 65:22<br>66:9 88:25<br>89:3,3,4,5,6<br>89:17 90:9<br>91:1,8<br><b>inch</b> 77:25<br>82:4,8,10,17<br><b>inches</b> 82:5,21<br><b>include</b> 11:11<br>52:14,18,20<br>52:23 53:1<br>59:16 78:20<br>79:7<br><b>includes</b> 5:23<br>54:2 56:4<br><b>including</b> 18:7<br>20:16 45:14<br>50:5 54:23<br>56:7 57:9<br>60:6<br><b>incorporate</b> | 79:16<br><b>incorporated</b><br>62:13 83:21<br><b>increase</b> 9:14<br>64:18 80:9<br>80:22<br><b>increased</b> 9:16<br>64:21,24<br>65:4,8<br><b>increases</b><br>79:22,24<br>82:7<br><b>increasing</b><br>25:15<br><b>incredible</b><br>7:19 49:22<br><b>incremental</b><br>82:7<br><b>indicated</b><br>61:19<br><b>individual</b><br>52:6 57:24<br>58:6 60:12<br>73:25 74:2,4<br>74:23 76:18<br>89:9<br><b>individually</b><br>83:24<br><b>industrial</b><br>30:1 33:20<br><b>industry</b> 36:21<br><b>infamous</b> 27:2<br><b>infiltrate</b><br>26:2 38:12<br><b>infiltrates</b><br>38:19<br><b>infiltration</b><br>52:17 57:18<br>82:23<br><b>inflow</b> 57:18<br><b>inform</b> 58:3<br><b>information</b><br>32:5 35:13<br>44:4 45:23<br>67:5,23<br><b>informed</b> 57:13 | 62:10<br><b>infrastruc...</b><br>1:5 4:7,24<br>5:5,7,14,15<br>5:19,21 6:2<br>6:14,19 7:1<br>7:20,22,24<br>8:12,13,16<br>9:4,10,13,17<br>9:20 10:11<br>10:13,22<br>13:1,25<br>14:20,21,24<br>15:16,16,19<br>15:20,23<br>16:3,9,13,15<br>16:23,24<br>17:8,13,16<br>20:15,20<br>21:5,21 22:1<br>25:19 26:25<br>27:15,17<br>28:9,19,23<br>30:22,23<br>35:22 39:17<br>40:19 43:7,8<br>45:17 46:25<br>47:3 48:10<br>48:14,19,23<br>49:1,17,23<br>50:7,11,16<br>50:21,23<br>51:5,14 52:9<br>52:11,12,14<br>52:18 53:6,8<br>53:14,17,19<br>53:25 54:6,8<br>54:17 55:2,5<br>55:9,17,19<br>55:21,24<br>56:1,3,12,13<br>56:15,17<br>57:2,4,14,23<br>58:4,9,15,17<br>58:21,25<br>59:2,3,4,6 |
|---|--|---|---|

|   |  |  |   |
|---|--|--|---|
| 59:16,17<br>60:4,11,14<br>60:17 61:15<br>61:22,24<br>62:2,3,6,11<br>62:12,17<br>63:7,9,20<br>64:12,13,23<br>65:5,9,10,11<br>65:20 66:2<br>66:21,24<br>72:7 73:5,8<br>73:18,20<br>74:14 75:17<br>75:19,24<br>76:4,17,24<br>77:12 78:4<br>78:24 79:7<br>79:11,22,23<br>80:6,11,13<br>81:6,15<br>86:25 87:3<br>87:21 88:16<br>89:13 90:3<br>90:10,16,23<br>92:1 93:10<br>93:12,17,19<br>93:23 94:1,4<br>94:15,18<br><b>infrastruc...</b><br>6:13 80:15<br><b>initiative</b><br>54:16 58:3<br>79:15<br><b>initiatives</b><br>46:15 66:2<br><b>inlets</b> 49:9,24<br>56:10<br><b>inner</b> 35:5<br><b>innocuous</b><br>23:22<br><b>innovation</b><br>66:24<br><b>innovative</b><br>49:15 50:19<br>51:7 56:23 | 59:17 60:18<br>62:20<br><b>input</b> 7:13<br>17:22,25<br><b>insights</b> 7:19<br><b>insistent</b><br>67:10<br><b>inspiration</b><br>44:21<br><b>inspirational</b><br>46:2<br><b>install</b> 59:21<br>60:24<br><b>installation</b><br>61:4 75:3<br><b>instance</b> 20:18<br><b>instances</b><br>11:21 70:20<br><b>instituting</b><br>79:23<br><b>insure</b> 11:12<br>71:9<br><b>integrate</b> 5:21<br><b>integrating</b><br>50:22<br><b>integrity</b><br>86:18<br><b>intellectual</b><br>53:12 54:21<br><b>intend</b> 83:23<br><b>intense</b> 83:1<br><b>interaction</b><br>79:21,25<br><b>interested</b><br>20:14 29:10<br>41:25<br><b>interesting</b><br>72:23<br><b>interpretive</b><br>40:11<br><b>interventions</b><br>93:19 94:4<br><b>introduce</b> 6:9<br>20:1,8<br><b>introduced</b><br>19:1,21 61:6 | 73:5<br><b>introducing</b><br>18:13<br><b>introduction</b><br>4:6 47:11<br><b>introductions</b><br>3:4<br><b>inventory</b> 13:8<br><b>invest</b> 14:14<br>49:17 52:2<br>56:11 61:15<br><b>invested</b> 55:23<br>81:1<br><b>investing</b><br>53:20 55:22<br>80:25<br><b>investment</b><br>33:13 56:15<br>61:23 74:16<br><b>investments</b><br>10:5,11<br>13:23,24<br>14:1,5,7,15<br>17:1 63:21<br><b>involved</b> 32:12<br>61:16 87:9<br><b>irene</b> 78:13<br><b>island</b> 87:18<br>93:13<br><b>isnt</b> 22:14,15<br>36:21<br><b>issue</b> 4:12<br>66:6 70:4<br>78:2 80:11<br><b>issued</b> 66:5<br>89:15<br><b>issues</b> 4:10<br>5:10,25<br>16:10 17:4<br>30:10 37:10<br>47:18,24<br>49:1,13 50:5<br>53:25 57:11<br>78:13 79:7<br>86:23 87:8<br>93:13 | <b>ive</b> 13:2 19:1<br>19:21 47:14<br>74:13 88:19<br><hr/> <b>J</b> <hr/> <b>j</b> 1:19<br><b>james</b> 19:12<br><b>january</b> 96:17<br><b>jeremiah</b> 2:7<br>3:9 46:4,8<br>63:17 73:23<br>79:3 81:14<br><b>jersey</b> 1:1,2<br>1:11,23 2:9<br>4:25 5:8<br>17:5,8,17<br>19:3,16 20:3<br>20:23 30:3<br>46:8,16 47:2<br>47:14,22<br>48:3,7,11,13<br>48:21,24<br>49:13,16<br>50:5,24<br>51:23 52:1<br>52:11 53:8<br>53:10,17<br>54:6,14,24<br>55:5,18,20<br>56:16,22<br>57:4,15,22<br>60:19,21<br>61:13,19,24<br>62:14 63:3,8<br>63:25 75:5<br>75:25 76:22<br>77:18 79:5<br>82:11,13<br>83:4 84:9,13<br>85:13 86:7<br>86:17 87:1,4<br>87:14 91:17<br>91:20 92:15<br>96:5<br><b>jerseys</b> 1:5<br>46:25 47:17 |
|---|--|--|---|

|  |   |   |   |
|--|---|---|---|
| 48:22 52:3<br>55:21<br><b>jessica</b> 19:15<br><b>jim</b> 18:16,25<br>19:1 34:24<br>82:12<br><b>joanie</b> 30:16<br>44:13<br><b>job</b> 13:2 44:9<br>86:17<br><b>joel</b> 93:8<br><b>joined</b> 19:24<br>48:2<br><b>jointly</b> 36:2<br><b>joy</b> 72:23<br><b>judgment</b> 30:23<br><b>judith</b> 43:16<br><b>jump</b> 14:13<br><b>justice</b> 49:2<br>50:10                                  | 64:1 65:20<br>68:24 69:4<br>70:11 71:4<br>71:23 72:2<br>72:22 73:7<br>75:18 79:25<br>80:2,20 81:4<br>86:20 94:6,9<br>94:19<br><b>kinds</b> 46:13<br><b>kitchen</b> 22:16<br><b>knock</b> 32:14<br><b>know</b> 8:11,17<br>15:14 19:9<br>23:3 24:12<br>35:1 37:12<br>37:16,17,18<br>40:12 42:16<br>42:22 47:12<br>63:1 67:25<br>70:6 73:13<br>75:8 79:20<br>81:3 83:15<br>83:23 84:16<br>87:24<br><b>knowing</b> 4:9<br><b>knowledge</b> 4:20<br><b>known</b> 27:3<br>53:9<br><b>kudos</b> 44:15,18 | <b>landscape</b> 2:10<br>24:10 31:22<br>42:3 43:13<br>46:7 47:4<br>48:1,4 50:14<br>53:11 55:16<br>62:23 63:10<br>84:25<br><b>landscaped</b><br>74:24<br><b>landscapes</b><br>24:8 50:19<br>57:5<br><b>landscaping</b><br>43:13 72:4<br><b>lane</b> 36:3,5,7<br>36:24 37:2<br><b>lanes</b> 26:19<br>38:14 52:21<br><b>languages</b> 44:2<br><b>large</b> 13:13<br>14:5 26:10<br>91:13<br><b>larger</b> 15:3<br>16:10 82:23<br><b>lastly</b> 10:12<br>12:9<br><b>laughed</b> 4:14<br><b>lauren</b> 96:3,14<br><b>lavatelli</b> 84:2<br>86:4<br><b>law</b> 87:24<br><b>lay</b> 10:19<br>12:14 14:4<br>17:14 49:14<br><b>laying</b> 14:7<br>17:9<br><b>lead</b> 34:15<br>48:9<br><b>leaders</b> 25:9<br>42:20 51:8<br>54:12<br><b>leadership</b><br>28:18 76:20<br><b>leading</b> 58:2<br><b>league</b> 19:25 | 88:6<br><b>leaky</b> 33:4<br><b>learn</b> 43:9,11<br><b>learned</b> 5:7<br>6:18<br><b>learning</b> 43:22<br>70:13<br><b>leave</b> 23:25<br>30:4 83:10<br>83:19<br><b>leaves</b> 56:10<br>70:2 71:4,6<br>71:14,15<br>74:20<br><b>leaving</b> 30:12<br>30:13<br><b>led</b> 4:22 5:1<br>39:4 47:19<br>52:15<br><b>left</b> 36:21<br>50:4<br><b>legislation</b><br>84:9,11<br>85:17<br><b>legislature</b><br>80:21<br><b>len</b> 83:22<br>86:15,15<br><b>length</b> 29:23<br><b>lenient</b> 83:17<br><b>level</b> 8:16,17<br>9:5 13:9<br>37:24 45:5<br>51:24 65:19<br>65:21 66:9<br>86:1<br><b>leverage</b> 50:14<br>53:10,11<br>54:19 55:16<br>58:12 59:19<br><b>leveraged</b> 59:6<br><b>leverages</b> 47:4<br>63:10<br><b>leveraging</b><br>16:22 53:9<br><b>liaison</b> 18:23 |
| <b>K</b>   |   |   |   |
| <b>keep</b> 44:19<br>54:4 56:16<br>83:18 90:10<br>90:24 91:11<br><b>keeping</b> 74:19<br><b>key</b> 6:25 7:10<br>10:6 12:24<br>12:25 13:5<br>15:10 16:9<br>16:22,25<br>53:9 93:13<br><b>keynote</b> 3:6<br>6:10<br><b>khris</b> 2:5 3:7<br>20:25 21:3,9<br>79:13 81:14<br><b>kids</b> 35:4,17<br>43:3<br><b>kind</b> 11:20<br>24:10,14,18<br>29:21 31:5<br>31:22,24<br>44:21,22<br>45:17 63:23 | <b>L</b><br><b>l</b> 2:1<br><b>la</b> 45:14<br><b>labor</b> 19:20<br><b>lack</b> 9:4 88:23<br>94:15 95:5<br><b>laid</b> 12:23<br>16:7<br><b>lake</b> 25:4<br>26:15 27:2,3<br><b>lakes</b> 50:3<br><b>lamp</b> 39:4<br><b>lamps</b> 39:4<br><b>land</b> 65:3 86:6<br>90:1  |   |   |

