Darby Creek Watershed
Legal Service-Learning Project

Prepared for
Oldham County
Kentucky Division of Water
Kentucky Waterways Alliance
University of Louisville

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Acknowledgements

This report was prepared by 11 University of Louisville planning and law students for Craig Anthony (Tony) Arnold's Land Use Planning Law Course over the 2008 spring semester. Beth Stuber, Oldham County Engineer, Emily Liu, Oldham County Planner; and Katie Holmes, with Kentucky Waterways Alliance consulted with the team. Russell Barnett took team members on a watershed tour. Without them, none of this would be possible.

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Photos throughout this report are images from the Darby Creek Watershed. They were taken on March 16, 2008 by Carrie Beth Lasley and Jaime Patterson, and on March 22, 2008 by Carrie Beth Lasley. Maps were designed by Mike Clust and Carrie Beth Lasley using data provided by Oldham County Planning and Design, LOJIC and Kentucky Geonet data.

Executive Summary

The Darby Creek watershed is in good condition, and that is why it is so important to protect it. A history of agricultural and low intensity development has meant good water quality and proper drainage. However, development is flooding into the area. Floodplains are being sold and developed, and large suburban neighborhoods have begun to enter the watershed in the south and eastern edges of the watershed, where the headwaters are. It is this development pattern, typical of Oldham County which produces the greatest threat to the watershed. Growth is necessary, but mitigation measures accompanying this growth are also necessary.

Suburban development increases stormwater runoff. Roofs, roads and curbs are impervious, and the lawns that are laid to absorb the runoff are not as efficient at draining and filtering stormwater as the cover they replace. Residential development creates markets for small-scale services and industry that further increase runoff by adding parking.

The mitigation methods in the suburban development in Darby Creek range greatly. From retention ponds, to grassy swales, wetlands to storm drains, a number of mitigation measures show their face, but the trends are toward less natural and less effective measures — curbs and gutters — they are required by local ordinances. However, better alternatives exist in the watershed. Mockingbird Valley, with its grassy swales allow water to take a natural path into the ground with a slow release into the watershed, reducing erosion, and increasing biodiversity and filtration.

This report explores this challenge to the watershed and others, many of which accompany development, but other forms of development create other challenges. The use of septic systems in a highly cavernous landscape, the access of livestock to the stream and the use of straight pipes that deliver sewage directly to the water are some of these issues.

In our research, we met with local planners, consulted GIS data, went to a community forum, toured the watershed, examined existing laws, researched other communities and read books written by the experts. All along we grappled with the central issues of watershed management practices

We examined the use and existing laws as we struggled with the central issues of water quality. How can we grow a tax base without suffering the accompanying growing pains of growth in our watershed?

Russell Barnett, who studies the watershed at the

University of Louisville, identified four goals of watershed management:

- Minimize impervious surfaces and mitigate their effects
- Restore and protect riparian buffers
- Protect intermittent streams
- Improve green infrastructure

With these goals in mind, we considered how we might best reconsider ordinances and utilize planning tools. Overlay districts, subdivision requirements and buffer ordinances are all options for a community committed to defending water quality.

However, the tools of planners and lawmakers are not enough in and of themselves. Changing ordinances to allow for better management than curbs and gutters will not provide in and of itself more efficient mechanisms to control stormwater runoff. Developers must be encouraged to use best management practices — opting for wetlands over retention ponds, for instance. It is up to local planners and planning commissions to promote these methods and scrutinize plans that refuse to include them.

But the first step, the one we hope this report achieves, is exhaustive identification of the issues. We sought to identify uses and features, strengths and weaknesses of current laws, problems within the watershed, recommendations for change, and communities who have experienced similar problems, and enjoyed a measure of success.

In addition, we include in our appendices, model ordinances and helpful documents, but most important, Appendix B, includes a thorough examination of local laws, which Chapter 3 summarizes.

Watershed management is a wicked problem. Its solution is not found in a single action, but through a combination of many actions of law, planning, and the informed decisions of individuals. We propose a bundle of these actions, and while our work does not serve as legal advice, we hope it will generate a discussion and future action that defends water quality in the Darby Creek watershed as well as that of downstream neighbors.

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1. Introduction

Our group, as a part of Professor Tony Arnold's land-use planning law course at the University of Louisville, have drafted this report to enhance the efforts of the Darby Creek watershed-planning team. The report includes a preliminary land-use survey of the Darby Creek watershed, an analysis of the existing Oldham County ordinances using the Center for Watershed Protection's Codes and Ordinances worksheet, and recommendations of land-use planning tools and ordinance revisions that would protect the Darby Creek watershed with or without new development within its boundaries.

The Kentucky Waterways Alliance has described the Darby Creek Watershed as:

- a 9.4 square mile (6,017 acres) area located in the Harrods Creek watershed in Oldham County, Kentucky. There are a number of artificial ponds in the basin, the largest being Lake Lotawata. Most of the watershed is forested (50 percent), with approximately 13 percent developed. The rest is in pasture and cultivated crops. The developed portion of the watershed is located in the upper watershed near Buckner, including the Oldham County Country Club, surrounding subdivisions, and commercial and institutional development along Kentucky Highway 146. I-71 cuts across the upper watershed. Scattered homes are located along the roads crossing the watershed.

While Darby Creek is not currently degraded, development pressure could enhance impervious surface cover in the watershed, thus negatively impacting pollution and stormwater peak levels in the stream. This report is intended to provide recommendations to prevent further stream degradation, even in the face of new development.

2. Existing Conditions

The most recent land-use data attainable is from 2001. Conditions clearly have changed within the watershed since this time. Although it is somewhat dated, 2001 data still paints a reasonably accurate picture of land uses within the watershed. Land use data was collected from the U.S. Geological Survey Seamless Server.

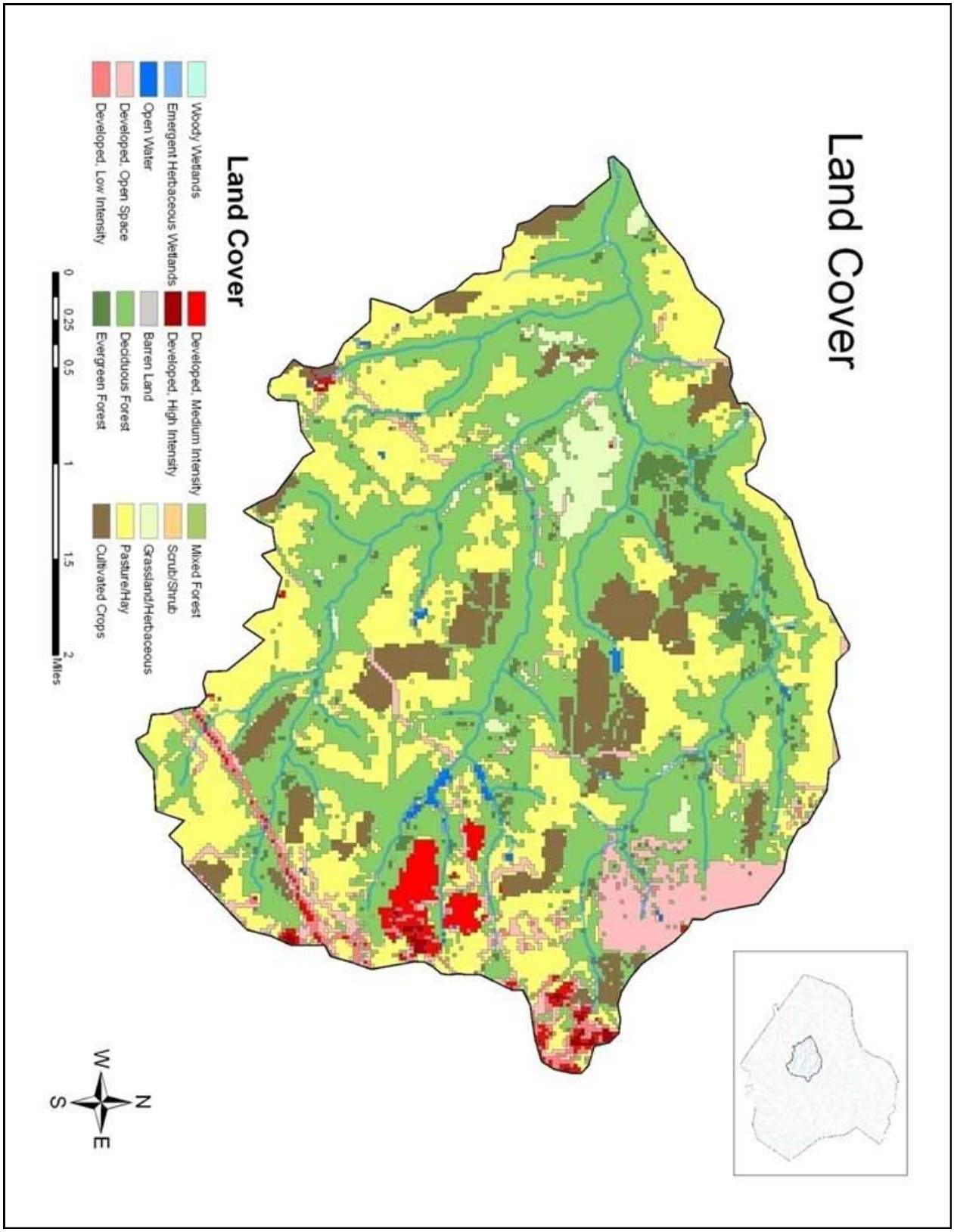
The Darby Creek Watershed is characterized by a wide range of land uses ranging from high intensity development to wetlands areas. As shown in Figure 1 and Table 1, the most dominant land uses within the watershed are deciduous forest and pasture/hay. Over 75 percent of the entire watershed can be categorized by these two uses. According to Oldham County Engineer Beth Stuber, a major reason that the Darby Creek Watershed was chosen for an in-depth watershed plan was because it remains in somewhat pristine condition. Russell Barnett echoed this sentiment by frequently calling the watershed a "gem" at the roundtable exercise on February 26, 2008 (Barnett 2008). Land uses within the watershed can be directly attributed to both Stuber and Barnett's feelings about the area. As of 2001, just approximately 12 percent of all land uses within the watershed are considered to be developed. Of the four degrees of developed, 'developed, open space' is the most frequent throughout the watershed. 'Developed, open space' generally refers to low-density, residential developments. Of the four categories of developed land, 'developed, open space' has the lowest impacts. 'Developed, open space' accounts for roughly 6 percent of all land uses in the watershed.

Table 1: Darby Creek Land Use

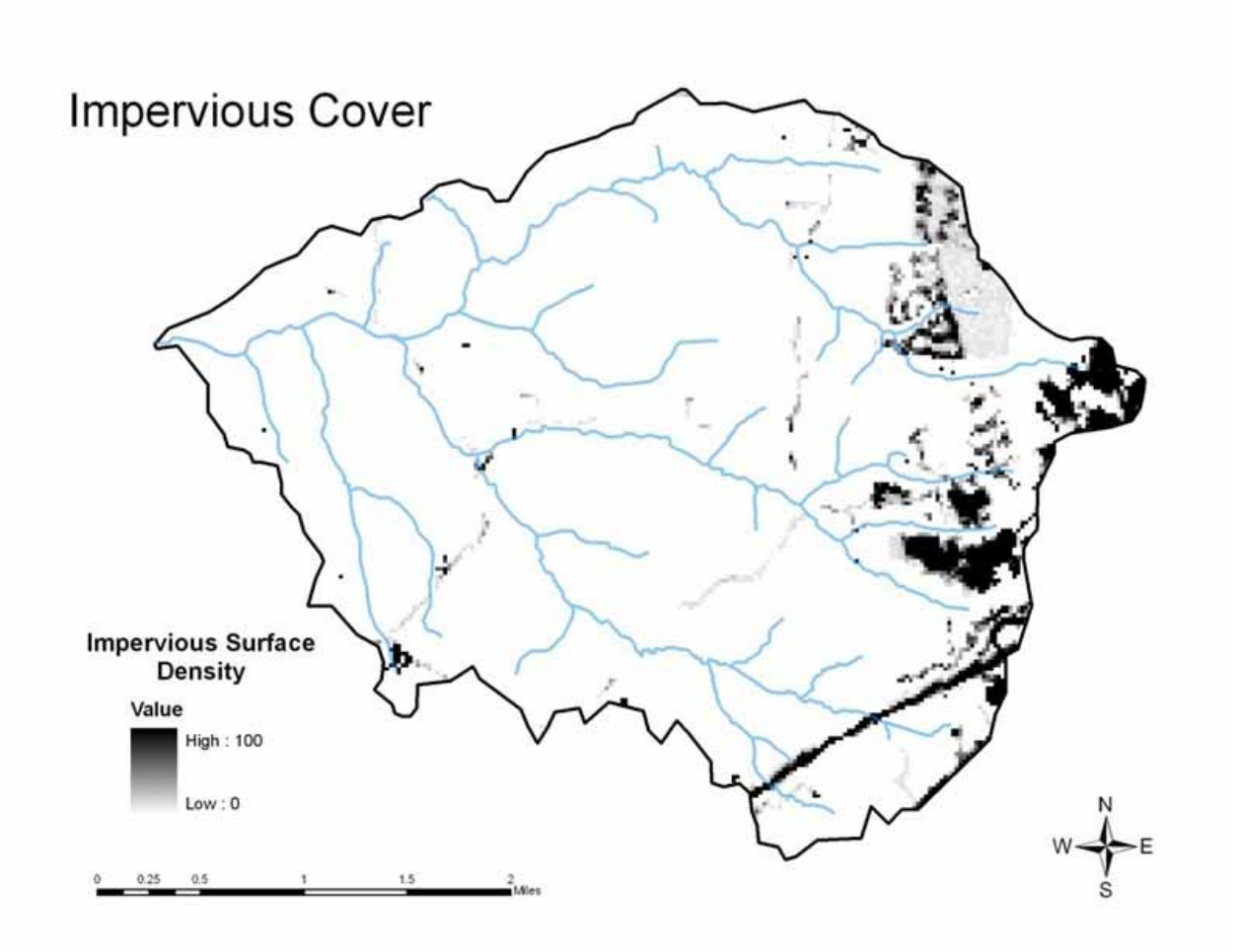
Land Use	Acres	Pct.
Deciduous Forest	2977.24	44.63
Pasture/Hay	2065.07	30.95
Cultivated Crops	560.01	8.39
Developed, Open Space	397.49	5.96
Grassland/Herbaceous	188.13	2.82
Evergreen Forest	168.14	2.52
Developed, Medium Intensity	128.05	1.92
Developed, Low Intensity	85.96	1.29
Open Water	25.80	.37
Mixed Forest	25.80	.37
Developed, High Intensity	23.61	.35
Scrub/Shrub	16.81	.25
Emergent Herbaceous Wetlands	6.45	.10
Woody Wetlands	1.78	.03
Barren Land	1.33	.02

The remaining 88 percent of uses have significantly

Map 1


Land Cover
Land Cover
Woody Wetlands
Emergent Herbaceous Wetlands
Open Water
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land
Deciduous Forest
Evergreen Forest
Mixed Forest
Scrub/Shrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
0 0.25 0.5 1 1.5 2 Miles
N
E
S
W

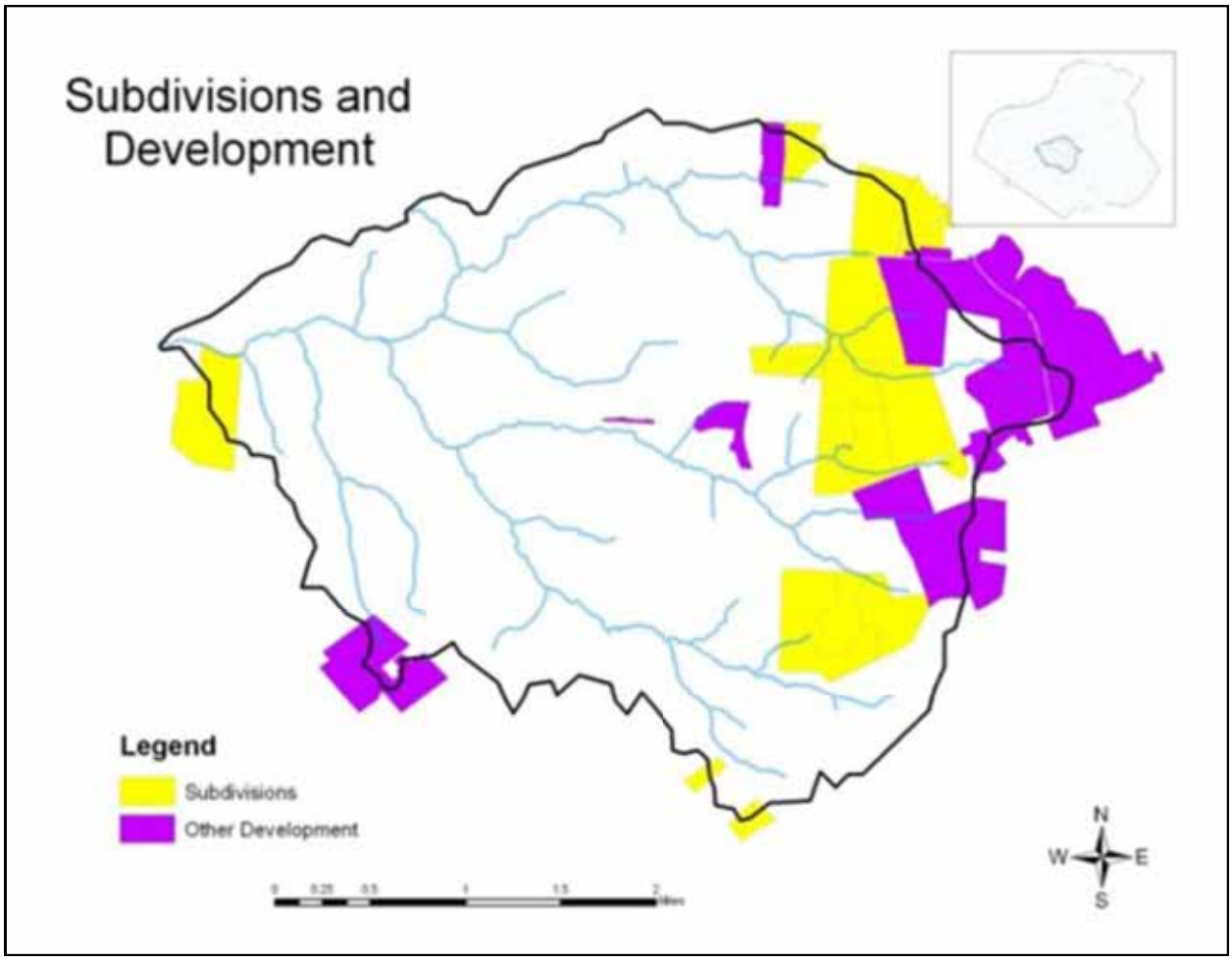
Map 2



lower impacts on watershed quality. Outside of deciduous forest and pasture/hay, grasslands and evergreen forest combined account for slightly over 5 percent of land uses within the watershed.

It should be noted that the developed land uses tend to be clustered within the eastern portion of the watershed. Oldham County Planner Emily Liu provided current data on the developed areas of the Darby Creek Watershed as well as additional zoning data. Figure 3 shows the locations of all subdivisions and other developments within the Darby Creek Watershed. 'Other developments' consist of uses such as schools, country clubs, etc. The clustering of development disproportionately burdens the streams located within the eastern section of the watershed. Data from the USGS on impervious cover shows this effect. Using remote-sensing techniques and 2001 land cover data, the USGS was able to derive locations of impervious cover. Figure 2 displays this data. The impervious density figure refers to not only the coverage of a single cell, but also takes into account the surrounding cells. Therefore, the black areas on the map are impervious surfaces with many additional surrounding impervious surfaces. Areas in white can be considered to be pervious surfaces. Figure 2 clearly shows the disproportionate amount of impervious surfaces in the eastern section of the watershed.

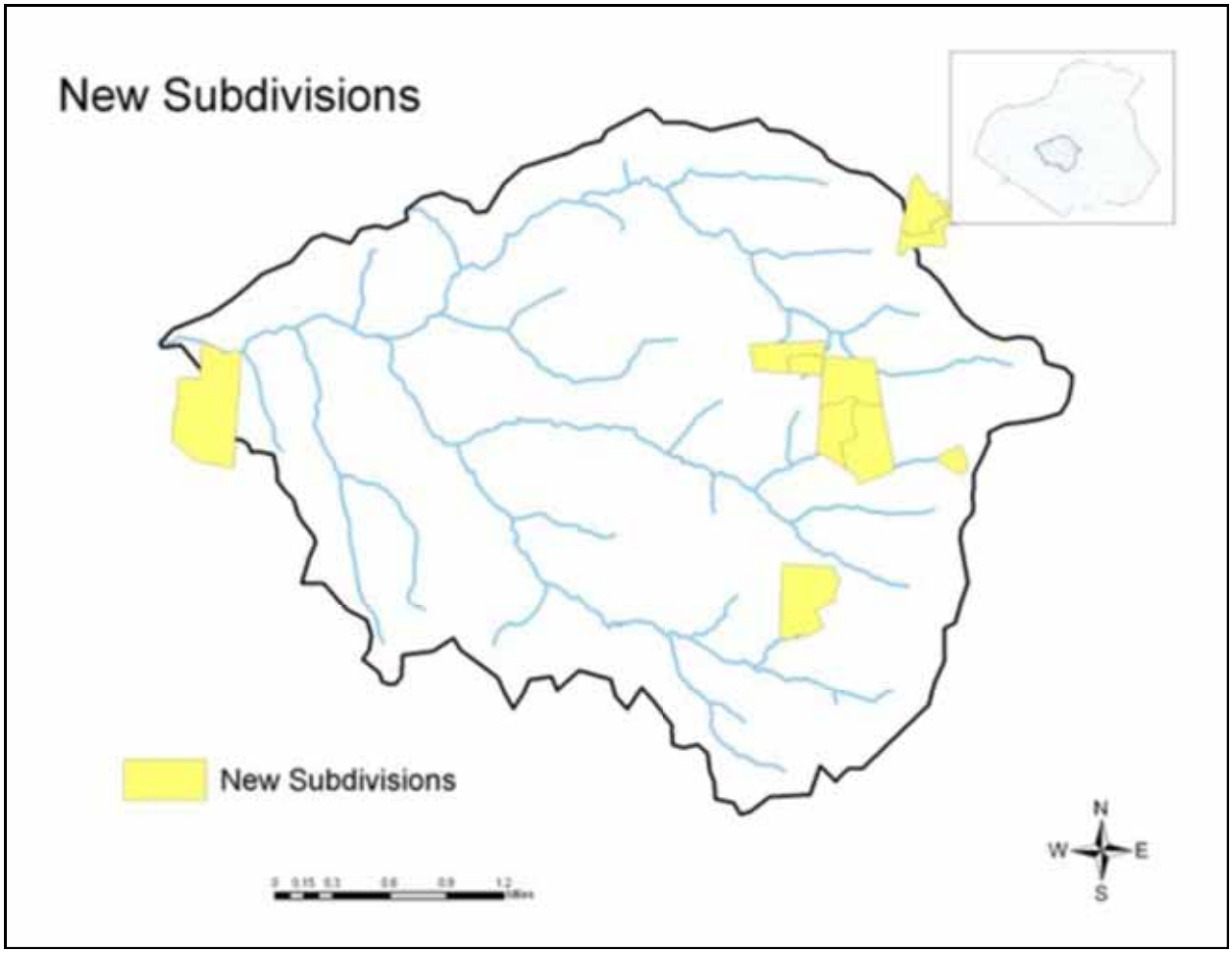
Map 3



It also is clear from the data that much of the development in the eastern section of the watershed is relatively recent. Table 4 and Figure 4 show subdivisions that have been built since 2001. This data is especially useful because it captures missing developments from the land use map. Since 2001, units have been built in subdivisions or phases of subdivisions including: Stonefield Trace, Darby Pointe, Heather Green, Morgan Place, Cedar Point Condos, and Harrod's Crossing. Table 5 shows the year in which these subdivisions were completed. These new subdivisions indicate the development climate in Oldham County. Figure 4 clearly shows a large amount of imperviousness where Interstate 71 is located. To a certain extent, the location of I-71 has driven the location of new developments, both subdivisions and commercial uses. Access to the interstate has been a key factor in the growth patterns of both Oldham County and the Darby Creek Watershed. Nearly all of the land immediately south of I-71 near the Darby Creek Watershed is already developed or is being developed. It can be assumed that development pressure will eventually edge northward and into the Darby Creek Watershed.

