

Appendix 5. Summary of Documentary Materials for Iowa City

Introduction

The objective of this report is to identify and examine planning documents that Iowa City has related to flooding and housing, both before and after the 2008 flood. To help guide the research on housing and flooding within the City of Iowa City four questions were developed:

1. Does City of Iowa City have a housing needs assessment document?
2. Are there documents that report the losses from the 2008 floods?
3. Does Iowa City have plans that include issues related to flooding and housing?
4. Did any of these documents change after the 2008 floods?

Executive Summary

A number of planning documents exist for Iowa City that deal with housing, as well as the outcomes and results of recovery actions following the 2008 flood. The presence of the University of Iowa and its medical facilities creates a unique housing market in Iowa City, consisting of expensive housing with many cost burdened residents, along with a high renter population and a lack of affordable housing. However, in February 2011, a model was developed to provide suitable locations for affordable housing. This model is expected to resolve Iowa City's affordable housing issues, while also potentially offering solutions to other communities suffering similar problems.

In addition to providing a housing model, documents from the 2008 flood report the recovery process and mitigation strategies for Iowa City. Floodwaters inundated many homes in Iowa City and the recovery and rebuilding process has been a prolonged effort. The approach the city is taking to recovery involves relocating structures in vulnerable areas, as well as exploring options for additional protection. Two specific locations, the Parkview Terrace and Idyllwild neighborhoods, were substantially impacted. With acquisition and demolition, many homes in these neighborhoods were converted to open space. Mitigation efforts were conducted in these neighborhoods to identify flood protection options for the remaining homes.

While Iowa City had many useful documents reporting on both housing and flooding, many goals identified

within the documents come in the form of bullet points with limited elaboration. Few benchmarks or time lines are established to measure progress or success. One recommendation for providing a better framework for successful disaster recovery would be to specifically address each goal in these documents and to identify the stakeholders who would be involved in accomplishing each goal.

1. Does the City of Iowa City have a housing needs assessment document?

Four housing related documents were examined:

- 2006–2010 and 2011–2015 Consolidated Plans (CP)
- 2007 Affordable Housing Market Analysis (AHMA)
- 1997 Iowa City Comprehensive Plan (ICCP)
- 2011 Using GIS to identify suitable locations for federal housing assistance: a case study from the City of Iowa City, Iowa

1.1. 2006–2010 and 2011–2015 Consolidated Plans (CP)

Iowa City revises its consolidated plan (CP) every five years to ensure an up-to-date plan reflecting accurate amounts of funding received for housing. The consolidated plans reviewed for this study include the 2006–2010 and 2011–2015 plans. The purpose of the CP is to guide funding decisions in the next five years based on the receipt of specific federal funds. The two primary funding sources are the Community Development Block Grant (CDBG) and the HOME Investment Partnership programs. The CP focuses on housing needs and strategies that should be adopted to address those needs, dealing with primarily low-income individuals and households. Three goals guide the CP:

- Provide decent housing by preserving affordable housing stock and increasing availability of affordable housing.
- Provide a suitable living environment through safer, more livable neighborhoods and better integration of low-income residents throughout the city.

- Expand economic opportunities through more home ownership opportunities and empowerment of low and moderate-income persons to achieve self-sufficiency (CP 2011–2015, p. 2).

Housing Prices

Iowa City has had a unique housing market due to the presence of the University of Iowa and its large medical complexes. The demands from these institutions significantly affect both the elderly and young households and families that compete with students for housing in and around the downtown area, which is close to the university and other main centers of employment. The median price of a single-family home in 2004 was \$151,500, ranking Iowa City as one of the most costly single-family housing markets in the state. Compared to regional and national averages, the state of Iowa still has a relatively low average housing cost. To put the Iowa City market in perspective, there are very few homes in Iowa City valued at less than \$60,000, approximately 0.5% of the housing market. On the other hand, in the state of Iowa, more than half of the homes are valued at less than \$60,000. In 2003, 49% of the owner occupied homes for sale in Iowa City were valued between \$100,000 and \$179,999 (CP 2006–2010, p. 13).

Housing Market

According to the 2006–2010 CP, the population in Iowa City increased 4.2% during the period 1990–2000, adding pressure on the housing market as it responded to meet increased housing needs. From 1990 to 2000 the number of housing units in Iowa City increased from 22,464 to 26,076—a 16% increase that is significantly higher than the population growth. Consequently, vacancy rates have increased. At the same time, the size of households has been decreasing, which has increased the demand for additional units. In 2000 there were 26,083 housing units in Iowa City, not including dormitories and University of Iowa family apartments. Of these, 25,202 were occupied; 11,712 (46.6%) were owner-occupied and 13,432 (53.4%) were renter-occupied. Of the total housing units, 881 (3.4%) were vacant. Of the occupied units, the most common problem identified was the burden of cost. Cost-burdened households comprise approximately 84% of all households reporting housing problems. A total of 7,364 (54.8%) renter households and 2,034 (17.4%) owner-occupied households reported housing problems in 2000 (CP 2011–2015, p. 31).

Housing Problems

Within the Department of Housing and Urban Development (HUD), the Comprehensive Housing Affordability Strategy (CHAS) monitors existing housing to ensure it is maintained and provides good living

conditions. CHAS identifies households with housing problems as those that:

- Occupy units lacking complete kitchen and bathroom.
- Occupy an overcrowded unit (more than one person per room).
- Are considered cost burdened (where housing costs, including utilities, exceed 30% of gross income; housing costs of 50% or more are considered a severe cost burden) (CP 2006–2010, p. 14).

The primary problem low-income renters face in Iowa City is being cost burdened, because renters do not make enough to pay the high rental rates in the city. Overall, the total number of family-related and elderly households that are cost burdened has slightly decreased from 1990 to 2000. At the same time, households under 30% of median income continue to have the greatest need for rental assistance. Other problems for low-income renters include: 1) not being able to afford up-front costs such as the security deposit and 2) locating an affordable rental-housing unit (CP 2006–2010, p. 20).

Housing Strategies

Strategies are identified in Iowa City's consolidated plans to reduce the current barriers to affordable housing:

- Ensure that suitable undeveloped land is zoned for higher densities. Where possible, areas that have sufficient infrastructure to accommodate multifamily development will be identified and recommended for possible rezoning.
- Examine inclusionary zoning practices, including density bonuses for developments that include affordable housing units.
- Pursue in-fill development of nonconforming lots by granting variances, when appropriate.
- Consider the annexation of land suitable for the development of affordable densities, particularly medium-density multifamily housing, manufactured housing, and smaller affordable single-family housing (CP 2006–2010, p. 125).

Renters

Approximately 75% of all low-income rental households are occupied by students or other unrelated persons. Of the low-income rental households that may be identified as elderly or are related, 43% have some type of housing problem. More than one-third of the low-income elderly or related renter households pay more than 30% of their income for housing. A significant number of households receive rental assistance through the Iowa City Housing Authority (ICHA), which owns and manages 88 public

housing rental units in Iowa City. As of June 2004, the estimated wait time was two years for assistance from the Housing Choice Voucher (HCV) program and other public housing programs operated by the ICHA. In 2010 there were 1,667 families waiting for HCV assistance and 1,109 families waiting for public housing (CP 2006–2010, p. 15).

Owners

Owner-occupied units make up approximately 46% of the total housing stock in Iowa City compared to 68% for Iowa and 66% nationally. Low-income households accounted for 12% of all owner-occupied units in Iowa City. Of the low-income owner-occupied units, 39% are occupied by elderly people (CP 2006–2010, p. 21).

1.2. 2007 Affordable Housing Market Analysis (AHMA)

Housing Issues

Iowa City collaborated with Coralville, North Liberty, Tiffin and University Heights to prepare the 2007 Affordable Housing Market Analysis (AHMA), which examines existing and future needs for housing among lower-income households. The major findings from this document reiterate some of the housing problems previously stated, including household growth outpacing population growth, and rising housing prices outpacing increases in income. In addition, other barriers to affordable housing are identified:

- Absence of developable land zoned for multifamily housing and available for purchase.
- Lack of state and federal funding resources available to finance affordable housing projects.
- The high cost of land and construction places new housing development beyond the reach of most affordable housing developers (AHMA, pp. 3–9).

Housing Recommendations

The following recommendations were made to address the need for affordable housing opportunities in the Iowa City metro area:

- Change the public's perception for multifamily housing. Multifamily housing at street intersections and in transition areas between residential and nonresidential uses can be very beneficial.
- Most, if not all, of the land currently zoned for multifamily housing in Iowa City is either developed or not on the market. Increasing the amount of land zoned for multifamily housing would eliminate the need to go through the rezoning process.
- Adopting a mandatory inclusionary zoning ordinance would help provide zoning for multifamily uses. The ordinance could provide financial and other incentives to developers in

exchange for a percentage of the housing units set aside for households with incomes at or below 80% of the area median income.

- Awards from setting aside land for affordable housing could include: Impact fee waivers or reductions, planning fee waivers or reductions, streamlining or priority processing, density bonuses, and/or local funding to assist with the construction of the affordable housing units. (AHMA, pp. 11–12).

1.3. 1997 Iowa City Comprehensive Plan (ICCP)

Affordable Housing

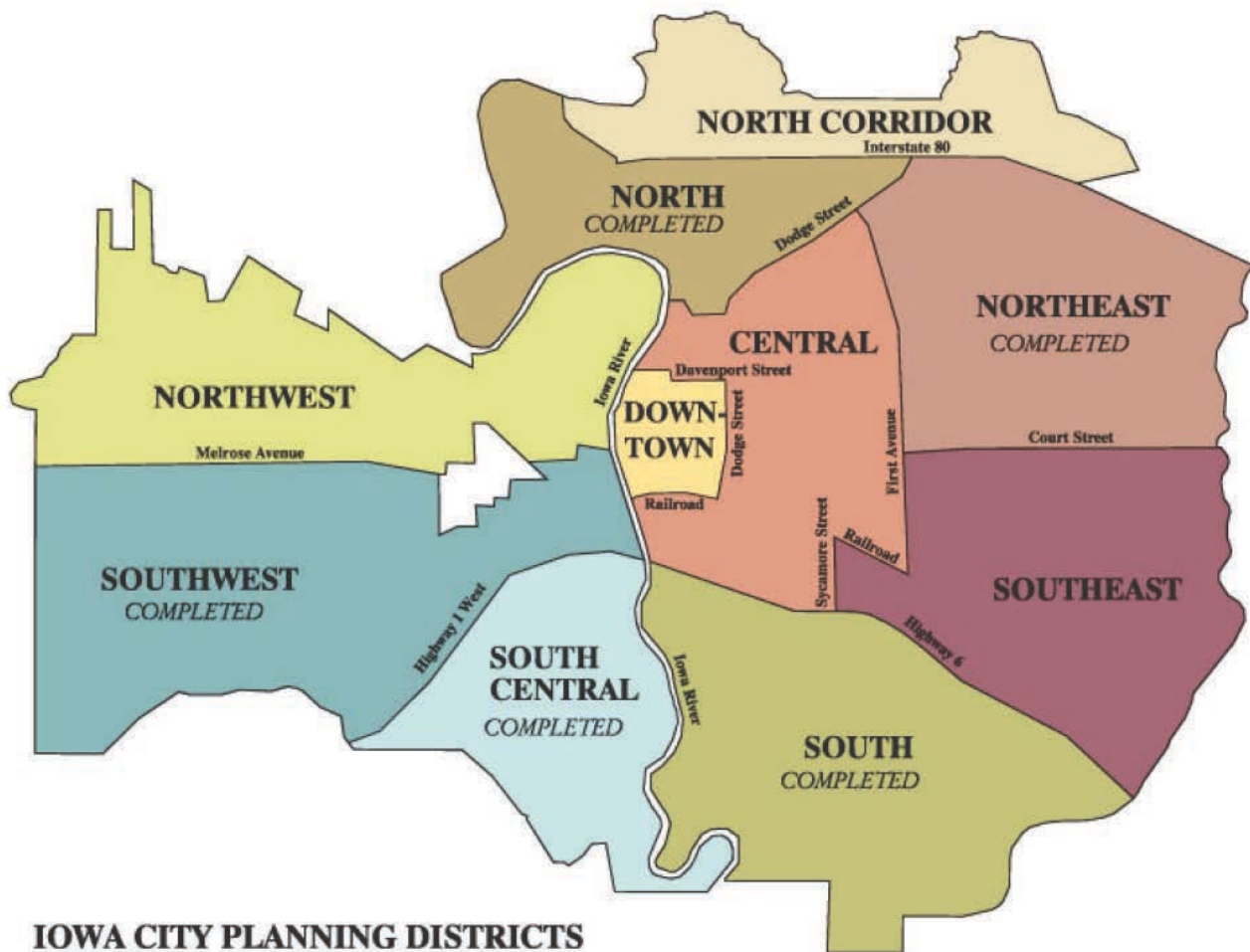
This plan divides Iowa City into ten districts (see figure 1). Each district has its own plan, which is developed or in the process of being developed. These plans are intended to promote patterns of land use, urban design, infrastructure and services that contribute to the livability of Iowa City and its neighborhoods. Affordable housing-related strategies listed in this document include the following proposed actions:

- Zone land for lower-cost housing alternatives such as single-room occupancy, manufactured and modular homes.
- Institute incentives such as density bonuses, provision of infrastructure and reduction of infrastructure requirements for the development of affordable housing.
- Identify and eliminate barriers to affordable and accessible housing.
- Simplify procedures for mixing housing types.
- Investigate a “fair share” concept for affordable housing.
- Implement zoning that integrates multifamily buildings as transitions between neighborhood commercial zones and lower-density single-family areas (ICCP).

1.4. 2011 Iowa City Affordable Housing Model (AHP)

In February 2011, the city council for Iowa City voted in support of a model developed by city employees that will determine where certain types of affordable housing are located. The model takes into account the current locations of subsidized housing, school data, crime statistics, household income, and home sales in neighborhoods throughout the city. The model will be used to guide decisions on the location of rental housing projects that include new construction or property acquisitions that receive CDBG and HOME funds.

Figure 1. Iowa City planning districts



IOWA CITY PLANNING DISTRICTS

Source: Iowa City Comprehensive Plan

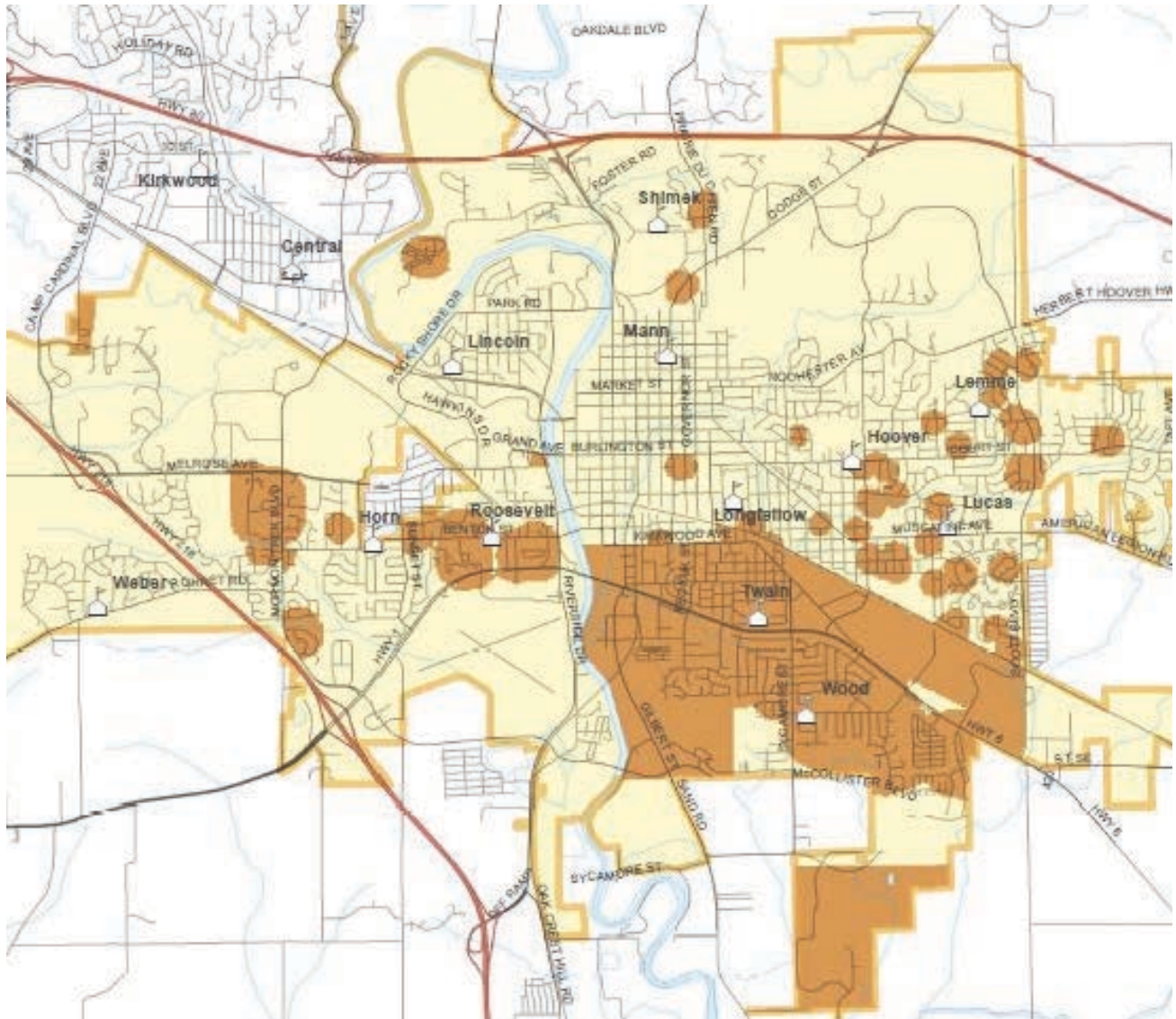
The model developed for the city focuses on creating affordable housing while attempting to minimize concentrations of poverty. Certain zoning regulations have been shown to increase diversity of household incomes within neighborhoods, specifically inclusionary zoning. This method has been successful when implemented at the regional or state level. Iowa City attempted to collaborate with surrounding communities to establish inclusionary zoning, but the effort was short lived. To guide the model, the city council outlined three goals for affordable housing: 1) to avoid further burdening neighborhoods and elementary schools that already have issues related to concentrations of poverty, 2) to recognize a desire to have mixed-income neighborhoods, and 3) to work with the Iowa City Community School District to determine its views on the affordable housing issue.

The city council identified multiple spatial themes for the analysis and established the following criteria:

- Distance to existing subsidized housing locations.
- Elementary school mobility data represented by the percentage of students that enroll or leave each school after the school year begins.
- Elementary school academic performance as indicated by Iowa Test of Basic Skills scores.
- Student participation in elementary school free and reduced-rate lunches.
- Crime rates.
- Median household income.
- Change in residential sales prices.

Each of the seven criteria was transformed into datasets using geographic information systems (GIS). Because some factors were identified as being more important than others, the data were prioritized and weighted appropriately (table 1). The datasets were compiled to calculate a score representing the suitability of the area

Figure 2. Affordable housing locations



Source: City of Iowa City, IA

for future assisted affordable housing projects. This model essentially pinpointed suitable locations for affordable housing derived from the established criteria.

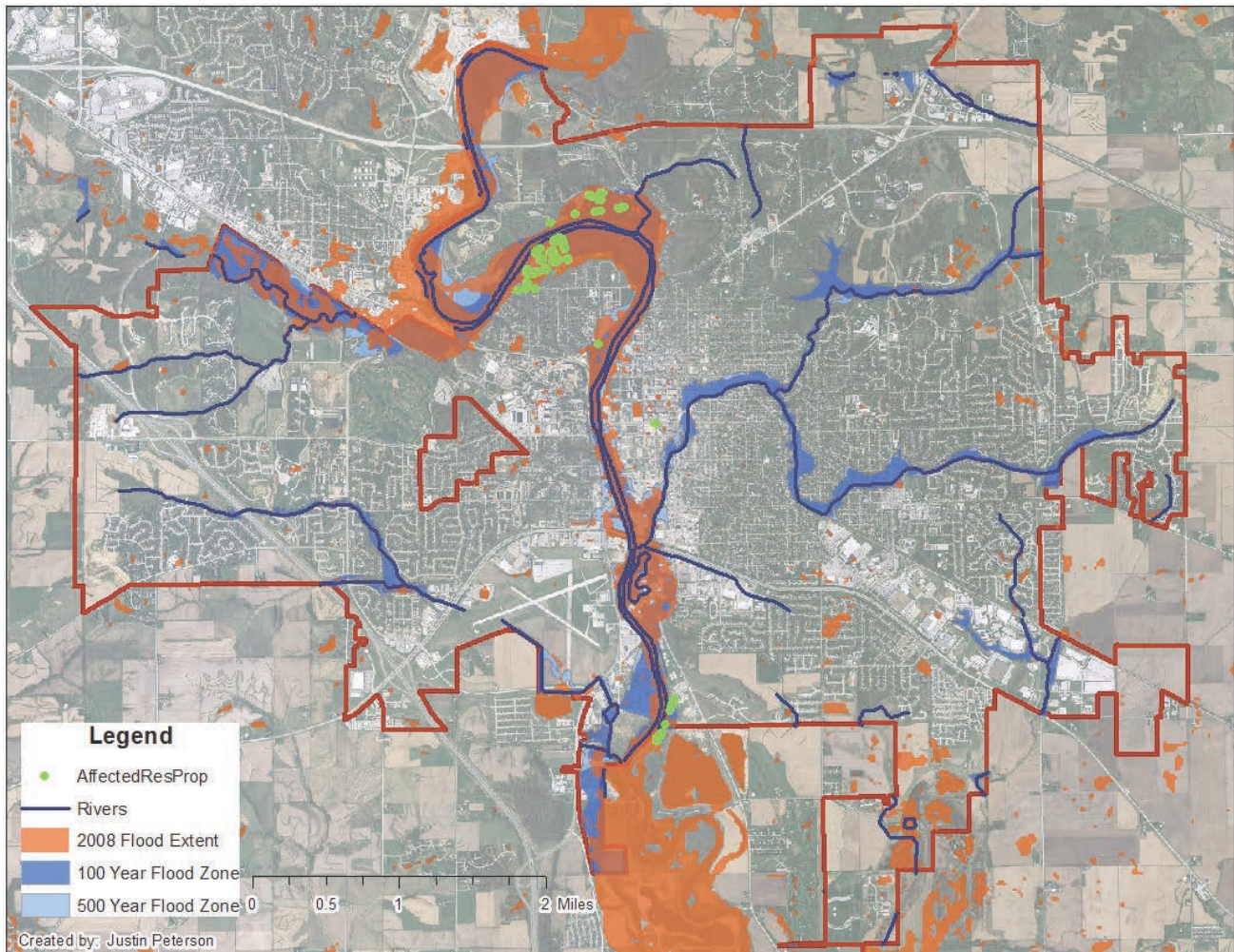
In contrast to inclusionary zoning, the model developed was adopted without opposition but should result in similar outcomes. “Based on feedback from the city council, local affordable housing developers, and residents, this new GIS-based location suitability model may be an effective approach to ensuring [that] future federal assistance for affordable housing does not contribute to concentrations of poverty” (Ackerson and Long, p. 6). Much of the land in southeast Iowa City will be devoted to these types of projects. Figure 2 identifies these locations in dark brown.

Table 1. Affordable housing model weighted criteria

Distance to existing assisted rental housing, excluding Section 8 vouchers	40%
Elementary school mobility rate	20%
Median household income	10%
Change in residential sales prices	10%
Crime rates	10%
Elementary school ITBS performance	5%
Student participation in elementary school free and reduced-rate lunches	5%

Source: Iowa City, IA

Figure 3. Flood-affected areas in the Iowa City area



Source: City of Iowa City, IA

In summary, Iowa City has many documents on housing that cross-reference each other, creating consistency among the plans and resulting in the identification of similar problems relating to low-income housing in Iowa City. With the creation of the affordable housing model in February 2011, Iowa City is addressing these issues and taking steps to provide more housing for low-income residents. The model developed to address these affordable housing issues could also be used by other communities with similar housing issues.

2. Are there documents that report losses related to the 2008 floods?

According to the GIS data from Iowa City, the 2008 flood affected 262 residential properties. Figure 3 illustrates the extent of the 2008 floods, with affected properties identified in green. Most of the impacted residential structures are in the northern part of the city along a

bend in the Iowa River. There were also a few impacted properties in the southern part of the city.

3. Does the City of Iowa City have plans that include issues related to flooding and housing?

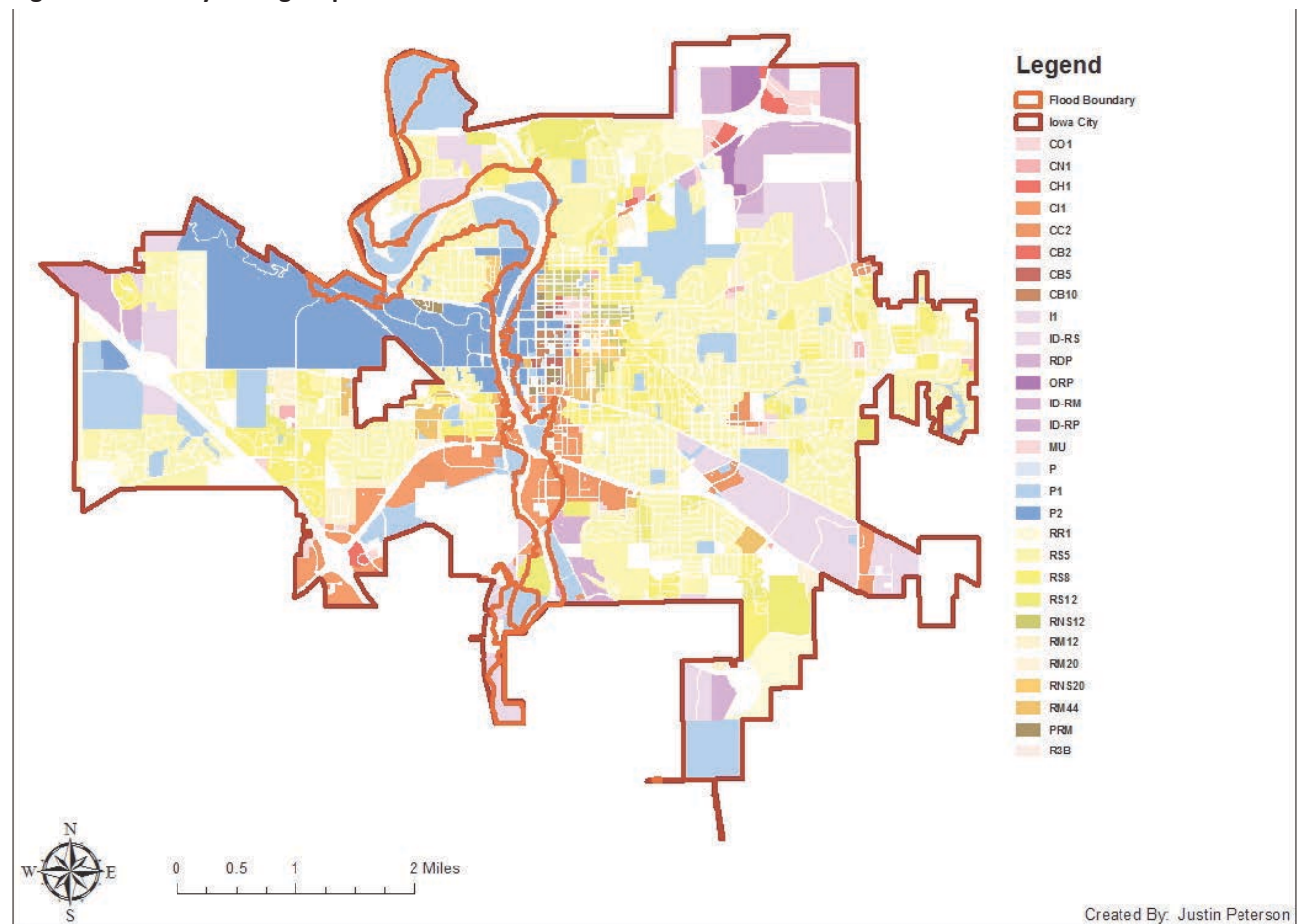
Four planning-related documents were examined:

- 2008 Iowa City Zoning Code (ICZC)
- 1997 Iowa City Comprehensive Plan (ICCP)
- 2009 Iowa City River Corridor Flood Protection Options (FPO)
- 2010 Hazard Mitigation Plan (HMP)

3.1. Iowa City Zoning Code (ICZC)

Chapter 5, article J of the Iowa City Zoning Code lists the city's floodplain management standards:

Figure 4. Iowa City zoning map



Source: City of Iowa City, IA

- Reserve sufficient floodplain area for the conveyance of flood flows so that flood heights and velocities will not be increased substantially.
- Restrict or prohibit uses that are dangerous to health, safety or property in times of flood or that cause excessive increases in flood heights or velocities.
- Require that uses vulnerable to floods, including public utilities that serve such uses, be protected against flood damage.
- Assure that eligibility is maintained for property owners to purchase flood insurance through the national flood insurance program (ICZC, 5J-2).

