



CITY OF FORT LAUDERDALE

**PLANNING AND ZONING BOARD  
CITY OF FORT LAUDERDALE  
CITY HALL – CITY COMMISSION CHAMBERS  
100 NORTH ANDREWS AVENUE  
FORT LAUDERDALE, FLORIDA  
MONDAY, SEPTEMBER 17, 2018 – 6:30 P.M.**

**Cumulative**

<b>Board Members</b>	<b>Attendance</b>	<b>June 2018-May 2019</b>	
		<b>Present</b>	<b>Absent</b>
Catherine Maus, Chair	P	3	1
Howard Elfman, Vice Chair	P	4	0
John Barranco	P	3	1
Brad Cohen (arr. 6:44)	P	3	1
Mary Fertig	P	3	1
Jacquelyn Scott	P	4	0
Jay Shechtman	P	4	0
Alan Tinter	A	3	1
Michael Weymouth	P	4	0

It was noted that a quorum was present at the meeting.

**Staff**

Ella Parker, Urban Design and Planning Manager  
Shari Wallen, Assistant City Attorney  
Chris Cooper, Deputy Director, Department of Sustainable Development  
Jim Hetzel, Urban Design and Planning  
Florentina Hutt, Urban Design and Planning  
Brigitte Chiappetta, Recording Secretary, Prototype, Inc.

**Communications to City Commission**

None.

**I. CALL TO ORDER / PLEDGE OF ALLEGIANCE**

Chair Maus called the meeting to order at 6:30 p.m. and all recited the Pledge of Allegiance. The Chair introduced the Board members present, and Urban Design and Planning Manager Ella Parker introduced the Staff members.

**II. APPROVAL OF MINUTES / DETERMINATION OF QUORUM**

**Motion** made by Ms. Scott, seconded by Vice Chair Elfman, to approve. In a voice vote, the **motion** passed unanimously.

### III. PUBLIC SIGN-IN / SWEARING-IN

Individuals wishing to speak on tonight's Agenda Items were sworn in at this time.

### IV. AGENDA ITEMS

#### Index

<u>Case Number</u>	<u>Applicant</u>
1. ZR16001A2**	BW Cypress Creek Powerline, LLC
2. PL18007**	Clarkson-Bergman Family Partnership, LTD
3. Z18007* **	Clarkson-Bergman Family Partnership, LTD
4. ZR17007* **	Pier 17 Investments 2014, LLC

#### Special Notes:

**Local Planning Agency (LPA) items (\*)** – In these cases, the Planning and Zoning Board will act as the Local Planning Agency (LPA). Recommendation of approval will include a finding of consistency with the City's Comprehensive Plan and the criteria for rezoning (in the case of rezoning requests).

**Quasi-Judicial items (\*\*)** – Board members disclose any communication or site visit they have had pursuant to Section 47-1.13 of the ULDR. All persons speaking on quasi-judicial matters will be sworn in and will be subject to cross-examination.

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<b>1. CASE:</b>	<b>ZR16001A2</b>
<b>REQUEST: **</b>	Site Plan Level III Review: Site Plan Amendments including Removal of 3,999 Square-Foot Chick-fil-A Restaurant, Adjustment to Layout and Design to the Wawa Gas Canopy, and Adjustment to Turn Lane.
<b>APPLICANT:</b>	BW Cypress Creek Powerline, LLC
<b>PROJECT NAME:</b>	Wawa
<b>GENERAL LOCATION:</b>	6191 N Powerline Road
<b>ABBREVIATED LEGAL DESCRIPTION:</b>	A Part of The Southeast One-Quarter (Se 1/4) Of Section 9, Township 49 South, Range 42 East, Broward County, Florida
<b>ZONING DISTRICT:</b>	General Business District (B-2)
<b>LAND USE:</b>	Employment Center
<b>COMMISSION DISTRICT:</b>	1 – Heather Moraitis
<b>CASE PLANNER:</b>	Florentina Hutt

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Disclosures were made at this time.

Stephanie Toothaker, representing the Applicant, explained that this project was previously approved as a Wawa and Chick-fil-A. Rezoning and flex allocation were also previously approved by the City Commission. After these approvals were granted, the

County requested the dedication of a turn lane and addition of a bus bench on Powerline Road. When these changes could not be accommodated within the original Site Plan, the Applicant removed plans for the Chick-fil-A from the site.

The current plan is for a Wawa only, with no other changes proposed. While the Applicant has dedicated rights-of-way along both Powerline Road and Cypress Creek Road, there will not be a turn lane on Cypress Creek Road: instead, a large sidewalk will be constructed within that right-of-way. The Uptown Business Council has provided a letter of support for the amended plan.

Florentina Hutt, representing Urban Design and Planning, stated that the request is for Site Plan Level III review of an amendment to a previously approved Site Plan. The amendment includes removal of 3999 sq. ft. of restaurant space, adjustment to the layout and design of the Wawa, and a turn lane. Proposed amendments include the following:

- Removal of a Chick-fil-A restaurant building from the Site Plan while retaining the location and square footage of the Wawa convenience store and gas station
- Removal of a right turn lane on Cypress Creek Road, with a sidewalk replacing the turn lane
- Increasing the length of the turn lane on Powerline Road
- Canopy and dumpster design and layout
- Pavement marking and signage plan

The proposed amendment to the Site Plan is consistent with the applicable land use and zoning regulations. Previous approvals by the City Commission include rezoning from Industrial to Business (B-2) and the use of commercial flexibility for land use. Vehicular ingress and egress remain from Cypress Creek Road and Powerline Road. The Applicant proposes 68 parking spaces on the site where only 45 spaces are required.

A 7 ft. sidewalk is proposed along the length of the property in order to improve the pedestrian environment in accordance with the City's Uptown Urban Village Master Plan. Staff recommends approval of the Application.

There being no questions from the Board at this time, Chair Maus opened the public hearing. As there were no individuals wishing to speak on this Item, Chair Maus closed the public hearing and brought the discussion back to the Board.

**Motion** made by Vice Chair Elfman, seconded by Mr. Weymouth, to approve. In a roll call vote, the **motion** passed 7-0.

It was determined that Items 2 and 3 would be heard together and voted upon separately.

**2. CASE:** **Z18007**

**REQUEST: \* \*\*** Rezoning from Mobile Home Park (MHP) to Residential Multifamily Mid Rise/ Medium High Density (RMM-25)

**APPLICANT:** Clarkson-Bergman Family Partnership, LTD

**PROJECT NAME:** Pearl-Riverland

**GENERAL LOCATION:** 400 SW 27th Avenue

**ABBREVIATED LEGAL DESCRIPTION:** A Parcel of Land Lying within the West One-Half (W 1/2) of the West One-Half (W 1/2) of the Northeast One-Quarter (Ne 1/4) of Section 8, Township 50 South, Range 42 East, City of Fort Lauderdale, Broward County, Florida

**ZONING DISTRICT:** Current: Mobile Home Park (MHP)  
Proposed: Residential Mid Rise Multifamily/Medium High Density District (RMM-25)

**LAND USE:** Medium-High Density Residential

**COMMISSION DISTRICT:** 3 – Robert L. McKinzie

**CASE PLANNER:** Florentina Hutt

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**3. CASE:** **Z18007**

**REQUEST: \* \*\*** Rezoning from Mobile Home Park (MHP) to Residential Multifamily Mid Rise/ Medium High Density (RMM-25)

**APPLICANT:** Clarkson-Bergman Family Partnership, LTD

**PROJECT NAME:** Pearl-Riverland

**GENERAL LOCATION:** 400 SW 27th Avenue

**ABBREVIATED LEGAL DESCRIPTION:** A Parcel of Land Lying within the West One-Half (W 1/2) of the West One-Half (W 1/2) of the Northeast One-Quarter (Ne 1/4) of Section 8, Township 50 South, Range 42 East, City of Fort Lauderdale, Broward County, Florida

**ZONING DISTRICT:** Current: Mobile Home Park (MHP)  
Proposed: Residential Mid Rise Multifamily/Medium High Density District (RMM-25)

**LAND USE:** Medium-High Density Residential

**COMMISSION DISTRICT:** 3 – Robert L. McKinzie

**CASE PLANNER:** Florentina Hutt

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Disclosures were made at this time.

Robert Lochrie, representing the Applicant, stated that the Items before the Board are a rezoning and boundary plat request. The rezoning is from Mobile Home Park (MHP) to Residential Multi-family Medium Density (RMM-25). The underlying land use for the property is Medium Residential.

The site is currently a mobile home park. Over the last 15 years, the owner of the property has purchased most of the individual units. Tenants have been notified that the property will convert to multi-family use. An analysis has determined that adequate housing is available within the area for these tenants.

Mr. Cohen arrived at 6:44 p.m.

Mr. Lochrie showed views of the proposed project, which will include multiple residential buildings, a landscaped central entrance, a clubhouse, and a lake feature. The Applicant agrees with all Staff recommendations. A public outreach meeting was held with the Riverland Civic Association in June 2018.

Ms. Hutt of Urban Design and Planning first presented the plat request, which is proposed for 11.19 acres currently occupied by a mobile home park. The replatting will allow for the construction of 276 units of multi-family residential development. It was reviewed by the Development Review Committee (DRC) as a Site Plan Level II request. The plat will include a plat note restriction limiting the property to 276 mid-rise multi-family units. All DRC comments have been addressed. Staff recommends approval of the request.

The rezoning request would rezone the property from MHP to RMM-25 to allow for the proposed 276-unit development. This application is currently under DRC review. The property is the current site of the Sunset Mobile Home Park, which includes 110 mobile homes.

Florida Statute 723.083 prohibits approval of any application for rezoning or other official action resulting in the removal or relocation of mobile home residents without first determining that other mobile home parks or suitable facilities exist for relocation. The Applicant has provided a housing study that shows there are sufficient opportunities to secure replacement housing.

Staff has reviewed the rezoning request for compliance with Code and has found it to be compliant with the following criteria:

- The request is consistent with the City's Comprehensive Plan
- Changes anticipated by the proposed rezoning will not adversely affect the character of development in or near the area under consideration
- The rezoning is compatible with the surrounding districts and uses

The Applicant has complied with public participation requirements by meeting with the Riverland Civic Association. Staff recommends approval of the request.

There being no questions from the Board at this time, Chair Maus opened the public hearing. She requested that all speakers identify the Item on which they wish to speak, and noted that individuals' comments are limited to three minutes.

Martin Etiya, private citizen, addressed Item 3, stating that he owns one of the mobile homes currently located on the property. He asked how long residents of the park would have to find a new location, as well as where other available housing might be located. He added that he is an owner receiving rent from tenants on the property, and asked if he and other owners would receive remuneration from lost rent.

Chair Maus recommended that Mr. Etiya speak with the Applicant or Mr. Lochrie, as the Board cannot answer his questions. Mr. Etiya replied that the Applicant has not previously responded to these concerns. Mr. Lochrie confirmed that he would speak with Mr. Etiya following the meeting.

Betzaida Giraldo, private citizen, stated that she is representing several tenants of the mobile home park who do not speak English. She advised that the park's office has indicated that tenants will need to move within eight months, but has not provided more information.

Chair Maus reiterated that the Board cannot address details of the plans affecting tenants and recommended that Ms. Giraldo also speak to Mr. Lochrie.

Patrick Blackwell, private citizen, stated that he also lives in the mobile home park. He asked why trailers are being remodeled if the intent is to remove them.

Ms. Wallen advised that informal interpretation by Ms. Giraldo would be allowed as long as all speakers are sworn in.

Chair Maus requested clarification of what outreach has been provided to residents of the mobile home park. Mr. Lochrie replied that both the Applicant and the operators of the park have reached out to residents and will continue these efforts with interpreters. He added that there are no plans to relocate tenants from their homes in the near future. State Statutes require that all tenants have six months to relocate once full approvals have been given for the project.

Mr. Lochrie continued that the owner of the mobile home park has purchased units as they became available. Many of the tenants rent their units by the month. He characterized the park as having outlasted its useful life, estimating that all tenants are eight to twelve months from being required to leave their homes.

Mr. Shechtman asked if the Applicant will make the information acquired through the housing study available to residents of the park so they can seek new homes. Mr. Lochrie replied that this information would be provided to tenants.

Ms. Giraldo confirmed that the residents for whom she would be translating are aware that they are months from having to relocate. She pointed out, however, that residents may not have sufficient money to move from the park, as they must continue to pay rent during this time.

Sugey Hernandez, private citizen, stated through Ms. Giraldo that there are many residents of the mobile home park who have children attending nearby schools. They are concerned because many have low incomes and do not know what will happen to them.

As there were no other individuals wishing to speak on this Item, Chair Maus closed the public hearing and brought the discussion back to the Board.

Ms. Fertig expressed concern that there were no formal interpreters present to assist in translation at tonight's hearing. She noted that while the Applicant may have reached out to the Riverland Civic Association, it did not appear that there was outreach to residents of the mobile home park.

Mr. Lochrie replied that the Applicant's team attended a general membership meeting of the Riverland Civic Association. Regarding tenants living in the mobile home park, there has been communication with the owners. The operator and manager of the park are ultimately responsible for outreach to tenants. He noted that the operator had not wished to overly concern tenants at this time, as the residents would not be forced to leave right away.

Ms. Scott asked if the Applicant had any plans to assist tenants of the park. Mr. Lochrie advised that the Applicant's intent is to purchase units within the park from the remaining owners. As an alternative, these units could be moved, as the study showed sufficient capacity for the units in other parks; however, he reiterated that many of the units are past their useful life and are likely to be destroyed rather than relocated once sold to the Applicant. The property itself does not meet current standards for a mobile home park due to circulation, infrastructure, setback, and other requirements. Mr. Lochrie assured the Board that the owners and managers would work with tenants who would need to relocate.

Mr. Cohen asked how many units are currently on the property, as well as how many would still need to be purchased by the property owner. Mr. Lochrie replied that there are roughly 106 mobile homes on the site, three to four of which have not yet been purchased by the owner.

Mr. Cohen asked what other uses would apply to the property if the rezoning request is not approved. Mr. Lochrie explained that these uses are limited by the property's MHP zoning, which was adopted in 1997.

**Motion** made by Vice Chair Elfman, seconded by Mr. Weymouth, to approve case number PL18007. In a roll call vote, the **motion** passed 8-0.

**Motion** made by Ms. Fertig, seconded by Ms. Scott, to defer [Item 3] a month to give [the Applicant] time to meet with the residents and explain to them what is going on.

Ms. Fertig pointed out that while an applicant is required to meet with nearby neighborhood associations, there is no requirement that an applicant meet directly with tenants who will be affected. She felt this meeting could alleviate many of the tenants' concerns.

Mr. Shechtman asked if it may be premature to meet with residents of the park before all necessary approvals have been granted to allow the project to advance. Assistant City Attorney Shari Wallen advised that case law states it is not necessary to wait for the results of a rezoning application in order to evict tenants.

Mr. Cohen asked if the tenants rent their units on a monthly or annual basis. Mr. Lochrie confirmed that the units are rented month-to-month. He added that the property owner does not want tenants to be frightened into relocating before it is necessary. Mr. Cohen explained that his concern was that a 30-day deferral might accomplish little.

Mr. Barranco asked if, should the **motion** currently on the table fail, the Board might make a motion to approve the rezoning, with the condition that further study and/or outreach is necessary before the Application goes before the City Commission. Attorney Wallen advised that it would be better to defer the Item pending further outreach.

Mr. Weymouth asked if it would be helpful to provide residents of the mobile home park with assurance that they would not be evicted on short notice. Attorney Wallen explained that eviction is addressed under a separate Statute. The Statute governing the current Application requires a finding of adequate housing to which tenants could relocate.

In a roll call vote, the **motion** failed 3-5 (Vice Chair Elfman, Mr. Barranco, Mr. Cohen, Mr. Shechtman, and Mr. Weymouth dissenting).

**Motion** made by Mr. Weymouth, seconded by Vice Chair Elfman, to approve [Item 3]. In a roll call vote, the **motion** passed 7-1 (Ms. Fertig dissenting).

Mr. Lochrie stated that the Applicant would reach out to the residents of the park.

<b>4. CASE:</b>	<b>ZR17007</b>
<b>REQUEST: * **</b>	Site Plan Level IV Review: Rezoning from Residential Single Family/Low Medium Density (RS-8) to Community Business (CB) with 0.25 acre of Commercial Flex Allocation / Waterway Use /Conditional Use for 34-slip Marina with 2,400 Square-Foot Storage Building and 1,553 Square-Foot Crew Club Building
<b>APPLICANT:</b>	Pier 17 Investments 2014, LLC
<b>PROJECT NAME:</b>	South Fork Marina
<b>GENERAL LOCATION:</b>	1500 SW 17th Street



<b>ABBREVIATED LEGAL DESCRIPTION:</b>	A Portion of Block "A", "Yellowstone Park Amended" According to the Plat thereof as Recorded in Plat Book 15, Page 3, of the Public Records of Broward County, Florida
<b>ZONING DISTRICT:</b>	Industrial (I) and Residential Single Family/LowMedium Density (RS-8)
<b>LAND USE:</b>	Industrial and Low-Medium Residential Density
<b>COMMISSION DISTRICT:</b>	4 – Ben Sorensen
<b>CASE PLANNER:</b>	Florentina Hutt

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Disclosures were made at this time.

Stephanie Toothaker, representing the Applicant, showed multiple views of the subject property, which was previously an active marina where repairs were made. While most of the site is zoned Industrial, the request before the Board would rezone a small residential parcel to Community Business (CB).

The proposed project, previously called Pier 17, had received previous Site Plan approval. It included 22 slips, each of which was covered by a shed 65 ft. in height. The new proposal includes 34 slips with no sheds as an open mega-yacht marina. It includes 140 linear ft. of rentable floating dock space. The Applicant has assured the property's neighbors that no more than 55 boats, including tenders, will be kept on the property.

The proposed clubhouse for the project has been reduced to a single story and will be roughly 1500 sq. ft. in size. There will also be a storage building for the owners of boats. The Site Plan shows a docking schematic for the 55 boats on the property. Ingress/egress, a loading area, and a parking area were also shown on the Site Plan. The total parking provided is 47 spaces against a requirement of 33 spaces.

The marina will operate between the hours of 8 a.m. and 5 p.m. and will implement perimeter fencing, as well as lighting that is appropriate for the neighborhood. Secure dock access, security personnel, and a camera system will be included in the marina's operational plan.

Ms. Toothaker addressed community outreach for the project, stating that the Applicant has met with the appropriate neighborhood associations and invited all property owners residing along 17<sup>th</sup> Street to join these meetings. She characterized the project as a passive marina, with no heavy work performed on the boats docked there. The Applicant plans to improve SW 17<sup>th</sup> Street by widening a private road from 16 ft. to 20 ft., constructing a cul-de-sac to improve access to the residential properties, and providing utility improvements along 17<sup>th</sup> Street.

The Applicant has agreed to voluntary conditions of approval at the neighborhood's request, and is asking that Site Plan approval include all of these conditions. The Shady

Banks neighborhood has offered a letter of support that is specifically related to these voluntary conditions. The Applicant has drafted a Declaration of Restrictive Covenants and Marine Development Agreement that incorporate these conditions and will be recorded against the property. The conditions include the following:

- Dockage for in-water vessels shall not exceed 55 total boats and 34 mega-yacht slips, with required parking to accommodate demand and prevent spillover
- All boats up to a maximum of 55 ft. must be within 34 slips, providing that no individual slips shall ever have more than three boats
- The term "boats" shall include but not be limited to boats, vessels, watercraft, tenders, sailboats, and yachts
- Applicant agrees to limit the number of boats in each slip to a minimum of two per slip; one exception to this condition will be permitted for a tender that is directly related to a boat in the slip, provided the slip never exceeds three vessels
- No boat may extend beyond the slip limits as delineated in the modified submerged land lease
- Prior to final DRC approval, Applicant agrees to obtain an authorization from Broward County Environmental Protection stating that any soil or groundwater contamination on the property has been mitigated prior to land excavation, or obtain Broward County approval of a soil management plan that addresses how contamination will be handled during construction activities
- A management contract shall be required prior to a Certificate of Occupancy (CO)
- The marina operation shall be equipped with oil spill containment and fire safety attenuation equipment as required by City Code
- No outside loudspeakers or amplification systems are permitted
- No work activities shall be permitted at the marina that would violate noise or other nuisance-related Ordinances
- No rafting of boats shall be permitted in a slip along any dock or along a seawall adjacent to the property, except in an emergency
- Substantial changes to the marina's Site Plan requiring an amendment to be reviewed by the Planning and Zoning Board shall first be reviewed by the Marine Advisory Board
- Applicant shall comply with all permits required by governmental agencies with jurisdiction over the waterways, and with all Codes and regulations affecting operation of the marina, including ULDR adequacy requirements
- Applicant shall provide marine sanitation pump-out service accommodations at each of the 34 slips, and shall comply with established requirements imposed by the City and other environmental permitting agencies
- Applicant shall furnish the Supervisor of Marine Facilities with copies of the final plans required
- The following work is prohibited at the South Fork Marina: heavy grinding, heavy sanding, extensive exterior painting, haul-out, dry dock storage, or any service or work on the upland; minor and water repairs are permitted

- Storage or disposal of any form of petroleum-based fuel is not allowed on the property unless permitted by the appropriate environmental agencies; disposal of any form of petroleum-based fuel will be handled in accordance with Code
- Signs are not permitted on dock structures or property for the purpose of selling vessels, boats, or other marine-related amenities unless approved in accordance with the City's Code of Ordinances and the ULDR in conjunction with DRC Site Plan approval
- Vessels moored on the New River adjacent to the South Fork Marina or in any slip may not extend beyond the submerged land lease
- Applicant shall take all steps necessary to modify the existing 2017 submerged land lease so it accurately reflects the construction of proposed structures in accordance with the current Site Plan
- Applicant agrees that in any subsequent extended or modified submerged land lease to the benefit of the marina, the number of slips will not change
- Special condition to establish a self-imposed restriction by the Applicant will prohibit permanent live-aboard vessels on site; necessary overnight use by owners is permitted
- Fixed fueling facilities are not permitted; fueling service provided by third-party vendors are limited to using mid-sized fuel tanker trucks or delivery via water; should more restrictive standards be imposed by County, state, or federal permitting agencies, the Applicant will abide by those standards
- Applicant has removed two residential lots from the Site Plan; however, the seawall required on those lots will be provided by the Applicant
- The Applicant has committed to addressing increased parking and traffic concerns for the neighborhood by making a financial commitment of \$50,000 to be used toward neighborhood improvements
- 18-wheel vehicles shall not be permitted to access the site once a CO is issued
- Applicant agrees to remedy any shoreline erosion to Bill Keith Preserve
- Applicant shall enter into an appropriate maintenance agreement with 17<sup>th</sup> Street property owners for its share of the upkeep of SW 17<sup>th</sup> Street
- Applicant will work with the SW 17<sup>th</sup> Street property owners to address the necessary easement and lateral design requirements for the installation of a sewer main on SW 17<sup>th</sup> Street

Ms. Toothaker reiterated that these conditions are requested as part of Site Plan approval.

Vice Chair Elfman requested additional information regarding the lighting plan for the street. Ms. Toothaker replied that the Applicant submitted a photometric plan showing there is no spillover to residential lots. Lighting is directed toward the marina and away from nearby residential lots.

Ms. Hutt of Urban Design and Planning stated that the request is for Site Plan Level IV review and rezoning from RS-8 to CB, with 0.25 acre of commercial flex allocation,

waterway use, and conditional use for a 34-slip marina. The marina will include a 2400 sq. ft. storage building and 1553 sq. ft. crew club building. The club building is an accessory use intended to be used by marina tenants.

The residential portion of the property has an underlying land use of low/medium residential density. Commercial use is permitted if the allocation of commercial flex does not exceed 5% of the total land use area within the flex zone designated for residential use. There are currently 519.6 acres available for commercial flex. If approved, 519.3 acres of commercial flex will remain available. The proposal was reviewed by the DRC and all comments were addressed.

The project is compliant with rezoning criteria, and the proposed rezoning will allow the entire site to be used as a marina. The proposed development is in character with neighboring properties to the south, which also incorporates marina and boat-related uses along the waterway.

Staff has reviewed the project for compliance with conditional use criteria, adequacy, and neighborhood compatibility. The project is found to be compliant with all these sections of Code. The project is consistent with the surrounding character of the neighborhood, and the proposed design of the marina is compatible with the residential neighborhood to the north. The development will improve a private road southwest of 17<sup>th</sup> Street, and the Applicant will construct a cul-de-sac to improve access to the residential properties to the north.

Vehicular ingress/egress is provided from SW 18<sup>th</sup> Avenue to SW 17<sup>th</sup> Street. A traffic impact statement from April 2018 was prepared by the Applicant's consultant and reviewed and approved by Staff. The Applicant held numerous meetings with the Shady Banks Neighborhood Association and River Oaks Civic Association.

Staff recommends that the Board approve the request with the following conditions:

- Prior to issuance of a final CO, the Applicant shall record an ingress/egress easement along the south side of SW 17<sup>th</sup> Street private road, varying from 8 ft. to 11 ft., and complete a 20 ft. roadway section that expands to include a proposed cul-de-sac 70 ft. in diameter, located at the east end of the private road, as approved by the City Engineer
- Prior to issuance of a final CO, the Applicant shall record a utility easement as appropriate along SW 17<sup>th</sup> Street private road for placement of proposed sewer infrastructure outside the existing right-of-way, to facilitate City maintenance and access as approved by the City Engineer

Four additional conditions resulted from meetings between the Applicant and the neighborhood association(s):

- Prior to final DRC approval, the Applicant agrees to obtain authorization from Broward County Environmental Protection which states that any soil or

groundwater contamination on the property has been mitigated before land excavation

- The marina manager shall not permit rafting of boats
- The two northeast residential parcels previously included in the DRC application have been removed from the Site Plan and will not be incorporated into the South Fork Marina project
- The Applicant shall repair the seawall around these parcels and align it with the property line no later than the completion date of the South Fork Marina
- The owner of the marina shall ensure that 18-wheel vehicles will not be permitted to access or service the South Fork Marina site once marina operations commence; during construction or any permitted site work, 18-wheel vehicles will be limited and only used to transport construction equipment or materials; no 18-wheel dump trucks will be permitted at any time

There being no questions from the Board at this time, Chair Maus opened the public hearing.

Barbara Haggerty, representing the Marine Advisory Committee of the Shady Banks Civic Association, addressed three areas of concern regarding the Application. In May 2018, the Association voted to support the project with the inclusion of 25 voluntary conditions; however, City Staff suggested that language requiring the City to enforce these conditions was not acceptable. There were also duplicate conditions in existing Code.

The voluntary conditions document a collaborative effort reflecting the concerns of many residents. While City Staff has suggested rewording the document, the revised conditions have not yet been signed by the developer. There is also an issue related to the absence of an easement agreement requested by 17<sup>th</sup> Street property owners in light of traffic safety concerns during and after construction. Ms. Haggerty concluded that the \$50,000 commitment states that upon receiving cost estimates from the City, the Applicant will commit to a reasonable and fair financial contribution to the City for the construction of two "three-legged" intersections.

Ms. Haggerty characterized the neighborhood as in favor of the project with exceptions. She requested that the Board either table the issue and allow additional time for execution of conditions, or allow the rewritten 25 conditions read by the Applicant's representative to be part of the Site Plan approval.

Clayton Ratliff, private citizen, advised that he supports the development of the marina, subject to the voluntary conditions agreed upon by the Applicant and residents. He pointed out that only four of these conditions are recommended for the Board's approval by Staff, and asked that the development be approved with all 25 conditions. The neighborhood has begun working on private restrictive covenants that would incorporate all 25 voluntary conditions. If the Board is not willing to approve these conditions, Mr. Ratliff asked that the Application be tabled at this time.

Chair Maus asked if there are any restrictions that preclude the Board from including the 25 conditions in their approval of the Application. Ms. Parker explained that some conditions are voluntary rather than Code requirements. The City does not want the obligation of enforcing voluntary conditions between private parties. The four conditions included in the Staff report are subject to Code Enforcement; for the remaining conditions, Staff recommends a private restrictive covenant coordinated through the Applicant's attorney.

Mr. Shechtman noted that the 25 conditions have been agreed upon separately from the Site Plan between the community and the developer. Mr. Ratliff stated that these conditions should be recorded as a restrictive covenant on the property in order to allow for their enforcement. Current language makes these conditions enforceable only by the Shady Banks Civic Association; however, the Association has no management aspect that could oversee enforcement.

Attorney Wallen explained that the City informed the Applicant's attorney as early as June 2018 that a restrictive covenant was recommended. She reiterated that the City is not comfortable enforcing conditions through City resources when most are not Code requirements. A restrictive covenant would allow for enforcement of the 25 conditions for the residents who have requested it. The City had been under the impression that this issue was resolved before tonight's meeting.

Mr. Shechtman asked if the Board may approve the Application with the condition that restrictive covenants be completed. Attorney Wallen recommended against this action, as Code states private covenants or deed restrictions for a subdivision that are not approved by the City do not fall within the jurisdiction of City enforcement. Because City resources are limited, they are not intended to be used to enforce private agreements.

Vice Chair Elfman requested clarification of what constitutes a private restrictive covenant. Attorney Wallen replied that this is an agreement with the requested regulations which are not Code requirements. The City does not wish to move outside the scope of governing City Code requirements.

Mr. Ratliff asserted that the Association is not happy with the revised covenants provided to them by the Applicant earlier in the day.

Mr. Shechtman asked for clarification of what has been executed thus far. Ms. Toothaker replied that the 25 conditions were drafted in a Declaration of Restrictive Covenants at Staff's suggestion. The Association returned a different draft that divided the document into two separate documents: one was the Declaration, while the other was a Marine Development Agreement. All conditions are included in the two signed documents.

Ms. Toothaker continued that the Applicant does not agree with the Association regarding what entity or persons have the right to enforce the documentation. The Applicant does not feel it is appropriate for individual homeowners throughout the neighborhood to have enforcement rights; they feel enforcement should be done either by the City, by the Association, or both. This is the only remaining issue of contention between the Applicant and the Association.

Ms. Toothaker asserted that the Applicant would still like to make the 25 voluntary restrictions as conditions of the Site Plan. Attorney Wallen advised that the conditions refer to private agreements, which the City cannot enforce.

Stephen Sperling, private citizen, stated that the voluntary conditions are intended to prevent any future owners of the marina property from taking action that would adversely affect the neighborhood. He characterized the Civic Association as a volunteer entity that cannot enforce any of the conditions. He could not support the Site Plan in the absence of the proposed conditions.

Heather Keith, private citizen, explained that she has been an advocate for the proposed project and lobbied for its approval by the Marine Advisory Board, subject to the 25 conditions. At that meeting, although Staff had recommended not including the conditions for the same reasons discussed tonight, the Marine Advisory Board recommended approval of the project including the conditions. She asked that the Planning and Zoning Board do the same. She felt further discussion of which conditions the City may enforce should be held before the City Commission.

Ms. Fertig asked if Ms. Keith wanted the project approved with the conditions. Ms. Keith confirmed this, adding that there are significant issues with the documentation provided to the neighborhood by the developer prior to today's meeting.

Barbara Schwebel, private citizen, stated that the magnitude of the project would affect the character of the neighborhood. She did not feel there is sufficient infrastructure to accommodate the project and its construction, including large trucks, increased traffic, and light and noise pollution. She concluded that she did not support the proposed rezoning.

Reiner Schwebel, private citizen, said he was not in favor of the project due to the traffic it would bring into the neighborhood, and expressed concern for property values. He submitted a letter from another resident of the neighborhood, Jeff Ore, who also disapproved of the project.

Thurman Mintz, private citizen, advised that he was supportive of the proposed project as long as the developer abides by the 25 conditions. He pointed out that work is already being performed on large boats docked at the marina.

Jennifer Jones, private citizen, expressed concern with the increased traffic the project would bring, as the neighborhood already experiences traffic issues due to speeding. She also noted that the marina's hours of operation would not apply to the captains and crew who may be staying overnight on vessels.

Colleen Colton, private citizen, noted that the condition requiring the marina to remedy shoreline erosion at the Bill Keith Preserve is not one of the four conditions recommended by Staff. She recommended that the Item be tabled for at least 30 days so further discussion could be held between residents and the Applicant.

Shelby Smith, private citizen, stated that when the property served as a working marina, it amounted to an industrial use. He suggested that the Board recommend approval of the Item with the requirement that the agreement between the Applicant and the Association be completed before final approval.

Lynn Phoenix Mark, private citizen, asked that the Board defer the Item if they could not approve the Application with the 25 conditions attached.

Peter Wan, private citizen, felt the proposed development would change the character of the Shady Banks neighborhood. He asked that the 25 conditions be included in approval of the project.

Chris Miller, private citizen, advised that he was only recently made aware of the proposed easement and maintenance agreement related to 17<sup>th</sup> Street, and would like more clarity on this issue before approval is granted.

As there were no other individuals wishing to speak on this Item, Chair Maus closed the public hearing and brought the discussion back to the Board.

**Motion** made by Ms. Fertig, seconded by Ms. Scott, to adopt the Site Plan with the 25 conditions and Staff conditions.

Vice Chair Elfman requested additional information on the easement. Colby Cooper, Chief Operating Officer of Hicks-Snedaker and developer of the project, explained that the easement agreement is between the City and the residents of SW 17<sup>th</sup> Street. Additional information is required before the developer may work with the City to ensure that the City may maintain the sewer once it has been installed.

Mr. Cooper continued that the only easement before the neighborhood affects residents of SW 17<sup>th</sup> Street and is between them and the City. Once the Applicant has City-approved language and forms, they will reach out to the SW 17<sup>th</sup> Street owners and address any further concerns.

Mr. Weymouth asked if the 25 conditions are intended to be enforceable by individual residents of the surrounding neighborhood. Ms. Toothaker reiterated that the Applicant



offered the 25 voluntary conditions with the intent that they would be conditions of Site Plan approval. In addition, the 25 conditions have been included in a Declaration of Restrictive Covenants or a marina developer's agreement. The only remaining issue is one of enforcement.

Ms. Toothaker continued that the 25 conditions are attached to the letter from the Shady Banks Civic Association, which specifically conditioned its members' approval upon inclusion of these conditions. Ms. Fertig **amended** her **motion** as follows: the 25 conditions as delineated in the letter from Shady Banks.

In a roll call vote, the **motion** passed 8-0.

#### **V. COMMUNICATION TO THE CITY COMMISSION**

None.

#### **VI. FOR THE GOOD OF THE CITY OF FORT LAUDERDALE**

Mr. Barranco observed that the discussion of Items 2 and 3 showed that the developer took all action required of them under Code; however, it did not appear that Code requirements were sufficient in this case. He felt if developers can be asked to meet with neighborhood associations, this courtesy could be extended to tenants as well, with housing options provided to these residents.

Ms. Fertig advised that Staff should look into the possibility of having an interpreter present in case one is needed in the future. She pointed out that other governmental entities make provisions for this need, and expressed concern that residents came forward with the intent of participating in the meeting but were not heard because professional interpretation was not available. Mr. Shechtman agreed, also asserting that this need should be accommodated.

Chair Maus advised that there are members of the public wishing to speak under For the Good of the City who may address projects that have previously come before the Board for approval. She pointed out that because not all parties associated with these projects are present at tonight's meeting, and Staff is not fully prepared for discussion of past cases, it may not be appropriate to discuss specific projects. She recommended that the discussion be limited to concepts rather than specifics.

Stan Eichelbaum, president of the Downtown Fort Lauderdale Civic Association, stated that the Board is not asked to make a formal recommendation at tonight's meeting. He noted that once a decision has been made, this is considered history and is subject to discussion.

Attorney Wallen explained that the issue is that there should not be re-litigation of cases that have already been decided. It is appropriate to discuss specific closed cases, but if

those cases are undergoing appeal or other approval is pending, further discussion is inappropriate. She asked that discussion of specific cases be limited to items currently being litigated. It was determined that Staff would clarify whether or not a given case is still in process.

Mr. Eichelbaum distributed a handout to the Board members, stating that there is a new organization, Fort Lauderdale on Public Safety (FLOPS), which arose from concerns regarding a wind vortex in the Downtown area. A resident had cautioned that this condition could arise from the approval of projects that are not designed to mitigate the wind vortex.

Members of the organization met with the City Attorney, who clarified that the City is only legally vulnerable to issues listed in the ULDR. The organization's legal advisors do not agree, and feel the City is liable for the approval of projects that may do harm to the community in relation to safety and financial security.

Mr. Eichelbaum characterized FLOPS as pro-development but concerned with the use of correct development practices. He stated that the organization is concerned with the entire approval process, including enforcement and compliance monitoring. Their intent is to address shortfalls within these processes.

Mr. Eichelbaum continued that FLOPS is concerned with infrastructure insufficiency as well as inadequate enforcement of compliance staffing, wind eddying and vortices, ULDR shortfalls, and water supply and infrastructure, among others. He asserted that the community has sent multiple letters expressing concern with these and other issues.

Gary Grayson, private citizen, stated that he felt false statements were made in the past regarding the effects of wind on buildings, and addressed safety issues related to these effects, including the possibility that wind velocity may cause buildings to fail hurricane zone requirements. Mr. Grayson concluded that there is no way to mitigate the effects of wind issues if spacing guidelines are not met.

Lenny Steinbaum, private citizen, advised that he no longer feels safe in the City due to overbuilding, failing infrastructure, and traffic congestion. The City has not increased its emergency medical services locations and staff sufficiently to protect its inhabitants. He also expressed concern for the ability of emergency services to reach residents during flood situations. He felt the City's Master Plan should place a temporary moratorium on construction until safety issues are resolved.

John Bordeaux, private citizen, read from an email he had sent to several residents of the Downtown area. The email addressed traffic congestion, water and sewer usage, increased response time for emergency vehicles, staging of construction, and egress of residents in the event of an emergency. The City does not include an emergency response station in the Downtown area.

Mr. Bordeaux expressed concern with the number of high-rise buildings, most of which are over 40 stories tall, located in one quarter-mile area. He advised that there have been no comprehensive traffic or emergency egress studies conducted for these buildings. Significant wind tunnels also exist between these buildings. He asked if the City would be liable for fatalities related to evacuation from these structures.

Steve Rifkin, private citizen, stated his concern with increasing growth, traffic congestion, dangerous winds, and access for emergency services. He pointed out that multiple new buildings are under construction close to the Downtown area, which will contribute to traffic congestion and possibly to liability to the City in the event of an emergency. He asked that developers be held accountable, that a moratorium be imposed on new construction, and that the safety of citizens be protected.

