United States and State of Indiana v. City of Fort Wayne, Indiana

Consent Decree
Appendix 7

State Supplemental Environmental Project Plans

CITY OF FORT WAYNE, INDIANA

FORT WAYNE CITY UTILITIES

Supplemental Environmental Projects

Septic System Elimination Program
And
RAIN GARDEN DEMONSTRATION AND INCENTIVE PROGRAM

TO:

The Indiana Department of Environmental Management

December 2007

The City of Fort Wayne (City) provides municipal sewage treatment and/or conveyance services to nearly 85% of the developed area in the Fort Wayne Metropolitan area. This represents approximately 80,000 sanitary sewer customers. The City system includes the operation of a sewage treatment plant with a current peak capacity of 60 MGD and over 1,100 miles of sanitary sewer piping. The central area of the City is served by a combined sewer system.

The City's Long-Term Control Plan (LTCP) contemplates watershed-based solutions to control combined sewer overflows (CSOs). These solutions will be implemented over the next 18 years as described in the LTCP. In an effort to continue improving water quality and to enhance public health and the environment, the City has identified non-CSO related pollution sources that have the potential to impair the City's CSO receiving streams. The two independent State Supplemental Environmental Projects (SEPs) described below are intended to help address two of those non-CSO related pollution sources.

STATE SEPTIC SYSTEM ELIMINATION PROGRAM SEP

Project Overview and Purpose

For the first of its two independent State SEPs, the City proposes to undertake efforts focused on the elimination of failed or failing septic systems located throughout its service area with a focus on those located within developed/urban areas. This SEP will include a four-year $126,000 investment in sanitary sewer line extensions that will eliminate 42 existing septic systems in high priority areas within said four years. The City is not being required by any regulatory agency, ordinance of any agency, or as a result of any existing litigation or settlement to eliminate septic systems via public sewer extensions.

There are currently approximately 1,600 septic systems within the City's sanitary sewer service area. Of these approximately 1,600, approximately 500 are located within the serviceable area of Fort Wayne's City limits. Septic systems have a limited life and generally afford unpredictable performance over time. Failing septic systems often lead to human exposure to bacteria, including E. coli, which ultimately appears in neighborhood streams and ditches and even in yard areas when systems 'boil' up out of the ground. Having these conditions within densely developed areas creates a greater risk of human exposure. To better mitigate these risks to area waters and residents, the City has developed this proposed SEP which will serve to eliminate septic systems within and near the City limits.

The City has identified and evaluated approximately 130 areas inside and/or near the City service area where clusters of homes are served by private on-site waste treatment or "septic" systems. The attached Exhibit identifies these potential septic relief areas. The clusters may contain as few as three or four or as many as 100 or more individual septic systems. Fort Wayne has evaluated these cluster areas of septic systems for serviceability, constructability and environmental impact.

In septic system neighborhoods, most home's sewage exits from a tank system on the private property via a gravity discharge pipe. These pipes may discharge into a common pipe (often

referred to as a septic drain line or field tile) that conveys the sewage to the nearest sewer (if one exists) or to the nearest open ditch, stream, river or other waterway. In un-sewered areas, these septic system drain lines can convey septic waste thousands of feet underground through piping before the effluent is ultimately discharged into an open waterway. While some discharging septic systems that have been properly maintained may discharge effluent that meets water quality standards, many systems discharge high levels of bacteria that can eventually make its way to an area ditch, drain, stream or river. The proximity of septic systems to local waterways can be observed on the attached Exhibit.

Research performed by Purdue University estimates that one-quarter of the septic systems in the State have failed or are failing. They have also estimated that every failing system can discharge more than 76,650 gallons of untreated wastewater to the groundwaters and surface waters per year. That means that the estimated 500 failing septic systems in the Fort Wayne area are introducing approximately 38,000,000 gallons of raw or only partially treated sewage into the environment annually.

Untreated wastewater contains excessive nutrients (nitrogen and phosphorus) that can harm native plant and fish populations and it can choke off the oxygen supply in surface waters and eventually lead to gradual environmental degradation. Untreated or partially treated wastewater can also lead to microbial populations in these surface waters exceeding regulatory full-body contact standards.

