

City of South Bend Phase II Wellhead Protection Plan Five Year Update

**City of South Bend Utilities
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ABBREVIATIONS

AST	Aboveground Storage Tank
BMP	Best Management Practice
CPWSS	Community Public Water Supply System
DRASTIC	Depth to water; Recharge; Aquifer media; Soil media; Topography; Impact of the vadose zone; Conductivity of the aquifer
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HAZMAT	Hazardous Materials
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
LEPC	Local Emergency Planning Committee
LPT	Local Planning Team
LUST	Leaking Underground Storage Tank
NA	Not Available
NFA	No Further Action
NPDES	National Pollutant Discharge Elimination System
ORD	Ordinance
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PCS	Potential Contaminant Source
PSI	Potential Source Inventory
PWSID	Public Water System Identification
RCRA	Resource Conservation and Recovery Act
SBFD	South Bend Fire Department
SBWW	South Bend Water Works
SJCHD	St. Joseph County Health Department
SSA	Sole Source Aquifer
SQG	Small Quantity Generator
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethylene
TQP	Technically Qualified Person
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VFC	Virtual File Cabinet
VRP	Voluntary Remediation Program
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Plan

1.0 Executive Summary

American Structurepoint, Inc., on behalf of South Bend Water Works (PWSID No. IN5271014), has prepared this update to the City's Wellhead Protection Plan, in accordance with the regulations outlined at 327 IAC 8-4.1 (the "Indiana Wellhead Protection Rule") for the South Bend Wellfields. The wellfields are located in northeastern St. Joseph County, in and around the City of South Bend.

The previous wellhead protection plan update was prepared by American Structurepoint, Inc. and submitted to IDEM on behalf of South Bend Water Works (SBWW), on November 10, 2014. No redelineations were required during the prior 5 year wellhead protection plan update and all the wellfields remained the same as those approved in 2003 and 2008.

Due to the addition of high capacity wells at Memorial Hospital, located just to the west of the North Station Well Field, and a replacement well (North Station #1B) being installed, a new delineation was required for the North Station well field. IDEM determined no other well field required redelineation as part of this 5 year wellhead plan update (Appendix A). Similar to the previous models completed for the other well fields in 2008 and prior, MODFLOW was used to model the new North Station capture zone. Due to the high pumping rates of the Memorial Hospital wells, the shape of the North Station wellhead delineation changed significantly. The new delineation area is included in Appendix B with figures of all of the current well field delineations and active production wells. IDEM approved the new North Station well field delineation September 10, 2019 (Appendix C).

South Bend Water Works has remained active in implementing their wellhead protection plan through the most recent 5 year update period and met numerous times including holding two combined LPT and public meetings about wellhead protection and the well fields. Action items outlined from LPT included securing, monitoring wells, verifying the location and condition of wellhead signs placed in 2000, monitoring for additional constituents based on detections and potential contaminant sources (PCSs), and a commodities flow study for the county transportation routes. Other actions taken were trainings completed by utility staff regarding incident management system (Federal Emergency Management Agency, FEMA), emergency planning (FEMA), introduction to exercises (FEMA), introduction to incident command system (FEMA), all hazards preparedness (FEMA), and water and wastewater all hazards boot camp (EPA). Copies of the completed training certificates are included in Appendix H.

The potential contaminant source inventories were revisited for each well field. A desktop review was first completed using IDEM hazardous material database layers and Google Maps. These sites were compared to the previous PCS inventory that was completed to assess if any new sites listed in the state databases were located within the wellhead protection areas. One new PCS was identified by South Bend that is partially within their South Well Field protection area. One new PCS was in the Edison wellhead protection area during the desktop survey. Three new PCSs were identified within the new north station delineation area. Additional PCS were identified during the windshield survey completed on September 18th and 19th, 2019. The newly identified PCSs are listed and highlighted in the tables in Appendix F.

