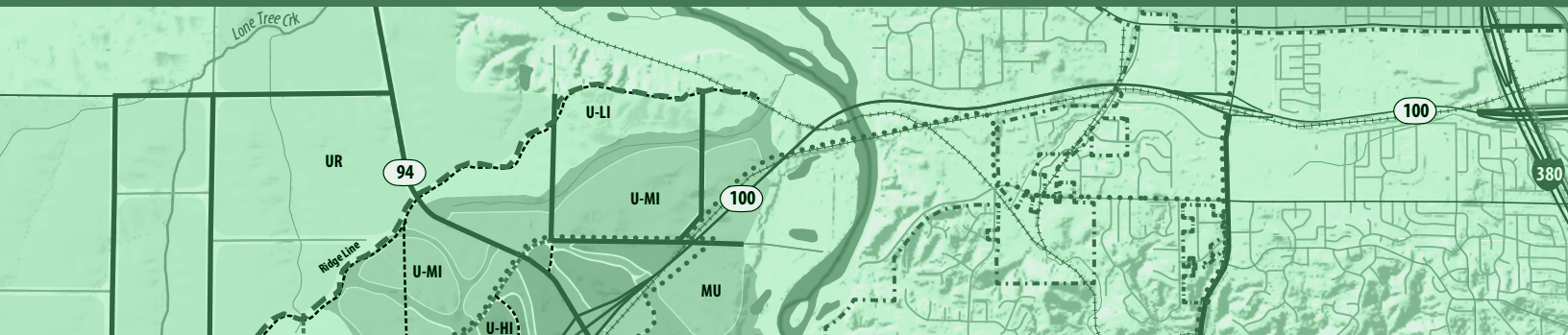




HIGHWAY 100 CORRIDOR MANAGEMENT PLAN



PREPARED FOR
CORRIDOR MPO
BY
HR GREEN, INC.
RDG PLANNING & DESIGN
DRAFT FEBRUARY 12, 2016

ACKNOWLEDGEMENTS

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1

INTRODUCTION



PURPOSE

The construction of Highway 100 will have a dramatic impact on how its surroundings develop and on the transportation system necessary to serve this anticipated growth. What was once the edge of Cedar Rapids will eventually be a burgeoning center of residential, employment, commercial, and mixed use development. The overall goal of this document is to create a development vision that unites these various and sometimes conflicting forces, and helps the county, cities, and other decision makers manage this change in ways that are beneficial to both the economic and natural environments. It promotes orderly growth and development as well as a plan for necessary infrastructure improvements to accommodate this future growth. Ultimately, this plan conveys an approach to facilitate urban development that integrates:

- Multi-modal/complete streets transportation alternatives and links them to associated land uses;
- Protection of open spaces and sensitive environmental areas;
- Preservation of the existing rural character of the area as well as transitioning new developments toward urban design standards;
- A regional growth management strategy that considers annexation; and
- An evaluation of the feasibility of sustainable design options in comparison to conventional methods.

STUDY AREA

The study area is comprised of approximately 14,500 acres of land. It can be generally defined as the unincorporated area east and west of the U.S. Highway 100 alignment starting at the intersection of Collins Road (Highway 100) and Edgewood and proceeding to the interchange at Highway 100 and U.S. Highway 30. The western limits of the study area are slightly beyond 1 mile of the referenced highway. **Map 1** illustrates the extent of the study area. In addition, the map identifies future land use beyond the study's original scope, although considerations to infrastructure needs are limited to the 1-mile area.

RELEVANT STUDIES, PLANS, AND AGREEMENTS

An enormous amount of design work has been undertaken over the past few years, producing a wealth of data that bears on the growth and development of the transportation system. One of the initial tasks in developing a viable and cohesive transportation and land use plan involved extracting and integrating relevant portions of previous planning efforts into a single document. A review of the following plans for their applicability to this current effort was a key first step in the process.

The project team, consisting of MPO Staff and the Project Steering Committee, reviewed and incorporated relevant elements in other adopted plans. The summary below provides a synopsis of each plan that was reviewed, the purpose of each plan, and the respective plan's relevance to the Highway 100 CMP.

USE OF THIS DOCUMENT

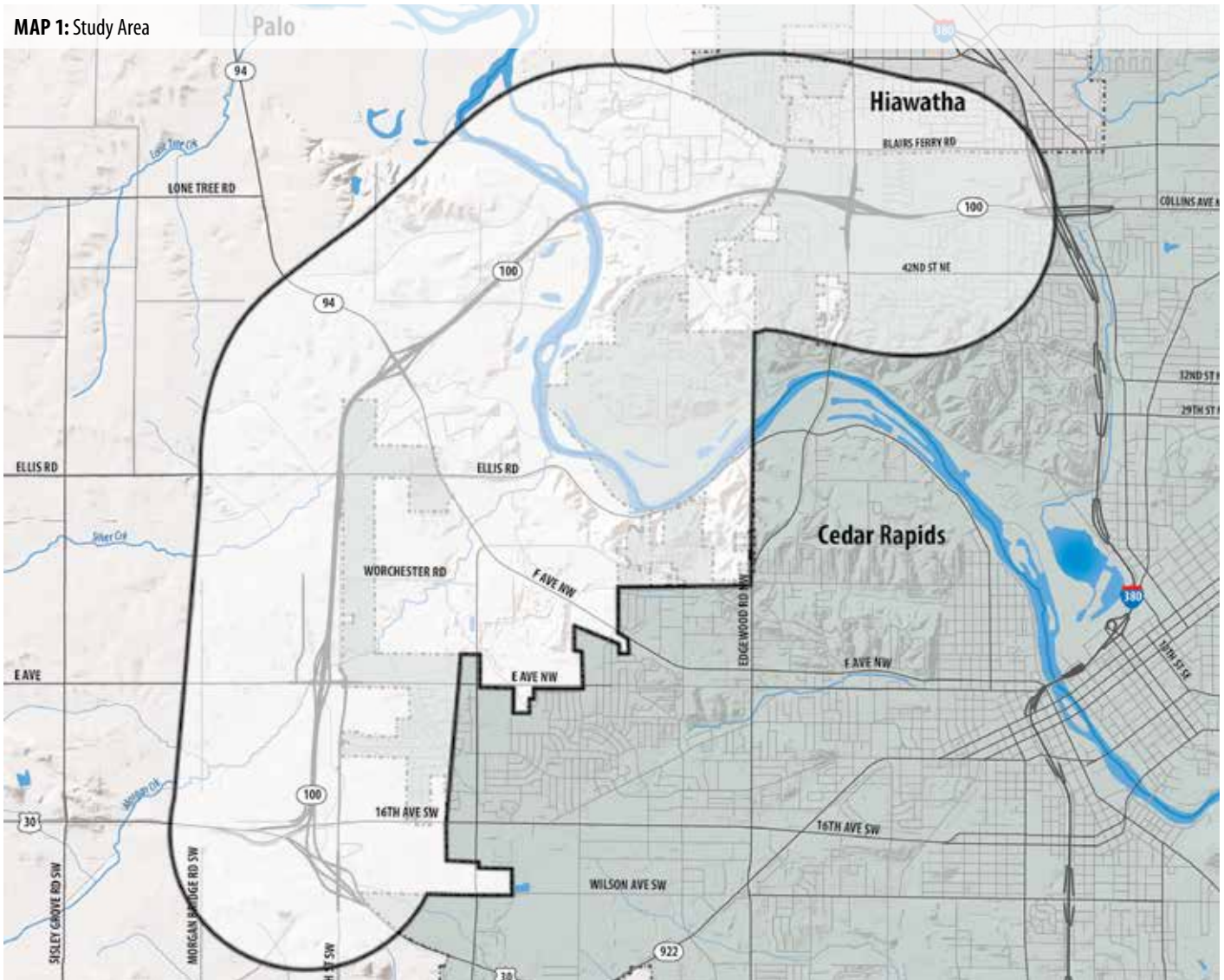
The Highway 100 Corridor Management Plan (CMP) is organized to allow citizens, public officials, and other stakeholders to understand the methodology associated with creating this plan and ultimately transition to the implementing recommendations cited in this document. This plan is also sensitive to the extraterritorial area impacting the cities of Cedar Rapids, Fairfax, Hiawatha, and Palo. The plan strives to identify compatible land uses and circulation patterns that do not create unintended consequences for communities abutting the study area.

The Plan was also vetted by MPO staff, the Highway 100 CMP Steering Committee, and the MPO Policy Board. The plan will be adopted by the MPO; however, respective municipalities are also encouraged to adopt this plan.

Ultimately this plan should guide future growth and development projects. The substance of this plan is consistent with the EnvisionCR Plan as well as comprehensive plans of adjacent communities at the time of adoption and is intended to compliment and provide more detail to city-wide comprehensive plans. As documents such as EnvisionCR and the Linn County Rural Land Use Plan evolve, this document should be evaluated and modified to address inconsistencies which may emerge in the future.

- **EnvisionCR (2015).** EnvisionCR serves as Cedar Rapids' comprehensive plan, and was completed on a parallel tract to the Highway 100 CMP. The future land use map approaches land use designation around Highway 100 using intensity-based land uses: low, medium, and high, while also designating areas for specific commercial uses.
- **Connections 2040 (2015).** This document references the Corridor MPO Long-Range Transportation Plan. Adopted on June 18, 2015, this plan cites several regional transportation and transit projects for the metropolitan Cedar Rapids area – including around the Highway 100 project. This document was used to define the functionality of the Highway 100 project and linkages to ancillary improvements such as Highway 30 and regional trail systems just to name a few. While the focus of this plan are the transportation projects that are programmed to received funding over a five-year period, the document also provides important context to the future development of abutting land. The document also implements a mode-based split for future funding with a 50% allocation for road projects, 30% for trail projects, and 20% for transit.
- **Highway 100 Corridor Project.** The Iowa DOT is a partnering agency on the corridor management plan and is contributing to offset a portion of the expenses. Construction of the Highway 100 improvements started in 2014 and will be implemented over several construction seasons. Of equal importance this circumferential highway will address regional traffic circulation patterns and ease congestion on existing systems. The six-mile alignment will also create opportunities for future development on abutting property via interchanges and accommodations for non-vehicular travel.

MAP 1: Study Area



SOURCE: CORRIROR MPO. THIS PLAN CONSIDERS DEVELOPMENT BEYOND THE STUDY AREA.

- **Comprehensive Plans.** Comprehensive Plans for the Cities of Cedar Rapids, Fairfax, Hiawatha, and Palo as well as the Linn County Comprehensive Plan. The study area currently consists largely of agricultural land that falls under the jurisdiction of Linn County, Iowa. However, the target area also has implications for several adjacent communities. Of particular interest are the comprehensive plans of these communities to provide some perspective about plans each community envisions for their respective extraterritorial (or two-mile) area. The consulting team examined planned land uses, transportation and utility improvements envisioned for these areas and how they could influence the Highway 100 corridor. The document review was also followed up with one-on-one conversations with local officials to confirm information contained in the plans as well as to gain additional insights on plans currently being considered as well as development pressures affecting the study area.
- **Cedar Rapids Comprehensive Trails Plan.** The City of Cedar Rapids adopted a trails plan for the metropolitan area in January 2012. This plan outlines a far-reaching plan for pedestrian and recreational trails in Cedar Rapids as well as adjacent communities. Being that this plan envisions

the design and construction of several trails in the study area, it is particularly pertinent that this document would be incorporated into future planning for non-vehicular transportation in the area. Another key attribute of this plan is the desire to use trails to connect with employment centers, neighborhoods, parks, schools, and related destinations. This plan also strives to incorporate vehicular and non- vehicular travel as a means of moving people throughout the study area and creating links to venues of importance.

- **28E Agreements summarizing urban service and/or annexation boundaries for communities in the Cedar Rapids metropolitan area¹.** Some communities have entered into 28E Agreements , also known as intergovernmental agreements to define annexation borders as well as address related concerns about development occurring along a common boundary. The agreements cited in this document pertain to future annexations and in some instances specific utility improvements to be provided by one city to the other. These agreements are valid for up to ten years and can be renewed.

¹ 28E refers to the section in the Code of Iowa that enables two or more governmental jurisdictions to enter into a common agreement for future planning, development, provide selected services, etc.



2

CONDITIONS AND CONCEPTS



The land use planning process for the Highway 100 Corridor Management Plan begins with estimating probable demand for new urban land. Two factors contribute to this estimate: the natural population growth that the area is likely to experience as part of the Cedar Rapids metropolitan area and the additional development generated by a dramatic new influence: the extension of Highway 100 to Highway 30.

DEVELOPMENT INFLUENCES

Population Changes and Trends

The roughly 23 square mile of the study area includes two primary development contexts: the City of Cedar Rapids and low-density rural residential areas beyond the reach of existing urban services. This study area is particularly interesting because it represents the leading edge of western expansion of the Cedar Rapids metropolitan area and each of these contexts has a different personality. **Table 2.1** summarizes population growth for the City of Cedar Rapids between 2000 and 2010.

Population Scenarios for Cedar Rapids

By 2030, population is anticipated to increase between 12,000 and 30,000 people, growing from a 2015 population of 130,000 to between 142,000 and 160,000. In Cedar Rapids' natural course, it will continue to develop at a rapid rate, while Fairfax, smaller and somewhat more distant, would experience moderate growth. Because of its increasing population base, Cedar Rapids' annual growth rate is anticipated to increase at 0.64% compound annual growth rate (CAGR), reflecting the CAGR from 1960 to 2010, which is a slightly higher CAGR experienced from 2000 to 2010 (0.45% CAGR). These projections are included in the table and shown in **Chart 2.1** Population Change. The projection also includes a more aggressive 1.0% CAGR.

EnvisionCR anticipates that development will primarily focused on infilling areas of the existing city and later supporting fringe development with extension of services. Hypothetically, if all growth were to occur in the Highway 100 area, it would absorb 1.75 to 4.5 square miles for residential uses. This calculation assumes an average density of 6 housing units per acre at 2.2 people per household, and 20% of the gross area is reserved for roads, infrastructure, and minimal environment preserve.

Current Development and Trends

The study area is primarily rural and unincorporated. Development has occurred in very low-densities along local roads that generally align with the section line grid. South of Highway 30, development density is limited by difficult access and lack of public services, yet this area is not considered in the CMP. Residents here include a combination of people who are associated with the metro area, but prefer to live on large rural lots or the convenience of access to Highway 30. Despite the amount of land covered by this very large-lot residential development, its linear pattern along section lines will eventually front streets designated as collector streets.

Several rural subdivisions are located northeast of the study area and adjacent to the Cedar River. In addition, Covington is generally located north of Ellis Boulevard and southeast of the planned Highway 100 alignment. These areas have been developed as large-lot rural subdivisions and are served by private wells and septic systems.

In general, these affected areas (see **Map 1**) are transitioned into the recommended land use plan and are buffered by parks, stormwater management areas, and separation distances. However, these areas could pose challenges in the event that an adjacent city annexes the area and/or septic and wells fail. These situations often result in relatively costly wastewater and water service extensions to replace the failed systems.

Anticipated Community Services. As the Highway 100 area develops, the City of Cedar Rapids anticipates establishing services for police, fire, utilities, parks and trails as well as traditional services associated with municipal services. In addition, the Cedar Rapids Community School District has acquired property within the study area to address future school facility needs. Chapter 3, Preferred Land Use Plan, identifies possible locations for amenities typical for designing neighborhoods.

Anticipated Utilities and Infrastructure. **Map 2.1** illustrates the locations where future improvements to water and sewer infrastructure are planned. In addition, current roadways are identified. These facilities are developed as rural cross-sections. As future development materializes in this area, roads will be converted to an urban design standard and be consistent with a complete streets design approach.

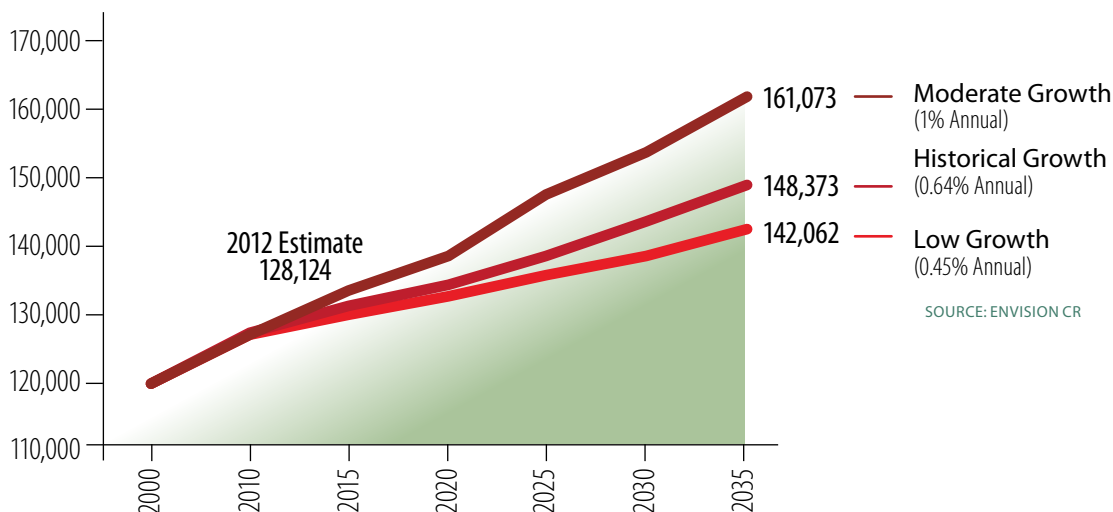
Property Ownership

Large tracts of land in common ownership could be assembled in the future for major planned development. **Map 2.2** shows property ownership for the CMP study area. The pattern of ownership indicates that the northern properties are held by many owners in smaller parcels, while the southern properties are held by fewer owners in larger parcels. Assuming property owners are amenable to their property transitioning to urban use, the properties in the southern area appear to be logical candidates for a single (or consortium) of developers to initiate a major development project in the southern area.

Private Wells and Septic Systems

The presence of private wells and/or septic systems can create challenges in transforming rural developments into subdivisions that are constructed to an urban design standard. Design requirements associated with the creation of septic fields often create economic challenges for converting private systems to standard municipal utility systems. In addition, private systems are prone to failure which also creates a burden to a city's utility now bound to provide service to an affected area.

The target area has in excess of 640 private wells. **Map 2.3** and **Table 2.2** show private water supply wells. Wells summarized in this table serve at least 25 people and/or have at least 15 service connections.

CHART 2.1: Population Change and Projection**Table 2.1: Projected Population Growth**

	2000	2010	2012 Est.	2015	2020	2025	2030	2035	Change 2015-30
Natural Population Change ²	120,758	126,326	128,124	128,283	130,644	132,825	134,367	134,854	6,570
Historical Growth Rate Medium (1960-2010 Annual Growth = 6.4%)	120,758	126,326	128,124	130,600	134,833	139,203	143,715	148,373	17,773
Historical Growth Rate Low (2000-2010 Annual Growth = 0.45%)	120,758	126,326	128,124	129,861	132,810	135,825	138,909	142,062	12,201
High Growth Rate (1% Annual Growth)	120,758	126,326	128,124	132,006	138,740	145,817	153,255	161,073	29,066

SOURCE: US CENSUS BUREAU, RDG PLANNING & DESIGN

Table 2.2: Private Water Supply Wells**Public Water Supply Wells (Portion of Linn, County, Iowa)**

Facility Name	Address	City	Zip	Status	PWS Source	PWS Type
Glenn Oaks Addition	1951 Carrier Road	Palo	52324	Active	Ground Water	Community
John XXIII Catholic Church	2984 80th Street SW	Fairfax	52228	Active	Ground Water	Transient Non-Community
Chestnut Ridge	6310 High County Drive NE	Cedar Rapids	52411	Active	Ground Water	Community
Twin Knolls Sixth Addition	4316 Cloverdale Road	Cedar Rapids	52411	Inactive	Ground Water	Community
Morgan Creek Park	10260 Morris Hills Drive	Toddville	52341	Active	Ground Water	Transient Non-Community
Twin Knolls Fourth/Fifth Addition	4353 Cloverdale Road	Cedar Rapids	52411	Active	Ground Water	Community
Crestwood Acres	4110 Emerson Avenue NE	Cedar Rapids	52411	Active	Ground Water	Community
Oak Valley	4601 Deer View Road	Cedar Rapids	52411	Active	Ground Water	Community
Seminole Park-city Well	-	Cedar Rapids	52411	Inactive	Ground Water (GUI)	Transient Non-Community
Brittany Estates Homeowners Association	3092 Brittany Circle	Cedar Rapids	52411	Active	Ground Water	Community
Contractors Machinery, Inc.	10415 J Street	Cedar Rapids	52404	Inactive	Ground Water	Transient Non-Community
Private Business	1962 5th Avenue	Marion	52302	Inactive	Ground Water	Transient Non-Community
Essential Montessori School	-	Cedar Rapids	52411	Inactive	Ground Water	Transient Non-Community
Teahen Land LLC - Chapel	-	Cedar Rapids	52405	Inactive	Ground Water	Transient Non-Community

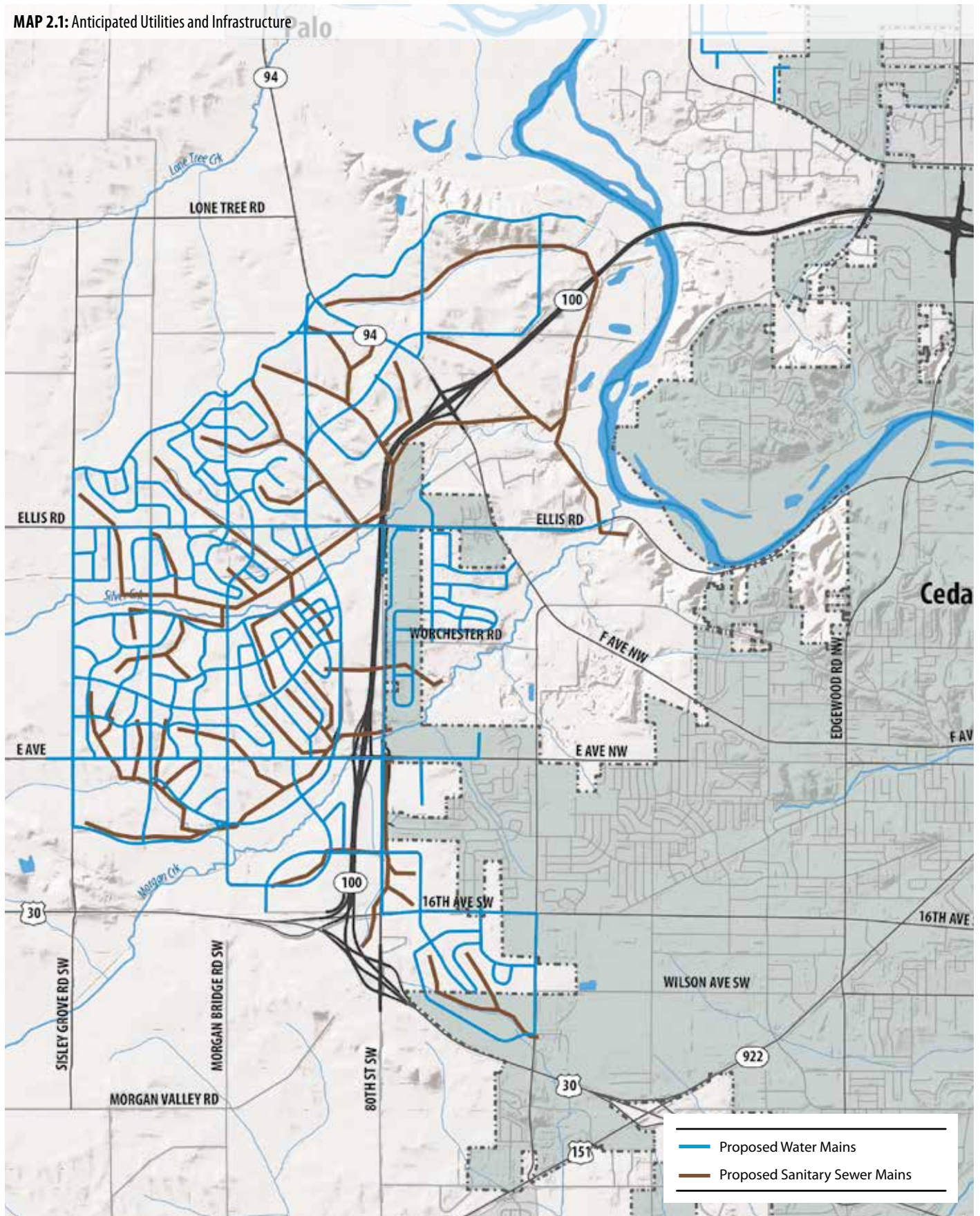
(1) A well serving > 25 people or with >15 service connections

(2) Well operating under a water use permit (>25,000 gallons per day). Municipal wells not shown.

(3) Private wells not listed (i.e. Domestic, irrigation, etc.)

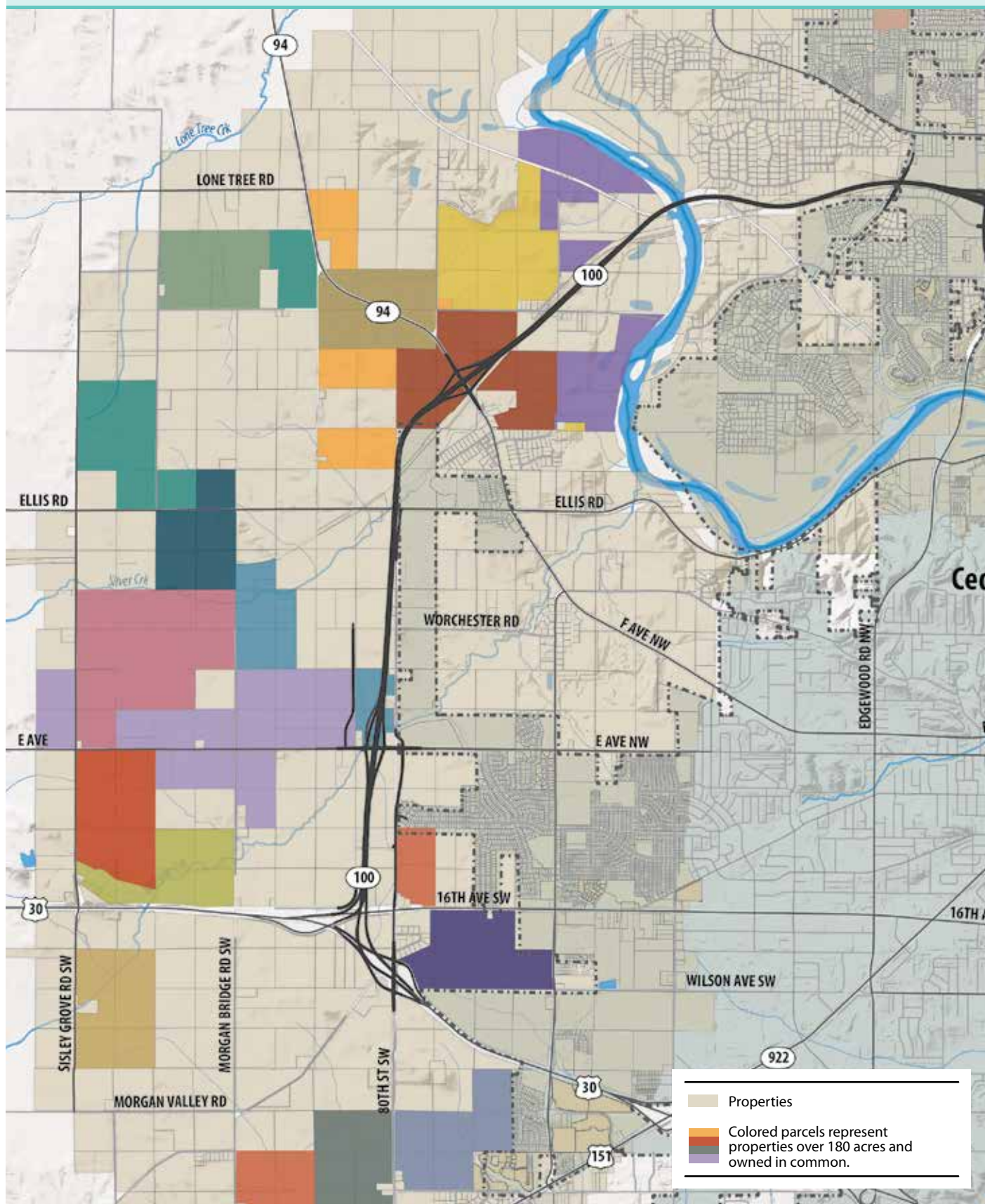
² Natural Population Change (births and deaths). A younger population will have more people in child-bearing or family formation years. Such a population will have higher fertility (number of births per 1,000 residents) than mortality, trending toward a population increase.

MAP 2.1: Anticipated Utilities and Infrastructure

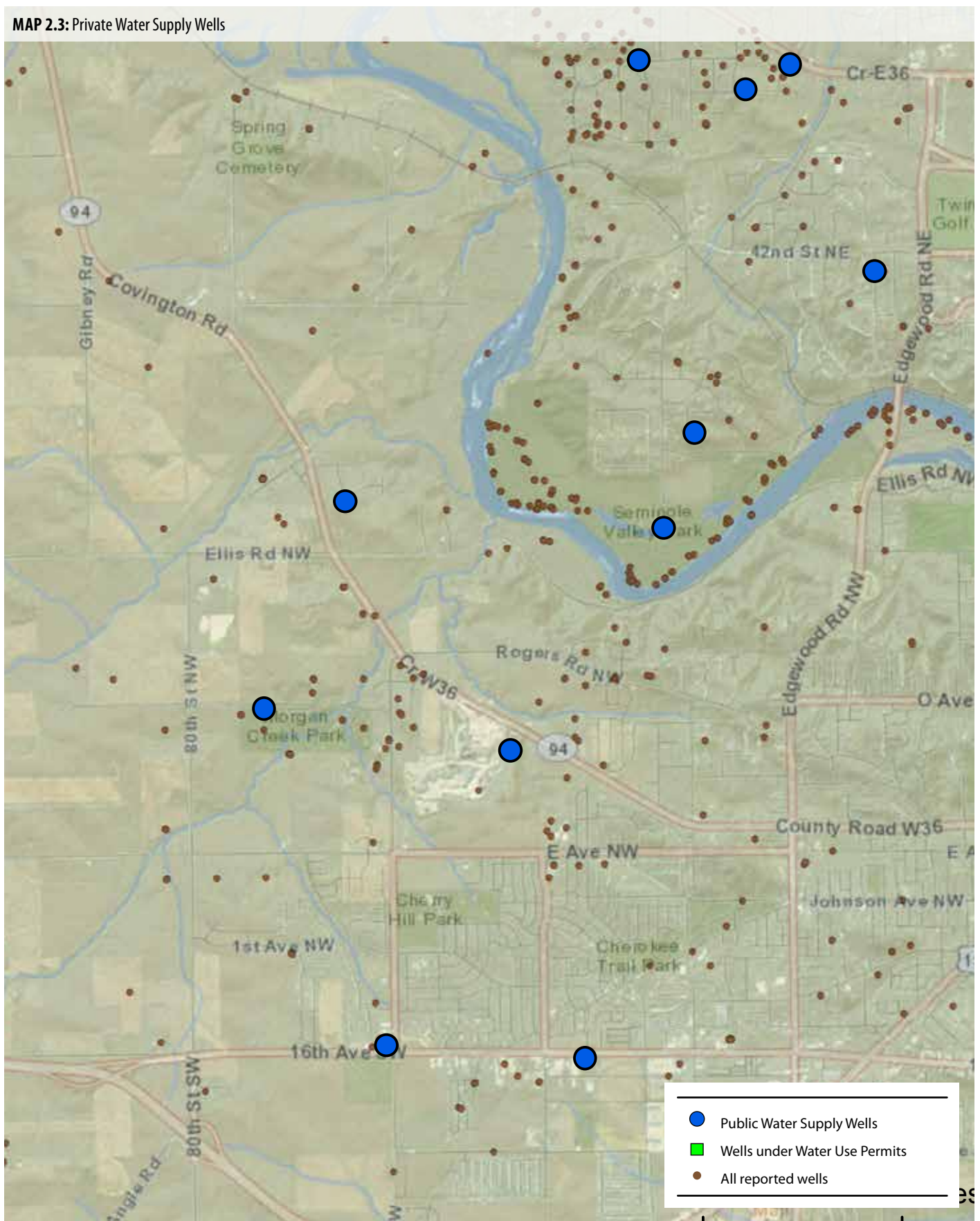


SOURCE: E: HR GREEN, INC.

MAP 2.2: Property Ownership



MAP 2.3: Private Water Supply Wells



Of these, John’s Catholic Church also operates under a Water Use Permit meaning >25,000 gallons per day. Municipal wells fall under these categories too but are not shown here in detail (i.e., the Cedar Rapids well field). Other private wells (e.g., domestic) are shown but there is not much information available, including location accuracy or status (e.g., active, plugged). In general, each farm house will have at least one well.

Areas that are subject to annexation may pose some challenges relative to transitioning home and business owners from private systems to municipal services.

Rural Subdivisions

Much of the land within the study area is comprised of unincorporated land. Several rural subdivisions are located northeast of the study area and adjacent to the Cedar River. In addition, Covington is generally located north of Ellis Boulevard and southeast of the planned Highway 100 alignment. These areas have been developed as large-lot rural subdivisions and are served by private wells and septic systems.

Quarries

The Crawford Quarry is located south of F Avenue NW/Covington Road, east of Stoney Point Road NW, and north of E Avenue NW. Several urban, low-density residential subdivisions are relatively close to this facility. An interview with a company representative indicates that the business is likely to remain active for the next 40 to 50 years. A redevelopment plan should be prepared for the property to consider adapting the quarry as a water amenity. The redevelopment plan should consider possible phases for public and private uses.

Century Farms

The presence of century farms¹ in Iowa also creates an additional layer of oversight and compliance issues, areas that may be targeted for growth and conversion to urban development. Consistent

with Iowa’s agricultural history, the State has adopted policies and practices that identify and protect farms that have been in a family ownership for 100 or more years. The purpose of this section is to provide some perspective about where century farms are located in the study area and allow cities to understand many of the requirements that are associated with annexation, zoning policies, and economic development.

Select provisions of the Iowa Code place certain limitations on development when century farms are involved. By definition, a century farm must consist of an area which is at least 40 acres and has been held in continuous ownership by the same family for one hundred years or more. Century farms are sometimes called protected farmland. **Table 2.3** summarizes some of the more common concerns linked to city growth and/or economic development involving both farmland and century farms.

Based on the potentially significant impacts resulting from the presence of agricultural land and an expectation that the Highway 100 corridor represents a future growth area for the metro area, HR Green worked with the Linn County Auditor and the Iowa Department of Agricultural and Land Stewardship to identify registered century farms and determine if the study area was impacting these types of agricultural areas.

The Iowa Department of Agriculture provided a database of century farms registered with the state through 2013. Our team identified those farms that are within the project limits. **Map 2.4** highlights the sites that are consistent with the protected farmland definition.

Century farms³ are generally subject to special conditions if and when land that meets this definition is being considered for annexation or included in an Urban Renewal Area/tax increment financing (TIF) area. For example, Iowa Code Chapter 403 Urban Renewal requires that any farmland that meets this definition or is designated as “agricultural land” not be included in the district unless the owner of the land agrees to include the land in the urban renewal area. .