|                      |                       |                       |                       |
|----------------------|-----------------------|-----------------------|-----------------------|
| <b>license</b> 96:3  | 44:11                 | <b>lot</b> 6:25 7:4,7 | 50:6 55:4,21          |
| <b>licensed</b> 46:7 | <b>location</b> 1:9   | 7:13 8:15,18          | 55:23 56:12           |
| 48:1                 | <b>lock</b> 36:14     | 8:20 9:3,8            | 73:19,20              |
| <b>lie</b> 70:12     | <b>logo</b> 37:19     | 9:22 11:23            | 76:15                 |
| <b>life</b> 6:15,15  | <b>long</b> 8:19 9:10 | 15:1,2 17:2           | <b>maintenance</b>    |
| 13:6,11 50:9         | 9:18 10:3,4           | 17:2,3 21:23          | 16:16,19              |
| 51:2 55:11           | 10:5,8,10,13          | 26:11,11,13           | 28:13 56:4            |
| 62:7 92:9,10         | 10:23 11:7            | 27:23 28:7            | 61:21 62:3            |
| <b>lift</b> 58:19    | 13:12,20,22           | 33:3,24 34:4          | 69:23 70:1            |
| <b>likewise</b> 6:7  | 13:24 14:2,7          | 34:6,7,15             | 70:10,11              |
| 19:23 83:18          | 14:14 15:21           | 36:8,8,22,22          | 72:25 73:7,8          |
| <b>limited</b> 50:5  | 16:4,6,11,22          | 38:12,18,20           | 73:21 74:1            |
| 50:25 59:20          | 17:7,10,14            | 38:21,23,25           | 74:12,18              |
| 90:17                | 61:19,24              | 39:5,22,24            | <b>major</b> 10:15,16 |
| <b>line</b> 9:24     | 64:10,17              | 40:3 41:1,3           | 11:21 12:12           |
| 26:11,11             | 74:15 87:15           | 41:8 59:23            | 12:22 13:21           |
| 36:8,8,22,22         | <b>longer</b> 29:10   | 69:11 71:5,8          | <b>majority</b> 73:11 |
| 66:12 73:4           | 71:13                 | 71:12 72:14           | <b>making</b> 29:21   |
| <b>lines</b> 12:11   | <b>longevity</b>      | 74:17 76:2            | 43:23 74:19           |
| <b>lisa</b> 79:7     | 64:10,11              | 76:19 87:6            | <b>manage</b> 22:14   |
| <b>little</b> 38:5,8 | <b>look</b> 8:4,5,8,9 | 87:23 89:14           | 26:13,24              |
| 41:14 51:11          | 13:16 14:1            | 90:11                 | 32:1 34:6             |
| 51:25 55:12          | 22:25 36:11           | <b>lots</b> 25:12     | 35:11 38:10           |
| 68:11 78:16          | 38:9,10               | 33:16 34:19           | 49:7 51:17            |
| 79:21 81:18          | 42:16 46:2            | 34:20 38:9            | 52:25 53:13           |
| 82:19,23,25          | 46:21 48:18           | 50:2 52:21            | 70:6 78:22            |
| 83:17                | 50:13 51:22           | 53:2 68:5,6           | 95:3                  |
| <b>livable</b> 47:9  | 52:12 57:23           | 71:2 95:8             | <b>managed</b> 38:21  |
| 63:14                | 62:25 63:4            | <b>lou</b> 19:24,24   | 39:23 40:1            |
| <b>live</b> 22:13,19 | 68:2 86:17            | <b>low</b> 16:15      | <b>management</b>     |
| 34:25 40:18          | 87:7,17               | <b>lower</b> 17:3     | 10:10,17,21           |
| 41:1                 | <b>looked</b> 10:14   |                       | 12:24 13:2,3          |
| <b>living</b> 29:10  | 10:15 20:15           | <b>M</b>              | 13:5,12,21            |
| 29:21 49:3           | 27:14                 | <b>m</b> 1:13,13      | 16:3,12               |
| <b>lla</b> 2:7,9 3:9 | <b>looking</b> 8:24   | 95:24                 | 33:21 49:8            |
| <b>loan</b> 14:24    | 12:2,10 13:6          | <b>magazine</b> 44:12 | 51:1 52:5             |
| 71:7                 | 13:19 28:14           | <b>mahoney</b> 30:16  | 54:2,15 77:6          |
| <b>loans</b> 15:24   | 49:11 51:6            | 44:13                 | <b>manager</b> 84:3,4 |
| <b>local</b> 21:6    | 58:20 77:15           | <b>main</b> 13:7      | <b>manages</b> 33:7   |
| 23:12,17             | 82:4,10,16            | 30:14                 | <b>managing</b> 13:6  |
| 47:7 54:13           | 82:18,20              | <b>maintain</b> 9:18  | 50:17 84:3            |
| 54:25 58:23          | <b>looks</b> 36:16    | 49:7 69:2             | 91:6                  |
| 59:19 60:1           | 39:10 62:6            | 70:10 73:3            | <b>manhole</b> 12:8   |
| 63:12 76:20          | 67:21 81:12           | 73:18 76:10           | <b>manipulate</b>     |
| 77:13                | <b>loses</b> 70:2     | 76:16                 | 67:15                 |
| <b>locally</b> 40:23 | <b>lost</b> 88:12     | <b>maintaining</b>    | <b>manual</b> 75:18   |



|   |  |  |  |
|---|--|--|--|
| 77:1 94:1,3<br><b>mapped</b> 27:8,9<br><b>mapping</b> 32:2<br><b>march</b> 33:1<br><b>mark</b> 2:9 46:4<br>46:5 48:1<br>81:14<br><b>marketable</b><br>43:12<br><b>marketing</b><br>37:20<br><b>martin</b> 2:4 3:6<br>5:9 6:10,11<br>6:20,21 18:2<br>20:13 61:18<br><b>master</b> 62:13<br>93:16<br><b>masters</b> 21:6<br><b>matt</b> 67:9<br><b>matter</b> 1:4<br>32:8 63:25<br>64:3<br><b>maximize</b> 50:25<br><b>maximizing</b><br>52:4<br><b>mayor</b> 43:14<br>78:15<br><b>mazes</b> 44:4<br><b>mccracken</b><br>19:10,11<br><b>meadowlands</b><br>91:4<br><b>mean</b> 64:9,9<br>70:25<br><b>means</b> 14:7<br>37:8 40:6<br>41:18,19<br>43:1<br><b>meant</b> 25:22,22<br><b>measures</b> 50:20<br>60:2<br><b>mechanisms</b> 9:9<br>20:20<br><b>media</b> 44:7,10<br><b>median</b> 39:24<br><b>meet</b> 21:2 | 92:22<br><b>meeting</b> 27:25<br>43:16 59:12<br>59:12,12<br>66:13<br><b>melt</b> 25:1<br>69:14,18<br><b>member</b> 19:21<br>19:23 20:5<br><b>members</b> 6:22<br>18:4,6,13,21<br>28:8<br><b>memorial</b> 39:20<br><b>memorialize</b><br>91:14<br><b>mention</b> 9:3<br><b>mentioned</b> 8:22<br>20:13 82:12<br><b>mercier</b> 51:9<br>53:20<br><b>merit</b> 11:14<br><b>message</b> 41:20<br>56:24<br><b>met</b> 51:8<br><b>meter</b> 84:20<br><b>metered</b> 84:15<br><b>metering</b> 84:9<br>84:11,16<br>85:14,15,23<br>86:2<br><b>methods</b> 81:22<br><b>michelle</b> 18:7<br><b>mid</b> 22:20<br><b>middle</b> 27:22<br>33:25<br><b>midland</b> 28:21<br><b>midsize</b> 22:20<br><b>mile</b> 36:9<br><b>miles</b> 49:10<br><b>milestones</b><br>31:16<br><b>million</b> 14:19<br>14:22 15:7,8<br>15:9,22<br>22:21 28:22<br>31:2,11,19 | 31:24 36:10<br>39:20<br><b>millions</b> 22:17<br>29:14 68:22<br>80:5<br><b>mind</b> 10:5 38:2<br>54:5<br><b>minds</b> 9:19<br><b>minimal</b> 74:13<br><b>minimize</b> 49:12<br>56:8<br><b>minimum</b> 11:3<br><b>miniseries</b> 4:7<br><b>minute</b> 91:20<br><b>minutes</b> 20:10<br>83:16<br><b>mission</b> 47:23<br><b>mobility</b> 37:10<br><b>model</b> 20:22<br>31:5,5 43:20<br>79:14<br><b>models</b> 20:21<br><b>modes</b> 36:12<br><b>modify</b> 52:15<br><b>molay</b> 67:9<br><b>money</b> 9:9<br>14:11,20,25<br>15:10,11<br>33:2,2 37:23<br>38:1 63:20<br>65:11,12<br>66:19,20,23<br>67:1<br><b>monies</b> 16:21<br>58:19<br><b>monitoring</b><br>31:3,13<br>43:18<br><b>montclair</b><br>51:11<br><b>month</b> 45:10<br><b>months</b> 29:13<br><b>morning</b> 4:1<br>10:7 69:13<br>72:20 83:25<br>93:7 | <b>mornings</b> 22:3<br><b>motivated</b><br>63:21<br><b>move</b> 12:21<br>30:24 54:4<br>58:22 62:16<br>62:21 66:6<br>70:16 76:10<br>78:6 89:14<br><b>moving</b> 24:14<br>44:19 74:21<br>76:4 83:18<br><b>multiple</b> 55:6<br>55:7<br><b>multiply</b> 24:2<br><b>municipal</b><br>13:17 44:16<br>52:15<br><b>municipali...</b><br>15:17 19:25<br>77:5,11<br>78:17 88:6<br>90:14,15,17<br>94:5<br><b>municipality</b><br>57:15 60:2<br><b>museum</b> 36:15<br>37:7<br><b>musical</b> 4:8<br><hr/> <b>N</b> <hr/> <b>n</b> 3:1<br><b>name</b> 4:2 66:17<br>83:10,14<br>84:1 93:7<br><b>named</b> 27:12<br>44:13<br><b>names</b> 18:20<br><b>narrowed</b> 37:7<br><b>narrower</b> 37:8<br><b>national</b> 45:12<br><b>nationally</b><br>44:12<br><b>native</b> 69:6,8<br><b>natural</b> 57:6<br>57:12 |
|---|--|--|--|