The land use patterns within Darby Creek are generally conducive to good water quality. Most of the watershed is rural, with a variety of agricultural uses. However, subdivision developments and ac-

Map 4



companying light commercial services and light industry have begun to have a presence near the Interstate 71 exit onto 393 near the headwaters of the South Fork and Darby Fork of Darby Creek.

The biggest change, and likely the largest threat to the watershed from land use lies in stormwater management and wastewater management maintenance in the suburban corridor in the south of the watershed.

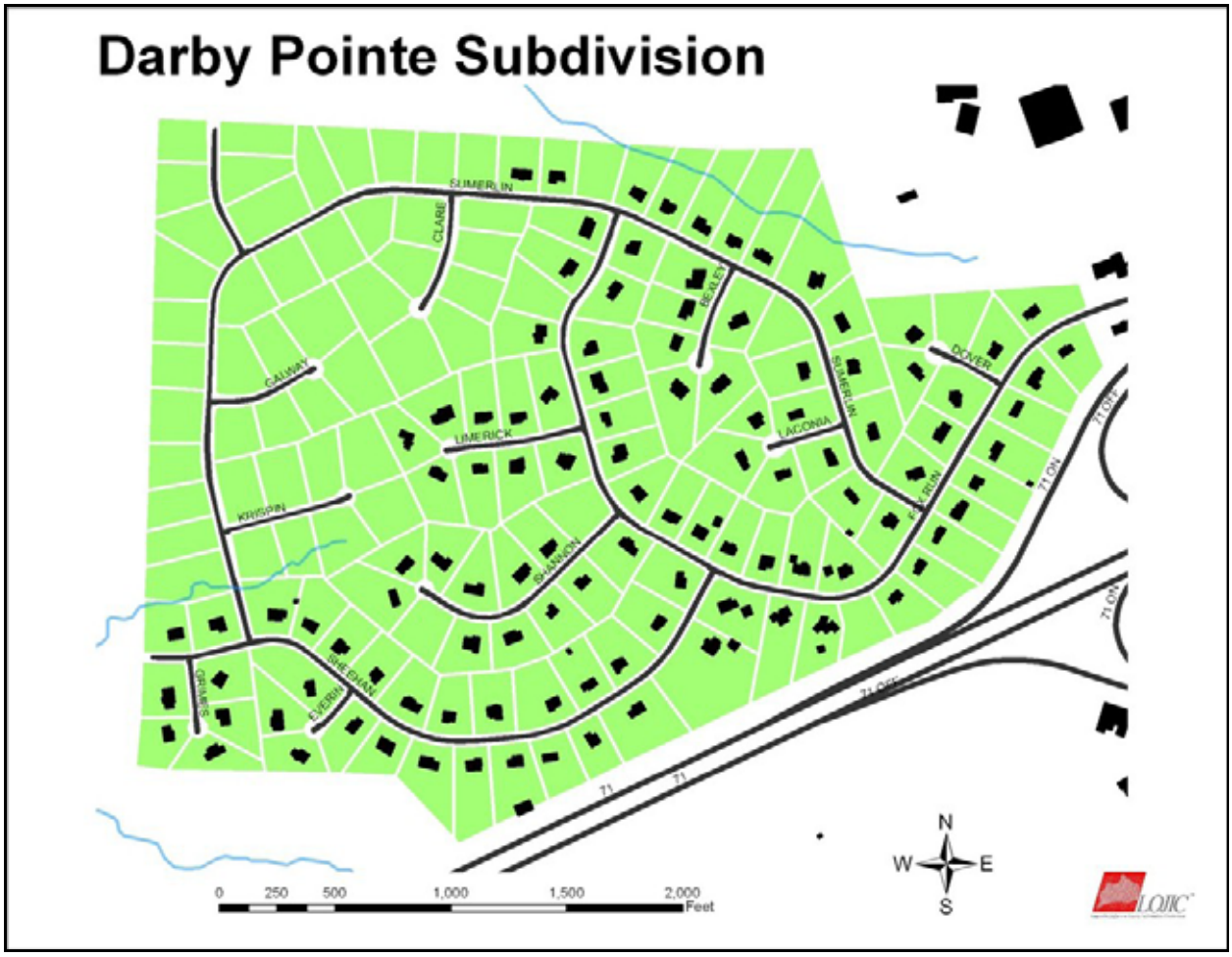
Subdivision Conditions

The Darby Pointe subdivision is a typical subdivision within the Darby Creek Watershed. In fact, it is typical of most subdivisions throughout the entire country. Darby Creek is located in the southeastern

Table 2: New Subdivisions

Subdivision or phase	Year
Morgan Place 1	2001
Stonefield Trace 2	2001
Darby Pointe 3	2001
Darby Pointe 4	2003
Harrods Crossing	2004
Stonefield Trace 3	2004
Heather Green 1A	2005
Stonefield Trace 4	2005
Heather Green 1B	2005
Cedar Point Condos	2006
Morgan Place 2	2006

Map 5



portion of the watershed immediately north of I-71. It is characterized primarily by large homes, large lots, and collector streets. While it may seem large lots associated with certain subdivisions would have a positive influence on drainage, due to large amounts of pervious surfaces, frequently subdivisions with these characteristics have negative watershed impacts. Typical suburban lawns drain less efficiently than the cover they replace. (Barnett 2008) Figure 5 shows Darby Pointe almost built out. Two streams run through the subdivision, one in the north section and one in the southwest section. It is likely that these streams have much lower water quality than neighboring streams in less developed areas. In all, the Darby Pointe subdivision has 10 cul-de-sacs. While these cul-de-sacs may not have a direct affect on stream health and watershed integrity, they do highlight that there was a clear lack of regard for watershed impacts when designing the subdivision.

Riparian Buffer

It has been shown that one of the best methods of mitigating negative watershed impacts is through the use of a riparian buffer. A riparian buffer is essentially a low-impact land use surrounding a stream. Table X shows the 2001 land uses located within 50 feet in both directions of all streams in the watershed. More than 80 percent of land immedi-

Table 3: Land Use in Buffers

Land Use	Acres	Pct
Cultivated Crops	2.16	0.63
Deciduous Forest	272.3	79.7
Developed, Low Intensity	1.73	0.51
Developed, Medium Intensity	2.24	0.66
Developed, Open Space	8.99	2.63
Emergent Herbaceous Wetlands	1.11	0.33
Evergreen Forest	11.37	3.33
Grassland/Herbaceous	4.03	1.18
Mixed Forest	1.21	0.35
Open Water	7.54	2.21
Pasture/Hay	27.23	7.96
Scrub/Shrub	1.07	0.21
Woody Wetlands	0.8	0.23

ately surrounding streams in the watershed is forested. This figure is encouraging considering that less than 50 percent of land throughout the watershed as a whole is forested. Another positive finding is that just over 1 percent of land within the riparian buffer zone is some degree of developed. Having a wide and forested riparian buffer will continue to have a positive impact on water quality throughout the Darby Creek Watershed.

Zoning

Three distinct zoning codes dominate the Darby Creek Watershed. They are R-2 Residential District (43 percent), CO-1 Conservation/Residential District (27 percent), and AG-1 Agricultural/Residential District (24 percent). These three separate zones play perhaps the biggest role when thinking about future development in the Darby Creek Watershed. Looking at Figure 20, R-2 dominates the central, south, and eastern portions of the watershed. The CO-1 zone is found solely along the riparian corridors of the watershed. AG-1 takes up the remainder of space, primarily in the northwestern portion of the watershed. Of the three primary zones within the watershed, the R-2 is most conducive towards new development. The Oldham County Comprehensive Zoning Ordinance describes the R-2 Residential District's intent:

> *The purpose of the R-2 Residential District is to allow, preserve, and protect the character of low density, detached single-family areas and neighborhoods at densities up to 3.63 dwelling units per acre. (Oldham County Comprehensive Zoning Ordinance*)

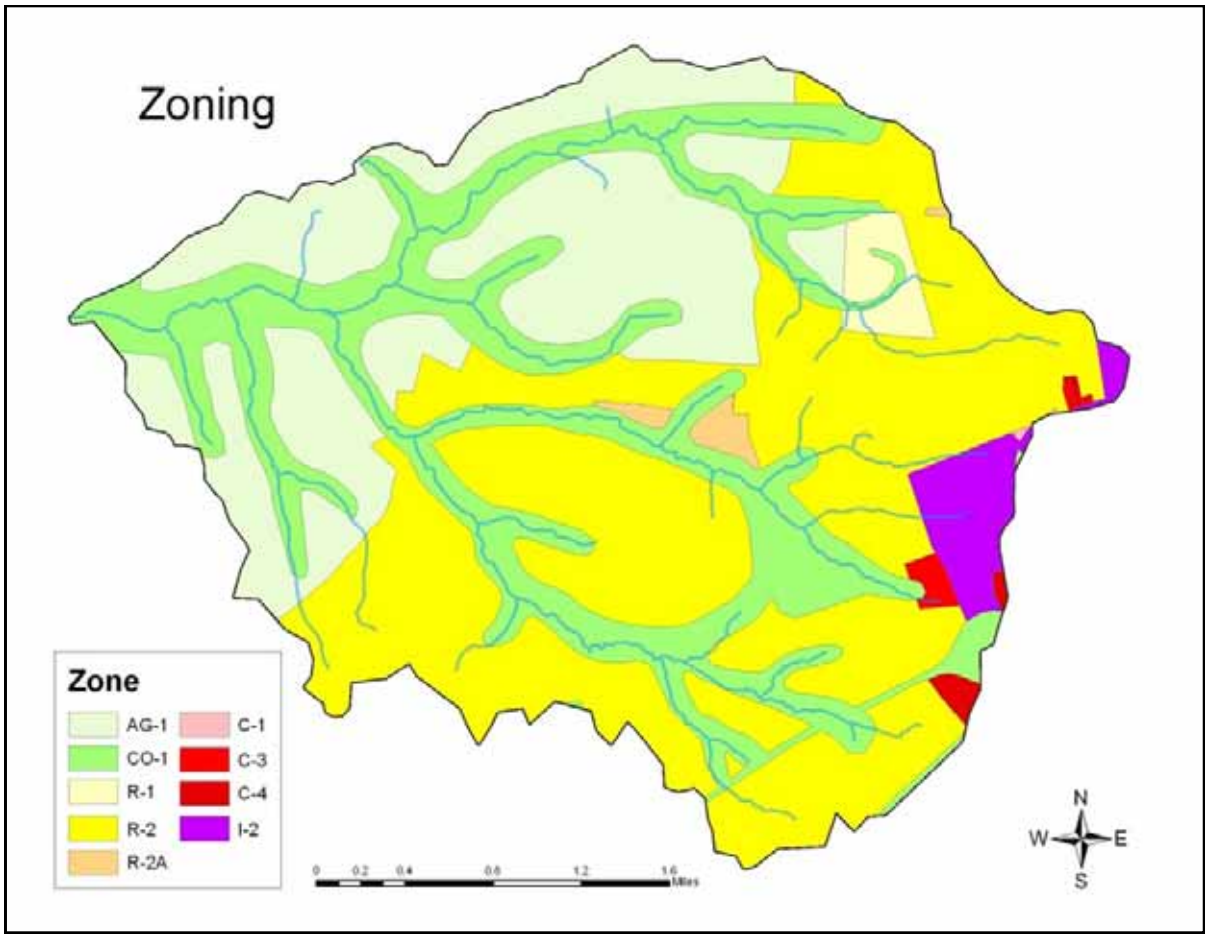
Not surprisingly, the majority of new subdivisions are located within the R-2 zone. The second largest zone in the watershed is CO-1. Per the Oldham County Comprehensive Zoning Ordinance, the intent of the CO-1 Conservation/Residential zone is:

> *The Conservation/Residential District is intended to promote and protect significant natural features, wooded areas, water courses, existing and potential lake sites, other recreational and conservation resources, wildlife, habitat, present and future water supplies, and to minimize erosion of soil and the siltation and pollution of streams and lakes. (Oldham County Comprehensive Zoning Ordinance).*

The CO-1 zone is undoubtedly one of the most prominent tools that Oldham County uses to protect stream health and water quality. Because the CO-1 zone is located along stream corridors, it helps to preserve the riparian buffers that are vital to stream integrity. The third major zone within the watershed is AG-1 Agricultural/Residential. This zone is primarily located in the undeveloped northwestern portion of the watershed. Its intent is:

> *The AG-1 Agricultural/Residential Dis-*

Map 6



trict is intended to: (1) support and encourage agriculture for the purpose of recognizing the cultural heritage of the community and the agricultural contribution to the economic base; and (2) minimize the urban-type development in rural areas until urban-type services and utilities can be efficiently provided. (Oldham County Comprehensive Zoning Ordinance).

Similar to the CO-1 zone, AG-1 seeks to mitigate many types of development. This zone also speaks to the rural heritage of Oldham County.

Table 4: Zoning

Zone	Acres	Percent
AG-1	1,629.54	24.42
C-1	2.14	0.03
C-3	27.42	0.41
C-4	26.51	0.4
CO-1	1,807.59	27.09
I-2	179.88	2.7
R-1	104.38	1.56
R-2	2,843.78	42.62
R-2A	50.73	0.76

Wastewater

Water and wastewater infrastructure resources in the watershed are shown in Map 7. Wastewater is treated in the watershed in one of two manners -- package treatment plants connected to suburban

neighborhoods, or in septic systems in the more rural areas. Urban water lines run along Cedar Point Road, cutting through Darby Creek and terminating near the Darby Fork at the intersection of Cedar Point and New Cut Road. This area is likely to be subject to additional development pressure and future threats to water quality in the watershed.

Stormwater

Map 8 shows impervious surfaces and manufacturing facilities in the Darby Creek Watershed. When areas are paved or built upon stormwater cannot soak into the ground below the developed surface. Various water control methods exist within the watershed. Storm drains and curbs along roads pipe the water into streams in some suburban neighborhoods. Rocks line one stretch of Cedar Point to help decrease erosion and hasten ground absorption. Grassy swales exist along roadsides in Mockingbird Valley and other older residential developments. Retention ponds hold water until it can be absorbed in some developments, and neighborhoods such as Stonefield Trace use wetlands to store and filter water. Older neighborhoods in the watershed often demonstrate better stormwater management practices than newer ones in the watershed by using natural methods such as grassy swales. (Barnett 2008).

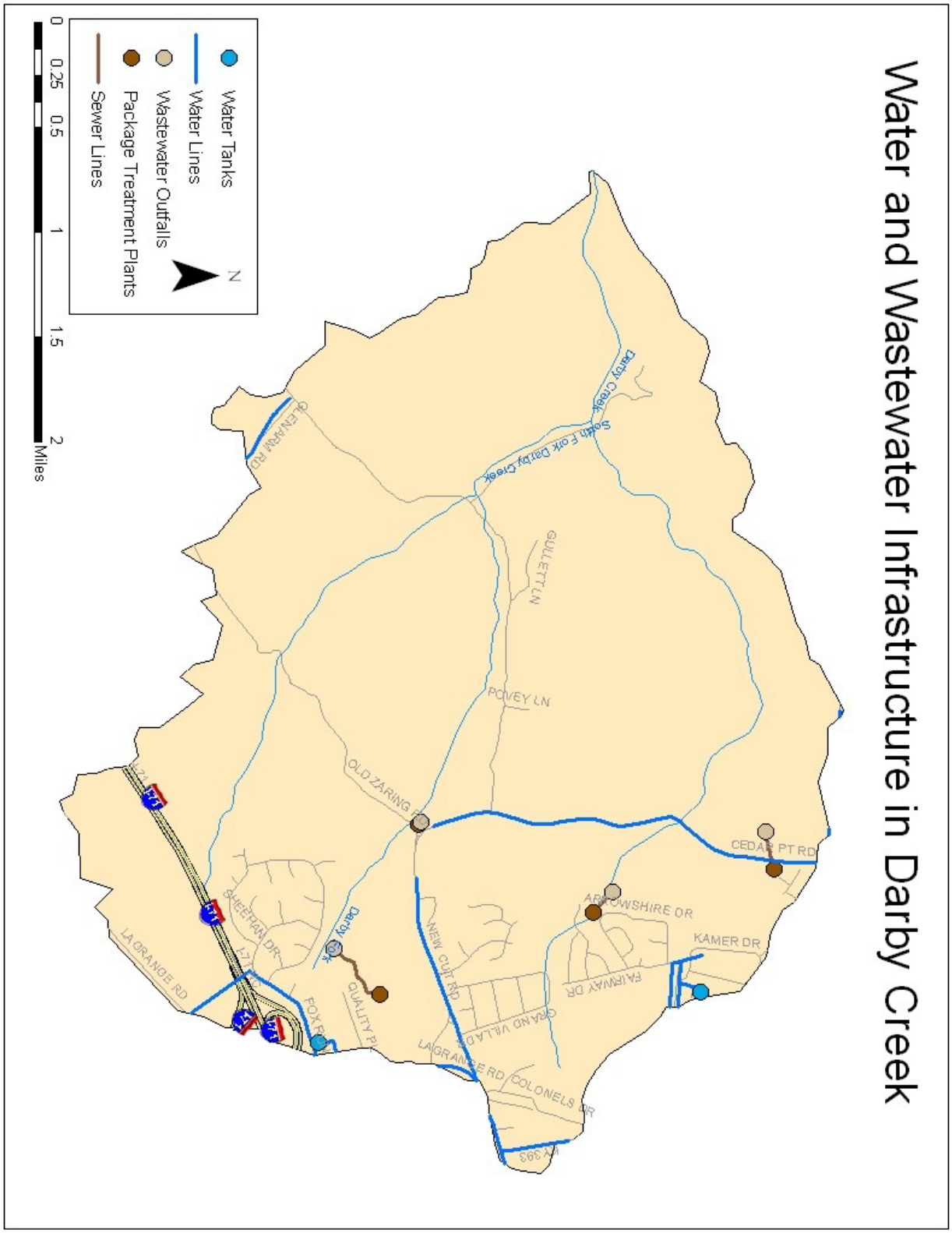
Wetlands

Map 9 shows the hydrologic features of the Darby Creek watershed. Wetlands registered in the National Watershed Inventory are shown in the map. While there is a consistent and scattered pattern of wetlands across the watershed, areas in the suburban corridor where impervious surfaces are more prevalent would see improved performance by expanding the number or size of wetlands in the area.

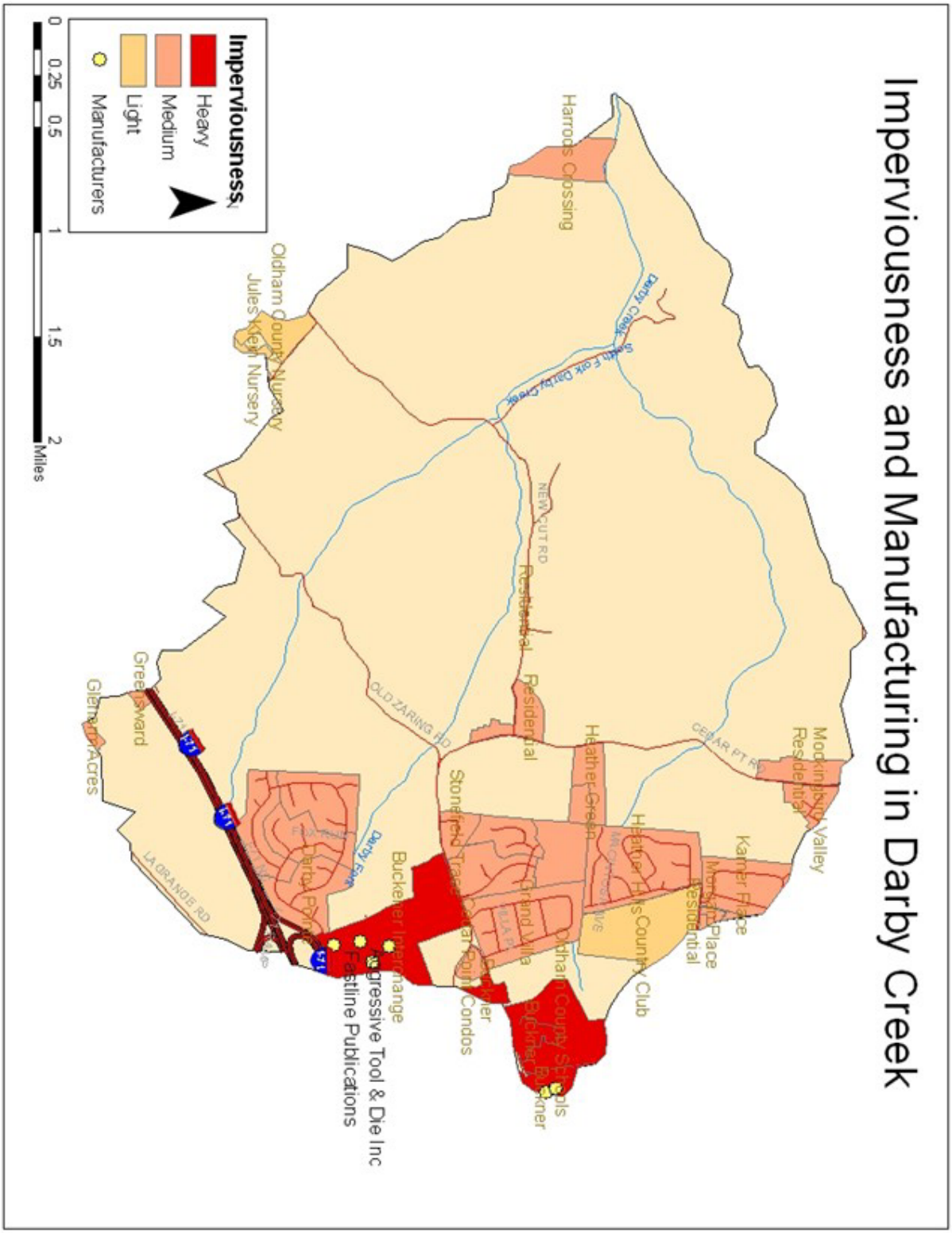
Also shown on Map 9 is the 100-year floodplain and intermittent streams. The floodplain is mainly along the banks of the major streams in the watershed, but has recently seen residential development that puts people and property in harm's way if not properly mitigated. Development in floodplains exacerbates downstream flood conditions by increasing impervious surfaces

Map 10 shows karst features in the watershed. Karst is a form of landscape, typical to Kentucky and some other small areas of the world. Water easily erodes passageways and develops underground caverns and streams in this geologic phenomenon. (Bergman 2003) By its nature, exact locations of karst is difficult to determine, however, areas in which it is more or less have been delineated, and can be seen in Map 10.

