



# City of Jackson, Jackson County June 2008

**Prepared by:**

W I L L I A M S   &   W O R K S

Michigan Rural Water Association



## TABLE OF CONTENTS

	TITLE	PAGE
	<b>Wellhead Protection Program Overview and Local Objectives</b>	<b>4</b>
<b>1.0</b>	<b>Agency Duties for the City of Jackson Wellhead Protection Program</b>  <i>1.1 Introduction</i> <i>1.2 State Agency Responsibilities</i> <i>1.3 Local Agency Responsibilities</i> <i>1.4 City of Jackson Wellhead Protection Team Members</i> <i>1.5 Regional Groups</i>	<b>8</b>
<b>2.0</b>	<b>Wellhead Protection Area Delineation Executive Summary</b>  <i>2.1 General Geologic Description</i> <i>2.2 Groundwater Flow Model</i>	<b>18</b>
<b>3.0</b>	<b>Potential Sources of Contamination</b>  <i>3.1 Contaminants of Concern</i> <i>3.2 Contaminant Pathways</i> <i>3.3 Categories of Potential Contaminant Sources</i> <i>3.4 Procedures for Identifying Potential Sources of Contamination</i> <i>3.5 Mapping Potential Sources of Contamination</i>	<b>21</b>
<b>4.0</b>	<b>Management Approaches for Controlling Potential Sources of Contamination within the Wellhead Protection Area</b>	<b>34</b>
<b>5.0</b>	<b>Wellhead Protection Program Contingency Plan</b>	<b>37</b>

<p><b>6.0</b></p>	<p><b>Siting Considerations for New Wells</b></p> <p><i>6.1 Groundwater Sources and New Production Facilities</i></p> <p><i>6.2 New Well Checklist</i></p> <p><i>6.3 New Well Construction Guidelines</i></p>	<p><b>37</b></p>
<p><b>7.0</b></p>	<p><b>Public Participation and Education for Wellhead Protection</b></p>	<p><b>41</b></p>
<p><b>8.0</b></p>	<p><b>Appendices</b></p> <p><i>A Wellhead Protection Area Map</i></p> <p><i>B Contaminant Source Inventory Map</i></p> <p><i>C Examples of Management Strategies</i></p> <p><i>D Contingency Plan</i></p> <p><i>E Examples of Public Education Activities</i></p>	<p><b>45</b></p>

## WELLHEAD PROTECTION PROGRAM OVERVIEW

Water has *always* ranked as a priority issue with the City of Jackson. Water is found deep within the bedrock under variously protected conditions. This deep system is the only practical resource that the City can use as its water supply. Although shallower groundwater systems exist in the area, they are not significant enough to support the community water supply needs. Contamination of this resource, therefore, would seriously hinder the City's ability to find an alternate water supply source. The City of Jackson would be forced into moving their pumping centers far outside the City limits and, as a result, would be an expensive undertaking.

Wellhead protection provides an excellent opportunity to preserve the investment of their water system, and will be an important component to their overall water supply management scheme.

Wellhead protection is a groundwater management program that observes the relationship between land use activities, and the quality of drinking water from the wells. This program will eventually be comprised of several elements which will address technical, administrative and educational goals, each a critical component to the overall success of the program.

The typical Wellhead Protection Program consists of seven elements. These are:

1. Specify roles and duties of the program managers, local and state agencies.
2. Delineate the Wellhead Protection Areas for each well.
3. Identify sources of potential or existing contamination within the Wellhead Protection Area.
4. Develop management approaches to protect the water supply.
5. Develop contingency plans for the water supply system.
6. Site new wells, which will minimize the potential for impact.
7. Ensure public participation.

Groundwater in the area is the exclusive water resource utilized by the City of Jackson and surrounding residences for their water supply. It is the *only* economically feasible source of water for the community, and due to the nature and extent of the aquifer in the area, there are very few alternative sites which can support the City's water demand. The aquifer's susceptibility to contamination is moderate, due to the absence of thick overlying clayey materials, or in some areas, due to the absence of any soils over the bedrock.

As with all impacted groundwater resources, the cost of prevention is much less than the cost of lost capital. In this respect, there is a need for the City and its encompassing Township to ensure that the water quality of this resource is preserved. Protection of this

resource is, therefore, paramount to the community and the investment in its production facilities.

To that end, community and regional education of groundwater protection, and groundwater resource management are only a few of the critical highlights which will result from this important program. In addition, the City will benefit greatly from the identification and closure of abandoned water wells.

### **Location and General Description**

The City of Jackson, located in south central Michigan is the county seat of Jackson County. In July of 1829, Horace Blackman of New York, accompanied by Alexander Laverty, set up camp in Jackson. In August of that same year, Blackman and his brother cleared land and built a cabin. Other settlers began to arrive and a post office was opened in 1830. The town was first called Jacksonburgh, in honor of Andrew Jackson, but was then changed to Jacksonopolis and shortened to Jackson in 1833. On July 6, 1854, the Republican Party formally organized itself by holding its first convention, adopting a platform and nominating a full slate of candidates for state offices.

Today, Jackson is a modern city with numerous parks and weekend festivities. Major employers in the city include CMS Energy, which provides natural gas and electrical services to much of Michigan and has its international headquarters in the city, as well as Foote Hospital. Michigan Automotive Compressor, Inc. (MACI) is the largest manufacturer in the County. Jackson is also home to one of the world's largest maximum-security prisons, which provides employment to many Jackson residents. The City covers approximately 11.1 square miles and has a total population of approximately 36,316.

### **History and Description of the Public Water Supply Wells**

The City of Jackson's public water supply system (PWSS) is derived from sixteen production wells that serve approximately 54,250 customers. Twelve of the production wells are located at the Mansion Street well field and have a production capacity of 24 million gallons per day (MGD). Four of the production wells are located at the Ella Sharp Park well field and have a production capacity of 7 MGD. In an emergency situation, the City also owns one backup well at Northwest Avenue with a production capacity of 1 MGD and another backup well at the Ella Sharp Park well field with a production capacity of 1.5 MGD. The City also has six interconnections with Summit Township that can be utilized during an emergency.

### **Land Use**

The City of Jackson's WHPA includes the southern edge of the City limits, and a good portion of Summit Township. Land use within the WHPA is primarily residential with an industrial area in the northeastern section and some industrial and agricultural areas in the southeastern section.

## **Local Wellhead Protection Activities**

In May of 2003, a report titled, "Wellhead Protection Area Delineation Jackson County Community" was completed by Williams and Works. On September 9, 2003, the report was approved by the Michigan Department of Environmental Quality (MDEQ).

In 2006, the City submitted a draft Wellhead Protection Program Plan to the MDEQ. On February 24, 2004, a letter from the MDEQ was sent to the City indicating that further information was needed. The City contacted the Michigan Rural Water Association (MRWA) Groundwater Specialist for assistance with the completion of the WHPP Plan. The Groundwater Specialist reviewed the draft plan and met with the City on October 23, 2006. The Contaminant Source Inventory findings and an overview of the information needed for plan completion were discussed. At the second meeting, held on November 21, 2006, the Contaminant Source Inventory findings and map were discussed along with the updated Contingency Plan. At the third meeting, held March 5, 2008, the team discussed management strategies and public education ideas. The Plan will be finalized and submitted to the MDEQ. After approval, the team should meet at least two times throughout the year to discuss the program's progress. In particular, management approaches and public education activities should be reviewed. Future meetings will be decided by the City.

This document will become a "living" program; one that will constantly undergo updates and adjustments, and thus, will account for the unique characteristics of the community.

One of the most important elements of this Wellhead Protection Program will be public participation and education. Even the most carefully prepared program will meet difficulty in its implementation if the community does not understand why or what it stands for. Public participation will build support for the program for such things as controls on pollution sources and voluntary groundwater protection efforts.

Wellhead protection planning in the City will answer the question of the seriousness and distribution of preventable contamination problems in the area. Perhaps most of all, the City will have the ability to focus on this unique resource.

## **Local Wellhead Protection Goals and Objectives**

The local WHPP goals, decided by the City of Jackson are outlined below.

- Provide the local governmental framework, such as regulations and policies, to prevent groundwater contamination from occurring at businesses and industries which store, use or generate quantities of hazardous wastes in the WHPA.
- Provide for the protection of Jackson's drinking water supply through comprehensive planning and zoning provisions for Jackson.

- Work closely with Summit Township to develop and implement management approaches and public education initiatives that will aid in groundwater protection efforts.
- Enhance communication and coordination between local and state agencies on pollution incidents to assure adequate cleanup for natural resource and public health protection.
- Work with local, state and federal agencies to ensure identified contamination sites do not impact groundwater resources.
- Implement a public education program to inform residents, businesses and farmers on the importance of groundwater protection and what they can do to protect their drinking water.
- Establish a WHPA based on the 10 year capture zone identified in the delineation process when new wells are developed.
- Update the inventory and mapping of all potential sources of contamination within the WHPA every three to five years.
- Monitor existing and future activities within the WHPA that have been identified as potential sources of contamination.
- Maintain an up-to-date contingency plan for alternative drinking water supplies to help mitigate contamination of the current water supply.
- Site new wells properly to maximize yield and minimize potential contamination.
- Inform landowners of the potential impacts of abandoned wells on Jackson's water supply and continue to search and properly plug abandoned wells within the WHPA.

## **1.0 AGENCY DUTIES FOR THE CITY OF JACKSON WELLHEAD PROTECTION PROGRAM**

### ***1.1 Introduction***

This section describes the state and local responsibilities for the City of Jackson Wellhead Protection Program. Under this program, most of the effort will be placed on the City of Jackson to maintain and update the program. Through local land use planning and regional education, the City of Jackson will be the critical leader of the program.

### ***1.2. Summary of Local Cooperative Responsibilities for Wellhead Protection***

A summary of local agency responsibilities is outlined below.

#### **The City of Jackson**

1. Custodian of the Wellhead Protection Program.
2. Responsible for the continued maintenance of the local Wellhead Protection Program and review of the program with the Jackson County Wellhead Program Committee.
3. Responsible for continued public education and public awareness of the WHPP, including water and sewer issues.
4. Responsible for the maintenance of the contaminant source inventory and mapping.
5. Responsible for the promotion of best management practices within the Wellhead Protection Area.
6. Responsible for the performance of any contingency procedures in the event of a water system or water supply emergency.
7. Responsible for the proper siting and consideration of any new production wells for water supply in a manner consistent with the conclusions of the WHPA delineation and its results.
8. Responsible for the continued support and promotion of the County's Used Oil Collection Program and Household Hazardous Waste Programs.
9. Responsible for the continued maintenance and operation of the water system and wastewater system
10. The Zoning Administrator is responsible to assist inspectors, builders, and earth moving contractors to be aware of environmentally incompatible land activities or materials handling practices.



### **Blackman, Leoni, Summit, and Napoleon Townships**

1. Responsible for the continued inspection of new or existing buildings and manufacturing facilities.
2. Responsible for observing best alternatives for any future planning and zoning within the WHPA.
3. When opportunities arise, responsible for education and environmental awareness for the citizens within the City of Jackson.
4. Responsible for continued maintenance of their own Wellhead Protection Programs.

### **Jackson County**

1. Encouraged to limit road salt application within the WHPA.
2. Encouraged to maintain best management practices at construction areas within the WHPA.
3. The County Public Health Department office is encouraged to ensure that septic systems, inspections, and groundwater protection regulations are enforced regularly with priority placed within the WHPA.
4. Encouraged to promote education and environmental awareness, when possible, for the citizens within the County.
5. Encouraged to maintain the Jackson County disposal programs for used oil and household hazardous wastes.

### ***1.3 State Agency Responsibilities***

In an effort to protect groundwater sources, 1986 amendments to the Federal Safe Drinking Water Act provided for the establishment of Wellhead Protection Programs (WHPPs). As discussed above, WHPPs develop long-term strategies that are aimed at protecting community drinking water supplies. Grant monies to be used in the implementation of WHPPs became available under the 1996 amendments to the Federal Safe Drinking Water Act. Realizing the importance of groundwater protection, the State of Michigan established a WHPP and a WHP Grant Program. Michigan's WHPP is voluntary and designed to be locally initiated and implemented, with the MDEQ playing a supporting role. The Department will carry out the following tasks during the life of the program:

1. Inform public water supply facility managers and other local officials about Wellhead Protection Program requirements and opportunities;
2. Search for funding sources for Wellhead Protection Program activities at the state and local level;
3. Prepare technical assistance materials for local units of government;

4. Coordinate Wellhead Protection Program requirements with other federal and state regulatory, public information, and education programs.

The MDEQ, through the Water Bureau, has specific responsibilities that will benefit the City of Jackson WHPP. These include:

1. Continue to monitor the quality of public drinking water supplies; and
2. Incorporate WHPP requirements into the periodic evaluations and surveillance of public water supplies that are carried out by MDEQ personnel.
3. Promote enforcement of the regulatory programs listed above within the Wellhead Protection Areas.

#### ***1.4 City of Jackson WHPP Team Members***

The WHPP Team has the responsibility of meeting to develop and implement the WHPP. Contact information for the City of Jackson WHPP team members is listed in the table below. Immediately following the table are descriptions of the roles and responsibilities of each team member.

## ***City of Jackson Wellhead Protection Team Members***

<b>NAME</b>	<b>TITLE</b>	<b>REPRESENTING</b>	<b>ADDRESS</b>	<b>PHONE</b>	<b>EMAIL</b>
Glenn Chinavare	Director of the Department of Public Services	City of Jackson	521 Water Street Jackson, MI 49203	517-768-6060	gchinavare@cityofjackson.org
Dan Bujanda	Water Services Manager	City of Jackson	515 Water Street Jackson, MI 49203	517-768-6103	dbujanda@cityofjackson.org
Paul Hudson	Water Plant Superintendent	City of Jackson	515 Water Street Jackson, MI 49203	517-788-4073	pwhudson@dmci.net
Bob Koehn	Water Plant Operator	City of Jackson	515 Water Street Jackson, MI 49203	517-788-4073	bkoehn@dmci.net
Randy McMunn	City Engineer	City of Jackson	161 W. Michigan Jackson, MI 49203	517-788-4160	rmcmunn@cityofjackson.org
Steve Rumsey	Water Project Coordinator	City of Jackson	515 Water Street Jackson, MI 49203		waterinfo@cityofjackson.org
Grant Bauman	Planner	Region 2 Planning Commission	120 W. Michigan Jackson, MI 49203	517-768-6711	gbauman@cojackson.mi.us
Jerry Drake	Environmental Engineer	MDEQ	301 E. Louis Glick Hwy. Jackson, MI 49203	517-780-7838	drakej@michigan.gov
Scott Bevier	Water Operator	Summit Township	2121 Ferguson Drive Jackson, MI	517-788-4113	
Kelly Hon	Training Specialist	MRWA	780 W. Spruce St. PO Box 960 Harrison, MI 48625	989-621-2361	Kellyhon1@yahoo.com

## **Roles and Responsibilities of each WHPP Team Member**

### ***Glenn Chinavare, City of Jackson—Director of the Department of Public Services***

The Director of the Department of Public Services will be responsible for providing support and guidance as the WHPP Plan is implemented. This person will also promote the importance of the WHPP to City administrators and other staff members. This person has considerable knowledge about the public water supply system and can ensure that the WHPP remains an active and vital part of the City.

