

Resolution

Number 22-1297

Adopted Date August 23, 2022

ENDORSE AND SUPPORT THE SOURCE WATER ASSESSMENT AND PROTECTION PLAN FOR FRANKLIN AREA PUBLIC WATER SYSTEM AND APPROVE ITS SUBMITTAL TO THE OHIO ENVIRONMENTAL AGENCY FOR ENDORSEMENT

WHEREAS, the ample supply of high-quality drinking water is a necessity for vibrant and healthy residential communities, for the growth of commercial and retail businesses, and the development of a strong and supportive economy that promotes jobs and businesses; and

WHEREAS, to help assure citizens and businesses of Warren County that their drinking water collected and treated from aquifers along the Great Miami River is safe to drink, this Board has directed the Water & Sewer Department to prepare a Source Water Assessment and Protection Plan for the customers served by the Franklin Area Water Treatment Plant; and

WHEREAS, this Board recognizes the need to seek the Ohio Environmental Protection Agency, Division of Drinking and Ground Water review, approval, and endorsement of the prepared plan; and

NOW THEREFORE BE IT RESOLVED, that:

- 1) This Board hereby approves the Warren County Source Water Assessment and Protection Plan for the Franklin Area Public Water System.
- 2) This Board hereby directs the Warren County Water & Sewer Department to implement, enforce, and take actions necessary and appropriate to implement the plan.
- 3) The Warren County Sanitary Engineer is hereby authorized to submit the Warren County Source Water Assessment and Protection Plan for the Franklin Area Public Water System to the Ohio Environmental Protection Agency for review, approval, and endorsement.

Mrs. Jones moved for adoption of the foregoing resolution being seconded by Mr. Young. Upon call of the roll, the following vote resulted:

Mr. Grossmann – yea
Mr. Young – yea
Mrs. Jones – yea

Resolution adopted this 23rd day of August 2022.

BOARD OF COUNTY COMMISSIONERS

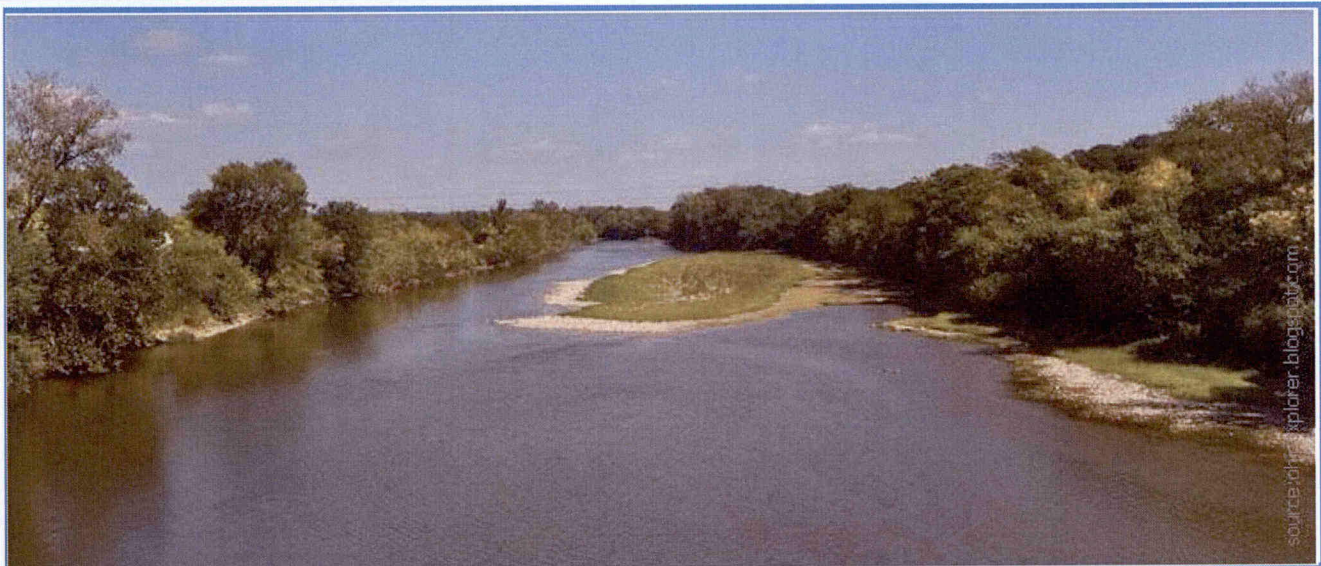


Tina Osborne, Clerk

cc: Water/Sewer (file)

WARREN COUNTY
**SOURCE WATER ASSESSMENT
& PROTECTION PLAN**

FRANKLIN AREA PUBLIC WATER SYSTEM



**WARREN COUNTY WATER & SEWER DEPARTMENT
WARREN COUNTY REGIONAL PLANNING COMMISSION**

August 2022

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ACRONYMS

Bac-T:	Bacteriological Test
BUSTR:	Bureau of Underground Storage Tank Regulation
CCR:	Consumer Confidence Report
CDM:	Camp, Dresser & McKee
EPA:	Environmental Protection Agency
ERP:	Emergency Response Plan
ESI:	Expanded Site Inspection
GMR:	Great Miami River
GCWW:	Greater Cincinnati Water Works
gpm:	Gallons per minute
HAS:	Hydrogeologic Sensitivity Assessments
HazMat:	Greater Cincinnati Hazardous Materials Team
MGD:	Million gallons per day
MSDS:	Material Safety and Data Sheets
OAC:	Ohio Administrative Code
ODNR:	Ohio Department of Natural Resources
OKI:	Ohio-Kentucky-Indiana Regional Council of Governments
ORC:	Ohio Revised Code
PPS:	Potential Pollution Sources
PPSI:	Potential Pollution Sources Inventory
RCRIS:	Resource Conservation and Recovery Information System
RCRA:	Resource Conservation and Recovery Act
SCADA:	Supervisory Control and Data Acquisition
SDWA:	Safe Drinking Water Act
SOCs:	Synthetic Organic Compounds
SWAP:	Source Water Assessment and Protection
TDH:	Total Dynamic Head
TOT:	Time of Travel
TPH:	Total Petroleum Hydrocarbons
TRI:	Toxic Release Inventory
USTs:	Underground Storage Tanks
UV:	Ultraviolet
VOCs:	Volatile Organic Compounds
WHP:	Wellhead Protection
WHPA:	Wellhead Protection Area

Section 1 – Introduction

The Warren County Water and Sewer Department has been working with the Ohio Environmental Protection Agency Division of Drinking and Ground Waters to update the Source Water Protection Area and Plan for the County's Franklin Area Well Field. This document covers the three components of the Source Water Assessment: Delineation, Potential Contaminant Source Inventory and Aquifer Susceptibility. This document also serves as a detailed plan for source water protection as part of the County's Asset Management program. The SWAP plan will be reviewed and updated every five years, with the next update scheduled for the summer of 2027. The plan will also be updated when the well field capacity is expanded through the addition of new wells or upsizing of current wells regardless of the amount of time since the previous update.

The original delineation was completed by Camp, Dresser & McKee in 1996 and included nine proposed production wells with a total capacity of 8 million gallons a day. The delineation was revised to match current well field conditions to include the seven current production wells pumping an average of 9.3 million gallons per day. Descriptions of the well field and how the protection area was delineated are included in Section 1.1.

The physical and hydrogeological settings of the well field and aquifer are described in Section 1.2. In addition, business within and adjacent to the Time of Travel (TOT) zones are identified; assessed and prioritized as potential contaminant sources in Sections 1.3 and 1.4. Finally, this section concludes with a general discussion on the strategies to reduce the risk of pollution in Section 1.5.

1.1 Model Delineation and Well Field Description

1.1.1 Model Delineation

The first step in developing the Plan was the identification of the Source Water Assessment and Protection (SWAP) area which is divided into three zones—the One Year Time of Travel zone (where pollution takes a year to enter the wells); the Five Year Time of Travel zone (pollution takes five years to enter the wells), and areas beyond the TOT zones that could possibly impact the well fields. Delineation of the TOT zones was completed in August 2019 using GFLOW groundwater modeling software developed by Haitjema Software, a subdivision of Haitjema Consulting, Inc. For the purposes of this report, the more encompassing five year time of travel zone is shown in **Figure 1-1** and is identified as the County's Source Water Protection Area.