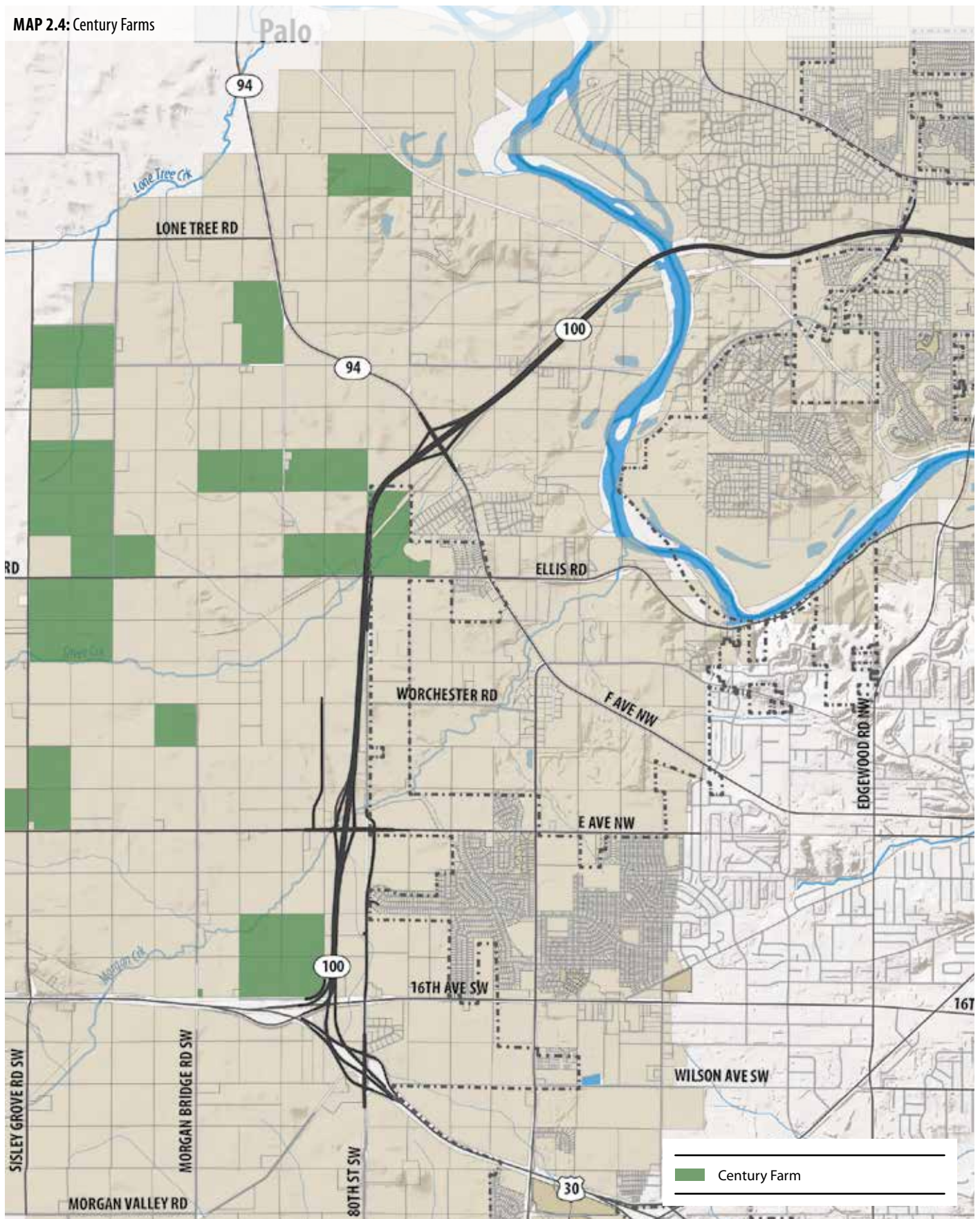
Table 2.3: Century Farms	
Iowa Code Section	Summarized Provision
368.26 Annexation of Certain Property	Renders city ordinance(s) adopted for the purpose of regulating protected farmland as unenforceable.
403.7 Condemnation of property through the use of eminent domain for economic development purposes.	Municipalities may not condemn agricultural land by exercising its eminent domain authority within an economic development area unless the owner of the agricultural land ² consents to the condemnation or unless the municipality determines the land is necessary to: 1. Operating a city utility; or 2. Operate a city franchise conferred by the authority to condemn private property under 364.2.
403.17, subsection 10, Economic Development Area	Urban Renewal Areas designated as an economic development area shall not include agricultural land , including land which is part of a century farm, unless the owner agrees to include the land.

¹ Definition of a *century farm* is cited in Iowa Code Chapter 403.17.10.

² Agricultural land (Iowa Code 403.17, subsection 3) is defined as real property owned by a person in tracts of ten acres or more and not laid off into lots of less than ten acres or divided by streets and alleys into parcels of less than ten acres, and that has been used for the production of agricultural commodities during the three out of the past five years.

³ Sometimes also referred to as “protected farmland” is described as a farm in which is at least forty acres and has been held in continuous ownership by the same family for on hundred years or more.

MAP 2.4: Century Farms



SOURCE: HR GREEN, INC.

A similar condition also exists in the Iowa code governing annexations. Specifically, Iowa Code Chapter 368.26 (1) states that: A city ordinance or regulation that regulates a condition or activity occurring on protected farmland or regulates a person who owns and operates protected farmland is unenforceable against the owner of the protected farmland for a period of ten years from the effective date of the legislation. Section 335.2 states that this provision shall apply to the protected farmland until the owner of the protected farmland determines that the land will no longer be operated as an agricultural operation. Any enforcement activity conducted in violation of this section is void.

While the presence of agricultural land and century farms do not necessarily prevent cities from annexing land or helping facilitate economic development. The cited provisions in the Iowa code create some conditions that may limit or impact a city's ability to regulate and/or facilitate private development when protected land is involved.

28E Agreements

Iowa Code Chapter 28E enables two or more governmental entities to enter into intergovernmental agreements to improve efficiencies and coordination in the delivery of public services and policies. Quite often these agreements include provisions for shared services; however, this section of the report summarizes agreements that address future growth issues and outlines growth boundaries. The summary below (**Table 2.4**) includes a synopsis of two Annexation Moratorium Agreements that exist between the City of Cedar Rapids and the cities of Atkins and Palo.

Annexation

Iowa Code Section 368 includes provisions for various approaches to annexation as well as requirements that are associated with each process. The code outlines six methods available to cities to annex property, the majority of which involve voluntary methods. While involuntary annexation is an option, it places a significant burden on the city to justify the annexation request. In addition, if approved by the city development committee the petition is subject to a referendum. Based on the unlikely event that a city will file a voluntary annexation request, this section will focus on applications and application scenarios that may be more likely to occur.

- Voluntary annexation
- Voluntary application that includes non-consenting land owners within an urbanized area Map 2.5 illustrates the two-mile extraterritorial boundaries of cities and its relationship to the study area.
- Voluntary application that includes non-consenting land owners that is not within an urbanized area
- Urbanized annexation
- Non-urbanized annexation
- Secondary road annexation (368.7A)
- Involuntary: (368.11)

Different approaches to annexation can also be augmented by moratorium agreements and/or fringe-area agreements. It is sometimes advantageous for two or more contiguous communities that are contiguous. The former is meant to designate a specific annexation area.

Table 2.4: Applicable 28E Agreements			
Parties to the Agreement	Date Enacted	Expiration Date	Key Provisions
City of Cedar Rapids and the City of Atkins	11-7-2007	11-7-2017	<ul style="list-style-type: none">• Intended to facilitate orderly growth• Establishes a policy instrument for unincorporated land near the two municipalities<ul style="list-style-type: none">- No voluntary/involuntary annexations within the defined area- Extraterritorial subdivision approval authority granted to both communities (e.g., two miles within corporate limits)• Communities will not offer economic incentives to relocate an entity from the other community without written authorization from the affected communities
City of Cedar Rapids and the City of Palo	5-16-2007	5-16-2017	<ul style="list-style-type: none">• Date Establishes a long-term policy regarding the annexation of land near the two municipalities<ul style="list-style-type: none">- Annexation limited to defined area- Extraterritorial subdivision approval authority granted to both communities (e.g., two miles within corporate limits)• City of Cedar Rapids will provide sanitary sewer services to the City of Palo• City of Palo agrees that all public improvements (e.g., water, sanitary sewer, storm sewer, drainage facilities, streets, and sidewalks) will conform to the Cedar Rapids Metro Area Design Standards Manual• Communities will not offer economic incentives to relocate an entity from the other community without written authorization from the affected community

Future land use with an emphasis on extraterritorial areas

Map 2.5 identifies cities, their incorporated areas and annexation agreements. The urban fringe of these cities are considered a transitional zone where rural development is likely to become urbanized.⁴ As such, comprehensive plans and future land use plans for affected communities were reviewed and evaluated for land use compatibility issues. The summary below references the affected jurisdiction and planned future use for the area that is adjacent to the study area.

- **City of Atkins.** The eastern area associated with the City's future land use map envisions a combination of single-family residential development and a corridor reserved for a conservation district. Also anticipated is a future trail extension following the "conservation district" and linking to a Linn County Trail system located northeast of the city.
- **City of Fairfax.** Much of the City's growth corridor is developed as low-density residential housing with a limited number of multi-family residential, agricultural, and highway commercial zoning in place. Williams Boulevard (U.S Highway 151) provides a common link to the City of Cedar Rapids and the City of Fairfax.
- **City of Hiawatha.** The affected area is generally bounded by Tower Terrace Road and the Cedar River. Most of the future land use designations consist of low- to high-density residential uses. However, some industrial and commercial development is targeted in the south and north along County Home Road.
- **Linn County.** The Linn County Comprehensive Plan adopted in 2013 identifies a Metro Urban Service Areas (MUSA) which is comprised of areas adjacent to the cities of Cedar Rapids, Marion, Hiawatha, and Robins. It is intended that the USAs be maintained primarily for agricultural use until such time as the land is needed for orderly city development and is annexed into the adjacent city. If land within the USAs is developed under county jurisdiction, it shall be developed in a manner compatible with the adjacent city.

- **City of Palo.** The southeastern area totaling approximately 52 acres is designated as future residential area and reserved space. The "reserved space" designation does not have a specific reference regarding future use; however, it would be reasonable to assume this area will be designated for an urban development of some type and falls under a City-County Strategic Growth Plan with Linn County.

Approved Plats and Zoning Requests

While much of the study area is either undeveloped agricultural area, several property owners filed site plans and plats concerning real estate development projects. **Map 2.6** illustrates the location and general nature of these projects. **Table 2.5** also provides some additional details concerning the applications, scale and filing status.

Fire Service

In communication with the Cedar Rapids Fire Department, the study area would likely be served by Stations #4 and #9. The department has a response time goal of 3.5 minutes and serving a population of up to approximately 9,000 residents. Estimated response times from Station #4 located at the E Avenue to the subject area is 7.5 minutes.

While facility decisions are recommended by the City Council's Public Safety & Youth Services Committee, the department representative indicated that Station #4 could be relocated near Xavier High School; however, consideration of a move like this would be based on the rate and scale of development occurring in the study area and the availability of funds to support a capital project of this nature. In addition, any change or expansion of a fire facility is subject to a more detailed study.

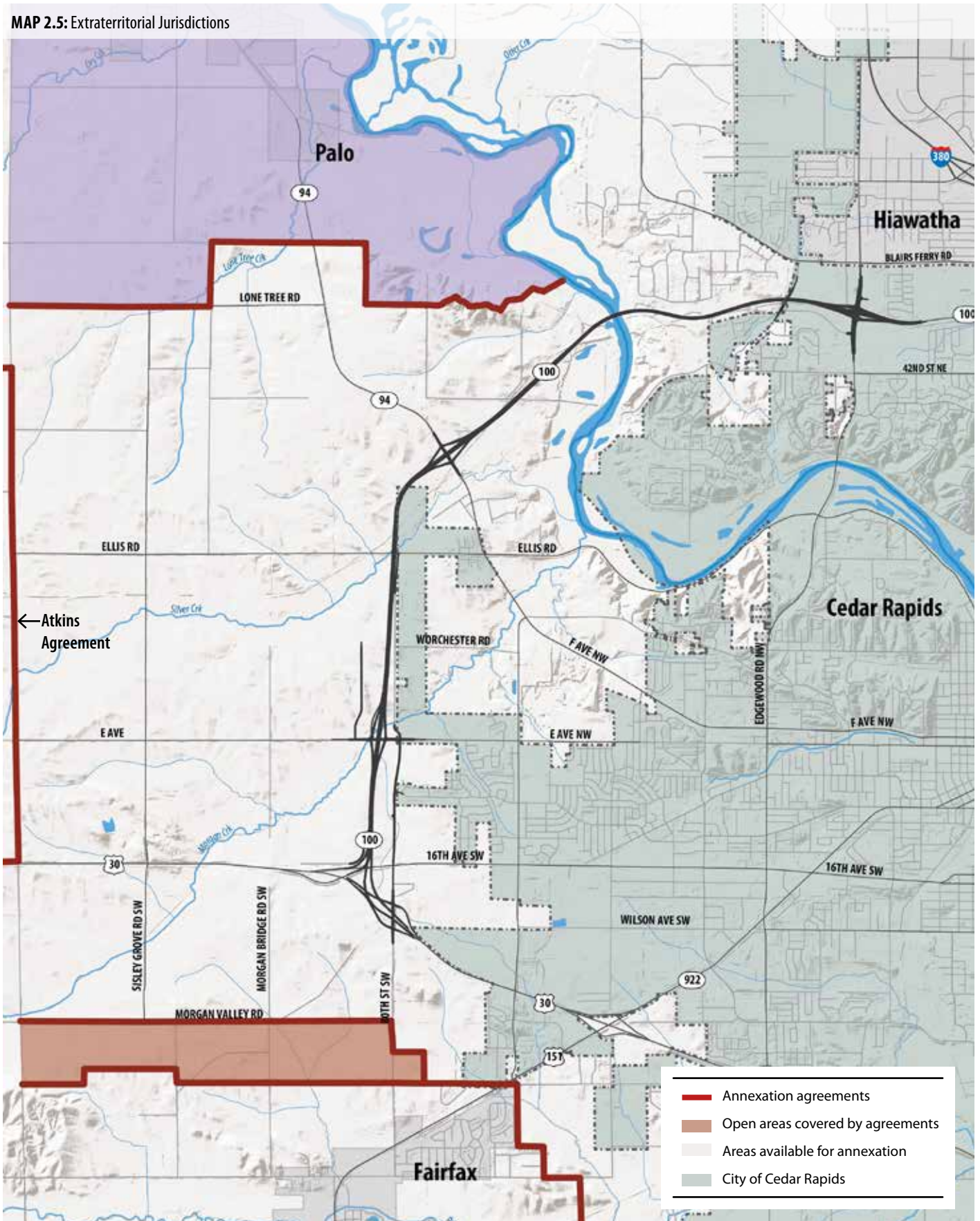
As this fringe area is developed as an urban area, policy makers and staff are encouraged to apply relevant planning and design standards that encourage compact and orderly growth. These practices improve the quality and manages the cost of delivering these services.

Table 2.5: Plat and Zoning Activities Adjacent to Study Area

Name of Project	Project Type	Approval Date
River Ridge North Office Park Renovation	Preliminary Plat	Cedar Rapids City Council - 12-2-2013
Stoney Point 24 th Addition	Preliminary Plat	Cedar Rapids City Council - June, 2012
Cawiezell First Addition	Final Plat	-
Forrest First Addition	Minor Preliminary Plat	Linn County
Red Rock Addition	Preliminary Plat	Cedar Rapids City Council
Sisley Grove First Addition	Preliminary Plat	Linn County

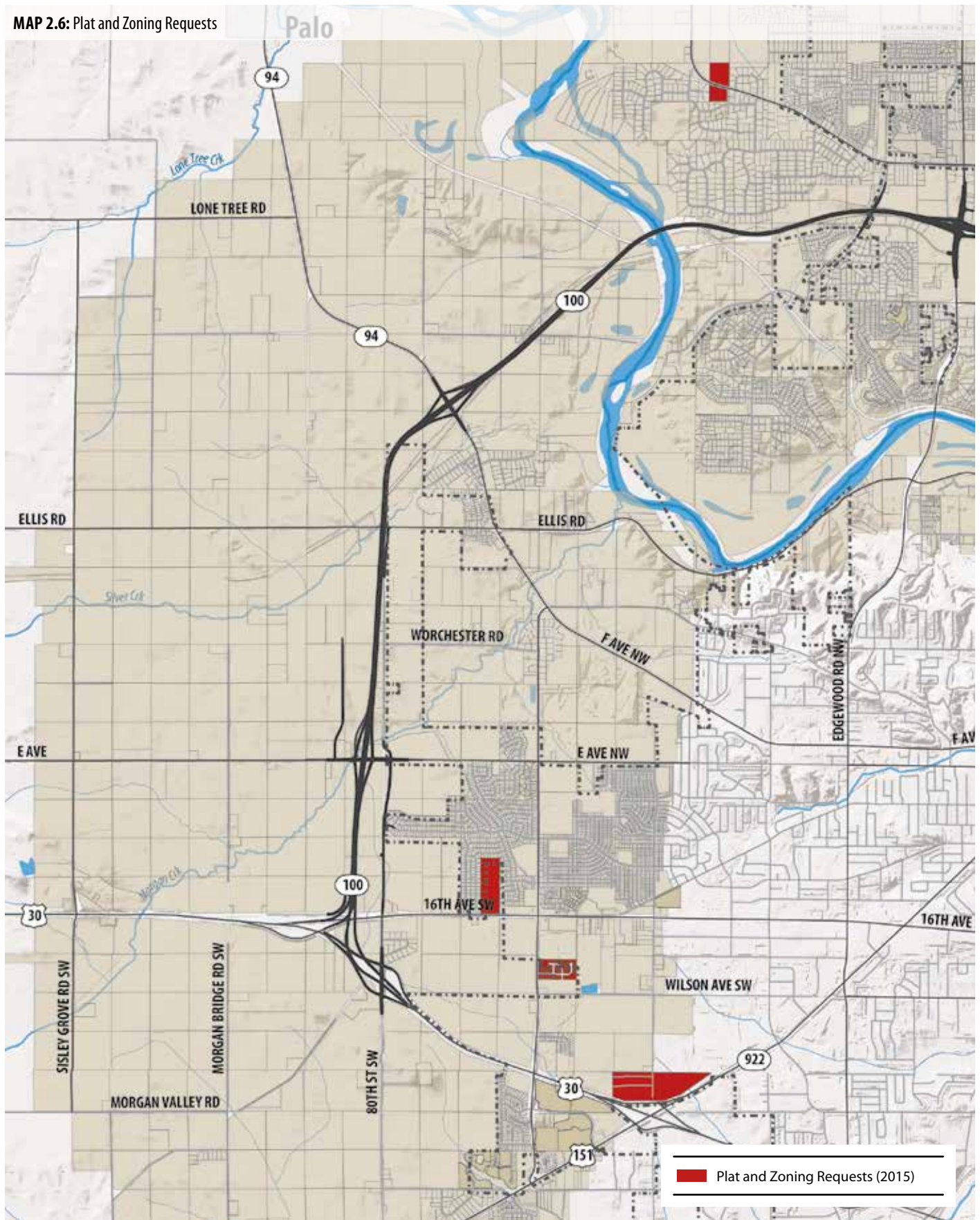
⁴ An alternative to the two-mile extraterritorial area is characterized as an Urban Service Area (USA). In general USAs can more commonly be described as a defined as an unincorporated area where a determination has been made that it can be served by an adjacent community. The primary difference in these two designations is the two-mile area is not based on a city's ability to provide standard municipal services; versus a USA which bases its designation on the city's ability to provide standard municipal services.

MAP 2.5: Extraterritorial Jurisdictions



SOURCE: ENVISION CB, CITY OF CEDAR RAPIDS

MAP 2.6: Plat and Zoning Requests



SOURCE: CITY OF CEDAR RAPIDS, CORRIDOR MPO

Schools

The study area is within the Cedar Rapids Community School District and this undeveloped western area represents approximately 50 percent of the school district's land area. For this reason, Cedar Rapids Community Schools are particularly interested in the future growth and development of the study area and points west. In fact, the School District anticipates building an elementary school at an undetermined location in the northern part of the CMP study area. This elementary would serve residents north of Silver Creek and longer-range development north of the ridgeline between Silver Creek - Cedar River watershed and Morgan Creek watershed. Neighborhood design may necessitate an additional school be built in the southern area to provide walkable access for students. Natural features, such as Morgan Creek and Silver Creek, and built features, such as collector streets and the West Parkway, present obstacles for students walking to schools. Having two schools in the area allows for greater walkability. **Map 2.7** shows possible locations for schools within the CMP.

While remote learning and the internet will impact facility needs into the future, the District has taken a proactive approach to securing land for a future school within the study area. A 37-acre parcel has

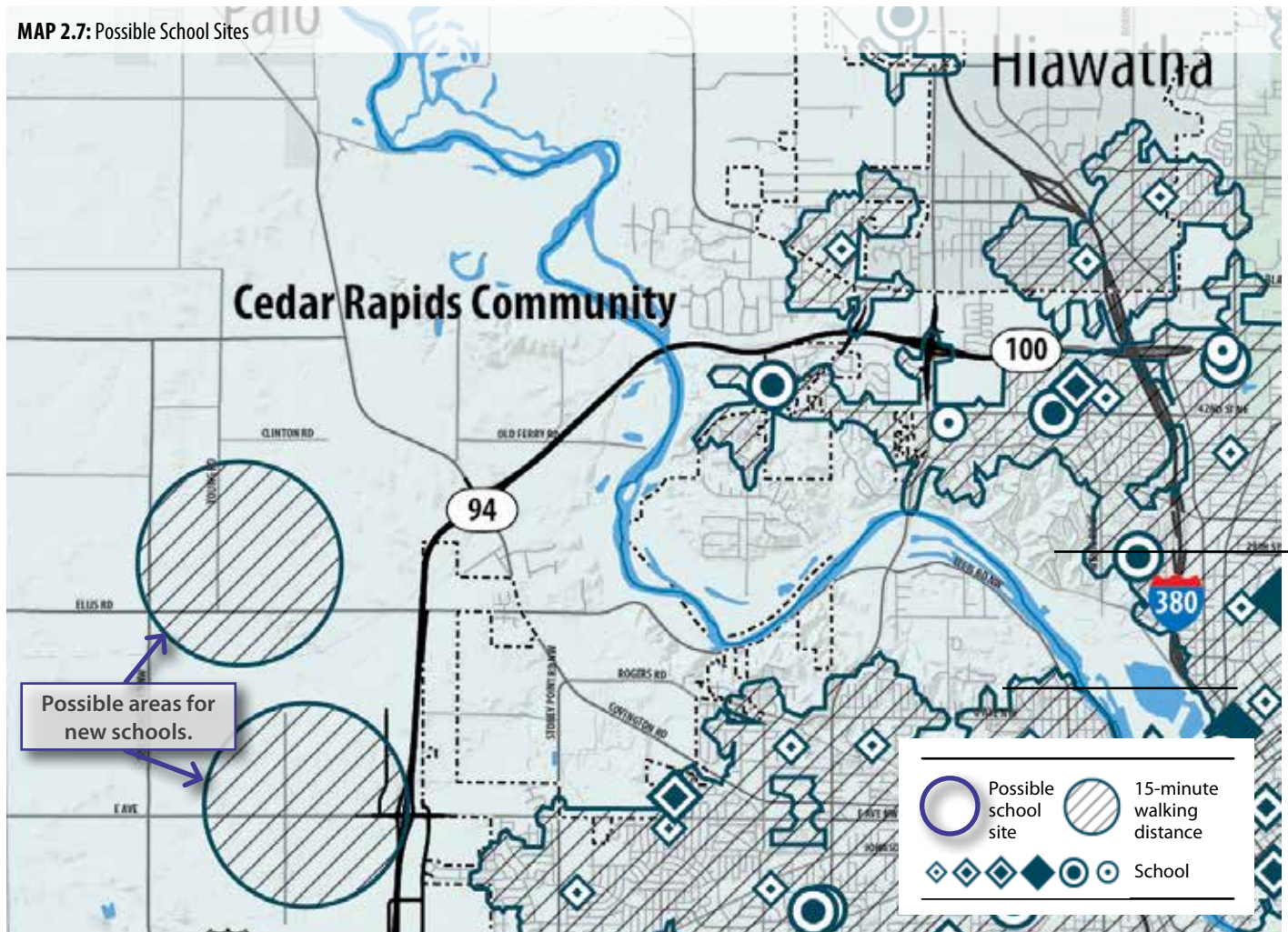
been purchased by the District near Morgan Creek to accommodate an elementary and middle school in the area. Any future students that would reside in this area would most likely be educated at Truman, Coolidge, and Gibson elementary schools and Taft, Harding, or Franklin middle schools before new facilities are constructed.

The District encourages residential development in the area and discourages facilities that sell alcohol, tobacco, adult establishments, industrial uses, and the presence of power transmission lines.

In addition to the Cedar Rapids Community School District, Xavier High School is also located relatively close to the project limits and is impacted by the Highway 100 project. While the high school does not envision an expansion or capital project in the near term, it is possible that the concept of consolidating school facilities into a campus is possible. The representative encouraged residential uses to be promoted within the study area and discouraged commercial, manufacturing, and related heavy-traffic generators from the area.

Xavier also expressed some concerns about the loss of trees along the north property line abutting the Highway 100 project, associated traffic noise, and stormwater management in the area.

MAP 2.7: Possible School Sites



TRANSPORTATION ENVIRONMENT

Initially, the roadway network within the Study Area was evaluated using aerial images to determine the existing transportation networks connectivity, access spacing of existing land uses, and features that may act as barriers to roadway development. Additionally, the Corridor MPO travel demand model provided existing traffic demand for roadways within the Corridor.

Public input provided preferences for the proposed transportation network through an Image Preference Survey. According to the results of the survey, the urbanism approach is preferred in commercial and retail areas. In residential areas, respondents preferred a conservation approach to roadway design. Respondents also stated that the following amenities were important in the design of residential areas throughout the Corridor:

- Accommodations and connections for bicycles and pedestrians
- Accommodations for public transportation
- Inclusion of public safety features, such as lighting
- Inclusion of aesthetic streetscape improvements

In addition to the preference for roadway design, respondents stated surface parking facilities following the conservation approach were preferred over the other approaches. Elements of the parking design to be considered within the Study Area should include limiting parking to reduce the number of unused spaces, decorative lighting, and permeable paving to manage stormwater.

Transportation Network

The transportation network in the Highway 100 Corridor builds on the existing rural roadway network and provides proposed arterial and collector streets on a grid-type network. Connections to existing arterial streets within the City of Cedar Rapids provide thoroughfares to access the City from the Study Area.

The addition of collector streets within the Study Area will improve network connectivity and support a future local street network as residential development occurs. The proposed roadway network developed by this plan is shown in **Map 2.8**.

Arterials

The current rural arterial network is designed to accommodate movement between the rural residential and agricultural land uses surrounding the City of Cedar Rapids to core areas within the City and adjacent municipalities. Primarily, the following rural arterial roadways are two-lane paved or gravel facilities:

- Sisley Grove Road NW
- 16th Avenue SW
- E Avenue
- Ellis Road
- Covington Road



The proposed transportation network consists of extending existing roadways in the Study Area, as well as, adding additional roadways to improve connectivity and accessibility. The addition of a parkway-type facility parallel to Highway 100 and Highway 30 between Old Ferry Rd. and Sisley Grove Rd. NW provides an additional arterial roadway within the Study Area. The new parkway will link commercial development in the northern portion of the Study Area to residential and office/retail development at the southern end of the Study Area.

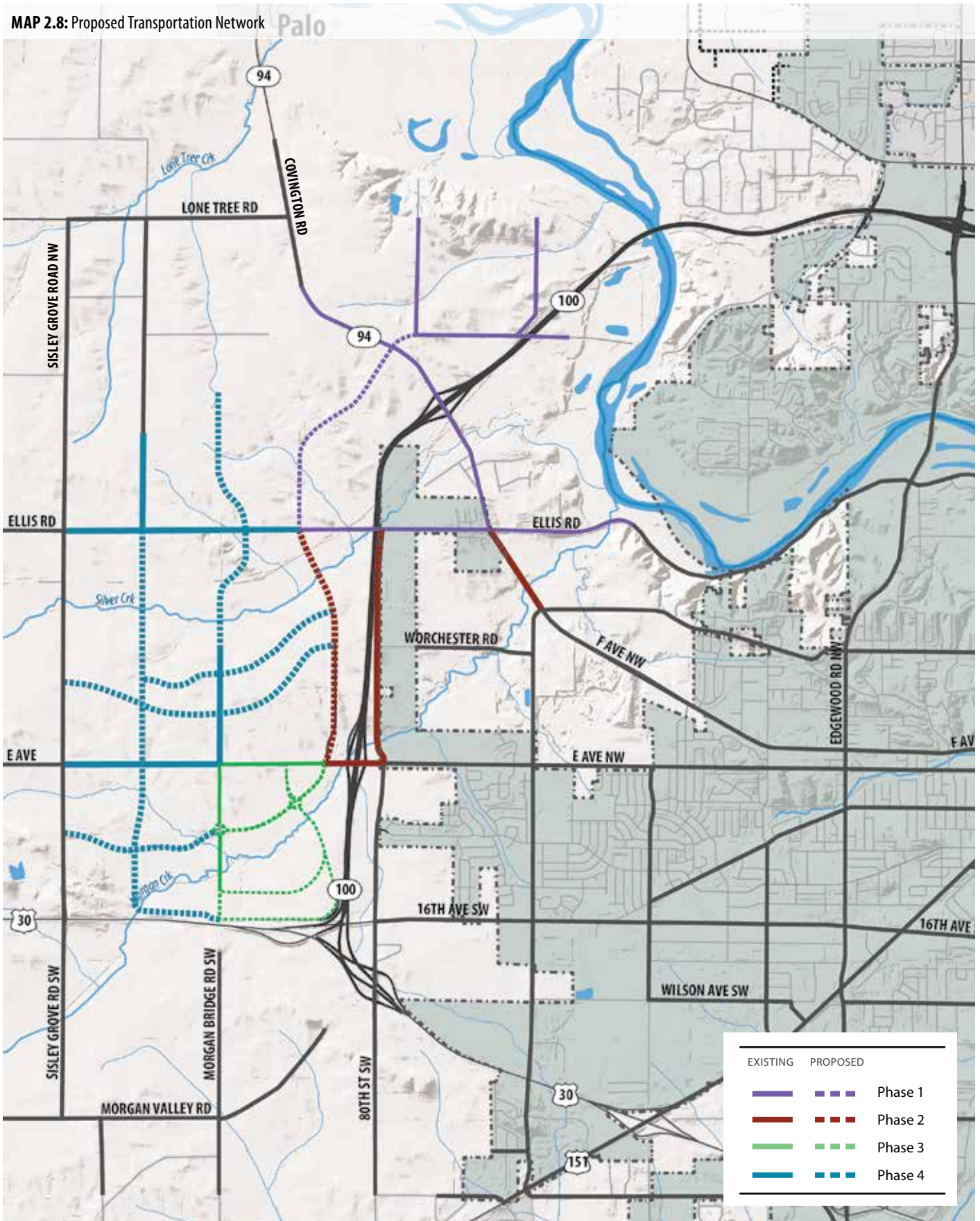
Collectors

The existing collector roadway network within the Highway 100 Corridor Study Area consists of two gravel rural “collectors.” These roadways provide access to several rural residential properties located within the Study Area. Expanding the following north-south “collector” roadways will improve circulation within the Study Area and improve access to proposed residential land uses.

- Young Road
- Morning Bridge Road NW

The proposed transportation network includes the addition of two collector roadways, located parallel to E Ave. and Ellis Rd., providing east-west connectivity between Sisley Grove Rd. and the proposed parkway-type facility. These two new collector roadways provide access to planned low and medium-density development in the core of the Highway 100 Corridor.

MAP 2.8: Proposed Transportation Network



NATURAL ENVIRONMENT

Environmental Inventory⁶

Development Suitability Map (**Map 2.9**) overlays and weights the environmental factors previously considered to group land within the study area into four gradations of suitability. The most significant factors – streams, flood-prone areas, hydric soils, wetlands, and tree cover – receive a higher weighting in this composite map, while constraints such as moderate slopes that can be modified without significant ecological loss are of less concern. Most of the potential development area is relatively unconstrained. Less suitable areas are associated with Silver Creek, Morgan Creek, and their major tributaries.

The information discussed in this section is based on the October 2007 Iowa 100 Extension West of Cedar Rapids, Linn County, Iowa Final Environmental Impact Statement and Draft Section 4(f) Evaluation (2007 FEIS).⁷ The area for this Corridor Management Plan (CMP) can generally be described as the unincorporated land east and west of the 2007 FEIS highway alignment.

As part of the 2007 FEIS, environmental impacts were reported for the Highway 100 corridor footprint, which is within the larger general study area of the CMP. A review of the environmental resources identified in the 2007 FEIS provides an indicator of the resources likely to be encountered during the development of the larger CMP study area, but may not be inclusive of all potential impacts. Additionally, regulations or existing conditions may have changed since the FEIS Record of Decision was signed. For example, the northern long-eared bat is a species proposed to be listed in the spring of 2015 as federally endangered with the potential to exist in Linn County.

According to the 2007 FEIS, the following environmental resources are present in the Study Corridor. These resources are shown on **Map 2.9**. Please note that some of these resources were not mapped in the 2007 FEIS and therefore are not mapped.

- Waters of the US (WOUS)
 - Wetlands
 - Rivers and streams (open water resources)
- Floodplain / Floodway
- Parkland / Wildlife Preserve
- Habitat for State Threatened and Endangered Species
- Forest / Upland (not mapped)
- Cultural resource (historic properties, archeological sites) (not mapped)
- Regulated materials (not mapped)
- Agricultural land (not mapped)



All of the resources listed above in addition to other resources could be present in the CMP area. While agricultural land is located throughout the CMP area, the majority of the natural resources are located along the Cedar River and the associated tributaries. Habitats for state threatened and endangered species are located on the northern portion of the study area. Additional surveys will be required for the northern long-eared bat habitat.

⁶References: Cross, Bryan & Erica Spolar, The Mystery of Environmental Permitting, PowerPoint Presentation, Presented to ACEC Environmental Committee September 9, 2014. Federal Highway Administration, Iowa 100 Extension West of Cedar Rapids, Final Supplemental Environmental Impact Statement and Draft Section 4(f) Evaluation, NHS-100-1(36)--19-57, November 2007. Federal Highway Administration, Iowa 100 / US 30 Final Environmental Impact Statement and Location Study Report, September 1979

⁷Federal Highway Administration, Iowa 100 Extension West of Cedar Rapids, Final Supplemental Environmental Impact Statement and Draft Section 4(f) Evaluation, NHS-100-1(36)--19-57, November 2007.

MAP 2.9: Development Suitability Map



DEVELOPMENT SCENARIOS

The conditions portion of this chapter present the ingredients of the land use plan—the mix of commercial and residential land to react to probable market demand from population growth. Also, environmental and public service issues that influence development patterns. This section combines these land use determinants and uses different variables to prepare three alternative land use and development scenarios. The purpose of these scenarios is to test different assumptions and to illustrate their implications on the ground. These scenarios were presented to the steering committee, area public officials, and the general public for review and comment as part of an evaluation process that leads to a Preferred Hybrid – a concept that reflects the best features of the options and becomes the basis for future area-wide policies, including transportation planning.