|                            |                                   |                      |                       |
|----------------------------|-----------------------------------|----------------------|-----------------------|
| <b>naturalize</b><br>52:15 | <b>needs</b> 5:15<br>7:14,14 14:2 | 48:22,24<br>49:13,16 | <b>nine</b> 27:24     |
| <b>nature</b> 6:5          | 25:16 47:2                        | 50:4,24              | <b>nj</b> 2:4 18:25   |
| <b>ncuas</b> 8:5           | 48:5 50:12                        | 51:23 52:1,3         | 19:20 48:2            |
| <b>near</b> 40:18          | 52:1,3,7                          | 52:11 53:7           | 62:22                 |
| 41:2 50:18                 | 53:10 56:3                        | 53:10,17,21          | <b>njasla</b> 46:10   |
| 66:13                      | 57:4,22                           | 54:6,14,24           | 48:9                  |
| <b>nearby</b> 25:4,6       | 58:13 59:3,9                      | 55:5,17,20           | <b>njdep</b> 46:11    |
| <b>nearly</b> 49:25        | 61:16,19,24                       | 55:21,22             | 54:20                 |
| 54:18                      | 63:8 65:6                         | 56:8,13,15           | <b>noise</b> 35:16    |
| <b>necessarily</b>         | 76:16,17,18                       | 56:21 57:4           | <b>noisy</b> 35:15    |
| 29:20 73:9                 | 83:18 84:23                       | 57:15,22             | <b>nonpoint</b> 50:8  |
| <b>necessary</b> 8:15      | <b>neely</b> 19:24                | 58:16 59:13          | <b>nonprofit</b>      |
| 8:17 9:18                  | <b>neighborhood</b>               | 60:19,21             | 32:10 54:12           |
| 17:12,14,22                | 29:25                             | 61:13,19,24          | 54:23                 |
| 58:5 88:24                 | <b>neighborhoods</b>              | 62:2,14 63:3         | <b>nonprofits</b>     |
| <b>necessity</b>           | 50:10                             | 63:8,25              | 33:3                  |
| 91:23                      | <b>neighbors</b>                  | 66:22 68:12          | <b>north</b> 86:7     |
| <b>need</b> 5:13 7:13      | 35:14,16                          | 68:19,20             | <b>northeast</b> 38:9 |
| 8:7,18 9:2                 | <b>net</b> 84:9,11,15             | 70:19 73:21          | <b>northeastern</b>   |
| 10:4,18,20                 | 84:16,20                          | 75:5,15,16           | 36:20                 |
| 10:22 11:5,6               | 85:14,15                          | 75:20,25             | <b>northern</b> 91:15 |
| 11:8,8,10,24               | 86:2                              | 76:22 77:1           | <b>notary</b> 96:4    |
| 12:16,17                   | <b>network</b> 49:22              | 77:10,18             | <b>notes</b> 96:7     |
| 13:18 14:12                | 49:23 50:11                       | 78:21 79:4           | <b>notion</b> 6:18    |
| 15:2 17:22                 | 57:4                              | 82:11,13             | <b>novel</b> 87:3     |
| 27:16,20                   | <b>never</b> 28:13                | 83:4 84:9,13         | <b>nuisance</b> 49:6  |
| 30:4 34:3                  | 32:25 65:14                       | 84:19 85:13          | 57:17                 |
| 48:18 50:13                | 94:25                             | 85:17 86:16          | <b>number</b> 8:14    |
| 52:2 54:4                  | <b>new</b> 1:1,2,5,11             | 86:17 87:1,4         | 33:12 57:8            |
| 55:6,25                    | 1:23 2:9                          | 87:14 89:8           | 62:8 93:11            |
| 56:11,19,24                | 4:25 5:8                          | 91:17,20,24          | 93:18 94:21           |
| 57:11,13                   | 15:17 16:7                        | 92:15,17             | <b>numbered</b> 28:3  |
| 58:1,11,21                 | 16:19 17:5,8                      | 93:14,16             | <b>numerous</b> 54:25 |
| 58:23,25                   | 17:11,16                          | 96:5                 | <b>nutrient</b> 92:3  |
| 59:15 60:9                 | 19:3,16 20:2                      | <b>newark</b> 30:3   |                       |
| 60:16 64:4                 | 20:17,23                          | 45:10,11             | <hr/>                 |
| 69:17 73:9                 | 21:8 27:22                        | 51:10 86:14          | <b>o</b> 2:1          |
| 73:19 76:13                | 30:3,16                           | 88:20 93:9           | <b>objectives</b>     |
| 77:5 85:7,9                | 33:16 35:21                       | <b>news</b> 44:5     | 77:6,13,14            |
| 85:9 88:22                 | 39:4,4 44:24                      | 69:10                | <b>obropta</b> 47:20  |
| 94:17                      | 45:15 46:8                        | <b>nhl</b> 37:17     | <b>obviously</b> 8:21 |
| <b>needed</b> 4:25         | 46:16,25                          | <b>nice</b> 33:16    | 16:6 45:16            |
| 11:3 14:12                 | 47:1,14,17                        | 35:22 68:11          | <b>occasional</b>     |
| 28:25 49:20                | 47:22 48:3,7                      | 72:20 86:24          | 72:3                  |
| 64:4 73:14                 | 48:10,12,21                       | <b>night</b> 29:6    | <b>occurred</b> 87:12 |
|                            |                                   |                      | <b>oclock</b> 43:10   |

|   |  |  |   |
|---|--|--|---|
| <b>october</b> 45:13<br>66:5  | 21:2 37:10<br>46:21 62:24  | <b>overturning</b><br>93:2   | 39:22,24,25<br>50:1 52:20   |
| <b>offer</b> 32:18<br>65:22   | 72:23 84:25  | <b>owned</b> 40:22   | 59:23 68:5  |
| <b>offered</b> 33:1   | <b>opposed</b> 77:13   | <b>owner</b> 32:9<br>73:25   | 71:2,5,8,12<br>90:11 95:8   |
| <b>official</b> 44:14   | <b>options</b> 11:17   | <b>owners</b> 60:13  | <b>parks</b> 35:21  |
| <b>officials</b> 75:2<br>76:1,21,24                                   | <b>orange</b> 51:11  | 61:11 66:8,9<br>74:4   | 49:4 53:4<br>59:8 77:24   |
| <b>offset</b> 61:5  | <b>ordinance</b><br>78:11,14,18<br>93:15   | <b>oyster</b> 91:20<br>92:1,4,5,16   | <b>part</b> 4:8,15<br>9:13 12:22  |
| <b>oh</b> 19:9 36:19<br>36:21 37:2                                    | <b>ordnance</b> 78:11  | <b>oysters</b> 91:23<br>91:24 92:14<br>93:5  | 16:3 22:10<br>28:19 31:14<br>39:16 42:4<br>42:12 44:1<br>46:19 59:1,3<br>59:9,9,14<br>61:16 62:25<br>71:17 74:3<br>74:12,14<br>76:2 80:18<br>80:23,24<br>85:5 91:13 |
| <b>oil</b> 23:17  | <b>oregon</b> 87:18  |  | <b>participate</b><br>62:24   |
| <b>ok</b> 19:5  | <b>organization</b><br>91:1  | <b>P</b>   | <b>particular</b><br>4:15 18:15<br>20:17 46:12  |
| <b>old</b> 8:18 9:3<br>56:7   | <b>organizations</b><br>47:21 54:13<br>54:23 55:1,7<br>91:12                       | <b>page</b> 3:3 66:18<br>79:11   | <b>particularly</b><br>68:6 87:9<br>95:1  |
| <b>oldest</b> 36:14   | <b>original</b> 44:21<br>96:7  | <b>paid</b> 34:11,14<br>35:8 36:2<br>81:1  | <b>partner</b> 21:22<br>59:12   |
| <b>omm</b> 28:12  | <b>osha</b> 72:5   | <b>paint</b> 42:12   | <b>partnered</b><br>59:19   |
| <b>once</b> 61:3 71:2<br>71:6 72:11<br>82:3 91:3                      | <b>outdated</b> 56:7   | <b>palpable</b> 79:25  | <b>partnering</b><br>47:21 58:1   |
| <b>ones</b> 39:4<br>46:14 91:9  | <b>outflows</b> 27:9   | <b>pamela</b> 2:3 3:5<br>4:2 6:22  | <b>partners</b> 57:9  |
| <b>online</b> 66:16<br>77:2   | <b>outlets</b> 49:9<br>49:24   | <b>panel</b> 6:23<br>20:9  | <b>partnership</b><br>31:7 53:23<br>54:18,24<br>60:6,7,22   |
| <b>onondaga</b> 21:19<br>21:21,24<br>26:25 27:2<br>36:1 43:15<br>65:1 | <b>outline</b> 62:12   | <b>panelist</b> 20:10  | <b>partnerships</b><br>48:12 54:11  |
| <b>onsite</b> 11:6<br>78:24   | <b>outreach</b> 21:24<br>31:13 40:5<br>44:2 47:13                                  | <b>panelists</b> 5:20<br>20:12 27:23   | <b>parts</b> 91:22  |
| <b>open</b> 20:11<br>63:17 83:6<br>84:10 89:16                        | <b>outside</b> 43:22<br>72:21  | <b>panels</b> 34:11  | <b>passaic</b> 57:25  |
| <b>opening</b> 3:4<br>85:14   | <b>overall</b> 7:16<br>8:10 9:11<br>11:14,22<br>12:14 13:4<br>14:14 16:23<br>17:23 | <b>paper</b> 30:12   | <b>passed</b> 85:17   |
| <b>operating</b> 56:1   | <b>overcome</b> 59:15<br>67:3  | <b>parade</b> 41:16  |   |
| <b>operational</b><br>9:24  | <b>overflow</b> 24:16<br>25:4  | <b>paradigm</b> 53:18  |   |
| <b>operations</b><br>11:13 28:12                                      | <b>overflows</b><br>23:11,16<br>28:4 30:8<br>56:9 57:19<br>77:25 87:11             | <b>parents</b> 35:17   |   |
| <b>opportunities</b><br>9:12 52:4<br>56:2 58:4<br>84:10               | <b>overturn</b> 93:3   | <b>park</b> 35:21<br>37:4,5 40:22<br>42:18   |   |
| <b>opportunity</b>  |  | <b>parking</b> 25:12<br>26:20 33:3<br>33:16,24<br>34:4,6,6,15<br>34:19,20<br>36:23 37:2<br>38:9,12,13<br>38:18,20,21<br>38:23,25 |   |

