

INVOICE GL DISTRIBUTION REPORT FOR CITY OF DEXTER  
EXP CHECK RUN DATES 10/05/2016 - 10/05/2016  
JOURNALIZED OPEN AND PAID  
BANK CODE: POOL

GL Number	Inv. Line Desc	Vendor	Invoice Desc.	Invoice	Due Date	Amount	check #
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GL Number	Inv. Line Desc	Vendor	Invoice Desc.	Invoice	Due Date	Amount	check #
Fund Totals:							
			Fund 101 GENERAL FUND			209,615.06	
			Fund 202 MAJOR STREETS FUND			1,514.86	
			Fund 203 LOCAL STREETS FUND			3,996.84	
			Fund 204 MUNICIPAL STREETS			47.25	
			Fund 226 SOLID WASTE COLLECTION FUND			42,358.35	
			Fund 303 GENERAL DEBT SERVICE FUND (V			8.62	
			Fund 402 EQUIPMENT REPLACEMENT FUND			1,138.72	
			Fund 590 SEWER ENTERPRISE FUND			5,078.26	
			Fund 591 WATER ENTERPRISE FUND			13,585.43	
Total For All Funds:						<u>277,343.39</u>	

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**OFFICE OF THE CITY MANAGER**

8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

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**Memorandum**

**To:** Mayor Keough and City Council  
**From:** Courtney Nicholls, City Manager  
**Re:** Consideration of: Scope of Services from OHM for Drainage Study  
**Date:** October 5, 2016

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Attached for Council's review is a proposal from OHM to complete a drainage study in the area of Third and Broad. The work is eligible to be included for SAW grant funding, which means that the City will be reimbursed for 90% of the cost. The funds for the 10% will be taken from Local Streets – Stormwater – Professional Services (203-445-802.000).

Council is asked to approve the scope of services from OHM for an amount not to exceed \$4,000.

October 5, 2016

**CITY OF DEXTER**

8123 Main Street  
Dexter, M 48123

Attention: Ms. Courtney Nicholls  
City Manager

**Regarding: Third/Broad Street Drainage Review**  
Professional Services

Dear Ms. Nicholls:

Thank you for the opportunity to submit this proposal for professional services related to developing design concepts for drainage improvements at Third and Broad Streets.

**PROJECT UNDERSTANDING**

In recent years, the City of Dexter has noted occurrences of flooding at the northwest corner of Broad and Third Street. The flooding is likely the result of failing pipes within the Amtrak Railroad right of way. While the railroad has made vague indication that they acknowledged the issues, it has not resulted in any action for over 6 months. As a result, the City of Dexter is seeking to identify alternative drainage options for this area.

This scope of work will look into possible alternatives for drainage improvements. This will consider improvements to the existing route as well as 2 other routes. One route will carry drainage to the north towards Huron Street. The second will route drainage along the southern property line of the former Michigan Central railroad depot. The work will follow the scope of services for the Storm Asset Management plan (SAW Grant) submitted to the State of Michigan in 2013. As a result, the work will be eligible for reimbursement under the plan.

**SCOPE OF SERVICE**

We propose the following tasks to complete the above mentioned drainage study:

1. Determine the ultimate drainage area for the improvement by way of a watershed delineation for areas upstream of Third and Broad. This will include a review of contour data in the vicinity of the drainage issue and review of surrounding drainage areas. Undrained areas will also be identified along with qualitative analysis to determine if draining areas lower than the 3<sup>rd</sup> / Broad intersection is feasible.
2. Determine possible routing for the two drainage alternatives. This will include evaluation of existing conditions, property lines, topography (GIS) and the receiving watercourse.
3. Routes will be verified with city staff for concurrence. If this routes are acceptable, spot topographic survey using a GPS or level may occur to confirm elevations along the proposed drainage course.
4. Hydraulic sizing will be performed based on the 10-year design event. This will include pipe and channel design.
5. Prepare an engineer's opinion of probable cost for each alternative.



6. Prepare a technical memorandum summarizing each alternative along with key findings, recommendations and costs for each. The memorandum will also include required easements, permits and a probable schedule for each alternative.

## **FEE**

The services outlined above will be performed on an hourly basis in accordance with the OHM 2016 rate schedule. The proposed cost for these services shall not exceed \$4,000.

## **SCHEDULE**

OHM anticipates that the work will be completed by mid-November of 2016.

## **FURTHER CLARIFICATIONS AND ASSUMPTIONS**

Should you find this agreement acceptable, please execute both copies and return one copy to us for our file. We look forward to providing professional services on this project. If you have any questions, please contact us.