Scenario Variables

Scenarios are generated by specific variables that are adjusted and produce different results that can be evaluated against each other. In the study area, the variables with the greatest potential impact on potential land use policy are:

- Highway 100 Build-Out.
- Residential density.
- Geographic distribution.
- Environmental preservation.
- Suitability for development.

The following discussion defines the assumptions and principles for each of these variables used to develop the scenarios.

Highway 100 Build-Out. The alignment of the corridor and its connections to the existing street network were defined by Iowa DOT through a separate planning process.

Residential Density. Residential density affects the amount of land needed for growth or the amount of population that can be accommodated within a given area. Generally, higher residential density scenarios are associated with more compact urban form, and devote a higher percentage of growth to medium- and high-density development options. A large percentage of the potential residential growth discussed earlier will occur within the city limits of Cedar Rapids and are subject to its comprehensive plan, EnvisionCR. As such, the scenarios assume that residential development in urban service areas will be similar to the mix found in fringe areas of Cedar Rapids. The alternatives explore medium- and high-density housing in appropriate areas, but emphasize single-family housing at various densities. One of the scenarios, Urbanism, does explore a higher density approach.

Geographic Distribution. In the CMP study area, the geographic distribution variable concentrates on residential uses supported by neighborhood services. The location of commercial, business parks,

and limited industrial is targeted towards land with convenient access to highways or locations that are logically unsuitable for residential use. Geographic principles common to all scenarios include:

- **Commercial mixed use at interchanges.** Consistent with EnvisionCR, all scenarios propose substantial mixed use development. The proposed interchanges are not designed to accommodate major development. However, locational advantages, the city's land use plan, existing zoning, and the expectations of property owners and developers indicate that relatively intensive development will occur there.
- **Major development project near Highway 100 and Highway 30 interchange.** Parcels near the interchange are held by a few owners, enabling a developer to assemble the fewest amount of properties to come forward with a major development plan. Also, the land's proximity to the interchange limits the marketability of some parcels.
- **Low density development near drainage areas.** In all scenarios, the areas near streams leading to creeks suggests clustering development to preserve environmental features and take advantage of soil characteristics conducive to green infrastructure. Very low intensity use is the desirable future for this part of the study area to minimize land disturbing activity in this area to minimize downstream effects.
- **Silver Creek-Cedar River Watershed.** Developing north of the ridgeline and into the Silver Creek - Cedar River watershed will necessitate costly infrastructure. The Standard Development Practice and Urbanism approaches shows development in the Morgan Creek watershed, while the Conservation scenario avoids development in the Silver Creek-Cedar River watershed.

Environmental Preservation. Development results in new rooftops and hard surfaces which shed water quickly, rather than soaking it up ("infiltration"), thus producing in-wash into water ways. These hard surfaces also often displace important soil-holding grasses and habitat for wildlife (and outdoor spaces for people). By heeding these impacts and planning accordingly, we can enjoy the jobs and vibrancy of high quality economic development and capture a vast array of natural resources benefits at the same time. This plan intends to support both of those outcomes.

All scenarios are based on maintaining drainage courses with surrounding buffers, floodplains, avoiding excess slopes, and preserving wetlands as open space with minimum disturbance. Drainage integrity in this planning area is a particularly important issue. The development of Highway 100 will dramatically increase impervious coverage with the progression of residential uses.

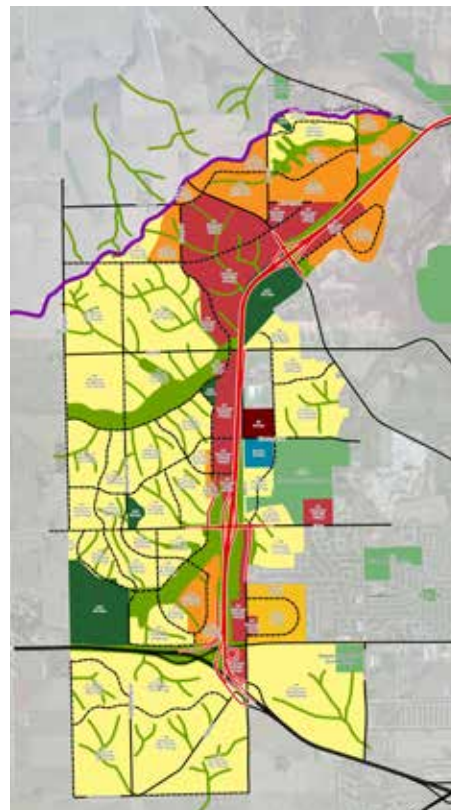
Natural features and resources also present important constraints and opportunities for the future of this dynamic area. This plan builds on a foundation based on understanding the importance of water quality, stormwater and flood management, habitat protection, and trails and recreation within a context of major development, and high quality environmental and recreation attributes.

STANDARD DEVELOPMENT PRACTICES

URBANISM

CONSERVATION

SOURCE: RDG PLANNING & DESIGN



Development Suitability. Cost of development, including extension of utilities or new transportation facilities, represents a significant variable for development options. All scenarios place most development in the path of urban service areas where extensions are relatively easy to accomplish. Alternative approaches would be necessary only if existing served areas were insufficient to meet probable market demands. However, some scenarios require additional transportation improvements.

Markets and growth estimates for Cedar Rapids suggest that development in the Highway 100 CMP will continue beyond the next quarter century, yet the accessibility and convenience to Highway 100 will likely stimulate development interest. Establishing land use policy and growth phasing are critical to responding to probable demand and needs for additional transportation and infrastructure services required to accommodate the changes that the area is likely to experience. The plan anticipates that infrastructure will develop in phases, incrementally serving emerging neighborhoods that will be completed in decades to come. Each scenario presents case studies, or demonstrations, of projects relevant to each scenario that describes advantages and disadvantages of market potential for different types of uses.

 Low Density Residential	 Open Green Space
 Medium Density Residential	 Park
 Mixed Use	

Three land use scenarios were evaluated as part of this plan:

Scenario One: Standard Development Practices. Developments are characterized by the dominance of the automobile, segregation of land uses, and minimal emphasis on environmental conservation.

Scenario Two: Urbanism. Development design is focused on the neighborhood, which is characterized by the mixing of land uses, the interconnectedness of subareas, and the emphasis on walkability.

Scenario Three: Conservation. These developments feature a clustering of buildings to preserve open space, accommodate a natural drainage system and minimize project infrastructure costs.

Each scenario description includes:

- A detailed land use plan illustrating development, open spaces, transportation linkages, and other elements.
- A graphic representing yields for each scenario.
- Evaluation of advantages and disadvantages for each scenario.
- Case studies relevant to the scenario.

SCENARIO 1: STANDARD DEVELOPMENT PRACTICES

Map 2.10: Standard Development Practice shows a scenario based on a hierarchical transportation system foundation. Mobility is almost totally dependent on private automobiles. Therefore streets are wide and emphasize automobile movement over other modes. Land uses are segregated and the density of development is low to provide ample space for parking of vehicles. There is a minimal emphasis on the natural environment. The concept features widespread development connected by a network of public highways and roads. Neighborhoods mostly have single-family homes with the adjacent arterials accommodating commercial and retail space. These commercial areas are separated from the residential neighborhoods, with access exclusively by automobile. The average density of housing is 2 dwelling units per acre, with higher density townhouses and apartments existing in separate isolated “pods”. While the open spaces may be relatively abundant, they are not the foundation of the concept. Along the major corridors, parking lots dominate the open space. Standard Development Practices design has the following traits:

BUILDING LOCATION AND SCALE

- Houses are set back from the street to provide privacy
- The sizes of houses vary, but are generally 1 or 2 stories.
- Subareas of residential neighborhoods are generally consistent in size and value of homes.
- Commercial buildings are set back from the street, with parking in front of the buildings.

ARCHITECTURAL DESIGN

- There is often minimal architectural design variation within a residential development.
- Auto garages are a dominant feature on the front of the houses
- Garages may serve as the main entrances to the houses
- Commercial design is highly variable and often reflective of national chain store franchises.

LANDSCAPE PUBLIC SPACES

- Large front yards act as a buffer between the street and homes.
- Some green space is preserved, typically along drainageways, but is not usually publicly accessible, as it is located behind private homes.

- There are often neighborhood parks providing space for passive and active recreation.

STREETS, PARKING AND SERVICE AREAS

- Residential streets provide internal circulation, but do not provide easy access to adjacent commercial areas
- Sidewalks exist but due to the street network do not provide easy pedestrian access to neighborhood services
- Garages and driveways are very visible and create the dominant impression of the neighborhood
- Commercial developments provide access to public street, but rarely to adjacent businesses
- Large commercial parking lots often do not include internal landscaping

COMMUNITY IDENTITY

- Since there is a focus on privacy, there are few neighborhood gathering places
- Marketing to potential residents focuses on the residential unit amenities that may have an identity based on the subdivision name. This rarely extends beyond the individual subdivision to include multiple types of residential and commercial areas.

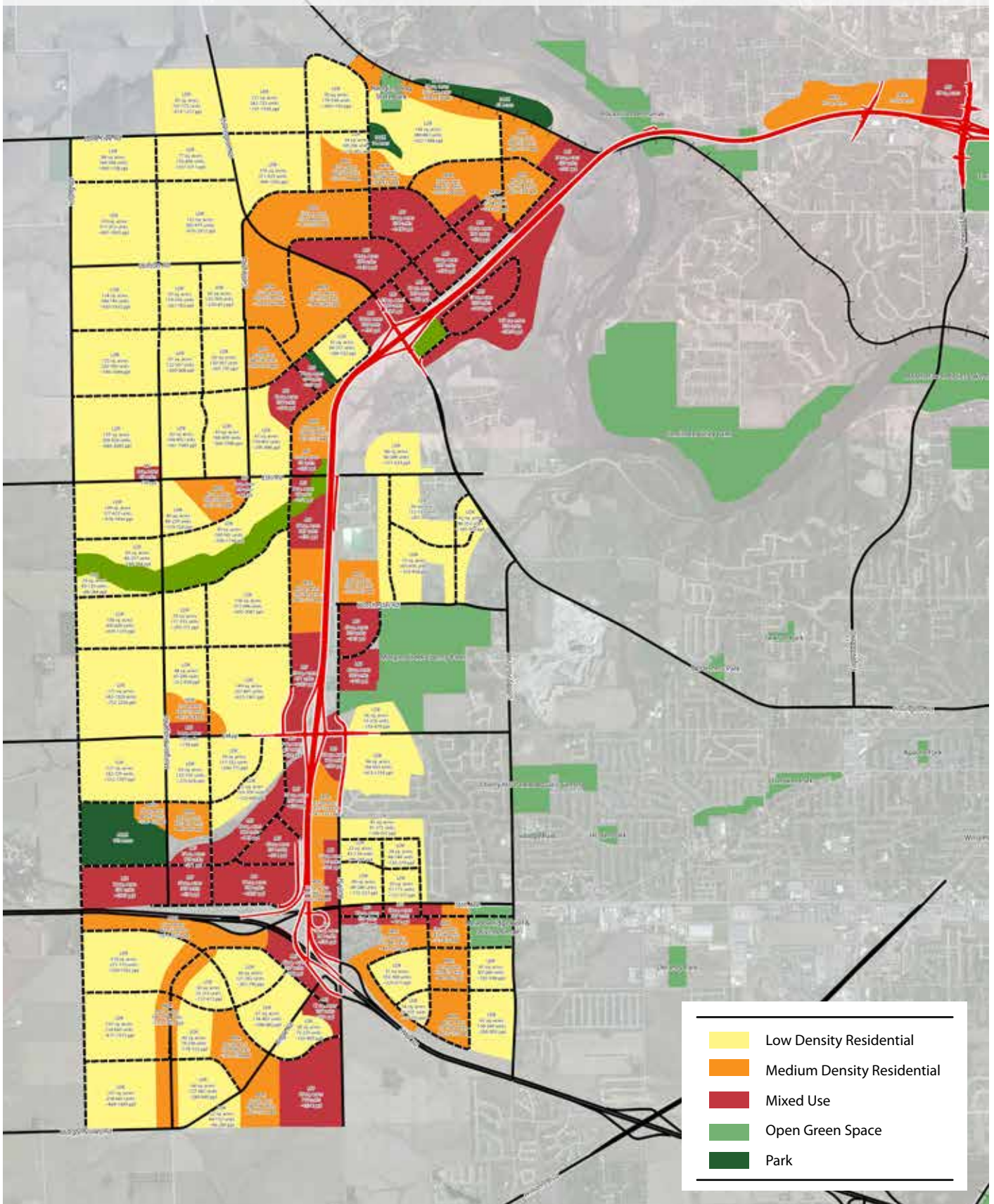
Possible Advantages

- Developer autonomy. Individual developers can establish their own design standards and can accommodate their own site development needs.
- Reflective of fragmented market. Provides more flexibility for individual design and use of property. Responsive to the way the market functions, with emphasis on individual property ownership and rights.
- Reflective of developers’ capabilities. Most developers focus on a single type of development and are unfamiliar with building mixed use developments.
- City policies focus on protecting residential neighborhoods from traffic rather than promoting pedestrian connections. This minimizes the need for publicly funded trails and sidewalks.
- Consistent with traditional zoning, which tends to separate and isolate different uses

Possible Disadvantages

- Individual developers can establish their own detailed design standards, but these are not coordinated across projects.
- This creates a haphazard image and detracts from establishing community identity.
- Quality urban design and adherence to an overall design vision are minimal.
- Lack of focus on a natural drainage system increases possibilities of flood damage. Reliance on storm water management structures increases infrastructure and maintenance costs. Also, such structures tend to “push the problem downstream.”
- The segregation of land uses results in an inefficient transportation system, increasing infrastructure costs.
- The low density of commercial development results in higher public infrastructure and services costs.
- There tends to be a high proportion of cul-de-sacs and loop streets within each “pod” of development, with through traffic only by means of a few “collector” streets, which consequently become easily congested. Congestion is increased further when there are only a couple of ways out of the development to the peripheral arterial street system.
- The lack of a comprehensive bike/pedestrian system detracts from the opportunities for a healthy lifestyle that includes regular recreation. Opportunities to save energy costs by commuting to work are also decreased.

MAP 2.10: Scenario1: Standard Development Practices



Demonstrations: Standard Development Practices

Westridge Estates

Location: West Des Moines, Iowa
Start Date: 1992-93
Total Acres: Approximately 150 acres



BACKGROUND

The Westridge Estates neighborhood is an example of standard development practice - homogenous land use, limited connectivity, auto-oriented, with large residential lots. While the development type is very common in growth areas and comfortable to home buyers, from a land use perspective the designs are inefficient and often inconsiderate of the natural environment.

Standard developments often focus on creating a single type of land use of a single style - for example a development may include primarily single family detached homes on large parcels. More recently, these developments have incorporated commercial and/or different types of residential; however these uses are often segregated from the development.

Standard development practices, such as Westridge Estate, have evolved to capture and improve upon the pattern of suburban housing development over the past 100 years. In many ways, the pattern has improved but still remains inefficient and reliant on the automobile.

DEVELOPMENT CHARACTER

USES

- Single Family Homes
- Elementary School at fringe (14.5 acres)
- Apartments separated and at the fringe

COMPOSITION

- Single Family Homes: 214; 1.7 du./ac.
- Single Family Home Area: 95 acres (63%)
- Right of way: Approximately 26 acres (17%)
- Roadway: Approximately 4.3 miles or 4.4 acres (3%)
- School: 14.5 acres (10%)
- Park Area: 11 acres (7%)

CHARACTER

- Large residential lots (privatized open space)
- Large homes
- Wide streets with sidewalks

ADVANTAGES

- Low homeowner association fees due to the limited amount of communal space to maintain
- Large privately owned residential parcels
- Low traffic volume resulting from dead end streets and limited through traffic.
- New elementary school within walking distance or short

driving distance. Mode depends on distance from the school.

- Builders and homebuyers are comfortable with the development type

DISADVANTAGES

- Low overlay development density
- Limited connectivity presents challenges to fire, police, and emergency medical response times
- Limited connectivity reduces walkability within and through the development
- Limited supply of open space per capita

CHALLENGES AND OBSERVATIONS

The Westridge Estates neighborhood follows many standard development practices and therefore suffers from many of the same challenges associated with conventional suburban development. While the neighborhood is quiet and the streets have little traffic volume, these factors also ensure residents will rely on a vehicle for virtually all trips.

While it should be applauded that the neighborhood includes an elementary school, its location at the northeast fringe, the privatization of land resources, and the lack of connectivity limits the number of households that will walk to the school.

From a land use perspective, conventional development is inefficient in its consumption of land resources. From a municipal perspective, the cost of providing police, fire, and emergency services increases significantly as the transportation system is fragmented by cul-de-sacs and other dead-ends.

The Woods on the River

Location: Des Moines, Iowa
Start Date: 1999
Total Acres: Approximately 98 acres



BACKGROUND

The Woods on the River neighborhood is an example of a standard development practice - homogenous land use, limited connectivity, auto-oriented, with privatized open space. The Woods on the River development is most characterized by its dependence on the automobile and isolating design.

While the neighborhood includes an elementary school, several multi-family apartments, in addition to an emerging commercial project, however, all uses are located at the fringe to separate land uses - consistent with conventional development practices.

In addition, the subdivision is designed to provide the maximum amount of private yard area (open space) as possible in a quiet environment. This is accomplished using cul-de-sacs to reduce traffic volume.

DEVELOPMENT CHARACTER

USES

- Single Family Homes
- Elementary School at fringe
- Apartments separated and at the fringe

COMPOSITION

- Single Family Homes: 376; 4.75 du/ac
- Single Family Home Area: 79 acres (81%)
- Right of way: Approximately 18.5 acres (19%)
- Roadway: Approximately 4.3 miles

CHARACTER

- Small residential lots (privatized open space)
- Starter homes
- Standard street widths with sidewalks and street trees

ADVANTAGES

- Low homeowner association fees due to the limited amount of communal space to maintain
- Moderate size lots provide private open space
- Low traffic volume resulting from dead end streets
- Elementary school and retail center within walking distance or short driving distance. Mode depends on distance.
- Builders and homebuyers are familiar with the development type

DISADVANTAGES

- Relatively low density development
- Limited connectivity presents challenges to fire, police, and emergency medical response times
- Limited connectivity reduces walkability within and through the development

CHALLENGES AND OBSERVATIONS

The Woods on the River neighborhood is a conventional development intended to provide residential opportunities for first-time homebuyers. The target market necessitates the creation of relatively small residential lots.

While the density is higher than the Westridge Estates study, the overall efficiency of the design remains approximately the same. These projects seek to maximize the number of units with private yards on the original plot of land. The Woods on the River offers its residents relatively close proximity to a school and an emerging retail cluster.

From a land use perspective, conventional development is inefficient in its consumption of land resources. From a municipal perspective, the cost of providing police, fire, and emergency services increases significantly as the transportation network is fragmented by cul-de-sacs and such.

SCENARIO TWO: URBANISM

Map 2.11: Urbanism shows a scenario prioritizing pedestrian accommodation and opportunity for bike and transit use. As a result, commercial and employment centers are embedded in compact neighborhoods. Urbanism features a walkable scale neighborhood, typically ¼ mile radius, with mixed development interconnected by a network of streets. Streets are narrow and emphasize the use of on-street parking. Neighborhoods have a diverse mix of single-family homes, multi-family townhomes and apartments, and local retail and office space. There is typically a “neighborhood center” consisting of a school or other civic building and/or a neighborhood park. The average density of housing in the neighborhoods is 8 dwelling units per acre. This allows the City to preserve a larger section of its land for agriculture or environmental protection. Urbanism design has the following traits:

BUILDING LOCATION AND SCALE

- Buildings are oriented to the street and are located close to it to enhance the sense of street enclosure, contributing to a quality pedestrian experience.
- Lot sizes vary and accommodate a range of building types, from small single-family houses and townhouses to multi-family duplexes.
- Emphasis is on form and scale of buildings rather than permitted use. Changes in scale of buildings occur at the rear lot line so that buildings on both sides of a street are compatible.

ARCHITECTURAL DESIGN

- Main entrances to commercial buildings and houses face the street.
- Houses may feature porches or other architectural details that enhance public life.
- Garages are relegated to the rear yard or, at least, recessed and not the dominant front feature of the house.
- While architectural design and scale are consistent along street frontages, uses of buildings can have some variability – e.g. single-family, two-family, live/work space.
- Architectural design standards are typically adopted to insure

consistency with overall development design goals.

LANDSCAPE PUBLIC SPACES

- Neighborhoods typically have a “center”, which is often a public open space/park, or neighborhood school.
- Sidewalks connect to neighborhood services and open space.
- Smaller front yards encourage public interaction.

STREETS, PARKING AND SERVICE AREAS

- Streets feature a network that connects to adjacent areas.
- Alleys serve the houses and keep service uses and parking away from the main streets.
- Parking and service areas are tucked behind commercial structures.

COMMUNITY IDENTITY

- Architecture respects the local (or vernacular) style and the heritage of the community or region.
- Marketing to potential residents focuses on both the neighborhood and the dwelling amenities.
- Signage is moderate in scale.
- Integrated land use tends to support neighborhood identity.

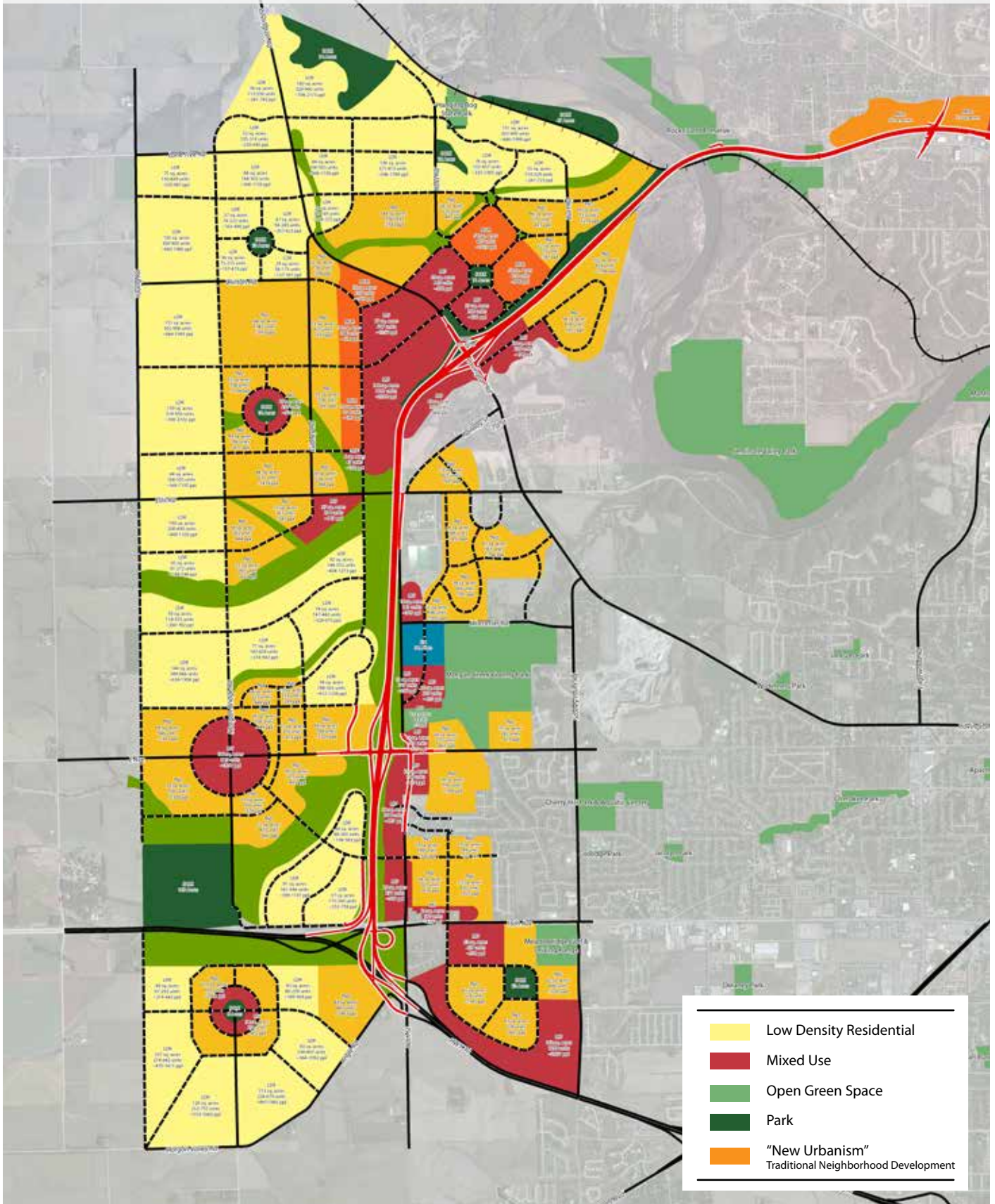
Possible Advantages

- Quality design and neighborhood character enhance perceptions of community quality.
- By bringing most of the activities of daily living into walking distance everyone, but especially the elderly and the young, gain independence of movement
- By reducing the number and length of automobile trips, traffic congestion is minimized, the expenses of road construction are limited, and air pollution is reduced.
- By providing streets and squares of comfortable scale and defined spatial quality, neighbors come to know each other and to watch over their collective security.
- By providing a full range of housing types and work places, age and economic classes are integrated and the bonds of an authentic community are formed.
- Accessible park/open space.
- Design guidelines, such as those for Somerset in Ames, protect the character of existing neighborhoods.

Possible Disadvantages

- Untested market for higher density development on the fringe of the city. Target market for higher density projects tend to migrate in or near downtown.
 - Development requirements lengthen approval process.
 - Homes and commercial space in these developments tend to be higher cost.
 - Paper: “Suburban Sprawl of Livable Neighborhoods,” Andres Duany, Duany & Plater-Zyberk Architects, Miami, Florida
-

MAP 2.10: Scenario1: Standard Development Practices



Demonstrations: Urbanism

The Peninsula Neighborhood

Location: Iowa City, Iowa
Start Date: 2002-2003
Total Acres: Approximately 40 acres



BACKGROUND

Billed as a new community, and a testament to thoughtful planning. The Peninsula Neighborhood was designed to offer alternatives to housing options typically found within the market. Rather than single housing types the neighborhood offers a variety of housing options, and was designed to include public gathering places.

DEVELOPMENT CHARACTER

USES

- Single Family Homes (Attached and Detached)
- Apartment Buildings
- Commercial Cluster
- Parks and Playground Features

COMPOSITION

- Single Family: 13 acres (30%)
- Multi-family: 7.7 acres (19%)
- Open Space: 8 acres (20%)
- Right-of-way: 12 acres (31%)

CHARACTER

- Period Architecture
- Parking in Rear - A Strong Pedestrian Realm
- Tree lined streets and connected open spaces
- Mix of housing types and uses
- Highly walkable neighborhood with parks
- Access to walking trails, a dog park, golf course, and a pedestrian bridge to Coralville

ADVANTAGES

- Medium to high density development can sustain a degree of retail and commercial development. The Peninsula recently added a small commercial cluster including a restaurant, wine bar, and coffee shop.

- The walking paths, the dog park, the pedestrian bridge, and the adjacent golf course offer recreation amenities to residents
- The neighborhood is very walkable and the community parks are designed as gathering places with a playground for children.

DISADVANTAGES

- The Peninsula Neighborhood is relatively isolated from the community and while partially self-contained, outside trips will be required for most consumer trips.
- The isolated location makes it costly to provide community services such as water, sewer, police and fire.
- The cost of creating an urbanist cluster requires a significant market demand for housing in a unique atmosphere. The neighborhood is extremely compact, it is not very feasible to walk to other destinations outside of the neighborhood as a mode of transportation.
- The development is not served by public transportation.

CHALLENGES AND OBSERVATIONS

The Peninsula Neighborhood is an excellent example of traditional neighborhood design. The variety of housing types with community amenities such as parks and a restaurant within walking distance make the neighborhood convenient for residents. While the neighborhood is very walkable for trips within its boundary, it is isolated from Iowa City and approximately 1/2 mile from Coralville via a pedestrian bridge.

The Peninsula has become a highly desirable neighborhood since its development and is nearly 100% built-out.

Somerset Village

Location: Ames, Iowa
Start Date: 1997
Total Acres: Approximately 180 acres



BACKGROUND

The Village of Somerset is located in Ames, Iowa, directly north of the Iowa State university Campus. With over 800 trees planted, private parks, sidewalks/trails, a variety of housing options, and a commercial town center it is designed as a mixed-use neighborhood.

The Somerset development is a neo-traditional neighborhood designed to the tenants of New Urbanism. The vision is to create a diverse urban

environment which offers its residents a town center in addition to parks and recreation opportunities in a walkable environment.

- Retail/office within walking distance
- Build-to lines to ensure consistent and appropriate front yard setbacks

DEVELOPMENT CHARACTER

USES

- Single Family Homes (Attached and Detached)
- Apartment Buildings
- Retail and Office Towncenter
- Assisted Living Facility
- Parks, Recreation, and Trail Features

COMPOSITION

- Single Family Detached: 51 acres (26%)
- Single Family Attached: 25 acres (13%)
- Multi-family: 28.5 acres (14%)
- Commercial (live/work): 13 acres (6%)
- School site: 26 acres (13%)
- Parkland: 10 acres (5%)
- Right-of-way: 40.6 acres (23%)

CHARACTER

- Period Architecture
- Parking in Rear - A Strong Pedestrian Realm
- Tree lined streets and connected open spaces
- Common open spaces connected by trails

ADVANTAGES

- Higher density allows for the efficient delivery of community services
- Mix of land uses makes the neighborhood more self-contained than conventional Euclidian development

DISADVANTAGES

- Limited commercial requires residents to travel for higher order consumer needs
- Strict zoning and design standards may deter private investment to areas with fewer requirements
- Market conditions and design standards combined to slow the build-out of the development.

CHALLENGES AND OBSERVATIONS

The Somerset Village is a good example of a traditional neighborhood development project which has evolved to incorporate elements of conventional development in later phases of the project.

The form and design of the Somerset Village is guided through Traditional Neighborhood Development Zoning and design guidelines. While the quality of the original intent is evident in the first phases of the project - embodied by rear lot parking, alley access, tree lined streets, and build-to lines - later phases of the Village have deviated in the direction of conventional development.

Overall, the Somerset Village is an excellent example of an urbanist approach to development. The neighborhood includes a sound mixture of housing types and a healthy supply of park, retail and office areas.

SCENARIO 3: CONSERVATION

Map 2.12: Conservation, shows a scenario using the latest environmentally sustainable “green” strategies to minimize the impacts of development. It promotes dense, compact development to use land most efficiently and offers a range of transportation options. The Conservation scenario is closely integrated with the natural environment, and emphasizes environmental performance. It features a dense mix of uses, including multi-family residential units, commercial and retail space, all connected by a limited number of roadways. The average density of housing for the developed part of the site is 15 dwelling units per acre or greater, and most of the area is preserved for open space or local food production. The primary objective of Conservation Design is to protect or restore the natural hydrology of a site. Conservation practices use or mimic natural processes to maintain stream base flows, infiltrate, evapotranspire or reuse stormwater or runoff as close to its source as possible. Conservation design has the following traits:

The Conservation Scenario approaches development in the study area by managing development around natural resources. The health of water resources and surrounding area is especially important. Consequently, this plan considers a watershed approach. This method:

1. Defines and maps key environmental resources affecting the study area and the surrounding region. These resources include:
 - Drainage-related resources, including wetlands, floodplains, streams and other watercourses, lakes, and permanent small water bodies
 - Parks and trails
 - Steep slopes that can limit development or cause significant erosion and water quality impairment. This is a particularly significant issue with the very large footprint buildings.
 - Hydrologic Soils
 - Hydric Soils
 - Vegetation
 - Areas of resource extraction activity
2. Relates these environmental characteristics to one another to assess:
 - Development suitability, identifying areas where development is least likely to affect vital environmental systems.
 - Areas that should be permanently preserved as open spaces. Areas may be preserved by development permitting and site specific approvals on private property; easements; or public acquisition.
3. It has a watershed based plan principle. That is, development is largely based upon subwatershed and larger watershed boundaries, lesser with conventional political boundaries, metes or bounds. It depends largely on the existing surface drainage system to infiltrate, convey and manage stormwater. Green infrastructure suitability, identifying opportunities where infiltration based best practices can balance the demands of maximizing development yield and protecting critical resources. This analysis has identified areas that are especially appropriate for techniques that promote infiltration (i.e. “soaking up”) of rainwater. But it is important to note that a suite of natural stormwater management practices (e.g. stream buffers, wetland restoration, grassed waterways) are appropriate and should be employed across most of the study area.

4. It respects the existing topography by placing the streets and roads and structure on the gently sloping ridges, ridgelines and side slopes while preserving the steeper, poorer soil plagued drainage ways, valleys, wetlands, and floodplains for common open space, wildlife habitat recreational trails and activities and stormwater quality and quantity management.