Fort Wayne's State Septic System Elimination Program will eliminate this risk within the areas of septic system removal and reduce impacts to local groundwater and surface waters by transporting this wastewater to the City's Water Pollution Control Plant for treatment. It is estimated that this program will account for the elimination of approximately 8% of the septic systems located within the City and its service area of the City.

City staff will oversee the implementation of the Septic System Elimination Program through its Capital Improvement Program. This will include planning, designing, bidding and managing the construction of the projects. The program will also entail working with the various neighborhoods and property owners within the identified areas by holding pubic information meetings and sending out mailings. A cost-share program, as noted below, will be adopted and administered by the City that will provide a sanitary sewer utility subsidy for each affected property.

Project areas will be selected based on various criteria including: failure rate of existing septic systems and associated impacts (as provided by the local Board of Health), impact on the City's drinking water source (St. Joseph River), constructability and degree of property owner interest and involvement in the project

Project Scope, Schedule and Cost

The total engineering and construction cost for the elimination of 42 septic systems is estimated to be approximately $599 thousand. The City will adopt a cost share program that provides a sanitary sewer utility subsidy for each benefited property. This City subsidy will be applied

toward engineering and construction-related costs for the various projects and is estimated to be $126,000 (at a minimum). This contribution of $126,000 represents approximately 21% of the estimated cost of the engineering & construction portions of the program. The remaining approximately $473 thousand is anticipated to be paid by the benefited property owners. Additionally, the City will offer and administer a robust finance program for property owners that will include multi-year financing options to assist individual property owners in paying for their share of the cost of the sanitary sewer extension project. City administrative costs for overall program management and the financing program implementation are not included in the $126,000 program costs, all of which represents capital costs (no one-time non-depreciable expenditures or annual recurring costs are included within the estimated $126,000 contribution).

Consistency with SEP Policy

The proposed SEP described above is consistent with the IDEM's Supplemental Environmental Project Policy. Notably:

- This SEP proposes work that will be environmentally beneficial to Fort Wayne's receiving waters and protective of public health.
- The City agrees to undertake this project in settlement of an enforcement action.
- The City is not otherwise legally required to perform this project.

Progress Reports

The City will submit to IDEM progress reports upon implementation of the SEP project along with each milestone report required under the Consent Decree. Each progress report will provide the status of the State Septic System Elimination Program, and will provide information about any elements of the program that were completed during the reporting period.

Modification/Substitution of Projects

The City may modify the project or may substitute a similar project for the State Septic System Elimination Program identified above with the advance written approval of IDEM provided that the alternative SEP represent costs at least equal to those described herein for the State Septic System Elimination Program.

Substantial Compliance

The City will be in compliance with the requirement to implement this SEP provided it spends $126 thousand toward septic tank elimination by December 31, 2011 and documents such expenditures in the required SEP Completion Report.

SEP Completion Report

Within 120 days after completion of the SEP and/or the expenditure of at least $126 thousand toward the same, the City shall submit to IDEM a final SEP Completion Report documenting the

City's expenditures on toward this SEP and its completion. Upon IDEM's written acceptance of that completion report, the City shall be deemed to have satisfactorily completed this SEP.

RAIN GARDEN DEMONSTRATION AND INCENTIVE PROGRAM SEP

In addition to the State Septic System Elimination Program SEP described above, the City proposes to perform a SEP focused on reducing water pollution through the creation of demonstration rain gardens in learning environments and other public locations and developing incentives for the creation and maintenance of residential rain gardens. Much of this SEP project would be carried out within Fort Wayne's combined sewer area, although some rain gardens would be installed in suburban areas served by separate storm sewers.

Project Overview and Purpose

The City is proposing a rain garden program that would first establish demonstration rain gardens at a number of public locations, including public parks and schools, in the Fort Wayne area. The demonstration gardens would be designed and plants would be paid for by the City, and would be created through a cooperative effort involving Fort Wayne City Utilities, the Purdue University Cooperative Extension Agency's Master Gardener program, Indiana University-Purdue University Fort Wayne, area school corporations, the Fort Wayne Parks and Recreation Department, teachers and students. As they are being established and maintained, the gardens at schools would be used as part of an environmental curriculum developed within the SEP. A second part of the rain garden program would provide financial incentives for residential property owners who would agree to establish and maintain rain gardens on their own properties.