GFLOW is a highly efficient stepwise groundwater flow modeling system run on a Windows program base. It models steady state flow in a single heterogeneous aquifer using the Dupuit-Forchheimer assumption. Pump rates from Warren County's North Well Field were derived from the peak capacity of the well field over the last year at 9.3 MGD for modeling purposes. For the aquifer, a base elevation of 532 feet was assumed, with a thickness of 200 feet, a hydraulic conductivity of 300 feet/day, and an assumed porosity of 0.2. This information was obtained from previous Subsurface Investigations submitted to Warren County by Bennett & Williams, Inc. February 1990. Contouring was set to compute contours based on head, with a minimum of 530 feet, a maximum of 700 feet, and an interval of 2 feet with coarse grid resolution. An aquifer recharge rate of 0.000913 ft/day (4 in/year) was set based on previously reported data. The Buried Valley Aquifer was modeled with an inhomogeneity with a hydraulic conductivity of 550 feet/day and an added recharge of 0.00137 feet/day (6in/yr). The two ponds created by the Martin Marietta Franklin Gravel Pit were modeled as inhomogeneities with hydraulic conductivities of 500,000 feet/day.

1.1.2 Well Field Description

The Franklin Area Water Treatment Plant is a groundwater facility capable of treating 10.8 million gallons per day (mgd) for customers in the Franklin, Clearcreek and Turtlecreek Townships as well as parts of Wayne and Massie Townships. The facility is served by seven wells (7) in one (1) wellfield along the Great Miami River Buried Valley Aquifer. The wells have a combined capacity of approximately 15.363 million gallons per day (MGD) provided there is no hydrogeologic interference.

1.2 Aquifer Description

1.2.1 Physical Setting

The North well field is located on the southern edge of a buried glacial valley within the Great Miami Buried Valley Aquifer System, which was designated by the U.S. EPA as a Sole Source Aquifer in 1988 (OKI, 1988). When the glaciers were receding, meltwaters transported sediment into the valleys forming the buried valley in this area. Steeply sloping bedrock walls surround the aquifer creating a low permeability radius around the aquifer. The aquifer is covered by less than 15-feet of low permeability material, which provides minimal protection from contamination. In this area the aquifer is about one and a half miles and widens to more than two miles in surrounding areas.

The buried valleys in this area mainly contain sediments consisting of sand and gravel, with silt and clay layers. The sand and gravel portion of the sediment in this area has been reported to be about 35 feet in the east and 90 feet thick in the west. The thickest deposits of sand and gravel in this area are located in the central area of the well field, becoming thinner to the north and south. Wells developed in this valley can have yields from 500 to over 1,000 gallons per minute.

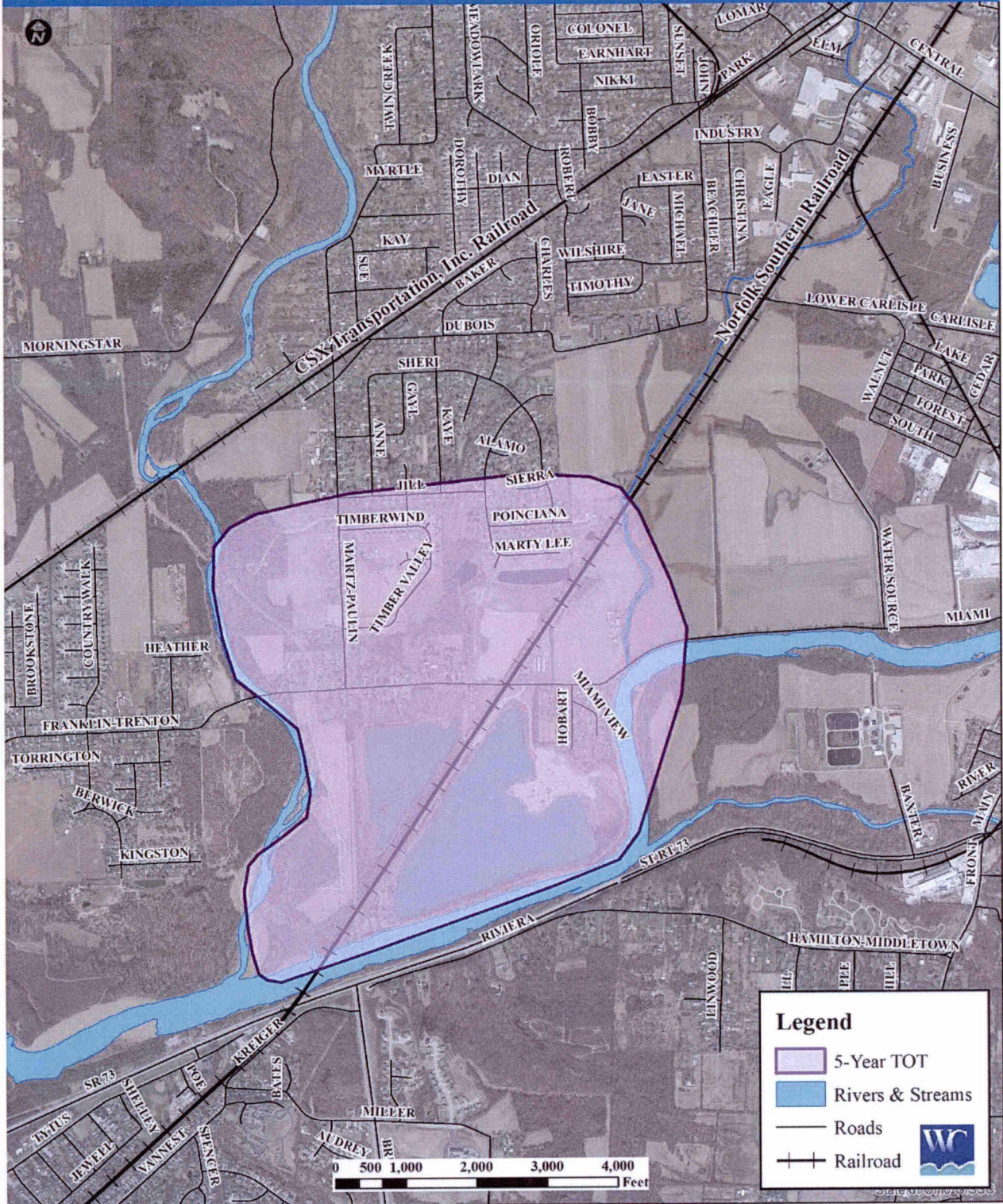
1.2.2 Hydrogeologic Setting

The North Well field situated within the Southern Ohio Loamy Till Plain region of the Till Plain section of the Central Lowland physiographic province (Brockman, 1998). This area has a surface of loamy till with moraines between relatively flat ground and is cut by steep valleys formed from large streams. The valleys are the remnants of a pre-glacial drainage system. Flooding due to glacial melting caused the valley to fill with outwash consisting of vast quantities of sand, gravel, silt.

The main hydrologic feature in this region is the Great Miami River, which borders the well field to the east and south, which flows to the southwest and discharges into the Ohio River. Another hydrologic feature in the region is Twin Creek, running along the western border of the well field, which flows south into the Great Miami River. Due to the flows of these two features, the expected surface water flow is in both a west and a south direction towards Twin Creek and/or the Great Miami River.

Depth to water in this aquifer is 10 to 16 feet below the ground surface. The top of the aquifer is the same as the depth to water. Groundwater recharge in the area occurs mainly by infiltration of rainfall and leakage through the bottom of the surface water sources. Infiltration into the groundwater by precipitation has been estimated at 10 inches per year for the Franklin area. Pervious testing has shown that the hydraulic conductivity values at this site average at 3,500 pgd/ft² (ranging from 900 to 7,000 pgd/ft²). Pumping test data was used to calculate the aquifer transmissivity of 295,200 gpd/ft towards the center of the well field.

Figure 1-1
Source Water Protection Area



1.2.3 Aquifer Susceptibility Analysis

Ohio EPA recently completed a study of source of drinking water for Warren County Franklin Area PWS to identify potential contaminant sources and provide guidance on protecting the drinking water source. According to this study, the aquifer that supplies water to Warren County Franklin Area PWS has a high susceptibility to contamination. This determination is based on the following:

- The presence of a relatively thin protective layer of clay overlying the aquifer,
- The shallow depth (less than 16 feet below ground surface) of the aquifer,
- The presence of manmade contaminants in treated water.