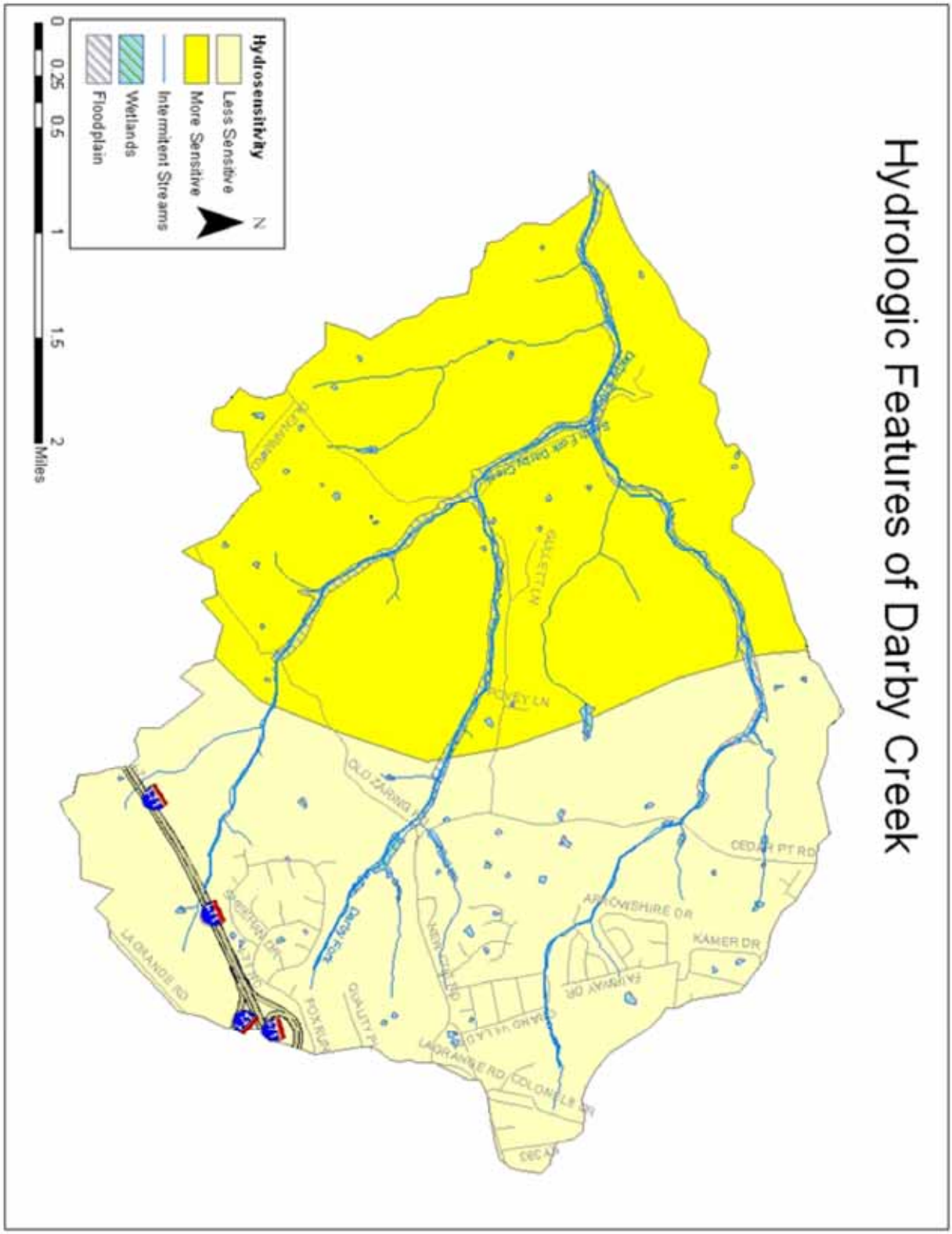
Map 7


Water and Wastewater Infrastructure in Darby Creek
Water Tanks
Water Lines
Wastewater Outfalls
Package Treatment Plants
Sewer Lines
N
0
0.25
0.5
1
1.5
2
Miles
Darby Creek
South Fork Darby Creek
GLENHURI RD
GULLETT LN
POVEY LN
OLD ZARING
CEDAR PT RD
ARROWSHIRE DR
KAMER DR
FAIRWAY DR
NEW CUT RD
GRAND VILLAGE
LAGRANGE RD
COLONELS TR
HY 393
Darby Ck
QUALITY P
FOX RD
SHEEHAN DR
LA GRANGE RD
I-71

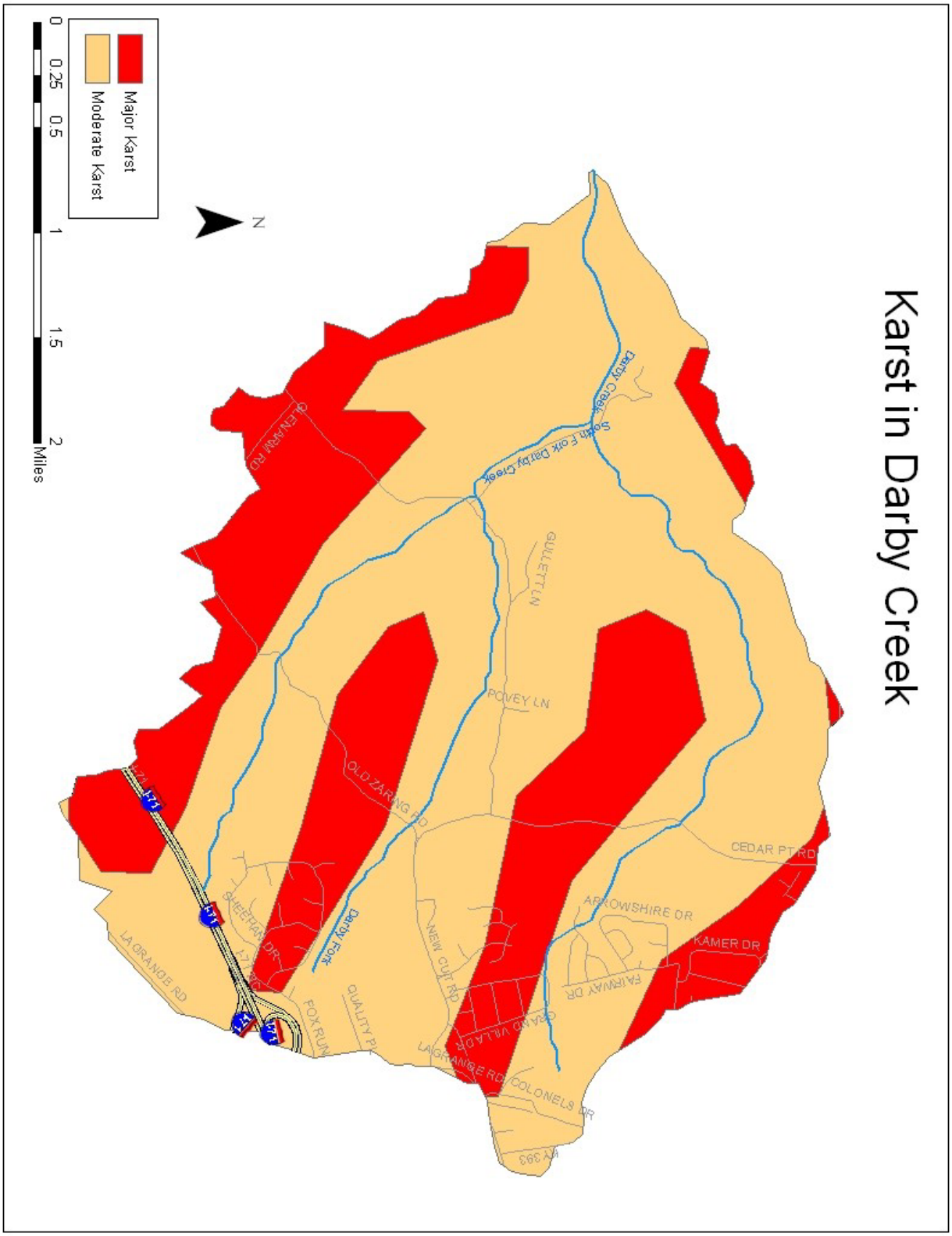
Map 8


Imperviousness and Manufacturing in Darby Creek
Imperviousness
Heavy
Medium
Light
Manufacturers
0 0.25 0.5 1 1.5 2 Miles
Harrods Crossing
Oldham County Nursery
Jules Klein Nursery
Mockingbird Valley Residential
Kamer Place Mobile Home Residential
Heather Hills Country Club
Heather Green
Oldham County Schools
Buckner
Buckner Interchange
Aggressive Tool & Die Inc
Eastline Publications
Stonefield Trace
Cedar Point Condos
Residential
Grand Villa
Darby Creek
South Fork Darby Creek
NEW CUT RD
OLD ZARING RD
CEDAR PT RD
LA GRANGE RD
Greenward
Glenwood Acres
Darby Park
71

Map 9


Hydrologic Features of Darby Creek
Hydrosensitivity
Less Sensitive
More Sensitive
Intermitent Streams
Wetlands
Floodplain
N
0 0.25 0.5 1 1.5 2 Miles
CEDAR PT RD
ARGYLESHIRE DR
KAMER DR
FAIRWAY DR
LA GRANGE RD
COLONEL LN
OLD ZANESVILLE RD
Darby Fork
FOX RUN
QUALITY PL
BRISTOL DR
GALLETTA LN
Darby Creek

Map 10


Karst in Darby Creek
Major Karst
Moderate Karst
0
0.25
0.5
1
1.5
2
Miles
N
Darby Creek
South Fork Darby Creek
GLEN ARM RD
GULETT LN
POVEY LN
OLD ZARING RD
CEDAR PT RD
ARROWSHIRE DR
KAMER DR
FAIRWAY DR
SHEERAN DR
Darby Fork
NEW CUT RD
QUALITY P
FOX RUN
LA GRANGE RD
LAGRANGE RD
COLONELS DR
MT 393

Suburban Corridor

Lined curbs, top, common in newer neighborhoods in the area increase the velocity and decrease the quality of storm water runoff. Grassy swales, top right, in older neighborhoods allow water to sink into the ground. Retention ponds, right, hold water, but wetlands, below, are a more natural and more efficient option.

Suburban Corridor

New construction, top left, of suburban neighborhoods of large houses, top right, increases stormwater runoff in a watershed. Residents desire restaurants and services, right, jobs, next down and civic infrastructure. The large parking lot that accompanies these facilities increase impervious cover.

Agricultural Residential Issues

This landscape nursery, top left, is one of several lawn and landscape farms. Mules, top right, and cows, right, typically have free access to streams despite existing federal incentives for fencing to control access. Building in floodplains requires mitigation measures such as raised elevation, below left, but expansion into the floodplain exacerbates downstream problems.

Wastewater and Water

Package treatment plants, top, are typical of neighborhoods in the area. Rural households typically use septic fields, right. This former cistern, below, may or may not be in use. Most of the area does not have city water, but this landscape nursery, bottom left, is an exception.

Existing Ordinances

Street Width

Section 270-040 (4) restricts the minimum pavement width for road improvements. The ideal pavement width would be between 18 and 22 ft.

Arterial	**24'**
Collector	**22'**
Sub-collector	**20'**
Local	**20'**
Cul-de-sac	**20'**
Cul-de-sac <400	**18'**
Alley	**18'**

There is no ordinance providing that parking lanes are also allowed to serve as traffic lanes (i.e. queuing streets). Nor do either ordinances promote street standards that reduce overall street length.

Right-of-Way Width

Article VII, Section 7.1 of the Subdivision Regulations requires local access streets to have a minimum right-of-way width. The ideal right-of-way is less than 45 feet. The regulations only require a minimum right-of-way of 50 ft. with curb and gutter and 60 ft. without curb and gutter.

Cul-de-Sacs

According to Article VII, Section 7.1 of the Subdivision Regulations, cul-de-sacs must be a minimum of 36' if <1000 feet in length or 46' if >1000 feet in length, however, the ordinances do not address whether a landscaped island can be created in the cul-de-sac terminus.

Curb and Gutters

Section 210-110 sets out the requirement for curb and gutters. Ideally, there would be no requirement for curb and gutters along residential streets. The ordinances require all public streets to have curb and gutters. Additionally, the Subdivision Regulations require curb and gutters in residential subdivisions with average lot frontage of 100 ft. or less. Curb and gutters are not required for open space developments.

Vegetated Open Channels

All public streets are required to have curbs and gutters, pursuant to Section 210.110. Further, the Subdivision Regulations requires curbs and gutters in residential subdivisions with average lot frontage of 100 feet or less. There is no established design criteria in the ordinances for swales which can provide storm water quality treatment. However, the

runoff must be managed by the storm-water management plan approved by the County Engineer.

Parking

Parking Ratios

The minimum parking ration for a professional office building is imposed by Section 280.070 of the ordinances. Section 280.070 also sets out maximum parking ratios for professional office buildings.

Min	1.0 space /	300 sq. ft. of gross floor area
Max	1.0 space/	200 sq. ft. of gross floor area.

Section 280.110 mandates the required parking ratio for shopping centers

<400 sq. ft. leasable area.	Min. 4.0 spaces/1000 sq.ft leasable area.	Max. 4.5 spaces/1000 sq. ft leasable area.
400-600 sq. ft. leasable area.	Min. 4.5 spaces/1000 sq.ft. leasable area.	Max. 5.0 spaces/1000 sq.ft. leasable area.
>600 sq.ft. leasable area.	Min. 5.0 spaces/1000 sq.ft. leasable area.	Max. 6.0 spaces/1000 sq.ft. leasable area.

Section 280.100 imposes the parking ratio for single-family homes which allows only a minimum of 2.0 spaces for each dwelling unit, with no more than 3.0 vehicles allowed to park outdoors. The requirements are set by minimum requirements, not median requirements.

Parking Codes

Section 280.140 permits shared parking as long as set standards are met, however, shared parking is not promoted. Although the ordinances provide no "model" shared parking agreement, Section 280.140 recommends developments with different operating hours consider a shared parking arrangement. The ordinances do not address whether parking ratios are reduced if shared parking arrangements are in place, or whether if mass transit is provided nearby that the parking ratio is reduced.

Parking Lots

Section 280.150 requires that parking stalls for a standard parking space in Oldham County have a minimum width of 9'. The minimum length is 18'. There is no requirement that 30 percent of the spaces at larger commercial parking lots have smaller dimensions for compact cars, however Section 280.150 allows that up to 20 percent of the required spaces be allocated to compact cars.

Structured Parking

There are no incentives to developers to provide parking in garages rather than within surface parking lots.

Parking Lot Runoff

A minimum percentage of a parking lots must be landscaped. Pursuant to Section 300-070, any new lot of more than 6,000 sq. ft. must implement Interior Landscaping Areas. At least 5 sq. ft. of ILA is required for every 100 sq. ft of parking lot area. A Perimeter Landscape Buffer is also required, by 300.050. However, the ordinances do not require landscaping in lots of <6000 sq. ft. Further, the ordinances do not address whether the use of bioretention islands or other storm water practices is im-

posed within the Interior Landscaping Area.

Lot Design

Open Space Design

Section 230.010 sets the regulations for a Planned Unit Development District, which encourages building clustering and preservation of natural resources. Further, land conservation is an objective of the open space of a Planned Unit Development. But, there are no specific open space design ordinances, nor is impervious cover reduction provided as a major goal. Flexible site design criteria are not provided for developers that utilize open space or cluster design options.

Setbacks and Frontages

Section 040.040 imposes a 35' front setback, a rear setback of 30' and a 15' side setback for R-1A (for a ½ acre lot). Section 040.040 also imposes a 100' minimum frontage distance for a ½ acre lot if the lot is connected to a sewer, and a 150' on lots using septic systems.

Sidewalks

Section 230.010 requires that in a development plan a developer must show all sidewalks and their width; there is no minimum sidewalk width imposed in the ordinances. Although Section 230.010 requires that a PUD, in general, shall have a pedestrian orientation and that a developer shall provide sidewalks or trails, there is no requirement that both sides of the street have sidewalks. Section 230.010(a)(7) allows trails, but does not specify whether they can be substituted in the community for sidewalks. The ordinances do not require that the sidewalks are sloped to the yards and not the street.

Driveways

The ordinances do not address a minimum driveway width in a PUD, whether pervious materials can be used for single-family home driveways, whether "two-track" designs are permitted, and whether shared driveways are permitted in residential developments.

Open Space Management

The community has enforceable requirements to establish associations that effectively manage open space, as part of the PUD approval process, in Section 230.070. The ordinances require 250 sq. ft. per dwelling unit in attached single-family structures. The open space areas must be designated in the Master Plan Map in Section 230.070 (a)(2)(C) and open space may be designated for conservation and/or recreational purposes. There is no requirement that open space areas be consolidated into larger units. In Section 230.020, a 20 percent minimum requirement on open space within the community is established, but there is no imposition that the area must be left in its natural condition. Section 030.020 imposes the requirement that to the greatest extent possible existing significant trees shall be preserved and that healthy mature woodlands shall be preserved. However, allowable and unallowable uses for open space in residential developments are not imposed, although 70 percent must be retained as common open space under Section 230.020. Section 230.060(D)(b) allows for the dedication to a third

party or a land trust, as long as the developer provides documentation prior to final Master Plan Map approval.

Rooftop Runoff

The ordinances do not address whether rooftop runoff be discharged to yard areas or whether current grading or drainage requirements allow for temporary storm water ponding on front yards or rooftops.

Natural Areas

Buffer Systems

There is no ordinance for stream buffers. However, there are Property Perimeter Landscape Buffers for most zoning categories, except single-family residential uses. There is no requirement for minimum stream buffers, or an option to expand the buffer to include freshwater wetlands, steep slopes or the 100-year flood plain. There is no stream buffer requirement that at least part of the stream buffer be maintained with native vegetation. There is no stream

buffer ordinance outline for allowable uses within a stream buffer and no specific enforcement and education mechanisms.

Clearing and Grading

Section 300.070 encourages preservation by providing, "Retention of existing vegetation to meet landscaping requirements is strongly encouraged. Single-family detached residential developments should preserve as many trees as possible that do no adversely affect site grading, infrastructure installation and house construction." Whether septic field areas must be cleared of trees at time of development is not addressed.

Tree Conservation

The ordinances do not require that developers must preserve a portion of any stands of specimen or forests that exist on a development. There are limits shown on the construction plans adequate for preventing clearing or natural vegetative cover during construction in Section 300.010, in that if property is required to have a Soil Erosion and Sediment Control Permit, then Section 300.100 (2) prohibits clearing, grading or other land disturbing activities.

Land Conservation Incentives

There are no incentives to developers or landowners to conserve unregulated land (open-space design, density bonuses, storm-water credits or lower property-tax rates.) There is no flexibility to meet regulatory or conservation restrictions (density compensation, buffer averaging, transferable development rights, off-site mitigation) offered to developers.

Storm Water Outfalls

Storm water treatment before discharge is imposed through 05-830-326 Sec 9(1)(b)(iv), by requiring that the discharges do not contain sediment. The ordinances contain design criteria for storm water best management practices in Ord. 05-830-326 Sec 2 (1), Best Management Practices are defined relating to storm water control. 05-830-326 Sec 7(b) (iv) imposes best management practices regarding perimeter control. However, in 05-830-326 Section 10 (5) bb, the SWPP plan itself must only identify "management practices" not "best management

practices." Section 230.060 (D)(1) imposes the requirement that developers must submit a Soil and Erosion Plan concurrently with their Master Plan Map submittal. The ordinances are unclear on whether storm water can be directly discharged into a jurisdictional wetland without pretreatment. Ord. 05-830-326 requires that developers prepare a SWPP for developments of greater that one acre, unless the development is in an exempt category. Ord. 05-830-326 Section 9 (D)(ix) requires that the developer must ensure that detention and retention basins are stabilized, but the ordinance does not address jurisdictional wetlands.

The floodplain management ordinance, KOC 06-360-411, restricts or prohibits development in the 100-year floodplain by imposing a development permit and design build criteria. Section 3 (C) and Section 5.

Problems

While the Darby Creek watershed is in overall good condition, our group identified many problems associated with the watershed. Some of the areas that we have focused on in this report are currently affecting water quality. Other areas have been identified for their potential to cause problems as more development occurs. In this section we have set forth problem areas. The following section provides legal tools to address these concerns and proposed changes to codes and ordinances.

Some problems within the watershed were identified on a site visit to the watershed, led by Russell Barnett. Other problems were identified using the Codes and Ordinances Worksheet provided by the Center for Watershed Integrity. Mapping also gave insight into problematic areas. Additionally, members of our group attended a community roundtable meeting and listened as citizens voiced their concerns, some of which are referred to here.

At a town meeting on February 26, 2008, residents of Oldham County were asked to identify the problems that they felt were affecting the quality of the water in their watershed. They were concerned with many of the problems that we observed and that a review of codes and ordinances brought to light. Their concerns included soil erosion, pollution, flooding, improper uses of the streams, runoff of lawn chemicals, salt and brine, illegal dumps, failing septic systems, stream alterations, increased development and much more. They also expressed a willingness to support efforts to address these concerns.

On a tour of the watershed, we saw beautiful countryside with sloping ridges and clear water gushing down streams lined with trees and vegetation. We saw scattered houses in Dempleytown and new subdivisions juxtaposed with farms. We also saw some of the more damaging features including a number of straight pipes that feed sewage directly into the watershed near Dempleytown on New Cut Road and Illegal dumps dotting the landscape.

There are many natural areas in the Darby Creek watershed. In some areas riparian vegetation lined the stream while in others it was stripped away. Currently there is no ordinance in Oldham County to prevent the stripping of riparian vegetation which serves as a buffer. Buffers are a specific planning tool to protect stream quality and aquatic habitat. They serve as natural boundaries between local waterways and existing or emerging development and help protect streams by filtering pollutants, providing flood control, alleviating streambank erosion,

mitigating stream warming, and providing room for lateral movement of the stream channel.

On our tour we saw livestock grazing near and in streams. Allowing livestock unfettered access to streams affects water quality in many ways. Livestock harm water quality when they consume and trample vegetation in the riparian buffer. Without that vegetation, manure and pesticides from cropland are not filtered and enter the water directly. Livestock also contribute to the erosion of stream banks. Livestock push mud and sediment into streams which clouds the water making it difficult to support aquatic life. (Manure Management Choices, USDA Natural Resources Conservation Service, University of Wisconsin – Extension, Wisconsin Department of Natural Resources, Wisconsin Department of Agriculture, Trade & Consumer Protection available at http://clean-water.uwex.edu/pubs/pdf/farm.himanure.pdf)

The Darby Creek Watershed is threatened by the presence of e.coli, fecal coli form. Enforcement of maintenance agreements for the package treatment plants and the septic systems can help curb e.coli and fecal coli form contamination (Barnett 2008).

One problem that we noticed in subdivisions was the lack of natural vegetation at many of the sites. It appears that lots are stripped of vegetation prior to construction. There is currently no requirement that developers preserve natural vegetation, although it is encouraged. This includes trees as well as other types of vegetation. Many lawns are sod, which is semi-impervious.

In most subdivisions in the watershed there are problems with storm water runoff due to the increase of impervious surfaces. Impervious surfaces are land cover that water cannot penetrate and thus prevents the natural filtration of water through the soil. This increases the quantity and velocity of runoff and the kinds and amounts of pollutants that are carried into streams. (Clean-Water and Land Us: Connecting Scale and Function. Craig Anthony (Tony) Arnold, 2006 at 295).

Using the Codes and Ordinances Worksheet, our group identified several subject areas concerning streets and parking that are not in accordance with

best practices identified by the Center for Watershed Protection. One problem with streets that our group identified was a greater than necessary right of way width. It is recommended that local access streets have a minimum width of less than 45 feet. Oldham County has a required minimum of 50 feet. Narrow streets minimize impervious surfaces.

The minimum radius of cul-de-sacs is larger than that recommended by the Center for Watershed Protection. If possible, developers should create landscaped islands in cul-de-sacs to increase pervious surfaces. A landscaped island was observed in one subdivision. However, the island was elevated and blocked off by curbs. Thus, the island would have to be watered manually while storm water would be channeled into a storm gutter. The vegetation identified on the island was not native to this area, and is thus less drought resistant and may require additional watering.