Rain gardens have the potential to decrease stormwater runoff and thus peak stream flows and the amount of stormwater going into combined sewers in some areas. The EPA website states that green infrastructure, including rain gardens, can protect surface waters and drinking water supplies. It goes on to site levels of pollutant removal levels for metals, phosphorus and nitrate that bioretention can be expected to accomplish (see attached).

The Center for Neighborhood Technology in 2007 published "Green Infrastructure Performance: Results of Monitoring Best Management Practices." The paper cites a paired watershed study done in Burnsville, MN that showed installation of rain gardens within a watershed reduced runoff volumes by 89 to 92 percent when compared with a watershed where no rain gardens were installed.

Research literature shows that rain gardens are particularly effective at reducing solids and nutrients in Stormwater runoff from residential yards and parking lots. A study at the H.B. Fuller lot in St. Paul, MN cited in a presentation by EPA Region 5 found that a wetland area built into a parking lot to capture runoff reduced stormwater runoff volume by 73%, particulate matter export by 94% and phosphorus loading by 70%. (Van der Kloot, 2006). Research done by the Center for Watershed Protection found that "bioretention facilities" installed in parking lots reduced total phosphorus measured in runoff by 65%, total nitrogen by 49%, and metals by 95 – 97% (Quigley and Lawrence, 2001).

A study conducted in Haddam, CT involving replicate rain gardens assessed whether the creation of a saturated zone in a rain garden improved retention of pollutants. The study found that

concentrations of nitrite+ nitrate-N, ammonia-N, and total-N (TN) in roof runoff were significantly reduced by the rain gardens. Rain garden mulch was found to be a sink for metals, nitrogen and phosphorus. (Dietz and Clausen, 2006)

Based on this cursory review of research literature, and based on the fact that rain garden incentive programs are specifically cited in the document "Project Ideas for Potential Supplemental Environmental Projects" updated in July of 2006 and provided to EPA administrators and staff, Fort Wayne proposes the use of rain gardens for the reduction of storm water and storm water pollutants discharged to sewer systems. Further, based on the idea that concentrations of nutrients and metals in water bodies can pose a human health threat, use of a technology that reduces these pollutants should reduce human health threats. Fort Wayne would expect stormwater volume and pollutant reductions in localized areas to be similar to those found in the studies cited above.

Project Scope, Schedule and Cost

The rain garden demonstration and incentive program would begin with the establishment of criteria to be used to select public sites for demonstration rain gardens. Fort Wayne would establish demonstration gardens in the three major CSO-impacted watersheds. The City would work with the Fort Wayne Parks and Recreation Department, public and private school corporations, the Indiana University-Purdue University campus and the Purdue Cooperative Extension Service to identify appropriate locations for rain gardens where they can have the greatest impact on stormwater quantity and quality management. These public agencies would be asked to designate areas on property owned by them where the City could install a demonstration rain garden. Fort Wayne does not propose to purchase any property as part of this program. The City of Fort Wayne would completely fund the installation of 20 demonstration rain gardens of approximately 2,000 square feet each. Approximately 40% of the demonstration gardens will be located within the City's combined sewer area. The estimated cost for a 2,000 square foot rain garden is $12,000 based on a single quote acquired from a Fort Wayne based environmental design and restoration company and includes the cost of design and plants. Labor costs are not included as labor is expected to be done by volunteers. Thus, the total investment by the City in demonstration gardens would be $240,000.

The City would also fund the development of an education module to be used exclusively by students in the schools where rain gardens are located. The curriculum would be customized for elementary, middle and high school students. The curriculum is not targeted at the general public and would not be distributed beyond the schools where rain gardens have been installed as a result of this rain garden demonstration program. Because the curriculum material is not intended for general public educational awareness, this proposal should be consistent with Section D, Part 9(a) of the "EPA Supplemental Environmental Projects Policy."

A consultant will be hired to develop a curriculum that will correlate with Indiana science standards but will also include modules that can be used to teach math, language arts and other subjects. The curriculum will be geared to the age of the students attending the schools where gardens are installed. The curricular material will include general information about what a rain garden is and how it works, sizing, simple soil type and infiltration evaluation, basic hydrology,

plant selection (based on weather zone), native plants and plant history of the area, awareness of invasive species, principles of landscape architecture and visual design principles.