BUILDING LOCATION AND SCALE

- Buildings are oriented to the south to maximize solar exposure
- Buildings are constructed at a higher density to conserve energy

ARCHITECTURAL DESIGN

- The neighborhood’s apartments, townhouses and commercial space feature a number of environmentally green design elements, including planted green roofs, solar panels, operable windows and shading devices
- Because the development design works with the existing terrain, there tends to be a much greater opportunity for homes to have “walk out” lower levels, which adds to unit value.
- Building façades address the street and create a consistent “street wall”
- Entrances face the street
- Buildings are designed for adaptability over time

LANDSCAPE PUBLIC SPACES

- Streets use porous paving and rain gardens to manage stormwater
- Front yards minimize use of grass turf and feature native plants and rain gardens
- Yards and parks feature working landscapes (i.e. for food production, water filtration)

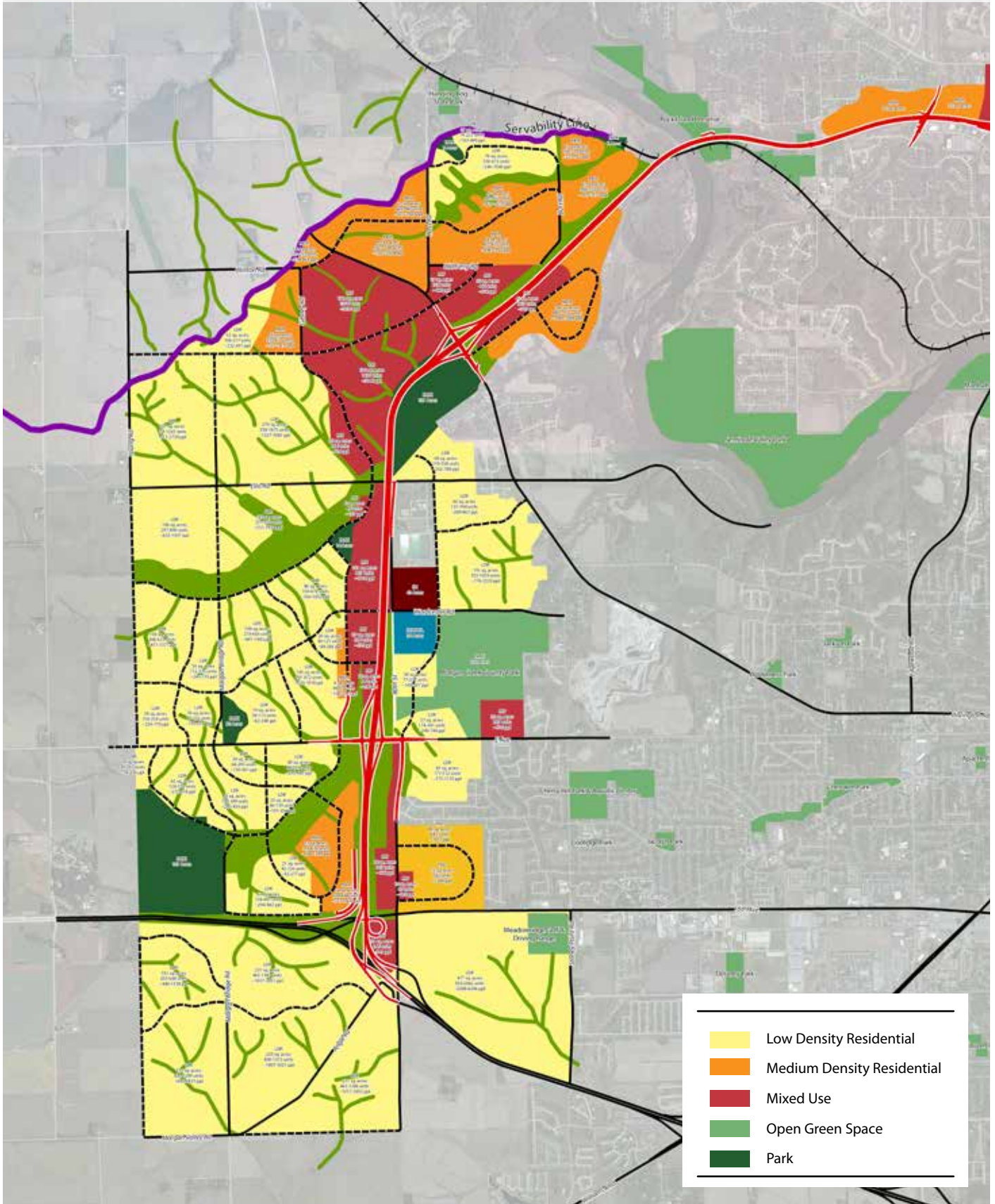
STREETS, PARKING AND SERVICE AREAS

- Streets respect a balanced approach to car, bike, pedestrian and transit use
- Parking is limited due to the prevalence of transit, biking and walking, and is placed in common parking areas

COMMUNITY IDENTITY

- Signage is pedestrian scale and incorporates green materials
- “Green” character of neighborhood tends to reinforce neighborhood identity

MAP 2.10: Scenario1: Standard Development Practices



	Possible Advantages	Possible Disadvantages
ENVIRONMENTAL	<ul style="list-style-type: none"> • Managing the quality of water resources. Stormwater is captured and filtered before entering streams. • Protects wildlife habitat • Minimize impervious surfaces. • Common open space, if properly sited and managed, can provide wildlife habitat with the three basic requirements of shelter, food and water and can be used to protect “unique or fragile” habitat as identified by local, regional or state natural resource surveys. • When linked to other existing open areas, the common open spaces can serve as wildlife corridors and un-fragmented wildlife preserves. • Promotes the natural movement of water within ecosystems and thereby increase the amount of water available to a watershed through percolation and storage. • Stormwater and runoff could become a resource and not a waste product. • Water quality is improved from the increased quantity of water percolating into the watershed due to use of pervious/permeable surfaces and based upon the use of vegetative uptake of storm water pollutants as well as the processes of filtration through the use of bio-soils, bioretention and/or vegetated filter swales. • Use of Low-Intensity Development (LID) technologies can result in decreased loads of runoff volume and sediments, as well as pollutant reductions of biological oxygen demand (BOD), nutrients and inorganics all of which will produce better water quality in the watershed. • LID practices also employ minimal fertilizer and chemical applications which results in less nutrient loading and thus preservation of water quality. 	<ul style="list-style-type: none"> • Areas with a consistently high/shallow groundwater table are not an ideal setting for LID practices that utilize infiltration. • Low permeability of existing soils can make implementation of conservation subdivision components difficult.
DEVELOPER	<ul style="list-style-type: none"> • Development costs are reduced as utility lines, streets, driveways and sidewalks are shorter and more direct. • Where zoning permits, a variety of housing types, ranging from single family detached to attached units, may be more easily accommodated. • Conservation subdivisions have marketing and sales advantages, as buyers prefer walk-out lots with direct access and connected to protected open space network. • Homes in conservation subdivisions tend to appreciate faster than counterparts in conventional developments. • Homebuyers are willing to pay a premium for less environmental impact and more natural features 	<ul style="list-style-type: none"> • Increased time and potential expense for project development (site inventories, approval process). • Profit margins and markets are more difficult to project and to find comparables for real estate appraiser • Pro-rated to offset “undeveloped” land, so unit cost per sq. ft. of lot and home are higher.
HOME OWNER	<ul style="list-style-type: none"> • Legacy value of alternative development. • Subdivision has unique look and feel • Home resale value is greater and transaction time is faster. • Shallower lots require less maintenance for individual homeowners. 	<ul style="list-style-type: none"> • Common areas may require neighborhood associations to maintain them (may require “dues”).
MUNICIPALITY	<ul style="list-style-type: none"> • Legacy value of alternative development. • Subdivision has unique look and feel. • Real estate value is greater. • Open space enhances the municipality’s quality of life, one of its chief assets in attracting quality businesses and in encouraging economic growth. • Smaller investment in municipal service provision when homes are clustered. 	<ul style="list-style-type: none"> • More difficult to regulate development as the design principals do not often follow metes and bounds and instead, follow watersheds. • Open space management must be carefully addressed; who is responsible for what, and when. • Use of permeable pavements has its limitations in high traffic areas, where heavy commercial trucks are traveling and parking. • Use of permeable pavements has its limitations where sanding and is necessary. Use of permeable pavement technologies in areas that require sand applications for inclement weather would result in the introduction of excess sediment into the system, ultimately compromising permeability. • May require more direct monitoring of onsite activities. • Development yield is lower than other scenarios

Demonstrations: Conservation

Danamere Farms

Location: Carlisle, Iowa
Start Date: 2005
Total Acres: Approximately 100 acres



BACKGROUND

Danamere Farms is a Conservation Community, taking into account environmental principals and green spaces. Based on the premise that nature knows best, conservation living designs protect natural features such as woodlands and stream buffers. To protect these areas, impervious surfaces such as streets and driveways are reduced and a more natural stormwater management system is used. Conservation Communities provide approximately seven times the amount of public, open space than what is found in a typical development. These areas, usually planted with native flowers and grasses, are beautiful and functional. They provide aesthetic value, adequate stormwater conveyance, distribution of the water flow and natural filtration of pollutants.

DEVELOPMENT CHARACTER

USES

- Single Family Homes
- Townhomes (planned)
- Neighborhood commercial)
- Adjacent Elementary School

COMPOSITION

- Single Family: ~30.6 acres or 5.8 units/acre (32%)
- Multi-family: ~9.8 acres or <16 units/acre (10%)
- Commercial: ~6.4 acres (8%)
- Right-of-way: ~10 acres (11%)
- Open Space/Protected: 37 acres (39%)

CHARACTER

- Large expanse of open space surrounding natural features
- Recreational trails to increase connections with nature and to optimize the use of open space
- Sidewalks and southern building orientation for solar access
- Narrow residential streets - Approximately 25'
- Dwelling units per acre: 2.10 (at build out)
- 39 single family homes built to date (193 planned) + townhomes
- Single family residential homes as Phase 1, Townhomes or Multi-family residential as Phase 2 on small lots
- Elementary School within walking distance

ADVANTAGES

- Neighborhood is walkable
- Natural features are preserved
- Immediate access to walking and recreation trails in addition to natural amenities and scenic vistas
- Reduced environmental impact from the development
- Stormwater is managed on site and the design is intended to reduce net impact of development
- New elementary school within walking distance
- The variety of housing types (planned) will create additional stability in ownership and occupancy of dwelling units.

DISADVANTAGES

- Limited commercial requires residents to travel for higher order consumer needs
- Development density is lower than other forms of development
- Association fees are assessed to maintain communal infrastructure.

CHALLENGES AND OBSERVATIONS

Danamere Farms is a good example of a conservation design neighborhood. The development has sought to make the most of its surroundings by preserving the natural environment - this abundance of open space provides a valuable quality of life resource to its residents while being a steward to the land.

While thoughtfully designed and true to the spirit of conservation design, the development started in 2005 and construction slowed as a result of the 2008 recession.

Demonstrations: Conservation

St. James Place

Location: Ankeny, Iowa
Start Date: 2005
Total Acres: Approximately 30 acres



BACKGROUND

St. James Place is a residential neighborhood which places the conservation of the land as a top priority. The winding road offers scenic vistas in addition to an abundance of open natural area that will be preserved in perpetuity.

The geography of the area is bounded by meandering creeks on the west, south and the east. The neighborhood plan is designed to preserve the integrity of the water system in addition to ensuring the natural areas remains as an amenity for residents of St. James Place.

The St. James Place neighborhood was developed as a Planned Unit Development and the land not required for the development was placed in conservation as part of the Four Mile Creek Greenbelt. This ensures the perpetual preservation of the area as an open and natural area for the enjoyment of residents and for the health of the greater larger environment.

DEVELOPMENT CHARACTER

USES

- Single Family Homes
- Open space at perimeter (Four Mile Creek Greenbelt)

COMPOSITION

- Single Family Detached: 53 units; 26 ac.; 2 du/ac
- Roadway/Right of Way: 4 acres
- Open Space/Protected: Four Mile Creek Greenbelt

CHARACTER

- Narrow streets (23-25') without curb and gutter systems to reduce stormwater velocity
- Limitations on extent of site grading permitted and requirements for erosion control

ADVANTAGES

- Natural features are preserved
- Preservation of scenic vistas and surrounding natural area
- Reduced environmental impact from the development
- Stormwater is retained on site and the design is intended to reduce net impact
- Furthers the intent of the regional greenway plan

DISADVANTAGES

- Lack of commercial in close proximity requires residents to travel for consumer needs
- Development density is lower than other forms of development
- Limited connectivity for vehicle and pedestrian trips.

CHALLENGES AND OBSERVATIONS

St. James Place is a good example of a conservation neighborhood. The neighborhood contributes to the integrity and preservation of a regional greenway network which also serves to preserve the scenic vistas for residents of St. James Place.

Through restrictive covenants, St. James Place requires residential development to meet size and design requirements to create a homogeneous neighborhood.

While the development is true to the intent of conservation design by preserving much of the open space and furthering regional goals, it leans toward conventional development in several ways.

Unlike many conservation designs which offer paths and trails which allow its residents to experience the natural areas, the St. James Place neighborhood preserves the natural areas for passive observation and appreciation only. Perhaps this is the junction between the idea of 'preservation design' and conservation design.

St. James Place is an example of a hybrid of conservation and conventional design which is intended to preserve the quality of the natural environment at the macro scale while allowing for high quality suburban development at the micro scale.

STANDARD
DEVELOPMENT PRACTICES
IN PRACTICE



URBANISM
IN PRACTICE



CONSERVATION
IN PRACTICE





3

PREFERRED DEVELOPMENT CONCEPT





PUBLIC INPUT

A series of events, on-line surveys, and one-on-one meetings were held to share ideas, solicit input, and identify preferences to various concepts that were developed for the study area. In addition, the project team worked with a project steering committee comprised of representatives from area cities, Linn County, and the Iowa DOT. It should also be noted that while largely separate, the EnvisionCR Plan and process confirms the findings of the preferred development concept.

The summary below highlights these events and associated findings.

Open House Events and On-Line Survey

Two open house events were held. The first event was conducted in cooperation with the Iowa DOT District 6 office and an update on the Highway 100 design process. The CMP project team shared a series of land use designs and traffic patterns modeled after three distinct themes: Standard Development Practices, Urbanism, and Conservation design scenarios.

The second open house was held in conjunction with the EnvisionCR event and a myriad of other city and metro area community based initiatives. This event included two separate but related public involvement activities. The first activity was a series of boards and displays that provided illustrations and descriptions of the three design alternatives under consideration. Participants were asked to complete a questionnaire summarizing preferences on a range of topics concerning multi-modal transportation, protection of open spaces and sensitive environmental areas, etc. A copy of the questionnaire and associated responses is provided in Exhibit A. The second opportunity for input was to complete an on-line image preference survey. The survey illustrated a range of land uses and associated development patterns, transportation infrastructure, surface parking areas, etc. Participants were asked to rank preferences and also rank criteria that should be applied to various land uses and development practices.

Both events were reasonably well attended; however, few signed the sign-in sheet and many used the on-site events as informational. Conversely, the on-line survey generated 118 responses.

One-on-One Meetings

Early in this study the project team recognized that several organizations, municipalities, and businesses have a significant presence within the project study area. As such, a series of one-on-one meetings with representatives from these entities were used to gain insight on some of the more significant issues and concerns linked to future development. A total of 13 organizations were interviewed, the list included: Aegon/Transamerica, Cedar Rapids Community School District, several City of Cedar Rapids departments, cities of Fairfax, Hiawatha, and Palo, Crawford Quarry, Linn County Conservation, Linn County Planning and Zoning, Wendling Quarries, and Xavier High School. The purpose of these interviews was to gain insight and determine the current and anticipated needs of a mix of government, quasi-government, and businesses located within the corridor.

A summary of responses to questions is included in Exhibit A. However, in general participants suggested that:

- Residential, commercial/retail, or alternatively low-impact development would be most compatible with current land uses and operations in the area;
- Heavy industry or significant traffic generating enterprises are least compatible with surrounding uses;
- Communities impacted by this corridor and plan should integrate multi-modal transportation options – particularly a regional trail system; interjurisdictional water systems; and a sound growth management plan.

Transition from Alternative Development Scenarios to the Preferred Development Concept

The three scenarios described in Part Two do not represent refined concepts, but illustrate different land use placements and development ideas to test market feasibility, traffic impacts, and stakeholder input. Review of these three related but significantly different options led to comments that inform a preferred scenario - in this case, an amalgam of the best features of each idea.

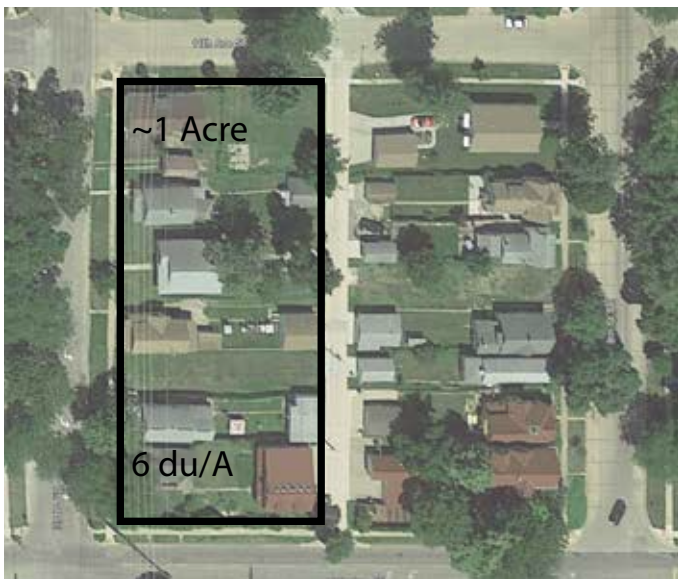
Land Use Intensities and Conformance to EnvisionCR.

Table 3.1 identifies the Land Use Typology Areas (LUTAs) from EnvisionCR. The intensity of development is expected to have a lower profile, resulting in target residential densities lower than other areas of Cedar Rapids. Designating land use in EnvisionCR consists of intensities, rather than just densities. The initial refined land use concept of the CMP was adjusted to consider the mix of uses within districts to match the land use methodology. **Table 3.2** of the GrowCR chapter represents the associated development phase, land use, densities, and projected population growth.

Map 3.1 identifies the preferred land use concept, while **Map 3.2** associates growth with a corresponding phase. Phases refer to the sequence of how smaller areas within the study area will or are likely to develop. Phases 1 through 3 represent those areas that are likely to develop in order of priority. Factors influencing development of these areas include the extension of infrastructure, completion of Highway 100 and interchange improvements, etc. Phase 4, characterized as urban reserve, is comprised of unincorporated property in Linn County but is not likely to be developed for the foreseeable future.

Table 3.1: Land Use Typology Areas

Land Use Typology Area	Description/Purpose	Residential density (du/A)	Non-residential or Mixed-use intensity (FAR)
AP Agricultural Preserve	Areas preserved for permanent farming and agricultural production.	1 unit/40 acres max	NA
R Rural	Areas that are unlikely to receive urban services. Agriculture and very low-density development will be the probable final use.	1 unit/2 acres max	NA
U-LL Urban-Large Lot	Areas with urban services including very low-density residential constrained by environmental elements, such as steep slopes, waterways, and woodlands.	0-6	0.50 max.
U-LI Urban-Low Intensity	Areas with urban services including relatively low-density residential and neighborhood commercial and service uses.	2-12	0.50 max.
U-MI Urban-Medium Intensity	Areas with urban services including medium-density residential and neighborhood and community commercial, office, and service uses.	4-24	1.0 max.
U-HI Urban-High Intensity	Areas with urban services including medium and high-density residential, major commercial, office, and service uses, and limited industrial in suitable locations.	8-40	3.0 max.
C Commercial	Areas dominated by major community and regional commercial development that are both large in scale and have high traffic impact. May include high-density residential use.	16-40	1.0 max.
I Industrial	Areas dominated by large-scale industrial uses.	NA	NA
ER Employment Reserve	Areas reserved for future large employers.	NA	NA
P Public, Semi-Public	Areas with major, typically land-intensive public, semi-public, or other civic uses.	NA	NA
OS Open Space	Areas intended to provide open space recreational uses, such as local and regional parks and for the preservation of environmentally sensitive areas. May include accessory or complementary uses if permitted by flood plain or other environmental regulations.	NA	NA
UR Urban Reserve Overlay	Areas that are unlikely to be served by urban infrastructure during the planning period but will be feasibly served and needed for urban development in the long-term.	1 unit/40 acres max	NA
EC Environmental Conservation Overlay	Areas will remain undeveloped due to sensitive environmental features and habitat.	NA	NA
FC Flood Control Study Area	Areas of the community currently under study for planned flood control project.	NA	NA



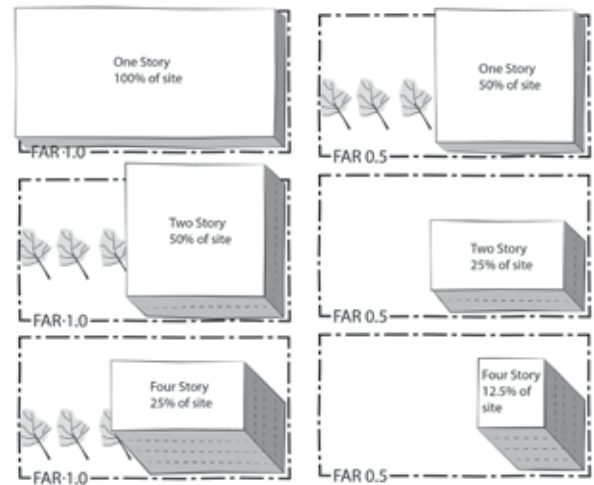
Understanding Density (du/A)

CALCULATING DENSITY

In the photograph, six single-family houses are included on an acre of land. The density of this site, then, is 6 dwelling units per acre (du/A).

Residential density is calculated using the net area of the project site. All proposed residential densities must fit within the range specified by the LUTA for the particular property.

FIGURE 3.1: Density and Land Use Typology



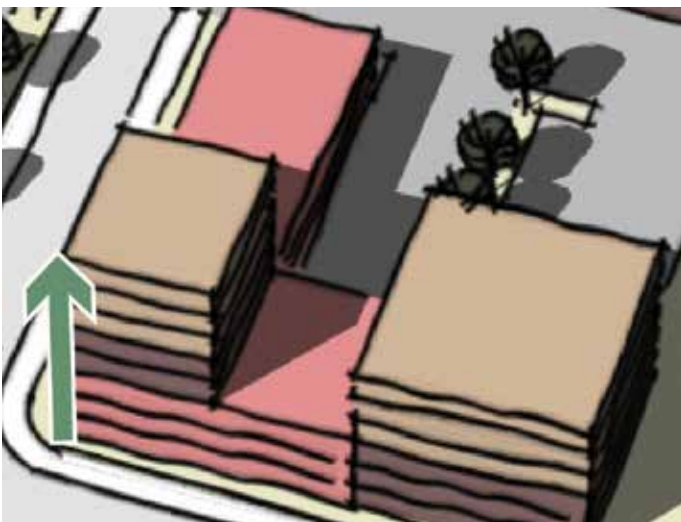
Understanding Floor Area Ratio (FAR)

CALCULATING FAR

In the top-right sketch, the total building area is 1/2 the site area, so the Floor Area Ratio or FAR=0.5. In the top-left drawing, the total building area is equal to the site area, so the FAR=1.0. However, as the other sketches show, there are different ways of designing a project that have the same ratio.

Floor Area Ratio (FAR) equals the total above-ground gross floor area of all buildings divided by the area of the project site.

Understanding Integration and Mixing of Uses



VERTICAL INTEGRATION

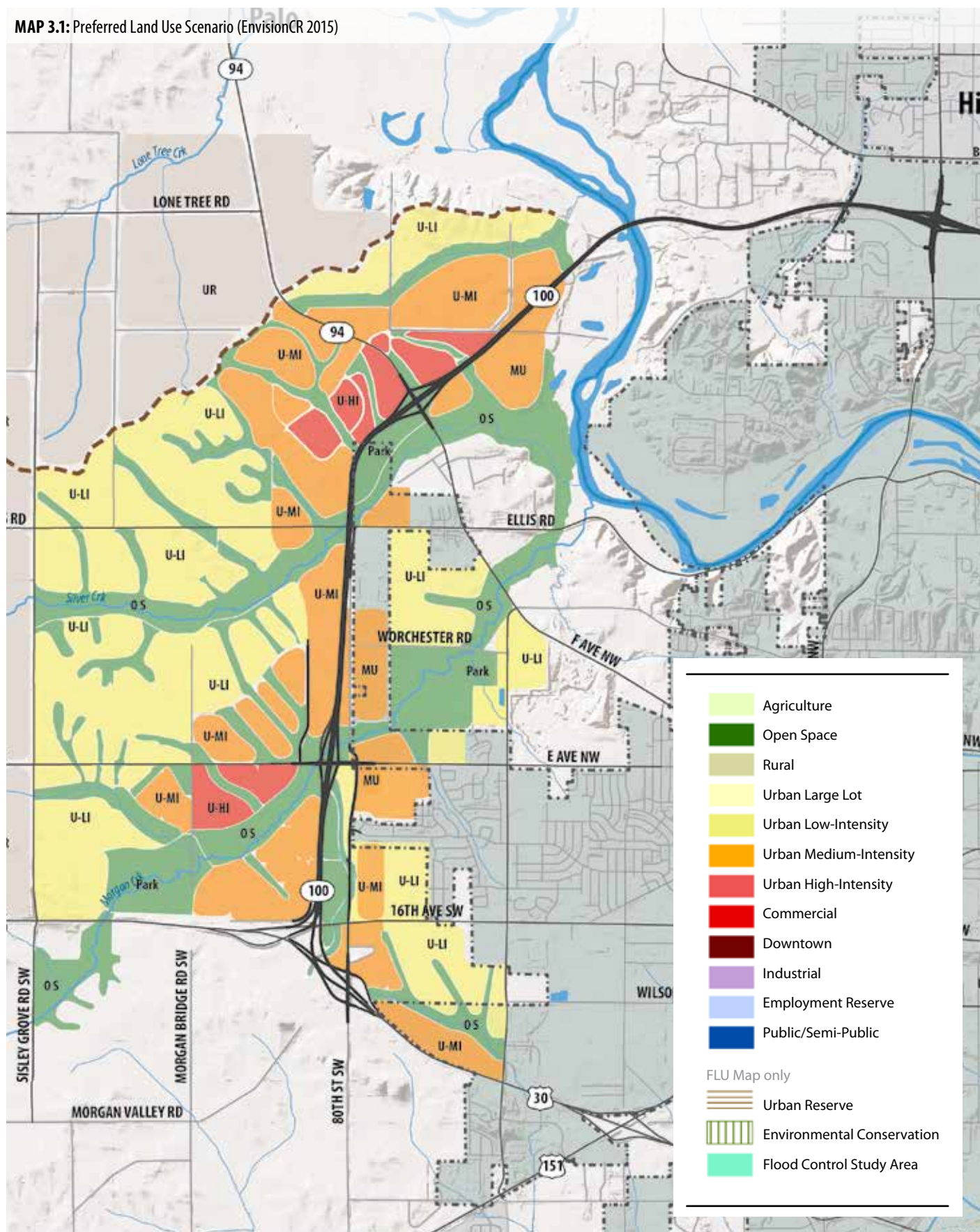
Vertical integration of uses means that different uses are located in the same buildings.



HORIZONTAL INTEGRATION

Horizontal integration of uses means that different uses are housed in different buildings but are related to each other.

MAP 3.1: Preferred Land Use Scenario (EnvisionCR 2015)



SOURCE: ENVISION CR, HR GREEN, INC., RDG PLANNING & DESIGN

MAP 3.2: Phased Development

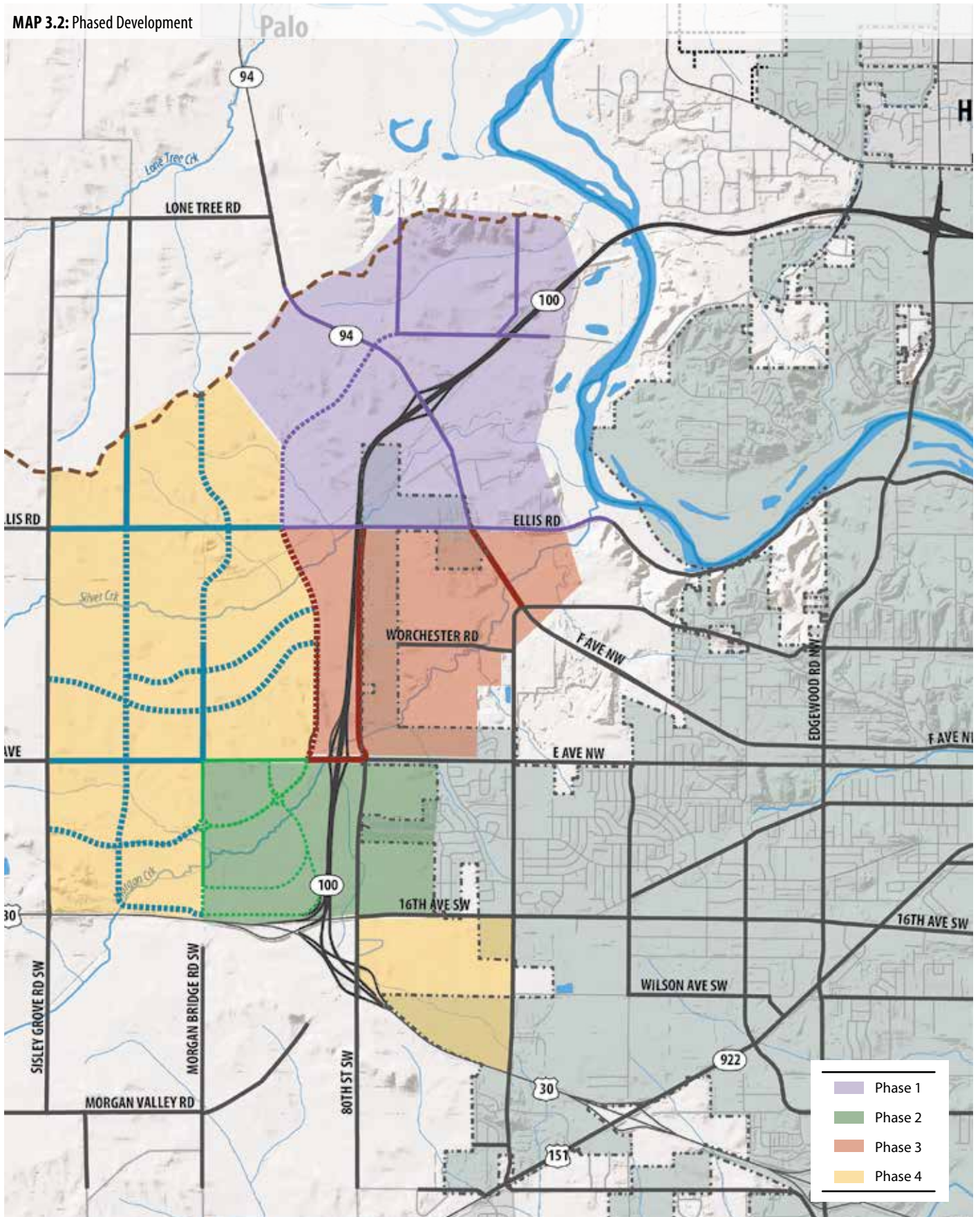


Table 3.2: Preferred Development Concept Growth Projections

Phase	Land Use	Target Assumption	Acres		Housing		Population	
			Gross Acres	Net Acres	Low	High	Low	High
1	U-H Non-Residential	No significant population	240.4	0.0	-	-	-	-
1	U-L	Target: 2 to 6 units per acre 2.2 people per unit	207.3	165.9	332	996	730	2,191
1	U-M	Target 6 to 12 units per acre 2.2 people per unit	678.4	542.7	3,257	6,511	7,166	14,324
1	U-M Mixed Use	50% Commercial 50% residential @ U-M	169.8	68.0	408	816	897	1,795
2	Open Space	-	82.5	0.0	-	-	-	-
2	U-H Non-Residential	-	117.7	0.0	-	-	-	-
2	U-L	Target 2 to 6 units per acre 2.2 people per unit	134.8	107.8	216	649	474	1,427
2	U-M	Target 6 to 12 units per acre 2.2 people per unit	165.9	132.7	797	1,594	1,754	3,505
2	U-M non-residential	No significant population	237.1	0.0	-	-	-	-
3	U-L	Target 2 to 6 units per acre 2.2 people per unit	347.1	277.7	555	1,667	1,222	3,666
3	U-M	Target 6 to 12 units per 2.2 people per unit	231.3	185.0	1,111	2,221	2,444	4,886
3	U-M Mixed Use	50% Commercial 50% residential @ U-M	95.5	38.2	229	459	504	1,010
4	U-L	Target 2 to 6 units per acre 2.2 people per unit	1986.5	1589.2	3,179	9,536	6,993	20,979
4	U-M	Target 6 to 12 units per acre 2.2 people per unit	404.2	323.4	1,941	3,881	4,273	8,536
All		-	-	-	12,025	28,330	26,457	62,319

The table displays the range of typology areas that apply to Cedar Rapids. The majority of the city's area falls into U-LI, U-MI, and U-HI.

Managing Development near Greenways

Sound development in the CMP study area requires natural resource management. The health of water resources and surrounding area is especially important. Consequently, this plan employs a comprehensive approach. This method:

- Relates environmental characteristics in the study area to one another to assess:
 - Development suitability, identifying areas where development is least likely to affect vital environmental systems.
 - Areas that should be permanently preserved as open spaces. Areas may be preserved by development permitting and site specific approvals on private property; easements; or public acquisition.
 - Green infrastructure suitability, identifying opportunities where infiltration based best practices can balance the demands of maximizing development yield and protecting critical resources.
- Provides direction to build cohesive natural systems and support vibrant development. This plan identifies methods to maintain and restore habitat continuity, links communities and features through trail and pathway corridors, and strives to manage stormwater where it lands to the greatest degree possible. The resulting benefits include supported development sites, enhanced recreation, flood/stormwater improvements and increased water quality. Figures 3.2 and 3.3 show exhibits for managing stream bank development.
- Provides examples for successful development of sites. To illustrate system benefits, Figures 3.2 and 3.3 show examples for the unsuccessful and successful development of sites. Figure 3.2 shows conventional streambank development practices which may have negative consequences for natural resources. Figure 3.3 demonstrates site design concepts which use on-site techniques to reduce impact on the external environment and provide more successful projects for workers and residents. They are presented throughout this document as simple examples of methods available to developers, private landowners, public agencies and others to take full advantage of the approaches outlined here. Demonstrations in Chapter 2: Conservation Scenario.

FIGURE 3.2: Conventional Streambank Development



FIGURE 3.3: Conservation Streambank Development



Preferred Transportation Scenario

Street Typology and Design Standards

The proposed street network will follow a complete street approach to accommodate transportation users of all modes, including pedestrian, bicycles, automobiles, and transit. The complete street approach to street design within the Highway 100 Corridor will support the Corridor MPO 2040 Connections 2040 long range transportation plan (LRTP) goal of "Offer Travel Choices." Additionally, the proposed transportation network achieves the following LRTP Objectives:

- Provide Travel Choice including Transit, Bicycle Trails and Paths, and Sidewalks
- Provide a Transportation Network which Supports Land Use Planning

The proposed street network typology and design standards were developed in accordance with the City of Cedar Rapids Complete Streets Policy (July 2014). Roadways within the Highway 100 Corridor Study Area should follow these design standards as outlined as part of the Cedar Rapids Metro Design Standards. These standards provide a variety of design options created to supplement and build upon the Statewide Urban Design and Specification (SUDAS) Standards, as well as, the Complete Streets approach developed by the Corridor MPO in the 2040 LRTP Update.

The following roadway classifications are anticipated to be included in or adjacent to the Highway 100 Corridor.

RURAL

Rural roadways provide access between agricultural and rural residential land uses primarily on the edge of the Highway 100 Corridor Study Area. The existing rural roadways will likely meet the traffic needs for the Study Area for the near future. As development occurs, the existing rural roadways will likely need to be upgraded to the proposed roadway classifications shown in **Figure 3.4** to support increased traffic demand.

Providing connections to the upgraded arterial and collector roadways to rural roadways adjacent to the Study Area will continue to be a goal of the street network for the Corridor as development occurs.

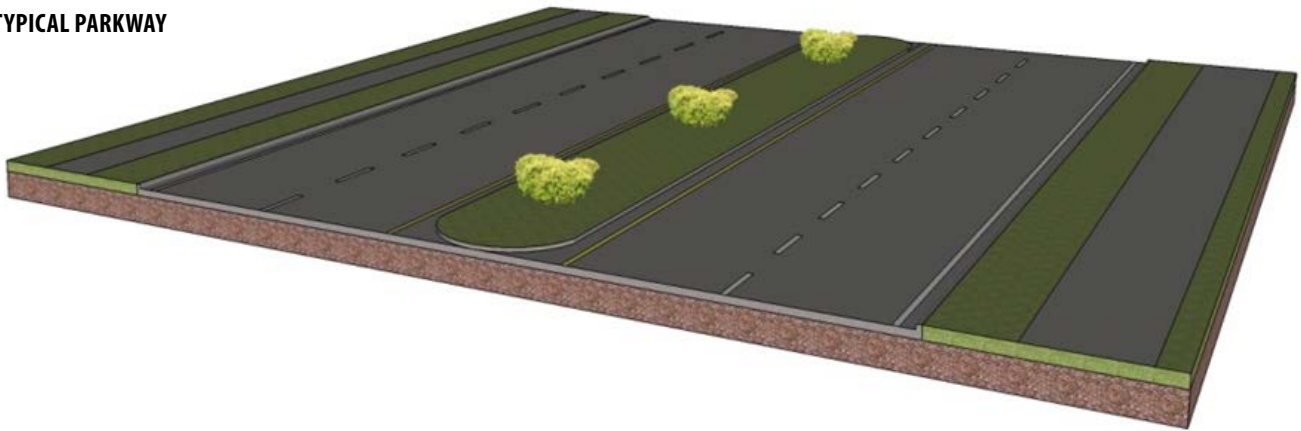
To achieve the multimodal and complete streets goals of both the Corridor MPO and the City of Cedar Rapids, paved shoulders will be considered for rural roadways adjacent to the Study Area. Providing paved shoulders will improve the comfort and safety of bicyclists travelling along the roadways with minimal investment. Additionally, connecting the paved shoulders of the rural roadways to the proposed trail network will enhance the regional bicycle network.