### ***Dan Bujanda, City of Jackson—Water Services Manager***

The Water Services Manager will assist in the implementation of the WHPP Plan and will work to ensure that the WHPP Plan is updated every 3 to 5 years or as needed. This person will also work to implement the management activities and public education efforts as outlined in this Plan. This person will be responsible for reviewing the contingency plan and preparing employees for potential threats.

### ***Paul Hudson, City of Jackson—Water Plant Superintendent***

The City of Jackson Water Plant Superintendent has an important knowledge base about the City's drinking water history. This person is able to indicate the biggest threats and challenges to the system. He can educate and encourage the Department to support efforts related to wellhead protection. He may have valuable knowledge and ideas about locating new wells and potential and existing contaminant sources.

### ***Robert Koehn, City of Jackson—Water Plant Operator***

The City of Jackson Water Plant Operator also has an important knowledge base about the City's drinking water history. He is able to indicate the biggest threats and challenges to the system. He can educate and encourage the Department to support efforts related to wellhead protection. He may have valuable knowledge and ideas about locating new wells and potential and existing contaminant sources.

### ***Randy McMunn, City of Jackson—Engineer***

The City of Jackson Engineer can educate the department about the importance of the WHPP. In addition, this person can encourage the department to support efforts related to wellhead protection.

### ***Steve Rumsey, City of Jackson—Project Coordinator***

The Project Coordinator will assist in the implementation of the WHPP Plan. This person will work with the MRWA Training Specialist to apply for grant funding through the Michigan Wellhead Protection Grant Program. This individual played a vital role in the success of the Abandoned Well Management Program within the City and will further

assist with this management effort and others. This person will also work to implement public education and outreach initiatives as directed in this Plan.

***Grant Bauman, Region 2 Planning Commission—Planner***

The Region 2 Planning Commission representative is familiar with the City’s current site plan review standards, zoning ordinances, master plan revisions and other land use planning issues. This person plays a pivotal role in determining what the most effective management strategies should be for the City. In addition, this person will assist with the implementation of the local management strategies.

***Jerry Drake, Michigan Department of Environmental Quality (MDEQ)—Environmental Engineer***

The MDEQ Environmental Engineer plays an important role on the wellhead protection team. This person can educate the team about state and federal requirements. This person may also offer knowledge about potential and existing sources of contamination within the WHPA.

***Scott Bevier, Summit Township—Water Department***

The representative from Summit Township will serve as a liaison between the Township and the City of Jackson. This person will be responsible for communicating about the WHPP to Summit Township leaders and educating them about the Wellhead Protection Program. In addition, Summit Township may decide to implement management strategies and public education activities that will protect their drinking water and the City’s drinking water.

***Kelly Hon, MRWA—Training Specialist***

The representative from the MRWA can educate the City about public education and outreach ideas and management approaches that have worked well within other communities. This person can also generate materials (i.e. brochures, placemats, etc.) that can be tailored to fit the City’s WHPP. In addition, this person serves as a liaison between the MDEQ and the City of Jackson. Finally, this person can assist the City in applying for the Michigan Wellhead Protection Grant Program.

### **1.5 Regional Groups**

Regional groups also provide a great deal of support. These groups are intimately familiar with both State laws and specific regional (and local) needs and concerns. The groups that will become part of the overall wellhead protection effort will include:

#### Neighboring municipalities

Summit Twp (Rick Faling)	517-788-4119
Jackson County Health Department	517-788-4420
Jackson County Sheriff Dept.	517-768-5812
MSU Extension	517-788-4292

#### Universities and Colleges

Jackson Community College	517-787-0800
Michigan Townships Association	517-321-6467
Michigan Society of Planning Officials	248-553-7526
Michigan Rural Water Association	989-539-4111
Michigan Section of the AWWA	517-335-9717
Michigan Water Environment Association	517-487-1991
Grand River Environmental Action Team	517-596-2210
	517-374-4444

#### County Drain Commission

Geoffrey Snyder	517-768-6632
Michigan Department of Transportation	517-750-0401
Upper Grand River Watershed Council	
Planning & Zoning Center (Lansing)	517-886-0555
Region 2 Planning Commission	

Grant Bouman

A detailed description of each organization's role is included below.

### **Neighboring municipalities**

Neighboring municipalities can offer assistance to the local WHPP by providing information about their local groundwater protection programs. In addition, if part of the City's WHPA were to extend into neighboring municipalities, it would be important that the two meet and discuss management activities and public education initiatives that could be implemented within the neighboring municipalities.

### **Jackson County Health Department**

The local health department can assist in educating the City about current and future state and county laws and regulations. They may also be familiar with groundwater protection efforts throughout the County. Consequently, they can offer ideas and in some situations assistance with the local WHPP.

### **Jackson County Sheriff Department**

The Sheriff's Department can assist in the protection of the WHPA by monitoring activities that occur within the County. The Sheriff's Department is also often aware of potential and existing sites of environmental contamination and can offer knowledge during the completion of the Contaminant Source Inventory. The City could work with the Sheriff's Department to organize a county-wide education program.

### **MSU Extension**

The local MSU Extension staff can offer assistance, knowledge, resources and funding. MSU Extension staff are trained to educate citizens about groundwater protection and many offices have resources available to effectively demonstrate local geology.

### **Universities and Colleges**

Local universities and colleges are staffed with educated individuals. The City could partner with local schools to host educational workshops and develop materials on groundwater protection.

### **Michigan Townships Association**

The Michigan Townships Association represents the interests of Townships throughout the State. If there are Townships within the City's WHPA, they can be a valuable resource because they can serve as a liaison between the Townships and the City. They can also educate the Townships about the importance of WHPP efforts.

### **Michigan Society of Planning Officials**

Michigan Society of Planning Officials have experienced planners on staff that can assist with WHPP management activities within the City. They can also host workshops on planning and zoning and serve as a valuable educational resource.

### **Michigan Rural Water Association (MRWA)**

The MRWA can assist the City with the development of the WHPP Plan. In addition, MRWA staff can educate the City about public education and outreach ideas and management approaches that have worked well within other communities throughout the State. MRWA staff can also generate materials (i.e. brochures, placemats, etc.) that can be tailored to fit the City's WHPP. In addition, they serve as a liaison between the MDEQ and the City. The MRWA hosts trainings throughout the state aimed at educating communities about water and wastewater. Finally, MRWA staff can assist the City in applying for the Michigan Wellhead Protection Grant Program and updating the Plan.

### **Michigan Section of the AWWA**

The Michigan Section of the AWWA can assist the City by offering training materials and workshops on water and wastewater. Materials can be purchased to educate the public about groundwater protection.

### **Michigan Water Environment Association**

The Michigan Water Environment Association can assist the City by offering training materials and workshops on water and wastewater. Materials can be purchased to educate the public about groundwater protection.

### **Grand River Environmental Action Team**

The Grand River Environmental Action Team is a non-profit organization dedicated to the protection and restoration of the Upper Grand River Watershed. This organization works to educate the public about watershed protection and creates materials for the public. The City could coordinate with the Team to incorporate local WHPP elements.

### **County Drain Commission**

Working with the County Drain Commission and educating staff about the local WHPP is an important step in protecting the City's drinking water source. Knowing where the City's WHPA is located and understanding why the area should be protected will be valuable knowledge when the County Drain Commission is issuing permits.



### **Michigan Department of Transportation**

The Michigan Department of Transportation is a valuable resource if the City is interested in putting up WHPA signage. Educating the Department about the local WHPP can aid in their cooperation and assistance.

### **Upper Grand River Watershed Council**

Coordinating efforts with the Upper Grand River Watershed Council can prove to be a valuable move. Local watershed councils are often putting together materials and educational workshops on watershed protection. Although the two are separate (watershed protection versus groundwater protection), efforts can be collaborated.

### **Planning & Zoning Center (Lansing)**

The Michigan State University Planning and Zoning Center has experienced planners on staff that can develop and help apply research-based solutions to local planning needs, focusing heavily on training and modeling development. Consequently, the Center can assist the City with expertise on planning and zoning activities that can be used within the local WHPP.

### **Region 2 Planning Commission**

The Region 2 Planning Commission has experienced staff that are educated on planning and zoning, geographical information systems, soil erosion and sedimentation, and regional and urban transportation issues. This Commission which serves Hillsdale, Jackson and Lenawee counties serves as a clearinghouse of information for local communities. Among other things, the Commission can assist the City with expertise on planning and zoning activities that can be used within the local WHPP.

## **2.0 WELLHEAD PROTECTION AREA DELINEATION EXECUTIVE SUMMARY**

The public and private water supplies in Jackson County are almost exclusively derived from groundwater resources within either the glacial drift or the uppermost three bedrock formations present in the County. These resources can be divided into three general aquifer systems based on the geology of the area. The groundwater flow model is comprised of three layers representing these three aquifer systems. The model was calibrated using water levels measured within the bedrock intervals as part of this project, and measured water levels within the glacial drift that were compiled as part of a separate work. The calibrated model was used to simulate the stresses induced on the groundwater resources over a ten-year period due to pumping each of the production wells included in the study at the current (Year 2002) peak production rates. The model was then used to predict the source areas for the extracted groundwater over the same period. The source area for each of the production wells included in this study is designated as a Wellhead Protection Area (WHPA).

### ***2.1 General Geologic Description***

The average thickness of the glacial drift across the county is about 50 feet, and varies from less than 5 feet thick near the City of Jackson to over 250 feet thick in the southeastern portion of the county. The drift aquifers are typically not extensive and are relatively thin. None of the municipal production wells utilize this resource.

The uppermost four bedrock formations in the county, from the youngest to the oldest, are the Saginaw Formation, the Michigan Formation, the Marshall Formation, and the Coldwater Shale. The Saginaw Formation and the Marshall Formation are both groundwater resources and the Michigan Formation and the Coldwater Shale are both confining units.

The Saginaw Formation consists of all the Pennsylvanian rocks and the Bayport Limestone. The formation consists of interbedded sandstone, shale, limestone, dolomite, and gypsum. The groundwater potential of this resource varies from poor to moderate and is directly related to the presence of sandstone intervals. These intervals are typically less than 50 feet thick and pinch out or rapidly thin laterally. The formation is only present in the northern half of the county.

The Michigan Formation consists of highly interbedded intervals of shale, siltstone, sandstone, limestone, and dolomite. The various intervals are typically less than 10 feet thick and appear to be laterally discontinuous. The upper surface of the formation is highly eroded, and represents a discontinuity. In some areas erosion has completely removed the formation. The Michigan Formation is only present across the northern half of the county, and is considered by most researchers to confine the top of the Marshall Formation.

The Marshall Formation is the most prolific and continuous aquifer in the county. The formation is composed primarily of sandstone intervals, typically greater than 50 feet thick, interbedded with shale, limestone, and dolomite intervals, all typically less than 10 feet thick. The formation is present beneath the entire county, but in the southwest and southeast townships the formation grades into, and is very lithologically similar to, the underlying Coldwater Shale. Geologic mapping indicates an east-west trending band across the center of the county where the subcrops of the Marshall Formation and the adjacent formations are in contact. Municipal production wells within this band typically exhibit high production capacities.

The Coldwater Formation is the oldest and lowermost formation addressed in this study. The formation is composed primarily of shale with occasional intervals of sandstone, siltstone, limestone, and dolomite. The formation is greater than 500 feet thick in this area and confines the bottom of the Marshall Formation.

## ***2.2 Groundwater Flow Model***

The groundwater flow model utilized for this project was MODFLOW (McDonald and Harbaugh, 1988), and the pre- and post-processor was Groundwater Vistas (Environmental Simulations). The model area is rectangular with a north-south dimension of 35 miles and an east-west dimension of 38 miles. The area is centered over Jackson County and extends nearly five miles outside the county on all sides. The model grid contains 204 columns and 186 rows, all equally spaced to divide the model area into nearly 38,000 square cells with a uniform dimension of 1000 feet by 1000 feet.

Vertically, the model is comprised of three layers. The upper layer represents the glacial drift, the middle layer represents the Saginaw and Michigan Formations, and the bottom layer represents the Marshall Formation. The upper and lower surfaces of the layers were defined by importing surface contour maps derived from water well and oil-gas well logs. The model coordinates are referenced to the southern zone of the Michigan State Plane Coordinate System and the North American Vertical Datum (1988). The boundary conditions applied within the model included: rivers, production wells, and no-flow boundaries. A uniform recharge rate of 8.8 inches per year was applied to the entire modeled area.

The hydraulic properties of the glacial drift were estimated from commonly associated values for unconsolidated materials (Freeze and Cherry, 1979). A value of 150 ft/day for the hydraulic conductivity was applied to areas of outwash and river valleys, and a value of 25 ft/day was applied to the remainder of Layer One.

The hydraulic properties of the Saginaw/Michigan/Bayport layer were based on a few scattered aquifer tests within Jackson and Eaton Counties, personal communication with MDEQ staff, and USGS studies (Holtschlag, Luukkonen, and Nichols, 1996). A uniform value of the hydraulic conductivity of 7.5 feet/day was applied over the entire Saginaw/Bayport/Michigan layer. The vertical anisotropy varies from 0.01 to 0.1.

The hydraulic properties of the Marshall Formation were based on the results of 13 aquifer tests conducted within Jackson County and nearby communities. The modeled hydraulic conductivity ranges from 10 feet/day in the northern half of the county, to 250 feet/day along the highly fractured Marshall Formation in the central portions of the County, to 150 feet/day in the southern half of the County. The vertical anisotropy varies from 0.01 to 0.1.

The model was run and calibrated for steady-state conditions. The model was calibrated using water levels were collected from nearly 70 private and municipal bedrock water wells across the study area. To calibrate the water levels within the glacial drift layer, the results of groundwater mapping study (Michigan State University) were used<sup>1</sup>. The simulated potentiometric surface matches the measured water levels reasonably well with a standard deviation of about 10 percent.

The calibrated model was used to calculate Wellhead Protection Areas (WHPAs) for the twelve participating municipalities by simulating groundwater production at the municipal wellfields. The simulated production rate at each wellfield was an equivalent production rate derived from the pumping records of the year 2002<sup>2</sup>. The selected wells were “turned on” at their respective rates and pumped to steady state conditions producing a stressed water level map. Reverse particle tracking was applied at each municipal well to track particles up gradient from the wells to delineate the groundwater source areas for each wellfield over a ten-year period. A set of delineation areas was produced for each wellfield by varying the hydraulic characteristics of the aquifer while “pumping” each well at the equivalent pumping rate. The final wellhead delineation area for each wellfield is a conservative composite area representing the sum of these delineation area sets.

Williams and Works submitted the delineation report titled, “Wellhead Protection Area Delineation, Jackson County Community” in May of 2003. The report was submitted to the MDEQ and approved on September 9, 2003.

---

<sup>1</sup> The study analyzed the water levels recorded on well logs of private wells installed within the drift across the county.

