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**Application:** Zoning Map Amendment Z2020-7 &  
Special Exception SE2020-5

**Applicant:** Hartford Dispensary dba Root Center for Advanced Recovery

**Owner:** 392 Washington Middletown LLC

**Address:** 392 Washington Street (23-0070)

**Zone:** MX

**Description:** Rezone from MX (Mixed Use) to SMH (Substance Abuse/ Mental Health Floating Zone) & Change of Use to Substance Abuse Clinic and Site Improvements

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## **UPDATE**

The Planning and Zoning Commission continued the public hearing from the September 9<sup>th</sup> meeting so the applicant could address the staff, department, Commission and public comments.

Subsequently, the applicant submitted select revised plans and a document titled, "Responses to PCD Comments and Public Comments from September 9, 2020 Public Hearing," on September 18, 2020 ("the applicant's response").

The following staff comments supersede the comments dated September 8, 2020 as many of the deficiencies in the site plan were addressed in the revised plans. These comments will address the submitted materials including the applicant's response.

## **Proposal**

The Hartford Dispensary dba Root Center for Advanced Recovery ("Root") submitted a petition for a zone change, an application for special exception and site plan review to change the use of an existing building to a substance abuse clinic administering methadone treatment pursuant to Sections 39C, 44, 55 and 71 of the Middletown Zoning Code. The building is located at 392 Washington Street in the MX zone.

## **Existing Site Conditions**

The property is bound by a commercial property with a restaurant use to the west, a mixed use building and an automotive repair facility to the east, a railroad right-of-way with single family dwellings beyond to the north and Route 66 with a cemetery beyond to the south.

The property comprises of a single parcel containing of 1.115 acres in the MX zone. It has 100 ft of frontage on Washington Street. The property has conforming frontage and lot area. It is improved with a 7,200 SF, one story commercial building with associated utilities, driveways, parking area and green spaces. The building was once divided into two tenant spaces with one space occupied by an automobile repair facility and the other space a retail space. It has conforming, height, stories, setbacks and a nonconforming use. The site has a lawn area and parking in front of the building, and parking, greenspace and some down-sloped area in the back of the property. There are no inland wetlands within 300 ft of the property.

## **ZONING MAP AMENDMENT**

The property is currently in the MX zone and abuts only properties located in the MX Zone. The cemetery across Washington Street is in the M zone. The applicant proposes to change the zone of the property to the Substance Abuse/Mental Health Floating (SMH) Zone with the MX zone remaining the underlying zone.

Floating zones differ from the traditional Euclidian zone in that it has no defined boundaries. It can “float” over an entire area where it may eventually be established. This provides relief in the rigidity of defined district zoning and allow individual treatment of property (See Fuller, *Connecticut Land Use Law and Practice, Sec. 3.9* (4<sup>th</sup> ed. 2019; Appendix A). This flexibility also has its drawbacks since it may go against the City’s goals for orderly development and preservation of property values and character.

Floating zones generally apply to commercial or multi-family development. The Middletown Zoning Code offers four floating zones:

- The Substance Abuse/Mental Health Floating (SMH) Zone
- Neighborhood/Rural Commercial Development (NRCD) Zone
- Special Residential Development (SRD) Floating zone Sub District
- Redevelopment Design District (RDD)

A floating zone is a legislative action. The Commission is not required to grant a floating zone even if the applicant meets all the requirements in the floating zone regulation. The Commission’s actions must promote the interest of the community as a whole, rather than the interests of a particular property owner ((See Fuller, *Connecticut Land Use Law and Practice, Sec. 33.2* (4<sup>th</sup> ed. 2019; Appendix B)). There is supporting case law confirming the authority of the Commission to act legislatively and on its own judgement on zone changes (*Homart Development Co. v. Planning and Zoning Commission of the Town of Watertown et al;* Appendix C).

### **Substance Abuse/Mental Health Floating (SMH) Zone**

The intent of the zone is to minimize the impact of such development on neighbors within the floating zone and abutters in adjacent, more restrictive zones while recognizing the important service which these facilities provide to the residents of Middletown.

There are certain criteria the applicant needs to meet to the satisfaction of the Planning and Zoning Commission for rezoning to the SHM zone.

### **Applicability (39C.02)**

The floating zone may be applied to any site within five specified corridors including sections of Saybrook Road, Main Street Extension, South Main Street, Washington Street and Silver Street providing that the lots have frontage on those street segments. Properties eligible are in an array of zones including: B-1, B-2, B-3, ID, DVD, MX, RPZ, M, and R-15 zone.

The subject property lays within the section of Washington Street of which the SMH zone could be applied.

### **Permitted Use (39C.03)**

The proposal is for a substance abuse/mental health diagnosis and treatment facility providing methadone treatment, which appears to fall under the allowed uses in the zone (39C.03). The proposed use is not permitted in the MX zone (Section 60).

### **Changes in Use/ Enlargement/ Expansion (39C.04)**

The proposal includes review for the use for initial approval. The use would occupy the entire 7,200 SF of the existing building with no proposal to expand the building footprint or square footage. The remaining portions of the site will be utilized as driveways, parking, loading, sidewalks, green spaces, a staff patio and other improvements associated with the proposed use.

### **Yards and Height Requirements (39C.03)**

Both the existing and proposed conditions meets the yard and height requirements for the underlying MX zone.

### **Building and Site Requirements (39C.06)**

- 1) A special exception and site plan were submitted simultaneously with the petition to rezone the property. Analysis of the special exception and site plan criteria is provided in this report, all those comments are applicable to the zone change application and are incorporated into the record for the zone change application. In general, the proposed site plan has undergone two revisions and appears to be substantially compliant with Section 55 of the Zoning Code.
- 2) The Design Review and Preservation Board (DRPB) reviewed approved revised plans dated September 2, 2020 on September 9, 2020.
- 3) Draft minutes from the September 9, 2020 DRPB meeting are attached (Appendix D).
- 4) The average building size of the five closest buildings is estimated to be 7,208 SF based on information from the property field cards (Appendix E).
- 5) The most restrictive abutting zone is the MX zone as all properties that abut the subject property are in the MX zone. The proposal meets the required height and bulk requirements of that zone.
- 6) The compatibility with the neighborhood in terms of traffic, noise, illumination and number of patients/clients is evaluated later in this report under the special exception and site plan review.
- 7) Due to the proximity of existing buildings and driveways and proposed parking and retaining walls to property lines, there is little opportunity for adequate evergreen screening, fences and earthen berms to screen the facility from adjacent properties to the north and west. A 6ft tall vinyl fence is proposed along the eastern property line.
- 8) The Commission is given authority based on reasonable and minimum standards to impose additional conditions and modifications as necessary to protect the public health, safety and welfare.

### **Illumination (39C.07)**

All site lighting for the site includes three lights on the building and five light poles along the driveway and within landscape islands in the parking lot. The lumen plan shows light spillover of up to 0.1 foot candles onto adjacent properties to the east and north. There is no light spilling onto properties with residential uses. All adjacent properties are in the MX zone which is classified as a residential zone, which allows for some commercial uses as special exception use (Section 60). The proposed signs are not internally illuminated.

### **SPECIAL EXCEPTION/SITE PLAN**

On April 22, 2020 the Planning and Zoning Commission approved a text amendment removing methadone clinics from the prohibitive use category and made clinics for mental health and/or substance abuse diagnosis and treatment uses special exception uses in the SMH zone.

Approval of this application for special exception is predicated on the approval of the zoning map amendment of this property from the MX zone to the SHM Zone.

The applicant's response falsely claims that the Commission designated a methadone clinic as a special exception use in the MX zone. In April 2020, the Commission designated a methadone clinic as a special exception use in the SMH zone (Appendix F). The property at 392 Washington Street will remain in the MX zone, unless the Commission approves the map change to the SMH zone. Substance abuse treatment clinics or methadone clinics are not listed as either permitted or special exception uses in the MX zone. Contrary to the applicant's response, the Commission is in fact obligated to deny the special exception request under MX zoning.

A site plan is required for the special exception use (44.03.1). The proposal qualifies as a Category 4 site plan review.

### **Proposed Conditions**

The applicant proposes to maintain the existing building and curb cut and constructed façade improvements, expanding the parking lot to the rear of the property, installing a new generator, constructing a new staff patio area, constructing privacy walls, fencing, retaining wall, drainage system, landscaping and other associated improvements.

### **Buildings and Uses**

The existing building will obtain façade improvements. The front façade will be clad with a mixture of materials including grey and white hardie plank artisan lap siding, painted grey block wood siding with a wood trellis. The front windows will be glazed and the door into the building is limited to employees. The company sign and logo is visible from the front façade.

The main entrance to the building will be located at the rear of the building. This façade includes a main front door and canopy over the entrance and sidewalks. The cladding will be grey and white hardie plank artisan lap siding and wood cedar siding.

The side facades will include painted brick. The southern wall will have a screening wall that provides privacy for patients as they exit the building after treatment.

The floor plans show entry vestibule and check in areas and common space at the rear of the building. The floor plans include 13 counseling rooms, three group counseling rooms, dosing areas, medical supply area, pharmacy, conference room, exam room, lab and other support spaces. The rooms along the front façade including a staff conference room, three counseling rooms and an employee breakroom.

### **Parking, Loading and Circulation**

The site will utilize the existing curb cut. A 24 ft wide driveway will provide two way access to the rear of the property where all the onsite parking is provided. The proposed conditions show a parking lot containing 46 parking spaces at the rear of the building which includes two ADA accessible spaces. There is a loading space located at the front of the building.

The proposed medical clinic use demands 45 parking spaces as presented by the applicant (40.04.03). The use will utilize all 7,200 SF of the building as well as provide one space for the one doctor on site and one space for each of the three employees.

The proposal exceeds the parking demand by one parking space.

Two electric charging stations are proposed adjacent to the building where two charging space are required (40.02.01).

### **Drainage**

The proposed drainage system consists of collecting stormwater from the driveways and parking area and directing it into an underground detention system. Overflow will be directed to a scour hole proposed in the northwest corner of the lot and adjacent to the railroad right-of-way. A stormwater management report was provided and notes that peak flows will be reduced for all storms measure up to a 100 year storm under proposed conditions.

### **Utilities**

The building will utilize existing underground utilities that service the building. An emergency generator with concrete pad is proposed to the rear of the building.

### **Lighting**

Lighting was addressed in the illumination section discussed earlier in the report.

### **Signage**

The applicant proposes one building sign on the street fronting façade. The signage includes the company name "Root Center for Advanced Recovery" and company logo. No dimensions for the signage to demonstrate compliance with the regulations. There are no specific sign standards for the SMH zone but the underlying MX zone allows a maximum of one building sign (48.03.06).

### **Landscaping**

The landscaping plan shows a mix of trees, shrubs and perennial flowers and grasses.

The front of the building will include a front lawn area with plantings around the staff break area. A street tree (Bloodgood London Planetree) is proposed behind the sidewalk in the front yard of the property. Adjacent to the building will be a patio area that will be screened with a cedar fence and landscape planting.

The rear parking lot will have landscaping within an island and along the periphery of the paved area. The parking lot trees includes four red oaks, four flowering dogwoods and one honey locust. Additional shrubs and grasses are proposed.

### **Erosion & Sediment Controls**

The proposal includes erosion & sedimentation controls that consist of a row of silt fencing along the perimeter of the rear of the property around the disturbed area. An anti-tracking pad is located at the construction entrance that utilizes an existing curb cut.

### **Special Exception Findings (44.04)**

The Commission may grant a special exception when making a finding on the following criteria below:

#### Compliance with the City Plan

The 2010 Plan of Conservation and Development does list expanding and growing the medical sector as a regional draw, as one of the guiding principles of the Plan. The plan describes the Saybrook Road Medical Corridor and the significant investment in the medical sector in this area. Portions of Saybrook Road are eligible for rezoning to the SMH Zone.

Furthermore, the Plan lists protecting the unique character of neighborhoods and improving the quality of development by adopting form-based design standards. The Planning and Zoning Commission has not adopted form-based design standards for this section of Washington Street; but any current or potential formed-based design standards would likely discourage, if not prohibit, orienting front building facades away from the public way. Rear entrances are not a concern but rather the desire to have an attractive façade that contributes to the streetscape.

#### Adverse Effects

There has been significant amount of written public comment and testimony at the public hearing expressing concerns of safety among community.

The applicant's response includes empirical evidence showing that drug treatment centers are no more associated with violent crimes than are liquor stores, and occur less frequent than that associated with convenience stores and corner stores.

The majority of the public comment was more concerned with the impact of the facility on nonviolent crimes which include theft, vandalism, drug use or drug dealing. Those were not addressed in the applicant's response.

On Wednesday, September 9, 2020, I inspected the Root Center Methadone Treatment Clinics located at 355 Broad Street, Manchester, CT and 70 Whiting Street, New Britain, CT. I stayed at each location for one hour and observed activity on site, and I did not interact with anyone. I noted the number of patients entering and exiting the clinic, their means of transportation and made other general observations.

During my time at each facility witnessed three patients openly litter including throwing trash directly out of the car window onto the parking lot. I further witnesses a person at each facility loitering in the parking lot for the duration I was there. Three clients appeared to be administered medication by staff outside on the front sidewalk or adjacent to cars at the New Britain facility.

#### Visibility and Accessibility

Not applicable.

#### Traffic Movement

The proposal will use the existing curb cut for ingress and egress onto the site for vehicular travel. The applicant provided a traffic impact study for the proposed site activity. The analysis generalizes the use as a "clinic" and does not discuss any potential changes in trip generation for the proposed substance abuse treatment use.

The applicant's response included a memo from Mark Vertucci, PE, PTOE dated September 16, 2020 that states that a review of the trip generation rates for a clinic were similar to operational data provided by the Root Center in the morning peak hour and higher than what is typically experienced by Root Center's other facilities in the afternoon peak hour.

I was at the Manchester Clinic from 7:50am to 8:50am. The clinic is part of a larger 33,000 SF building and the clinic occupies 8,236 SF. The entrance to the clinic was at the back of the building and adjacent to a large parking lot.

#### My observations:

- 47 total patients
- 38 total motor vehicles (Translates to 76 trips)
- 1 Bicyclist
- 18 patients drove alone
- 11 patients had a ride
- 6 vehicles both a driver and a passenger as patients
- 1 vehicle had a driver and two passengers as patients
- 1 patient road a bike
- 2 patients road took a taxi or a public transportation
- One driver drove noticeably erratic

I was at the New Britain Clinic from 9:25am to 10:25am. The clinic is 5,580 SF. There was a building between the clinic building and the road. The driveway entrance had a gate that was open. The parking lot had 10-12 parking spots available to clients.

My observations:

- 56 total patients
- 51 Motor vehicles (Translates to 102 trips)
- 1 Pedestrian
- 35 patients drove alone
- 13 patients had a ride
- 3 vehicles had a driver and at least one passenger as patients
- Almost one vehicular accident in the parking lot

During these two hours of nearly peak hour observation, on a common Wednesday, the two clinics generated 76 trip and 102 trips respectively. The traffic study assumed 42 peak hour trips to the proposed facility in Middletown, using a general "clinic" designation. The Manchester facility is larger than the proposed Middletown facility; and the New Britain facility is smaller. The average observed peak hour trips is more than double those represented in the traffic impact study.

The applicant has represented that it is estimate that 500 patients would be utilizing the facility including about 125 Middletown residents. Let's assume for a moment that the actual morning peak hour demand is 90 patients which is the average observed peak hour trips between of the Manchester and New Britain facilities. Assuming of the 90 trips, 45 would be entering and 45 would be existing. Entering the site from Washington Street measures a LOS A at both directions, which has minimal delays. If trips entering the site were perfectly distributed across the peak hour, there would be a car entering the site every 1 minute 20 seconds. Equally, if 45 cars are exiting the site the frequency would be 1 minute 20 seconds but at a LOS F, which measures at least a 50 second delay at the unsignalized intersection. So given the volume, frequency, and delays, it is reasonable to assume that at any given moment during peak hour, there will be a car trying to enter the site while a car is trying to exit, potentially crossing paths, all while dealing with the high volume of traffic along Washington Street. Any patron or resident of a property on Washington Street with experience entering or exiting sites from an unsignalized intersection can attest that the movement can be an intense and stressful moment. The study notes that there were 7 car crashes within 200 ft of the proposed site in the past year.

In Steven Zuckerman's presentation, he represents that the treatments patients receive do not impact the patient's ability to drive a vehicle and many patients receive treatment and drive to work. Side effects of methadone treatment may include impaired cognition or confusion, forgetfulness, impaired balance or coordination, fatigue, nausea or vomiting, and stupor among other effects (Appendix G). Scientific research has found deficits in execute functions, particularly in planning, monitoring, judgment and decision making among methadone maintenance patients. (Appendix H). Planning, monitoring, judgement and decision making are critical when navigating a difficult intersection.

It is likely that a majority of the clients will continue to use private motor vehicles to visit the treatment facility. The facility is not proposed in a location that will generate much foot traffic for patients as it is not within a comfortable walking distance (.25 miles) from most residential neighborhoods (Appendix I). Public transit is available with the closest bus stop nearly 800 ft from the building.

#### Orderly Development

The proposed use will utilize the existing building and existing curb cut. The parking lot to the rear of the site will be expanded.

The site is located in the middle of the MX zone which is primarily a residential zone that allows for a select amount of commercial uses. Many of the current buildings and uses in the MX zone were established prior to the creation of the zone. Medical and dental offices and clinics are the most similar use which are allowed under special exception (61.01.54 & 61.02.35). For the purpose of a comparison, a medical clinic would fail to meet specific special exception standards at this location, as the site would require 200 ft of frontage and a minimum of 50 ft side yards for the building pursuant to Section 44.080.06 of the Middletown Zoning Code.

#### Property Values and Character

It remains unclear how the proposed use can affect property values. There is public input that expresses concerns about property values.

The applicant's response included empirical evidence that marginalizes previous economic models that claim that substance abuse treatment centers decrease property values by 3.4% to 4.6%. The study concludes that based on the model they applied, they find no evidence that the treatment centers have an impact on property values. The study is flawed as it groups hospitals, residential facilities, outpatient treatment facilities, or other facilities with an SUD treatment program with a common variable that they all offer substance abuse treatment. The study ignores other factors within this set itself that may impact property values. These facilities may have very different effects on property values. For example a study that evaluated the impacts of hospitals on property values finds different effects based on the size of the hospital (Appendix J). Furthermore, the study provided in the applicant's response only looks at impacts on residential property values and ignores all other property values. Furthermore, the study does not differentiate the difference between inpatient or outpatient treatment as they would generate very different use patterns.

The Washington Street corridor would be impacted by the proposed development. The corridor could be greatly benefited with building façade and landscaping improvements. There are some fundamental flaws to the proposal that negatively impacts the character of the corridor. First, the building is orientated backwards. While placing the parking behind the building is encouraged and desirable, the most attractive façade is on the back of the property. The front façade should be made equally if not more attractive than the back. Furthermore the proposal includes a semi private staff area that is screened by fence. The fence will be the most visible improvement from the public street. Furthermore, the use of the door that faces the street is

limited to employees only and the windows facing the street will be glazed/tinted, which will eliminate the opportunity to let the internal use of the building contribute activity of the streetscape.

#### Parking and Loading

The plan proposes off-street parking totaling 46 spaces when 45 would be required under Section 40 of the Zoning code.

#### Compliance with Standards

There are no additional specific standards for special exception use under Section 44.08.

#### **Issues remaining to be addressed**

1. The concerns about safety, traffic, and property values seem to remain open ended.
2. The building façade facing the public-way should be enhanced with additional design elements to enhance the appearance of it being the front of the buildings.
3. Windows, at least at the street side façade should be clear and visible from the street.
4. Dimensions for the signage should be provided to verify compliance.
5. The cedar screening fence for the patio area should be removed to expose more of the front of the building.

#### **Staff Recommendations**

It is recommended that the public hearing be continued so that the applicant and the Commission can have time to review materials and address comments. The Commission may extend the public hearing up to 90 days pursuant to Executive Order 7I. The applicant may request an extension up to 65 days (CGS 8-7d).

# APPENDIX A

§ 3:9. Floating zones, 9 Conn. Prac., Land Use Law & Prac. § 3:9 (4th ed.)

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## 9 Conn. Prac., Land Use Law & Prac. § 3:9 (4th ed.)

Connecticut Practice Series TM | October 2019 Update

Land Use Law & Prac.  
Robert A. Fuller

### Part I. Land Use Agencies and Their Powers and Duties

#### Chapter 3. The Zoning Commission and Types of Zoning Controls

### § 3:9. Floating zones

Another land use device that was more popular in the 1960s and early 1970s than it is now is the floating zone. This also was a response to the rigidity of defined district zoning and another device to allow individual treatment of properties. A “floating zone” can be defined as a special detailed use district of undetermined location in which a proposed type, size, and form of structures must be preapproved, and which is legislatively deemed in advance to be compatible with the area in which the zone is eventually placed, if specified standards in the zoning regulations are met, and the particular application is not unreasonable.<sup>1</sup> The floating zone differs from the traditional Euclidian zone in that it has no defined boundaries and is said to “float” over the entire area where it may eventually be established.<sup>2</sup>

A floating zone differs from a special permit which is an administrative action allowing specified uses in the zoning district under conditions specified in the zoning regulations; a special permit applies to a defined area within an existing zone while a floating zone does not have any predetermined location and carves a new zone out of an existing one.<sup>3</sup>

Floating zones involve a two-step procedure. As a first step, the zoning commission adopts the floating zone regulations, which do not place any particular property in the zone but merely designate a type of use that can be allowed in the municipality. The regulations may require approval of a special permit as a condition for using specific property for the preapproved uses in the floating zone, or it may achieve substantially the same thing by a set of defined standards stating when and under what circumstances the property may be used for the specified use. As a second step, a property owner petitions the zoning commission to designate his property as a floating zone, allowing the use specified in the zoning regulations.<sup>4</sup> The second step involves an actual change of zone and approval of the particular land development project.

A floating zone is a legislative action. Unlike a special permit which is an administrative application, the zoning commission is not required to grant a floating zone even if the applicant meets all of the requirements in the floating zone regulations.<sup>5</sup>

While the floating zone has been approved in numerous court decisions, and is superficially impressive to zoning commissioners who want to zone land on a case by case basis, the floating zone does have drawbacks. Since the floating zone regulations establish a zone for a type of use with an undetermined location, the zone can technically be applied anywhere in the municipality. It can result in individual preferences and respond to development pressures rather than considering the best area for location of particular uses.<sup>6</sup> It is contrary to the zoning goal of stabilization of property values and consistency with surrounding land uses. This understandably causes concern to municipal residents, and in most towns, they elect the members of the zoning commission. If a parcel proposed to be used for a floating zone is sufficiently large, it may overcome arguments that it is spot zoning or not in accordance with the comprehensive plan under by [General Statutes § 8-2](#). Large parcels, specially zoned, may have a significant impact on surrounding uses which are often residential in nature. Since the commission exercises a legislative function when rezoning land, opponents of a floating zone change may have difficulty in overturning it.