Design criteria for rural roadways are provided in **Appendix B**. A model of potential rural roadway design is shown in the next page.

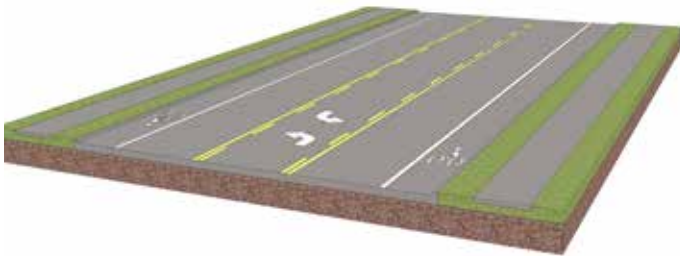


FIGURE 3.4: Paved shoulders allow bicycles to safely travel on a rural roadway without impeding traffic along the corridor. Maintain adequate distances between higher speed traffic and the bicycle will also increase the comfort level of the bicyclist.

TYPICAL PARKWAY



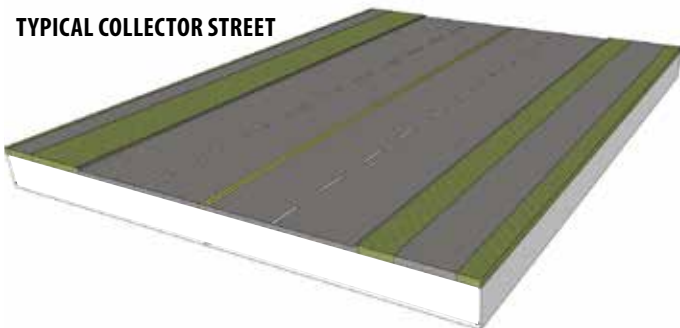
**TYPICAL ARTERIAL STREET
NO PARKING WITH BICYCLE LANES**



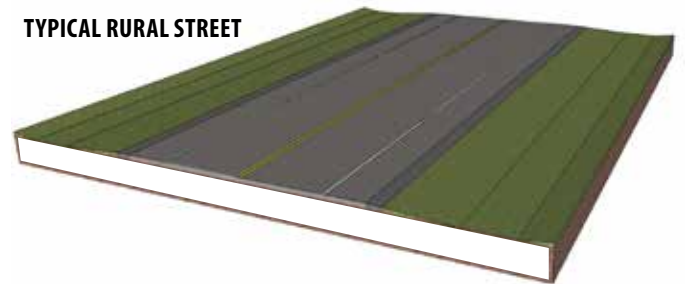
**TYPICAL ARTERIAL STREET
WITH PARKING WITH BICYCLE LANES**



TYPICAL COLLECTOR STREET



TYPICAL RURAL STREET



Active Transportation

Map 3.3 shows the Active Transportation Network. Transportation is a key element of the Highway 100 Corridor Management Plan, and without an effective transportation system, the area will not be able to absorb the growth and change that is coming its way. Necessarily, the focus of transportation planning is managing the unusual increase in truck and automobile traffic that will accrue from the additional access from Highway 30 to Highway 100, the probable long-term development of commercial and office space, and residential growth.

But there is another dimension to transportation that has become an increasing subject of interest in the metropolitan area and around the country – the modes of movement that are referred to as active transportation. In this study area, on the edge of a major metropolitan region, “active transportation” concentrates on bicycle and pedestrian facilities. Moreover, since this plan’s study area is largely outside the fine-grained environment of the city, this section will be largely oriented to moderate to long-distance, multi-purpose facilities, used by pedestrians and sized for bicyclists. With some exceptions, it will not address the smaller scale of pedestrian facilities like conventional sidewalks.

PURPOSES OF ACTIVE TRANSPORTATION

Trips made under people’s own power are often separated into two general categories of purpose: utilitarian and recreational. Unique among urban transportation modes, utilitarian trips may also be recreational. It is one of the most attractive features of these modes. In general, though, utilitarian trips are made for a purpose, specifically to reach a destination for specific purposes: commuting to work, travelling to shop, going to school, or even going to a park or other recreational facility. Recreational trips are made for the purpose of the trip itself, and the enjoyment that it brings. Given that dichotomy, there are a number of specific purposes and issues that an active transportation network for the study area should address.

TRANSIT MOBILITY

Cedar Rapids Transit serves the City of Cedar Rapids and adjacent communities in a manner consistent with where services are needed and in patterns that affect the department’s ability to serve. The Study Area is not currently served by Cedar Rapids Transit. Moreover, the Connections 2040 plan does not include transit expansion into the Study Area. Based on these observations transit service within the Study Area should be reevaluated as development occurs. As the proposed medium-density residential land uses develop along Highway 100, transit could provide a valuable multimodal option for residents within the Study Area. The concentration of medium-

density residential and commercial development between Highway 100 and the proposed parkway facility could provide a transit supportive mix of residential, commercial, and office land uses that could spur transit use along the parkway.

The location of the Highway 100 Corridor on the edge of the Cedar Rapids Metropolitan Area provides opportunities for transit supportive improvements, like park-and-ride locations, should also be considered as development occurs.

PEDESTRIAN MOBILITY

The network of sidewalks within the Highway 100 Corridor should be designed to achieve the “Pedestrian Vision” as outlined in Connections 2040. As a requirement of the plan, all new public and private development should include sidewalks on both sides of the street. Additionally, the sidewalk network within the Study Area should make provisions to link destinations, such as, schools, parks, shopping centers, and residential development to support the walkability of the Corridor.

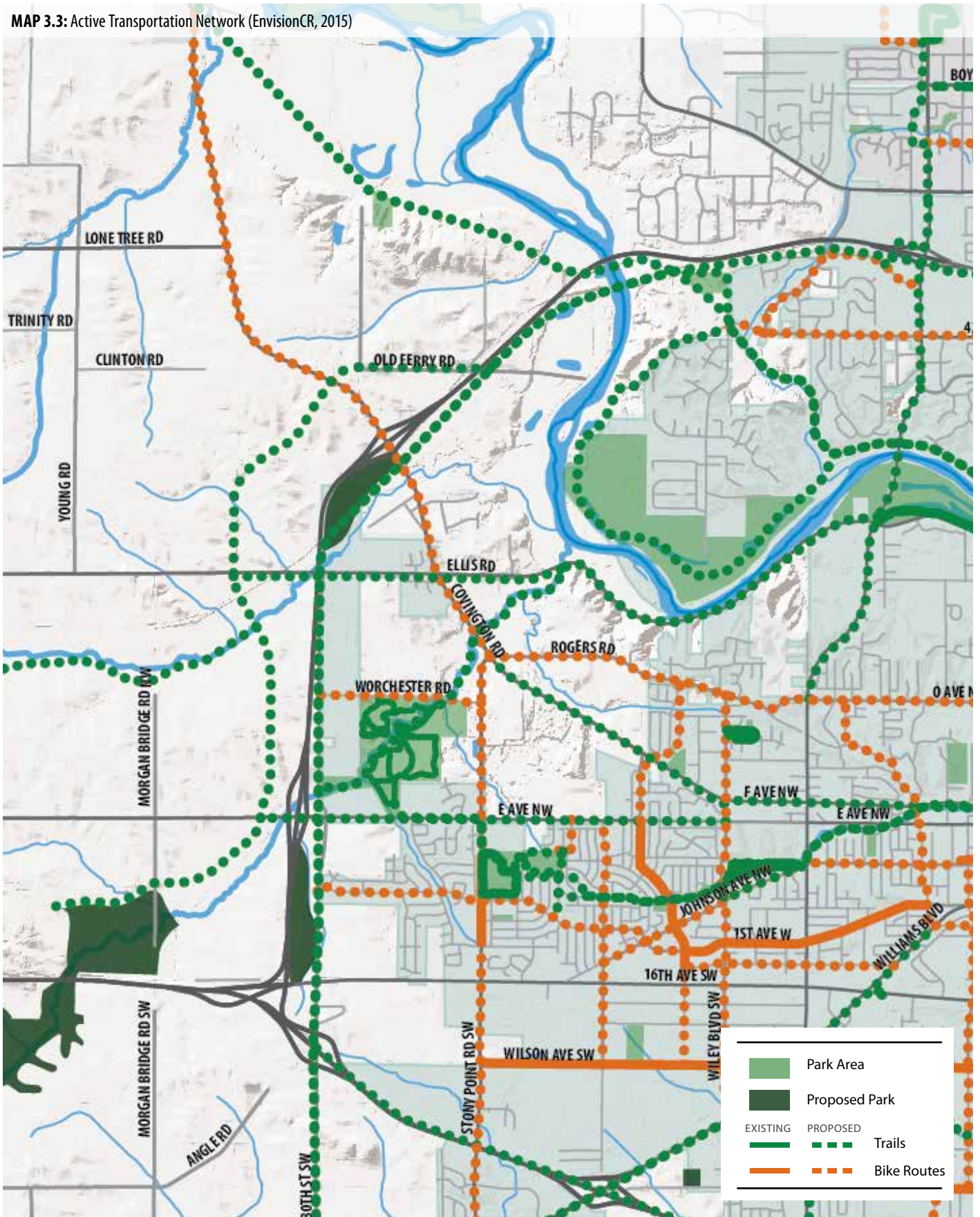
During roadway design, safety of pedestrians should be considered at or near roadway crossings. Crossing treatments aimed to reduce the distance pedestrians are required to cross at intersections, such as bump-outs or median refuge islands, are elements that should be considered during design. Aesthetic elements, including street furniture, shade trees, and pedestrian scale lighting should also be considered. Improving the overall safety and enjoyment of walking within the Corridor will encourage increased pedestrian travel. Future design elements should also incorporate traffic calming improvements such as bump-out areas as well as designating recessed areas before signalized intersections and four-way stops – particularly before designated right turn lanes.

BICYCLE MOBILITY

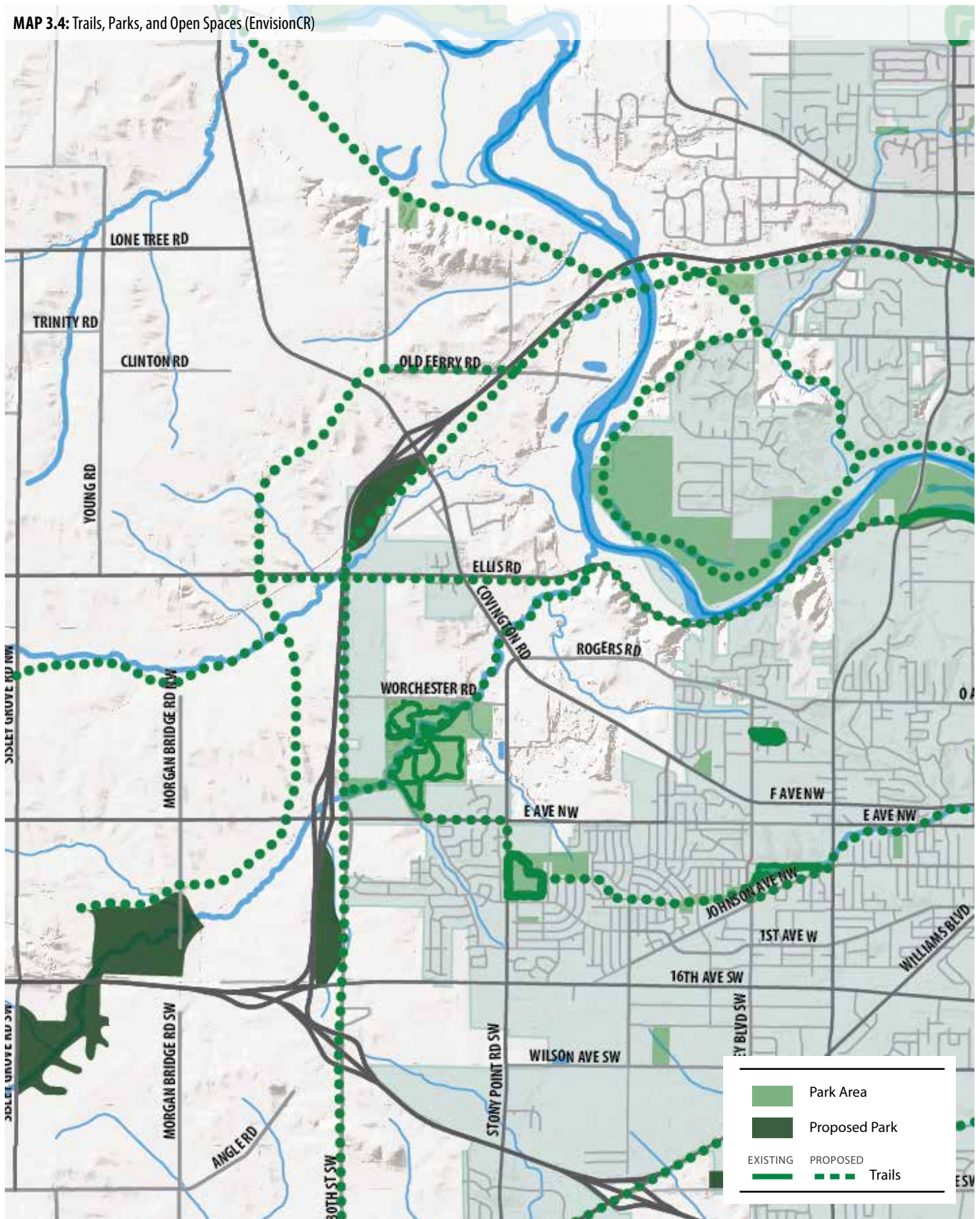
Providing accommodations for bicycle travel is a key component of a complete streets approach to roadway design. Within the Highway 100 Corridor, on- and off-street facilities will provide safe routes for bicycle users. Expanding the bicycle network will improve connectivity and accessibility throughout the Highway 100 Corridor and the region. Much like the “Pedestrian Vision,” the bicycle network should attempt to link destinations within the Study Area.

Safety of bicycle users will be considered when determining the appropriate facility for the roadway corridor. Arterial streets will likely see high volumes of traffic through the Corridor, off-street facilities are recommended along E Avenue, Ellis Road, and the proposed parkway. Collector streets will support either on- or off-street facilities depending on adjacent land uses and traffic volumes at the time of construction.

MAP 3.3: Active Transportation Network (EnvisionCR, 2015)



MAP 3.4: Trails, Parks, and Open Spaces (EnvisionCR)



SOURCE: ENVISIONCR

TRAILS AND RECREATION

The existing trail system within the Cedar Rapids Metropolitan Area is planned to expand within the City's limits to connect to both regional and city-wide trails. The proposed trail network will connect to the existing or planned trail system currently in the metropolitan area in order to provide a comprehensive and continuous system of trails. As shown in **Map 3.4**, the trail network within the Study Area provides east-west connections to the Highway 100 Trail, planned to follow the expansion of the roadway.

Special consideration will be given for crossing locations so that Highway 100 does not create a barrier for the trail network. Crossings located at planned interchanges will avoid conflict with traffic entering or exiting Highway 100 wherever possible. Separate facilities may be needed to ensure traffic flow on and off the Highway and safety of trail users are not impacted.

Infrastructure Types

Transportation system improvements are encouraged to be consistent with the complete streets approach, similar to the standards adopted by the City of Cedar Rapids. For example, active transportation system within the study area should apply to the following types of bicycle and pedestrian facilities and upgrades:

- **Paved multi-use trail on separated right-of-way.** This kind of facility, typically using such resources as watercourses, railroad abandonments, utility corridors, buffers, or parks, has been the staple of facility development in the metropolitan area. They offer the highest level of perceived comfort to most users because they are generally free of conflicts with cars and trucks. In the study area, multi-use trails apply to regional facilities, major trails along drainageways (particularly along Morgan Creek), within buffers, and along abandoned Union Pacific railroad segments.
- **Paved multi-use trails within or along road right-of-way.** Sometimes called "sidepaths" these multi-use pathways within street right-of-ways typically run parallel to the roadway and are separated from the street channel. The West Parkway is a candidate location for a sidepath, which can also be referred to as "widened" or "multi-use" sidewalks. Sidepaths should be avoided along collector and local streets. The use of sidepaths has been controversial in the planning and design of bicycle facilities. The previous edition of the AASHTO bicycle facilities design manual actively discouraged their use, while the new version is more accepting when provided with appropriate design features. In the study area, sidepaths are a good solution along busy streets or roadways with controlled access and relatively few intersecting roadway and driveways.
- **Highway 100 with separated path.** This includes road design with a parallel sidepath, creating an acceptable facility for bicyclists. The path provides an immediate connection for bicyclists to access the western part of the city prior to the build-out to the area. Ultimately, the Highway 100 sidepath becomes the spine route for future trails in the neighborhoods to connect.
- **Urban bike lanes with sidewalk continuity.** This solution, often referred to as "complete streets," accommodate both pedestrians and bicyclists, often in city or urbanizing environments. Features of complete streets include:
 - Continuous pedestrian access, with sidewalks that provide sufficient width, setbacks from traffic ways, and continuity to provide safe environments. Complete pedestrian access also includes safe crossings at intersections or at strategic locations along major corridors. This is especially important near possible school locations.
 - On-street bicycle infrastructure. Although there are variations, on-street infrastructure typically includes three broad categories: sharrows (or shared use markings), bike lanes, and protected bikeways.
- **Shared on-street routes.** These facilities, with lower ADT's, include continuous sidewalks or bicycle boulevards and accommodate bicycles through shared use pavement markings (sharrows), signage, traffic calming devices, and other features. These facilities generally apply to low- to middle-volume urban streets. Often these types of facilities can operate as on-street trails or bicycle boulevards creating safe, comfortable and appealing low cost cycling connections.
- **Possible Barriers.** Bridging difficult barriers can be very important in improving pedestrian and bicycle mobility. Key barriers to active transportation in the study area include:
 - Cedar River. Crossing the Cedar River using the old railroad alignment parallel to Highway 100.
 - Silver Creek and Morgan Creek crossings for vehicles, bicyclists, and pedestrians.
 - Highway 30 as it affects bicyclist and pedestrian mobility to future employment and residential areas.
 - Surface street pedestrian crossings.
 - Highway 100 as it affects trail linkages of the regional park. E Avenue NW is a critical linkage. Interchanges within the Study Area are designed to rural spacing standards (3 mile) with connections at E Ave. and Covington Rd. The interchanges will be designed with multimodal amenities including on- or off-street bicycle facilities and sidewalks that provide safe travel across Highway 100. Providing these connections across Highway 100 will encourage pedestrian and bicycle travel throughout the corridor and will keep Highway 100 from becoming a barrier to accessibility and mobility.

Utility and Green Infrastructure Concept

Water

Flow Estimates. As discussed in the sanitary sewer section, demands vary significantly by land use. For planning purposes, water use rates for the new development areas were calculated using the Cedar Rapids Design Standards. Flow rates were estimated using the same flows as the sanitary sewer system. A breakdown of the flows per land use is shown in **Table 3.2**. The approximate average flow that would be required to serve the proposed development area is 5,380 gpm, or 7.75 MGD.

Treatment. The City of Cedar Rapids NW water treatment facility is located within the development area. This facility mainly serves the Prairie Valley area, which is located south east of the new development area. This facility is currently unable to handle the expected increase in flow. The new development area will need to be served by the existing WTP located at J Avenue. The development will be expanded in phases and the J Avenue water treatment plant will be expanded incrementally to serve the additional users.

The existing plant is located approximately five miles east of the development. The existing distribution capacity of the system is unknown and a booster station may be required to meet the required pressure and demands. It is suggested that a more comprehensive water system study be conducted to determine the need and required capacity of a booster station.

A study was conducted in February 2014 on the existing water treatment plant and the requirements for expansion. Once a certain average day threshold is met, the water treatment plant expansion is triggered. The flow threshold that would trigger this expansion is 55 million gallons per day. The City is expecting to reach this threshold by 2027. This threshold would likely be met with the addition of the proposed development area.

Distribution and Storage. Similar to the wastewater section, the distribution system was divided into 4 phases. The initial connection would be to the 24-inch existing main near E avenue. Phase 1 would have to be connected to the existing distribution system through a 24-inch main. Additional storage would also be required to provide fire protection for the development. Phase 2 would include the construction of a 2 million gallon water storage tank. To assist in planning for future growth, it is suggested that a 24-inch main be looped to the far west of the development. This will allow for additional growth to the west in the future.

Table 3.3: Proposed Water Pipe Sizes & Associated Lengths

Diameter (in)	Length (lf)
8	209,201
12	69,417
16	3,258
20	8,717
24	64,285
30	270
48	214

The total lengths of the proposed pipe sizes for the entire proposed development are detailed in **Table 3.3**.

Table 3.2: Projected Water Flow Estimates for Preferred Development Concept

Phase	Land Use	Commercial Village Center	Urban Low Intensity	Urban Medium Intensity	Open Space	Total Flow (mgd)
	Flow Rate	5,000	100	100	-	
	Unit	gpd/Acre	gpd/Capita	gpd/Capita	gpd/Acre	
1	Acres/Population	-	1,453	10,778	1,330.79	2.37
	Flow (mgd)	-	0.15	1.08	-	
2	Acres/Population	354.41	-	5,150	819.96	2.29
	Flow (mgd)	1.77	-	0.52	-	
3	Acres/Population	-	1,503	4,895	230.63	0.97
	Flow (mgd)	-	0.15	0.49	-	
4	Acres/Population	-	11,209	10,070	1,663.11	2.13
	Flow (mgd)	-	1.12	1.01	-	
Total	Acres/Population	649.79	14,165	30,893	4,044.49	7.75
	Flow (mgd)	3.16	1.42	3.09	-	

Table 3.4: Projected Wastewater Demands for Preferred Development Concept

Phase	Land Use	Commercial Village Center	Urban Low Intensity	Urban Medium Intensity	Open Space	Total Flow (mgd)
	Flow Rate	5,000	100	100	-	
	Unit	gpd/Acre	gpd/Capita	gpd/Capita	gpd/Acre	
1	Acres/Population	230.21	1,453	10,778	1,330.79	2.37
	Flow (mgd)	1.15	0.15	1.08	-	
2	Acres/Population	354.41	-	5,150	819.96	2.29
	Flow (mgd)	1.77	-	0.52	-	
3	Acres/Population	65.17	1,503	4,895	230.63	0.97
	Flow (mgd)	0.33	0.15	0.49	-	
4	Acres/Population	0	11,209	10,070	1,663.11	0.97
	Flow (mgd)	0	1.12	1.01	-	
Total	Acres/Population	649.79	14,165	30,893	4,044.49	7.75
	Flow (mgd)	3.16	1.42	3.09	-	

Wastewater

Flow Estimates. Sanitary sewage demands for proposed development of the land vary significantly by use. For planning purposes, sewage flow rates for the new development areas were calculated using the Cedar Rapids Design Standards. A breakdown of the flows and acreages for each type of land use are shown in **Table 3.4.**

The anticipated residential population within the HWY 100 development is predicted to be as much as 45,000 persons. Based on the anticipated residential population and the flow rates predicted for each alternative land use, the average flow for the proposed development is 7.75 million gallons per day (MGD). A peaking factor must be applied to the average flow to determine the maximum flow rate which is used to size pipes and lift stations. The peaking factor was determined using the Cedar Rapids Metropolitan Area Design Standards, and the equation shown:

$$PF = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Where P = population in 1,000 persons

With this population, the resulting peaking factor is 2.31. When this peaking factor is applied to the average flow of 7.75 MGD, the peak flow from the proposed development is 17.9 MGD. The capacity of the nearby Morgan Creek lift station and interceptor were increased in 2000 to meet future flows for this area. The Morgan Creek lift station has the ability to pump a peak flow of approximately 17.3 MGD. The interceptor sewer has a capacity of 19.4 MGD.

Wastewater Treatment. The City Water Pollution Control Facility (WPCF) is located approximately 12 miles east of the development area. This facility is currently able to handle moderate increases in flow, but does not have the capacity to accept the entire development area. The current plant average flow for 2013 was 58.3 MGD and the plant’s maximum capacity is 86.95 MGD. The new development area will be expanded in phases and the wastewater treatment plant will likely need to be expanded to serve the additional users.

Collection and Transmission. The development area was divided into 4 proposed phases of improvements based on location and land use. **Figure 1** shows a layout of the proposed collection system and a map of the 4 development phases. The anticipated sewer layout was developed using the Cedar Rapids Design Standards and a maximum cover of 25 feet.

There are two locations where the proposed sewer system will tie into the existing sanitary sewer. These connections are detailed in the following paragraphs.

There is an existing 24-inch transmission line located in the Morgan Creek Park. This main trunk line will accept the majority of the new development flow. This would serve all phases with the exception of the south east portion of Phase 4. The Morgan Creek lift station will need to be upgraded to handle the predicted flow from the new development. The existing capacity of the Morgan Creek lift station is 10.8 MGD. The current average flow is 2.6 MGD for 2014. This study does not include determining the requirements for upgrading the existing lift station. It is suggested that a study be completed on the existing and proposed flows, to determine the required increase in capacity needed for the existing lift station. With the proposed timeframe for the build-out of the full development, upgrades or

expansion of the lift station will likely be required as this lift station continues to age.

The second tie in point would be at Stoney Point Road SW and Bryant Boulevard SW. An 18-inch transmission main is located along Bryant Boulevard SE. This location would receive an additional 600 gpm or 0.85 MGD at peak flows. Again, the downstream segments would also need to be analyzed to determine if the existing system has adequate capacity to accept this flow.

A breakdown of the pipe sizes and lengths for the gravity sewer throughout the entire proposed development are given below in **Table 3.5.**

Table 3.5: Proposed Sanitary Sewage Pipe Sizes & Associated Lengths

Diameter (in)	Total Length (lf)
8	97,925
10	13,029
12	11,036
15	6,712
18	10,085
24	15,661
30	7,373
36	4,549

Wastewater Infrastructure Upgrades. There are four main areas of infrastructure impact that may occur based on the proposed development plan. These include the Morgan Creek Lift Station, the Morgan Creek Park Trunk Sewer, the Bryant Boulevard SE Transmission Main, and the WPCF. The Morgan Creek Left Station and the Morgan Creek Park Trunk Sewer have previously been upgraded to handle some development in the proposed area. Based on the projected peak flows from the proposed development, upgrade of these facilities will be required near the end of the build-out period if actual peak flows develop as predicted. The Bryant Boulevard SE Transmission Main should have adequate capacity to accept the projected flows at this time. However, development of this area is planned for Phase 4 of the development and the condition of the sewer and downstream segments will have to be revisited to determine if adequate capacity still exists in the future.

The WPCF currently serves Cedar Rapids and the surrounding communities and has some capacity to receive additional flow from other areas. Even though the proposed development could justify the addition of a second wastewater treatment facility in the area, growth in this area has been planned for and flow from the proposed development will be transported to and treated at the existing WPCF. Because the timing of the proposed development phasing and build-out is uncertain, it is difficult to predict when expansion of the WPCF may be needed. Expansion will be determined more likely based on the condition of the existing process equipment, expansion of the service area in other areas, regulations from the

Table 3.6: Estimated Flows & Associated Impacts per Phase

Phase	Estimated Flow (mgd)	Potential Existing Infrastructure Impacts
1	2.37	No Impacts to existing infrastructure predicted
2	2.29	WPCF
3	0.97	WPCF
4	2.13	Morgan Creek Lift Station, Morgan Creek Park Truck Sewer and WPCF

Iowa Department of Natural Resources, and the aging of current infrastructure allowing more inflow and infiltration into the sanitary sewer system.

Table 3.6 shows the estimated flows for each of the phases and predicts what infrastructure might be impacted by the increase in total flow. This only considers the proposed development and does not consider the other factors described above.

Stormwater Management

Map 3.5 shows the watersheds for the region. The project area lies in three separate HUC-12 watersheds: Silver Creek – Cedar River on the north end, Morgan Creek through the center, and a small portion of Prairie Creek on the south end. All of the project area eventually drains to the Cedar River. Morgan Creek and Silver Creek fall within the study area and have mapped floodplains. Morgan Creek has a mapped regulatory floodway, while Silver Creek is mapped as FEMA Zone A. The soils in the area are predominately silty clay loams and silt loams within Hydrologic Soil group C, and have medium to low infiltration rates. Slopes are generally 2 to 9 percent with flatter slopes occurring within the low lying drainage ways and flood zones.

PROPOSED STORMWATER MANAGEMENT TECHNIQUES

Regional Detention/Retention. Regional detention means using large ponds to collect and detain runoff from entire development areas (regions), instead of smaller, more frequent “local” detention ponds. Because they usually serve multiple small watersheds, regional basins are usually located low in the watershed, often within existing streams. The feasibility of using regional (or “online”) detention was evaluated throughout the study area and it was not deemed feasible for most of it since detention or retention is not allowed in mapped, regulatory floodplains. Regional detention may be feasible higher in the watershed where commercial and higher density land use is specified and site by site detention may not be as cost effective. These regional detention areas could be installed within existing drainage ways in areas zoned as open space. Regional detention basins can also be designed as multi-use areas, for example a soccer field could be located in a large basin that is flooded only occasionally. The area west of the Covington Road interchange is one area that may conducive to regional detention. USDA soils information for this area indicate pockets of Sand and Sandy Loam, which are very favorable for infiltration basins.

Conventional Localized Detention/Retention. Local detention is recommended for most of the project area. Developments should be required to adhere to the City standard of limiting the rate of runoff from the 5-year through 100-year frequency storm events to the existing, pre-developed peak runoff from a 5-year event. Enforcing this standard would ensure that the cost of detention is included in the development of each site. Emphasis should be placed on detention that also improves water quality – such as bio-filters, wet ponds or wetlands – or reduces runoff volume such as infiltration oriented practices. In commercial and high density areas, permeable pavement and underground facilities such infiltration chambers may be a better fit than conventional detention practices that take up valuable land area. Outlet structures from detention and retention facilities should be multi-stage to allow for controlled release of the



FIGURE 3.5: Example of an “online” regional detention pond, although they typically have more vegetation (image courtesy of rvtcorp.com)



FIGURE 3.6: Small constructed wetland for stormwater detention and water quality improvement (image courtesy of uncw.edu)

water quality and channel protection volumes (the runoff from 1.25 and 2.4 inch storms, respectively).

Small Scale Stormwater Management Techniques. The use of smaller, more numerous practices, such as bioretention cells, rain gardens, native landscaping, rain barrels, and other small scale stormwater treatment techniques (often called Best Management Practices or “BMPs”) should be incorporated into site development whenever possible. These types of practices offer the best downstream results when they are distributed across the landscape, each unit serving a relatively small drainage area. These stormwater management techniques are intended to infiltrate water close to the source, thus reducing both the rate and volume of stormwater reaching the drainageways and creeks and ultimately reducing downstream erosion and pollutant loading. It is recommended that developments be required to utilize these types of facilities to infiltrate the Water Quality Volume at a minimum. Ideally, the Channel Protection Volume would be treated and/or infiltrated onsite (the concepts of Water Quality volume and Channel Protection volume

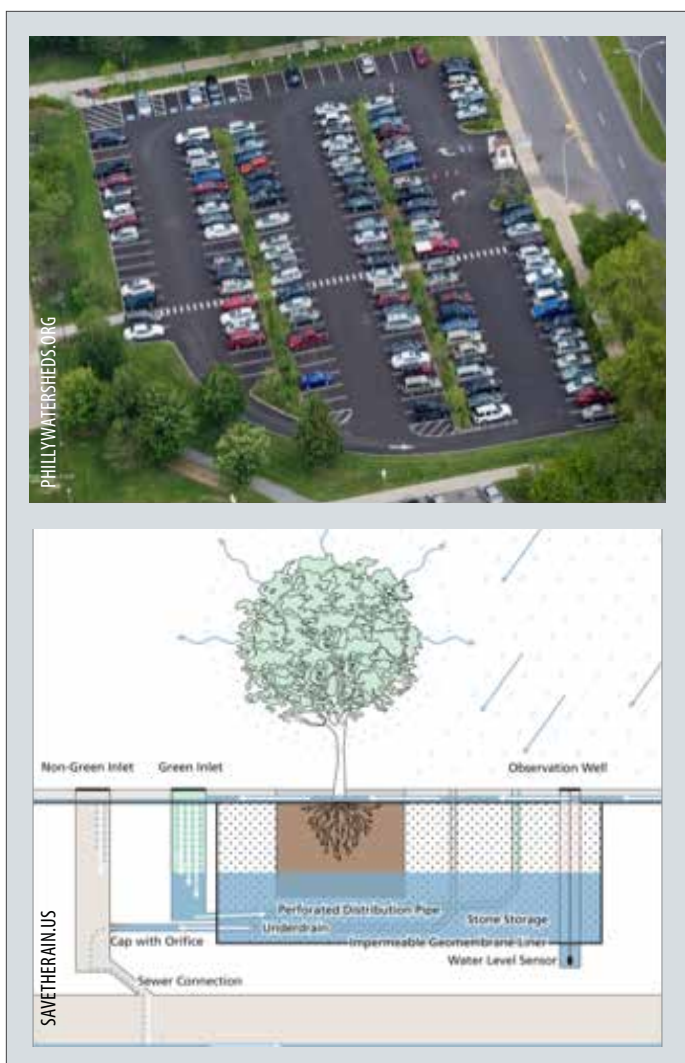


FIGURE 3.7: Aerial view and cross section of “tree infiltration trenches”, which are often used to drain and cool parking lots while improving runoff water quality and enhancing aesthetics.

are described thoroughly in the Iowa Stormwater Management Manual). While the City requirement of releasing at the 5-year pre-development rate is excellent for reducing downstream flooding, it is the smaller, more frequent storms that have been shown to cause the most erosion and water quality degradation in channels, creeks, and rivers. These practices will promote healthy, attractive waterways and allow stormwater that does not infiltrate to function as an amenity instead of a nuisance.

Transportation Network. The transportation network has been designed in a way to minimize waterway crossings and, where possible, to follow ridgelines. Stormwater discharge from the roadways will discharge into the existing waterway areas zoned as open space. If possible, roadways should be designed to include some detention, retention, or infiltration to further minimize impacts on the waterways. Examples of BMP techniques applicable to roadway design include bio-swales, curb-cut rain gardens, permeable pavement, minimizing pavement width, and underground storage. In rural applications, simply using a native seed mix in ditches can

significantly reduce peak volumes and flows. Another creative solution is the installation of open-bottom manholes in areas where high infiltration rates exist. Often the cost of these practices is offset by cost savings in smaller storm sewer piping.