Marvin Srulowitz, private citizen, advised that problems unique to buildings such as Las Olas by the River, where he resides, have not been addressed in the past. These include flooding from sewers and consistent power outages. He noted that the City does not consider buildings as part of a larger area but on their own merits only. He recommended that the City take a more global look at the projects it approves.

Mr. Eichelbaum concluded that issues in the Downtown are escalating with regard to public safety and the City's fiscal security. He provided a list of the issues with which FLOPS is concerned.

Ms. Fertig asked if these concerns could be addressed or considered in light of the Downtown Master Plan. Attorney Wallen replied that the Planning and Zoning Board only has jurisdiction to address certain issues: they may make recommendations to the City Commission, but ultimately any changes to Ordinances would come at the direction of the City Commission and City Manager.

Ms. Scott commented that she shares many of the residents' concerns regarding access for emergency vehicles and services, including response times.

Dylan Lagi, private citizen, advised that the Flagler Village area is also part of Downtown Fort Lauderdale and represents a portion of the Northwest Progresso-Flagler Heights Community Redevelopment Agency (NPF CRA). He felt a collective discussion should be held between civic groups both north and south of Broward Boulevard, representing both portions of Downtown, to address concerns and make improvements for residents.

There being no further business to come before the Board at this time, the meeting was adjourned at 9:10 p.m.

Any written public comments made 48 hours prior to the meeting regarding items discussed during the proceedings have been attached hereto.

*Catherine Manz*

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Chair

*Brigitte Chiappetta*

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Prototype

[Minutes prepared by K. McGuire, Prototype, Inc.]

EMAIL CONFIRMATION OF DEVELOPER'S AGREEMENT  
TO 25 VOLUNTARY CONDITIONS OF APPROVAL

SOUTH FORK MARINA

-----Original Message-----

From: Colby Cooper [mailto:colby@hixsnedeker.com]

Sent: Monday, September 17, 2018 3:50 PM

To: Heather Keith <Heather.Keith@glhomes.com>; Stephanie J. Toothaker <sjt@trippscott.com>

Cc: Barbara Haggarty <haggertybj@earthlink.net>; Ben Sorensen <BSorensen@fortlauderdale.gov>;

Daniel E. Taylor <det@trippscott.com>; Clayton Ratliff <Clayton.Ratliff@glhomes.com>;

colby@hixsnedeker.com

Subject: RE: P&Z Meeting on South Fork Marina = Tonight 9/17/18

Heather - I am 100% supportive of the original 5/28/18 conditions being added to the site plan as voluntary conditions of approval. That was the original intention and the ensuing effort was only a reaction and solution to the City staff's response. We have never backed away from our promises, collectively we have had to find a vehicle and a way to deliver them.

-Colby

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251.605.9713 Cell  
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## MUNICIPAL LIABILITY FOR WATER/SEWER DAMAGES

Detroit to pay \$11M in water damage claims

Farmers Insurance Sues 100's of Municipalities for Flooding Claims

NYC Sewer overflow claims reduced due to DEP efforts and should yield savings for the City

Michigan Court of Appeals affirmed municipal liability for water and sewage damage to a commercial building without the need to prove negligence

Liability of Cities for Sewer Backups

Liability for Sewer Back-ups - U of TN Municipal Technical Advisory Service

Municipal Liability for Flood and Sewage Back-up Claims

Municipal Liability for Property Damage Caused by Flooding (NY Law Journal)

Is a Municipality Liable for Damages Caused by a Leak in Its Water Supply System (NYS Bar Association)

Municipal Liability for Sewer and Water Pipe failures - Despite Statutory Authority and Immunity

Sewage Backup and Flooding

Sanitary Sewer Overflows - Florida Dept of Environmental Protection

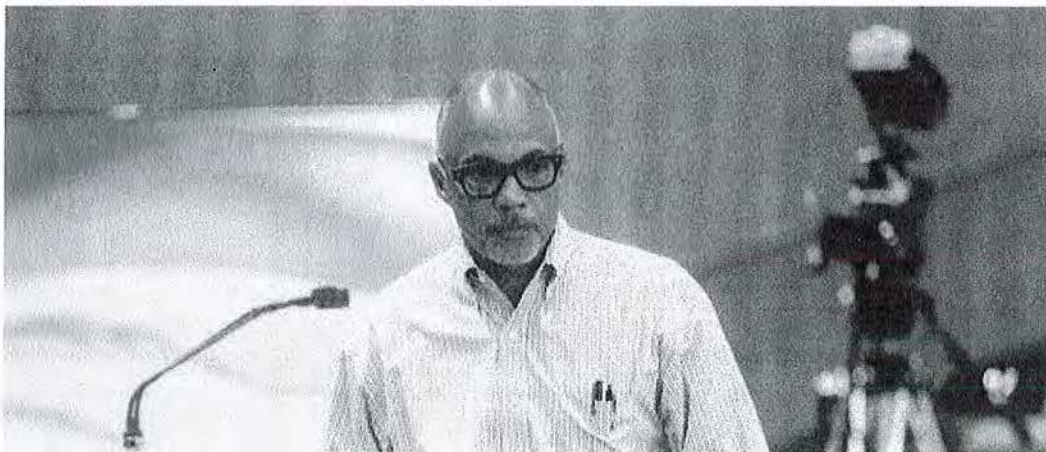
Sewer Toolkit - A Guide for Sanitary Sewer Maintenance Policies and Procedures - Florida Rural Water Association - Objective: "to minimize regulatory enforcement and/or penalties resulting from a spill/Sanitary Sewer Overflow



## Detroit to pay \$11M to 800 residents in water damage claims

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5 mins read





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**D**etroit Water and Sewage Department Director Gary Brown leads a presentation to discuss the Detroit Water and Sewage Department's new drainage fee that will go into effect Oct. 1st, during a Detroit city council meeting at Coleman A. Young Municipal Center in Detroit on Thursday, Sept. 8, 2016. (Photo: Kimberly P. Mitchell DFP) Buy Photo

Months after two severe storms flooded basements on Detroit's east side, the Detroit Water and Sewerage Department has decided to pay the claims of all residents who are not suing the water department.

"No matter whose fault it is, we're going to settle all the claims before January," DWSD Director Gary Brown told the Free Press on Friday. "I just signed off on 10 claims where residents don't have furniture or hot water. We wrote them a check. I did that today."

Hundreds of homes were damaged during the July 8 flooding, which resulted in many basements flooded with brown, smelly water. Brown said that the department isn't waiting for the disposition of ongoing investigations being conducted by the Great Lakes Water Authority, which operates the system and the water department, which charges residents for water.

► **Related:** [Detroiters mob church to vent on flooded basements in rainstorm's wake](#)

► **Related:** [Detroiters on east side get deja vu basement shock](#)

Brown said the department plans to settle with the 800 people who filed claims – and have not sued – beginning with 17 whose furnaces



and hot water tanks were rendered inoperable by the flooding. The department expects to spend about \$11 million.

"It is our intent to settle all claim by January 1st," he said. "We're going to settle those right away so they can have hot water and heat before winter," he told the Free Press. "I'm committing that whether it's the Great Lakes Authority or us, we can work that out separately, but we will settle the claims."

News of the settlement heartened some residents who said they were anxious to see the details.

"I'm happy to hear it," said Jocelyn Harris, 66, who has lived in her home on Lakewood for 42 years. "The challenge I have is how it's going to get done."

Harris said the July 8 flood damaged her furnace and hot water tank as well as her washer, dryer and a refrigerator in the basement. She estimates the cost at replacing or repairing all of them at about \$5,000.

She had been using space heaters to keep warm and taking her clothes to a laundromat until she can get her washer and dryer fixed. She said it's hard for people to find receipts for appliances that might be several years old and not all repair shops offer free estimates.

"It's a real challenge," she said.





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City of Detroit Water and Sewage team leader Mathew Mercer (center) and field service team leader Philip Curry work to remove basin covers from E. Milwaukee near Russell in Detroit on Thursday September 29, 2016 to move flood waters from the street after heavy rains dumped through the Detroit area. (Photo: Ryan Garza, Detroit Free Press)

Brown's decision comes about two months after the second of two storms caused massive flooding in the Jefferson-Chalmers and Victoria Park neighborhoods on the city's east side. The second flood came just as residents had repaired damage from the first one in July.

Brown said that the water department had already begun aid efforts by spending more than \$2 million to clean the basements of nearly 300 homes in Jefferson-Chalmers whose owners said they couldn't afford the repairs.

"We didn't wait to see whose responsibility it was (between Great Lakes and DWSD)," he said. "I hired two contractors and we cleaned and sanitized and threw out things. ... We're not going to put customers in the middle (of the debate over) whose responsibility it is. In some instances, we had to build stairways to get into their basements, and we cleaned vacant property that the (Detroit) land bank owned so there wouldn't be a stench near the homes that are occupied," said Brown, who is a former city councilman.

Phil Wassenaar has lived in his home on Marlborough for 35 years. He saw almost 2 feet of water in his basement, which damaged not only his appliances, but many tools he using in his contracting

business, including a chain saw and an air compressor. He also lost new boots and down bedding.

He filed his claim with the city in July and heard nothing until about a week ago, when he got a letter telling him he must submit receipts, photographs and an itemized list of items lost or damaged in the flood.

"It was dark, black, stinky water and everything was covered," Wassenaar said. "The onus is going to be on me to prove what I had."

Wassenaar said he had as many as 50 screwdrivers that were rusted because of the flood.

"How much is my time worth to clean all of that?" he said. "I'm hoping they make good on it."

Brown said the decision to pay the claims is part of the department's efforts to rise above a reputation damaged by water shutoffs that made international headlines. In addition to paying the claims, the department recently instituted a program through the Great Lakes Water Authority. The Water Residential Assistance Program, or WRAP, helps customers who are behind on their water bills but who make consistent payments over a period of time.

The program, which Brown said was the most generous in the country, allows customers who are at or below 150% of the federal poverty income level to pay a small portion of the accumulated bill and to make regular small payments on their bills. If they pay regularly for six months, the department will pay half of their outstanding bill. If they pay regularly for a year, the department will pay the other half. The program is available for water customers in Wayne, Oakland, Macomb, Monroe, Washtenaw and Lapeer counties.

Brown said that about 44,000 of the department's 175,000 customers are on payment plans. Of those, only about 6,000 face shutoffs, and none of them have to lose water if they just ask for help.

# Farmers Insurance Sues 100's of Municipalities For Flooding Claims

[municipalminute.ancelglink.com](http://municipalminute.ancelglink.com)

1 min read

Thursday, May 08, 2014 [Julie Tappendorf](#)

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Update 6/3/2014: Farmers voluntarily dismissed its Cook County lawsuit today and it appears it may be dismissing all of its lawsuits.

On April 17, 2014, Farmers Insurance filed class action lawsuits against nearly 100 municipalities, townships, and other governmental entities in the Cook County, Illinois area seeking to recover millions of dollars paid in claims the insurance company paid out after the heavy rains on April 18, 2013 and April 19, 2013. The lawsuits were filed on behalf of insurers and property owners.

The first count in the complaint filed in Cook County Circuit Court alleges that the municipalities negligently maintained their storm water systems by failing to utilize temporary storm water protection systems. The second count alleges a failure to remedy a known dangerous condition where the storm water invasions had occurred before. The third count states that the plaintiffs were subject to an unlawful taking where the local governments had appropriated the property of others for use as retention basins, detention basins, or other storage structures.

Citing the 2008 adoption of the Chicago Climate Action Plan, the dominant argument of the complaint is that local governments

mismanaged their storm water systems when they knew the systems were undersized for increased rainfall brought about by climate change, and that the governments allegedly knew that that they needed to increase their storm water system's capacity because of prior flooding incidents and investigations.

We will provide updates on the status of this litigation, including any responses filed by the defendant municipalities and other governmental entities.

You can find the 143-page complaint [here](#).

Post Authored by Julie Tappendorf and Caitlyn Sharrow, Ancel Glink



# Sewer Overflow Claims

[comptroller.nyc.gov](http://comptroller.nyc.gov)

## Sewer Overflow Claims

**D**epartment of Environmental Protection: Sewer overflow claims fell by 20 percent between FY 2012-2013 and FY 2014-2015. In FY 2012-2013, there were 1,296 sewer overflow claims filed against DEP. In FY 2014-2015, there were 1,035 claims filed, with the number falling significantly from FY 14 (589) to FY 15 (446). This represents a significant improvement for DEP and should yield savings for the City in the coming years.

There were significant changes in where the claims came from during this time period. Community District 5 in Brooklyn and Community District 10 in Queens had more than 100 additional claims filed in FY 2014 and 2015 than in FY 2012 and 2013. By comparison, Community District 18 in Brooklyn and Community District 2 in Staten Island saw their claims activity decline by more than 100 claims during this time period.

Sewer claims continue to be concentrated in low-lying areas of the City, including Staten Island and in communities surrounding Jamaica Bay.



# 580 N.W.2d 468, 229 Mich. App. 141

[www.courtlistener.com](http://www.courtlistener.com)

9 mins read

Judges: Michael J. Kelly, P.J., and Wahls and Gage

CS&P, INC., d/b/a Lasercolor  
Presentations, 3-S Construction, Inc.  
and LBL Investments, Plaintiffs-  
Appellees,

v.

CITY OF MIDLAND, Defendant-  
Appellant.

CINCINNATI INSURANCE CO.,  
Plaintiff-Appellee,

v.

CITY OF MIDLAND, Defendant-  
Appellant, and  
CS&P, INC., d/b/a Lasercolor  
Presentations, Not participating.

Docket Nos. 192303, 192304.

**Court of Appeals of Michigan.**

Submitted April 10, 1997, at Lansing.

Decided March 31, 1998, at 9:20 a.m.

Released for Publication July 14, 1998.

Barry B. George, Midland, for CS & P, Inc.

Sidney B. Schneider, Midland, for 3-S Construction, Inc., and LBL  
Investment.

O'Neill, Wallace & Doyle, P.C. by James E. O'Neill, III, Saginaw, for  
Cincinnati Insurance Company.

O'Connor, DeGrazia & Tamm, P.C. by Julie McCann-O'Connor and  
James I. DeGrazia, Bloomfield Hills, for city of Midland.

Before MICHAEL J. KELLY, P.J., and WAHLS and GAGE, JJ.

\*469 WAHLS, Judge.

In Docket No. 192303, defendant City of Midland appeals as of right from the trial court's amended judgment entered in favor of plaintiffs CS & P, Inc., 3-S Construction, Inc., and LBL Investments following a jury trial. In Docket No. 192304, Midland appeals as of right from the amended judgment entered in favor of plaintiff Cincinnati Insurance Company following a consolidated jury trial. We affirm.



According to the undisputed testimony, water and sewage emanating from the toilets and floor drains invaded the premises of a commercial building located in Midland and owned by LBL Investments. Both CS & P and 3-S Construction occupied suites in the lower level of the building. The flooding caused extensive damage to the building and its contents. The tenants could not occupy the lower portion of the building for several weeks. CS & P received \$48,367.62 in insurance proceeds from Cincinnati Insurance because of the damage. Cincinnati Insurance subsequently received a \$10,000 salvage refund. Broken risers in the sewer on a street adjacent to the building caused a blockage, and diverted the water and sewage into the building. Midland admitted that it owned the sewer system, that it was responsible for maintaining, installing, and repairing sanitary sewers, and that the section of the sewer that failed had been cleaned and inspected, no problems having been found.

On November 2, 1994, CS & P, 3-S Construction, and LBL Investments filed a one-count complaint against Midland, claiming that Midland was liable for damages to the building and its contents under a trespass-nuisance theory. On November 7, 1994, Cincinnati Insurance, as the subrogee of CS & P, filed a complaint against Midland. In its pretrial statement, Cincinnati Insurance indicated that it was proceeding under a theory of trespass-nuisance. Midland pleaded governmental immunity and contributory or comparative negligence as affirmative defenses to both complaints.

3-S Construction, LBL Investments, and Cincinnati Insurance all moved for summary disposition pursuant to MCR 2.116(C)(9) and (10), arguing that Midland had admitted to the elements of trespass-nuisance and that negligence did not need to be proved to find liability under a trespass-nuisance theory. CS & P made a similar motion pursuant to MCR 2.116(C)(10). Midland filed motions for summary disposition pursuant to MCR 2.116(C)(7), (8), and (10), arguing that because maintenance of a sewer system is a governmental function, plaintiffs' claims were barred by governmental immunity.

The trial court held that plaintiffs had pleaded causes of action under the trespass-nuisance exception to governmental immunity, that a genuine issue of material fact remained only with respect to plaintiffs' damages, and that governmental immunity was not a defense for Midland. The trial court also ruled that negligence was not an element that plaintiffs had to prove to establish Midland's liability under a trespass-nuisance theory. Following a jury trial with respect to damages, CS & P was awarded \$30,348.74 in damages, interest, and costs; LBL Investments was awarded \$20,802.99 in damages and interest; 3-S Construction was awarded \$10,739.21 in damages and interest; 3-S Construction and LBL Investments were jointly awarded \$165.80 in costs; and Cincinnati Insurance, as the subrogee of CS & P, was awarded \$33,618. The trial court subsequently awarded mediation sanctions to plaintiffs on the basis of Midland's refusal to accept the mediation determinations.

Midland's sole issue on appeal is that the trial court erred in ruling that plaintiffs did not need to prove negligence as a predicate to establishing liability under the trespass-nuisance exception to governmental liability. We disagree.

Under the governmental immunity act, M.C.L. § 691.1401 *et seq.*; M.S.A. § 3.996(101) *et seq.*, governmental agencies are immune from tort liability when engaged in the exercise or discharge of a governmental function. *Phinney v. Perlmutter*, 222 Mich.App. 513, 549, 564 N.W.2d 532 (1997). In *Hadfield v. Oakland Co. Drain Comm'r*, 430 Mich. 139, 422 N.W.2d 205 (1988), the Court considered whether there was a nuisance exception to governmental immunity. The Court concluded that a limited trespass-nuisance \*470 exception to governmental immunity existed. *Continental Paper & Supply Co., Inc. v. Detroit*, 451 Mich. 162, 164, 545 N.W.2d 657 (1996); *Hadfield, supra* at 145, 205, 209, 213, 422 N.W.2d 205.

Trespass-nuisance is a "trespass or interference with the use or enjoyment of land caused by a physical intrusion that is set in motion by the government or its agents and resulting in personal or property damage." *Continental Paper, supra* at 164, 545 N.W.2d 657; *Hadfield,*

*supra* at 169, 209, 422 N.W.2d 205. To establish trespass-nuisance, a plaintiff must show: (1) condition (nuisance or trespass); (2) cause (physical intrusion); and (3) causation or control (by government). *Continental Paper*, *supra* at 164, 545 N.W.2d 657; *Hadfield*, *supra* at 169, 422 N.W.2d 205. The trespass-nuisance doctrine applies only to state and local governments. See *Cloverleaf Car Co. v. Phillips Petroleum Co.*, 213 Mich.App. 186, 193, 540 N.W.2d 297 (1995).<sup>[1]</sup>

In *Peterman v. Dep't of Natural Resources*, 446 Mich. 177, 205, n. 42, 521 N.W.2d 499 (1994), the Court stated the following with regard to a claim pursuant to the trespass-nuisance doctrine:

*While a governmental entity must have been a proximate cause of the injury, "the source of the intrusion" need not originate from "government-owned land," Li [v. Feldt (After Remand), 434 Mich. 584, 456 N.W.2d 55 (1990)], *supra* at 594, n. 10 456 N.W.2d 55]. Moreover, "[n]egligence is not a necessary element of this cause of action." *Robinson v. Wyoming Twp.*, 312 Mich. 14, 24, 19 N.W.2d 469 (1945). This is true even if an instrumentality causing the trespass-nuisance was "built with all due care, and in strict conformity to the plan adopted by" a governmental agency or department. *Seaman v. City of Marshall*, 116 Mich. 327, 329-330, 74 N.W. 484 (1898).*

This Court is obligated to follow the Supreme Court's decision in *Peterman* until such time as the Supreme Court overrules itself.<sup>[2]</sup> See *O'Dess v. Grand Trunk W.R. Co.*, 218 Mich. App. 694, 698, 700, 555 N.W.2d 261 (1996). Accordingly, the trial court did not err in ruling that plaintiffs did not need to prove negligence as a predicate to establishing liability under the trespass-nuisance exception to governmental liability.<sup>[3]</sup> *Id.*; *Robinson, supra* at 23-24, 19 N.W.2d 469.

Affirmed.

MICHAEL J. KELLY, P.J., concurred.

GAGE, Judge (dissenting).

I respectfully dissent from the result reached by the majority, which accepts strict liability for municipal defendants in trespass-nuisance cases.

First, as a primary matter, the majority opinion correctly indicates that in a note in *Peterman v. Dep't of Natural Resources*, 446 Mich. 177, 205, n. 42, 521 N.W.2d 499 (1994), our Supreme Court stated that negligence was "not a necessary element" of a trespass-nuisance cause of action. However, I believe that the Court's comments in note 42 are \*471 dicta. The Court ultimately found that the trespass-nuisance doctrine did not apply because there was no physical intrusion in that case. *Id.* at 207, 521 N.W.2d 499. Therefore, I believe that we are not obligated to follow the Supreme Court's analysis of the issue in *Peterman* because the note is not "germane to the determination of the parties' respective interests." See *O'Dess v. Grand Trunk W.R. Co.*, 218 Mich.App. 694, 700, 555 N.W.2d 261 (1996).

In the Supreme Court opinion cited in the note, *Robinson v. Wyoming Twp.*, 312 Mich. 14, 19 N.W.2d 469 (1945), the trial court denied the defendant's motion for summary dismissal of the plaintiffs' complaint, denied the defendant's motion for judgment *non obstante veredicto* after a jury found for the plaintiffs, and denied defendant's

motion for a new trial. On appeal, the defendant argued that the plaintiffs were required to allege and prove negligence to establish a *prima facie* case. The Supreme Court disagreed, noting without citation to prior authority, that in a lawsuit alleging trespass, "evidence of negligence on the part of the agents and servants of the defendant was not necessary in order to establish a *prima facie* case. Negligence is not a necessary element of this cause of action." *Id.* at 23-24, 19 N.W.2d 469. However, the *Robinson* Court also quoted from Cooley on Torts (2d ed.), p. 680, the rule that "there is imposed upon a person who collects water in an artificial reservoir an obligation to use care `proportioned to the danger of injury from the escape.' " In determining that the defendant township was not immune from liability, the Court noted: "From the evidence in the case at bar the jury could find that the township of Wyoming had so constructed its park and lake that the flooding of plaintiffs' property was a natural result from surplus water flowing out of the breakthrough in the embankment." *Robinson, supra* at 25, 19 N.W.2d 469. Thus, it does not appear that the Supreme Court in *Robinson* held the township defendant strictly liable for the plaintiffs' damages, despite the often-repeated holding that negligence is not a necessary element of a *prima facie* case of trespass.

Moreover, other opinions from our Supreme Court appear to provide that some element of wrongdoing must be established to find a municipal defendant liable for trespass-nuisance. For example, in *Seaman v. City of Marshall*, 116 Mich. 327, 329-330, 74 N.W. 484 (1898), the Supreme Court noted:

*We are of the opinion that there may be a right of action where an injury results from a sewer, although built with all due care, and in strict conformity to the plan adopted by the council. Such liability is*

*recognized where it is permitted to collect water and discharge it upon the lands of a private person....*

*Upon the uncontradicted testimony, we are able to say that the city of Marshall caused an accumulation of water that would not have occurred but for its street gutters, and that by reason of the inadequacy of the outlet, or its stoppage, this water overflowed the gutter upon plaintiff's premises, to his injury. There is no doubt of the authority of the city to establish a system of drainage for the benefit of the highway and the citizens, and it cannot be said that it must be sufficient for every possible emergency. But the city is required to use due caution, and if, through its negligence in not providing reasonably efficacious means to take care of the water that it should reasonably expect to accumulate by reason of its gutters, a person is injured by the overflow upon his premises of water collected by the sewers, and brought to such premises, and which would not otherwise have invaded them, the city is liable for the damages. [Emphasis added.]*

Similarly, *Herro v. Chippewa Co. Rd. Comm'rs*, 368 Mich. 263, 118 N.W.2d 271 (1962), involves a suit for a wrongful death in which the plaintiff's decedent died in a summer house, which had been upended and hurled into a ravine by rising floodwater after a particularly heavy rainfall. The decedent became trapped in the sand and drowned after the water rose slowly around her. The plaintiff alleged that the defendant, which had completed the installation of a culvert and the reinforcement of roads in the area twenty months before the drowning, \*472 knowingly violated its duty to construct and maintain its roads and culverts to provide adequate drainage of accumulated rainwater to prevent flooding. The Supreme Court, finding that plaintiff had stated an actionable claim, overturned the lower court's grant of summary judgment for the defendant.

I believe that in each of these cases, the Supreme Court found some element of wrongful or tortious conduct by the defendant before establishing liability. Although the cases recognize that there is no governmental immunity when a plaintiff successfully pleads and proves a trespass-nuisance by a public defendant, none of these cases calls for strict liability for a municipal defendant based on the construction of a sewer system or other public works project.


The present case was sent to the jury for damages only. Liability on the part of defendant was presumed under the reasoning adopted by the majority. I would reverse the judgment for plaintiffs on the basis of the trial court's erroneous ruling that plaintiffs did not need to prove any wrongful or tortious conduct to establish defendant's liability. If defendant chooses to pursue an additional appeal, I would urge our Supreme Court to accept its application to resolve the apparent controversy concerning whether a public defendant can be held strictly liable for a trespass-nuisance or whether the plaintiff must establish some level of wrongdoing on the part of the defendant.

## NOTES

[1] A person who is not a governmental agency must intend to intrude upon the private property of another in order to be liable under a trespass theory. *Cloverleaf, supra* at 195, 540 N.W.2d 297. A private actor is not liable for a negligent intrusion onto the property of another. *Id.*

[2] Unlike the dissent, we conclude that we are bound by the rule in *Peterman*. Even if the footnote in *Peterman* is dicta, we believe that the cases cited there bind us to the same rule. See *Robinson, supra* at 23-24, 19 N.W.2d 469. The trespass-nuisance exception to governmental immunity has its roots in the "Taking" Clause of the Michigan Constitution, Const. 1835, art. 1, § 19 through Const. 1963, art. 10, § 2. "Trespassory invasions that stopped short of being 'takings' of property were considered actions for which governmental entities should not escape liability." *Hadfield v. Oakland Co. Drain Comm'r*, 430 Mich. 139, 155, 168-169, 422 N.W.2d 205 (1988) (Brickley, J.).

[3] In most jurisdictions, the liability of a municipality for the damage caused by the clogging of a drain or sewer is predicated in the first instance upon its negligence. Anno: *Municipality's liability for damage resulting from obstruction or clogging of drains or sewers*, 59 A.L.R. 2d 281, 301, § 7[a]. Professor Luke K. Cooperrider criticized the Court's decision in *Robinson, supra*, as blurring the "distinction between the intrusion that is the intended or necessary result of the defendant's act and that which is accidental." Cooperrider, *The court, the legislature, and governmental tort liability in Michigan*, 72 Mich. L. R. 187, 243 (1973).





# Liability Of Cities For Sewer Backups

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August 9, 2012 [Leave a comment](#)

You hear about this all the time. Heavy rains hit, your city's sewer system doesn't do its job, and you suddenly have a swimming pool filled with sewage overflow where your basement used to be. Like anything else involving water damage, that can be a very expensive repair project because you have the cost of cleaning everything up, the cost of repairing any portions of the basement that were ruined by the water, and the cost of replacing any property items that were lost during the flooding. If you have insurance to cover those losses, that's great and the flooding won't have much of an impact on you. But many insurance policies provide minimal coverage in these circumstances, leaving you to pay out-of-pocket for everything that's not covered by insurance.

So do you have any legal rights to recoup your losses in that situation? You do, and there's various options. The obvious choices are to assert legal claims against whatever companies were responsible for designing, constructing, and installing the sewer system or connecting it to your property.

Another possible defendant is the city you live in, and that's what I want to talk about. There are three main theories of liability against cities regarding sewer overflow damage: (1) negligent design or construction of the sewer system; (2) negligent inspection, including granting of permits or licenses, of the sewer system; and (3) negligent maintenance, repair, or operation of the sewer system.

The first category, negligent design or construction of a sewer system, is a very difficult claim to make. Iowa Code 670.4(8) provides cities with broad immunity for sewer design or construction liability on “[a]ny claim based upon or arising out of a claim of negligent design or specification, negligent adoption of design or specification, or negligent construction or reconstruction of a public improvement . . . or other public facility that was constructed or reconstructed in accordance with a generally recognized engineering or safety standard, criteria, or design theory in existence at the time of the construction or reconstruction. A claim . . . shall not be allowed for failure to upgrade, improve, or alter any aspect of an existing public improvement or other public facility to new, changed, or altered design standards.” A sewer system is considered a “public improvement.” Iowa’s courts have stated that a violation of engineering or safety standards existing at the time the sewer system was constructed must be proved or the city is immune.

The second category, negligent inspection and licensing and permits, is frequently implicated when a city is accused of negligently granting a building permit or something similar during a construction project. Two laws govern those types of cases. Iowa Code 670.4(9) provides that cities cannot be sued on “[a]ny claim based upon an act or omission by an officer or employee of the municipality or the municipality’s governing body, in the granting, suspension, or revocation of a license or permit, where the damage was caused by the person to whom the license or permit was issued, unless the act of the officer or employee constitutes actual malice or a criminal offense.” Iowa Code 670.4(10) confers immunity to cities from “[a]ny claim based upon an act or omission of an officer or employee of the municipality, whether by issuance of permit, inspection, investigation, or otherwise, and whether the statute, ordinance, or regulation is valid, if the damage was caused by a third party, event, or property not under the supervision or control of the municipality, unless the act or omission of the officer or employee constitutes actual malice or a criminal offense.”

Iowa Code 670.4(10) and its statutory predecessors have made regular appearances in lawsuits against cities in which a third party causes physical injuries or property damage and the injured party seeks to blame the city for essentially failing to prevent the problem. Much of the fight in those cases concerns the “supervision or control” component of Iowa Code 670.4(10) because, if the city did not have supervision or control, then the injured party must meet the almost impossible burden of proving that the city acted with actual malice or committed a crime. So establishing a right to go after a city for regular negligence because it had supervision or control is essential.

The third and final category of city liability for sewer overflows is negligence in the maintenance, repair, or operation of a sewer system. In this category, cities are treated like any other property owner and have a duty to maintain their property (the sewer system) so that it does not injure anyone. Common examples in this category are claims for obstructions in sewers or failing sewers that are allowing seepage, overwhelming the system, and increasing the chance of an overflow. The city will be liable if the injured party can prove that the city negligently addressed the obstruction or the failing sewer.

As you can see, negligence claims against cities for sewer overflow flooding and damages are complicated and require a carefully nuanced legal approach. This is an area where the legal manner in which you present your claim can have a substantial impact on your city’s potential liability for the flooding damage to your home. If you approach your claim from the wrong legal direction, you will likely run into one or more of the city’s immunities, summarized above, and have your case dismissed by the judge before you ever get to trial. Please feel free to contact me if you’d like me to review a possible legal matter involving your city’s sewer system.

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Liability for Sewer Back-Ups

## **Liability for Sewer Back-Ups**

### **Summary:**

MTAS was asked whether a municipality is liable for sewer back-ups that cause damage to private property.

### **Original Author:**

Hemsley, Sid

**Date Created:** Friday, March 25, 2011

**Legal Opinion(s):** Liability for sewer backups public.docx (1)  
**Reference Document(s):**

## MEMORANDUM

TO: MTAS Utilities Consultant

FROM: Sid Hemsley, Senior Law Consultant

DATE: March 25, 2011

RE: Liability for sewer back-ups

You have the following question: Is a municipality liable for sewer back-ups that cause damage to private property?

The answer is yes, but only with respect to back-ups caused by problems in the municipal sewer system. Where the sewer problem lies in the property owner's sewer lines (except where that problem might be caused by problems in the municipal sewer system), the property owner would be liable for such problems. But as will be seen below, even where the sewer back-up problem at issue occurs in the municipal sewer system, municipalities are immune from suit except where that immunity has been removed under the Tennessee Governmental Tort Liability Act (TGTLA), and under that Act, municipal liability for sewer back-ups is limited by the terms of that Act, and those limitations are quite strict.

As far as I can determine, there are two provisions of the TGTLA under which municipal liability for sewer back-ups is possible:

- Tennessee Code Annotated, § 29-20-204 (Removal of immunity for injury from dangerous structures).
- Tennessee Code Annotated, § 29-20-205 (removal of immunity for injury caused by negligent act or omission of employees).

Sewer back-ups have also produced cases based on allegations of nuisance and the taking of property.

There are few cases involving liability for sewer back-ups that have made their way up to the Tennessee Court of Appeals and the Tennessee Supreme Court. Those that have made it that far have been treated quite roughly by those courts, generally because of the failure of those cases to comply with basic TGTLA legal principles, such as notice and the statute of limitations, or by selecting the wrong remedy. Presumably, many sewer back-up incidents cases are routinely handled by local governments, or the "cases" they become are otherwise disposed of by the trial courts.

## **Proper notice of the problem to the city is required under § 29-20-204**

In Smith v. City of Covington, 734 S.W.2d 327 (Tenn. Ct. App. 1987), Smith sued the city for an injunction to abate an alleged nuisance caused by intermittent sewerage back-up in his restaurant, and for the damages the back-ups caused his restaurant, including its loss of profits, etc. The back-ups had started before April 12, 1983, but Smith had appeared before the Covington Board of Mayor and Aldermen on that date to discuss the sewer back-up problem on his property. The trial court dismissed Smith's claims against the city, holding that Smith had failed to give written notice to the city of the sewer back-up problems, as required under the Tennessee Governmental Tort Liability Act (TGTLA).

The Court of Appeals upheld the trial court, declaring that suits against governments on the basis of nuisance are encompassed by the TGTLA. What the Court said about the application of the TGTLA is worth repeating at length:

The Tennessee Governmental Tort Liability Act expressly provides that except as allowed by the Act all governmental entities are immune from suit from any injuries resulting from the activities of the entity in the exercise of *any* of its functions. [The Court's emphasis.] T.C.A. § 29-20-201 (980) Actions against governmental entities for damages on the theory of liability historically labeled nuisance are included in and covered by the act. *Collier v. Memphis Light, Gas & Water Division*, 657 S..2d 771 (Tenn. App. 1983).

The case at bar falls into the category of cases covered by T.C.A. § 29-20-204 which states....:

(a) Immunity from suit of a governmental entity is removed for any injury caused by the dangerous or defective condition of any public building, structure, dam, reservoir or any public building improvement owned and controlled by such governmental entity.

(b) Immunity is not removed from latent defective conditions, nor shall this section apply unless constructive and/or actual notice to the governmental entity of such condition be alleged and proved in addition to the procedural notice required by § 29-20-302.

Paragraph (b) of the statutes mentions two types of notice in cases coming under this statute, one of which is the procedural notice referred to in T.C.A. § 29-20-302, which was the basis of the trial court's judgment for the city. [This statute was repealed by Public Acts 1987, Chapter 407, but the notice requirement below is still a part of § 29-20-204(b)].

The other provision of paragraph (b) involves the knowledge of the governmental entity that there is a dangerous or defective condition of its instrumentality. The legislature specifically made the removal of immunity under this statute conditional upon allegation and proof that the entity knew or should have known of the condition of its instrumentality causing the damages complained of. Thus, if the plaintiff is unable to prove that the entity had actual or constructive notice of the defective condition the entity is immune from suit. In this case the trial court found that there was no notice to the city prior to the April 12, 1983, Board of Mayor and Aldermen meeting .... Thus, the removal of immunity provided by 29-20-204 does not apply "for any injury caused by the ... defective condition" of the sewer prior to April 12, 1983.

But as the Court took care to point out, "*The city would not be immune for suit for the subsequent recurrences [of the sewer back-ups] because of their knowledge acquired on April 12, 1983.*" [At 329] [Emphasis is mine.]

The same result was reached in Lee v. City of Cleveland, 859 S.W.2d 347 (Tenn. Ct. App. 1993) (Permission to appeal to Tennessee Supreme Court denied July 6, 1993). There, a sewer back-up also caused damage to Lee's business. Citing Smith v. City of Covington, above and other cases, the court held that there was no allegation in Lee's complaint that the city had actual or constructive notice of the defective sewer.

### **Negligence of municipal employee/s must be alleged for suit brought under § 29-20-205**

In Lee v. City of Cleveland, above, Lee's suit alleged that the city "failed to exercise due care to maintain the [sewer] system....", and that the city had failed "to adequately design, install or maintain the sewer system..." [At 348] But the Court declared that Tennessee Code Annotated, § 29-20-205 provides that:

Immunity of suit for all governmental entities is removed for injury proximately caused by a negligent act or omission of *any employee within the scope of his employment ...* [At 348] [Emphasis is the Court's.]