Nitrate has been detected above the concentration of concern of 2 mg/L in the drinking water on multiple occasions since 2000, with the maximum concentration being 5.3 mg/L on August 2, 2000. This indicates a pathway from the ground surface to the aquifer.

The risk of future contamination can be minimized by implementing appropriate protective measures. More information about the source water assessment or what consumers can do to help protect the aquifer is available by visiting our website.

1.3 Land Use & Business Inventory

In the area surrounding the well field, there is a mix of land uses including residential, business, mineral extraction, industrial, and agricultural. A zoning map of the surrounding area is shown in *Figure 1-2*.

To better assess the potential contamination sources (PCS) inventory in the surrounding area, the non-residential parcels within the one and five-year time-of-travel (TOT) zones were mapped. The owner, address, and land use type for these parcels were compiled into the business inventory list contained in *Table 1-3* and the locations are shown in *Figure 1-3*.

The inventory contains a variety of businesses and industries including:

- gravel pits
- automotive repair and service
- public sanitary sewer lines and a wastewater treatment plant
- city service equipment and road salt storage
- soil, gravel and landscaping supply store

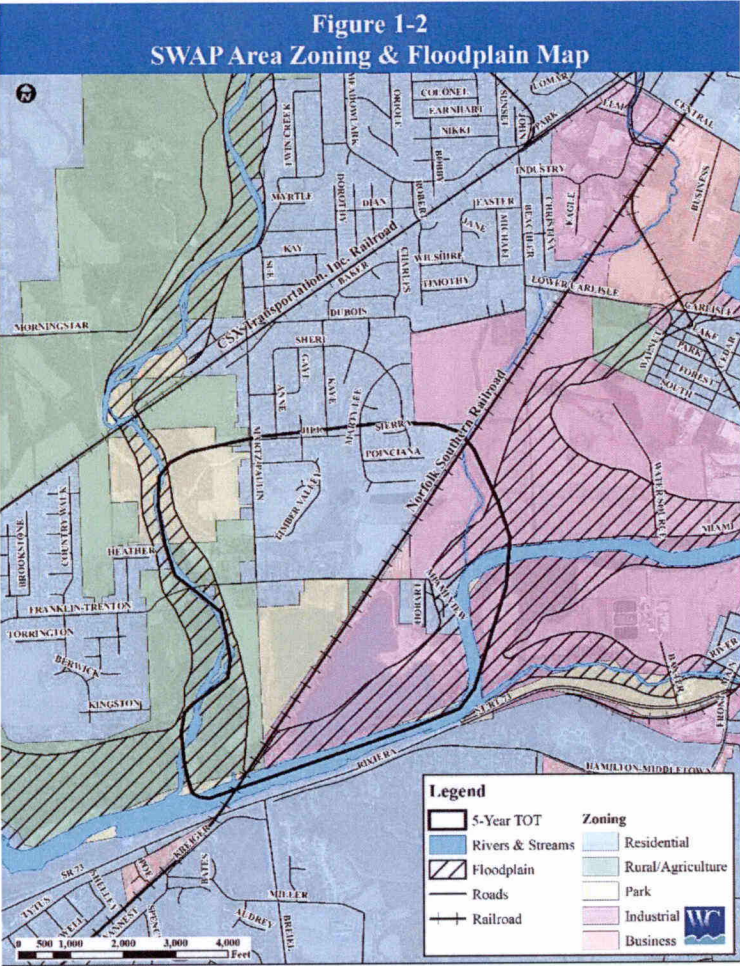
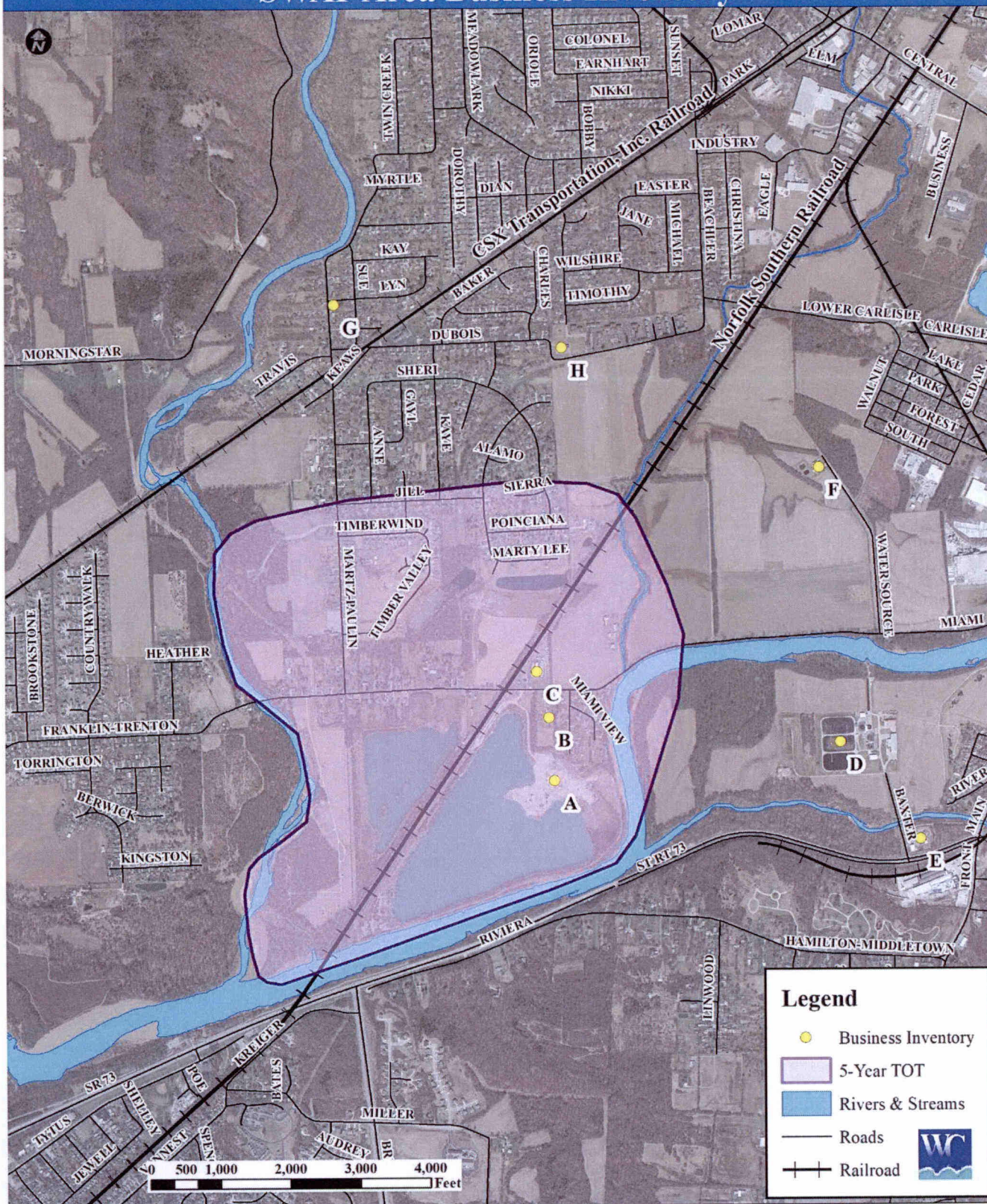


Table 1-3: Business Inventory

Inv. #	Business	Location	Land Use	TOT
A	Martin Marietta Franklin Gravel (formerly American Aggregates gravel pit)	7533 Franklin-Trenton Rd.	Industrial	1 year
B	Woodruff Koi Farm	7481 Franklin Trenton Rd	Residential	1 year/ 5 year
C	Franklin-Trenton Rd Self Storage	7518 Franklin-Trenton Rd	Business	5 year
D	Franklin Regional WWTP	201 Baxter Dr.	Municipality - Wastewater	Outside
E	Franklin Service Center Lot 1	202 Baxter Dr.	Municipality	Outside
F	Franklin Water Treatment Plant	2651 Sonney Lewis Way	Municipality – Water Treatment Plant	Outside
G	Cookie's Market	8098 Martz-Paulin Rd	Business	5 year
H	A&M Mini Mart (Formerly Dairy Mart)	984 Dubois Rd	Business	5 year

Figure 1-3 SWAP Area Business Inventory



1.4 Potential Contaminant Sources

The following sections describe how the County used the business inventory to develop the list of Potential Contaminant Sources (PCS) and their respective threat level. A list of the prioritized PCS sites is also included in this section.