2.0 Introduction

The Indiana Wellhead Protection Program and rule (327 IAC 8-4.1) outlines five basic categories for Community Public Water Supply System (CPWSS) wellhead protection plans. These areas include the following:

1. Local Planning Team (LPT)
2. WHPA Delineation
3. Identification of Potential Contaminant Sources (PCS)
4. Potential Source Management
5. Contingency Planning

This report serves to document the wellhead protection implementation and five year update by the SBWW and to outline the plan for continued protection of the wellfields with respect to the components outlined by IDEM.

Wellfield Description

- The Carriage Hills Wellfield includes Wells 3 and 4, and is located within a residential subdivision, approximately 0.17-mile east of Ironwood Drive.
- The Cleveland South and Cleveland North Wellfields include Wells 1 through 6. Cleveland North Wellfield is located approximately 0.10-mile north of Cleveland Road along Patricia Lane. Cleveland South Wellfield is located approximately 150-feet south of Cleveland Road, north of Interstate 80.
- The Edison Station Wellfield includes Wells 1A, 2A 3A, and 4, and is located within Edison Park, just east of North Ironwood Drive.
- The Erskine Wellfield includes Well 2 and is located approximately 0.56-mile north of US Highway 20 on the western portion of the Erskine Park Golf Course.
- The North Station Wellfield is located west and south of a meander of the St. Joseph River, approximately 300-feet east of State Road 933. The North Station Wellfield includes Wells 1B, 2A, 3A and 5A.
- The Olive Station Wellfield is located in the southwestern portion of South Bend, on the southwest corner of Olive Street and Sample Street. Olive Station Wellfield includes Wells 1A, 2A, 3A, 4, 5 and 6.
- The Pinhook Station Wellfield is located in the northwestern portion of South Bend, just west of the St. Joseph River and approximately 0.57-mile south of Interstate 80. The Pinhook Station Wellfield includes Wells 1 through 5.
- The South Wellfield includes Wells 4A and 5 and is located approximately 0.8-mile north of the St. Joseph Valley Parkway and approximately 900-feet west of Main Street.

Appendix B provides the location of the wellfields and additional detailed aerial maps of the wellfields and production well locations.

3.0 Delineations

The WHPA delineations were completed as part of the 2003 Phase I plan and updated as part of the 2008 Phase II plan. IDEM agreed, in correspondence dated October 6, 2014, the delineations did not require an update as part of the 2014 5-year Phase II WHPP update submittal. Additionally, Peerless-Midwest, Inc. completed an evaluation of the South Bend delineation as part of their 2008 Phase II WHPP and found the delineated area was conservative enough to allow for significant wellfield expansion. Appendix B provides an aerial display of each of the South Bend WHPAs.

The WHPA delineations were completed in 2003 (Phase I), 2008 (Phase II) and 2019 (North Station Only – 5 year update). The delineations include 1-year and 5-year time-of-travel boundaries for each well field. The models were completed using MODFLOW, a USGS created modular hydraulic modeling program. MODFLOW is the standard for moderate to complex three dimensional multi-layer models.

The newest delineation completed for only the North Station well field was approved by IDEM on September 10, 2019. The approval letter for the new delineation is included in Appendix C.

Additional and more detailed information regarding the delineations, models, geology, and hydrology is available in the delineation reports, on file with South Bend water Works and IDEM.

3.1 Summary of Regional and Local Hydrogeology

Unconsolidated deposits derived from Wisconsin-aged glaciation cover St. Joseph County (Gray, 2002). These deposits include glacial till interspersed with sand and gravel outwash formations. Glacial till deposits are incised by an outwash valley that generally coincides with the St. Joseph drainage network. The unconsolidated deposits in St. Joseph County overlay the Ellsworth Shale bedrock of Devonian age.

The project area is located in the Plymouth Morainal Complex and St. Joseph Drainageways sections of the Northern Moraine and Lake Region of Northern Indiana (Gray, 2000). This physiographic province is characterized by an extensive alluvial plain along the St. Joseph River corridor. The section has little topographic relief and is drained axially by the Pigeon, Elkhart, and St. Joseph Rivers.