Curbs and gutters are required on all public streets. Curbs and gutters are also required in resi-

dential subdivisions with average lot frontage of 100 feet or less. Curbs are problematic to water quality. During rain showers and storms, curbs keep water in the roadways instead of permitting the water to filter though natural surfaces. Preventing water from reaching lawns and grass reduces the opportunity for water filtration and increases storm water runoff.

Oldham County has greater front, rear and side set backs than are recommended by the Center for Watershed protection. The Center recommends that front set backs have a minimum requirement of 20 feet or less, rear set backs have a minimum of 25 feet and side a minimum of eight. Oldham County's minimum requirements are 35, 30 and 15 respectively. One of the many reasons that setbacks are important is because soil is intrinsically weak. When soil is exposed to slopes, such as along riverbanks, bank slumping can naturally occur. These soils can become even weaker upon the artificial

addition of water, such as from lawn watering or septic systems, causing the rate of bank slumping to greatly accelerate. Such slumping can create very harmful and expensive problems.

With regard to open space management, the Center recommends that a percentage be set that reflects a minimum amount of open space that is to be maintained in its natural condition. Oldham County does not have such a standard in their code. Setting aside open space is important because open spaces provide habitat for animals and plants as well as passive recreational areas for residents, also providing relief from urbanization.

Currently, there seems to be no codes or ordinances that address roof top runoff. Roof top runoff control measures are described as modifications to conventional building design that retard runoff originating from roofs. The modifications include vegetated roof covers, roof gardens, vegetated building facades, and roof ponding areas. Roofs are one of the most important sources of concentrated runoff from developed sites. If runoff is retarded at the source, the size of other BMPs throughout the site can generally be significantly reduced in size. Rooftop runoff management effectively decreases the timing and concentration of runoff derived from roofs, delaying runoff peaks and lowering runoff discharge rates. The primary advantage of managing runoff from rooftops is to disconnect impervious surfaces, reducing the effective impervious cover in a watershed. Many of the impacts of urbanization on the habitat and water quality of streams are related to the fundamental change in hydrologic cycle caused by the increase of impervious cover.

Intermittent streams, floodplains and wetlands are essential water storage and filtration elements in a healthy watershed. Development that modifies or removes these elements can threaten water quality and exacerbate flood losses.

Recommendations

Watershed Protection Toolkit

There are several basic tools that can be used to protect watersheds in a wide variety of settings, from pristine rural areas to impacted urban settings. The conditions in the Darby Creek watershed include mostly agricultural uses, limited large lot development, and suburban development pressure in a traditional zoning scheme. Given those conditions, we have selected certain planning and legal tools that should be particularly effective in this environment. For example, the institution of aquatic buffers along Darby Creek and its tributary streams would likely be of immediate and lasting benefit to the health of the watershed. However, the creation of an urban growth boundary would seem to be somewhat politically infeasible and possibly unnecessary.

The following watershed protection toolkit for the Darby Creek watershed consists of recommendations that consider the area's currents land uses, environmental issues, development climate, and current political and regulatory climate. The tools generally are predicated on the goals limiting new impervious surfaces, making current land uses more pervious for groundwater recharge, and limiting current and future uses that pollute the water through human waste, agricultural waste, and erosion.

- **Aquatic Buffer Overlay Zone**

A common practice to protect the water quality of a stream and to prevent erosion along its banks is the creation of an aquatic buffer. Such a buffer protects the integrity of a stream by filtering stormwater, enhancing groundwater recharge, and stabilizing stream banks to avoid erosion. The bioremediation of buffers generally reduces oxidation levels in streams, allowing for healthier biological communities.

Aquatic buffers can be instituted either with a jurisdiction-wide ordinance or an overlay zone that applies strictly to applicable watershed. We believe that an aquatic buffer overlay zone would be most effective for the Darby Creek watershed. The overlay zone would protected the integrity of the watershed without having the political problems of passing a buffer ordinance for all of Oldham County.

Aquatic buffers often have three areas with varying levels of protection. There is often a streamside zone, a middle zone, and an outer zone, each allowing progressively more intensive but limited uses. (www.epa.gov, Watershed Academy Web). However, for Darby Creek, we recommend only a streamside zone of 25 feet that strictly limits the cutting of riparian trees and a recreational zone of

25 feet that can include hiking trails.

In addition we recommend a buffer of 15 feet to protect riparian forest along intermittent stream tributaries of Darby Creek and its branches. Such an overlay zone would otherwise not impact the existing zoning in the area.

- **Transfer of Development Rights**

In 2002, the Kentucky Legislature created enabling legislation for city and county governments to create TDR ordinances. (Kentucky Revised Statutes 100.208). TDR programs allow development rights to be severed and transferred to areas that are more appropriate for development, because of existing sewer, water, and other infrastructure. The program promotes smart growth and prevents sprawling development in environmentally sensitive areas.

Because the Darby Creek watershed is an environmentally sensitive area, an Oldham County TDR program should designate properties in the watershed and allow their development rights to be transferred to areas of Buckner that are out of the watershed. Under the Kentucky statute, Darby Creek would be designated as a "sending area" and Buckner or some other appropriate urban area as a "receiving area."

- **Low-Impact Development**

We recommend that Oldham County change its subdivision regulations to require low impact development practices in new subdivisions to protect and enhance green infrastructure. Low-impact development is an urban design theory that attempts to limit impervious surfaces in new developments. This allows stormwater to recharge more easily to groundwater aquifers, cleansing the water and reducing erosive stream flooding during storm events.

The Oldham County subdivision regulations should require that trees on the property be retained when feasible. Development should be allowed to cluster in higher densities to preserve environmentally sensitive areas as open space. Forest along intermittent streams in the Darby Creek watershed would be preserved under such new regulations. The regulations should also limit the size of roads,

sidewalks, and cul-de-sacs, which contribute greatly to total imperviousness. Grassy swales should be used instead of concrete curbs to convey stormwater runoff from roads and sidewalks. Finally, the regulations should require the use of indigenous vegetation that decreases stormwater and cleanses it. These few design changes could greatly decrease imperviousness ratios in new Oldham County subdivision developments.

- **Conservation Easements**

We recommend that Oldham County create a conservation easement bank or work with a local land trust to increase the purchase of easements in environmentally sensitive areas such as the Darby Creek watershed. While the creation of an overlay zone, TDR program, and changes in subdivision regulations are likely to benefit the Darby Creek area, easements are the surest method to protect the Darby Creek watershed. In a conservation easement, the property owner transfers his right to develop the property to a governmental entity or a third party, such as the Nature Conservancy. Property adjacent to active or intermittent streams

should be the focus of such a program.

Ordinance Changes

- **Vegetated Buffers on Streets**

Use plants native to Kentucky as part of the design criteria. Amend Section 210-110 to strike the requirement for curbs and gutters.

- **Parking**

Revise parking ratios to provide for parking ratio maximums and medians, and take into consideration

shared-parking agreements and the proximity of mass transit.

Promote shared parking; a shared parking agreement can be accomplished using a model shared parking agreement during the development process.

See Appendix A for a model "Shared Use Agreement for Parking Facilities."

- **Parking Lots**

Revise ordinance to allow for smaller dimensions for 30 percent of a new parking lot to be reserved for compact cars.

- **Structured Parking**

Although there are no incentives to encourage structured garage parking, a proposed ordinance change on this issue would not reflect the present parking needs of Oldham County.

- **Use of Bioretention Islands to Address Parking Lot Runoff**

Suggest bioretention islands in parking lot site plan design criteria. Ensure long-term maintenance by including deed restrictions or covenants for privately-owned bioretention cells. Make sure that the design criteria do no include curbs. Encourage use of plants native to Kentucky in bioretention islands.

- **Lot Design**

Amend ordinances to provide that the reduction of impervious cover is a major goal. Provide flexible site design criteria to developers who propose open space or cluster design developments. Encourage use of native plants and native grasses in landscape design.

- **Sidewalks**

Amend ordinance to provide:

A) All sidewalks or portions thereof hereafter constructed or repaired shall comply with the following specifications:

1. All sidewalks shall be constructed to the grade established by existing adjoining walks, or in the absence of the foregoing, the County Engineer, and shall be paved. Paving bricks may be substituted at the discretion of the county. Sidewalks should be sloped toward the yard and not the street.

2. All sidewalks shall be at least 4 feet in width. Wider walks to a maximum of 8 feet may be required by the County in commercial or industrial areas or multi-family areas, due to anticipated traffic and the development of the area.

- **Driveways**

(a) All motor vehicle access driveway aprons shall be surfaced with an approved type of concrete or asphalt pavement or similar structural course such as bricks, or decorative pavers or turf blocks, and shall extend to the curb when curbing is installed or to the curb line of the street where no such curbing

exists. The apron driveway depth shall be a minimum of 10 feet from the edge of the street or to the curve radius return, whichever is greater.

(b) Wood-chip driveways and other non-asphaltic or non-concrete driveways are expressly prohibited in nonresidential areas. In residential areas, after the minimum apron depth as defined in section (a) above, alternative solid or stabilized porous materials may be used, as approved by the city manager.

(c) The proposed driveway shall not create more than 50 percent impervious area within the right-of-way.

Modified from Proposed Ordinance No. 2007-xx City of Neptune Beach, Florida.

Rooftop Runoff and Yard Temporary Ponding

- **Gutters on homes**

Use design criteria to encourage use of rain barrels and other temporary ponding of rooftop runoff.

- **Stream, River and Lake Buffers**

Any new lot which contains or has any portion of its boundaries adjacent to any perennial stream shall incorporate a 50-foot natural buffer along the entire length of the stream's banks contained within or adjacent to the lot. The interior edge of the buffer shall duplicate the course and direction of the Project Boundary, or the top of the bank of the stream, whichever applies. The distance of the interior edge of the buffer shall be measured horizontally, such that at any point along the interior edge a horizontal line would be exactly 50 feet from a vertical line extending up from the Project Boundary or the top of the bank of the stream channel.

Disturbance of the existing terrain, or removal of existing vegetation within the buffer shall not be allowed, except as specifically provided below. This includes any disturbance or removal of topsoil, trees and other natural growth located in the buffers. Trees within the buffer that are less than 4 inches DBH, may be removed, provided that the same is done using only manual labor and hand or chain saws, and not mechanical equipment. Additionally, any trees that are dead or have become diseased or damaged through natural processes may be removed in the same manner. No motorized vehicles or construction equipment, other than chain saws or similar hand operated machines, are permitted within the buffer, except as specified below.

A limited number of trees within the buffer may be removed to provide an access corridor to the Project Boundary for the purposes of installing shoreline stabilization and water-dependent structures, removing large debris or previously existing structures, or installing paths, boardwalks or stairs to access water-dependent structures. This corridor shall not exceed 15 feet in width, and shall not constitute an area greater than one-fifth of the total buffer area required on each lot. Vehicular equipment may be operated in this access corridor, and the natural terrain may be disturbed only to the extent required to safely operate such equipment. The resulting terrain should be immediately stabilized and revegetated with shrubs, low-growing trees and other natural ground cover plantings after such disturbance, and

should closely match the existing terrain on either side of the access corridor. When this access corridor is used for the installation of paths, boardwalks

or stairs leading to the Project Boundary, such structures shall not exceed 4 feet in width.

Tree removal within buffers bordering the Project Boundary, for the purpose of creating view corridors of lakes or rivers is allowed, provided that such removal shall not exceed 15 feet in width and constitute an area greater than one-fifth of the total buffer area required on each lot. Any tree removal shall be manually performed using hand or chain saws, and no other disturbance of the natural terrain is permitted. Any opening created under this provision shall be subsequently stabilized and improved with

shrubs, low growing trees or other natural ground cover plantings.

Underbrush (defined as nuisance shrubs, vines, and similar plant growth beneath the tree canopy, and generally growing less than 6 feet in height) may be removed within the buffer, provided that such work is performed manually and without the use of vehicular or mechanical equipment. This activity may also include removal of any natural or man made debris lying on or near the floor of the buffers.

Pruning and trimming of trees within the buffer is permitted, provided that pruning shall be limited to tree branches beginning at the ground and extending up the trunk no more than one half of the total height of the tree. Trimming or pruning also may be performed on any limbs or branches that are diseased or naturally damaged. No topping of trees is permitted within buffer.

- **Buffer Requirements for Rivers, Lakes and Streams**

Include developer incentives to remediate stream buffers in areas in which there is presently no existing stream buffer in place. Stream buffers and vegetation buffers are the most important way to protect hydrologic health of the creek. The trees in the buffer filter storm water, and protect the temperature of the creek, making it cooler.

See Appendix A for model - CONSERVATION SUBDIVISION/OPEN SPACE DEVELOPMENT ORDINANCE

- **Open Space Requirements for Existing Ordinance**

A portion of all development falling under these regulations shall be set aside as undisturbed permanent open space for public use. The developer is strongly urged to set aside natural areas that will allow for connectivity to adjacent properties. The proportion of the area to be set aside for open space is defined as follows:

⇒ Projects within Municipalities – Five percent of the project area

⇒ Projects in Developed Areas outside of Municipalities* – 10 percent of the project area

⇒ Projects in Rural Areas* — 15 percent of the project area

*Designation to be based upon a map developed by the locality.

Source: *http://www.scdhec.gov/environment/baq/docs/ModelOrdinances/ OpenSpaceRequirements-WordingforExistingOrdinance.pdf*

- **Clearing and Grading**

Add to the ordinance:

The area within the protective barricade shall remain free of all building materials, stockpiled soil or other construction debris. Construction traffic, storage of vehicles and materials, and grading shall not take place within the protective areas of the existing trees. Barricades shall be erected at a recommended

minimum distance from the base of protected trees according to the following standards:

a. For trees 10 inches or less diameter at breast height (DBH): Protective barricades shall be placed a minimum distance of 10 feet from the base of each protected tree, or outside the drip-line, whichever is greater.

b. For trees greater than 10 inches DBH: Protective barricades shall be placed at a minimum distance equal to 10 feet from the base of a protected tree plus an additional 1 foot for each additional 1 inch DBH, or outside the dripline, whichever is greater.

- **Relating to installation of septic fields and tree removal**

Add to ordinance:

Where no other alternative exists for the placement of a septic field but in the vicinity of an existing tree, the developer may remove the tree.

Modified from http://www.tentowns.org/10t/ordtreer.htm (Ten Towns, Great Swamp Watershed Management Committee).

The disposal of human wastewater within the Darby Creek watershed imposes pollutant pressure on Darby Creek. In the Dempleyville Community, straight sewer pipes output unfiltered human waste into Darby Creek. Other sewer septic systems built and installed by homeowners are not subject to government testing as to whether the filtration is adequate to protect Darby Creek's water quality. Some subdivisions put in septic fields individually, but this is for homes located on more than a one-acre lot (per Section 330-060 of Zoning Ordinances), thus many subdivisions with greater density install private sewage treatment plants, but the long term maintenance of the sewage treatment plants is not imposed through the ordinances. Further, to install sanitary sewer systems for the Darby Creek area

would be very costly.

- **Suggestions**

Obtain funding to allow and encourage individuals with septic fields to test the integrity of their septic fields and leaching systems.

For an example of the compliance timelines that the State of Minnesota used to address the issue, see http://proteus.pca.state.mn.us/publications/wq-wwists2-38.pdf. The Minnesota legislature also amended its statutes to allow greater local government ability to assess fines against non-compliant homeowners.

Individual subdivision private sewage treatment plants: For ongoing development, obtain information from a maintenance association on the long term costs of maintaining, repairing and replacing the private sewage treatment plants. Require developers to impose long term cost on a Homeowner's Association for the subdivision through the Subdivision Provisions of Section 230-060(D).

- **Landscaping and Tree Preservation**

Previous to any construction activity, an Environmental Inventory shall be conducted to identify existing trees and vegetation that shall remain undisturbed during construction.

- **Preservation of Existing Vegetation**

The existing vegetation shall be preserved whenever feasible. The decision to preserve trees shown

on the environmental inventory shall be made jointly by the Planning Director, developer and design team during the project approval process.

When selecting which trees to preserve, the following shall be considered:

- existing and proposed grading; age, condition and type of tree; and location of site improvements and utility connections.

Trenching, placing backfill in the critical root zone (CRZ), driving or parking equipment in the CRZ, and dumping of trash, oil, paint or other materials detrimental to plant health in close proximity of the trees to be preserved is prohibited.

Should any tree designated for preservation in the landscape plan die, the owner shall replace it within 180 days with landscaping equal to what would be required in this ordinance.

- **Land Conservation Issues**

Amend density calculations in ordinance to allow for the calculation of net buildable area gives credit for the land area in dedicated conserved areas. This is intended to serve as a density incentive.

Modified from: http://www.planning.org/smartgrowthcodes/pdf/section47.pdf

- **Storm Water Outfalls**

Amend ordinance 05-830-326 to impose best management practices on developer during SWPP process.

Amend ordinance to add:

Storm water shall undergo pretreatment to prevent silt, debris and chemical pollutants from entering the wetland. Pre-treatment measures may include sedimentation basins, vegetated swales and buffer strips. Riprap made of natural rock may be used only where vegetation cannot control erosion. Storm drains may not discharge directly into a wetland. Lining of swales with paving materials shall not be permitted.

http://www.angelfire.com/in4/earthpages/indianawetlands.html

Amend ordinance Ord. 05-830-326 to provide that in lieu of retention and detention basins, the developer may use filtration basins.

Case Studies

Olympia, Oregon

The City of Olympia, in conjunction with Thurston County, enacted innovative policies to better protect its watershed. The plan of the Olympia City Council and the Thurston County Commission focused on the small area of Green Cove Creek, a 2,600-acre watershed that has low impervious cover, good forest cover, good in-stream conditions, and good water quality. In these ways, the Green Cove Creek watershed is similar to the Darby Creek watershed. One major difference between the two watersheds is that in the Green Cove Creek watershed, several subdivisions already have been planned, and thus, the area is expecting immediate rapid growth. A professional consultant group researched the area and suggested guidelines for development, including maintaining the natural hydrologic condition of the watershed, maintaining at least 60 percent vegetation, minimizing the number of variances or regulatory changes, minimizing impervious surfaces, maintaining urban level for emergency vehicle access, producing a marketable development, and maximizing single-family homes. In order to maintain the quality of the watershed, the planning commission decided to amend the city and county codes to accommodate subdivision development while protecting natural hydrologic features. Since only part of the Green Cove Creek watershed is within the Olympia city limits, the goal to protect

it became a coordinated effort between the city and county governments.

The amendments for the urban growth areas were wide ranging. The city ordinances attempted to avoid development in sensitive areas, while providing for higher density development in less sensitive areas. In this way, a similar number of units were permitted, but they were more consolidated than they would have been if the city had mandated lower densities. In addition, the ordinance changes limited the impervious cover for each of the lots and allowed sidewalks and parking lots to be constructed with porous materials, as well as limiting the width of streets. Duplexes and other multi-unit facilities also were permitted, whereas the zoning laws normally would have excluded these types of dwellings. Changes to the drainage ordinances included limiting the discharge durations from newly developed sites to pre-development durations in an attempt to retain the natural flow rate of runoff. The clearing of land or grading was limited to the dry seasons only.

The county ordinances resembled the city ordinances in many ways, but allowed for lower density development in urban growth areas. In more sensitive areas, such as along the creek, development was limited to one unit for every five acres. In all. urban growth areas, 60 percent of each site was required to be maintained as open space for which the existing vegetation must be preserved. The county commission would later consider whether to offer incentives to small property owners who maintain native tree growth on 60 percent of their properties. However, the open space provisions did not apply to areas outside urban growth areas, but the commission hopes to consider such a provision in the future.

The City of Olympia Water Resources staff, the authors of the study, consider the amendments to be successful. Although no new developments have arisen since the amendments passage, the city government was able to cooperate with the county government. Additionally, the project was aimed at a site that was not yet developed but which probably will be soon. The project incorporated many third parties and based conclusions on scientific evidence. It thoroughly documented the need for preserving the watershed, its model assumed that the process would be lengthy, it encouraged the governments to adopt interim measures while the research was conducted, and it approached all changes by asking if the amendments would be feasible in the community. However, though there were successes, the Water Resources staff admitted there were also some flaws. The staff noted that the process would have been more productive had they attempted to address the problem in an even less-developed area, and that they should have included more interaction with the public when making policy decisions.

The Green Cove Creek watershed project can serve as a model for the future development of the Darby Creek watershed. The Darby Creek watershed is relatively undeveloped, some scientific studies have documented the need for preserving the quality of the watershed, and the community is already involved. The Green Cove Creek project offers a model for reducing impervious surfaces, increasing

drainage efficiency, limiting development to certain areas by zoning more high density units, and maintaining vegetative cover. The Darby Creek watershed could greatly benefit by implementing some of these strategies, designed in such a way as to benefit the uniqueness of its terrain, drainage needs, and community wants.

Cuyahoga County, Ohio

The Euclid Creek Watershed is located in northern Ohio and is considered to be part of the larger ecosystem of Lake Erie. While the Darby Creek watershed largely lies within an area where the land uses are residential and agricultural, the Euclid Creek Watershed is found within an area that is far more urbanized. This watershed's main problems consist of flooding, water quality, and stream alteration. Although the Darby Creek Watershed varies greatly from the Euclid Creek Watershed, much information can be gleaned from The Euclid Creek Watershed Planning Guide that was developed by the Cuyahoga County Planning Commission in 2005. Of particular interest is the conservation planning techniques the Cuyahoga County planners have decided to use in the preservation of the Euclid Creek Watershed.

The primary technique the Cuyahoga County planners are using in the preservation of the Euclid Creek Watershed is the use of conservation planning. In conservation planning, tracts of land are set aside voluntarily by homeowners so that they may be preserved without development. Generally, these tracts of land are environmentally fragile or significant in some way that would require special care. While it may seem implausible for homeowners to willingly donate their land so that it can not be developed, there are benefits for the homeowner. First and foremost, by preserving land around residential areas, home values will generally rise with the preserved green spaces. Also, these green spaces can serve as recreation areas for local residents. Finally, many residents are aware of ecological concerns and may be persuaded to donate their land to a cause that helps preserve local water resources.

In the Euclid Creek Watershed, the Cuyahoga County planners proposed that in using conservation planning, many of the needs for the preservation of the watershed could be met. The method the planners used to enact conservation planning was integral to its success. One of the key components

that the planners used in selling the conservation plan was that the homeowners would retain ownership of the donated land, but the land would be under the care of a conservation organization. This means that the homeowners would not be losing any of their land technically, but would still be able to participate in the watershed's conservation. Planners in Cuyahoga County also developed a plan to use the conserved area to create a walking path that would allow for recreation for the local residents. This would also be a very low impact use of the land so that the effects of the conservation would not be negated by its use. Finally, the planners in Cuyahoga County have worked diligently to include the residents in the Euclid Creek Watershed area in the planning of the watershed. Planners established a plan and a timeline to not only identify the potential homeowners affected by the conservation plan, but also to educate them and provide them with incentives to participate in this undertaking. The planners also educated public officials in conservation plan-

ning so that everyone would have the same information and hopefully get on board.

While Euclid Creek and Darby Creek are at completely different places in their development, many ideas from Euclid Creek can be applied to Darby Creek. In fact, it may be easier to apply these ideas to Darby Creek as Darby Creek is less developed, and it may be possible to proactively apply some of these ideas rather than apply them to already existing homeowners. Conservation planning, as demonstrated by the Euclid Creek Watershed and the Cuyahoga County planners, is an effective way to help control a watershed's development and ensure that the watershed remains viable for future generations.