<sup>2</sup> Calculation of the equivalent pumping rate assumes twenty-four hours of pumping to produce the total amount of water pumped on the average day of the peak month

### **3.0 POTENTIAL SOURCES OF CONTAMINATION**

The Federal Safe Drinking Water Act (SDWA), under Subsection 1428(a)(3), states that state Wellhead Protection Programs (WHPP) "shall, at a minimum ... identify within each Wellhead Protection Area all potential anthropogenic sources of contaminants which may have an adverse effect on the health of persons."

The definition of an anthropogenic source as found in EPA guidance documents is: "any activity, performed by or caused by human actions, that is or can potentially be a source of contamination to ground water including human actions affecting natural contaminants." Sources of concern include point source discharges, non-point sources of pollution, aboveground and underground threats, existing sites of contamination, potential sources of contamination, and actions that indirectly may lead to contamination. The EPA interprets a contaminant as any "organic, inorganic, radiological, or microbiological substance that is regulated under Federal, State or local environmental programs, and any other substance that the State determines appropriate."

The Michigan WHPP further recognizes and defines hazardous substances as contaminants. A hazardous substance is defined to be a chemical, or other material, which is, or may become, injurious to the public health, safety, or welfare, or to the environment. This definition is similar to the definition in the Michigan Environmental Response Act (Act 307, P.A. 1982, as amended). This broad definition recognizes a wide range of chemicals, acids, bases, petroleum products, solvents, and hazardous wastes, which can contaminate the environment if mishandled. Even small quantities of hazardous substances, such as a 1/2 drum of a dry cleaning solvent, have been known to contaminate groundwater in Michigan. Hazardous substances are found in thousands of small and large businesses throughout the state, as reflected by the listing of land uses with a potential for groundwater contamination below.

Michigan's WHPP also recognizes the importance of remediating contamination sites within WHPAs. Contamination sites within a defined WHPA will be recognized as having higher priority than equally severe sites outside of a WHPA.

#### ***3.1 Contaminants of Concern***

The communities across Jackson County range from largely rural to highly urbanized, and thus the main contaminants of concern also vary across the County. All of the water-providing communities, with the exception of the City of Jackson, have wellhead areas that extend into adjacent farmlands. Contaminants associated with agricultural land use are herbicides/pesticides, fertilizers, and fuel and chemical storage tanks. However, a more common contaminant from such areas is nitrate associated with the raising of livestock and spreading of manure on bare soils.

Small businesses and more urbanized areas are present within every community across the county. In areas where a septic sewer system is not available, private septic systems often contribute nitrates to the groundwater, especially in areas of denser housing. Once installed, private septic fields and floor drains are unregulated and may be used to dispose of unwanted hazardous materials and potential contaminants such as paints, motor oils, and cleaners.

Commercial and industrial land use is the heaviest in Blackman and Summit Townships. However, such properties are typically inspected and managed both due to their size and high public profile. The quantities of both imported and produced contaminants and hazardous materials necessitate frequent inspections and mandated handling precautions and containment in case of a spill.

Transport and disposal of contaminants and hazardous materials either by highway or train to local or out-of-county disposal sites is also an area of concern. Fuel spills or accidents can happen at any time with devastating effects to a community water supply. Especially dangerous is the transport of liquid chemicals by railcar. The Wellhead Team will work closely with the local fire department and law enforcement regarding these issues. The County Road Commission should be apprised of the location of the wellhead areas to restrict the amount of road salt applied during the winter months.

### ***3.2 Contaminant Pathways***

Within the Wellhead Protection Area there are several pathways through which contaminants could potentially impact the groundwater. These are: septic systems, dry wells, interior floor drains, aboveground storage tanks, and bare soils. Each of these may be a conduit by which contaminants can easily reach groundwater in this area. Leaking tanks, spills, wash water runoff, and improperly stored, or disposed, hazardous substances also can contaminate groundwater.

**On-Lot Septic systems:** On-lot septic systems are designed for domestic sanitary wastewater, not for chemicals or solvents.

**Floor drains:** General-purpose floor drains in work and storage areas, where hazardous substances or wastewater are generated, are only permitted by the Michigan and Federal regulations if they are connected to a sanitary sewer (with permission from the facility) or a closed holding tank. Floor drain identification within private home garages is very difficult, and will be phased into the inventory process as they are identified over time.

**Bare soils:** Bare soils allow certain chemicals and contaminants to more quickly reach the groundwater by direct percolation. This can be further intensified during periods of rainfall, which would tend to "drive" these chemicals into the soil. Bare soils will be more difficult to control because agricultural practices generally dictate this condition during certain periods of the growing season. An alternative mitigation procedure would be to plant rye or some other soil stabilizing plant during soil "resting" periods in order to prevent water and wind erosion.

**Dry wells:** Dry wells, like on-lot septic systems, are sometimes discharge points for contaminated wash water or rinse water. When contaminated water is discharged underground for a continuous period of time, contamination of soils and groundwater is inevitable.

**Abandoned wells:** These structures, if not properly abandoned, provide direct conduits to the groundwater. The geology of the area clearly reveals that, by far, the majority of the public and private wells in the county utilize the same aquifer, the Marshall Sandstone. Therefore, the likelihood of numerous abandoned wells within this aquifer is very high and a strong effort will be made to identify, locate, and properly abandon such wells. Detection of such wells is difficult, but necessary, and the effort will constitute an important part of the annual wellhead program review and update.

### ***3.3 Categories of Potential Contaminant Sources***

Land use categories with a significant potential for groundwater contamination generally fall into either agricultural, residential, small business, or industrial parcels. Whether these types of land uses pose actual threats to public drinking water supplies depends upon the types and quantities of substances, their storage, handling and disposal practices, the characteristics of the property, and the pathways to groundwater. The list below should be considered a starting point for identifying potential sources of contamination within the various land use categories.

#### **Agricultural:**

1. Bulk storage of agricultural chemicals.
2. Aboveground and underground storage tanks for chemicals and fuels.
3. Abandoned irrigation wells.
4. Bare soils susceptible to erosion and percolation, especially if spread with livestock waste.

#### **Residential:**

1. Low density residential development with on-site septic systems.
2. Home-based businesses or hobbies which require hazardous materials or contaminants (e.g. auto-repair)
3. Aboveground and underground storage tanks for fuel oil and gasoline.
4. Floor drains in garages or out buildings.

#### **Industrial:**

1. Manufacturing plants or industry, which generate, or require, large volumes of hazardous materials.

2. Landfills for hazardous and municipal waste.
3. Airports and fuel storage sites for aircraft fuel. De-icing fluids for airplanes and runways.

**Small Businesses/Commercial:**

1. Former gas stations with unknown underground storage tanks on the property.
2. The wide range of chemicals required by garages, dry-cleaners, funeral homes, lumberyards, car dealerships, etc. Compilation of a list of the hazardous materials and contaminants present at these locations is possible under the Firefighter's Right to Know policy.

**3.4 Procedures for Identifying Potential Sources of Contamination**

The State of Michigan identifies nine sites that must be reviewed when conducting the Contaminant Source Inventory (CSI). These include:

- Sites of Environmental Contamination (Part 201 Sites)
- Underground Storage Tank Sites
- Leaking Underground Storage Tank Sites
- Oil and Gas Contamination Sites
- Hazardous Waste Generator Sites
- Groundwater Discharge Permit Sites
- Landfills and Solid Waste Disposal Sites
- Federal National Priorities List (CERCLA and Superfund)
- Other Sites of Concern
- Federal Permits for Class V Wells (Underground Injection Control Program) (Optional)

In the fall of 2006, the Michigan Rural Water Association Groundwater Specialist conducted a CSI for the City of Jackson. A search was conducted within the WHPA for each site required by the MDEQ. Several types of searches occurred. First, the Groundwater Specialist reviewed the site lists provided by the MDEQ and the United States Environmental Protection Agency (EPA). Next, the Michigan State University Map Image Viewer program was utilized. A map of potential and existing sources of contamination was reviewed by the WHPP team for error. Finally, team members indicated previous sites of contamination that were not revealed on any lists (i.e. previous establishments).

**Part 201 Sites of Environmental Contamination**

**WHPA for the City of Jackson**

There were nine Part 201 sites of environmental contamination located within the WHPA. These sites include:



- Wolverine Technology, 701 E. Washington Avenue
- Central Michigan Plating, 309 E. South Street
- Ryerson Haynes Inc., 2500 Enterprise Drive
- Conrail Jackson Yard, Page and Elm Streets
- Pittsburg Forge, 919 Amur Street
- Jackson Drop Forge, Wellworth Avenue
- Jackson MGP, 703 S. Cooper Street
- Frogtown Area Wells, Page Avenue at Knollwood
- Jaco Plating-Mansion Street, 502 E. Mansion Street

Source: <http://www.deq.state.mi.us/part201ss/>, the Michigan Map Image Viewer and the City of Jackson

### Active Underground Storage Tank Sites

#### WHPA for the City of Jackson

There were sixteen active Underground Storage Tank (UST) sites located within the WHPA. These sites include:

- Buddy's Mini-Mart, 710 E. South Street
- Commercial Fuels Inc., 2129 South Street
- Dawn Equipment Company, 2000 Townley Street
- Elf Asphalt Inc., 416 Water Street
- Frost School, 1226 South Wisner Street
- Jackson Transportation Authority, 2350 E. High Street
- Jensen Lincoln Mercury Inc., 3535 Francis Street
- Marathon Unit, Francis and Prospect
- Kelly's Express Mart, 1825 Horton Road
- Not Recorded, 1133 Greenwood Avenue
- Pittsburgh Forgings Company, 919 Amur
- PS Foodmart—West Avenue, 1301 S. West Avenue
- Sunoco Station, 1403 Francis Street
- Worthington Specialty Processing, 4905 S. Meridian Road
- Zimmerman Fuel Distributors Inc., 2200 Enterprise Street
- Admiral Petroleum, 250 W. Prospect Street

Source: [www.deq.state.mi.us/ustd/](http://www.deq.state.mi.us/ustd/), the Michigan Map Image Viewer and the City of Jackson

### Closed Underground Storage Tank Sites

#### WHPA for the City of Jackson

There were eighty-one closed UST sites located within the WHPA. These sites include:

- AC Moller Construction Company, 3144 Francis Street
- Adams Outdoor Advertising, 111 Randolph Street
- Aeroquip Corp., 300 S. East Avenue
- Airco Welding Supply, 621 Liberty Street
- Alro Steel Corp., 3100 E. High Street
- Alternative School, 766 Park Road
- Anr Advance Transportation, 1500 Market Street
- Applegate Heating & Air Conditioning Inc., 485 E. South Street
- Arrow Uniform Rental Inc., 2300 E. High Street
- Belden Asphalt Paving Co., PO Box 443
- Bob Hardy Toyota, 3575 Francis Street
- Bootes Orchard, 5330 Browns Lake Road
- Brail Dry Cleaners, 405 W. Prospect Street
- Canteen Service Co., 2305 E. High Street
- Cast Concrete Products Co., 744 E. South Street
- Charles Braun, 210 W. Euclid Avenue
- City of Jackson Water Department, 745 E. Mansion Street
- City of Jackson DPW, 518 Water Street
- City of Jackson DPW, 521 Water Street
- Consolidated Freightways, 2006 Dunigan Drive
- Conway Central Express, 1239 Lewis Street
- Dawlen Corp., 2029 Micor Drive
- Dawn Food Products, 951 E. South Street
- Delongs Furniture Stripping, 1460 Badgley Road
- Ella Sharp Park, 3225 4<sup>th</sup> Street
- Elm Street Yard, Elm Street and Page Avenue
- Emmons Service Inc., 913 Water Street
- Estate of Peter Mulder, 309 E. South Street
- Francis Street Shell Inc., 820 Francis Street
- General Truck Leasing, 2012 Dunigan Drive
- Hammond Hardware Inc., 1800 Francis Street
- Horton Co., 2333 E. High Street
- Industrial Property, 1708 S. Jackson Street
- Inter City Trucking Service, 2326 Brooklyn Road
- International Insulators Inc., 420 E. Prospect Street
- Jackson Division, 1306 Page Avenue
- Jackson County Soc. Crippled Children, 219 W. Prospect Street
- Jackson District Office, 817 W. High Street
- Jackson Drop Forge, 2001 Wellworth Avenue
- Jackson Gar/STR, 1015 Belden Road
- Jackson Fibers Inc., 1417 S. Elm Avenue
- Jackson Fire Department, 1906 S. Milwaukee Street
- Jackson Roll Form, 1800 Losey Avenue
- Jackson Parks Maintenance Building, 2602 Cobb Road

- Jackson Printing, 3136 Francis Street
- Jackson Steel Service, 1150 S. Elm Avenue
- Jackson Truck Service Inc., 1183 Lewis Street
- Jackson Tumble Finish, 1801 Mitchell Street
- Kelly's Distributing Company, 750 Liberty Street
- Kelly Distributing Inc., 702 Hupp Avenue
- Keyes Service, 1200 Greenwood Avenue
- Marathon Unit #2532, 702 Greenwood and Wilkins
- Michael Wisniewski, 1307 Page Avenue
- Michigan Seat, 1227 Francis Street
- Miller Industrial Products, 801 Water Street
- Miller Tool & Die Co., 829 Belden Road
- Miller Truck and Storage, 1800 Mitchell Street
- Monarch Electric Inc., 3005 Francis Street
- Motor City Battery, 2040 E. South Street
- Overhead Conveyor, 1950 Wellworth
- Parker Motor Freight, 2032 Dunigan Drive
- Parkside Junior High, 2400 4<sup>th</sup> Street
- Pat Service, 4540 Francis Street
- Paul King & Associates, 260 W. Euclid Avenue
- Peet Packing Co., 450 E. Prospect Street
- Pioneer Foundry Co. Inc., 606 Water Street
- Production Products Co., 2020 Micor Drive
- RW Mercer Company, 2322 Brooklyn Road
- Shredding Shearing Division, 701 Lewis Street
- St. Johns Cemetary, 403 E. South Street
- Summit Fire Department, 4628 Francis Street
- Summit Township, 2121 Ferguson Road
- Transportation Services, 2000 Goodrich Street
- United Parcel Service, 2009 Dunigan Drive
- Way Bakery, 2100 Enterprise Street
- Willbee Concrete Products Co., PO Box 388
- Willbee Transit Mix Co. Inc., 2323 Brooklyn Road
- Wise International Trucks Inc., 3001 E. High Street
- Wolverine Technologies Inc., 633 Hupp Avenue
- Wolverine Technologies Inc., 701 E. Washington Avenue
- Wyman Bordon Co., 2218 E. High Street

Source: [www.deq.state.mi.us/ustdl/](http://www.deq.state.mi.us/ustdl/), the Michigan Map Image Viewer and the City of Jackson

## Open Leaking Underground Storage Tank Sites

*WHPA for the City of Jackson*

There were twenty-one open Leaking Underground Storage Tank (LUST) sites located within the WHPA. These sites include:

- Admiral Petroleum Company #136, 250 W. Prospect Street
- Adtech Inc., 2100 Brooklyn Road
- Brail Dry Cleaners, 405 W. Prospect Street
- Buddy's Airline Marathon, 1701 Airline Drive
- Estate of Peter Mulder, 309 E. South Street
- Former Mobil Oil, 1363 Oak Lane
- Former Sunoco, SW corner of Prospect and Francis
- General Truck Leasing, 2012 Dunigan Drive
- Horton Co., 2333 E. High Street
- Jackson Drop Forge, 2001 Wellworth Avenue
- Jackson Fire Department, 1906 S. Milwaukee Avenue
- Jackson Roll Form, 1800 Losey Avenue
- Jackson Transportation Authority, 2350 E. High Street
- Kelly Fuels Inc., 740 E. South Street
- Keyes Service, 1200 Greenwood Avenue
- Overhead Conveyor, 1950 Wellworth
- Shell Spee-D-Mart, 1302 E. McDevitt Avenue
- Trudells, 201 E. McDevitt Avenue
- U.S. Truck Company, 909 S. Water
- Wolverine Technology, 701 Liberty Street
- Yellow Freight Systems, 2324 Brooklyn Road

#### **Closed Leaking Underground Storage Tank Sites**

##### **WHPA for the City of Jackson**

There were thirty-seven closed LUST sites within the WHPA. These sites include:

- A.C. Moller Construction, 3144 Francis Street
- Adams Outdoor Advertising, 111 Randolph Street
- ANR Advance Transportation, 1500 Market Street
- Arrow Uniform Rental Inc., 2300 E. High Street
- Bob's Country Store, 2103 Horton Road
- Canteen Service Co., 2305 E. High Street
- City of Jackson Water Department, 745 E. Mansion Street
- Dunigan Brothers Inc., 911 E. South Street
- Ella Sharp Park, 3225 4<sup>th</sup> Street
- Fletcher's Garage, 2221 E. South Street
- Glynn Trolz & Associates Inc., 14950 Horning Road
- Jackson County Soc. Crippled Children, 219 W. Prospect Street
- Jackson Division, 1306 Page Avenue

- Jackson Gar/STR, 1015 Belden Road
- Jackson Fibers Inc., 1417 S. Elm Avenue
- Jensen Lincoln Mercury, 3535 Francis Street
- John Crowley Inc., PO Box 925
- Kelly Distributing Inc., 702 Hupp Avenue
- Kelly's Express Mart, 1825 Horton Road
- Kent-Moore Tool Group/Sealed POW, 1600 Executive Drive
- Lefere Forge & Maching Co., 665 Hupp Avenue
- Michael Wisniewski, 1307 Page Avenue
- Miller Tool & Die Co., 829 Belden Road
- Monarch Electric Inc., 3005 Francis Street
- Parkside Junior High, 2400 4<sup>th</sup> Street
- Paul's Auto Wash, 1312 S. West Avenue
- Production Products Co., 2020 Micor Drive
- Quanex Corp. Macsteel Division, 3100 Brooklyn Road
- Rapid Design, 624 Hupp Avenue
- SF&S Company, 741 E. South Street
- Shredding Shearing Division, 701 Lewis Street
- South Point Auto, 2003 Horton
- Storey Stone Company, 3904 Francis Street
- Vandercook Lake Public Schools, 1000 E. Golf Avenue
- Way Bakery, 2100 Enterprise Street
- West and High Mobil, 1240 S. West Avenue
- Wyman Bordon Co., 2218 E. High Street

Source: [www.deq.state.mi.us/lustcs/](http://www.deq.state.mi.us/lustcs/), the Michigan Map Image Viewer and the City of Jackson

### **Oil and Gas Wells/Contamination Sites**

There were no oil and gas wells located within the WHPA. There was one well in the Summit Township WHPA for the Meadow Heights, Three-Forty Farms and Kimmel Road Wells. This well is located north of Kimmel Road and west of Surrey Road (halfway between Surrey Road and Mercedes Lake).

Source: [www.deq.state.mi.us/mir/](http://www.deq.state.mi.us/mir/) and the Michigan Map Image Viewer

### **Hazardous Waste Generators/Landfills/Solid Waste Disposal Sites**

#### **WHPA for the City of Jackson**

There were one hundred and forty-five hazardous waste generator sites, landfill sites and/or solid waste disposal sites within the WHPA. These sites include:

- A.C. Moller Construction, 3144 Francis Street
- Adams Outdoor Advertising, 111 Randolph Street

- AJ Williams Manufacturing, 1213 Lewis Street
- Admiral Petroleum #136, 250 W. Prospect Street
- Advance Auto Parts, 135 W. Prospect Street
- Advance Packaging Corp., 2400 E. High Street
- Advance Plating Inc., 1307 Page Avenue
- Air Metal Corp., 1309 Bagley Avenue
- Al Greens Auto Polishing, 432 E. Prospect Street
- Alro Steel Corp., 2500 Enterprise Drive
- Alvan Motor Freight, 1500 Market Street
- Arrow Uniform Rental Inc., 2300 E. High Street
- Auto Emporium, 1216 S. Elm Street
- Autozone, 1237 Francis Street
- Belden Asphalt Paving Co., PO Box 443
- Bob's Radiator, 2452 Brooklyn Road
- Boones Welding, 210 W. Euclid Avenue
- Brail Dry Cleaners, 405 W. Prospect Street
- Bre-Z Coin Laundry and Cleaners, 1701 Woodbridge Street
- Buddy's Mini Mart, 710 E. South Street
- C&L Paint and Body, 1807 Lewis Street
- Central Michigan Plating, 309 E. South Street
- Certainteed Corp., 701 E. Washington Avenue
- City of Jackson Water Department, 745 E. Mansion Street
- City of Jackson DPW, 515 Water Street
- City of Jackson DPW, 521 Water Street
- Clark and Sons Enterprise, 1197 E. Morrell Street
- Codo Machine, 1418 Lewis Street
- Collier Smith Machinery, 909 Belden Road
- Condex Corp., 950 S. Roberts Street
- Connection Co., 2032 Dunigan Drive
- Contour Tool, 2393 Research Drive
- Crandell's Body Shop, 1311 Lewis Street
- Dawlen Corp., 2029 Micor Drive
- Dawn Food Products, 2021 Micor Drive
- Dick Maxson Garage, 951 ½ E. South Street
- Dunigan Brothers Inc., 911 E. South Street
- Eagle Car Wash, 3989 Weatherwax Road
- Eagle Precision Technologies, 2218 Enterprise Drive
- Eagle Production Welding and Machining, 2190 Brooklyn Road
- Eiler Brothers Inc., 2201 Brooklyn Road
- Elf Asphalt Inc., 416 Water Street
- Elm Plating Co., 1319 S. Elm Avenue
- Emmons Service Inc., 913 Water Street
- F&S Tool and Gauge Co., 1027 E. South Street
- Food Products, 955 E. South Street

- General Car and Truck, 2112 Dunigan Drive
- Great Lakes International Trucks LLC, 3001 E. High Street
- Hammond Hardware Inc., 1800 Francis Street
- Handley Industries, 2101 Brooklyn Road
- Heat Controller Inc., 1900 Wellworth Street
- Horton Co., 2333 E. High Street
- Huco Inc., 1399 S. Cooper Street
- Huco Inc. Environmental Services, 1224 Locust Street
- Hydraulics Systems Inc., 1505 E. High Street
- Industrial Property, 1708 S. Jackson Street
- Jackson Iron and Metal, 701 Lewis Street
- Jackson Car Wash, 242 W. Prospect Street
- Jackson City County Credit Union, 2320 Francis Street
- Jackson Manufacturing and Design Inc., 915 E. South Street
- Jackson Mobile Home Park, 2240 Brooklyn Road
- Jackson Outdoor Equipment, 1525 Horton Road
- Jackson Printing, 3136 Francis Street
- Jackson Roll Form, 1800 Losey Avenue
- Jackson Transportation Authority, 2350 E. High Street
- Jackson Truck Service Inc., 1183 Lewis Street
- Jackson Tumble Finish, 1801 Mitchell Street
- Jaco Plating-Mansion Street, 502 E. Mansion Street
- Joe's M-50 Garage, 2336 Brooklyn Road
- Judy Murry, 828 Oakridge Drive
- Kelly's Distributing Company, 750 Liberty Street
- Kelly Oil Company, 740 E. South Street
- Kent-Moore Corp Tool Division, 1501 S. Jackson Avenue
- Keyes Service, 1200 Greenwood Avenue
- Kinder-Morgan Power Orion Project, 2219 Chaplin Street
- Knight Enterprises Inc., 1403 Francis Street
- KRT Precision Tool Manufacturing, 1300 Mitchell Street
- Kurpinski Iron and Metal Works, 2735 Page Avenue
- LE Warren, 1600 S. Warren
- Lenco Transmission, 801 Page Avenue
- Lindsey Corp., 1211 Lewis Street
- Magtee Casting, 2411 Research Drive
- Mark Zande, 5500 Browns Lake Road
- Masters Garage, 305 South Street
- Mercer Tank Lining Inc., 2326 Brooklyn Road
- Mercury Stamping, 1911 S. Cooper Street
- Michigan DOC, 936 Water Street
- Michner Plating Co., 1725 Angling Road
- Midbrook Couplings Inc., 2070 Brooklyn Road
- Midbrook Inc., 2080 Brooklyn Road

- Midway Supply, 1611 Clara Street
- Mike's Crane Service, 1225 Locust Street
- Miller Tool & Die Co., 829 Belden Road
- Miller Truck and Storage, 1800 Mitchell Street
- Miller Truck & Storage Co., 1111 S. Elm Avenue
- Mobil Oil Corp., 238 W. Euclid Avenue
- Modern Machine Tool Co., 2005 Losey Street
- Mygrants Wholesale Tire, 1705 E. High Street
- Myrtle Industries, 1421 S. Cooper Street
- Nalco Company, 1610 Clara Street
- Norfolk Southern Corp., Elm Street and Page Avenue
- Norfolk Southern Corp., 1101 S. Elm Avenue
- Oliver's Collision Center, 735 E. South Street
- Omni Source, 422 E. High Street
- Omni Source Corp., 1306 Page Avenue
- One Hour Martinizing LLC, 320 W. Prospect Street
- Orbitform Inc., 2100 Brooklyn Road
- Overhead Conveyor, 1950 Wellworth
- Parkside Junior High, 2400 4<sup>th</sup> Street
- Penske Truck Leasing Co., 2012 Dunigan Drive
- Pipeline Oil Sales Bulk Plant, 749 E. South Street
- Pipeline Oil Sales Inc., 1707 S. Cooper Street
- Precision Dental Arts Inc., 412 W. Prospect Street
- Production Engineering, 2330 Brooklyn Road
- Production Products Co., 2020 Micor Drive
- Quality IST Auto Painting Inc., 1708 S. Cooper Street
- RW Mercer Company, 2322 Brooklyn Road
- Ramsey Holding LLC, 1150 S. Elm Street
- Regal Tire Sales, 108 W. South Street
- Richard K. Maxson, 951 E. South Street
- Riverside Grinding, 2425 E. High Street
- Rudd's 24 Hour Service, 1510 S. Jackson Street
- Ryder Truck Rental, 2435 E. High Street
- SF&S, 741 E. South Street
- Shepherd's Industrial Truck, 601 Water Street
- Simplicity Mower Shop, 2900 Page Avenue
- Steinke Fenton Co., 1355 Page Avenue
- Sterling Spring LLC, 2001 Wellworth Avenue
- Superior Welding, 2338 Brooklyn Road
- Technique, 2427 Research Drive
- Tempered Spring, 2415 E. High Street
- Transportation Services, 2000 Goodrich Street
- True Grind, 1607 ½ S. Gorham Street
- Turn Tech Precision Inc., 1912 Townley Street



- Unified Tool, 2010 Micor Drive
- United Parcel Service, 2009 Dunigan Drive
- UPS Jackson Center, 2009 Dunigan Drive
- Way Bakery, 2100 Enterprise Street
- Willbee Transit Mix, 2401 Brooklyn Road
- Willbee Transit Mix Co. Inc., 2323 Brooklyn Road
- Woodland Cemetery, 2615 Francis Street
- Worthington Steel Company, 953 E. South Street
- Wyman Bordon Co., 2218 E. High Street
- Yellow Freight Systems, 2324 Brooklyn Road
- Zimmerman Fuel Distributors Inc., 2200 Enterprise Street

Source: [www.deq.state.mi.us/tsd/](http://www.deq.state.mi.us/tsd/), [www.deq.state.mi.us/wdsp/](http://www.deq.state.mi.us/wdsp/), Michigan Map Image Viewer Program and the City of Jackson

### **Groundwater Discharge Permit Sites**

There were no groundwater discharge permit sites located within the WHPA for the City of Jackson. There were also no groundwater discharge permit sites located within the Meadow Heights/Three-Forty Farms/Kimmel Road WHPA and the Southfield WHPA.

Source: MDEQ Water Bureau (Part 31 of Act 451)

### **Federal National Priority List Sites**

There were no federal national priority list sites located within the WHPA for the City of Jackson. There were also no federal national priority list sites located within the Meadow Heights/Three-Forty Farms/Kimmel Road WHPA and the Southfield WHPA.

Source: [www.superfund/sites/npl/npl.htm](http://www.superfund/sites/npl/npl.htm) and [www.epa.gov/R5Super/npl/michigan/MID980410617.htm](http://www.epa.gov/R5Super/npl/michigan/MID980410617.htm)

### **3.5 Mapping Potential Sources of Contamination**

Maps of potential and existing sources of contamination within the WHPA are attached in Appendix B.

## **4.0 MANAGEMENT APPROACHES FOR CONTROLLING POTENTIAL SOURCES OF CONTAMINATION WITHIN THE WELLHEAD PROTECTION AREA**

Several factors will dictate how the City can and will manage its WHPA. Indeed, this is probably the most difficult task in the program. Some of the factors that have an influence on how management approaches will be affected include the following;

1. Existing land use activities range from commercial to agricultural within nearly all the delineated wellhead areas creating a wide range of potential contaminants.
2. There are many previously existing businesses, farms, industry, septic systems and floor drains which may be difficult to inspect and manage.
3. Intergovernmental cooperation between the various communities within the County, the Region 2 Planning Commission, and the MDEQ has already been established and the Jackson County Wellhead Program Committee is already in place.
4. Abandoned wells will continue to be a serious threat to groundwater quality in the area due to the lack of information and public knowledge.

Given these limitations, this Wellhead Protection Management Plan has the following characteristics;

1. It reflects the potential sources of contamination within the Wellhead Protection Area.
2. It is feasible for the City of Jackson to implement the program given the land uses already in place.
3. The public water supply system can be protected from potential sources of contamination by following this wellhead program, but it is imperative that the public be aware and well-educated regarding their roles and responsibilities.

### ***Chosen Management Approaches and Implementation Timetable***

The management approaches that the City of Jackson has developed in the past and those that the City will utilize in the future are described below.

### ***Incorporating Wellhead Protection into the Master Plan***

The City plans to add a picture of the Wellhead Protection Area into the Master Plan. Additional information on the WHPP does not need to be added because the City currently has environmental provisions and protection standards in the Master Plan.

The Summit Township WHPA and the Jackson WHPA somewhat overlap. Summit Township has a zoning ordinance in place for abandoned well management.