A related concern is lack of stability in zoning if the zoning commission has broad discretion to place an incompatible use in an existing district. An example is a commercial use in a residential zone. The uncertainty of a floating zone springing up in an undesirable location, and real or imaginary fears of favoritism by the zoning commission, has also dampened enthusiasm for the floating zone concept. On the other hand, a special permit is a use which is previously approved for a particular zone so there are no surprises when one is later applied for and granted.

An additional objection to floating zones is that the adoption of floating zone regulations is not appealable to the courts. There is no particular area or property that is effected by them, and it is uncertain whether the regulations will ever be applied to a particular piece of property.<sup>7</sup>

A zoning commission avoids some of the pitfalls and objections to the floating zone by combining it with a special permit requirement. Whether this would be upheld in the courts is unclear, and arguably, the enabling statute, General Statutes § 8-2, does not allow a combination of these devices. Once the floating zone regulations have been adopted, cases have upheld applying the use and the regulations to a particular parcel of land with a special permit.<sup>8</sup> However, as a practical matter, a zoning commission can accomplish substantially the same thing without the same objections and problems by a conventional change of zone followed by an application for a special permit for a use permitted in the new zone. Most floating zones involve commercial or multifamily uses.<sup>9</sup> Where an application is made to designate a particular parcel as a floating zone, the zoning commission has broad discretion to deny it even though it meets the existing regulations for the zone.<sup>10</sup>

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#### Footnotes

- 1 [Schwartz v. Town Plan and Zoning Commission for Town of Hamden](#), 168 Conn. 20, 22, 357 A.2d 495, 496 (1975).
- 2 [Schwartz v. Town Plan and Zoning Commission for Town of Hamden](#), 168 Conn. at 22, 357 A.2d at 496; [Sheridan v. Planning Bd. of City of Stamford](#), 159 Conn. 1, 16, 266 A.2d 396, 404 (1969). See also [Pleasant Valley Neighborhood Association v. Planning and Zoning Commission of Town of South Windsor](#), 15 Conn. App. 110, 114, 543 A.2d 296, 298, 299 (1988) describing the floating zone and its implementation. [Heithaus v. Planning and Zoning Commission of Town of Greenwich](#), 258 Conn. 205, 217, 779 A.2d 750, 759 (2001).
- 3 [Heithaus v. Planning and Zoning Commission of Town of Greenwich](#), 258 Conn. 205, 216–217, 779 A.2d 750, 759 (2001).
- 4 [Homart Development Co. v. Planning and Zoning Commission of Town of Watertown](#), 26 Conn. App. 212, 215, 600 A.2d 13, 14 (1991).
- 5 [Homart Development Co. v. Planning and Zoning Com'n of Town of Watertown](#), 26 Conn. App. 212, 216–217, 600 A.2d 13, 15 (1991).
- 6 [Campion v. Board of Aldermen of City of New Haven](#), 278 Conn. 500, 519, 899 A.2d 542 (2006), quoting this text.
- 7 [Sheridan v. Planning Bd. of City of Stamford](#), 159 Conn. 1, 13, 14, 266 A.2d 396, 403 (1969); [Schwartz v. Town Plan and Zoning Commission for Town of Hamden](#), 168 Conn. 20, 25, 26, 357 A.2d 495, 498 (1975).
- 8 See [Norris v. Planning and Zoning Commission of Town of Westport](#), 156 Conn. 592, 593, 244 A.2d 378, 378 (1968); [Weigel v. Planning and Zoning Commission of Town of Westport](#), 160 Conn. 239, 241, 278 A.2d 766, 767 (1971).
- 9 Besides [Schwartz](#) and [Sheridan](#), other cases upholding the floating zones are [Lurie v. Planning and Zoning Commission of Town of Westport](#), 160 Conn. 295, 278 A.2d 799, 49 A.L.R.3d 476 (1971) (design development district); [Hawkes v. Town Plan and Zoning Commission of Town of Farmington](#), 156 Conn. 207, 240 A.2d 914 (1968) (restricted apartment zone); [Dooley v. Town Plan and Zoning Commission of Town of Fairfield](#), 154 Conn. 470, 226 A.2d 509 (1967) (residence district); [Miss Porter's School, Inc. v. Town Plan and Zoning Commission of Town of Farmington](#), 151 Conn. 425, 198 A.2d 707 (1964) (restricted

apartment zone); *Luery v. Zoning Bd. of City of Stamford*, 150 Conn. 136, 187 A.2d 247 (1962) (designed commercial district); *De Meo v. Zoning Commission of City of Bridgeport*, 148 Conn. 68, 167 A.2d 454 (1961) (garden apartment zone); *Loh v. Town Plan and Zoning Commission of Town of Fairfield*, 161 Conn. 32, 282 A.2d 894, 52 A.L.R.3d 486 (1971); *Pleasant Valley Neighborhood Ass'n v. Planning and Zoning Com'n of Town of South Windsor*, 15 Conn. App. 110, 114, 543 A.2d 296, 298 (1988) (designed commercial zone).

10 *Homart Development Co. v. Planning and Zoning Com'n of Town of Watertown*, 26 Conn. App. 212, 217, 600 A.2d 13, 15 (1991).

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# APPENDIX B

## 9A Conn. Prac., Land Use Law & Prac. § 33:2 (4th ed.)

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Land Use Law & Prac.  
Robert A. Fuller

### Part III. Land Use Appeals and Litigation

#### Chapter 33. Tests for Judicial Review of Agency Decisions

## § 33:2. Zone changes and amendments to zoning regulations

A zone change should be upheld if it passes a two-part test: (1) it is in accordance with the comprehensive plan, and (2) it is reasonably related to the normal police power purposes in Gen 8-2 of the General Statutes.<sup>1</sup> A zoning commission, when amending zoning regulations or passing a zone change, acts in a legislative capacity, which gives it very broad discretion, and the superior court on appeal should not substitute its judgment for that of the commission unless the appellants prove that the commission's action was clearly arbitrary or illegal.<sup>2</sup> A zoning commission has broad discretion when it acts within its prescribed legislative powers.<sup>3</sup> The question on appeal is not whether the court would have reached the same conclusion as the agency but whether the record before the agency supports the decision reached.<sup>4</sup> When a zoning commission acts in a legislative capacity, its discretion is broader than that of an administrative board which performs administrative or quasi-judicial functions.<sup>5</sup>

The substantial evidence standard for the judicial review of administrative decisions does not apply to changes of zones because the zoning commission is acting legislatively, and the decision must only be reasonably supported by the record.<sup>6</sup>

An historic overlay zone is not a floating zone and does not change the zone of the property so that the zoning commission acts in an administrative and not in a legislative capacity when it reviews an overlay zone application.<sup>7</sup> The same concept would apply to other overlay zones such as an aquifer overlay zone where the zoning regulations of the underlying district apply to the property, but there are additional special requirements for a permitted use in the zone.

When a zoning commission makes a change of zone, it is required to give reasons for its action.<sup>8</sup> The zone change must be upheld if any of the reasons given for it by the commission are valid, reasonably supported by the record, and pertinent to the considerations which the commission was required to apply under the zoning regulations.<sup>9</sup> The upgrading of a zone to a more restrictive classification which is in the interest of the community is almost always upheld.<sup>10</sup> Only the reasons given by the commission count and the court will not consider the reasons stated on the record by members for their individual votes.<sup>11</sup> Where only individual reasons are given, the court must search the entire record to see if the two-part test for zoning amendments is met.<sup>12</sup>

The cases finding a formal, collective statement of reasons for a decision of a land use agency involve situations where the agency couples its communication of its ultimate decision with express reasons behind the decision.<sup>13</sup> A statement by each agency member both before and after the vote as to the personal reasons for their vote is not a collective statement of reasons.<sup>14</sup> The appellate court has noted an exception to that concept where an application failed to pass for an insufficient number of votes, and there was only one commission member who voted against the application, and he stated a reason for his vote, which was considered as the stated reason for denying a special permit application.<sup>15</sup>

Where the commission fails to give reasons for granting a zone change, its action is not void,<sup>16</sup> and the appellant has the burden of proving that the zone change was illegal.<sup>17</sup> The court will search the record to see if there is a valid reason for the commission's action and whether the change meets the two-part test for a zone change.<sup>18</sup> The commission does not have to show that its action complied with all the factors in [General Statutes § 8-2](#) or make findings of compliance with them.<sup>19</sup> The failure to comply with [General Statutes § 8-3](#) is directory only so that failure to give reasons does not render the commission's action void.<sup>20</sup> The appellant still has the burden of proving that the commission acted illegally or so arbitrarily and unreasonably as to invalidate its decision.<sup>21</sup>

A zoning commission is not required to give reasons for denying a zone change application.<sup>22</sup> A zoning commission did not have to amend the zone boundaries to eliminate a zone line dividing a lot even though the plan of development recommended that residential zone boundaries be reviewed for possible adjustments where the commission determined that this should not be done without a review of other properties in the area.<sup>23</sup>

Where reasons are given, it is sufficient if any one of the reasons would be a valid basis to deny the application.<sup>24</sup> The court will only consider the collective reasons given by the commission and not individual reasons of its members.<sup>25</sup> The commission members may rely on their personal knowledge of the area involved.<sup>26</sup> This includes knowledge of traffic and real estate development patterns in the area.<sup>27</sup> Credibility of witnesses before the agency and determination of factual issues are matters solely within the province of the agency.<sup>28</sup>

The commission cannot totally reject the testimony of an expert unless there is evidence in the record which undermines either the expert's credibility or final conclusions.<sup>29</sup>

The decision of the trial court reversing denial of a zone change will generally be set aside by the appellate courts.<sup>30</sup> The same result usually occurs where the trial court sets aside a zone change granted by a zoning commission.<sup>31</sup> The denial of a zone change application by a zoning commission may be reversed on appeal in those unusual cases where the zoning of the property only allows uses of the property which will never be implemented because of the location and surrounding land uses<sup>32</sup> or where restriction to the current use amounts to confiscation.<sup>33</sup> Where a zoning commission exists under a special act, the test for judicial review of its decisions is usually the same as for review of actions of zoning commission acting under the General Statutes.<sup>34</sup>

The denial of a zone change application from a two acre residential zone to a multifamily design residence zone for a 5.4 acre parcel located on a heavily travelled state highway near the commercial center of the town was reversed and remanded to the zoning commission when none of the reasons for denial of the application were valid, and the record showed that adjacent land and property across the road were located in and used for various retail and commercial uses, the town plan of conservation and development amended only two years earlier had designated the subject property as a moderate density multifamily site, and there had been no standard subdivisions for single family residences on the state highway for a distance of five miles in over 30 years.<sup>35</sup>

In *Builders Service Corporation, Inc. v. Planning and Zoning Commission of Town of East Hampton*,<sup>36</sup> it was held that a *change in zoning regulations* is valid if it has a rational relationship to the legitimate objectives of zoning set out in the enabling statute, [General Statutes § 8-2](#), rejecting the test of whether the regulation substantially advances legitimate state interests as discussed in a U.S. Supreme Court case.<sup>37</sup> However, it held that in the absence of any evidence of a rational relationship between the minimum floor area requirements in the zoning regulations and any of the legitimate objectives of zoning in [General Statutes §](#)

8-2, the regulation was invalid.<sup>38</sup> A change in zoning regulations only has to meet one of the factors in [General Statutes § 8-2](#), and the commission does not have to consider the impact of the amendment on a particular site.<sup>39</sup>

A zoning commission has broad discretion in denying a request to designate land as a floating zone even where its provisions contain floating zone provisions and standards, and an application for a particular parcel can meet the requirements.<sup>40</sup> Since the commission acts in a legislative capacity and a floating zone requests a change in the boundaries of an existing zone district, the provision in [General Statutes § 8-2h](#) which protects administrative applications from changes in zoning regulations does not apply.<sup>41</sup> The zoning commission's actions are required to promote the interest of the community as a whole, rather than the interests of a particular property owner, but its action is not invalid even though some property owners may receive an incidental benefit from a zone change or change in regulations.<sup>42</sup>

The commission has very broad discretion when refusing to delete its own presumptively valid regulation.<sup>43</sup>

A regulation that has some relationship to promoting the general welfare or some subset of that concept, such as public health, safety, property values, or any of the declared purposes in [General Statutes § 8-2](#), is valid if it does not at the same time promote or generate results which are contrary to the general welfare, and where that exists, closer scrutiny of the regulation occurs, but some adverse effect is not determinative.<sup>44</sup> Where zoning regulations are racially discriminatory, they may be vulnerable unless the commission can show that the regulation advances a legitimate good faith governmental interest, and it cannot rely on the strong presumption of validity of zoning regulations.<sup>45</sup>

If the administrative record supports the commission's reasons for a change in the regulations, the trial court must then determine if the reasons are valid as being rationally related to a legitimate purpose of zoning.<sup>46</sup>

An amendment to the zoning regulations providing that inland wetlands and slopes of 25% or more should be excluded in computing minimum lot size has been upheld as having a rational basis because it was reasonably related to balancing development and conservation, which is a legitimate purpose of zoning under [General Statutes § 8-2](#).<sup>47</sup> In the same case, a claim that this violated the uniformity provision in [§ 8-2](#) was rejected because the amendment applied to all parcels in the town even though the effect differed as to specific parcels depending upon the amount of 25% slopes, inland wetlands, and watercourses they contained<sup>48</sup> and even though approved subdivisions were exempt from the change because of [General Statutes § 8-26a\(b\)](#).<sup>49</sup> A change in the zoning regulations and the zoning map providing a 200 foot buffer along an interstate highway was upheld where the zoning commission was acting legislatively and in accordance with the comprehensive plan.<sup>50</sup>

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#### Footnotes

- 1 [First Hartford Realty Corp. v. Plan and Zoning Commission of Town of Bloomfield](#), 165 Conn. 533, 541, 338 A.2d 490, 495 (1973); [Protect Hamden/North Haven from Excessive Traffic and Pollution, Inc. v. Planning and Zoning Com'n of Town of Hamden](#), 220 Conn. 527, 544, 545, 600 A.2d 757, 766, 767 (1991); [Ghent v. Zoning Com'n of City of Waterbury](#), 220 Conn. 584, 600 A.2d 1010 (1991); [Damick v. Planning and Zoning Commission of Town of Southington](#), 158 Conn. 78, 83, 84, 256 A.2d 428, 431 (1969).
- 2 [Protect Hamden/North Haven from Excessive Traffic and Pollution, Inc. v. Planning and Zoning Com'n of Town of Hamden](#), 220 Conn. 527, 542, 600 A.2d 757, 765 (1991); [Burnham v. Planning and Zoning Com'n of Town of South Windsor](#), 189 Conn. 261, 265, 455 A.2d 339, 340 (1983); [Calandro v. Zoning Commission of City of Bridgeport](#), 176 Conn. 439, 440–42, 408 A.2d 229, 229–30 (1979); [Hawkes v. Town Plan and Zoning Commission of Town of Farmington](#), 156 Conn. 207, 210, 240 A.2d 914, 916 (1968).

- Harris v. Zoning Com'n of Town of New Milford, 259 Conn. 402, 416, 788 A.2d 1239, 1250 (2002);  
Konigsberg v. Board of Aldermen of City of New Haven, 283 Conn. 553, 581–83, 930 A.2d 1, 17–18, 223  
Ed. Law Rep. 845 (2007).
- 3 First Hartford Realty Corp. v. Plan and Zoning Commission of Town of Bloomfield, 165 Conn. 533, 338  
A.2d 490, 495 (1973).
- 4 Burnham v. Planning and Zoning Com'n of Town of South Windsor, 189 Conn. 261, 455 A.2d 339, 341  
(1983); Wisniewski v. Zoning Bd. of City of Stamford, 6 Conn. App. 666, 667, 506 A.2d 1092, 1093 (1986);  
Primerica v. Planning and Zoning Com'n of Town of Greenwich, 211 Conn. 85, 96, 558 A.2d 646, 651  
(1989).
- 5 First Hartford Realty Corp. v. Plan and Zoning Commission of Town of Bloomfield, 165 Conn. 533, 544,  
338 A.2d 490, 496 (1973).  
Blakeman v. Planning and Zoning Com'n of City of Shelton, 82 Conn. App. 632, 644, 846 A.2d 950, 958  
(2004).
- 6 Dutko v. Planning and Zoning Bd. of City of Milford, 110 Conn. App. 228, 231, 233, 954 A.2d 866 (2008).  
7 Heithaus v. Planning and Zoning Com'n of Town of Greenwich, 258 Conn. 205, 219, 779 A.2d 750, 760  
(2001).
- 8 General Statutes § 8-3(c); Zenga v. Zebrowski, 170 Conn. 55, 61, 364 A.2d 213, 216 (1975).  
9 Burnham v. Planning and Zoning Com'n of Town of South Windsor, 189 Conn. 261, 265, 455 A.2d 339, 341  
(1983); First Hartford Realty Corp. v. Plan and Zoning Commission of Town of Bloomfield, 165 Conn. 533,  
338 A.2d 490, 496 (1973); Parks v. Planning and Zoning Commission of Town of Southington, 178 Conn.  
657, 662, 663, 425 A.2d 100, 103 (1979); Primerica v. Planning and Zoning Com'n of Town of Greenwich,  
211 Conn. 85, 96, 97, 558 A.2d 646, 651, 652 (1989).
- 10 Spada v. Planning and Zoning Commission of Town of Stratford, 159 Conn. 192, 199, 268 A.2d 376, 380  
(1970); Andrew C. Petersen, Inc. v. Town Plan and Zoning Commission of Town of Bloomfield, 154 Conn.  
638, 642, 228 A.2d 126, 127 (1967); Metropolitan Homes, Inc. v. Town Plan and Zoning Commission of  
Town of Farmington, 152 Conn. 7, 11, 202 A.2d 241, 243 (1964); Senior v. Zoning Commission of Town of  
New Canaan, 146 Conn. 531, 534, 153 A.2d 415, 417 (1959); Central Bank for Sav. v. Planning and Zoning  
Com'n of Town of Cromwell, 13 Conn. App. 448, 456, 537 A.2d 510, 515 (1988).
- 11 Suburban Development Corp. v. Town Council of Town of West Hartford, 158 Conn. 301, 302, 259 A.2d  
634, 635 (1969); Protect Hamden/North Haven from Excessive Traffic and Pollution, Inc. v. Planning and  
Zoning Com'n of Town of Hamden, 220 Conn. 527, 544, 545, 600 A.2d 757, 766, 767 (1991).  
Harris v. Zoning Com'n of Town of New Milford, 259 Conn. 402, 420, 788 A.2d 1239, 1252 (2002).
- 12 Protect Hamden/North Haven from Excessive Traffic and Pollution, Inc. v. Planning and Zoning Com'n of  
Town of Hamden, 220 Conn. 527, 545, 600 A.2d 757, 766, 767 (1991).  
Harris v. Zoning Com'n of Town of New Milford, 259 Conn. 402, 420–423, 788 A.2d 1239, 1252–1254  
(2002).
- 13 Harris v. Zoning Commission of Town of New Milford, 259 Conn. at 420–423, 788 A.2d at 1252–1254.  
This case contains a good summary of the prior cases on this subject.
- 14 Protect Hamden/North Haven from Excessive Traffic and Pollution, Inc. v. Planning and Zoning Com'n of  
Town of Hamden, 220 Conn. 527, 544, 545, 600 A.2d 757, 767, 768 (1991).
- 15 A. Aiudi & Sons v. Planning and Zoning Com'n of Town of Plainville, 72 Conn. App. 502, 513, 806 A.2d  
77, 86 (2002), judgment aff'd, 267 Conn. 192, 837 A.2d 748 (2004).
- 16 Nielson v. Zoning Commission of Waterbury, 149 Conn. 410, 411, 180 A.2d 754, 755 (1962); Corsino v.  
Grover, 148 Conn. 299, 310, 170 A.2d 267, 272, 95 A.L.R.2d 751 (1961).
- 17 Woodford v. Zoning Commission of Town of Ridgefield, 147 Conn. 30, 32, 156 A.2d 470, 472 (1959).  
18 Morningside Ass'n v. Planning and Zoning Bd. of City of Milford, 162 Conn. 154, 156, 292 A.2d 893, 895  
(1972); Langer v. Planning and Zoning Commission of Town of Westport, 163 Conn. 453, 460, 313 A.2d  
44, 48 (1972); Little v. Planning and Zoning Commission of Town of Manchester, 161 Conn. 563, 287 A.2d  
741 (1971).
- 19 Protect Hamden/North Haven from Excessive Traffic and Pollution, Inc. v. Planning and Zoning Com'n of  
Town of Hamden, 220 Conn. 527, 553, 554, 600 A.2d 757, 771 (1991).