The complaint was defective on this point, declared the Court, because:

In Gentry v. Cookeville General Hosp., 734 S.W.2d 337 (Tenn. App. 1987), the Middle Section of this Court stated:

A complaint against a governmental entity for tort must overtly allege that the tort was committed by an employee or employees of the governmental entity within the scope of his or their employment. A complaint which does not so state a claim for which relief can be granted because the action is not alleged to be within the class of cases exempted by the statute from governmental immunity. [At 348]

However, apparently notice to the local government of a defective sewer would not be necessary when the plaintiff complaining of damages from a sewer back-up alleges the sewer back-up was caused by the negligence of a local government employee or employers. It was held in Morrow v. Town of Madisonville, 737 S.W.2d 547 (Tenn. Ct. App. 1987), with respect to Morrow's injury by falling when the meter cover over which she was walking tilted, that the notice requirement contained in § 29-20-203 [notice requirement for injuries from defective, unsafe or dangerous streets] was not applicable because "The evidence establishes plaintiff's injuries were due to a city employee's negligence and not a dangerous or defective condition of the sidewalk. The applicable statute is T.C.A., § 29-20-205 ...." ["Immunity from suit ... is removed for injury proximately caused by the negligent act or omission of any employee within the scope of his employment..."] [At 547]

### **One Year statute of limitations under TGTLA generally**

Another business was damaged by a sewer back-up in Shaw v. Cleveland Utilities Water Division, 2009 WL 4250157 (Tenn. Ct. App.), on August 30, 2005. Shaw did not sue Cleveland Utilities until almost three years later, on August 6, 2008. By the time Shaw filed suit against Cleveland Utilities, the city's insurance company, GAP, had already paid a part of the claims, including some clean-up costs by Servpro. The Court noted that, "The plaintiff's affidavit asserted that both Cleveland Utilities and GAB [Cleveland Utilities insurer] held GAB out as the insurer. The plaintiff also asserted, "they approved my claim." The plaintiff later argued that his complaint was that, "They [GAP] had made an agreement. It's a lawsuit to enforce their agreement to meet the damages in this case." [At 3]

While the Court complimented the plaintiff on that "brilliant legal argument," it rejected it, declaring that there was no contract in the case, the only cause of action being under the TGTLA. The Court declared that

As a governmental entity, Cleveland Utilities is immune from suit except as expressly provided for in the TGTLA. Tenn. Code Ann. § 29-20-201 (Suppl 2009); *Doe v. Coffee County Board of Edu*, 852 S.W.2d 899, 906 (Tenn. Ct. App. 1992). To the extent a claim can be brought against Cleveland Utilities, it must be "brought in strict compliance with the terms of the GTLA..." [At 4]

There were two defects in the plaintiff's suit continued the Court. The first defect was that:

To the extent the complaint is construed to allege liability on the part of Cleveland utilities for damages after the fact of the sewer overflow based upon persons who were the "agents" of Cleveland Utilities but not the employees of Cleveland Utilities, immunity is not removed and the complaint fails as a matter of law. *See Lee v. City of Cleveland*, 859 S.W. 2d 347, 348 (Tenn. Ct. App. 1993) (must overtly allege that the sewer overflow was the result of the negligent act of an employee acting within the scope of employment to place the claim with the "class of cases excepted by the statute) ...." [At 4]

The second defect was that:

To the extent the complaint is construed to allege that the damage was caused by the negligent act of an employee of Cleveland Utilities, it was untimely unless "commenced within twelve (12) months after the cause of action [arose]." Tenn. Code Ann. § 29-20-305 (b). [At 4]

The only employee mentioned in the plaintiff's complaint was a David Orr, who had acted as a go-between for Cleveland Utilities, Shaw and GAP, the last time apparently in early May, 2007, when he promised Shaw he would call GAP and make it resolve Shaw's claim. But on May 7, 2007, Shaw received GAP's letter explaining that it had closed its file on the claim. That date, concluded the Court, was the last date any cause of action for Shaw arose, which was still past the one year statute of limitation.

The Court also held that the one year statute of limitations that applies to cases brought under the TGTLA does not apply to other parties, in this case to GAP and to Servpro, but held that it was one year under other statutes. The statute of limitations also applied to



Servpro and to GAP, held the Court.

### **Nuisance and taking of property**

We saw in Smith v. City of Covington, above, that it has been held that sewer back-ups that have been brought on nuisance grounds are handled under the TGTLA. However, that appears not to be true where the suit is brought as an inverse condemnation or as a nuisance type taking. In Edwards v. Hallsdale-Powell Utility District, 15 S.W.3d 461 (Tenn. 2003), two property owners whose homes were flooded by sewer-back-ups at least twice claimed their value of their homes had been reduced to zero and had resulted in a taking of their property.

The Court rejected their claims. It acknowledged that Tennessee had an eminent domain and inverse condemnation statutes, found at Tennessee Code Annotated, §§ 29-16-101 to 29-16-127, and 29-17-101 to 29-17-1201, and that:

“Inverse condemnation” is the popular description for a cause of action brought by a property owner to recover the value of real property that has been taken for public use by a governmental defendant even though no formal condemnation proceedings under the government’s power of eminent domain have been instituted.... [At 465]. [Citations omitted by me.]

There were two such kinds of inverse condemnations, continued the Court: “Physical occupation takings,” and “nuisance type takings.”

The reason the Court rejected the Edwards’ claim was that:

To constitute a taking under either line of cases, however, some action on the part of the governmental defendant is required. As we have held, a taking occurs when a governmental defendant with the power of eminent domain performs “*any action ... which destroys, interrupts or interferes with the common and necessary use of real property of another.*” Vrandenberug, 545 S.W.2d at 735 emphasis added [by Court]. In each of the cases in which this Court has found that a taking has occurred, the governmental defendant performed a *purposeful or intentional act* for the public good that resulted in damage to a plaintiff’s property or property rights.... [At 466]

Citing case law from Tennessee and other states, the Court concluded that:

In the present case, the damage to the plaintiff’s property was not caused by a purposeful or intentional act of HPUD. In their claim for inverse condemnation, the plaintiffs allege that the “defendant has ruined and therefore taken their homes as a result of the sewerage overflow.” The plaintiffs do not allege, however, that HPUD performed any purposeful act that resulted in damage to their homes. The backup was most likely caused by tree roots entering the line, not by any purposeful or intentional act on the part of HPUD. *If the backup was caused by the failure of HPUD to meet its obligation to operate and maintain its sewer system as alleged, its failure would constitute negligence, not a taking.* [At 466] [Emphasis is mine.]

Indeed, this case was “remanded to the trial court on the plaintiff’s remaining claims under

the Governmental Tort Liability Act.” [At 467]

The above cases reflect sewer back-up cases that have been resolved by the Tennessee Supreme Court and the Tennessee Court of Appeals. They may give one a distorted view of the ultimate fate of most sewer back-up cases. Most of them may be resolved by local governments before they ever reach the courts, and many of those that become cases may be finally resolved by the trial courts. What the above cases probably do show is that most cases brought under the TGTLA generally, and most sewer back-up cases in particular, are resolved by Tennessee’s higher courts by a strict reading and application of the TGTLA. If that is true, that fact is bound to influence how local governments and their insurers themselves approach such cases.

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# What's In The Pipe? Municipal Liability for Flood and Sewage Back-Up Claims

[www.mcinnescooper.com](http://www.mcinnescooper.com)

## Publication

May 2, 2014

By David Graves, at McInnes Cooper

April showers bring ... flood and sewage back-up claims. Flooding and sewage back-up can result in significant damage for municipal ratepayers, so ratepayers place a high value on municipal water and sewer services. And when there's a problem, they quickly look to the municipality to make good any damage or loss.

The best way for a municipality to minimize liability exposure for flood and sewer claims is to understand the most significant risks it faces - and the key defences available to it. Here are the three most common claims and three most common defences.

## CLAIMS

A home or business owner who experiences damage related to water or sewer, or her insurer, sometimes sues the municipality. The three most common types of claims are:

**Negligence.** Negligence claims by homeowners and businesses against municipalities for sewer backup and overland flooding are the most common. Court decisions demonstrate that proper maintenance

is important for municipalities to avoid liability, particularly in cases of a known or foreseeable risk.

For example, in one case a business flooded during a heavy rainfall and the owner sued the municipality. The court decided the municipality failed to both remove debris from a nearby catch basins and pipes and to install a curb to prevent water from flowing across a piece of land and onto the owner's property. The court concluded the municipality was negligent.

**Environmental Legislation.** Environmental legislation (for example, the NS *Environment Act*) typically:

- prohibits a person (including a municipality) from releasing a substance (which includes sewage or wastewater) that may cause an "adverse effect" on the environment; and
- imposes a corresponding duty to report and remediate the release of such substances.

A conviction under the legislation can lead to civil liability: in a civil claim for resulting damages, proof of conviction can be used as evidence that the municipality was negligent. Legislation might give a municipality a statutory defence against claims for damages arising from failure in its inspection system – but the municipality may still be liable for the potentially significant costs of remediation measures.

**Negligent Approvals.** Municipalities are also exposed to liability for negligently issuing approvals.

For example in one case a municipality knew a piece of land was only marginally stable, but still issued a development permit. The land owner breached certain conditions in the permit, including that he refrain from installing a certain type of irrigation system. Part of his yard collapsed into an abutting ravine, and his house was damaged. He sued the municipality. The court decided the municipality owed a special duty to ensure the owner was aware of the risks of using the prohibited irrigation system – and was 35% liable for the damage.

## **DEFENCES**

When a municipality is sued, it has some unique defences available to it because it's a public body. The three most common are:

**Policy Decision.** A municipality is immune from liability if it made a policy – as opposed to an operational – decision:

- Policy decisions are those dictated by financial, economic, social, or political constraints and are usually made by a municipal council. A municipality is not liable for policy decisions.
- Operational decisions are those based on administrative direction, expert/professional opinion, or technical standards. A municipality does owe a duty of care for operational decisions – and therefore may face liability for them.

In one case snowmelt couldn't drain into the municipality's catch basin because of ice and snow. Instead, it ran into a person's driveway – and basement. The person sued the municipality. The municipality argued that it would be too costly to keep every catch basin in the municipality fully operational at all times, and it had followed its policy for inspections. The court decided this was a policy decision, and the municipality could not be held liable.

**Statutory Authority.** A municipality might also avoid liability by relying on the defence of statutory authority. This defence requires that a statute not only authorize the municipality to do something but also authorize the way it is to be done. However, if a statute authorizes the municipality to do something – but not how to do it – then it can be liable for damages if it could have done the authorized thing in a way that avoided damage to others.

**Statutory Immunity.** Partly as a reaction to court decisions that tended to increase municipal liability, several Provinces have amended municipal statutes to provide immunity from certain claims, other than negligence. The result is a municipality simply can't be

sued for these claims. For example, the NS *Municipal Government Act* includes statutory immunities for liability:

- arising from a system of inspections unless performed negligently
- arising from the breakage of a pipe, conduit, pole, wire, cable or party of a utility or service
- for failure to provide a service or the manner of providing a service, unless the municipality failed to meet a certain standard determined by financial , economic and other consideration
- for failure to maintain a public place unless it has notice of a state of disrepair
- for failure to enforce a bylaw unless the decision is made in bad faith
- for sewer and water overflow as a consequence of snow, ice, or rain
- for damages caused by wastewater facilities, storm water systems, supply water systems, or from the discharge of sewage from a municipal sewer unless it was caused by poor construction or neglect in maintenance

Courts do tend to construe these defences narrowly. For example, in one case, there was statutory immunity against damages for a sewer system's breakdown or malfunction. Gravel built up in a sewer causing it to back-up and flood. A homeowner successfully sued the municipality: the court decided there was neither a "breakdown" nor a "malfunction" of the sewer system, but rather a failure to maintain it.

### **KEEPING THE PIPES CLEAN**

Municipalities will likely continue to face liability exposure from flooding and sewage backup claims given the importance of water and sewer service to municipal ratepayers, the significant damage that can occur, and the perception that municipalities have deep

pockets. Minimizing this exposure is challenging. The best starting point is:

- understanding the primary sources of liability and defences;
- encouraging municipal councils to make decisions to take advantage of the a policy defence; and
- taking care when issuing approvals.

Knowledgeable legal counsel can help municipalities take these steps and minimize exposure.

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## Municipal Liability for Property Damage Caused by Flooding

**Andrea M. Alonso and Carl S. Sandel**

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The aftermath of Hurricane Irene in 2011 has given rise to a substantial increase in the number of lawsuits seeking to hold municipalities liable for property damage caused by flooding. In many cases the doctrine of sovereign immunity and the fact that flooding usually occurs after a supervening event outside of the municipality's control (such as a hurricane) may bar the plaintiff from recovery. This article explores the viability of the claims and defenses characteristic of cases brought against municipalities seeking to recover damages caused by flooding.

### Sewer Systems

In determining what types of negligence claims are available relating to damages caused by municipal sewer systems, New York courts distinguish between claims based on the design of the sewer system and accidents stemming from negligent maintenance or construction of the sewer system.

New York courts have adopted the distinction established by the U.S. Supreme Court in *Johnston v. District of Columbia*.<sup>1</sup> In *Johnston*, the court held that:

The duties of the municipal authorities, in adopting a general plan of drainage, and determining when and where sewers shall be built, of what size and at what level, are of a quasi judicial nature, involving the exercise of deliberate judgment and large discretion \*\*\* [which] is not subject to revision by a court or jury in a private action for not sufficiently draining a particular lot of land.<sup>2</sup>

The court did recognize that a municipality could be held liable for damages caused by the negligent construction or repair of a sewer system because these municipal actions were ministerial as opposed to legislative:

But the construction and repair of sewers, according to the general plan so adopted, are simply ministerial duties; and for any negligence in so constructing a sewer, or keeping it in

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repair, the municipality which has constructed and owns the sewer may be sued by a person whose property is thereby injured.<sup>3</sup>

New York courts have repeatedly dismissed plaintiffs' claims that a municipal sewer system was poorly designed, or that it had too small a capacity to prevent flooding after a heavy rainfall.<sup>4</sup> However, plaintiffs may recover for damage caused by flooding if they can establish that a sewer system suffers from construction defects or has been inadequately maintained.

Because of the difficulty of establishing that a potentially decades-old sewer system was defectively constructed, virtually all flood damage plaintiffs have sought instead to establish negligent maintenance on the part of the municipal defendant. Municipal defendants have typically been able to obtain summary judgment on these negligent maintenance claims if they can demonstrate that they conduct routine maintenance and inspection of their sewer system and the plaintiff proffers no evidence to the contrary.<sup>5</sup> In contrast, evidence that, prior to the flooding, the sewers were visibly filled with large debris which had seemingly accumulated over a long period of time was sufficient to rebut evidence of regular inspections and raise a triable issue of fact in *Pet Products v. City of Yonkers*.<sup>6</sup>

In *Holmes v. Incorporated Village of Piermont*, engineering reports noting serious deterioration of the town's system coupled with the testimony of a plaintiff that he observed sewage in his driveway in the wake of Tropical Storm Floyd was sufficient to create a triable issue of fact regarding the plaintiff's negligent inspection claims.<sup>7</sup>

Evidence that a municipal defendant had actual notice of a blockage in its sewer systems but failed to take action between the receipt of the notice and the flooding of the plaintiffs' property may also be sufficient to overcome a defendant's summary judgment motion.<sup>8</sup>

One additional wrinkle in pending cases involving claims of negligent performance of ministerial governmental actions is the potential impact of the Court of Appeals' recent decision in *McLean v. City of New York*.<sup>9</sup> In *McLean*, a decision of tremendous import to municipal defendants, the Court of Appeals held that a governmental agency was not liable for the negligent conduct of its officers absent the existence of a special duty between the governmental entity and the plaintiff.<sup>10</sup> Since many lower courts did not require the establishment of a "special relationship" as a prerequisite to holding municipalities liable for negligent conduct prior to *McLean*,<sup>11</sup> municipal defendants are likely to argue that the cases holding municipalities liable for negligent inspection of their sewer systems are no longer good law.

### **Water Main Breaks**

Plaintiffs have also sought to hold municipalities liable for damages caused by burst water mains. Although municipalities have a duty to exercise care in the maintenance of their water main system, courts have been mindful of the practical problems inherent in maintaining a large network of underground pipes. In *Gillette Shoe Company v. City of New York*, the

plaintiffs attempted to hold New York City liable for negligent maintenance of an approximately 75-year-old water main which broke, resulting in property damage.<sup>12</sup> The plaintiffs' expert concluded that the pipe had been weakened based on the presence of a type of bacteria which was present in the surrounding soil.<sup>13</sup> The expert contended that the bacteria could have been detected via the placement of cast iron "coupons" in the soil surrounding the water main.<sup>14</sup> These coupons, once removed, would indicate if the bacteria were present in the soil.<sup>15</sup>

The First Department reversed a jury verdict for the plaintiffs and directed judgment in favor of the defendants, finding that the plaintiffs' proposed method of inspection was impracticable because it would effectively require the city to periodically unearth its entire piping system to perform the tests.<sup>16</sup> The court concluded that liability could be maintained only where the city had some warning of a possible defect in a specific portion of its underground piping.<sup>17</sup> Accordingly, plaintiffs seeking to establish that an inaccessible underground water main was negligently inspected should be mindful of the practical impediments they face if their claims would place upon a municipality the duty to periodically inspect a large network of inaccessible underground pipes.

Municipalities may still be held liable for water main breaks if the plaintiff can establish that inspections were performed negligently a short time before the break occurred. In *K&S Realty v. City of New York*, the city conducted inspections of a water main months before that water main broke.<sup>18</sup> The inspectors had, but elected not to use, ground microphones designed to detect leaks.<sup>19</sup> Despite finding that the use of microphones was discretionary and that there was no special duty to the plaintiffs, the First Department upheld a jury verdict for the plaintiffs, holding that the city was acting in a proprietary capacity as a water vendor rather than in its governmental capacity.<sup>20</sup>

### **Res Ipsa Loquitur**

Some plaintiffs with flooded basements have tried to prevail on *res ipsa loquitur* theories of liability, with mixed results. In *Bierniacki v. Village of Ravena*, the Third Department reversed the denial of the municipal defendant's summary judgment motion.<sup>21</sup> The court held that plaintiff's *res ipsa loquitur* argument based on the plaintiff's speculative lay testimony and the proximity of a municipal pipe near the basement was insufficient to raise a triable issue of fact in the absence of any expert analysis as to the source of the water in the plaintiff's basement.<sup>22</sup>

In contrast, in *Pickersgill v. City of New York*, the court allowed the plaintiff to establish negligent sewer maintenance via a *res ipsa loquitur* theory of liability based on his testimony that water had "backed up" into his basement through the pipes which connected his home with the defendant's sewer system during a storm.<sup>23</sup> The court concluded that this backup could not have occurred but for the town's negligent maintenance.<sup>24</sup>

Given the possible inconsistency between *Pickersgill* and *Biernacki*, the viability of proving negligence solely via a *res ipsa loquitur* argument remains in doubt.

Plaintiffs who seek to establish municipal negligence based on a municipality's failure to remove a blockage from its drainage system face an additional hurdle to recovery in the form of statutes requiring that the city be provided with written notice of the obstruction before it can be held liable for failure to remove the blockage. For example, New York Village Law §6-628 immunizes villages from liability stemming from an out-of-repair or obstructed culvert unless written notice was given to the village clerk prior to the incident and the village failed to respond to this notice in a reasonable period of time. Courts have adopted a broad definition of the statutory term "culvert," defining it as "a conduit or tunneled drain conveying water across or beneath street or highway."<sup>25</sup>

### **The 'Act of God' Defense**

Since flooding typically occurs after a significant rainfall, most defendants in flooding cases invoke the "act of God defense." Under this common law affirmative defense, defendants will be exempt from liability if they can demonstrate that the plaintiff's property damage was caused by a natural event outside of human control.<sup>26</sup>

While this defense may seem attractive to municipal defendants in flooding cases, New York courts have construed the act of God defense narrowly in recent decisions. In *Pickersgill*, the court rejected the defendant's claim that heavy rainfall, an "act of God," led to the backup of the municipal sewers into the plaintiff's basement. The court noted that "in order to invoke the Act of God theory of defense the city must establish that the weather conditions were so extraordinarily harsh as to not be anticipated by reasonable design engineers of the sewers."<sup>27</sup> The heavy rainfall prior to the flooding of plaintiff's basement was deemed insufficient to meet this standard.

In *Prashant Industries v. State*, the Third Department applied a scientific approach when rejecting the defendant's "act of God" defense.<sup>28</sup> The court concluded that the storm produced a water flow of 300 cubic feet per second.<sup>29</sup> It then compared this figure to a "five year storm," (the most intense storm to occur in a typical five-year period), which would produce an estimated 580 cubic feet per second of water.<sup>30</sup> This led the court to conclude that the storm in question was "by no means extraordinary and unprecedented," leading to the rejection of the "act of God" defense.<sup>31</sup>

Accordingly, attorneys relying on the act of God defense should be prepared to present the court with meteorological evidence establishing the unique or extraordinary features of the rainfall in question. This showing may be possible in cases stemming from damage caused during Hurricane Irene, one of the most damaging hurricanes in U.S. history, but may not be available in lesser acts of God.<sup>32</sup>

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**Endnotes:**

1. See *Biernacki v. Village of Ravena*, 664 N.Y.S.2d 682, 683 (3rd. Dept. 1997).
2. *Johnston v. District of Columbia*, 118 U.S. 19, 20-21 (1886).
3. *Id.*
4. See e.g., *Biernacki*, *supra* at 683.
5. *Briga v. Town of Binghamton*, 778 N.Y.S.2d 545, 545-546 (3d Dept. 2004).
6. 736 N.Y.S.2d 699 (2d. Dept. 2002).
7. *Holmes v. Incorporated Village of Piermont*, 863 N.Y.S.2d 774 (2d. Dept. 2008).
8. *De Witt Properties v. City of New York*, 44 N.Y.2d 417, 424 (1978).
9. 12 N.Y.3d 194 (2009)
10. *McLean*, *supra*, at 199.
11. *Signature Health Center v. State*, 902 N.Y.S.2d 893, 906-907 (N.Y. Ct. Cl., 2010).
12. 86 A.D.2d 522 (1982)
13. *Id.* at 523.
14. *Id.*
15. *Id.*
16. *Id.*
17. *Id.* at 524 [citing *DeWitt Properties v. City of New York*, 44 N.Y.2d 417, 424 (1978)].
18. 304 A.D.2d 349 (1st Dept. 2003).
19. *Id.*
20. *Id.* at 350.
21. *Id.* at 683-684.
22. *Id.*
23. *Pickersgill v. City of New York*, 642 N.Y.S.2d 469, 471 (Civ. Ct. Queens Cty. 1996).
24. *Id.*
25. *DiLorenzo v. Village of Endicott*, 333 N.Y.S.2d 456 (Sup. Ct., Broome Co. 1972).
26. See generally, *Memphis & Charlestown RR v. Reeves*, 77 U.S. 176 (1870) (recognizing that common carriers are not liable for unforeseeable forces of nature).
27. *Pickersgill*, 642 N.Y.S.2d, 469, 470.
28. *Prashant Enterprises v. State*, 614 N.Y.S. 2d 653, 654 (3d Dept. 1994).
29. *Id.* at 654.
30. *Id.*
31. *Id.*
32. [http://en.wikipedia.org/wiki/Hurricane\\_Irene](http://en.wikipedia.org/wiki/Hurricane_Irene)

# Water, Water Everywhere: Is a Municipality Liable for Damages Caused by a Leak in Its Water Supply System?

By Karen M. Richards

In many communities, water supply systems are provided by a municipality. Leaking water supply systems can cause various types of property damages. This article explores a municipality's liability for such damages.



## Governmental/Proprietary Functions

In determining a municipality's liability for damages, courts have examined "the specific act or omission out of which the injury is claimed to have arisen and the capacity in which that act or failure to act occurred."<sup>1</sup> In other words, was the municipality acting in a governmental or proprietary capacity when it engaged in the allegedly negligent activity?

A proprietary function "is undertaken when governmental activities essentially substitute for or supplement traditionally private enterprises."<sup>2</sup> When acting in a proprietary capacity, a municipality is held to the same duty of care as private individuals and institutions engaging in the same activity.<sup>3</sup> A municipality is not entitled to the defense of governmental immunity when it is engaging in a proprietary function, and accordingly, a plaintiff does not have to establish a "special relationship" with it in order to successfully commence an action against the municipality.<sup>4</sup>

In claims for damages caused by a municipality's water supply system, courts generally have found that the "maintenance and repair of water mains is traditionally performed by private businesses, such as water companies, and thus, where a municipality maintains a water system to provide water to private customers, it constitutes a proprietary function."<sup>5</sup> This is illustrated in *D & D of Delhi, Inc. v. Village of Delhi*, where a village employee turned a shutoff valve believing it would stop the flow of water through the main line and help isolate the water break.<sup>6</sup> Instead, the water flowed into the plaintiff's store causing substantial property damage. The court rejected the village's contention that the complaint should be dismissed on the basis of governmental immunity because it found that the village's maintenance and repair of water mains constituted a proprietary function.

The same finding of a proprietary function occurred in *K & S Realty Co. v. City of New York*, where a city crew had inspected the main for leaks months before a 48-inch water main broke and flooded nearby properties.<sup>7</sup> The inspection for leaks "was prompted principally by the desire to avoid waste of a commodity, i.e. water."<sup>8</sup> The court found the plaintiff's claim was actionable, even in the absence of a special duty running from the City to the plaintiffs, since the decision made by the City to inspect for leaks "was conducted by the City acting proprietarily as a water vendor rather than in its governmental capacity as a protector of the public health and safety."<sup>9</sup>

On the other hand, the protection and safety of the general public pursuant to the general police powers is a governmental rather than a proprietary function.<sup>10</sup> When a municipality acts in a governmental capacity, it will only be held liable for injuries resulting from its negligent performance when a "special relationship" exists between it and the injured party.<sup>11</sup>

A municipality's construction, installation, and extension of a water system have been found to be governmental actions because these functions are necessary for the preservation of public health and safety.<sup>12</sup> Therefore, where it is alleged that negligence occurred during the construction, installation, or extension of a water system, liability can only attach if the plaintiff can establish a special relationship with the municipality.<sup>13</sup>

Continuing to utilize the governmental/proprietary distinction in claims involving a municipal water supply system has come under criticism. While supplying water may have historically been undertaken by private agencies,

[i]n this day and age, municipal water corporations have flourished to the relative exclusion of private utilities. Moreover, in our modern, complex urban civilization, it is readily apparent that the supplying of water by a municipality is as immediately and directly related to the health, safety and welfare of its inhabitants as is the construction of sewers which are all but universally regarded as governmental.<sup>14</sup>

Despite this criticism, New York courts have yet to abolish this distinction in actions involving a municipi-

pal water supply system, although the governmental/proprietary distinction has been abolished in other areas of the law, such as zoning.<sup>15</sup>

### Reasonable Care

Although the distinction between governmental and proprietary functions has been questioned, there is no question that courts in New York have long recognized that a municipality is not an insurer of its water system. A municipality, therefore, cannot be held liable for injury unless it is shown that the injury was caused by negligent construction or subsequent maintenance.<sup>16</sup> All that is required of a municipality in the construction or maintenance of its water system is reasonable care.<sup>17</sup>

Reasonable care was exercised in *Biancanello v. Town of Colonie*. The plaintiff alleged that the town, despite notice of a leak, had negligently permitted a leak in a water main to continue for three months, causing water to accumulate in the cellar of the plaintiff's house.<sup>18</sup> In response to first being told of a leak, the town's employees inspected a hydrant and the surface of the ground adjacent to the premises above the pipe leading into the house, which was the usual and customary method of examination. If a leak existed, it would ordinarily appear on the surface of the ground, but no evidence of a leak was visible. When the employees made another inspection a few weeks later, they excavated around the hydrant down to the bottom of the line. Again, no leak was detected. The court found that the town employees responded whenever notice was given and employed the usual tests to discover a leak, and "[t]hey were not required to do more in the exercise of reasonable care."<sup>19</sup> To hold otherwise and "require them to excavate to a point where the leak was finally discovered when the application of customary tests failed to show any evidence of a leak" would have impermissibly made the town an insurer of its water system.<sup>20</sup>

In the exercise of reasonable care, a municipality is not expected or required to regularly unearth its entire system to detect a leak or inspect its system because imposing such a duty upon a municipality "is obviously impractical and would undoubtedly create new hazards."<sup>21</sup> There is, however, an obligation to exercise reasonable care when there is some warning of a possible defect. Often, upon being notified of a leak, a municipality's liability for damage caused by its water supply system is predicated on its response to the notice. Failure to act promptly and efficiently can result in liability for damages caused by a municipality's inaction, which is what occurred in *Rochester Gas and Electric Corp. v. City of Rochester*.<sup>22</sup> When the utility's contractor noticed significant water seepage from three places along the city's water main, which was exposed by the utility while placing its electrical conduits in

the ground, it reported the leaks to the city. Despite this actual knowledge, the city took no action, made no inspection, and undertook no program of watchfulness or monitoring. Its failure to act promptly and efficiently after being notified of the leak resulted in liability for damages to the plaintiff's water conduits.<sup>23</sup>

By contrast, in *Malfatti v. 13 Gramercy Park S. Corp.*, upon being notified of a leak, the city employees promptly responded and immediately commenced work to stop the leak.<sup>24</sup> Since the plaintiffs could not demonstrate how the actions of the city employees were deficient or that the leak could have been stopped sooner, there was no basis for liability against the city.

In another case, although there was no indication of actual notice to the city, there was some evidence that for several weeks prior to the breaking of the water main there were depressions in the pavement of the street that became filled with water.<sup>25</sup> There were also other indications that there was a leak in the water main at that point. Although the city may not have been formally notified of a possible leak, the court found that there was a question of fact as to the existence of wetness and depressions in the street prior to the break. If these conditions did indeed exist, they may have been sufficient to put the city on inquiry as to their cause, and accordingly, a jury might find the city was negligent in failing to make an investigation.<sup>26</sup>

### Res Ipsa Loquitur and Third Parties

The doctrine of *res ipsa loquitur* is commonly applicable in cases where a water main breaks and causes damages, as it can be difficult to ascertain what caused a pipe buried deep in the earth to break.<sup>27</sup>

The theory is that water mains do not ordinarily break if they are properly installed and maintained, and that any break in the main was probably caused by the owner's neglect of its duty, since the owner is generally in exclusive possession and control. In such a case it is unnecessary to prove the exact cause of the injury in order to hold the owner liable since the circumstances show that the owner is responsible for all reasonably probable causes to which the event can be attributed.<sup>28</sup>

In New York, to establish a permissible inference of negligence based on this doctrine, a plaintiff must establish three elements: (1) the event must be of a kind which ordinarily does not occur in the absence of someone's negligence; (2) it must be caused by an agency or instrumentality within the exclusive control of the defendant; and (3) it must not have been due to any voluntary action or contribution on the part of the plaintiff.<sup>29</sup> "[P]roof that third parties have had access

to the instrumentality generally destroys the premise [of *res ipsa loquitur*], and the owner's negligence cannot be inferred unless there is sufficient evidence that the third parties probably did nothing to cause the injury."<sup>30</sup>

Often a water main rupture is caused by activity of a third party that was permitted by a municipality to excavate a public street or sidewalk, and therefore, the doctrine of *res ipsa loquitur* may not be applicable because the area where the leak occurred was not in the exclusive control of the municipality. The presence of a third party has led to allegations that a municipality was liable to a plaintiff for failing to inspect the third party's work. Generally, courts have rejected these allegations. For example, in *DeWitt Properties, Inc. v. City of New York*, a landowner sued the city and a gas company to recover for damage to its premises as the result of a burst water main under a street.<sup>31</sup> The plaintiff alleged that the utility's negligent installation of a gas pipe on top of the city's water main caused it to burst. The plaintiff also alleged that the city was negligent in inspecting the work to ascertain whether the utility's work may have damaged the water main and flooded the adjoining properties. However, the duty to inspect the activity of a third party, such as a utility, has only been imposed on a municipality when it permitted dangerous or imminently dangerous activities in its thoroughfares and

it can hardly be said that the actual installation of the [gas] pipes, by trained utility employees, ordinarily poses an obvious risk to existing water mains. Thus there is generally no reason to expect the city to inspect the utility's installation, and no duty to do so.<sup>32</sup>

Thus, the mere grant of authorization to a third party to perform work near a water main does not create a duty in a municipality to inspect the party's work.<sup>33</sup> If, however, the application for a permit "indicates that conditions at the work site or the methods to be employed might pose a special risk to the [municipality's] water system," the municipality may have a duty to inspect the third party's work because it is actually aware of and has notice of the potential risk.<sup>34</sup> If the utility's plans or application for a permit did not note the presence of a water main at the site, a municipality has been held not to be actually aware of the danger created by the utility.<sup>35</sup>

## Conclusion

The applicability of the governmental/proprietary test to water leak claims is archaic, as today it is generally municipalities, rather than private utility companies, that provide water. Although it is "a concededly artificial and illogical distinction," it is nevertheless

utilized by many courts in claims brought against a municipality for injuries caused by a water leak.<sup>36</sup> Whether the governmental/proprietary test is abolished in this area of law remains to be seen.

It also remains to be seen whether the standard of reasonable care evolves as newer methods of construction and maintenance are developed. Although tearing up streets to inspect pipes and performing extensive excavation to detect a leak is without question impractical, as less intrusive and destructive methods of inspection and detection are developed, a municipality may need to employ those methods to avoid liability especially if those methods become customary in the industry.

## Endnotes

1. *K & S Realty Co. v. City of New York*, 304 A.D.2d 349, 350 (1st Dept. 2003) (citations omitted).
2. *Carter v. City of New York*, 2004 WL 3078698 at \*11 (Sup. Ct., Kings County 2004), *aff'd*, 38 A.D.3d 702 (2nd Dept. 2007), *leave to appeal denied*, 9 N.Y.3d 994 (2007).
3. *Carter*, 2004 WL 3078698 at \*11; *DeWitt Properties, Inc. v. City of New York*, 44 N.Y.2d 417 (1978).
4. *D & D Delhi, Inc. v. Village of Delhi*, 47 A.D.3d 1117, 1118; *Rochester Gas and Electric Corp. v. City of Rochester*, 118 Misc.2d 420 (City Ct., City of Rochester 1983) ("Water supply systems are not governmental functions, and when municipalities operate such systems, they are not privileged under the limited immunities from tort liability granted to them in the exercise of their police power.").
5. *D & D of Delhi, Inc. v. Village of Delhi*, 47 A.D.3d 1117 (3rd Dept. 2008); *K & S Realty Co., v. City of New York*, 304 A.D.2d 349, 350 (1st Dept. 2003).
6. *D & D of Delhi, Inc. v. Village of Delhi*, 47 A.D.3d 1117 (3rd Dept. 2008).
7. *K & S Realty Co., v. City of New York*, 304 A.D.2d 349, 350 (1st Dept. 2003).
8. *Id.* at 350. Although it was equipped with ground microphones capable of detecting leaks, the crew did not use them, which was a discretionary and not a ministerial decision.
9. *Id.*
10. *Carter v. City of New York*, 2004 WL 3078698 at \*11 (Sup. Ct., Kings County 2004), *aff'd*, 38 A.D.3d 702 (2nd Dept. 2007), *leave to appeal denied*, 9 N.Y.3d 994 (2007).
11. *Id.* at \*11.
12. *Id.* at \*12; *Jamaica Water Supply Co. v. City of New York*, 180 A.D. 834 (2nd Dept. 1952), *aff'd*, 304 N.Y. 917 (1953); *reargument denied, remittitur amended* by 305 N.Y. 560 (1953), *cert denied*, 346 U.S. 821 (1953).
13. *Carter*, 2004 WL 3078698 at \*13.
14. *Id.*, citing, Seasongood, *Municipal Corporations: Objections to the Governmental or Proprietary Test*, 22 Va. L. Rev., pp. 914-916; *County of Nassau v. South Farmingdale Water Dist.*, 62 A.D.2d 380, 395 (2nd Dept. 1978), *aff'd*, 46 N.Y.2d 794 (1978) (recognizing "that the question of whether the water district is performing a governmental or proprietary function is not free from doubt").
15. See *Matter of County of Monroe*, 72 N.Y.2d 338 (1988) (abolishing the governmental/proprietary test in zoning cases).
16. *DeWitt Properties, Inc.*, 44 N.Y.2d at 423; *Biancianiello v. Town of Colonie*, 261 A.D. 161 (3rd Dept. 1941).

17. *DeWitt Properties, Inc.*, 44 N.Y.2d at 424; *Kusnir v. City of Yonkers*, 131 Misc.2d 25, 29 (City Ct., City of Yonkers 1985).
18. *Biancanello v. Town of Colonie*, 261 A.D. 161 (3rd Dept. 1941); see also *Olympia v. Town of Poughkeepsie*, 23 A.D.3d 445 (2nd Dept. 2005) (finding “[t]he Town established its prima facie entitlement to judgment as a matter of law as to the negligence cause of action by demonstrating that it had inspected the plaintiffs’ flooded property on several occasions, using two separate tests to search for a municipal water leak, and found none”).
19. *Biancanello v. Town of Colonie*, 261 A.D. at 162.
20. *Id.*
21. *Gillette Shoe Co., Inc. v. City of New York*, 86 A.D.2d 522, 524 (1st Dept. 1982), motion to dismissed appeal denied, 56 N.Y.2d 711 (1982), order *aff’d*, 58 N.Y.2d 853 (1983) (where the plaintiff’s expert contended that the water main break was caused by an attack of anaerobic bacteria upon the pipe material).
22. *Rochester Gas and Electric Corp. v. City of Rochester*, 118 Misc.2d 420 (City Ct., City of Rochester 1983).
23. The damage to the plaintiff’s conduits occurred in April when a road collapsed due to a water main break. The city knew that the road had previously collapsed in March because of a water main break. The city argued that the damages caused by the April break were too distant from the March break (the April break was 300 feet farther north from the March break) to consider the March break as notice of where the April break would occur. The court stated that “[w]hile distance is a factor in evaluating the scope of the notice, and while it is true the plaintiff’s letter did not pinpoint the spot of the April break, 300 feet is sufficiently close, as a matter of law, to hold the city on notice to the risk of collapse of Culver Road at the site of the April break.” *Id.* at 423.
24. *Malfatti v. 13 Gramercy Park S. Corp.*, 259 A.D.2d 420 (1st Dept. 1999), leave to appeal denied, 94 N.Y.2d 752 (1999).
25. *Lauer v. City of New York*, 216 A.D. 468 (Sup. Ct., New York County 1943).
26. *Id.* at 470.

Whether prior written notice statutes, which are in derogation of the common law and strictly construed by the courts, are applicable to water breaks depends on the language in the statute, but generally, they have been found to be inapplicable. See *McKinnis v. City of Schenectady*, 234 A.D.2d 760 (3rd Dept. 1996) (since the city code made no reference to latent defects

or conditions and referred to actual physical defects in the surface of a street or highway the court determined that the notice statute was inapplicable because the leaking water pipe was subsurface and not visible); *Windsor Court Associates, LP v. Village of New Paltz*, 27 A.D.3d 814 (3rd Dept. 2006) (finding prior written notice laws did not apply to subsurface structures such as water mains).