The estimated cost for curriculum development is $50,000. This estimate for the development and printing of an education module is based on the cost approved by the Indiana Department of Environmental Management for a watershed curriculum for use in schools being developed by the St. Joseph River Watershed Initiative.

Once the gardens are installed, students and teachers in the specific schools where the gardens are located will be asked to maintain the gardens. This may include pulling weeds, adding plants, moving mulch, minimal watering, trimming, and preparing the gardens for winter. The school curriculum will incorporate information about how plants use nutrients, plant seeding and reproduction and the risks and management of invasive species.

The materials developed as part of the school curriculum will be provided only to the participating school corporations and their teachers. While volunteers from the City and from the Master Gardener's program may be recruited to assist with "teaching" the curriculum or maintaining the garden, the purpose of using volunteers is only to help educate students in classrooms in schools where rain gardens are located. Volunteers will not be trained as a means to do general public educational awareness, but to educate students. The rain gardens would be installed and education module available for use by December 31, 2014.

The City will promote the installation of rain gardens on private residential property by offering an incentive of $100 each to homeowners who install rain gardens. Homeowners would be required to construct a rain garden in accordance with general guidelines and standards established by the City and would be asked to maintain the gardens following construction. Once the garden is installed at the property owner's expense, the property owner could apply to the City to receive the $100 incentive as a reimbursement. The property owner could apply the reimbursement from the City to offset some of the plant or installation costs for the rain garden. Fort Wayne has set a goal of facilitating the creation of 1,000 rain gardens by the end of 2014.

The City will create a "how to" manual that would be provided to home owners. It would include the City's guidelines for sizing the garden, making soil amendments, plant selection and maintenance. Development and printing of the how-to manual will cost an estimated $30,000. Graphic design and printing costs for the "how to" manual are based on costs for similar publications produced by the City of Fort Wayne. The salary cost includes labor and burden for one employee who would research and write the manual. In developing the manual, the City will consult the Indiana Storm Water Quality Manual (www.idem.in.gov/stormwater).

The City's total investment in rain garden demonstration and incentive program through this SEP will be $420,000. Program cost details and funding sources are shown in the table below:

	Demonstration Rain Gardens 20 @ 2,000 sq. ft.	Educational curriculum and material for school	Residential rain garden incentives for 1,000	Develop and print 1,000 copies of rain garden "How	Total cash or in kind

	each @ $12,000	students	gardens at @$100 each	To" manual 40 hrs staff time at $40 per hour, $5,000 to graphic designer for layout, $23,400 for printing 1,000 @ approx $20 per book plus set up	
City of Fort Wayne	$240,000 cash to contractor	$ 50,000 cash to contractor	$100,000 cash payments to property owners	$1,600 salary $ 28,400 cash payment to contractor = $30,000	$420,000 cash
Fort Wayne Community and other area public and private school systems In-kind support	10 garden spaces @ 2,000 sq. ft. each @ land price of $1.00 per sq. ft. = $20,000	Advising on curriculum requirements and appropriateness of material for various age groups 40 hours at $40 per hour = $1,600	$0	$0	$ 21,600 in-kind
Purdue Cooperative Extension Service Master Gardener Program In-kind support	$0	Review of material for appropriateness for area soils and weather conditions, advising on maintenance, classroom presentations 100 hours @ $25 per hour = $2,500	$0	Review of material for appropriateness for area soils and weather conditions, constructability and functionality based on sizing and preparation suggested in manual 60 hours @ $25 per hour	$ 4,000 in-kind

				= $1,500	
Indiana University/ Purdue University Fort Wayne In-kind support	10,000 sq. ft of rain garden space @ land value of $1.00 per sq. ft = $10,000	$0	$0	$0	$ 10,000 in-kind
Fort Wayne Department of Parks and Recreation In-kind support	10,000 sq. ft. of rain garden space @ land value of $1.00 per sq. ft. = $10,000	$0	$0	$0	$ 10,000 in-kind
Total cash investment	$240,000	$50,000	$100,000	$ 30,000	$420,000
Total anticipated in-kind (non-monetary) support	$ 40,000	$ 4,100	$0	$ 1,500	$ 45,600

Consistency with SEP Policy

Fort Wayne's proposed Rain Garden Demonstration and Incentive Program is consistent with IDEM's Supplemental Environmental Project Policy. IDEM's Supplemental Environmental Project Policy (April 1999) seeks to encourage and obtain environmental and public health protection and improvements that would not occur without the incentives provided by the Policy. IDEM encourages the use of SEPs that are consistent with its Policy because these voluntary

supplemental environmental projects offer significant additional environmental or public health protection, beyond what is required in settlement of an enforcement action.