All information in this case study is directly from The Euclid Creek Watershed Planning Guide: A Vision for the Watershed which was developed by the Cuyahoga County Planners in 2005 and can be found at the Web site

http://planning.co.cuyahoga.oh.us/euclidcreek/

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Appendix A: Model Ordinances

MODEL TRANSFER OF DEVELOPMENT RIGHTS (TDR) ORDINANCE

The model ordinance below establishes a general framework for severing development rights involving net density and intensity (through FARs) from a sending parcel and transferring them to a receiving parcel. Section 101 of the ordinance authorizes a transfer of development rights (TDR) for a variety of purposes, including environmental protection, open space preservation, and historic preservation, which are the most typical. Under Section 104, the local government has two options in setting up the TDR program. The first involves the use of overlay districts, which would zone specific areas as sending and receiving parcels. The second involves identifying which zoning districts would be sending and receiving districts in the text of the ordinance itself, rather than through a separate amendment to the zoning ordinance. In both cases, the designations must be consistent with the comprehensive plan. Section 105 of the ordinance contains a table that shows, by use district, the permitted maximum increases in density and FAR that can be brought about through TDR. Section 106 outlines a process by which the zoning administrator would determine the specific number of development rights for a sending parcel in terms of dwelling units per net acre or square feet of nonresidential floor area (for commercial and industrial parcels) and issue a certificate to the transferor. Sections 107 and 108 describe the instruments by which the development rights are legally severed from the sending parcel through instruments of transfer and attached to the receiving parcel. Section 107 describes how the applicant for a subdivision or other type of development permit would formally seek the use of development rights in a development project (e.g., a subdivision). Note that the transfer would not apply to rezonings, but only to specific projects where a development permit is going to be issued in order that development may commence. Commentary to the ordinance describes, in Section 109, a development rights bank, a mechanism by which the local government purchases development rights before they are applied to receiving parcels, retains them permanently in order to prevent development, or sells them as appropriate in order to make a profit or direct development of a certain character to a specific area. Whether this is an appropriate role for local government or should be left to nonprofit organizations (e.g., land trusts) is matter for local discussion and debate. No ordinance language is provided, although the description in the commentary should be sufficient for local government officials to draft language establishing the bank.

Primary Smart Growth Principle Addressed: Preserve open space and farmland

Secondary Smart Growth Principle Addressed: Direct development towards existing communities

101. Purposes

The purposes of this ordinance are to:

(a) preserve open space, scenic views, critical and sensitive areas, and natural hazard areas;

(b) conserve agriculture and forestry uses of land;

(c) protect lands and structures of aesthetic, architectural, and historic significance;

(d) retain open areas in which healthful outdoor recreation can occur;

(e) implement the comprehensive plan;

(f) ensure that the owners of preserved, conserved, or protected land may make reasonable use of their property rights by transferring their right to develop to eligible zones;

(g) provide a mechanism whereby development rights may be reliably transferred; and

(h) ensure that development rights are transferred to properties in areas or districts that have adequate com-

ing district may be used.

"**Receiving Parcel**" means a parcel of land in the receiving district that is the subject of a transfer of development rights, where the owner of the parcel is receiving development rights, directly or by intermediate transfers, from a sending parcel, and on which increased density and/or intensity is allowed by reason of the transfer of development rights;

"**Sending District**" means one or more districts in which the development rights of parcels in the district may be designated for use in one or more receiving districts;

"**Sending Parcel**" means a parcel of land in the sending district that is the subject of a transfer of development rights, where the owner of the parcel is conveying development rights of the parcel, and on which those rights so conveyed are extinguished and may not be used by reason of the transfer of development rights; and

"**Transfer of Development Rights**" means the procedure prescribed by this ordinance whereby the owner of a parcel in the sending district may convey development rights to the

owner of a parcel in the receiving district or other person or entity, whereby the development rights so conveyed are extinguished on the sending parcel and may be exercised on the receiving parcel in addition to the development rights already existing regarding that parcel or may be held by the receiving person or entity.

Comment: *This definition recognizes that development rights may be sold to an entity (e.g., the local government or a nonprofit organization) that will hold them indefinitely.*

"Transferee" means the person or legal entity, including a person or legal entity that owns property in a receiving district, who purchases the development rights.

"Transferor" means the landowner of a parcel in a sending district.

104. Establishment of Sending and Receiving Districts.

[***Alternative 1: Amend the zoning map using overlays***]

(1) The [local legislative body] may establish sending and receiving districts as overlays to the zoning district map by ordinance in the manner of zoning district amendments. The [planning director] shall cause the official zoning district map to be amended by overlay districts to the affected properties. The designation "TDR-S" shall be the title of the overlay for a sending district, and the designation "TDR-R" shall be the title of the overlay for a receiving district.

Comment: *When a zoning map is amended, one practice is to list the ordinance number and the enactment date in a box on the map, along with the signatures of the planning director and the clerk of the local legislative body (e.g., the clerk of council). This allows for an easy reference if there should be any later questions about whether the map amendment accurately reflects the legal description in the ordinance.*

(2) Sending and receiving districts established pursuant to Paragraph (1) shall be consistent with the local comprehensive plan.

[*Alternative 2—Specify zoning districts that can serve as sending and receiving districts*]

(1) The following zoning districts shall be sending districts for the purposes of the transfer of development rights program:

[*list names of districts*]

(2) The following zoning districts shall be receiving districts for the purposes of the transfer of development rights program:

Section 4.6 Model Transfer of Development Rights (TDR) Ordinance *Model Smart Land Development Regulations* Interim PAS Report, © American Planning Association, March 2006 4

[*list names of districts*]

Comment: *Since the sending and receiving districts are being established as part of the ordinance rather than through separate overlays, the local government would need to make a declaration of consistency with the comprehensive plan for such districts as part of the enactment of these two paragraphs.*

105. Right to Transfer Development Rights

(1) Each transferor shall have the right to sever all or a portion of the rights to develop from the parcel in a sending district and to sell, trade, or barter all or a portion of those rights to a transferee consistent with the purposes of Section 101 above .

(2) The transferee may retire the rights, resell them, or apply them to property in a receiving district in order to obtain approval for development at a density or intensity of use greater than would otherwise be allowed on the land, up to the maximum density or intensity indicated in Table 1.

Maximum Density and Intensity Allowed in Zoning Districts through Transfer of Development Rights (TDR)

Note: District names, densities, and intensities are hypothetical examples only.

Zoning District Title	Maximum Density in Dwelling Units Per Net Acre	Maximum Intensity in Floor Area Ratio	Maximum Density with TDR	Maximum Intensity in Floor Area Ratio with TDR
R-1	4		8	
R-2	8		16	
R-3	16		32	
C-1		0.2		0.4
C-2		1.0		2.0
C-3		2.0		4.0
C-4		4.0		8.0
I-1		0.75		1.5

(3) Any transfer of development rights pursuant to this ordinance authorizes only an increase in maximum density or maximum floor area ratio and shall not alter or waive the development standards of the receiving district, including standards for floodplains, wetlands, and [*other environmentally sensitive areas*]. Nor shall it allow a use otherwise prohibited in a receiving district.

Comment: *In some cases, it may be desirable to allow the transfer of the right to additional impervious surface coverage on a site. For example, if a certain zoning district limits the amount of surface parking by a maximum impervious surface parking ratio and additional parking is needed, Table 1 should be amended to authorize this.*

106. Determination of Development Rights; Issuance of Certificate

(1) The [zoning administrator] shall be responsible for:

(a) determining, upon application by a transferor, the development rights that may be transferred from a property in a sending district to a property in a receiving district and issuing a transfer of development rights certificate upon application by the transferor.

(b) maintaining permanent records of all certificates issued, deed restrictions and covenants recorded, and development rights retired or otherwise extinguished, and transferred to specific properties; and

(c) making available forms on which to apply for a transfer of development rights certificate.

(2) An application for a transfer of development rights certificate shall contain:

(a) a certificate of title for the sending parcel prepared by an attorney licensed to practice law in the state of [*name of state*];

(b) [five] copies of a plat of the proposed sending parcel and a legal description of the sending parcel prepared by [licensed *or* registered] land surveyor;

(c) a statement of the type and number of development rights in terms of density or FAR being transferred from the sending parcel, and calculations showing their determination.

(d) applicable fees; and

(e) such additional information required by the [zoning administrator] as necessary to determine the number of development rights that qualify for transfer

Comment: *A local government should consult with its law director or other legal counsel to determine the requirements for an application for a TDR. Consequently, this paragraph as well as other Sections of the ordinance may need to be revised to reflect state-specific issues concerning real property law and local conditions.*

(3) A transfer of development rights certificate shall identify:

(a) the transferor;

(b) the transferee, if known;

(c) a legal description of the sending parcel on which the calculation of development rights is based;

(d) a statement of the number of development rights in either dwelling units per net acre or square feet of nonresidential floor area eligible for transfer;

(e) if only a portion of the total development rights are being transferred from the sending property, a statement of the number of remaining development rights in either dwelling units per net acre or square feet of nonresidential floor space remaining on the sending property;

(f) the date of issuance;

(g) the signature of the [zoning administrator]; and

(h) a serial number assigned by the [zoning administrator].

(4) No transfer of development rights under this ordinance shall be recognized by the [local government] as valid unless the instrument of original transfer contains the [zoning administrator's] certification.

munity facilities, including transportation, to accommodate additional development.

Comment: *The local government may tailor this list of purposes to its particular planning goals and objectives or leave it with a wide range of purposes and implement the ordinance to achieve specific goals and objectives.*

102. Authority

This ordinance is enacted pursuant to the authority granted by [*cite to state statute or local government charter or similar law*].

Comment: *It is important to determine whether the local government has legal authority to enact a TDR program because not all local governments in all states have identical powers. In addition, enabling legislation for TDR may require that the transfers be done in a certain manner other than is described in this model.*

103. Definitions

As used in this ordinance, the following words and terms shall have the meanings specified herein:

"**Development Rights**" mean the rights of the owner of a parcel of land, under land development regulations, to configure that parcel and the structures thereon to a particular density for residential uses or floor area ratio for nonresidential uses. Development rights exclude the rights to the area of or height of a sign.

Comment: *Unless sign area and height are excluded from the definition of "development rights," it is possible to transfer them to another parcel, resulting in larger or taller signs. In*

some cases, development rights might extend to impervious surface coverage, and a transfer of such rights would allow more extensive lot coverage.

"Density" or **"Net Density"** means the result of multiplying the net area in acres times 43,560 square feet per acre and then dividing the product by the required minimum number of square feet per dwelling unit required by the zoning ordinance for a specific use district.

"Density" or "Net Density" is expressed as dwelling units per acre or per net acre

"Floor Area" means the gross horizontal area of a floor of a building or structure measured from the exterior walls or from the centerline of party walls. "Floor Area" includes the floor area of accessory buildings and structures.

"Floor Area Ratio" means the maximum amount of floor area on a lot or parcel expressed as a proportion of the net area of the lot or parcel.

"Net Area" means the total area of a site for residential or nonresidential development, excluding street rights-of-way and other publicly dedicated improvements, such as parks, open space, and stormwater detention and retention facilities, and easements, covenants, or deed restrictions, that prohibit the construction of building on any part of the site. "Net area" is expressed in either acres or square feet.

[**"Overlay District"** means a district superimposed over one or more zoning districts or parts of districts that imposes additional requirements to those applicable for the underlying zone.]

Comment: *This definition is only necessary if the TDR designation is accomplished via an overlay district.*

"**Receiving District**" means one or more districts in which the development rights of parcels in the send-

107. Instruments of Transfer

(1) An instrument of transfer shall conform to the requirements of this Section. An instrument of transfer, other than an instrument of original transfer, need not contain a legal description or plat of the sending parcel.

(2) Any instrument of transfer shall contain:

(a) the names of the transferor and the transferee;

(b) a certificate of title for the rights to be transferred prepared by an attorney licensed to practice law in the state of [name of state];

(c) a covenant the transferor grants and assigns to the transferee and the transferee's heirs, assigns, and successors, and assigns a specific number of development rights from the sending parcel to the receiving parcel;

(d) a covenant by which the transferor acknowledges that he has no further use or right of use with respect to the development rights being transferred; and

(e) [*any other relevant information or covenants*].

(3) An instrument of original transfer is required when a development right is initially separated from a sending parcel. It shall contain the information set forth in paragraph (2) above and the following information:

(a) a legal description and plat of the sending parcel prepared by a licensed surveyor named in the instrument;

(b) the transfer of development rights certificate described in Section 106 (4) above.

(c) a covenant indicating the number of development rights remaining on the sending parcel and stating the sending parcel may not be subdivided or developed to a greater density or intensity than permitted by the remaining development rights;

(d) a covenant that all provisions of the instrument of original transfer shall run with and bind the sending parcel and may be enforced by the [*local government*] and [*list other parties, such as non-profit conservation* organizations]; and

(d) [*indicate topics of other covenants, as appropriate*].

(4) If the instrument is not an instrument of original transfer, it shall include information set forth in paragraph (2) above and the following information :

(a) a statement that the transfer is an intermediate transfer of rights derived from a sending parcel described in an instrument of original transfer identified by its date, names of the original transferor and transferee, and the book and the page where it is recorded in the [land records of the county].

(b) copies and a listing of all previous intermediate instruments of transfer identified by its date, names of the original transferor and transferee, and the book and the page where it is recorded in the [land records of the county].

(5) The local government's [law director] shall review and approve as to the form and legal sufficiency of the following instruments in order to affect a transfer of development rights to a receiving parcel:

(a) An instrument of original transfer

(b) An instrument of transfer to the owner of the receiving parcel

(c) Instrument(s) of transfer between any intervening transferees

Upon such approval, the [law director] shall notify the transferor or his or her agent, who shall record the instruments with the [name of county official responsible for deeds and land records] and shall provide a copy to the [*county assessor*]. Such instruments shall be recorded prior to release of development permits, including building permits, for the receiving parcel.

Comment: *The procedures in paragraph (5) may need to be modified based on the structure of local government in a particular state and the responsibilities of governmental officials for land records and assessments. The important point is that the TDRs must be permanently recorded, and the property of the owner of the sending parcel, the value of which is reduced because of the transfer, should be assessed only on the basis of its remaining value.*

108. Application of Development Rights to a Receiving Parcel

(1) A person who wants to use development rights on a property in a receiving district up to the maximums specified in Table 1 in Section 105 above shall submit an application for the use of such rights on a receiving parcel. The application shall be part of an application for a development permit. In addition to any other information required for the development permit, the application shall be accompanied by:

(a) an affidavit of intent to transfer development rights to the property; and

(b) either of the following:

1. a certified copy of a recorded instrument of the original transfer of the development rights proposed to be used and any intermediate instruments of transfer through which the applicant became a transferee of those rights; or

2. a signed written agreement between the applicant and a proposed original transferor, which contains information required by Section 106(2) above and in which the proposed transferor agrees to execute an instrument of such rights on the proposed receiving parcel when the use of those rights, as determined by the issuance of a development permit, is finally approved.

(2) The [local government] may grant preliminary subdivision approval of a proposed development incorporating additional development rights upon proof of ownership of development rights and covenants on the sending parcel being presented to the [local government] as a condition precedent to final subdivision approval.

(3) No final plat of subdivision, including minor subdivisions, shall be approved and no development permits shall be issued for development involving the use of development rights unless the applicant has demonstrated that:

(a) the applicant will be the bona fide owner of all transferred development rights that will be used for the construction of additional dwellings, the creation of additional lots, or the creation of additional nonresidential floor area;

(b) a deed of transfer for each transferred development right has been recorded in the chain of title of the sending parcel and such instrument restricts the use of the parcel in accordance with this ordinance; and

(c) the development rights proposed for the subdivision or development have not been previously used. The applicant shall submit proof in the form of a current title search prepared by an attorney licensed to practice law in the state of [name of state] .

109. Development Rights Bank [*optional*]

Comment: *This section should establish a development rights bank, otherwise referred to as a "TDR Bank." The local government or any other existing or designated entity may operate the bank. The TDR Bank should:*

- *have the power to purchase and sell or convey development rights, subject to the local legislative body's approval;*
- *have the power to recommend to the local legislative body property where the local government should acquire development rights by condemnation;*
- *have the power, to hold indefinitely any development rights it possesses for conservation or other purposes;*
- *receive donations of development rights from any person or entity; and*
- *receive funding from the local government, the proceeds from the sale of development rights, or*

grants or donations from any source.

No model ordinance language for the creation of the TDR bank is provided here because the specifics of such must be determined by the operating entity.

References

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Howard County, Maryland. Zoning Ordinance, Section 106, Density Exchange Option Overlay District [accessed December 14, 2004]: http://www.co.ho.md.us/DPZ/DPZDocs/ClusterDEO070104.pdf

Redmond, Washington, City of. Community Development Guide, Section 20D.200, Transfer of Development Rights/Purchase of Development Rights Program [accessed December 14, 2004]: http://search.mrsc.org/nxt/gateway.dll/rdcdg?f=templates&fn=rdcdgpage.htm$vid=municodes:RedmondCDG

Sarasota County, Florida. Zoning Code, Section 4.11, TDR Overlay District Intent Statements and Section 6.12, TDR Overlay District Development Standards,
website [accessed December 14, 2004]: http://www.scgov.net/Frame/ScgWebPresence.aspx?AAA498=AFC1BAAFC0A89CB7B9BBBAA7C0A4B273C8B5B3B5C86FBBAAC981B0ABB8A2C2B1C980ADB9C2B9

St. Mary's County, Maryland. Zoning Ordinance, Chapter 26, Transferable Development Rights [accessed December 14, 2004 http://www.co.saint-arys.md.us/planzone/docs/TDRammendment.pdf

Model Conservation Easement

Note: The boxed numbers inserted in the text of the easement correspond with the subheading numbers in the commentary that follows.

DEED OF CONSERVATION EASEMENT 1

THIS GRANT DEED OF CONSERVATION EASEMENT is made this ____day of _____, 19___, by _____ and _____, husband and wife, having an address at _____

("Grantors"), in favor of _____ a non profit [state of incorporation] corporation [qualified to do business in (state where property is located)] , having an address at _____("Grantee"). 2

WITNESSETH:

WHEREAS, 3 grantors are the sole owners in fee simple of certain real property in _____ County, [state] , more particularly described in Exhibit A attached hereto and incorporated by this reference (the "Property"); 4 and WHEREAS, the property possesses [e.g., natural, scenic, open space, historical, educational, and/or recreational] values (collectively, "conservation values") of great importance to Grantors, the people of [county, locale, or region] And the people of the State of _____; 5 and

WHEREAS, in particular, [describe specific conservation values] ; 6 and

WHEREAS, the specific conservation values of the Property are documented in an inventory of relevant features of the Property, dated _____ _____ , 19_____ , [on file at the offices of Grantee–or– attached hereto as Exhibit B] and incorporated by this reference ("Baseline Documentation"), which consists of reports, maps, photographs, and other documentation that the parties agree provide, collectively, an accurate representation of the Property at the time of this grant and which is intended to serve as an objective information baseline for monitoring compliance with the terms of this grant; and 7

WHEREAS, Grantors intend that the conservation values of the Property be preserved and maintained by the continuation of land use patterns, including, without limitation, those relating to [e.g., farming, ranching, or timber production] Existing at the time of this grant, that do not significantly impair or interfere with those values; and 8

WHEREAS, Grantors further intend, as owners of the Property, to convey to Grantee the right to preserve and protect the conservation values of the Property in Perpetuity; and 9

WHEREAS, Grantee is a publicly supported, tax-exempt nonprofit organization, qualified under Section 501 (c)(3) and 170(h) of the Internal Revenue Code, whose primary purpose is [e.g., the preservation, protection, or enhancement of land in its natural, scenic, historical, agricultural, forested, and/or open space condition] ; and 10

WHEREAS, grantee agrees by accepting this grant to honor the intentions of Grantors stated herein and to preserve and protect in perpetuity the conservation values of the Property for the benefit of this generation and the generations to come; 11

NOW, THEREFORE, in consideration of the above and the mutual covenants, terms, conditions, and restrictions contained herein, and pursuant to the lows of [state where property is located] and in particular [specific

state statutory authority] , Grantors hereby voluntarily grant and convey to Grantee a conservation easement in perpetuity over the Property of the nature and character and to the extent hereinafter set forth ("Easement"). 12

1. Purpose. It is the purpose of this Easement to assure that the Property will be retained forever [predominantly] in its [e.g., natural, scenic, historic, agricultural, forested, and/or open space] condition and to prevent any use of the Property that will significantly impair or interfere with the conservation values of the Property. Grantors intend that this Easement will confine the use of the Property to such activities, including, without limitation, those involving [e.g., farming, ranching, timber production, public recreation, or education] , as are consistent with the purpose of this Easement. 13 2. Rights of Grantee. To accomplish the purpose of this Easement the following rights are conveyed to Grantee by this Easement:

a. To preserve and protect the conservation values of the Property;

b. To enter upon the Property at reasonable times in order to monitor Grantors' compliance with and otherwise enforce the terms of this Easement; provided that such entry shall be upon prior reasonable notice to Grantors, and Grantee shall not unreasonable interfere with Grantors' use and quiet enjoyment

of the Property; and

c. To prevent any activity on or use of the Property that is inconsistent with the purpose of this Easement and to require the restoration of such areas or features of the Property that may be damaged by any inconsistent activity or use, pursuant to paragraph 6. 14

3. Prohibited Uses. Any activity on or use of the Property inconsistent with the purpose of this Easement is prohibited. Without limiting the generality of the foregoing, the following activities and uses are expressly prohibited: 15

[Insert Express Restrictions] 16

4. Reserved Rights. Grantors reserve to themselves, and to their personal representatives, heirs, successors, and assigns, all rights accruing from their ownership of the Property, including the right to engage in or permit or invite others to engage in all uses of the Property that are not expressly prohibited herein and are not inconsistent with the purpose of this Easement.

[Without limiting the generality of the foregoing, the following rights are expressly reserved:] 17

[Insert Express Reservations, if desired] 18

5. Notice of Intention to Undertake Certain Permitted Actions. The purpose of requiring Grantors to notify Grantee prior to undertaking certain permitted activities, as provided in paragraphs _____ , is to afford Grantee an opportunity to ensure that the activities in question are designed and carried out in a manner consistent with the purpose of this Easement. Whenever notice is required Grantors shall notify Grantee in writing not less than [e.g., sixty (60)] days prior to the date Grantors intend to undertake the activity in question.

The notice shall describe the nature, scope, design, location, timetable, and any other material aspect of the proposed activity in sufficient detail to permit Grantee to make an informed judgment as to its consistency with the purpose of this Easement.

5.1 Grantee's Approval. Where Grantee's approval is required, as set forth in paragraphs _____ , Grantee shall grant or withhold its approval in writing within [e.g., sixty (60)] Days of receipt of Grantors' written request therefore. Grantee's approval may be withheld only upon a reasonable determination by Grantee that the action as proposed would be inconsistent with the purpose of this Easement. 19

6. Grantee's Remedies. If Grantee determines that Grantors are in violation of the terms of this Easement or that a violation is threatened, Grantee shall give written notice to Grantors of such violation and demand corrective action sufficient to cure the violation and, where the violation involves injury to the Property resulting from any use or activity inconsistent with the purpose of this Easement, to restore the portion of the Property so injured. If Grantors fail to cure the violation within [e.g., thirty (30)] Days after receipt of notice thereof from Grantee, or under circumstances where the violation cannot reasonably be cured within a [thirty (30)] Day period, fail to begin curing such violation within the [thirty (30)] Day period, or fail to continue diligently to cure such violation until finally cured, Grantee may bring an action at law or in equity in a court of competent jurisdiction to enforce the terms of this Easement, to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction, to recover any damages to which it may be entitled for violation of the terms of this Easement of injury to any conservation values protected by this Easement, including damages for the loss of scenic, aesthetic, or environmental values, and to require the restoration of the Property to the condition that existed prior to any such injury. Without limiting Grantors' liability therefore, Grantee, in its sole discretion, may apply any damages recovered to the cost of undertaking any corrective action on the Property. If Grantee, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the conservation values of the Property, Grantee may pursue its remedies under this paragraph without prior notice to Grantors or without waiting for the period provided for cure to expire. Grantee's rights under this paragraph apply equally in the event of either actual or threatened violations of the terms of this Easement, and Grantors agree that Grantee's remedies at law for any violation of the terms of this Easement are inadequate and that Grantee shall be entitled to the injunctive relief described in this paragraph, both prohibitive and mandatory, in addition to such other terms of this Easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. Grantee's remedies described in this paragraph shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity. 20

6.1 Costs of Enforcement. Any costs incurred by Grantee in enforcing the terms of this Easement against Grantors, including, without limitation, costs of suit and attorneys' fees, and any costs of restoration necessitated by Grantors' violation of the terms of this Easement shall be borne by Grantors. If Grantors prevail in any action to enforce the terms of this Easement, Grantors' costs of suit, including, without limitation, attorneys' fees, shall be borne by Grantee. 21

6.2 Grantee's Discretion. Enforcement of the terms of this Easement shall be at the discretion of Grantee, and any forbearance by Grantee to exercise its rights under this Easement in the event of any breach of any term

of this Easement by Grantors shall not be deemed or construed to be a waiver by Grantee of such term or of any subsequent breach of the same or any other term of this Easement or of any of Grantee's rights under this Easement. No delay or omission by Grantee in the exercise of any right or remedy upon any breach by Grantors shall impair such right or remedy or be construed as a waiver.