“The flood hazard areas in Iowa City are subject to periodic inundation which can result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief and impairment of the tax base, all of which adversely affect the peace, safety, health, welfare, comfort and convenience

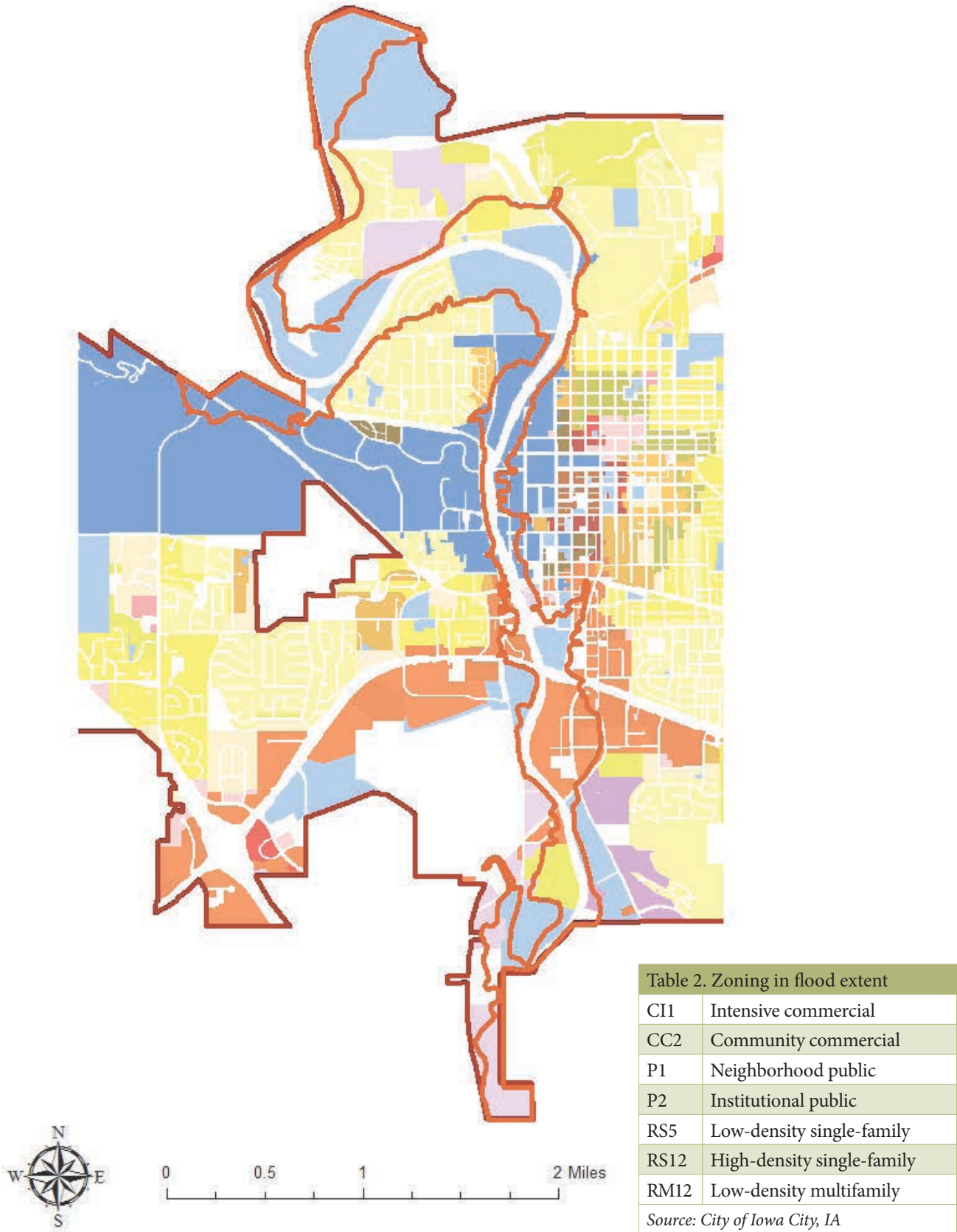
of its residents” (ICZC 5J-2). To help limit development in the floodplain and identify the current uses at specific locations, the city’s zoning map is used (see figures 4 and 5).

While flooding in Iowa City from 2008 had major affects on the community, the zoning map shows limited development in the flood extent. Much of the land is zoned for public parks, neighborhood public and institutional public uses. These zones do include university buildings and other public structures; however, they are still publicly owned, thereby creating less stress if an acquisition or relocation process is deemed necessary. Nearly all residential properties affected were located within the 100- and 500-year floodplains. The most significant clusters of affected residential properties came from the Parkview Terrace and Idyllwild neighborhoods, to be discussed later in this report.

Permits and Construction

A floodplain development permit must be obtained prior to the initiation of any development within the 100-year floodplain according to the review and approval

Figure 5. Iowa City zoning map with 2008 flood extent



procedures. Prior to the use of the structure, the applicant is required to submit certification by a professional that the finished fill, flood elevations, floodproofing or other flood protection measures were completed (ICZC 5J-3).

To meet general construction requirements, structures must be adequately anchored to prevent flotation, collapse or lateral movement of the structure and constructed with flood-resistant materials and utility equipment using methods that minimize flood damage.

Chapter 5 of the ICZC specifies general standards for residential buildings in the floodplain. "All new or substantially improved residential structures must have the lowest floor, including basement, elevated a minimum of one (1) foot above the 100-year flood elevation. Where existing topography, street grades, or other factors limit elevating by fill, alternative methods of elevating, such as piers, may be allowed, subject to approval of a special exception by the Board of Adjustment. In such a case, convincing evidence must be presented to the Board of Adjustment that the methods used will be adequate to support the structure as well as withstand the various hazards associated with flooding" (ICZC 5J-4).

In addition, "subdivisions and planned developments, including manufactured housing parks, must be designed to minimize flood damage and must have adequate drainage provided to reduce exposure to flood damage, and must meet the applicable performance standards established by the City Engineer. Any subdivision, planned development, or manufactured housing park intended for residential development must provide all lots with a means of vehicular access that will remain passable during occurrence of the 100-year flood event" (ICZC 5J-5).

Finally, all manufactured housing, including those placed in existing manufactured housing parks, planned developments or subdivisions must be "anchored to resist flotation, collapse or lateral movement as well as elevated on a permanent foundation such that the lowest floor of the structure is a minimum of one (1) foot above the 100-year flood elevation" (ICZC 5J-4).

Permitted Uses

No use is permitted in the floodway that would increase the 100-year flood elevation, unless approved by the Iowa DNR. All uses within the floodway must be constructed with flood-resistant materials and utility equipment using methods that minimize flood damage.

No use is permitted that would affect the capacity or conveyance of the channel or floodway or any tributary to the main stream, drainage ditch or any other drainage facility or system. Structures, building and sanitary and utility systems, if permitted, must meet the applicable general floodplain management standards and must be constructed or aligned to present the minimum possible

resistance to flood flows. Buildings, if permitted, must have low flood damage potential and must not be used for human habitation. Watercourse alterations or relocations, including channel changes and modifications, must be designed to maintain the flood carrying capacity within the altered or relocated portion and must be approved by the Iowa DNR. Finally, any fill or stream bank erosion control projects allowed in the floodway must have some beneficial purpose and will be limited to the minimum amount necessary" (ICZC 5J-6).

The purpose of regulating development in and around stream corridors is to maintain their value in conveying and storing floodwater, promote filtration of storm-water runoff, reduce stream bank erosion and protect wildlife habitat (ICZC 5J-7).

Buffer Requirements

Unless exempt, the following natural buffers must be maintained along regulated stream corridors. When other regulated sensitive features are located within a stream corridor, a 50-foot buffer is required.

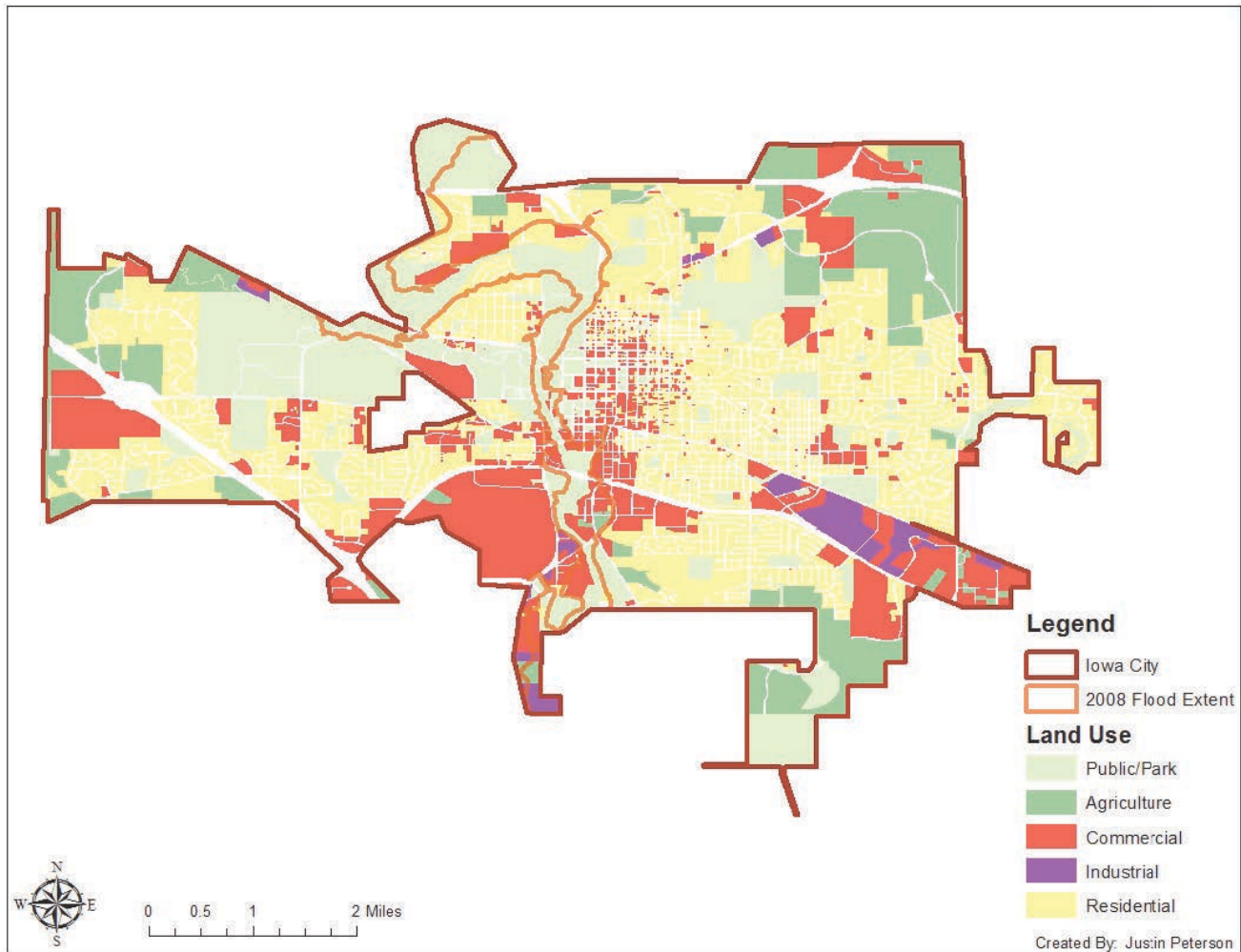
- Along the Iowa River, a 50-foot natural buffer must be maintained between any development activity and the stream corridor, which includes the floodway.
- Along tributaries to the Iowa River that have delineated floodway, a 30-foot natural buffer must be maintained between any development activity and the stream corridor, which includes the floodway. These tributaries include, but are not limited to Ralston Creek, Willow Creek, Snyder Creek, Clear Creek and Rapid Creek.
- Along tributaries or drainage ways that do not have a delineated floodway, a 15-foot natural buffer must be maintained between any development activity and the stream corridor limits (ICZC 5J-8).

A buffer may be reduced up to 50% if the portion of the buffer does not contain significant existing vegetative cover, does not contain other sensitive areas, and enhanced vegetative cover will be provided in the remaining buffer area. The required natural buffer may be reduced by up to 100% if the stream corridor is located in a developed area of the city, or if the portion of the buffer being reduced does not contain other sensitive areas and requiring full stream corridor buffer would hinder reasonable use of the property. Enhanced vegetative cover will be provided in any remaining buffer area (ICZC 5J-7).

3.2. Iowa City Comprehensive Plan

The 1997 Iowa City Comprehensive Plan divides the community into 10 planning districts. While the plan

Figure 6. Iowa City land use map



Source: City of Iowa City, IA

does not specifically address flooding, it does cover environmental protection. The Iowa Growth Policy section of the plan defines environmental protection as a basic tenet of Iowa City's vision for the future, and states that growth and development should be managed in a way that ensures that impacts on environmental features are minimized (ICCP p. 17).

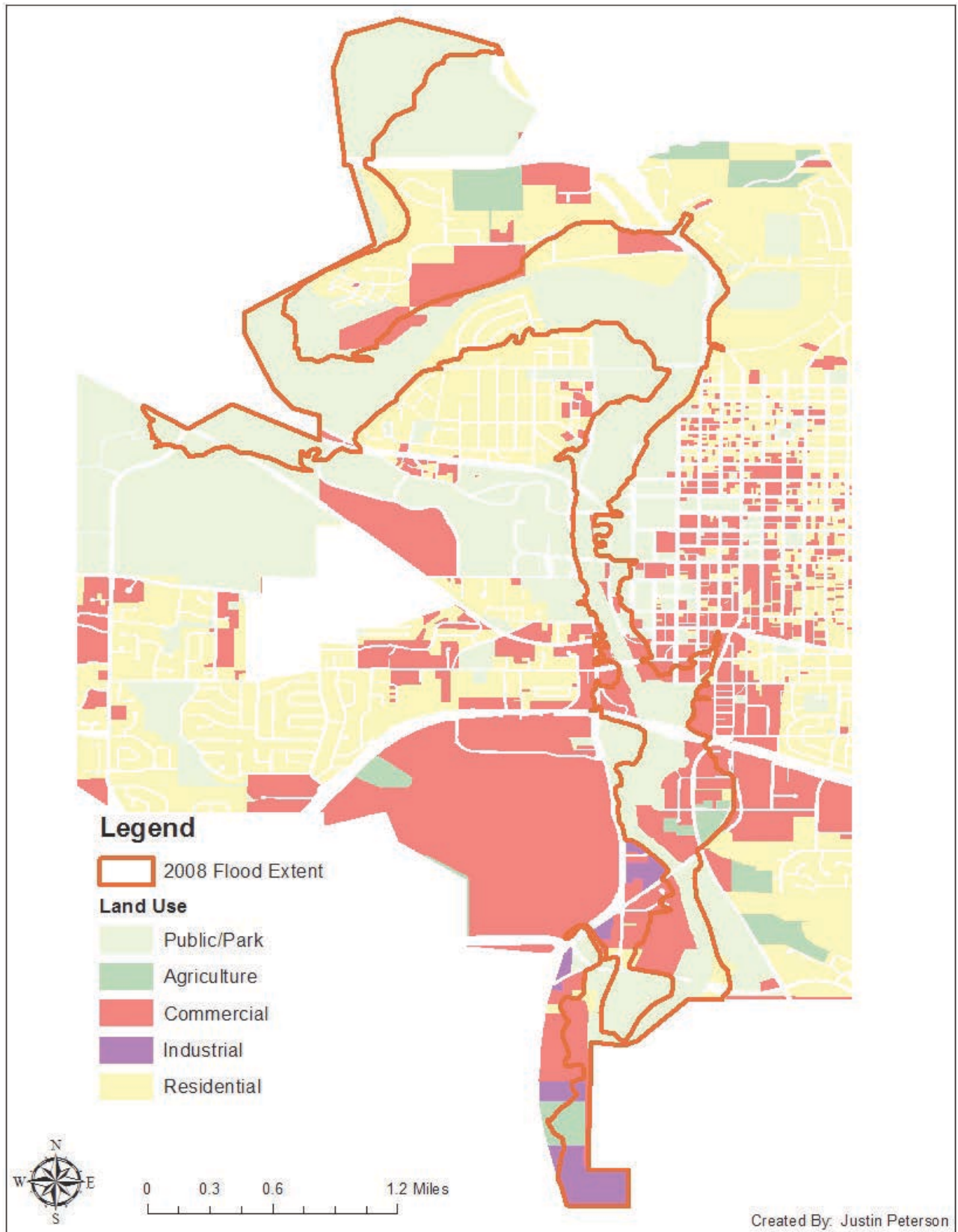
In 1993, Iowa City inventoried and mapped its environmentally sensitive areas, including woodlands, wetlands, regulated slopes, stream corridors, and so on. In 1995, an ordinance was adopted to protect these areas. The ordinance requires that environmental features be considered during the development process and encourages construction that respects and protects natural areas. To further guide existing and future growth, the city's land use map identifies uses located for each specific area (ICCP p. 23). Figures 6 and 7 show Iowa City's land use map and a close-up of the flood extent, respectively.

Most of the land uses within the flood extent can be identified as public or park uses. These are the correct uses for areas that are vulnerable to flooding. Figure 7 reveals that residential land use within the floodplain is located primarily in the northern part of Iowa City, consisting of Parkview Terrace and Idyllwild neighborhoods, which were extensively impacted by the flood. Commercial land affected includes areas on the east side of the river in downtown and parcels south of the downtown area.

3.3. Iowa City River Corridor Flood Protection Options (FPO)

The two residential areas most significantly impacted by the 2008 flood were the Parkview Terrace and Idyllwild neighborhoods, which are located along the Iowa River on the north side of Iowa City. These areas suffered significant damage to homes and condominiums, and required evacuation of the residents. In 1993, these neighborhoods also experienced a flood event that was near the 100-year

Figure 7. Iowa City land use map with 2008 flood extent



Source: City of Iowa City, IA

flood level. The study Iowa City River Corridor Flood Protection Options for Parkview Terrace and Idyllwild Neighborhoods was conducted in January 2009 to evaluate potential options for providing flood protection for these two neighborhoods at the 100- and 500-year flood levels.

Stanley Consultants conducted the following analysis of potential flood protection options for the Parkview Terrace and Idyllwild neighborhoods. At the time of this report, 40 of the 57 eligible households had indicated interest in the buyout of their property through the Hazard Mitigation Grant Program (HMGP) (FPO p. 2).

The flood protection options analyzed for this study included variations of the following:

- Elevating structures above the floodplain
- Constructing earthen levees
- Constructing structural concrete floodwalls
- Constructing demountable floodwalls
- Wet floodproofing the homes with basements or crawl spaces

Parkview Terrace Mitigation Options

- Elevate the homes above the floodplain:
 - Several homes are already built at or above the 100-year floodplain but the vast majority of the homes are below the 500-year floodplain.
- Construct a floodwall or levee along the north side of Normandy Drive
 - This option requires removal of all of the homes on the north side of Normandy Drive, but provides flood protection for all of the remaining homes. A permanent earthen levee or concrete wall would be constructed for flood protection.
- Construct a demountable floodwall on the north side of Normandy Drive
 - This option also requires the removal of all of the homes on the north side of Normandy Drive and provides flood protection for all of the remaining homes. A demountable floodwall would allow a view to the river that would be open at all times except during a flood event.
- Elevate the intersection of Normandy Drive and Manor Drive above the 100-year floodplain
 - The Parkview Terrace neighborhood has only one access road (Normandy Drive) that serves the entire 130+ lot neighborhood. Normandy Drive is overtopped by

floodwaters below the 100-year event, preventing residents from entering their homes even in parts of the neighborhood that are not impacted by floodwaters.

- Construct a demountable floodwall and/or permanent floodwall within the right-of-way north of Normandy Drive
 - This option assumes that the city will acquire the homes north of Normandy Drive and adjacent to the park that are eligible for the HMGP.
- Wet floodproof the homes with basements (FPO pp. 5–6).

Table 3 reports the estimated costs for each mitigation strategy for the Parkview Terrace neighborhood. These mitigation strategies have a range of costs and include protection estimates for both 100- and 500-year flood levels.

Idyllwild Mitigation Options

The focus of flood protection for this neighborhood was on protecting the Idyllwild condominiums, the Parkview Church, and the homes along Taft Speedway. The condominiums were already built at or above the 100-year floodplain, so protecting them at the 500-year flood event was the only necessary consideration for these properties. Six options were considered:

- Elevate the homes along the river, south of Taft Speedway
 - This option provides flood protection only to the existing homes along Taft Speedway. No additional flood protection is provided to the Idyllwild condominiums or the Parkview Church.
- Elevate Taft Speedway and No Name Road above 500-year floodplain
 - This option would provide protection from a 500-year flood for the condominiums and the church, but no protection for the homes along the river.
- Construct a floodwall on the north side of Taft Speedway and east side of No Name Road
 - This option provides the same protection as the previous option but would not require elevating the adjacent roads. The portion of the floodwall directly south of the condominiums could be a demountable floodwall, which would preserve the views to the river except during flood events.

Table 3. Parkview Terrace mitigation options cost summary

Item	Mitigation option	100-yr level	500 yr-level	Cost per home	
				100-yr event	500-yr event
Parkview Terrace alternative 1	Elevate homes	\$1,000,000	\$3,700,000	\$21.7K	\$29.1K
Parkview Terrace alternative 2-A	Levee/floodwall on north side of Normandy Drive	\$9,700,000	\$12,900,000	\$100K	\$133K
Parkview Terrace alternative 2-B	Floodwall on north side of Normandy Drive	\$12,900,000	\$14,500,000	\$133K	\$149K
Parkview Terrace alternative 3	Demountable wall on north side of Normandy Drive	\$16,300,000	\$21,700,000	\$170K	\$226K
Parkview Terrace alternative 4	Elevate Manor, Eastmoor Drives, Park Place, and a portion of Normandy	1,100,000			\$8.7K
Parkview Terrace alternative 5-A	HMGP Eligible - combination floodwall/demountable wall on north side of Normandy Drive in the city right-of-way		\$11,800,000		varies
Parkview Terrace alternative 5-B	HMGP eligible - demountable wall on north side of Normandy Drive in the city right-of-way		\$15,500,000		varies
Parkview Terrace alternative 6	Wet floodproofing homes with basements—allow the basements to flood				\$15K–\$30K

Source: City of Iowa City, IA

- Construct a floodwall through the condominium and church properties
 - This option provides protection for 22 of the 23 existing condominiums and the church. One of the condominium buildings would either have to be acquired and demolished or remain unprotected. This option would provide demountable floodwall options for the portion of the wall directly south of the condominiums. It also would prohibit future development of the remaining undeveloped properties, thereby reducing the usefulness of those properties.
- Construct combination levee/floodwall
 - This option provides the same protection of options three and four. It requires elevating a portion of Taft Speedway and all of No Name Road to the 500-year protection level, but the portion of Taft Speedway directly south of the condominiums would remain at its current elevation. Either a permanent floodwall or a demountable floodwall would be constructed on the north side of the portion of Taft Speedway left unchanged.
- Wet floodproof the structures (FPO pp. 6–8)

Table 4. Idyllwild mitigation options cost summary					
Item	Mitigation option	100-yr level	Cost per home		
			500-yr level	100-yr level	500-yr level
Idyllwild alternative 1	Elevate homes	\$233,000	\$321,000	\$19K	\$27K
Idyllwild alternative 2	Levee around Idyllwild condominiums and Parkview Church		\$9,800,000	\$107K	\$107K
			w/tee walls	w/demountable walls	
Idyllwild alternative 3	Floodwall around Idyllwild and Parkview Church		\$9,200,000	\$11,900,000	\$100K
Idyllwild alternative 4	Floodwall through Idyllwild and Parkview Church properties		\$8,400,000	\$11,900,000	\$95K
Idyllwild alternative 5	Combination flood levee-floodwall around Idyllwild and Parkview		\$9,400,000	\$12,000,000	\$102K
Idyllwild alternative 6	Wet floodproofing homes with crawl spaces – allow the crawl space to flood				\$15K–\$30K
Source: City of Iowa City, IA					

Table 4 provides the estimated costs of each mitigation strategy for the Idyllwild neighborhood. These options have a range of costs and estimate protection at both the 100- and 500-year flood levels.

Figure 8 displays current information on the buyout process for Parkview Terrance and Idyllwild neighborhoods. The city offered a voluntary buyout program in which it would purchase selected homes in the neighborhoods for 112% of the assessed market value. The following figures display the buyout process for both neighborhoods as of December 30, 2010. The outcome of the buyout process for these neighborhoods will have a substantial impact on the mitigation measures the city will take to protect the remaining homes.

Figures 9 shows the locations of the buyout properties. The map identifies both the 100- and 500-year floodplains as well as the city's boundary. The general location of these reported buyouts within the city is outlined with an orange rectangle. These neighborhoods are north of downtown adjacent to the Iowa River. Flooding in 2008 significantly damaged the majority of homes in these neighborhoods.