- 20 Morningside Ass'n v. Planning and Zoning Bd. of City of Milford, 162 Conn. 154, 156, 292 A.2d 893, 895 (1972); Chucta v. Planning and Zoning Commission of Town of Seymour, 154 Conn. 393, 396, 225 A.2d 822, 824 (1967); Nielson v. Zoning Commission of Waterbury, 149 Conn. 410, 411, 180 A.2d 754, 755 (1962).
- 21 Chucta v. Planning and Zoning Commission of Town of Seymour, 154 Conn. 393, 396, 225 A.2d 822, 824 (1967); Woodford v. Zoning Commission of Town of Ridgefield, 147 Conn. 30, 32, 156 A.2d 470, 472 (1959).
- 22 Calandro v. Zoning Commission of City of Bridgeport, 176 Conn. 439, 441, 408 A.2d 229, 230 (1979); Cascio v. Town Council of Town of West Hartford, 158 Conn. 111, 115, 256 A.2d 685, 687 (1969); Hall v. Planning and Zoning Bd. of City of Milford, 153 Conn. 574, 576, 219 A.2d 445, 447 (1966); Zenga v. Zebrowski, 170 Conn. 55, 61, 364 A.2d 213, 216 (1975).
- 23 Cottle v. Planning and Zoning Com'n of Town of Darien, 100 Conn. App. 291, 295–96, 917 A.2d 1030, 1033–34 (2007).
- 24 Burnham v. Planning and Zoning Com'n of Town of South Windsor, 189 Conn. 261, 265, 455 A.2d 339, 341 (1983); Zygmunt v. Planning and Zoning Commission of Town of Greenwich, 152 Conn. 550, 553, 210 A.2d 172, 174 (1965); Dutko v. Planning and Zoning Bd. of City of Milford, 110 Conn. App. 228, 233, 954 A.2d 866 (2008), citing this text.
- 25 Morningside Ass'n v. Planning and Zoning Bd. of City of Milford, 162 Conn. 154, 156, 292 A.2d 893, 895 (1972); Woodford v. Zoning Commission of Town of Ridgefield, 147 Conn. 30, 156 A.2d 470 (1959). Harris v. Zoning Com'n of Town of New Milford, 259 Conn. 402, 423, 788 A.2d 1239, 1254 (2002).
- 26 Blaker v. Planning and Zoning Com'n of Town of Fairfield, 212 Conn. 471, 484, 562 A.2d 1093, 1099 (1989); Burnham v. Planning and Zoning Com'n of Town of South Windsor, 189 Conn. 261, 267, 455 A.2d 339, 341 (1983).
- 27 Dram Associates v. Planning and Zoning Com'n of Town of Cromwell, 21 Conn. App. 538, 542, 574 A.2d 1317, 1319 (1990); Central Bank for Sav. v. Planning and Zoning Com'n of Town of Cromwell, 13 Conn. App. 448, 458, 537 A.2d 510, 515 (1988).
- 28 Calandro v. Zoning Commission of City of Bridgeport, 176 Conn. 439, 440, 408 A.2d 229, 229 (1979).
- 29 Kaufman v. Zoning Com'n of City of Danbury, 232 Conn. 122, 157, 653 A.2d 798, 817 (1995).
- 30 Burnham v. Planning and Zoning Commission of Town of South Windsor; Fenn v. Planning and Zoning Com'n of Town of Seymour, 24 Conn. App. 430, 589 A.2d 3 (1991).
- 31 Pleasant Valley Neighborhood Ass'n v. Planning and Zoning Com'n of Town of South Windsor, 15 Conn. App. 110, 113, 114, 543 A.2d 296, 298 (1988); Central Bank for Sav. v. Planning and Zoning Com'n of Town of Cromwell, 13 Conn. App. 448, 453, 454, 537 A.2d 510, 513 (1988).
- 32 Smith v. Milford Planning & Zoning Chairman, 12 Conn. L. Rptr. 590, 1994 WL 613369 (Conn. Super. Ct. 1994) (denial of zone change from residential to commercial improper where the parcel was adjacent to a parkway, and zone changes were previously granted for surrounding properties).
- 33 See § 54:4.
- 34 Zenga v. Zebrowski, 170 Conn. 55, 59, 364 A.2d 213, 215 (1975).
- 35 Danbury Ltd. Partnership v. Planning and Zoning Com'n of the Town of Wilton, 1998 WL 46232 (Conn. Super. Ct. 1998).
- 36 Builders Service Corp., Inc. v. Planning & Zoning Com'n of Town of East Hampton, 208 Conn. 267, 283, 284, 545 A.2d 530, 539, 87 A.L.R.4th 255 (1988).
- 37 Nollan v. California Coastal Com'n, 483 U.S. 825, 107 S. Ct. 3141, 97 L. Ed. 2d 677, 26 Env't. Rep. Cas. (BNA) 1073, 17 Env't. L. Rep. 20918 (1987).
- 38 Builders Service Corp., Inc. v. Planning & Zoning Com'n of Town of East Hampton, 208 Conn. 267, 306, 545 A.2d 530, 550, 87 A.L.R.4th 255 (1988).
- 39 Protect Hamden/North Haven from Excessive Traffic and Pollution, Inc. v. Planning and Zoning Com'n of Town of Hamden, 220 Conn. 527, 547, 554, 600 A.2d 757, 768, 771 (1991).
- 40 Homart Development Co. v. Planning and Zoning Com'n of Town of Watertown, 26 Conn. App. 212, 217, 600 A.2d 13, 15 (1991) (denial of application because the commission wanted to tighten up the regulations for a regional shopping center floating zone before applying them to particular parcels).
- 41 Homart Development Co. v. Planning and Zoning Com'n of Town of Watertown, 26 Conn. App. 212, 218, 600 A.2d 13, 16 (1991).
- 42 See § 34:10.

- 43 Connecticut Resources Recovery Authority v. Planning and Zoning Com'n of Town of Wallingford, 225 Conn. 731, 751–52 n.26, 626 A.2d 705, 715–16 n.26 (1993).
- 44 Builders Service Corp., Inc. v. Planning & Zoning Com'n of Town of East Hampton, 208 Conn. 267, 283, 545 A.2d 530, 539, 87 A.L.R.4th 255 (1988).
- 45 Huntington Branch, N.A.A.C.P. v. Town of Huntington, 844 F.2d 926 (2d Cir. 1988), judgment aff'd in part, 488 U.S. 15, 109 S. Ct. 276, 102 L. Ed. 2d 180 (1988).
- 46 AvalonBay Communities, Inc. v. Orange Planning & Zoning Com'n, 26 Conn. L. Rptr. 203, 1999 WL 1289039 (Conn. Super. Ct. 1999).
- 47 Harris v. Zoning Com'n of Town of New Milford, 259 Conn. 402, 427, 788 A.2d 1239, 1256 (2002).
- 48 Harris v. Zoning Com'n of Town of New Milford, 259 Conn. at 431, 788 A.2d at 1258.
- 49 Harris v. Zoning Com'n of Town of New Milford, 259 Conn. at 435, 436, 788 A.2d at 1261.
- 50 Lee and Lamont Realty v. Planning and Zoning Com'n of Town of Vernon, 112 Conn. App. 484, 492, 963 A.2d 98 (2009).

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# APPENDIX C

26 Conn.App. 212  
Appellate Court of Connecticut.

HOMART DEVELOPMENT COMPANY  
v.  
PLANNING AND ZONING COMMISSION  
OF the TOWN OF WATERTOWN et al.

No. 9967.

|  
Argued Sept. 23, 1991.

|  
Decided Dec. 10, 1991.

## Synopsis

Appeal was taken from zoning commission's denial of application for rezoning which was upheld by the Superior Court, [Kulawiz, J.](#) The Appellate Court, [Cretella, J.](#), held that denial of rezoning was proper exercise of legislative function even though reason given was that the commission desired to amend applicable regulations.

Affirmed.

## Attorneys and Law Firms

\*\*13 \*212 Karen P. Blado, with whom, on the brief, was [Alyce L. Raboy](#), Hartford, for appellants (plaintiff).

[Thomas P. Byrne](#), Farmington, for appellees (defendants).

Before [LAVERY](#), [LANDAU](#) and [CRETELLA](#), JJ.

## Opinion

\*\*14 [CRETELLA](#), Judge.

This appeal arises from a judgment of the trial court dismissing the plaintiff developer's \*213 appeal from the denial of its zone change application by the defendant planning and zoning commission. The plaintiff submitted the application in order to have certain land in Watertown redesignated as a Planned Regional Shopping District (PRSD) zone, pursuant to the town's zoning regulations, as a precedent to the construction of the proposed Watertown Mall. The plaintiff argues that the trial court should not have upheld the action of the commission, claiming that it was illegal, arbitrary and an abuse of discretion for the

commission to deny the zone change application on the basis of its desire to amend the PRSD regulations in the future. We affirm the judgment of the trial court.

The following facts are relevant to the resolution of this appeal. On August 7, 1989, the commission amended its zoning regulations to provide for a PRSD consisting of a minimum area of 100 acres upon initial creation. At that time, no areas were so designated on the Watertown zoning map. On August 23, 1989, the plaintiff applied for an amendment to the Watertown zoning map, seeking to change approximately 162 acres from various industrial zone designations to a PRSD zone. Public hearings were held on the application. On January 24, 1990, the commission voted, by a four to three margin, to deny the plaintiff's application. The reason articulated by the commission for its denial was that it wanted to "tighten up" the PRSD regulations before applying them to a particular parcel of land so that the commission might retain greater control over development in PRSD zones.

Thereafter, the plaintiff appealed to the trial court seeking a reversal of the denial of its application for a zone change. After the trial court dismissed the appeal, we granted the plaintiff's petition for certification to appeal to this court.

\*214 The plaintiff argues that the commission's denial of the application was improper because its reason for the denial, as stated in the record, was its desire to change the PRSD regulations in the future to give the commission more control over development in PRSD zones. The plaintiff argues that this (1) amounts to an unauthorized, retroactive moratorium on the consideration of PRSD zone applications, (2) is not among the criteria specified in [General Statutes § 8-2](#) that may be considered by a zoning authority in adopting regulations and setting district boundaries, and (3) conflicts with the requirements of [General Statutes § 8-2h](#)<sup>1</sup> to apply the then existing zoning regulations to an application before a zoning authority. The plaintiff further argues that, because the commission failed to find that the plaintiff's proposal did not comply with the PRSD regulations, the commission's action was arbitrary and an abuse of discretion and the plaintiff's application must be granted. We do not agree.

The PRSD zone at issue here is a form of what is commonly referred to as a "floating zone." "A floating zone is a special detailed use district of undetermined location in which the proposed kind, size and form of structures must be preapproved. It is legislatively predeemed compatible with the area in which it eventually locates if specified standards

are met and the particular application is not unreasonable.... It differs from the traditional 'Euclidean' zone in that it has no defined boundaries and is said to 'float' over the \*215 entire area where it may eventually be established." (Citations omitted.) *Sheridan v. Planning Board*, 159 Conn. 1, 16, 266 A.2d 396 (1969); see also *Pleasant Valley Neighborhood Assn. v. Planning & Zoning Commission*, 15 Conn.App. 110, 114–15, 543 A.2d 296 (1988).

\*\*15 "[W]hen a zoning board grants an application requesting it to apply a floating zone to a particular property, it alters the zone boundaries of the area by carving a *new zone* out of an existing one." (Emphasis added.) *Sheridan v. Planning Board*, supra, 159 Conn. at 17, 266 A.2d 396. Accordingly, an application to apply a floating zone to a particular property, like the one at issue in this appeal, is a request for a zone change. *Schwartz v. Town Plan & Zoning Commission*, 168 Conn. 20, 24, 357 A.2d 495 (1975); *Pleasant Valley Neighborhood Assn. v. Planning & Zoning Commission*, supra. Our courts are loath to overturn a decision by a zoning authority denying a requested zone change. See, e.g., *Goldfeld v. Planning & Zoning Commission*, 3 Conn.App. 172, 177–78, 486 A.2d 646 (1985). "Only under certain circumstances, where the classification is found to be unjust, confiscatory or unconstitutional and the reasons for such a change are unusual and compelling, will the courts reverse the authority's refusal to grant an application for a change of zone on the ground that the existing classification is found to be unjustified." *Cascio v. Town Council*, 158 Conn. 111, 114, 256 A.2d 685 (1969).

Our Supreme Court's comparison of a zoning authority's action in regard to a floating zone with its power to grant special exceptions in *Sheridan v. Planning Board*, supra, underscores the wide discretion afforded to a zoning authority when passing on a request to designate land as part of the floating zone. "While the concept of a floating zone is similar to the established power of a zoning board to grant special exceptions, the two types of regulation may be distinguished. The special exception is the product of administrative action, while the floating zone is the product \*216 of legislative action.... Further, if a landowner meets the conditions set forth for a special exception, the board is bound to grant one, but in the case of a floating zone discretion is maintained and additional limitations may be imposed—more control is retained by the zoning board because it is acting legislatively." (Citation omitted.) *Id.*, 159 Conn. at 16, 266 A.2d 396.

A local zoning authority acting within its legislative capacity is endowed with the freedom to act *or not to act* as it deems appropriate to meet the needs and demands of the body politic, as it determines those needs and demands. "Balancing the preservation of the status quo with the reasonable pressures for change due to the growth in population and the onslaught of business needs and community requirements is a function of zoning which must best be resolved by the duly authorized legislative municipal body...." *Jablon v. Town Planning & Zoning Commission*, 157 Conn. 434, 443, 254 A.2d 914 (1969). Thus, our Supreme Court has observed that when acting in its legislative capacity to enact or amend its regulations, a local zoning authority "must therefore be free to modify its regulations whenever time, experience, and responsible planning for contemporary or future conditions reasonably indicate the need for a change.... The discretion of a legislative body, because of its constituted role as a formulator of public policy, is much broader than that of an administrative board, which serves a quasi-judicial function.... A less strict rule would require the court to exercise a legislative judgment." (Citations omitted.) *Malafrente v. Planning & Zoning Board*, 155 Conn. 205, 209, 230 A.2d 606 (1967); see *Arnold Bernhard & Co. v. Planning & Zoning Commission*, 194 Conn. 152, 164, 479 A.2d 801 (1984); *Central Bank for Savings v. Planning & Zoning Commission*, 13 Conn.App. 448, 453, 537 A.2d 510 (1988). This broad legislative discretion applicable to \*217 the approval of a zone change is equally applicable to the denial of a requested zone change, and will not be disturbed on appeal unless the zoning authority has acted illegally or arbitrarily and has thus abused the discretion vested in it. *Cascio v. Town Council*, supra; *Fenn v. Planning & Zoning Commission*, 24 Conn.App. 430, 434–35, 589 A.2d 3, cert. denied, 219 Conn. 908, 593 A.2d 133 (1991); *Goldfeld v. Planning & Zoning Commission*, supra 3 Conn.App. at 177–78, 486 A.2d 646; \*\*16 *Coastal Suburban Builders, Inc. v. Planning & Zoning Commission*, 2 Conn.App. 489, 492, 479 A.2d 1239 (1984).

The plaintiff assumes that if its proposed use of the land in question met all of the requirements of the PRSD regulations, then the commission was bound to grant the application for a zone change. This assumption, however, is fundamentally flawed. The inclusion of a floating zone within a town's comprehensive zoning regulations does not alter the basic fact that when passing on an application to apply a floating zone, the zoning authority continues to act legislatively. *Sheridan v. Planning Board*, supra, 159 Conn. at 16, 266 A.2d 396. Nothing in our case law concerning the floating

zone concept even remotely suggests that a zoning authority cannot refuse to apply a floating zone to a particular piece of property simply because the applicant has complied with all of the requirements of the regulations establishing the floating zone. By establishing such zones, the zoning authority has not thereby ceded any of its broad authority to exercise its legislative judgment with respect to the competing needs and demands presented by a request for a zone reclassification.

This reasoning leads us to conclude that the plaintiff's claims that the denial of its application either amounts to an unauthorized, retroactive moratorium on the consideration of PRSD zone applications or conflicts with the requirements of [General Statutes § 8-2h](#) are without merit. First, no moratorium is at issue here. \*218 The commission denied the plaintiff's application for a specific reason which we evaluate in light of the evidence before the commission and in the context of the substantial discretion afforded to a zoning commission acting in its legislative capacity. Second, because an application to apply a floating zone is a request to change the boundaries of existing zoning districts, the mandate of [§ 8-2h](#) cannot logically apply to such action. The provisions of [§ 8-2h](#); see footnote 1, *supra*; are directed at situations where an application is filed with a zoning authority that seeks to make use of land in a manner permitted under regulations existing at the time the application is filed. In those circumstances, [§ 8-2h](#) requires the zoning authority, *acting in its administrative capacity*, to process the application in accordance with the regulations in effect at the time the application is filed. Nothing in the language or legislative history of Public Acts 1989, No. 89-311, which enacted [§ 8-2h](#), suggests that it was intended to require the approval of requests for zone reclassification or otherwise to diminish the *legislative capacity* of a zoning authority with respect to such requests.

At oral argument, the parties informed us that Watertown's PRSD regulations were repealed subsequent to the commission's action which gave rise to this appeal. Although we have concluded that [§ 8-2h](#) is not applicable to this appeal, we do not find this appeal to be moot pursuant to [McCallum v. Inland Wetlands Commission](#), 196 Conn. 218, 492 A.2d 508 (1985). There, it was held that the zoning law or regulation in effect at the time of the decision of a court is controlling, and that that appeal was therefore moot because a recent change in local zoning regulations precluded the applicant from obtaining the relief he originally sought. *McCallum*, however, did not involve an application for a zone change. Because shopping centers remain a permitted use in

all business districts; Watertown \*219 Zoning Regs., art. III, § 33; and because the plaintiff can still seek a zone change; *id.*, art. VIII, § 81; the repeal of the PRSD regulations does not preclude the plaintiff from obtaining the relief it seeks.

We now examine the record of the proceedings before the zoning commission. When we are required to review a decision made by a zoning commission in its legislative capacity, "it is not the function of the court to retry the case. Conclusions reached by the commission must be upheld by the trial court if they are reasonably supported by the record. The credibility of the witnesses and the determination of issues of fact are matters solely within the province of the agency. The question is not whether the trial court would have reached the same conclusion but whether \*\*17 the record before the agency supports the decision reached." [Primerica v. Planning & Zoning Commission](#), 211 Conn. 85, 96, 558 A.2d 646 (1989); [Calandro v. Zoning Commission](#), 176 Conn. 439, 440, 408 A.2d 229 (1979); see [Fenn v. Planning & Zoning Commission](#), *supra*, 24 Conn.App. at 434-35, 589 A.2d 3. This often repeated standard of judicial review applicable to the legislative actions of local zoning authorities is but an application of the well settled principle that when municipal legislative bodies "are acting within the limits of the formal powers conferred upon them, and in due form of law, the rights of courts to supervise, review or restrain them is necessarily exceedingly limited." [LaTorre v. Hartford](#), 167 Conn. 1, 8-9, 355 A.2d 101 (1974); [McAdam v. Sheldon](#), 153 Conn. 278, 281, 216 A.2d 193 (1965); [Whitney v. New Haven](#), 58 Conn. 450, 457, 20 A. 666 (1890). "[A]ny broader rule would potentially involve the courts in the review and revision of many, if not all, major controversial decisions of the legislative ... authorities of a municipality." [McAdam v. Sheldon](#), *supra*.

The record here reveals that there was voluminous evidence before the commission as a result of the hearings \*220 conducted on six days. Substantial evidence was offered by the plaintiff and others in support of the application, and substantial evidence was also offered by residents of the area and others in opposition to the application. The commission had the task of weighing that evidence and reaching a conclusion on the merits of the plaintiff's application. The evidence before the commission supported its conclusion that the existing regulations permitting the establishment of a PRSD zone were inadequate to protect the legitimate interests of the town of Watertown and its citizens as they related to land identified by the plaintiff.

From the record before us, then, it appears that the judgment of the commission to deny the plaintiff's application for a zone change "has been reasonably and fairly exercised and honestly arrived at after giving proper consideration to the public welfare in evaluating the needs of [Watertown] in relation to the appropriate use of land contained therein." *Sheridan v. Planning Board*, supra, 159 Conn. at 21, 266 A.2d 396. To conclude otherwise would undermine the flexibility inherent in the floating zone concept and would require us to substitute our judgment for that of the commission. We will do neither.

The judgment is affirmed.

In this opinion the other Judges concurred.

**All Citations**

26 Conn.App. 212, 600 A.2d 13

**Footnotes**

- 1 [General Statutes § 8-2h\(a\)](#) provides: "An application filed with a zoning commission, planning and zoning commission, zoning board of appeals or agency exercising zoning authority of a town, city or borough which is in conformance with the applicable zoning regulations as of the time of filing shall not be required to comply with, nor shall it be disapproved for the reason that it does not comply with, any change in the zoning regulations or the boundaries of zoning districts of such town, city or borough taking effect after the filing of such application."

# APPENDIX D

**CITY OF MIDDLETOWN**  
**DESIGN REVIEW AND PRESERVATION BOARD**  
Department of Planning, Conservation, and Development  
**REGULAR MEETING MINUTES**  
September 9, 2020 6:00 PM  
Virtual Meeting

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Meeting was held online. Members of the public were able view/listen to the meeting as follows:

1. Going to <https://webex.com> and joining the meeting using the appropriate meeting number and password
2. Launching the WebEx application and joining the meeting using the appropriate meeting number and password
3. Via telephone at 1-408-418-9388 and the appropriate access code  
**Meeting Number/Access Code:** 1739115838  
**Event Password:** Preservation

Call to order at 6:00pm.

**I. Public Comment for Items on the Agenda**

No public comment.

**II. Old Business**

**1. Site and Façade Improvements. 392 Washington Street. Hartford Dispensary dba Root Center for Advanced Recovery. SPR2020-105.**

Ron Bomengen, Tim Hollister and Joe Sirko were in attendance to represent the applicant. Mr. Bomengen presented the revised plans and noted the following changes: moving the generator to the rear of the property, installing a new vinyl fence along the northern property line, a new street tree along Washington Street, a new monument sign with landscaping around it, and reducing the size of the privacy wall along the side entrance. It was noted that a "green" wall with vegetative screening would not survive. Marek Kozikowski noted that that one wall sign would have to be removed to be compliant with the zoning code. Bruce Plumley made a motion to approve the revised plans as submitted. Christina Wasch seconded the motion which passed unanimously.

**III. New Business**

**1. Sign Application. 90 Court Street. Play on Court LLC. SPR2020-112**

Marek Kozikowski presented the application which included a round illuminated wall sign projecting from the front of the building. The sign was white with the company name and logo. Chairman Bianco noted that if the white part of the sign was opaque and only the lettering and logo were illuminated, then the sign would comply with the design guidelines and would not require additional review by the Board. Marek would advise the applicant accordingly.

**2. Concept Review. Science Building. Wesleyan University**

Mark Oldham, project architect presented early concepts of the new science building being designed on property between Church Street and Lawn Avenue.

**IV. Minutes**

**1. March 11, 2020**

No action taken.

**2. July 8, 2020**

**3. August 12, 2020**

Christina Wasch made a motion to approve the minutes from all the meetings. Marilyn Mills seconded the motion which passed unanimously.

**V. Public Comment for Items not on the Agenda**

No public comment.

**VI. Adjournment**

Maria Madsen Holzberg made a motion to adjourn. Christina Wasch seconded the motion which passed unanimously. The meeting adjourned at 6:57pm.