Sincerely,  
OHM Advisors

---

Patrick M. Droze, P.E.

cc: Rhett Gronevelt, P.E., OHM  
File



**City of Dexter  
2016 Asphalt Maintenance Program  
Engineering Services**

Accepted By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**OFFICE OF THE CITY MANAGER**

8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

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**Memorandum**

**To:** Mayor Keough and City Council  
**From:** Courtney Nicholls, City Manager  
**Re:** Discussion of: Draft of Water Reliability Study  
**Date:** October 3, 2016

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The City of Dexter is required by the Michigan Department of Environmental Quality to complete a water reliability study every five years. In January 2016 Council approved a scope of services from OHM to complete the study. The draft is provided for Council's review.

The water system was found to be in good condition with enough capacity and storage to meet our current needs and needs for development within the City over the next five years – as long as the current water restrictions are continued. The capital projects identified are water main replacements that have been included in the CIP for several years.

The next step in the process is submitting the study to the Michigan Department of Environmental Quality for their review.



The City of  
 **DEXTER**  
*Michigan*

Water Reliability Study

September 2016



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# City of Dexter Water Reliability Executive Summary and Recommendations



## Executive Summary

The City of Dexter is located in north central Washtenaw County, approximately 9 miles northwest of Ann Arbor, 7 miles east of Chelsea, and 35 miles west of Detroit. It has an area of 1.8 square miles and borders Scio Township to the south and Webster Township to the north. The City of Dexter is part of the Huron River Watershed. Approximately 2,000 feet of the Huron River passes through the northeast portion of the City. With the removal of the Mill Pond Dam in 2008, Mill Creek now forms the western border of the City for approximately 6,000 feet. The creek continues for 1,000 feet through the City and then as a northern City boundary before connecting with the Huron River.

The City's public water supply is provided by the City's Utility Department through five community wells. The nearest community water systems are in Scio Township, the City of Chelsea, and the City of Ann Arbor. The City's water system is in a single pressure district. The service area of the City's water system includes the entire City as well as Dexter High School to the City's southwest.

The City produces its water from five wells. Four of the wells pump into a 0.86 MGD Iron-Removal Water Treatment Plant. A fifth well pumps directly into the system with chemical additions of chlorine and polyphosphate. Pressure within the distribution system is maintained by 500,000 gallon elevated water storage tank.

The Michigan Department of Environmental Quality (MDEQ) requires a Water Reliability Study and General Plan be prepared for municipal systems and updated every five years. OHM was retained by the City of Dexter to prepare a Water System Reliability Study and General Plan. The required elements of the Water Reliability Study include population and water demand projections for existing, 5-year and 20-year planning periods along with a capacity and needs assessment of the water supply and storage components. The General Plan requirements include the creation of a comprehensive water system map, hydraulic analysis of the water system displaying system pressures and available fire protection and a capital improvement plan for the 5-year and 20-year planning periods.

A computer water model was used to perform the hydraulic analysis. The model was updated from the City's previous water model which was last updated and calibrated in 2009. The model was updated to reflect new water main construction, current water demands, and current system operations. Treatment plant and storage tank operating data were input into the model to simulate actual operating conditions. Existing water demand was calculated and peaking factors for maximum day and peak hour were determined from City production, pumping, and tank level data. As there were relatively few changes from the previous model, the model was assumed to be calibrated.

Data from the Southeast Michigan Council of Governments (SEMCOG) was used to forecast the 5-year and 20-year population and resulting water demand projections. The model was then used to predict anticipated system pressures and available fire protection for these future planning periods.

#### Water Pressure and Available Fire Protection

Water systems are required to supply at least 35 psi during normal demand conditions and at least 20 psi during emergency conditions. The Dexter water system was found to provide good working pressure throughout the service area.

Available fire protection was also found to be generally good throughout the City with one exception. Poor fire protection was identified near the intersection of Baker Road and Grand Street. There is an industrial building at this location that is served through a 4-inch water main. The 4-inch water main limits the available fire protection to approximately 500 gpm. Replacing the 4-inch main with 8-inch would improve available fire protection here to 3,600 gpm. Re-development in this area is currently being planned, and improvements to the available fire protection can be made as development occurs.

## Recommendations and Capital Improvements

Recommended improvements have been developed based on the analysis of the water system and discussions with the City. One recommended improvement was identified in order to improve fire protection near Baker Road and Grand Street. A few other recommendations stem from pipe replacements that were already being planned by the City. The planned replacements include replacing the 6-inch main that runs along 2<sup>nd</sup> Street and Cushing Court and replacing the 8-inch main along Baker Road from Hudson Street to Creekside Intermediate School. The total cost of the recommended improvements is \$656,000.