Figures 10 and 11 are from the Iowa City River Corridor Flood Protection Options report and show close-ups of the buyout area before and during the 2008 flood, respectively.

3.4. Iowa City Hazard Mitigation Plan

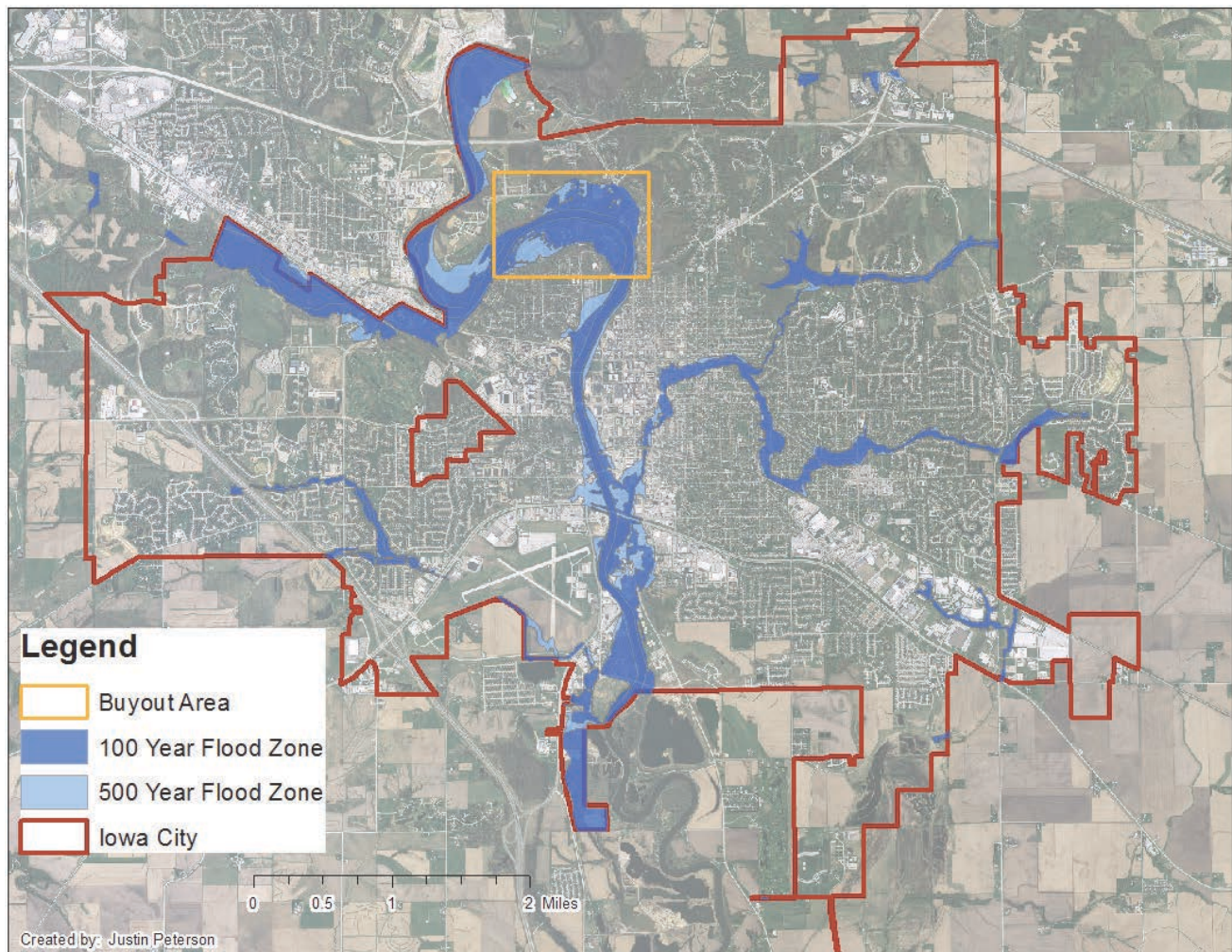
Historically, flooding has been a relatively common occurrence in much of the Midwest, especially within the 100-year floodplain. Table 5 shows the estimated population of Iowa City living in the 100-year floodplain. The total assessed value for each land use is given, along with the number of properties classified under each use. Commercial and industrial properties are located in the floodplain, as well as many University of Iowa properties, increasing the impact of flooding to people who live outside the floodplain but go there to work or study. Floods also affect other parts of the population when roadways and bridges are closed. Therefore, the total percentage of the population vulnerable to flooding is actually much higher than 4.6%.

Figure 7. Iowa City buyout program



Source: City of Iowa City, IA

Figure 9. Buyout area location



Source: City of Iowa City, IA

Figure 10. Buyout location before flooding



Source: City of Iowa City, IA

Figure 10. Buyout location after flooding



Source: City of Iowa City, IA

Table 5. Estimated population in floodplain									
Use type	Number			Value			Population		
	In city	In SFHA	% in SFHA	In city	In SFHA	% in SFHA	In city	In SFHA	% in SFHA
Exempt	288	24	8.3%	\$58,826,538	\$20,109,100	34.2%	n/a	n/a	n/a
Ag	129	14	10.9%	\$2,220,179	\$246,534	11.1%	32	0	0%
Apt. or Rental	745	47	6.3%	\$362,322,380	\$36,103,470	10.0%	1468	93	6.3%
Commercial Condo	226	17	7.5%	\$48,079,770	\$1,861,540	3.9%	n/a	n/a	n/a
Commercial	821	136	16.6%	\$509,856,110	\$106,557,610	20.9%	n/a	n/a	n/a
Vacant Commercial	226	39	17.3%	\$15,921,360	\$2,360,480	14.8%	n/a	n/a	n/a
Industrial	27	8	29.6%	\$32,930,050	\$16,968,890	51.5%	n/a	n/a	n/a
Single Family	11,612	715	6.2%	\$2,212,517,343	\$124,852,603	5.6%	27,520	1,695	5.2%
Duplex or Townhouse	892	69	7.7%	\$164,433,730	\$11,287,140	6.9%	2,114	164	7.7%
Condo	4,433	480	10.8%	\$548,973,370	\$77,025,200	14.0%	10,506	1,138	10.8%
Rooming House	77	8	10.4%	\$20,036,960	\$2,901,380	14.5%	152	16	10.4%
Residential Outbuilding	150	6	4.0%	\$2,593,620	\$67,800	2.6%	150	6	4.0%
Vacant Residential	1,143	90	7.9%	\$18,642,060	\$2,185,760	11.7%	n/a	n/a	n/a
Other	279	104	37.3%	\$0	\$0	n/a	n/a	n/a	n/a
Total:	21,509	1,757	8.2%	\$4,117,066,430	\$402,527,507	9.8%	67,062	3,110	4.6%
Source: Iowa City, IA									

Table 6. FEMA's STAPLEE method		
S	Social	The public must support the overall implementation strategy and specific mitigation actions. Therefore, the project is evaluated in terms of community acceptance.
T	Technical	The proposed options must be technically feasible, must reduce losses in the long term, and have minimal secondary impacts.
A	Administrative	The anticipated staffing, funding and maintenance requirements to determine if existing capabilities exist or if outside staffing is needed.
P	Political	Determining how community leadership feels about issues to gauge the level of political support for proposed mitigation objectives.
L	Legal	Identifying what level of government (or other entity) has the legal authority to undertake the mitigation action.
E	Economic	Differentiating between cost effective mitigation actions that can be funded in the near future and those that are only economically feasible in a post-disaster scenario.
E	Environmental	Impact on the environment is evaluated, including compliance with statutory considerations such as NEPA.
Source: Iowa City, IA		

Some of the buildings affected by the 2008 floods will be relocated as part of the hazard mitigation plan. Mitigation options were assessed for those structures that will remain in the floodplain (HMP p. 30).

The Iowa City Planning Committee evaluated mitigation options using the STAPLEE method outlined by FEMA. This technique assists in identifying, evaluating and prioritizing mitigation actions based on existing local conditions (table 6).

Based on its evaluation of mitigation options, Iowa City developed two sets of proposed actions in response to past floods: current mitigation actions and alternative mitigation actions. The current mitigation actions include procedures and policies currently in place to deal with flood issues, while alternative mitigation actions include proposed or future actions potentially viable to include in Iowa City's efforts to reduce damages from floods.

Current Mitigation Actions

- Continued compliance with NFIP
- Acquisition and administration of a floodplain development ordinance
- Acquisition of flood-prone properties
- Education and outreach
- Environmental protection and storm-water management
- River gauges and flood level monitoring
- Multijurisdictional cooperation within watershed
- Additional floodplain studies and mapping

Alternative Mitigation Actions

- Develop a flood emergency operations plan
- Investigate structural flood mitigation projects or relocation to protect critical facilities, especially the wastewater plants and lift stations
- Improve water and sewer system infrastructure to prevent additional damage
- Acquire or relocate flood-prone structures
- Backup generators
- Elevate flood-prone structures
- Elevate or protect roadways and bridges
- Storm drainage system expansion and maintenance
- Basement backflow protection
- Study and update existing structure flood mitigation projects
- Perform preventative maintenance on existing flood control measures to maintain functionality

- Dry floodproofing
- Wet floodproofing (HMP, p. 32)

4. Do any of these documents change after the 2008 floods?

Following the 2008 flood, Iowa City updated the floodplain management section of its zoning ordinance. Changes were made to the standards regarding floodplain development permit applications, as well as those regarding residential and new subdivision development.

An ordinance amending Title 14, Chapter 5, Article J: Floodplain Management Standards was approved in November of 2010. The terms "100-year flood event" and "500-year flood event" were redefined and considered together as a "flood hazard area" to reflect the increased risk of flooding in these areas. To mitigate the risks of future flood events, the city adopted floodplain regulations to manage development in the flood hazard area. Certain critical facilities, such as hospitals and jails, should remain accessible during a flood. Variance from these standards will be allowed in certain situations (14-5J: Floodplain Management Standards Update).

Review and approval procedures for floodplain development permits were updated, stating that a floodplain development permit must be obtained from the building office prior to initiation of any development on a parcel of land within the flood hazard area. The issuance of a floodplain development permit does not relieve the property owner from complying with federal, state, or other agency regulations, including approval when required from the Iowa DNR (14-5J-6 Floodplain Development Permit Update).

New or substantially improved residential structures must have the lowest flood of the original structure and any lateral addition elevated a minimum of one (1) foot above the flood hazard elevation. Any subdivision, planned development, or manufactured housing park intended for residential development must provide all lots with a means of vehicular access that will remain passable during occurrence of the 100-year flood event. Proposals for subdivisions shall include the flood hazard elevation data for those areas located within the flood hazard areas (14-5J-7 General Floodplain Management Standards Update).

Table 6. Planning-related documents information			
Document	Year	Source	Website
Iowa City Comprehensive Plan	1997	City of Iowa City	http://www.icgov.org/default/?id=1373
Affordable Housing Market Analysis	2007	Mullin & Lonergan Associates Inc.	http://www.icgov.org/site/CMSv2/file/planning/commDev/hsngAnalysis.pdf
Iowa City Zoning Code	2008	City of Iowa City	http://www.icgov.org/default/?id=1478
Iowa City River Corridor Flood Protection Options for Parkview Terrace and Idyllwild Neighborhoods	2009	Stanley Consultants Inc.	http://www.icgov.org/site/CMSv2/file/tempArticles/IowaCityRiverCorridor_200901rfsopt.pdf
Hazard Mitigation Plan	2010	Iowa City, IA	www.icgov.org/hmplan
Ordinance Amending Title 14, Chapter 5, Article J: Floodplain Management Standards to Regulate the 100 and 500 Year Floodplain and Associated Changes	2010	City of Iowa City	
Iowa City Consolidated Plan	11–15	Mullin & Lonergan Associates Inc.	http://www.icgov.org/site/CMSv2/file/planning/commDev/citySteps/CitySteps2011-2015Final1.pdf
Using GIS to identify suitable locations for federal housing assistance – A case study from the City of Iowa City, Iowa.	2011	Ackerson, Kristopher; Long, Steve	

Table 7. Planning-related documents summary			
Document	Author	Brief summary	Important issues
1997 Iowa City Comprehensive Plan	Iowa City, IA	Divides the city into 10 planning districts, each with its own comprehensive plan	Location of important maps Land use Zoning Sensitive areas
2007 Affordable Housing Market Analysis	Mullin & Lonergan Associates Inc.	Identifies trends that affect the demand for affordable housing and identifies barriers to creating more affordable housing	Permits required before development in floodplain Households outpacing population growth Housing prices outpacing income Many barriers in producing affordable housing
2008 Zoning Code	Iowa City, IA	Sections used contain requirements and regulations for building in the floodplain. Identifies mitigation measures the city is currently addressing as well as alternative actions	Permits required before development in floodplain New residential units elevated one (1) foot above 100-year floodplain Use of natural buffers to regulate development

Table 7. continued			
Document	Author	Brief summary	Important issues
2009 Iowa City River Corridor Flood Protection Options for Parkview Terrace and Idyllwild Neighborhoods	Stanley Consultants Inc.	Assessment of flood mitigation options for both Parkview Terrace and Idyllwild neighborhoods. Multiple options with ranging estimated costs available including: elevating structures, floodwalls or levees, demountable floodwalls, elevating roads and wet flood proofing	Many available flood mitigation options at varying estimated costs Number of homes remaining will determine mitigation measure
2010 Hazard Mitigation Plan	Iowa City, IA	Sections used contain requirements and regulations of building within the floodplain	Current and alternative flood mitigation actions
2010 Ordinance Amending Title 14, Chapter 5, Article J: Floodplain Management Standards to Regulate the 100- and 500- year Floodplain and Associated Changes	Iowa City, IA	The 1993 and 2008 floods caused catastrophic damage to private property and public infrastructure in both the 100- and 500-year floodplains. This amendment includes changes made to Iowa City's Zoning Ordinance to better regulate floodplain development	The 100- and 500-year flood events mislead the public regarding the actual, annual risk of investing in a flood hazard area 100- and 500-year floodplains are redefined and considered together as a "flood hazard area"
2011–2015 Iowa City Consolidated Plan	Mullin & Lonergan Associates Inc.	Contains sections including housing and homeless needs assessment, housing market analysis and strategic plan	Expensive housing Many cost-burdened houses Long wait for housing assistance Competitive housing market Large renter population Low vacancy rate
Using GIS to identify suitable locations for federal housing assistance: A case study from the City of Iowa City, Iowa	Ackerson, Kristopher; Long, Steve	An affordable housing suitability model is developed identifying suitable locations for affordable housing based on a set of criteria	Identifies areas suitable for CDBG and HOME funding for affordable housing Developed to limit concentrations of low income housing

Table 8. GIS-related data		
Shapefile	Source	Website
Aerial Photograph	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
Iowa City Boundary	Iowa City	n/a
Rivers	Iowa City	n/a
Floodplain	Iowa City	n/a
Parcels (land use)	Iowa City	n/a
Zoning	Iowa City	n/a
08 Flood Extent	Iowa City	n/a
08 Flood Aerial	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/

References

- Ackerson, Kristopher and Steve Long. 2011. *Using GIS to identify suitable locations for federal housing assistance: A case study from the City of Iowa City, Iowa.*
- City of Iowa City. 1997. Iowa City Comprehensive Plan.
- City of Iowa City. 2001–2006. Consolidated Plan.
- City of Iowa City. 2008. Iowa City Zoning Code.
- City of Iowa City. 2010. Mitigation Plan.
- City of Iowa City. 2011–2015. Consolidated Plan.
- Mullin Lonergan Associates Inc. 2007. *Affordable Housing Market Analysis.*
- Stanley Consultants, Inc. Jan. 2009. *Iowa City River Corridor: Flood Protection Options for Parkview Terrace and Idyllwild Neighborhoods.*

Appendix 6. Summary of Documentary Materials for Mason City

Introduction

The objective of this report is to identify the planning-related documents that the City of Mason City has related to flooding and housing, both before and after the 2008 floods. To guide the search process, the following questions were developed:

1. Does the City of Mason City have a housing needs assessment document?
2. Are there documents that report losses related to the 2008 floods?
3. Does the City of Mason City have plans that address issues related to flooding and housing?
4. Did any of these documents change after the 2008 floods?

Executive Summary

Mason City experienced extensive damage during the 2008 floods. Within the city, 158 properties flood-damaged properties have been identified as either purchased or in the process of being purchased by the city. The main source of flooding was the Winnebago River, which is the main waterway located within the city limits. The river generally flows from the northwest corner to the southeast corner of the city. Mason Creek is also located on the south edge of the city and drains into the Winnebago River. These sources of water pose a significant flooding threat to the city.

Extensive structural development has taken place in the floodplain. Many of these structures are built in the 100-year floodplain and would be lost during a severe flood. The floodplains of the Winnebago River, Willow Creek and Chelsea Creek have all undergone extensive residential, industrial and recreational development. Poor floodplain management practices have allowed continued construction in flood-prone areas along these streams and development has encroached closer to the waterways. As a result, many residential and industrial areas are vulnerable to more severe flooding. Land classified as single-family residential was most severely affected by the 2008 flooding. Mixed-use and office-use properties were affected less severely. The fact that the majority of the properties affected were classified as single-family residential should influence the city to encourage other types of land uses in flood-prone areas.

While Mason City's designated floodway and floodplain areas are identified on FEMA base maps and regulated under current city regulations, city staff have identified additional designated and undesignated wetland and flood-prone areas based on history and past experience. These additional areas should be taken into consideration in future land use and zoning decisions. It is recommended that the current 100- and 500-year floodplains be reexamined and newly identified areas of risk included in each appropriate floodplain.

The following recommendations were made for Mason City to mitigate the potential effects of future flooding:

- City growth should be directed away from the Winnebago River and other potential sources of flooding. Open space and recreational use should be encouraged in areas alongside the Winnebago River. This will mitigate the potential affect that flooding can have on housing in Mason City.
- Mason City should create and enforce stricter development ordinances for areas designated as flood zones. This would minimize property loss in the case of flooding.

1. Does the City of Mason City have a housing needs assessment document?

Mason City has conducted its own housing needs assessment and created the Mason City 2005 Housing Needs Assessment and Action. This plan, as well as census data and data from Mason City Assessor's Office were consulted to obtain information for Mason City on housing inventory, population trends and projections, income information, value of existing housing, availability of affordable housing and capacity for housing development.

Housing Inventory

Research conducted in late 2004 by the Mason City Housing Assessment Committee shows that there were 13,191 housing units in Mason City, of which 665 were vacant (94.96% occupancy rate). Approximately 65% of the housing units in Mason City were built before 1960, compared to approximately 50% for the state of Iowa as a whole. Research by the housing assessment committee showed that 4,295 of the 13,191 housing units in Mason City were rental properties, of which 2,556 were classified as regular apartments and duplexes.

Population Trends and Projections

Mason City's population in the age group 70 or older is slightly higher than that of the state overall. The 2010 population estimate for Mason City is 29,476 residents. Table 1 shows the housing demand projected for the end of 2010 by the Mason City Housing Assessment Committee.

Income Information

Approximately 45% of the households in Mason City are low- to moderate-income households (household gross income is less than 80% of the area median income level).

Value of Existing Housing

According to the Mason City Assessor's Office, the average value of the existing units in Mason City increased by 3.20% annually between 2000 and 2004. Sales statistics provided by the Mason City Board of Realtors show that the average sales price of homes listed through their members increased at an annual rate of 3.27% between 2000 and 2004. The median home value, as of January 1, 2005, in Mason City was approximately \$85,000.

Availability of Affordable Housing

There is a growing affordability gap in Mason City, especially for low- to moderate-income households (those with an income at or below 80% of median income), which make up approximately 45% of all households in the city. Statistically, none of those households can afford a median-priced home in Mason City. Also, many first-time home buyers at or near the 100% median income level cannot afford a median-priced home.

Housing Development Capacity/Land Availability

Mason City has potential to replenish its aging housing stock with new residential construction. However, in order to afford a newly constructed home in Mason City, a household would have to be earning at least 165% of the median income for Cerro Gordo County, based on a

new home cost of at least \$200,000. A new home available at a price of \$150,000 would be affordable to households earning at least 125% of median income for the county. Mason City's present infrastructure has sufficient capacity to support extensive residential expansion, as well as economic growth in the community.

2. Are there documents that report losses related to the 2008 floods?

The 2009 Mason City Buyout Property List was examined to acquire data regarding losses related to the 2008 flooding. According to the property list, 158 properties have been identified as either purchased or in the process of being purchased by the city (see figure 1). As shown on the map, affected properties from the 2008 floods are distributed throughout the city and adjacent to the river and the creeks. Of these properties, 106 were located within the 100-year floodplain. Creating and enforcing stricter development guidelines will deter future development within the flood zones.

3. Does the City of Mason City have plans that include issues related to flooding and housing?

Information was gathered from the following planning documents:

- 2006 Mason City Comprehensive Plan
- Mason City Title 12 Zoning Ordinances
- 2006 City of Mason City Pre-Disaster Mitigation Plan
- Cerro Gordo County and Incorporated areas Flood Insurance Study

3.1. 2006 Mason City Comprehensive Plan

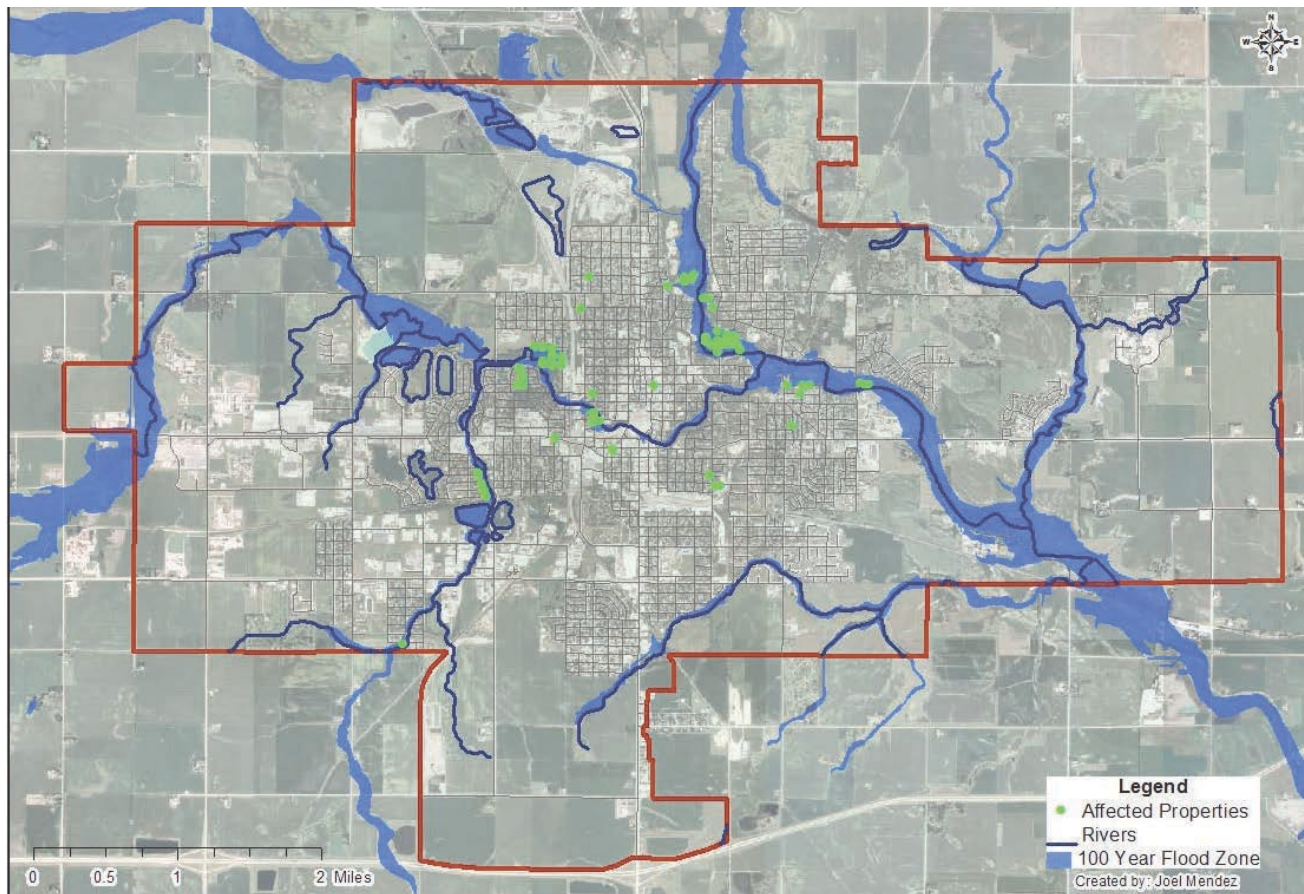
According to the comprehensive plan, most of Mason City's developed land—34.1% or 2,886 acres—falls into the residential uses category. Single-family residential development accounts for approximately 92% of residential land. Newly constructed housing accounts for 7.7% of residential land and is not concentrated in any one area of the city (p. 15).

Industrial land uses, not including transportation infrastructure, constitute 15% or 1,267 acres of developed land in Mason City. Primary industrial uses are warehousing, general industrial and industrial-agriculture purposes (p. 17).

Civic uses comprise 16.9% (1,434 acres) of total developed land. Included in this category are schools, religious

Table 1. Projected housing demand for Mason City by the end of year 2010	
Household projected population	28,433
Divided by projected average household size	2.22
Projected housing units needed by year 2010	12,808
Minus current number of existing housing units	13,191
Plus estimated number of existing units physically & functionally obsolete	743
Additional new units needed by 2010	360
Source: City of Mason City 2005 Housing Needs Assessment & Action Plan (p. 35)	

Figure 1. Properties in Mason City affected by the 2008 flood



Source: City of Mason City

institutions, public utilities, parks and recreation facilities, libraries and government offices. The Mercy Hospital Campuses, North Iowa Area Community College, public and private elementary, middle and high schools, and East Park are examples of civic uses included in this category (p. 17). Land use within Mason City is outlined in figure 2.

Figure 3 shows properties that were affected by the 2008 flood. Single-family residential properties were affected most significantly. Mixed-use and office-use properties were affected less severely. The fact that the majority of the properties affected were classified as single-family residential should influence the city to encourage other types of land uses in flood-prone areas.

A total of 249 properties are located in the 100-year floodplain and are classified under the following land uses: residential (single-family) 88 (35.3%), parks/open space 63 (25.3%), commercial 30 (12.0%), industrial 19 (7.6%), railroad 13 (5.2%), and public/civic/institutional properties 12 (4.8%).

Land use areas that contained properties affected by flooding are described below. Characteristics of each

land use were obtained from the 2006 Mason City Comprehensive Plan.