Locally, the project area resides within the regional St. Joseph River Basin Hydrogeologic Setting (Fowler, 1994). Productive aquifers within this basin include unconsolidated deposits comprised of surficial sand and gravel, buried sand and gravel, sand and gravel within buried pre-glacial bedrock valleys, and discontinuous sand and gravel (Fowler, 1994). The sand and gravel aquifers beneath the project area include the (shallow) surficial sand and gravel and the (deep) buried sand and gravel bodies, interpreted collectively as the St. Joseph Aquifer System (Dean, 2010).

According to Dean (2010), the St. Joseph Aquifer System is comprised primarily of fine to medium sand, with some zones of coarse sand and gravel; the granular aquifer formations are interspersed with clay or till units of limited areal extent. Numerous high capacity wells are completed in the St. Joseph Aquifer, which constitutes one of the major aquifer systems in the State (Dean, 2010).

3.2 Current Production Wells

The only changes in production wells since the last 5 year update is the addition of well 1B in the North Station Well Field and the deactivation and abandonment of well 1A in the North Station Well Field. All of the active well are listed in Table 1 below.

ID	Facility ID	Well Number	Site	Address	Install Year
1	Carriage Hills	3	Carriage Hills	52290 Shenandoah Dr	1982
2	Carriage Hills	4	Carriage Hills	52290 Shenandoah Dr	1989
3	Cleveland South	1	Cleveland	4900 W Cleveland Rd	1984
4	Cleveland South	2	Cleveland	4900 W Cleveland Rd	1991
5	Cleveland South	3	Cleveland	4900 W Cleveland Rd	1996
6	Cleveland South	4	Cleveland	4900 W Cleveland Rd	1984
7	Cleveland North	5	Cleveland	4949 W Cleveland Rd	2003
8	Cleveland North	6	Cleveland	4949 W Cleveland Rd	2004
9	Edison Plant	1A	Edison	2708 Rockne Dr	1982
10	Edison Plant	2A	Edison	2708 Rockne Dr	2003
11	Edison Plant	3A	Edison	2708 Rockne Dr	2007
12	Edison Plant	4	Edison	2708 Rockne Dr	1954
13	Erskine	2	Erskine	4116 S Fellows St	1992
14	North Station	1A*	North	830 N Michigan St	1996
15	North Station	1B	North	830 N Michigan St	2019
16	North Station	2A	North	830 N Michigan St	2001
17	North Station	3A	North	830 N Michigan St	2001
18	North Station	5A	North	830 N Michigan St	2002
19	Olive Station	1A	Olive	915 S Olive St	2000
20	Olive Station	2A	Olive	915 S Olive St	2000
21	Olive Station	3A	Olive	915 S Olive St	2008
22	Olive Station	4	Olive	915 S Olive St	1958

ID	Facility ID	Well Number	Site	Address	Install Year
23	Olive Station	5	Olive	915 S Olive St	1966
24	Olive Station	6	Olive	915 S Olive St	1966
25	Pinhook Plant	1	Pinhook	2801 Riverside Dr	1961
26	Pinhook Plant	2	Pinhook	2801 Riverside Dr	1961
27	Pinhook Plant	3	Pinhook	2801 Riverside Dr	1961
28	Pinhook Plant	4	Pinhook	2801 Riverside Dr	1961
29	Pinhook Plant	5	Pinhook	2801 Riverside Dr	2004
30	South Well Field	4A	South	3600 S Main St	2000
31	South Well Field	5	South	3600 S Main St	2007
*Well abandoned in 2019 (Abandonment log included in Appendix D)					