27. *DeWitt Properties, Inc.*, 44 N.Y.2d at 426.
28. *Id.* (citations omitted).
29. *Pickersgill v. City of New York*, 168 Misc.2d 768, 770 (City Ct., City of New York 1996).
30. *DeWitt Properties, Inc.*, 44 N.Y.2d at 426 (citations omitted); *Foltis, Inc. v. City of New York*, 287 N.Y. 108, 115 (1941) (*Res ipsa loquitor* “has the effect of creating a prima facie case of negligence sufficient for submission to the jury, and the jury may—but is not required to—draw the permissible inference.” It is a rule of evidence which does not provide a presumption of negligence but rather provides merely a permissive inference of negligence. However, where this doctrine is applied in water break cases, although a plaintiff is relieved from the burden of producing direct evidence of negligence, “it does not relieve a plaintiff from the burden of proof that the person charged with negligence was at fault.”)
31. *DeWitt Properties, Inc. v. City of New York*, 44 N.Y.2d 417 (1978).
32. *Id.* at 424.
33. *Id.*; accord *Gillette Shoe Co., Inc. v. City of New York*, 86 A.D.2d 522, 524 (1st Dept. 1982), motion to dismissed appeal denied, 56 N.Y.2d 711 (1982), order *aff’d*, 58 N.Y.2d 853 (1983).
34. *DeWitt Properties, Inc.*, 44 N.Y.2d at 425.
35. *Gillette Shoe Co., Inc.*, 86 A.D.2d at 524.
36. *County of Nassau v. South Farmingdale Water Dist.*, 62 A.D.2d 380, 385 (2nd Dept. 1978), *aff’d*, 46 N.Y.2d 794 (1978).

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# Municipal Liability for Sewer and Water Pipe Failures ... Despite Statutory Authority and Immunity

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## Introduction

There is nothing more fundamental to human society than access to water and safe disposal of human waste and wastewater. In the January 2007 edition of the British Medical Journal, readers of that publication considered the introduction of clean water and sewage disposal piping systems as the greatest medical advance since 1840. In most Canadian urban areas, these fundamental services are provided by municipalities through sewer and water pipes, some over 100 years old. These billions of dollars of buried infrastructure normally serve us so well that they are overlooked, “out of sight, out of mind”. They are rarely top tier political issues, and when budgets are tight it is tempting to defer their inspections, maintenance, repair or replacement.

The backlog of repairs and replacement has been characterized by Ontario’s Ministry of Public Infrastructure Renewal as a ‘water infrastructure deficit’. The water infrastructure deficit in Ontario has been estimated by the Province’s own Expert Strategy Water Panel as between \$30 and \$40 billion. As a result, many experts fear a deluge of pipe problems and failures, including water main breaks and leaks, and sewer breaks, blockages and backups. Some such failures may be seen as a temporary inconvenience and have relatively few impacts on third parties and the environment, but others cause huge losses

and damages. In the Toronto area in 2006 two separate sink holes had estimated repair costs of several million dollars each, quite apart from the disruption to homeowners and the lost business of nearby stores and restaurants.

On February 8, the New York Times published an article highlighting the problems of our aging pipeline infrastructure. The author states that “thousands of miles of century- old underground water and sewer lines are springing leaks, eroding and – in extreme cases – causing the ground above them to collapse. Though there is no master tally of sinkholes, there is consensus among civil engineers and water experts that things are getting worse.” The article also showed graphic photos of sinkholes that had swallowed trucks and cars. In the US, it is estimated that nearly 50% of pipes will be in poor condition (or worse) by 2020. At the same time, demand on the system is increasing. Sound familiar?

Burst watermains may flood homes and businesses; sinkholes may disrupt traffic, utility services and businesses; and sewer backups that flood basements and lakes with human waste. Even mere leaks can create risks to human health, for example through contamination of surface water and drinking water. Due to the building boom and the skyrocketing property prices across many cities across Canada there appears to be a dramatic shift of the population into high rise office towers and residences. All of these high rises rely on high pressure water sprinkler systems as their first and often only line of defence against fire. In an ironic twist, this increased reliance comes at a time when the average age of watermains in the City of Toronto, for example, is rapidly approaching and in many cases has surpassed their maximum life expectancy.

When these “accidents” happen, do municipalities have to pay for the harm caused? If so, should they be spending more on inspection, maintenance, repair and replacement of their water and sewer infrastructure?

At first blush, municipalities should not have much to worry about. In some provinces such as Ontario, they benefit from both statutory authority and statutory immunity. Yet despite these twin defences, municipalities still risk being held liable, criminally or civilly, for

malfunctions of their sewer and water pipes. This is the subject of this article.

Examples of liability imposed on municipalities for sewer and water pipe problems.

The courts are much more willing to impose liability on municipalities than they have been to impose similar liability on more senior governments. Examples that specifically relate to sewer and water pipes include:

- In *Port Alberni (City) v. Moyer*, the plaintiff successfully sued the City after flooding from a sewer backup damaged his basement. The City had a program, accepted by City council, of video inspection and sewer flushing, for both preventative maintenance and for emergency response. The City's program was supposed to flush 10% of the lines each year; by the year of the incident, they should have inspected all lines, but had not done so. The plaintiff succeeded even though B.C.'s Municipal Act (as it then was) gave municipalities statutory immunity in an action based on nuisance or the rule in *Rylands v. Fletcher* if the damages arise "directly or indirectly, out of the breakdown or malfunction of (a) a sewer system..."

- In *Carson v. Gloucester (City)*, a resident successfully sued the City for flooding from a nearby drainage ditch, following a thaw and heavy rainfall. Carson had called the City, which advised him to obtain a second sump pump; he did this and also tried himself to open the culvert (and failed). A City worker attended on site and did nothing. Another City employee improperly attempted to clean out the clogged ditch, and no one inspected his work. **Ontario's Drainage Act** provides that, in the absence of negligence on the part of the City, the City is not liable in damages for damage caused by drainage works blocked by snow or ice and overflowing onto a person's lands.

- In *Canada v. Ottawa-Carleton*, a water main in downtown Ottawa burst and flooded several large office buildings. The building occupants (including the federal government)

successfully sued the City. While the cast iron main had operated without incident since 1917, and had been properly installed and operated, it had been defective when originally manufactured, many decades before the City took over the road. The Court found the City liable in nuisance; the criterion of inevitability relates to what is possible according to the state of scientific knowledge at the time.

- In *Clemmens v. Kenora (Town)*, Kenora was successfully sued for a sewer backup. The Town had a program to assess its sewer and watermain needs and to make repairs, through systematic video inspection. The inspection revealed a broken pipe near the plaintiff's home; the Town's workers had begun repair work, but stopped at the onset of frost. Spot repairs were not done because of the added expense; the sewer line later backed up.
- In *R. v. City of Barrie*, the City was convicted of discharging raw sewage into a creek when sewage overflowed from a pumping station. The pumping station was blocked with construction debris dumped into a manhole by unknown builders. Initial attempts to find the overflow were unsuccessful until daylight.
- In *Laurentide Motels Ltd. c. Beauport (Ville)*, water was not available at fire hydrants for 45 minutes after a fire started. The City was held responsible for property damage caused by the failure of municipal firefighters to put out the fire. It had not taken sufficient care to ensure that all fire hydrants were always kept in working order.
- In *McLaren v. Stratford (City)*, a severe rainstorm caused widespread flooding with both sewage and storm water. The City received 445 property damage reports. The Province refused to provide disaster relief because the damage was from a sewer backup. The plaintiffs successfully had a class action certified against the City, asserting that the City was responsible to maintain storm and sanitary sewers in the area, and had negligently failed to take action despite past flooding.

**A**nd the most famous case of all:

- In *Tock* the plaintiff's basement was damaged when the municipality's storm sewer became blocked on a day of unusually heavy rainfall. Water backed up and flooded the plaintiff's basement. The plaintiff sued alleging negligence, nuisance. Refer to *Rylands v. Fletcher*.

### Municipalities – Legal structure, powers and responsibilities

What is the basis for all these claims? And should municipalities expect more of them as climate change increases the intensity of rainfall and other stresses?

In general, the duty of care under tort law applies to municipalities in the same way that it applies to any ordinary corporation. Typical torts claimed in pipe cases are nuisance, negligence and *Rylands v. Fletcher*. Municipalities also have the same responsibilities as other corporations to comply with environmental statutes, e.g. to prevent, report and cleanup spills.

But municipalities have statutory powers and duties that corporations do not have, plus unique financing opportunities and constraints and two major defences that corporations rarely have: the defence of statutory authority, and the defence of statutory immunity.

### **Statutory Powers and Duties in Municipal Statutes**

Powers are optional; duties are mandatory. Municipalities are clearly authorized by statute to provide sewer and water services. Strictly speaking, this is usually a power and not a duty, but there is no practical alternative in urban areas.

The Municipal Act, 2001 makes municipalities responsible and accountable for matters within their jurisdiction; they are given powers and duties under this and other Acts for purposes that include providing services and other things the municipality considers necessary and desirable for the municipality, and fostering the current and

future economic, social and environmental well-being of the municipality.

Municipalities are also authorized to exercise regulatory authority over water and sewer pipes that connect to municipal utilities. Municipalities have general and specific powers. Municipalities have general powers to make by-laws concerning matters within several broad spheres of jurisdiction, including waste management, public utilities and drainage and flood control (except storm sewers). A public utility is defined to include a system that provides water and sewage services for the public, as well as the service that is provided. Under these general powers, municipalities can regulate or prohibit respecting a matter (e.g., water or sewer systems), provide for a permit or licence system, and impose conditions for obtaining licences and approvals. Municipal powers are interpreted broadly and within their context and statutory limitations, unless there is express direction to the contrary in the legislation. A municipality may also regulate matters not specifically provided for in any Act purposes related to the health, safety and well being of its inhabitants.

Statutes for individual cities or regions may also give specific powers that relate to water and sewer services. For example, the City of Toronto Act, 2006 includes special powers for the municipality, as well as provisions that mirror the statutory immunity in the Municipal Act, 2001.

While these statutes do not specifically require municipalities to keep their sewer and water infrastructure in good repair, it is possible that this could be implied because of the essential nature of these utilities to an urban population.

### **Statutory Duties to maintain infrastructure**

Some statutes expressly require municipalities to maintain infrastructure. For example, Ontario's Safe Drinking Water Act, 2002 ("SDWA"), mandates that "potable" water must meet the minimum requirements of prescribed drinking-water quality standards, despite any other Act or regulation. The SDWA has stringent requirements

for owners and operators of drinking water systems. For example, it requires that the owner of any drinking water system, including a municipal drinking water system, ensure that all water provided by the system as drinking water meet certain prescribed quality standards, and that the system be maintained in good repair and operated in accordance with the requirements under the Act.

The **Ontario Water Resources Act**, (“the OWRA”) provides that sewage works shall at all times be maintained and kept in good repair, and operated in a manner and with facilities as may be directed by a Director appointed under the Act. As well, a Director may report to a municipality that it is necessary in the public interest for water or sewage works (or any part) be established, maintained, operated, improved, extended, enlarged, altered, repaired or replaced. The municipality shall forthwith do everything in its power to implement Director’s report. While municipalities have some power to delegate these duties, they cannot entirely avoid responsibility for ensuring that the duties are carried out.

The OWRA also provides that any person may complain to the Ontario Municipal Board that a municipality is constructing, maintaining or operating sewage works or has control of these works, and has failed to do anything required under any Act (or regulation under any Act), or by any order or direction or agreement with the municipality, or has done such thing improperly. The complaint must include that this action (or inaction) is causing deterioration, loss, injury or damage to property. The Board may make any order, award or finding in respect of any such complaint as it considers just.

**The Drainage Act imposes duties on a municipality to inspect, maintain and report on its drainage works. A municipality has a duty to maintain and repair drainage works and may be liable for non-repair. Where ice or snow blocks the drainage works, causing property damage, a municipality may be liable if this occurred due to negligence.**

41. **Ontario's Drainage Act**

*s. 74 Any drainage works constructed under a by-law passed under this Act or any predecessor of this Act, relating to the construction or improvement of a drainage works by local assessment, shall be maintained and repaired by each local municipality through which it passes, to the extent that such drainage works lies within the limits of such municipality, at the expense of all the upstream lands and roads in any way assessed for the construction or improvement of the drainage works and in the proportion determined by the then current by-law pertaining thereto until, in the case of each municipality, such provision for maintenance or repair is varied or otherwise determined by an engineer in a report or on appeal therefrom.*

42.

43. Drainage Act provisions:

44.

45. Power to compel repairs

46. *79. (1) Upon...notice in writing served by any person affected by the condition of a drainage works, upon the head or clerk of the local municipality whose duty it is to maintain and repair the drainage works, the municipality is compellable ... to exercise the powers and to perform the duties conferred or imposed upon it by this Act as to maintenance and repair or such of the powers and duties as to the referee appears proper, and the municipality is liable in damages to the owner whose property is so injuriously affected.*

*Municipality liable for damages caused by non-repair*

Also, under this Act, the municipality must appoint a superintendent to inspect every drainage works and to report to council on the condition of the works.

A prescribed standard of care for municipal drinking water systems has been passed, but is not yet in force; this will legislate a duty on the part of municipalities and their employees to exercise a level of



care, diligence and skill that a reasonably prudent person would be expected to exercise in a similar situation, and to act honestly, competently and with integrity. This could be a very difficult standard of care to meet.

The Fire Protection and Prevention Act, 1997 requires every municipality in Ontario to provide such fire protection services as it determines may be necessary in accordance with its needs and circumstances. Virtually every municipality has interpreted this obligation to require a network of watermains and fire hydrants in urban areas. In the event that the system is inadequate in any manner, the Fire Marshal has certain powers to monitor and review the fire protection services provided by municipalities to ensure that municipalities have met their responsibilities and, if the Fire Marshal is of the opinion that, as a result of a municipality failing to comply with its responsibilities, a serious threat to public safety exists in the municipality, he or she may make recommendations to the council of the municipality with respect to possible measures the municipality may take to remedy or reduce the threat to public safety.

If the municipality ignores the Fire Marshal's recommendations, the Minister charged with administering this Act may recommend that regulations be made that establish fire protection service standards in municipalities and require municipalities to comply with the standards.

**Breach of a statutory duty is presumptive evidence of negligence. Municipalities that fail to maintain infrastructure when required by statute to do so may face administrative liability (i.e. be subject to regulatory orders), civil liability (lawsuits for damages) or even prosecution. For example, it will be a serious offence under the SDWA to fail to meet the new standard of care for delivery of safe drinking water. Penalties may be significant; individuals may face jail.**

**Environmental statutes (*Ontario Environmental Act*)**

Prosecution is also a favoured tool under environmental statutes. Several environmental statutes impose duties on everyone, including municipalities, to avoid pollution that could occur through, e.g., inadequate maintenance of sewers.

For example, s. 36 of the Fisheries Act forbids any discharge of a deleterious substance into water frequented by fish. Numerous cases confirm that raw sewage is a deleterious substance.

**Ontario's Environmental Protection Act ("EPA") contains a general prohibition against discharging contaminants, which are defined to include any solid, liquid, gas, odour or combination that result directly or indirectly from human activities and that causes or may cause an adverse effect. An "adverse effect" is defined under the Act to include injury or damage to property or plant/animal life; harm or material discomfort to any person; loss of enjoyment of normal use of property or interference with normal conduct of business.**

**A spill of sewage into the natural environment breaches this prohibition, and engages the spills provisions of the EPA. A municipality is considered to have "control" over sewage in its pipes, and must prevent it from being spilled into the environment. The EPA also places a duty to mitigate and restore the natural environment on the municipality, as owner/person having control of the spilled pollutant; this duty arises as soon as the municipality knows or should have known the pollutant was spilled and is likely to cause an adverse effect.**

A similar prohibition is found in s. 30 of the Ontario Water Resources Act, ("the OWRA").

The penalties for such spills can be very substantial. Every person who contravenes the Act is guilty of an offence; in serious matters, conviction on a first offence can bring fines of up to \$6 million per day of the offence for corporations (this could include municipalities) and up to \$4 million per day and/or up to 5 years in jail for individuals.

The monetary penalty increases for subsequent offences.

As well, in determining a sentence, the court is required to consider aggravating factors, such as where an offence resulted in impairment of water quality, or where the party committing the offence was motivated by a desire to decrease costs.

### **Powers: Policy versus Operational decisions**

When citizens sue municipalities over their powers (rather than their duties), much turns on whether the decision in question is one of policy or of operations. 56 Municipalities do not owe a private duty of care to citizens to take care in making discretionary policy decisions, and therefore cannot be sued, if that policy decision is made as a bona fide exercise of its discretion. Policy decisions are:

“decisions of a political nature for which the authority should be accountable not before the courts but before the electorate or the legislature.”

Thus, a municipality could refuse, as a matter of policy, to provide municipal water or sewer services, either generally or in a particular area. However, when a municipality decides to provide these services, it owes a duty to its citizens to take reasonable care in constructing and maintaining the system. Such acts are described as operational, and therefore can be the subject of a civil suit. Unfortunately, as it is often difficult to characterize a decision as purely “policy” or “operational”, it sometimes seems that the courts impose liability whenever they believe it is fair to do so.

For example, in *Just*, boulders fell onto a busy highway, killing the passenger of a car and injuring her father. The province had a system in place for inspecting rock slopes and carrying out remedial work on them. In suing the province for negligence in failing to maintain the highway, the father challenged the way in which the inspections were done, the frequency of inspections, and the manner in which remediation should have been carried out.

The Just court recognized the need to differentiate between policy decisions and their operational implementation. As a general rule, decisions concerning budgetary allotments are classified as policy decisions. It is important to protect governments (and their officers

and employees) from liability for policies because, otherwise, the courts would constantly interfere with what should truly be political decisions. The “operational” aspect of a governmental activity includes that manner and quality of an inspection system, and the standard of care applied to a particular operation is assessed in light of all surrounding circumstances, including budgetary restraints, and the availability of trained staff and the appropriate equipment. The court cited an Australian case as providing helpful guidelines: the distinction between policy and operational factors is not easy to formulate, but the dividing line between them will be observed if we recognize that a public authority is under no duty of care in relation to decisions which involve or are dictated by financial, economic, social or political factors or constraints. Thus budgetary allocations and the constraints which they entail in terms of allocation of resources cannot be made the subject of a duty of care. But it may be otherwise when the courts are called upon to apply a standard of care to action or inaction that is merely the product of administrative direction, expert or professional opinion, technical standards or general standards of reasonableness. [emphasis added by the court in Just].

In Just, the manner in which inspections were carried out, and how remediation was undertaken, were held to be operational in nature. They involved matters related to administrative direction, expert or professional opinion, technical standards or general standards of care. As such, these inspections were subject to review by the court to determine whether the province had been negligent or had satisfied the standard of care. In Just, the court agreed that it was reasonable for the user of a highway to expect that it be maintained properly. The matter was referred for a new trial. If a duty of care is owed by the government agency to the individual, and no exemption (by statute or policy decision-making) is available, then a traditional torts analysis follows.

Thus, once a municipality has decided to provide sewer or water service in a particular area, the actual provision of this service will probably be found to be operational, and therefore subject to civil

lawsuits. However, a municipality need not upgrade and expand its service to accommodate growth.

In *Riverscourt Farms Ltd v. Niagara-on-the-lake (Town)*, fire destroyed the plaintiff's building. The plaintiff sued the Town in negligence for failing to ensure that an adequate water supply was available to extinguish the fire. The defendant Regional Municipality of Niagara was responsible for supply, treatment and storage of water for local municipalities; the Town was responsible for distribution of water and maintenance of lines and water mains. The water system was outdated and both the Region and the Town knew that there was not enough water to fight a large house fire. Elements of negligence were established: the plaintiff was owed a duty of care by the Region and the Town; damage to the plaintiff by fire was foreseeable due to the lack of water.

There was sufficient relationship of proximity between the parties, where it was reasonable that carelessness on the part of the defendants would likely cause damage to the plaintiff. However, the Town exercised its discretionary power in establishing a fire department and in operating and maintaining waterworks; it had no statutory obligation to establish these services. It was exercising a policy decision in not upgrading its water system. It could not therefore be held liable in negligence.

A municipality can however still be liable for damages arising primarily from urban growth and increased loading of its systems. In *Oosthoek v. Thunder Bay (City)*, four actions were brought as test cases to determine if a City was liable for flooding to private property. Two actions related to flooding from water due to backup from combined sewers and two cases were for damage when water escaped from burst, leaking or corroded cast iron watermains.

During a heavy rainstorm in June 1991, about 200 basements were flooded. The combined sewer systems were installed in 1907 and 1925 and during the subsequent years, urban development resulted in increased water loads on the system. In 1965 consultants recommended to the City that rainwater leaders (flow of water from eaves troughs) be disconnected from the system. It was not until 1985

that the City passed a by-law directing that existing rainwater leaders and weeping tiles be disconnected (homeowners to pay) and prohibiting any future connection to the storm sewer. The evidence at trial were that no attempts were made to enforce the 1985 by-law despite the fact that bylaw officials recognized from the outward appearance of homes that the disconnections had not been made. The agreed statement of facts clearly identified the flow from rainwater leaders as a contributing factor to the floods.

At trial, the judge found that the City did not act with reasonable care, in its operational non-enforcement of the by-law. The policy decision not to enforce the by-law was successfully challenged on the basis that the decision was not made in the bona fide exercise of discretion. The City was found negligent. The judge rejected the municipality's argument that the sewer backups were an inevitable consequence of the original construction of the sewers; rather the backups were due to several factors that overloaded the system, including the extensive paving of roads and other surfaces, new homes being added to the system, and the fact that the leaders and weeping tiles had not been disconnected. The Court of Appeal upheld the decision at trial that the municipality was liable to the plaintiffs in both nuisance and negligence arising from the failure to take reasonable measures to enforce the 1985 by-law.

The watermain cases in Oosthoek are also of interest. These involved two cast iron watermains that flooded citizens' basements. One, installed in 1909, had a latent defect not detectable by visual inspection and burst in 1990. A second, installed in 1956, burst in 1993. The City was found liable in nuisance for the water cases because it was unable to establish that breaks in the watermain were an inevitable consequence of the installation of the watermains. The City was not liable in negligence, as its yearly allotments for maintaining and upgrading the waterworks were based on budgetary considerations, a basis for the defence of policy decision.

The Defence of Statutory Authority

One traditional defence that municipalities have relied upon, especially in nuisance actions, is the defence of statutory authority.

Government bodies regularly carry out activities that impose costs and constraints on some people, in the name of the larger public interest. The defence of statutory authority allows them to do so, without being sued, if the adverse impact on the victim could not be avoided without sacrificing the public interest:

The traditional rule is that liability will not be imposed if an activity is authorized by statute and the defendant proves that the nuisance is the “inevitable result” or consequence of exercising that authority.”

[emphasis added] 66

Because of the importance of this traditional defence, the OWRA also provides that sewage works constructed, maintained or operated in compliance with the OWRA, Ontario’s Environmental Protection Act (and applicable regulations), and with any orders, directions or approvals issued under authority of the OWRA shall be deemed to be under construction, constructed, maintained or operated by statutory authority.

Unfortunately, statutory authority provides, at best, a narrow defence to nuisance.

In *Ryan*, a motorcyclist was injured while trying to cross railway tracks located on a Victoria city street; the front tire of the vehicle became trapped in a flangeway gap that ran along the inner edge of the tracks. The plaintiff sued the applicable rail companies and the City, claiming that the flangeway created a hazard because it was unnecessarily wide; the railways denied liability on the ground that the tracks were authorized by, and complied with, all applicable statutes, regulations and administrative orders. The regulations prescribed a minimum width for the flangeways, but no maximum. The court examined whether the hazard created was an “inevitable result” of exercising statutory authority; that is, whether it was “practically impossible” for the Railways to avoid the nuisance from the gap. Since the maximum width of the flangeway was a matter of discretion on the part of the railways, it was not an “inevitable result” or “inseparable consequence” of complying with the regulations.

The railways had decided not to install flange fillers when these became available after 1982. The Court found that the wide flange-ways created a greater risk than was absolutely necessary, and that the defence of statutory authority was not available. A similar narrowing of the defence of statutory authority was expressed by the Ontario Court of Appeal in *Oosthoek* by applying the burden of proof upon the defendants in the manner expressed by Justice Sopinka in *Tock*.

### **The Defence of Statutory Immunity**

In the late 1980's, after four Supreme Court of Canada decisions seemed to push municipal liability to unbearable lengths, several provinces amended their municipal statutes to provide a new defence of statutory immunity. These amendments limit or exclude liability for municipalities, thereby reducing exposure to lawsuits and associated costs. In particular, claims in nuisance are not available in several provinces. The statutes also provide for general immunity from personal liability, which, from a policy perspective, serves the public interest in that it encourages individuals not to fear seeking public office.

For example, these statutory provisions may provide immunity from liability for:

- any act done in good faith in performance of a duty, or for any neglect or default in performance of that duty, although may not specifically exempt negligent acts;
- in nuisance for escape of water and sewage from sewage works or water works;
- claims based on nuisance or the rule in *Rylands v. Fletcher*, if the damages are directly or indirectly due to breakdown or malfunction of a sewer system or a water or drainage facility or system;
- claims based on damage resulting from performance of a discretionary power from any policy decision made in good



faith by the municipality (e.g., inspections, lack of inspections);

- no action against a current or former municipal public officer, for anything he/she said, did or omitted in performance of his/her duty or exercise of his/her powers unless this person acted dishonestly, was grossly negligent or their misconduct was malicious or wilful. However, certain corporations (e.g., councils or regional board) will not be immune from tort liability committed by these persons, if that body would have been liable had the provision not been in force.

While somewhat controversial, statutory immunity provisions can be effective. For example, in *Bavelas v. Copley*, construction on the Copley property caused silty water to drain more quickly into a roadside ditch owned by the City of Saanich. From there, the water flowed onto the Bavelas' property, and damaged a marsh. Neither the Copleys nor the city of Saanich would correct the problem. Dr. Bavelas sued them, and won at trial, but lost on appeal, because s.596 of B.C.'s Municipal Act provided statutory immunity from liability for a nuisance created on municipal land by a third party. The relevant provision was:

596 (6) No action arising out of, by reason of or in respect of the construction, maintenance, operation or use of a drain or ditch authorized by this section, whenever the drain or ditch is or was constructed, may be brought or maintained in a court against a district municipality.

However, BC repealed this statutory immunity shortly afterwards. Even when they are in force, statutory immunity provisions are not iron clad.

- As described above, the City lost in *Port Alberni (City) v. Moyer*, where the plaintiff's basement was damaged by flooding from a sewer backup due to a buildup of gravel in

the line. B.C.'s Municipal Act (as it then was) provided that a municipality is not liable in an action based on nuisance or the rule in *Rylands v. Fletcher* if the damages arise "directly or indirectly, out of the breakdown or malfunction of (a) a sewer system..."<sup>87</sup> The Court decided that a buildup of gravel in a sewer, causing a backup, was neither a "breakdown" nor a "malfunction", thus denying the City its statutory immunity defence.

Similarly, a statutory immunity defence was no help to the City of Gloucester when Carson's house was flooded.

**Ontario's Drainage Act provides statutory immunity only in the absence of negligence; the Court found the City negligent.** Carson had called the City, which advised him to obtain a second sump pump; he did this and also tried himself to open the culvert (and failed). A City worker attended on site and did nothing. Another City employee improperly attempted to clean out the clogged ditch, and no one inspected his work.

### **Negligence**

To succeed in a claim of negligence, a plaintiff must prove the following:

86. The municipality owed that plaintiff a duty of care;
  - The municipality breached that duty of care, by failing to meet the requisite standard
  - of care; and
  - Breach of that duty must cause damage to the plaintiff that was reasonably foreseeable.
  - Where a municipality chooses to provide a water, sewer and drainage system, it owes a duty to take reasonable care in construction, maintenance and operation of the system. By breaching this duty of care, such as by failing to have a reasonable inspection, maintenance and monitoring

program in place, a municipality is vulnerable to a claim in negligence.

- The Supreme Court of Canada affirmed that the “Anns/Kamloops” test is the appropriate one to determine whether a body owes a duty of care. As stated by Justice Bastarache in *Ingles v. Tutkaluk Construction Ltd* :
- These cases provide the basis for determining whether the law can impose on a public authority a private law duty towards individuals, enabling individuals to sue the authority in a civil suit, and for determining whether a duty of care is owed by a public authority in particular circumstances. To determine whether a private law duty of care exists, two questions must be asked....

(1) is there a sufficiently close relationship between the parties (the local authority and the person who has suffered the damage) so that, in the reasonable contemplation of the authority, carelessness on its part might cause damage to that person? If so,

(2) are there any considerations which ought to negative or limit (a) the scope of the duty and (b) the class of persons to whom it is owed or (c) the damages to which a breach of it may give rise?

Once it is determined that a municipality owes a duty of care to a person (or class of persons, such as citizens), the next step of the analysis is to determine the applicable standard of care and whether the municipality met this standard. To avoid liability, a municipality must exercise the standard of care that would be expected of an ordinary, reasonable and prudent person under the same circumstances. The facts of each case determine what is “reasonable”, and consideration may include the likelihood of a foreseeable harm occurring, the seriousness of that harm, and the cost burden of preventing the injury. External indicators of reasonable conduct may also be considered, for example, customary practice in the industry and statutory or regulatory standards.

The standard of care for providing and maintaining water and sewer infrastructure may vary somewhat from municipality to municipality, but would involve regular inspection of water and sewer lines, installation and maintenance of pipes according to industry specifications (e.g., with respect to materials used, method of installation), as well as competent operation of the system. If inspections are to be made, these must be reasonable and made properly. The court may review the inspection scheme to determine if it is reasonable and has been carried out reasonably in light of all the circumstances, in order to determine if the municipality has met the required standard of care.

Adequate training and knowledge on the part of municipal employees engaged in servicing the system would be required. One example of how municipalities ought to deal with infrastructure is contained in a recent article by an infrastructure engineer for the City of Calgary. The article includes a comparison of PVC versus metallic distribution mains with respect to corrosion rates, and examines locations and causes of documented PVC main failure in the City over several years. It stresses the importance that inspections are done to rigorous standards.

**Thus, a municipality may be found liable in negligence if**

- **It failed to have an inspection system in place;**
  - **It failed to ensure the system was reasonably maintained;**
  - **Its employees (or agents) were careless in constructing, inspecting and maintaining the system;**
  - **It failed to respond to complaints in a timely manner (e.g., if a flood or sewer backup occurred due to slow response time by a city crew).**
- Can a municipality refuse to inspect?**

Unless there is a statutory duty to act, or unless they have undertaken to act, governments may make a policy decision not to inspect, maintain, or repair its water and sewer infrastructure. In *Ingles*, Justice Bastarache stated:

While I have stated above that a government agency will not be liable for those decisions made at the policy level, I must emphasize that, where inspection is provided for by statute, a government agency cannot immunize itself from liability by simply making a policy decision never to inspect.

However, it is difficult to imagine that a municipality can escape having a duty to act in this area. As described above, several environmental and other statutes impose relevant duties, including the duties to provide safe water, to keep sewage works in repair, and to prevent pollution.

Despite the above, where inspection is not mandated by statute, a municipality may make a policy decision not to inspect. It would consider all relevant circumstances (e.g., cost of inspections, age of infrastructure, likely consequences of line breaks, allocation of scarce funding) and (according to the caselaw) would not be liable in negligence for that policy decision. For example, in *Vizbaras v. Hamilton (City)* the plaintiff tripped in her driveway over the cap of a service barrel leading to the City's water supply.

The cap is normally flush with the surface of the driveway, but popped up due to heaving of the frozen ground. The City had 125,000 similar installations, and its policy was to respond to pop-up complaints, but not to inspect. The Court found that the policy decision had been made in good faith and that general practice among municipalities supported its reasonableness.

## **Conclusion**

Municipal councils are understandably resistant to devoting huge sums to invisible pipes. Costs of water and sewer service have already skyrocketed, due to post-Walkerton changes such as the Safe Drinking Water Act. The companion Bill, intended to ensure that adequate funding is available, has not yet been proclaimed. A recent Toronto Star article highlighted the fact that Toronto needs to raise \$800 million to replace its aging pipes and to overhaul treatment plants. The City is trying to come up with a way to balance rates charged to resi-

dents and businesses. This is a huge political issue: if rates are hiked too much, businesses will flee the City, depriving it of income. If residents have to pay too much for services, they may vote out the Council.

Nevertheless, despite the apparent protection provided by statutory immunities, municipalities risk civil suits and prosecutions if they fail to adequately inspect, maintain, repair and replace their underground infrastructure. After all, our society depends on it.

**February 20, 2007**

Jackie Campbell, B.Sc. (Pharm.), LLB

Dianne Saxe, Ph.D. in Law, Certified Specialist in Environmental Law  
(both of Saxe Law Office, Toronto)

Frank Zechner, B.A.Sc., P.Eng., LLB

(Executive Director, Ontario Sewer and Watermain Construction  
Association)

*“Big water users up in arms – industries, schools seek relief from 9% rate hike as city looks for way to spread the cost of urgent repairs between residents and businesses” John Spears, Toronto Star, January 16, 2007*



# Sewage Backup and Flooding

Liddle & Dubin, PC has successfully recovered millions of dollars on behalf of thousands of clients claiming damages as a result of a sewage backup or flooding event. Due to our experience in handling claims arising from a sewage backup, we are intimately familiar with the cause of most sewage backups and how to acquire the evidence necessary to prove that the backup was the fault of a governmental entity.

## Why do sewage backups and basement flooding occur?

In most instances, the governmental entity charged with operating the local sewer system will claim that a sewage backup occurred as a result of an "Act of God" or extreme rain event. Based on this assertion, governmental entities almost universally refuse to voluntarily pay for the damages arising from a sewage backup incident.

Liddle & Dubin has been extremely successful in demonstrating that the sewage backup did not arise as a result of an unusual rain event but instead was caused by the negligence of the entity charged with operating the local sewer system.

Most sewer systems are separated in that the water generated by a rain event is captured by a separate storm drain. The sanitary sewage system — or the system that most often backs up into private property — is intended only to convey the water generated by ordinary household uses. In a separated system, there are no catch basins and rainwater is not intended to be present in these separated sanitary sewer systems.

The sewage backup occurs as a result of holes or cross connections that allow rainwater to enter the relatively small sanitary sewer system which causes pressure and surcharging and ultimately leads to a sewage backup.

Due to our unique experience in handling sewage backups, Liddle & Dubin has successfully represented clients in states throughout the Midwest. If you have a case involving a potential sewage backup or damages arising from flooding, please [contact us for a free case review](#) and to learn about your litigation options.

## What should I do if I have a sewage backup?


- **TAKE PICTURES AND, IF POSSIBLE, VIDEO** If possible, take pictures of water and sewage in your home and the residue left after it recedes. Also, take pictures of all damaged items, including when those items are placed at the curb.
- **NOTICE** In many jurisdictions it is necessary to provide various governmental agencies with written Notice of the flooding within a defined period of time. As these Notice requirements vary depending upon jurisdiction, we urge you to [contact our office as soon as possible](#) after a flooding event and we will provide the required legal Notice. We will provide free of charge the Michigan Notice requirement.
- **DOCUMENT YOUR LOSSES AS SOON AS POSSIBLE** [Contact us](#) to obtain a copy of our standardized Damage Claim Form. If you do not desire to utilize our Damage Claim Form at least try to make a written list of the ruined items while they are still fresh in your mind.

## Health Concerns

- Do not enter the wet area until you are sure there are no electrical issues or fire hazards. The presence of water can cause a risk of electrocution or fire. The risk is particularly high if the water level has flooded any electrical system (i.e. an outlet, furnace or appliance that is plugged in).
- **AVOID INFECTION** Make sure that you avoid infection when handling items saturated by a sewage flood. This is true even if the water appears clear. Use gloves and do not expose any open cuts to the sewage. Also, be careful when using wet basement steps as our clients often report injuries due to slippery stairs. Use bleach as a disinfectant when cleaning. The sooner you dry and air out the flooded area, the less likely you are to have mold. Discard any contaminated food and porous items (i.e. pillows) that were saturated with sewage.

## Select Case Keyword

Select a case from this list to learn more about it:



# Sanitary sewer overflows



## What are Sanitary Sewer Overflows?

A sanitary sewer overflow can spill domestic wastewater out of manholes, onto streets and into stormwater systems or surface water bodies before it is able to reach a treatment facility.

## Why Do Sewers Overflow?

Although wastewater facilities are permitted and designed to safely and properly collect and manage a specified wastewater capacity, obstructions or extreme conditions can cause SSOs.

When the flow of wastewater is obstructed in the pipe, the wastewater may then back up and overflow through a manhole, cleanout, toilet, sink or drain. This overflowing wastewater may then make its way into the environment, a house or a business.

Contributing factors may include:

- » Too much rainfall infiltrating through the ground into leaky sanitary sewers, which are not intended to hold rainfall. Excess water also can flow through roof drains connected to sewers or poorly connected sewer lines.
- » Blocked, broken or cracked pipes and other equipment or power failures that keep the system from properly functioning. Tree roots can grow into the sewer. Sections of pipe can settle or shift so that pipe joints no longer match. Sediment and other material can build up and cause pipes to break or collapse.
- » A deteriorating or aging sewer system that can be expensive to repair. Some municipalities have found severe problems, necessitating costly correction programs. DEP has a State Revolving Fund Program that provides low-interest loans for investments in water and sanitation infrastructure upgrades.

## Why are SSOs a problem?

A key concern with SSOs entering rivers, lakes or streams is their negative effect on water quality. The overall impact of wastewater discharges to surface waters is fortunately temporary. Our bays, rivers and gulf are constantly moving, which results in the dissipation and dilution of wastewater contaminants in a few days.

The Florida Department of Health issues health advisories when bacteria levels present a risk to human health, and may also post warning signs when bacteria affect public beaches or other areas where there is the risk of human exposure.

Because SSOs contain partially treated (or potentially untreated) domestic wastewater, ingestion or similar contact may cause illness. People can be exposed through:

- » Direct contact in areas of high public access
- » Food that has been contaminated
- » Inhalation and skin absorption

## How Can SSOs Be Reduced?

SSOs can be reduced by:

- » Sewer system cleaning and maintenance.
- » Reducing infiltration and inflow through system rehabilitation and repairing broken or leaking lines.
- » Enlarging or upgrading sewer, pump station or sewage treatment plant capacity and/or reliability.
- » Construction of wet weather storage and treatment facilities to treat excess flows.
- » A few SSOs may be unavoidable, including those occurring from unpreventable vandalism, some types of blockages and extreme rain events.
- » Permit holders do have bypass provisions when human health and safety are at risk and there is no feasible alternative. The utilities are required to notify DEP within 24 hours if they need to use those provisions.

continued

## How does DEP respond to SSOs and resulting discharges to surface waters?

After DEP has received final data from the utilities regarding their wastewater releases, environmental specialists will review the data to assess the situation and the overall impact to the environment when considering whether to take additional action. Specialists will be evaluating many factors, including:

- » How serious was the violation?
- » Is it a first-time violator or a chronic offender?
- » Was the violation inadvertent or beyond reasonable control?
- » Can any damage to the environment be undone or remediated quickly?