GLOSSARY OF STORMWATER BEST MANAGEMENT PRACTICES

1. **Infiltration Trenches.** These are trenches filled with highly porous aggregate that receive directed runoff from small sites. Infiltration is promoted and some water quality improvement is provided by filtration. One special type suited to parking lots are called “Tree Trenches” wherein pavement runoff is intercepted by long grates over the trenches. The trenches then slope toward tree or landscaping clusters placed in parking medians or other spaces unusable for parking.
2. **Infiltration Basins.** These are shallow basins, typically dry and covered in grasses that receive runoff from impervious areas, or small watersheds. Infiltration of rainwater is promoted by native soil porosity (only applicable for sites with suitable soil), and an overflow structure is usually provided for high flow events. Water quality is improved by filtration; infiltration is promoted so long as sediment clogging is avoided.
3. **Bioretention Cells / Rain Gardens.** These are similar to infiltration basins except they are typically shallower yet, and planted with aesthetically appealing vegetation. Soil is amended to maximize porosity and non-buoyant hardwood mulch is placed around the plantings. They are typically designed to fill to just below an overflow structure in a 1.25 inch rain event, then infiltrate and drain within 24 hours afterward. Significant water quality improvement is provided by the combination of filtration, nutrient uptake by plants, and sequestration / immobilization of metals and some organic compounds.
4. **Native Landscaping.** This simple concept involves retaining or mimicking the existing undisturbed landscape. An existing floodplain, grassland, or forested area may be left undisturbed – or replicated if not previously existing – or native plant species may be used in conventional development areas. Native species and long-established landscaping tend to infiltrate and retain runoff well and be well-suited to the local climate, requiring little maintenance. Water quality improvement varies with the application.
5. **Dry Detention Basins.** Dry ponds are similar to infiltration basins except they may be sized for temporary storage of runoff from larger storm events. Water quality is typically improved by settling of particulate matter only.
6. **Wet Detention Basins.** Wet ponds are similar to dry ponds except infiltration is not promoted such that at least part of the basin maintains a permanent pool. The design typically provides for additional storage and slow release of stormwater runoff. Settling of particulate matter is expected, and some uptake of nutrients by algae and aquatic plants occurs.

7. **Stormwater Wetlands.** This is basically a wet pond with additional plants and emphasis on biodiversity. More water quality improvement is expected than with a wet pond because the additional aquatic plants (and the microorganisms that they support) provide rapid uptake of nutrients, mineralization of some organic compounds, and sequestration of metals. Not to be confused with a natural wetland, these are designed and constructed for specific functionality; they also tend to harbor less total biodiversity than a natural pond. Note that existing, natural wetlands are not typically permitted to be converted for stormwater detention in excess of the natural capacity. See **Figure 3.6** above for a visual example.
8. **Grassed Swales.** A swale is a long depression that slopes gently toward one end. It is used to direct the flow of runoff while slowing and infiltrating runoff with vegetation. Some pollutant removal occurs during low flow events.
9. **Wet Swales.** A wet swale is similar to a grassed swale with the exception of limited infiltration. Some stormwater detention may be provided, and additional water quality improvement is expected compared to a typically dry swale.
10. **Vegetated Filter Strips.** These are similar to swales except they are not always used to direct the flow of runoff, sometimes their primary purpose is to slow sheet flows from adjacent impervious surfaces. Filtration of sediment, infiltration of runoff, and uptake of nutrients may also occur.
11. **Underground Detention Chambers.** These are constructed underground voids for temporary storage of runoff. They can be formed by pre-fabricated vaults, open bottom arch structures, large pipes, or simply by filling a pit with “open-graded” rock. They can be configured for water reuse such as irrigation, or for slow release to a typical storm sewer system pursuant to onsite detention regulations.
12. **Green Roofs.** These are low-pitch or flat roofs that are covered with a growth medium and hardy, drought-tolerant plants. Runoff from the roof is retarded by the system and atmospheric pollutants are reduced as the water passes through it. Some buildings with green roofs include rooftop public spaces for combined use benefits.
13. **Online Water Quality Devices.** These are storm sewer system appurtenances that provide one or more types of treatment of water already in the storm sewer system. While volume and rate of runoff are not attenuated, concentrated pollutant removal is the goal. Typical applications include sequestering floating debris, settling out suspended solids and capturing oil and grease. These tend to be relatively expensive and are typically specified where known high pollutant loading is expected (industrial sites, parking ramps.).
14. **Permeable Pavement / Paver Brick.** Permeable pavement is a rapidly growing practice for improving rainwater infiltration and reducing runoff rate and volume. Few other practices are as immediately effective because the typical source of rainwater runoff is impermeable surfaces, such as pavement itself. Rainwater falling on the pavement continues through to an open-graded rock layer below where it is then



FIGURE 3.8: Examples of bioretention cells and rain gardens (images courtesy of centralohioraingardens.org)

infiltrated or directed to a detention or conveyance means (perforated subdrains are often used to control saturation). While permeable pavements may require occasional maintenance – such as cleaning by vacuum truck – they also require less conventional maintenance, less winter treatment (ice doesn’t accumulate), and less, if any, storm sewer system. The only application not currently recommended for permeables is high-speed, high-usage (speeds over 45 mph) streets.

Management Technique Decision Making

As indicated above, various practices exist for the management of stormwater, and the reasoning for selecting each type varies by site and the scale of contributing drainage area. In general, the more dense the development, the smaller and more unobtrusive the practice must be. However, higher-density development correlates with increased fraction of the land surface that is made up of impermeable surfaces, thereby increasing the total volume of stormwater runoff that must be treated, retained, etc. per unit area. Because the fraction of runoff is greater, and the practices must have smaller footprints, these areas



FIGURE 3.8: Figure 3.9. Example of an underground detention system (image courtesy of hydrocad.net)



FIGURE 3.10: Example of a permeable pavement slab (image courtesy of materialicious.com)

tend to require more frequent, well-distributed practices, usually one or more per parcel. The types of practices in these developments tend to more diverse also, because they need to blend into each specific site design. At the highest level of development density, stormwater practices tend to be combined with other development features, such as green roofs, underground detention chambers, or sub-pavement tree trenches below parking lots.

Lower density development caters to practices with larger footprints that blend in with the existing landscape because these practices tend to cost less per unit volume of runoff treated, and they blend aesthetically with their surroundings. Lower density development also presents the opportunity to incorporate measures to reduce and sometimes eliminate the need for storm drainage infrastructure. Using native landscaping, adding at least four to eight inches of quality topsoil under lawns, and using small distributed practices such as rain gardens can sequester rainfall onsite, reduce the need for storm infrastructure, and also reduce municipal and landowners’ maintenance burden.

With proactive land use planning stormwater runoff from low density development can often be directed to green spaces, or other marginal land where natural infiltration is provided essentially for free. With this design philosophy care must always be taken to ensure that runoff from heavy rain events is not concentrated in a manner that damages these natural areas, so some type of “hard infrastructure” is often provided for conveyance of larger events only, allowing small event runoff to bypass and infiltrate naturally.

The single most important variable in choosing a stormwater management technique is the type of soil on the site in question (and to a lesser extent the uphill watershed to that site). This is because the soil’s ability to absorb (“infiltrate”) rainfall directly dictates how much runoff there will be, and how quickly ponded water will percolate into the soil. The water that doesn’t infiltrate is the water that must be “managed” with piping, detention, etc. Releasing it too quickly results in increased downstream costs: flooding, urban stream degradation, reduced water quality, infrastructure damage, etc. The soil’s “infiltration potential” (see “Soil Infiltration Potential” **Map 3.5**) is a combination of geophysical traits that control the volume and rate of infiltration, and this metric is the key to preliminary management practice selection.

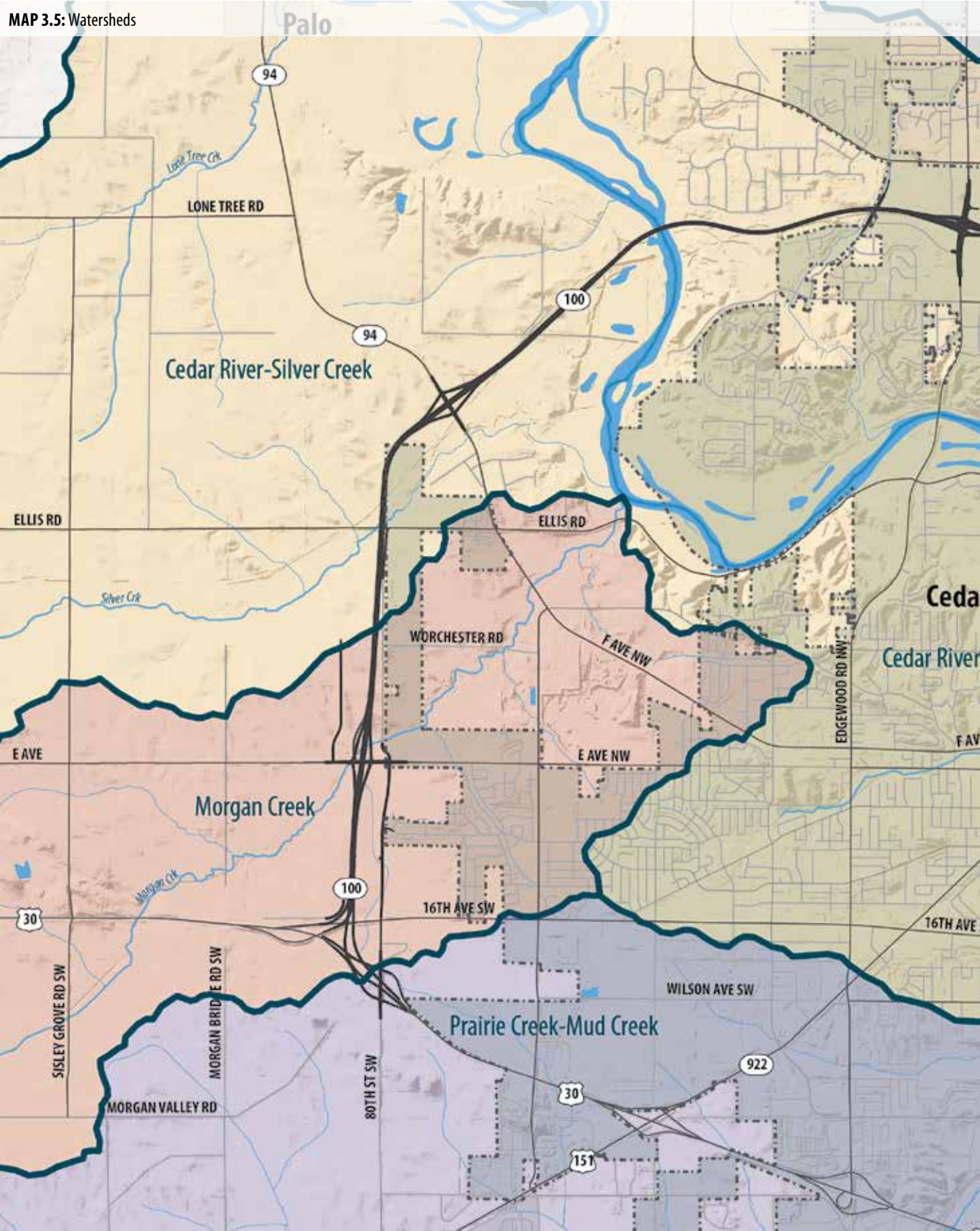
Although significant local variability exists – and considering that the entire development area is generally considered good for infiltration compared to the national average – the following list describes the soil capacity for each phase:

- Phase 1 has pockets of low and high infiltration potential, but is mostly medium to good
- Phase 2 is consistently medium to medium-low infiltration potential
- Phase 3 has pockets of very high infiltration potential; otherwise the remaining area is consistently medium to good
- Phase 4 is typically medium with a fair amount of low-medium potential

The following matrix (**Table 3.7**) illustrates the general viability of management practice types grouped by development phase, based solely on the distribution of soil types in each phase. Infiltration-only practices include infiltration basins and trenches, raingardens and bioretention cells, and native landscaping. Detention-only practices include wet detention basins, wetlands, wet swales, underground detention (sealed), and green roofs. Combination practices include dry detention basins, grassed swales, detention chambers (non-sealed), and permeable paving systems. Keep in mind of course that even some of the lowest infiltration potential soils can be fitted with infiltration practices, but the design and size may vary from standard applications.

Table 3.7: Recommended Stormwater Management				
Practices Based on Project Phase - General Recommendations				
Practice Type	Phase 1	Phase 2	Phase 3	Phase 4
Infiltration	High	Medium	High	Medium
Infiltration and Detention	High	High	High	High
Detention	Low	Medium	Low	Medium

MAP 3.5: Watersheds



SOURCE: ENVISIONCR

MAP 3.6: Soil Infiltration Potential (EnvisionCR)



Costs of Stormwater Management by Phase

The ultimate cost of stormwater management depends on many factors, including extent of detention for flood control and channel protection, extent of treatment of small storm runoff for protection of water quality, and most importantly the amount of impervious area to be drained. Spending more on distributed detention and treatment during initial development does save money in the long run for the following reasons:

- Increased sediment capture in basins and BMPs means less expensive long-term maintenance
- Increased distributed detention requires smaller storm sewer systems
- Increased detention reduces downstream flooding and related damages
- Increased stream water quality improves neighborhood aesthetics, property values, and recreational potential
- Increased infiltration recharges groundwater and reduces the severity of droughts on landscaping
- Runoff captured for reuse directly reduces municipal water costs

Stormwater management cost estimates are provided in the tables below. **Table 3.8** summarizes the costs for storm sewer networks associated with roadway drainage alone. The last column shows the storm sewer network costs with reduced primary pipe and manhole sizes to reflect the hard infrastructure reductions possible if the development includes consistent detention and small storm infiltration practices. **Table 3.9** summarizes the potential costs of including 100-year detention basins and treatment BMPs. Because the type and scale of BMPs are so variable, high and low estimates are provided.

Table 3.8: Cost for New Road Storm Sewer Networks by Phase

Phase	Proposed Roadways Miles	Conventional Sizing \$MM	Sized with Detention and BMP Reductions \$MM
1	4.6	5.2	4.1
2	5.0	5.7	4.4
3	7.3	8.3	6.4
4	37.7	43.1	33.5

Environmental Permitting and Clearances

The permits and environmental clearances needed before construction of a project or development is allowed depend on the location of a project, the environmental resources present and nearby, and the funding sources for the project. Permits and environmental clearances are required to comply with federal, state, and local laws or statutes.

Permits are needed when the law or statute mandates that a permit be issued before construction occurs. Permits are typically written documentation, typically with a permit number and an expiration date that the project has been reviewed by the agency with jurisdiction over the resource and the project is allowed to proceed with construction. Some laws and statutes require coordination with agencies with jurisdiction over the resource but the law does not require a permit to be issued. Coordination with the regulatory agency is important and the documentation received for the coordination is considered a clearance. Clearances are typically written correspondence between the resource agency and the project proponent stating that the agency concurs with the proposed project. Permits and clearances are equally important documents proving compliance with environmental laws and should be kept with the project files.

Table 3.10 describes typical environmental resources that could be encountered in the CMP area and the types of permits or clearances needed. This list is a partial list of the potential permits and clearances that may be required given the resources identified in the 2007 FEIS. This list does not include construction or operation type permits such as NPDES permits, storm water runoff permits, fugitive dust permits, and other local construction permits.

Table 3.9: Cost for New Road Storm Sewer Networks by Phase

Phase	Proposed Roadways Miles	Conventional Sizing \$MM	Sized with Detention and BMP Reductions \$MM
1	4.6	5.2	4.1
2	5.0	5.7	4.4
3	7.3	8.3	6.4
4	37.7	43.1	33.5

Table 3.9 Cost for New Road Storm Sewer Networks by Phase (continued)

Phase	Total Area	Planned Impervious Area	Impervious Fraction	Water Quality Volume	Low Cost BMPs for Treating WQv	High Cost BMPs for Treating WQv	100 Year Runoff Volume	Average Cost to Detain 100 Year Runoff
	Acres	Acres	Percent	Acre Ft	\$MM	\$MM	Acre Ft	\$MM
1	2427	656	27%	40	24	48	674	13
2	1122	478	43%	31	18	36	358	9
3	1292	296	23%	17	11	23	284	8
4	3375	930	28%	53	35	70	1090	31

It should be noted that some of the involvement with the various resource agencies may not be required by a law or regulation. The resource agencies can make recommendations that by themselves are not legally required. However, these recommendations can become conditional to a permit such as the Section 404 permit from the US Army Corp of Engineers (USACE). The USACE may not issue the permit without acceptance of the provision. The permit establishes the connection to which outside agencies can make binding conditions to the project. The USACE is technically only responsible for the jurisdictional Waters of the U.S. under the Clean Water Act; however, they are bound to all federal laws which affect their decision to issue a permit so they must have enough information necessary to make the decision.

The case studies cited below are meant to illustrate some common examples of which permits may be required based on development projects most likely to be encountered. Please understand that these examples are referenced for illustrative purposes. Actual development projects may create differing outcomes.

- **Scenario 1 – Private Development.** A private developer buys farmland in the northwest quadrant of the proposed IA 100 and E Avenue Interchange with private funding. The proposed development includes low and medium density residential and some green space. The known environmental resources from the 2007 FEIS in the northwest quadrant of the interchange include wetlands, streams, floodplains, and agricultural land. The developer should, at a minimum, coordinate with the Iowa DNR to determine if other resources are located in the proposed development area. For this example it is assumed that the development avoids impacting wetlands, streams, and floodplains. The only impact is to agricultural land, which only federally funded projects need to address through coordination with the NRCS. Since this project is privately funded and does not impact wetlands, streams or floodplains,

no coordination, clearances, or permits are likely needed. However, documentation that these resources are not present or not impacted should be included in the project file.

- **Scenario 2 – Private Development that impacts a stream.** Same scenario as in Case Study 1 but the proposed development crosses a stream in the agricultural land. To comply with the Clean Water Act, the developer would need to conduct a Waters of the U.S. Study and send this study to the USACE for them to determine if the stream is jurisdictional and subject to protection under the Clean Water Act. If the USACE says no, no permit is needed. If the USACE says yes, then Section 401/ 404 permits are needed. In addition to the permit/s, the USACE will likely require a cultural resources study, coordination with the NRCS, FWS, SHPO, and Iowa DNR before the permit is issued. If there is a floodplain associated with the impacted stream, the City of Cedar Rapids or Linn County will likely need to be involved to issue a floodplain permit.
- **Scenario 3 – Public Works Project using Federal Funds.** The City of Cedar Rapids uses Community Development Block Grant (CDBG) funds to extend water main into a proposed business park located in the southwest quadrant of the IA 100 and F Avenue Interchange. The proposed water main extension requires miles of excavation. The known environmental resources from the 2007 FEIS in the southwest quadrant of this interchange include only agricultural land. Since the project is being funded by a federal source, the U.S. Department of Housing and Urban Development (HUD), who funnels the funds to the Iowa DNR, the City will need to coordinate with the project manager at the DNR administering the funds. The City will need to conduct an archeology study to determine if cultural resources are present in the proposed project's alignment. Coordination with SHPO is required. The development of an Environmental Review will be required by HUD to comply with the National Environmental Policy Act (NEPA). Coordination and clearances with NRCS, EPA, USACE, FWS, SHPO, and Iowa DNR will be required.

Table 3.10 Environmental Resources and Associated Permits and Clearances

Resource	Law	Agency	Typical Documentation	Permit or Clearance	Timeframe to Issue Permit or Clearance
Waters of the U.S. (Jurisdictional Wetlands, and Rivers and Streams)	Clean Water Act	Army Corps of Engineers (USACE), Iowa Department of Natural Resources (DNR)	Wetlands and Waters of the U.S. delineation study	Section 401 and 404 Permits	30 days minimum to six months. Depends on permit backlog.*
Floodplains	Clean Water Act, Iowa Code 571-13	USACE, Iowa DNR, Linn County, City of Cedar Rapids	Hydrology study, floodplain study	Permit	30 days minimum
Parkland / Wildlife Preserve	Endangered Species Act	Iowa DNR, Linn County Conservation Board (CCB), City of Cedar Rapids	Parkland/ Refuge land study	Clearance	30 days minimum
Habitat for Federal or State Threatened and Endangered Species	Endangered Species Act, Iowa Code 481B	Fish and Wildlife Service (FWS), Iowa DNR	Habitat study, species surveys.	Clearance or Permit if species present	30 days minimum
Forest / Upland	Iowa Code 314.23	Iowa DNR, CCB	Woodland study	Clearance	30 days minimum
Cultural Resources	National Historic Preservation Act	Iowa Historic Preservation Office (SHPO)	Archeology study, Architectural study	Clearance	30 days minimum
Regulated Materials	CERCLA, RCRA, and Solid Waste Disposal Act	Environmental Protection Agency (EPA), Iowa DNR	Regulated materials study	Clearance	30 days minimum
Agricultural Land	Farmland Protection Policy Act	Natural Resource Conservation Agency (NRCS)	Farmland Conversion Form	Clearance	30 days minimum

*IF A CLEARANCE IS TIED TO A SECTION 404 PERMIT, THE SECTION 404 PERMIT WILL BE THE RATE DETERMINING TIME FRAME.



4

IMPLEMENTATION STRATEGY



Recommendations for land use designation, transportation system improvements and infrastructure requirements are included in the appropriate chapters of this document. This Corridor Management Plan will be most effective if the City of Cedar Rapids, Corridor MPO, area communities, and Iowa Department of Transportation accepts the plan as a consensus guidance document and incorporates the priorities recommended within their individual plans and capital improvement programs. It is recommended that the partners in the development of this plan meet annually to discuss and coordinate implementation of the recommendations.

DEVELOPMENT SEQUENCE AND IMPLEMENTATION

Transitioning to a recommended course of action for sequencing and implementing the preferred development scenario is important to identify recommended actions that pertain to the entire study area as well as associate suggested activities that are tailored to each phase of the development plan. As such, this section is divided into two sections: overall recommendations relating to the study area and those that are specific to each phase. The phased approach outlined in this Plan reflects a prioritized sequence of development inputs (e.g., infrastructure and land use policies) and expected development results. In other words, the phased approach attempts to strike a balance between making timely public sector investments with the expectation that the private sector responds through investments in residential, commercial, mixed-use developments, etc.

Recommended actions for the Study Area

Public outreach activities provided a strong desire to institute design standards that are consistent with the conservation and urbanism design scenarios. In addition, the plan anticipates that this area will become part of an urbanized area. The discussion and recommended actions summarized below reflect issues and concerns that are common throughout the study area and not necessarily specific to one or more of the recommended phases.

- **Institute development review and oversight procedures that embraces the transition of agricultural land uses to various urban developments.** All of the land area included in this study is located in unincorporated Linn County and while the County has adopted development review practices that are favorable to extraterritorial areas that, in a manner of speaking, are most likely to transition from rural to urban development. In this context it would be advantageous for cities anticipating the annexation of undeveloped land to formulate fringe area agreements and/or a 28E agreement that include the joint review of plats, change in zone requests, site development plans, and conditional use requests for areas within two-miles of a respective city's limits.
- **Build-through Acreage Transition.** As indicated in EnvisionCR, the build-through Acreage Transition recognizes that developers could build very low-density subdivisions

in outlying areas, which would eventually interfere with the efficient extension of sewers and other infrastructure. The Build-Through Acreage (BTA) concept enables the owner to plat a specific part of a development parcel for permanent rural residential development. The remainder of the area is master planned and left open for eventual urban development of sufficient density to reach a specific target. This technique gives property owners the ability to take advantage of current demand for large lot residential but still protects the ability of the city to grow soundly within the urban services area.

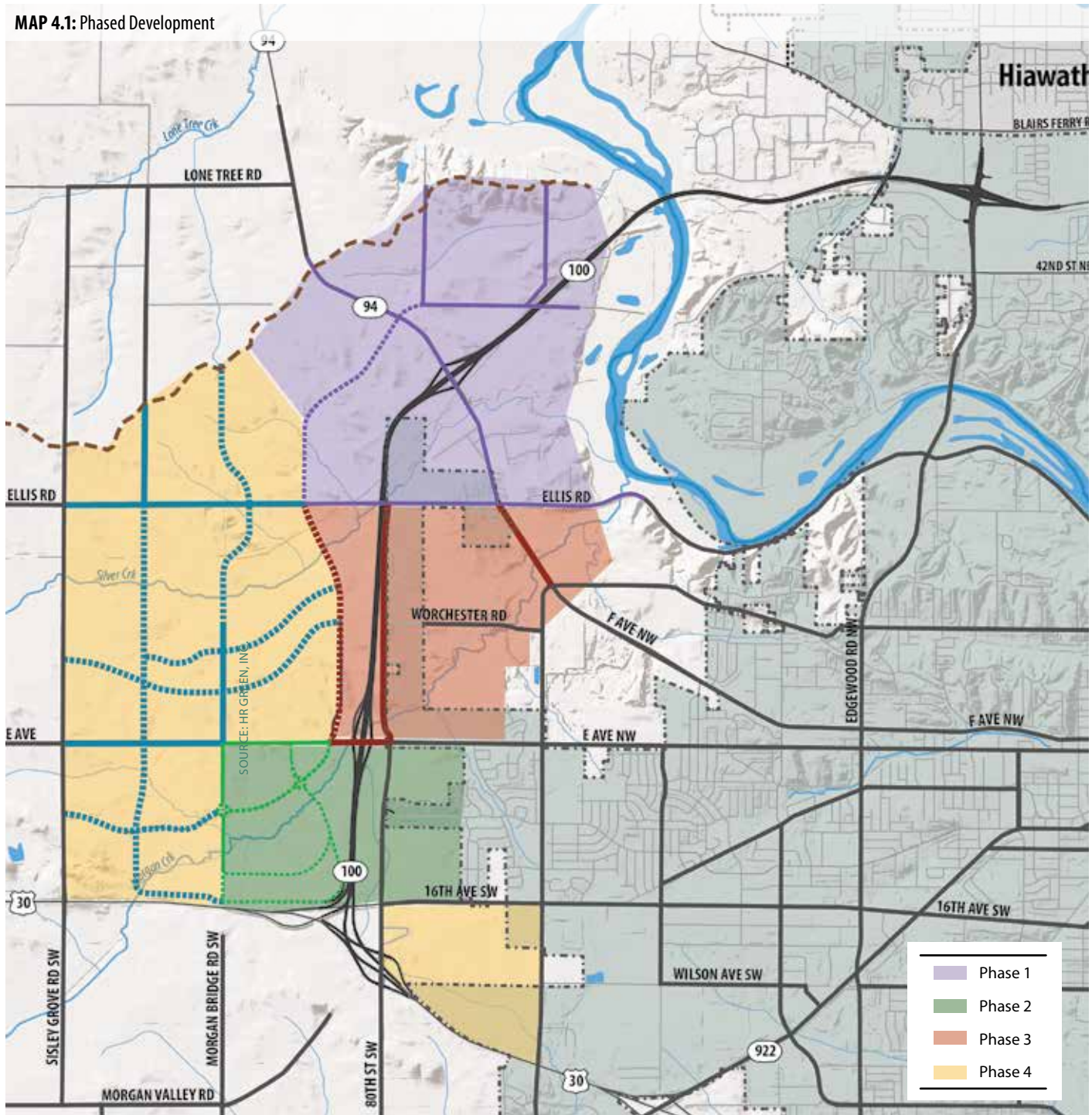
- **Create and adopt growth management and annexation agreements that consider the interests of cities in the region and Linn County.** While conducting key person interviews with adjacent communities, several city representatives alluded to the likely event that the City of Cedar Rapids would be the principal sponsor of annexation request for land within the study area. Aside from Cedar Rapids border being adjacent to the study area, both Fairfax and Hiawatha are also within reasonable proximity of the Highway 100 corridor. Based on the proximity of these communities, it is recommended that Cedar Rapids work with Linn County, and the cities of Hiawatha and Fairfax to create a fringe area agreement or work directly with the cities to formulate a moratorium agreement outlining future annexation limits.
- **Urban Reserve.** Land uses west of the proposed West Parkway are identified. Although, for the purposes of planning should be considered urban reserve until infrastructure services are available.
- **Incorporate a complete streets model for parkway, arterial, and collector roadway design.** Consistent with the metro area communities' desire to integrate vehicular, pedestrian, and public transportation into a common transportation model, staff and elected leaders are encouraged to implement policies and design practices that encourage the construction of multi-modal transportation networks.
- **Take a regional perspective for pedestrian and non-vehicular trail systems.** In addition to the proposed complete street system design that will be associated with proposed parkway, arterial, and collector streets, this plan also recommends careful consideration of proposed trail alignments identified in the Cedar Rapids Trail Master Plan. Many of the proposed trails cited in this document create pedestrian and bicycle linkages to regional destinations, such as schools, shopping, neighborhoods, and natural areas. Design features incorporated into Highway 100 interchanges also includes sufficient right-of-way to include trails.
- **Take a regional perspective on stormwater management.** **Maps 3.5 and 3.6** indicate that the project area is within three watersheds and includes varying levels of soil infiltration potential respectively. Much of the public sentiment on development practices and stormwater management was more conducive to sustainable stormwater methods. Based on these findings and planned development patterns in the study area, developers and cities are encouraged to use conservation approaches and low-impact development to manage stormwater in the area.

Recommended actions for each phase

Implementation of the preferred development plan will not likely occur all at once. Rather, employing a phased implementation plan will provide a systemic approach to the future development of this corridor. This section of the plan summarizes each phase, proposed infrastructure improvements associated with each phase as well as performance metrics that could be used to trigger future actions. Lastly, each phase will also include a summary of external funding options that can be used to help offset the cost of designing and constructing proposed improvements.

It is important to note that projections and associated concept cost opinions are based on modeling assumptions. As such a more detailed design should be prepared as this study area is developed.

MAP 4.1: Phased Development



PHASE 1 AREA

DESCRIPTION OF AREA

This sub-area (**Map 4.1**) is the most northeastern section of the study area. It is served by Highway 100 with an interchange at Covington Road. In addition, the area is served by Old Ferry Road, Ross Road, and Burt Road. All of these roadways are designed as two-lane rural cross sections. The area is bordered by Union Pacific Railroad to the north, the Cedar River to the east, Ellis Road to the south, and the general path of Gibney Road to the west.

UNIQUE FEATURES OF THE AREA

This phase is impacted by the Cedar River, Rock Island Botanical Preserve, and a combination of rural residential subdivisions to the north and low-density urban residential neighborhoods. The subject area is also home to hydric soils due to the proximity to the river and wetlands in the area. There are also some century farms in the area. This characteristic does not in and of itself evoke a physical limitation or barrier; however, it can create a set of conditions that would have to be considered and possibly implemented if the area transitioned to an urban development.

TRANSPORTATION CHARACTERISTICS

Appendix B references the reconstruction and widening of three arterial roads (Old Ferry Road, Covington Road, and Ellis Road) and two collector roads (Ross Road and Burt Road). This phase also envisions the construction of a new five-lane parkway from Ellis Road to Old Ferry Road. With the exception of the collector roads which will be limited to three-lanes, the remaining improvements will be designated as two to three-lane alignments. **Table 4.1** summarizes the planned improvements for this area with associated concept level cost assumptions. It is recommended that the parkway be constructed to accommodate five lanes and not be constructed incrementally. Likewise, construction of three-lane roads should be constructed to provide the full effect of the center turn lane.

Typical cross-section designs create pedestrian and bike accommodations via a separated path and sidewalk for arterial streets and parkway. Collector streets include a bike lane and sidewalk. The CMPO also envisions a new trail to be constructed along the Highway 100 corridor at some point in the future. The trail will be designated as the Highway 100 Trail and is likely to originate at the approximate location of the Rock Island Botanical Preserve, use the former bridge piers to construct a pedestrian/bicycle bridge across the Cedar River and generally follow the alignment of Highway 100.

LAND USE CHARACTERISTICS

Growth at Covington Road Interchange. The development of the Covington Road Interchange will likely first attract auto-oriented services that generate spending from transient traffic along Highway 100 and travelers to Palo and Covington.

As residential subdivisions emerge, the more mixed use development is anticipated to expand from the interchange. These uses should include commercial, commercial/residential mixed uses, and higher density residential to maximize value of this strategic location. Transitions to low-intensity uses can naturally occur at stream banks. This first phase should have good local street linkages and active transportation features and linkages over the Cedar River. The Future Land Use Plan expects that development will respect natural drainageways leading to Silver Creek. A subarea master plan should be prepared by the developer that indicates phased development.

Commercial areas should be wrapped by medium-intensity development.

WATER CHARACTERISTICS:

Water needs for commercial uses in the Phase I project area are projected to be 1.15 of a total 2.37 mgd (or approximately 50 percent) of the study area's water flow needs. Comparatively, population projections suggest over 12,200 citizens would reside in the Phase I area. This translates to a flow of 1.23 mgd, the remaining 50 percent of the area's water flow. The Phase I area also dedicates approximately 1,331 acres to open space; however, water service would not be provided to this area.

Distribution and storage would occur by connecting the existing 24-inch main near E Avenue. The Phase I project area would be served via this 24-inch main connection. This phase also envisions a need for additional storage. Constructing a 2 million gallon water storage tank will provide additional storage for fire protection in the area as well as address development driven water needs. Future growth to adjacent land and future phases will be accomplished by constructing a 24-inch main that is looped to the far western limits of this study area.

Table 4.2 below summarizes proposed improvements in the Phase I area and associated concept level cost opinions for these improvements. In addition to water main improvements ranging from 8 inch to 24 inch mains, a 2 million gallon water storage tank is also recommended for this area to provide fire protection.

WASTEWATER CHARACTERISTICS

The flow characteristics of this phase would, of course, be consistent with those cited in the water discussion above. The population projection for this phase is approx. 12,200 or roughly 25 percent of the total population projected for this area. Ultimately, this population increase coupled with added commercial uses in the area will create an estimated flow of 2.37 mgd; however, these added users are not predicted to require any additional infrastructure improvements. Moreover, the Phase I project area is expected to be served entirely on gravity service with no lift stations being recommended.

Collection and transmission will be facilitated through an existing 24-inch transmission line located in the area of Morgan Creek Park. This trunk main will accept the majority of the flow resulting from the new development.

Table 4.1 Proposed Phase 1 Transportation Improvements

Phase 1	Roadway	Classification	# of Lanes	Miles	Project Type	Estimated Cost
	Ross Road	Collector	3	0.5	Reconstruction and Widening	\$1,000,000
	Burt Road	Collector	3	0.75	Reconstruction and Widening	\$1,500,000
	Old Ferry Road	Arterial	3	1.25	Reconstruction and Widening	\$2,500,000
	Covington Road (Ellis Road to Study Limits)	Arterial	3	2	Reconstruction and Widening	\$4,000,000
	Ellis Road	Arterial	3	2.25	Reconstruction and Widening	\$4,500,000
	Proposed Parkway (Ellis Road to Old Ferry Road)	Parkway	5	1.5	New Road	\$5,000,000

Table 4.2 Proposed Water Improvements and Associated Cost Option for Phase 1

Phase 1	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Water Main	LF	19594	\$70	\$1,371,557
	12" Water Main	LF	25562	\$90	\$2,300,594
	20" Water Main	LF	804	\$135	\$108,557.06
	24" Water Main	LF	8485	\$155	\$1,315,159
	Water Tower	EA	1	\$3,500,000	\$3,500,000
	Hydrants	EA	78	\$2,500	\$195,000
	Valves	EA	78	\$5,000	\$390,000
				Subtotal	\$9,180,868
				Contingency	\$3,672,347
				Total	\$12,853,215

Table 4.3 Proposed Sanitary Improvements and Associated Cost Option for Phase 1

Phase 1	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Gravity Sewer	LF	18452	\$95	\$1,752,912
	10" Gravity Sewer	LF	5140	\$100	\$513,990
	12" Gravity Sewer	LF	6156	\$105	\$646,401
	15" Gravity Sewer	LF	2562	\$110	\$281,787
	18" Gravity Sewer	LF	6028	\$115	\$693,185
	24" Gravity Sewer	LF	3690	\$125	\$461,212
	30" Gravity Sewer	LF	6925	\$170	\$1,177,267
	36" Gravity Sewer	LF	4549	\$200	\$909,820
	Manholes	EA	134	\$4000	\$536,000
				Subtotal	\$6,972,575
				Contingency	\$2,789,030
				Total	\$9,761,604

Table 4.3 references planned improvements for the area to provide service within the Cedar Rapids Metro Design Standards.