3.3 Well Field Pumping Analysis

Pumping has decreased from the previous 5 year wellhead protection plan pumping analysis. The pumping analysis is included in Appendix E. North Station pumps at approximately 84% of the most recent modeled pumping rate. All other well fields remain at 59% or less of the originally modeled pumping rates. Overall compared to the previous 5 year pumping rates South Bend has decreased pumping by 1,992,868.70 gallons, a reduction of 12.45%. There have been slight increases in pumping at the Cleveland Road, Pinhook, and South well fields, but decreases in all the other well fields. Due to the installation of Memorial Hospital high capacity wells to the west of the North Station Well Field, a new delineation was completed by American Structurepoint, Inc. and approved by IDEM on September 10, 2019. Major changes to the size and shape are due to the high pumping rates of the Memorial Hospital wells that noticeably decrease the capture zone from the west of the North Station Well Field. IDEM was contacted for verification that no other well field needed to be redelineated based on well pumping rates or the installation of high capacity wells. IDEM confirmed that the North Station Well Field was the only field that needed to be redelineated and the confirmation letter is attached in Appendix A.

4.0 Local Planning Team

The SBWW established an LPT in 1999 consisting of the utility personnel, St Joseph County Health Department (SJCHD), South Bend Fire Department (SBFD), and other local agencies. During 2009-2013, an attempt to maintain a routine schedule proved difficult, and therefore LPT meetings were not conducted. However, an LPT meeting was held on October 3, 2014. Since the last Phase II wellhead update the LPT met November 29, 2016, December 7, 2017, and October 23, 2019. The meetings held on November 29, 2016 and October 23, 2019 were announced to the public for any individuals of the citizens to attend.

The meetings have been attended by up to 20 participants, but some of the individuals and the number of participants have varied for meetings. The public notice, meeting minutes, sign in sheets, presentation and action items and follow up notes are included in Appendix G.

The LPT meetings have been attended by the individuals listed below.

Name	Affiliation	Representing
Mark Rzepnicki	South Bend Utilities	City Utilities
Bill Korban	EnviroSolutions, Inc.	Environmental Consultant
Brad VanOosterum	South Bend Utilities	City Utilities
Eugene E. Pietsch II	South Bend Utilities	City Utilities
Darric N. Cole	South Bend Utilities	City Utilities
Mark Epich	St. Joseph County Health Department	County Health Department
Rocco Sergio	South Bend Utilities	City Utilities
Andrea Alexander	South Bend Utilities	City Utilities
Michelle Smith	South Bend Utilities	City Utilities
Kim Thompson	South Bend Utilities	City Utilities
Ed Herman	South Bend Utilities	City Utilities
Al Greek	South Bend Utilities	City Utilities
Matthew Hartz	Eurofins Eaton Analytical	Analytical Laboratory
Casey White	St. Joseph County Health Department	County Health Department
Bob Krol	South Bend Utilities	City Utilities
Serena Lozano-Shane	South Bend Utilities	City Utilities
Matthew Bussell	South Bend Utilities	City Utilities
Rick Kedik	South Bend Utilities	City Utilities
Jerry Fussell	South Bend Utilities	City Utilities
Rich Haackel	IDEM	State Emergency Response
John Lankowicz	IDEM	State Emergency Response
Ken Smith	South Bend Utilities	City Utilities
Richard Radcliff	South Bend Utilities	City Utilities
Scott Horvath	South Bend Utilities	City Utilities

Name	Affiliation	Representing
Travis Cole	American Structurepoint, Inc.	Environmental Consultant
Jennifer Kedik	South Bend Citizen	Public Attendee
Sue Kesim	South Bend Citizen	Public Attendee

5.0 Potential Contaminant Source (PCS) Inventory

An integral part of protecting the public water supply wellfields is to identify all potential sources of groundwater contamination within the WHPAs. The following provides an overview of the general and specific land uses within the WHPAs and methodology used to identify potential contaminant sources.

5.1 Methods for Identification of Potential Sources of Contamination

To update the PCS inventory a desktop review was first conducted. Using the previous PCS inventory information, the data was overlaid with the most recent IDEM HAZMAT database information. This database includes locations and descriptions of a variety of environmentally regulated facilities around the state (i.e., UST, LUST, RCRA, VRP sites, and landfill sites). Additionally the City of South Bend had previously identified a PCS near the South Well Field. Because of the new delineation of the North Station Well Field, many of the previous PCSs were no longer within the wellhead protection area. Four new PCSs were identified in the additional new area of the North Station delineated area. The PCS maps and corresponding tables are included in Appendix F.