6.3 Waiver of Certain Defenses. Grantors hereby waive any defense of laches, estoppel, or prescription. 22

6.4 Acts Beyond Grantors' Control. Nothing contained in this Easement shall be construed to entitle Grantee to bring any action against Grantors for any injury to or change in the Property resulting from causes beyond Grantors' control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken by Grantors under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes. 23

7. Access. No right of access by the general public to any portion of the Property is conveyed by this Easement. 24

8. Costs and Liabilities. Grantors retain all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property, including the maintenance of adequate comprehensive general liability insurance coverage. Grantors shall keep the Property free of any liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantors. 25

8.1 Taxes. Grantors shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority (collectively "taxes"), including any taxes imposed upon, or incurred as a result of, this Easement, and shall furnish Grantee with satisfactory evidence of payment upon request. [Grantee is authorized but in no event obligated to make or advance any payment of taxes, upon [e.g., three (3)] Days prior written notice to Grantors, in accordance with any bill, statement, or estimate procured from the appropriate authority, without inquiry into the validity of the taxes or the accuracy of the bill, statement, or estimate, and the obligation created by such payment shall bear interest until paid by Grantors at the lesser of ____ percentage points over the prime rate of interest from time to time charged by [designated bank] or the maximum rate allowed by law.]

8.2 Hold Harmless. Grantors shall hold harmless, indemnify, and defend Grantee and its members, directors, officers, employees, agents, and contractors and the heirs, personal representatives, successors, and assigns of each of them (collectively "Indemnified Parties") from and against all liabilities, penalties, costs, losses, damages, expenses, causes of action, claims, demands, or judgments, including, without limitation, reasonable attorneys' fees, arising from or in any way connected with: (1) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause, unless due solely to the negligence of any of the Indemnified Parties; (2) the obligations specified in paragraphs 8 and 8.1; and (3) the existence or administration of this Easement. 27

9. Extinguishment. If circumstances arise in the future such as render the purpose of this Easement impossible to accomplish, this Easement can only be terminated tr extinguished, whether in whole or in part, by judicial proceedings in a court of competent jurisdiction, and the amount of the proceeds to which Grantee shall be entitled, after the satisfaction of prior claims, from any sale, exchange, or involuntary conversion of all or any portion of the Property subsequent to such termination or extinguishment, shall be determined, unless other-

wise provided by [state] law at the time, in accordance with paragraph 9.1. Grantee shall use all such proceeds in a manner consistent with the conservation purposes of this grant. 28

9.1 Proceeds. This Easement constitutes a real property interest immediately vested in Grantee, which, for the purposes of paragraph 9, the parties stipulate to have a fair market value determined by multiplying the fair market value of the Property unencumbered by the Easement (minus any increase in value after the date of this grant attributable to improvements) by the ratio of the value of the Easement at the time of this grant to the value of the Property, without deduction for the value of the Easement, at the time of this grant. The values at the time of this grant shall be those values used to calculate the deduction for federal income tax purposes allowable by reason of this grant, pursuant to Section 170(h) of the Internal Revenue Code of 1954, as amended. For the purposes of this paragraph, the ratio of the value of the Easement to the value of the Property unencumbered by the Easement shall remain constant. 29

9.2 Condemnation. If the Easement is taken, in whole or in part, by exercise of the power of eminent domain, Grantee shall be entitled to compensation in accordance with applicable law. 30

10. Assignment. This Easement is transferable, but Grantee may assign its rights and obligations under this Easement only to an organization that is a qualified organization at the time of transfer under Section 170(h) of the Internal Revenue Code of 1954, as amended (or any successor provision then applicable), and the applicable regulations promulgated thereunder, and authorized to acquire and hold conservation easements under [state statute] (or any successor provision then applicable). As a condition of such transfer, Grantee shall require that the conservation purposes that this grant is intended to advance continue to be carried out. 31

11. Subsequent Transfers. Grantors agree to incorporate the terms of this Easement in any deed or other legal instrument by which they divest themselves of any interest in all or a portion of the Property, including, without limitation, a leasehold interest. Grantors further agree to give written notice to Grantee of the transfer of any interest at least [e.g., twenty (20)] days prior to the date of such transfer. The failure of Grantors to perform any act required by this paragraph shall not impair the validity of this Easement or limit its enforceability in any way. 32

12. Estoppel Certificates. Upon request by Grantors, Grantee shall within [e.g., twenty (20)] days execute and deliver to grantors any document, including an estoppel certificate, which certifies Grantors' compliance with any obligation of Grantors contained in this Easement and otherwise evidences the status of this Easement as may be requested by Grantors. 33

13. Notices. Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and either served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantors: _____

To Grantee: _____ or to such other address as either party from tie to time shall designate by written notice to the other. 34

14. Recordation. Grantee shall record this instrument in timely fashion in the official records of _____ County, [state] And may re-record it at any time as may be required to preserve its rights in this Easement. 35

15. General Provisions. a. Controlling Law. The interpretation and performance of this Easement shall be governed by the laws of the State of [state] . b. Liberal Construction. Any general rule of construction to the con-

trary notwithstanding, this Easement shall be liberally construed in favor of the grant to effect the purpose of this Easement and the policy and purpose of, [state statute] . If any provision in this instrument is found to be ambiguous, an interpretation consistent with the purpose of this Easement that would render the provision valid shall be favored over any interpretation that would render it invalid.

c. Severability. If any provision of this Easement, or the application thereof to any person or circumstance, is found to be invalid, the remainder of the provisions of this Easement, or the application of such provision to persons or circumstances other than those as to which it is found to be invalid, as the case may be, shall not be affected thereby.

d. Entire Agreement. This instrument sets forth the entire agreement of the parties with respect to the Easement and supersedes all prior discussions, negotiations, understandings, or agreements relating to the Easement, all of which are merged herein. [No alteration or variation of this instrument shall be valid or binding unless contained in an amendment that complies with paragraph ____ (see supplementary provisions re: Amendment.)]

e. No Forfeiture. Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

f. Joint Obligation. The obligations imposed by this Easement upon Grantors shall be joint and several.

g. Successors. The covenants, terms, conditions, and restrictions of this Easement shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Property.

h. Termination of Rights and Obligations. A party's rights and obligations under this Easement terminate upon transfer of the party's interest in the Easement or Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

i. Captions. The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

j. Counterparts. The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling. 36

TO HAVE AND TO HOLD unto Grantee, its successors, and assigns
forever. 37

IN WITNESS WHEREOF Grantors and Grantee have set their hands on the day and year first above written.

_____

_____

Grantors

_____

Grantee

By _____

its [Official Capacity] 38

[Acknowledgments]

SCHEDULE OF EXHIBITS

A. Legal Description of Property Subject to Easement

[B. Baseline Documentation]

B. or C. Site Descriptions/Map

[C. or D. Identification of Prior Mortgage

MODEL CONSERVATION EASEMENT

Supplementary Provisions 39

(Paragraph numbers indicate relative position in model.)

[5.2] Arbitration. If a dispute arises between the parties concerning the consistency of any proposed use or activity with the purpose of this Easement, and Grantors agree not to proceed with the use or activity pending resolution of the dispute, either party may refer the dispute to arbitration by request made in writing upon the other. Within [e.g., thirty (30)] days of the receipt of such a request, the parties shall select a single arbitrator to hear the matter. If the parties are unable to agree on the selection of a single arbitrator, then each party shall name one arbitrator and the two arbitrators thus selected shall select a third arbitrator; provided, however, if either party fails to select an arbitrator, or if the two arbitrators selected by the parties fail to select the third arbitrator within [e.g., fourteen (14)] days after the appointment of the second arbitrator, then in each such instance a proper court, on petition of a party, shall appoint the second or third arbitrator or both, as the case may be, in accordance with [state arbitration statute] , or any successor statute then in effect. The matter shall be settled in accordance with the [state arbitration statute or other appropriate body of rules] then in effect, and a judgment on the arbitration award may be entered in any court having jurisdiction thereof. The prevailing party shall be entitled, in addition to such other relief as may be granted, to a reasonable sum as and for all its costs and expenses related to such arbitration, including, without limitation, the fees and expenses of the arbitrators and attorneys' fees, which shall be determined by the arbitrator(s) and any court of competent jurisdiction that may be called upon to enforce or review the award. 40

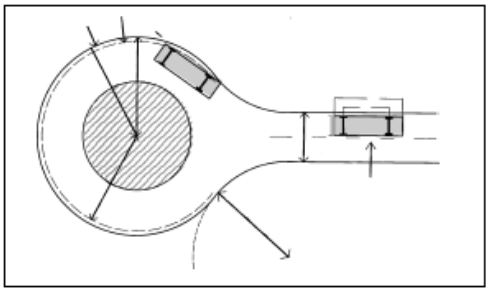
[Between 9 and 10] Amendment. If circumstances arise under which an amendment to or modification of this Easement would be appropriate, Grantors and Grantee are free to jointly amend this Easement; provided that no amendment shall be allowed that will affect the qualification of this Easement or the status of Grantee under any applicable laws, including [state statute] or Section 170(h) of the Internal Revenue Code of 1954, as amended, and any amendment shall be consistent with the purpose of this Easement, and shall not affect its perpetual duration. Any such amendment shall be recorded in the official records of _____ County, [state] . 41

[10.1] Executory Limitation. If Grantee shall cease to exist or to be a qualified organization under Section 170 (h) of the Internal Revenue Code of 1954, as amended, or to be authorized to acquire and hold conservation easements under [state statute] , and a prior assignment is not made pursuant to paragraph 10, then Grantee's rights and obligations under this Easement shall become immediately vested in [designated back-up grantee] . If [designated back-up grantee] is no longer in existence at the time the rights and obligations under this Easement would otherwise vest in it, or if [designated back-up grantee] is not qualified or authorized to hold conservation easements as provided for an assignment pursuant to paragraph 10, or if it shall refuse such rights and obligations, then the rights and obligations under this Easement shall vest in such organization as a court

of competent jurisdiction shall direct pursuant to the applicable [state] law and with due regard to the requirements for an assignment pursuant to paragraph 10. 42

[Between 10 and 11] Subordination. At the time of conveyance of this Easement, the Property is subject to the mortgage identified in Exhibit [C or D] attached hereto and incorporated by this reference, the holder of which has agreed by separate instrument, which will be recorded immediately after this Easement, to subordinate its rights in the Property to this Easement to the extent necessary to permit the Grantee to enforce the purpose of the Easement in perpetuity and to prevent any modification or extinguishment of this Easement by the exercise of any rights of the mortgage holder. The priority of the existing mortgage with respect to any valid claim on the part of the existing mortgage holder to the proceeds of any sale, condemnation proceedings, or insurance or to the leases, rents, and profits of the Property shall not be affected thereby, and any lien that may be created by Grantee's exercise of any of its rights under this Easement shall be junior to the existing mortgage. Upon request, Grantee agrees to subordinate its rights under this Easement to the rights of any future mortgage holders or beneficiaries of deeds of trust to the proceeds, leases, rents, and profits described above and likewise to subordinate its rights under any lien and to execute any documents required with respect to such subordination, except that the priority of any lien created by Grantee's exercise of any of its rights under this Easement prior to the creation of a mortgage or deed of trust shall not be affected thereby, nor shall this Easement be subordinated in any other respect. 43

Cul-de-Sac Design



Description

Careful cul-de-sac design can greatly reduce the amount of impervious surface in subdivisions. To do this, cul-de-sacs (also called turnarounds or dead-ends) should use the smallest practical radius. A 40-foot turning radius will accommodate turning of most emergency, service, and maintenance vehicles, while a 30-foot radius will require the largest of these vehicles to make one backing movement in order to turn around.

Simply changing the radius from 40 feet to 30 feet can reduce the impervious coverage by about 50 percent (Schueler, 1995).

Additionally, a landscaped island can be created in the center of the cul-de-sac, where driving does not occur. This island can be designed as a depression to accept stormwater runoff from the surrounding pavement, thus furthering infiltration. A flat apron curb will stabilize roadway pavement and allow for runoff to flow into the cul-de-sac's open center.

A T-shaped (or hammerhead) turnaround reduces impervious surface even further—yielding a paved area less than half that of a 30-foot radius turnaround. Since vehicles need to make a three-point turn to drive out, T-shaped turnarounds are most appropriate on streets with ten or fewer homes.

Advantages

- Cul-de-sac designs like those suggested here result in less stormwater runoff requiring management and less impact on downstream water bodies.
- Planted cul-de-sac islands are attractive amenities
- Less paving can lower development costs

Purpose

Water Quantity	
Flow attenuation	◧
Runoff volume reduction	■
Water Quality	
Pollution prevention	
Soil erosion	□
Sediment control	◧
Nutrient loading	◧

■ Primary design benefit
◧ Secondary design benefit
□ Little or no design benefit

Cul-de Sac Design

- Reducing pavement lessens the urban heat island effect—the increase in air temperature that can occur when highly developed areas are exposed to the sun.
- Reducing pavement can help reduce the increased runoff temperature commonly associated with impervious cover.

Limitations

- City ordinances may not accommodate small radii cul-de-sacs, due to accommodations for emergency vehicles. (Some older vehicles require very large turning radii.)
- Hammerhead turnarounds require vehicles to make a three-point-turn to drive out.
- In first two to three years, planted islands require more maintenance than paving.

Requirements

Design

- If traffic volume is low (10 or fewer homes), consider a T-shaped turnaround. A dimension of 20 by 60 feet will accommodate most vehicles. (See Fig. 4)
- Design circular cul-de-sacs with a radius of 30 feet or less whenever possible. (See Fig. 2)
- Include an unpaved, depressed island, using whatever radius will allow a 20-foot-wide road. (See Fig. 3)
- To make turning easier, the pavement at rear of center island may be wider. (See Fig. 2)
- In the island, plant attractive, low-maintenance perennials or shrubs appropriate for the soil and moisture conditions.

Construction

- During paving, care should be taken to avoid compacting soil in center island. Should compaction occur, it may be necessary to rip or till soils to a depth of 2 feet.
- Choose plants that will thrive when rainfall is high, as well as during droughts without watering. See On-Lot Infiltration BMP for plant list.

Maintenance

- Cul-de-sac island planting areas must be weeded monthly during the first two to three years. After that, weeding once or twice a growing season may suffice.

Cul-de-Sac Design

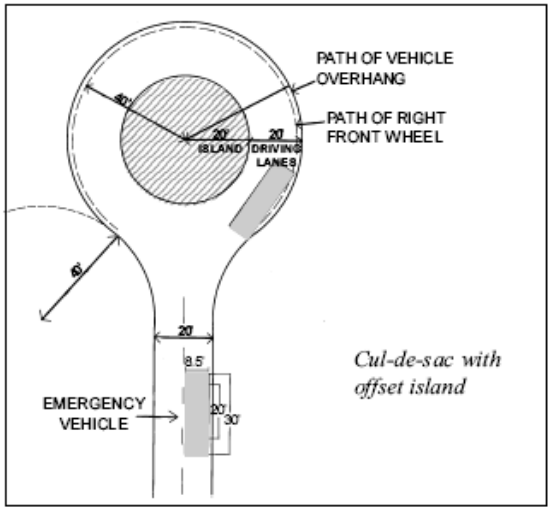


Figure 1

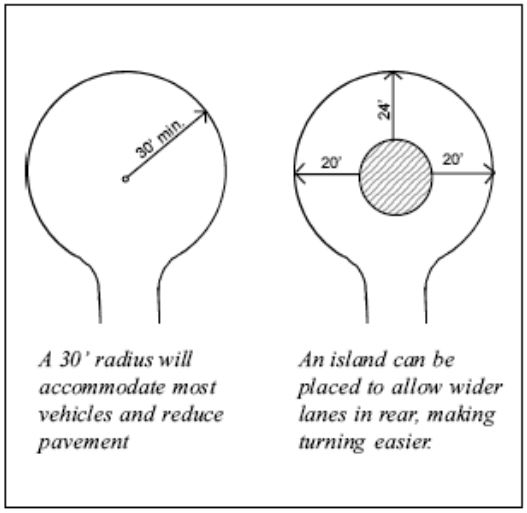


Figure 2

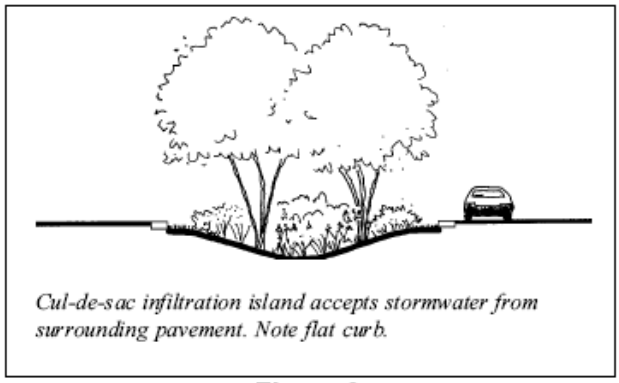


Figure 3

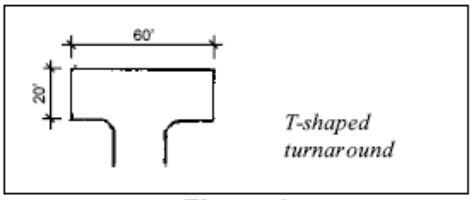


Figure 4

Sources: Adapted from Schueler, 1995, and ASCE, 1990.

Appendix B: Codes and Ordinances Worksheet

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Basis for Score maximum and instructions	
Streets and Parking				
1. Street Width				
a. What is the minimum pavement width allowed for streets in low density residential developments that have less than 500 average daily trips (ADT)?	Sec. 270-040 (4) defines the minimum pavement width requirements for existing road improvements. Arterial = 24', Collector = 22', Sub-Collector = 20', Local = 20', Cul-De-Sac = 20', Cul-De-Sac if < 400' = 18', Alley = 18'.		4	Between 18-22 feet, 4 points
b. At higher densities are parking lanes allowed to also serve as traffic lanes (i.e., queuing streets)?	Not Found		3	YES, award 3 points
2. Street Length				
a. Do street standards promote the most efficient street layouts that reduce overall street length?	Not Found		1	YES, award 1 point
3. Right-of-Way Width				
a. What is the minimum right-of-way (ROW) width for a residential street?	According to Article VII Section 7.1 of the Subdivision Regulations, Local Access Streets have a minimum ROW width of 50' With curb and gutter and 60' Without curb and gutter.		3	Less than 45 feet, 3 points
b. Does the code allow utilities to be placed under the paved section of the ROW?	Not Found		1	YES, award 1 point
4. Cul-de-Sacs				
a. What is the minimum radius allowed for cul-de-sacs?	Section 7.1 of the subdivision regulations establishes a minimum radius of 50' if < 1,000 ft. in length, or 60' if more than 1,000 ft. in length.		3	<35 feet, 3 points If 36 - 45 feet, 1 point
b. Can a landscaped island be created within the cul-de-sac?	Not Found		1	YES, award 1 point
c. Are alternative turn arounds such as "hammerheads" allowed on short streets in low density residential developments?	Not Found		1	YES, award 1 point
5. Vegetated Open Channels				
a. Are curb and gutters required for most residential street sections?	Sec. 210-110 Requires all public streets to have curbs and gutters. The subdivision regulations requires curbs and gutters in residential subdivisions with average lot frontage of 100 feet or less. Curbs and gutters are not required for open space developments.		2	NO, award 2 points
b. Are there established design criteria for swales that can provide storm water quality treatment (i.e., dry swales, biofilters, or grass swales)?	Though no established design criteria was found, runoff must be managed by the storm-water management plan approved by the County engineer.		2	YES, award 2 points

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Basis for Score maximum and instructions	
6. Parking Ratios				
a. What is the minimum parking ratio for a professional office building (per 1000 ft2 of gross floor area)?	Sec. 280-070 Min.= 1.0 Space for each 300 sq. ft. of gross floor area, Max.= 1.0 Space for each 200 sq. ft. gross floor area		1	<3.0 spaces, award 1 point
b. What is the minimum required parking ratio for shopping centers (per 1,000 ft2 gross floor area)?	Sec. 280.110 Dependent upon size. < 400,00 sq. ft. of gross leasable area = Min. 4.0 spaces for each 1,000 sq. ft. of gross leasable area, Max. 4.5. 400,00-600,00 sq. ft. = Min. 4.5 spaces for each 1000, Max 5.0. >600,000 = Min. 5.0 spaces for each 1000, Max. 6.0.		1	≤4.5 spaces, award 1 point
c. What is the minimum required parking ratio for single family homes (per home)?	Sec. 280.100 states Min. 2.0 spaces for each dwelling unit, no more than 3.0 vehicles parked outdoors.		1	≤2.0 spaces, award 1 point
d. Are the parking requirements set as maximum or median (rather than minimum) requirements?	There are both Minimum and Maximum figures.		2	YES, award 2 points
7. Parking Codes				
a. Is the use of shared parking arrangements promoted?	Sec. 280-140 allows shared parking so long as there is compliance with set standards.		1	YES, award 1 point
b. Are model shared parking agreements provided?	Though Sec. 280-140 does not seem to provide a "model" agreement, they do recommend developments with different operating hours to consider this arrangement.		1	YES, award 1 point
c. Are parking ratios reduced if shared parking arrangements are in place?	Not Found		1	YES, award 1 point
d. If mass transit is provided nearby, is the parking ratio reduced?	Not Found		1	YES, award 1 point
8. Parking Lots				
a. What is the minimum stall width for a standard parking space?	Sec. 280-150 Requires a minimum width of 9'		1	9 Feet or less, 1 point
b. What is the minimum stall length for a standard parking space?	Sec. 280-150 Requires a minimum length of 18'		1	18 feet or less, 1 point
c. Are at least 30% of the spaces at larger commercial parking lots required to have smaller dimensions for compact cars?	Sec. 280-150 Allows up to 20% of the required spaces to be 9' x 15' for use by compact cars. It does not seem to be a requirement.		1	YES, award 1 point
d. Can pervious materials be used for spillover parking areas?	Sec. 280-150 Requires that all off-street parking areas are in a dust-free condition. All parking areas for nonresidential uses must be paved.		2	YES, award 2 points
9. Structured Parking				