For example, DEP takes into account the severity of the rain event, was it a hurricane or a storm, or if the area had received an unusually large amount of rainfall beyond historical averages. If the discharge was caused by an operator error, or lack of a certified operator on-site at the time, the department may consider additional training for operators to prevent similar errors from occurring in the future.

In some circumstances, the department will meet with utilities to discuss infrastructure repairs and process improvements the utility is making and planning to implement in order to avoid further discharges.

Most of the cities and counties that are having wastewater issues are investing millions of dollars to upgrade their infrastructure, but these are complex and costly projects that take time to complete.

# **Sewer Toolkit:**

**A guide for sanitary sewer  
maintenance policies and  
procedures**



## **SANITARY SEWER SYSTEM ASSESSMENT**

### **What is this tool?**

The Sanitary Sewer System Assessment is a form that helps your utility identify and document all of the components in your utility's sanitary sewer system. It can also serve as a record of the established programs and practices related to that system.

### **Why should you complete it?**

Completing the system assessment provides the utility with comprehensive, up to date information on its municipal sanitary sewer system. It is very difficult to effectively operate and maintain your sanitary sewer system if you have no information about the components of that system. Too frequently, the history and information about a utility's sanitary sewer system are stored in an employee's brain and not written down anywhere. The greatest benefit to completing this tool will be having up to date information about all aspects of the utility's sanitary sewer system in one place available for anyone needing that information.

Utilities that do the assessment will be a step ahead when Capacity, Management, Operation, and Maintenance (CMOM) rules eventually become law. CMOM refers to rules that were proposed by the Environmental Protection Agency regulating municipal wastewater systems. They are part of a larger EPA program to eliminate the environmental effects of sanitary sewer overflows. The proposed CMOM rules expand the duties of owners/operators of municipal wastewater collection systems. Utilities that have system documentation in place prior to adoption of the proposed CMOM rules will find complying with the deadlines in the rules less burdensome.

### **Who should complete this document?**

This document should be completed by the employee(s) or contractor who is most familiar with the utility's sanitary sewer system. It should be completed in the manner that is most effective and efficient for your utility. One person could complete the entire assessment document over time, the various sections could be given to different employees and then compiled upon completion, or perhaps this would be an appropriate assignment for an intern in the public works or wastewater area.

### **What do we do with it after it's completed?**

Use it! Keep the assessment and use it as a reference tool for your utility's sanitary sewer system policies and practices. Remember, like any other policy, this is a living document and should be reviewed and updated periodically.

## I. Purpose

This Sanitary Sewer Overflow Response Plan has been prepared in accordance with FDEP regulation 62-604.550. The purpose of this SSO Response Plan is to ensure proper SSO reporting and minimize the adverse effects that may be caused by a Sanitary Sewer Overflow.

This plan is effective beginning on \_\_\_\_\_  
Date: mm / dd / yy

This plan will be reviewed and/or updated annually to incorporate any changes in contact information; system components; and/or personnel.

## II. Objectives

The objectives of this plan are listed below:

- To protect the public health and the environment
- To meet regulatory and permit requirements
- To develop and implement procedures to mitigate the effects of an SSO
- To protect collection system and wastewater treatment personnel
- To ensure the longevity of the collection system and wastewater treatment plant equipment
- To protect both public and private property
- To minimize regulatory enforcement and/or penalties, resulting from a spill/SSO
- To provide appropriate customer service

Wind Tunnel October 15, 2014 6:23 pm

Updated: October 15, 2014 6:31 pm

# City planner wants to stop wind tunnels created by some skyscrapers



By Minna Rhee  
Reporter Global News

TORONTO – The city's chief planner is all too aware about the wind gusts that have been created in isolated spots across the city because of the city's tall condo buildings.

And she says in the coming months, the city will be taking steps to stop the wind tunnels.

"We'll be introducing, likely within the next 12 months, specific development permit bylaws in specific areas within the city," Jennifer Keesmaat, the city's chief planner said. "[The winds are] a result of the built form, that's absolutely true. This is a condition that we've created unfortunately."

When the wind hits a tall building it can be pushed down towards the sidewalk where it swirls around and creates wind tunnels throughout Toronto. It's called the Venturi Effect or Downwash.

"As these buildings get higher, this vortex effect – as you have wind shedding off the sides of the buildings, create small little vortices that will have an influence at the ground level," Dr. Paul Walsh, a professor of Aerospace Engineering at Ryerson, said.

It's no secret that the city is building taller buildings, but at what cost? Toronto's rapidly rising neighbourhoods are having a direct impact on the comfort of Torontonians.

"More and more we're becoming like Chicago, the windy city," David Clarkson, the manager of Kit Kat Italian Bar & Grill on King Street said.

He said menus, chairs and glasses have been blown off of tables in recent years. The only reason they don't blow into the streets is because they're being weighed down by heavy plates.

The King Street patio used to bring in over \$4,000 a day for close to two decades, Clarkson said. That is, until the condo boom hit.

Kit Kat doesn't even put up their overhead awning anymore – the high winds cause it to sway dangerously.

"Overall I blame the city. The city's the one who allows these developers to come in and do it – and just taken their word that they've done wind studies and here's the proof that it's affecting businesses in the area," Clarkson said.

Global News used a wind-measuring device called a anemometer to measure wind speeds in downtown Toronto and clocked gusts between 30-45 km/hr at the southwest corner of the 55-story Four Seasons Hotel.

Wind speeds of less than 5 kilometres and hour were measured just north of that same building.

But not all tall buildings create wind tunnels. On dozens of buildings downtown, the tall portion is inset from the road considerably. The lower portion, often five to six storeys in height, is called a podium. It acts as a windbreaker – sending the downward gusts spiralling back up again.

“So here we are at York and Bremner, surrounded by dozens of tall buildings. And yet, with the canopies, the wind is still very light,” Walsh said referring to the large glass canopies jutting from the perimeter of many of the nearby towers. Their purpose is to deflect the wind.

The City of Toronto adopted a Tall Building Design Guideline in May, 2013. Section 4.3 of the 92 page document is dedicated to mitigating wind, but adherence isn't enforceable.

“The way the system works today, the architectural team and developer, hires a consultant to undertake a wind study, and in the context of that study, indicated that the condition would be comfortable, but clearly it's not.”

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### AMBER ALERT

Police said a six-year-old girl abducted in Saskatchewan requires medication every 12 hours and missing a dose could lead to extreme medical distress. [READ MORE: https://trib.al/bTSKBiQ](https://trib.al/bTSKBiQ)



# What damage can skyscraper air turbulence do?

## A Study prepared for The Vauxhall Society

What's one thing we can't do without, is there to enjoy and yet can harm our environment and hurt or even kill us?

Answer: air. A cooling breeze on a hot day brings a smile to the face. But moving air can also become a ferocious, unseen force, pushing, shoving, and tugging at our clothing. Even that kind of air can be bracing, say at the coast and overlooking the open sea.

However, there are wind factors that trouble aerodynamicists, wind farm engineers, architects and others. These factors are the energy and the force to which wind can subject people and buildings. With its invisible might, wind can and does destroy both. These are matters that should concern you if you live, work or are responsible for people and services in Vauxhall and much of Wandsworth.

### **When wind and skyscrapers meet**

Skyscrapers can be slender, elegant marvels of engineering and design. Designers subject model skyscrapers to wind-tunnel tests to see what effect real wind might have on a real structure.

If the designers get things wrong or do not look deep enough, there could be real trouble.

It quickly became clear that designers got the Millennium Bridge wrong. No lives were lost, and it was relatively simple if expensive and time-consuming to rectify.

Tall buildings are different from low bridges. Once built, skyscrapers are much harder to put right. So is the damage that such buildings can do, to people, to property and even to whole neighbourhoods.

Take Canary Wharf, a grandiose development to which the Mayor's Vauxhall, Nine Elms & Battersea Opportunity Area is often compared. When it's windy it can be very unpleasant on the streets of Canary Wharf, such is the wind turbulence the tall buildings create at ground level.

Luckily, Canary Wharf's shops were built underground.

But this turbulence is not confined to the surrounding streets. The downwind area affected by these tall buildings extends along the River Thames. Few seem to know for how far, or how strong the effects.

### **Never mind rainchecks, let's have wind checks**

How thorough, then, are checks on the impact of a tall building on wind conditions to the lee side in the building's immediate vicinity, let alone around clusters of such buildings or in communities some distance away? Answer, these checks may not be as thoroughgoing as you might think.



Wind is volatile, tricky, and tall buildings make it even more so. Conditions in a given area will change depending on the speed of any surrounding wind or winds. Patterns of wind may move around and interact in surprising ways.

The overall extent (or reach) of tall-building wind turbulence can extend well beyond the immediate surroundings of any one structure or group. A kind of wind 'shadow' or 'plume' can be generated, invisible to the eye unless accompanied by dust storm.

A place in the lee of a tall building may be calm when the wind is moderate, but should wind-speed change, conditions can veer from calm to unpleasant and even threatening. Gales and storms are hardly unknown, even in Vauxhall.

Whirling pollen may increase health and allergy risks. Air quality suffers as pockets turbulence trap pollutants and fine particulate matter. Trees shed branches or just keel over.

All these things can and do happen, often at a distance from the buildings that create or exacerbate the necessary wind conditions. Wind turbulence in the form of swirls, gusts and high-speed-wind valleys is caused by the mass, orientation and shape of a building interacting with the prevailing wind directions and speeds.

But what if there's more than one skyscraper?

What happens if we have other tall structures near that building?

Well, each structure introduces a down-wind effect of its own; they then all interact and combine in some way. That effect can be disruptive, if not damaging, to buildings and roofing. Leisure spaces may become unwelcoming. Pedestrians may be buffeted or blown over and injured, or hurt by falling debris such as roof tiles.

Such things may have been unknown before the arrival of a tall-building cluster.

Is anybody telling you what effects such a cluster could have over what size area as the Vauxhall riverside disappears under skyscrapers?

Does anybody really know?

If so, they have yet to come forward.

Trouble waiting to happen in Vauxhall and beyond?

There is, I suggest, trouble waiting to happen in Vauxhall, indeed throughout London. This is because UK planning policy for tall structures does NOT require any assessment of the impact on the area down-wind, except in the immediate vicinity. Today's town planners give priority to 'pedestrian comfort' in the street below; the well-being of the community beyond is rarely considered.

This continuing failure to require an adequate assessment of the 'bigger picture', the effect on the extended area, ignores the potentially-disastrous combined impact of the addition of one tall building

to an existing structure – let alone, as in Vauxhall, a cluster of them.

Planning policy, I suggest, must include better-informed and fairer expectations, guidelines and research requirements. We need to know a design proposal's total 'urban wind effect'.

As far as I know (and I would welcome being corrected if I'm wrong) the wind-assessment reports prepared for planning proposals today are limited to assessing only the impact on resident and pedestrian 'comfort' not much further than the other side of the street.

### **Do planners ask for thorough wind-speed assessments?**

Yet even here, you're lucky if a real wind-speed assessment is done at the proposed construction site. Wind-speed data is gathered, but may be presented to (and accepted by) local authority planners in a form convenient to investors and developers. Peak wind speeds (as in gusts) may be excluded. Questionable assumptions may be made as to the condition of the wind as it approaches a tall-building site.

Yet tall structures can affect wind conditions far beyond their own neighbourhood, especially during seasonal gales.

As things stand, however, the science of urban wind engineering and tall structures is so little-consulted that makers of planning policy can afford to ignore or work around it.

The consequences for an area such as Vauxhall, as we have seen at Canary Wharf, will be unsettling, to say the least.

The 'downwind community' of the Vauxhall Cross/Nine Elms skyscraper clusters, for example, could well include the Kia Oval cricket ground, which stands a mere 500 metres from the nearest proposed tall structure. This is the 32-story block proposed for 30-60 South Lambeth Road, opposite (and shading) Vauxhall Park and its massive trees.

There are many other planning applications under consideration for tall structures within far less than 500 metres of 30-60 South Lambeth Road.

### **Building risks into skyscraper clusters**

Until wind-effect assessment for tall buildings becomes more thorough and less selectively self-serving, we are building risks into skyscraper clusters. Everything may turn out right. But what if it doesn't?

Who might suffer, where, when and how? What architect, builder, developer, investor or local-authority official would be held liable?

Few people, it seems, are pausing to ask, let alone answer such questions. Skyscrapers = 'regeneration', and 'regeneration' = 'recovery', so we're told 'upwards' = 'onwards'.

We should not be so 'blindly led' that future generations see us as 'the fools that followed'.

Community groups should start asking questions of the tax-funded planning bureaucracy, the councillors and Mayor of London too.

The Mayor's London Plan is the policy framework behind all these 'regeneration' schemes that, like ours in Vauxhall, is based upon attaining increased urban residential density through clusters of tall buildings.

Yet the London Plan bysteps the impact of such clusters on the broader, urban wind environment and the effects on communities such as ours.

### **How can community groups respond?**

- Begin by demanding a comprehensive urban wind-impact assessment for each and every proposed building more than five floors high and for an area of at least a mile
- The study should take into account the overall impact on wind conditions in the entire area that exists, downwind of the site of the proposed tall building
- Planning policy and planning applications require extensive evaluation of the impact on views, especially heritage views. Yet there is no assessment of altered wind conditions on the broader community. We should expect the same standard of assessment for the living conditions and environment of people living in that view, downwind of any group of tall buildings
- Developers and planners should be required to measure wind-speeds accurately, during all four seasons, on location and over an extensive area
- Studies should take into account the condition of wind as it approaches grouped buildings, as well as of wind conditions downwind of a proposed construction site
- Push your representatives in local and central government to ferret out the facts on high building-induced wind turbulence, make those facts widely available, and to enforce a planning system in which fairness to people is not in inverse proportion to the distance they live from tall buildings.

That's how you put wind effect at the centre of planning policy on skyscrapers.

*Brian Vos*

At the time of writing, neither the author nor The Vauxhall Society has received the courtesy of a reply from any official, planner or professional organisation approached for help with the preparation of this paper.

### **NOTES**

#### *WHAT CAN HAPPEN WHEN WIND-SPEED MEASUREMENTS ARE SKIMPED*

West Yorkshire, 1965, three of Ferrybridge C power station's eight cooling towers vibrate then collapse and the other five are wrecked in 85mph gusts. The towers had been designed to withstand higher wind speeds, but were tested for average wind speeds over one minute, neglecting shorter gusts. The grouping of the cooling towers funnelled westerly winds into the towers themselves to create a vortex. Nobody hurt.

*INTERNATIONAL ACADEMIC RESEARCH – WHY NOT TAKE A LOOK AT VAUXHALL?*

International academic research institutions actively study wind in towns overseas.

An opportunity may exist to propose Vauxhall as a good site for such research.

Vauxhall presents unique characteristics that condition the wind before it reaches the cluster of tall buildings built or proposed for Vauxhall Cross/Nine Elms.

The direction of prevailing winds aligns with the widely-fluctuating level of the tidal River Thames, an approximate 220m-wide basin of cold water, varies in depth with the tides by about 5.5m.

### *THE NEW US EMBASSY: AT RISK FROM TALL BUILDINGS?*

The relocation of the United States embassy to Nine Elms within about 1 km of Vauxhall Cross raises security questions for any development nearby.

There is a case for designating each tall building a security risk, and for assessing them individually and as a group.

The risk to be assessed is that, in providing access to high-points near the 'Embassy Quarter' and within that area's prevailing winds, that tall buildings nearby could become a target for terrorist attack, or worse still, a platform for releasing toxic contaminant into the atmosphere.

For a report on what can happen within 1km: Atmospheric Dispersion from Releases from Releases in the Vicinity of Buildings – C. Walsh & J. A. Jones, June 2002 (ISBN 0 85951 487 0)

National Radiological Protection Board

### *ACADEMIC/SCIENTIFIC RESEARCH*

Tokyo Polytechnic University  
Tall Buildings and Urban Habitat:

UK GOVERNMENT abolished the Commission for the Built Environment and the London Development Agency, reassigning their responsibilities to, among others, the Greater London Authority.

The Localisation Act devolves responsibilities from central & regional to more local authorities, such as the GLA. The ensuing political disruption may present an opportunity to influence Planning Policy, with regard to the importance of Tall Buildings and Urban Wind Impact, presently not considered as having much importance, if at all.

### *SOME ORGANISATIONS*

RWDI – Consulting Engineers – 'The science of buildings, structures and environment' – Authors of 30-60 South Lambeth Road Wind Assessment report, WES affiliates  
WES – UK Wind Engineering Society

WES is affiliated to the Institution of Civil Engineers  
See also profile

WES is also affiliated to the International Association for Wind Engineering

The American Association for Wind Engineering  
Council on Tall Buildings and Urban Habitat  
Working Group – Wind Engineering

### *UK AUTHORITIES*

Note the trend towards limiting the scope of wind impact to the immediate vicinity for 'pedestrian comfort', no consideration of broader impact on areas downwind of a tall building or group of tall buildings.

UK Government Select Committee on Tall Buildings 2001/2  
CABE – Commission for Architecture and the Built Environment – (abolished 2011)  
London Development Agency – (abolished March 2012):  
Greater London Authority – the Mayor and London Plan

### *SOME USEFUL DEFINITIONS*

Downdraft – the wind that flows down and around the face of the structure, causing a 'Wind Tunnelling', high-speed winds around the base of the building.

Eddy, eddies – small, relatively speaking, swirls of air, in a turbulent flow.

Laminar flow – smooth and even airflow

Leeward – Downwind of any structure or location point

Turbulence – Unstable flow of air, experienced as buffeting or gusts

Vortex – a volume of air that may be swirling

Wind shear – changes in wind speeds and directions in a 3d spatial volume (a space)

Wind wake – the effect of wind in the area downwind of a structure. The character of the area depends upon factors such as wind direction/speed, and whether the approaching wind is turbulent or not

Wind channelling – this happens when the wind is accelerated between two buildings or along streets with buildings along either side.

Wind Valley – similar to a channel, but wider

# Limitations of Building Codes: Interference Effect

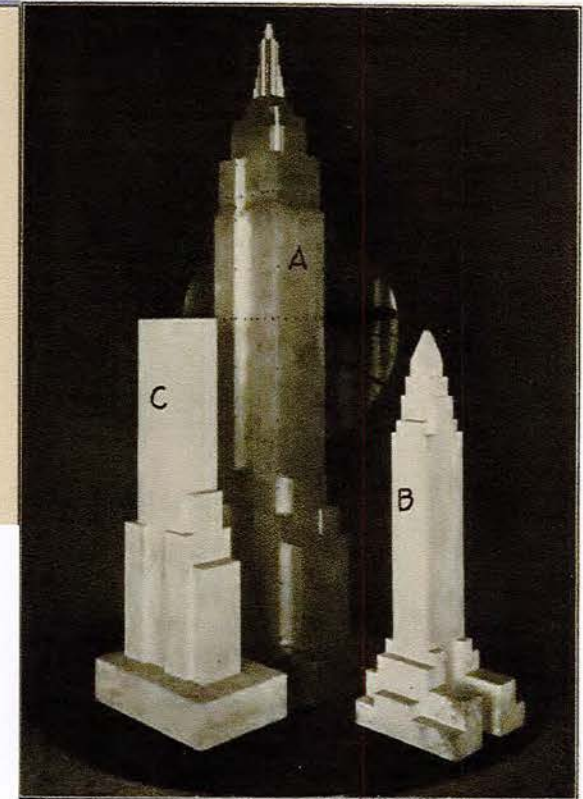
U.S. DEPARTMENT OF COMMERCE BUREAU OF STANDARDS

RESEARCH PAPER RP637

*Part of Bureau of Standards Journal of Research, vol. 12, January 1934*

INFLUENCE OF NEIGHBORING STRUCTURES ON THE  
WIND PRESSURE ON TALL BUILDINGS

By C. L. Harris <sup>1</sup>



# Technical Notebook: The Venturi Effect

Why claims professionals need to make peace with the laws of physics.


By Charles C. Roberts, Jr., Ph.D., P.E. | February 19, 2014 at 07:37 AM

**f** Insurance claims personnel are often asked to consider whether damage to a building is related to excessive wind forces or whether a structure is deficient in its capacity to resist wind. Extending or denying wind damage related coverage is linked to the expected wind loading on a structure. Wind velocity data is often obtained from weather station reports obtained from instrumentation in open country. This data may or may not be reflective of the actual wind speed at the claimant's loss site. A wind speed of 70 mph may not be sufficient to cause damage to the claimant's properly designed and maintained structure, yet a wind speed of 90 mph may be damaging. A condition at the loss site that can cause higher wind speeds than that reflected by open country wind speed data is called the Venturi effect.

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 (<http://www.aimreprints.com>)

# The problem with the skyscraper wind effect



copyright PA

Image caption Complaints about wind near the Walkie Talkie have prompted action by the City of London

The City of London is promising that high-rise buildings will be monitored to ensure they don't make conditions unbearably windy in surrounding streets. But why do skyscrapers have this effect and what can be done to alleviate it?

Anyone who has ever walked near a very tall building in the middle of a city on a windy day will have noticed a strange effect.

The wind is often much more intense around the base of the tower.

And the [growth in high-rise structures](#) is generating more concerns. The City of London Corporation has promised a more "rigorous" assessment of developers' predictions of ground winds, following [complaints about strong gusts](#) outside the 20 Fenchurch Street Building, better known as the Walkie Talkie.



"I almost got blown over the other day walking up past the building," a sales assistant working nearby said [earlier this year](#). "When I got around the corner it was fine. I was scared to go back."



Image copyright Getty Images

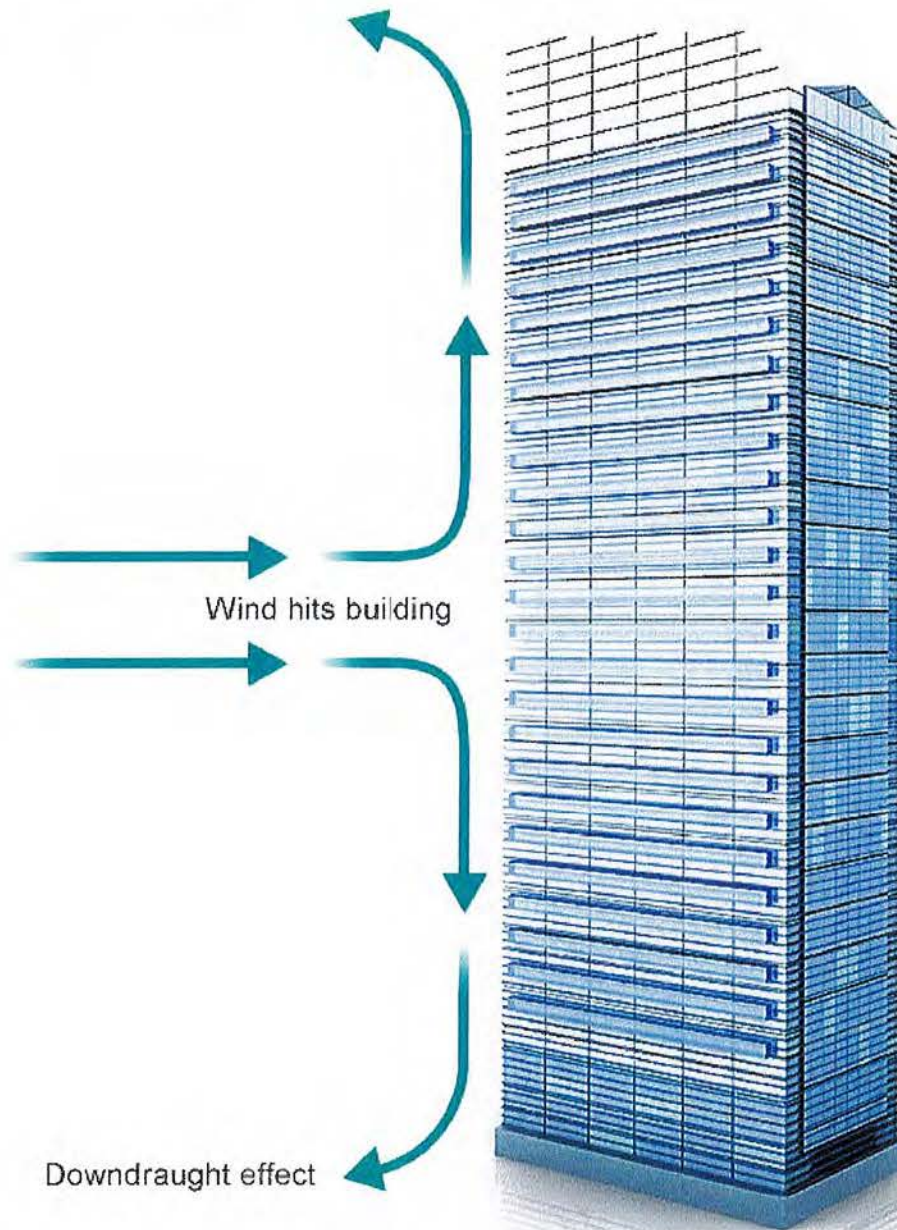
Image caption Dubai's Burj Khalifa, the world's tallest building, was tested for effects on ground winds

Toronto in Canada has suggested bringing in by-laws to ensure planning for skyscrapers takes into account the risk of street winds.

In Leeds, 35-year-old Edward Slaney was crushed after [strong winds toppled a lorry](#) near the 32-storey Bridgewater Place, the city's tallest building, in 2011. This was one of several incidents, some resulting in injuries, reported to the council.

Accelerated winds near skyscrapers are caused by the "downdraught effect", says Nada Piradeepan, an expert on wind properties at engineering consultancy firm Wintech. This happens where the air hits a building and, with nowhere else to go, is pushed up, down and around the sides. The air forced downwards increases wind speed at street level.

## The downdraught effect



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**BBC** Image

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Image caption This graphic is not an exact representation of the point at which wind hits buildings, but an illustration of the overall downdraught effect

There is also an acceleration of wind around the side of the buildings if it has [completely square corners](#).

And, if several towers stand near each other, there is an effect known as "channelling", a wind acceleration created by air having to be squeezed through a narrow space. This is a form of the [Venturi effect](#), named after the 18th-19th Century Italian scientist Giovanni Battista Venturi.

"These different effects can combine to create faster-moving wind. It's complex," says Piradeepan. "The downdraught effect is most strong where buildings stand face-on to the prevailing wind, which in London is from the south west." More rounded buildings, such as [London's Gherkin](#), don't have quite the same downdraught effect and don't encourage an increase in wind speed around them, as the air doesn't accelerate around corners, he adds.



Image

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Image caption A man died after winds next to Bridgewater place in Leeds toppled a truck

The City of London has fewer skyscrapers than New York but much of its layout is based on [medieval street patterns](#). Its narrower roads mean it concentrates the wind through channelling more than happens in New York's generally wider streets and avenues, says architect Steve Johnson.

Architects test skyscraper designs in [wind tunnels](#) to ensure there would be no damage to structures. But the potential effect on people living and working down below is becoming more of a focus for study, says Johnson.

Dubai's [Burj Khalifa](#), the world's tallest building at 828m (2,716.5ft), underwent "micro-climate analysis of the effects at terraces and around the tower base" before opening in 2010.

In Toronto, the broadcaster Global News [measured gusts](#) of between 30kmph (18.6mph) and 45kmph (28mph) at one corner of the 55-storey Four Seasons Hotel. It detected wind speeds of just 5kmph (3.1mph) slightly north of the building.

As the air at higher altitudes is colder, it can create chillier micro-climates when down-draught from skyscrapers reaches street level. This can be welcome during hot spells, but less so in winter. And, as buildings go higher, [the speed of air hitting them rises](#), increasing ground winds below.

Skyscraper-affected airflow is a relatively new phenomenon in cities like London and Leeds, which were mainly low-rise until recently.

This is not so in New York, where, more than a century ago, residents were complaining of the winds caused by the face of the [Flatiron building](#), then considered tall at 93m (305ft). It was said to [lift women's skirts](#) above their ankles, attracting young men not used to such public exposure. In 1905, a salacious (for the time) film of this phenomenon was made.



Image

copyright ALAMY

Image caption Dwindraught from New York's Flatiron building caused an ankle-revealing sensation

As long ago as 1983 in New York, engineering consultant Lev Zetlin called for [laws to counteract the effects](#) of buildings on street wind.

The City of London Corporation is not going this far, but it is changing the way it works with developers. The level of wind predicted by developers and that which actually occurs can differ "somewhat", says the corporation's head of design, Gwyn Richards. So there's going to be independent verification of studies carried out by developers to ensure they're as "rigorous and resilient" as possible, he adds.

The problem is that, where buildings causing downdraught problems have already been built at great expense, they can't simply be demolished.

Among the solutions on offer are screens to shield people from the wind at street level or even the use of more trees and hedges to break up air flow.

In Leeds, the city council last year granted permission for angled shelters near the base of Bridgewater Place, known as "baffles". But Lindsay Smales, senior lecturer in building, planning and geography at Leeds Beckett University, has said he [doubts much can be done](#) "once you've built a tall building like that to mitigate the problems of micro climate and the effect of the wind".

Concerns were raised over the proposed [15-storey Lumina tower block](#) in Birmingham and a [27-storey building in Manchester](#), both of which gained planning permission last year.

As downdraught happens most where buildings are square-on to wind, would changing their angles be a good idea?

Johnson is inspired by the example of a far more low-rise place, the seaside resort of [Whitstable in Kent](#), famed for its oyster trade and now home to offshore wind farms. Some of its street layout was designed to be at 45 degrees to the prevailing wind so that there's not such a wide section facing it, he says.

"None of these problems are new," Johnson says. "The ancient Greeks and Romans knew something about the effects of wind on buildings. It's just that, unlike today, they didn't try to build enormous skyscrapers."

## Giovanni Battista Venturi (1746-1822)



Image

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Italian scientist who was a professor at the University of Modena in Italy

Researched sound and colour, but is most famous for his work on hydraulics

He first noted [the effects of constricted channels on fluid movement](#)

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# WIND IS A MAJOR CHALLENGE IN DESIGNING TALL BUILDINGS

By MATTHEW L. WALD



Page 001042  
The New York Times Archives

Winds like those that accompanied Hurricane Gloria on Friday do not threaten to topple multistory buildings, engineers and building officials say. But designing those buildings so that they will not sway or lose parts of the facade is a major challenge.

Wind is a bigger strain on multistory buildings than gravity, according to engineers.

"Most tall buildings today are over-engineered in terms of their ability to handle the gravity load, because the wind governs," said Irwin G. Cantor, whose firm is one of New York's most prominent structural engineering companies.

Since the construction of the 60-story John Hancock tower in Boston in the early 1970's, he said, far more attention

has been paid to the effects of wind. In 1975, after three years of glass shattering caused by high winds blowing out the building's windows, the builders removed all 10,344 windows and replaced them with specially tempered panes at a cost of \$7.7 million.

Mr. Cantor's company and others build scale models of proposed buildings, filled with pressure sensors and set amid other buildings that would surround them. The models, which then make up entire neighborhoods, are set in wind tunnels and rotated slowly, often with smoke blown in to give visible evidence of currents.

## Partial Vacuums and 'Hot Spots'

"You get unusual answers in wind tunnels," Mr. Cantor said. Wind changes direction as it rounds a corner or eddies, creating partial vacuums on the lee side of a building that can make windows fall out. The sensors can also show spots where pressures can be 50 percent higher than average.

"The profession is working hard, especially researchers, in developing techniques to determine how a building's going to react in wind, just as well as how it's going to support the gravity load," said Lynn S. Beedle, a professor of civil engineering at Lehigh University who is director of the Council on Tall Buildings and Urban Habitat, which is sponsored by architects, engineers and planners.



New York City requires that buildings up to 100 feet high be designed to withstand wind pressures of 20 pounds to the square foot, equal to winds of about 90 miles an hour.

Buildings from 100 feet to 300 feet high must be built to handle loads of 25 pounds to the square foot, or 100 mile-an-hour winds; buildings 300 to 600 feet high are required to meet loads of 30 pounds to the square foot, equivalent to 110 mile-an-hour winds, and buildings 600 to 1,000 feet high must be designed for 35 pounds to the square foot, or 118 mile-an-hour winds. #3 Buildings Exceed 1,000 Feet New York also requires buildings over 1,000 feet high to handle loads of 40 pounds to the square foot, or winds of 127 miles an hour. But there are only three such structures: the Empire State Building and the two towers of the World Trade Center.

The theory behind the requirements is that taller buildings generally face greater wind pressures.

"All this translates into weight," said Charles M. Smith Jr., Commissioner of Buildings in New York City. "To brace buildings against wind, you must add material."

There are separate requirements for the building skins of steel, masonry or stone, and they are usually stricter than the requirements for the structure itself.

#### Swaying Must Be Limited

According to engineers, keeping the buildings from being blown over is an easier task than preventing them from swaying. Sway must be limited because it can cause cracks in interior walls and break windows.

The acceleration is measured in G's, with one G representing the normal force of gravity.

According to Mr. Cantor, most builders would design for movement of no more than 23- to 25-thousandths of a G in an office building, and 15- to 17-thousandths of a G in a residential building. The movement would be less below the top floor.

The motion is often at right-angles to the direction of the wind, because of the eddies created on either side of a structure when wind strikes its face.

"When it's blowing in one direction, the building is going to find it difficult to come back," said Professor Beedle, explaining the right-angle swing.

#### Frequency of Wind Gusts

Another factor in planning for stability is to assure that the building's natural frequency, the rate at which it swings back and forth, does not coincide with the frequency of wind gusts. Engineers say this is equivalent to a child's pushing a playmate on a swing and adding force at exactly the right moment on each cycle, pushing the swing higher and higher.

The natural frequency of a building can be changed by altering the height or stiffness.

Two methods are in common use for stiffening buildings: using columns or beams heavier than what gravity requires, and installing diagonal braces, either internally or externally. Steel buildings, because they are less massive than concrete ones, often require more bracing.

A few tall buildings, including the Citicorp Building in New York, have installed "tuned mass dampers," which reduce the sway by not moving as the building does. Many others, including the World Trade Center, use a "viscous damper," material at the joints that does not transmit force as easily.

Professor Beedle says future buildings might use a structural aspect to break up the wind. "If you put a hole through a building, it obviously breaks that up," he said, raising the possibility of gaps five or six stories high in a building's face. "It exists on drawings, and it's something that they would certainly seriously consider if you got above 110 stories," he said.

# Architecture View; A Novel Design And Its Rescue From Near Disaster

By PAUL GOLDBERGER



Page 002034  
The New York Times Archives

ONE OF THE MOST EXTRAORDINARY stories in contemporary American architecture is that of the John Hancock Tower in Boston, a glass slab that for years was known less for its architecture than for the fact that while it was under construction its windows kept tumbling out onto the street. They did not all fall out, but so many of them cracked, broke and were replaced with a temporary sheet of plywood that it was common to hear Bostonians call the tower the U.S. Plywood Building. Eventually all 10,344 original panes of glass in the 60-story building were replaced with a different kind of glass, and in 1976 the building finally opened, five years behind schedule.

The Hancock Tower had other problems as well. The excavation for its foundation caused problems for Trinity Church and

the Copley Plaza Hotel, the building's venerable and architecturally distinguished neighbors on Copley Square. Once its structure was completed, engineers found that the building, whose rhomboid shape is narrow and exceptionally long, swayed in the wind more than most towers. And then it was discovered that, despite the fact that the Hancock's structure fully complied with all building codes, there was actually a small possibility that the building could topple over.

The Hancock could have been considered jinxed had it not been for the fact that, once its structural problems were finally solved, the building was revealed to be a tower of compelling beauty. As time went on, the esthetic quality of the design, which was the work of Henry Cobb of I. M. Pei & Partners, came to the fore, and the problems, immense as they were, were gradually forgotten. The Hancock tower is now justly celebrated as one of the great American skyscrapers of the 1970's, and many a Bostonian today barely remembers that 15 years ago, when the glass began to fall out, the building was an object of mockery more than of admiration.

It was to find what could be learned from the disaster and rescue of the Hancock Tower that Robert Campbell, the thoughtful architecture critic of *The Boston Globe*, recently conducted a series of interviews with an engineer and an architect who were close to the project. The interviews, which were published in *Architecture*, the journal of the American Institute of Architects, are a more significant journalistic achievement than they might at first appear to be, since despite the Hancock building's notoriety, its full saga has never been told. The reason for this is simple: as part of the 1981 settlement of the complex web of lawsuits that resulted from the

Hancock Tower's problems, all of the parties involved in the design and construction of the tower agreed legally to refrain "in perpetuity" from any public discussion of the building's problems.

This included the architects, the engineers, the various contractors, Libbey-Owens-Ford, which was the company that manufactured the glass, and the John Hancock Life Insurance Company itself. This enforced silence has protected from any public blame those responsible for the problems, and worse still, it has meant that for 15 years it has been impossible for other engineers and architects to learn from what Mr. Campbell, with understatement, calls "perhaps the most celebrated American building failure of its decade."

Mr. Campbell's interviews are with William LeMessurier, a well-known structural engineer who heads his own firm, and Victor Mahler, an architect and specialist in glass curtain walls who was formerly with the I. M. Pei firm and is now a consultant. Both men had some involvement in the Hancock building, Mr. LeMessurier as an independent consultant hired by Hancock to review the structural plans before construction began, to be sure that they adhered to the building code, and Mr. Mahler as a member of the I. M. Pei office. Neither man was involved in the lawsuits, however, and as a result neither felt bound by the nondisclosure agreement. (For a long time, they had chosen not to speak in detail publicly on the subject, and oddly, they had not until recently been asked to do so.) Their remarks to Mr. Campbell are fascinating, but startling. They reveal the astonishing extent to which engineers, contractors and manufacturers were treading on uncertain ground in the construction of this building - which Mr. LeMessurier and Mr. Mahler demonstrate was a great deal more troubled than had been publicly known. The science of testing for the effects of wind, which has become quite sophisticated in the last decade, was relatively primitive in the years when the Hancock Tower was designed, and neither engineers nor building codes took into account the effect of gravity on a building that had already begun to sway slightly in the wind. Mr. LeMessurier reveals here that Bruno Thurlimann, a Swiss engineer who was an expert on steel structures, and A. G. Davenport, a Canadian expert on wind engineering, discovered a problem with the Hancock Tower far more dangerous than the falling windows - the unnerving possibility that in certain wind conditions the Hancock Tower had some risk of total collapse.