STORMWATER CHARACTERISTICS

The area is part of the Silver Creek-Cedar River Watershed and soil infiltration potential is medium to medium-low. There are also areas

that are high and others that are considered low. Recommended stormwater management approaches for this phase include:

- Infiltration and infiltration and detention for areas that have high soil infiltration characteristics; and
- Detention for areas with low soil infiltration characteristics.

PHASE 2 AREA

DESCRIPTION OF THE AREA

Map 4.3 references the Phase 2 sub-area which is located east of Morgan Bridge Road SW, south of E Avenue SW, west of 1st Avenue SW, and north of the 16th Avenue/Highway 30 corridor. The eastern most reaches of this area include several low-density residential developments. The area is also bisected by Morgan Creek.

UNIQUE FEATURES OF THE AREA

The area immediately east of this district is developed as urban, low-density residential areas and is within the jurisdictional boundaries of the City of Cedar Rapids. Morgan Creek bisects the area; as such, this characteristic also creates flood plain issues for adjacent properties. This area is also impacted by a century farm located northwest of the proposed Highway 100/30 interchange.

TRANSPORTATION CHARACTERISTICS

Figure 4.1 references the reconstruction and widening of E Avenue and Morgan Bridge Road NW. These facilities will be expanded to three-lane urban cross sections respectively. This phase also includes the construction of three new roads: continuation of the parkway and two collector roads – one named Office Park Road and the other would serve as a collector between the Parkway and E Avenue.

Table 4.4 references the proposed transportation improvements and associated characteristics.

Pedestrian, trail, and bicycle accommodations will be part of these proposed roads. In addition to the pedestrian accommodations associated with the design characteristics of the referenced roadway improvements several additional trail projects area being proposed for the area. For example, 1st Avenue currently has a wide shoulder with bike route signage. Future improvements call for a dedicated bike lane along this roadway. In addition, the Highway 100 trail will continue its route through this area with the expectation of creating a trail hub at the Ellis Trail, Cherokee Trail, and southern on-street facility at Stoney Point Road.

LAND USE CHARACTERISTICS

To maintain a consistent land use pattern, land uses east of Highway 100 and along the 16th Avenue corridor would be medium density urban residential. In addition, integrating moderate density mixed-use projects in the area is also recommended. A “village center” or mixed-use commercial area is also proposed northwest of the parkway/Highway 100/Highway 30 interchange. The scale of this project would be consistent with an urbanism design.

- **Higher intensity, urban land uses should be clustered around the Highway 100 and E Avenue interchange.** These uses should include commercial uses that maximize value of this strategic location.

- **Business park uses, potentially combining offices, light industry, and flexible space, are appropriately sited adjacent to the bend of Highway 100 to Highway 30.** The major focus of the business park steers traffic immediately from Highway 30 at Sisely Grove Road, thereby intercepting employment traffic from entering neighborhoods. Also, access from Highway 100 at E Avenue is immediately redirected to the south.
- **Commercial district traffic circulation.** The local circulation system in the primary commercial area should channel traffic to the Highway 100 and E Avenue NW interchange and actively discourage or prevent heavy truck use of the West Parkway. Street system design should provide connectedness, but also discourage major truck use. The system should also provide alternative routes to Highway 30 and Sisley Grove NW for truck movements in order to reduce impact on neighboring homes.

WATER CHARACTERISTICS

The Phase 2 area projects a 2.29 mgd total flow rate. This translates to approximately 0.52 mgd per capita (or 23 percent) for the 5,150 residents projected to live in medium density housing in this area. The remaining capacity will serve office uses (1.18 mgd) and 0.59 mgd for a proposed village center.

Table 4.5 illustrates planned water service and treatment improvements that are associated with the Phase 2 area.

WASTEWATER CHARACTERISTICS

Collection and transmission of wastewater will occur via an existing 24-inch transmission line located at Morgan Creek Park. Tow summarizes proposed sanitary sewer improvements for the Phase 2 area.

Table 4.6 illustrates planned wastewater improvements that are associated with the Phase 2 area.

STORMWATER CHARACTERISTICS

This area is located within the Morgan Creek Watershed and is comprised of soils with medium to medium-low infiltration potential. Recommended stormwater management approaches for this phase include:

- Infiltration and detention for areas that have medium soil infiltration characteristics; and
- Infiltration and detention for areas with high soil infiltration characteristics.

TRAILS AND RECREATION CHARACTERISTICS

- **New Regional Park.** A new regional park north of Highway 30 connects to Morgan Creek and regional trail that links to Morgan Park, effectively expanding Cedar Rapids’ regional trail system and offering major recreational opportunity on the western edge of the community. This park is not anticipated to receive urban services immediately, yet can be developed to support western expansion and balance to the overall park system. This plan recommends developing a master plan for the park.

Table 4.4 Proposed Transportation Improvements and Associated Cost Option for Phase 2

Phase 2	Roadway	Classification	# of Lanes	Miles	Project Type	Estimated Cost
	E Ave	Arterial	3	0.75	Reconstruction and Widening	\$1,500,000
	Morgan Bridge Road NW	Collector	3	0.75	Reconstruction and Widening	\$1,500,000
	Proposed Office Park Road	Collector	3	1.25	New Road	\$2,500,000
	Proposed Collector (Parkway to E Ave)	Collector	3	0.25	New Road	\$500,000
	Proposed Parkway	Parkway	5	0.75	New Road	\$2,500,000
	Proposed Parkway (Ellis Road to Old Ferry Road)	Parkway	5	1.5	New Road	\$5,000,000

Table 4.5 Proposed Water Improvements and Associated Cost Option for Phase 2

Phase 2	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Water Main	LF	9193	\$70	\$643,515
	12" Water Main	LF	13833	\$90	\$1,244,948
	16" Water Main	LF	3258	\$115	\$374,697
	24" Water Main	LF	12240	\$155	\$1,897,263
	Hydrants	EA	66	\$2,500	\$165,000
	Valves	EA	66	\$5,000	\$330,000
				Subtotal	\$4,655,424
				Contingency	\$1,862,170
				Total	\$6,517,594

Table 4.6 Proposed Wastewater Improvements and Associated Cost Option for Phase 2

Phase 2	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Gravity Sewer	LF	6537	\$95	\$621,062
	10" Gravity Sewer	LF	359	\$100	\$35,900
	12" Gravity Sewer	LF	1171	\$105	\$122,934
	18" Gravity Sewer	LF	2884	\$115	\$331,637
	24" Gravity Sewer	LF	6671	\$125	\$833,812
	30" Gravity Sewer	LF	156	\$170	\$26,435
	Manholes	EA	45	\$4000	\$180,000
				Subtotal	\$2,151,781
				Contingency	\$860,712
			Total	\$3,012,493	

PHASE 3 AREA

DESCRIPTION OF THE AREA

Map 4.4 cites the Phase 3 sub-area. It is bordered by Ellis Road to the north, Cedar Rapids corporate limits/Stoney Point Road to the east, E Avenue NW to the south, and the proposed Parkway on the west.

UNIQUE FEATURES OF THE AREA

This area is adjacent to the Northwest Water Treatment Plant and Morgan Creek Park. Some of the areas are developed and contiguous to the City of Cedar Rapids.

TRANSPORTATION CHARACTERISTICS

Planned elements in this area include the construction of the proposed Parkway from E Avenue to Ellis Road and reconstructing Covington Road from Rodgers Road NW to Ellis Road. The West Parkway is anticipated to be the premier street in Cedar Rapids western area, providing mobility options for all. The public environment should include a sidepath, bicycle lanes, a promenade of trees, exceptionally designed lighting, and pedestrian features. **Table 4.7** below further characterizes planned improvements as well as the concept level opinion of cost for those improvements. As subdivisions develop, local streets should create a network. For example, extending Railway Street south to Worchester Road or extension.

LAND USE CHARACTERISTICS

- **Urban Medium-Density Uses.** The West Parkway running parallel to Highway 100 provides immediate access to this development area that nestles between Silver Creek and Morgan Creek. This area is anticipated to develop with small apartment/condominium buildings and office overlooking the attractive parkway. Development should minimize offsite stormwater runoff.
- **Connected Development.** Linear development along the West Parkway is expected to provide internal connections and circulation that limits curb-cuts along the parkway. While the eastside of the parkway may have intermittent access, the west side of the parkway should not be interrupted. Projects should not have independent access, which leads to traffic conflicts.

TRAILS AND RECREATION CHARACTERISTICS

- A sidepath running parallel to the West Parkway provides a continuous path for development, interrupted only at collector streets. Linear development along the west side of the parkway should provide access to side streets.

- While not accounted for in **Table 4.7** the CMPO is also making provisions for pedestrian and bicycle trails in this area. The Highway 100 trail, Cherokee Trail, and a segment of the Ellis Road Trail will also impact this area. These dedicated trails will also be complimented by both of the roadway projects planned for this area because the Parkway and Covington Road improvements will include separated path and sidewalk facilities.

WATER CHARACTERISTICS

With a combination of commercial development as well as low-and medium-density housing, water needs for this phase are estimated to be 0.97 mgd. This is comparatively low when contrasted with other phases. The projected population for this area totals approximately 6,400 citizens. **Table 4.8** below summarizes planned improvements for the area and an associated concept level cost opinion.

WASTEWATER CHARACTERISTICS

Several characteristics associated with Phase II are true in Phase 3. While this area represents a comparatively lower total flow value (0.97 mgd), the area will most likely be served by the 18-inch transmission main located along Bryant Boulevard.

Increased need in this area may also require upgrades at the Water Pollution Control facility. However, it is difficult to determine what improvements might be necessary. A more thorough assessment of system needs should be conducted as this area is developed.

Table 4.9 below summarizes the planned improvements for this area as well as a concept level cost opinion for cited improvements.

STORMWATER CHARACTERISTICS:

This area is part of the Morgan Creek Watershed and is mostly comprised of soils with medium to medium-low soil infiltration potential. Recommended stormwater management approaches for this phase include:

- Infiltration as well as infiltration and detention for areas that have high soil infiltration characteristics; and
- Detention for areas with low soil infiltration characteristics.

RECOMMENDED LAND USE AND/OR LAND USE CONTROLS

Areas abutting the water treatment plant and highway would be medium density mixed-use developments. However, as development transitions away from these facilities land uses would also transition to a low-density residential use. The parkway also creates opportunities for additional development to the west.

Table 4.7 Proposed Transportation Improvements and Associated Cost Option for Phase 3

Phase 3	Roadway	Classification	# of Lanes	Miles	Project Type	Estimated Cost
	Proposed Parkway (E Ave to Ellis Rd)	Parkway	5	2	New Road	\$6,500,000
	Covington Road (Rogers Road NW to Ellis Road)	Arterial	3	0.75	Reconstruction and Widening	\$1,500,000

Table 4.8 Proposed Water Improvements and Associated Cost Option for Phase 3

Phase 3	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Water Main	LF	28737	\$70	\$2,011,623
	12" Water Main	LF	2907	\$90	\$261,645
	20" Water Main	LF	700	\$135	\$94,492
	24" Water Main	LF	9837	\$155	\$1,524,756
	30" Water Main	LF	270	\$145	\$39,078.31
	48" Water Main	LF	214	\$310	\$66,409
	Hydrants	EA	31	\$2,500	\$77,500
	Valves	EA	31	\$5,000	\$155,000
				Subtotal	\$4,230,508
				Contingency	\$1,692,203
				Total	\$5,922,711

Table 4.9 Proposed Wastewater Improvements and Associated Cost Option for Phase 3

Phase 3	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Gravity Sewer	LF	999	95	\$94,915
	10" Gravity Sewer	LF	2025	100	\$202,460
	24" Gravity Sewer	LF	3408	125	\$425,988
	30" Gravity Sewer	LF	293	170	\$49,776
	Manholes	EA	17	4000	\$68,000
				Subtotal	\$841,138
				Contingency	\$336,455
				Total	\$1,177,593

PHASE 4 AREA

DESCRIPTION OF THE AREA

The designated urban reserve areas (see Map 4.5) consists of two separate yet distinct regions that are contiguous to Phases 1 – 3. The larger area is generally located west of phases 1, 2, and 3 sub-areas, and extends to Sisley Grove Road SW to the west. The remaining urban reserve designated area is south of 16th Avenue SW, west of Stoney Point Road SW, and north of the Highway 30 corridor. The purpose of designated these areas as urban reserve stems from the assumption that this area will be developed after Phases 1, 2, and 3 realized planned infrastructure improvements, and the privately held agricultural land is transitioning toward urban development.

This area should be classified as urban reserve and not be subject to premature development. Phases 1 through 3 should be either built out or efforts within those areas should be well underway before Phase 4 is implemented.

UNIQUE FEATURES OF THE AREA

Two creeks bisect this area – Silver Creek to the north and Morgan Creek to the south. Much of the area designated as urban reserve is west of the proposed Parkway improvements and in some instances is over one-mile west of the Highway 100 alignment. The urban reserve area south east of the Highway 100/30 interchange is contiguous to the City of Cedar Rapids but is within two-miles of the City of Fairfax.

TRANSPORTATION CHARACTERISTICS

Being that this area is currently served by rural roads, there are several recommended reconstruction and widening roadway projects being recommended as well as the construction of several new roads. Table 4.10 below cites these proposed roadway projects and associated concept level cost opinion for cited improvements. All collector, arterial, and parkway roads being proposed for this area include pedestrian and bicycle accommodations.

While the table below does not include projected costs for trail improvements in the referenced areas, several alignments are being proposed for the area. For example, the Highway 100 and Ellis Road Trails would continue in the area west of the Highway 100 and Highway 30 interchange.

As subdivisions develop, local streets should create a network. For example, extending Bryant Boulevard SW west into undeveloped areas then connecting to other streets that continue to neighborhoods north of Highway 30.

LAND USE CHARACTERISTICS.

- **Mix of development intensities with new commercial projects near major intersections.** Development to occur contiguous, limiting gaps between projects and lending strong consideration to environmental features, such as drainage areas and greenways. This area should be considered Urban Reserve until significant build-out of previous phases. Major features include:
- **Crossroads Commercial/Office Uses.** U-LI and U-MI offer developers the flexibility of incorporating commercial services in their development. Proximity to crossroads of collector streets is a major criterion, along with the proposed externalities of the project to the adjacent neighborhood.
- **School Sites.** Areas designated U-MI or U-LI can be locations for a possible school. Both Morgan Creek and Silver Creek have a series of connecting greenways that act as fingers reaching into the land. A school adjacent to one of these fingers, or even the creek, creates an opportunity for preserving the natural drainage areas for public use, and offers potential programming for outdoor classrooms. The selection of the site must consider access for pedestrians to the location, proximity to trails, and proximity to collector streets for conveniently bus/drop-off.
- **Northern Site.** Criteria for site selection should consider access to Covington Road, available/affordable land, residential neighborhoods south of the ridgeline, as well as, longer-term that may develop north of the ridgeline.
- **Southern Site.** Criteria for site selection should consider access to the proposed Morgan Creek Trail, residential neighborhoods, and E Avenue NW.

WATER CHARACTERISTICS

This phase represents the largest area by land mass; however, projected water flow values place it third among the four phases. Proposed land uses in this area are generally comprised of low- and medium-density residential areas. As such, the area is projected to have a total flow of 2.13 mgd. The area is also projected to have over 21,000 residents – nearly half of the number of new residents in this area.

Table 4.11 summarizes planned water service improvements for these urban reserve areas as well as a concept level opinion of probable cost for the cited improvements.

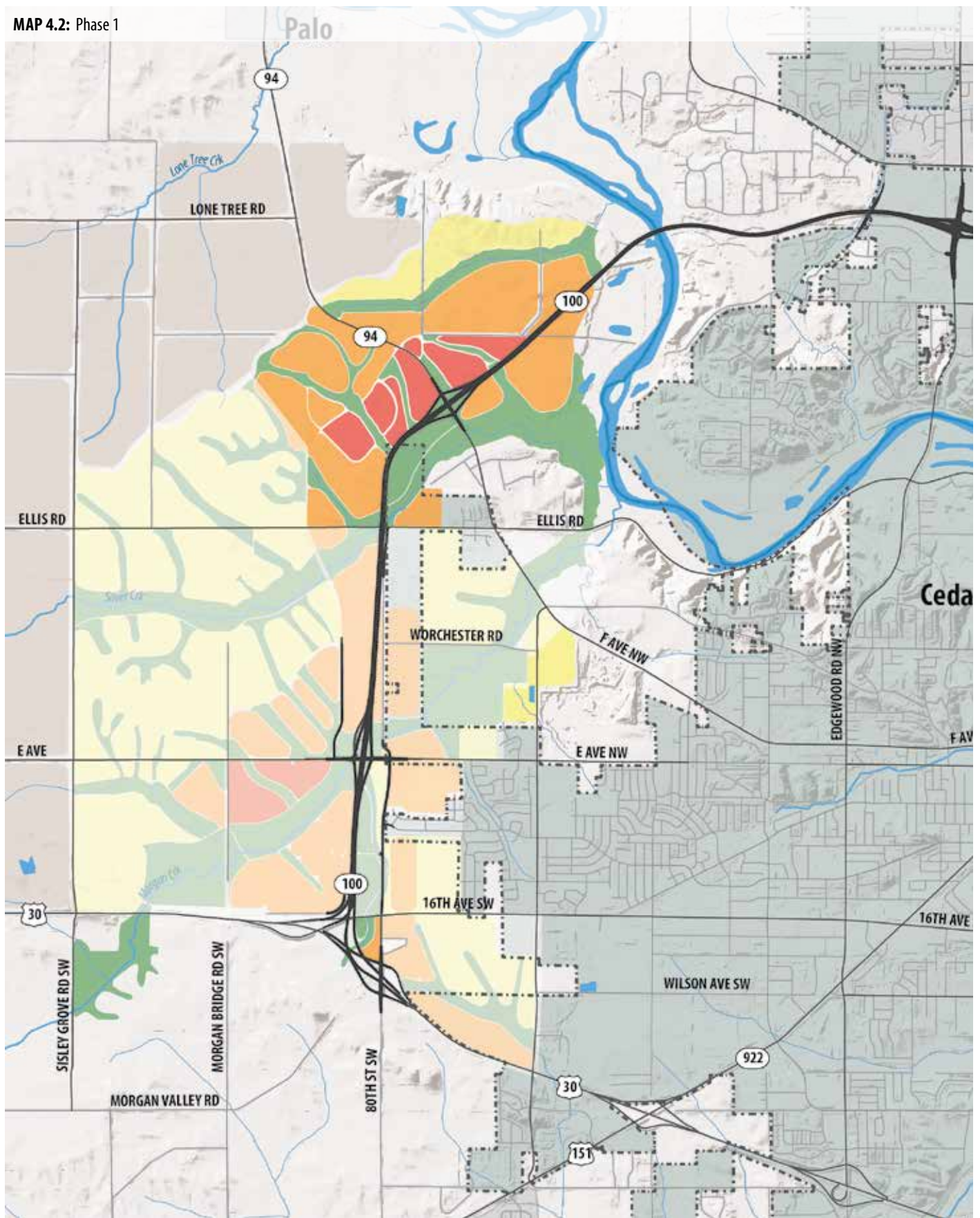
Table 4.10 Proposed Transportation Improvements and Associated Cost Option for Phase 4

Phase 4	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Gravity Sewer	LF	71936	\$95	\$6,833,948
	10" Gravity Sewer	LF	5506	\$100	\$550,570
	12" Gravity Sewer	LF	3709	\$105	\$389,403
	15" Gravity Sewer	LF	4150	\$110	\$456,511
	18" Gravity Sewer	LF	1174	\$115	\$134,987
	24" Gravity Sewer	LF	1893	\$125	\$236,600
	Manholes	EA	221	\$4000	\$884,000
				Subtotal	\$9,486,019
				Contingency	\$3,794,408
				Total	\$13,280,427

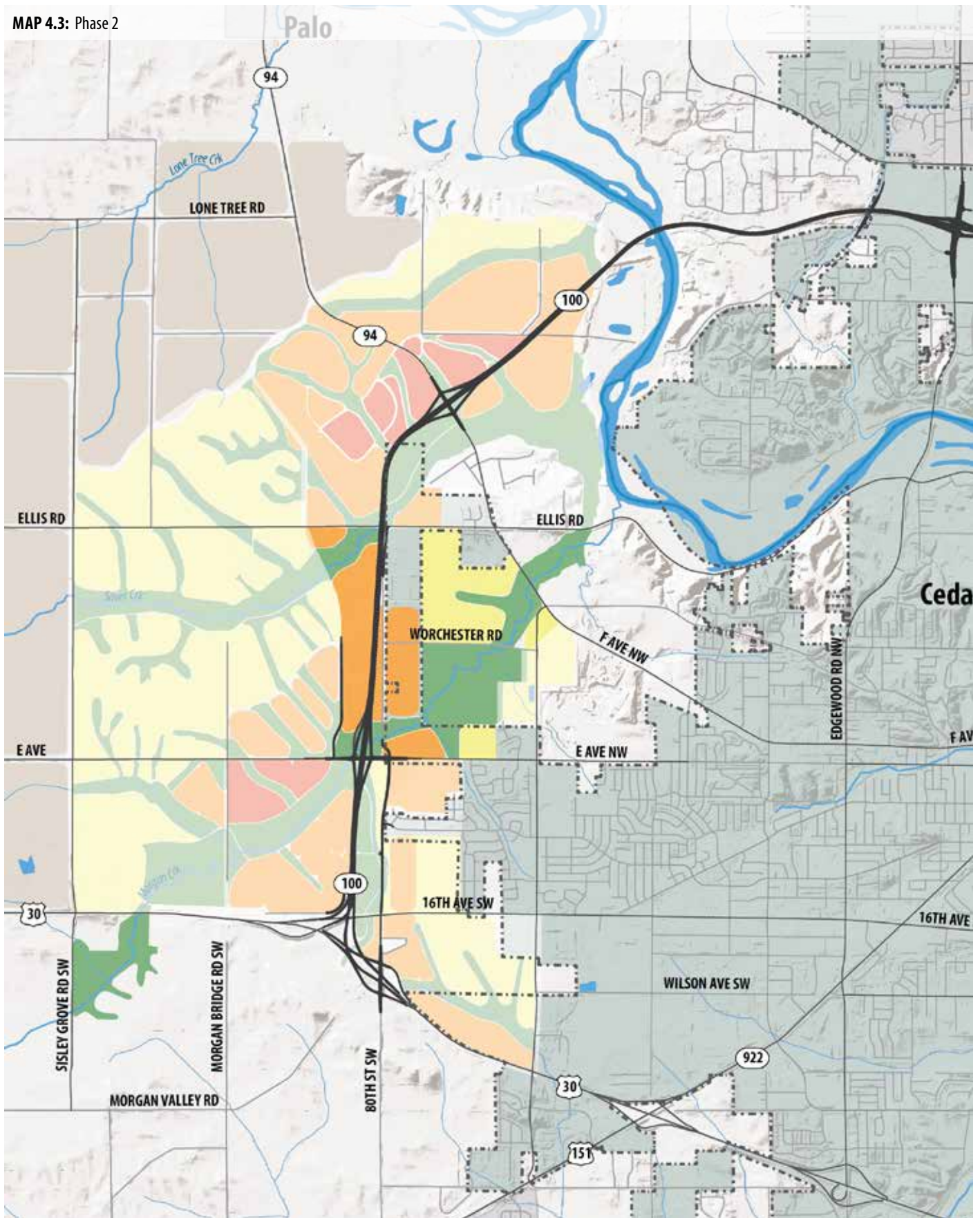
Table 4.11 Proposed Water Improvements and Associated Cost Option for Phase 4

Phase 4	Item	Units	Quantity	Unit Cost	Estimated Cost
	8" Water Main	LF	168556	\$70	\$11,798,954
	12" Water Main	LF	41408	\$90	\$3,726,731
	20" Water Main	LF	7213	\$135	\$973,727
	24" Water Main	LF	38551	\$155	\$5,975,410
	Hydrants	EA	194	\$2,500	\$485,000
	Valves	EA	194	\$5,000	\$970,000
				Subtotal	\$23,929,822
				Contingency	\$9,571,929
				Total	\$33,501,751

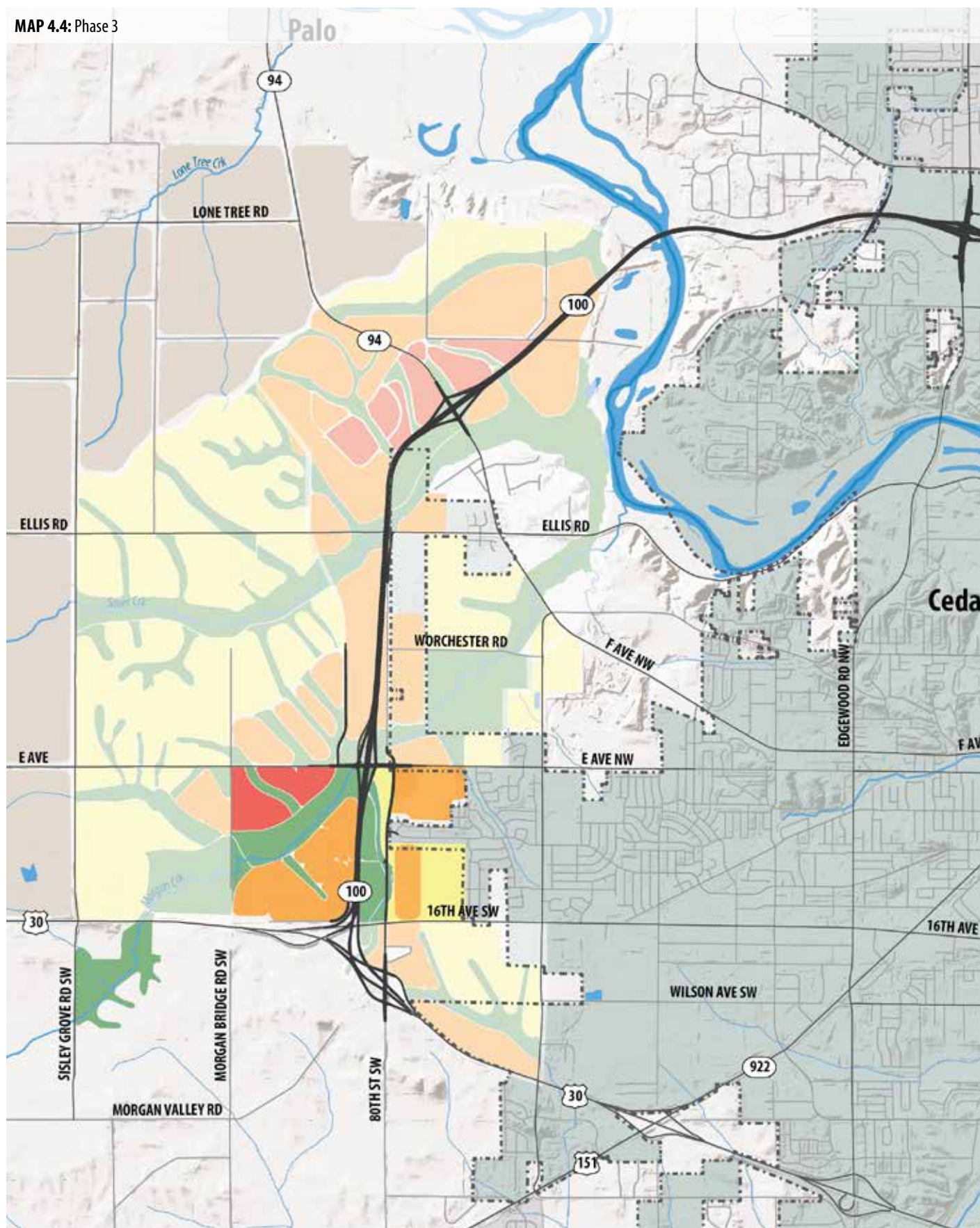
MAP 4.2: Phase 1



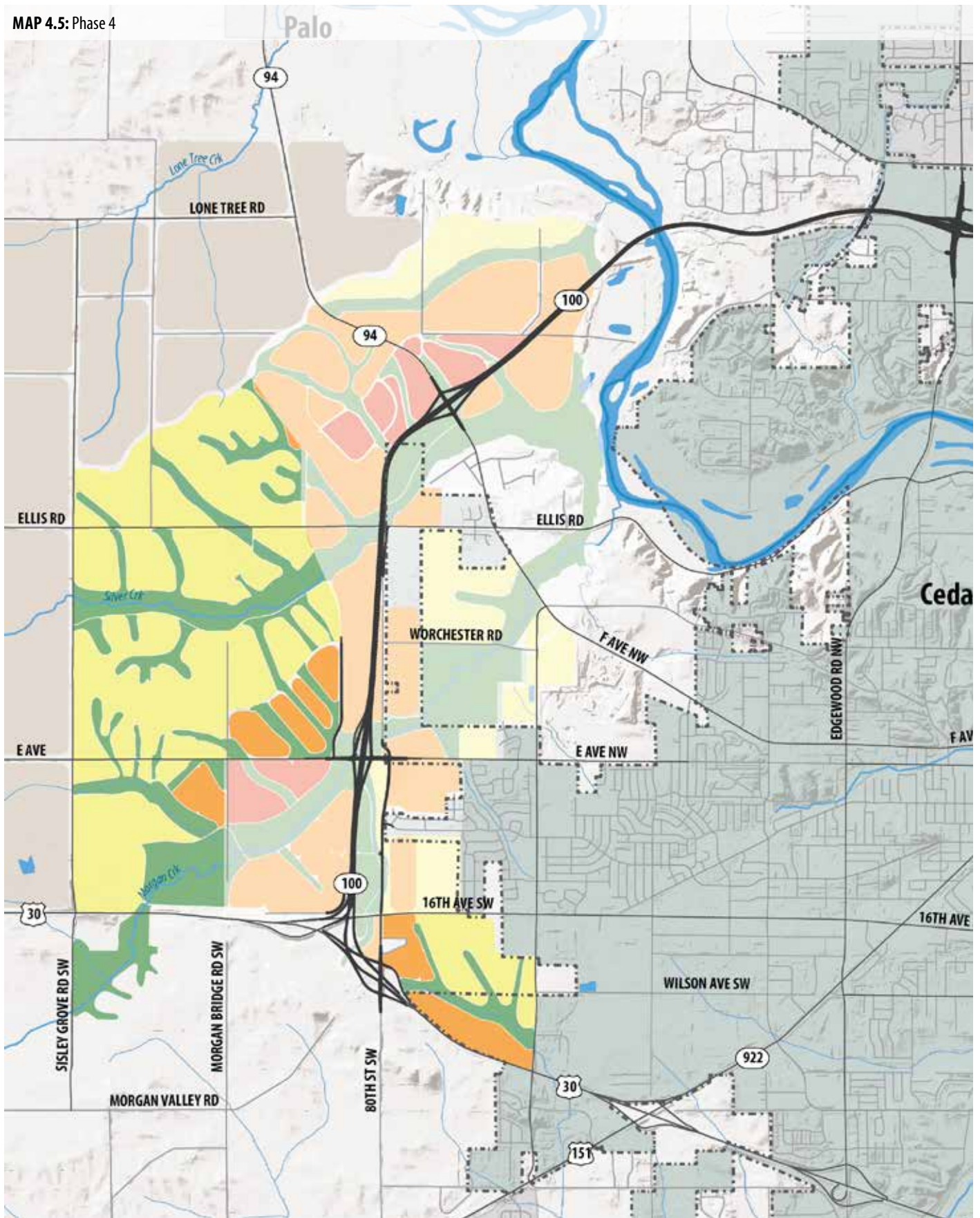
MAP 4.3: Phase 2



MAP 4.4: Phase 3



MAP 4.5: Phase 4



FUNDING ALTERNATIVES

This section will summarize several funding options for capital improvements summarized in each of the phases discussed above. This section focuses on identifying and outlining outside funding sources, unique attributes associated with those sources (e.g., eligible uses of funds), and cross-referencing projects listed in each phase to the respective program. While this section provides a cursory overview of funding options available to local units of government, Appendix C provides a detailed summary of scoring criteria, local match requirements, filing deadline(s), and related information.

Please note that these funding sources are preliminary recommendations based on the relationship between the attributes associated with each project and the respective program requirements. Subject to adoption of this plan and/or following any modifications or amendments to this plan approved subsequent to the adoption of this plan should be reviewed based on potential changes in the scope of improvements as well as possible changes in program eligibility requirements.

TRANSPORTATION RELATED IMPROVEMENTS – EMPHASIS ON VEHICULAR IMPROVEMENTS

- **Iowa Clean Air Attainment Program (ICAAP).** This program is designed to direct funds to highway/street, transit, bicycle/pedestrian, or related programs that reduce transportation-related emissions. To be eligible all projects must be on the federal aid system. The program receives \$4.4 to \$4.7 million annually. Common projects include road and/or intersection improvements that reduce auto emissions, bus route service improvements, roundabout and signalization, etc. Since FY 2012, the average award for projects has ranged between approximately \$419,000 and over \$427,000. In addition, the Iowa DOT Commission awards 11 to 15 projects annually.
- **Revitalizing Iowa's Strong Economy (RISE).** This program makes funds available for transportation improvements that facilitate economic development projects. RISE has two sub-programs: Immediate Opportunity Grants and Local Development Project Grants. The former sub-program provides 80 percent of the funds necessary to construct transportation improvements for a development project that has committed to locate in a community. Conversely, local development projects are speculative in nature. Typical projects include designing and constructing roadway improvements to make land available for future development (e.g., constructing roads in an industrial park or business park development). Local development projects are eligible to receive 50 percent of the funding for eligible transportation projects. It is important to note that RISE only funds transportation improvements for manufacturing related industries, office/business parks, and tourism. Retail projects are not eligible for funding.
- **Corridor MPO – Surface Transportation Program (STP).** The CMPO receives approximately \$4.625 million in federal STP funding. These funds can be obligated to surface transportation improvements that are regionally significant. While the CMPO Policy Board has taken action to target 30 percent of STP program funds to regional trail system improvements between 2021 and 2040, this funding option

may have some relevance for funding 80 percent of the eligible costs for roadway improvements and/or non-vehicular improvements. Moreover, these funds also offer additional discretion and control being that funding is distributed at the local level.

PEDESTRIAN/TRAILS RELATED FUNDING

Being that the proposed parkway and arterial roadway improvements within the study area will be designed and constructed as complete streets; the right-of-way will include accommodations for vehicular, pedestrian, bicycle, and public transportation. In addition, CMPO staff also identified several ancillary trails projects occurring within the study area and beyond. The CMPO and associated communities are encouraged to develop cohesive trail plans that are regional in nature and leverage linkages to adjacent trail systems. The funding sources identified below could be used to fund any of the projects cited in this plan; however, the competitiveness of applications will, in part, be based on articulating a regional trail system approach.

- **Corridor MPO – Transportation Alternatives Program (TAP).** The Corridor MPO receives approximately \$259,000 annually in Federal TAP funding. As summarized in the STP narrative, this source could also serve as a funding option – albeit funds would be relegated to trail/pedestrian improvements or enhancement related projects.

The EnvisionCR plan identifies two potential future school sites. In addition, interviews with the Cedar Rapids Community School District revealed that the District has purchased property within the study area (Phase 3) to accommodate a middle and elementary school. As these plans materialize the CMPO should give consideration to using TAP funds to provide safe routes for school children to travel from residences to school facilities.
- **Federal Recreational Trails Program.** This funding option is restricted to pedestrian improvements that are aligned with the proposed roadway improvements. While these funds are highly competitive, this program can provide 80 percent of the capital necessary to design and construct recreational and trail-related projects. Needless to say, improvements associated with this project would be far more competitive if the pedestrian areas were consistent with a regional or national trail system, community/university trail plan, or comprehensive pedestrian/transit system.