After completing the desktop survey and review, a windshield survey was completed to identify and inventory any additional PCSs that might be located within the wellhead protection areas. During the desktop reviews and the windshield survey, eighteen new PCSs were identified. Several of the PCS are adjacent to the wellhead protection area boundaries, but it was decided to include these as well.

5.2 Land Use Within the Wellfield Protection Areas

The area within the South Bend WHPAs is urban and primarily developed as residential and commercial with some industrial facilities (primarily in the Olive Station and South WHPAs). Review of aerial photography identified some agricultural land use within the Olive, Pinhook, and Cleveland well field delineation areas.

Contaminant sources from residential areas would likely be in the form of typical household chemicals (i.e., chlorine bleach, lawn chemicals, fuel, etc.). Leachate from septic systems (if present) could introduce nitrates, phosphates, or coliform bacteria to the aquifer. See tables 3-1 through 3-7 in Appendix F for further information and locations of the industrial properties located within the WHPAs.

Major roads within the South Bend WHPAs include Interstate 80, US Highway 20, US Highway 31, Michigan Street, and multiple three to four lane thoroughfares. These transportation routes could be a potential source of contamination in the form of roadway runoff; however, of greater concern is the possibility of a

hazardous materials spill, especially for Interstate 80. Jim Lopez of the Michiana Area Council of Governments completed a commodity flow study for St. Joseph County in September 2016 (Appendix I). The report details hazardous chemicals transported in and out of the county by way of rail or roadways. The report shows the types of chemicals transported throughout the county and by what means they are transported. Although all of the major roadways are not listed as point source PCSs, transportation routes and rail ways can be considered PCSs if a spill or accident were to occur. Consideration of these has been taken into account in the emergency management and contingency plan.

6.0 Management Plan

6.1 Sanitary Set-Back Area

SBWW well sites are surrounded by a 100 foot radius controlled by direct land ownership or easement, and are all subject to disinfection prior to distribution.

All SBWW wells have been installed following approval by IDEM or IDEM's predecessor, the Indiana State Board of Health, and therefore, meet the construction standards set forth in 327 IAC 8-3.4. The mixing and storage of any chemical, except those required for operation, treatment, or maintenance of the wells are prohibited within the well isolation areas. No roads or parking areas are permitted within 50 feet of any well except for those necessary for well access. All wells possess adequate security measures to prevent the unauthorized access or tampering with wells, pumping equipment, controls, and power feed. There are no major transportation routes within the well isolation areas, only minor arterial streets and access drives to the wells. Management of the well isolation areas (or at least the immediate area surrounding the wells) has proved adequate during the Phase I and Phase II, and last 5 year update implementation periods.

6.2 Wellhead Protection Area Management

City and County ordinances have appointed the St. Joseph County Health Department (SJCHD) to manage and monitor the PSCs. All facilities that meet or exceed base quantities of hazardous chemicals or petroleum substances are regulated through a permitting and inspection process.

The SJCHD approach to Wellhead Protection is one of engagement and education, with a goal of cooperation and compliance. It attempts to work together with PSCs to protect the environment and groundwater. The program focuses on groundwater contamination prevention rather than remediation.

After an initial review of a Wellhead Permit application, the SJCHD conducts a thorough site inspection, and works with businesses to develop ways, if appropriate, to manage potential threats to the groundwater. After a permit is issued, the SJCHD conducts annual routine inspections of regular permittees and inspects drywell-only facilities every three years unless there are issues found. A copy of the SJCHD Wellhead Protection Permit Application and list of currently permitted facilities can be found in Appendix J. The county also implements a county wide code, county code 52, which deals with surface and groundwater protection, well drilling and water supply systems, and wellhead protection. <https://www.sjcindiana.com/DocumentCenter/View/19694/County-Code-52-Water-Regulations>

The PSCs are managed through routine inspections by the SJCHD, letters to the PSC property owners, informational materials, and presentations. Failure to comply with the requirements of the ordinances by a PSC property may result in legal action and penalties.