Even more bizarre than the simple fact of collapse was the specific kind of collapse the engineers envisioned - that the tower's narrow end could fall, not its long end, as if a book standing upright fell on its binding, not on its face. The long end is more vulnerable to the effects of wind, since it faces into the wind like a sail, but as a result, Mr. LeMessurier explains, it had already been designed to be three times as stiff as the narrow end. The narrow end had less strength to it, and in the original plans engineers failed to take into account the effect of gravity - acting on the weaker side of the structure - as the building swayed in the wind. This could have accentuated the problem to the point of causing the narrow side to collapse entirely.

Ultimately, it took the expenditure of \$5 million and 1,650 tons of extra steel beams to stiffen the vulnerable narrow side. This effort followed the installation of two 300-ton weights called tuned mass dampers, on the 58th floor. These weights stabilized the building and helped reduce its sway in

the wind. The dampers were developed by Mr. LeMessurier and were similar to weights he had placed at the top of Citicorp Center in New York to mitigate the problems of that building's sway in the wind. In Boston, however, the huge weights were not part of the original design but were added after the building was complete since the degree to which the Hancock Tower would sway had not been properly predicted.

Then, of course, there were the famous falling windows. According to Mr. Mahler, the problem came not from the twisting movements of the building's structure, as initially suspected, but from the windows themselves, which were among the first double-layered windows with reflective glass ever produced. Two-layered glass had been a common building material for many years, but reflective glass had been developed only in the 1960's, and the combination of the two represented a new technology.

The real culprit, Mr. Mahler explained, was the tiniest of details -the thin strip of lead between the two layers of glass, which had begun to develop metal fatigue and to crack. Because the lead had been bonded so tightly to the glass, its cracks were transmitted into the reflective chrome coating on the glass, eventually causing the glass itself to crack. The glass that was eventually used to replace the original was single-layered, and unusually thick to compensate for the loss of the second layer; it was also more highly reflective, and as a result it changed the final appearance of the Hancock Tower slightly for the worse. With its original glass, the Hancock building was a relatively flat, muted tower. It is now one with a somewhat more wavelike appearance in its glass. The building is a bit less crisp than it was originally, and less subtle.

What are the lessons of the Hancock story? Does the genuine danger that was apparent in this structure mean that all innovation carries with it a massive inherent risk, or that certain esthetic achievements are beyond the reach of technology? Hardly. It is clear that the Hancock Tower was just a bit ahead of its time: technology developed so rapidly in the years after the tower was constructed that Mr. Cobb's esthetic ideas could have been brought to fruition with vastly less risk just a short while later. And the enormous advances in the last few years in technology and in the sophistication of both engineering analysis and building codes have come in part because of the Hancock Tower's ordeal.

No conclusion would be sadder than to use the Hancock saga as a justification for avoiding novel designs. Our culture has become conditioned to the notion that risk and innovation are at odds with corporate operations, and perhaps the real lesson in the long Hancock tale is that it reminds us of the rewards that can eventually come to those who pursue a different road. It is worth noting here that both Mr. Mahler and Mr. LeMessurier praised Henry Cobb's performance highly, and took pains to make clear that the architectural ideas were not in and of themselves the root of the problem, and that Mr. Cobb had conscientiously led the effort to find a solution. (Mr. Cobb still practices with I. M. Pei & Partners, and went on to design several of the last decade's most distinguished corporate skyscrapers, such as the Allied Bank tower in Dallas.) At the John Hancock Tower, an architect of immense creativity, Henry Cobb, proposed a design of great esthetic power, and eventually engineers made it happen. This was a time when the art of architecture lurched forward rather than leaped gracefully - but it did move ahead, and we remain the better for it.

# Wind and the city: An evaluation of San Francisco's planning approach since 1985

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## Abstract

In 1985, San Francisco adopted a downtown plan on ground-level wind currents intended to mitigate the negative effects of wind on pedestrians' perceived comfort in public open spaces. The plan mandates that new buildings in designated parts of the city associated with high density or development potential be designed or adopt measures to not cause wind in excess of accepted comfort levels. This study examines whether and to what degree the plan has successfully shaped an urban form that mitigates wind by comparing the ground-level wind environment in 1985 and 2013. A series of wind tunnel tests found that during San Francisco's windiest season when the westerly winds are prevalent, the overall mean wind speed ratio measured at 318 locations in four areas of the city dropped by 22%. However, there still exist many excessively windy places that are associated with specific urban form conditions, including streets oriented to have direct exposure to westerly winds, flat façades on high-rise buildings, and horizontal street walls where building façades align. Recommendations based on the findings include incorporating more tangible guidance on the built form conditions, expanding the plan's reach to cover more parts of the city, and learning from strategies used elsewhere. By evaluating the urban form impacts of a wind mitigation policy that has been in place for 30 years, the research offers insights for other cities that have implemented or plan to adopt similar approach and sheds light on issues related to wind comfort in high-density urban areas.

## Keywords

Urban form, wind, outdoor comfort, San Francisco, wind tunnel simulation

## Introduction

Spurred by the residents' strong interest in the quality of the built environment and securing comfort in public open spaces, in 1985, San Francisco became one of the first cities in North America to adopt a downtown plan on ground-level wind currents, supplemented by

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planning codes. The intention has been to mitigate the adverse effects of wind on pedestrians by securing acceptable comfort in areas of public seating and walking (City and County of San Francisco, 1985). The plan focuses on the downtown area and four additional parts of the city, all associated with high density or development potential and substantial pedestrian activities. It has mandated that all new developments or additions to existing buildings located in these areas be designed or adopt measures so as to not cause ground-level wind current in excess of certain wind speed levels. Developers are required to provide in their Environmental Impact Review (EIR) process an in-depth wind tunnel study that examines the effect of the proposed project on the ground-level wind environment in adjacent public open spaces, including streets and plazas. Similar attempts to mitigate the negative impacts of building-induced wind have been enacted in other North American cities, notably Toronto, which benchmarked San Francisco's approach (Bosselmann et al., 1990), as well as New York City, Boston, and Chicago (American Society of Civil Engineers, 2004). Attempts have also been made in Wellington, New Zealand, which introduced wind regulations (Donn, 2011) and Tokyo, Japan, which requires that all projects over a gross floor area of 100,000 m<sup>2</sup> be subjected to wind study (Ng, 2009).

San Francisco's wind planning approach is discussed in numerous studies. Arens et al. (1989) and Arens and Bosselmann (1989) presented how the plan's wind speed criteria were established. A number of planners (Bosselmann, 1998; Gehl, 2010; Gehl and Svarre, 2013; Loukaitou-Sideris and Banerjee, 1993; Marcus and Francis, 1998; Punter, 1999) and building scientists and urban climatologists (Brown and DeKay, 2001; Donn, 2011) noted the significance of the plan in promoting more comfortable public spaces, but proceeded no further. Others attempted empirical analysis of the relationship between wind and comfort in San Francisco (Bosselmann et al., 1988; Zacharias et al., 2004) but without reference to the city's planning approaches to ground-level wind currents.

Despite San Francisco's wind planning having been in effect for 30 years, there have been no studies to our knowledge that have empirically evaluated its effectiveness in making the city less windy, thus promoting comfort in public open spaces. We suspect one reason is because it usually requires at least several decades to witness significant changes in a city's physical form, especially in the American context. Another reason is that collaboration between planning and urban climatology or building science fields, which is crucial to carrying out such research, has been relatively difficult to achieve. Critics comment that this is mainly due to communication problems between planners and scientists and lack of consensus of the role and importance of climate knowledge in planning (Eliasson, 2000; Hebbert, 2014; Willemsen and Wisse, 2007). Recently, the relationship between urban form and wind has garnered academic interest with respect to pedestrian comfort and activity (Lenzholzer and van der Wulp, 2010; Szűcs, 2013), air ventilation of urban areas (Ng, 2009; Ng et al., 2011), and mitigation of the urban heat island (Middel et al., 2014). As climate-responsiveness and resilience of cities are becoming key tasks of planning today, it is time to revisit the plan and examine whether or not such an approach has been successful in accomplishing its primary goal.

This study examines whether and to what degree the plan changed San Francisco's urban form so as to provide a less windy environment, thereby providing more wind comfort in a city with a relatively cool climate and high wind speed levels and where wind is often regarded as an element of discomfort. It compares the wind environments in 1985 and 2013 generated by the changes in the urban form conditions of the two years. Based on the findings, this study identifies urban form conditions commonly found in the windy places and presents policy suggestions. The outcome of this study may provide useful insights for planners, designers, architects, and engineers concerned with creating livable and sustainable

cities, and shed light on wind comfort issues in cities with a high-density urban core or new business districts.

## **San Francisco's wind planning**

### *Climate of San Francisco*

*The coldest winter I ever spent was a summer in San Francisco.*

Although this quote is incorrectly attributed to Mark Twain, it is one of the best descriptions of San Francisco's unique climate. The city is famous for being windier in the summer than in the winter, which is different from many other U.S. cities where winters are usually considerably windier. Temperatures in San Francisco range between 50 and 70°F in summer and 40 and 60°F in winter, but with summer winds, averaging above 11 mph as compared to winter winds of 6 mph, it can feel very cool in summer.

San Francisco is not the windiest city in the U.S. According to the annual wind speed data between 1971 and 2000 provided by the National Climatic Data Center (2005), San Francisco's annual average wind speed is 8.7 mph, substantially lower than that of major U.S. cities that are notorious for fierce winds such as Boston (12.3 mph), Oklahoma City (12.2 mph), Wichita (12.2 mph), and Chicago (10.3 mph). However, the monthly average wind speed of San Francisco in July (11.2 mph), the windiest month, is similar to that of winter winds in Chicago (11.9 mph), which is known as "the windy city," and higher than that in New York (10.8 mph). San Francisco's cool summer temperatures and tall buildings accelerating winds are important contributing factors that make the residents of San Francisco feel windy and cold from mid-spring to mid-fall (Null, 1995).

The Central Valley east of San Francisco plays a key role in increasing the city's wind speed. Mountains of the Coastal and Sierra Nevada ranges ring this 22,500 square mile plain with the only break in the Coastal Range occurring at San Francisco. The Valley's daytime temperatures usually reach 100°F on summer days, and heat waves frequently bring temperatures above 115°F, generating extensive updrafts. Cool air from the Pacific Ocean rushes in through the gap at San Francisco to fill the void created by the updrafts, resulting in high westerly winds in the city.

### *From the Manhattanization of San Francisco to the 1985 Downtown Area Plan*

San Francisco's approach to dealing with wind issues was shaped by the city's unique planning history. Beginning in the mid-1960s when suburbanization was accelerating flight out of many U.S. cities, San Francisco was one of the few cities that saw uninterrupted downtown growth (Vettel, 1985). The amount of downtown office space doubled between 1965 and 1983, mostly accommodated in newly constructed high-rise office towers in the Financial District (Hartman, 2002). This resulted in the so-called "Manhattanization" of San Francisco (Keating and Krumholz, 1991).

Citizens became concerned about the adverse impacts of rapid downtown development and in the 1980s initiated the "Anti-High-Rise Movement" (Hartman, 2002). One concern was the deteriorating environmental quality of San Francisco's public open spaces. Critics argued that existing planning measures, including incentive zoning and design reviews, failed to provide outdoor spaces that made people feel welcome and comfortable (Loukaitou-Sideris and Banerjee, 1993, 1998). Although since the 1970s the city had required wind studies for new high-rise buildings as a part of the EIR process, many downtown open



spaces became uncomfortable places for walking or gathering due to the excessive ground-level winds and shades produced by high-rise buildings (Arens et al., 1989).

In the early 1980s, researchers at the University of California, Berkeley examined the effects of new developments in downtown San Francisco on sun and wind conditions at the street level, evaluating their combined effects on outdoor thermal comfort (Bosselmann et al., 1983). Their findings pointed to many places where the wind environment produced a feeling of discomfort. They recommended that the ground-level wind conditions could be significantly improved through better building designs (Bosselmann et al., 1984).

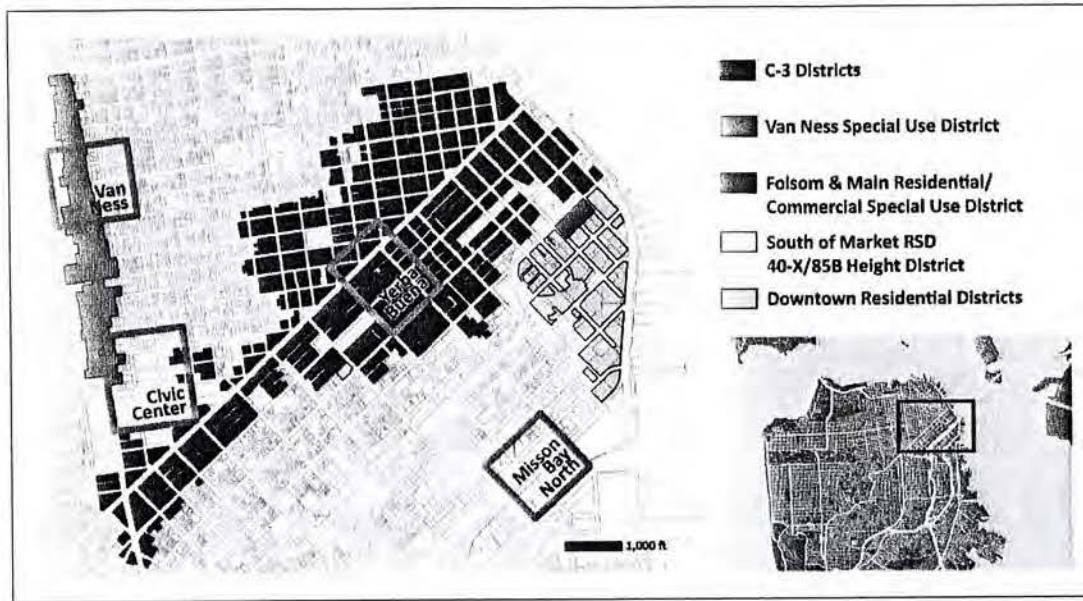
The passage in 1984 of Proposition K, a voter referendum measure known as the “no new shadows” or “sunshine” rules, prevented the development of any structure over 40 feet tall that would cast a shadow on city-owned open spaces. It was followed in 1985 by the adoption of the Downtown Area Plan, enacted as part of the San Francisco General Plan (Lai, 1988). This was not only the first downtown plan in the U.S. to impose limitations on growth (Keating and Krumholz, 1991) but also the first to include concrete planning objectives and policies related to wind and sunlight access, thus regulating the physical form of new developments.

### *Key contents of San Francisco's wind planning*

San Francisco's Downtown Area Plan includes planning objectives and implementation policies on ground-level wind currents and mitigating its adverse effects. Objective 10 and Policy 10.5, in the Open Space element of the Plan, emphasize that minimizing adverse wind is crucial to well-designed open spaces. Objective 14 and Policy 14.2, in the Urban Form element, present the need for creating and maintaining comfortable pedestrian environments by regulating the physical form of new developments that would generate ground-level wind currents in surrounding streets and open spaces. Policy 14.2 also suggests several preferable approaches to building massing and detailing, such as narrow or complex façades and setbacks at various levels.

The Downtown Area Plan is supplemented by the San Francisco Planning Code, five sections of which present the wind planning details: §§ 148, 249.1, 243, 263, and 825. Collectively they provide technical guidelines on wind speed criteria for comfort and safety, preexisting conditions, exceptions, and documentation. They require that new buildings and additions to existing buildings should not cause ground-level wind currents to exceed on a year-round basis the comfort level of 11 mph equivalent wind speed in areas of pedestrian use and 7 mph in areas with public seating for more than 10% of the time between 7 a.m. and 6 p.m. When preexisting ambient wind speeds exceed the comfort levels, the codes require that new buildings be designed to reduce wind speeds. An exception may be granted, allowing the building or addition to produce excessive winds for a longer time, when the amount and time by which the comfort level is exceeded are limited, and when an unattractive or ungainly building form would result by applying the regulations to the letter. However, no exception is granted if the equivalent wind speeds reach or exceed the hazard level of 26 mph for a single hour of the year. The Planning Code stipulates that wind tunnel test procedures and results must be included in EIRs of all development projects.

The comfort and safety wind speed criteria were established based on research findings dating from the 1970s and 1980s that empirically examined the mechanical effect of wind on people's acceptable range of comfort and safety (Arens, 1981; Davenport, 1972; Hunt et al., 1976; Jackson, 1978; Lawson, 1978; Melbourne, 1978; Penwarden, 1973; Penwarden and Wise, 1975). A noteworthy point is the use of “equivalent wind speed,” which is defined as a mean wind speed adjusted to incorporate the effects of the gustiness of wind on pedestrians.



**Figure 1.** Location of the five zoning districts subject to wind planning, and the four selected study areas (Yerba Buena, Van Ness, Civic Center, and Mission Bay North) for wind tunnel simulation (in color online).

Equivalent wind speed and turbulence intensity are calculated, respectively, by equations (1) and (2):

$$U_{eqv} = \bar{U} \times (1 + 3I) \quad (1)$$

$$I = \frac{1}{\bar{U}} \sqrt{\frac{1}{N} \sum_{i=1}^N (U_i - \bar{U})^2} \quad (2)$$

Where  $U_{eqv}$ : equivalent wind speed;  $\bar{U}$ : mean wind speed;  $I$ : turbulence intensity; and  $U_i$ : wind speed measured at location  $i$ .

The Planning Code designates implementation of wind regulation in five zoning districts all located in the northeastern part of San Francisco, in and around the downtown, as shown in Figure 1: Downtown Commercial (C-3) Districts, the Van Ness (VN) Special Use District, the Folsom & Main Residential/Commercial Special Use District, the South of Market Residential/Service Mixed Use 40-X/85B Height District, and Downtown Residential Districts. As summarized in Table 1, areas currently contained within these districts include 479 parcels on 496 acres of land. Permitted densities and building heights in the five zones are generally high, implying that areas with high density or development potential are prone to high ground-level wind currents.

## Methods

### Wind tunnel simulation

A series of wind tunnel simulations were carried out to comparatively study how the wind environment of 2013 differs from that of 1985, thus analyzing how effective the regulations have been at shaping urban form to improve wind comfort in San Francisco. Boundary layer wind tunnels are frequently used to study wind environments around buildings and structures in urban areas. They manipulate air flow to model wind near the earth's

**Table 1.** Adopted year, location, zoning information, and area of the five zoning districts.

Planning code section	Adopted year	Implemented zoning district		Permitted density (floor area ratio)	Permitted height (feet)	Total area (acres)	Total number of parcels
148	1985	Downtown Commercial (C-3) Districts	Downtown Office (C-3-O)	18:1	75–550	80	67
			Downtown Office Special Development (C-3-O (SD))	18:1	150–450	79	48
			Downtown Retail (C-3-R)	6:1	85–400	54	29
			Downtown General Commercial (C-3-G)	6:1	65–320	97	63
			Downtown Support (C-3-S)	5:1	50–320	44	14
			Total	–	–	354	221
243	1988	Van Ness Special Use District		4.8:1	80–130	69	174
249.1	1985	Folsom and Main Residential/Commercial Special Use District		5:1 <sup>a</sup>	400	5	2
263.11	1990	South of Market Residential/Service Mixed Use 40-X/85B Height District		1.8:1 <sup>a</sup>	80–130	1	1
825	2013	Downtown Residential (DTR) Districts <sup>b</sup>	Rincon Hill DTR District	No limit <sup>c</sup>	40–200	30	66
			South Beach DTR District	No limit <sup>c</sup>	40–200	37	14
			Total	–	–	67	80
Total				–	–	496	479

Source: City and County of San Francisco (2013).

<sup>a</sup>Applies to nonresidential use only.

<sup>b</sup>Does not include Transbay DTR District.

<sup>c</sup>Applies to residential use only.

surface in a scaled fashion by generating relevant friction and turbulence (American Society of Civil Engineers, 1999). The method has been validated by comparing its simulation results with those from full-scale field measurements (Carpenter, 1990; Isyumov, 1995; Isyumov and Davenport, 1975). It has proven effective and reliable in predicting wind speeds at the pedestrian level and has become the industry standard (American Society of Civil Engineers, 2004).

In a typical boundary layer wind tunnel, a scale model of an urban area is placed on a turntable that is rotated as required to simulate the actual wind direction. To evaluate the wind environment, wind speeds at selected locations are measured with an anemometer. The wind speed ratio (WSR) of a location is calculated by dividing the wind speed measured there by the reference wind speed at the top of the boundary layer of wind. In theory, the WSR of any location will remain constant regardless of wind conditions as long as the surrounding physical setting stays the same and is used to estimate the actual wind speed. For example, if the WSR of a location is 0.5, then when the wind speed at the top of the boundary layer of wind (usually 1700 feet above ground level in dense urban areas) is 20 mph, the wind speed at the location is estimated to be 10 mph.

A different method of analyzing wind flows involved simulation using computational fluid dynamics (CFD), which has the advantages of easier implementation and visualization. It is a branch of fluid mechanics that adopts numerical methods and algorithms to solve problems that involve fluid flows. Although researchers developing this method have made considerable progress toward accurately assessing urban wind environments (Reiter, 2010), CFD simulation was not used in this study. Their insufficient capability of fully addressing the complexity and uncertainty of turbulence in the real world raises concerns on reliability when applied to urban scale and may generate erroneous results (American Society of Civil Engineers, 2011).

### *Study areas*

Four areas of San Francisco were selected for wind tunnel simulation, referred to as Yerba Buena (YB), Van Ness (VN), Civic Center (CC), and Mission Bay North (MBN). The locations of each area are shown in Figure 1. They were chosen because they have high development density, high levels of ambient wind speed, and large volumes of pedestrian traffic. Each rectangular shaped study area covers approximately 45 acres, with sides ranging between 1200 and 1800 feet. Although the four areas comprise only a small subset of San Francisco's diverse urban forms and wind environments, they represent typical development characteristics in their vicinity and different conditions related to the number of parcels subject to the wind planning. All of YB and parts of VN and CC are within designated wind control districts. MBN is not in a wind control district, but was included in this study because its urban form has changed significantly over the last 30 years, allowing comparison of wind levels in regulated versus nonregulated areas. Table 2 shows each study area's land use and wind conditions.

### *Scale models and measurement locations*

Scale models representing urban form conditions in 1985 and 2013 were created for each of the four study areas. Information for the models was gathered from a variety of sources. For 1985, Sanborn Maps from the Earth Sciences and Map Library, University of California, Berkeley that provide information on block configurations, building footprints, and building stories were used. This data were cross-checked with satellite images, photographs, and

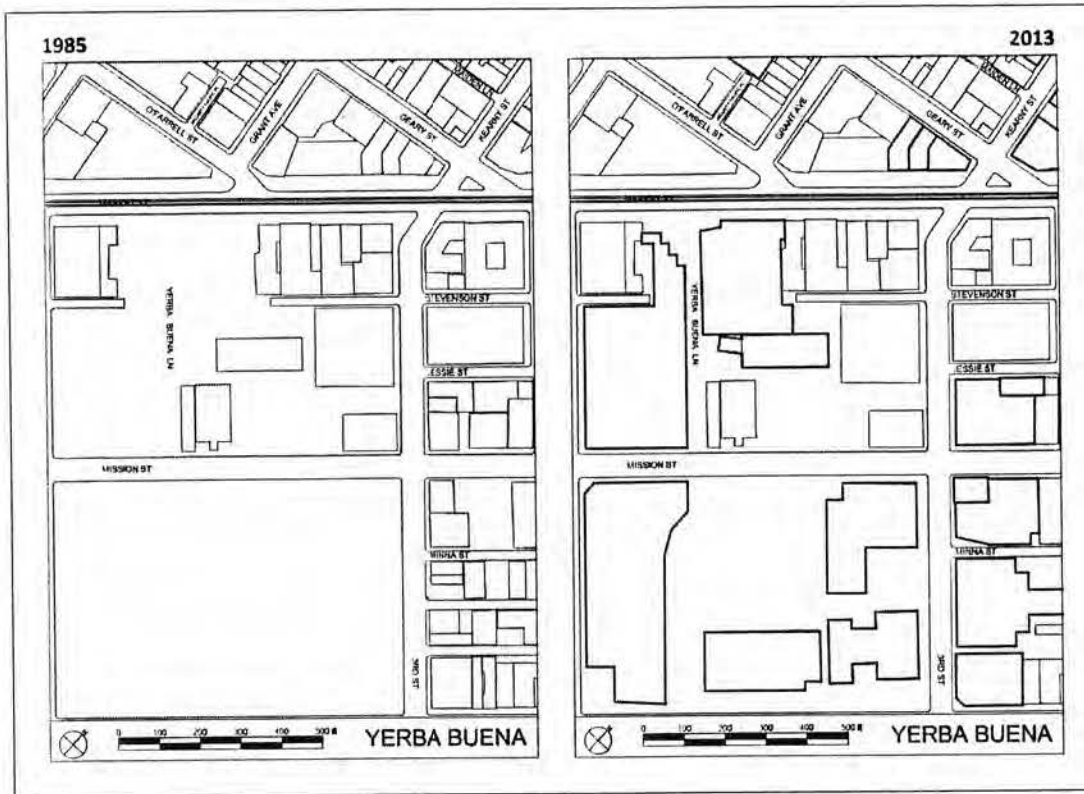
**Table 2.** Land use and wind conditions of the four study areas.

Study area	Number of parcels	Number (%) of parcels subject to wind planning	Number (%) of parcels with urban form change since 1985	Land use types in 2013	Development density in 2013 (total floor area ratio) <sup>a</sup>	Average wind speed (mph) <sup>b</sup>
YB	68	68 (100%)	17 (25%)	Commercial, mixed use, open space	8.0	6.4
VN	191	40 (21%)	24 (13%)	Commercial, residential, mixed use	2.9	8.7
CC	92	9 (10%)	20 (22%)	Civic/institutional, commercial, mixed use, open space	4.4	4.2
MBN	44	0 (0%)	11 (25%)	Commercial, residential, mixed use, open space	2.4	4.2

Note: YB: Yerba Buena; VN: Van Ness; CC: Civic Center; MBN: Mission Bay North.

<sup>a</sup>Total floor area of existing buildings divided by total area of parcels in each study area.

<sup>b</sup>Data come from field work measurements carried out in the four study areas.



**Figure 2.** 1985 and 2013 Urban form conditions of YB. Buildings constructed after 1985 are expressed in thicker lines.

documents from the mid-1980s. For 2013, geographical information system (GIS) data on blocks, parcels, streets, and buildings and detailed information on parcels and buildings were downloaded from publicly available online resources provided by the City and County of San Francisco (City and County of San Francisco, n.d.; San Francisco Planning Department, n.d.). As an example, Figure 2 shows the changes in YB's urban form between 1985 and 2013. While little redevelopment or reconstruction occurred north of Market Street, the area south of Market Street saw major changes. Most notably, YB Gardens was built on a block south of Mission Street, which had been a large surface parking area, and a number of high-density developments were built along Third Street.

Represented on the scale models were the physical configuration and location of blocks, parcels, streets, railroads, and buildings. Topography was not included since the four study areas are located on relatively flat parts of the city where slopes are not a significant factor. Small building elements (e.g., louvers, signboards, bay windows, and awnings), street furniture (e.g., benches, ledges, lamp posts, and utility poles), and vegetation (e.g., trees and landscaping) were not included because these features have relatively limited effect on the surrounding wind environment.

A scale of  $1'' = 30'$  (1:360) was used for the models for several reasons. First, it is the scale used in the study by Bosselmann et al. (1984) that provided the technical foundation for San Francisco's wind planning, and so was selected for this study for reasons of consistency. Second, the scale meets accepted standards for wind tunnel study of urban areas, including that adopted by the American Society of Civil Engineers (1999). Lastly, many wind tunnel studies of proposed developments in San Francisco have used or similar scales, as indicated

in their EIRs. White foam core boards were used to make building volumes, and chipboard sheets were used for the ground surface.

Wind speeds were measured, and WSR was calculated at locations corresponding to where people's everyday outdoor activities tend to occur. The locations can be categorized into five types: street corners, mid-block points on sidewalks, transit stops, bicycle lanes, and open spaces. A total of 318 such locations were identified throughout the four study areas: 74 in YB, 72 in VN, 102 in CC, and 70 in MBN, as illustrated in Figure 3. The larger number of locations in CC than the other three is mainly because this area includes Civic Center Plaza, a large-scale public open space. The same measurement locations were used for 1985 and 2013 conditions. On the scale models, measurement locations were indicated with small white stickers. Figure 4 shows the scale models of the four study areas in their 1985 and 2013 urban form conditions.

### *Simulation procedure*

The same wind tunnel simulation used for the Bosselmann et al. (1984) study was used for this study. The scale models were placed on a turntable that was rotated to simulate westerly winds. This wind direction was selected for the following reasons. First, not only statistically but also perceptually it is the most prevalent wind direction during the windiest period of the year in San Francisco, mid-spring to mid-fall (Gilliam, 2002; Null, 1995). Second, the vast majority of wind studies of proposed developments in San Francisco, as found in their EIRs (e.g., San Francisco Planning Department, 2010a, 2010b, 2012), are centered on analyzing the effect of westerly winds. Third, based on a series of interviews with local academics and planners, including those who participated in developing the 1985 wind regulations, it was evident that addressing adverse effects of westerly winds was the most critical concern.

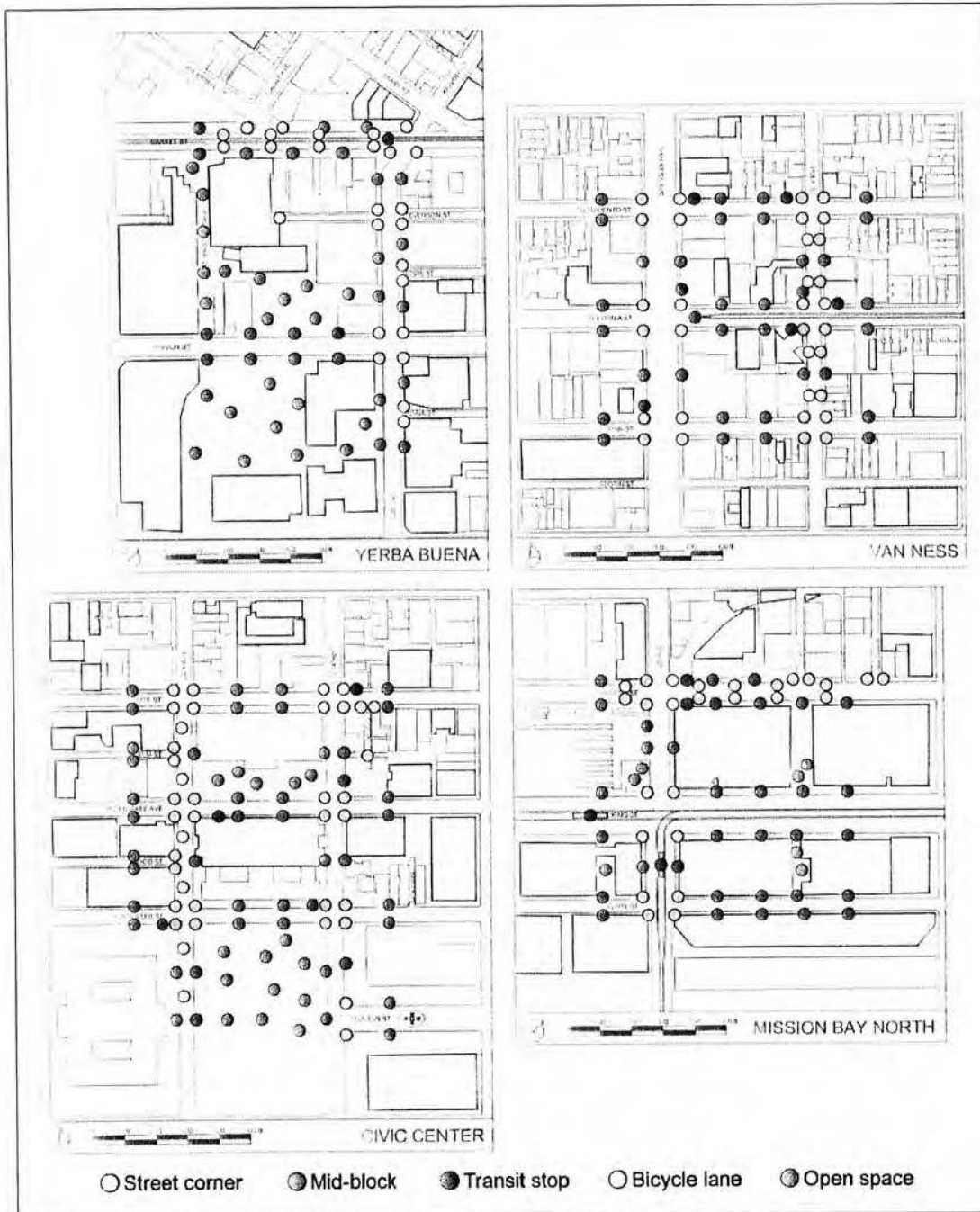
Wind speed was measured at each location with an anemometer held in place for 20 seconds, a period long enough to generate a reliable mean wind speed value. The reference wind speed, based on which the WSR was calculated, was collected at the Pitot tube, a measurement instrument suspended from the ceiling of the wind tunnel above the model.

## **Results**

An evaluation of overall changes in the wind environment generated by changes in the urban form conditions between 1985 and 2013 is presented below. Changes in the WSR at selected individual measurement locations and places within each area are also examined.

### *Overall changes*

As shown in Table 3, the mean WSR measured at 318 locations in the four study areas was 0.279 in 1985 and decreased by 22% to 0.218 in 2013. Among the 318 locations, 212 experienced a decrease in WSR, and 106 went through an increase. All four areas had a lower overall mean WSR value in 1985 than 2013. The 1985 YB and MBN models showed the highest overall mean WSR levels, 0.308 and 0.310 respectively, while the VN and CC models showed 0.244 and 0.262, respectively. In 2013, YB and MBN showed the lowest WSR levels. The mean WSR in YB dropped 34%, from 0.308 to 0.202, and that in MBN dropped 41%, from 0.310 to 0.184. VN and CC experienced a relatively small decrease, 8% and 6%, respectively. Table 4 presents that among the five location types, open spaces and mid-block points had the highest overall WSR in both 1985 and 2013. Bicycle lanes and

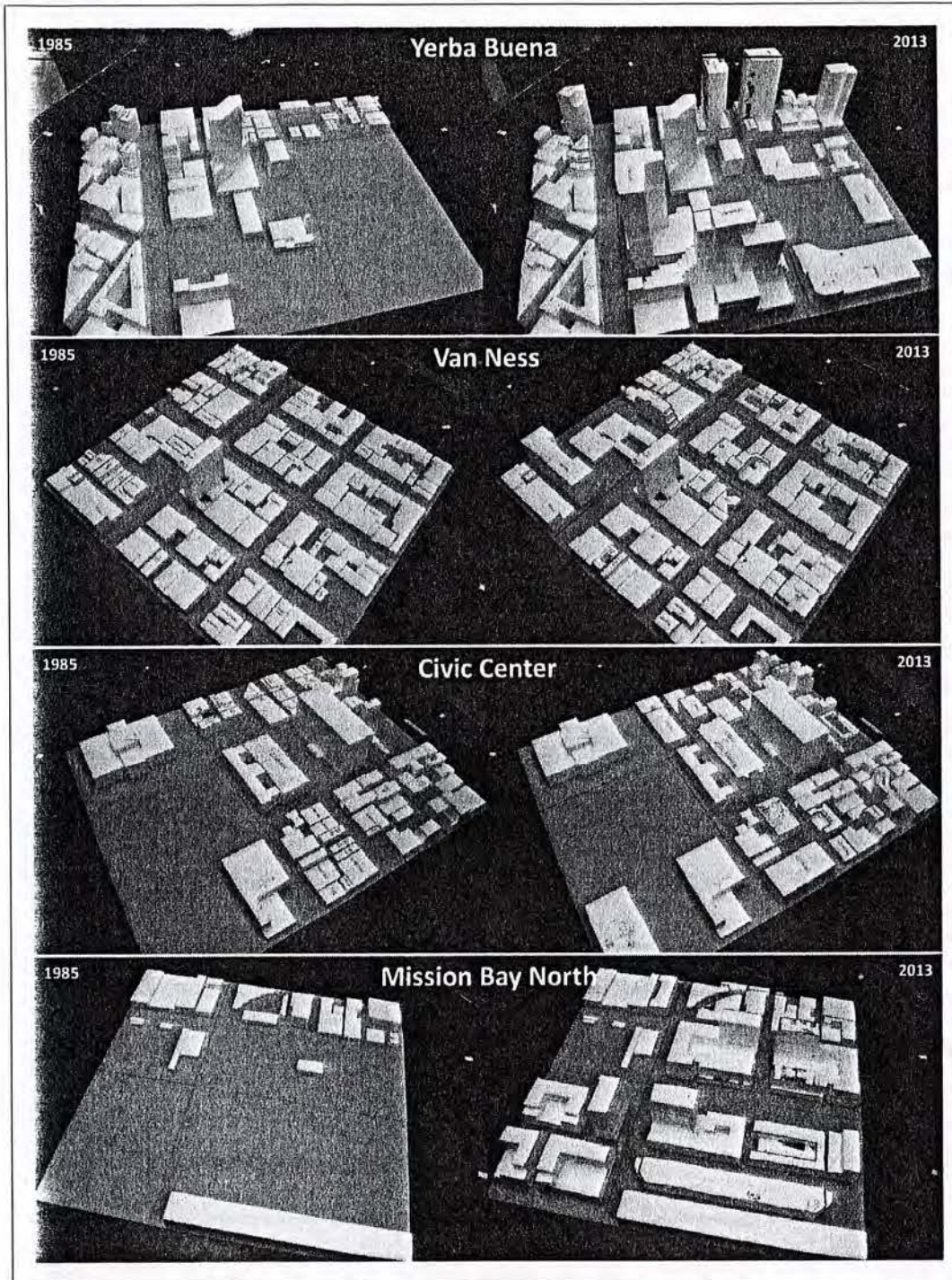


**Figure 3.** Measurement locations of the four study areas. Buildings constructed after 1985 are expressed in thicker lines (in color online).

street corners registered the lowest WSR in 1985, while bicycle lanes and transit stops did so in 2013.