1.4.1 Identifying Potential Contaminant Sources

The county evaluated parcels listed in the business inventory to determine if they are a potential contaminate source with information collected and gathered from a variety of sources. These sources included zoning and land use maps, internet searches, regulatory reports, hydrogeological/topographic maps, and the RCRA, CERCLA, BUSTR and E-Plan HazMat databases. A windshield survey was conducted in September of 2017 by Kathryn Gilbert (P.E.), Warren County Staff Engineer, with no hazards observed.

1.4.2 Ranking Potential Contaminant Sources

While assessing the relative risks potential contaminant sources pose to the well field, several factors were considered. Specifically the factors considered by the County included the location within the aquifer, land use, type of business, pervious unpermitted discharges or spills, distance to the well field, and ground water flow direction. The potential contamination source ranking is contained in **Table 1-4** and located on the map contained in **Figure 1-4**.

The County recognizes that this preliminary ranking serves as a starting point for the collection of additional data that will help refine the risk assessment of each PCS. In the short-term, this approach is considered adequate, though there is values for a more detailed and site specific risk assessment.

In the long-term, each PCS impact will be updated; reprioritized; and risk levels reassigned. The WCWSD will also arrange site visits to the initial high and medium-risk PCS sites together with representatives from Warren County’s Emergency Management Agency.

Table 1-4: Prioritized Potential Contaminant Sources

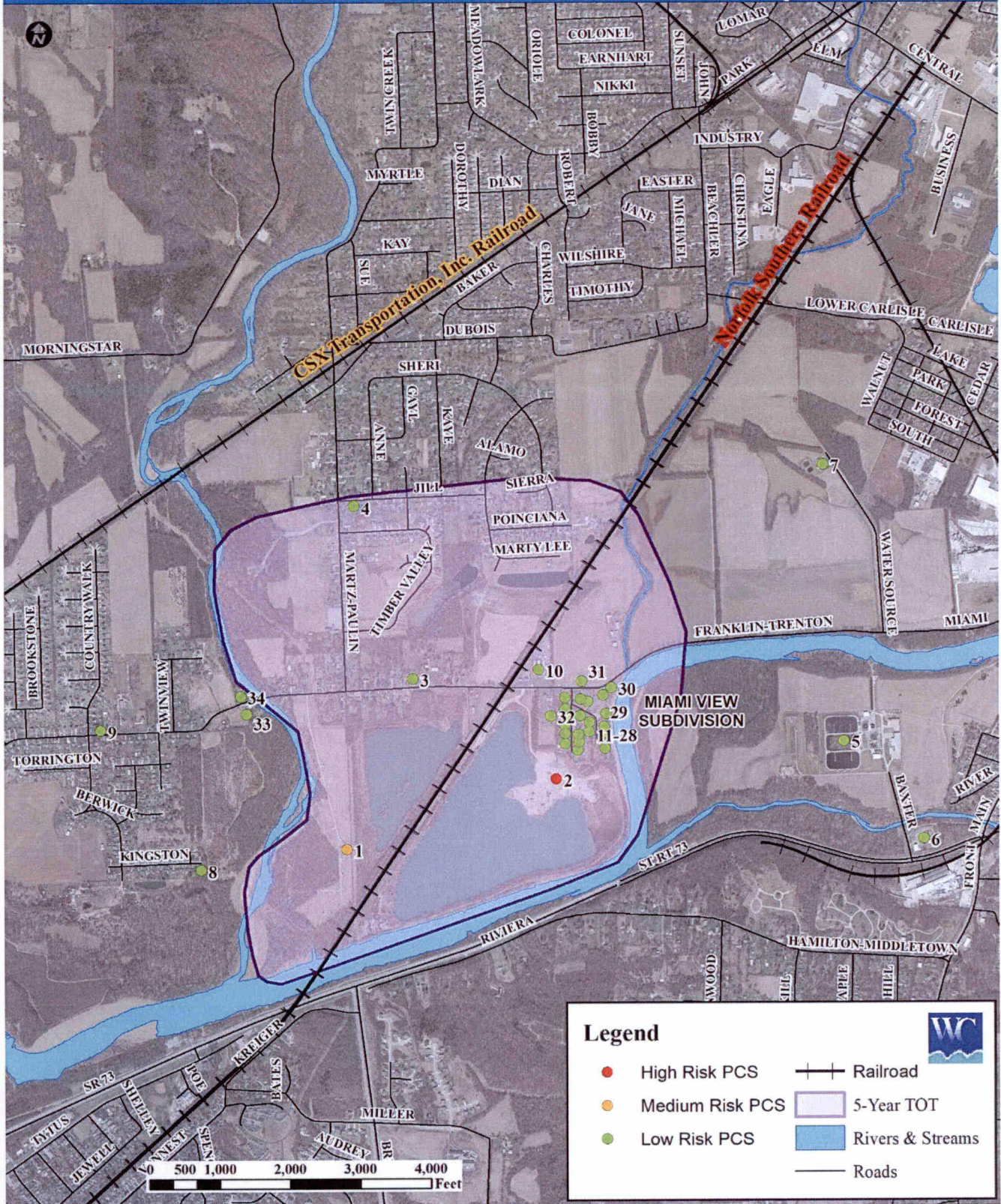
Site Number	Name and Location	Risk Level	Miles to Well Field	T.O.T. Zone	Zoning
<u>High Risk Level</u>					
2	Martin Marietta Franklin Gravel 7533 Franklin-Trenton Rd.	Gravel Pit	0.3	1 year	Industrial
	Norfolk Southern Railroad	Railroad	N/A	1-year/ 5 year	Varies
<u>Medium Risk Level</u>					
1	North Well Field 8093 Franklin Trenton Rd.	Bulk Storage of Sodium Bisulfite for water treatment and Diesel Fuel for generator in above ground storage tank	0	1-year	Municipal
	CSX Railroad	Railroad	N/A	1-Year/ 5-Year	Varies

Section 1 – Introduction

Site Number	Name and Location	Risk Level	Miles to Well Field	T.O.T. Zone	Zoning
<u>Low Risk Level</u>					
3	Franklin-Trenton 35 Lift Station	Sanitary Sewer Lift Station	0.34	5-Year	Municipal
4	Jill Lane Lift Station	Sanitary Sewer Lift Station	0.70	5-Year	Municipal
5	Franklin WWTP 201 Baxter Dr.	Biosolids ICIS-NPDES Non-Major	1.2	Outside	Municipal
6	Franklin service Center Lot 1 202 Baxter Dr.	Road Salt Storage Facility	1.3	Outside	Municipal
7	Franklin Water Treatment Plant 2651 Sonney Lewis Way	Bulk Storage of Sodium Hypochlorite and Hydrofluorosillic Acid for water treatment.	1.6	Outside	Municipal
8	Castlebrook Lift Station	Sanitary Sewer Lift Station	0.24	Outside	Municipal
9	Franklin-Trenton 36 Lift Station	Sanitary Sewer Lift Station	0.61	Outside	Municipal
10	Franklin-Trenton Rd Self Storage 7518 Franklin-Trenton Rd.	Potential for small quantities of residential hazardous materials such as motor oil, gasoline, diesel fuel, lawn fertilizers, and household chemicals	0.6	1 Year	Commercial
11 – 28	Residential Septic Systems Miami View Subdivision	Septic Systems	0.65	5-Year	Residential
29 – 32	Residential Septic Systems	Septic Systems	0.65	5-Year	Residential
33 – 34	Residential Septic Systems	Septic Systems	0.20	Outside	Residential

UTS	Underground Storage Tank File
SHWS	State Hazardous Waste Sites Master List
RCRA	Resource Conservation & Recovery Act
SQG	Small Quantity Hazardous Waste Generator
LQG	Large Quantity Hazardous Waste Generator
TRIS	Toxic Chemical Release Inventory System
NAICS	North American Industry Classification System
NPDES	National Pollutant Discharge Elimination System
ICIS	Integrated Compliance Information System

Figure 1-4
SWAP Area Pollution Source Inventory



1.4.3 Potential Contaminant Source Description

The following section contains information on the high and medium risk PCS sites and the rationale for their ranking.