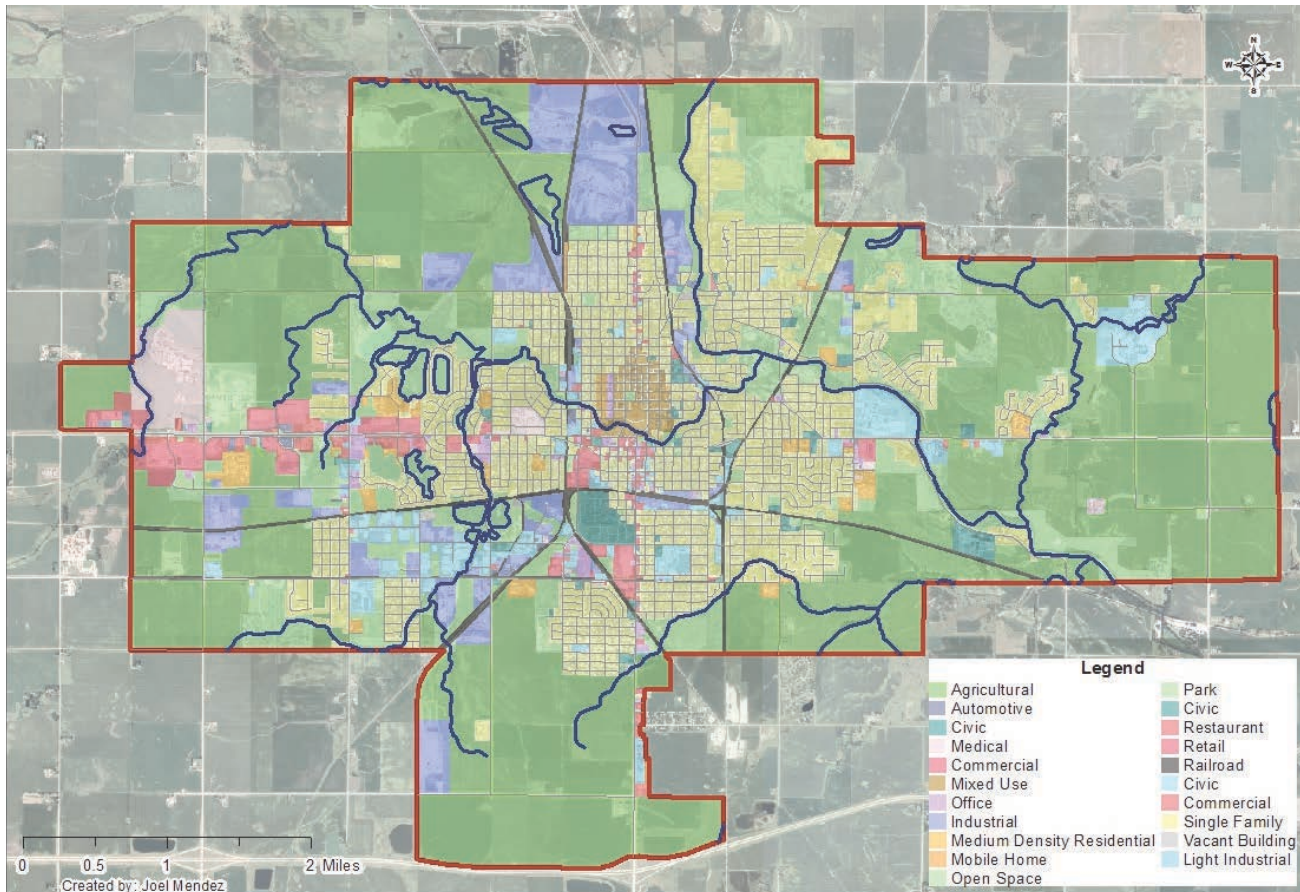
Mixed-use

- Establishes mixed-use pattern in the traditional city center.
- Recognizes current development patterns without permitting undesirable land uses.
- Allows the district to expand with development of appropriately designed adjacent projects.
- Requires new projects to respect pedestrian scale and design patterns and setbacks within the overall district.
- Values historic preservation (p. 37).

Office-use

- Should be located at intersections of major arterial or collector streets.
- Should avoid a “four corners” configuration, except when planned as a district.
- Should emphasize pedestrian scale and relationships among businesses.

Figure 2. Mason City land use map



Source: City of Mason City

- Should limit uses in terms of operational effects.
- Should maintain good landscaping and restrictive signage standards.
- Should provide good pedestrian/bicycle connections into surrounding areas.
- Should use project design to moderate the dominance of automobiles (p. 36).

Single-family

- Primarily located in residential growth centers.
- Insulated from adverse environmental effects including noise, odors, air pollution, and light pollution.
- Should provide a framework of streets and open spaces.
- Has typical densities ranging from one to six units per acre (p. 34).

Figure 4 is a map of Mason City's zoning. Zoning patterns are similar to the land uses depicted in figure 2. The majority of the land zoned residential is located in the

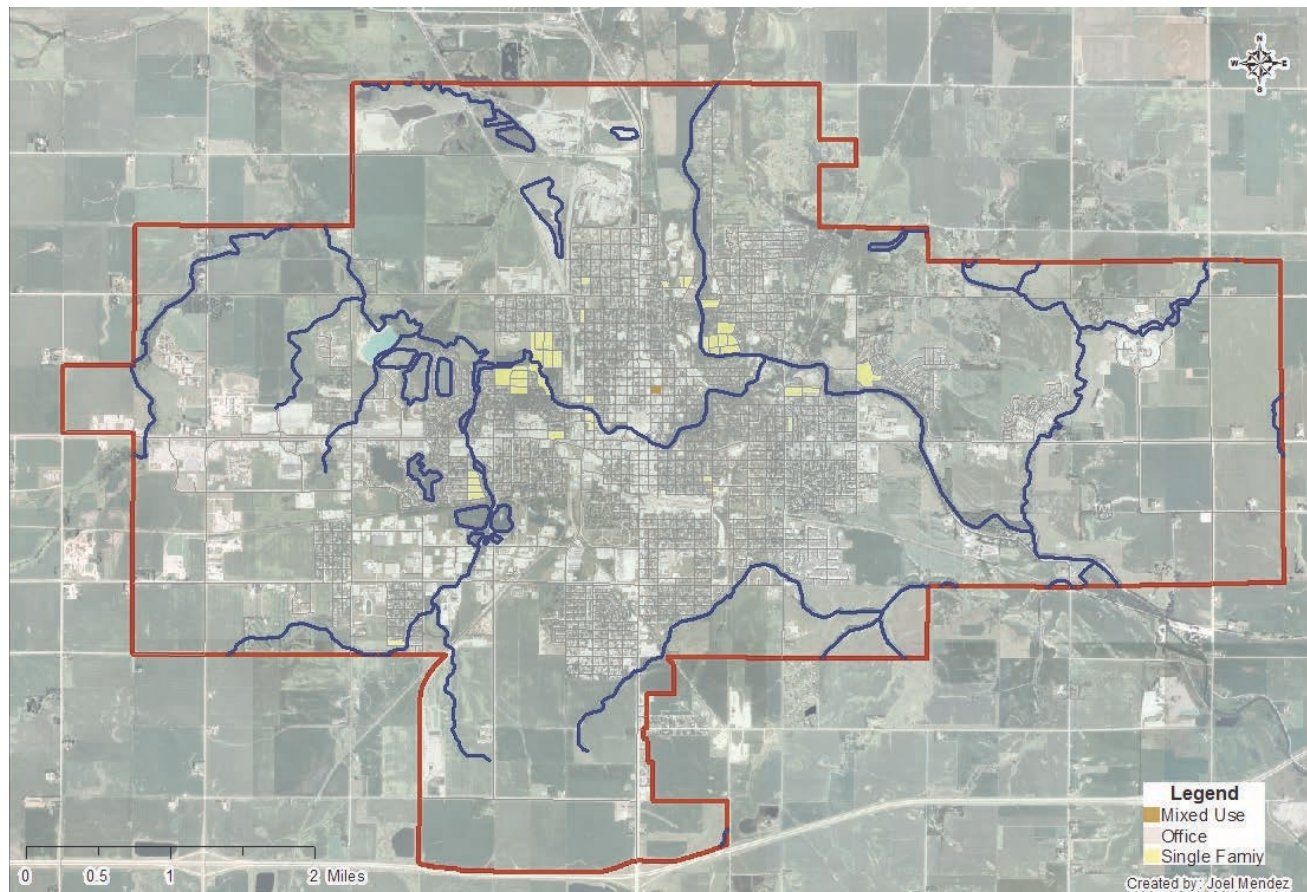
center of the city, while land in the outskirts is zoned for industrial and agricultural purposes.

Figure 5 shows the zoning designations that contained flood-impacted properties. Most of the land that was affected by the 2008 floods carries the sub-urban zoning designation. This correlates with figure 3, which shows that single-family residential was the land use most affected by the flood. Zoning designations affected to a lesser extent by the flood are general urban, multiuse, central business, and open industrial zoning designations. At the time of the 2008 floods, much of the 100-year floodplain was zoned for residential uses. Flood-prone areas around the rivers and creeks of Mason City should be zoned for recreational purposes mitigate potential housing losses due to flooding.

3.2. Mason City Title 12 Zoning Ordinance

The Mason City zoning ordinance divides the city was divided into four districts: floodway overlay district (FW), floodway fringe overlay district (FF), general floodplain overlay district (FP), and shallow flooding overlay district (SF).

Figure 3. Land use affected by the 20008 flood



Source: City of Mason City

Floodway Overlay District (FW)

Uses permitted in the FW district are residential uses such as lawns, gardens, parking areas or play areas that do not include placement of structures, factory-built homes, fill or other obstruction, storage of material or equipment, excavation or alteration of a watercourse. Structures, buildings and sanitary and utility systems, if permitted, must meet the applicable performance standards of the floodway fringe district and shall be constructed or aligned to present the minimum possible resistance to flood flows (p. 122).

Floodway Fringe Overlay District (FF)

All uses are permitted in the FF district to the extent that they are not prohibited by any other code (or underlying zoning district), and they are consistent with the need to minimize flood damage. Structures must be adequately anchored to prevent flotation, collapse or lateral movement of the structure, use construction methods and practices that will minimize flood, damage, and use construction materials and utility equipment that are resistant to flood damage. There are specific structure requirements in the ordinance for residential buildings, factory-built homes, subdivisions and accessory structures such as garages (p. 124).

General Floodplain Overlay District

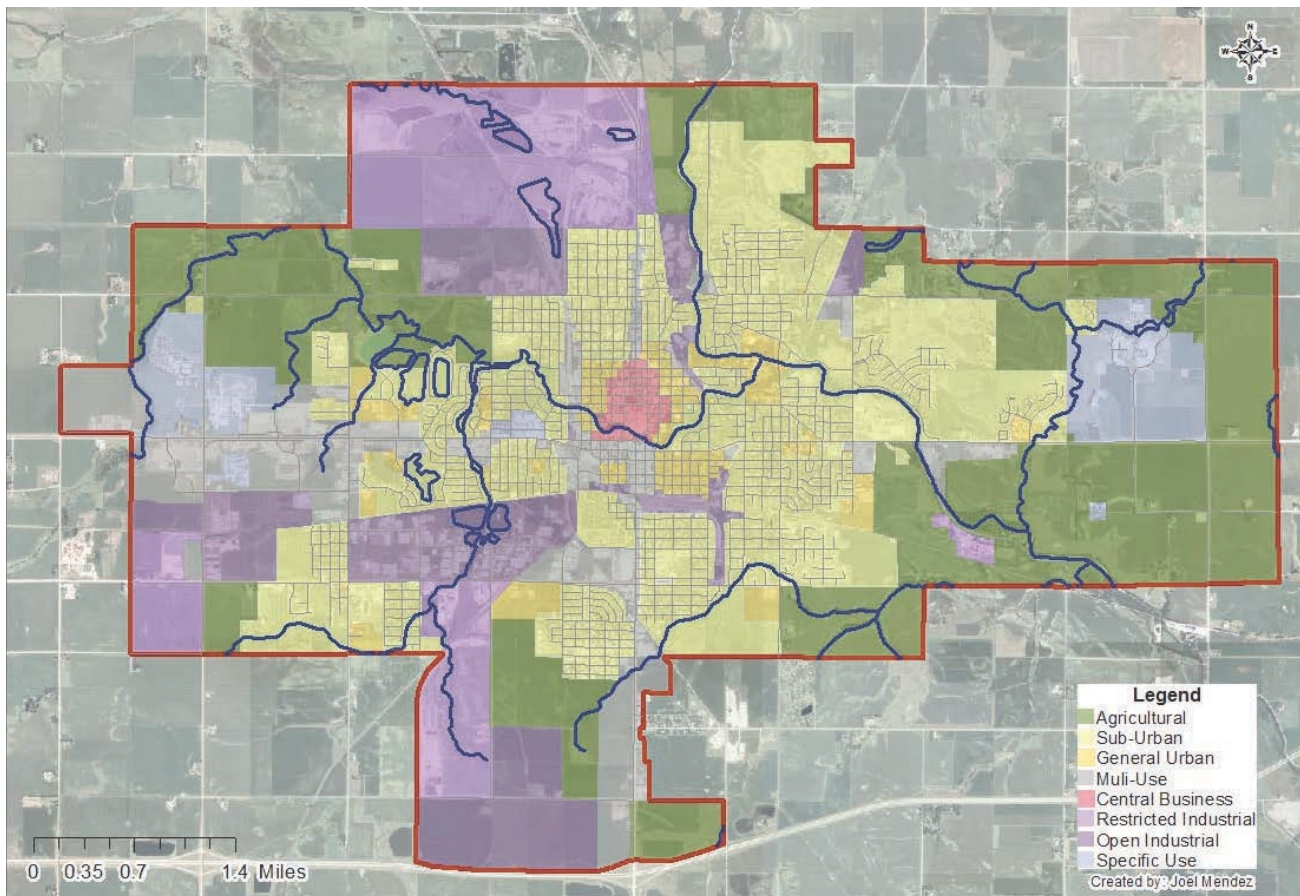
Uses permitted in the FW district are residential uses such as lawns, gardens, parking areas or play areas that are not prohibited by any other code (or underlying zoning district) and provided they do not include placement of structures, factory built homes, fill or other obstructions, the storage of materials or equipment, excavation or alteration of a watercourse.

A conditional permit from the planning and zoning board is required for uses that involve placement of structures, factory-built homes, fill or other obstructions, storage of materials or equipment, excavation or alteration of a watercourse. These uses shall be must be reviewed by the DNR to determine whether the land involved is either wholly or partly within the floodway or floodway fringe and the base flood level (p. 129).

Shallow Flooding Overlay District (SF)

All uses are permitted in the SF district to the extent that they are not prohibited by any other code (or underlying zoning district) and provided they meet the performance standards required for the floodway fringe district, with some exceptions (p. 130).

Figure 4. Mason City zoning map



Source: City of Mason City

3.3. 2006 City of Mason City Pre-Disaster Mitigation Plan

The 2006 Mason City disaster mitigation plan provides an overview of the flood situation in the city. The plan outlines where floodwaters come from and what is affected by the floodwater, ranks areas as the most vulnerable to flooding, estimates losses in the event of a flood, and describes policies in place related to flood mitigation. The sections are as follows:

Water Systems

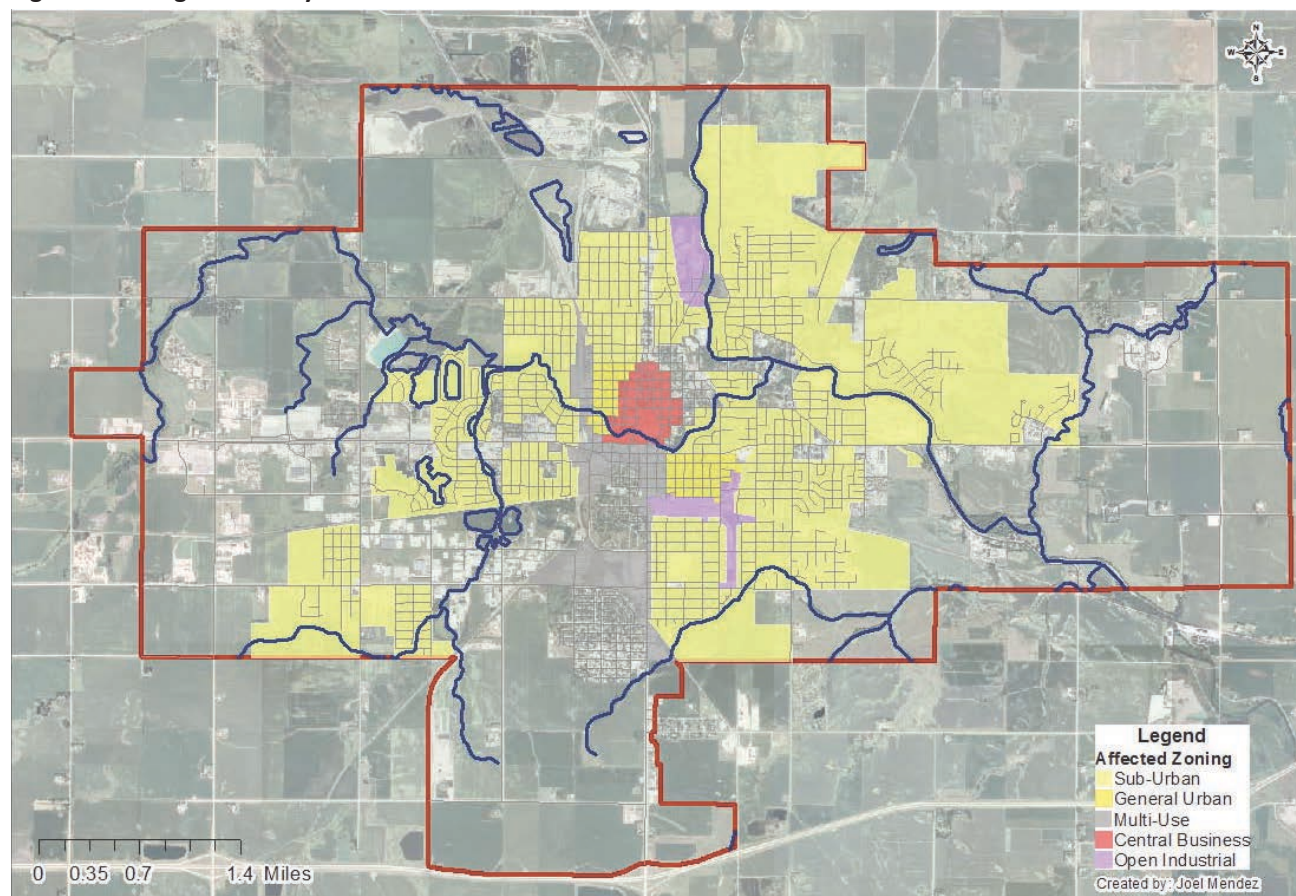
The Winnebago River is the main waterway located within the city limits of Mason City. The river generally flows south from the northwest corner to the southeast corner of the city. Mason Creek is also located on the south edge of the city and drains into the Winnebago River. Crane Creek drains into Willow Creek near the middle of the western edge of Mason City. Willow Creek then meets Chelsea Creek near the middle of the city before Willow Creek flows into the Winnebago River on the eastern side of the city. Ideal and Calmus Creeks also flow through the city and are located in the east and northeast portions of the city respectively. The properties along the city's

waterways are primarily residential, commercial, and agricultural and have been damaged severely during past flooding events. Although large floods have occurred in the past, studies indicate that even larger floods are possible in the future (p. 5).

Flood Hazard

The city of Mason City has a history of river flooding, sewer system infiltration problems, and damage to residential homes. According to the National Climatic Data Center, Cerro Gordo County has seen 48 floods in 12 years, an average of four flood events per year. Direct river-related flooding is not limited due to the structural development in the Special Flood Hazard Area (SFHA). The 100- and 500-year flood areas for the City of Mason City are indicated on FIRM maps developed by the FEMA. The city has not seen a 100-year flood even in recent history and certain neighborhoods could be devastated by such an event. Mason City has a large amount of structural development in the floodplain. Many of these structures are built within the 100-year floodplain and would be lost during such a flood. To make matters worse, many of the levees in Mason City have not been maintained properly

Figure 5. Zoning affected by the 2008 flood



Source: City of Mason City

and have trees rooted in them. The trees located in the levees must be grubbed and filled to protect the stability of the levees (p. 45).

The greatest risk of flood damage in the community is the residential, commercial, and industrial developments near the multiple creeks and rivers that flow through Mason City. Many of these structures would be damaged or destroyed if a historic flood were to occur. Returning the majority of the floodplain region located in the City of Mason City back to open space and or public parks would help mitigate the future flood hazard (p. 46).

A 500-year flood would affect properties throughout the entire city. The 528 structures in the floodplain that were identified in the Mason City 2005 biannual report are at highest risk for flood damages. Mason City is currently seeking buyout, elevation, and relocation options for structures located in the floodplain. Areas of the city with poor storm sewer drainage can flood residential structures that are located at higher elevations. Underpasses at the intersection of Highway 122 at Carolina and Monroe, South Monroe, South Federal and 12th Street can fill with water during a heavy rain and cause transportation hazards (p. 46).

To help prioritize future pre-disaster mitigation activities, the Mason City Planning Committee used a scale of 1 to 9 to score all hazards relevant to the area to determine what type of hazard is the biggest threat to Mason City. The committee applied six factors to each type of hazard: historical occurrence, probability, vulnerability, maximum threat, severity of impact and speed of onset. The scores for the six factors were totaled to determine a composite score for each hazard. The flooding hazard was ranked second among other potential hazards, with a score of 50 (p. 20).

Hazard Mitigation

The committee developed the following flood mitigation strategies:

1. Provide pre-manufactured sewer plugs for basement floor drains.
2. Conduct a sanitary inflow and infiltration study.
3. Implement remedies offered in the inflow and infiltration study.
4. Construct a ring levee to protect the water treatment plant.

5. Install emergency generators for the water reclamation plant and multiple storm sewer lift stations serving critical roadways.
6. Consider flood mitigation through buyout, elevation, or relocation for residents of Elm Drive, Birch, Oakland Drive, Maryland Avenue, North Carolina, North Hampshire and North Harrison Avenue. Other eligible structures include the Norris softball complex and the old sanitation building.
7. Stabilize the Winnebago River levee from 12th Street NE bridge to the Aquatic Center.
8. Stabilize the levee on Willow Creek from Pierce Avenue to 1st Street NW.
9. Stabilize and repair floodwalls on Willow Creek through the downtown.
10. Create a comprehensive storm-water management plan and policies for the city.
11. Consider water detention ponds at 9th Street SW, East Brooke, Meadow Brook and West Haven.
12. Install a lift station at the Mason City Municipal Airport.
13. Improve drainage in the East Brooke neighborhood area.
14. Upgrade the pump system at Sunset Lake to control the water level and maintain the levee.
15. Dredge Chelsea Creek, Willow Creek, Mason Creek and the Winnebago River.

16. Install larger culverts under critical roadways.
17. Continue compliance and implementation of the requirements for NFIP and to reduce the flood risks associated with the flood hazard area (p. 71).

Each task has a designated time line and a responsible party. Potential funding sources were also identified to facilitate the implementation of each task.

3.4 The 2010 Cerro Gordo County and Incorporated Areas Flood Insurance Study

According to the 2010 flood insurance study, the floodplains of the Winnebago River, Willow Creek and Chelsea Creek had undergone extensive development for residential, industrial, and recreational uses by the time of the previous study. Poor floodplain management practices have allowed continued construction in flood-prone areas along these streams. The results of poor floodplain management practices as well as the encroachment of development closer to the waterways are that many residential and industrial areas are vulnerable to more severe flooding (p .6). The revision of current zoning and land use practices would be beneficial for Mason City to deter development in areas close to the waterways.

4. Did any of these documents change after the 2008 floods?

At this time there has been no significant change to any of the documents written prior to the 2008 flood.

Table 2: Planning-related document information		
Document	Author	Website
Mason City Title 12 Zoning Ordinances	Short Elliott Hendrickson, Inc.	http://www.masoncity.net/UltimeEditorInclude/UserFiles/Common/Document/Zoning_Ordinance_Title_12_04-26-2011_102346.pdf
Cerro Gordo County and Incorporated Areas Flood Insurance Study	Federal Emergency Management Agency	http://www.masoncity.net/UltimeEditorInclude/UserFiles/Common/Document/Preliminary_Flood_Insurance_Study_07-19-2010_111652.pdf
2006 Mason City Comprehensive Plan	RDG Planning and Design, Inc.	http://www.masoncity.net/UltimeEditorInclude/UserFiles/Common/Document/2006_Comprehensive_Plan_-_Chapter_1_10-20-2009_043728.pdf
2006 City of Mason City Pre-Disaster Mitigation Plan	North Iowa Area Council of Governments	n/a
Historical and Architectural Reconnaissance Survey for 2008 Flood Projects in Mason City, Cerro Gordo County	Department of Public Defense; Iowa Homeland Security Division and Emergency Management Division	http://www.masoncity.net/UltimeEditorInclude/UserFiles/Common/Document/Historical_Properties_Survey_for_2008_flood_properties_03-30-2010_032007.pdf

Table 3. Planning-related documents summary

Document	Author	Brief summary	Important issues
Mason City Title 12 Zoning Ordinances	Short Elliott Hendrickson Inc.	Flood zoning districts were established and restrictions for development within these areas were defined.	The floodplain areas are divided into the following districts: floodway overlay, floodway fringe overlay, general floodplain overlay, and shallow flooding overlay
Cerro Gordo County and Incorporated Areas Flood Insurance Study	Federal Emergency Management Agency	This document identified the major sources of flooding for Mason City and identified several at-risk areas within the city.	The Winnebago River, Willow Creek and Chelsea Creek floodplains have been extensively developed for residential, industrial, and recreational uses
2006 Mason City Comprehensive Plan	RDG Planning and Design Inc.	The current land use plan was introduced.	Family residential is the land use which was most affected by the 2008 flood.
2006 City of Mason City Pre-Disaster Mitigation Plan	North Iowa Area Council of Governments	This document addresses the vulnerability of flooding in Mason City. It also proposes flood mitigation steps to be completed in the future.	The largest hazard to housing in Mason City is to those houses located in the floodplain of the Winnebago River and its tributaries.

Table 4. GIS-related data

Shapefile	Source	Website
Mason City Limits	Jessy Willadsen, Mason City GIS Analyst	n/a
Mason City Land Use	Jessy Willadsen, Mason City GIS Analyst	n/a
Mason City Zoning	Jessy Willadsen, Mason City GIS Analyst	n/a
100-Year Flood Zone	Jessy Willadsen, Mason City GIS Analyst	n/a
Rivers	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
Roads	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
Aerial Photograph	Iowa Geographic Map Server	http://ortho.gis.iastate.edu/client2.cgi?zoom=10&x0=483671&y0=4777678&layer=doqqs&action=layernaip_2010_nc&pwidth=600&pheight=600

References

- North Iowa Area Council of Governments. 2005. City of Mason City Housing Needs Assessment & Action Plan.
- RDG Planning and Design. 2006. Mason City Comprehensive Plan.
- North Iowa Area Council of Governments. 2006. City of Mason City Pre-Disaster Mitigation Plan.
- Department of Public Defense, Iowa Homeland and Emergency Management Division. 2009. *Historical and Architectural Reconnaissance Survey for 2008 Flood Projects in Mason City, Cerro Gordo County*.
- Federal Emergency Management Agency. 2010. *Cerro Gordo County and Incorporated Areas Flood Insurance Study*.
- Short Elliott Hendrickson Inc. 2010. Mason City Title 12 Zoning Ordinances.