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**DESIGN REVIEW & PRESERVATION BOARD MEMBERS**

**Chair-** Jeff Bianco -Present

Member- Bruce Plumley-Present

Member - Christina Wasch-Present

Member- Marilyn Mills-Present

Member- Jammie Middleton-Present

Member- Maria Madsen Holzberg-Present

Member- Brian Kronenberger-Present

Member- Vacant

Member- Vacant

Member- Vacant

Staff- Marek Kozikowski, AICP –City Planner-Present

# APPENDIX E

## 390 WASHINGTON ST

**Location** 390 WASHINGTON ST

**Map-Lot** 23 / 0069 /

**Acct#** R10397

**Owner** SANTAVENERE SONIA A

**Municipality**

**Assessment** \$203,000

**Appraisal** \$290,000

**PID** 1064

**Building Count** 1

**Assessing District**

### Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$123,500	\$166,500	\$290,000
Assessment			
Valuation Year	Improvements	Land	Total
2018	\$86,450	\$116,550	\$203,000

### Parcel Addresses

Additional Addresses
No Additional Addresses available for this parcel

### Owner of Record

<p><b>Owner</b> SANTAVENERE SONIA A</p> <p><b>Co-Owner</b></p> <p><b>Address</b> 390 WASHINGTON ST MIDDLETOWN, CT 06457</p>	<p><b>Sale Price</b> \$0</p> <p><b>Certificate</b></p> <p><b>Book &amp; Page</b> 1672/0802</p> <p><b>Sale Date</b> 07/23/2009</p> <p><b>Instrument</b> 29</p>
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### Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
SANTAVENERE SONIA A	\$0		1672/0802	29	07/23/2009
SANTAVENERE PHILLIP P & SONIA A	\$0		1141/0123	29	10/28/1997

### Building Information

## Building 1 : Section 1

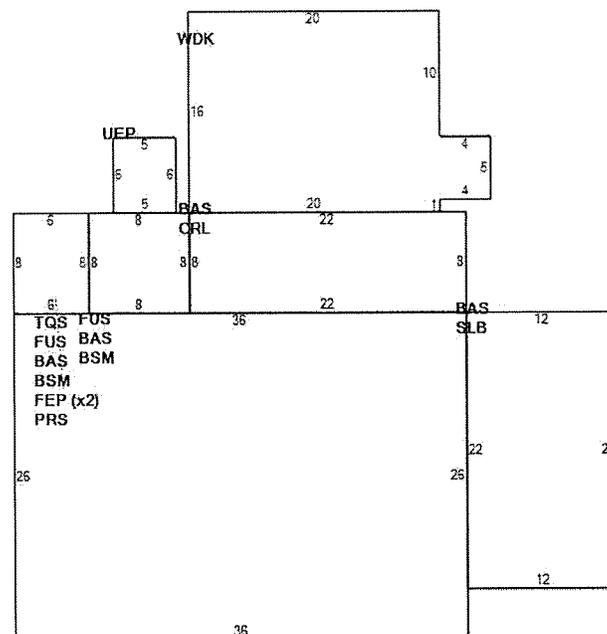
**Year Built:** 1928  
**Living Area:** 3,142  
**Replacement Cost:** \$266,658  
**Building Percent Good:** 59  
**Replacement Cost Less Depreciation:** \$157,330

## Building Photo



(<http://images.vgsi.com/photos/MiddletownCTPhotos/A00\03\01\67.jpg>)

## Building Layout



(ParcelSketch.ashx?pid=1064&bid=1064)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,440	1,440
FUS	Finished Upper Story	1,000	1,000
TQS	Three Quarter Story	936	702
BSM	Basement	1,000	0
CRL	Crawl	176	0
FEP	Enclosed Porch	96	0
PRS	Piers	48	0

Building Attributes	
Field	Description
STYLE	Office/Retail Conv
MODEL	Commercial
Grade	B-
Stories	2.9
Occupancy	1.00
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt Shingl
Interior Wall 1	Plastered
Interior Wall 2	Drywall
Interior Floor 1	Hardwood
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Water
AC Type	Partial
Struct Class	
Bldg Use	Res / Comm MDL 94
Usrflid 215	
Usrflid 216	
Cov Parking	0
Uncov Parking	0
Percent Fin	100
1st Floor Use	
Heat/AC	None
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Wall
Rooms/Prtns	Average
Wall Height	8.00
Usrflid 214	

SLB	Slab	264	0
UEP	Utility Enclosed Porch	30	0
WDK	Wood Deck	340	0
		5,330	3,142

### Extra Features

Extra Features	Legend
No Data for Extra Features	

### Land

#### Land Use

**Use Code** 203C  
**Description** Com / Res  
**Zone** MX  
**Neighborhood** 3150  
**Alt Land Appr** No  
**Category**

#### Land Line Valuation

**Size (Acres)** 0.21  
**Assessed Value** \$116,550  
**Appraised Value** \$166,500

### Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving	AS	Asphalt	6270.00 UNITS	\$7,050	1
PTO	Patio	CN	Concrete	192.00 UNITS	\$360	1

### Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$123,500	\$166,500	\$290,000
2018	\$123,500	\$166,500	\$290,000
2017	\$164,740	\$166,500	\$331,240

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$86,450	\$116,550	\$203,000
2018	\$86,450	\$116,550	\$203,000
2017	\$115,320	\$116,550	\$231,870

# 396 WASHINGTON ST

**Location** 396 WASHINGTON ST

**Map-Lot** 23//0071//

**Acct#** R07124

**Owner** MARINO REALTY ASSOCIATES  
LLC

**Municipality**

**Assessment** \$259,990

**Appraisal** \$371,420

**PID** 814

**Building Count** 1

**Assessing District**

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$185,420	\$186,000	\$371,420
Assessment			
Valuation Year	Improvements	Land	Total
2018	\$129,790	\$130,200	\$259,990

## Parcel Addresses

Additional Addresses
No Additional Addresses available for this parcel

## Owner of Record

**Owner** MARINO REALTY ASSOCIATES LLC

**Sale Price** \$0

**Co-Owner**

**Certificate**

**Address** 15 CHRISTIAN HILL ROAD  
HIGGANUM, CT 06441

**Book & Page** 1733/0705

**Sale Date** 08/09/2011

**Instrument** 29

## Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
MARINO REALTY ASSOCIATES LLC	\$0		1733/0705	29	08/09/2011
MARINO SEBASTIAN F	\$0		1733/0703	29	08/09/2011
MARINO REALTY ASSOCIATES LLC	\$0		1224/0026	29	01/19/2000

NEGRELLI VIRGINIA M (1/2 INT) &	\$0	1224/0024	29	01/19/2000
NEGRELLI VIRGINIA M ETALS	\$0	1224/0018	29	01/19/2000

## Building Information

### Building 1 : Section 1

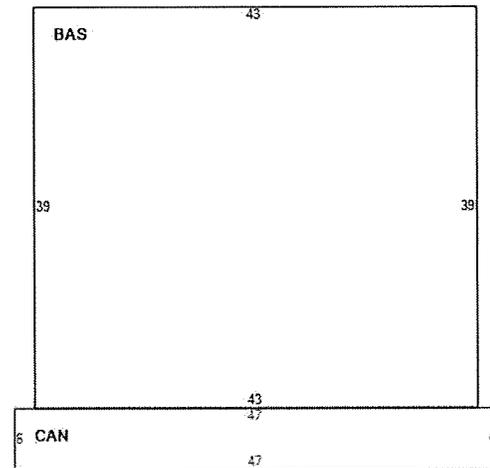
**Year Built:** 1971  
**Living Area:** 1,677  
**Replacement Cost:** \$256,899  
**Building Percent Good:** 67  
**Replacement Cost Less Depreciation:** \$172,120

### Building Photo



(<http://images.vgsi.com/photos/MiddletownCTPhotos/A00\02\12\33.jpg>)

### Building Layout



(ParcelSketch.ashx?pid=814&bid=814)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,677	1,677
CAN	Canopy	282	0
		1,959	1,677

Building Attributes	
Field	Description
STYLE	Fast Food Rest
MODEL	Commercial
Grade	C+
Stories	1
Occupancy	1.00
Exterior Wall 1	Brick Veneer
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar and Gravel
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Ceram Clay Til
Interior Floor 2	Quarry Tile
Heating Fuel	Gas
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	Commercial Improv
Usrflid 215	
Usrflid 216	
Cov Parking	0
Uncov Parking	0
Percent Fin	100
1st Floor Use	
Heat/AC	Heat/AC Split
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Walls	Typical

Rooms/Prtns	Average
Wall Height	9.00
Usrflid 214	

### Extra Features

Extra Features	Legend
No Data for Extra Features	

### Land

#### Land Use

Use Code	201
Description	Commercial Improv
Zone	MX
Neighborhood	3150
Alt Land Appr	No
Category	

#### Land Line Valuation

Size (Acres)	0.34
Assessed Value	\$130,200
Appraised Value	\$186,000

### Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving	AS	Asphalt	9024.00 UNITS	\$13,200	1
LT2	W/Double Light			1.00 UNITS	\$100	1

### Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$185,420	\$186,000	\$371,420
2018	\$185,420	\$186,000	\$371,420
2017	\$185,420	\$186,000	\$371,420

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$129,790	\$130,200	\$259,990
2018	\$129,790	\$130,200	\$259,990
2017	\$129,790	\$130,200	\$259,990

# 400 WASHINGTON ST

**Location** 400 WASHINGTON ST

**Map-Lot** 23 / / 0072 / /

**Acct#** R00003

**Owner** BIRCHWOOD REALTY LLC

**Municipality**

**Assessment** \$1,355,210

**Appraisal** \$1,936,010

**PID** 366

**Building Count** 1

**Assessing District**

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$1,136,010	\$800,000	\$1,936,010
Assessment			
Valuation Year	Improvements	Land	Total
2018	\$795,210	\$560,000	\$1,355,210

## Parcel Addresses

Additional Addresses
No Additional Addresses available for this parcel

## Owner of Record

**Owner** BIRCHWOOD REALTY LLC  
**Co-Owner**  
**Address** 619 EASTERN PARKWAY  
 BROOKLYN, NY 11213

**Sale Price** \$2,050,000  
**Certificate**  
**Book & Page** 1896/0168  
**Sale Date** 06/14/2017  
**Instrument** 00

## Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
BIRCHWOOD REALTY LLC	\$2,050,000		1896/0168	00	06/14/2017
G & B MIDDLETOWN PROPERTIES LLC	\$2,033,000		1577/0671	00	11/30/2006
BUTLER I LTD LLC	\$600,000		1453/0798	00	07/22/2004

ASPEN GLEN LLC & BUTLER I LTD LLC	\$821,000	1227/0537	00	03/17/2000
SPONZO FRANK	\$0	1016/0415	29	07/16/1993

## Building Information

### Building 1 : Section 1

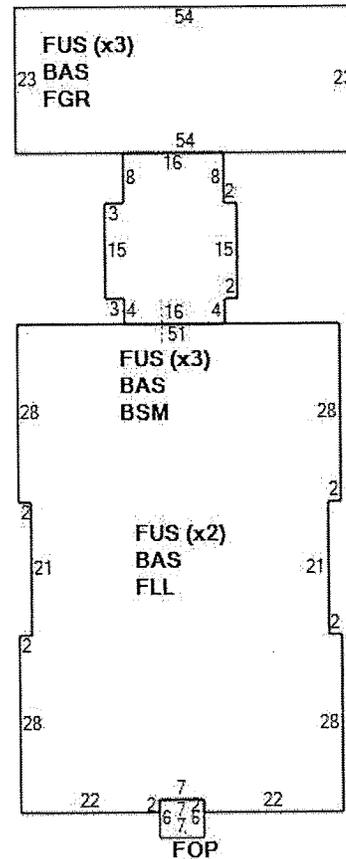
**Year Built:** 1967  
**Living Area:** 22,312  
**Replacement Cost:** \$1,626,443  
**Building Percent Good:** 66  
**Replacement Cost Less Depreciation:** \$1,073,450

### Building Photo



(<http://images.vgsi.com/photos/MiddletownCTPhotos/A00\03\01\68.jpg>)

### Building Layout



(ParcelSketch.ashx?)

pid=366&bid=366)

<b>Building Sub-Areas (sq ft)</b>	<b>Legend</b>
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Building Attributes	
Field	Description
STYLE	Apartments
MODEL	Commercial
Grade	C
Stories	4
Occupancy	32.00
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar and Gravel
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Tile
Heating Fuel	Electric
Heating Type	Electr Basebrd
AC Type	None
Struct Class	
Bldg Use	Apartments MDL-94
Usrflid 215	
Usrflid 216	
Cov Parking	0
Uncov Parking	0
Percent Fin	100
1st Floor Use	
Heat/AC	None
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Wall

Rooms/Prtns	Average
Wall Height	8.00
Usrflid 214	

Code	Description	Gross Area	Living Area
FUS	Finished Upper Story	12,905	12,905
BAS	First Floor	5,578	5,578
FLL	Finished LL	3,829	3,829
BSM	Basement	507	0
FGR	Garage	1,242	0
FOP	Framed Open Porch	42	0
		24,103	22,312

### Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
ELV1	Elevator - Passenger	4.00 STOPS	\$39,600	1

### Land

#### Land Use

**Use Code** 108C  
**Description** Apartments MDL-94  
**Zone** MX  
**Neighborhood** C  
**Alt Land Appr** No  
**Category**

#### Land Line Valuation

**Size (Acres)** 0.52  
**Assessed Value** \$560,000  
**Appraised Value** \$800,000

### Outbuildings

Outbuildings					Legend	
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving	AS	Asphalt	12010.00 UNITS	\$13,510	1
SHD1	Shed	FR	Frame	128.00 UNITS	\$480	1

### Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$1,136,010	\$800,000	\$1,936,010
2018	\$1,136,010	\$800,000	\$1,936,010
2017	\$1,136,010	\$800,000	\$1,936,010

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$795,210	\$560,000	\$1,355,210
2018	\$795,210	\$560,000	\$1,355,210

2017	\$795,210	\$560,000	\$1,355,210
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# JACKSON ST

Location JACKSON ST

Map-Lot 23 / 0067 / 1

Acct# R02328

Owner MID-TOWN TIRE & SUPPLY INC

Municipality

Assessment \$102,270

Appraisal \$146,090

PID 557

Building Count 1

Assessing District

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$40,340	\$105,750	\$146,090

Assessment			
Valuation Year	Improvements	Land	Total
2018	\$28,240	\$74,030	\$102,270

## Parcel Addresses

Additional Addresses
No Additional Addresses available for this parcel

## Owner of Record

Owner MID-TOWN TIRE & SUPPLY INC  
Co-Owner  
Address 310 LUCUST STREET  
HARTFORD, CT 06114

Sale Price \$0  
Certificate  
Book & Page 1130/0663  
Sale Date 07/01/1997  
Instrument 29

## Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
MID-TOWN TIRE & SUPPLY INC	\$0		1130/0663	29	07/01/1997

## Building Information

## Building 1 : Section 1

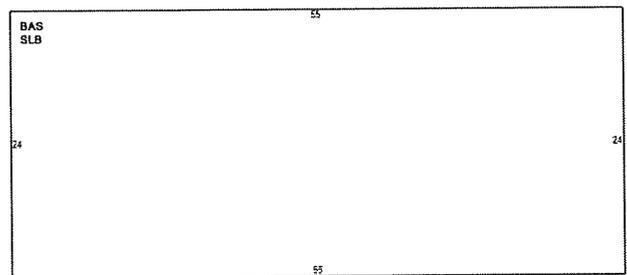
**Year Built:** 1946  
**Living Area:** 1,320  
**Replacement Cost:** \$68,543  
**Building Percent Good:** 45  
**Replacement Cost Less Depreciation:** \$30,840

## Building Photo



(<http://images.vgsi.com/photos/MiddletownCTPhotos/A00\03\01\65.jpg>)

## Building Layout



(ParcelSketch.ashx?pid=557&bid=557)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,320	1,320
SLB	Slab	1,320	0
		2,640	1,320

Building Attributes	
Field	Description
STYLE	Service Shop
MODEL	Commercial
Grade	D+
Stories	1
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Hip
Roof Cover	Asbestos Shing
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Concrete
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air
AC Type	None
Struct Class	
Bldg Use	Commercial Improv
Usrflid 215	
Usrflid 216	
Cov Parking	0
Uncov Parking	0
Percent Fin	100
1st Floor Use	
Heat/AC	None
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Walls	Ceiling Only
Rooms/Prtns	Average
Wall Height	10.00
Usrflid 214	

## Extra Features

Extra Features	Legend
No Data for Extra Features	

**Land**

**Land Use**

**Use Code** 201  
**Description** Commercial Improv  
**Zone** MX  
**Neighborhood** 3075  
**Alt Land Appr** No  
**Category**

**Land Line Valuation**

**Size (Acres)** 0.51  
**Assessed Value** \$74,030  
**Appraised Value** \$105,750

**Outbuildings**

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FN2	Fence-5' Chain			1000.00 UNITS	\$9,500	1

**Valuation History**

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$40,340	\$105,750	\$146,090
2018	\$40,340	\$105,750	\$146,090
2017	\$40,340	\$105,750	\$146,090

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$28,240	\$74,030	\$102,270
2018	\$28,240	\$74,030	\$102,270
2017	\$28,240	\$74,030	\$102,270

# 386 WASHINGTON ST

**Location** 386 WASHINGTON ST

**Map-Lot** 23 / 0068 / /

**Acct#** R12415

**Owner** BUTON LLC

**Municipality**

**Assessment** \$291,700

**Appraisal** \$416,710

**PID** 1178

**Building Count** 1

**Assessing District**

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$214,210	\$202,500	\$416,710
Assessment			
Valuation Year	Improvements	Land	Total
2018	\$149,950	\$141,750	\$291,700

## Parcel Addresses

### Additional Addresses

No Additional Addresses available for this parcel

## Owner of Record

**Owner** BUTON LLC  
**Co-Owner** %DZIEGIELEWSKI JEFF  
**Address** 55 BOSTON POST RD  
WESTBROOK, CT 06498

**Sale Price** \$0  
**Certificate**  
**Book & Page** 1148/0095  
**Sale Date** 01/21/1998  
**Instrument** 29

## Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
BUTON LLC	\$0		1148/0095	29	01/21/1998

## Building Information

## Building 1 : Section 1

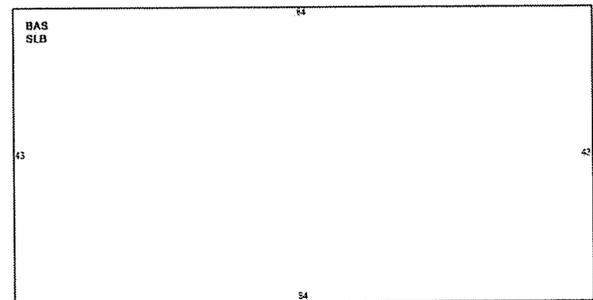
**Year Built:** 1982  
**Living Area:** 3,612  
**Replacement Cost:** \$238,571  
**Building Percent Good:** 84  
**Replacement Cost Less Depreciation:** \$200,400

## Building Photo



(<http://images.vgsi.com/photos/MiddletownCTPhotos/\A00\03\01\66.jpg>)

## Building Layout



(ParcelSketch.ashx?pid=1178&bid=1178)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	3,612	3,612
SLB	Slab	3,612	0
		7,224	3,612

Building Attributes	
Field	Description
STYLE	Service Shop
MODEL	Commercial
Grade	B+
Stories	1
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar and Gravel
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Concrete
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air
AC Type	Partial
Struct Class	
Bldg Use	Commercial Improv
Usrflid 215	
Usrflid 216	
Cov Parking	0
Uncov Parking	0
Percent Fin	100
1st Floor Use	
Heat/AC	None
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Walls	Sus Ceil & Wal
Rooms/Prtns	Average
Wall Height	12.00
Usrflid 214	

## Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
MEZ1	Mezzanine-Unf	504.00 UNITS	\$3,270	1

## Land

### Land Use

**Use Code** 201  
**Description** Commercial Improv  
**Zone** MX  
**Neighborhood** 3150  
**Alt Land Appr** No  
**Category**

### Land Line Valuation

**Size (Acres)** 0.45  
**Assessed Value** \$141,750  
**Appraised Value** \$202,500

## Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving	AS	Asphalt	8804.00 UNITS	\$9,900	1
FN1	Fence-4' Chain			80.00 UNITS	\$640	1

## Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$214,210	\$202,500	\$416,710
2018	\$214,210	\$202,500	\$416,710
2017	\$214,210	\$202,500	\$416,710

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$149,950	\$141,750	\$291,700
2018	\$149,950	\$141,750	\$291,700
2017	\$149,950	\$141,750	\$291,700

# APPENDIX F

## City of Middletown



### Department of Planning, Conservation & Development

245 deKoven Drive  
Middletown, CT 06457  
www.MiddletownPlanning.com

#### MEMORANDUM

TO: Ashley A. Flynn, Town Clerk  
FROM: Marek Kozikowski, AICP, City Planner  
DATE: April 24, 2020  
RE: Zoning Text Amendments Z2020-2  
Prohibited Uses

On April 22, 2020 the Planning & Zoning Commission approved text amendments to the Middletown Zoning Code as follows:

~~Strikethrough~~ Text: Deleted

**Bold Text:** Added

**xx:** Denotes section number to be determined

#### 61.05 PROHIBITED USES

Any use which can be reasonably considered to cause, despite existing environmental safeguards, hazardous or noxious conditions or which would violate Section 15.01, Performance Standards. Further any use not specified as a permitted use, special exception use, accessory use, permitted home occupation use or use by temporary permit are prohibited uses including but not limited to the incineration of solid waste, correctional facilities, alternate incarceration centers, ~~methadone clinics~~, half way houses, ~~rooming houses~~, pawn shops, check cashing establishments, and asphalt/batch plants.

ZONES: ALL

#### Section 61 BUSINESS ZONES, INDUSTRIAL ZONES AND OTHER NON-RESIDENTIAL ZONES USE SCHEDULE

#### 61.02 SPECIAL EXCEPTION USES

61.02.xx Rooming Houses  
ZONES: ~~MIX~~, ID

#### 61.02.xx Clinics for Mental health and/or substance abuse diagnosis and treatment

ZONE: SMH

#### Section 40 OFF-STREET LOADING REGULATIONS

	USE	REQUIREMENT
40.04.03	<del>CLINIC, MEDICAL OR DENTAL</del>	One (1) parking space for each two hundred (200) sq. ft. of floor area plus one (1) space for each doctor plus one (1) space for each three (3) employees.
40.04.18	<u>URBAN CORE LIVING UNIT</u> <del>(Including former category of Rooming House)</del>	One or no bedrooms 1 space Two or more bedrooms 2 spaces
40.04.20	<u>ROOMING HOUSES</u> <del>Included in Urban Core Living Unit</del>	<del>DELETED</del> Same as a Same a Urban Core Living Unit

# APPENDIX 6

**Text Copied from:**

**<https://americanaddictioncenters.org/methadone-addiction>**

## Methadone Addiction

Edited by [Editorial Staff](#)

*Last Updated: February 3, 2020*

### **What is Methadone?**

Methadone is a long-acting synthetic opioid painkiller that is often used to treat individuals who suffer from addiction to opioid drugs, such as heroin or prescription painkillers.

When taken as prescribed, methadone can be very useful in treating opiate addiction, but it too can be addictive, as it is still an opiate.

When used as a treatment to wean individuals off other drugs of addiction, methadone prescriptions and use are closely supervised by medical professionals. However, due to the cost of many prescription painkillers and the relatively low cost of methadone, doctors have been prescribing methadone as a long-acting painkiller for chronic pain for years. This has allowed more people exposure to methadone than before, including numerous individuals who have not been exposed to opioid medications in the past. This exposure has caused a rise in addictions to methadone, as well as easier access to methadone as a recreationally abused substance.