High Risk Sites

Site #2 Martin Marietta Franklin Gravel (formerly American Aggregates gravel pit)

Martin Marietta Franklin Gravel is located in Franklin Township, to the east of the well field, within the one year TOT zone. It is currently an active business that was formerly American Aggregates. The site is a sand and gravel quarry that extracts soil, overburden materials, sand and gravel. There are monitoring wells between the gravel pit and the production wells to monitor any potential contaminants that may be released.

Railroad CSX Railroad

There is 1.5 miles of the CSX Railroad within the 1 and 5 year time of travel zones for the North Well Field. Due to the nature of the railroad industry, the type and amount of potential contaminants changes on a continuous basis making it hard to effectively determine the risk level associated with the railroad. Pollutants from gravel pit operations, commercial/industrial uses, as well as snow and ice removal chemicals could contaminate the groundwater or storm water. The Conrail Railroad was designated as a high risk site due to it crossing the well field at only 350 feet from Well #2.

Medium Risk Sites

Site #1 North Well Field Chemical Building and Emergency Generator

A chemical storage building and backup generator are located on the North Well Field property. The chemical building includes a max storage capacity of 50,000 pounds of sodium bisulfite for use in the water treatment process. Also located at the well field is an emergency backup generator with 25,000 pounds of diesel fuel storage. The chemical building and emergency generator were designated as medium risk due to being located within the well field with adequate containment around storage tanks.

Railroad Baltimore & Ohio Railroad

The Baltimore and Ohio Railroad crosses Twin Creek approximately 4,700 feet from the well field. Due to the nature of the railroad industry, the type and amount of potential contaminants changes on a continuous basis making it hard to effectively determine the risk level associated with the railroad. Pollutants from gravel pit operations, commercial/industrial uses, as well as snow and ice removal chemicals could contaminate the groundwater or storm water. The Baltimore and Ohio railroad was designated as a medium risk due to its proximity to the well field.

Low Risk Sites

Site #3 Franklin-Trenton 35 Lift Station

The Franklin-Trenton 35 Lift Station is a sanitary sewer lift station located to the northeast of the well field, within the 5-year time of travel zone. The facility is an active sanitary sewer lift station with an average daily flow of 98,000 gallons per day. The lift station is checked daily by county staff to ensure proper operation. There are monitoring wells on the northeaster edge of the well file that will detect any possible contaminants before they reach the production wells.

Site #4 Jill Lane Lift Station

The Jill Lane Lift Station is a sanitary sewer lift station located to the north of the well field, within the 5-year time of travel zone. The facility is an active sanitary sewer lift station with an average daily flow of 46,000 gallons per day. The lift station is checked daily by county staff to ensure proper operation. There are monitoring wells on the northern edge of the well file that will detect any possible contaminates before they reach the production wells.

Site #5 Franklin Waste Water Treatment Plant

The Franklin Waste Water Treatment Plant is located in the City of Franklin, to the east of the well field, outside of the five year TOT zone. The facility is an active waste water treatment plant with an approved daily flow of 1 to 10 MGD. The plant discharges directly north of the plant, at about 1.5 miles northwest of the well field, into the Great Miami River. There are several monitoring wells on the eastern edge of the well field that will detect any possible contaminates before they reach the production wells.

Site #6 Franklin Service Center Lot 1

The Franklin service center is located at the Corner of Baxter Drive and State Route to the southeast of the well field, outside of the five year TOT zone. The facility is an active salt and roadway maintenance storage facility owned by the City of Franklin. The facility includes a 70-foot diameter concrete walled salt storage dome as well as two additional concrete walled with plastic covered salt storage structures and the storage structures are in good condition. There are several monitoring wells on the eastern edge of the well field that will detect any possible contaminates before they reach the production wells.

Site #7 Franklin Water Treatment Plant

The Franklin Water Treatment Plant is located to the northeast of the well field outside of the five year TOT zone. The facility is an active drinking water treatment plant rated for 5 million gallons a day. The treatment facility has bulk storage of Caustic Soda solution (2,700 pounds max), Hydrofluosilicic Acid (3,500 pounds), and Sodium Hypochlorite (16,000 pounds) for drinking water treatment. There are several monitoring wells on the eastern edge of the well field that will detect any possible contaminates before they reach the production wells.

Site #8 Castlebrook Lift Station

The Castlebrook Lift Station is a sanitary sewer lift station located to the west of the well field, outside of the 5-year time of travel zone. The facility is an active sanitary sewer lift station with an average daily flow of 120,000 gallons per day. The lift station is checked daily by county staff to ensure proper operation. There are monitoring wells to the west of the well file that will detect any possible contaminates before they reach the production wells.

Site #9 Franklin-Trenton 36 Lift Station

The Franklin-Trenton 35 Lift Station is a sanitary sewer lift station located to the west of the well field, outside of the 5-year time of travel zone. The facility is an active sanitary sewer lift station with an average daily flow of 39,000 gallons per day. The lift station is checked daily by county staff to ensure proper operation. There are monitoring wells to the west of the well field that will detect any possible contaminates before they reach the production wells.

Site #10 Franklin-Trenton Self Storage

The Franklin-Trenton Self Storage facility is a residential storage facility with both attached and free standing enclosed storage units in addition to uncovered, open air boat and RV storage. While the exact contents of the storage units are unknown it is possible that small quantities (less than 5-10 gallons) of residential hazardous materials could be present. Possible residential hazardous chemicals that may be present include as motor oil, gasoline, diesel fuel, lawn fertilizers, household chemicals, and herbicides. There are monitoring wells to the northeast of the well field that will detect any possible contaminants before they reach the production wells.

1.4.4 Other Potential Contaminant Sources

The following section contains information on additional potential pollution sources that should be considered.

Residential Use

Residential neighborhoods exist in many of the areas surrounding the well field. Stormwater runoff from these residential areas may contain household chemicals, lawn fertilizers, and herbicides. As well as this, a portion of the houses in the 1 and 5 year TOT zones have above ground storage tanks for the purpose of holding gas or oil for the heating of their homes. Control strategies for residential developments should include public education and public participation on pollution prevention. Within the 1 and 5 year Time of Travel Zones there are 18 residential properties within the Miami View Subdivision (Sites #11 – 28) and five additional residential properties (Sites #29 – 34) with septic systems. No failures or violations have been reported to the Health Department.

Road and Rail Vehicles

Due to the nature of the railroad industry, the type and amount of potential contaminants changes on a continuous basis making it hard to effectively determine the risk level associated with the railroad. Pollutants from gravel pit operations, commercial/industrial uses, as well as snow and ice removal chemicals could contaminate the groundwater or storm water.

Road Salt Storage

The City of Franklin has a road salt storage facility (Site No. 6) located on the corner of Baxter Rd. and State Route 73, about a mile and half from the North Well Field. This facility, while outside the 5-year TOT zone, is located on Clear Creek upstream of the North Well field. The groundwater flow model shows this area as flowing to the Franklin Well Field but is a concern to the North Well Field due to its proximity.

1.5 Protection Strategies for PCS Risk Reduction

The strategies for protecting the SWAP area groundwater supply are to reduce the risk of contamination from potential pollution sources. The protection strategies include:

- **Public Education & Awareness:** Implementing a program to educate and increase public awareness on: (1) the importance of maintaining the supply source of their drinking water; (2) the protection measures that their local government and other agencies are doing to safeguard the quantity and quality of the water source; and (3) their role and responsibilities to be successful in realizing that objective. This education campaign is aimed at all owners and occupants of the

different land uses on properties that drain toward the SWAP area. Implementation of the education and awareness strategies will increase the public's awareness of how their activities within the source water protection area effect the quality of their drinking water and minimize contamination.