Appendix 7. Summary of Documentary Materials for Waterloo

Introduction

Recovering from a flooding event is often a time-consuming process. Waterloo, like many communities affected by the 2008 floods, is still in the recovery stage. To help guide the research on housing and flooding within the City of Waterloo four questions were developed:

1. Does the City of Waterloo have a housing needs assessment document?
2. Are there documents that report the losses from the 2008 floods?
3. Does Waterloo have plans that include issues related to flooding and housing?
4. Did any of these documents change after the 2008 floods?

Executive Summary

The City of Waterloo's website provided a number of useful documents pertaining to housing and flooding in Waterloo. In addition to planning within the City of Waterloo, a partnership is established with Cedar Falls, which borders Waterloo to the west. The Waterloo-Cedar Falls HOME Consortium was formed to enable the cities to actively plan together at a regional level. A report is updated every five years that identifies plans and distribution of funding throughout these communities.

Within the city's documents and reports, much consideration is given for the process in achieving identified goals. Goals and strategies are often followed with an outline of how each goal and strategy will be met. Identification of bench marks and progress updates are often included. For example, the Analysis of Impediments to Fair Housing Choice document from 2009 begins with an update from the previous report identifying the progress made since the previous analysis.

Like many communities in Iowa, Waterloo is decreasing in population. However, the number of homes in the city is increasing. This unhealthy development pattern will not only increase vacancy rates, but also create pockets of new development on the outskirts of the city while older neighborhoods within the city deteriorate. Revitalization of older neighborhoods would be a more sustainable form of development for a city with a declining population.

To better plan for future flooding within Waterloo, further analysis of the 2008 floods could be beneficial. A specific

list of affected properties would help identify the exact number of people affected. Mapping the boundaries of each flood district (floodway, floodway fringe, general floodplain and shallow flooding overlay districts) would be valuable to help plan and protect from future flooding events.

1. Does the City of Waterloo have a housing needs assessment document?

Four housing-related documents were examined:

- a) Consolidated Plan (2010–2014): Waterloo-Cedar Falls Home Consortium (CP)
- b) 2010 Annual Plan (AP)
- c) FY 2011 Consolidated Plan One-Year Action Plan
- d) 2009 Analysis of Impediments to Fair Housing Choice (AIFH)

According to Community Development Director Rudy Jones, the housing needs assessment is included in the Five-Year Consolidated Plan, a document produced as a requirement for a housing consortium between Waterloo and Cedar Falls. This plan is updated on a five-year basis or as needed according to federal guidelines.

1.1. Consolidated Plan (FY 2010–2014): Waterloo-Cedar Falls Home Consortium (CP)

The cities of Waterloo and Cedar Falls have established a consortium under the federal HOME Investment Partnerships Program to qualify for funding. As a HOME consortium, Waterloo and Cedar Falls have made a commitment to taking a more regional, collaborative approach to meeting their affordable housing needs. The representative of the consortium and lead entity is the City of Waterloo. As such, Waterloo assumes overall responsibility for compliance with the HOME program requirements (CP, pp. 1–2).

Waterloo and Cedar Falls receive funds each year from the federal government for housing and community development activities. These funds are intended to meet priority needs that have been locally identified by the cities. To receive these federal funds, the two cities must submit a strategic plan—the Consolidated Plan—every five years to the US Department of Housing and Urban Development (HUD) that identifies local needs and how these needs will be addressed (CP, pp. 1–2).

The following excerpt from this document provides a description of the housing situation in Waterloo:

The Waterloo-Cedar Falls area is also a regional employment center, offering a range of economic and employment opportunities. However, as an older working-class city, Waterloo contains some neighborhoods that face deteriorating infrastructure and facilities, aging housing stock, and economic establishments that may have become obsolete or marginally viable. As the regional economy continues to grow and housing costs continue to rise relative to incomes, a segment of the population faces increasingly challenging issues such as inadequate and unaffordable housing, poverty, deteriorating neighborhood conditions and quality of living, and limited access to services and facilities (CP, p. 2).

Cost Burden and Other Housing Problems

Table 1 summarizes information on renters and homeowners with housing problems in Waterloo. This information is provided by the Comprehensive Housing Affordability Strategy (CHAS) study from HUD. As defined by CHAS Data 2000, any housing problem includes a cost burden greater than 30% of income, and/or overcrowding, and/or lack of complete kitchen or plumbing facilities. The table also identifies cost-burdened households. Cost-burdened households are distinguished as paying 30% to 50% of their income on housing. Households paying greater than 50% are classified as severely cost burdened.

As shown in table 1, CHAS Data 2000 reports 27,177 households in Waterloo of which 8,863 (32.6%) are renter-occupied and 18,314 (67.4%) are owner-occupied.

Notably:

- 6,251 households (23%) have housing problems.
- 5,428 households (86.8%) with housing problems are low income, with annual incomes at or below 80% of the median family income (MFI). Lower-income households are most likely to have housing needs due to limited resources.
- 3,679 renter households (41.5%) have a housing problem. Renters comprise 58.9% of the 6,251 households with a housing problem.
- Of the 8,863 renter households, 6,104 (68.9%) have incomes classified as low, very low or extremely low. Of the 3,679 renter households with a housing problem, 3,458 (93.4%) have incomes at or below 80% of MFI.
- 2,718 owner households (14.8%) have a housing problem. Owners comprise 41.1% of the 6,251 households with a housing problem.

- Of the 18,314 owner households, 6,274 (34.3%) have incomes classified as low, very low or extremely low. Of the 2,718 owner households with a housing problem, 2,116 (77.9%) are low income.

Table 1 also provides information regarding cost burden by income category. According to 2000 CHAS data, 5,827 households (21.4%) pay 30% or more of their income for housing. Of the cost-burdened households, 2,852 (48.9%) pay more than 50% of their income for housing and are classified as severely cost burdened.

- 3,368 (38%) of the 8,863 renter households are cost burdened. Renters make up 57.8% of the 5,827 cost-burdened homes.
- 2,459 (13.4%) of the 18,314 owner households are cost burdened. Owners make up 42.2% of the 5,827 cost-burdened homes.
- In total, Waterloo has 3,362 extremely low-income households; 2,584 (76.9 %) are cost burdened; 2,058 (79.6%) of the 2,584 pay 50% or more of their income for housing costs.
- In total, the city has 3,183 very low-income households; 1,533 (48.2%) are cost burdened; 492 (32.1%) of the 1,533 pay 50% or more of their income for housing costs.
- In total, Waterloo has 5,833 low-income households; 716 (12.3%) are cost burdened; 100 (14%) of the 716 pay 50% or more of their income for housing costs.
- Finally, the city has 14,799 households with income above 80% of MFI; 851 (5.8%) are cost burdened. 148 (17.4%) pay 50% or more of their income for housing costs (CP, pp. 29–31).

Characteristics of the Housing Market

Waterloo and Cedar Falls, like many communities along the banks of Iowa's rivers, are still in the process of recovery from significant flood damage incurred in June 2008. A flooding event swelled waterways across the state, resulting in more than \$7 billion in loss. Locally, 580 homes and 150 businesses in Waterloo were impacted, along with 520 homes in Cedar Falls. The consortium's primary focus for CDBG and HOME funds since 2008 has been aiding displaced residents and rebuilding what was damaged. This has included emergency rehabilitation, rental assistance and some new construction.

Despite a population decline since 2000 that shows little indication of reversing, the supply of housing stock in Waterloo has continued to increase. In 1990, there were 29,074 housing units in Waterloo. The housing inventory expanded to 29,533 units in 2000 and is estimated at 30,574 in 2008 and 31,280 in 2013. Over the 18-year

Table 1. Waterloo households with housing problems by household income, 2000

Income Category of Household	Total		Any Housing Problem		Cost Burden				Other Housing Problems	
			Total	%	30%–50%		More than 50% (severe)		Total	%
		% of Total			Total	%	Total	%		
Renter Households										
Extremely Low (0–30% MFI)	2,261	26%	1,893	83%	342	15%	1,528	67%	23	1%
Very Low (31–50% MFI)	1,750	20%	1,068	61%	683	39%	263	15%	123	7%
Low (51–80% MFI)	2,073	23%	496	24%	290	14%	41	2%	166	8%
Above 80% MFI	2,759	31%	221	8%	193	7%	28	1%	0	0%
Total Renters:	8,863	100%	3,679	42%	1,508	17%	1,860	21%	311	4%
Owner Households										
Extremely Low (0–30% MFI)	1,081	6%	724	67%	184	17%	530	49%	11	1%
Very Low (31–50% MFI)	1,433	8%	602	42%	358	25%	229	16%	14	1%
Low (51–80% MFI)	3,760	21%	790	21%	564	15%	113	3%	113	3%
Above 80% MFI	12,040	66%	602	5%	361	3%	120	1%	120	1%
Total Owners:	18,314	100%	2,718	15%	1,467	8%	992	5%	258	1%
All Households										
Total All Households:	27,177	100%	6,251	23%	2,989	11%	2,718	10%	544	2%

Source: Consolidated Plan (FY 2010-2014) Waterloo, IA

period between 1990 and 2008, Waterloo's housing units are estimated to have increased by 1,500, or 5.2%. The city's population during that same period fell by 1,140 persons, or 1.7%. Notably, the number of vacancies is projected to rise steadily from 6.9% in 1990 (1,993 units) to 12.6% in 2013 (3,954 units) (CP, p. 44).

1.2. 2010 Annual Plan (AP)

Waterloo has prepared a required year-one action plan for fiscal year 2010 to identify activities to be funded through the Waterloo-Cedar Falls HOME Consortium's Community Development Block Grant (CDBG) and HOME program funds available during the program year.

Housing Priorities

The City of Waterloo will use its CDBG and HOME funds to enhance the availability and affordability of housing for extremely low-, very low-, and low-income households. This will be accomplished by creating new housing, improving the existing housing stock through redevelopment, and providing housing counseling and assistance. The following are the priorities and specific objectives for Waterloo:

- a) *Expand home ownership opportunities*
Expand home ownership opportunities for very low- and low-income individuals and households through the Iowa Heartland Habitat for Humanity. *Objective:* Provide funds for the purchase of lots and public infrastructure improvements. Funds will be used to build three houses in the first year.
- b) *Develop affordable housing*
Utilize local Community Housing Development Organization (CHDO) (Iowa Heartland Habitat for Humanity) to provide financial and technical assistance in developing housing for extremely low-, very low-, and low-income home buyers. *Objective:* Provide access to utilities and lots to develop affordable owner-occupied housing.
- c) *Develop affordable housing*
Contribute to a tax credit project funded by the State of Iowa to provide affordable housing to very low-income households. *Objective:* Increase supply and quality of affordable rental housing through the development of 50 units in the first year.

d) *Expand home ownership opportunities*

Expand home ownership opportunities for very low- and low-income individuals and households through the first-time home-buyer program. *Objective:* Increase the levels of home ownership through down payment assistance in the Consolidated Urban Revitalization Area (CURA).

e) *Improve access to affordable housing*

Provide funds for the tenant-based rental assistance program. *Objective:* Assist 26 households with rental deposits in year one through the program and 70% of the first month's rent for Family and Self-Sufficiency Program participants (AP, p. 2).

CDBG and HOME Budgeted Expenses

Waterloo receives CDBG and HOME funds from HUD. These funding sources will be available over the next five years to help support new affordable housing projects, home-buyer assistance programs, housing rehabilitation programs, and homeless outreach and prevention activities. Waterloo and Cedar Falls also anticipate receiving additional funding through the American Recovery and Reinvestment Act of 2009 (ARRA) that can be used for similar housing activities. The following table reviews the FY 2010 budgets for HUD programs in Waterloo.

Waterloo Housing Authority

Assisted rental housing includes public housing units owned and managed by the Waterloo Housing Authority (WHA). Assisted rental housing also describes the Section 8 Public Housing Choice Voucher program. The role of WHA is to provide affordable, decent housing. WHA serves as an administrator for HUD and has four broad areas of responsibility:

- Certify and recertify tenants
- Approve units/leases
- Pay housing assistance to the owner
- Monitor program performance compliance with federal rules (AP, p. 15).

WHA provides a 50-unit senior public housing facility known as Ridgeway Towers, a subsidized apartment complex. This is WHA's sole public housing development. Waterloo administers 1,056 Section 8 vouchers. In 2000, there were 1,100 applicants on the waiting list, which translates to a 1.5-year wait for new applicants. In addition, there were 1,128 families on the waiting list, which is currently open. Of the 1,128 families, 900 (79.8%) are classified as extremely low income (AP, p. 15).

Waterloo remains committed to removing barriers to affordable housing, though some of the policies and factors that negatively impact affordable housing in the

Table 2. FY 2010 CDBG and HOME budgets

	Program activity	Budgeted expense
CDBG	Zone 9 Sidewalk Repair	\$30,000
	Clearance and Demolition	\$10,000
	Consumer Credit Counseling Services	\$4,000
	Emergency Repairs	\$150,000
	Administration (20%)	\$278,016
	Neighborhood Services	\$85,000
	Operation Accessibility	\$10,000
	Food Bank Capital Campaign	\$50,000
	Operation Threshold Foreclosure Prevention	\$10,000
	Operation Threshold Weatherization Plus	\$15,000
	Rehabilitation Administration	\$139,983
	Single-family Rehabilitation	\$556,081
	Housing Partnership Coordinator, Home-buyer Education	\$50,000
	Human Rights Department	\$2,000
	Total Waterloo CDBG:	\$1,390,080
HOME	Cedar Falls HOME Consortium Allocation	\$75,000
	Tax Credit Projects	\$182,721
	Iowa Heartland Habitat for Humanity (CHDO)	\$91,203
	Operation Threshold TBRA	\$23,000
	Single-family Rehabilitation	\$141,763
	Waterloo Housing Partnership	\$100,000
	HOME Administration	\$68,187
	Total Waterloo HOME:	\$681,874

Source: City of Waterloo, IA

city are not entirely under the control of local government. Waterloo is an active partner with area agencies involved in the development of fair housing. In addition to the city's willingness to work with local developers and nonprofits, Waterloo relies on several initiatives to address existing barriers to affordable housing through CDBG and HOME funding. These include grants for down payment assistance for first-time home buyers in CURA and tax abatement incentives designed to provide affordable housing for very low-income persons (AP, p. 16).

1.3. FY 2011 Consolidated Plan One-Year Action Plan

The Waterloo-Cedar Falls HOME Consortium's priority for the 2011 fiscal year is to expand home ownership opportunities for income-eligible households through new construction and down payment assistance as well as housing rehabilitation. Waterloo hopes to rehabilitate 30 housing units and make at least 30 additional housing units lead-safe. The city will also provide assistance to about 35 households through the Emergency Capital Repair Program (ECRP), which provides up to \$4,000 assistance for maintenance and repairs. Also, approximately 35 new home buyers will be given down payment assistance to purchase their first home (p. 18).

1.4. 2009 Analysis of Impediments to Fair Housing (AIFH)

Progress from Previous Analysis of Impediments

The Waterloo-Cedar Falls HOME Consortium completed its previous analysis of impediments in 2003. The following recommendations were made:

- Develop ways to make housing credit more freely available to all citizens of both communities.
- Both Waterloo and Cedar Falls should maintain and strengthen local fair housing enforcement.
- Area realtors and landlords should continue to receive training on the requirements of federal, state, and local fair housing statutes and encouragement in taking approaches to their businesses that make housing available in an equitable fashion.
- The citizens of Waterloo and their leaders should continue to work together to enhance the physical condition and the quality of life in neighborhoods with large minority populations and they should also work to reverse the negative stereotypes and stigma associated with living on the East Side.
- The cities of Waterloo and Cedar Falls should continue and expand their efforts to make more affordable housing available to their residents (AIFH, p. 98).

In Waterloo, the community development board implements an affirmative marketing policy for the housing rehabilitation programs. The elements of this policy include the following:

- Informing the public, potential renters, and potential owners about federal fair housing laws and affirmative marketing policies.

- Informing potential renters of vacancies in properties improved with rental rehabilitation or other federal funds.
- Keeping records of advertisements and other efforts to inform the public.
- Undertaking special outreach through community centers and media serving the minority community.
- Taking corrective actions if goals are not met (AIFH, p. 99).

The board also cooperates with the Waterloo Commission on Human Rights and the Iowa Civil Rights Commission to enforce fair housing laws.

The board has utilized programs delivered by the Iowa Heartland Habitat for Humanity, a community housing development organization (CHDO), in its efforts to make housing more affordable. Operation Threshold, a community action agency, works in collaboration with local banks to improve access to credit for home buyers. The agency provides home ownership training that is widely marketed in the minority community and follow-up assistance to graduates of a training class in securing conventional loans to purchase the home of their choice. Additionally, WHA offers down payment assistance grants, awarding grants to 19 households to purchase their first home. The partnership with the Eastside Ministerial Alliance encourages non-traditional first-time home buyers and Section 8 voucher holders who may be apprehensive about approaching lenders (AIFH, p. 100).

In summary, Waterloo, like many cities, has housing problems. The city's population is declining and is expected continue to do so in the future. However, homes are continuing to be built. While the population was decreasing between 1990 and 2008 by 1.7%, available housing units increased by 5.2%. This unhealthy development pattern is likely to increase vacancy rates within the city.

2. Are there documents that report losses related to the 2008 floods?

According to the Five-Year Consolidated Housing Plan, 580 homes and 150 businesses in Waterloo were impacted by floods of 2008. However, City Planner Aric Schroeder was unsure if a formal report was produced. Figure 1 on the following page shows the areas that the City of Waterloo believes to have been affected by the flooding. This map was not based on any technical or field gathered data; it highlights flood problem areas in green.

A list of properties the City of Waterloo acquired or is in the process of acquiring through the Hazard Mitigation

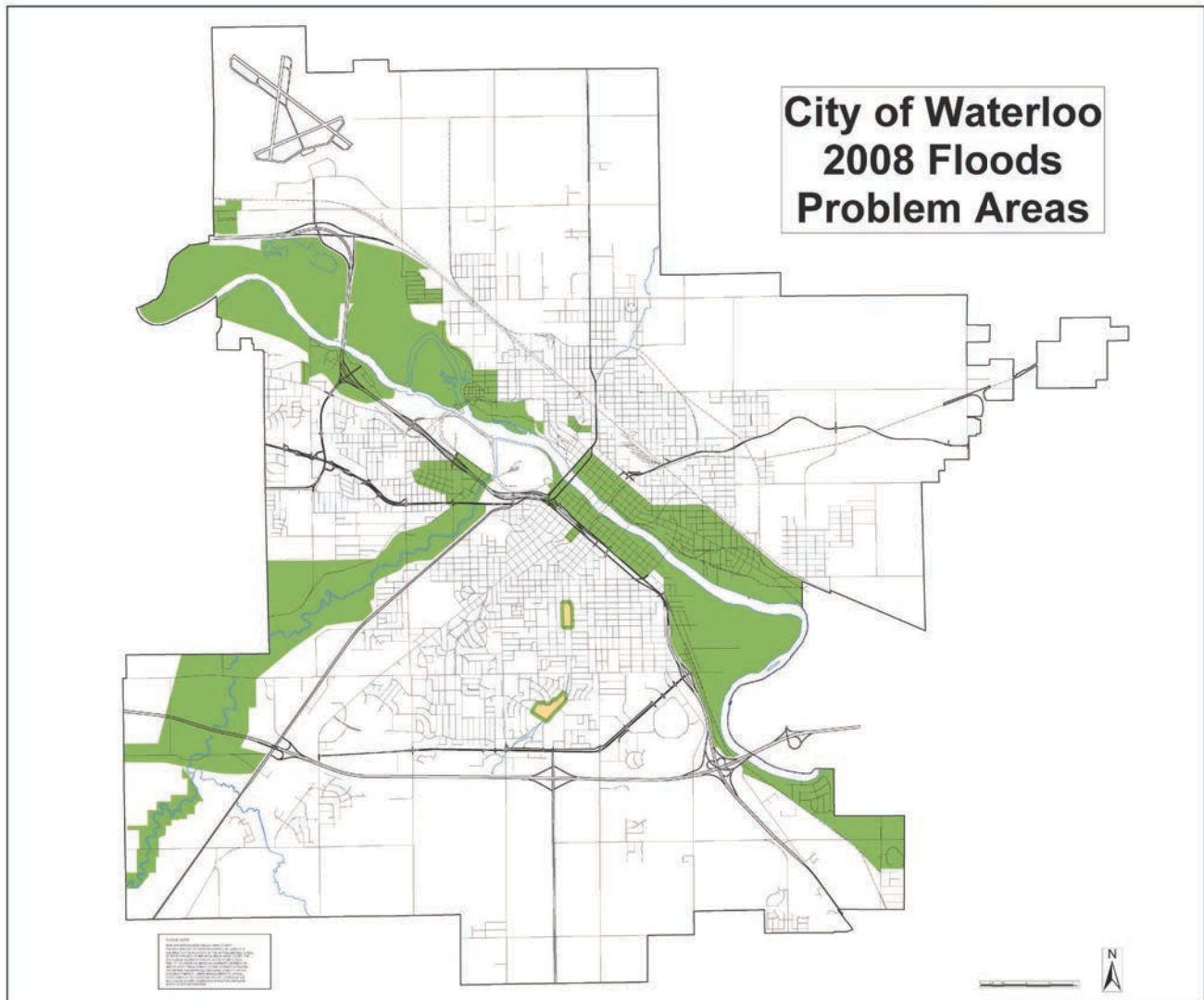
Buyout Grant program has been established. This program purchases residential properties in the floodplain to prevent residential redevelopment in flood-prone areas. Schroeder, who provided the list and map, said these sites are primarily vacant lots with no development and damaged residences. The details of this list provide the name of the deed holder, the address, and the status of the process: acquired, offer accepted, on appeal, offer submitted, and no offer given yet. Accompanying the list are GIS maps identifying flood problem areas as well as properties acquired after the 2008 floods.

3. Does the City of Waterloo have plans that include issues related to flooding and housing?

Five planning-related documents were examined:

- a) City of Waterloo Comprehensive Plan (WCP)
- b) City of Waterloo Zoning Ordinance (Updated February, 2007) (WZO)
- c) Waterloo Hazard Mitigation Plan Update 2009 (WHMP)
- d) 2010 Annual Plan: City of Waterloo (AP)
- e) Consolidated Plan: 2010 to 2014 (CP)

Figure 1. City of Waterloo flood problem areas (identified in green)



Source: City of Waterloo, Iowa

Figure 2: Waterloo buyout process



Source: City of Waterloo, Iowa

3.1. City of Waterloo Comprehensive Plan (WCP)

A small section within the comprehensive plan for Waterloo dealing with flooding was found and is outlined below.

Flood Control

The City of Waterloo manages the potential for flooding using two primary tools. First, it maintains an elaborate levee system along the Cedar River and Black Hawk Creek, both of which subdivide the community. The city received assistance for constructing the levee system from the US Army Corps of Engineers. This levee system protects much of the city from flood events. Second, the city enforces a floodplain overlay district ordinance within flood-prone areas. The ordinance places restrictions on development in the floodplain, which includes both the floodway and flood fringe areas, in an attempt to minimize personal injury and structural damage within the community.

In the future, the city will have to regularly inspect and maintain the levee system in order to continue to protect its residents from flooding. The city should also continue to enforce its floodplain ordinance in the community. Waterloo may want to consider purchasing and removing

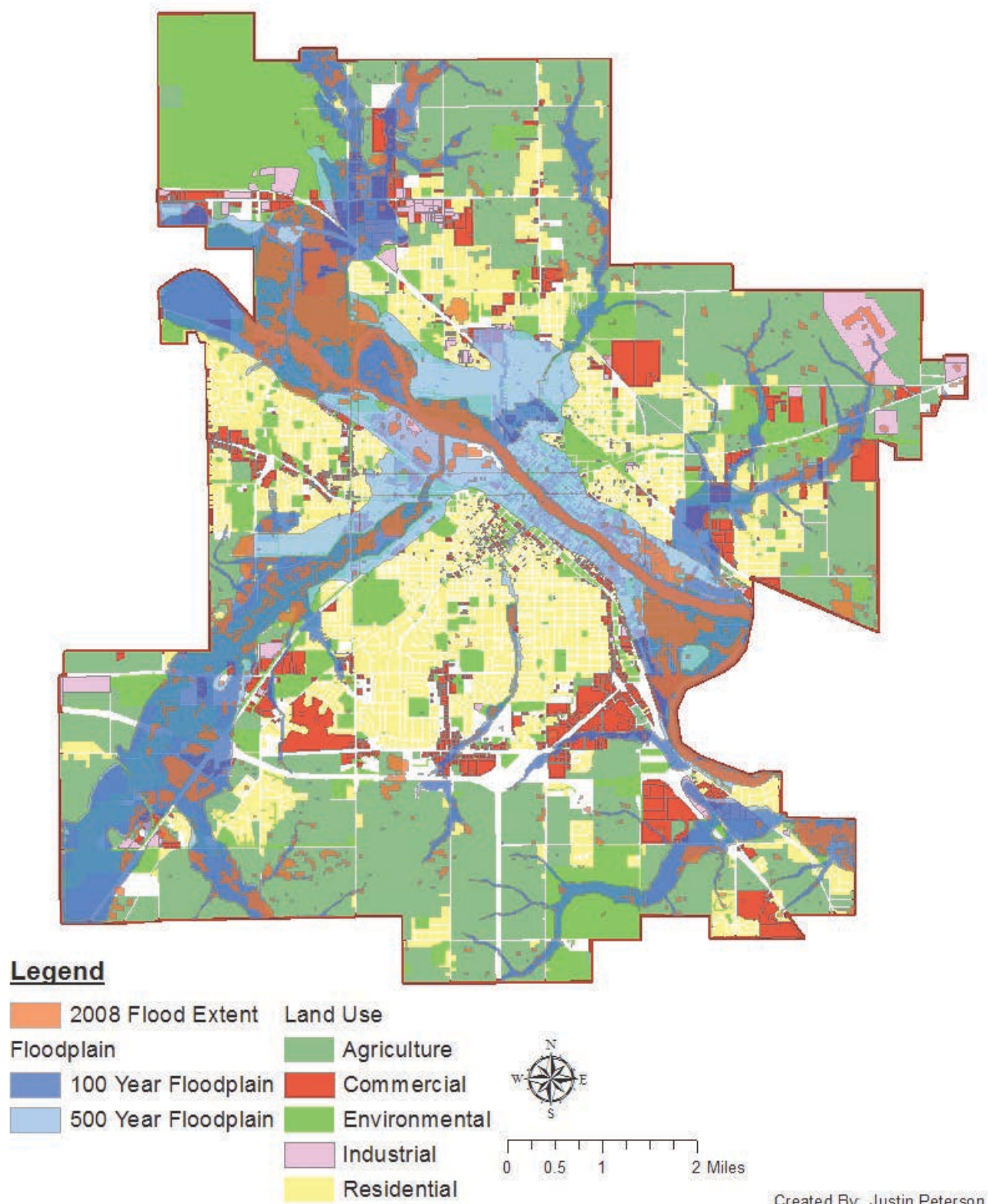
structures from the floodplain in an effort to minimize property damage while protecting the health and safety of its residents.