### **How Does Methadone Work?**

[Methadone](#) works on the brain by binding to the same receptors as other opioid drugs like heroin or OxyContin. Since methadone remains in the body for a long period of time – typically 1-3 days – it helps to block euphoric effects of other opiate drug abuse and lessen painful symptoms of withdrawal from these drugs.

Because methadone is such a [long-acting drug](#), designed to ease symptoms in people addicted to heroin for 1-2 days, it can build up quickly in the body and remain in the bloodstream for a long time. It is important for individuals with methadone prescriptions to use this medication exactly as prescribed, and to not adjust their own dose without a doctor's advice and oversight. It is easy to overdose on methadone due to the strength of one dose.

## What Is Methadone Used For?



Since the 1970s in the US, methadone clinics and methadone maintenance have been promoted as ways for people who struggle with heroin addiction to avoid the worst withdrawal symptoms while preventing relapse. Today, methadone is still used under close medical supervision to help people suffering from opioid addiction to ease through the withdrawal process.

However, [according to the Centers for Disease Control and Prevention](#), in 2009, methadone contributed to one in three prescription painkiller deaths. As stated above, doctors sometimes prescribe this long-acting drug to treat chronic pain from multiple sclerosis, cancer, or injuries. Legitimate use via a prescription can turn into abuse as tolerance develops. Once abuse starts, addiction can quickly take hold.

## Methadone Side Effects

Methadone's side effects are [similar](#) to those associated with other opioid drugs. These include:

- Constipation
- Lightheadedness or dizziness
- Sleepiness or drowsiness
- Nausea or vomiting
- Impaired cognition or confusion
- Forgetfulness
- Impaired balance or coordination

It is much easier to overdose on methadone than other opioid drugs. Symptoms of overdose include:

- Slow, shallow breathing, known as *respiratory depression*
- Clammy or bluish skin
- Blue-tinted lips and fingertips
- Extreme fatigue to the point of being unable to stay awake
- Stupor
- Convulsions
- Vomiting
- Coma
- Death

Mixing methadone with other drugs, whether prescription or illegal drugs, can lead to [serious heart problems](#) as well. These heart problems range from arrhythmia to heart attack.

## Use to Abuse and Addiction

Because many individuals receive prescriptions for strong painkillers every year, more and more people find themselves suffering from addiction to prescription pain medications. These are often an oxycodone- or hydrocodone-based medication, such as Vicodin, Percocet, or OxyContin. Lawmakers and regulators now say that prescription pain medications are over-prescribed for problems that may not be fixed by this medication, such as chronic back pain, or they are prescribed in large quantities for post-surgery pain treatment. Although the Food and Drug Administration does not recommend methadone as a prescription painkiller for these types of pain, over 4 million prescriptions were written for methadone in 2009. The rise in methadone prescriptions, specifically for use as a painkiller, is due to the fact that methadone is cheap, especially compared to hydrocodone and oxycodone. Insurance companies are sometimes more

willing to cover the cost of methadone instead of brand name opioid painkillers, and that has driven many people to switch their prescriptions to methadone.

Because methadone is designed to be a long-acting drug, it can build up very quickly in the body, and that can mean that taking even one more dose than prescribed can [lead to an overdose](#). Unless carefully monitored by a medical professional, methadone use is dangerous, and abuse or addiction can lead to very serious consequences.

Methadone's half-life, depending on dose, ranges anywhere from 8 to 59 hours, while the analgesic, or painkilling, effects last up to 8 hours. The long half-life benefits those in recovery from heroin or prescription painkiller addiction, as it stays in the body to ease withdrawal symptoms and cravings. However, this means it is less effective for treating chronic pain conditions related to diseases, such as cancer, multiple sclerosis, or osteoarthritis, because the painkilling effects do not last as long as the drug remains in the body. As a result, individuals who take methadone as a painkiller can put themselves in danger of an overdose if their pain returns before they can safely take their next dose.

## **Recreational Methadone Abuse**

As methadone has increasingly been used to treat pain, not just opioid addiction, more of this long-acting opiate has become available to people who abuse drugs. Much like the wide availability of hydrocodone or oxycodone, people who abuse opiate drugs can more easily find methadone by stealing it from friends or family, or by buying it illegally. Illegal selling of a prescription medication is called [diversion](#), and it is the leading cause of the opioid drug abuse epidemic in the US.

**When an individual abuses methadone for recreational purposes, the person is at a much higher risk of developing an addiction to this medication.**

In addition, the person is at a very high risk of overdosing on the drug.

## Methadone Withdrawal

Since methadone was originally designed for use in treating heroin addiction, and it is used in treating all kinds of opioid addictions, its symptoms of withdrawal are less severe and do not set in as quickly as with other opiates. This is because methadone stays in the body in some form for 1-3 three days. Though less severe, withdrawal symptoms from methadone are similar to withdrawal symptoms from other opioid drugs.

They include:

- Watery eyes
- Runny nose
- Fever or chills
- Sweating
- Tremors or shaking
- Muscle aches
- Diarrhea
- Nausea or vomiting
- Loss of appetite
- [Anxiety or irritability](#)
- [Depression](#)
- Restlessness
- Insomnia
- Tachycardia

## Treatment for Methadone Addiction



Whether the person started abusing methadone recreationally or began using the medication as part of an opioid addiction treatment regime, treatment for methadone addiction requires both medical detox and comprehensive therapy.

Since methadone is an opioid, medical detox is always required to withdraw from the drug. In some instances, individuals will be gradually tapered off methadone, whereas individuals may be switched to another medication, such as buprenorphine, in other instances. Medications that may be used during treatment include:

- [\*Buprenorphine\*](#): A semisynthetic narcotic, buprenorphine was the first medication approved by the FDA to treat opioid addictions with more flexibility. Whereas methadone is highly regulated and patients must visit clinics for their daily doses, buprenorphine can be prescribed for take-home dosages. This prescription drug does have some similarities to methadone and other opioid drugs, meaning there is some potential for abuse or addiction, but it is viewed to have less abuse potential than methadone.
- [\*L-alpha-acetylmethadol \(LAAM\)\*](#): This medication is a Schedule II substance that is often used in opioid addiction treatment. Like buprenorphine, LAAM is an alternative to methadone therapy. It can therefore be helpful for individuals who are struggling with methadone addiction. There are a number of side effects associated with this medication, especially when used on a long-term basis, including rash, nausea, increased blood pressure, and abnormal liver function.
- *Psychiatric medications*: There are many psychological and emotional effects associated with withdrawal and recovery. Medications to treat depression or anxiety can be used with careful oversight to treat these effects. These are typically administered with a psychiatrist's prescription in addition to individual and/or group therapy treatment.

## Co-occurring Disorders

Many individuals who struggle with [methadone addiction have co-occurring disorders](#), like depression, post-traumatic stress disorder, schizophrenia, bipolar disorder, or another medical health condition. People who struggle with mental health issues may try to "self-medicate" their symptoms, often with drugs like alcohol, painkillers, marijuana, or cocaine. For these individuals, methadone addiction may stem from try to overcome other opioid addictions.

Psychiatrists and other medical professionals involved in the treatment of drug addiction work to identify underlying mental health disorders that might have led the individual to self-medicate addictive behaviors. Comprehensive care that addresses all [co-occurring disorders is needed for the individual to achieve true recovery from methadone addiction.](#)

Last Updated on February 3, 2020

## APPENDIX H



*Addict Health*. 2015 Summer-Autumn; 7(3-4): 109–116.

PMCID: PMC4741231

PMID: [26885347](#)

## Assessment of Cognitive Functions in Methadone Maintenance Patients

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<sup>3</sup>Assistant Professor, Department of Psychiatry, School of Medicine, Kerman University of Medical Sciences, Kerman, Iran

<sup>4</sup>General Practitioner, School of Medicine, Kerman University of Medical Sciences, Kerman, Iran

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### Abstract

---

#### Background

Methadone maintenance has received little scientific attention regarding neurocognitive effects. This study is aimed to assess the neuropsychological performance of methadone maintenance patients (MMP) compared to those healthy controls.

#### Methods

Thirty-five MMP and 35 healthy controls, matched for age, gender, education and employment status, examined on a battery of tests aimed at assessing verbal fluency, executive functions, verbal memory, and working memory, using controlled oral word association test (COWAT), trial making test (TMT) Part A and B, Rey auditory verbal learning test (RAVLT), and backward digit span.

#### Findings

MMP performed significantly poorly than controls in cognitive domains of verbal fluency, executive function, and verbal memory. MMP did not exhibit impairment in working memory, and TMT Part A compared to controls.

#### Conclusion

These results suggest that methadone consumption induces significant cognitive impairment that could compromise drug-treatment outcomes in MMP.

**Keywords:** Methadone maintenance, Opiates, Cognitive dysfunction

## Introduction

---

An increasing body of evidence indicates that chronic use of opiates, such as heroin, is associated with widespread impairments in neuropsychological functions.<sup>1</sup> Particularly, studies have shown individuals with current heroin abuse exhibited deficits in attention, working memory, episodic memory, and verbal fluency, and 7-14 days after admission to rapid detoxification treatment their performance reached the level of controls.<sup>2-4</sup> Other studies also have reported that opiate abstinent show better cognitive functions than during opiate abuse, indicating recovery of cognitive function.<sup>5</sup>

In opiate substitution treatment, the opioid-dependent patient receives long-acting mu opioid receptor agonists in order to prevent withdrawal symptoms and to reduce craving. The full mu opioid agonist methadone is the most commonly used drug for opiate addiction.<sup>6</sup> Methadone maintenance treatment (MMT) is probably the most accepted method of treatment in the field of drug abuse therapy.<sup>7</sup>

Although patients often show a reduction of illegal opioids and related problem behaviors, patients may experience adverse treatment effects, including cognitive disturbances. This is important, as having cognitive problems such as impaired attention leads poor treatment engagement and treatment prognosis in opioid dependent patients.<sup>8-11</sup>

The possible cognitive impairments associated with methadone use have not received as much attention as those related to heroin use.<sup>12,13</sup> So far, a few studies have investigated cognitive performance in methadone maintained patients (MMP) relative to controls.<sup>14</sup> Darke et al. found that MMP performed significantly worse than controls on measures of premorbid intelligence, psychomotor performance, information processing, attention, short-term and long-term memory, and problem-solving.<sup>15</sup>

In a larger sample size and using an extensive neuropsychological battery, Specka et al.<sup>16</sup> reported significantly poorer performance of MMP on tests of attention and visual orientation. Mintzer and Stitzer reported that MMP performed significantly worse than controls on tests of psychomotor speed, working memory, selective attention and decision-making measures.<sup>14</sup>

Iran has the highest rate of opiate use in the world because of its proximity with Afghanistan. Also, Iran has the most number of MMP clinics for drug users in the Middle East region. Approximately, 700 centers offered MMP to drug-dependent people in 2007.<sup>17,18</sup> However, only one study assessed cognitive functions in an Iranian MMP group, using balloon analog risk task for analysis decision making. Their results showed that the degree of risk taking of opioid dependents was lower than controls after treatment with methadone.<sup>19</sup>

The present study designed to examine performances of a group of MMP in multiple cognitive functions relative to a control group without histories of drug abuse. Our assessment focused on different neuropsychological functions including: 1. The controlled oral word association test (COWAT) (executive function), 2. Trail making test A and B (speed of processing and mental flexibility), 3. Rey auditory verbal learning test (RAVLT) (verbal learning and memory), 4. Wechsler adult intelligence scale-revised (WAIS) backward digit span (working memory).

Since mood and anxiety disorders are common in MMP, we used Hamilton depression scale (HAM-D) and Hamilton anxiety scale (HAM-A) to statistically control for mood and anxiety.

## Methods

---

This cross-sectional study was conducted in Kerman, Iran, the center of Kerman province as the largest province of Iran. Participants consisted of 35 MMP recruited from outpatient methadone clinic of Shahid Beheshti Hospital, and 35 matched controls without histories of substance abuse recruited from

the local community. Due to a higher prevalence of males than females during the sampling period, all the substance abusers, who volunteered for the study, were male. Both groups were matched with respect to age, years of education, and employment status.

Inclusion criteria for all participants were age between 18 and 50 years and for MMP group were: Being involved in a formal MMT, being stabilized in their current methadone dose for at least 1-month and a minimum abstinence period of 48 hours from any drug except methadone.

Participants who had diagnosed with any other disorder from Axis 1 of the diagnostic and statistical manual of mental disorders-4th edition (DSM- IV) according to psychiatric interview were excluded from the study. Potential participants who had been previously diagnosed with neurological disorders, human immunodeficiency virus (HIV) infection, history of head trauma and epilepsy, magnetic resonance, acute alcohol abuse and medical problem were also excluded.

The interview and neuropsychological testing took approximately 90 minutes. Written informed consent was obtained from all participants. The study was approved by the Ethics Committee of Kerman University of Medical Sciences.

Cognitive performance was determined by a small battery of cognitive tests to probe different aspects cognition. All tests were administered manually using paper and pencil testing. The testing battery included:

1. COWAT: The verbal fluency test was administered using both letter and semantic categories. In the letter fluency subtest, subjects were asked to generate as many words as possible in a minute starting with the letter "F." The subjects then repeated this task with the letters "A" and "S." In the category fluency subtest, they were asked to generate as many names from the semantic category "animals" within 60 seconds. Mean word generation for both letter and category fluency was measured.20
2. Trial making test (TMT): TMT is a measure of visual conceptual and visual motor tracking skills, with a focus on the ability to shift and mental flexibility. TMT consists of two parts namely, Trails A and Trails B. Trails A consists of 25 consecutive numbered circles that the participant connects by drawing a line through each element in the series. Trails B is a more complex task in which a series of numbers (1-13) and letters (A-L) are presented on the page enclosed within circles. The participant is asked to connect numbers and letters (i.e., 1-A-2-B-3-C ... L-13) until the 25th circle is reached, as quickly as possible. The final score for both parts was the number of seconds required to complete the task.21
3. RAVLT: Evaluates short-term auditory-verbal memory. Participants are given a list of 15 unrelated words repeated over five different trials and are asked to repeat.22
4. Wechsler memory scale-revised (backward digit span subtest): This task examines working memory. Several series of digits of increasing length were read to the participants, who were required to repeat each series. Each set length was tested twice. A backward condition was used. Participants earned one-point for each correctly repeated set.23
5. HAM-D: The HAM-D form lists 21 items, the scoring is based on the first 17. It generally takes 15-20 minutes to complete the interview and score the results. Eight items are scored on a five-point scale, ranging from 0 = not present to 4 = severe. Nine are scored from 0 to 2.24
6. HAM-A: The HAM-A is a rating scale developed to quantify the severity of anxiety symptomatology, often used in psychotropic drug evaluation. It consists of 14 items, each defined by a series of symptoms. Each item is rated on a five-point scale, ranging from 0 (not present) to 4 (severe).25

The data were analyzed using SPSS software (Version 17, SPSS Inc., Chicago, IL, USA). We carried out multivariate analyses of variance to test for group differences. Group (methadone and control) was used as fixed factor, while scores of RAVLT, COWA, backward digit span, TMT A, and TMT B were used as dependent variables. Anxiety and depression scores were used as covariates. A combination of independent t-test and chi-square were used to test demographic group differences.

## Results

Table 1 shows demographic characteristics of the two groups. There were no significant differences in age, employment, or educational levels between the two groups.

Table 1

Demographic and clinical characteristics of the two groups

Variables	MMT group	Control group	P
Age (years)	35.43	35.66	NS
Married (%)	80.00	80.00	NS
Employment (% Employed)	80.00	85.70	NS
Years of education	11.88	12.57	NS
Mean depression score	9.74	1.86	< 0.001
Mean anxiety score	13.49	6.37	0.001
Duration in MMT (months)	55.74	-	-
Methadone dose (mg)	15.14	-	-

MMT: Methadone maintenance treatment; NS: Not significant

Table 2 shows mean scores of the two groups on different cognitive tasks. Statistical comparisons on the basis of Wilkes criterion revealed overall significant effects of group,  $F(5,62) = 15.2$ ,  $P < 0.001$ . Effect of covariate was not significant, anxiety score  $F(5,62) = 1.1$ ,  $P = 0.300$ , depression score  $F(5,62) = 0.9$ ,  $P = 0.400$ . The main effect of group had a statistically significant effect on three out of five dependent measures, namely RAVLT ( $P = 0.009$ ), COWAT ( $P < 0.001$ ), TMT B ( $P = 0.002$ ). The MMP group performed significantly worse than controls in verbal fluency ( $P = 0.001$ ), verbal memory ( $P = 0.009$ ), and psychomotor speed/conceptual flexibility TMT B ( $P = 0.002$ ). There were no significant differences between the groups on TMT A, and backward digit span.

Table 2

Task measures for methadone maintenance patients (MMP) and control groups

Cognitive measures	Methadone users	Controls	P
	Mean $\pm$ SD	Mean $\pm$ SD	
RAVLT	52.1 $\pm$ 7.1	56.4 $\pm$ 3.3	0.009
COWA	20.8 $\pm$ 5.1	28.4 $\pm$ 2.6	0.001
TMT A	31.8 $\pm$ 10.1	30.4 $\pm$ 11.2	0.707
TMT B	98.4 $\pm$ 42.3	66.9 $\pm$ 19.1	0.002
Backward digit span	6.0 $\pm$ 1.8	5.7 $\pm$ 1.1	0.607

RAVLT: Rey auditory verbal learning test; COWA: Controlled oral word association test; TMT: Trial making test; SD: Standard deviation

Correlational analyses were carried out on methadone dosage and measure of each cognitive task. The results showed no significant association between methadone dosage and these measures (all  $P > 0.050$ ).

## Discussion

The present study aimed to examine the performance of a group of MMP on different cognitive functions including verbal fluency, mental flexibility, verbal memory, and working memory.

MMP group exhibited poorer performance in all cognitive, with the exception of speed of processing and working memory. Also, the MMP group had significantly higher scores of anxiety and depression, but scores were not significantly related to cognitive performance when these variables were taken into account. There was no significant correlation between methadone dose and cognitive performance among the MMP group.

In our study, MMP group obtained lower scores on a test of verbal fluency (COWAT) than controls. Similarly, Darke et al.,<sup>15</sup> Davis et al.<sup>26</sup> and Ornstein et al.<sup>27</sup> reported that MMP performed poorly on verbal fluency test. Our finding indicates that MMP group has deficits in executive functions, particularly in planning, monitoring, judgment, and decision-making which are important for retrieval of words from memory.<sup>28</sup> Moreover, deficits in verbal fluency in MMP shows impaired function of frontal lobe since this test has been used as an index of frontal lobe function, and studies have shown impaired verbal fluency is associated with frontal lobe damage.<sup>29</sup> Supporting evidence comes from studies showing methadone-treatment reduces cerebral blood flow especially in frontal cortices.<sup>30</sup>

The results of the present study showed that performance of MMP was significantly poorer on TMT B which is congruent with Verdejo-Garcia et al.,<sup>13</sup> Mintzer and Stitzer,<sup>14</sup> and Specka et al.<sup>16</sup> results. This finding indicates impaired mental flexibility and executive functions in MMP. Moreover, impaired in TMT B not in TMT A shows a decreased ability to shift between sets, which is critical component of mental flexibility. This result indicates that methadone might influence executive functioning, possibly through its impact on different monoaminergic systems converging in the frontal lobes.<sup>31</sup>

Consistent with other studies,<sup>14,15,26,32</sup> our results showed that methadone-treated patients have impaired verbal memory. According to animal studies,<sup>33</sup> one explanation for this finding is the inhibitory effects of opioids on acetylcholine release. Since, acetylcholine is an important neurotransmitter for learning and memory consolidation, decreased the level of acetylcholine results in memory deficits. Also impaired verbal memory in MMP might indicate disturbance of temporal lobe which is involved in verbal memory skills.<sup>34</sup>

The current study showed that MMP performed similarly to controls on test of working memory (backward digit span) and psychomotor speed (TMT A). Our results were in contrast with the impaired working memory and TMT A reported by Darke et al.,<sup>15</sup> Specka et al.<sup>16</sup> and other studies. There are a number of possible explanations for this difference, such as using different measures, sample size, demographic, and clinical characteristics (e.g. dependency on more than one substance) of the groups.

It should be mentioned that some studies have suggested that other factors indirectly related to opioid abuse, such as concurrent alcohol abuse, may be related to cognitive impairments in MMP.<sup>35,36</sup> However, none of the patients in our study uses any other drug, indicating that methadone consumption by itself may be associated with cognitive deficits.

In agreement with previous studies, our results showed higher rates of depression and anxiety in MMP, consistent with the notion that co-morbid psychological problem is common in substance-using individuals.<sup>37</sup>

Generally, there are possible explanations for the findings of cognitive impairment in MMP group. First, the direct effect of methadone may cause cognitive dysfunction, as studies have shown that opiates cross the blood-brain barrier (BBB). Moreover, neurocytotoxic effect of opiates on central nervous system has been reported in animal studies.<sup>38</sup> Second, it is possible that cognitive deficits of opiate abusers might be results of the direct toxic effects of concomitant substance abuse.<sup>15,39</sup> Third, according to Darke et al.,<sup>15</sup> indirect effects of opiates, such as lifestyle, poor nutrition, infections, or exposure to violence, might associated with their cognitive impairment.

One clinical implication of our results is that cognitive deficits observed in MMP, are possible to affect the daily functioning and their involvement in treatment. Importantly, recent studies have found that cognitive function influence the drug-abuse rehabilitation outcomes. Particularly, impaired executive function and verbal memory found in our study might result in difficulty in understanding complex instructions, and inhibiting inappropriate automatic behaviors in MMPs. Executive dysfunction could also have negative effects on their social relationships.<sup>13</sup> Finally, the finding that MMP have difficulties in acquiring verbal information might interfere with their social and occupational functioning. Altogether, cognitive deficits may be one of the important factors contributing to failure of patients to maintain in program.<sup>15</sup>

Several limitations of this study should be considered, including the limited sample size, some demographic differences between the MMP and controls, possible selection bias among controls. The deficits may be due to the acute effects of other drugs used in MMP group, although given our exclusion criteria; we believe it is unlikely to account for the deficits observed in MMP group. Finally, the performance deficits in MMP group may be related to differences between the groups on various factors (e.g., personality, brain dysfunction, and environment) that were not examined in the present study.

## Conclusion

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In summary, the current study indicates that in addition to the high rates of psychiatric morbidity, MMP also show impaired cognitive functions particularly in domains of executive functions and verbal learning, shown with poor performance in TMT B and COWAT, and RAVLT.

## Acknowledgments

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## Footnotes

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### Conflicts of Interest

The Authors have no conflict of interest.