The big drop in the overall mean WSR within YB, where every single parcel is subject to wind planning requirements and 25% of the parcels experienced new development between 1985 and 2013, suggests that the goal of reducing ground-level wind currents has been well achieved in spite of large-scale new developments. Both VN and CC,





**Figure 4.** Scale models of the four study areas representing their 1985 and 2013 urban form conditions. Small white stickers are placed at each measurement location (in color online).

where respectively only 21% and 10% of parcels are subject to wind planning, and development has been mostly in the form of small-scale infill rather than large-scale redevelopment projects involving consolidation of parcels, experienced relatively small overall decreases.

**Table 3.** Wind speed ratio statistics of the four study areas.

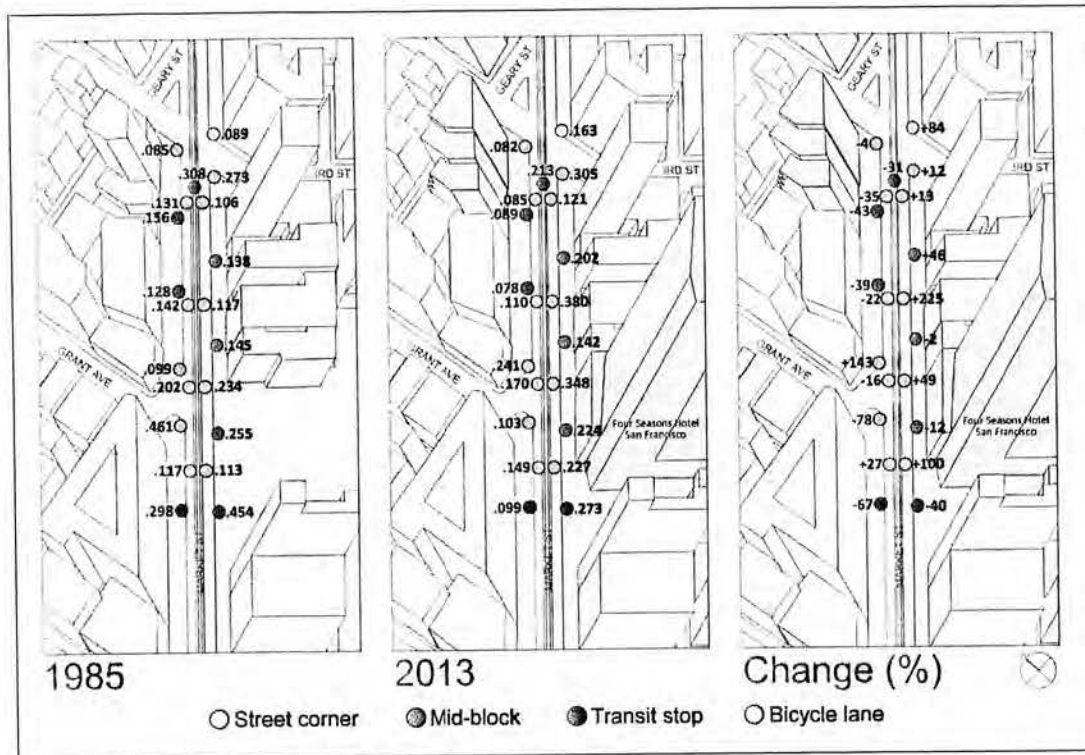
Study area	Number of locations	1985			2013			Average change (%)	Number of increase/decrease locations		Maximum increase/decrease (%)	
		Min.	Max.	Mean	Min.	Max.	Mean		Increase	Decrease	Increase	Decrease
Yerba Buena	74	0.064	0.599	0.308	0.067	0.593	0.202	-34*	20	54	+225	-83
Van Ness	72	0.049	0.662	0.244	0.056	0.649	0.225	-8	29	43	+266	-71
Civic Center	102	0.066	0.800	0.262	0.067	0.567	0.247	-6	45	57	+154	-70
Mission Bay North	70	0.069	0.564	0.310	0.060	0.541	0.184	-41*	12	58	+347	-84
Total/overall	318	0.049	0.800	0.279	0.056	0.649	0.218	-22*	106	212	+347	-84

\*The mean wind speed ratio in 1985 and 2013 are significantly different ( $p < 0.05$ ), based on Student's t-test.

**Table 4.** Wind speed ratio statistics of the five location types.

Location type	Number of locations	1985			2013			Average change (%)	Number of increase/decrease locations		Maximum increase/decrease (%)	
		Min.	Max.	Mean	Min.	Max.	Mean		Increase	Decrease	Increase	Decrease
Street corner	91	0.063	0.588	0.249	0.063	0.541	0.217	-13*	41	50	+266	-82
Mid-block	129	0.049	0.800	0.307	0.056	0.649	0.235	-23*	36	93	+347	-83
Transit stop	22	0.074	0.508	0.281	0.056	0.419	0.183	-35*	2	20	+37	-69
Bicycle lane	32	0.063	0.450	0.166	0.063	0.038	0.144	-13	13	19	+225	-78
Open space	44	0.066	0.599	0.341	0.060	0.567	0.240	-30*	14	30	+105	-84
Total/overall	318	0.049	0.800	0.279	0.056	0.649	0.218	-22*	106	212	+347	-84

\*The mean wind speed ratio in 1985 and 2013 are significantly different ( $p < 0.05$ ), based on Student's *t*-test.



**Figure 5.** WSRs in 1985 and 2013 and their changes in Market Street in YB (in color online).

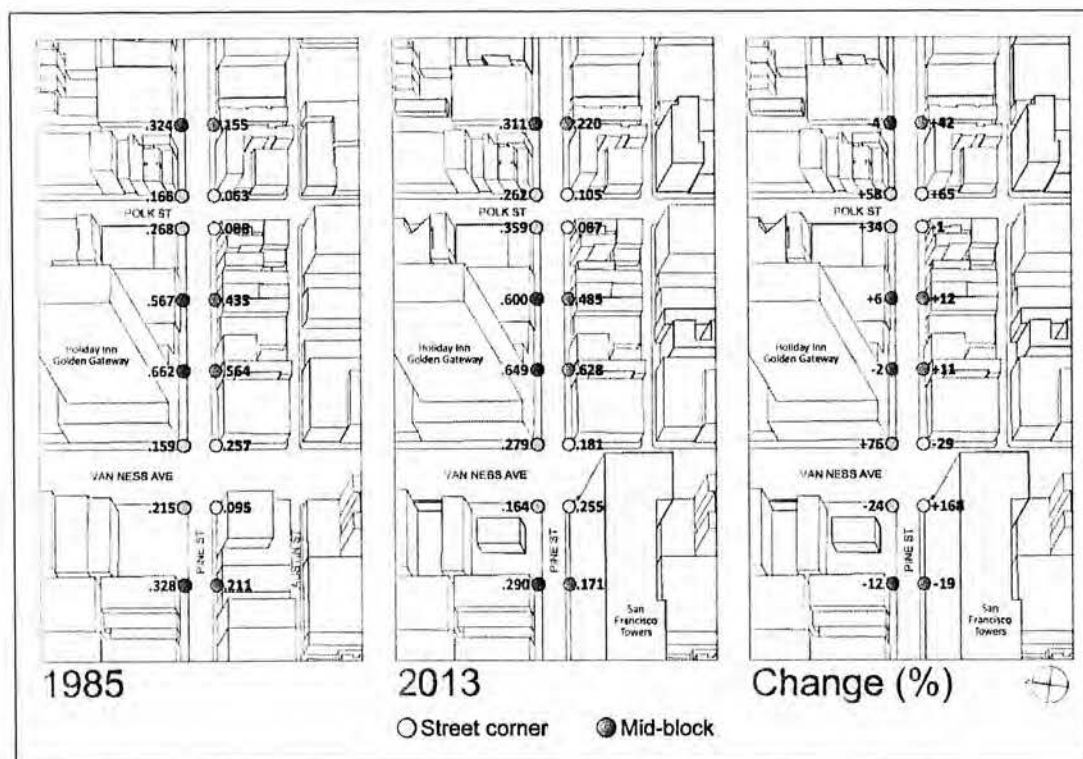
While MBN showed the biggest overall drop among the four areas, the location with the highest rate increase (347%) is in this area. MBN has no parcels subject to wind planning. In 1985, this area was a rail yard with few buildings or structures, but by 2013, as the result of redevelopment, many large-scale residential buildings had been erected. One plausible interpretation of the results is that the new buildings, which are situated in blocks whose long sides face northwest, operate as wind breaks along some streets. However, had the buildings in MBN been subject to wind planning restrictions, the WSRs may have been further reduced and locations with very high wind levels could have been minimized through better design.

It is unclear how much of the decrease in overall wind speed is attributable to the wind regulations and how much to there simply being more buildings, especially in the cases of YB and MBN. Nevertheless, the findings indicate that streets and open spaces in the four study areas generally experience lower wind levels in 2013 than in 1985. Because of urban form changes, San Francisco has become more wind comfortable during its windiest season, mid-spring to mid-fall, when the westerly winds are prevalent.

### *Changes in individual places*

For a closer analysis, the 318 locations in the four study areas were grouped into 21 subareas, such as all the locations along a particular street or within a particular open space. By way of example, the findings related to four of the subareas, one from each study area, are discussed below.

Figure 5 shows WSRs at locations on public sidewalks, bicycle lanes, and transit stops along Market Street in YB. In 1985, this place was generally well sheltered from westerly



**Figure 6.** WSRs in 1985 and 2013 and their changes in Pine Street in VN (in color online).

winds. WSRs at most locations remained below 0.250, but higher ratios existed at the Market Street and Grant Avenue intersection. The westerly wind that ran along Market Street was induced into the large vacant parcel south of the intersection, which had been cleared for new construction, resulting in several locations with WSRs exceeding 0.450. By 2013, large buildings such as the Four Seasons Hotel San Francisco were constructed on the vacant parcel. The westerly wind that runs along Market Street leaves several locations between Grant Avenue and Geary Street, especially on bicycle lanes, with higher ratios than in 1985. However, the ratios at most locations remain below 0.250.

Figure 6 presents Pine Street in VN. This street showed the highest level of WSRs within the VN study area in both 1985 and 2013. In 1985, the westerly wind that runs along the street was accelerated as it passed the 25-story Holiday Inn Golden Gateway located at the northeastern corner of the Pine Street and VN Avenue intersection. The ratios rose up to 0.662 and gradually slowed down at Polk Street. In 2013, the 13-story San Francisco Towers, built in 1997 at the southwestern corner of the same intersection, serves to decrease WSRs at several locations. The building also increases them elsewhere, especially street corners along the street, including ones that had relatively low WSRs in 1985. It can be interpreted that even though wind planning has been implemented in this subarea to secure wind comfort, many locations that used to be less windy have evolved in the opposite direction to the extent permitted by the wind planning.

Figure 7 illustrates Larkin Street in CC. A clear difference is observed in WSRs between the measurement locations at street corners and mid-block points in both years. In 1985, while the ratios at all mid-block points and transit stops did not exceed 0.130, those at street corners were generally higher, some of which reaching 0.483. By 2013, the biggest ratio increases are at street corner locations, especially at the two southern intersections where

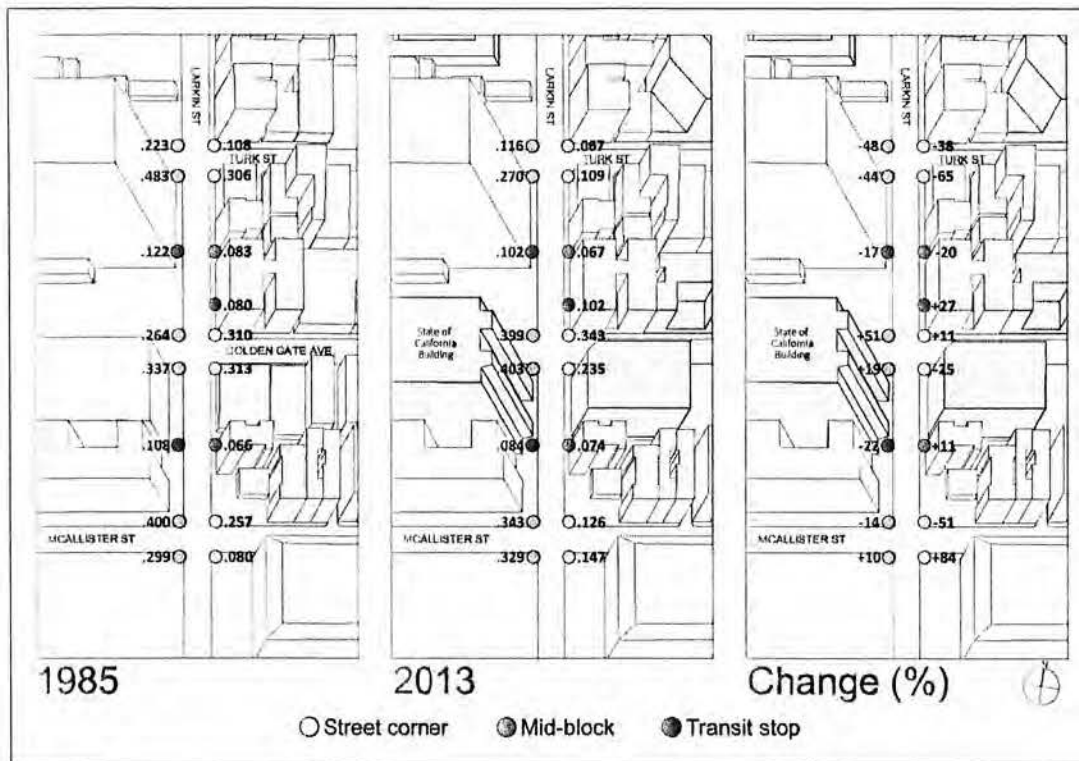


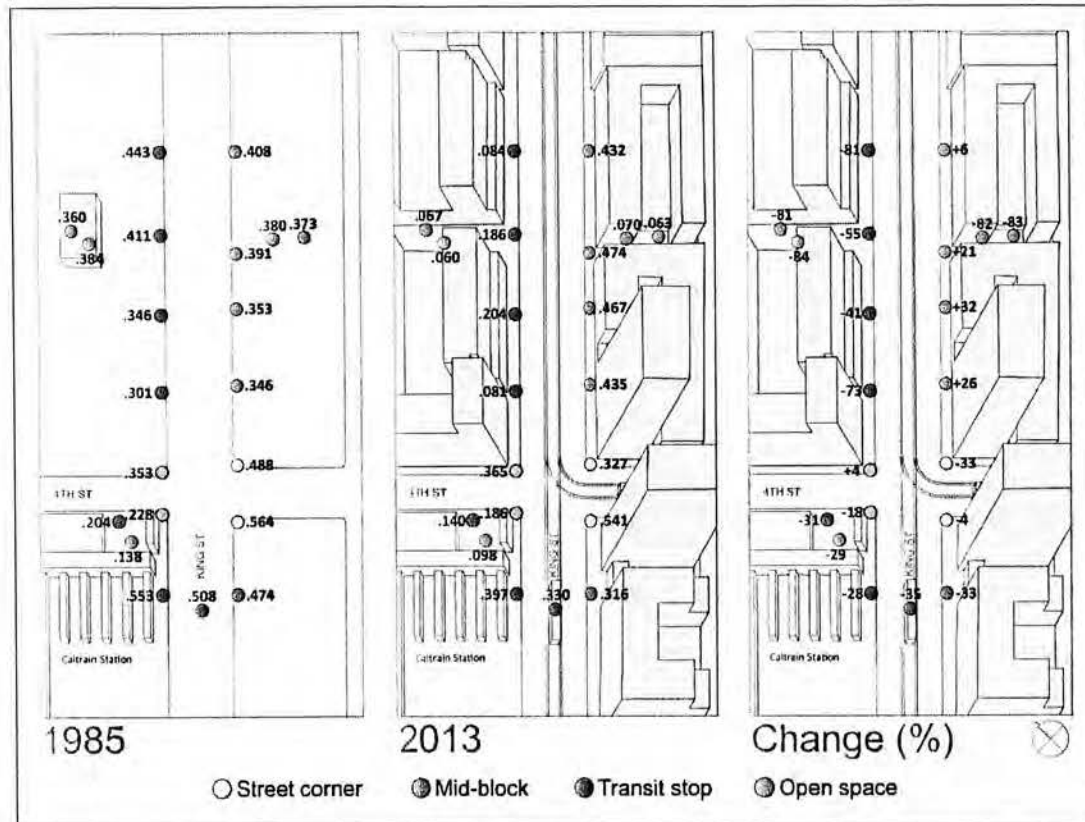
Figure 7. WSRs in 1985 and 2013 and their changes in Larkin Street in CC (in color online).

the ratios soared 84%. On the other hand, WSRs at the Larkin Street and Turk Street intersection are considerably lower than in 1985. Several new buildings such as the State of California Building located on the west seem to have influenced the wind environment in both positive and negative ways.

Figure 8 depicts the wind conditions and their changes along King Street and two adjacent open spaces in MBN. In 1985, there were few buildings to block westerly winds. All measurement locations, except for two located directly in front of the Caltrain Station sheltered by the station building, experienced relatively high WSRs ranging between 0.301 and 0.564. However in 2013, the new buildings on both sides of King Street have generally decreased the WSRs. WSRs in the small open spaces between the high-rise residential towers have decreased by up to 84%. However, several locations on the southeastern side of King Street experience higher WSRs, up to 0.474. Also, the high ratios existing in 1985 at the King Street and 4th Street intersection remain in 2013.

### Urban form conditions of windy places

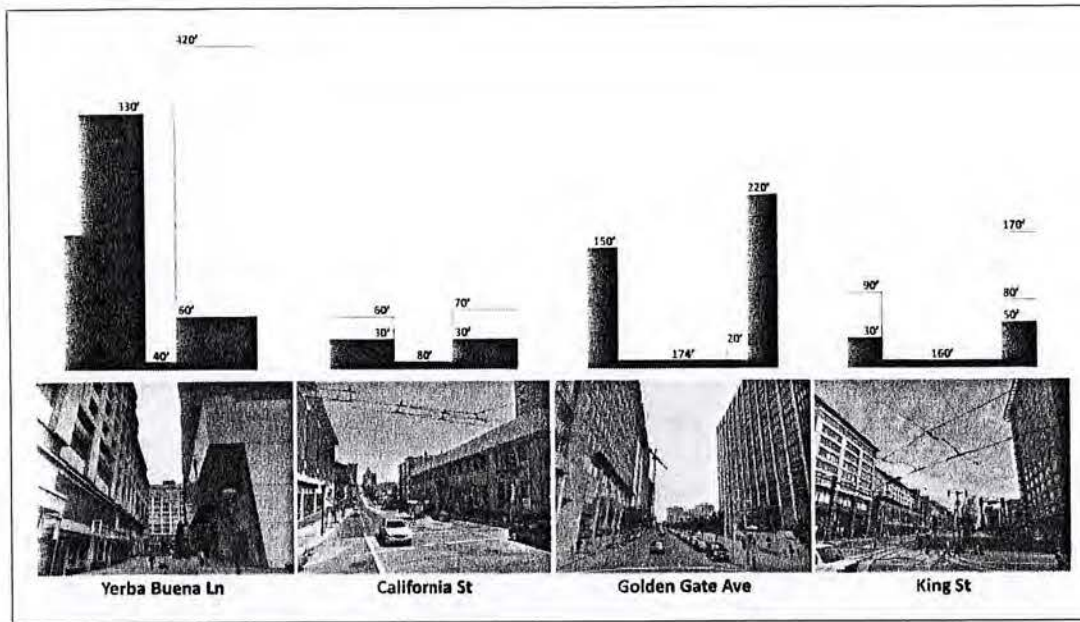
In order to study and understand how particular building forms affect WSRs, eight subareas among the 21 were selected for the further examination. These include subareas with the highest WSRs at particular locations and that also have concentrations of locations where the WSRs exceed 0.350 in 2013, which corresponds to the 80th percentile of the overall WSR distribution measured at 318 locations. The eight places are YB Lane and YB Gardens in YB; California Street and Pine Street in VN; Golden Gate Avenue, and McAllister Street and Fulton Street in CC Plaza in CC; and King Street in MBN.



**Figure 8.** WSRs in 1985 and 2013 and changes in King Street in MBN (in color online).

Figure 9 shows a sectional diagram and street view of the most representative subareas in each area—Yerba Buena Lane in YB, California Street in VN, Golden Gate Avenue in CC, and King Street in MBN—whose wind conditions in 2013 are discussed below.

Yerba Buena Lane experiences a concentration of WSRs that range from 0.373 to 0.554, especially in the narrow space between the 42-story Four Seasons Hotel and 38-story Marriot Marquis Hotel. Although this place is not directly exposed to the westerly wind, the flat façades of these two buildings are inducing the faster winds that exist at higher altitudes to slide down to the ground level. On California Street between VN Avenue and Polk Street, the highest WSRs range between 0.419 and 0.492. Winds are accelerated by both the continuous street walls, which let the wind flow smoothly without any obstacle on both sides of the street, and the 25-story Holiday Inn Golden Gateway Hotel located on the south side of the street, which induces the faster wind at higher altitude down to the street level. Along Golden Gate Avenue, clusters of WSRs ranging from 0.375 to 0.567 are found along a 175 foot-wide open space fronted on its north side by the 22-story Phillip Burton Federal Building and on its south side by the 15-story State of California Building. Not only is this place directly exposed to the westerly wind, but the high-rise buildings' flat façades draw the faster winds at higher altitudes down to the pedestrian environment. Finally, along the southeastern edge of King Street, a 160 foot-wide thoroughfare running southwest–northeast, a concentration of WSRs exists that range between 0.432 and 0.541. This place is both directly and indirectly exposed to the westerly wind. It is fairly wide, and no obstacles to its west block the prevalent wind patterns as continuous street walls rise up to 17 stories on both sides of the street.



**Figure 9.** Sectional diagram and © Google Maps street view of Yerba Buena Lane, facing northwest, California Street, facing east, Golden Gate Avenue, facing west, and King Street, facing northeast (in color online).

From this analysis, three common urban form conditions associated with concentrations of higher WSRs can be identified: (1) direct exposure of street orientation to the prevailing wind; (2) high-rise buildings with flat façades that extend directly to the street without any major surface changes such as setbacks; and (3) horizontal street walls where building façades align.

These findings are in line with those of previous research that investigated the impact of street configuration and orientation on urban wind environment (Brown and DeKay, 2001; Givoni, 1998), as well as some of the design elements introduced in the Downtown Area Plan. At the same time, they suggest the need for further improvement and amendment of the plan despite the positive changes it has made since 1985.

### Concluding remarks

In sum, San Francisco's wind planning, in place since 1985, seems to have had the intended effect of providing a less windy environment. It has generated increased wind comfort in public open spaces during the city's windiest months, between mid-spring and mid-fall, when westerly winds prevail. The overall mean WSR measured at 318 locations in scale models of four areas of the city dropped by 22% between 1985 and 2013, suggesting that the actual ground-level wind speeds in those areas decreased by the same rate. However, there still exist a number of excessively windy places in San Francisco that are associated with specific urban form conditions, including streets oriented to have direct exposure to westerly winds, flat façades of high-rise buildings, and horizontal street walls where building façades align.

Three policy suggestions result from this research. The first derives directly from the urban form conditions mentioned above. San Francisco's wind planning should be revised to incorporate more tangible guidance on the built form conditions associated windy places and how to design buildings that mitigate ground-level wind currents, perhaps in the form of form-based codes. The Downtown Area Plan and related Planning Codes should proceed



further and address the wind impacts of various block and street typologies, open space forms, and building masses and details.

Second, San Francisco should consider expanding the extent of its wind planning to cover more parts of the city. While the city's wind regulations appear to have successfully reduced overall wind ratios in the areas subject to them, this study suggests that many places in the city still experience excessive ground-level wind currents. These places should be identified, and appropriate wind mitigation policies should be implemented. The work of identification for better decision making could be accomplished via citywide wind monitoring and collaboration between planners and urban climatologists.

Lastly, San Francisco might improve its wind planning approach by learning from strategies used elsewhere. For example, Wellington, New Zealand, which also has had wind planning in effect since 1985, has made the city more wind comfortable and safer (Donn, 2011). Urban designers and architects are provided with a guide that shows building forms that should be avoided or promoted. Recommendations include designing tall buildings to have protruding lower level podiums and deep canopies to block the downwash off the tower, and screens and fences are installed as windbreaks that alter horizontal wind (Carpenter, 2002). The city has also constructed 90 micro wind shelters for pedestrians in major downtown locations (Donn, 2011).

By evaluating the impacts of an urban policy that has been in effect in San Francisco for 30 years, this study provides important feedback to the city's decision makers that may encourage refinement of the plan or expansion of its implementation areas. The research findings should also be of interest to other cities that have implemented wind planning or are considering it. Just as important, the study reinforces the need to create interdisciplinary bridging between the fields of urban planning and urban climatology, as has been emphasized by other researchers for many years (Givoni, 1976; Jackson, 1978; Lynch, 1962; Olgyay, 1963; Penwarden, 1973) but largely unheeded.

This study provides useful lessons for cities that have cool climates where wind mitigation would improve pedestrian comfort. Conversely, the same knowledge may be useful to warm weather cities where ground-level wind may need to be encouraged rather than discouraged to promote comfort. For more climate-responsive and resilient cities, researchers should keep exploring and studying a wide range of solutions in varied climate regions, and planners should develop their own climate-based plans followed by vigorous evaluation of plan effectiveness.

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**Hyungkyoo Kim**, is Assistant Professor in the Department of Urban Design and Planning at Hongik University, South Korea. He received his doctoral degree in city and regional planning from the University of California, Berkeley. His research focuses on urban form, microclimate and comfort, and climate-responsiveness of cities.

**Elizabeth Macdonald**, is Associate Professor of Urban Design in the Departments of City and Regional Planning and Landscape Architecture/Environmental Planning at the University of California, Berkeley. Her research focuses on the history of urban form, street design, livable neighborhoods and urban waterfront promenades. She is author of *Pleasure Drives and Promenades: A History of Frederick Law Olmsted's Brooklyn Parkways* (Center for American Places, 2012), co-author of *The Boulevard Book: History, Evolution, Design of Multiway Boulevards* (MIT Press, 2002), and co-editor of *The Urban Design Reader* (Routledge, 1st edition 2007, 2nd edition 2013).



August 27, 2018

**Meeting Notice: Planning and Zoning Board**

Dear Property Owner:

The Planning and Zoning Board, acting as the Local Planning Agency (LPA), will hold a public hearing on **Monday, September 17, 2018 at 6:30 p.m.** in the City Commission Chambers, City Hall, 100 North Andrews Avenue, Fort Lauderdale, FL to determine whether the following application is found to be consistent with the Goals, Objectives and Policies of the Comprehensive Plan and The City's Unified Land Development Code (ULDR).

**Case No:** 7R17007

**Request:** Site Plan Level IV Review: Rezoning from Residential Single Family/Low Medium Density (RS-8) to Community Business (CB) with 0.25 acre of Commercial Flex Allocation / Waterway Use /Conditional Use for 34-slip Marina with 2,400 Square-Foot Storage Building and 1,553 Square-Foot Crew Club Building

**Legal Description:** Mrs E F Marshalls Sub Rev Plat 1-2 B, 16-50-42, Lot 17, Lying in E3/4 of NE1/4 of SW 1/4 less W 17.5', together with, Yellowstone Park Amen Plat, 15-3 B, All Blk A

**General Location:** 1500 SW 17th Street

**Commission District:** 4 – Ben Sorensen

Should you desire to comment on this request, you may attend the hearing or send comments in writing to the Department of Sustainable Development, Urban Design and Planning Division, 700 N. W. 19 Avenue, Fort Lauderdale, Florida, 33311. You may also submit email comments, and view the application and plans at:

<http://www.fortlauderdale.gov/departments/city-clerk-s-office/advisory-boards-and-committees-agendas-and-minutes/planning-and-zoning-board>

Sincerely,

Florentina Hutt, AICP - Case Planner  
Urban Design and Planning Division

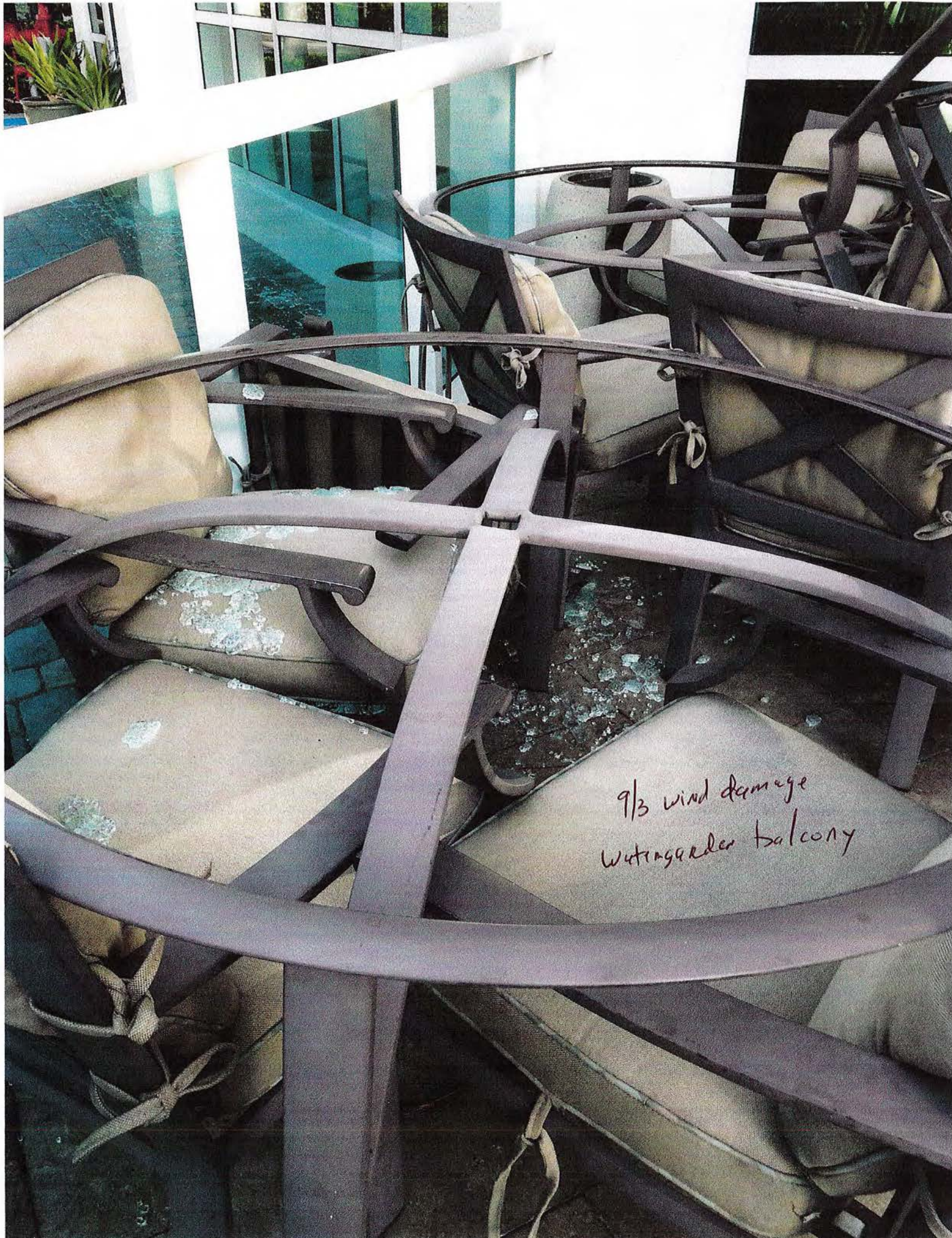
If any person decides to appeal any decision made with respect to any matter considered at this public meeting or hearing, he/she will need a record of the proceedings, and for such purpose, he/she may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based.

If you desire auxiliary services to assist in viewing or hearing the meetings or reading agendas and minutes for the meetings, please contact the City Clerk at (954) 828-5002 two (2) days prior to the meeting and arrangements will be made to provide these services for you. A turnkey video system is also available for your use during this meeting.

12

only one entrance point on M. New River Dr. Does the 20 foot  
 (width) of 333 to the Water tower, there will be significant  
 venturi effect between the two buildings. Will it happen if  
 there is a fire, or a natural evacuation? Will it happen if the  
 elevator goes out? How will it use 200 occupants get out and  
 why are they out? What happens if the city entrance is  
 the one? What happens if we get the roof flooded with a fire  
 not at the surge, and the entire M. New River Dr. is flooded.  
 and the occupants that either in place can be serviced?  
 (Need to find the garage and loading covered by that that  
 building had NO storm surge). What happens if there are  
 fatalities during evacuation? Since the building does not  
 comply with the Down Town Major Risk recommendations, will  
 the City be liable?  
 There needs to be a moratorium on all new construction in  
 Downtown until the broken ground, until the City council  
 takes safety issues.





9/3 wind damage  
Wittengarden balcony





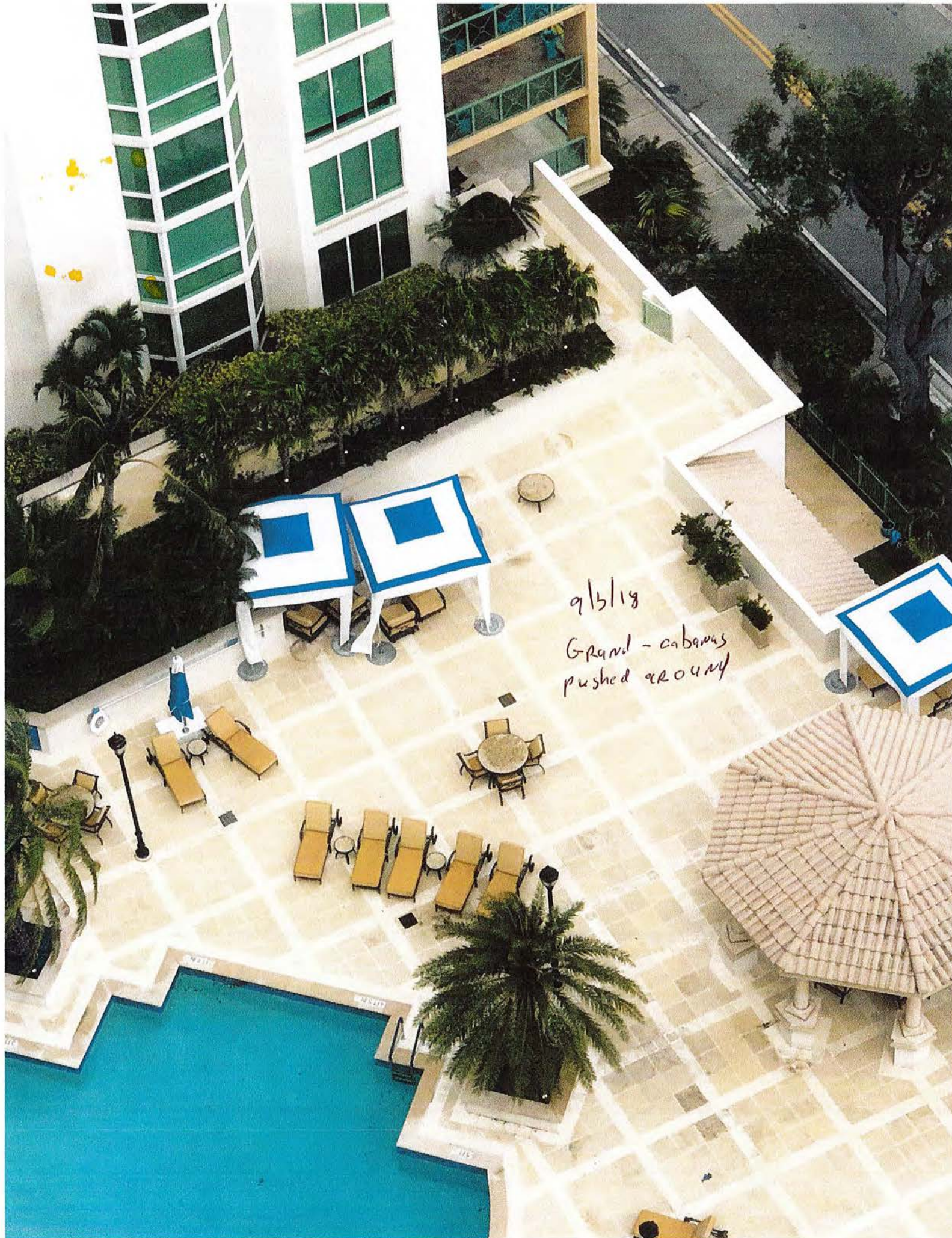
Done

10 of 10

*King Tide  
New River Dr. East 09/10/2018 A.M.*







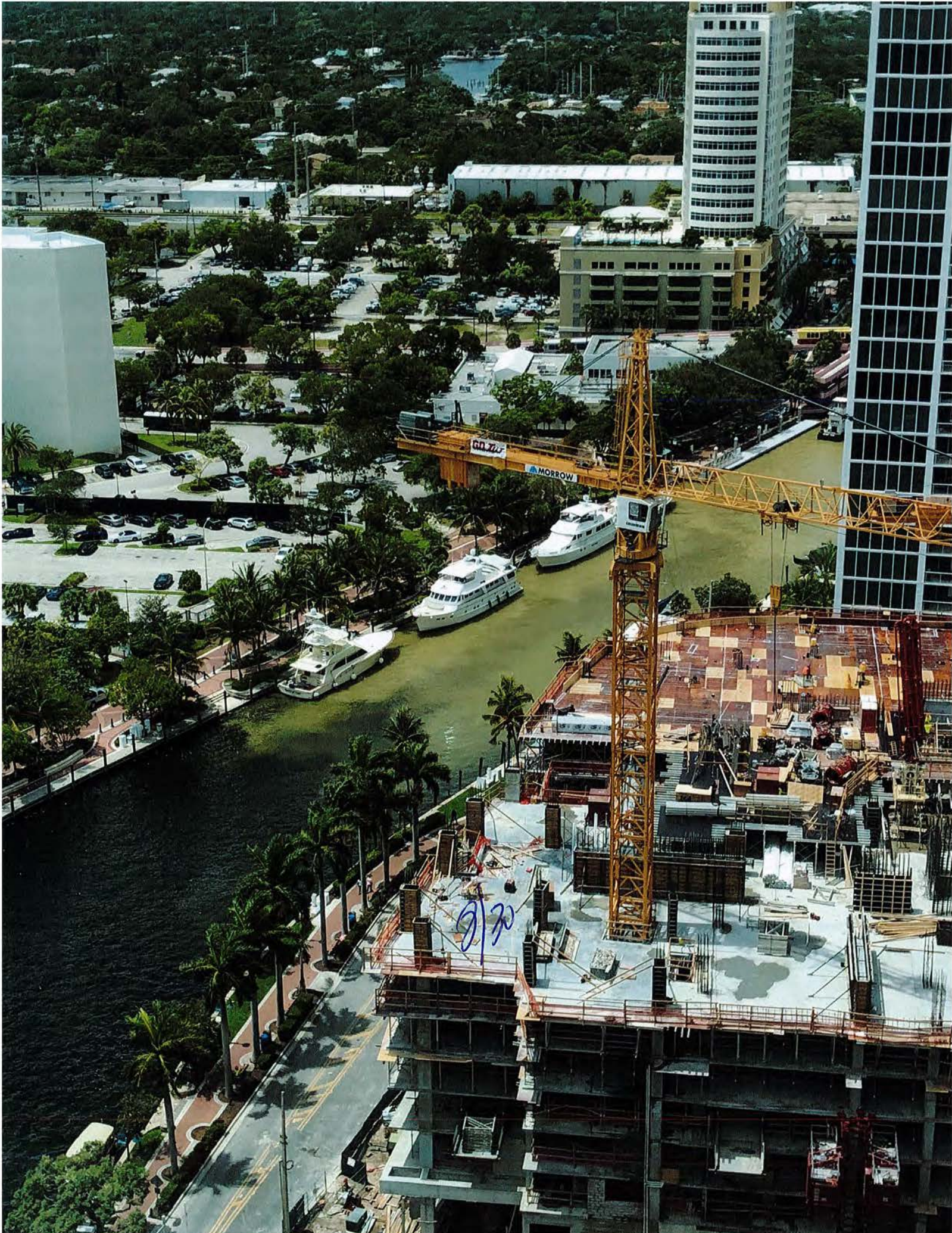
9/5/19  
Grand - cabanas  
pushed around





8/28









## St. Michael's

Inspired Care. Inspiring Science.