|                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 93:14                 | 70:6 72:12            | <b>piece</b> 23:21,21 | 32:16 33:18           |
| <b>passing</b> 93:16  | 75:9,23               | 75:16                 | 69:8                  |
| <b>passive</b> 95:8   | 79:12,14              | <b>pieces</b> 38:3    | <b>planted</b> 39:18  |
| <b>patching</b> 29:20 | 83:12 86:22           | 43:25                 | <b>plantings</b>      |
| <b>path</b> 4:9 48:22 | 89:1 90:2,4           | <b>pile</b> 24:6      | 51:15                 |
| <b>patience</b> 4:2   | 90:9 91:3,11          | <b>pilot</b> 77:4,16  | <b>plants</b> 8:3,6   |
| <b>patrols</b> 92:22  | 91:14,17              | <b>piloted</b> 60:22  | 26:2 29:8             |
| <b>patterson</b>      | 94:21                 | <b>piloting</b> 46:23 | 30:6,21               |
| 51:11                 | <b>peoples</b> 19:10  | <b>pipe</b> 23:7,10   | 50:12 59:8            |
| <b>pave</b> 22:25     | <b>percent</b> 15:11  | 66:12 88:7            | 69:8,21               |
| 40:15                 | 15:25 31:20           | 88:11,13              | <b>plastic</b> 23:21  |
| <b>paved</b> 23:11    | 32:17 81:16           | <b>pipes</b> 23:4     | <b>platinum</b> 34:16 |
| 90:21                 | 81:21,25              | 29:12 49:10           | <b>play</b> 7:11 16:9 |
| <b>pavement</b> 26:14 | 85:11 88:12           | 49:24 50:11           | 16:22 35:19           |
| 26:20 35:10           | <b>percentile</b>     | 56:10 85:3            | 94:3                  |
| 41:5,14               | 82:13                 | 88:20                 | <b>plays</b> 45:2     |
| 42:20 68:23           | <b>perception</b>     | <b>pitching</b> 41:25 | <b>please</b> 18:4    |
| 68:24 69:11           | 80:22                 | <b>place</b> 9:22     | 19:25 21:10           |
| 69:20,24              | <b>perennials</b>     | 11:24 12:16           | 63:1 70:14            |
| 70:1                  | 69:6                  | 12:20 17:7            | 83:9,15               |
| <b>pavers</b> 34:13   | <b>perfect</b> 46:3   | 37:3 75:4             | <b>pleased</b> 86:21  |
| 34:14 36:7            | <b>performing</b>     | 78:6 96:8             | <b>plow</b> 69:13,18  |
| 36:23                 | 13:8                  | <b>places</b> 26:21   | 70:14,14,14           |
| <b>paving</b> 51:16   | <b>period</b> 14:6,10 | 77:10,11              | 70:17 71:4            |
| 52:21 54:16           | <b>permeable</b>      | <b>placid</b> 26:16   | <b>plug</b> 94:3      |
| 74:17 76:13           | 51:16                 | <b>placing</b> 32:13  | <b>poaching</b> 92:20 |
| <b>pay</b> 22:13 33:6 | <b>permission</b>     | <b>plan</b> 12:15     | <b>pocket</b> 53:4    |
| 43:6 45:5             | 86:8                  | 14:4,9 16:4           | <b>point</b> 13:19,21 |
| 64:19 73:2            | <b>permit</b> 16:18   | 16:8 17:15            | 14:16 26:19           |
| 80:19 81:2            | <b>permits</b> 56:21  | 50:15 52:11           | 65:6 66:10            |
| <b>payer</b> 59:1,4   | 57:1 87:10            | 62:14 73:21           | 69:2 70:5             |
| <b>payers</b> 81:8    | <b>perpetuate</b>     | 76:6,8 93:16          | 81:10 92:20           |
| <b>paying</b> 80:25   | 92:16                 | <b>planned</b> 59:25  | <b>points</b> 21:17   |
| 81:8                  | <b>person</b> 24:3    | 60:5                  | 68:23                 |
| <b>payment</b> 80:10  | <b>pervious</b> 52:21 | <b>planning</b> 9:11  | <b>policies</b> 56:20 |
| <b>pays</b> 95:10     | 53:4 59:23            | 21:5 53:15            | 56:25                 |
| <b>pbsc</b> 8:5       | <b>phase</b> 50:23    | 57:1 73:12            | <b>policy</b> 7:12    |
| <b>peers</b> 43:8     | <b>philadelphia</b>   | 77:9 93:25            | <b>political</b>      |
| <b>people</b> 6:23    | 20:17 77:10           | <b>plans</b> 12:16,18 | 88:17 89:4            |
| 22:19 30:4            | <b>photo</b> 39:9     | 12:19,20              | 91:1,8                |
| 32:17 36:24           | <b>physical</b> 67:9  | 17:7,10               | <b>pollutants</b>     |
| 37:4 38:24            | <b>pick</b> 24:5      | 56:21 57:14           | 92:4                  |
| 40:7,17,23            | 32:17                 | 58:6,22 62:5          | <b>polluted</b> 27:3  |
| 41:4,7,21,25          | <b>picture</b> 36:17  | 62:10                 | 49:3 92:2             |
| 42:16,22              | <b>pictures</b> 29:23 | <b>plant</b> 8:5 22:4 | <b>pollution</b> 50:8 |
| 43:21,22              | 33:23 43:25           | 28:24 29:5,7          | <b>poop</b> 23:18     |

|                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <b>pooper</b> 23:25   | 24:13                 | <b>professional</b>   | 59:18 60:5            |
| <b>popular</b> 32:24  | <b>prepare</b> 62:9   | 19:4 37:13            | 62:12 67:17           |
| 94:21                 | <b>prepared</b> 58:14 | <b>professionals</b>  | 67:20 77:4            |
| <b>porous</b> 25:11   | <b>preparedness</b>   | 42:2 54:12            | 78:5,7 80:14          |
| 25:12,12              | 12:13                 | 55:7 60:25            | 84:5,12               |
| 26:14,17,18           | <b>prepares</b> 95:15 | <b>professor</b>      | 85:18,21              |
| 26:19 33:25           | <b>presence</b> 11:5  | 19:22                 | <b>promote</b> 16:14  |
| 34:3,4,4,6            | <b>presentation</b>   | <b>program</b> 2:8    | 16:18 52:16           |
| 34:13,14              | 65:18 78:17           | 14:24,25              | 55:19 79:12           |
| 35:10 36:6            | <b>preserving</b>     | 21:19,21,25           | <b>promoting</b>      |
| 36:23 38:22           | 57:12                 | 28:23 34:17           | 48:13                 |
| 40:15 41:5            | <b>pressure</b> 88:18 | 35:4 36:2             | <b>prone</b> 12:9     |
| 41:14 42:20           | <b>pressures</b> 14:3 | 42:8,9 44:2           | 50:9                  |
| 42:25 68:23           | 52:25 78:8            | 44:19 46:10           | <b>proof</b> 11:9     |
| 68:24 69:10           | <b>prestaging</b>     | 47:16,16,19           | <b>proofing</b> 11:22 |
| 69:20,24              | 11:15                 | 48:11 52:15           | 12:6                  |
| 70:1                  | <b>pretty</b> 28:6    | 56:14 60:20           | <b>property</b> 60:12 |
| <b>portland</b> 45:15 | 31:9 33:22            | 60:22 61:10           | 61:11 66:8            |
| 87:18,21              | 34:22 82:1,2          | 66:25 79:23           | <b>proposals</b>      |
| <b>poses</b> 61:8     | 87:3                  | 79:24 80:6            | 73:24                 |
| <b>positive</b> 26:23 | <b>prevent</b> 92:25  | 80:23 81:10           | <b>proposing</b>      |
| <b>possibilities</b>  | <b>price</b> 28:23    | <b>programs</b> 14:19 | 85:13                 |
| 11:19                 | <b>pride</b> 27:5     | 15:6 46:14            | <b>prospective</b>    |
| <b>possible</b> 18:17 | <b>primarily</b> 9:5  | 46:23 52:6            | 94:10                 |
| 58:13 59:7            | 13:14                 | 52:19 54:8            | <b>protect</b> 50:22  |
| 82:15 93:5            | <b>principal</b>      | 57:14 58:10           | 51:18 56:23           |
| <b>post</b> 7:21      | 15:10,12,24           | 60:19,19              | 61:23                 |
| 10:18 17:14           | <b>private</b> 13:14  | 87:15                 | <b>protected</b> 36:6 |
| 29:25 33:19           | 33:13 61:14           | <b>prohibitively</b>  | <b>protecting</b>     |
| <b>posted</b> 95:17   | 71:8 94:5             | 82:6                  | 47:10 51:3            |
| <b>pot</b> 33:16      | <b>prize</b> 45:10    | <b>project</b> 14:13  | 57:6,12               |
| <b>potable</b> 38:6   | <b>probably</b> 21:13 | 31:22 32:6            | 63:15                 |
| <b>power</b> 8:1      | 67:23 80:4,6          | 59:2,4 61:5           | <b>protection</b> 1:9 |
| 10:25 11:2,4          | 94:11,12              | 67:12,21              | 85:6 89:8             |
| 84:5,11,15            | <b>problem</b> 29:20  | 77:16 81:19           | <b>protects</b> 55:9  |
| 84:17,21,23           | 69:16 72:1            | 84:3 85:20            | <b>proud</b> 7:2,17   |
| 84:23 85:1,4          | 72:23 88:4            | <b>projects</b> 15:1  | 44:23                 |
| 86:6                  | <b>problems</b> 8:3   | 15:3,25               | <b>provide</b> 14:19  |
| <b>powerful</b> 33:22 | 87:6,20               | 27:17,20              | 16:17 47:6            |
| <b>practical</b>      | 90:16,18              | 31:8,9,25             | 52:10 60:10           |
| 47:25                 | 93:11                 | 32:7 33:8,12          | 61:14,20,25           |
| <b>practices</b>      | <b>process</b> 15:4   | 34:18 40:8,9          | 63:11 74:7            |
| 10:21 16:12           | 54:7 93:15            | 41:2 42:2,16          | <b>provided</b> 58:7  |
| 17:11 61:15           | <b>produced</b> 84:21 | 42:24 46:23           | 60:1                  |
| 94:2                  | <b>producing</b>      | 48:7 53:6             | <b>providence</b>     |
| <b>preaching</b>      | 84:17                 | 54:10 58:9            | 87:18                 |