### ***Wellhead Protection Zoning Ordinance***

The City would like to adopt groundwater protection standards, but they would like to explore whether it would be more effective within their current site plan review standards or placed in a stand alone ordinance. The City plans to work with the Region 2 Planning Commission, Watershed Committee and Legal Committee to determine the best approach.

### ***Environmental Permits Checklist***

The Regional Planner will provide the Environmental Permits Checklist to the Chief Building Inspector so that the checklist can be incorporated into the current site plan review standards.

### ***Site Plan Review Criteria***

The City has received an example site plan review that includes specific elements aimed at groundwater protection measures. They are interested in comparing this example with their current site plan review standards to see if additional measures can be added to ensure groundwater protection. In order to begin the process, the Water Department has to contact the City Council to ask that they consider adding groundwater protection standards to the Site Plan Review.

### ***Incorporate WHPA onto Current Zoning Map***

The City is planning to make an additional map that will include an overlay of the WHPA onto the current zoning map. This map will be placed near the general zoning map. This map will allow the Planning Commission and others to visibly see where the WHPA is located when making critical decisions.

### ***Household Hazardous Waste Collection Day***

Jackson County has a household hazardous waste collection day two times each year.

### ***Abandoned Well Management***

The City completed an abandoned well management program in December of 2007. Three hundred and seventy seven wells were located and properly abandoned. If funding becomes available again through the State of Michigan, it is hoped that three hundred to four hundred more will be plugged. It was suggested that the City's Cross Connection Control person could watch for abandoned wells when he/she is doing inspections.

### ***Stormwater Management***

Currently, the City works on stormwater management through the Phase 2 Program. They would like to educate the Phase 2 group about the WHPP and see if there are ways that the two can work together. Meetings are held monthly.

***MANAGEMENT STRATEGIES IMPLEMENTATION TIMETABLE***

<b>ACTIVITY</b>	<b>STATUS</b>	<b>COMMENT</b>
Wellhead Protection Zoning Ordinance	2008-2010	The City will work to determine if site plan review criteria or a zoning ordinance would be more effective.
Environmental Permits Checklist	2008-2010	
Site Plan Review Criteria	2008-2010	The City will work to determine if site plan review criteria or a zoning ordinance would be more effective.
Incorporate WHPA map onto City Zoning Map	2008-2010	
County-wide herbicide/pesticide disposal service	Annually	
Abandoned Well Management	Complete	If funds become available again, the City will finish plugging the 300 to 400 remaining abandoned wells
Stormwater Management	Monthly Meetings	

## **5.0 WELLHEAD PROTECTION PROGRAM CONTINGENCY PLAN**

A contingency plan is required under the federal Safe Drinking Water Act<sup>3</sup> for all water supply systems. The goal of a contingency plan is to anticipate water system emergencies, and to provide a response plan in case an emergency arises. The City of Jackson contingency plan is tailored to their particular system, water demands, and personnel. The contingency plan includes a list of personnel, equipment, and materials along with a protocol for rapid response to environmental accidents which could compromise the water supply system.

In addition, the contingency plan includes a response protocol in the event of an emergency (Section H-10-1 to F-1-8), policies and procedures related to water supply replacement (Section F-12-1) and contact information for emergency water suppliers (F-1-7). Because of the length of the Contingency Plan, an electronic copy has been included in Appendix D. The contingency plan will be reviewed and updated every three years by the City.

## **6.0 SITING CONSIDERATIONS FOR NEW WELLS**

Subsection 1428(a)(6) of the federal Safe Drinking Water Act (SDWA) requires that "consideration be given to all potential sources of such contaminants within the expected wellhead area of a new water well which serves as a public water supply system..." A new well is defined as either an additional well in an existing wellfield, a modification of an existing well that requires the extension of a Wellhead Protection Area (WHPA), or a well that is placed in an undeveloped water supply aquifer.

The MDEQ provides a process for the review and approval of new public water supply system (PWSS) wells under the administrative authority of the Michigan Safe Drinking Water Act (Public Act 399 of 1976, as amended). The MDEQ, in evaluating plans and specifications for new PWSS wells, will place considerable emphasis on the appropriateness of the new system at the time of construction.

The Michigan Safe Drinking Water Act (Public Act 399 of 1976, as amended) was established to protect public health by providing supervision and control over PWSSs. Act 399, administered by the MDEQ-Water Bureau, provides control over new wells meant to serve PWSSs by granting MDEQ the right to inspect facilities; to evaluate, approve, and/or reject plans and specifications submitted by PWSSs; and to issue permits for construction. Act 399 empowers the MDEQ to promulgate and enforce administrative rules.

---

<sup>3</sup> Subsection 1428(a)(5) "for the location and provision of alternate drinking water supplies for each public water system in the event of well or wellfield contamination ..."

## **6.1 Groundwater Sources and New Production Facilities**

With the present well system, the City of Jackson currently has enough production capacity to serve its present demands.

In the event that it should become necessary to develop new production facilities, the new well(s) could easily be constructed within the area of the present wellfield. In the event that this is not possible, the following procedures must be followed:

1. New production facilities must meet the current MDEQ well construction code (promulgated under the authority of Part 127 of Act 368). This code establishes minimum standards for well construction regardless of the type of water supply and includes criteria for water well casing materials, sealing of the annular space around a well casing, construction requirements for various drilling methods, construction requirements for various geological materials, wellhead termination, and pump installation. Act 368 also requires the sealing of abandoned water wells.
2. New wells sites need to include the proposed location, proposed depth, and other descriptive information that is relevant.
3. New well sites should include an analysis of the Wellhead Protection Area delineation, in addition to background data and any new data, which will make such an analysis possible (i.e., aquifer tests, cross-sections, hydrogeological mapping). These modeling results of the proposed production facility shall be approved by the MDEQ.
4. Because the hydrogeology in the immediate area is reasonably understood, proposed new well sites should include a description of the local geology, and a description of how it fits into the regional hydrogeological setting (as described in the WHPA delineation report).
5. New wells sites should identify potential and existing sources of contamination and ways to control these sources; and
6. Other information related to wellhead protection at the new well location.

Once the need for a new well has been established three potential options are available:

1. Increase the production capacity of the existing wells,
2. Construct a new well in an existing wellfield,
3. Construct a new wellfield.

Typically the most cost effective method of increasing production capacity is to increase the production rate of the existing wells. This method is limited by the physical characteristics of the well(s) and the aquifer. The aquifer testing completed as part of the wellhead delineation effort can be used to establish a maximum pumping rate for each well. The maximum pumping rate is established to prevent over-pumping of the well and damaging the well components, to prevent damaging the aquifer by dewatering, and to

prevent undue drawdown in the area of the wellfield, which may adversely affect neighboring wells.

The second option would be to construct a new well in an existing wellfield. The advantage of this method is that the new well is within an existing wellhead area, and the geology and hydraulic behavior of the aquifer being utilized is already known. Typically, connecting a new well to the existing water system is also not complicated. Although a pumping test should still be conducted on the new well, a full ground water resource evaluation report is typically not necessary. If the production rate of the wellfield(s) is increased, it will be necessary to re-evaluate the wellhead area and make any necessary modifications.

The third option is to construct a new wellfield(s). This option is typically exercised if the existing wellfield(s) has been contaminated or if the existing wellfield(s) cannot support the increased water demand. Selection of a new location for the wellfield should account for the local and regional geology combined with the contaminant source inventory conducted for the wellhead program. The regional geology of Jackson County is already described in the Wellhead Delineation Report, with two principal bedrock aquifers in the County, the Saginaw Formation and the Marshall Formation. Installation of a new wellfield necessitates an aquifer test, submittal and approval of a groundwater resource evaluation report, construction and inspection of the new well(s) and well house (including chemical treatment if necessary), and possibly an extension of the existing water main to connect the new well(s) to the water system. Finally, the Wellhead Delineation Area of the new wellfield and a complete contaminant source inventory need to be incorporated within the existing WHPP.

The new well checklist and guideline presented below are provided to assist in the determination if a new well is needed, and the presentation of that need to the MDEQ.

## **6.2 *New Well Checklist***

### **A new well is necessary because:**

- 1. Water demand has increased above the current rated system capacity.**
  - a. How does the current capacity compare to the current use?
  - b. Is community development and expansion expected?
  - c. Is business/commercial/industrial growth expected?
  - d. Can an increase in water supply attract business/commercial/industrial?
  - e. Are the production wells pumping at the maximum rated capacity?
- 2. The current water supply is contaminated.**
  - a. What are the sources of the current contaminant?
  - b. What potential contamination sources have been identified?
  - c. Can the potential contamination source be managed and controlled?
  - d. Can the current contamination be corrected?
  - e. Based on the Wellhead Delineation Report can a new wellfield be located in an area which appears to be isolated from the current contamination?
- 3. The existing well(s) is failing.**
  - a. How does the current production rate compare to the rated capacity?
  - b. Has the well been inspected?
  - c. Has the well previously been re-habilitated?
  - d. When was the well installed?
  - e. When was the pump assembly last inspected and serviced?
  - f. What is the groundwater chemistry?

## **6.3 *New Well Construction Guidelines***

1. Provide a map of showing the current wells and proposed well locations.
2. Provide a map of the current and potential contamination sources superimposed with groundwater flow directions.
3. Provide a map of the local cross-sectional geology with current and proposed well depth and production intervals.
4. Provide all previous aquifer analyses and reports.



## **7.0 PUBLIC PARTICIPATION AND EDUCATION FOR WELLHEAD PROTECTION**

Educating the community about groundwater protection is an essential component of the Wellhead Protection Program (WHPP). First, the City of Jackson will receive more support and encouragement from the local community if they are educated about the Program. Second, City residents and businesses will learn how to protect their drinking water source. Third, in the event of an emergency, the community will be better prepared and equipped to deal with the situation.

There are a number of educational activities and paraphernalia that can be developed. The following are typical activities:

- Presentations to local schools, community employees, community events, council meetings, local officials and other organizations
- Poster Contests
- Media advertisements and interviews (television, cinema, radio)
- Teacher training camps on groundwater protection
- Children's water festivals
- WHPP booth at a local fair
- WHPP website
- Water taste testing contests
- Educational workshops for businesses within the WHPA
- City employee training on the WHPP

The following are typical WHPP paraphernalia that can be developed or purchased:

- Newsletters
- Newspaper articles
- Brochures
- Road signs
- Placemats
- Mugs
- Clothing with WHPP logo (shirts, coats, hats, etc.)
- Coloring books
- Pens/pencils
- Magnets
- Groundwater Models
- Software for WHPP and groundwater education (CD)
- Rulers
- Stickers
- Powerpoint presentations
- Posters
- Water conservation materials

- Factsheets
- Notepads

The public education activities that the City of Jackson has developed in the past and those that the City will utilize in the future are described below.

### ***Website***

The City plans to put information about the local WHPP on their website.

### ***Placemats***

The City worked with staff from the MRWA to develop placemats on groundwater protection. These placemats will be given to local restaurants.

### ***Brochures***

The City worked with staff from the MRWA to develop WHPP brochures. These brochures will be placed in City Hall, at the Water Department and at the local Chamber of Commerce. The City could also send these to residents, businesses, and farmers within the WHPA.

### ***Article Series for Wellhead Protection***

The City received an article series from the MRWA that includes information on the WHPP, groundwater specifics, abandoned well management, stormwater care, septic system maintenance, lawn and garden care and household hazardous waste disposal. These articles will be placed on the City's website and placed in the semi-annual City newsletter.

### ***Groundwater Education***

The Dahlem Center offers an in-school program referred to as "Our World of Water." This annual program is offered to fourth through sixth grade students. Students learn about surface water, groundwater and watershed specifics, along with other key water components (water cycle, point and non-point source pollution, drinking water systems). The City will work to ensure that area schools are aware of this program.

### ***Grand River Environmental Action Team (GREAT)***

The Grand River Environmental Action Team offers an annual river cleanup in the spring. They also sponsor canoeing and kayaking along the Grand River. The City is interested in possibly approaching the Team to see if they would be interested in a partnership.

### ***Groundwater Model***

The Jackson County WHPP group purchased the groundwater model. It is housed at the City and is used within the surrounding communities. The Dahlem Center education program includes a groundwater model presentation. As long as they continue this program, the City will work to encourage and promote it.

### ***Movie Advertisements***

The City is interested in learning more about the movie advertisements for groundwater protection. MRWA staff will provide the City with information from other Michigan communities that have developed movie advertisements.

### ***City Newsletter***

The City has a semi-annual newsletter and is interested in putting information in about the local WHPP. Among other items, the City plans to include the article series described above.

### ***Cable Television Access***

The City is interested in putting information about groundwater education on the local cable access channel. They have an American Water Works Association video on the groundwater cycle that would be educational.

### ***Earth Week Presentations***

The DEQ Jackson District Office hosts a day long event during earth week for children. The City could work with staff from the District Office to collaborate efforts.

### ***Business Workshop***

The City is also interested in setting up an educational workshop on the WHPP. This workshop could focus on basic hydrogeology, specifics and importance of the WHPP and responsible business practices.