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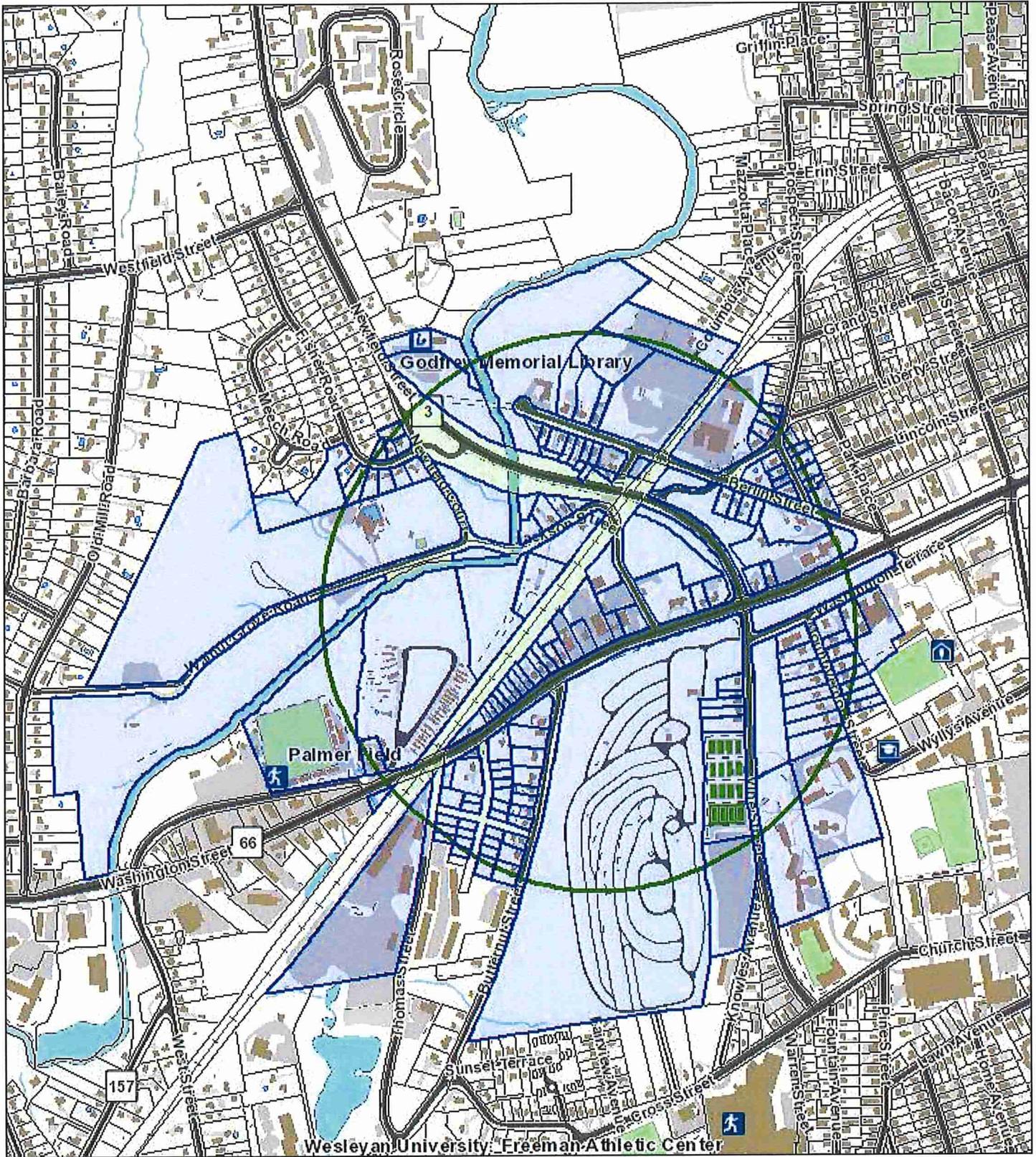
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# APPENDIX I



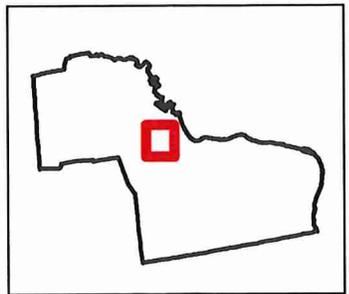
**392 Washington St. .25 Mile Radius**

Map generated 9/22/2020

Map Legend: <http://gis.cityofmiddletown.com/middletownct/legend.pdf>  
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1 in = 1,000 ft



**MAP FOR REFERENCE ONLY - NOT A LEGAL DOCUMENT**

Because of different update schedules, current property assessments may not reflect recent changes to property boundaries. Check with the Board of Assessors to confirm boundaries uses at the time of assessment.

RESEARCH

Open Access



# The impact of colleges and hospitals to local real estate markets

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## Abstract

This paper studies how the presence of universities and hospitals influences local home prices and rents. We analyze the data on ZIP code level and on the level of individual homes. Our ZIP code-level analysis uses median home price data from 13,105 ZIP codes over 21 years and rent data from 15,918 ZIP codes over 7 years to compare a ZIP code's appreciation, volatility and vacancies to the size of a university or hospital within that ZIP code. Our home-level analysis uses data from 2,786,895 homes for sale and 267,486 homes for rent to study the impact of the distance from the nearest university or hospital to individual home prices. While our results generally agree with our expectations that larger, closer institutions yield higher prices, we also find some interesting results that challenge these expectations, such as positive correlations between volatility and university/hospital size in some ZIP codes, a positive correlation between rent and distance from a hospital for some homes, and lower correlations of rent vs. distance from a university compared to price vs. distance.

**Keywords:** Home prices, Rent, Appreciation, Volatility, University proximity, Hospital proximity

## Introduction

Home price is made of two parts: price of land and the cost of the house. Land value is derived from its location which often, especially in urban areas, accounts for the lion's share of overall home price. The value of the land is subject to the laws of supply and demand and in turn depends on the land's scarcity. Indeed, decoupling price of land from price of construction has been extensively researched [1, 2]. Many factors are baked into land price, including proximity to amenities and land's inherent quality (e.g., proximity to a shoreline, the mountains, etc.). Unique and somewhat subjective home characteristics like view as well as proximity to ocean, lake, etc. are known to influence home price [3]. Conversely, land price may be adversely affected by proximity to sources of noise and pollution (airports, major highways, etc.) [4, 5]. Unlike building material, labor and capital, land is a "finite," or "non-renewable," resource, often limited by stringent geographic and topographical constraints. Amenities pertain to proximity and accessibility to things like opportunities in employment, education, transportation, entertainment, retail, cultural, recreational, etc.

This analysis focuses on universities and hospitals as "opportunity hubs," which encapsulate "packaged amenities" in terms of those listed above. It studies the impact of these

institutions on both home sale price and rent. Both types of institutions attract a “stable,” educated and mobile workforce, a mix of demographics and incomes, and various amenities. Unpacking amenities isn’t altogether simple, and is a somewhat subjective art. For example, a neighborhood’s school rating is on one hand a reflection of the neighborhood and its characteristics, demographics and economics. Conversely, the rating of a neighborhood’s schools affects its home prices, primarily via the value of the land on which each home in the neighborhood is built. Throughout this paper, we will unravel pricing substructure via the correlations between home value and proximity to said institutions as well as their “idiosyncratic rhythm.”

This study focuses on US homes. We perform two types of analysis. In *ZIP code-level analysis*, we use the median home price per ZIP code and study how the containment of a university or a hospital affects (correlates to) home prices by comparing against ZIP codes that do not contain such institutions. As real estate is always local, we looked for a wide availability of data at a very local possible level and ZIP code level data fit our requirements [6]. In *home-level analysis*, we consider the prices of individual homes with respect to their exact distance from institutions. The goal of this analysis is to study how the distance of a property to an institution affects its price or rent and test our assumption that universities and hospitals generally increase the sale prices and rent of nearby homes. Our basis for this assumption includes both prior work that has analyzed the effect of real estate prices in relation to proximity of various features as described above and in the Related Work section as well as intuition; for example, one would expect that homes close to universities have higher rent as students without cars prefer them. In addition to computing the price and rent correlations with the distance from a university or hospital, we study how rent or price appreciation and volatility as well as vacancies change over time and how they correlate with the size of a university or hospital.

We collected data for home listings and historic home rent and price trends from public listing sources. We also collected ZIP code populations, hospitals and vacancies data from government sources. We built a university dataset by crawling and combining data from online sources (US News and Wikipedia).

Our results show several correlations. In our ZIP code-level analysis, we found the strongest correlations in ZIP codes with a population below the national ZIP code average. These correlations were between appreciation and hospital size, volatility and university size, volatility and hospital size, and vacancies and university size. In our home-level analysis we found significant correlations between rent and distance from a university (especially private universities), and rent and distance from a smaller hospital.

### Related work

Real estate prices have been a frequent subject of analysis. Cesa-Bianchi et al. compared house prices in advanced and emerging economies between 1990 and 2012 and found that house prices in emerging markets experience faster growth, more volatility, less persistence and less synchronized than house prices in advanced economies [7]. Favara and Imbs found that housing prices increased in response to the expansion of mortgage credit [8]. Muehlenbachs et al. found that shale gas development has a negative effect on property values in areas dependent on groundwater, but a positive effect on property values in areas with piped water [9]. Waddell et al. drew several conclusions from their

analysis of residential property values in Dallas County, Texas: including a significant but fairly localized central business district price gradient; improvements to modeling the price effect of proximity to employment centers and other nodes of activity; amenities such as highways, retail, universities, and hospitals had a significant effect on modeling housing values; and a significant influence of race on housing prices [10]. Nau and Bishai found that life expectancy within communities predicted increases in home price indexes [11]. Otto and Schmid analyzed real estate prices in Germany using spatiotemporal models and found that urban regions with higher population density and higher per-capita disposable income have higher land prices than rural areas, shocks in regional real estate prices “ripple out” and affect the whole economy, and population density had an increasing impact on real estate prices [12].

Several papers have evaluated the impact of nearby points of interest on home prices. Rascoff and Humphries found that homes within a quarter mile of Starbucks locations appreciated more quickly than the overall rate of nationwide home appreciation [13]. Turner found that a several of points of interest, including supermarkets, restaurants and movie theaters, increase nearby home values in three neighborhoods in the San Francisco Bay Area [14]. Bolitzer and Netusil found that open spaces such as parks and golf courses increased nearby home prices in Portland, Oregon [15]. Similarly, Anderson and West’s analysis of the Minneapolis-St. Paul metropolitan area found that open spaces provide more value to homes in certain neighborhoods, such as those near the central business district or with many children [16]. Debrezion et al. found that real estate prices in three Dutch metropolitan areas are affected more by the most frequently chosen railway station in an area than the nearest station, and this effect is more pronounced in more urbanized areas [17].

Other work has analyzed economic statistics in populations near universities and hospitals. Moore and Sufrin concluded that large nonprofit institutions such as universities and hospitals can generate employment and personal income through interregional trade [18]. Beeson and Montgomery found that employment growth rates and income are higher in areas with higher-ranked universities, the probability of being employed as a scientist or engineer increases with local university research and development funding, and the probability of being employed in a high-tech industry increases with the number of local university graduates [19]. Hedrick et al. found that university commercial activities reduce private employment in small counties, particularly in the areas of finance, insurance, and real estate, but university enrollment and spending increase local employment, leading in a net positive effect on employment [20]. Moore’s analysis of the State University of New York university system found that per capita income generation in counties with a university is negatively correlated with per capita personal income; in other words, the greatest impact on income generation per capita is found in counties with lower personal incomes [21].

## **Methods**

### **Data collection**

#### ***Median ZIP code home price and rent***

Zillow maintains a dataset of home and rental data for public use [22]. For our ZIP code home price analysis, we used the ZIP Code Zillow Home Value Index (ZHVI) data for

May 2017, which lists the median home price in 13,105 ZIP codes for each month from no earlier than April 1996 to May 2017. For our ZIP code rent analysis, we used the May 2017 ZIP Code Zillow Rent Index (ZRI) data, which lists the median rent in 15,918 ZIP codes for each month from no earlier than November 2010 to May 2017. Apartments were not included in the ZRI calculation, thus our statements regarding rent in our ZIP code-level analysis refer only to the rent of houses. In our ZIP code-level analysis, we use the terms “home price” and “rent” to refer to ZHVI and ZRI, respectively. Note that these amounts are computed based on Zillow’s estimate of market price and rent.

#### ***ZIP code population data***

For population data, we used the 2010 census data provided by the United States Census Bureau [23]. We used two datasets extracted from this data for our analysis: a list of ZIP code tabulation area (ZCTA) populations, and a list of ZCTA population densities, where population density is given by the average number of people per square mile. We assume that the population and population density of each ZCTA are equal to the population and population density of the ZCTA’s corresponding ZIP code.

#### ***Universities***

We collected university details via a twofold approach restricted to universities in the United States. The first step consists of collecting details about the universities in the United States from Wikipedia [24]. This data source provides many crucial details about the university such as name, number of enrolled students, location and university-type to name a few. The second step includes finding rankings for these universities, the data for which is collected from US News and World Report’s ranking and is restricted to the first 200 ranked universities, while the others are unranked [25]. For our ZIP code-level analyses of price, rent and vacancies over time, we use four subsets of ZIP codes based on the number of students enrolled in a university in each ZIP code as described in Table 1. This distribution was selected to give each subset relatively similar sizes between ZIP codes with home price data and ZIP codes with rent data. Each ZIP code that contains more than one university is assigned to the subset corresponding to the university in that ZIP code with the most enrolled students.

#### ***Hospitals***

The Centers for Medicare and Medicaid Services (CMS) provide data used by the Medicare.gov website, including data on hospitals and physicians [26, 27]. Using the hospital

**Table 1 Distribution of ZIP codes with home price data based on the number of enrolled students**

Number of enrolled students	ZIP codes with home price data	ZIP codes with rent data
0 (No university)	12,473	15,153
Fewer than 10,000 Students	501	611
10,000–20,000 students	73	85
20,000 or more students	58	69

**Table 2 Distribution of ZIP codes with home price data based on the number of affiliated doctors**

Number of affiliated doctors	ZIP codes with home price data	ZIP codes with rent data
0 (No hospital)	10,819	13,009
Fewer than 100 doctors	309	539
100–500 doctors	1496	1837
500 or more doctors	481	533

**Table 3 Home Listings details: Number of records, start and end date of record collection**

Home data type	Number of records	Start date	End date
For rent	267,486	2017-04-03	2017-04-15
For sale	2,786,895	2017-05-03	2017-05-26

data, we determined which ZIP codes contained a hospital. To determine the number of doctors each hospital has, we used the affiliated hospitals listed for each physician in the physician data. For our ZIP code-level analyses of price, rent and vacancies over time, we use four subsets of ZIP codes based on the number of doctors affiliated with a hospital in each ZIP code as described in Table 2. As above, this distribution was selected to give each subset relatively similar sizes between ZIP codes with home price data and ZIP codes with rent data. Each ZIP code that contains more than one hospital is assigned to the subset corresponding to the hospital in that ZIP code with the most affiliated doctors.

#### **Home listings**

We collected data related to homes available for rent and sale from an online listings source that provides various details related to each home such as rent/sale price, home address, number of bedrooms and bathrooms, ZIP code and exact location (latitude and longitude). Apartments account for 7% of the rental data. We used each home's latitude and longitude to calculate the distance from any universities in the same ZIP code or neighboring ZIP codes. We cleaned the data, which includes removing entries with no details about the location, rent/sale price and number of bedrooms. In our home price analysis, we use the term "home price" to refer to the listed sale price and "rent" to refer to the listed rent price. A quantitative summary of the data of homes for rent and for sale is shown in Table 3.

#### **Home vacancy**

The US Department of Housing and Urban Development (HUD) provides home vacancy data [28]. This dataset includes the vacancy statistics for homes and businesses within each census tract. Census Tracts are "small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants prior to each decennial census as part of the Census Bureau's Participant Statistical Areas Program" [29]. We mapped the census tract data to ZIP codes by

using the Tract-ZIP code mapping provided by HUD and assuming a uniform distribution of vacant homes in each tract. The vacancy details include statistics such as the count of vacant homes, count of homes, and periods of vacancy.

Table 4 shows a summary of the types of data used and their use in either or both our ZIP code-level analysis and home-level analysis.

#### **ZIP code-level analysis**

We used two metrics to analyze median home price and rent in each ZIP code. The first of these is average annual appreciation, which is the average difference in median home price or rent in a ZIP code compared to twelve months prior. To calculate this, we sampled the median home price and rent for May of each year. The second metric is volatility. Given  $P_z$ , a list of median home price or rent over time in ZIP code  $z$ , we define volatility as  $\sigma/\mu$ , where  $\sigma$  is the standard deviation of the values in  $P_z$  and  $\mu$  is the mean of the values in  $P_z$ .

We also analyzed the percentage of vacancies in each ZIP code. For our analysis, we averaged the ratio of vacant homes over the four most recent quarters in our data (Q3 2016, Q4 2016, Q1 2017 and Q2 2017) for each ZIP code. This was done to account for changes in the vacancy ratio over the course of a year due to homes with seasonal vacancies (e.g. vacation homes).

For ZIP codes that contain a university or a hospital, we analyzed each of these metrics as a function of the size of the university or hospital to observe their correlations. We define size as the number of students enrolled in a university or the number of doctors affiliated with a hospital. We calculate these correlations using the Pearson correlation coefficient. For random variables  $X$  and  $Y$ , the Pearson correlation coefficient is defined as  $\rho_{X,Y} = \text{cov}(X,Y)/\sigma_X\sigma_Y$ , where  $\text{cov}(X,Y)$  is the covariance of  $X$  and  $Y$ ,  $\sigma_X$  is the standard deviation of  $X$  and  $\sigma_Y$  is the standard deviation of  $Y$  [30].

In addition to analyzing all ZIP codes together, we also partitioned the ZIP codes across various dimensions and analyzed each partition separately. Table 5 shows these dimensions and the threshold used to split the ZIP codes into two partitions. We also analyzed subsets of ZIP codes in metropolitan areas or non-metropolitan areas.

**Table 4 Data source description and usage summary**

Type	Description	Usage
Median ZIP code home price and rent	Monthly median rent and sale prices by ZIP code	ZIP code-level analysis
ZIP code population data	Demographic data of each ZIP code in USA	Both
University details	Statistical and locational details of 1991 universities	Home-level analysis
Hospital details	Statistical and locational details of 4691 hospitals	Both
Vacancy details	Quarterly statistical details of home vacancies in various ZIP codes in USA	ZIP code-level analysis
Home details	Details of homes for rent and sale throughout USA	Home-level analysis

**Table 5 Dimensions and thresholds to partition the ZIP codes into two sets**

Splitting dimension	Splitting threshold
Number of students (ZIP codes with universities)	20,000
Number of doctors (ZIP codes with hospitals)	1000
Median ZIP code home price/rent	National ZIP code average
ZIP code population	National ZIP code average
ZIP code population density	National ZIP code average
Metropolitan area ZIP code, as listed in Zillow data	Yes/no

### Home-level analysis

The home level analysis focuses on the impact of distance to a university or hospital on the home price or rent. This impact is gauged from the correlation of the home price or rent with the distance of the home from the nearest university or hospital. As in ZIP code-level analysis, we explore the Pearson correlations for various subsets of the homes, defined across various dimensions, such as the number of bedrooms or population of their ZIP code, university types and number of doctors in hospitals.

To partition the home data across such dimensions, a key step is to join the university (or hospital) and home data, as described in Table 4, based on the nearest university (or hospital) decided by the home-university (or hospital) distance. Specifically, for each home, we store its closest university (or hospital) if there is more than one institution within the home's vicinity. The result is a pool of homes which are within a defined vicinity range from a university (or hospital). We create separate data pools for home rent and sale price data. Here the defined maximum vicinity is ten miles from the location of the university or hospital. In the analysis we also consider reducing the vicinity ranges, to see if the correlation is stronger if we focus on homes that are very close to the institutions.

Note that the research and analysis did not use any data from HomeUnion.

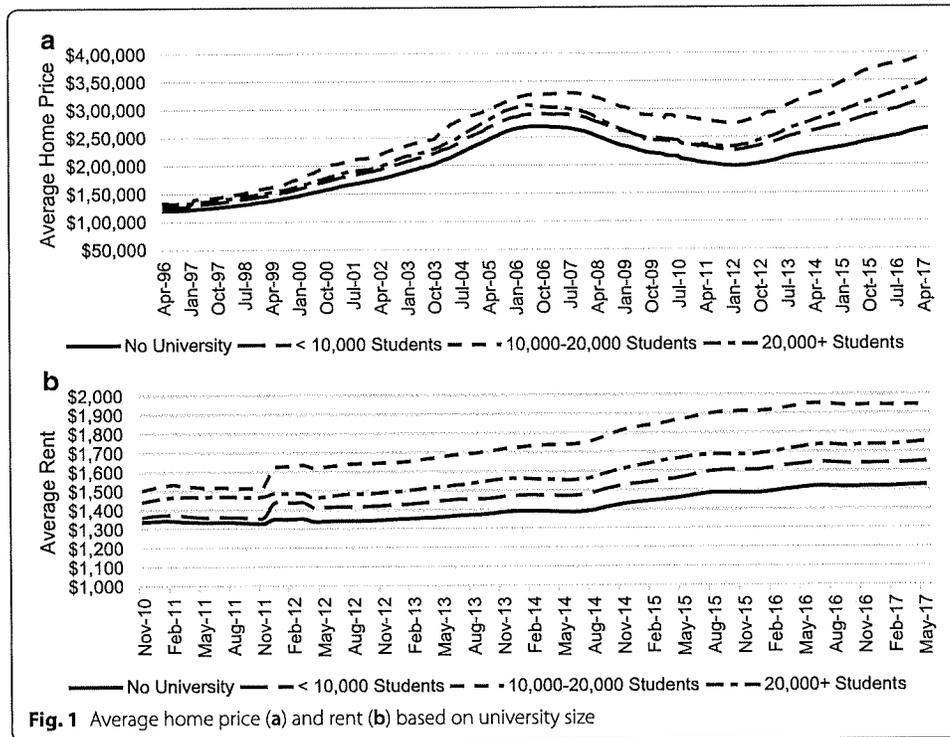
## Results

### ZIP code-level analysis

#### Home price and rent over time

We grouped ZIP codes into four subsets: ZIP codes with no university, ZIP codes that have a small university (fewer than 10,000 students enrolled), ZIP codes that have a medium university (at least 10,000 but fewer than 20,000 students enrolled) and ZIP codes with a large university (20,000 or more students enrolled). We then compared the average of the median home price and rent over time for each of these subsets. For brevity, we refer to these as "average home price" and "average rent," respectively. This comparison is shown in Fig. 1 for both home price and rent, where we see that *the average home price and rent are higher in ZIP codes with a university than those without, and highest in ZIP codes with a medium university*. The pairwise significance of the most recent values (May 2017), calculated using a one-tailed heteroscedastic Student's  $-t$ -test, is shown in Table 6 for home prices and Table 7 for rent.