|                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 9:15                  | 88:18 89:2,6          | <b>report</b> 18:10   | 9:16 10:8,14          |
| <b>recharge</b> 25:13 | 91:9                  | 28:15 66:15           | 10:15,24,25           |
| 26:6 52:17            | <b>reimbursement</b>  | 66:19 89:18           | 11:21                 |
| <b>recognition</b>    | 33:2                  | 91:22 95:15           | <b>resilient</b> 5:15 |
| 44:11 63:23           | <b>reinforced</b>     | <b>reporter</b> 96:4  | 47:8 52:8             |
| <b>recognize</b>      | 50:13                 | <b>reporters</b> 1:20 | 63:13 82:25           |
| 10:18 11:2            | <b>reinvest</b> 35:21 | <b>reporting</b>      | <b>resistant</b> 69:7 |
| 11:23 14:3            | 73:20                 | 31:14                 | 69:8 75:9             |
| 16:8 17:6             | <b>reinvestment</b>   | <b>represent</b> 48:2 | <b>resource</b> 49:1  |
| 57:5 94:20            | 65:7                  | <b>representa...</b>  | 54:16 91:5            |
| <b>recognized</b>     | <b>reliable</b> 61:20 | 18:25 19:1,6          | <b>resources</b> 4:24 |
| 9:25 58:1             | 62:1                  | 19:17                 | 9:6 46:9              |
| <b>recognizes</b>     | <b>reliance</b> 22:24 | <b>represents</b>     | 47:4,10,16            |
| 57:2                  | 25:14                 | 19:24 46:10           | 47:18,19,24           |
| <b>reconstitu...</b>  | <b>rely</b> 54:8 55:2 | <b>requa</b> 19:12,14 | 48:11 50:6            |
| 6:19                  | <b>remainder</b>      | <b>require</b> 10:4   | 50:14 51:1            |
| <b>record</b> 83:21   | 33:11                 | 12:15 53:15           | 51:19,24              |
| <b>recovery</b> 5:10  | <b>remaining</b> 71:4 | 53:17 60:18           | 53:12,24              |
| <b>redo</b> 33:5      | <b>remains</b> 89:16  | 73:9,9 74:17          | 54:3,19,20            |
| 38:25                 | <b>remarks</b> 21:1   | 74:18                 | 54:21,22,25           |
| <b>redone</b> 33:25   | 21:10                 | <b>required</b> 35:1  | 56:24 57:13           |
| <b>reduce</b> 50:20   | <b>remind</b> 83:7    | 94:6                  | 58:5 60:16            |
| 90:25                 | <b>remiss</b> 18:12   | <b>requirements</b>   | 63:10,15              |
| <b>reducing</b> 25:14 | <b>remote</b> 84:20   | 11:4 89:12            | 67:7 73:6             |
| 52:25                 | 85:15                 | <b>requiring</b> 16:2 | 76:7                  |
| <b>redundant</b>      | <b>removed</b> 70:7   | 74:25                 | <b>respect</b> 69:23  |
| 55:12                 | <b>removes</b> 29:17  | <b>resalt</b> 69:18   | <b>respective</b>     |
| <b>reestablish</b>    | <b>renewal</b> 84:5   | 69:18                 | 81:17                 |
| 91:23                 | 86:2                  | <b>research</b> 68:20 | <b>respond</b> 91:8   |
| <b>regard</b> 5:25    | <b>renovating</b>     | 91:21 92:17           | <b>response</b> 12:15 |
| 20:19 65:17           | 53:2                  | 92:23                 | <b>responsibi...</b>  |
| 67:4 69:23            | <b>rent</b> 70:23,25  | <b>researchers</b>    | 18:6                  |
| 69:25 70:3            | <b>renzi</b> 1:19     | 43:17                 | <b>responsible</b>    |
| <b>region</b> 43:15   | <b>renziassoc...</b>  | <b>reserved</b> 15:22 | 74:5                  |
| <b>regional</b> 28:11 | 1:25                  | <b>reservoir</b> 85:6 | <b>rest</b> 71:15,17  |
| 28:20 64:5            | <b>reopening</b>      | <b>residence</b>      | <b>restoration</b>    |
| 65:12                 | 85:19                 | 42:17                 | 91:20 92:17           |
| <b>regulated</b> 87:4 | <b>repair</b> 14:13   | <b>resident</b> 32:9  | <b>restore</b> 93:4   |
| <b>regulations</b>    | 14:13 56:4            | <b>residential</b>    | <b>restriction</b>    |
| 11:1 12:15            | <b>repairs</b> 14:11  | 27:19 32:15           | 85:23                 |
| 16:13 17:12           | 14:20                 | 52:19 74:13           | <b>result</b> 18:11   |
| 56:21,25              | <b>repaving</b> 52:20 | <b>residents</b>      | 50:4,8 54:11          |
| <b>regulators</b>     | <b>replaced</b> 12:12 | 42:11 49:2            | <b>results</b> 78:13  |
| 87:3 91:7             | <b>replacement</b>    | 50:9 54:13            | <b>retirement</b>     |
| <b>regulatory</b>     | 56:5                  | 62:8 76:21            | 75:12                 |
| 64:1,3 77:13          | <b>replacing</b> 56:7 | <b>resiliency</b>     | <b>return</b> 83:6    |

|                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 92:14                 | 69:24 70:3,7          | 69:18,19              | 92:10                 |
| <b>reveal</b> 6:16    | 71:20 72:9            | <b>sanchez</b> 19:15  | <b>seas</b> 6:6       |
| <b>reviewing</b> 84:8 | 72:10 74:8            | <b>sandy</b> 4:19 5:7 | <b>second</b> 11:21   |
| <b>revise</b> 75:22   | <b>roofs</b> 22:8     | 6:18 7:10,21          | 21:16 69:14           |
| <b>revising</b> 79:8  | 26:9 33:17            | 8:12,23 9:12          | 73:1,3 90:21          |
| <b>revitalizing</b>   | 34:20 51:15           | 10:18 12:21           | <b>sector</b> 33:14   |
| 33:20                 | 67:4,6 68:1           | 14:17 15:6            | 61:14 94:5            |
| <b>reward</b> 61:10   | 71:19 72:13           | 17:14 91:21           | <b>securing</b> 58:18 |
| <b>rhode</b> 87:18    | 72:18 74:12           | <b>sanitary</b> 16:1  | <b>sediment</b> 25:24 |
| <b>right</b> 15:2     | 74:15 76:12           | 23:7,16               | 56:10 71:3            |
| 23:23 27:22           | <b>rooftops</b> 23:1  | 24:11 25:16           | 71:15 73:16           |
| 28:4 29:19            | 28:16 44:20           | 80:17                 | 74:21                 |
| 32:23 35:19           | 50:1                  | <b>sat</b> 30:17      | <b>sedum</b> 72:12,13 |
| 35:24 36:14           | <b>room</b> 18:22     | <b>satisfied</b> 77:9 | <b>see</b> 15:18 16:5 |
| 37:2 42:11            | 83:14                 | <b>saturday</b> 22:3  | 16:7,20,25            |
| 59:21 65:25           | <b>root</b> 71:24     | <b>save</b> 21:19,25  | 17:1 20:15            |
| 68:1 69:4             | 72:15                 | 32:12 34:18           | 23:1 25:17            |
| 73:14 79:10           | <b>roots</b> 52:7     | 36:1 40:24            | 26:17,22              |
| 79:19                 | <b>row</b> 18:19      | 41:9,23 42:5          | 38:14,16              |
| <b>rink</b> 39:21     | <b>rtf</b> 28:22      | 68:16 80:13           | 39:9 40:15            |
| <b>rising</b> 6:6     | <b>rules</b> 10:22    | 80:23 81:9            | 40:17 41:9            |
| <b>riverkeeper</b>    | 91:13,13              | <b>saved</b> 65:12    | 60:15 62:14           |
| 57:9 86:16            | <b>run</b> 13:15      | <b>savetherain</b>    | 67:1 79:12            |
| <b>rivers</b> 28:16   | 14:17 23:14           | 32:4 67:18            | 79:14 86:24           |
| 44:20 50:3            | 39:13 78:22           | <b>savings</b> 47:7   | 93:10                 |
| 89:24 90:24           | <b>running</b> 26:7   | 60:4 63:12            | <b>seeing</b> 40:12   |
| <b>road</b> 25:10     | 45:19                 | 80:8 81:10            | <b>seen</b> 46:14     |
| 39:12,13,25           | <b>runoff</b> 52:25   | <b>saw</b> 7:23 8:2   | 49:18 66:8            |
| <b>roads</b> 23:2     | 61:12 79:1            | 92:12                 | 74:13 78:1,2          |
| 25:25 49:21           | <b>runs</b> 23:4      | <b>sayerville</b> 8:5 | <b>segue</b> 5:5 46:3 |
| 59:8                  | <b>rushing</b> 25:24  | <b>saying</b> 40:22   | <b>senator</b> 89:19  |
| <b>roadside</b> 25:21 | <b>russ</b> 19:5,6    | <b>says</b> 78:18     | <b>senior</b> 84:3    |
| <b>roadway</b> 25:11  | <b>rutgers</b> 2:7    | <b>scale</b> 95:1     | <b>sense</b> 4:23     |
| 26:17                 | 19:22 46:9            | <b>schafter</b> 79:8  | 20:23 27:5            |
| <b>roadways</b> 50:2  | 47:12,13              | <b>scheduling</b>     | 37:23 77:14           |
| <b>robust</b> 27:16   | 48:8,11               | 73:12                 | 90:9 91:19            |
| 82:2                  | 53:23 54:21           | <b>school</b> 29:4    | 92:19                 |
| <b>role</b> 7:11 16:9 | 58:2 60:22            | 42:19 87:24           | <b>separate</b> 36:4  |
| 16:22                 | 62:21                 | <b>schools</b> 49:21  | 57:16 94:23           |
| <b>roof</b> 24:19     |                       | 59:8,13               | <b>separations</b>    |
| 25:9 26:12            | <b>S</b>              | <b>science</b> 40:11  | 30:8                  |
| 33:4 34:9,12          | <b>s</b> 45:10        | 47:25 68:13           | <b>serve</b> 53:2     |
| 37:21 39:17           | <b>saddle</b> 51:12   | <b>scooper</b> 23:25  | <b>served</b> 46:10   |
| 39:19 40:1            | <b>safe</b> 95:23     | <b>screen</b> 8:23    | 58:6                  |
| 41:6,13               | <b>sale</b> 14:24     | 79:10                 | <b>serves</b> 58:3    |
| 42:20 68:8            | <b>salt</b> 69:6,8,17 | <b>sea</b> 28:16 92:9 | <b>service</b> 13:10  |