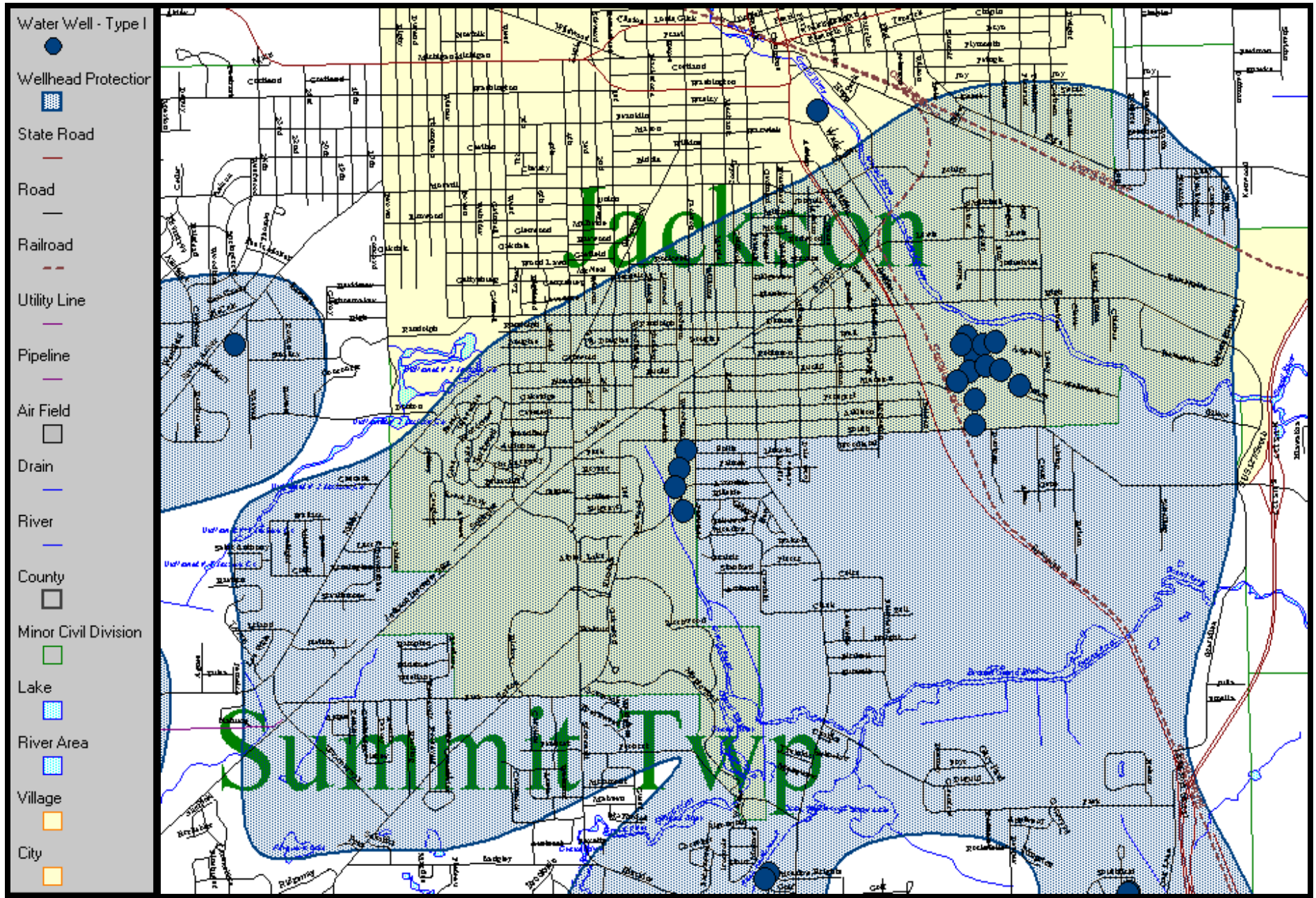
## Public Education and Outreach Implementation Timetable

<i>Activity</i>	<i>Status</i>	<i>Comments</i>
Website	2008-2009	
Placemat	2008 (Developed); 2009 (Distribute)	
Brochure	2008 (Developed); 2009 (Distribute)	
Article Series	2008 (Developed); 2008-2009 (Distribute)	
Groundwater Education through the Dahlem Center	Annually	
GREAT	Annual	
Groundwater Model	Completed	
Movie Advertisements	2009-2010	
City Newsletter	2009-?	
Cable Television	2009-?	
Earth Week Presentations	Annually	
Business Workshop	2009	

## **APPENDIX A**

### **WELLHEAD PROTECTION AREA MAP**

# City of Jackson Wellhead Protection Area



## **APPENDIX B**

### **CONTAMINANT SOURCE INVENTORY MAP**

## **APPENDIX C**

### **EXAMPLES OF MANAGEMENT STRATEGIES**



## STATE AND COUNTY ENVIRONMENTAL PERMITS CHECKLIST FOR THE **COMMUNITY NAME**



<b>Name of Business:</b>	
<b>Mailing Address:</b>	
<b>Facility Owner or Manager:</b>	
<b>Type of Business:</b>	
<b>Telephone:</b>	<b>Fax:</b>
<b>Date:</b>	<b>Signature:</b>

*Note: For assistance with permits and approvals from the Michigan Department of Environmental Quality (MDEQ), including permit coordination among MDEQ divisions, contact the Permit Coordinator, 517-335-4235.*



*Circle (Y/N) the items that may pertain to your project or facility; then contact the office(s) listed to determine specific requirements. Return a copy of this checklist to the municipality as part of your site plan submittal—even if state and county approvals have not been obtained. An updated copy should be submitted prior to occupancy.*

*This list includes the most common permits and approvals related to waste, water quality and air quality. Other permits and approvals, including local approvals, may also be needed.*

- Y N Will the project involve the discharge of any type of wastewater to a storm sewer, drain, lake, stream, wetland, or other surface water? **Contact:** MDEQ Water Bureau (WB) District Office: **XXXX** or National Pollutant Discharge Elimination Permit Program: 517-241-1346.*
  
- Y N Will the project involve the direct or indirect discharge of waste, waste effluent, wastewater, pollutants, and/or cooling water into the groundwater or on the ground? **Contact:** MDEQ WB, Groundwater Permits Program: 517-373-8148.*
  
- Y N Does the project involve construction or alteration of any sewage collection or treatment facility? **Contact:** MDEQ WB, Part 41 Construction Permit Program, District Office: **XXXX**.*
  
- Y N Will the project or facility store or use chemicals, petroleum products or salt? Depending on the type of substance, secondary containment and a Pollution Incident Prevention Plan (PIPP) may be required. **Contact:** MDEQ Waste and Hazardous Materials Division (WHMD), District Office: **XXXX**.*
  
- Y N Will the project involve the installation, operation, or removal of an underground or aboveground storage tank containing a petroleum product or a hazardous substance? **Contact:** MDEQ WHMD, Storage Tank and Solid Waste Section: 517-335-2690.*
  
- Y N Will the project involve liquefied petroleum gas storage tanks or container filling locations? **Contact:** MDEQ WHMD, Storage Tank and Solid Waste Section: 517-335-2690.*
  
- Y N Will the project involve the installation of a compressed natural gas dispensing station with storage? **Contact:** MDEQ WHMD, Storage Tank and Solid Waste Section: 517-335-7211.*

- Y N Will the project involve the generation of hazardous waste? Contact: MDEQ WHMD, District Office: XXXX.*
- Y N Will the project involve the on-site treatment, storage or disposal of hazardous waste? Contact: MDEQ WHMD, Hazardous Waste Section: 517-373-9875.*
- Y N Will the project involve the transport of hazardous waste or non-hazardous liquid industrial waste? Contact: MDEQ WHMD, Transporter Program: 586-753-3850.*
- Y N Will the project involve landfilling, transferring or processing solid non-hazardous wastes on-site? Contact: MDEQ WHMD, District Office: XXXX.*
- Y N Will the project involve the installation, construction, reconstruction, relocation, or alteration of any process or process equipment (including air pollution control equipment) which has the potential to emit air contaminants? Contact: MDEQ Air Quality Division (AQD), Permit Section: 517-373-7023.*
- Y N Will the project or facility involve the storage, mixing or distribution of pesticides or fertilizers in bulk quantities? Contact: Michigan Department of Agriculture, Pesticide and Plant Pest Management Division: 517-373-1087.*
- Y N Will the project involve any man-made change in the natural cover or topography of land, including cut and fill activities which may contribute to soil erosion and sedimentation? Will the earth change disturb an area of one acre or more, or occur within 500 feet of a lake or stream? If the answer to both of these questions is yes, a soil erosion and sedimentation control permit is required. Contact: County Drain Commissioner (or other responsible office): XXXX.*
- Y N Will the project involve dredging, filling, or construction in, across, or under (1) a river, stream, creek, ditch, drain, lake, pond, or swamp (2) wetlands (3) floodplain? Contact: MDEQ Land and Water Management Division (LWMD), Permit Consolidation Unit: 517-373-9244.*
- Y N Will the project involve any dredging proposed 500 feet of a lake, river, stream, creek or ditch? Contact: MDEQ LWMD, Permit Consolidation Unit: 517-373-9244.*
- Y N Will the project involve an earth change activity within 500 feet of a lake or stream or will the project disturb an area greater than one acre in size? Contact: MDEQ WB, Soil Erosion and Sedimentation: 517-335-3178.*
- Y N Will the project involve any construction or land alteration within 400 feet of a designated natural river or tributary? Contact: Michigan Department of Natural Resources, Forest Management Division, Natural Rivers Program Unit: 517-373-1275.*
- Y N Will the project involve construction of a building or septic system in a designated Great Lakes high risk erosion area? Contact: MDEQ LWMD, Permit Consolidation Unit: 517-373-9244.*
- Y N Will the project involve dredging, filling, grading or other alteration of the soil, vegetation, or natural drainage or placement of permanent structures in a designated environmental area? Contact: MDEQ LWMD, Permit Consolidation Unit: 517-373-9244.*
- Y N Will the project involve development, silvicultural activities, or contour alterations within a designated critical dune area? Contact: MDEQ LWMD, Permit Consolidation Unit: 517-373-9244.*
- Y N Will an on-site wastewater treatment system or septic system be installed?*

For sanitary sewage in quantities of 10,000 gallons per day or less, **Contact:** Local Health Department: **XXXX**. For any subsurface discharge of sanitary sewage in quantities equal to or greater than 10,000 gallons per day, **Contact:** MDEQ WB, Groundwater Permits Program: 517-373-8148.

For sanitary sewage in quantities of 6,000 to 10,000 gallons per day: In addition to obtaining a construction permit from the local health department, submit a state wastewater discharge notification form. Flow monitoring and reporting are required. **Contact:** MDEQ WB, Groundwater Permits Program: 517-373-8148.

For industrial or commercial wastewater in any quantity (other than sanitary wastewater), **Contact:** MDEQ WB, Groundwater Permits Program: 517-373-8148.

- Y N** Will the project involve the construction of a water supply well or the extension of a water supply service from an existing water system? **Contact:** MDEQ WB, Drinking Water and Environmental Health Section (DWEHS), Community Water Supply Program: 517-241-1300.
- Y N** Are there out-of-service wells, abandoned wells, or cisterns on the site? (includes drinking water, irrigation and monitoring wells) **Contact:** Local Health Department: **XXXX**.
- Y N** Will the project involve a subdivision or site condominium project utilizing individual on-site subsurface disposal systems or individual wells? **Contact:** WB, DWEHS: 517-241-1345 or Local Health Department: **XXXX**.
- Y N** Will the project involve the on-site storage of sanitary sewage prior to transport and disposal off-site (pump and haul)? **Contact:** MDEQ WB, Groundwater Permits Program: 517-373-8148.
- Y N** Has the property or facility ever been subject to a remedial action, limited closure, or other environmental cleanup response under Part 201, Natural Resources and Environmental Protection Act? Is the property currently subject to a response action? Has a Baseline Environmental Assessment been completed for the property? **Contact:** MDEQ Remediation and Redevelopment Division: 517-373-9837.

## Other Permits Required By MDEQ

- Y N** Are you designated by your facility to be the Certified Operator to fulfill the requirements of a wastewater discharge permit (NPDES or Groundwater)? **Contact:** MDEQ Environmental Science and Services Division (ESSD), Operator Training: 517-373-4755 and MDEQ WB, Storm Water Program: 517-241-8993.
- Y N** Are you a drinking water operator in charge of water treatment or water distribution system, back-up operator, or shift operator? **Contact:** MDEQ ESSD, Operator Training: 517-241-7199.
- Y N** Are you a water well drilling contractor, pump installer, dewatering well contractor or dewatering well pump installer? **Contact:** MDEQ WB, Well Construction Unit: 517-241-1377.
- Y N** Do you want to operate a central production facility (applies to oil and gas production facilities where products of diverse ownership are commingled)? **Contact:** MDEQ Office of Geological Survey (OGS), Petroleum Geology and Production Unit: 517-241-1515.
- Y N** Is the project a dry cleaning establishment utilizing perchloroethylene or a flammable solvent in the cleaning process? **Contact:** MDEQ AQD: 517-241-1324.

- Y N Does the project involve the construction, modification, or operation of a public swimming pool? Contact: MDEQ WB, DWEHS: 517-241-1340.*
- Y N Does your laboratory test potable water as required for compliance and monitoring purposes of the Safe Drinking Water Act? Contact: MDEQ ESSD, Laboratory Services Section: 517-335-9800.*
- Y N Does the project involve the generation of medical waste or a facility that treats medical waste prior to its disposal? Contact: MDEQ WHMD, Medical Waste Regulatory Program: 517-241-1320.*
- Y N Does the project involve the construction, modification or operation of a campground? Contact: MDEQ WB, DWEHS: 517-241-1340.*
- Y N Does the project involve the construction or alteration of a water supply system or sewage disposal system for a manufactured housing project? Contact: MDEQ WB, DWEHS: 517-241-1340.*
- Y N Does the project involve transport of septic tank, cesspool, or dry well contents or the discharge of septage or sewage sludge into or onto the ground? Contact: MDEQ WB, DWEHS, Septage Program: 517-241-1318.*
- Y N Do you store, haul or process scrap tires? Contact: MDEQ WB, WHMD, Storage Tank and Solid Waste Section: 517-335-4035.*
- Y N Do you engage in the business of hauling bulk water for drinking or household purposes (except for your own household use)? Contact: MDEQ WB, DWEHS, Noncommunity Unit: 517-241-1370.*
- Y N Does the project involve the installation of an aboveground storage tank for a flammable or combustible liquid (under 200 degrees Fahrenheit)? Contact: MDEQ WHMD, Storage Tank and Solid Waste Section: 517-335-7211.*
- Y N Does the project involve the installation of a liquefied petroleum gas container filling location or storage location that has a tank with a capacity of more than 2,000 gallons or has two (2) or more tanks with an aggregate capacity of more than 4,000 gallons? Contact: MDEQ WHMD, Storage Tank and Solid Waste Section: 517-335-7211.*
- Y N Does your facility have an electric generating unit that sells electricity to the grid and burns a fossil fuel? Contact: MDEQ AQD, Acid Rain Permit Program: 517-373-7023.*
- Y N Does your facility have the potential to emit any of the following: 100 tons per year or more of any criteria pollutant; 10 tons per year or more of any hazardous air pollutant; or 25 tons per year or more of any combination of hazardous air pollutants? Contact: MDEQ AQD, Permit Section: 517-373-7023*
- Y N Does the project involve either construction which will disturb one or more acre, or does the facility have industrial activity that comes into contact with storm water that enters a storm sewer, drain, lake, stream, or other surface water? Contact: MDEQ WB, Permits Section: 517-241-8993 or MDEQ District Office: XXXX*
- Y N Are you using chemicals or materials in, or in contact with, drinking water at any point in the water works system? Contact: MDEQ District Office: XXXX or Public Water Supply Program: 517-241-1318.*