Another critical component of the comprehensive plan is the featured land use. Waterloo's land use, along with the 2008 flood extent and 100- and 500-year floodplains, are included on the map (figure 3). Figure 4 shows a close up of the flood-affected areas.

3.2. City of Waterloo Zoning Ordinance (Updated February 2007)

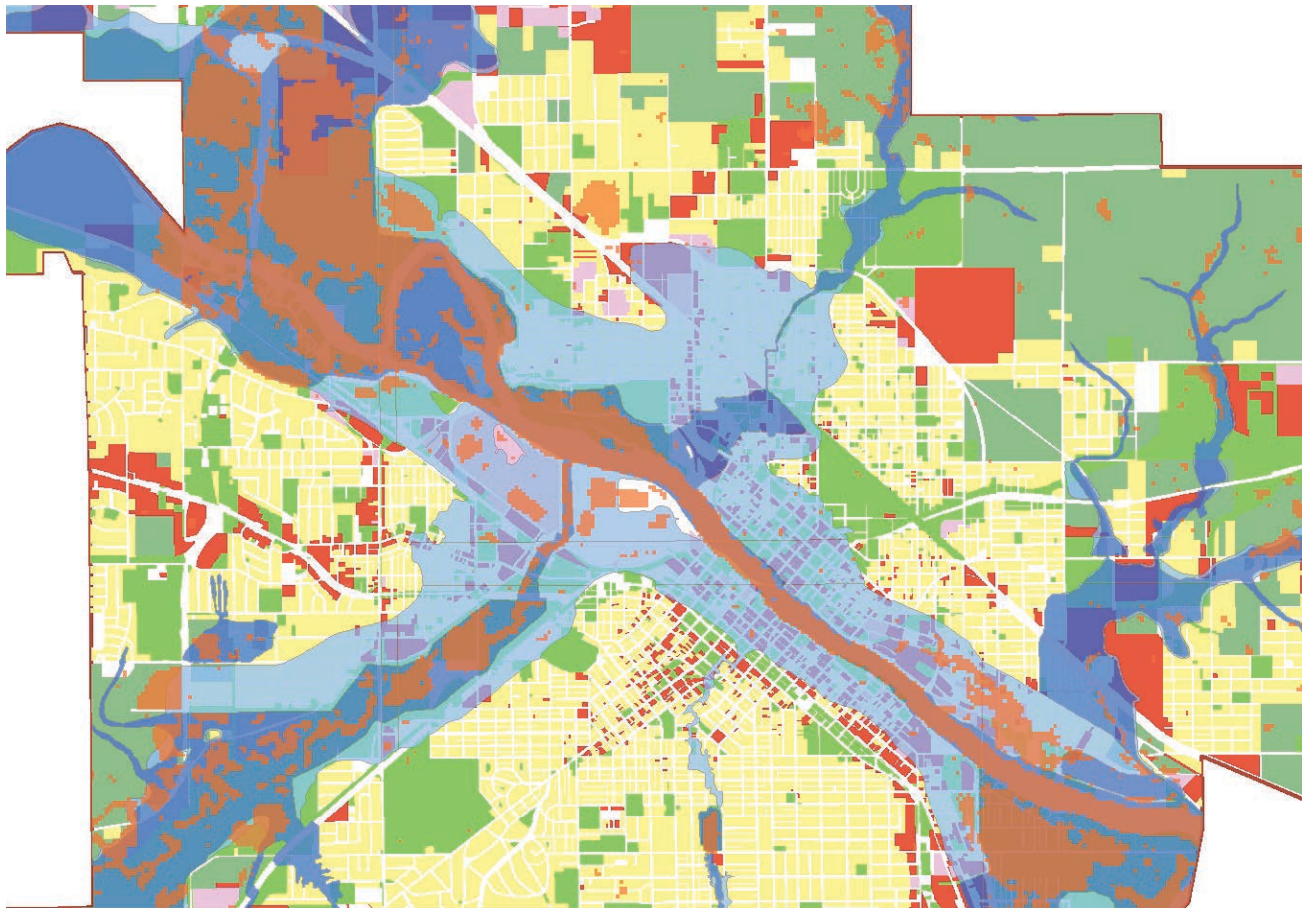
This document was examined to acquire data regarding flooding and housing before and after the 2008 floods. According to Part 18, "Floodway and Floodplain Districts," the general purpose of these floodplain overlay districts is "to promote the public health, safety and general welfare and to minimize public and private damages due to flooding in specific areas of the community."

Figure 3. Waterloo land use



Source: City of Waterloo, Iowa

Figure 4. Detail of areas in Waterloo affected by the flood



Source: City of Waterloo, Iowa

Additional objectives of this ordinance also include:

- To protect human life and health.
- To minimize expenditure of public money for costly flood control projects.
- To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public.
- To minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; streets and bridges located in areas of special flood hazard.
- To require uses vulnerable to floods to be protected against flood damage at the time of initial construction.
- To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize flood blight areas.
- To ensure potential buyers are notified that property may be in an area of special flood hazard

and that those who occupy said area assume responsibility for their actions.

- To reserve sufficient floodplain area for the conveyance of flood flows so that flood heights and velocities will not be increased substantially.
- To assure that eligibility is maintained for property owners in the community to purchase flood insurance through the National Flood Insurance Program (WZO, p. 20).

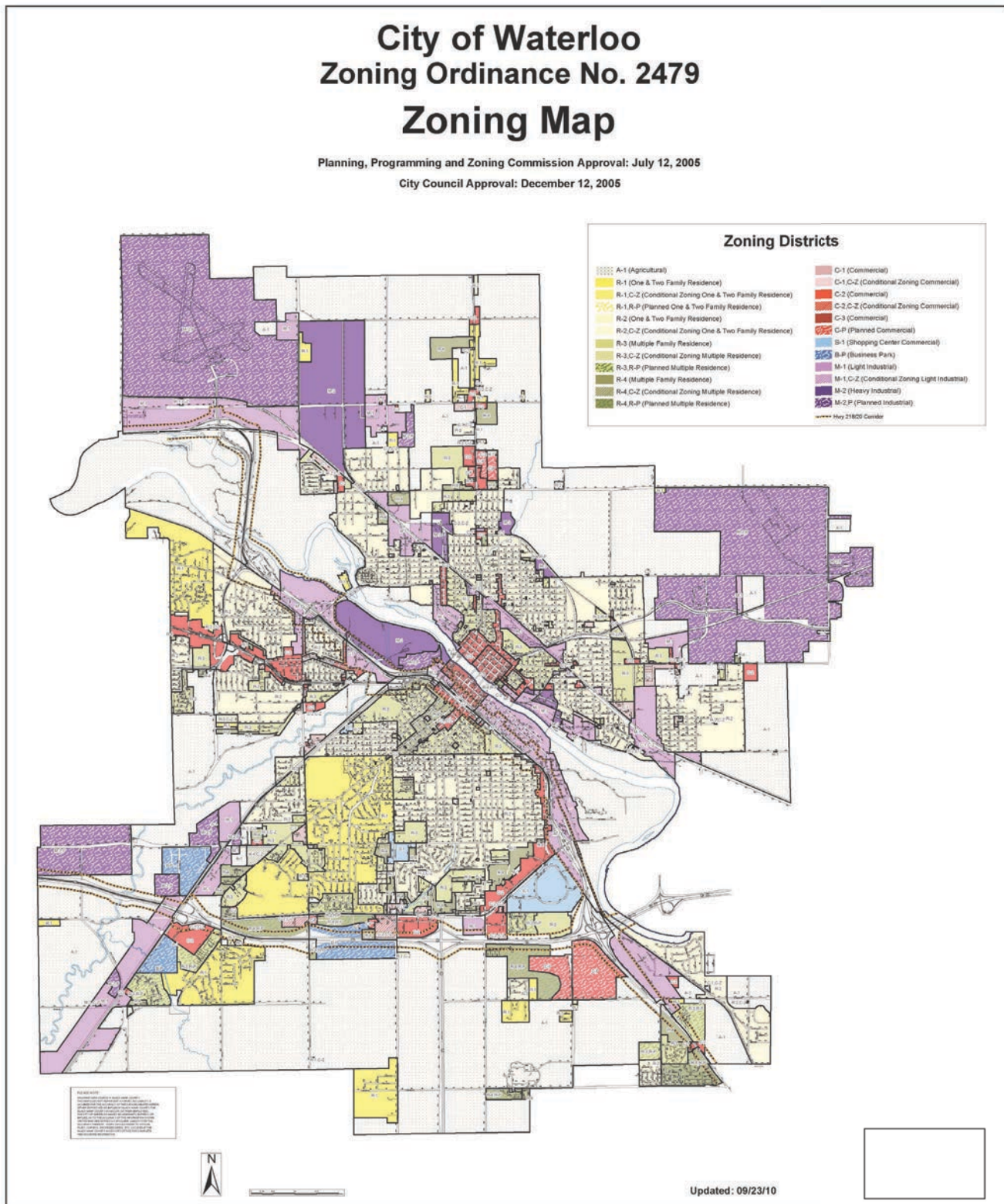
The city's zoning map is included to compare the zoning of land within both the 100- and 500-year floodplains. Figure 5 is the City of Waterloo zoning map.

The ordinance establishes four flood-related zoning (overlay) districts: Floodway District (F-W); Floodway Fringe District (F-F); General Floodplain District (F-P); and Shallow Flood District (S-F). The use, height, and area regulations are uniform in each district.

Floodway Overlay District

For the Floodway (Overlay) District (F-W), the following uses shall be permitted "to the extent they are not prohibited by other ordinance (or underlying zoning

Figure 5. Waterloo zoning map



district) and provided they do not require placement of structures, mobile homes, fill or other obstruction, the storage of materials or other equipment, excavation, or alteration of a watercourse.”

- Agricultural – uses such as general farming, forestry, and crop harvesting.
- Industrial-commercial – uses such as loading areas, parking areas, and airport landing strips.
- Private and Public – golf courses, tennis courts, picnic grounds and parks.
- Residential – uses such as lawns, gardens, parking and play areas.
- Such other open-space uses similar in nature to the above uses.

Conditional use for this district is permitted with the issuance of a special exception permit by the board of adjustment. The uses pertaining to housing include: 1) uses or structures accessory to open-space uses and 2) utility transmission lines and underground pipelines.

Performance standards are established for both principal permitted use and conditional uses. The standards pertaining to housing state: 1) “no use shall be permitted in the Floodway District that would result in any increase in the 100-year flood level”; 2) all uses should “minimize flood damage” through construction methods and practices, as well as usage materials resistant to flood damage; 3) uses shall not interfere with the flow of waterways; 4) “buildings, if permitted, shall have a low flood damage potential and shall not be for human habitation”; and 5) “any fill allowed in floodway must be shown to have beneficial purpose and shall be limited to the minimum amount necessary” (WZO, pp. 67–69).

Floodway Fringe (Overlay) District

The Floodway Fringe (Overlay) District (F-F) must be consistent with the need to minimize flood damage and shall meet the following applicable performance standards: “i) All structures shall (a) be adequately anchored to prevent flotation, collapse or lateral movement of the structure; (b) be constructed with materials and utility equipment resistant to flood damage; and (c) be constructed by methods and practices that minimize flood damage. “ii) All new or substantially improved residential structures shall have the lowest floor, including basements, elevated a minimum of one (1) foot above the 100-year flood level. Construction shall be upon compacted fill which shall at all points be no lower than one (1) foot above the 100-year flood level and extend at such elevation at least 18 feet beyond the limits of any structure erected thereon. All new residential building shall be provided with a means of access which will be passable by wheeled vehicle during the 100-year flood” (WZO, p. 69).

Consideration for performance standards is also extended to mobile/manufactured homes. Structures “placed in an existing mobile home park shall be anchored to resist flotation, collapse, or lateral movement by providing over-the-top and frame ties to ground anchors. Mobile/ manufactured homes not being placed in an existing mobile home park shall be placed in lots or pads elevated by means of compacted fill so that the lowest floor of the mobile home will be a minimum of one (1) foot above the 100-year flood level” (WZO, p. 69–72).

General Floodplain (Overlay) District

In the General Floodplain (Overlay) District (F-P), residential uses are limited to “lawns, gardens, parking areas and play areas.” Additional uses are permitted within the district according to zoning designations such as agricultural, industrial, commercial or recreational uses. Conditional uses are permitted within the Floodplain (Overlay) District “upon issuance of a Special Exception Permit by the Board of Adjustment. All such uses shall be reviewed by the Iowa Department of Water, Air and Waste Management to determine (1) whether the land involved is either wholly or partly within the floodway or floodway fringe and (2) the 100-year flood level” (WZO, pp. 72–73).

Shallow Flooding (Overlay) District

The final floodplain designation is the Shallow Flooding (Overlay) District (S-F). “All uses within the Shallow Flooding (Overlay) District shall be permitted to the extent that they are not prohibited by any other ordinance (or underlying zoning district)” and provided they meet the applicable performance standards of the Floodway Fringe (Overlay) District with the following exceptions: “i) In shallow flooding areas designated as an AO Zone on the Flood Insurance Rate Map, the minimum flood proofing/ flood protection elevation shall be equal to the number of feet as specified on the Rate Map above the crown of the nearest street; and ii) In shallow flooding the Flood Insurance areas designated as an AH Zone on the Flood Insurance Rate Map, the minimum flood proofing/flood elevation shall be equal to the elevation as specified on the Rate Map” (WZO, p. 73).

Variance Process

The ordinance allows for a variance process upon the authorization of the board of adjustments after meeting the following applicable standards:

1. No variance shall be granted for any development within the Floodway District which would result in any increase in the 100-year level. Consideration of the effects of any development on flood levels shall be based upon the assumption that an equal degree of development would be allowed for similarly situated lands.
2. Variances shall only be granted upon

- i. a showing of good and sufficient cause;
 - ii. a determination that failure to grant the variance would result in exceptional hardship to the applicant; and
 - iii. a determination that granting of the variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public.
3. Variances shall only be granted upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
4. In cases where the variance involves a lower level of flood protection for buildings than what is ordinarily required by this Ordinance, the applicant shall be notified in writing over the signature of the Building Official that: (1) the issuance of a variance will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage; and (2) such construction increases risks to life and property.
5. All variances granted shall have the concurrence of approval of the Department of Water, Air and Waste Management (WZO, p. 138).

Floodplain Occupancy Permits

Part 26 titled “Occupancy Permits,” describes the use of floodplain development permits, which are required prior to any development in the floodplain. The applicant must include “i) a description of the work to be covered by the permit”; ii) a “description of the land on which the proposed work is to be done”; iii) an “indication of the use or occupancy for which the proposed work is intended; iv) “elevation of the 100-year flood”; v) “elevation (in relation to mean sea level) of the lowest floor (including basement) of buildings or of the level to which a building is to be flood-proofed”; and vi) “the estimated cost of improvements and market value of the building prior to the improvements” (WZO, p. 141).

3.3. Waterloo Hazard Mitigation Plan Update 2009 (WHMP)

Waterloo has 12,606 acres of identified floodplain (100- and 500-year) inside city limits. This comprises approximately 31% of the total area of the city. According to the Waterloo Hazard Mitigation Plan, there are approximately 2,852 structures located in the floodplain in Waterloo at an estimated value of \$405,717,520 (building

and dwelling value alone, not including land). This estimated value represents approximately 12% of the city’s total net property valuation. In addition, an estimated 2,221 of the 2,852 structures in the floodplain are residential structures housing an estimated 5,308 people (WHMP, p. 11).

Waterloo became a member of the National Flood Insurance Program (NFIP) on July 3, 1985. The effective date of the map used to administer and regulate the floodplain was also effective on that date. Flood maps for Waterloo have undergone several amendments as a result of historic flood mitigation projects. For example, construction of floodwalls along the Cedar River and the placement of levees and gates along Black Hawk Creek have affected the floodplain. In order to remain a member of NFIP, the community has adopted and enforces a floodplain ordinance, which regulates what type of construction, if any, can occur in identified flood hazard areas. In addition, property owners in the community are eligible to purchase flood insurance on property within city limits, regardless of whether they are actually in an identified floodplain (WHMP, p. 15).

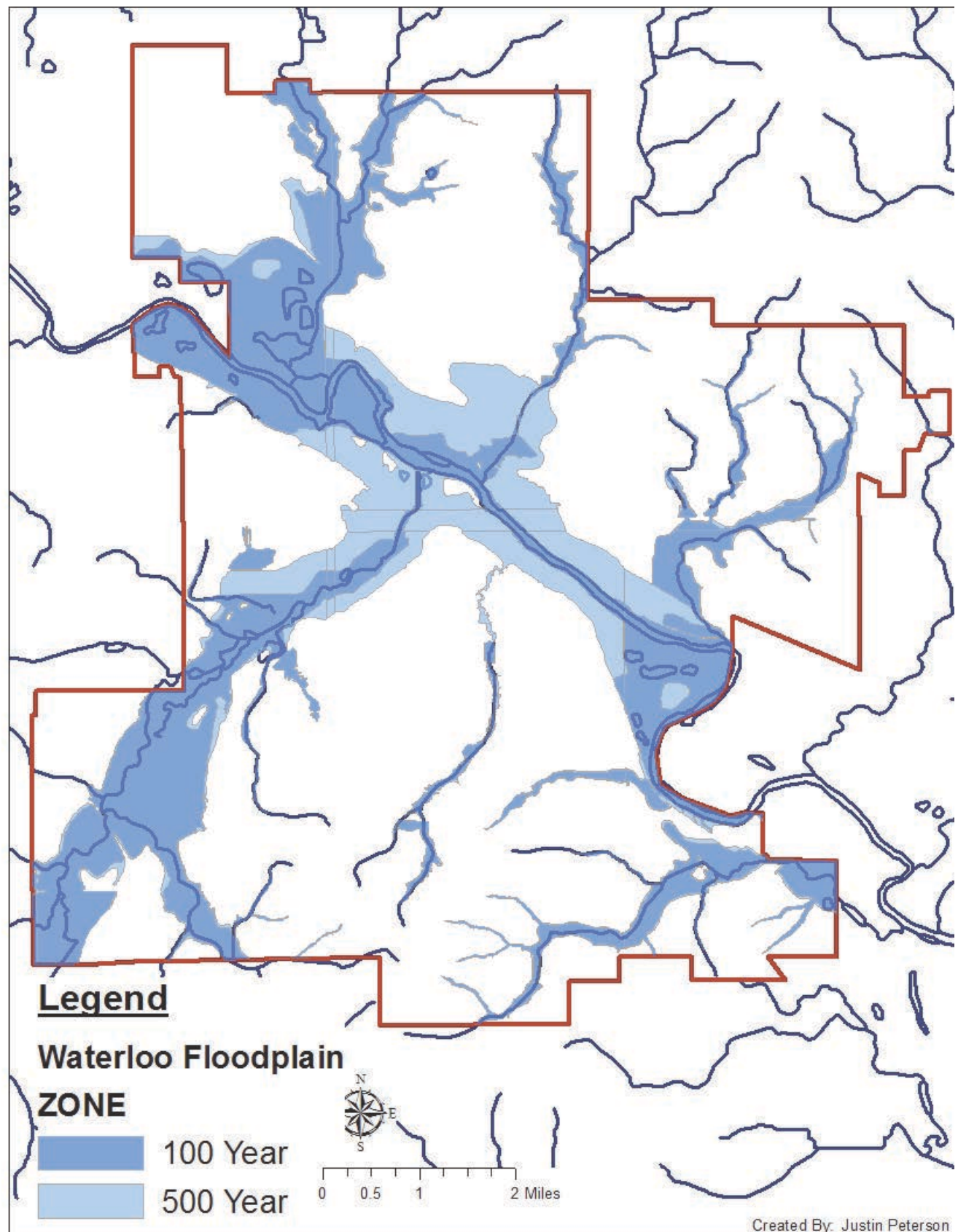
The city is currently cooperating with FEMA and the Black Hawk County engineer’s office to re-evaluate the local floodplain and establish a new map. It is anticipated that the previously identified flood hazard areas will be redefined as a result of extensive mitigation efforts made throughout the community since the development of the original flood insurance rate map (WHMP, p. 16).

The floods of 2008 were recorded as the worst natural disaster in the city’s history. The Cedar River crested on June 11, 2008 and was 3.5 feet higher than any previous record. The city’s levee system and installed flood panels saved much of the downtown from flooding. Damage was estimated at \$18 million for the city and \$15 million for private property (WHMP, p. 44). Figure 6 shows the city’s 100- and 500-year floodplains.

3.4. 2010 Annual Plan: City of Waterloo 2010 (HUD)

Waterloo has prepared a year-one action plan identifying the activities to be funded through the Waterloo-Cedar Falls HOME Consortium’s Community Development Block Grant (CDBG) and HOME program funds arriving during the program year. This document only refers to the flooding in the section titled “Addressing Obstacles to Underserved Needs” (p. 6). The plan identifies the fact that other housing funding resources have been utilized to aid in the flood recovery efforts stemming from the 2008 floods. This limits the ability for the community development department to request funds for its non-flood housing programs.

Figure 6. Waterloo floodplains



4. Did any of these documents change after the 2008 floods?

The Waterloo Hazard Mitigation Plan was updated in 2009 as a result of the flooding in 2008.

Table 3. Planning-related documents information			
Document	Year	Source	Website
Comprehensive Plan		City of Waterloo	n/a
Zoning Ordinance	2007	City of Waterloo	http://www.ci.waterloo.ia.us/images/PlanningZoning/pdf/ZoningOrdinance2479.pdf
Analysis of Impediments to Fair Housing	2009	Mullin & Lonergan Associates, Inc.	http://www.ci.waterloo.ia.us/images/CommDevelopment/AnalysisofImpedimentFairHsgFINAL.pdf
Waterloo Hazard Mitigation Plan Update	2009	City of Waterloo	n/a
Annual Plan	2010	City of Waterloo	http://www.ci.waterloo.ia.us/images/CommDevelopment/FY2010AnnualPlan.pdf
Consolidated Plan	2010–2014	City of Waterloo	http://www.ci.waterloo.ia.us/images/CommDevelopment/5YearConsolidatedPlanFY2010FY2014.pdf
Consolidated One-Year Action Plan	2011	City of Waterloo	n/a

Table 4. Planning-related documents summary			
Document	Author	Brief summary	Important issues
Comprehensive Plan	City of Waterloo	Includes the city's land use map	Contains small section on flood control Consideration given to regular inspection of levee system Featured land use map
2007 Zoning Ordinance	City of Waterloo	Floodway overlay districts and restrictions on development in the floodplain	Establishes regulations for development within the floodplain Zoning Map
2009 Analysis of Impediments to Fair Housing	Mullin & Lonergan Associates Inc	Outlines housing issues being faced within the city, including issues with fair housing	Identification of current issues being faced A proposed action step to correct these issues.
2009 Waterloo Hazard Mitigation Plan	City of Waterloo	Identifies potential hazards for the city of Waterloo. Focuses on flooding related hazards	Damage estimates include \$18 million for the cCity and \$15 million for private.
2010 Annual Plan	City of Waterloo	One-year action plan for the city (2010)	Identifies housing priorities and goals Budgeted expenses of funding received
2010–2014 Consolidated Plan	City of Waterloo	Cities of Waterloo and Cedar Falls established a consortium under the HOME program to qualify for funding. This report is part of a requirement for continued funding	Updated every five years or as necessary Submitted to HUD Identifies local needs and how these needs will be addressed
2011 Consolidated One-Year Action Plan	City of Waterloo	Outlines goals and expected results for the 2011 year	Identifies housing priorities Estimate of how many homes can be assisted

Table 5. GIS-related data		
Shapefile	Source	Webpage
Parcels (land use)	Waterloo	n/a
Waterloo Boundary	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
Floodplain	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
Rivers	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
08 Flood Extent	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/

References

- City of Waterloo. Waterloo Comprehensive Plan.
- City of Waterloo. 2007. Waterloo Zoning Ordinance.
- City of Waterloo. 2009. Waterloo Hazard Mitigation Plan Update.
- City of Waterloo. 2010. Annual Plan.
- City of Waterloo. 2010–2014. Consolidated Plan.
- City of Waterloo. 2011. Consolidated One-Year Action Plan.
- Mullin & Lonergan Associates Inc. 2009. *Analysis of Impediments to Fair Housing*.

Appendix 8. Summary of Documentary Materials for Waverly

Introduction

The objective of this report is to identify the planning-related documents that the City of Waverly has related to flooding and housing, before and after the 2008 flooding. To guide the search process, the following questions were developed:

1. Does the City of Waverly have a housing needs assessment document?
2. Are there documents that report losses related to the 2008 floods?
3. Does the City of Waverly Have Plans that include Issues Related to Flooding and Housing?
4. Do any of these documents change after the 2008 floods?

Executive Summary

The City of Waverly has made significant efforts toward flood mitigation. These efforts have included sandbagging plans, numerous flood and river studies, mitigation plans, property buyouts, and multiple construction projects.

There are a total of 1,169 properties within the 100-year flood zone in Waverly, the bulk of which are residential (786 properties or 67.2%). Assuming a total loss of all properties, damages would reach close to \$71.7 million (2009 Hazard Mitigation Plan) After the 2008 floods, it was recorded that 156 (96.7%) residential properties were damaged, resulting in recorded damages of \$5.3 million. Of the 156 properties affected by the 2008 flooding, 151 are zoned residential. The remaining five properties are zoned commercial (three properties) and religious (two properties). Of the 151 residential properties, 69 (45.7%) were purchased by the city and will no longer contain buildings of any type. The number of buyouts was the largest ever by the city; the highest number of buyouts before the 2008 flood was 10, following flooding in 1999.

To prevent future flooding damage, properties in flood zones received higher levels of review. On any property in the floodplains, new construction is prohibited unless the lowest occupied level sits at least one foot above the 100-year flood level. (Code of Ordinances of the City of Waverly) Since the majority of housing in flood zones is older homes built on smaller lots, new construction is extremely limited. This allows for a gradual reduction in the number of occupied properties within the floodplains.

Waverly is currently implementing major flood mitigation strategies. The largest project to date is the removal of the old concrete dam and the construction of a new inflatable dam. The new dam is designed to limit flooding upstream of the dam, minimizing the flood zones in northwest Waverly, the hardest hit area in 2008. Another project currently under consideration is the widening and deepening of Dry Run Creek. The project will greatly reduce the extent of the 100-year flood zone for the creek, removing approximately 440 properties from the 100-year floodplain. Of those 440 properties, 315 (71.6%) are zoned for residential use. The bulk of the additional protection serves northwest Waverly. A second project under consideration is the dredging of the Cedar River, which would deepen the shallow river and increase its flow. The proposed dredging requires several sand/silt islands to be removed, vastly increasing water's total surface area. The removal of the islands is primarily viewed as a recreation and tourism action rather than a flood mitigation action.