City's proposed SEP is consistent with IDEM's Supplemental Environmental Project Policy in that:

- There is a direct relationship between the underlying consent decree concerns (river and stream water quality) and the human and environmental benefits that will result from the SEP. The installation of a total of 120 rain gardens can reduce the rate of stormwater runoff from public and residential properties, thereby reducing the flow of stormwater and the pollutants it carries. In combined sewer areas, the use of rain gardens can reduce the amount of stormwater going into combined sewers.
- This SEP reduces risks to public health and the environment.
- The City, while not legally obligated to implement this project, will promote pollution prevention and environmental justice by creating this SEP.

Rain gardens developed under this program are intended to be for demonstration purposes only and for the enjoyment of those who may come into contact with them.

There will be no financial arrangement between the City of Fort Wayne and Purdue University for such a garden is one is developed on the campus or on the property of the Purdue Cooperative Extension Service. The City is not proposing to pay the University for the right to locate a rain garden on any property owned by the University. Any support that the University and its staff may provide will be voluntary and in-kind. If required by the University, (or any school corporation where a demonstration rain garden is proposed) and City may enter into an intergovernmental agreement that would allow the City to install a rain garden on property designated by the University (or other partner agency). It is the City's hope that such an agreement will not be needed and that volunteers from the University will want to build and plant the rain garden based on a design provided and paid for by the City.

Rain garden incentive programs are specifically cited in the U.S. EPA memorandum titled "Project Ideas for Potential Supplemental Environmental Projects" from Assistant Administrator Granta Y. Nakayama dated July 20, 2006.

Progress Reports

The City will submit to IDEM progress reports upon implementation of the SEP project along with each milestone report required under the Consent Decree. Each progress report will provide the status of the Rain Garden Demonstration and Incentive Program components identified above, and will provide information about any elements within those projects that were completed during the reporting period.

Modification/Substitution of Projects

The City may modify the project or may substitute a similar project for the Rain Garden Demonstration and Incentive Program identified above with the advance written approval of

IDEM provided that the alternative SEP represent costs at least equal to those described herein for the Rain Garden Demonstration and Incentive Program.

Substantial Compliance

The City will be in compliance with the SEP requirements provided it spends a total of $420,000 toward the installation of demonstration rain gardens and rain garden incentives by December 31, 2014 and documents the expenditures in the required SEP completion report.

SEP Completion Report

Within 120 days after either 1) completion of the Rain Garden Demonstration and Incentive Program, or 2) the expenditure of at least $420,000 toward accepted alternative projects the City shall submit to IDEM a final SEP Completion Report documenting the expenditures and the projects that have been completed.

RESOURCES AND REFERENCES

Dietz, Michael E. and Clausen, John C. "Saturation to Improve Pollutant Retention in a Rain Garden," *Environ. Sci. Technol.*, 40 (4), 1335 – 1340, 2006

Green Infrastructure Performance: Results of Monitoring Best Management Practices. 2007. Center for Neighborhood Technology, Chicago, IL.

Quigley, Martin F. and Lawrence, Timothy. *Multi-Functional Landscaping: Putting Your Parking Lot Design Requirements to Work for Water Quality*. 2001. Ohio State University, Columbus, OH.

Van der Kloot, Jim. "Green Brownfields Retrofit," *Collaborative Cleanups II*, Bretton Woods, NH, May 4-5, 2006.