Rating Questions		Oldham	Basis for Score maximum and instructions	
a. Are there any incentives to developers to provide parking within garages rather than surface parking lots?	Not Found		1	YES, award 1 point
10. Parking Lot Runoff				
a. Is a minimum percentage of a parking lot required to be landscaped?	Sec. 300-070 Requires Vehicular Use Areas (VUA) to implement Interior Landscaping Areas (ILA). Any new lot of 6,000+ sq. ft. must have one. 5 sq. ft. of ILA is required for every 100 sq. ft. of VUA. Additionally, 300-050 requires a Perimeter Landscape Buffer around a VUA.		2	YES, award 2 points
b. Is the use of bioretention islands and other storm water practices within landscaped areas or setbacks allowed?			2	YES, award 2 points
Subtotal - Streets and Parking			40	

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Basis for Score maximum and instructions	
Lot Design				
11. Open Space Design				
a. Are open space or cluster development designs allowed in the community?	Sec. 230-010 provides for Planned Unit Development Districts (PUD). These encourage the clustering of buildings and the preservation of nature resources. Providing open space is one of the objectives of a PUD.		3	YES, 3 points If NO, skip to No. 12
b. Is land conservation or impervious cover reduction a major goal or objective of the open space design ordinance?	Yes, land conservation is an objective.		1	YES, award 1 point
c. Are the submittal or review requirements for open space design greater than those for conventional development?	Sec. 230-020 seems to require heightened review for a PUD. Additionally, there are forbidden uses within a PUD.		1	NO, award 1 point
d. Is open space or cluster design a by-right form of development?	Not Found.		1	YES, award 1 point
e. Are flexible site design criteria available for developers that utilize open space or cluster design options (e.g, setbacks, road widths, lot sizes)	Not really. Sec. 230-020 requires a minimum lot size of 10 acres. Additionally, unless specifically mentioned, all other regulations cannot be waived. (Roads and setbacks did not seem to be mentioned as exceptions).		2	YES, award 2 points
12. Setbacks and Frontages				
a. Are irregular lot shapes (e.g., pie-shaped, flag lots) allowed in the community?			1	YES, award 1 point
b. What is the minimum requirement for front setbacks for a one half (½) acre residential lot?	Sec. 040-040 R-1A - 1 dwelling per acre to 1.74 dwellings per acre. Set back 35 feet.		1	20 Feet or less, 1 point
c. What is the minimum requirement for rear setbacks for a one half (½) acre residential lot?	Sec. 040-040 R-1A - 1 dwelling per acre to 1.74 dwellings per acre. Rear set back 30 feet.		1	25 Feet or less, 1 point
d. What is the minimum requirement for side setbacks for a one half (½) acre residential lot?	Sec. 040-040 R-1A 1 dwelling per acre to 1.74 dwellings per acre. 15 feet side		1	8 Feet or less, 1 points
e. What is the minimum frontage distance for a one half (½) acre residential lot?	Section 040-040 R-1A 1 dwelling per acre to 1.74 dwellings per acre. 100 feet (w/sewer)/150 feet (w/o sewer)		2	< 80 feet, 2 points
13. Sidewalks				
a. What is the minimum sidewalk width allowed in the community?	Not specified. Under Sec. 230-010, in a development plan the developer must show all sidewalks and their width.		2	4 Feet or less, 2 points
b. Are sidewalks always required on both sides of residential streets?	No. Sec. 230-010 A(7) requires in general that a PUD shall have a pedestrian orientation and that a developer shall provide sidewalks or trials.		2	NO, award 2 points
c. Are sidewalks generally sloped so they drain to the front yard rather than the street?	Trails permitted (Sec. 230-010 A(7).		1	YES, award 1 point

Rating Questions	Oldham	Basis for Score maximum and instructions
d. Can alternate pedestrian networks be substituted for sidewalks (e.g., trails through common areas)?		1 YES, award 1 point

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Basis for Score maximum and instructions	
14. Driveways				
a. What is the minimum driveway width specified in the community?	not found		2	<9 Feet (1 lane) or 18 feet (2 lanes), 2 pts
b. Can pervious materials be used for single family home driveways (e.g., grass, gravel, porous pavers, etc)?	not found		2	YES, award 2 points
c. Can a "two track" design be used at single family driveways?	not found		1	YES, award 1 point
d. Are shared driveways permitted in residential developments?	not found		1	YES, award 1 point
15. Open Space Management				
a. Does the community have enforceable requirements to establish associations that can effectively manage open space?	Yes. Required as part of PUD approvals, for Master Planned Communities. 230-070. Requires 250 sq.ft. per dwelling unit in attached single family structures. Must show on Master Plan Map Sec.230-090 (A) (2) (c) open space ownership and deisgnation if for conservation and/or recreational purposes.		2	YES, award 2 points
b. Are open space areas required to be consolidated into larger units?			1	YES, award 1 point
c. Does a minimum percentage of open space have to be managed in a natural condition?	No Addressed under 030-020 for Master Planned comunities. Sec. 030-020 (5) 10 % minimum open space, but no requirement to maintain in natural condition. A) at least 70% is common open space. Sec. 030-020 (6) imposes the requirement to the greatest extent possible that exiginting signficant trees shall be preserved and that healthy mature woodlands shall be preserved.		1	YES, award 1 point
d. Are allowable and unallowable uses for open space in residential developments defined?			1	YES, award 1 point
e. Can open space be managed by a third party using land trusts or conservation easements?	Allowed. Section 230-060(D)(b) -to obtain final Master Plan approval, developer has to provide documentation of approval of any receiving entity (such as a public agency or a land trust) that is different than the HOA if any open space is dedicated to ta third party.		1	YES, award 1 point
16. Rooftop Runoff				
a. Can rooftop runoff be discharged to yard areas?	not found		2	YES, award 2 points
b. Do current grading or drainage requirements allow for temporary ponding of storm water on front yards or rooftops?	not found		2	YES, award 2 points
Subtotal - Lot Design			36	

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Basis for Score maximum and instructions	
Natural Areas				
17. Buffer Systems				
a. Is there a stream buffer ordinance in the community?	No Stream Buffer. Property Perimiter L.B for most zoning categories, except single family residential. 300-040. Also Interior Landscaping Areas for Vehicular Use Areas. 300-070		2	YES, award 2 points
b. If so, what is the minimum buffer width?	Property Perimeter Landscape Buffer is 25 feet wide (300-040).		1	75 Feet or more,1 point
c. Is expansion of the buffer to include freshwater wetlands, steep slopes or the 100-year floodplain required?	Not found.		1	YES, award 1 point
18. Buffer Maintenance				
a. Does the stream buffer ordinance specify that at least part of the stream buffer be maintained with native vegetation?	Not found.		2	YES, award 2 points
b. Does the stream buffer ordinance outline allowable uses?	Not found.		1	YES, award 1 point
c. Does the ordinance specify enforcement and education mechanisms?	Not found.		1	YES, award 1 point
19. Clearing and Grading				
a. Is there any ordinance that requires or encourages the preservation of natural vegetation at residential development sites?	No requirement that they must preserve, but 300-070 states "Retention of existing vegetation to meet landscaping requirements is strongly encouraged. Single-family detached residential developments should preserve as many trees as possible that do not adversely affect site grading, infrastructure installation and house construction. "		2	YES, award 2 points
b. Do reserve septic field areas need to be cleared of trees at the time of development?	Not addressed in Section. 330-060 Water Supply and Sewage Disposal. Allows septic tank systems on lots greater than one acre.		1	NO, award 1 point
20. Tree Conservation				
a. If forests or specimen trees are present at residential development sites, does some of the stand have to be preserved?	No requirement that they must preserve, but 300-070 states "Retention of existing vegetation to meet landscaping requirements is strongly encouraged. Single-family detached residential developments should preserve as many trees as possible that do not adversely affect site grading, infrastructure installation and house construction. "		2	YES, award 2 points
b. Are the limits of disturbance shown on construction plans adequate for preventing clearing of natural vegetative cover during construction?	Yes. Sec. 300-010. If property is requred to have Soil Erosion and Sediment Control Permit, then Section.300-010 (2) prohibts clearing grading or other land-disturbing activites.		1	YES, award 1 point

Rating Questions		Oldham		Basis for Score maximum and instructions
21. Land Conservation Incentives				
a. Are there any incentives to developers or landowners to conserve non-regulated land (open space design, density bonuses, storm water credits or lower property tax rates)?	not found		2	YES, award 2 points
b. Is flexibility to meet regulatory or conservation restrictions (density compensation, buffer averaging, transferable development rights, off-site mitigation) offered to developers?	not found		2	YES, award 2 points

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Basis for Score maximum and instructions	
22. Storm Water Outfalls				
a. Is storm water required to be treated for quality before it is discharged?	Unclear. In Ord. 05-830-326 Sec. 9(1)(b)(iv) - the developer is required to ensure that discharges do not contain sediment. No clear imposition for treatment practices in Ord.		2	YES, award 2 points
b. Are there effective design criteria for storm water best management practices (BMPs)?	Ord: 05-830-326 Sec. 2 (1) defines best management practices. In Sec. 7 (b) (iv) relating to perimeter control, BMP is imposed. However, under SWPP requirements, Sec. 10 (5) bb - the SWPP plan itself must only identify "management practices." Does not impose "BMP". Comprehensive Zoning Ordinance compels that a developer submit a Soil and Erosion Plan concurrently with their Master Plan PUD map. Sec. 230-060 D(1).		1	YES, award 1 point
c. Can storm water be directly discharged into a jurisdictional wetland without pretreatment?	Unclear. In Ord 05-830-326, for developments on greater than one acre, a SWPP must be prepared unless its under an exemption category in Sec. 5. However, Sec. 9 indicates that to release the SWPP permit, the developer must under Sec. 9 (d)(ix) ensure that detention and retention are stabilized at designed vol & conditions. However, the ordinance does not address jurisdicitional wetlands.		1	NO, award 1 point
d. Does the floodplain management ordinance restrict or prohibit development within the 100 year floodplain exist?	Yes. Ordinance KOC 06-360-411.		2	YES, award 2 points
Subtotal - Natural Areas			24	
TOTAL			100	

Meaning of Score

Leader - keep up the good work
Good - minor changes needed
Opportunities for improvement
Significant opportunities for improvement
Serious reform needed

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions

		Oldham	Notes	Oldham
Streets and Parking				
1. Street Width				
a. What is the minimum pavement width allowed for streets in low density residential developments that have less than 500 average daily trips (ADT)?	Sec. 270-040 (4) defines the minimum pavement width requirements for existing road improvements. Arterial = 24', Collector = 22', Sub-Collector = 20', Local = 20', Cul-De-Sac = 20', Cul-De-Sac if < 400' = 18', Alley = 18'.		What is width?	20'
b. At higher densities are parking lanes allowed to also serve as traffic lanes (i.e., queuing streets)?	Not Found			
2. Street Length				
a. Do street standards promote the most efficient street layouts that reduce overall street length?	Not Found		Related to lot sizes	
3. Right-of-Way Width				
a. What is the minimum right-of-way (ROW) width for a residential street?	According to Article VII Section 7.1 of the Subdivision Regulations, Local Access Streets have a minimum ROW width of 50' With curb and gutter and 60' Without curb and gutter.		What is width?	50'
b. Does the code allow utilities to be placed under the paved section of the ROW?	Not Found			
4. Cul-de-Sacs				
a. What is the minimum radius allowed for cul-de-sacs?	Section 7.1 of the subdivision regulations establishes a minimum radius of 50' if < 1,000 ft. in length, or 60' if more than 1,000 ft. in length.		What is radius?	39' & 46'
b. Can a landscaped island be created within the cul-de-sac?	Not Found			
c. Are alternative turn arounds such as "hammerheads" allowed on short streets in low density residential developments?	Not Found			
5. Vegetated Open Channels				
a. Are curb and gutters required for most residential street sections?	Sec. 210-110 Requires all public streets to have curbs and gutters. The subdivision regulations requires curbs and gutters in residential subdivisions with average lot frontage of 100 feet or less. Curbs and gutters are not required for open space developments.			
b. Are there established design criteria for swales that can provide storm water quality treatment (i.e., dry swales, biofilters, or grass swales)?	Though no established design criteria was found, runoff must be managed by the storm-water management plan approved by the County engineer.			

Rating Questions

		Oldham	Notes	Oldham
6. Parking Ratios				
a. What is the minimum parking ratio for a professional office building (per 1000 ft2 of gross floor area)?	Sec. 280-070 Min.= 1.0 Space for each 300 sq. ft. of gross floor area, Max.= 1.0 Space for each 200 sq. ft. gross floor area		What is ratio?	1/300 ft^2
b. What is the minimum required parking ratio for shopping centers (per 1,000 ft2 gross floor area)?	Sec. 280.110 Dependent upon size. < 400,00 sq. ft. of gross leasable area = Min. 4.0 spaces for each 1,000 sq. ft. of gross leasable area, Max. 4.5. 400,00-600,00 sq. ft. = Min. 4.5 spaces for each 1000, Max 5.0. >600,000 = Min. 5.0 spaces for each 1000, Max. 6.0.		What is ratio?	1/250 or 300ft2
c. What is the minimum required parking ratio for single family homes (per home)?	Sec. 280.100 states Min. 2.0 spaces for each dwelling unit, no more than 3.0 vehicles parked outdoors.		What is ratio?	2/unit
d. Are the parking requirements set as maximum or median (rather than minimum) requirements?	There are both Minimum and Maximum figures.			both mx and min
7. Parking Codes				
a. Is the use of shared parking arrangements promoted?	Sec. 280-140 allows shared parking so long as there is compliance with set standards.			
b. Are model shared parking agreements provided?	Though Sec. 280-140 does not seem to provide a "model" agreement, they do recommend developments with different operating hours to consider this arrangement.			
c. Are parking ratios reduced if shared parking arrangements are in place?	Not Found			
d. If mass transit is provided nearby, is the parking ratio reduced?	Not Found			
8. Parking Lots				
a. What is the minimum stall width for a standard parking space?	Sec. 280-150 Requires a minimum width of 9'		What is width?	
b. What is the minimum stall length for a standard parking space?	Sec. 280-150 Requires a minimum length of 18'		What is length?	
c. Are at least 30% of the spaces at larger commercial parking lots required to have smaller dimensions for compact cars?	Sec. 280-150 Allows up to 20% of the required spaces to be 9' x 15' for use by compact cars. It does not seem to be a requirement.		What is percent?	
d. Can pervious materials be used for spillover parking areas?	Sec. 280-150 Requires that all off-street parking areas are in a dust-free condition. All parking areas for nonresidential uses must be paved.			
9. Structured Parking				

Rating Questions		Oldham	Notes	Oldham
a. Are there any incentives to developers to provide parking within garages rather than surface parking lots?	Not Found			
10. Parking Lot Runoff				
a. Is a minimum percentage of a parking lot required to be landscaped?	Sec. 300-070 Requires Vehicular Use Areas (VUA) to implement Interior Landscaping Areas (ILA). Any new lot of 6,000+ sq. ft. must have one. 5 sq. ft. of ILA is required for every 100 sq. ft. of VUA. Additionally, 300-050 requires a Perimeter Landscape Buffer around a VUA.			
b. Is the use of bioretention islands and other storm water practices within landscaped areas or setbacks allowed?				
Subtotal - Streets and Parking				

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions

Lot Design

		Oldham	Notes	Oldham
11. Open Space Design				
a. Are open space or cluster development designs allowed in the community?	Sec. 230-010 provides for Planned Unit Development Districts (PUD). These encourage the clustering of buildings and the preservation of nature resources. Providing open space is one of the objectives of a PUD.			
b. Is land conservation or impervious cover reduction a major goal or objective of the open space design ordinance?	Yes, land conservation is an objective.			
c. Are the submittal or review requirements for open space design greater than those for conventional development?	Sec. 230-020 seems to require heightened review for a PUD. Additionally, there are forbidden uses within a PUD.			
d. Is open space or cluster design a by-right form of development?	Not Found.			
e. Are flexible site design criteria available for developers that utilize open space or cluster design options (e.g, setbacks, road widths, lot sizes)	Not really. Sec. 230-020 requires a minimum lot size of 10 acres. Additionally, unless specifically mentioned, all other regulations cannot be waived. (Roads and setbacks did not seem to be mentioned as exceptions).			
12. Setbacks and Frontages				
a. Are irregular lot shapes (e.g., pie-shaped, flag lots) allowed in the community?				
b. What is the minimum requirement for front setbacks for a one half (½) acre residential lot?	Sec. 040-040 R-1A - 1 dwelling per acre to 1.74 dwellings per acre. Set back 35 feet.		What is front setback?	35'
c. What is the minimum requirement for rear setbacks for a one half (½) acre residential lot?	Sec. 040-040 R-1A - 1 dwelling per acre to 1.74 dwellings per acre. Rear set back 30 feet.		What is rear setback?	30'
d. What is the minimum requirement for side setbacks for a one half (½) acre residential lot?	Sec. 040-040 R-1A 1 dwelling per acre to 1.74 dwellings per acre. 15 feet side		What is side setback?	15'
e. What is the minimum frontage distance for a one half (½) acre residential lot?	Section 040-040 R-1A 1 dwelling per acre to 1.74 dwellings per acre. 100 feet (w/sewer)/150 feet (w/o sewer)		What is frontage distance? *100' sewered; 150 w/o sewer	*
13. Sidewalks				
a. What is the minimum sidewalk width allowed in the community?	Not specified. Under Sec. 230-010, in a development plan the developer must show all sidewalks and their width.		What is width? (ADA requires 4')	
b. Are sidewalks always required on both sides of residential streets?	No. Sec. 230-010 A(7) requires in general that a PUD shall have a pedestrian orientation and that a developer shall provide sidewalks or trials.			
c. Are sidewalks generally sloped so they drain to the front yard rather than the street?	Trails permitted (Sec. 230-010 A(7).			

Rating Questions	Oldham	Notes	Oldham
d. Can alternate pedestrian networks be substituted for sidewalks (e.g., trails through common areas)?			

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Notes	Oldham
14. Driveways				
a. What is the minimum driveway width specified in the community?	not found		What is width?	no mi
b. Can pervious materials be used for single family home driveways (e.g., grass, gravel, porous pavers, etc)?	not found			
c. Can a "two track" design be used at single family driveways?	not found			
d. Are shared driveways permitted in residential developments?	not found			
15. Open Space Management				
a. Does the community have enforceable requirements to establish associations that can effectively manage open space?	Yes. Required as part of PUD approvals, for Master Planned Communities. 230-070. Requires 250 sq.ft. per dwelling unit in attached single family structures. Must show on Master Plan Map Sec.230-090 (A) (2) (c) open space ownership and deisgnation if for conservation and/or recreational purposes.			
b. Are open space areas required to be consolidated into larger units?				
c. Does a minimum percentage of open space have to be managed in a natural condition?	No Addressed under 030-020 for Master Planned comunities. Sec. 030-020 (5) 10 % minimum open space, but no requirement to maintain in natural condition. A) at least 70% is common open space. Sec. 030-020 (6) imposes the requirement to the greatest extent possible that exiginting signficant trees shall be preserved and that healthy mature woodlands shall be preserved.			
d. Are allowable and unallowable uses for open space in residential developments defined?				
e. Can open space be managed by a third party using land trusts or conservation easements?	Allowed. Section 230-060(D)(b) -to obtain final Master Plan approval, developer has to provide documentation of approval of any receiving entity (such as a public agency or a land trust) that is different than the HOA if any open space is dedicated to ta third party.			
16. Rooftop Runoff				
a. Can rooftop runoff be discharged to yard areas?	not found			
b. Do current grading or drainage requirements allow for temporary ponding of storm water on front yards or rooftops?	not found			
Subtotal - Lot Design				

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions

		Oldham	Notes	Oldham
Natural Areas				
17. Buffer Systems				
a. Is there a stream buffer ordinance in the community?	No Stream Buffer. Property Perimiter L.B for most zoning categories, except single family residential. 300-040. Also Interior Landscaping Areas for Vehicular Use Areas. 300-070			
b. If so, what is the minimum buffer width?	Property Perimeter Landscape Buffer is 25 feet wide (300-040).			
c. Is expansion of the buffer to include freshwater wetlands, steep slopes or the 100-year floodplain required?	Not found.			
18. Buffer Maintenance				
a. Does the stream buffer ordinance specify that at least part of the stream buffer be maintained with native vegetation?	Not found.			
b. Does the stream buffer ordinance outline allowable uses?	Not found.			
c. Does the ordinance specify enforcement and education mechanisms?	Not found.			
19. Clearing and Grading				
a. Is there any ordinance that requires or encourages the preservation of natural vegetation at residential development sites?	No requirement that they must preserve, but 300-070 states "Retention of existing vegetation to meet landscaping requirements is strongly encouraged. Single-family detached residential developments should preserve as many trees as possible that do not adversely affect site grading, infrastructure installation and house construction. "			
b. Do reserve septic field areas need to be cleared of trees at the time of development?	Not addressed in Section. 330-060 Water Supply and Sewage Disposal. Allows septic tank systems on lots greater than one acre.			
20. Tree Conservation				
a. If forests or specimen trees are present at residential development sites, does some of the stand have to be preserved?	No requirement that they must preserve, but 300-070 states "Retention of existing vegetation to meet landscaping requirements is strongly encouraged. Single-family detached residential developments should preserve as many trees as possible that do not adversely affect site grading, infrastructure installation and house construction. "			
b. Are the limits of disturbance shown on construction plans adequate for preventing clearing of natural vegetative cover during construction?	Yes. Sec. 300-010. If property is requred to have Soil Erosion and Sediment Control Permit, then Section.300-010 (2) prohibts clearing grading or other land-disturbing activites.			

Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions

		Oldham	Notes	Oldham
21. Land Conservation Incentives				
a. Are there any incentives to developers or landowners to conserve non-regulated land (open space design, density bonuses, storm water credits or lower property tax rates)?	not found			
b. Is flexibility to meet regulatory or conservation restrictions (density compensation, buffer averaging, transferable development rights, off-site mitigation) offered to developers?	not found			

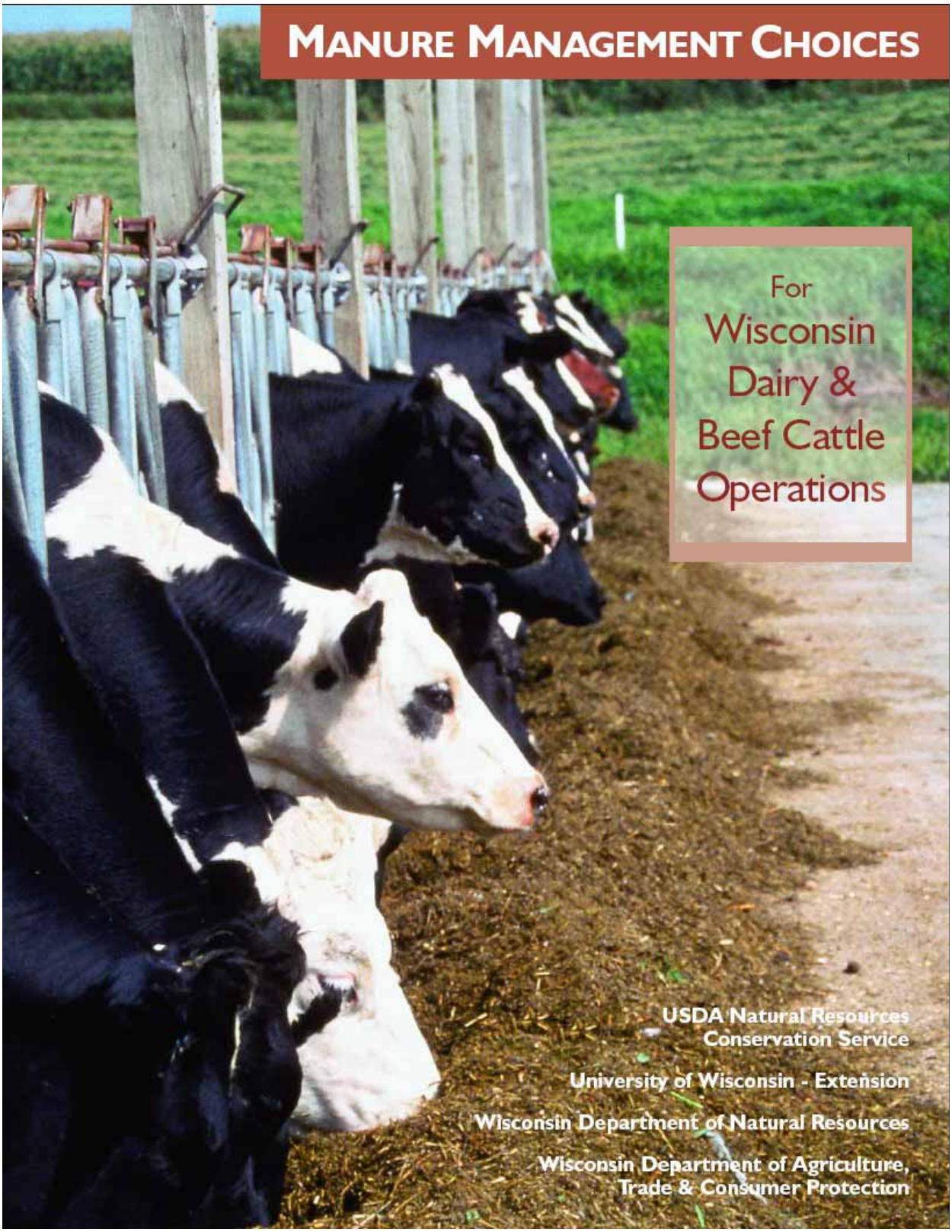
Center for Watershed Protection's Codes and Ordinances Worksheet

Rating Questions		Oldham	Notes	Oldham
22. Storm Water Outfalls				
a. Is storm water required to be treated for quality before it is discharged?	Unclear. In Ord. 05-830-326 Sec. 9(1)(b)(iv) - the developer is required to ensure that discharges do not contain sediment. No clear imposition for treatment practices in Ord.			
b. Are there effective design criteria for storm water best management practices (BMPs)?	Ord: 05-830-326 Sec. 2 (1) defines best management practices. In Sec. 7 (b) (iv) relating to perimeter control, BMP is imposed. However, under SWPP requirements, Sec. 10 (5) bb - the SWPP plan itself must only identify "management practices." Does not impose "BMP". Comprehensive Zoning Ordinance compels that a developer submit a Soil and Erosion Plan concurrently with their Master Plan PUD map. Sec. 230-060 D(1).			
c. Can storm water be directly discharged into a jurisdictional wetland without pretreatment?	Unclear. In Ord 05-830-326, for developments on greater than one acre, a SWPP must be prepared unless its under an exemption category in Sec. 5. However, Sec. 9 indicates that to release the SWPP permit, the developer must under Sec. 9 (d)(ix) ensure that detention and retention are stabilized at designed vol & conditions. However, the ordinance does not address jurisdicitional wetlands.			
d. Does the floodplain management ordinance restrict or prohibit development within the 100 year floodplain exist?	Yes. Ordinance KOC 06-360-411.			
Subtotal - Natural Areas				
TOTAL				

Meaning of Score

Leader - keep up the good work
Good - minor changes needed
Opportunities for improvement
Significant opportunities for improvement
Serious reform needed

Appendix C: Manure Management



Introduction

Farmers with dairy and beef cattle are familiar with the dilemma of manure management – the same nutrients that make manure a valuable fertilizer also make it a threat to Wisconsin's streams, lakes and groundwater. The challenge for the farmer is to manage manure in ways that maximize its benefits while protecting water resources.

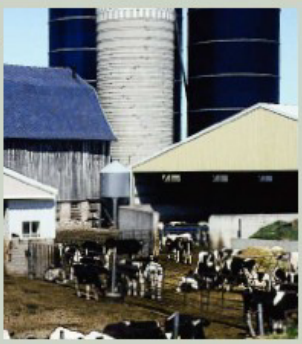
Your operation probably looks very similar to one of the management and housing systems shown on these two pages. This publication provides a guided tour of the water resource issues associated with each of these systems. It will help you look at your operation with an eye toward water quality, point out some common problems, and introduce practical management solutions.

Which system do you use?

Issues of concern (from pg. 4) for this system

Barn and lot

The traditional system in which cattle are rotated among the barn, lot and pasture. Typically, the barn has stanchions for the cows and a barn cleaner. Paved lots often include feed bunks.



- A Manure Application
- B Manure Storage
- C Animal Lot Control
- D Streambank & Shoreline Protection

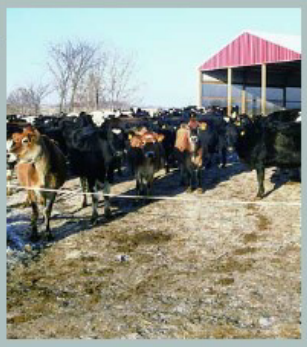
Confined Indoors

Dairy freestall housing and similar systems in which cattle are totally confined. Newer buildings have adjustable fabric sidewalls. Manure is typically collected in alleys.

- A Manure Application
- B Manure Storage

Confined Outside with Minimal Shelter

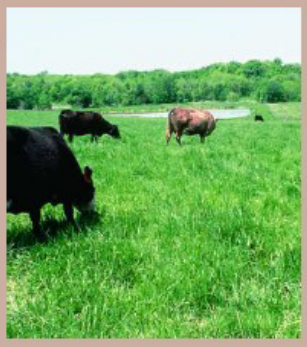
A common system for young stock and beef animals. Structure walls, wind break fences, trees or hay bales shelter animals from high wind but no roof protects animals from precipitation. Some systems have a roofed building with an open side. Manure builds up inside the building as a bedded pack and is removed several times a year.



- A Manure Application
- B Manure Storage
- C Animal Lot Control

Managed Grazing

Cattle grazed in rotation, mainly from April to November among different paddocks, which are mostly in sod and provide forage. Various housing options are used in winter.



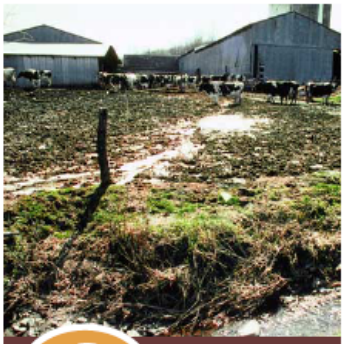
Other issues may apply, depending on how cattle are housed during the winter months.

- D Streambank & Shoreline Protection

4 Issues of Concern in Manure Management

A Manure Application

B Manure Storage

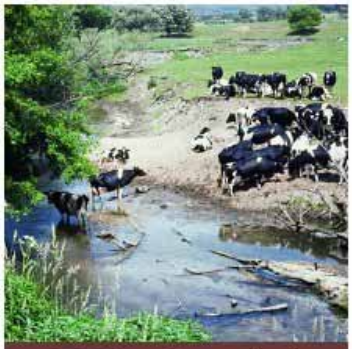


C Animal Lot Runoff Control

Careful spreading according to a nutrient management plan can protect water quality and help the farmer get the maximum fertilizer benefit from manure. The key is to put manure in known places at known rates so that it can be credited for its nutrient values. Overapplication of manure or runoff from spreading sites can result in pollution of streams, lakes or groundwater.

In livestock operations where cattle are confined, manure must be collected and eventually spread on the land. Manure storage is primarily a tool to make manure handling and nutrient management easier. Storage facilities allow the farmer to spread manure when conditions are environmentally safe, and to place manure so that nutrients can be credited and used by crops.

Wherever manure is concentrated and exposed to the elements, rain and melting snow can wash nutrients, bacteria and organic matter into nearby drainageways, and ultimately to streams and lakes. Polluted runoff is often associated with barnyards and exercise areas. Runoff control practices help to divert water away from manure-covered areas, retain manure on the lot and capture the runoff or filter it before it reaches a waterway. In addition to the water quality benefits, runoff controls create a drier, healthier environment for cattle, and make manure handling easier.



D Streambank & Shoreline Protection

Livestock operations that allow cattle unrestricted access to streambanks and shorelines can seriously damage water quality and habitat for fish and wildlife. Sediment from trampled banks clouds the water, manure is deposited directly in the water, and the lack of vegetation allows more pesticides and nutrients from cropland to run off into the water. Banks stripped of vegetation are prone to erosion. Several practices can allow cattle access to water while protecting banks and shorelines.

Which Issues Do I Need to Consider?

More than likely, you recognize some or all of the issues listed at left. Depending on your management and housing system, you may need to address one or more of these issues.

	Manure Application	Manure Storage	Animal Lot Runoff Control	Streambank & Shoreline Protection
Barn and Lot	A	B	C	D
Confined Indoors	A	B		
Confined Outdoors/ Minimal Shelter	A	B	C	
Managed Grazing	(Other resource issues might apply, depending on how cattle are housed during winter months.)			D

How to Use This Publication:

The following pages present photos and illustrations of popular, practical options for runoff control, manure storage, land application and streambank and shoreline protection. Under each option you will see one of three symbols:

The + indicates an advantage of the option.

The - indicates a disadvantage of the option.

The ☆ indicates additional information that is neither an advantage or disadvantage, but is something to consider.

Nutrient Management Plan

The key is to spread manure in known places at known rates so that it can be credited as fertilizer. The easiest way to do this is to handle and spread manure according to a nutrient management plan. Applying manure according to a plan allows you to maximize the use of nutrients in manure and legumes, and cut back on commercial fertilizer purchases. A nutrient management plan includes the following:

Soil test – to determine the nutrient status of fields;

Manure test – to determine the nutrient content of the manure (book values are acceptable for daily hauled manure; stored manure should be tested);

Manure spreading plan – to identify which fields get manure, how much they get and when they get it. It also identifies areas with manure spreading limitations (such as land with excess nutrients, areas close to bodies of water, steeply sloped fields, and fields with thin soils above creviced bedrock).

To protect water quality, a nutrient management plan is essential. Information and assistance in developing a plan is available from crop consultants and local offices of UW-Extension, the Natural Resources Conservation Service, and county Land Conservation Departments. If manure is applied according to a nutrient management plan, any of the common application methods can be effective.

Manure Spreader

Spreaders are typically used for solid manure. However, many farmers spread semi-solid manure with a liquid-tight, end-gate spreader or a flail discharge V-spreader.

- \+ Relatively inexpensive
- \+ Low maintenance
- \- Difficult to apply uniformly and difficult to reach fields in winter
- \- Odor can be a problem
- * Incorporation within three days increases available nitrogen and reduces runoff and odors
- * Spreader should be calibrated (weighed) to determine the amount of manure in a load

Tank Wagon (surface spread)

Tank wagons are used with liquid manure and milking center wastes.

+ Uniform application easier to achieve compared to a spreader
- Soil compaction may be significant
- Odor can be a problem
* Incorporation within three days will increase available nitrogen and reduce the chance of runoff and odor

Tank Wagon with Knives or Disks

Tank wagons with incorporation might be preferable to broadcast tank wagons because they eliminate the need for later incorporation.

+ More uniform application rate than surface spreading
+ Less odor during application than other methods
- Knives/disks can bury residue, conflicting with residue requirements in low tillage systems
* Cropland surface is left rough after injection

Flexible Drag Hose

The drag hose is the quickest way to apply manure from large storage facilities on relatively flat fields.

+ Fast
+ Less soil compaction compared to tank wagons
- May require permission to cross property lines
- Works best when transport distance is less than two miles
- Limited field accessibility may lead to build-up in nearby fields
* System mainly used by custom handlers

B Manure Storage OPTIONS

On many farms storage is the preferred manure-handling option. It eliminates the inconvenience of daily hauling, and allows manure to be conveniently stockpiled in a single facility until conditions are environmentally safe and agronomically correct for field application. Whether manure is hauled and spread daily or stored and spread seasonally, it should always be spread according to a nutrient management plan.

All storage systems have certain disadvantages. The costs are seldom offset by the fertilizer savings, facilities require unloading during busy spring and fall seasons, and they can pose water quality and safety hazards if not designed and maintained properly. Before making a decision on manure storage, take a careful look at your operation. Consider siting or design limitations on the farm, possible future changes in your operation (because storage systems are difficult to modify once built), bedding, how you will transfer manure into and out of storage, odors, and how much time and labor you can devote to manure handling. Also consider local and state regulations that might affect the project.

Four types of storage are common in Wisconsin:

Can I Afford Storage?

Cost is a big factor in deciding whether or not to build a storage facility. Typical costs run from $100 per cow for earthen ponds to $1,000 per cow for above-ground tanks. Various cost-share programs may reduce the initial investment, but annual costs to finance and operate the system can still be significant.

Walled Enclosure

- \+ Can handle solid, semi-solid or liquid manure
- \+ Will fit into most farm layouts and are often located next to barnyards for easy loading
- \- Moderate to high cost
- * Some walled enclosures have roofs to keep out direct precipitation

Storage Pond

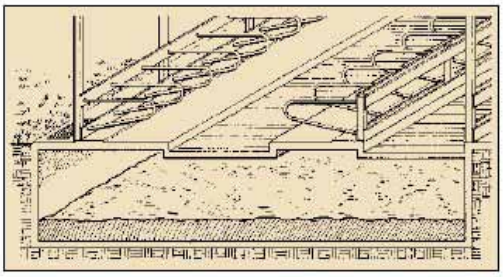
+ Low to moderate cost depending on liner requirements
- Site limitations are more likely to limit design options compared to other storage options
* Stores liquid manure
* Most appropriate for farms with deep soil and adequate building space

Above-Ground Tank

+ Suitable for site with shallow soil or high groundwater
+ Prefabricated system that fits most farm layouts
+ Most volume in the smallest area
- High cost
* Stores liquid manure

Under-Floor Storage

+ Low labor requirement
+ Reduced volume because precipitation does not enter storage
- High cost
- Limits bedding options
* To avoid gas build-up, adequate ventilation is required



C Animal Lot Runoff Control OPTIONS

Preventing runoff from areas where manure is concentrated involves two strategies:

– Keep clean water from flowing across manure-covered areas
– Filter polluted runoff

Four practices are common in Wisconsin:

Rain Gutters, Downspouts & Outlets

Gutters and downspouts direct clean roof water away from manure-covered areas. In some cases downspouts are connected to an underground tile outlet to carry water away from the heavy traffic areas.

+ Low cost
+ Can be custom fitted to most buildings
+ Helps create drier, cleaner yard
+ Gutters on the ground (photo at right) eliminate problem of ice and snow slide
- Ice can plug gutters and downspouts and sometimes damage them; snow sliding from roofs can also cause damage
* Gutters must be cleaned to keep them free of debris
* A roof over the yard helps keep precipitation off, but lack of sunlight may promote sloppy conditions

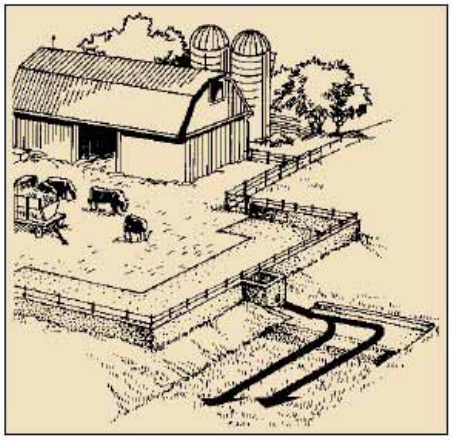
Diversion

A clean water diversion is an earthen ridge or channel built across the slope upgrade of barnyards or feedlots.

+ Low cost
+ Carries water away and helps create drier, cleaner yard
- Might be a traffic obstacle
* If the barnyard is at the bottom of a slope, a diversion should be the first step in minimizing runoff problems

Settling Basin

A wall with an outlet box at the lower end of the yard allows runoff water to leave the yard at a controlled rate. A concrete slab along the inside of the wall allows trapped manure to be scraped and removed.



- \+ Can result in a cleaner, drier yard
- \+ Good retrofit for an existing barn/lot
- \+ Cleaning the yard and collecting the manure is easier, especially if entire yard is paved
- \+ An area for short-term manure stacking can be designed adjacent to the settling area
- \- Temporary ponding after a storm will limit use of the yard
- \- May limit future management changes
- \- Can be expensive
- \- Runoff water leaving the yard contains organic particles and dissolved nutrients
- * Periodic maintenance is required, including scraping the yard (especially before storms), cleaning the outlet box after a storm and replacing deteriorating boards

Filter Strip

Water leaving a settling basin or barnyard is directed to a grass filter strip or buffer area that traps nutrients and suspended material. A spreader above the filter strip distributes the water so it flows evenly across the filter.

- \+ Inexpensive to install
- \+ Can effectively remove solids and nutrients from runoff water
- \- Size and location of the filter strip can be an inconvenience
- \- Filter strips can gradually become clogged and nutrients can build up in the soil
- \- Water percolating through the filter can carry nitrate to groundwater if soils are highly permeable
- * Maintenance includes cutting the grass and removing clippings several times a year, and regrading and reseeding areas that have died off or thinned

D Streambank & Shoreline Protection OPTIONS

When cattle are concentrated along streambanks and shorelines, bank erosion and manure threaten water quality. Excluding cattle usually means fencing the cattle away from the water, allowing controlled access for drinking and crossing, and in some cases providing an alternative source of water. The management and financial benefits of livestock exclusion – cattle safety and health, reduced erosion along cropland edges – are harder to pinpoint than with other manure management practices. And with time and money in short supply on many farms today, these practices are not often a high priority. However, the long-term benefits of cleaner water, improved fish and wildlife habitat and a positive public perception of farming should not be ignored.

Livestock Exclusion

Exclusion usually means fencing. The type of fencing depends somewhat on site conditions, but single or double-strand electric fence with flexible line posts is probably the most common and economical choice. Woven wire tends to trap debris and be damaged during flooding.

- \+ Allows vegetation to stabilize the bank and shield it against further erosion
- \+ Improved fish and wildlife habitat
- \- Can be expensive, depending on the length of fencing required
- \- Severely eroded banks may need to be stabilized by grading and seeding or placement of rip-rap prior to fencing
- \- Fencing in flood-prone areas requires high maintenance
- * Undesirable tree growth may need to be controlled; however, problems can be minimized by planting desired grasses and seedlings during fence installation

Crossings

Crossings or access ramps are typically built of gravel or roughened concrete. Swing gates or suspended panels keep cattle from moving up or down stream, but do not permanently block the stream.

- + Cattle have access to the stream for drinking
- + Hard surface crossings provide stable footing and keep cattle from churning up the bottom
- + Crossings allow equipment to easily cross a stream
- + Cattle are less likely to linger in a stream when using a crossing
- - Cattle drinking from the stream are more exposed to waterborne diseases than cattle drinking from cleaner sources

Watering Alternatives

If cattle are completely excluded from the water, an alternative water source may be needed.

- * Pasture pumps or hydraulic rams can bring water to cattle if no stream access is provided. Pumps can be cattle-powered, solar-powered, gas-fueled, or electrically powered

A Final Word

Taking all the steps necessary to maximize manure value and protect water resources can seem like a formidable task. But assistance is available at every step.

Staff with the agencies listed here can help you sort through the options, discuss nutrient management planning, and provide more detailed publications on all aspects of manure management. Cost-sharing is often available, greatly reducing the cost to the landowner.

Contact your local NRCS office, USDA Service Center, county Land Conservation Department or UWEX office for more information on manure management or conservation assistance.

Appendix D: Lexington-Fayette Conservation Easement Agreement Brochure

- Construction and repair of ponds, springs, etc. (*)
- Composting or burning (as permitted by law)
- Outdoor recreation (non-commercial)
- Construction, repair and maintenance of structures and facilities
- Leasing of farm for permitted uses
- Farm Office
- Other activities (to be negotiated)

5. **Notification and Approval**- Certain activity will require the landowner (grantor) to notify the Rural Land Board staff 30 days ahead of time. The Rural Land Board has to respond within 30 days of getting the request. Make sure you understand which activities require notification and Rural Land Board approval.
6. **Grantee's Remedies**- If the terms of the Conservation Easement are violated, the Rural Land Board will notify the landowner and seek corrective action within 30 days. Options are given on ways to resolve violations.
7. **Access-** **THE CONSERVATION EASEMENT WILL NOT GRANT PUBLIC ACCESS.** However, landowners can agree to allow public access if they choose.
8. **Costs, Liabilities, Taxes and Environmental Compliance-** The landowner (grantor) will still be responsible for all costs and liabilities of the property.
9. **Extinguishment of Easement-** This section lists the ways and conditions under which the Conservation Easement can be removed or released. At a minimum, it will be 25 years before the Conservation Easement can be extinguished when using local or state funds and 30 years if federal money is involved. It's very important to fully understand this section. The Purchase of Development Rights Ordinance lists the details of the procedure.
10. **Mortgages-** All liens and mortgages must be acknowledged and the holders must agree to subordinate their interests to the Conservation Easement.

11-16. Additional Legal Requirements-

Legal issues such as: Assignment and Backup Grantee, Subsequent Transfers, Estoppel Certificates, Notices, Recordation and General Provisions should be understood before signing the agreement.

Other Notes:

- Be sure you understand how the Conservation Easement will affect your future land and estate planning.
- More information and a copy of the complete Conservation Easement "Template" is available at:
  www.lfucg.com/pdr

For more information call or email the PDR staff:
Maner Ferguson, PDR Program Manager
(859) 425-2227 or mferguso@lfucg.com
Billy F. Van Pelt, RLA, ASLA
PDR Program Administrative Officer
(859) 425-2226 or bvanpelt@lfucg.com
Facsimile (859) 258-3839

Lexington-Fayette County

Horse Capital of the World

Rural Land Management Board

Purchase of Development Rights Program

Conservation Easement Agreement Summary

2006

Q: What is the Deed of Conservation Easement?

A: It is a legal agreement between the landowner (Grantor) and the Rural Land Board (Grantee) in which the landowner will remove (by sale or donation) the development rights from -his or her property. Sellers of development rights will be compensated the difference in the agricultural value of the land if it were developed in a non-agricultural use. Donation of development rights will offer tax savings.

Q: Do I have to hire an attorney?

A: Your decision to participate in the program will affect the property for generations to come and your estate. Careful planning should involve family members, financial planners and an attorney. Although hiring an attorney is not mandatory, **the Rural Land Board strongly recommends that you retain counsel**.

The following summary does not contain every item found in the Conservation Easement and is intended to help interested landowners get a general idea of what the agreement may involve. Make sure you read and understand the full document before signing.

Deed of Conservation Easement Summary

Opening Statement- Includes many "Whereas" which refer to various state and local laws and policies that promote rural land protection.

1. **Purpose**- Describes what the Conservation Easement does (preserve agriculture, scenic, historic, cultural and natural resources, and prevents development).

2. **Rights of Grantee- (i.e. the Rural Land Board)**- This section describes what responsibilities the Rural Land Board will have in monitoring the commitments made in the Conservation Easement. This includes the right to inspect the property (with advance notice and the property owner's permission). The Rural Land Board will have the authority to seek enforcement of the Conservation Easement agreement if needed.

3. **Prohibited Uses**- This is a very important part of the agreement. Certain activities are considered to go against the purpose and "spirit" of the PDR program; however, "Normal" agricultural uses and activities will continue to be allowed. Some examples of prohibited uses are:

- Mining and Quarrying
- Non Agricultural Commercial or Industrial uses
- Removal of "protected trees"
- Underground storage of hazardous materials
- Improper use of chemicals
- Junkyards or illegal dumping
- Illegal Signage (Billboards for example)

4. **Reserved Rights**- This section lists uses and activities in which the present and future landowner will be permitted to engage in. Certain uses or activities will require the prior approval of the Rural Land Board (*).

- Agricultural production
- New construction of 1 principle single family residence(s) or tenant homes for employees (*)
- Building additions to existing homes (*)
- The use and enjoyment of the property
- Selective cutting of trees or vegetation
- Drilling for water for farm use