|  |   |  |  |
|--|---|--|--|
| 27:12 89:18<br><b>services</b> 67:9<br><b>serving</b> 22:11<br><b>set</b> 10:5 14:22<br>15:4,8 84:24<br>96:8<br><b>setting</b> 7:12<br>11:24<br><b>seven</b> 55:18<br><b>sewage</b> 22:3<br>29:5,6 30:5<br>30:8<br><b>sewer</b> 12:11<br>23:7,16<br>24:16,21<br>25:14,16<br>27:8,9 28:4<br>44:16 49:10<br>53:1 56:9<br>57:16,19<br>62:7 77:22<br>78:9 79:1<br>80:17,19<br>87:11 88:7<br>95:4<br><b>sewerage</b> 57:25<br><b>sewers</b> 27:10<br>49:4<br><b>shape</b> 7:12<br><b>shapes</b> 68:2<br><b>share</b> 21:10<br>55:19 67:10<br><b>shared</b> 62:19<br><b>sharing</b> 35:2<br>46:22<br><b>shed</b> 27:8,13<br>41:13<br><b>sheds</b> 27:10<br><b>sheet</b> 34:2<br><b>shell</b> 92:5<br><b>shepards</b> 21:15<br><b>shift</b> 53:18<br><b>shimmed</b> 34:1<br><b>shore</b> 49:11<br><b>short</b> 14:5,17<br>14:22 | <b>shouldnt</b> 44:9<br><b>show</b> 31:10<br>39:15<br><b>showed</b> 8:6<br><b>shower</b> 24:24<br><b>shown</b> 54:10<br><b>shows</b> 32:6<br><b>shrubs</b> 69:5<br><b>shutting</b> 28:6<br><b>sick</b> 27:5<br><b>side</b> 10:19<br>34:1 40:2<br>42:21<br><b>sides</b> 25:25<br>43:24<br><b>sidewalk</b> 24:20<br>25:8 26:7<br>33:5 36:6<br>39:14 41:14<br><b>sidewalks</b> 23:2<br>25:12 26:21<br>50:2 53:5<br><b>sign</b> 89:7<br><b>signage</b> 42:21<br><b>signed</b> 83:8,13<br><b>significant</b><br>7:6,24 8:3<br>60:3 64:16<br>95:5,9<br><b>signifier</b> 37:3<br><b>silly</b> 93:1<br><b>similar</b> 30:2<br>46:14 75:17<br>85:16,16,21<br><b>simply</b> 5:20<br>56:9 88:1<br>90:11 92:14<br><b>single</b> 24:3<br><b>sit</b> 29:13<br><b>site</b> 32:3<br>67:18 68:1<br>84:17,18,19<br>84:21,22<br>85:7 93:19<br>93:20 95:17<br><b>sites</b> 85:9 | <b>sitting</b> 18:18<br>72:21<br><b>six</b> 31:19<br><b>size</b> 22:18<br>29:1 57:24<br>64:6 65:9<br>92:6<br><b>sizes</b> 68:2<br><b>skate</b> 37:14,22<br>38:2<br><b>skaters</b> 38:7<br><b>skills</b> 43:9,12<br><b>sky</b> 45:7<br><b>slant</b> 72:18<br><b>slides</b> 21:13<br><b>slow</b> 26:1<br><b>slowly</b> 38:19<br><b>small</b> 9:22,23<br>71:11 95:6<br><b>smaller</b> 15:1<br><b>smallish</b> 22:20<br><b>smart</b> 21:4<br>54:15<br><b>smith</b> 89:19<br><b>snow</b> 25:1 68:5<br>68:8,10<br>69:12 70:15<br>70:16,19,23<br><b>soak</b> 26:2<br>32:23<br><b>social</b> 44:7,10<br><b>socially</b> 29:3<br><b>society</b> 2:10<br>48:3 62:23<br><b>socioecono...</b><br>43:4<br><b>soft</b> 43:9<br><b>soils</b> 50:19<br>57:6<br><b>solar</b> 34:10<br><b>solution</b> 54:4<br>61:17 63:1<br>87:5 93:11<br>93:18<br><b>solutions</b><br>47:25 51:7 | 52:22 76:13<br><b>solved</b> 88:3<br><b>somebody</b> 6:12<br><b>someones</b> 13:9<br>42:25<br><b>sonkin</b> 93:7,8<br><b>soon</b> 4:5<br><b>sort</b> 9:25<br>88:21 94:12<br><b>source</b> 50:8,18<br><b>sources</b> 11:9<br><b>space</b> 23:2,10<br>26:4 35:14<br>35:16 36:3<br>40:12,22<br>65:3 94:6<br><b>spanish</b> 44:3<br><b>speak</b> 20:10<br>65:24 83:13<br>83:23 86:9<br><b>speaker</b> 3:6<br>6:10<br><b>speakers</b> 18:9<br>20:8<br><b>speaking</b> 46:6<br>86:5<br><b>speaks</b> 81:15<br><b>speciality</b><br>47:16<br><b>specialized</b><br>73:10 74:24<br>74:25<br><b>species</b> 32:17<br>71:23 72:2<br><b>specific</b> 11:24<br>12:18 52:3<br>74:19 77:7,8<br>84:19 93:19<br>93:21<br><b>specifically</b><br>5:9 47:15<br>61:1 66:21<br>85:15 93:12<br><b>specificat...</b><br>67:16 72:5<br><b>speed</b> 25:24 |
|--|---|--|--|

|   |   |  |  |
|---|---|--|--|
| 26:17,19,22<br><b>spend</b> 7:4,6<br>14:11 37:23<br><b>spent</b> 29:14<br><b>spoke</b> 78:16<br><b>sponsored</b> 61:7<br><b>spout</b> 26:5<br><b>spouts</b> 25:9<br><b>spring</b> 5:11<br>71:2<br><b>square</b> 71:20<br>78:21,23<br>94:8<br><b>srf</b> 15:12<br>16:21 66:19<br>66:20<br><b>stability</b><br>64:17<br><b>staff</b> 18:6<br>73:13 76:21<br>79:8 86:16<br>93:25<br><b>stakeholders</b><br>54:3,9<br><b>stalls</b> 26:20<br><b>stan</b> 18:22,23<br>81:12<br><b>stand</b> 18:19<br><b>standard</b> 37:24<br>74:23 75:19<br>94:1<br><b>standards</b><br>11:23,25,25<br>12:2 67:4<br>75:3 92:22<br><b>start</b> 4:25<br>7:15 8:24<br>9:2 10:13,20<br>11:18 26:18<br>38:10 52:1<br>82:3 87:13<br>91:6<br><b>started</b> 4:8<br>15:2 28:7<br>87:20 88:2<br><b>starting</b> 32:22 | 38:24 39:6<br>87:15,16<br>88:5<br><b>starts</b> 82:6<br><b>state</b> 1:1,10<br>1:22 4:24<br>5:8 7:20,24<br>8:7,13,13<br>9:6,15 10:19<br>10:23 11:15<br>11:19 13:1<br>14:20,21<br>16:17 17:5,7<br>17:13,16<br>19:8 20:23<br>21:7 44:24<br>46:8,24<br>47:13 48:7<br>48:15 54:20<br>56:25 61:10<br>62:15 65:19<br>68:12 73:24<br>75:20 82:13<br>84:19 85:21<br>90:4,16,22<br>91:15 94:13<br>94:17 95:11<br>96:5<br><b>states</b> 14:16<br>24:17 52:8<br>57:3 67:1<br>84:14<br><b>statewide</b><br>14:23 56:20<br><b>static</b> 26:4<br><b>station</b> 36:14<br><b>stations</b> 12:3<br>12:7 39:2<br><b>steep</b> 70:12<br><b>stenographic</b><br>96:7<br><b>step</b> 58:20<br><b>steps</b> 58:8<br>62:14<br><b>stick</b> 55:15<br>64:1,3 | <b>stinch</b> 81:24<br>81:25<br><b>stop</b> 50:13<br><b>storage</b> 11:8,8<br>11:11,18<br>28:10 38:19<br>94:20 95:8<br><b>storm</b> 5:10 6:1<br>6:3,4 11:3<br>24:20 49:10<br>57:16 81:24<br>82:13,21<br>83:1 90:10<br>90:12 91:23<br>92:12,25<br><b>storms</b> 12:21<br>49:12<br><b>stormwater</b><br>12:11 13:19<br>16:2,18 17:4<br>22:14,18,22<br>23:5 25:1,18<br>26:13,24<br>28:10 31:11<br>33:7 35:11<br>36:10,23<br>38:10 40:4<br>49:8 50:17<br>51:18 52:16<br>52:25 53:13<br>54:1,15 56:6<br>56:15 61:12<br>61:22 66:22<br>68:19 75:18<br>78:11,22<br>79:1 81:21<br>82:3 85:6<br>87:6 89:19<br>89:23 90:3,5<br>90:7,8,15,23<br>93:15 94:7<br>94:23 95:3,9<br><b>story</b> 40:6,8<br><b>strategic</b><br>41:19<br><b>strategies</b> | 49:16 50:23<br>60:14 61:20<br>61:25 62:13<br>62:20 66:4<br>73:22 74:3,6<br>74:11 76:9<br>76:14 78:24<br><b>strategy</b> 13:12<br>70:19<br><b>straw</b> 30:7<br><b>stream</b> 25:5<br><b>streams</b> 50:3<br><b>street</b> 1:10<br>9:9 15:1<br>26:8 29:10<br>30:6,14<br>32:13 33:5<br>35:24 36:13<br>36:17 37:9<br>42:18<br><b>streets</b> 32:19<br>32:21 39:5<br>49:4 57:20<br>77:24<br><b>strengthen</b><br>47:7 63:12<br><b>stringent</b><br>78:11<br><b>strip</b> 36:9<br>38:15<br><b>strips</b> 34:7<br><b>strong</b> 46:11<br>65:1,2<br><b>structural</b><br>50:19 67:4<br><b>structure</b><br>71:10 92:7,8<br><b>structures</b><br>56:5 92:11<br><b>struggling</b><br>35:20 36:20<br>48:25,25<br>49:7 51:5<br>57:17 73:17<br><b>stuck</b> 71:5<br><b>student</b> 68:15 |
|---|---|--|--|