Similarly, we compared the average home price and rent over time for four ZIP code subsets based on hospitals. This comparison was between ZIP codes with no hospital,



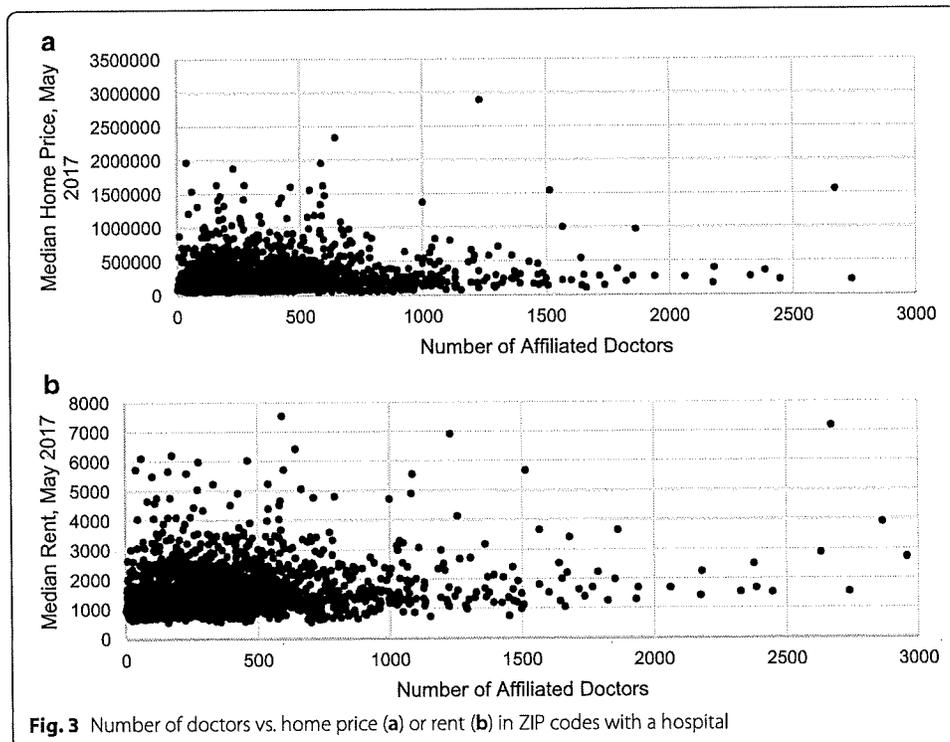
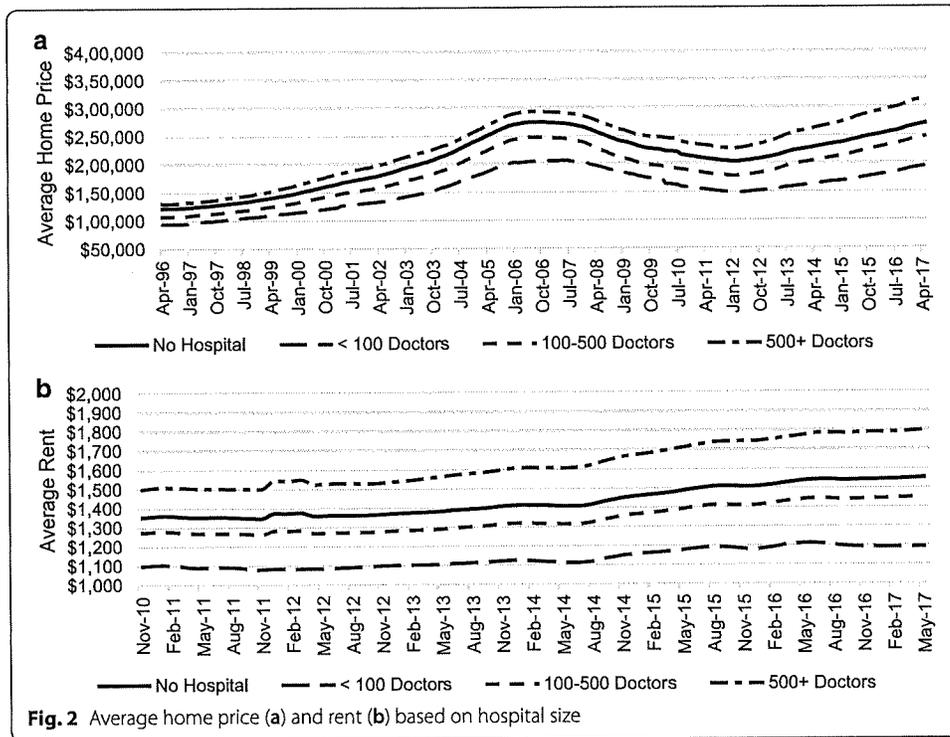
**Table 6** Pairwise significance (p-values) of average May 2017 home prices in ZIP codes by university size

	No university	Fewer than 10,000 students	10,000–20,000 students
Fewer than 10,000 students	0.00361	–	–
10,000–20,000 students	0.00676	0.0733	–
20,000 or more students	0.0132	0.203	0.239

**Table 7** Pairwise significance (p-values) of average May 2017 rent in ZIP codes by university size

	No university	Fewer than 10,000 students	10,000–20,000 students
Fewer than 10,000 students	0.00615	–	–
10,000–20,000 students	0.00118	0.0189	–
20,000 or more students	0.00258	0.128	0.106

ZIP codes with a small hospital (fewer than 100 affiliated doctors), ZIP codes with a medium hospital (at least 100 but fewer than 500 affiliated doctors) and ZIP codes with a large hospital (500 or more affiliated doctors). This comparison is shown in Fig. 2 for both home price and rent, where we see that ZIP codes with larger hospitals have higher average home price and rent than those with smaller hospitals, while only ZIP codes with large hospitals have higher average home price and rent than ZIP codes



with no hospital. Figure 3 shows the correlations between the number of doctors affiliated with a hospital and both home price (Pearson correlation 0.154) and rent (Pearson correlation 0.261). The  $p$ -value for both correlations is less than  $1 \times 10^{-5}$ .

**Table 8** Pairwise significance (p-values) of average May 2017 home prices in ZIP codes by hospital size

	No hospital	Fewer than 100 doctors	100–500 doctors
Fewer than 100 doctors	$4.02 \times 10^{-10}$	–	–
100–500 doctors	$7.27 \times 10^{-5}$	$2.85 \times 10^{-5}$	–
500 or more doctors	0.000637	$1.94 \times 10^{-11}$	$2.35 \times 10^{-6}$

**Table 9** Pairwise significance (p-values) of average May 2017 rent in ZIP codes by hospital size

	No hospital	Fewer than 100 doctors	100–500 doctors
Fewer than 100 doctors	$1.71 \times 10^{-43}$	–	–
100–500 doctors	$4.11 \times 10^{-9}$	$4.84 \times 10^{-20}$	–
500 or more doctors	$2.72 \times 10^{-9}$	$2.63 \times 10^{-35}$	$4.79 \times 10^{-15}$

**Table 10** Correlations between the number of students enrolled in a university and home price appreciation

Subset	Pearson correlation	p-value
ZIP codes with a university	0.132	0.000864
ZIP codes with a university and home prices below the national ZIP code average	0.136	0.0063
ZIP codes with a university and home prices above the national ZIP code average	0.115	0.0822
ZIP codes with a university and a population above the national ZIP code average	0.134	0.00126
ZIP codes with a university and population density above the national ZIP code average	0.107	0.0359

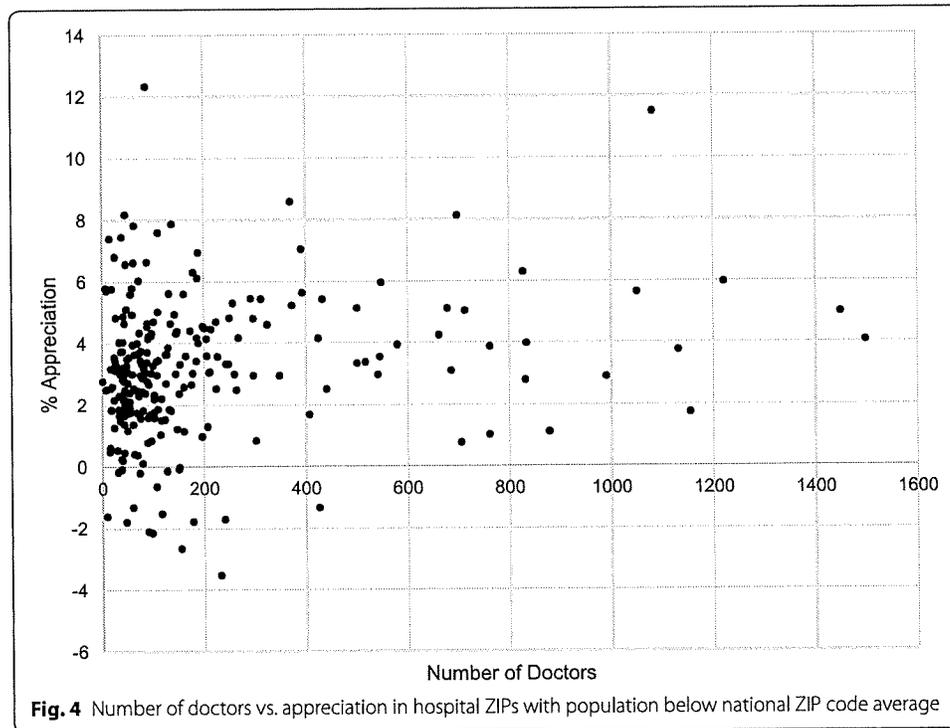
**Table 11** Correlations between the number of students enrolled in a university and rent appreciation

Subset	Pearson correlation	p-value
ZIP codes with a university	0.124	0.000575
ZIP codes with a university and rent below the national ZIP code average	0.142	0.00232
ZIP codes with a university and a population above the national ZIP code average	0.117	0.00218
ZIP codes with a university and population density below the national ZIP code average	0.144	0.00793

The pairwise significance of the most recent home price and rent values (May 2017), calculated using a one-tailed heteroscedastic Student's *t*-test, is shown in Tables 8 and 9 for rent.

#### **Appreciation of home price and rent**

We found several very weak correlations between the number of students enrolled in a university and average annual home price and rent appreciation in ZIP codes with a university. These correlations are listed in Table 10 for home price appreciation and Table 11 for rent appreciation. For hospitals, we found *a weak positive correlation between the number of doctors affiliated with a hospital and average annual home price*



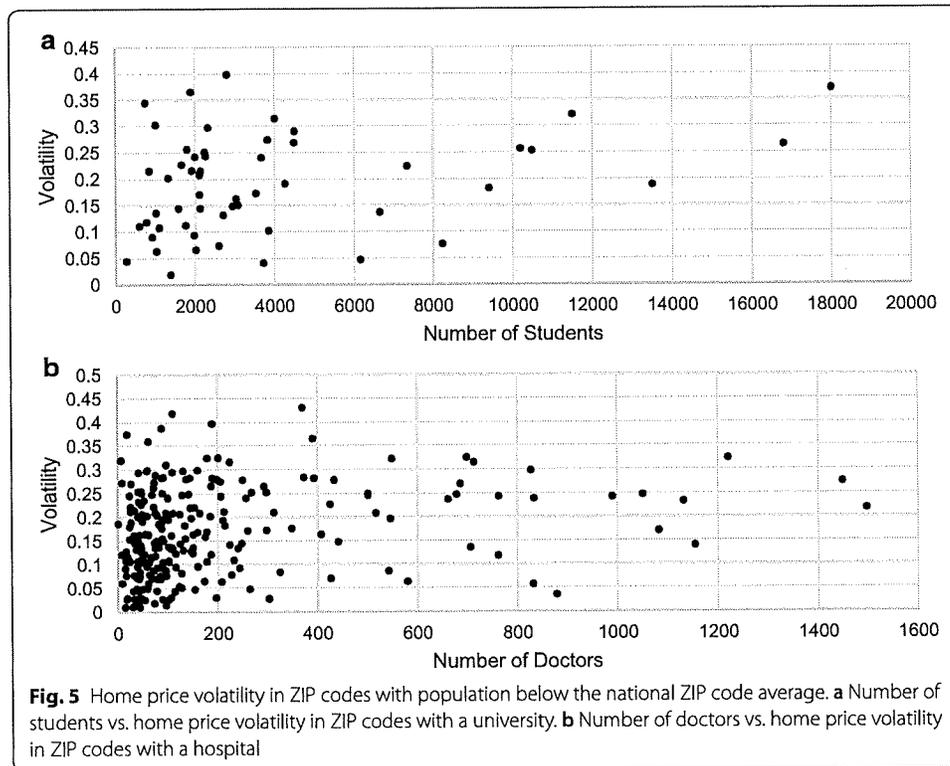
**Table 12** Correlations between the number of doctors affiliated with a hospital and rent appreciation

Subset	Pearson Correlation	p-value
ZIP codes with a hospital	0.197	$< 1 \times 10^{-5}$
ZIP codes with a hospital and rent below the national ZIP code average	0.173	$< 1 \times 10^{-5}$
ZIP codes with a hospital with fewer than 1000 affiliated doctors	0.17	$< 1 \times 10^{-5}$
ZIP codes with a hospital and a population below the national ZIP code average	0.156	0.000832
ZIP codes with a hospital and a population above the national ZIP code average	0.167	$< 1 \times 10^{-5}$
ZIP codes with a hospital in a metropolitan area	0.166	$< 1 \times 10^{-5}$

appreciation in ZIP codes with a hospital and a population below the national ZIP code average (Fig. 4; Pearson correlation 0.203,  $p$ -value 0.0016). We also found a very weak correlation between the number of doctors affiliated with a hospital and average annual home price appreciation in all ZIP codes with a hospital (Pearson correlation 0.107,  $p$ -value  $< 1 \times 10^{-5}$ ) in addition to several very weak correlations between the number of doctors affiliated with a hospital and average annual rent appreciation in ZIP codes with a hospital. These correlations are listed in Table 12.

**Volatility of home price and rent**

We found a weak positive correlation between the number of students enrolled in a university and home price volatility in ZIP codes with a university and a population below the national ZIP code average (Fig. 5a; Pearson correlation 0.296,  $p$ -value 0.0299) as well as several very weak correlations between the number of students enrolled in a



**Table 13** Correlations between the number of students enrolled in a university and home price volatility

Subset	Pearson correlation	p-value
ZIP codes with a university	0.139	0.000449
ZIP codes with a university and home prices below the national ZIP code average	0.1749	0.000434
ZIP codes with a university and a population above the national ZIP code average	0.129	0.00193
ZIP codes with a university and population density below the national ZIP code average	0.124	0.0518

university and home price volatility in ZIP codes with a university. These correlations are listed in Table 13. For hospitals, we found a weak positive correlation between the number of doctors affiliated with a hospital and home price volatility in ZIP codes with a hospital and a population below the national ZIP code average (Fig. 5b; Pearson correlation 0.244, p-value 0.000134). We also found several very weak correlations between the number of doctors affiliated with a hospital and home price and rent volatility in ZIP codes with a hospital. These correlations are listed in Table 14 for home price volatility and Table 15 for rent volatility.

**Vacancies**

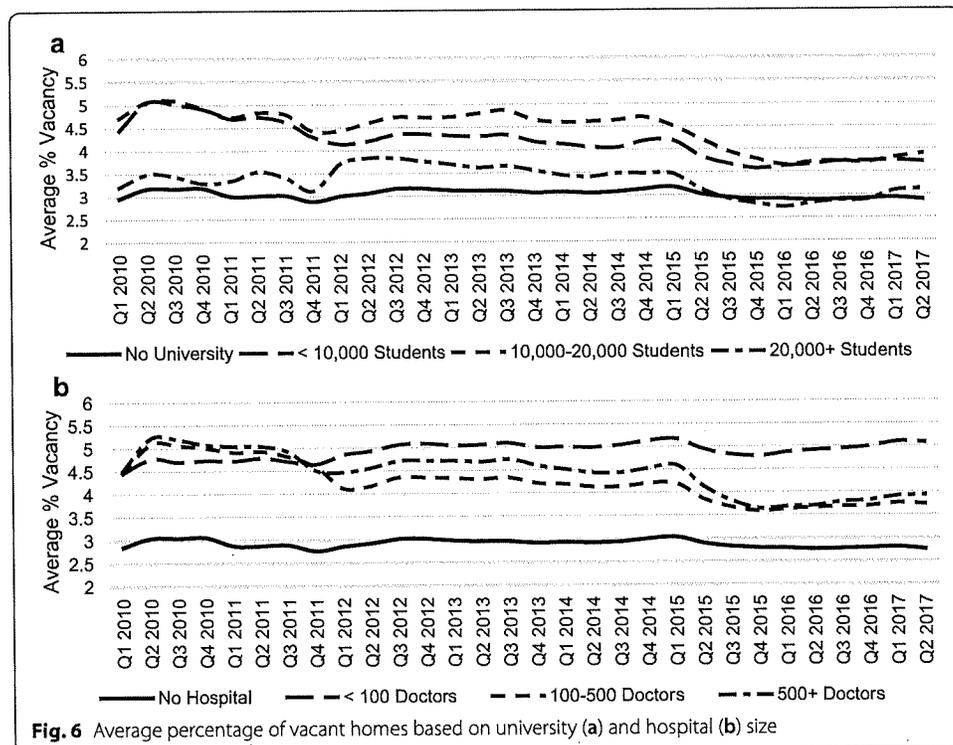
We again grouped ZIP codes into four subsets for both universities and hospitals to compare the average percentage of vacant homes between subsets. These comparisons are shown in Fig. 6. Among ZIP codes with a university, we see that *the average*

**Table 14 Correlations between the number of doctors affiliated with a hospital and home price volatility**

Subset	Pearson Correlation	p-value
ZIP codes with a hospital	0.135	$< 1 \times 10^{-5}$
ZIP codes with a hospital with fewer than 1000 affiliated doctors	0.144	$< 1 \times 10^{-5}$
ZIP codes with a hospital and home prices below the national ZIP code average	-0.152	$< 1 \times 10^{-5}$
ZIP codes with a hospital and home prices above the national ZIP code average	-0.108	0.0052
ZIP codes with a hospital and a population above the national ZIP code average	0.103	$< 1 \times 10^{-5}$
ZIP codes with a hospital and population density below the national ZIP code average	0.113	$7.6 \times 10^{-5}$
ZIP codes with a hospital and population density above the national ZIP code average	-0.106	0.000537

**Table 15 Correlations between the number of doctors affiliated with a hospital and rent volatility**

Subset	Pearson correlation	p-value
ZIP codes with a hospital	0.105	$< 1 \times 10^{-5}$
ZIP codes with a hospital and a population below the national ZIP code average	0.147	0.00165



**Fig. 6** Average percentage of vacant homes based on university (a) and hospital (b) size

percentage of vacant homes is highest in ZIP codes with medium universities and lowest in ZIP codes with no university, while ZIP codes with small universities have a higher average percentage of vacant homes than ZIP codes with large universities. Among ZIP codes with a hospital, we see that the average percentage of vacant homes is highest in ZIP codes with small hospitals and lowest in ZIP codes with no hospital, while ZIP codes

with large hospitals have a higher average percentage of vacant homes than ZIP codes with medium hospitals. The pairwise significance of the most recent values (Q2 2017), calculated using a one-tailed heteroscedastic Student's  $-t$ -test, is shown in Table 16 for ZIP codes grouped by university size and Table 17 for ZIP codes grouped by hospital size.

We found a weak positive correlation between the number of students enrolled in a university and the percentage of vacant homes in ZIP codes with a university and a population below the national ZIP code average (Fig. 7; Pearson correlation 0.285,  $p$ -value 0.0368). However, we also found a very weak negative correlation between the number of students enrolled in a university and the percentage of vacant homes in ZIP codes with population density below the national ZIP code average (Pearson correlation  $-0.134$ ,  $p$ -value 0.0361). Among ZIP codes with a hospital, we found very weak correlations between the number of doctors affiliated with a hospital and the percentage of vacant homes in ZIP codes with home prices above the national ZIP code average (Pearson correlation 0.14,  $p$ -value 0.000296) and rent above the national ZIP code average (Pearson correlation 0.129,  $p$ -value 0.000134).

#### University rankings

We found weak negative correlations between university ranking and both home price and rent. The Pearson correlation is  $-0.269$  for university ranking vs. home price with a  $p$ -value of 0.021. The Pearson correlation is  $-0.327$  for university ranking vs. rent with a  $p$ -value of 0.00271. These results are not surprising as the negative correlations imply that real estate prices tend to be higher in ZIP codes with higher ranked universities.

#### Home-level analysis

Our goal is to determine whether there exist subsets of the data, partitioned across the dimensions of the university, hospital and home data, in which the distance to a university or hospital is significantly correlated to home price or rent. A few possible avenues for finding these subsets are along the features of the data such as distance ranges, number of bedrooms, types of university and number of doctors affiliated with hospitals. We try to filter data layer by layer by using the feature filters to arrive at a particular high-correlation subset of data.