- Y N Are you applying a chemical treatment for the purpose of aquatic nuisance control (pesticide/herbicide, etc.) in a water body (i.e. lake, pond or river)? **Contact:** MDEQ WB, Aquatic Nuisance Control and Remedial Action Unit: 517-241-7734.*
- Y N Are you applying materials to a water body for a water resource management project (i.e. mosquito control treatments, dye testing, or fish reclamation projects)? **Contact:** MDEQ WB, Surface Water Assessment Section: 517-373-2190.*
- Y N Does the project involve filling or placement of structures in water, wetlands, floodplains, or any work at the land/water interface? **Contact:** MDEQ LWMD, Permit Consolidation Unit: 517-373-9244.*
- Y N Does the project involve construction of a dam, weir or other structure to impound flow? **Contact:** MDEQ LWMD, Dam Safety Program: 517-241-9862.*
- Y N Does the project involve the removal of sand from a sand dune area within two (2) miles of a Great Lakes shoreline? **Contact:** MDEQ OGS, Minerals and Mapping Unit: 517-241-1542.*
- Y N Does the project involve the diversion and control of water for the mining and processing of low-grade iron ore? **Contact:** MDEQ OGS, Minerals and Mapping Unit: 517-241-1542.*
- Y N Does the project involve the surface or open-pit mining of metallic mineral deposits? **Contact:** MDEQ OGS, Minerals and Mapping Unit: 517-241-1542.*
- Y N Does the project involve the mining of nonferrous mineral deposits at the surface or in underground mines? **Contact:** MDEQ OGS, Minerals and Mapping Unit: 517-241-1542.*
- Y N Does the project involve mining coal? **Contact:** MDEQ OGS, Minerals and Mapping Unit: 517-241-1542.*
- Y N Do you want to change the status of an oil and gas well (i.e. plug the well)? **Contact:** MDEQ OGS, Permits and Bonding Unit: 517-241-1528.*
- Y N Does the project involve drilling of oil, gas, brine disposal, secondary recovery, or hydrocarbon storage wells? **Contact:** MDEQ OGS, Permits and Bonding Unit: 517-241-1528.*
- Y N Does the project involve plugging or deepening of an oil or gas well, or conveying rights in the well as an owner to another person? **Contact:** MDEQ OGS, Permits and Bonding Unit: 517-241-1528.*
- Y N Does the project involve changing the status or plugging of a mineral well? **Contact:** MDEQ OGS, Minerals and Mapping Unit: 517-241-1532.*
- Y N Does the project involve the drilling or deepening of wells for brine production, solution mining, waste disposal, storage, or as test wells? **Contact:** MDEQ OGS, Minerals and Mapping Unit: 517-241-1532.*
- Y N Does the project involve the receipt, possession, manufacture, use, storage, transport, transfer, release, or disposal of radioactive material in any form? **Contact:** MDEQ WHMD, Radioactive Material and Standards Unit: 517-241-1274.*

Updated: March 2006

## **CHAPTER 0123**

### **SITE PLAN REVIEW**

- 0123.01 Purposes of Review
- 0123.02 Site Plan Required; Authority of Planning Commission
- 0123.03 Application Procedure
- 0123.04 Site Plan Contents
- 0123.05 Review by Planning Commission
- 0123.06 Amendments to Approved Site Plans
- 0123.07 Issuance of Zoning Permits
- 0123.08 Appeals

#### **CROSS REFERENCES**

Zoning and planning in home rule cities - see M.C.L.A. Sec. 0123.4i

Regulation of location of trades, buildings and uses by local authorities - see M.C.L.A. Sec. 012.345

Regulation of buildings; authority to zone - see M.C.L.A. Sec. 012.345

Regulation of congested areas - see M.C.L.A. Sec. 012.345

Uses of land or structures not conforming to ordinances; powers of legislative bodies; acquisition of property - see M.C.L.A. Sec. 012.345a

#### 0123.01 PURPOSES OF REVIEW

The purposes of the site plan review are to determine compliance with the provisions of this Zoning Code; to promote the orderly development of the **Village**; to prevent the depreciation of land value because of uses or structures which do not give proper attention to siting or area protection; and to provide cooperation between applicants and the Planning Commission so that applicants may accomplish their objectives in the utilization of their land in conformity with the provisions of this Zoning Code.

(Ord. 123. **Date Passed**)

## **0123.02 SITE PLAN REQUIRED; AUTHORITY OF PLANNING COMMISSION**

A site plan, prepared in accordance with the requirements of this chapter, shall be submitted to the Planning Commission. The Planning Commission will require a site plan for all land uses except the following:

- (a) Single and two-family dwelling units on individual lots.
- (b) Residential and agricultural accessory buildings.
- (c) Nonresidential accessory buildings less than 832 square feet in area.

Uses with approved site plans or existing buildings which propose a change constituting ten percent or less of the building floor area or ten percent or less of the required parking spaces may be reviewed, approved and administrated by the Planning Commission.

(Ord. 0123. **Date Passed**)

## **0123.03 APPLICATION PROCEDURE**

- (1) An application for site plan review shall be made to the Zoning Administrator, along with a fee as required by resolution of Council. The application shall, at a minimum, contain the following information.
  - (a) The applicant's name, address and telephone number.
  - (b) Proof that the applicant is the owner of the property or has a legal or financial interest in the property, such as a purchase agreement.
  - (c) The name, address and telephone number of the owner(s) of record, if different from the applicant.
  - (d) The address and/or parcel number of the property.
  - (e) A project description, including the number of structures, dwelling units, square feet of the building, parking spaces and employees.
  - (f) Gross and net acreage of all parcels in the project.
- (2) The Zoning Administrator shall review the plan with the applicant and attempt to resolve areas of noncompliance and concern.
- (3) A copy of the site plan may be forwarded to the Police and/or Fire Department(s) for review as deemed appropriate by the Zoning Administrator.

- (4) The Zoning Administrator shall forward the application and copies of the plan to the Planning Commission within thirty days of the receipt of the application.
- (5) Fifteen copies of the site plan shall be submitted with the application for site plan review.

#### 0123.04 SITE PLAN CONTENTS

The site plan shall be drawn at a scale which is appropriate to the development and which is easily readable. The site plan shall contain the following information, unless compliance is waived by the Zoning Administrator:

- (a) A vicinity map illustrating the location of the site within the **Community**.
- (b) Structures and lot lines within 100 feet of the boundaries of the site.
- (c) The date the site plan was prepared.
- (d) The name, address and professional seal of the preparer.
- (e) A north arrow.
- (f) Existing elevations at a minimum of two-foot intervals and the site's relationship to adjoining property.
- (g) Property lines, dimensions and building setback distances.
- (h) The location of existing and proposed buildings and their intended uses, as well as the length, width and height of each building.
- (i) The location of abutting streets, rights of way, drives, curb cuts and access easements serving the site.
- (j) Proposed elevations at two-foot intervals and the direction of drainage flow.
- (k) The location and size of all water and sanitary sewer lines and storm drainage lines, as well as fire hydrants and catch basins.
- (l) The location of all sidewalks, bike paths and other walkways.
- (m) The location and size of any walls, fences or other screening provisions.
- (n) The location of all proposed landscape materials, including the size and types of plantings.
- (o) The location of all proposed accessory structures, including light poles, flag poles, storage sheds, transformers, dumpsters and signs.



- (p) Proposed parking areas and access drives, showing the number and size of spaces and aisles.
- (q) The location of utility easements.
- (r) The location and type of significant existing vegetation.
- (s) Watercourses and water bodies, including County and **Community** drains and man-made surface drainageways, floodplains and wetlands.
- (t) Zoning on adjacent properties.
- (u) Storage and containment areas, if the use of hazardous substances is involved.
- (v) Other items as deemed necessary by the Planning Commission in order to ensure that the proposed development is in compliance with this Zoning Code and other local ordinances, as well as State and Federal statutes.

(Ord. 0123 **Date Passed**)

#### 0123.05 REVIEW BY PLANNING COMMISSION

- (1) The Planning Commission shall review the site plan for compliance with the requirements of this Zoning Code and conformity to the following general standards:
  - (a) All elements of the site plan shall be harmoniously and efficiently organized in relation to topography, the size and type of the lot, the character of adjoining property and the size and type of buildings. The site shall be developed so as not to impede the normal and orderly development or improvement of surrounding property for uses permitted in this Zoning Code.
  - (b) The landscape shall be preserved in its natural state, insofar as practical, by minimizing tree and soil removal and by topographic modifications which result in maximum harmony with adjacent areas.
  - (c) All storm water shall be detained on site for controlled release. Special attention shall be given to proper site drainage such that the controlled release of storm waters will not adversely affect neighboring properties.
  - (d) The site plan shall provide for reasonable visual and sound privacy for all dwelling units located on the site. Fences, walks, barriers and landscaping shall be used, as appropriate, for the protection and enhancement of property and for the privacy of its occupants.

- (e) All buildings or groups of buildings shall be so arranged as to permit emergency access by some practical means to all sides.
- (f) Every structure or dwelling unit shall have access to a public street, walkway or other area dedicated to common use.
- (g) There shall be provided a pedestrian circulation system which is insulated, as completely as reasonably possible, from the vehicular circulation system.
- (h) All loading and unloading areas and outside storage areas, including areas for the storage of trash, which face or are visible from Residential Districts or public thoroughfares, shall be screened by a vertical screen consisting of structural or plant materials no less than six feet in height.
- (i) Exterior lighting shall be arranged so that it is deflected away from adjacent properties and so that it does not impede the vision of traffic along adjacent streets.
- (j) With respect to vehicular and pedestrian circulation, including walkways, interior drives and parking, special attention shall be given to the location and number of access points, general interior circulation, the separation of pedestrian and vehicular traffic, and the arrangement of parking areas that are safe and convenient and that do not, insofar as practicable, detract from the design of the proposed buildings and structures and the neighboring properties.
- (j) All streets shall be built in accordance with the requirements of the community.
- (k) Site plans shall conform to all applicable requirements of State and Federal statutes, and approval may be conditioned on the applicant receiving necessary State and Federal permits before final site plan approval or an occupancy permit is granted. See the State and County Environmental Permits Checklist.
- (l) Standards for groundwater/wellhead protection, as approved by the Michigan Department of Health and the Michigan Department of Natural Resources on October 7, 1994, and in accordance with the **Community Name** Wellhead Protection Program shall be as follows:
  - The project and related improvements shall be designed to protect the natural environment, including lakes, ponds, streams, wetlands, floodplains, groundwater and steep slopes.
  - General purpose floor drains shall be allowed only if they are connected to a public sewer system, an on-site holding tank, or a system authorized through a State groundwater discharge permit.

- Sites at which hazardous substances and polluting materials are stored, used or generated shall be designed to prevent spills and discharges to the air, to the surface of the ground, and to groundwater, lakes, streams, rivers or wetlands.
- State and Federal agency requirements for storage, spill prevention, record keeping, emergency response, transport and disposal of hazardous substances and polluting materials shall be met. No discharges to groundwater, including direct and indirect discharges, shall be allowed without required permits and approvals.
- Secondary containment for above-ground areas where hazardous substances and polluting materials are stored or used shall be provided. Secondary containment shall be sufficient to store the substance for the maximum anticipated period of time necessary for the recovery of any released substance.
- Outdoor storage of hazardous substances and polluting materials shall be prohibited except in product-tight containers which are protected from weather, leakage, accidental damage and vandalism.
- Secondary containment structures such as out-buildings, storage rooms, sheds and pole barns shall not have floor drains which outlet to soils, groundwater or nearby drains or rivers.
- Areas and facilities for loading or unloading of hazardous substances and polluting materials, as well as areas where such materials are handled and used, shall be designed and constructed to prevent discharge or runoff to floor drains, rivers, lakes, wetlands, groundwater or soils.
- Existing and new underground storage tanks shall be registered with the authorized State agency in accordance with requirements of the U.S. Environmental Protection Agency and the State Police Fire Marshal Division.
- Installation, operation, maintenance, closure and removal of underground storage tanks shall be in accordance with requirements of the State Police Fire Marshal Division. Leak detection, corrosion protection, spill prevention and overfill protection requirements shall be met. Records of monthly monitoring or inventory control must be retained and available for review by government officials.
- Out-of-service abandoned underground tanks shall be emptied and removed from the ground in accordance with the requirements of the State Police Fire Marshal Division and the Michigan Department of Environmental Quality.

- Site plans shall take into consideration the location and extent of any contaminated soils and/or groundwater on the site and the need to protect public health and the environment.
  - Development shall not be allowed on or near contaminated areas of a site unless information from the Michigan Department of Environmental Quality is available indicating that clean-up will proceed in a timely fashion.
  - No above-ground storage of hazardous substances and related secondary containment facilities shall be located within fifty feet of any property line or 100 feet of any residentially zoned property.
  - No underground storage tank shall be within thirty feet of any property line or fifty feet of any residentially zoned property.
- (2) The Planning Commission shall notify the Zoning Administrator and the applicant of its decision within thirty days of the meeting at which the plan was reviewed. Failure to do so will cause the project to be approved unless the failure is beyond the ability of the Planning Commission to control. This requirement may be waived by the applicant.
- (3) In compliance with the Zoning Enabling Act (M.C.L.A. 012.345e, as amended), the Planning Commission may require, upon staff recommendation, a performance bond, letter of credit, certified check or cash bond, in an amount equal to the estimated cost of the improvements associated with the project (as defined by M.C.L.A. 012.345e, as amended). Such performance guarantee shall be deposited with the **Community** Finance Director/Treasurer at the time of the issuance of the permit authorizing the activity or project to ensure faithful completion of the improvements indicated with the approved site plan. If not completed, said performance bond shall be forfeited. The **Community** shall rebate a proportional share of cash deposits only when requested by the depositor, based on the percentage of improvements completed, as attested to by the depositor and verified by the Zoning Administrator.
- (4) A site plan approved under this section shall be valid for a period of one year. If construction has not commenced within this time period, the site plan shall become null and void. Upon a written request from the applicant, the Planning Commission may grant one extension of the site plan for a period not to exceed sixty days.
- (5) The site plan shall be approved, denied or approved subject to any conditions that the Planning Commission may reasonably deem essential for the protection of the public health, safety and welfare of the community.

(Ord. 012. **Date Passed**; Ord. 012. **Date Passed**; Ord. 012. **Date Passed**)

#### 0123.06 AMENDMENTS TO APPROVED SITE PLANS

Amendments to an approved site plan shall be made in accordance with the provisions of this chapter.

(Ord. 012. **Date Passed**)

#### 0123.07 ISSUANCE OF ZONING PERMITS

The Zoning Administrator shall, upon approval of the final site plan and upon application by the applicant, issue a zoning permit, provided that all other applicable **community** ordinances and codes have been complied with.

(Ord. 012. **Date Passed**)

#### 0123.08 APPEALS

Any person or party aggrieved by a decision of the Planning Commission under this chapter may appeal such decision to the Zoning Board of Appeals in accordance with the provisions of this Zoning Code. Such appeal shall be filed within ten days of the date of a final decision on the site plan by the Planning Commission.

**CITY OF XXXX**  
**XXXX COUNTY, MICHIGAN**  
**ORDINANCE NO. XXXX**

AN ORDINANCE TO PROVIDE FOR AND REGULATE THE PROTECTION OF GROUNDWATER RESOURCES IN THE CITY OF XXXX.

THE CITY OF XXXX ORDAINS:

SECTION 1. That Chapter XXXX, TITLE OF CHAPTER, of the XXXX City Code be, and hereby is, amended by adding thereto at the end thereof the following article:

**ARTICLE XXXX. GROUNDWATER PROTECTION**

Sec. CHAPTER NO.-XXX SHORT TITLE.

This article shall be known as the “XXXX Groundwater Protection Ordinance”.

Sec. CHAPTER NO.-XXX PURPOSE

The City of XXXX has determined that:

1. The groundwater underlying the City is the sole source of the City’s drinking water.
2. Groundwater aquifers are integrally connected with, and flow into, the surface water, lakes, and streams which constitute significant public health, recreational and economic resources of the City.
3. Spills and discharges of petroleum products, sewage and other hazardous substances threaten the quality of the groundwater supplies and other water related resources, posing potential public health and safety hazards and threatening economic losses.

Therefore, the City of XXXX has enacted an ordinance to:

4. Preserve and maintain existing and potential groundwater supplies, aquifers, and groundwater recharge areas of the City, and protect them from adverse development or land use practices.