|                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <b>studies</b> 21:8   | <b>support</b> 15:22  | 24:21 25:4,6          | <b>talked</b> 7:1,21  |
| <b>study</b> 27:1     | 52:7 54:8             | 25:15,18              | <b>talking</b> 4:10   |
| <b>stuff</b> 34:22    | 64:25 65:5            | 53:1 57:16            | 5:4 7:16              |
| 68:25 71:3            | 91:10 93:2            | 57:19 62:7            | 10:20 12:7            |
| <b>sturm</b> 19:16,18 | 95:10                 | 77:23 78:9            | 12:12 17:11           |
| 63:19 64:18           | <b>supports</b> 76:23 | 79:2 85:3,12          | 22:17 89:14           |
| <b>submit</b> 61:4    | <b>sure</b> 10:23     | 90:7,12 95:9          | <b>target</b> 27:16   |
| <b>subscribe</b>      | 12:19 27:4            | 95:10                 | 31:17                 |
| 44:17                 | 37:5 44:12            | <b>systemic</b> 93:22 | <b>targeted</b> 41:19 |
| <b>subscribers</b>    | 44:16 74:20           | <b>systems</b> 7:25   | <b>tax</b> 59:1,3     |
| 44:6                  | <b>surge</b> 92:12    | 9:24 12:4,6           | <b>taxes</b> 22:14    |
| <b>subsidize</b> 95:7 | <b>surprisingly</b>   | 12:9 13:4             | <b>taxpayer</b> 89:24 |
| <b>substantial</b>    | 84:13                 | 16:2 47:6             | <b>taxpayers</b> 81:8 |
| 65:6                  | <b>sussex</b> 48:16   | 50:21 63:11           | <b>teach</b> 43:8     |
| <b>suburban</b> 49:5  | <b>sustain</b> 52:12  | 73:16 74:15           | <b>team</b> 37:13     |
| 52:13 80:18           | <b>sustainabi...</b>  | 82:16,19,25           | 45:2                  |
| 80:21                 | 64:9                  | 84:24                 | <b>technical</b>      |
| <b>suburbs</b> 80:14  | <b>sustainable</b>    |                       | 21:23 60:23           |
| <b>successful</b>     | 29:2,3 47:24          | <b>T</b>              | 94:16                 |
| 54:7,14               | 52:8 64:7,8           | <b>t</b> 96:1,1       | <b>techniques</b>     |
| <b>successfully</b>   | <b>sustained</b> 55:3 | <b>table</b> 63:3     | 61:11                 |
| 53:6 55:8             | <b>swale</b> 25:8     | 76:7                  | <b>technologies</b>   |
| 59:20                 | <b>swim</b> 31:5      | <b>tabling</b> 41:16  | 16:19 68:23           |
| <b>sudden</b> 33:16   | <b>syracuse</b> 2:5   | <b>tag</b> 28:23      | 68:25 86:2            |
| <b>sufficient</b>     | 3:8 20:18,22          | <b>tailored</b> 76:16 | <b>technology</b>     |
| 11:5                  | 21:4 22:19            | 76:17                 | 56:8                  |
| <b>suite</b> 1:22     | 22:19 27:1,5          | <b>take</b> 20:12     | <b>tel</b> 1:24       |
| <b>summary</b> 66:18  | 27:7 28:8,17          | 35:6 39:3             | <b>tell</b> 40:8 41:7 |
| <b>summer</b> 39:8    | 29:1 30:2             | 45:20,21              | 41:23                 |
| 40:14                 | 31:7 34:16            | 58:20,24              | <b>telling</b> 27:22  |
| <b>summit</b> 45:12   | 34:25,25              | 62:15 65:2            | 40:6,24,25            |
| <b>sump</b> 27:9,10   | 35:1,8,20,25          | 72:15 79:15           | <b>tens</b> 40:22     |
| <b>sun</b> 69:13      | 35:25 36:1            | 83:6 92:2             | 49:8                  |
| <b>sunken</b> 38:15   | 36:18 37:15           | <b>taken</b> 13:2     | <b>tension</b> 80:20  |
| <b>sunny</b> 39:8     | 37:18,19              | 83:11 96:7            | 80:24                 |
| 40:14                 | 39:16 40:3            | <b>takes</b> 72:12    | <b>term</b> 8:19 9:11 |
| <b>super</b> 32:24    | 42:11 43:5            | <b>talk</b> 6:25 8:20 | 9:18 10:3,4           |
| 39:5                  | 43:14,18              | 8:21 10:7,8           | 10:5,8,11,14          |
| <b>superstorm</b>     | 45:13,16              | 10:9,10,12            | 10:23 11:7            |
| 8:12,23               | 63:22 64:15           | 10:24 12:25           | 13:12,20,22           |
| 12:21 14:17           | 68:4,11,14            | 13:22,24              | 13:24 14:7            |
| <b>supplies</b> 11:10 | 68:17 69:11           | 15:13,15              | 14:14,22              |
| <b>supply</b> 7:25    | 75:6 77:8             | 21:20 43:2            | 15:21 16:4,6          |
| 10:25 12:5            | 79:14 80:16           | 45:16 46:12           | 16:11,22              |
| 13:17 60:20           | 81:20 82:1            | 46:13 81:18           | 17:7,10,15            |
| 60:21 86:7            | <b>system</b> 13:9    | 91:19                 | 61:19,25              |

|                       |                      |                       |                       |
|-----------------------|----------------------|-----------------------|-----------------------|
| 64:10,17              | 77:15                | <b>thoughts</b> 46:22 | 88:13                 |
| 74:16 82:5            | <b>theyve</b> 71:9   | <b>thousands</b>      | <b>tony</b> 19:10,19  |
| <b>test</b> 77:4      | 88:3 89:10           | 40:23 49:9            | <b>tools</b> 51:14,17 |
| <b>testimony</b> 3:12 | <b>thick</b> 72:13   | <b>threat</b> 78:2    | <b>top</b> 17:25      |
| 83:7,9,15,19          | <b>thin</b> 38:14    | <b>three</b> 10:15    | 26:12 67:19           |
| <b>texting</b> 43:11  | <b>thing</b> 9:19    | 42:10 53:22           | <b>topic</b> 5:18,20  |
| <b>thank</b> 4:1,4    | 24:4 26:3            | 55:14 65:3            | <b>tops</b> 74:8      |
| 6:21,22 7:17          | 29:22 39:11          | 69:12 82:21           | <b>toss</b> 23:23     |
| 17:18 18:1,3          | 41:24 55:14          | 83:12                 | <b>total</b> 31:11,20 |
| 18:17 19:5            | 75:10 77:7,8         | <b>thriving</b> 29:6  | 80:5,7                |
| 19:19 20:7            | 88:21 91:18          | <b>ties</b> 9:11      | <b>touch</b> 40:18    |
| 21:10 46:17           | <b>things</b> 5:22   | <b>tight</b> 12:8     | <b>town</b> 25:23     |
| 46:19,20              | 6:17,25              | <b>time</b> 6:7 7:4,6 | 32:11 59:12           |
| 63:15,16              | 17:20 21:17          | 14:6,10 18:3          | 76:11 87:17           |
| 81:11 83:5            | 22:12 23:22          | 21:12,13              | <b>towns</b> 13:18    |
| 83:10 86:13           | 24:7 26:9            | 27:3 30:18            | 49:20 90:6            |
| 93:6 95:11            | 28:10 29:13          | 41:11 42:11           | <b>township</b> 51:9  |
| 95:13,18,22           | 32:8 33:24           | 45:21,22              | 53:20,23              |
| <b>thanking</b> 18:14 | 41:3,16              | 49:5 64:25            | <b>townships</b> 49:6 |
| <b>thats</b> 8:14     | 44:23 51:25          | 68:9 72:17            | 52:14                 |
| 14:6,10               | 67:17 68:18          | 79:18 92:10           | <b>traditional</b>    |
| 21:20 26:23           | 70:8 72:15           | 96:7                  | 34:2 35:9             |
| 28:1,22               | 75:4 88:18           | <b>times</b> 65:3     | 94:24 95:3            |
| 33:12,19,24           | 88:19,24             | 70:24,25              | <b>traffic</b> 26:19  |
| 36:20 66:1,6          | 89:21,22             | 72:1,16               | 36:5 42:19            |
| 66:11 68:7            | 90:10 93:21          | <b>tires</b> 44:10    | <b>train</b> 42:2,7   |
| 70:15 75:23           | 93:24                | <b>today</b> 4:18     | <b>trained</b> 73:13  |
| 77:9 81:3,22          | <b>think</b> 4:18    | 7:17 17:24            | <b>training</b> 16:17 |
| 82:2,16 87:6          | 23:3 25:21           | 18:22 20:8            | 54:16 74:25           |
| 87:17 88:15           | 28:5 30:14           | 21:20 48:2            | <b>transcript</b>     |
| 88:21 94:21           | 43:6 53:18           | 55:13 62:19           | 96:6                  |
| <b>theres</b> 9:4,19  | 64:12 68:15          | 63:5 65:3,17          | <b>transitional</b>   |
| 27:4 32:8,11          | 75:21 84:23          | 86:9,19               | 71:22                 |
| 34:9 35:18            | 87:6,17              | <b>today's</b> 5:17   | <b>transparency</b>   |
| 36:25 71:11           | 88:15,25             | 95:14                 | 67:11                 |
| 80:19,21              | 89:7,13              | <b>toilet</b> 23:9    | <b>transport</b>      |
| 84:10 88:17           | 90:13 91:9           | 24:24 30:12           | 88:11                 |
| 88:25 89:2,3          | 91:15                | 45:6                  | <b>transporta...</b>  |
| 89:4,20               | <b>thinking</b> 7:12 | <b>toilets</b> 30:13  | 26:25 36:12           |
| <b>theyll</b> 79:15   | 86:23 87:8           | 45:3                  | <b>trash</b> 71:4     |
| <b>theyre</b> 12:11   | <b>third</b> 12:12   | <b>token</b> 80:13    | <b>travel</b> 27:10   |
| 31:9 36:24            | 80:6                 | <b>told</b> 70:5      | 27:23                 |
| 37:17 40:12           | <b>thirdly</b> 10:10 | 92:21                 | <b>travels</b> 23:6,7 |
| 41:22 43:3            | <b>thirds</b> 80:8   | <b>toll</b> 1:24      | 29:22                 |
| 70:18 75:14           | <b>thought</b> 5:3   | <b>tomorrow</b> 9:21  | <b>treat</b> 69:2     |
| 75:23 77:6            | 20:22 38:23          | <b>tongue</b> 88:8,10 | <b>treated</b> 94:7,8 |