- **PCS Personnel Education & Awareness:** Meeting with representatives of commercial, industrial, research–tech, and local government uses that are of groundwater quality protection concern. The objective is: (1) to make them aware of: their location in relation to the well fields; (2) the importance of them facilitating and operating their uses in a manner that will prevent or minimize the possibility of surface or ground water contamination; (3) to let them know what to do in the event of a pollutant spilling incident, and (4) for the Warren County Water Department to gain a better understanding of the facility and operations at each PCS site. Implementation of the education and awareness strategies for the personnel at the potential contamination sources will increase the awareness of how their actives effect the quality of the drinking water and provide guidance on how to reduce the risk of contamination of the source water.
- **Spill Emergency Response:** Strengthening emergency and contingency responses by meeting with all emergency service providers in the SWAP area to communicate the plan for responding to different potential emergency incidents and the protocol for coordinating the various emergency service providers to be successful in response specific to each different incident. Swift response and mitigation of spills within the SWAP area will reduce the risk of the spilled material from penetrating into the aquifer and contaminating the source water.
- **Planning Protection Provisions:** Working with local jurisdictions in the SWAP area to include aquifer and well field TOT protection provisions in the future land use element of their comprehensive plans, and to likewise implement in their respective zoning, subdivision, and development regulations, and storm water drainage management plans. Working with local jurisdictions to regulate land uses will prevent additional high risk pollution sources from being constructed within SWAP area.
- **Groundwater Monitoring:** Increasing and regularly monitoring groundwater quality at and near known or potential contamination sources located in or up gradient near the TOT zones where surface and/or ground water flows toward the well fields. Increasing the monitoring of groundwater quality near contamination sources will allow the County to detect aquifer any contamination and allow the County to determine a plan to deal with it before it reaches the wellfield.

Details of these strategies are described in the subsequent sections.

1.6 Protective Strategies Evaluation

The results from groundwater monitoring will be used to evaluate the effectiveness of the groundwater protection strategies. The inventory of potential contaminant sources will be updated every three years through a review of property sales records, review of pollution incident report records, windshield inspections, and site visits of the uses identified in the PCS inventory. The next review and update should occur in the summer of 2025.

Section 2 – Education and Outreach

The overall success of protective strategies depends upon the cooperation of Warren County residents living and working in the Great Miami River (GMR) aquifer protection area. Citizens in the aquifer area need to understand that their actions can affect the quality of their drinking water. They also need to understand how they can change their actions to prevent contamination from occurring. Public education and outreach is the key to ensuring this awareness and therefore it is a significant component of this protection plan. The County’s education and outreach protective strategy includes updating and utilizing a list of local resources and contacts, maintaining an active role in the Southwest Ohio Groundwater Committee, providing educational materials and instruction to school age children, and providing educational materials to residents at major community events.

2.1 Drinking Water Source Protection Local Resources

To successfully protect its source water, Warren County must utilize local resources on a continual basis. Many of these resources will be called upon during times of emergency response while others will be utilized on a daily basis to implement sound operating procedures. The SWAP team includes County staff with input and guidance from environmental consultants and local well drillers. A complete list of the SWAP team members is located in *Table 2-1*. A list of contact information for local and state agencies is included in *Table 2-2*.

Table 2-1: Source Water Assessment and Protection Program Team

Person/Agency	Title/Role
Nick Zimmerman	Franklin Area PWS Chief Operator (WCWS)
Ed Turner	Water Superintendent (WCWS)
Chris Brausch	Sanitary Engineer (WCWS)
Kathryn Gilbert	Staff Engineer (WCWS)
Terran Associates	Hydrogeology Consultant
Moody’s of Dayton, Inc.	Well Drilling, Cleaning and Testing

2.2 Local Resource Input & Collaboration

The County will submit the draft plan for review, feedback, and endorsement to local government agencies including Franklin Township, the City of Franklin, the Municipality of Carlisle, the Warren County Board of Commissioners, and the Warren County Emergency Management Agency. Feedback from these agencies will be incorporated into the final plan.

The County will seek input from a variety of local and state resources as issues occur and the input and feedback from these resources will be periodically incorporated into this plan.

Table 2-2: Local and State Agency Contact Information

Agency	Contact Person	Contact Number
Franklin Area PWS (Warren County Water & Sewer)	Nick Zimmerman, Chief Operator	(513) 499-8414
Warren County Water & Sewer	Ed Turner, Water Superintendent	(513) 683-3687 (w) (513) 582-5043 (c)
Warren County Water & Sewer	Chris Brausch, Sanitary Eng.	(513) 695-1255 (w) (513) 315-2509 (c)
Warren County Commissioners	Tiffany Zindel, Administrator	(513) 695-1250
City of Franklin	Sonny Lewis, City Manager	(937) 746-9921
City of Franklin Fire Department	Main Office	(937) 746-4542
Combined Health District	Duane Stansbury	(513) 695-2566
County Emergency Management	Michael Bunner	(513) 695-1315
Cox Media Group Ohio	Main Office	(937) 225-2000
Franklin Township	Traci Stiver, Administrator	(937) 746-2852
Environmental Education Services	Suzanne Geisler	(513) 695-1209
Franklin Township Fire Department	Main Office	(937) 746-9811
Martin Marietta Franklin Gravel	Main Office	(513) 615-1549
Municipality of Carlisle	Julie Duffy, Village Manager	(937) 743-7727
Municipality of Carlisle Fire Department	Main Office	(937) 743-7725
Ohio EPA – Groundwater	Southwest District Office	(937) 285-6357
OKI Regional Council of Government	Marilyn Osboren, Board Administrator	(513) 619-7683
Regional Planning Commission	Stan Williams	(513) 695-1223
Warren County Soil and Water	Jeff Thomas	(513) 695-1337
Warren County Solid Waste	Susanne Mason	(513) 695-1209

2.3 OKI Groundwater Committee

Warren County is an active member of the OKI Regional Council of Government's Groundwater Committee. The committee works to coordinate groundwater management for the southwest Ohio aquifer system that supplies two-thirds of a million people with drinking water. The committee meets quarterly and is composed of individuals from public and private water suppliers, businesses, industries, and local governments. The committee provides a forum where emerging issues relevant to water quality and quantity, such as the disposal of pharmaceutical and personal care products, can be discussed as well as state and federal regulations and legislation, and the impacts of pumping trends and drought conditions.

2.4 Public Education & Outreach Goals

One of the best ways to reduce the potential contamination risk to the County’s well fields is to educate the public. The County’s public education program is focused primarily on school age children and includes classroom education. The County’s educational program also provides outreach to local residents through informational booths at major community events and through the Warren County Solid Waste Department’s website that provides instructions regarding household hazardous waste disposal.

2.4.1 Classroom Education

Warren County provides school systems in the county with water quality, environmental, and natural resource lessons aligned with the Ohio Department of Education’s revised academic content standards. Lessons are offered from pre-kindergarten through 8th grade and last between 25 to 50 minutes. The County tracks and records the number of classroom presentations conducted each year. During 2021, the County provided 19 presentations to 525 students. The number of classroom presentations was less in 2021 than in previous years due to the Covid-19 pandemic and the County has begun to ramp up the education program for the 2022-2023 school year.

2.4.2 Information Booths at Community Events

The County will provide informational displays at community festivals and events to the extent that their annual budget allows. At these events, the County provides materials that inform residents and visitors of the importance of protecting the County’s drinking water supply. Display materials typically include information on best management practices, proper disposal of household hazardous wastes, as well as coloring books and activity sheets that focus on water quality. The County, to the maximum extent possible, will continue to provide display booths and materials at significant community events such as the Warren County Fair and annual festivals at Warren County Parks.

2.4.3 Household Hazardous Waste Disposal

The Warren County Solid Waste District provides residents with information on the proper disposal of a wide variety of household wastes including automotive fluids (oils, antifreeze, transmission, & hydraulic fluids), pesticides, paints, tires, and other residential generated wastes. Residents access this information through the County’s Solid Waste website or by calling the Solid Waste Department.

2.4.4 Informational Mailings

Outreach to Warren County residents will be accomplished by coordinating with the City of Franklin, Municipality of Carlisle, and Franklin Township to allow the County to include informational articles in periodic publications provided to their residents. Articles will provide residents with aquifer protection related information such as home sewage treatment system maintenance, lawn fertilizer application, and the proper disposal of household hazardous wastes.

The Warren County Water and Sewer Department will also provide their water customers with aquifer protection information through its website.

2.4.5 Roadway Signage

The County has purchased and installed roadway signage with the purpose of informing motorists that they are entering an aquifer protection area and instructing them to call 911 to report a spill. These signs

have been installed along roadways near the 5-year time of travel aquifer boundary and are legible as travelers enter the aquifer protection area.