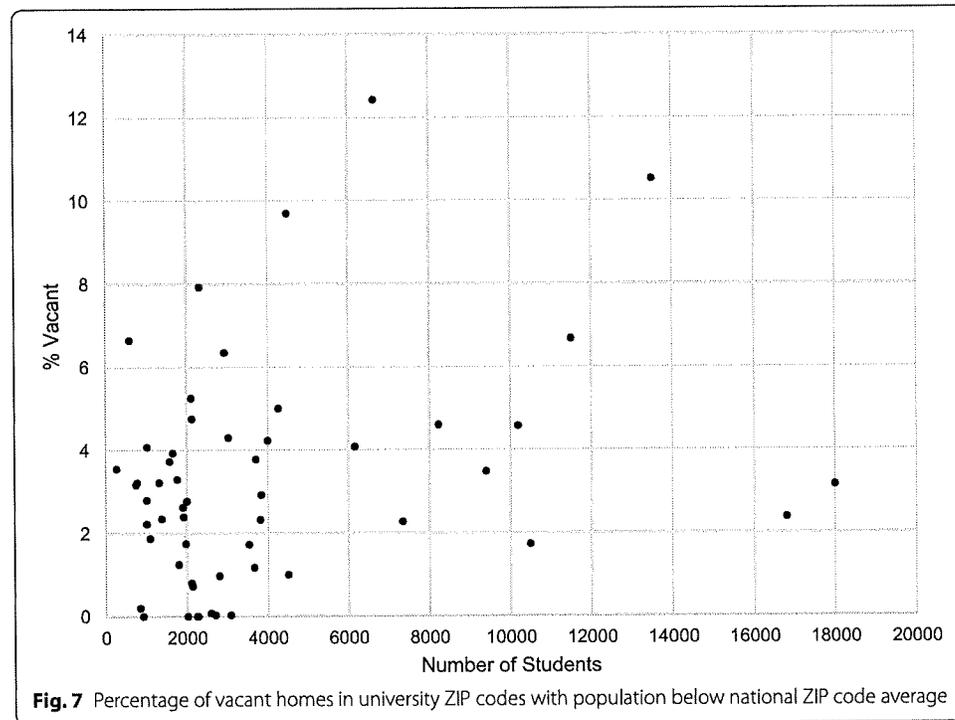
As discussed in "Methods" section, each entry in the data table consists of details for homes within ten miles of a university along with that university's details. If a home is near multiple universities, only the entry with the shortest distance from a university

**Table 16** Pairwise significance ( $p$ -values) of average home vacancy percentage in ZIP codes by university size

	No university	Fewer than 10,000 students	10,000–20,000 students
Fewer than 10,000 students	$1.89 \times 10^{-11}$	–	–
10,000–20,000 students	0.0013	0.43	–
20,000 or more students	0.362	0.00802	0.0246

**Table 17** Pairwise significance (p-values) of average home vacancy percentage in ZIP codes by hospital size

	No hospital	Fewer than 100 doctors	100–500 doctors
Fewer than 100 doctors	$1.3 \times 10^{-66}$	–	–
100–500 doctors	$8.55 \times 10^{-48}$	$1.13 \times 10^{-21}$	–
500 or more doctors	$4.9 \times 10^{-15}$	$3.07 \times 10^{-11}$	0.206



is considered. We applied the same scheme to home-hospital data. Table 18 shows the average number of homes for sale and for rent within ten miles of a university or hospital.

**Analysis of university and hospital proximity on home price and rent**

As a preliminary analysis, we analyzed the effective distance range to which the presence of a university affects home prices and rent. Table 19 shows the correlations between home price/rent and distance from the nearest university based on different maximum distances. Although all such correlations are very weak, we observed slightly higher correlations for both home price and rent among homes within two miles of a university.

**Table 18** Average number of homes near a university or hospital (within ten-mile radius)

Home type	University	Hospital
For rent	165.028	497.483
For sale	107.686	315.817

**Table 19 Distribution of homes by distance from nearest university and home price/rent-distance correlation**

Miles from a university	Homes with home price data	Pearson correlation (home price-distance)	Homes with rent data	Pearson correlation (rent-distance)
<2	129,102	-0.149	115,340	-0.087
<3	228,185	-0.122	153,668	-0.076
<4	326,055	-0.101	183,404	-0.055
<5	414,769	-0.095	205,884	-0.038
>5 and <10	290,713	-0.017	61,602	0.016

**Table 20 Home price/rent-distance from hospital correlations for various distance ranges up to ten miles**

Home price-distance analysis			Rent-distance analysis		
Miles from a hospital	Number of homes	Pearson correlation	Miles from a hospital	Number of homes	Pearson correlation
Any	877,067	-0.0495	Any	300,768	0.079
<3 miles	303,313	-0.081	<2 miles	123,313	-0.013
>3 miles	573,754	0.006	>2 miles	177,455	0.094

Therefore, unless mentioned otherwise, all further experiments related to homes near universities limit the dataset to homes that are within two miles of the nearest university.

Next, we examined at the effect of proximity to a hospital on home prices and rent. As a preliminary experiment, we calculated the home price-distance and rent-distance correlations based on different maximum distances and found the best correlations by partitioning the home data at three miles for home prices and two miles for rent. As seen in Table 20, *homes within a three-mile radius of a hospital have higher correlation between home price and distance from a hospital*. In the remainder of this section, we consequently focus on other data filters based on the number of bedrooms in a home and the number of doctors affiliated with a hospital to find correlations between home price and distance from a hospital. Table 20 also shows that for rent data, the highest correlation between rent and distance from the nearest hospital exists beyond a two-mile radius from the hospitals. Interestingly, the correlation is positive, that is, the rent is higher for homes farther from a hospital.

#### ***Analysis of university/hospital proximity: price and rent analysis by number of bedrooms***

For these experiments, we partitioned the home data based on the number of bedrooms. In the first of these experiments, we analyzed the correlations between home price/rent and distance from a university within two miles of a university. We found that *two-bedroom homes have the highest correlation between home price and distance from a university* (Pearson correlation -0.319). This was followed closely by one-bedroom homes. The correlation was very weak for homes with more than two bedrooms. We also found a *weak correlation between rent and distance from a university for one-bedroom homes* (Pearson correlation -0.191). The Pearson correlations for various numbers of bedrooms and the home counts for each such category are shown in Table 21.

**Table 21 Home price/rent-distance from university correlations based on distribution by number of bedrooms**

Number of bedrooms	Homes with home price data (< 2 miles)	Pearson correlation (home price-distance)	Homes with rent data (< 2 miles)	Pearson correlation (rent-distance)
1	13,663	-0.219	32,473	-0.191
2	31,050	-0.319	40,371	-0.142
3	44,028	-0.225	26,369	-0.149
4	24,206	-0.212	11,566	-0.056
> 4	16,155	-0.119	4563	0.073

**Table 22 Home price/rent-distance from hospital correlations based on distribution by number of bedrooms**

Number of bedrooms	Homes with home price data (< 3 miles)	Pearson correlation (home price-distance)	Homes with rent data (> 2 miles)	Pearson correlation (rent-distance)
1	20,524	-0.223	24,102	-0.008
2	61,831	-0.140	55,195	0.015
3	114,657	-0.100	63,904	0.055
4	68,914	-0.095	26,151	0.114
> 4	37,837	-0.048	2935	0.186

Next, we analyzed the correlations between home price/rent and distance from a hospital. As shown in our earlier experiments, the set of homes less than three miles away from the nearest hospital is a good candidate for analyzing the effect of proximity to a hospital on home prices, while the set of homes more than two miles away from the nearest hospital is a good candidate for analyzing the effect of proximity to a hospital on rent. For home price data, Table 22 shows that single-bedroom homes have a higher correlation between home price and distance from a hospital (Pearson correlation  $-0.223$ ) than the other bedroom categories. In the next subsection, we shall thus focus only on these one-bedroom homes. Among the correlations between rent and distance from the nearest hospital for each category, the correlations get stronger as the number of bedrooms increases, as shown in Table 22. The strongest of these is a weak positive correlation for homes with more than four bedrooms (Pearson correlation  $0.186$ ).

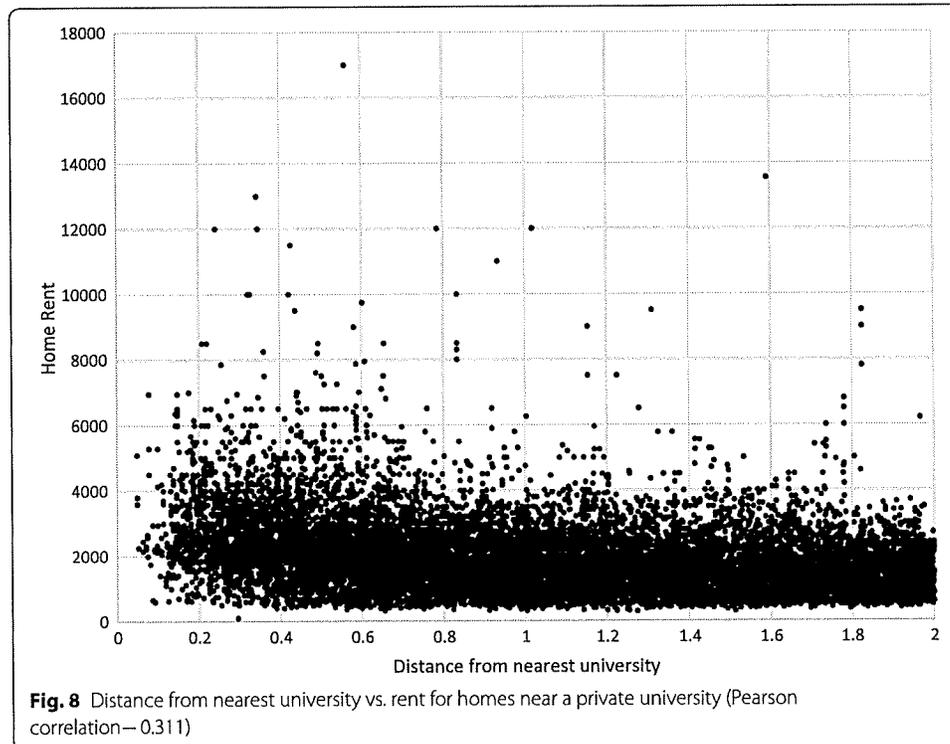
#### ***Analysis of university proximity: price and rent analysis by type and rank of university***

For home price analysis within two miles of a university, we classify the universities into the following three types: public, private and other. Also, as observed in previously, two-bedroom homes near universities provide a good enough correlation to be explored further. Table 23, which compares the correlations between home price and distance for these types of universities, shows that *two-bedroom homes have a weak negative correlation between home price and distance from a private university within a two-mile radius*.

For rent analysis within two miles of a university, we again classify the universities into the three types mentioned previously and limit our experiment to one-bedroom homes due to the higher correlations found with those homes. In Table 23, we found a *negative correlation between rent and the distance from a university for one-bedroom homes*

**Table 23 Home price/rent-distance correlations based on university type distribution**

University type	University count	Homes with home price data (<2 miles, 2 bedrooms)	Pearson correlation (home price-distance)	Homes with rent data (<2 miles, 1 bedroom)	Pearson correlation (rent-distance)
Private	1068	16,680	-0.368	16,992	-0.311
Public	548	7812	-0.220	6463	-0.203



near a private university (Fig. 8; Pearson correlation - 0.311). We also observed a weaker correlation for one-bedroom homes near public universities. Note that we have omitted results for homes near “other” universities since there were very few of these universities compared to the other two types and they yielded very small correlations.

We also considered the rank of universities in our analysis. The university rankings provided by US News and World Report provide data for only the top 200 schools. However, we found no significant correlations in our experiments involving university rankings as can be seen in Table 24.

We then checked for any interesting correlations between home price/rent and distance from university on the filters of ranked or unranked universities for homes within a two-mile radius. Further, on filtering over one-bedroom homes for rent and two-bedrooms for home price, we found similar correlation for ranked as well as unranked universities. Results for these experiments are shown in Tables 25 and 26. Hence, as per our analysis, the ranking of a university does not play a crucial role in the dynamics of real estate prices of nearby homes.

**Table 24 Correlation of distance from university to home price/rent for top ranked/unranked universities**

	Distance-rent correlation	Distance-price correlation
Top 200 ranked universities	-0.007	-0.055
Unranked universities	-0.005	-0.039

**Table 25 Correlation of university distance (within two miles) to home price/rent for top ranked/unranked universities**

	Distance-rent correlation	Distance-price correlation
Top 200 ranked universities	-0.052	-0.137
Unranked universities	-0.105	-0.160

**Table 26 Correlation of university distance (within two miles) to two-bedroom home price/one-bedroom rent for top ranked/unranked universities**

	Distance-rent correlation (one-bedroom homes)	Distance-price correlation (two-bedroom homes)
Top 200 ranked universities	-0.230	-0.298
Unranked universities	-0.180	-0.327

**Table 27 Home price/rent-distance correlations by number of doctors affiliated with the nearest hospital**

Number of doctors	Homes with home price data (1 bedroom, <3 miles)	Pearson correlation (home price-distance)	Homes with rent data (>4 bedrooms, >2 miles)	Pearson correlation (rent-distance)
< 500	12,976	-0.196	5168	0.214
> 500	7548	-0.293	2935	-0.085

**Analysis of hospital proximity: price and rent analysis by number of affiliated doctors**

For home price data, we consider only single-bedroom homes as they exhibited the highest correlation between home price and distance from the nearest hospital. Table 27 shows that *single-bedroom homes near larger hospitals (more than 500 doctors) have a higher distance-home price correlation compared to those near smaller hospitals.*

For rent data, we restricted our analysis to homes with more than four bedrooms at distance of over two miles from the nearest hospital. We then categorize this data into two subsets of fewer than 500 or more than 500 doctors affiliated with the nearest hospital. Table 27 shows that *larger homes (more than four bedrooms) near a smaller hospital (fewer than 500 doctors) had a significantly higher rent-distance correlation as compared to homes near a larger hospital.*

## Discussion

In our analysis of average ZIP code median home price and median rent over time (“average home price” and “average rent”), we found that the average home price and rent are higher in ZIP codes with a university than those without, and highest in ZIP codes with a medium-sized university (10,000–20,000 students). One possible explanation for this observation is that public universities tend to have a more positive effect on home price and rent, as most medium-sized universities in our analysis are public. We also found that ZIP codes with larger hospitals have higher average home price and rent than those with smaller hospitals, while only ZIP codes with large hospitals have higher average home price and rent than ZIP codes with no hospital. One possible reason why ZIP codes with small and medium hospitals have lower home price and rent than ZIP codes with no hospital is that smaller hospitals tend to be in more remote areas with lower real estate prices. In general, these measures were positively affected by the presence of a university and negatively affected by the presence of a hospital (this should not be confused by the impact of the hospital distance of individual homes within a ZIP code). Note that the existence of a large (or small) university in a ZIP code does not imply the existence of a large (or small) hospital or vice versa (Table 28).

The strongest ZIP code-level correlations discovered in this study were found for smaller ZIP codes (population below the national ZIP code average). The reason may be that institutions have a higher impact in smaller ZIP codes as they are one of the main employers or drivers of economic activity. Specifically, we found that *in smaller ZIP codes with at least one hospital, there is a positive correlation (0.203) between the number of affiliated doctors and home price appreciation*. This result, along with several weaker correlations we found between home price/rent and appreciation, agrees with our expectation that appreciation is higher near larger institutions. Our analysis of volatility in smaller ZIP codes showed that for ZIP codes with at least one university, there is a positive correlation (0.296) between the number of enrolled students and home price volatility, and for ZIP codes with at least one hospital there is a positive correlation (0.244) between the number of affiliated doctors and home price volatility. *These results on volatility are opposite from what we expected, as larger universities or hospitals generally imply more job security for the area, and hence one would expect lower price volatility as well*. We also found that smaller ZIP codes with at least one university have a positive correlation (0.285) between the number of students enrolled and the percentage of vacant homes. This agrees with our expectation that the vacancy rate is higher near larger universities, as many students leave for the summer.

**Table 28** Number of ZIP codes with both a university and a hospital for each subset

	No university	Fewer than 10,000 students	10,000–20,000 students	20,000 or more students
No hospital	N/A	305	43	32
Fewer than 100 doctors	290	16	2	1
100–500 doctors	1340	122	24	10
500 or more doctors	404	58	4	15

Our analysis of homes near universities or hospitals based on the number of bedrooms in homes showed several interesting correlations. We found that the correlation between home price and distance from a university is strongest for two-bedroom homes ( $-0.319$ ), while the correlation between rent and distance from a university is strongest with one-bedroom homes ( $-0.191$ ). *That is, smaller homes are of higher demand closer to universities.* This conclusion seems logical as most of the occupants within a two-mile radius from a university would be students and not big families.

Similarly, we found that the correlation between home price and distance from a hospital is strongest for one-bedroom homes ( $-0.223$ ), which could imply high demand for single bedroom homes near hospitals. In contrast, the correlation between rent and distance from a hospital was strongest for homes with more than four bedrooms ( $0.186$ ), which implies that larger families may prefer to live farther from a hospital.

We found negative correlations between the price of a two-bedroom home and distance from a private university ( $-0.368$ ) or a public university ( $-0.220$ ). We also found negative correlations between the rent for a one-bedroom home and the distance from a private university ( $-0.311$ ) or a public university ( $-0.203$ ). *A probable cause for the difference in correlations between public and private universities is that private university students may be willing to pay more rent to be closer to the university.* These results also show that renting a home near a university has a slightly lower correlation compared to the sale of a home, implying a higher demand for buying a home. This may be accounted for by sales to investors for the purposes of renting out these homes. This possibility may be a subject for future research.

As noted in previous sections, economic laws as viewed from the lens of homes lying in the proximity of universities and hospitals act in subtle ways. What seems to be true near a university may not be true near a hospital. Indeed, one should not be altogether surprised by those findings. Although both universities and hospitals are magnets of highly educated workforce, universities have students while hospitals generally do not (with the exception of teaching hospitals, which are by definition universities). Demand for housing is a function of multiple factors which aren't altogether easy to decouple—variations in demand differ according to factors that would appeal to different demographic and economic strata. For example, students fuel demand for inexpensive housing lying in close proximity to a university campus. On the other hand, hospitals' professional staff, some highly paid (doctors, senior nurses and senior management), are adult, mostly with families that compete for larger homes, in neighborhoods having amenities commensurate to their needs and desires. Clearly the differences between those two demographical strata are stark. That said, there are many examples of universities that are situated in what may be considered as "inner city" and those include some of the finest universities in this country, e.g. University of Pennsylvania and Temple University (both in Philadelphia), University of Southern California (Los Angeles), Wayne State University (Detroit), etc., where this analysis would prove wrong. More often, there are many examples of hospitals situated in what one would consider a "bad" part of town, where the professional staff does not live; where doctors, nurses, management, etc. drive to work, sometime for an hour one-way, "put their time" and drive back to their home in a middle- or upper-middle-class suburbia. It is also interesting to note that "job security" plays a secondary role, if that. Indeed, those "old" notions of job security do not

seem to play prominently into the economic calculus, especially as it manifests in real estate terms. However, as expected, what is confirmed by the analysis is the notion that demand for modest rent housing is high near an employer promising job security.

### Limitations

When considering the distance between homes and universities/hospitals, we used the geographical distance without regard to elevation or roads. The Google Maps API could be used to account for these, but the API rate limits imposed by Google made this impractical. The university rankings provided by US News and World Report provide data for only the top 200 schools. For that, we generally study them in two groups, ranked and unranked.

The CMS hospital data includes smaller medical centers in addition to traditional hospitals. These medical centers tend to have very few affiliated doctors, which may affect our calculations involving subsets of ZIP codes that contain these medical centers. However, these medical centers are often in small cities with no other hospital nearby, thus we believe they are appropriate for our analysis.

Two limitations apply to the Zillow data. First, the prices/rent are based on listed prices/rent and not actual sale prices/rent. Second, the median monthly home price and rent data provided by Zillow had 1 or more months of data missing for some ZIP codes. To account for a ZIP code has one or more consecutive months of missing data between months with data, we assume the change in home price or rent is linear during the months with missing data. If a ZIP code's first month of data is after the first month of Zillow data (April 1996 for home prices and November 2010 for rent), that ZIP code is not included in our calculation of average median home price/rent for months before that ZIP code's first month of data, and our calculation of appreciation and volatility for that ZIP code are made using only the range of months for which we have data for that ZIP code.

We assume a ZIP code containing a university or a hospital contained that institution throughout the entire range of dates used in calculations for that ZIP code; however, some universities or hospitals may have been built after the start of their containing ZIP codes' ranges of home price/rent data.

As discussed above, many factors affect the demand—and therefore the price—of housing. While our study focuses on a select few factors, our home price and rent data may be affected by one or more other variables that we do not consider.

### Conclusions

We analyzed several measures of real estate valuation near universities and hospitals based on both individual home sales and ZIP code level aggregates. In our ZIP code-level analysis, we found that ZIP codes with universities tend to have above average median home price and median rent, especially those with medium-sized universities, while ZIP codes with hospitals tend to have below average median home price and median rent, with the exception of those with large hospitals, and that less populated ZIP codes have positive correlations between the number of doctors affiliated with a hospital and home price appreciation, and between the number of enrolled university students and home vacancy rate. Notably, less populated ZIP codes also have positive correlations between

home price volatility and both the number of enrolled students (in ZIP codes with a university) and the number of affiliated doctors (in ZIP codes with a hospital), which is surprising given that one would expect these institutions to have a stabilizing effect on home prices. In our home-level analysis, we found that the home price and rent for smaller homes tend to be the most affected by distance from a university, while distance from a hospital has greater effect on both the price of one-bedroom homes as well as on the rent of large homes. Of particular interest is our finding of a positive correlation between rent and distance from a hospital beyond two miles, suggesting that renters prefer homes in areas without a hospital nearby.

The findings point at complex interactions between demand and supply in the ZIP codes and homes under study. There is little doubt that supply–demand curves should be stratified by price points and possibly additional factors. This is clearly demonstrated in the city of Irvine, California, (ZIP code 92618) where two large healthcare facilities, Kaiser and Hoag hospitals, employ a large staff at a diverse income levels: from board-certified surgeons at the higher end, to nurse assistants and orderlies at the other. As one may readily check on Zillow or similar websites, there is little, if any “affordable” housing in the vicinity of ZIP code 92618, presumably necessitating low-income hospital staff to seek housing in lower-rent areas. An overall theory to explain behavior of real estate in the vicinity of a university or a hospital may prove complex as it should take into account myriad hard-to-measure factors. We will take this kind of analysis in a subsequent study, specifically the effects of interactions between economics, demographics, and amenities, to further explore how all the effects interact with the metrics we normally associate with real estate and potentially develop a machine learning model based on these analyses.

#### Abbreviations

CMS: Centers for Medicare and Medicaid Services; HUD: US Department of Housing and Urban Development; ZCTA: ZIP code tabulation area; ZHVI: Zillow Home Value Index; ZRI: Zillow Rent Index.

#### Authors' contributions

RR performed the ZIP-code level analysis and added the methods and results relevant to that analysis to the manuscript. DP performed the home-level analysis and added the methods and results relevant to that analysis to the manuscript. VH conceived the study and provided coordination and guidance in the experiments and writing of the manuscript. JRB provided guidance in the experiments and assisted in writing the Introduction and Discussion sections of the manuscript. NS provided guidance in the experiments and the writing of the manuscript. All authors read and approved the final manuscript.

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#### Competing interests

The authors declare that they have no competing interests.

#### Availability of data and materials

The median ZIP code home price (ZHVI) and rent (ZRI) datasets are available from Zillow [22].

The ZIP code population data are available from Splitwise, which includes ZIP code population data [31] and ZIP code population density data [32]. These datasets were derived from the US Census Bureau [23].

The university data was generated from Wikipedia [24] and US News and World Report's National University Rankings [25].

The hospital data was generated from two datasets provided by the Centers for Medicare and Medicaid Services: Hospital General Information [26] and the Physician Compare National Downloadable File [27].

The home listings data is from a public home listings website.

The home vacancy dataset is available from the US Department of Housing and Urban Development [28].

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