### Newsroom

#### Our Stories

[Living in highrise buildings associated with lower survival rates from cardiac arrests, study finds, recommending more AEDs, better access for first responders](#)

Toronto, January 18, 2016

By Leslie Shepherd

Tweet



Like 66

The number of people living in highrise buildings is rising, but along with the convenience and panoramic views of a downtown condo comes a risk: a new study found that survival rates from cardiac arrest decrease the higher up the building a person lives.

"Cardiac arrests that occur in highrise buildings pose unique barriers for 911-initiated first responders," said Ian Drennan, lead author of the study published today in the *Canadian Medical Association Journal*.

"Building access issues, elevator delays and extended distance from the emergency vehicle to the patient can all contribute to longer times for 911-initiated first responders to reach the patient and start time-sensitive, potentially life-saving resuscitation," he said.

Drennan is a paramedic with York Region Paramedic Services and a researcher with Rescu, a group based at St. Michael's Hospital that studies emergency health care that begins outside of a hospital.

Looking at data from 8,216 adults who suffered an out-of-hospital cardiac arrest treated by 911-initiated first responders in the City of Toronto and nearby Peel Region from January 2007 to December 2012, they found 3.8 per cent survived until they could be discharged from a hospital. Survival was 4.2 per cent for people living below the third floor and 2.6 per cent for people living on or above the third floor.

But Drennan said when they went back and looked at the exact floor the patients lived on, they found decreased survival rates as the floors got higher. Survival above the 16th floor was 0.9 per cent (of 216 cases, only two survived). There were no survivors to hospital discharge of the 30 cardiac arrests above the 25th floor.



Ian Drennan

"Patients who survived tended to be younger, their cardiac arrest was more often witnessed by bystanders, and bystanders were more likely to perform CPR," Drennan said, noting the rate of bystander AED use was very low in this study. "They also had shorter times for 911-initiated first responders to get to the scene and to the patient."

While this study was intended to compare the rate of survival to hospital discharge for cardiac arrests that occur on higher versus lower floors of residential buildings, it also highlighted the fact that response times for 911-initiated first responders are traditionally measured from the time a call is received by the 911 dispatch centre to when the first emergency vehicle arrives on the scene. But Drennan said this measure does not take into account the time required for 911-initiated first responders to reach the patient after they arrive on the scene and can begin resuscitation.

"After collapse from sudden cardiac arrest, early bystander CPR and a shock from a publicly accessible automated external defibrillator can make the difference between life and death," Drennan said. "Effective CPR performed by a bystander immediately after cardiac arrest can more than double a person's chance of survival, but only 30 per cent of cardiac arrest victims get CPR from a bystander. With a rapidly deteriorating heart rhythm, in the absence of bystander CPR and defibrillation, cardiac arrests that occurred on higher floors may have a lower probability of survival due to the delay to patient contact by 911-initiated first responders. This early period is essential for bystander interventions by a family member, friend or other willing person to improve survival."

He said another possible explanation for lower survival at higher floors is that it simply takes longer to get patients out of the building.

The study made several recommendations:

- Improving the accessibility of AEDs by placing them on specific floors, in building lobbies or inside elevators so that they can be easily delivered to the floor of the cardiac arrest, saving precious minutes and ensuring rapid defibrillation.
- Give paramedics a universal elevator key similar to what firefighters have, giving them sole access to elevators without public interference
- Find ways to alert building security to the fact 911-initiated first responders are en route so they can have easy access to the building and elevators waiting on the main floor

Overall, the study said there was a 20 per cent increase in the rate of cardiac arrests suffered in private residences over the years of the study. In roughly the same time, 2006 to 2011, the number of people living in highrise buildings grew by 13 per cent in Toronto. Many of those people are older, with higher rates of serious medical issues and higher risk of cardiac arrest.

This study received funding from the Canadian Institutes of Health Research and the Heart and Stroke Foundation of Canada.

This paper is an example of how St. Michael's Hospital is making Ontario [Healthier, Wealthier, Smarter](#).

#### About St. Michael's Hospital

St. Michael's Hospital provides compassionate care to all who enter its coors. The hospital also provides outstanding medical education to future health care professionals in 27 academic disciplines. Critical care and trauma, heart disease, neurosurgery, diabetes, cancer care, care of the homeless and global health are among the hospital's recognized areas of expertise. Through the Keenan Research Centre and the Li Ka Shing International Healthcare Education Centre, which make up the Li Ka Shing Knowledge Institute, research and education at St. Michael's Hospital are recognized and make an impact around the world. Founded in 1892, the hospital is fully affiliated with the University of Toronto.

#### Media contacts

For more information or to arrange an interview with Dr. Khan, please contact:

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shepherdl@smh.ca

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Host: CWH



The City of London is promising that high-rise buildings will be monitored to ensure they don't make conditions unbearably windy in surrounding streets. But why do skyscrapers have this effect and what can be done to alleviate it?

Anyone who has ever walked near a very tall building in the middle of a city on a windy day will have noticed a strange effect.

The wind is often much more intense around the base of the tower.

And the growth in high-rise structures is generating more concerns. The City of London Corporation has promised a more "rigorous" assessment of developers' predictions of ground winds, following complaints about strong gusts outside the 20 Fenchurch Street Building, better known as the Walkie Talkie.

"I almost got blown over the other day walking up past the building," a sales assistant working nearby said earlier this year. "When I got around the corner it was fine. I was scared to go back."

In today's Magazine

### 'How I escaped the priest who abused me for decades'

13 September 2018

### The hostel accused of failing young homeless

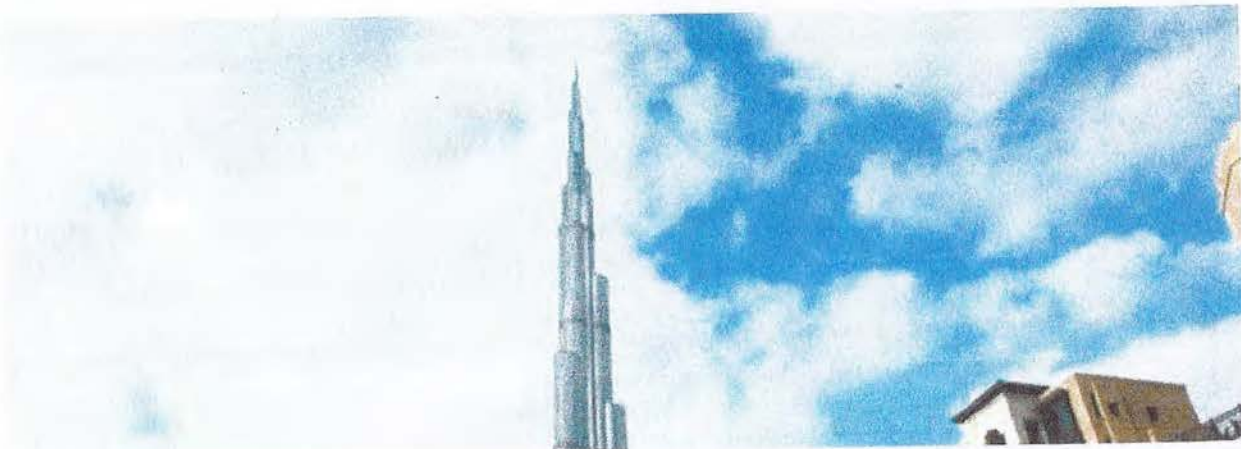
12 September 2018

### Reviving Italy's ghost towns with an unusual hotel

14 September 2018

### The women unsafe in their own homes

7 September 2018



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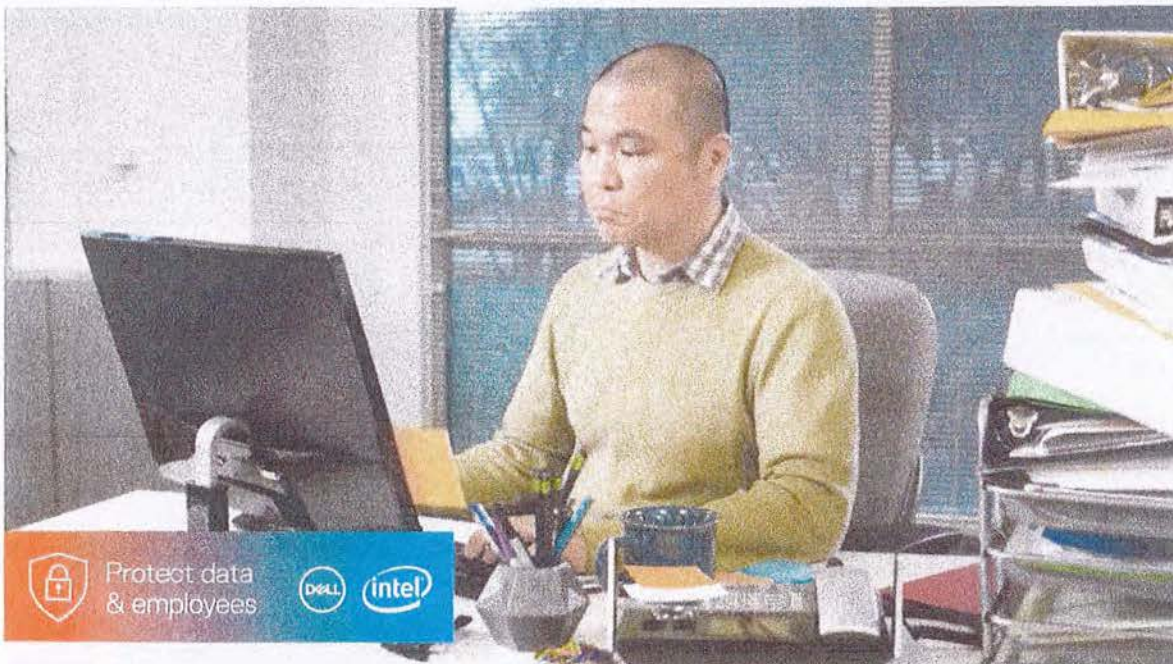


Host: CWH



Toronto in Canada has suggested bringing in by-laws to ensure planning for skyscrapers takes into account the risk of street winds.

ADVERTISEMENT



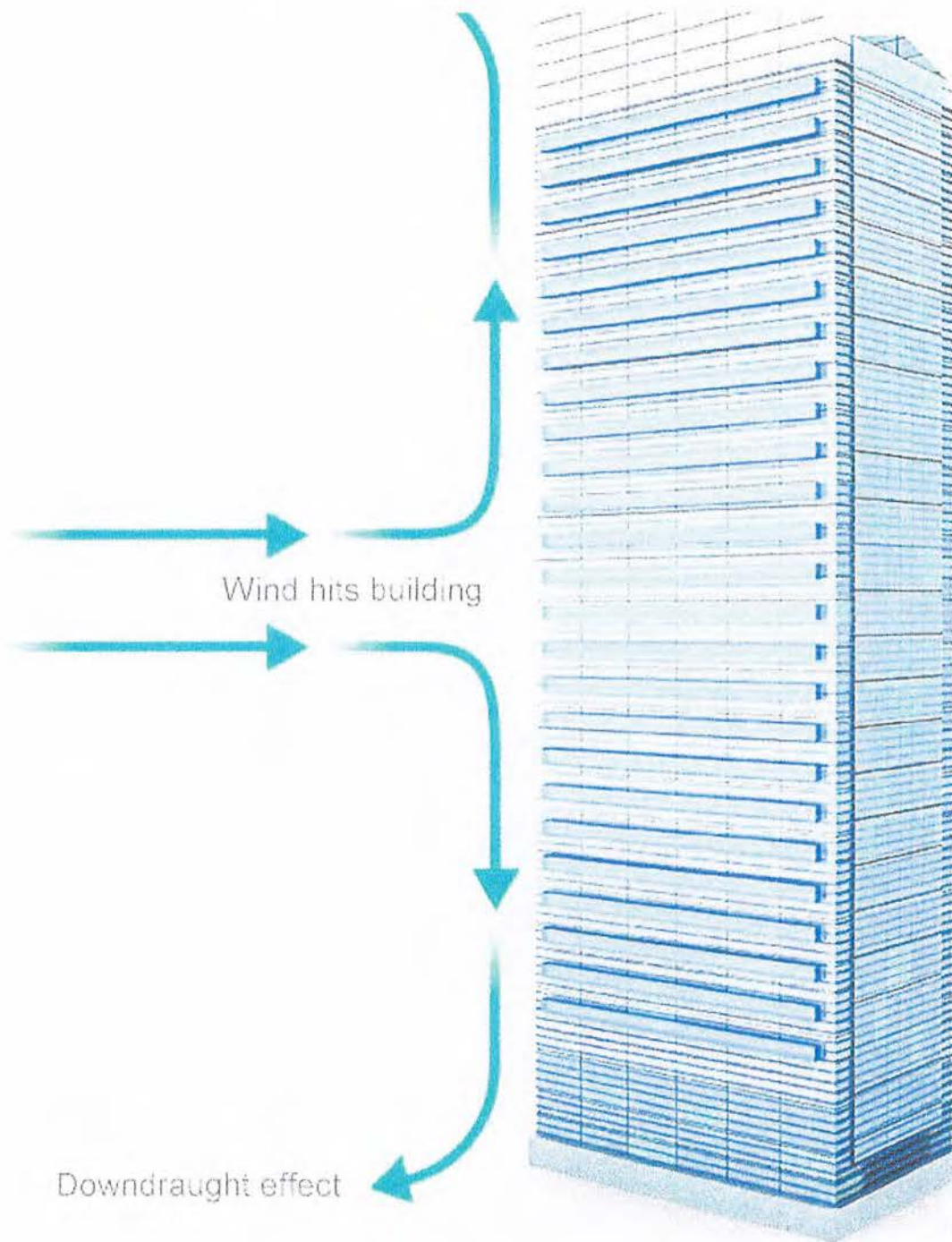
In Leeds, 35-year-old Edward Slaney was crushed after **strong winds toppled a lorry** near the 32-storey Bridgewater Place, the city's tallest building, in 2011. This was one of several incidents, some resulting in injuries, reported to the council.

Accelerated winds near skyscrapers are caused by the "downdraught effect", says Nada Piradeepan, an expert on wind properties at engineering consultancy firm Wintech. This happens where the air hits a building and, with nowhere else to go, is pushed up, down and around the sides. The air forced downwards increases wind speed at street level.

### The downdraught effect







Thinkstock

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There is also an acceleration of wind around the side of the buildings if it has **completely square corners**.

And, if several towers stand near each other, there is an effect known as "channelling", a wind acceleration created by air having to be squeezed through a narrow space. This is a form of the **Venturi effect**, named after the 18th-19th Century Italian scientist Giovanni Battista Venturi.





"These different effects can combine to create faster-moving wind. It's complex," says Piradeepan. "The downdraught effect is most strong where buildings stand face-on to the prevailing wind, which in London is from the south west." More rounded buildings, such as **London's Gherkin**, don't have quite the same downdraught effect and don't encourage an increase in wind speed around them, as the air doesn't accelerate around corners, he adds.



The City of London has fewer skyscrapers than New York but much of its layout is based on **medieval street patterns**. Its narrower roads mean it concentrates the wind through channelling more than happens in New York's generally wider streets and avenues, says architect Steve Johnson.

Architects test skyscraper designs in **wind tunnels** to ensure there would be no damage to structures. But the **potential effect on people living and working down below is becoming more of a focus for study**, says Johnson.

Dubai's **Burj Khalifa**, the world's tallest building at 828m (2,716.5ft), underwent "micro-climate analysis of the effects at terraces and around the tower base" before opening in 2010.

In Toronto, the broadcaster Global News **measured gusts** of between 30kmph (18.6mph) and 45kmph (28mph) at one corner of the 55-storey Four Seasons Hotel. It detected wind speeds of just 5kmph (3.1mph) slightly north of the building.

As the air at higher altitudes is colder, it can create chillier micro-climates when downdraught from skyscrapers reaches street level. This can be welcome during hot spells, but less so in



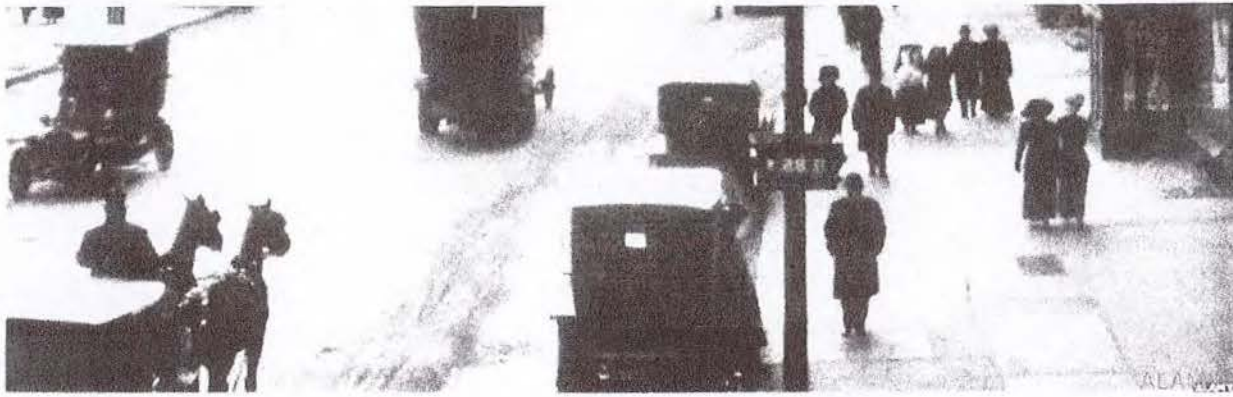
winter. And, as buildings go higher, **the speed of air hitting them rises**, increasing ground winds below.

Skyscraper-affected airflow is a relatively new phenomenon in cities like London and Leeds, which were mainly low-rise until recently.

This is not so in New York, where, more than a century ago, residents were complaining of the winds caused by the face of the **Flatiron building**, then considered tall at 93m (305ft). It was said to **lift women's skirts** above their ankles, attracting young men not used to such public exposure. In 1905, a salacious (for the time) film of this phenomenon was made.







As long ago as 1983 in New York, engineering consultant Lev Zetlin called for **laws to counteract the effects** of buildings on street wind.

The City of London Corporation is not going this far, but it is changing the way it works with developers. The level of wind predicted by developers and that which actually occurs can differ "somewhat", says the corporation's head of design, Gwyn Richards. So there's going to be independent verification of studies carried out by developers to ensure they're as "rigorous and resilient" as possible, he adds.

The problem is that, where buildings causing downdraught problems have already been built at great expense, they can't simply be demolished.

Among the solutions on offer are screens to shield people from the wind at street level or even the use of more trees and hedges to break up air flow.

In Leeds, the city council last year granted permission for angled shelters near the base of Bridgewater Place, known as "baffles". But Lindsay Smales, senior lecturer in building, planning and geography at Leeds Beckett University, has said he **doubts much can be done** "once you've built a tall building like that to mitigate the problems of micro climate and the effect of the wind".

Concerns were raised over the proposed **15-storey Lumina tower block** in Birmingham and a **27-storey building in Manchester**, both of which gained planning permission last year.

As downdraught happens most where buildings are square-on to wind, would changing their angles be a good idea?

Johnson is inspired by the example of a far more low-rise place, the seaside resort of **Whitstable in Kent**, famed for its oyster trade and now home to offshore wind farms. Some of its street layout was designed to be at 45 degrees to the prevailing wind so that there's not such a wide section facing it, he says.

"None of these problems are new," Johnson says. "The ancient Greeks and Romans knew something about the effects of wind on buildings. It's just that, unlike today, they didn't try to build enormous skyscrapers."

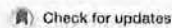




## Wind and the city: An evaluation of San Francisco's planning approach since 1985

Hyungkyoo Kim, Elizabeth Macdonald

First Published September 24, 2015 Research Article



<https://doi.org/10.1177/0265813515607474>



### Abstract

In 1985, San Francisco adopted a downtown plan on ground-level wind currents intended to mitigate the negative effects of wind on pedestrians' perceived comfort in public open spaces. The plan mandates that new buildings in designated parts of the city associated with high density or development potential be designed or adopt measures to not cause wind in excess of accepted comfort levels. This study examines whether and to what degree the plan has successfully shaped an urban form that mitigates wind by comparing the ground-level wind environment in 1985 and 2013. A series of wind tunnel tests found that during San Francisco's windiest season when the westerly winds are prevalent, the overall mean wind speed ratio measured at 318 locations in four areas of the city dropped by 22%. However, there still exist many excessively windy places that are associated with specific urban form conditions, including streets oriented to have direct exposure to westerly winds, flat façades on high-rise buildings, and horizontal street walls where building façades align. Recommendations based on the findings include incorporating more tangible guidance on the built form conditions, expanding the plan's reach to cover more parts of the city, and learning from strategies used elsewhere. By evaluating the urban form impacts of a wind mitigation policy that has been in place for 30 years, the research offers insights for other cities that have implemented or plan to adopt similar approach and sheds light on issues related to wind comfort in high-density urban areas.

### Keywords

Urban form, wind, outdoor comfort, San Francisco, wind tunnel simulation

### Introduction

Soured by the residents' strong interest in the quality of the built environment and securing comfort

**Explore More**





WETLAND NEEDS WETLANDS

# Houston's flooding shows what happens when you ignore science and let developers run rampant

By [Ana Campoy](#) & [David Yanofsky](#) · August 29, 2017

Since Houston, Texas was founded nearly two centuries ago, Houstonians have been treating its wetlands as stinky, mosquito-infested blots in [need of drainage](#).

Even after it became a widely accepted scientific fact that wetlands can soak up large amounts of flood water, the city continued to pave over them. The watershed of the White Oak Bayou river, which covers [much of northwest Houston](#), is a case in point. From 1992 to 2012, this area lost more than 70% of its wetlands, according to

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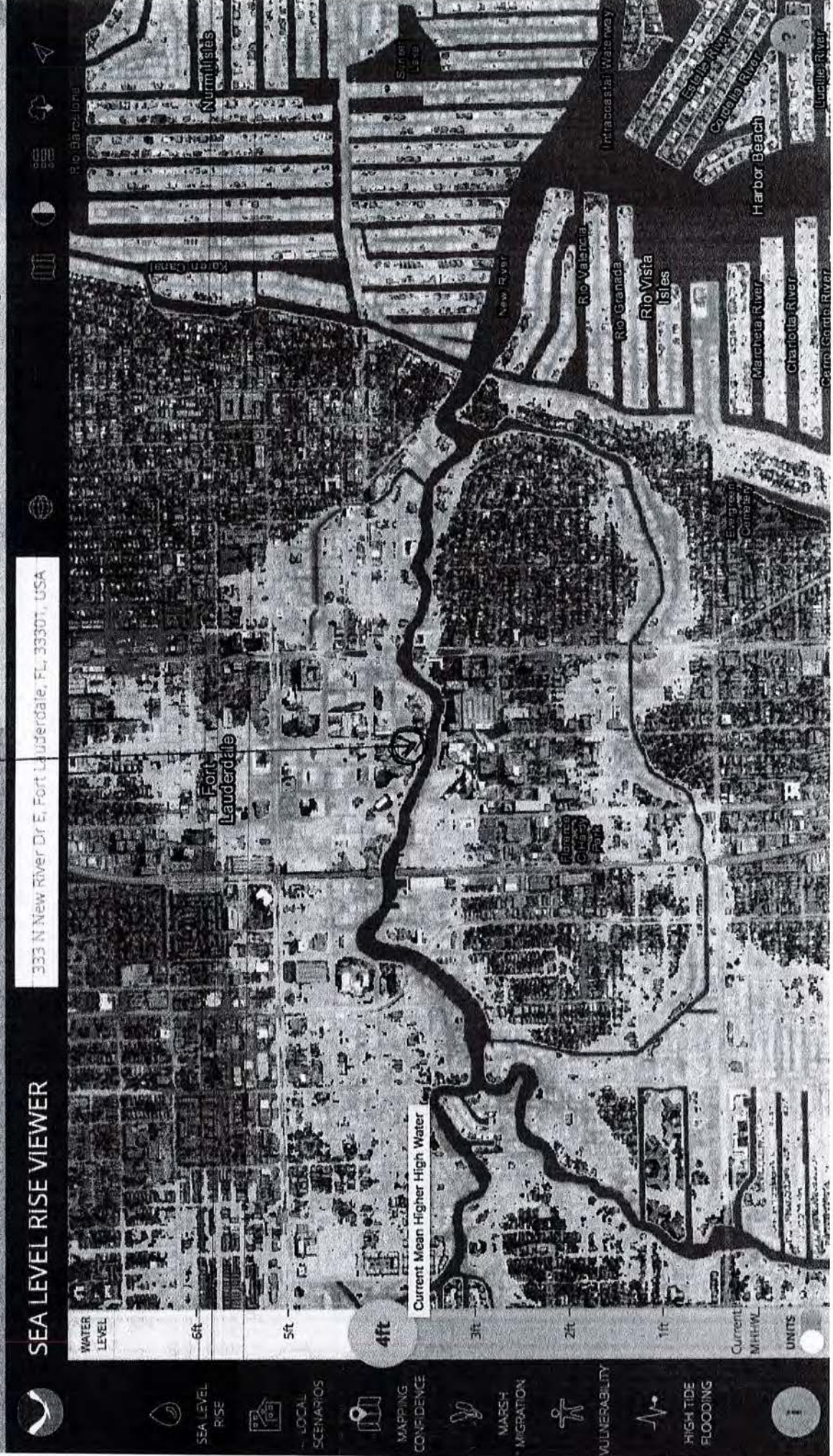
Technical drawing details, possibly including dimensions or labels, though they are very faint and difficult to read.

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Sea Level Rise Viewer



Shows 4ft sea rise - North side New River flooded



# Houston's flooding shows what happens when you ignore science and let developers run rampant

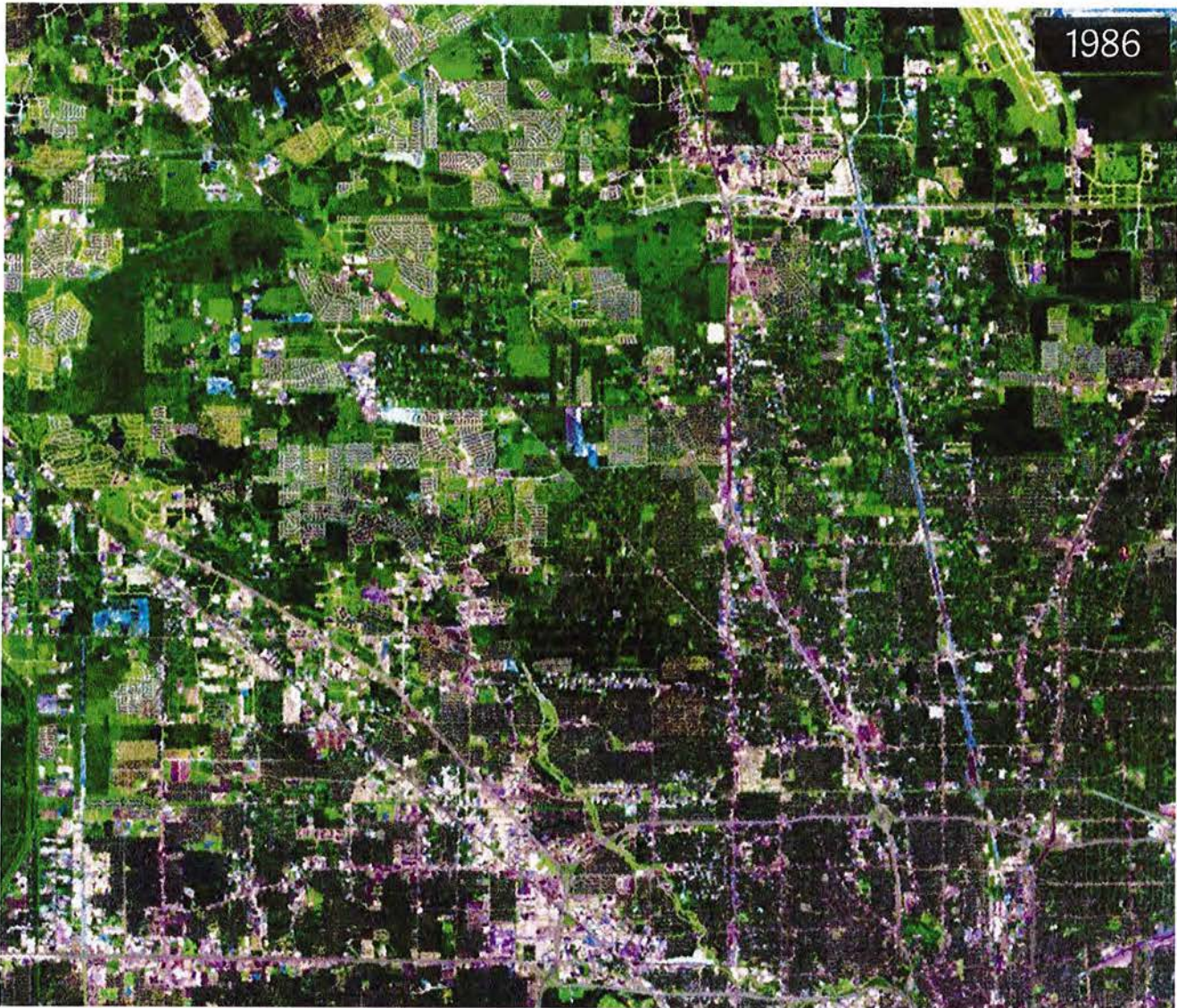
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In the false-color satellite images below, plants and other vegetation appear green, while urbanized and developed areas appear blue and purple. Drag the slider to see how northwest Houston has changed since 1986.



In recent days, the flooding caused by Hurricane Harvey has raised water levels in some parts of the watershed high enough to **completely cover** a Cadillac. The vanished wetlands wouldn't have prevented flooding, but they would have made it less painful, experts say.

The Harvey-wrought devastation is just the latest example of the consequences of Houston's **gung-ho approach** to development. The city, the largest in the US with no zoning laws, is a case study in limiting government regulations and favoring growth—often at the



expense of the environment. As water swamps many of its neighborhoods, it's now also a cautionary tale of sidelining science and plain common sense. Given the Trump administration's assault on environmental protections, it's one that Americans elsewhere should pay attention to.

## **A distaste for regulation**

Wetland loss is one of the many effects of lax rules. The construction of flood-prone buildings in flood plains is another one: The elderly residents of La Vita Bella, a nursing home in Dickinson, east of Houston, were [up to their waists](#) in water before they got rescued. The home is within the Federal Emergency Management Agency's (FEMA) [designated flood zone](#).

Yet another consequence is that too few people have flood insurance. Although federal rules require certain homeowners to carry it, those rules are based on **outdated flood data**. Only a little over a quarter of the homes in “high risk” areas in Harris County, where Houston sits, have flood insurance. The share is even lower, 15%, in many other areas that will also no doubt suffer water damage from Harvey.

And that’s before Trump came into office and started removing layers of regulation. Just 10 days before Harvey struck, the president **signed an executive order** that rescinded federal flood protection standards put in place by his predecessor, Barack Obama. FEMA and the US Housing and Urban Development Department, the two federal agencies that will handle most of the huge pile of cash expected for the rebuilding of Houston, would have been forced to require any rebuilding to conform to new, safer codes. Now, they won’t.

“What’s likely to happen is we’re going to spend tens of billions of dollars rebuilding Houston exactly like it is now, and then wait for the next one,” says Rob Moore, a senior policy analyst on water issues for the Natural Resources Defense Council.

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To take another example: Obama had greatly expanded the number of wetlands protected by the Clean Water Act. This federal law requires developers who destroy wetlands to mitigate the ecological effects, for instance by creating new wetlands elsewhere. In February, the Trump administration [said it would repeal](#) (paywall) Obama's decision, meaning a lot more wetlands would lose that protection. (The repeal process [is still unfolding](#).)

Not that Houston has ever been a stickler for federal rules. To get a permit under the Clean Water Act, developers who build in protected wetland areas must submit paperwork showing they've completed mitigation measures. In 2015, Texas A&M and non-profit research group HARC [analyzed a sample](#) of permits issued from 1990 to 2012 in the greater Houston area. They found that in fewer than half of the cases had the developers submitted complete paperwork, and in two thirds of the cases, there was no documentation that any type of mitigation had happened. [Another study](#) (pdf) by the same two groups looked at a dozen projects that had obtained permits, and found that only two of them had successfully offset wetland

destruction, seven were partially successful, and three were complete failures.

And that's only projects subject to federal regulations. The researchers found that the vast majority of wetland-disrupting activities aren't subject to those rules. "The inevitable resultant freshwater wetland loss is therefore often uncounted and unmitigated," [they wrote](#) (pdf).

## **Draining the swamp**

Largely unobstructed either by rules or by natural features such as mountains, the Houston area sprawled. Between 1992 and 2010 alone nearly 25,000 acres (about 10,000 hectares) of natural wetland infrastructure was wiped out, the Texas A&M research shows. Most of the losses were in Harris County, where almost 30% of wetlands disappeared.

Altogether, the region lost the ability to handle nearly four billion gallons (15 billion liters) of storm water. That's equivalent to \$600 million worth of flood water detention capacity, according to the university researchers' calculations.

To be sure, that's a drop in the bucket of what Harvey will eventually unleash. The estimate was already at **nine trillion gallons** a couple of days after the storm made landfall. But saving and restoring wetlands is nonetheless an important part of making Houston more storm resistant, says Mary Edwards, a wetlands specialist at Texas A&M's AgriLife Extension.

Much of the destroyed wetlands were covered with pavement to accommodate the region's explosive population growth. So these days, even a run-of-the-mill storm causes water to gush down the streets and can lead to flooding. "We generated a lot of runoff and until now we haven't been able to keep up," she said.

It won't be long before remaining undeveloped places in the Houston area are swallowed up. Take a look at the Brays Bayou watershed, in southwestern Houston. The maps below show how the area lost nearly half of its wetlands, shown in purple, as development (the gray areas) expanded. The area has flooded for the past three years in a row.

It's not just wetlands that are being destroyed. Another major concern is the loss of wetlands. Wetlands are important for many reasons, including their ability to filter pollutants and store carbon. In the Houston area, wetlands have been lost at a rapid rate. This is due to a combination of factors, including urban development and the destruction of wetlands during the flooding caused by Hurricane Harvey. The loss of wetlands is a significant problem because it can lead to increased flooding and the loss of biodiversity. Wetlands also play a crucial role in the water cycle, and their destruction can have a negative impact on the environment. The loss of wetlands is a serious issue that needs to be addressed. We need to take steps to protect and restore wetlands, and we need to prevent further destruction. This is a challenge, but it is one that we must face if we want to protect our environment and our future.

It's not just wetlands that are being destroyed. Prairies, which also act as floodwater sponges, have been decimated too. Below, maps show the change in the Katy Prairie, west of downtown Houston. By 1996, much of it was gone, but another 10% had been lost by 2010, while the developed acreage grew by 40%, data from HARC shows.

These maps don't show what has happened over the past seven years. Bill Bass, the HARC geospatial technology expert who put them together for Quartz, says the National Oceanic and Atmospheric Administration (NOAA), which compiles the data he used, hasn't released its latest installment, for 2015. That's the result of another example of shortsightedness; NOAA, one of the government agencies best equipped to generate information for tracking and responding to climate change, has been [underfunded for a while](#), and Trump has proposed [cutting its budget](#) even more.

## **More people = more storm refugees**

Houston has been stuck in a vicious circle. More people means more



subdivisions, and more subdivisions means more runoff. That results in more flooding, which ends up affecting more people.

John Jacob, a wetlands expert who runs Texas A&M's Coastal Watershed Program, [has been warning](#) about the dangerous effects of bulldozing natural flood barriers for years. The mission of his program is to share the science with communities to help them better cope with the fact that many of them live not much above sea level in hurricane country. He says he sees signs that Houstonians are finally coming to terms with the need to change their ways.

“The idea that we just don't care is radically changing,” says Jacob. “The real-estate people, to them Houston is a one-night stand. The rest of us want this to be a place where our grandkids are happy and safe... This storm just cements that there's consequences to the way

we've done stuff.”

*Heather Timmons contributed to this article.*

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