2.5 Additional Goals and Strategies

The strategies in this subsection are for the purpose of raising awareness with PCS owners and operators of the importance to protect groundwater quality. These recommendations are in addition to the education and outreach programs and activities intended to broadly inform the public about the importance of their groundwater supply and their role and responsibility in protecting it. The information education and outreach strategies for controlling groundwater PCS risks and impacts are as follows:

1. Perform site visits at each PCS location for the following purpose and goals:
 - update the County's PCS inventory including new risks, removing sites that are no longer risks, and classifying each site's risk level;
 - provide owners, operators, and employees with SWAP information including the relationship and importance between their site, the well heads, time of travel zones, and groundwater quality;
 - emphasis the use of best-management practices; and
 - emphasis proper spill and emergency response procedures.
2. Meet with farmers and golf course operators to encourage the use of best management practices for groundwater quality protection.
3. Install SWAP area identification and response signs along roads and railways.
4. Coordinate with County and Township road maintenance departments to encourage the use of good housekeeping activities for the storage and application of roadway salt.

The first control strategy applies to inventoried PCS site facilities, operations, and activities where harmful substances are used. The specific intention of implementing the control strategies at these PCS sites is to help ensure owners, operators, and employees understand the groundwater protection importance of:

- their site location and operation relative to the vulnerability of potentially contaminating the groundwater supply; and
- their responsibility in preventing contamination of the groundwater by the potentially harmful substances they handle.

The second strategy focuses on farming and golf course operations. The WCWSD, in cooperation with the Warren County Soil and Water Conservation District (SWCD), seeks to implement this strategy by encouraging farmers and the golf course operators to use best management practices (BMPs) in the application of fertilizers, herbicides, and pesticides.

The purpose for implementing the third control strategy is to raise the general awareness of the public and more specifically, informing travelers within the SWAP area that they are in a groundwater protection area and providing instructions on how to report spills or the dumping of substances harmful to the groundwater.

The final control strategy is intended to remind and encourage local roadway departments to implement sound road salt and bulk chemical storage and housekeeping procedures that are required under their National Pollution Discharge Elimination System (NPDES) permit.

2.6 Public Education & Outreach Evaluation

The Warren County Water and Sewer Department will evaluate the effectiveness of the public education and outreach program each time the source water protection plan is updated.

Section 3 – Water Shortage & Emergency Response

In the event of a severe drought, flood, natural catastrophe, or significant contamination threat of the source water, Warren County will enact the contingency plans identified in this document in addition to their Emergency Response Plan (ERP). The County has an ERP as required by the Public Health and Bioterrorism Preparedness and Response Act of 2002. This plan was prepared by TetraTech and adopted by the County in 2004.

The County's ERP meets the requirements outlined in Chapter 3745-85 of the Ohio Administrative Code (OAC) and Ohio Revised Code (ORC) Section 3750. This source water protection plan is an additional resource to be used in conjunction with the County's existing ERP. This plan identifies corrective measures in the event of potential well field contamination, identifies temporary and long-term alternate drinking water supplies, and indicates financial mechanisms for implementing such alternatives.

3.1 Drinking Water Shortage

3.1.1 Water Storage (Ground and Elevated)

In the event of a short-term emergency requiring the County to cease operation of their water plant, the County can serve its customers from both elevated and ground storage tanks. The County has a total elevated and ground storage capacity of 9.5 million gallons within the North Water System. Assuming that the tanks are nearly full at the start of the emergency, this stored capacity provides the County roughly 43 hours of operation at a peak year demand of 5.3 million gallons per day.

3.1.2 Alternate Drinking Water Sources

In the event of an emergency lasting longer than a day, the County may need to purchase water from neighboring utility providers. The County can purchase water under its long-term service contract with the Greater Cincinnati Water Works (GCWW) as well as service agreements with Springboro, Waynesville, Butler County, and the City of Franklin. The connections for these entities are located throughout the North Water System. The County has sufficient emergency service agreements and water system interconnections with neighboring entities to allow the County to provide service should its well fields become threatened.

3.1.3 Planning for Future Water Supply Needs

Well Field Expansion – The County plans to expand the well field with the addition of four more production wells (each with a capacity of about 2 MGD) on the property owned by the Miami Conservancy District on the west side of Twin Creek. The addition of these wells would bring the total capacity of the well field to 23.4 million gallons a day with a firm capacity of 18.6 MGD. The County is planning on beginning the design in 2025 with construction completed in 2026-2027. Currently the average daily demand for the Franklin Area PWS is 3.5 mgd of finished water (4 mgd of raw water) with a peak day demand of 7.7 mgd finished water (8.6 mgd of raw water).

Shelly Pump Station Upgrades – The Shelly pump station was recently upgraded in 2014 with the addition of Peerless open line shaft vertical turbine can pumps capable of pumping 5 million gallons a day each. Currently 5 pumps are installed with a firm capacity of 20 MGD but there is room for three more pumps which would bring the firm capacity to 35 MGD.

3.1.4 Financial Funding for Alternative Water Sources

Revenues from the County’s user fees, improvement fees, and tap fees are sufficient to construct the planned improvements and necessary upgrades to the County’s water system. The County maintains sufficient financial reserves to address current and anticipated needed improvements.

3.2 Emergency Planning

3.2.1 Drinking Water Supply Contingency Plans

A copy of the County’s Drinking Water Supply Contingency Plan is located at each of the County’s treatment plants, the Department’s main office, and at the Warren County Emergency Operating Center. All Water and Sewer Department employees can access it. The response plan addresses a wide variety of emergencies and identifies the proper response procedures in the event of the following:

- unplanned absence of operator,
- power outage,
- main water break,
- inorganic/organic contamination,
- bacteriological contamination,
- suspected tampering,
- water system depressurization,
- distribution system storage failure,
- suspected backflow or cross connection, and
- source failure (including pumps, wells, and/or intakes)
- source water contamination

This source water protection plan focuses on the emergency scenarios that affect the County’s well fields. This plan provides additional details in the event of severe drought, well field flooding, chemical spills within the aquifer, and chemical spills within the Great Miami River.

3.2.1.1 Severe Drought

During severe drought conditions, the County will operate the treatment facilities to their best ability to provide County produced water to their customers. This includes operating all wells, sand filters, booster pumps, and treatment equipment. The County will remove wells from service as the water table within the aquifers drop below the levels required for safe pump operation. Well pumps equipped with variable frequency drives will be operated at slower speeds to allow for aquifer recharge and to prevent pump cavitation.

Should the North Water System not be capable of producing sufficient water to serve its customers, the County will convey water from their Richard A. Renneker (RAR) Water System to the North Water System through the County’s 24-inch interconnection.

Should the County not be capable of providing surplus water from the RAR Water System to meet customer demands, the County will open metered interconnection with neighboring entities to purchase surplus water.

If the County is not capable of purchasing sufficient water from other entities, it will **as a last resort**, place water restrictions upon its users. These restrictions will be limited to irrigation restrictions and, if

necessary, irrigation bans. In this event, the County will notify consumers of the severity of the water shortage, ban water use for all non-essential domestic use, and take necessary enforcement actions.

3.2.1.2 Well Field Flooding

Because the well fields are located along the Great Miami River, flooding is a common threat of contamination that the County must monitor and manage. The County removes wells from operation as the river level rises and the wells become exposed to surface water.

3.2.1.3 Chemical Spills within the Aquifer

One of the most critical threats to the operation of the treatment plant is a concentrated chemical spill or release into the aquifer near the County's well fields. The County has developed and will implement emergency procedures during a concentrated chemical release.

3.2.1.4 Chemical Spills within the Great Miami River

The aquifer is recharged from ground water, streams, and creeks as well as flow from the Great Miami River. A significant chemical release into the GMR will be of primary concern, especially if the chemical migrates into the aquifer as it travels along the river. A few potential chemical sources include spills from stored agricultural chemicals, gas line rupture at or near a river crossing, and spills from bulk chemical storage at commercial or industrial facilities.

Should a spill occur with the GMR, the County shall coordinate with the Ohio EPA and other emergency response agencies to quantify the amount of chemical released and track its progression along the River. When the chemical reaches 0.5 miles upstream of the County's well fields, the County shall turn off all wells and cease withdrawing water from the aquifer. The County shall not place wells back into operation for a period of 6 hours after the spill has passed the North Well Field. The County shall coordinate with the Ohio EPA prior to placing the wells back into service.