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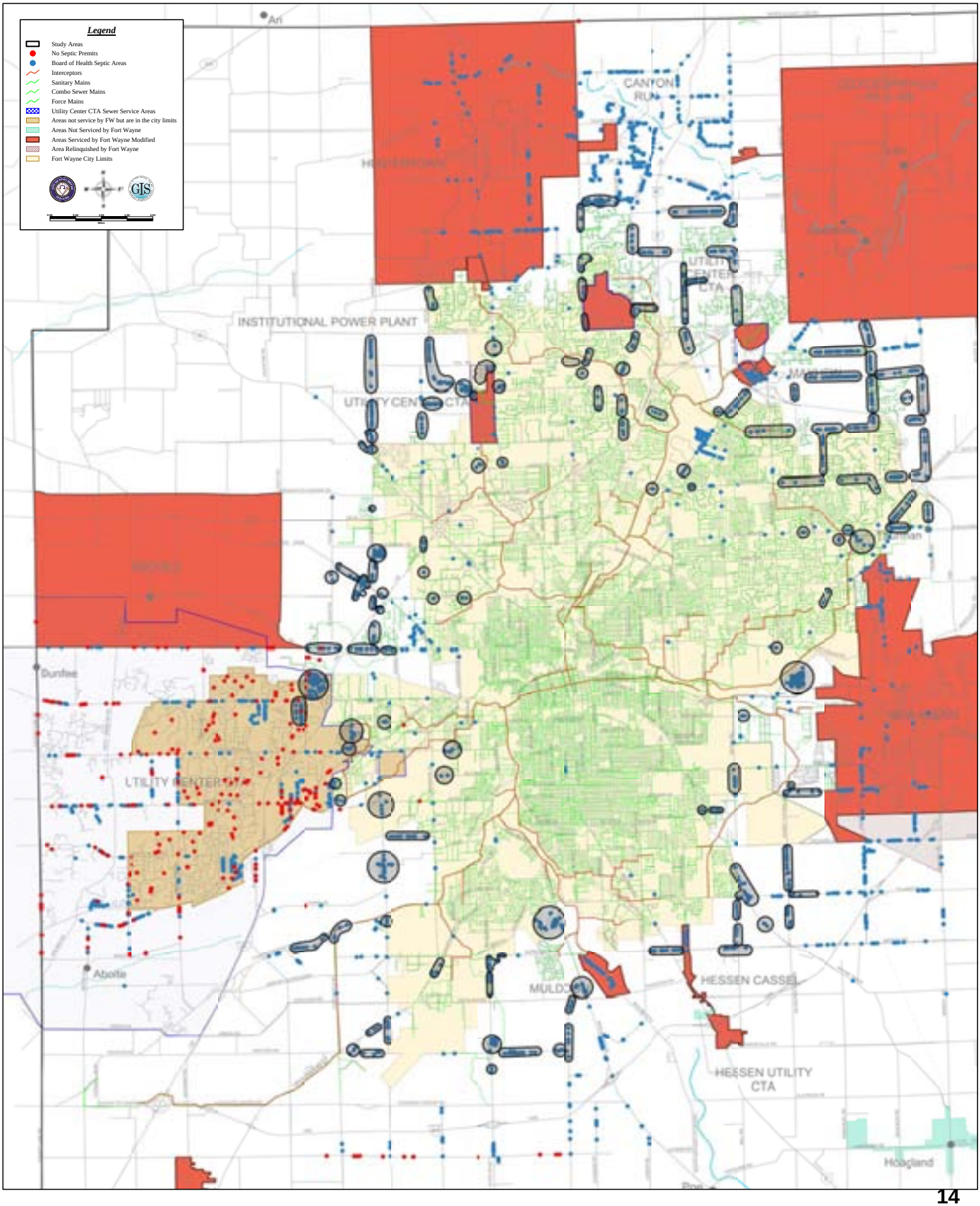
Legend
Study Areas
No Septic Premits
Board of Health Septic Areas
Interceptors
Sanitary Mains
Combo Sewer Mains
Force Mains
Utility Center CTA Sewer Service Areas
Areas not service by FW but are in the city limits
Areas Not Serviced by Fort Wayne
Areas Serviced by Fort Wayne Modified
Area Relinquished by Fort Wayne
Fort Wayne City Limits
GIS
CANTON RUN
INSTITUTIONAL POWER PLANT
UTILITY CENTER CTA
Dunlap
Aboite
HESSEN CASSEL
HESSEN UTILITY CTA
Hoagland