In recent years this grant has awarded funds to as few as four projects and as many as six projects. While average grants have ranged from \$206,000 to over \$300,000, the range of project types has varied. For example between 2011 and 2013 a total of 11 projects have received funding; however, funds were only used to underwrite six trail projects. As stated in the State Trails Program summary, funding associated with the Federal program is equally competitive.
- **State Recreational Trails Program.** This program is very similar to the Federal program listed above; however, there are three distinct differences. First, the program provides \$2 million in funding annually. Second, the funding cap is 75 percent of overall project expenses. And third, applications can be submitted January 2nd and July 1st.

Project	Phase	Sources		
		ICAAP	RISE	CMPO-STP
Old Ferry Road Reconstruction & Widening	1	✓	✓	✓
Covington Road Reconstruction & Widening	1	✓	✓	✓
Ellis Road Reconstruction & Widening	1		✓	✓
West Parkway New Construction	All Phases	✓	✓	✓
E Avenue Reconstruction & Widening	2	✓		✓
Proposed Office Park Road New Construction	2		✓	
Covington Road Reconstruction & Widening	3	✓		✓
Ellis Road Reconstruction & Widening	3	✓		✓
E Avenue Reconstruction & Widening	3	✓	✓	✓

In recent years funds have been allocated to as few as eight projects but not more than 13 state-wide. What's more project awards are consistent with the relative cost of pedestrian/trail needs for this project. It is worth noting that this funding source is extremely competitive. Pedestrian improvements that coincide with regional, state or national trail systems contribute to a more competitive proposal.

WATER & WASTEWATER FUNDING

Most utility related programs are relegated to small communities via Community Development Block Grants (CDBG). As such, the State Revolving Loan Fund (SRF) program summarized below may be among the more viable alternatives of seeking external funding – albeit through a loan program.

- **State Revolving Loan Fund (SRF).** Iowa's Clean Water State Revolving Fund (CWSRF) is the best choice to finance publicly owned wastewater treatment, sewer rehabilitation, replacement, and construction, and storm water quality improvements. Typical construction loans can be secured for interest rates below 2 percent and amortized over 20 years. The program is jointly administered by the Iowa Finance Authority and the Iowa DNR. Loan requests are subject to an application and review process which includes:
 - Submit a facility plan and an Intended Use Plan (IUP) to request inclusion on the SRF IUP.
 - Applicants must follow the wastewater construction permitting process to be eligible.
 - Projects must be on an approved IUP to be eligible for funding. The IUP Application is not an application for a loan. Rather, the IUP outlines the scope of the project, a summary of alternatives, and a determination of a preferred approach.
 - Once the project is listed on an approved IUP, it is eligible to apply for an SRF loan.

STORMWATER MANAGEMENT FUNDING

Stormwater improvements are generally considered an allowable

expense for many transportation grants summarized above. In addition, several funding alternatives are available to encourage more sustainable stormwater management practices. The sources identified below represent possible funding sources for bioswales or related sustainable design techniques.

- **Resource Enhancement and Protection Program (REAP).** The Iowa Department of Natural Resources directs a portion of funds collected to a series of sub-programs. One of the programs generally referenced as Roadside Vegetation receives three percent of the program's funds. Ultimately, these funds are redirected to the Iowa DOT and promoted as the Living Roadway Trust Fund (LRTF). Program funds can integrate roadside vegetation management (IRVM) activities, including the establishment of native prairie vegetation in rights-of-way. Low-maintenance prairie roadsides reduce erosion, slow runoff, and trap sediment among other things. As such, this source may serve as a more sustainable alternative to traditional stormwater management systems. For example, funds could be used to construct a bioswale to manage stormwater.
- **Watershed Improvement Fund.** Cities are eligible to apply to this program that can fund construction of improvements linked to water quality improvements or flood prevention practices. Eligible costs can include design, public bidding and contracting expenses, the purchase of easements, and salary and benefits for personnel implementing the project. Applicants can receive up to \$100,000 which can be awarded for a period up to three years.
- **Water Resource Restoration Sponsored Projects.** This program allows communities borrowing from the SRF program to redirect up to 10 percent of the interest expense on a loan to fund stormwater improvements. For example, if a city borrowed \$2.5 million to capitalize an eligible water or wastewater project up to \$250,000 could be set aside for a stormwater project.

Other Funding Options

In addition to the programs cited in this memorandum, two federal agencies administer programs that can be used to fund infrastructure

improvements, including transportation. These sources are cited in the interest of sharing the major sources of outside funding; however, these funding options are either highly competitive and/or represent substantial upfront costs for the applicant.

- **Transportation Investment Generating Economic Recovery (TIGER) Program.** This program originated with the America Recovery and Reinvestment Act (ARRA) and has been reauthorized six additional times. The program focuses on the relationship between multi-modal transportation improvements and job creation. While the program guidelines allow for up to 90 percent of eligible project expenses to be absorbed by a TIGER grant, historically the local/state to federal match ratio has been 3.5 to 1. In other words, \$3.50 of local funds have been leverage for every \$1 of TIGER funding. This observation coupled with a \$10 million grant minimum for urban areas could require a minimum project value of \$35 million to be competitive. This is also a very competitive program. For example, in 2014 72 grants were awarded among 797 eligible applications received. That translates to a 9 percent award rate.

- **Transportation Infrastructure Finance Innovation Assistance (TIFIA) Program.** The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides Federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. TIFIA credit assistance provides improved access to capital markets, flexible repayment terms, and potentially more favorable interest rates than can be found in private capital markets for similar instruments. TIFIA can help advance qualified, large-scale projects that otherwise might be delayed or deferred because of size, complexity, or uncertainty over the timing of revenues. Many surface transportation projects - highway, transit, railroad, intermodal freight, and port access - are eligible for assistance. Each dollar of Federal funds can provide up to \$10 in TIFIA credit assistance - and leverage \$30 in transportation infrastructure investment.

The program requires a minimum project cost of \$25 million. In addition, several additional factors also contribute creating challenges for prospective applicants. For example, the program requires the applicant to pay \$100,000 for upfront costs associated with legal and financial advisory fees regardless of whether the project receives TIFIA support. In addition, the participation limit was increased from 33 percent to 49 percent. However, U.S. DOT staff indicates that the department wants to make as many loans as possible. Consequently, successful applications will likely keep TIFIA participation at or below 33 percent of overall project costs. Lastly, this program requires a repayment mechanism, as such this will not be appropriate for all projects. The DOT does allow TIF to be used as a method or repayment.

- **Economic Development Administration (EDA) Public Works and Economic Adjustment Program.** The EDA is part of the U.S. Department of Commerce and provides capital and technical resources to help communities experiencing

significant economic distress. One of the agency's trade mark initiatives is the Public Works and Economic Adjustment Program. The program provides 50 percent of the capital for an array of public infrastructure projects; however, improvements must have a direct bearing on contributing to attracting and/or retaining jobs. Alternatively, the economic adjustment element can be used to develop facilities (buildings, business/ industrial parks, etc.) that contribute to retaining and retraining individuals impacted by the shut down or work force reduction involving a major employer.

The EDA uses comparatively high unemployment, low per capita income, or a defined special need to evaluate proposals and determine whether the agency will participate in a project. Print materials suggest that the criteria listed below are not used to determine if the agency will or will not provide funding. Rather, these factors help determine how the agency may participate. Applicants must meet one or more of the following criteria:

- An unemployment rate that is, for the most recent 24-month period for which data are available, at least one percentage point greater than the national average unemployment rate;
- Per capita income that is, for the most recent period for which data are available, 80 percent or less of the national average per capita income; or
- A "Special Need," as determined by EDA.

Current demographics indicate that none of the Corridor MPO communities qualify under the first two criteria and would be challenged to identify a "special need" that warrants participation.

- **Community Attraction and Tourism Program.** This program was borne out of the Vision Iowa Program to provide capital for the construction of regional community attractions and tourist destinations. Historically, this program has contributed to the construction of libraries, museums, and related attractions. In addition, funds have been used to construct trail systems.

While the program remains viable recent funding levels and pending legislation places the future of the program in question. Presently there is approximately \$4.4 million left to award in the CAT Fund with 12 applicants requesting more than \$8 million. Aside from the competition for available resources, a bill has been filed in the Iowa legislature that would eliminate the Vision Iowa/CAT program. Even if the legislation does not pass the program would require a legislative act to be funded for FY2016.

Implementing the Plan

Recommendations for land use designation, transportation system improvements and infrastructure requirements are included in the appropriate chapters of this document. This Corridor Management

Plan will be most effective if the City of Cedar Rapids, Corridor MPO, area communities, and Iowa Department of Transportation accepts the plan as a consensus guidance document and incorporates the priorities recommended within their individual plans and capital improvement programs. It is recommended that the partners in the development of this plan meet annually to discuss and coordinate implementation of the recommendations.



SOURCE: CH2MHILL



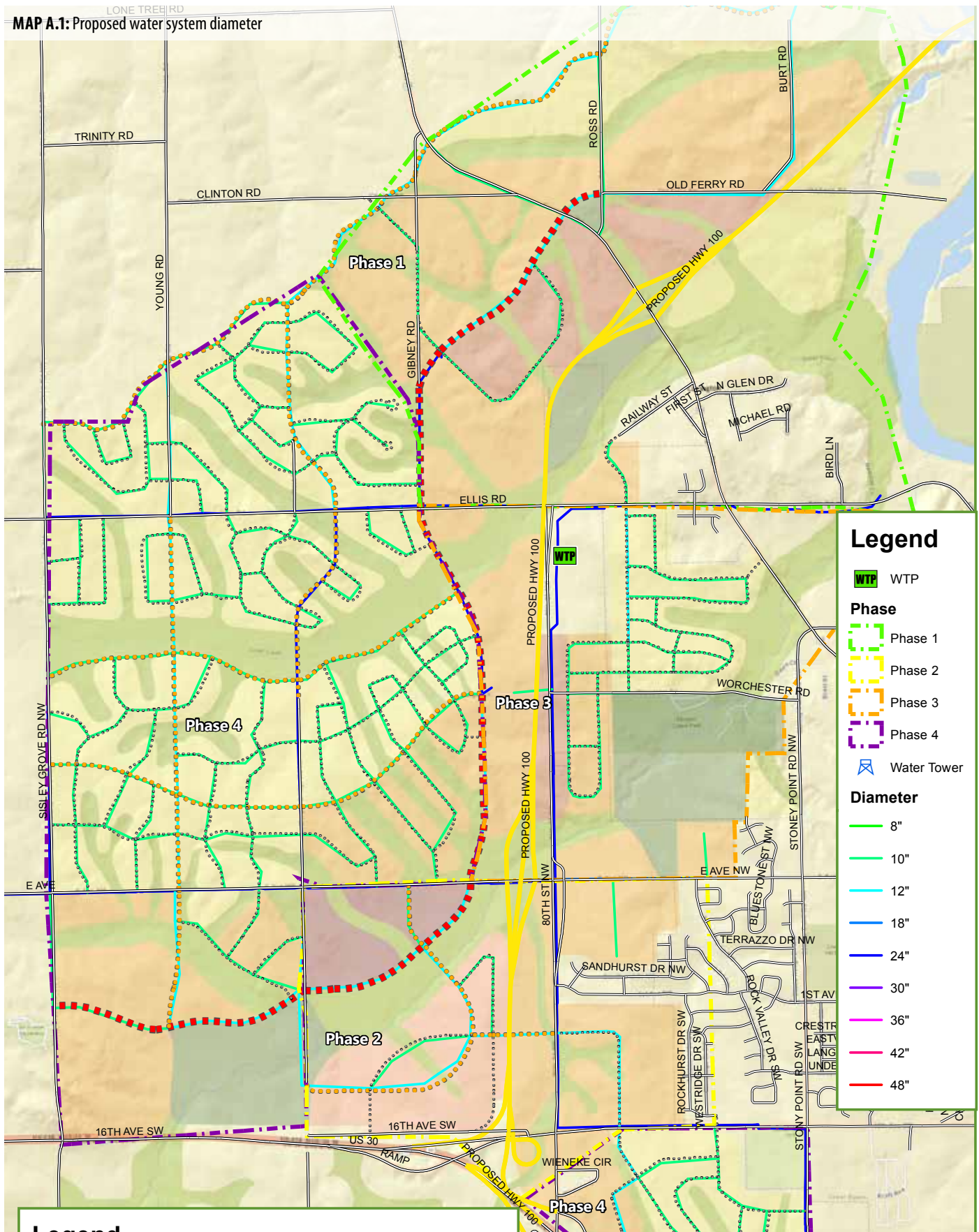


APPENDIX



REFERENCE A

MAP A.1: Proposed water system diameter



REFERENCE B

Street Typology and Design Standards

SEE ROAD CROSS SECTIONS FROM CONNECTIONS 2040 PLAN.

Visit www.corridormpo.com.

REFERENCE C

Select External Funding Opportunities

Community Attraction & Tourism / River Enhancement Community Attraction & Tourism Grant Program

EVALUATION CRITERIA

Threshold Eligibility

- Applicant must be a city, county, or public organization, or a combination of these forming a 28E; or school district in cooperation with a city or county.
- Broad local support for the project as reflected in an official resolution, minimum
- 50% match, enforceable commitments recommended, adequate funding for competition, non-financial resources cannot exceed 25% of the applicant's match.
- Financial needs after other sources are exhausted.
- Vertical infrastructure to include land acquisition and construction, major renovation and repair of buildings, all appurtenant structures, utilities, site development, and recreational trails.
- Applicant must provide pay for at least 50% of the costs of standard medical insurance plan for full-time employees working at the project after it is built.

Evaluation Criteria:

- Feasibility (0-25 points, 15-point minimum required);
- Economic Impact (0-25 points, 15-point minimum required);
- Leveraged Activity (0-10 points, 6-point minimum required);
- Matching Funds (0-25 points, no minimum);
- Planning Principles (0-10 points, no minimum);
- Technology and Values (0-5 points, no minimum).

PROJECT ELIGIBILITY

- See Threshold requirements cited above.

APPLICANT ELIGIBILITY

- See Threshold requirements cited above.

FILING DEADLINES

- Past practice allowed for applications to be submitted anytime; however, the applications are reviewed quarterly. More recently, the Iowa Economic Development Authority cites upcoming deadlines.

REPORTING REQUIREMENTS

- Grantees are required to enter into an agreement with the Iowa Economic Development Authority which outlines protocol concerning the drawdown of funds, timelines, and an opportunity to review the project both on-site and to compare the proposed budget to actual budget for cited improvements.

FUNDING MATCH

- The statute limits the fund to 50%; however, only in rare cases has the Vision Iowa Board authorized requests at this level.
- If the applicant is an organization other than a county, the applicant will be required to secure a funding commitment from the host county.
- See the Threshold Criteria for a more detailed summary of funding match expectations.

FUNDING CAP

- There is no specific funding cap; however, funds cannot exceed 50% of the eligible project costs.

ADDITIONAL REQUIREMENTS

- One-third of the funds available through the CAT program shall be allocated to projects in cities with populations of 10,000 or less, and/or counties that are among the 33 least populated counties in Iowa. If any portion of these funds has not been awarded by April 1st, the funds shall be available for any community or county in the state. (The smaller population areas are not limited to one-third of the funding, and may access the remaining funding as well.)

REVIEW PERIOD

- In general review periods are at least three months and frequently involved a short presentation to the CAT Committee/Vision Iowa Board.

Resource Enhancement and Protection Fund – Open Space

This money is available to cities through competitive grants. Parkland expansion and multipurpose recreation developments are typical projects funded under this REAP program. The DNR administers the city grant program.

EVALUATION CRITERIA

- The relationship of the project to relevant regional and statewide programs based on the demonstrated relationship to the state comprehensive outdoor recreation plan, the Iowa open spaces protection plan, the county resource enhancement plan, and other relevant local, state, and federal plans.
- Quality of project – for land acquisition. Quality is determined by the level of significance of the site (e.g., the relative rarity of the natural resources found on the project site); the quality of the project site, including but not limited to the size and diversity of the project area and the vegetation and wildlife it supports; specific factors or threats to the project area that constitute urgency for acquisition; relationship to public land (i.e., proximity to existing wildlife areas, existing parks, etc.).
- Quality of project – for construction projects. Plans that demonstrate the best use of the site via quality of design, use of materials that incorporate energy savings and adhere to sustainable building principles; and plan that include innovative construction methods.
- Environmental benefits that can include how the project will have a positive impact on the larger ecosystem.
- Public benefits in the context of numbers of estimated numbers of users and secondary benefits such as benefits to local tourism, surrounding businesses, and adjacent property owners.
- Local support that is demonstrated through letters of support, documented surveys, etc.
- A communication plan that informs and advises constituents and users about the importance of the proposed project and plans to promote the project to expected user groups.

PROJECT ELIGIBILITY

- Acquisition, establishment, and maintenance of natural parks, preserves, and open spaces.
- Multipurpose trails, restroom facilities, shelter houses, and picnic facilities.
- Museums
- Parks
- Preserves
- Parkways
- City forests
- City wildlife areas

APPLICANT ELIGIBILITY

- Any incorporated city or town.

FILING DEADLINES

- August 15.

REPORTING REQUIREMENTS

- No specific reporting requirements other than maintaining adequate records relating to the administration of the project.

FUNDING MATCH

- Grants for up to 100 percent of the project costs can be made to cities may be used for eligible project expenses.

FUNDING CAP

- Funding levels are based on population. Cedar Rapids would be eligible to receive up to \$300,000 (cities over 75,000 citizens).

ADDITIONAL REQUIREMENTS

- REAP applications are subject to a dual review process. Initially applications are submitted to the county resource enhancement committee from the county in which the project is located. Following this review and endorsement, the application is filed with the state.

REVIEW PERIOD

- 60 – 90 days

State Recreational Trails Program

EVALUATION CRITERIA

- Need, in terms of population to be served and existing trails in the area (25 points)
- Compatibility with local, area-wide, regional or statewide plans (15 points)
- Benefits of multiple uses and recreational opportunities (20 points)
- Quality of the site (25 points)
- Economic benefits to the local area (10 points)
- Special facilities for disabled users (5 points)

PROJECT ELIGIBILITY

- RTP is restricted to the acquisition, construction or improvement of recreational trails open for public use or trails which will be dedicated to public use upon completion.
- The project must be part of a local, area-wide, regional or statewide plan.
- The trail route must be designed to allow enjoyment of scenic views or points of historical interest, and maximize safety.
- Project must include a contribution of at least 25% matching funds from other sources. This match cannot include grants from other state agencies or provisions of in-kind services.

APPLICANT ELIGIBILITY

- State and local government agencies, municipal corporations, counties, and nonprofit organizations.
- Private organizations must have a governmental agency as a co-sponsor.

FILING DEADLINES

- January 2 and July 1

REPORTING REQUIREMENTS - NONE

FUNDING MATCH

- 25%- This match cannot include grants from other state agencies or provisions of in-kind services.

FUNDING CAP - NONE

ADDITIONAL REQUIREMENTS

- Trails resulting from successful applications must be maintained as a public facility for a minimum of 20 years.
- DOT must approve the trail design.
- Applicant must have an approved permit from the DOT maintenance engineer to perform any work with the R.O.W.

REVIEW PERIOD

- 3-4 months

Federal Recreational Trails Program

EVALUATION CRITERIA

- The degree of innovative trail sharing to accommodate motorized and non-motorized use.
- The number of compatible user groups allowed on the facility.
- The facilitation of access for use by persons with disabilities, older citizens, economically disadvantaged and other special groups.
- The development of trail linkages.
- The creation of opportunities for new partnerships.
- The furtherance of goals of Iowa's SCORP, Iowa Trails 2000, or a regional/county/municipal plan.
- The usage of grant funds to leverage other investments (in services and materials, as well as dollars).
- The level of citizen involvement in the project's concept and implementation.
- The degree to which the project ties in to other trails, natural, cultural, or recreational areas.
- The level of public/private partnerships for the ongoing operation and maintenance of the project.
- The degree the project will result in the cleanup of an area.

PROJECT ELIGIBILITY

- NRT funds may be used for projects from the following categories:
 - Maintaining and restoration of existing trails;
 - Development and rehabilitation of trailside and trailhead facilities and trail linkages;
 - Purchase and lease of trail construction and maintenance equipment;
 - Construction of new trails (with restrictions for new trails on Federal lands);
 - Acquisition of easements or property for trails;
 - Operation of educational programs to promote safety and environmental protection related to trails (limited to 5 percent of a state's funds).

APPLICANT ELIGIBILITY

- City and county governments, and other government entities, including federal agencies and special government districts.

FILING DEADLINES

- October 1

REPORTING REQUIREMENTS - NONE

FUNDING MATCH

- 20%- The remaining amount may come from federal, state, local or private funding sources. Other select federal funding sources may be used as matching funds. In-kind materials and services may also be permitted toward the project match.

FUNDING CAP - NONE

ADDITIONAL REQUIREMENTS

- Trails resulting from successful applications must be maintained as a public facility for a minimum of 20 years.

REVIEW PERIOD

- 3-4 months

Revitalize Iowa's Sound Economy (RISE)

EVALUATION CRITERIA

- **Immediate Opportunity Projects.** Staff shall evaluate the effect of the proposed project on the state economy using the following factors: consistency with the state economic development plan; diversification of the state economy; the impact on in-state suppliers, competitors, and import substitution; percentage of out-of-state sales; the quality of employment positions; and the record of law violations.
- **Local Development Projects**
 - **Development Potential (35 points).** The DOT will consider the current status of, and potential for, the economic development project associated with the RISE-funded roadway. Economic development includes business, industry, parks, and recreational or tourism activities.
 - **Economic Impact (20 points).** The DOT will consider the number of permanent direct and indirect "multiplier" jobs that will be created or retained, the number of visitors that will be attracted, the total capital investment, the amount of private participation in the roadway project, and the size of the development area served. Economic impact measures will be considered in proportion to the amount of RISE funds request.
 - **Local Commitment and Initiative (35 points- includes 5 points for the remediation or redevelopment of a brownfield site).** The DOT will consider what efforts have been made to plan for and attract economic development, whether or not arrangements have been made for non-roadway factors (such as zoning, utilities, and labor force training) critical to the success of the development, the amount of local participation in the roadway project, and whether the applicant has used available marketing services, such as the IDED's Community Economic Preparedness Program and Community Quick Reference Guide.
 - **Transportation Need (4 points).** The DOT will consider the information included in the "Transportation justification," whether or not the roadway project has been identified as a transportation need in local plans or programs, and the distance of the city or county from the interstate system and other major highways.
- **Area Economic Need (6 points).** The DOT will consider recent changes in local population and employment, the level of unemployment, and the local tax effort compared with the local tax capacity. No information is required from the application concerning area economic need.

PROJECT ELIGIBILITY

- **Immediate Opportunity Projects.** Projects related to an immediate, non-speculative opportunity for permanent job creation or retention. The applicant should be in the process of negotiating a location or retention decision with a developer or firm, and must be able to demonstrate that an immediate funding commitment is essential to influence a job location or retention decision.
- **Local Development Projects.** Projects that support local economic development, but that do not require an immediate commitment of funds or meet the threshold set for immediate opportunity projects.

APPLICANT ELIGIBILITY

- City and county governments

FILING DEADLINES

- February 1 and September 1 (Local Development Projects)

REPORTING REQUIREMENTS

- Three years after the roadway is open to traffic, the job creation and/or retention along with the wage rate and capital investment contingencies must be met. Plus, the job creation and/or retention contingency at the wage rate established at the time of project approval must be maintained for a six-month continuous period during the three-year monitoring period.

FUNDING MATCH

- Immediate Opportunity Projects- 20% or up to \$10,000 per job created/retained; whichever is less.
- Local Development Projects- 50%

FUNDING CAP - None (see funding match above)

ADDITIONAL REQUIREMENTS

- DOT reviews all road project concepts, cost estimates, plans, and specifications.
- Plans and specifications should be prepared by an Iowa-licensed professional engineer.
- Code of Iowa requirements for public expenditures applies (e.g. R.O.W. activities, environmental clearances and letting procedures).
- Local development applications assisting the redevelopment of brownfield sites receive added consideration.

REVIEW PERIOD

- Immediate Opportunity Projects - may have a response time as short as a few weeks
- Local Development Projects - approximately four months

Iowa Clean Air Attainment Program (ICAAP)

EVALUATION CRITERIA

- **Traffic flow improvement (25 points).** The project applicant must document how the proposed project or program will increase travel speed relative to roadway capacity improvements and/or reduce travel delay in the project area. The applicant also must describe all assumptions and list the data sources used in calculating travel speeds and vehicle delays.
 - **VMT or SOV trip reduction (25 points).** The project applicant must document how the proposed project or program reduces the total number of SOV trips or the VMT in the project area.
 - **Vehicle emission reduction estimates (20 points).** The applicant must document how many kilograms per day of VOC (HCs), NOx, CO, PM-2.5 or PM-10 vehicle emissions will be reduced. Ozone is a secondary air pollutant formed when precursor vehicle exhaust emissions – VOCs (hydrocarbons) and NOx—react with sunlight.
 - **Degree of transportation-related air pollution or traffic congestion (15 points).** An area with a higher degree of transportation related air pollution or traffic congestion will receive higher priority for assistance. Air quality for the targeted pollutant(s) should be continually monitored, and the measurements documented.
 - **Project cost effectiveness relative to air quality benefits (30 points).** Project applicant must calculate the cost-effectiveness of the proposed project by dividing the average annual total cost of the project (total project cost divided by expected project life in years) by the total annual vehicle emissions reduction in kilograms per year for each target pollutant. [Average annual total project cost (dollars)] divided by [emissions reduction (kilograms per year)].
- **Travel Demand-Management Strategies.** Techniques or programs that attempt to reduce demand for singleoccupant vehicle travel, such as promotion of employee trip reduction programs, development of transportation management plans and establishment of auto-free zones
 - **Pedestrian and Bicycle Programs.** Pedestrian and bicycle facilities, promotional activities designed to encourage bicycle commuting and improved pedestrian walkways
 - **Vehicle Inspection and Maintenance Programs.** Start-up activities, such as updating quality assurance software, developing mechanic training curricula, construction of high-tech diagnostic facilities, and equipment purchases in networks meeting Environmental Protection Agency criteria
 - **Other Projects and Programs.**
 - » Other projects and programs that use promising technologies and feasible approaches to reduce transportation emissions
 - » Conversion of public fleets to alternative-fueled vehicles (eligible under certain conditions)
 - » Feasibility studies necessary to provide environmental documentation although general planning studies, traffic data collection activities and similar assessments are not eligible
 - **Transportation Control Measures.** Transportation control measures specified in Section 108 (f)(1)(A) of the Clean Air Act Amendment are generally eligible (Many of these also fall into one of the previous categories listed) .
 - **Transportation Activities in the State Implementation Plan.** Transportation activities in an approved state implementation plan, if applicable

PROJECT ELIGIBILITY

- Eligible highway/street projects must be on the federal-aid system, which includes all federal functional class routes except local and rural minor collectors.
- Iowa's program funds may be used anywhere in the state for any activity eligible under the Surface Transportation Program, as described in Section 133(b) of Title 23, U.S. Code, as amended by SAFTEA-LU, or the Congestion Mitigation and Air Quality Program, as indicated in Section 149(b) of Title 23, U.S. Code, as amended by SAFETEA-LU. To be eligible for Iowa program funds, the project should fit into one or more of the following categories.
 - **Traffic Flow Improvements.** Highway and street projects that improve air quality or reduce congestion
 - **Shared-Ride Services.** Establishment of carpool and vanpool programs, parking areas for people using these services, and programs to match drivers and riders
 - **Transit Improvements.** System and service expansion for bus and rail services, operational improvements, or

demand and market strategies to make transit a more attractive transportation alternative and divert riders from single-occupant vehicle trips

APPLICANT ELIGIBILITY

- Public entities such as MPOs, RPAs, public transit operators, state and local governments;
- Private-nonprofit organizations (other than designated public transit agencies);
- Individuals.

Applications by private nonprofit groups and individuals must be co-sponsored by public entities.

FILING DEADLINES

- October 1

REPORTING REQUIREMENTS

- Report required at the end of the project period that discusses the actual emissions benefits.

FUNDING MATCH

- 20%

FUNDING CAP

- None- the DOT assesses the cost effectiveness of the project (award) per kilogram of emissions benefit and has awarded less than requested awards in the past.

ADDITIONAL REQUIREMENTS

- Highway projects
 - Projects must be let by the DOT.
 - Federal Highway Administration (FHWA) environmental concurrence is required.
 - Right-of-way activities must comply with applicable federal and state laws.
 - Plans and specifications must be prepared by an Iowa licensed professional engineer.
 - If federal-aid dollars are used for a consulting engineer, the Federal-Aid Consultant Selection Process must be used.
 - DOT design criteria should be used for the appropriate road classification.
 - Approval by the DOT of plans and specifications is required.
 - Compliance with regulations regarding the following is required:
 - » federal equal employment opportunity;
 - » use of disadvantaged business enterprises;
 - » Occupational Safety and Health Administration provisions; and
 - » Federal (Davis-Bacon) wage rates.
- Transit projects
 - Capital improvements require adherence to approved transit procurement procedures and equipment specifications.
 - Project candidates must be part of an approved five-year Capital Improvement Program.
 - Federally funded projects must comply with requirements regarding:
 - » civil rights protections;
 - » use of disadvantaged business enterprises;
 - » competitive procurement;
 - » bus testing;
 - » pre- and post-procurement audits; and
 - » Drug and alcohol testing.

REVIEW PERIOD

- 4 months

Traffic Safety Improvement Program

EVALUATION CRITERIA

- DOT staff, along with a city/county committee, recommends prioritization of projects to the Iowa Transportation Commission, which then approves funding of specific projects.
 - Site-specific projects are evaluated by benefit/cost ratio analysis and other criteria.
 - Funding for traffic control devices is awarded on the basis of safety benefits of eligible applications, the annual funding level and other criteria.
 - Funding for research, studies, and public information initiatives is awarded on the basis of safety research needs, impact on safety, the annual funding, and other criteria.

PROJECT ELIGIBILITY

- Eligible projects must fall into one of three categories:
 - construction or improvement of traffic safety and operations at a specific site with an accident history (site specific improvements);
 - purchase of materials for installation of new traffic control devices such signs or signals, or replacement of obsolete signs or signals (traffic control devices); or
 - transportation safety research, studies, or public information initiatives such as sign inventory, work zone safety and accident data (Research, studies and public information initiatives)

APPLICANT ELIGIBILITY

- State, county, or city

FILING DEADLINES

- August 15 (FY 2014)

REPORTING REQUIREMENTS

- None (grantee works with the local systems engineer during the voucher submittal process but no formal reporting requirements)

FUNDING MATCH - NONE

FUNDING CAP

- The maximum traffic safety funding for a site-specific project shall not exceed \$500,000.
- Total funding allotted for traffic control materials cannot exceed \$500,000 annually.
- Total funding allotted for all research, studies and public information initiatives shall not exceed \$500,000 annually.

ADDITIONAL REQUIREMENTS - NONE

REVIEW PERIOD

- 3-4 months

Living Roadway Trust Fund

EVALUATION CRITERIA

- No formal scoring process for applications. Members of the LRTF Advisory Committee review and discuss each application using the criteria and priorities shown in their Funding Guidelines to determine if an application will be approved. Each application competes with others in the same jurisdictional category (state, county, and city).

PROJECT ELIGIBILITY

- **Roadside inventories.** Training sessions, roadsides inventory teams, database software and data input to help counties identify and record data about roadside prairie remnants and prairie plantings.
- **Gateway and Roadside plantings.** Gateway landscaping and roadside enhancement projects (LRTF funds purchase native grasses and wildflowers).
- **Research, demonstration and education.** Research projects study integrated roadside vegetation management (IRVM) issues while demonstration plantings show aspects of IRVM. Seminars, conferences, and classroom instruction educate the public about Iowa's native plants and their use on roadways.
- **Equipment.** Counties with designated roadside managers are eligible to apply for funding to purchase special equipment needed to establish, manage or harvest native roadsides and native roadside plantings.

APPLICANT ELIGIBILITY

- City, county or state agencies
- Non-profit organizations
- Private citizens or groups

FILING DEADLINES

- June 1

REPORTING REQUIREMENTS

- No set reporting requirements (with the exception of research projects). Depending on the type of project, the LRTF may request informal reports from grant recipients at the end of --or during-- their work.

FUNDING MATCH

- **Roadside inventories** - 20%
- **Gateway and Roadside plantings.** No match requirements but most applicants provide at least an in-kind match.

- **Research, demonstration and education.** No match requirements but most applicants provide at least an in-kind match.

- **Equipment** - 20% (requested)

FUNDING CAP

- Roadside inventories
 - » \$4,500 (expenses associated with data collection, data input, and personnel)
- Gateway and Roadside plantings
 - » Native seed: \$1,000/acre of seed costs.
 - » Native plant plugs: \$1,500 per project.
- Research, demonstration and education
 - » Indirect research costs will be funded to a maximum of 8%.
- Equipment
 - » No-till drill –\$10,000 for first drill in each county; \$5,000 for second or replacement drill.
 - » Hydroseeder –\$24,000 for first seeder. Hydroseeders must have mechanical agitation.
 - » Burn equipment – Counties may apply for up to 100% of personal protective fire gear and burn equipment costs.
 - » Silt fencer –\$5,000.
 - » Cultipacker –\$3,500.
 - » Mulcher/Blower –\$7,500.
 - » Seed storage –\$3,000 for construction or retro-fit of a seed storage room with temperature and humidity controls.
 - » UTV –\$8,000. UTVs must have seat belts and factory-installed roll bars.
 - » Chipper –\$10,000.
 - » Equipment storage –\$10,000 for IRVM shed. This is in addition to the seed storage room. Applicants for equipment storage funding must have adequate seed storage, or show it in plans for the new storage shed.

ADDITIONAL REQUIREMENTS - NONE

REVIEW PERIOD

- 3-4 months

Watershed Improvement Fund

EVALUATION CRITERIA

- Applications are assessed on the following factors:
 - » o Assessment – completion of a comprehensive watershed assessment.
 - » o Goals – the goals of the project must be clearly outlined and targeted source(s) of the identified impairment(s) as identified in the assessment.
 - » o Results – the application should contain sufficient information to address the scope of improvements, determination as to how the effectiveness of the system can be measured and a determination of whether results can be realized within the project's timeframe, and whether the appropriate technology is being utilized.

PROJECT ELIGIBILITY

- o Construction costs and items directly related to the construction of water quality or flood prevention practices, engineering costs to design these practices, public bidding and contracting expenses, salary and benefits for personnel implementing the project and purchasing easements.

APPLICANT ELIGIBILITY

- Soil and water conservation districts
- Public water supply utilities
- County conservation boards
- Local watershed improvement committees
- City or county

FILING DEADLINES

- December 14

REPORTING REQUIREMENTS

- Applications that are approved for funding are required to enter into a grant agreement. Administrative responsibilities associated with this Agreement include:
 - Project schedule – cannot exceed three years
 - Progress reports- the approving agency withholds 10% of the total grant until a final comprehensive report is accepted by the agency.
 - Public contract and bidding procedures
 - Assurance that practices comply with the USDA Natural Resources Conservation. Services Standards and Specifications, the Stormwater Management Manual.

FUNDING MATCH

- None specified

FUNDING CAP

- \$100,000

ADDITIONAL REQUIREMENTS

- None

REVIEW PERIOD

- Approximately 3 months



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