3.2.2 Chain of Command & First Response Staffing

The WTP Chief Operator, Water Treatment System Superintendent, Deputy Sanitary Engineer, and Sanitary Engineer shall be made aware of all emergency and critical events that have a potential to contaminate the well field. During emergency events, decisions regarding the operation of the treatment plant shall be made by the Chief Operator and Water Treatment System Superintendent. The Sanitary Engineer and Deputy Sanitary Engineer shall be informed of the potential threat, decisions, and changes in treatment plant operation throughout the course of each event. Contact information can be found in the chain of command located within the Contingency Plan for the Franklin Area Public Water System. The Contingency Plan also addresses the steps to take should the wellfield or one of the production wells is contaminated.

3.3 Emergency Response Strategies

The control strategies in this category are for the purpose of keeping the Warren County Emergency Management Agency (WCEMA) informed on the types and locations of PCS sites that are in the SWAP area. This is important because the WCEMA is the lead contact responsible for coordinating all first responders to prevent a spill or other discharge of groundwater harmful substances. They are intended to aid them in carrying out their charge of protecting the groundwater from contamination due to a spill emergency. The strategies to aid emergency response for controlling groundwater PCS risks and impacts are as follows:

Section 3 – Water Shortage & Emergency Response

1. Provide the SWAP area map to the Warren County Emergency Management Agency (WCEMA) that shows the groundwater TOT zones and GPS coordinates of the wells and PCS sites.
2. Provide WCEMA with contact information of the PCS operators and owners.
3. For other agencies and jurisdictions to notification to WCWS in the event of a spill or release in or near SWAP areas.

Section 4 – Potential Contaminant Source Control Strategies

Control strategies for Potential Contaminant Sources are described and outlined in *Table 4-1*. The table includes a brief description of the strategy for the high and medium risk potential pollution sources, organization or agency that is primarily responsible for implementation, and a general timeframe in which the task should be fulfilled. In addition to addressing specific sources of pollution, the County has included organizational strategies for responding to source water emergencies, regulatory strategies for land use planning and zoning, and strategies for public education and outreach.

The County will continue its ongoing public education program for property owners, residents, and school children that live or work within the aquifer area. To maintain the integrity of the water supply, the County acknowledges the importance of an informed citizenry that is capable of understanding the complex issues surrounding how pollution occurs and how to take preventative action.

Table 4-1: Implementation Strategies, Responsibility & Schedule

Control Strategy Description	Responsibility	Schedule
1. Potential Pollution Source (Point and Non-Point)		
1.1 Active/Inactive Gas Stations & Automotive Service Shops (Franklin Street Maintenance); <ul style="list-style-type: none"> Conduct site visit & review storage and disposal plan for automotive fluids & petroleum products. Inspect containment areas for above ground storage tanks and review monitoring reports for underground storage tanks. 	Warren County Water Treatment Superintendent, WTP Chief Operator, & Warren County Emergency Management Agency	Within 1 year after plan adoption
1.2 Martin Marietta Franklin Gravel <ul style="list-style-type: none"> Review reclamation plans and coordinate on the transfer of the reclaimed site to a governmental entity for public use. Conduct site visits and coordinate with owners regarding site security, drainage, chemical storage and containment and berms 	Warren County Staff Engineer and/or Sanitary Engineer	Within 1 year after plan adoption
1.3 Railways <ul style="list-style-type: none"> Due to the nature of the railroad business, there is not much that a local municipality can do with respect to regulating the railroad. Contact both railroad an attempt to obtain copies of their Emergency Response Plans. 	Warren County Staff Engineer and/or Sanitary Engineer	Within 1 year after plan adoption
1.4 North Well Field <ul style="list-style-type: none"> Continue proper maintenance of chemical and fuel storage tanks and associated containment devices. Coordinate with suppliers regarding best management practices for chemical and fuel deliveries. 	Warren County Water Treatment Superintendent , WTP Chief Operator	Ongoing
1.5 Collect data on high and medium risk PCS sites and compile the information into a centralized GIS-based data management system. Information will include interviews, site visits, and research of agency reports. Reevaluate the risk levels of the PCS sites as additional information is obtained.	WCWS Engineering & GIS staff & Water Treatment Superintendent	Ongoing
1.6 Conduct visits of high and medium-risk PCS sites to: <ul style="list-style-type: none"> become familiar with the facility operations; review best management practices; and educate owners on source water protection 	Warren County Water Treatment Superintendent , WTP Chief Operator, & Warren County Emergency Management Agency	Within 1 year after plan adoption

Section 4 – PCS Control Strategies

Control Strategy Description	Responsibility	Schedule
1.7 Monitor reports such as the BUSTR (Bureau of Underground Storage Tank); EPA-Corrective Action Reports; HMIRS (Hazardous Material information Reporting System); and LUST (Leaking Underground Storage Tanks Incident Report); for information, compliance with regulations and implementation.	Warren County Water Treatment Superintendent and WTP Chief Operator	Annually
1.8 Develop an effective source water monitoring program that may include the installation and/or removal of monitoring wells and annual contaminate sampling.	Warren County Water & Sewer Director & Staff Engineer, Water Treatment Superintendent, and EPA	Ongoing
2. Education and Outreach		
2.1 Submit SWAP Plan to the Warren County Emergency Management Agency, City of Franklin, Municipality of Carlisle, Warren County Combined Health District, and other appropriate agencies for review, input and collaboration. Conduct a coordination meeting with each entity.	Warren County Water & Sewer Director and Water Treatment Superintendent	Within 1 year after plan adoption
2.2 Offer Warren County public education program for school children to help them gain a better awareness to how to protect water resources.	Environmental Education Services, Inc. by contract with Warren County; by the Warren County Soil and Water Conservation District (SWCD)	Ongoing
2.3 Provide display booths at community events, festivals, parks, and other gathering places to present and distribute groundwater awareness and protection information.	Environmental Education Services, Inc. by contract with Warren County; by the Warren County Soil and Water Conservation District (SWCD)	Annually
2.4 Provide groundwater protection information and a SWAP executive summary on the Water and Sewer Department's website.	Warren County Water & Sewer Director and/or Staff Engineer	Ongoing
2.5 Inform residents of the proper procedure for the disposal of household chemicals, automotive fluids and other pollutants.	Warren County Solid Waste Management District	Ongoing through the Solid Waste website.
2.6 Visit Low Risk PCS sites and inform site owners and operators about: <ul style="list-style-type: none"> the relationship between their site, the well heads, and TOT zones; best-management practices; spill and emergency response procedures, and collect data and information on the PCS site. 	Warren County Water Treatment Superintendent, Plant Chief Operator, & WCEMA	Within 1-year after plan adoption; when a new PCS is inventoried; and every 5 years thereafter.
2.7 Install SWAP area identification and response signs along the roads and railways.	Warren County Water Treatment Superintendent, Chief Operator	Completed
3. Emergency Response & Contingency Planning		
3.1 Provide SWAP area map to Warren County Emergency Management Agency that shows the groundwater TOT zones and GPS coordinates of the wells and PCS sites.	Warren County Water & Sewer	Completed and updated as necessary.
3.2 Provide PCS site contact information to the Warren County Emergency Management Agency	Warren County Water & Sewer	Within 1 year after plan adoption and when a new PCS is inventoried.
3.3 Maintain Public Water System Contingency Plans	Warren County Water & Sewer Water Treatment Superintendent	Already in place and ongoing.

Control Strategy Description	Responsibility	Schedule
3.4 Establish/maintain policies and intergovernmental agreements for emergency water supply	Warren County Water & Sewer Director	Update existing agreements as needed.
4. Land Use Regulation		
4.1 Work with local jurisdictions to adopt groundwater protection provision in their zoning, subdivision regulations, and land use policies	Warren County Regional Planning Commission with Warren County Water & Sewer Director	Within 2 years after plan adoption
4.2 Identify and address regional groundwater protection issues with OKI Regional Council of Governments and participate in the OKI Groundwater Committee	Warren County Regional Planning Commission with Warren County Water & Sewer Director	Ongoing

Plan Revision

The Plan will be comprehensively reviewed for need of revision at least once every 5 years. Earlier review of the Plan may occur for the following reasons:

- New PCS are identified that not only necessitates updating the inventory, but also requires different control strategies;
- A new TOT zone is established;
- An emergency situation develops;
- Significant groundwater contamination is identified; or
- Other extenuating conditions or circumstances necessitate revisions.

Section 5 – Groundwater Monitoring

At this time, no groundwater monitoring program is needed for the Franklin Area PWS well field. The Warren Country Water and Sewer Department will adopt a groundwater monitoring plan should the need arise due contamination within the aquifer or the presence of a known contaminate is detected.