Waverly is making large strides to protect its citizens from future flood damage, gaining the attention of several organizations. The Environmental Protection Agency (EPA), the Federal Emergency Management Agency (FEMA), and the Rebuild Iowa Office (RIO) held a workshop in Waverly on smart-growth principles, with the flood buyout properties as a key issue. Future plans for Waverly incorporate more smart growth principles that will help limit the damage to persons and properties within Waverly. It is Waverly's goal to become the "green" capital of northeast Iowa.

It is recommended that the Waverly continue the flood mitigation strategies in place. After the completion of major projects, studies will be needed to assess flood zones in the future. Slight policy adjustments may be required after the impacts of the new flood mitigation efforts can be assessed.

1. Does the City of Waverly have a housing needs assessment document?

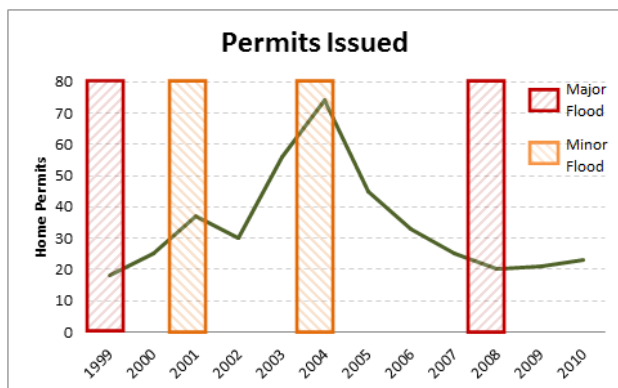
After searching for available online documents, none were found to be in existence. The City of Waverly zoning department confirmed this fact. However, the economic development office is in the initial stages of developing a housing assessment. Two summary statistics were found dealing with the total new housing numbers for Waverly:

- a) Subdivision and New Housing Statistics 1999–2006
- b) Single Family New Home Permits, Calendar Years 2007–2010

Subdivision and New Housing Statistics 1999–2006 states the total number of new single-family housing permits for each year from 1999 to 2006, and provides data regarding subdivisions during the same time frame. Single Family New Home Permits, Calendar Years 2007–2010 lists the total new home permits issued for each year from January 2007 to November 2010, as well as the total and average values of the new homes.

Figure 1 depicts the compiled data on permits issued from both documents. The red columns highlight major flooding event (crest of 15+ feet) years, while the orange columns highlight minor flooding event (crest of 12–15 feet) years.

Figure 1. Waverly new housing data



Source: Single Family New Home Permits, Calendar years 2007–2010; Subdivision and New Housing Statistics, 1999–2006

2. Are there documents that report losses related to the 2008 floods?

There are four documents related to the 2008 floods available at the City of Waverly website:

- a) Flood Recovery Projects & Expenditures 2010
- b) City of Waverly HMGP Buy Out List 2010
- c) City of Waverly Hazard Mitigation Plan 2009
- d) City of Waverly Rebuilding after the 2008 Flood

Flood Recovery Projects & Expenditures 2010 presents completed projects resulting from 2008 flood damage, divided into four categories: FEMA projects, non-FEMA projects, housing acquisition/demolition, and dam reconstruction/flood mitigation. The total cost of FEMA projects reached \$2 million, non-FEMA projects reached

\$300,000, housing acquisition/demolition costs reached \$8.3 million, and the dam reconstruction/flood mitigation costs reached \$4.3 million. These costs total \$14.9 million. Waverly was eligible for some funding: FEMA could potentially fund \$10 million; \$13.6 million could be funded by the federal government, \$1 million by the state government, and \$20,000 by local governments. Up to \$300,000 was also available from the Iowa Community Disaster Fund. These funding numbers are the potential maximum funding available. It is highly unlikely that the city would be able to obtain 100% of these funds.

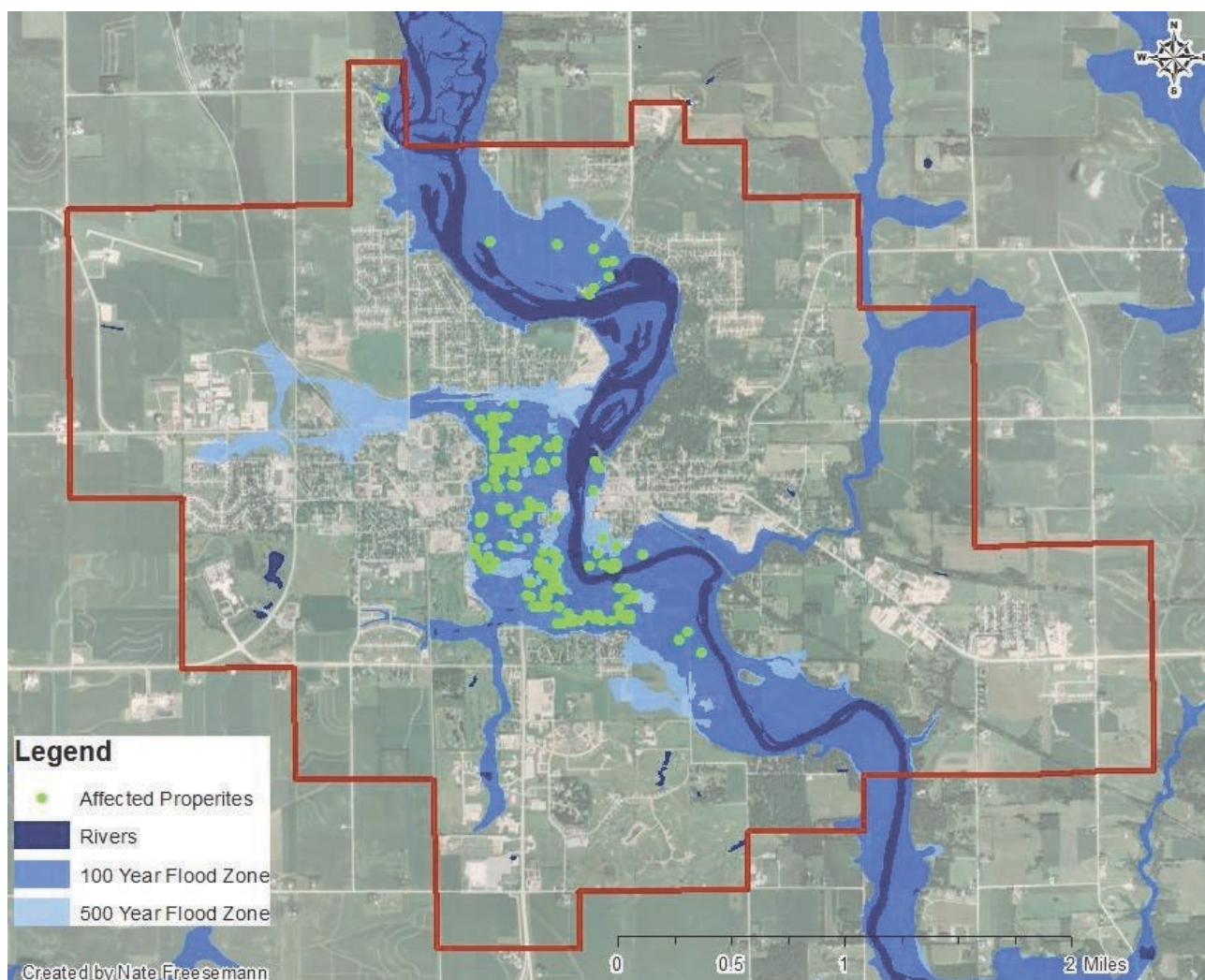
According to the City of Waverly Hazard Mitigation Plan 2009, there are 400 houses and 134 commercial and industrial structures located within the city's 100-year floodplain. Figure 2 shows the total number of recorded properties (156) that sustained damage during the floods of 2008, according to the City of Waverly's records. A map of the 2008 flood extent could not be found; therefore the 100-year floodplain has been used as a proxy. Of the 156 (96.7%) properties affected the 2008 floods, 151 are zoned residential. The remaining five properties are zoned commercial (three properties) and religious (two properties). Of the total 156 affected properties, 143 (91.7%) are located in the 100-year floodplain, 11 (7.1%) are located in the 500-year floodplain, and two (1.3%) are not located in a floodplain. It also should be noted that 31 (19.9%) affected properties lay within the floodway.

Table 1 displays the estimated loss of all properties within the 100- and 500-year floodplains. According to the Waverly's hazard mitigation plan, 936 people or approximately 10% of the total population live in the 100-year floodplain year-round.

The City of Waverly HMGP Buy-Out List 2010 has the number of properties the city attempted to purchase. It was determined that 69 properties qualified for the Hazard Mitigation Grant Program (HMGP). This program allows damaged properties to be purchased and used as open

Type of structure	Number impacted	Estimated Loss*
Residential	400	\$45,506,000
Commercial	122	\$12,699,380
Industrial	12	\$4,494,012
Agriculture	n/a	n/a
Religious/nonprofit	6	\$1,806,604
Government	2	\$794,532
Education	3	\$5,604,150
Utilities	4	\$766,172
Total:	549	\$71,670,850

Figure 2. Affected properties



spaces. Priority was given to properties that were located in the floodway hazard areas and sustained more than 50% damage during the flood. This record was last updated on April 30, 2010. Figure 3 is a map depicting the 69 buyout properties. Of the 69 properties purchased after the floods of 2008, 64 (92.7%) are located in the 100-year floodplain, and the remaining five properties are located in the 500-year floodplain. Of the 64 located in the 100-year floodplain, 13 (20.3%) are also located in the floodway.

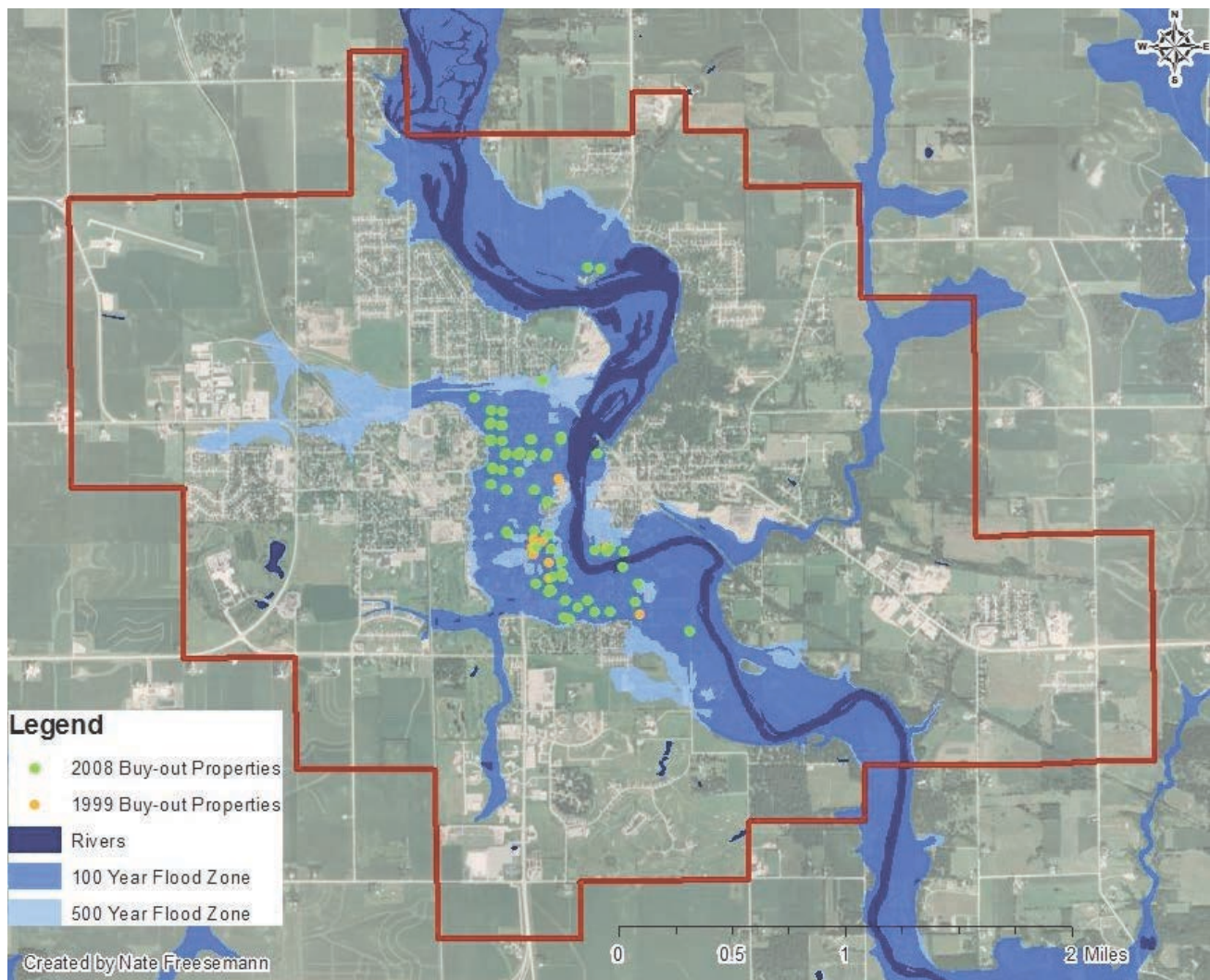
Waverly produced a brochure titled *City of Waverly Rebuilding after the 2008 Flood* to help inform people about what to do after the flood and how the city can help them. The brochure included information about removal and pickup of flood damaged items, temporary housing needs, medical help, sandbag disposal, and public utility information.

3. Does the City of Waverly have plans that include issues related to flooding and housing?

Six planning-related documents were examined:

- a) Chapter 102: Floodplain Management of the Waverly Code of Ordinances
- b) City of Waverly Comprehensive Land Use Plan 2005
- c) City of Waverly Hazard Mitigation Plan 2009
- d) City of Waverly Plan of Action for Potential Flooding 2009
- e) Waverly Flood Study Jan. 2001 (Appendix)
- f) Waverly Flood Study: Dry Run Creek Hydrologic Model, Sept. 2002 (Appendix)

Figure 3. City of Waverly buyout addresses, 1999 and 2008 floods



3.1. Chapter 102: Floodplain Management of the Waverly Code of Ordinances

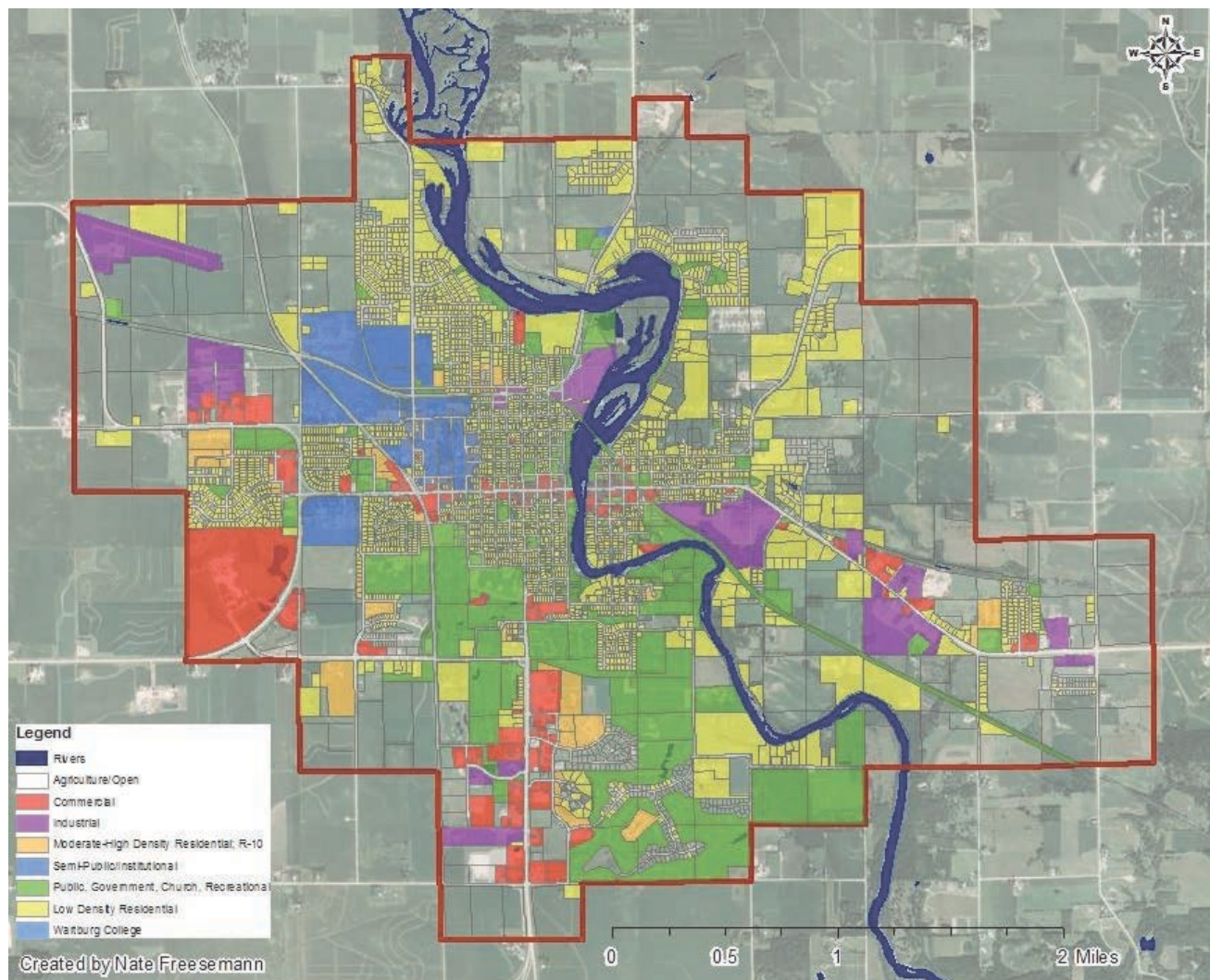
The floodplain management section of the city code can be found in the zoning ordinance chapter (Chapter 100: Zoning). The floodplain, in accordance of Section 102.4.01 of the Waverly City Code of Ordinances, is divided into four different levels:

1. Floodway (Overlay) District (FW): shall be consistent with the boundaries of the floodway as shown on the official Floodplain Zoning Map, provided by FEMA (FIRM Maps).
2. Floodway Fringe (Overlay) District (FF): shall be those areas as shown as floodway fringe on the official Floodplain Zoning Map, provided by FEMA (FIRM Maps).
3. General Floodplain (Overlay) District (FP): shall be those areas shown on the official Floodplain Zoning Map, provided by FEMA (FIRM Maps) as being within the approximate one hundred (100) year flood boundary.
4. Shallow Flooding (Overlay) District (SF): shall be those areas as shown on the official Floodplain Zoning Map, provided by FEMA (FIRM Maps) as being within the one hundred (100) year flood boundary and identified on the Flood Insurance Rate Map as (AO or AH) zone(s).

Each of the districts outlines different regulations for housing and other structures.

The Floodway District (FW) permits primarily open space uses: parking, gardens, parks, recreational uses, commercial loading areas, airport landing strips, play

Figure 4. City of Waverly current land use



Source: INRCOG, City of Waverly Comprehensive Plan Update 2012

areas and similar uses. Any structures to be built in this zone require a conditional-use permit approved by the board of adjustment. In order to receive approval the building must meet the performance standards set by Section 102.5.03.

The Floodway Fringe District (FF) permits all uses unless prohibited by any other ordinance or underlying zoning district, however all uses must also meet the performance standards as set by Section 102.6.02

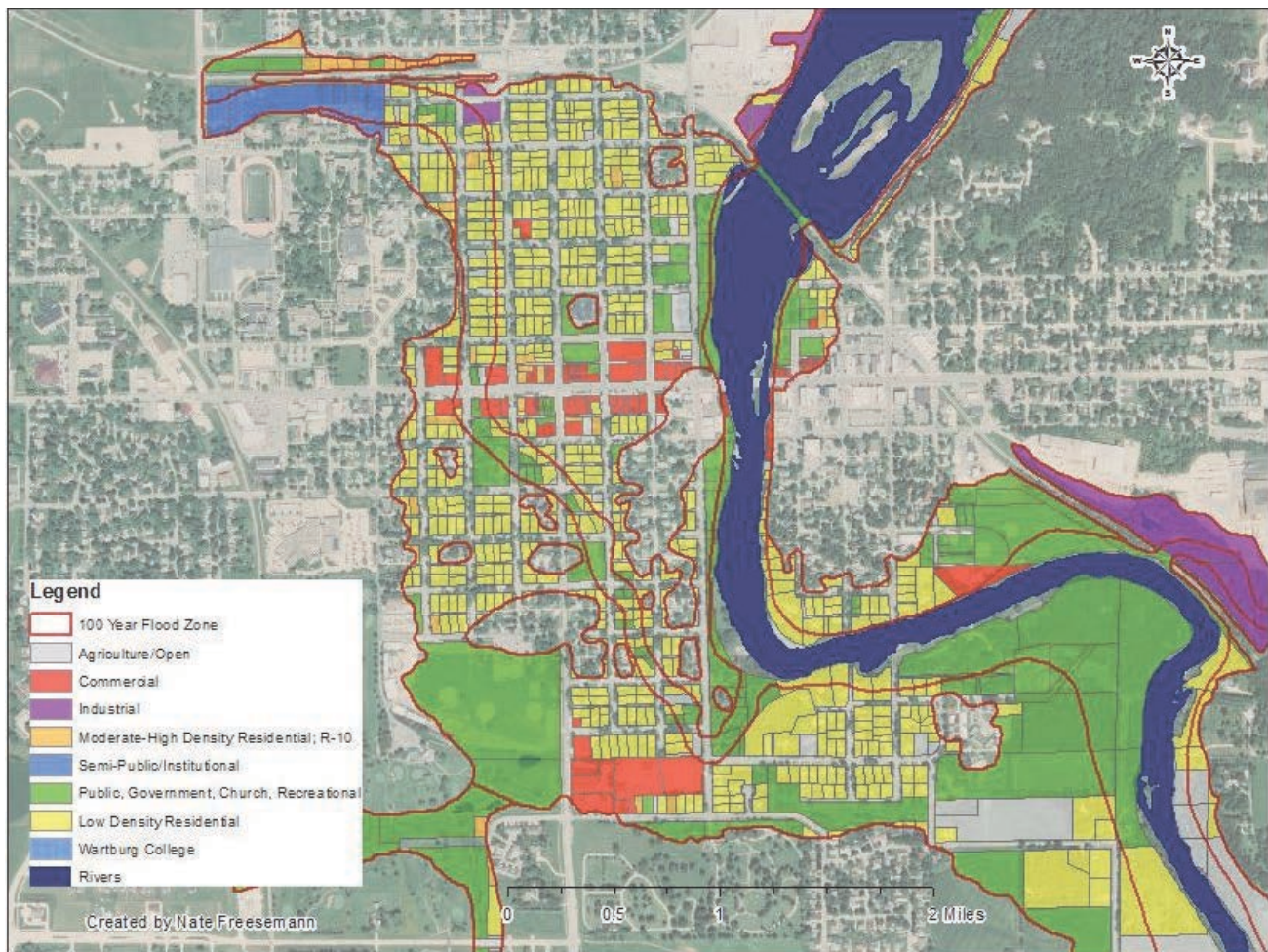
The General Floodplain District (FP) permits agricultural, industrial-commercial, recreation and residential uses, provided they do not include placement of structures, factory-built homes, fill or other obstruction; the storage of materials or equipment; excavation; or alteration of a water course. Any use that involves placement of structures requires approval of a conditional use permit

by the board of adjustment subject to review by the Iowa Department of Natural Resources (DNR).

The Shallow Flooding District (SF) permits all uses unless prohibited by any other ordinance or underlying zoning district provided they meet the performance standards as set in Section 102.8.02 in the City Code.

In summary, the City of Waverly restricts the development of housing in flood zones, but does not necessarily prohibit the development of those properties. Because the flood zones are set as overlay districts, properties must adhere to standards of both the underlying and overlay zoning classifications. For example, a property zoned R-1 in the General Floodplain (FP) must adhere by the regulations set for R-1 residential zones as well as the General Floodplain regulations. As long as the development meets the requirements set by the

Figure 5. Detail of City of Waverly current land use



Source: INRCOG, City of Waverly Comprehensive Plan Update 2012

performance standards of Section 102.6.02, development may occur.

3.2. City of Waverly Comprehensive Land Use Plan 2005

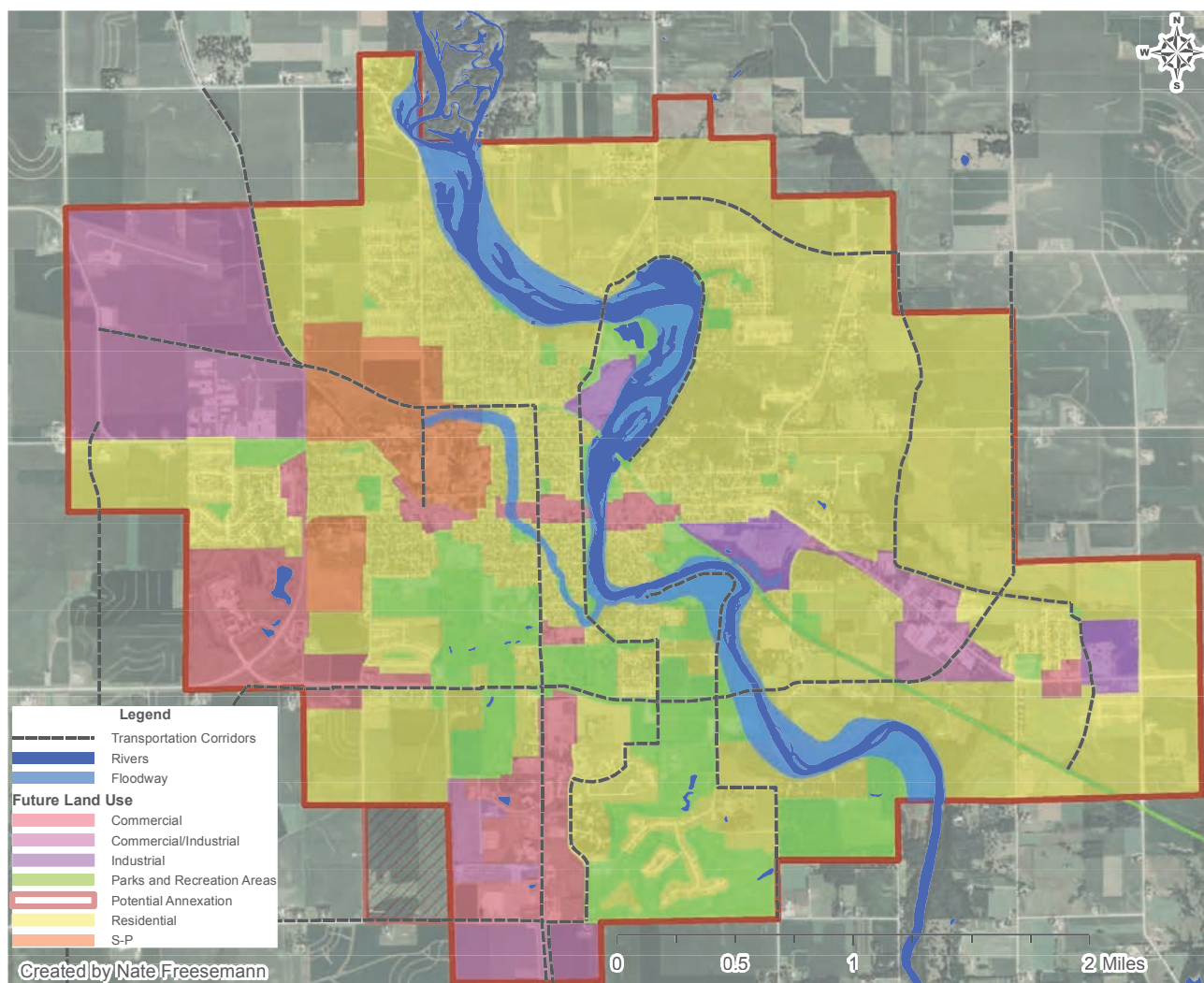
According to the comprehensive plan, the city has purchased a number of properties in the floodplain since the 1999 floods using funding from FEMA. All of the properties purchased are restricted from development and are to be maintained as open space for the community. A map of the 1999 buyout properties can be found in figure 3.