|                       |                     |                       |                       |
|-----------------------|---------------------|-----------------------|-----------------------|
| 10:10,12,24           | 36:8,13,17          | 17:2,3 20:24          | 37:6 38:21            |
| 12:1 13:22            | 37:14,21,24         | 24:16 26:24           | 39:11 41:7            |
| 14:13,14              | 38:2,6,6,11         | 27:15 28:19           | 42:9 44:1             |
| 15:13 16:13           | 38:19 39:13         | 32:11,23              | 46:23 49:18           |
| 16:15,17              | 39:21 44:16         | 33:7 41:20            | 55:13 59:18           |
| 17:6,18 30:1          | 44:25 45:1,3        | 53:18 54:5            | 71:10 77:20           |
| 33:4 42:6             | 45:4,5,10           | 54:17 59:21           | 79:18 89:14           |
| 46:12,19              | 46:9,11,20          | 64:16 72:19           | 93:14 94:2            |
| 55:18 64:7            | 46:25 47:10         | 73:19 84:24           | <b>whatnot</b> 70:2   |
| 67:23,24              | 47:16,17,19         | 87:7 89:23            | <b>whats</b> 4:21     |
| 70:17 72:24           | 47:24 48:11         | 95:2,14               | 27:11,12              |
| 75:11,11              | 48:21,22,25         | <b>ways</b> 9:8 17:2  | 42:22 63:21           |
| 76:11 78:12           | 49:1,20,25          | 33:21 49:12           | <b>white</b> 45:8     |
| 79:6 91:19            | 50:7,22 51:1        | 51:6 56:23            | <b>wide</b> 29:11     |
| <b>wanted</b> 45:25   | 51:5,16,18          | 61:13 92:25           | <b>widespread</b>     |
| 86:4                  | 52:5 53:24          | <b>weaning</b> 70:4   | 60:16                 |
| <b>wants</b> 29:4,5   | 56:23 57:3          | <b>weather</b> 4:18   | <b>wilberly</b> 61:8  |
| <b>war</b> 39:20      | 60:16,19,21         | 24:19,25              | <b>willing</b> 51:14  |
| <b>washer</b> 23:18   | 61:12 62:16         | <b>web</b> 32:3 67:18 | 60:24                 |
| <b>washing</b> 24:8   | 63:6,15 68:7        | 68:1 79:11            | <b>willingly</b>      |
| <b>wasnt</b> 29:2,2   | 71:13 82:11         | 95:17                 | 21:15                 |
| 64:23                 | 83:22 84:2,6        | <b>website</b> 66:16  | <b>window</b> 23:24   |
| <b>waste</b> 8:2 12:4 | 85:5,8,11           | <b>websites</b> 67:13 | 72:21                 |
| 13:4,17 21:5          | 86:5,7,8            | <b>weeding</b> 71:25  | <b>windows</b> 23:1   |
| 38:1 57:20            | 88:11 90:10         | <b>weeds</b> 73:14    | <b>windshield</b>     |
| <b>water</b> 1:2,5    | 90:24 91:25         | <b>weedy</b> 72:2     | 23:18                 |
| 2:8 4:3,8,13          | 92:2,2,3,6          | <b>weeks</b> 83:20    | <b>winter</b> 39:7    |
| 4:24 6:19             | 92:11 93:12         | <b>welcome</b> 3:4    | 40:14                 |
| 7:3,16,16,25          | 94:7,20,24          | 46:18                 | <b>wishes</b> 83:15   |
| 8:2,4,6,13            | 95:3                | <b>wells</b> 12:5     | <b>woman</b> 79:19    |
| 10:25,25              | <b>waters</b> 57:7  | <b>went</b> 8:4,6     | <b>won</b> 44:23 45:9 |
| 12:4,5,8,11           | 91:21,24            | 41:9 71:23            | <b>wonderful</b>      |
| 13:1,4,4,17           | 92:15,17            | 87:24                 | 68:14                 |
| 13:18 14:21           | 93:1,5              | <b>west</b> 51:11     | <b>wondering</b>      |
| 15:7,8,9,9            | <b>waterways</b>    | <b>wet</b> 24:25      | 65:21 67:3            |
| 17:18,21              | 23:12,17            | <b>weve</b> 5:22 6:25 | <b>wood</b> 88:8      |
| 21:4,5 22:5           | 24:10 49:3          | 7:7 9:7,14            | <b>wooden</b> 88:20   |
| 22:16 23:11           | 57:20 91:2          | 9:16,25               | <b>work</b> 7:7,18,19 |
| 23:20 25:2,6          | 91:12               | 11:17 12:17           | 10:4 11:13            |
| 25:8,13,14            | <b>watson</b> 83:22 | 13:16,25              | 11:14 13:23           |
| 25:24 26:1,4          | 83:25 84:1          | 14:18,21              | 14:17 15:3            |
| 26:5 27:13            | 86:10               | 22:9 27:8,9           | 17:19 21:18           |
| 29:17,18,18           | <b>way</b> 4:5 5:24 | 27:12,14              | 27:23 41:8            |
| 31:21 32:1            | 6:5 8:9,25          | 28:3 31:2             | 43:10,12              |
| 32:19,22              | 13:15,16            | 32:25 33:1,7          | 46:16 47:12           |
| 33:21 34:2            | 14:6,10 15:3        | 34:1,22 35:6          | 47:15 50:4            |

|   |   |   |  |
|---|---|---|--|
| 51:20,22<br>55:6 68:14<br>69:1 71:10<br>71:21 73:10<br>79:13,14<br>86:20 87:10<br>88:5 93:4,21<br>93:23 94:19<br><b>worked</b> 60:25<br><b>workers</b> 11:12<br><b>working</b> 21:19<br>43:1,10<br>46:15,16<br>47:14 48:17<br>71:17 77:21<br>84:4 85:19<br>88:2 89:8<br>93:4,25<br><b>works</b> 14:6<br>32:10 41:5<br>46:8<br><b>workshops</b><br>41:22<br><b>woven</b> 56:24<br><b>wrapper</b> 23:21<br><b>written</b> 83:19<br>95:21<br><b>wrong</b> 64:14<br><b>www</b> 1:25 | 72:1,15<br>82:21 83:2<br>87:22,25<br>93:14<br><b>years</b> 4:10<br>12:24 14:1<br>22:23,23<br>23:5,6 28:5<br>31:9 39:1<br>42:10 43:17<br>47:15,22<br>48:13 51:8<br>53:22 54:18<br>56:7 64:12<br>68:22 72:11<br>75:11 77:22<br>87:2,19 88:2<br><b>yep</b> 36:19<br><b>yesterday</b><br>66:14<br><b>yield</b> 45:23<br><b>york</b> 16:7<br>20:17 21:8<br>27:22 44:24<br>45:15 66:22<br>68:12 75:16<br>75:20 77:1<br>77:10 84:20<br>85:17 86:17<br>91:24 92:17<br><b>youll</b> 20:25<br>25:17 67:19<br><b>young</b> 43:3<br><b>youre</b> 19:6<br>24:15 32:9<br>35:1 42:4,6<br>78:25 85:8<br><b>youth</b> 42:1<br>43:2<br><b>youve</b> 8:19<br>46:14 | <hr/> <b>0</b> <hr/> 000 22:19 44:5<br>65:1,2 71:20<br>08625 1:11<br>08690 1:23 <hr/> <b>1</b> <hr/> 10 14:1 39:1<br>81:16<br>100 8:2 23:5,6<br>31:2,8<br>11 1:13 95:24<br>12 29:11 43:6<br>47:22<br>120 28:22 33:8<br>1200 42:9<br>13 1:12<br>14 15:21<br>147 22:19<br>15 1:13 15:21<br>20:10 43:7<br>89:11<br>17 71:20<br>18 67:25<br>190 15:8<br>1960 65:2,4 <hr/> <b>2</b> <hr/> 28:10 43:15<br>44:5,20<br>20 14:1 15:11<br>64:12 75:10<br>78:5,7 88:2<br>88:12 89:11<br>200 87:25<br>2006 28:16<br>2008 30:25<br>2010 33:1<br>75:22<br>2011 44:14<br>2013 1:12<br>33:11<br>2014 33:10,11<br>96:17<br>2018 22:22<br>31:12 32:13 | 21 3:7<br>22 31:25<br>2277 1:22<br>24 82:22<br>25 32:17 56:6<br>68:22<br>250 22:21<br>31:11,19<br>28 68:24 <hr/> <b>3</b> <hr/> 30 14:1 45:13<br>56:6 64:12<br>75:10 78:5<br>31st 95:20,22<br>32 15:22<br>32nd 66:18<br>33 1:22<br>34 1:13 95:24<br>35 31:23<br>350 15:6<br>36 31:24 33:8<br>3687652 1:24<br>37 31:24<br>38 15:9 <hr/> <b>4</b> <hr/> 4 3:4 4:8<br>40 78:7<br>400 78:21,23<br>401 1:10<br>410 1:22<br>450 65:1,2<br>46 3:9 66:18<br>48 58:3,6<br>49 28:4 <hr/> <b>5</b> <hr/> 50 15:24 22:23<br>78:7 86:6,6<br>92:1<br>54 33:9 <hr/> <b>6</b> <hr/> 6 3:6 8:10<br>60 22:23 |
|---|---|---|--|

**609** 1:24

**63** 3:10

**65** 14:22

---

**7**

---

**70** 7:25 28:6

**770** 24:16

---

**8**

---

**8** 96:17

**800** 1:24 14:19

**83** 3:11,12

**8500** 32:13

---

**9**

---

**9** 1:13 43:10

**90** 85:10

**90th** 82:12

**95** 81:21,25

**9899199** 1:24