5. Preserve and protect present and potential sources of drinking water supply for public health and safety.
6. Conserve the natural resources of the City.
7. Protect the financial investment of the City in its drinking water supply and to meet state requirements for wellhead protection.
8. Assure that state regulations which help protect groundwater are implemented consistently when new or expanded development proposals are reviewed.

Sec. **CHAPTER NO. XXX**. DEFINITIONS.

1. **AQUIFER**: A geologic formation, group of formations or part of a formation capable of storing and yielding a significant amount of groundwater to wells or springs.
2. **BEST MANAGEMENT PRACTICES**: Measures, either managerial or structural to prevent or reduce pollution inputs to soil, surface water or groundwater.
3. **DEVELOPMENT**: The carrying out of any construction, reconstruction, alteration of surface of structure or change of land use or intensity of use.
4. **ENVIRONMENTAL CONTAMINATION**: The release of a hazardous substance, or the potential release of a discarded hazardous substance, in a quantity, which is or may become injurious to the environment, or to the public health, safety, or welfare.
5. **FACILITY**: Any building, structure, or installation from which there may be a discharge of pollutants.
6. **HAZARDOUS SUBSTANCE**: A chemical or other material which is or may become injurious to the public health, safety, or welfare, or to the environment. The term "hazardous substance" includes, but is not limited to, hazardous substances as defined in the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767; "hazardous waste" as defined in the Hazardous Waste Management Act, Act No. 64 of the Public Acts of 1979, being sections 299.501 to 199.551 of the Michigan Compiled Laws; "petroleum" as defined in the Leaking Underground Storage Tank Act, Act No. 478 of the Public Acts of 1988, being sections 299.831 to 299.850 of the Michigan Compiled Laws.
7. **PRIMARY CONTAINMENT FACILITY**: A tank, pit, container, pipe, or vessel of first containment of a hazardous substance.

8. SECONDARY CONTAINMENT FACILITY: A second tank, catchment pit, pipe or vessel that contains liquid or chemical leaking or leaching from a primary containment area. Containment systems shall be constructed of materials of sufficient thickness, density and composition to prevent the discharge to land, ground waters, or surface waters, of any pollutant which may emanate from said storage container or containers.
9. UNDERGROUND STORAGE TANK SYSTEM: A tank or combination of tanks, including underground pipes connected to the tank or tanks, which is, was, or may have been used to contain an accumulation of hazardous substances, as defined in Part 213 of the State of Michigan Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended.
10. USED OIL: Any oil which had been (a) refined from crude oil, (b) used, and (c) as a result of such use contaminated by physical or chemical impurities.
11. WELL: A permanent or temporary opening in the surface of the earth for the purpose of removing fresh water, testing water quality, measuring water characteristics, liquid recharge, waste disposal, or dewatering purposes during construction, as defined in the Michigan Water Well Construction and Pump Installation Code, Part 127, Act 368 of the Public Acts of 1978, as amended, and rules.
12. WELLHEAD PROTECTION AREA (WHPA): The area around and upgradient from the public water supply wells delineated by the ten year travel time contour capture boundary.

Sec. CHAPTER NO.-XXX. SCOPE.

These provisions shall apply to all businesses and facilities, including private and public facilities, which use, store or generate hazardous substances in quantities greater than 100 kilograms per month (equal to about 25 gallons or 220 pounds), and which require site plan review under the provisions of this ordinance or Sec. CHAPTER NO.-XXX of the Zoning Ordinance of the City of XXXX.

Sec. CHAPTER NO.-XXX. GENERAL PROVISIONS

Groundwater Protection Standards.



- a) The project and related improvements shall be designed to protect the natural environment, including lakes, ponds, streams, wetlands, floodplains and groundwater, and to ensure the absence of an impairment, pollution, and/or destruction of water, natural resources, and the public trust therein.
- b) Stormwater management and drainage facilities shall be designed to retain the natural retention and storage capacity of any wetland, water body, or watercourse, and shall not increase flooding, or the potential for environmental contamination, on-site or off-site, and shall not result in loss of the use of property by any third party.
- c) Industrial facilities with a point source discharge of storm water shall maintain a Storm Water Pollution Prevention Plan in accordance with applicable state and federal regulations.
- d) General purpose floor drains shall be connected to a public sewer system, an on-site holding tank, or a system authorized through a state surface or groundwater discharge permit. If connected to the public sewer system then the volumes and concentrations of waste discharged to the floor drain may require compliance with the **City's Industrial Pretreatment Ordinance**.
- e) Sites at which hazardous substances are stored, used, or generated shall be designed to prevent spills and unpermitted discharges to air, surface of the ground, groundwater, lakes, streams, rivers, or wetlands.
- f) State and federal agency requirements for storage, spill prevention, record keeping, emergency response, transport and disposal of hazardous substances and polluting materials shall be met. No discharges to groundwater, including direct and indirect discharges, shall be allowed without applicable permits and approvals.
- g) In determining conformance with the standards of this ordinance, the **City** shall take into consideration all publications of the **Upper Grand River Watershed Council**, and other applicable references.
- h) Bulk storage of pesticides shall be in accordance with Regulation No. 640, Commercial Pesticide Bulk Storage, of Act 171 of the Public Acts of 1976, as amended, being section 286.569.

#### Aboveground Storage and Use Areas for Hazardous Substances and Polluting Material.

- a) Primary containment of hazardous substances shall be product tight.

- b) Secondary containment shall be sufficient to store the substance for the maximum anticipated period of time necessary for the recovery of any released substance. Products held in containers of 10 gallons or less packaged for retail use shall be exempt from this item.
- c) Outdoor storage of hazardous substances shall be prohibited except in product tight containers which are protected from weather, leakage, accidental damage and vandalism, including an allowance of the expected accumulation of precipitation.
- d) Out buildings, storage rooms, sheds and pole barns which are utilized as secondary containment shall not have floor drains which outlet to soil, public sewer system, groundwater, or nearby drains or natural water bodies unless a surface or groundwater discharge permit has been obtained pursuant to applicable requirements of Act 245.
- e) Areas and facilities for loading and unloading of hazardous substances as well as areas where such materials are handled and stored, shall be designed and constructed to prevent unpermitted discharges to floor drains, rivers, lakes, wetland, groundwater or soils.
- f) The location of the aboveground storage of hazardous substances and methods of primary and secondary containment shall be clearly illustrated on the site plan.

#### Underground Storage Tanks.

- a) Existing or new underground storage tanks shall be registered with the authorized state agency in accordance with applicable requirements of the U.S. Environmental Protection Agency and the Michigan Department of Environmental Quality.
- b) Installation, operation, maintenance, closure, and removal of underground storage tanks shall be in accordance with applicable requirements of the Michigan Department of Environmental Quality. Leak detection, corrosion protection, spill prevention and overflow protection requirements shall be met. Records of monthly monitoring or inventory control must be retained and available for review by City officials for five (5) years.
- c) All underground storage tanks which have been out of service for nine (9) months shall be removed from the site.

#### Well Abandonment.

- a) Out of service wells shall be sealed and abandoned in accordance with applicable requirements of the Michigan Department of Environmental Quality, Water Bureau, Drinking Water and Environmental Health, Well Construction Unit.

#### Sites with Contaminated Soils and/or Groundwater.

- a) Site plans shall take into consideration the location and extent of any contaminated soils and/or groundwater on the site, and the need to protect public health and the environment.
- b) Development shall not be allowed on contaminated areas of a site unless information from the Michigan Department of Environmental Quality is available indicating that cleanup will proceed in a timely fashion.
- c) Information must be provided regarding the type, concentration and extent of identified contamination, land use deed restrictions and any remedial action plans.
- d) Excavation, drilling, direct-push and other earth penetration shall be sealed with grout, or with soil material exhibiting lower hydraulic permeability than the native soil.

#### Construction Standards.

- a) The general contractor, or if none, the property owner, shall be responsible for assuring that each contractor or subcontractor evaluates each site before construction is initiated to determine if any site conditions may pose particular problems for handling any hazardous substances. For instance, handling hazardous substances in proximity to water bodies or wetlands may be improper.
- b) Hazardous substances stored on the construction site during the construction process, shall be stored in a location and manner designed to prevent spills and unpermitted discharges to air, surface of the ground, groundwater, lakes, streams, rivers, or wetlands. Any storage container of over 25 gallons, or 220 pounds containing hazardous substances shall have secondary containment.
- c) If the contractor will be storing or handling hazardous substances that require a manufacturer's material safety data sheet, the contractor shall familiarize him/herself with the sheet, and shall be familiar with procedures required to contain and clean up any releases of the hazardous substance.

- d) Upon completion of construction, all hazardous substances and containment systems no longer used, or not needed in the operation of the facility shall be removed from the construction site by the responsible contractor, and shall be disposed of, recycled, or re-used in a proper manner as prescribed by applicable State and Federal Regulations.
- e) Excavation, drilling, direct-push and other earth penetration shall be sealed with grout, or with soil material exhibiting lower hydraulic permeability than the native soil.

Maintenance.

In areas where hazardous substances are handled, structural integrity of the building must be maintained to avoid inadvertent discharge of chemicals to soil and groundwater. Cracks and holes in floors, foundations and walls must be repaired in areas where chemicals are handled or stored.

Sec. **CHAPTER NO.-XXX**. REVIEW REQUIREMENTS

1. Specify location and size of interior and exterior area(s) and structure(s) to be used for on-site storage, use, load/unloading, recycling, or disposal of hazardous materials.
2. Specify location of all underground and aboveground storage tanks for such uses as fuel storage, waste oil holding tanks, hazardous materials storage, collection of contaminated stormwater or wash water, and all similar uses.
3. Specify location of existing and proposed wells.
4. Specify location of exterior drains, dry wells, catch basins, retention/detention areas, sumps, and other facilities designed to collect, store or transport stormwater or wastewater. The point of discharge for all drains and pipes shall be specified on the site plan.
5. Specify areas on the site that the applicant has reason to believe are contaminated, together with a report on the status of site cleanup, if applicable.
6. Submit **"Hazardous Materials Reporting Form for Site Plan Review"**.
7. Submit **"CITY NAME Environmental Permits Checklist"**.
8. Refer to Section **CHAPTER NO.-XXX Site Plan Review of the Zoning Ordinance of the City of XXXX** for additional requirements.

Sec. **CHAPTER NO.-XXX**. DETERMINATION OF APPLICABILITY.

It shall be the responsibility of any person owning real property and/or owning and operating business within the **City** corporate limits to make a determination of the applicability of this ordinance as it pertains to the property and/or business under his or her ownership or operation and his or her failure to do so shall not excuse any violations of said ordinance.

Sec. **CHAPTER NO.-XXX**. CONDITIONS FOR APPROVAL OR DENIAL.

The Planning Commission, upon reviewing a site plan, shall take one of the following actions:

1. Approval—If the site plan meets all the Zoning Ordinance and related development requirements and standards, the Planning Commission shall record such approval and the Chairman shall sign three (3) copies of the site plan filing one in the official site plan, forwarding one to the Building Inspector, and returning one to the applicant.
2. Disapproval—If the site plan does not meet Zoning Ordinance and related development requirements and standards, the Planning Commission shall record the reasons for denial. The applicant may subsequently refile a corrected site plan under the same procedures followed for the initial submission.
3. Conditional Approval—Conditions on approval of the site plan may be imposed meeting the requirements specified in the **City** Zoning Enabling Act. Conditions must be:
  - a) designed to protect natural resources, and the health, safety and welfare and the social and economic well-being of residents, neighbors, and the community as a whole;
  - b) related to the valid exercise of the police power;
  - c) necessary to meet the purposes of the Zoning Ordinance and related to the standards established in the Zoning Ordinance for the land use or activity under consideration.
4. Table—If the site plan is found to be in violation of requirements, incomplete with respect to necessary information or presenting a unique situation, the Planning Commission may table the site plan until a public hearing can be scheduled to determine specific

improvement requirements the Planning Commission feels are necessary but the applicant is not in agreement with.

Sec. **CHAPTER NO.-XXX**. EXEMPTIONS AND WAIVERS.

The transportation of any hazardous substance shall be exempt from the provisions of this ordinance provided the transporting motor vehicle or rail is in continuous transit, or that it is transporting substances to or from a State licensed hazardous waste treatment, storage, or disposal facility.

Sec. **CHAPTER NO.-XXX**. APPEALS.

The City Council may grant a special permit if it finds by written decision that the proposed use:

1. Meets the intent of this section as well as its specific criteria;
2. Will not, during construction or thereafter, have an adverse impact on any aquifer or recharge area in the district;
3. Will not adversely affect an existing or potential domestic or municipal water supply; and is consistent with existing and probable future development of surrounding areas.

Sec. **CHAPTER NO.-XXX**. PENALTIES AND COSTS.

1. Falsifying Information.

Any persons who knowingly makes any false statements, representation or certification in any application, record, report, plan or other document filed or required to be maintained pursuant to this ordinance, or who falsifies, tampers with, or knowingly renders inaccurate any method required under this ordinance, shall be fined upon conviction not more than five hundred (\$500.00) dollars.

2. Violations.

Any person or persons who is found to have violated an order of the **City** or who willfully or negligently fails to comply with any provision of this ordinance and the orders, rules, and regulations and permits issued thereunder, shall be fined upon conviction not more than five hundred (\$500.00) dollars.

Each day on which a violation shall occur, or continue to occur, shall be deemed a separate and distinct offense. In addition to the penalties provided herein, the City may recover reasonable attorney's fees, court costs, court reporters' fees and other expenses of litigation by appropriate suit at law against the person found to have violated this ordinance or the orders, rules, regulations and permits issued thereunder.

Any person or persons violating any of the provisions of this ordinance, shall be liable to the City for any expense, loss, or damage caused by such violation. The City shall bill the person or persons for the costs incurred by the City (caused by the violation).

Sec. CHAPTER NO.-XXX. SEVERABILITY.

If any provision, paragraph, work, section or article of this ordinance is invalidated by any court of competent jurisdiction, the remaining provisions, paragraphs, words, sections, and chapters shall not be affected and shall continue in full force and effect.

SECTION 2. This ordinance shall be published in the manner required by law and shall become effective ten (10) days after the date of the publication.

Moved by Council member \_\_\_\_\_ supported by Council member \_\_\_\_\_ that the foregoing Ordinance No. XXX be adopted.

AYES: \_\_\_\_\_

NAYS: \_\_\_\_\_

ABSENT: \_\_\_\_\_

Ordinance No. XXX declared adopted at a \_\_\_\_\_ meeting of the CITY NAME City Council held on \_\_\_\_\_, 2007.

\_\_\_\_\_

Mayor

\_\_\_\_\_  
Clerk

I hereby certify that the foregoing is a true and exact copy of the ordinance adopted by the CITY NAME City Council at a \_\_\_\_\_ meeting held on \_\_\_\_\_, 2007, and was published in \_\_\_\_\_ on \_\_\_\_\_, 2007. (Summary published)

\_\_\_\_\_  
XXXX City Clerk



## **APPENDIX D**

### **CONTINGENCY PLAN**

## **APPENDIX E**

### **EXAMPLES OF PUBLIC EDUCATION ACTIVITIES**