Land use is introduced in the comprehensive plan and the current land use map is depicted in figure 4. A more detailed map of the 100-year floodplain can be found in figure 5. There are a total of 1,169 properties within the 100-year floodplain, of which 786 (67.2%) are residential, 89 (7.6%) are commercial, 22 (1.9%) are industrial, 96

(8.2%) are open space, 41 (3.5%) are agricultural, and 135 (11.5%) are governmental, religious, or parks.

The future land use map in the updated comprehensive plan shows the floodway, including the Dry Run Creek floodway (figure 6). The majority of the northern and eastern areas of the city are designated for future residential use. The southern and western areas of the city are evenly mixed between industrial, commercial, recreational areas, government and institutional zones. The high traffic transportation corridors are also noted on the future land use map. These corridors include Highway 3 (east-west), US 218 (north-south), and Tenth Avenue South (future east-west bypass). The 2005 Comprehensive Update does not directly show flood mitigation zoning; however, policies are in place to help curb development in flood overlay zones, as noted earlier.

Figure 5. City of Waverly future land use



Source: INRCOG, City of Waverly Comprehensive Plan Update 2012

3.3. City of Waverly Hazard Mitigation Plan 2009

The City of Waverly Hazard Mitigation Plan provides the best overview of the flood situation in the city. The plan outlines where floodwaters come from and what is affected by the floodwater, ranks areas are the most vulnerable to flooding, estimates losses in the event of a flood, and describes policies in place related to flood mitigation. The sections are as follows:

Water Systems

There are three primary surface water systems that affect the city of Waverly. The largest of these water systems is the Cedar River, which is part of a watershed that is responsible for the drainage of more than 1,500 square miles of land and has been the cause of most of the major flooding in the city. The second primary surface water system is Dry Run Creek, which flows mainly in a southeasterly direction before it converges as a tributary to

the Cedar River near the corner of Sixth Avenue SW and First Street SW. The third primary surface water system is relatively insignificant in nature when its effects on the city are compared to those of the first two channels. In fact, the FEMA Flood Insurance Study for the community identifies the stream as “Unnamed Creek,” sometimes referred to as “No Name Creek.” This creek converges with the Cedar River northwest of the intersection of Fifth Avenue SE and Eleventh Street Southeast (Hazard Mitigation Plan, p. 3)

Houses in Hazardous Areas

The city of Waverly is potentially affected by flooding from the Cedar River, Dry Run Creek and Unnamed Creek. The waterways have 100-year flood zones and a number of houses are still located within those flood zones. Many residential properties have been purchased by the City of Waverly to help alleviate flood hazard issues through the

flood zones. (Hazard Mitigation Plan, p. 5) Since 1999, Waverly has purchased 79 properties using federal funds. Several other properties have been purchased by the state for transportation reasons, and by the city for recreational or infrastructure reasons. Each property located within flood hazard areas undergoes additional review to limit the amount of damage to the property itself as well as other properties surrounding, or downstream.

Flood Hazard

In the hazard mitigation plan, a flood hazard is defined by two differing types of flooding. The first type mentioned is riverine flooding, which is the rising and overflowing of a body of water, especially onto a normally dry area of land. The second type of flood hazard mentioned is flash flooding, which is a localized flood of great volume and short duration generally caused by heavy rainfall in the immediate vicinity. The plan then describes the effects of flooding on the Waverly area. "Floods cause the most widespread and costly damage of any of the identified hazards in Waverly and in Iowa (Hazard Mitigation Plan, pp. 24–34)."

The main flood hazard in Waverly is the overflowing of the Cedar River and/or Dry Run Creek. The plan goes on to describe the flooding history of Waverly, stating that the flooding in the 1990s (1993 and 1999) had been the worst floods seen by Waverly. The 2008 floods, however, shattered the previous record for river crest by 30 inches (2.5 feet).

The plan states that unless new mitigation strategies are implemented, future flooding and damage will occur to property located in the floodway and 100-year floodplains. The plan describes the vulnerability of the properties within Waverly, indicating that there are 51 streets that are completely or partially in the flood hazard area as identified by FIRM mapping. The maximum threat caused by flooding is higher than just properties in low-lying areas. Transportation networks connecting homes, businesses, and work areas can be cut off by the flooding of streets. This leaves the entire community of Waverly susceptible to flooding and the effects of flooding. The speed of the onset of flooding greatly affects the ability of the city to respond to a flood threat. With riverine flooding, the onset is slower and gives the city more time to prepare, allowing for better sandbagging and the removal of personal belongings. With flash flooding, there is less time to act, but still enough time to enact some mitigation strategies.

A composite score was assigned to the hazard based on the following categories:

- Historical occurrence
- Probability

- Vulnerability
- Maximum threat
- Severity of impact
- Speed of onset

The flood hazard received a hazard score of 39, which ranked fourth in priority among other potential hazards to the city of Waverly.

Estimating Total Loss

Approximately 935 people live year-round in the 100-year floodplain in Waverly. Currently there are 400 houses and 134 commercial and industrial structures located within the city's 100-year floodplain. An attempt was made to estimate the losses that would occur in the event of a 100-year or a 500-year flood. Assuming total loss occurs during the flood, there will be \$45.5 million in residential damage, \$12.7 million in commercial damage, \$5.6 million in educational property damage, \$4.5 million in industrial damage, and \$3.3 million in damage to religious/nonprofit, government and utilities properties (Hazard Mitigation Plan, p. 64).

Current/Past Mitigation Activities

In addition to the past studies on flooding, other measures are being taken in order to mitigate this hazard. On September 2, 1980, the City of Waverly became an active member of the National Flood Insurance Program (NFIP) by adopting its initial floodplain ordinance. The Federal Insurance Administration (FIA) manages the insurance component of the NFIP and works closely with FEMA's Mitigation Directorate, which oversees the floodplain management aspect of the program (Hazard Mitigation Plan, p. 72) The city updated the floodplain ordinance most recently in 1996. The floodplain ordinance is part of the city's zoning ordinance. In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodplain. In addition, it requires those structures within the 100-year flood to: (a.) "be adequately anchored to prevent flotation, collapse or lateral movement of the structure"; (b.) "be constructed with materials and utility equipment resistant to flood damage"; and (c.) "be constructed by methods and practices that minimize flood damage." One of the floodplain management efforts made is the construction of several detention ponds in Waverly. These detention ponds are expected to control flooding at Dry Run Creek. Dry Run Creek is a creek that historically has flooded due to heavy localized rains causing flash flooding, as opposed to flooding on the Cedar River, which is usually preceded by substantial warning time.

Future Mitigation Activities

Future flood mitigation actions are proposed in the plan and shown below (Hazard Mitigation Plan, pp. 77–78).

Each proposed action is defined in greater detail in the document, including a general time line and the party responsible for each action. Several projects have been completed or are under way. This list is used as a benchmark to measure the city's progress in terms of flood mitigation. Some of the project implementation processes are described in greater detail later in this document.

1. Consider replacing the existing power dam with an inflatable dam.
2. Continue participation in the National Flood Insurance Program.
3. Continue further development of an update of the storm water management program.
4. Maintain, enforce, and update zoning and floodplain ordinances as needed.
5. Ensure proper training and certification of floodplain manager(s).
6. Continue acquisition and removal of homes from the floodplain.
7. Flood proof structures in the floodplain.
8. Replace or increase capacity of Third Street Bridge.
9. Consider construction of a levee, flood wall, or other flood protection system in Kohlmann Park.
10. Construct flood walls along the east bank of the river across from Kohlmann Park.
11. Implement projects identified for the Cedar Lane Bike Path.
12. Construct a dike and levee system in southeast Waverly, near SE 7th Avenue
13. Enhance and maintain storm sewer capacity.
14. Create a regional plan to address flooding concerns.
 - a. Wetland areas
 - b. Detention ponds
15. Monitor and enforce drainage regulations on residential, commercial and industrial developments.
16. Consider dredging the river.
17. Complete the Dry Run Creek obstruction and flash flooding analysis and consider other mitigation activities.
 - a. Third Street Bridge removal
 - b. Cedar River Trail Bridge removal
18. Purchase removable, portable flood barriers
19. Create a flood mitigation and evacuation brochure
20. Develop a flood response protocol for response, sandbagging and evacuation procedures

21. Continue to study additional mitigation alternative for southeast Waverly

3.4. City of Waverly Plan of Action for Potential Flooding 2009

City of Waverly Plan of Action for Potential Flooding 2009 was examined to acquire data regarding flooding and housing from before and after the 2008 flood. The city was broken up into four regions (cut north-south by Bremer Avenue and east-west by the Cedar River) and a plan of action was established depending on the severity of the flood. The purpose of this plan is to help inform citizens of Waverly about what will happen during a flood event. The city relies on a volunteer work force, in addition to municipal workers, to help build the sandbag levees.

NW Waverly

River gauge reading nearing eight or nine feet and predicted to go higher

- Plug storm sewers at Second Avenue NW & Third Avenue NW.

River Gauge reading nearing 12 feet and predicted to go higher – PHASE 1 (Attached Map)

- Establish sandbagging station on the north side of St. Paul's Lutheran Church.
- Construct first sandbag levee across First Avenue NW (and into St. Paul's parking lot).
- Construct second sandbag levee from Second Avenue NW to Third Avenue NW (starting at the north side of St. Paul's school parking lot and ending north of Third Avenue NW).
- These two levees are constructed two feet high and in such a way that they could be built higher. The levees will require approximately 3,500 sandbags and 100 tons of sand. (10 sandbags per lineal foot)

River Gauge reading nearing 14 feet and predicted to rise above 15 feet – PHASE 2 (Attached Map)

- The Phase 2 levee will be one continuous sandbag levee from the intersection of First Street NW and West Bremer Avenue to just east of the 510 First Street NW residence. This levee will utilize the existing two levees from Phase 1.
- This Phase 2 levee will require approximately 15,000 sandbags and 450 tons of sand.
- Construct top of levee to elevation of 900 feet (+) plus the gauge reading minus one foot.
- Maximum levee height is about four feet.

NE Waverly

River gauge reading nearing 10 feet and predicted to go higher

- Close intakes with sandbags at Second Ave NE, First Street NE, and beehive intake east of City Hall. (approximately 25 sandbags)

SE Waverly

River gauge reading nearing 12 feet and predicted to go higher (with boards on dam)

- Establish a sandbagging station at SE Elementary School or Harlington Cemetery.
- Construct a sandbag levee in the middle of Seventh Ave SE starting from the intersection of First St SW and Seventh Ave SE and stopping at 910 Seventh Ave SE.
- This levee will need to be wide or reinforced with concrete barriers.
- This levee will require approximately 10,000 sandbags (or 5,000 with concrete barriers) and 125–250 tons of sand.
- Construct top of levee to an elevation of 907 feet. Maximum levee height is about three feet. Survey equipment will be necessary to establish a uniform height of the levee. This will minimize effort and maximize benefit.

River gauge reading nearing 13 feet and predicted to go higher (with boards on dam)

- Establish a public sandbagging station at SE Elementary School or Harlington Cemetery.
- Establish a public sandbagging station at Public Services, 412 First Avenue SE.

SW Waverly

River gauge reading nearing 15 feet and predicted to rise above 16 feet (with boards on dam)

- Establish a public sandbagging station in the swimming pool's parking lot.

Maps were created as references and guides in emergency situations showing where these actions need to be completed (figures 7 and 8).

It is recommended that the City of Waverly continue the flood mitigation efforts outlined above. It is also recommended that the City of Waverly should move more aggressively to provide greenbelt protection along the Dry Run Creek through property acquisition. Review of current policies and documents indicates that the city is doing well in terms of protecting its citizens and public resources.

4. Do any of these documents change after the 2008 floods?

The following documents were created and/or updated after the 2008 floods:

- a) City of Waverly Hazard Mitigation Plan 2009
- b) City of Waverly Plan of Action for Potential Flooding 2009
- c) Stanley Consultants, Inc. Dry Run Creek Study Update, Jan. 2009

Since the floods of 2008, the City of Waverly has actively engaged in multiple projects to mitigate future flood damage. The city is also examining the effects of flooding on past, current, and future development efforts.

Currently, the city is in the process of constructing a new inflatable dam to replace the former concrete hydro-dam. Phase 1 of the project was set for completion in February 2011, and Phase 2 is set for completion in November 2011. The inflatable dam is engineered to minimize flooding events in the northwest quadrant of the city. Future flooding protection plans will shift the focus toward southeast and southwest Waverly, because of the protection the inflatable dam will bring to northwest Waverly.

In summer 2010, the City of Waverly, RIO, FEMA, EPA, the US Department of Agriculture Rural Development (USDA RD), IDED, and the Iowa Northland Region Council of Governments (INRCOG) held an Iowa Smart Planning Principles workshop. The workshop was intended to help the city develop policies and project designs that could be incorporated into the upcoming comprehensive plan update. A key topic discussed at the workshop was the use of FEMA-purchased properties within the city limits. Workshop participants discussed ways the city could use these sites for the benefit of the community. In the final report, several recommendations were made to the City of Waverly regarding both future flood events and future development that adheres to the Iowa Smart Planning Principles set by Iowa Legislature April 26, 2010.

Most of the buyout properties noted previously have been demolished or in the process of being demolished. Some of the newly empty lots have been leased to residents for use as extra lawn area for homes. The leasing of the lots allows the city's maintenance department to leave the maintenance of the lots to the renters, reducing any associated cost burden to the city. The City of Waverly is enforcing the rules set by FEMA in terms of construction on and use of the buyout properties.

Several reports and studies have been completed or updated, but were not released in any plans. One such

Figure 7. City of Waverly flood action plans



Source: City of Waverly Plan of Action for Potential Flooding 2009

This topographic map depicts a residential neighborhood with various features and handwritten annotations. The map includes contour lines indicating elevation, building footprints, and areas of dense tree cover. Handwritten in blue ink are the following labels:

- Sand Bag Levee:** An arrow points to a red line running vertically through the center of the map.
- 1st Street Sk:** An arrow points to a road running horizontally across the middle of the map.
- 7th Avenue SE:** An arrow points to a road running vertically along the left side of the map.
- Cedar River:** An arrow points to a river running diagonally along the right side of the map.

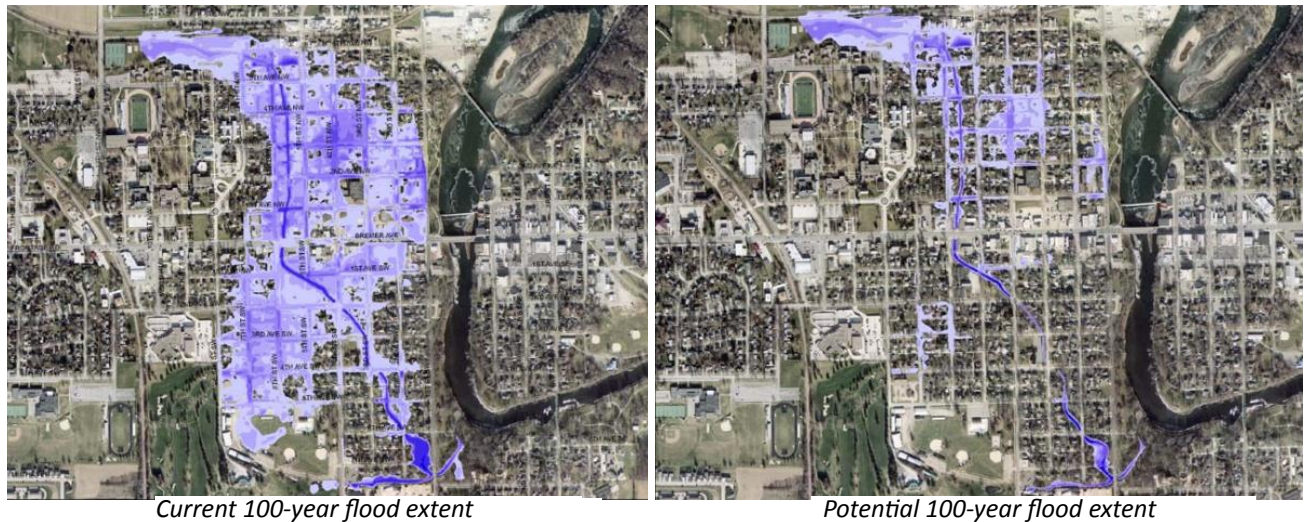
A north arrow is located in the bottom right corner of the map. Elevation points are marked with numbers such as 908.7, 908.6, 907.0, 906.8, 906.4, 909.5, 909.7, 910.3, 911.1, 909.4, 909.3, 909.2, 909.1, 909.0, 908.9, 908.8, 908.7, 908.6, 908.5, 908.4, 908.3, 908.2, 908.1, 908.0, 907.9, 907.8, 907.7, 907.6, 907.5, 907.4, 907.3, 907.2, 907.1, 907.0, 906.9, 906.8, 906.7, 906.6, 906.5, 906.4, 906.3, 906.2, 906.1, 906.0, 905.9, 905.8, 905.7, 905.6, 905.5, 905.4, 905.3, 905.2, 905.1, 905.0, 904.9, 904.8, 904.7, 904.6, 904.5, 904.4, 904.3, 904.2, 904.1, 904.0, 903.9, 903.8, 903.7, 903.6, 903.5, 903.4, 903.3, 903.2, 903.1, 903.0, 902.9, 902.8, 902.7, 902.6, 902.5, 902.4, 902.3, 902.2, 902.1, 902.0, 901.9, 901.8, 901.7, 901.6, 901.5, 901.4, 901.3, 901.2, 901.1, 901.0, 900.9, 900.8, 900.7, 900.6, 900.5, 900.4, 900.3, 900.2, 900.1, 900.0.

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update was the Dry Run Creek Study completed by Stanley Consultants. After updating the report, Stanley Consultants recommended that Dry Run Creek should undergo a deepening and widening process to increase the water flow and the total water capacity of the creek. The

images shown in figure 9 are from a presentation given by Stanley Consultants to the Waverly City Council in January 2009. The first image shows Dry Run Creek's current 100-year floodplain; the second image shows the same floodplain if Dry Run Creek was widened and deepened.

Figure 9. Dry Run Creek 100-year flood extent



Source: Stanley Consultants Dry Run Creek Update (1/5/09)

Table 2. Planning-related documents information		
Document	Author	Website
Waverly Flood Study, Jan. 2001	Stanley Consultants, Inc.	http://city.waverlyia.com/docs/WaverlyFloodStudy_January2001.pdf
Waverly Flood Study: Dry Run Creek Hydrologic Model, September 2002.	Stanley Consultants, Inc.	http://city.waverlyia.com/docs/WaverlyDryRunCreekStudySept2002.pdf
City of Waverly Comprehensive Land Use Plan 2005	Iowa Northland Regional Council of Governments	http://city.waverlyia.com/docs/Waverly%20Comprehensive%20Plan%202005.pdf
City of Waverly Subdivision and New Housing Statistics 1999-2006	City of Waverly	n/a
Rebuilding after the 2008 Flood	City of Waverly	http://city.waverlyia.com/docs/Rebuilding%20Handout%202008.pdf
2008 Code of Ordinances of the City of Waverly, Iowa	City of Waverly	http://city.waverlyia.com/city_ordinances.asp
2009 City of Waverly Plan of Action for Potential Flooding	City of Waverly	http://city.waverlyia.com/docs/Plan%20of%20Action%20+%20Maps.pdf
Waverly Flood Study: Dry Run Creek Hydrologic Model Up, Jan. 5, 2009	Stanley Consultants, Inc.	http://city.waverlyia.com/docs/1-5-2009%20Waverly%20Report%20Update.pdf
City of Waverly, Hazard Mitigation Plan 2009	Iowa Northland Regional Council of Governments	http://city.waverlyia.com/docs/waverly_hmp_update_june_2009_part_1.pdf http://city.waverlyia.com/docs/waverly_hmp_update_june_2009_part_2.pdf

Table 2. continued		
Document	Author	Website
Flood Recovery Projects and Expenditure 2010	City of Waverly	http://city.waverlyia.com/docs/Summary%20of%20Projects%20012510-%20.pdf
HMGP Buy-out List 2010	City of Waverly	http://city.waverlyia.com/docs/HMGP%20Properties%20with%20City%20closed%20properties%20shaded%204-30-10%20(69).pdf
Single Family New Home Permits: Calendar years 2007–2010	City of Waverly	n/a
EPA Smart Growth Workshop Final Report, 2010	Environmental Protection Agency	http://city.waverlyia.com/docs/Waverly%20Smart%20Planning%20Workshop%20Final%20Memo%20(1).pdf
City of Waverly Comprehensive Land Use Plan 2012 (Proposed Date)	Iowa Northland Regional Council of Governments	n/a

Table 3. Planning-related documents summary			
Document	Author	Brief summary	Important issues
Waverly Flood Study, January 2001	Stanley Consultants, Inc.	Hydraulic models created to show extent of flooding at differing levels of the Cedar River.	Creates the basis for flood zoning and flood mitigation strategies for differing flood levels
Waverly Flood Study: Dry Run Creek Hydrologic Model, September 2002	Stanley Consultants, Inc.	Hydraulic models created to show extent of flooding at differing levels of the Dry Run Creek	Creates the basis for flood zoning and flood mitigation strategies for differing flood levels.
City of Waverly Comprehensive Land Use Plan 2005	Iowa Northland Regional Council of Governments	The current land use plan was introduced	
City of Waverly Subdivision and New Housing Statistics 1999–2006	City of Waverly	Statistics related to new housing development in Waverly from 1999 to 2006	
Rebuilding after the 2008 Flood	City of Waverly	Brochure sent to the public after the floods of 2008 to help inform affected persons on what to do if property was damaged	
2008 Code of Ordinances of the City of Waverly, Iowa	City of Waverly	Four zoning overlay districts are established and restrictions are set for building and development for each district. The 100- and 500-year floodplains are established for better development regulation	The majority of affected properties lay within the 100-year floodplain.
2009 City of Waverly Plan of Action for Potential Flooding	City of Waverly	A guide for city employees and citizens for what will happen in the case of a flood. The severity of the flood is taken into consideration in this action plan. The purpose of this plan is to keep people well informed.	Details the city's strategy in protecting housing and other properties from flooding.

Table 3. continued

			Important issues
Waverly Flood Study: Dry Run Creek Hydrologic Model Up, January 5, 2009	Stanley Consultants, Inc.	An update to the Waverly Flood Study: Dry Run Creek Hydrologic Model, September 2002. The update focuses on what can be done to limit flooding from the Dry Run Creek.	Details implementation strategies to protect housing around the Dry Run Creek.
City of Waverly, Hazard Mitigation Plan 2009	Iowa Northland Regional Council of Governments	Defines flood sources, history of flooding in Waverly and affected areas; estimates damage costs in the event of a flood, housing options during flood events, current/past mitigation efforts, and future mitigation strategies.	Areas where flood damage was the heaviest received higher priority. Policy was formulated from this plan in terms of development.
Flood Recovery Projects and Expenditure 2010	City of Waverly	List of all flood recovery projects and expenditures given to the city council as a for spending relief funds, including buyout expenses.	
HMGP Buy-out List 2010	City of Waverly	List of 69 properties that were bought out by the City of Waverly.	
Single Family New Home Permits: Calendar years 2007-2010	City of Waverly	Statistics related to new housing development in Waverly from 2007 to November 2010	
EPA Smart Growth Workshop Final Report, 2010	Environmental Protection Agency	A detailed summary of a smart growth workshop that took place in Waverly during the summer 2010. The workshop was hosted by the EPA, FEMA and the City of Waverly.	The workshop gave the city some recommendations about the use of buyout properties as well as future flood mitigation strategies based on public input.
City of Waverly Comprehensive Land Use Plan 2012 (Proposed Date)	Iowa Northland Regional Council of Governments	In process update for the City of Waverly Comprehensive Plan of 2005. Because the document is not yet finished it is unavailable for public viewing.	The source of the shapefiles used in mapping.

Table 4. GIS-related data

Shapefile	Source	Website
Existing Land Use	Iowa Northland Regional Council of Governments (INRCOG)	n/a
Future Land Use	INRCOG	n/a
Floodway	INRCOG	n/a
Transportation Corridors	INRCOG	n/a
Bremer County Water	INRCOG	n/a
Waverly City Limits	INRCOG	n/a
Roads	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
Flood Hazard Areas	Iowa Department of Natural Resources	http://www.igsb.uiowa.edu/nrgislibx/
Aerial Photograph	ESRI	ArcMap 10.0 Built-in Basemap

References

- City of Waverly. 2006. City of Waverly Subdivision and New Housing Statistics 1999–2006.
- City of Waverly. 2008. Code of Ordinances of the City of Waverly: Floodplain Management. 200: 102.1-102.10.
- City of Waverly. 2008. City of Waverly Rebuilding After the 2008 Flood.
- City of Waverly. 2009. City of Waverly Plan of Action for Potential Flooding 2009.
- City of Waverly. 2010. Flood Recovery Projects & Expenditures 2010.
- City of Waverly. 2010. City of Waverly HMGP Buy Out List 2010.
- City of Waverly. 2010. Single Family New Home Permits, Calendar Year 2007–2010.
- Environmental Protection Agency (EPA). 2010. *EPA Smart Growth Workshop Final Report*.
- Iowa Northland Regional Council of Governments. 2004. City of Waverly Comprehensive Land Use Plan 2005.
- Iowa Northland Regional Council of Governments. 2009. City of Waverly Hazard Mitigation Plan 2009.
- Iowa Northland Regional Council of Governments. 2011. City of Waverly Comprehensive Land Use Plan 2012 (Proposed Date).
- Stanley Consultants Inc. 2001. *Waverly Flood Study, January 2001*.
- Stanley Consultants Inc. 2002. *Waverly Flood Study: Dry Run Creek Hydrologic Model, September 2002*.
- Stanley Consultants Inc. 2009. *Waverly Flood Study: Dry Run Creek Hydrologic Model Update, January 5, 2009*.