Much of the South Bend WHPAs fall within the EPA federally designated sole source aquifer (SSA) shown in Appendix K. This designation is applied to aquifers that supply at least 50 percent of the drinking water for

a service area where no other reasonably available water source exists. This designation provides the following protections for areas within the SSA: “After the publication of any such notice, no commitment for federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health, but a commitment for federal assistance may, if authorized under another provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer.”

6.3 Notification of Property Owners

Property owners were originally notified in 2003 and 2008 when the previous delineations were completed. Notification letters were mailed to newly identified property owners within the new North Station delineated protection area on November 15, 2019. A copy of the notification letter and wellhead protection informational insert are included in Appendix L.

6.4 Public Outreach

South Bend currently utilizes several wellhead protection mechanisms. The utility created an article for the city’s South Bend 311 knowledge center service portal. The article can be found at <https://311.southbendin.gov/knowledgecenter/article/?id=KA-04641>. South Bend includes information on wellhead protection and water quality in their consumer confidence report (CCR). A copy of the 2018 CCR can be found in Appendix L. Although individuals from the public did not attend the meeting, a public notice was sent out to advertise the wellhead protection meeting on November 29, 2016. The meeting on October 23, 2019 was also announced to the public. A copy of the public notice for the November 29, 2016 meeting can be found in Appendix G.

In 2018 a 4th grade class from Madison STEAM Academy, which is nearby the water facility at 830 North Michigan Street, were provided a tour of the facility and learned about water and wellhead protection.

The 2019 LPT meeting was combined with a national event called “Imagine a Day Without Water” on October 23, 2019, organized by the Value of Water campaign. South Bend announced the meeting by public notice, on their Facebook page and on Nextdoor. Two members of the public attended along with 18 other individuals from the City of South Bend, St. Joseph County Health Department, and IDEM emergency response. Three local news crews were also present and reported on the meeting in the following days news stories. Details of the meeting including the meeting notices, sign in sheets, power point presentation and news story coverage can be found in Appendix G.

As part of the 2019 5-year update South Bend created an informational rack card to be distributed at educational events and to have on hand at the utility buildings for interested residents. The rack card was also mailed with the new wellhead notification letters for residents located in the newly delineated area of the North Station well field. A copy of the rack card can be found in Appendix L.

6.5 Management Actions Taken

South Bend Water Works has remained active in implementing their WHPP through the most recent 5 year update period, meeting numerous times including a combined LPT and public meeting about wellhead protection and the well fields. Action items outlined after the LPT meetings included securing monitoring wells, verifying the location and condition of wellhead signs placed in 2000, monitoring for additional constituents based on detections and PCSs, and a commodities flow study for the county transportation routes. Other actions taken included trainings completed by utility staff regarding incident management system (FEMA), emergency planning (FEMA), introduction to exercises (FEMA), introduction to incident command system (FEMA), all hazards preparedness (FEMA), and water and wastewater all hazards boot camp (EPA). Copies of the completed training certificates are included in Appendix H.

South Bend identified two unsecured monitoring wells near the Olive Street well field. The wells belonged to Ashland Chemical, who repaired and secured the wells after being contacted by South Bend. Information regarding the securing of these wells can be found in Appendix M.

South Bend and Memorial Hospital entered into a shared well field and discharge agreement on November 10, 2015. This agreement limited the placement of the production wells and the amount of water that Memorial Hospital would pump from their wells as to not significantly impact the South Bend Community production wells. This agreement can be found in Appendix O.

South Bend also plans to create new wellhead protection area road signs to replace the old versions that were previously installed. The signs will be installed during the next wellhead protection plan update period.