## I. PURPOSE AND SCOPE

The purpose of this Water Reliability Study report is to evaluate the existing municipal water supply, storage, and transmission and distribution systems serving the City of Dexter. The goal is to provide a complete analysis of the system and make recommendations for improvements to the system that are necessary to meet the present and future needs of the community.

The City of Dexter owns and operates its own water system. The Water Reliability Study considers the ability of the system to meet the water demands of the service area and to provide for required operating pressure and available fire protection, where desired. Planning periods for present day, 5-year, and 20-year projections are included in this study.

The overall report is intended to satisfy the MDEQ Michigan Safe Drinking Water Act Administrative Rules requirements under Part 12 Water Reliability Study and Part 16 General Plan Requirements. Sections II – VI address the Part 12 Water Reliability Study, and Sections VII – VIII, along with the maps included in Appendix A address the Part 16 General Plan Requirements.

This report summarizes findings and recommendations from the water reliability study. The study included the following tasks:

- Compilation and reporting of current population and number of service connections.
- Compilation and reporting of water production and consumption data for present, 5-year, and 20-year planning periods consisting of average daily demand, maximum daily demand, peak hour demand, and fire demand. Basis for demand projections, monthly and annual water productions rates, and annual usage totals will also be provided.
- Data collection and system mapping.
- Update the City's water model by taking into consideration new water main construction, water demand allocation, adjustments to treatment plant settings, and storage tank settings to reflect the actual system operation.
- Water model analysis for average day, maximum day, peak hour, and fire protection under existing and proposed system conditions including the 5-year and 20-year planning periods.
- Identify recommended system improvements and provide cost opinions.

## Part 12 Reliability Study

### II. EXISTING WATER SYSTEM

#### A. SERVICE AREA

The City of Dexter's public water supply is provided by the City's Utility Department through five community wells. The nearest community water systems are in Scio Township, the City of Chelsea, and the City of Ann Arbor. The service area of the City's water system includes the entire City as well as Dexter High School to the City's southwest. The City's water system is in a single pressure district.

#### B. WATER SUPPLY AND TREATMENT OVERVIEW

The City produces its water from five wells. Four of the wells pump into a 0.86 MGD Iron-Removal Water Treatment Plant. A fifth well pumps directly into the system with chemical additions of chlorine and polyphosphate. The wells are summarized in Table 1.

**Table 1: Summary of Raw Water Wells**

Well Number	Location	Rated Capacity (gpm)	Ground Elevation (ft)	Depth (ft)	Screened Range	Pumps to...	Static Water Depth (ft)
1	Community Wellfield	300	920	222	Bottom 20 ft	Treatment	88
2	Community Wellfield	300	915	215	Bottom 20 ft	Treatment	79
3	Community Wellfield	300	913	210	Bottom 20 ft	Treatment	79
4	Community Wellfield	200	891	200	Bottom 20 ft	Treatment	70
5	Dexter High School	270	875	70	Bottom 10 ft	System	20

The total capacity of the City's wells is 1,440 gpm, and the firm capacity is 1,070 gpm. The Community Wellfield has a total capacity of 1,100 gpm with a firm capacity of 800 gpm.

Raw water from the Community Wellfield is pumped to the City's Water Treatment Plant (WTP). The raw water first goes to an aerator to oxidize iron and then goes into a detention tank. From the detention tank, the water is pumped with three high service pumps through three horizontal pressure filters to remove the iron. Prior to exiting the WTP the treated water is disinfected with sodium hypochlorite and fluoride is added for dental health benefits. The treatment plant's unit capacities are shown in Table 2.

**Table 2: Treatment Capacities**

Unit	Capacity
Aerator	1,200 gpm
Detention Tank	700 gpm (30 minute detention time)
High Service Pumps	1,200 gpm Total 800 gpm Firm
Pressure Filters	900 gpm Total 600 gpm Firm

As shown in Table 2, the 600 gpm firm capacity of the Pressure Filters is the limiting factor for the WTP. If the firm capacity of the pressure filters were increased to 800 gpm this would match the firm capacity of the Community Wellfield. This is greater than the 700 gpm capacity of the detention tank, however, a flow rate of 800 gpm through the existing detention tank would simply reduce the detention time to 26 minutes which should not greatly affect the finished water quality. Similar iron-removal plants have detention times of 20 minutes.

Well No. 5 at the Dexter High School pumps directly into the distribution system. Sodium hypochlorite and fluoride are added to the water similar to the WTP. Polyphosphate is also added at the High School well for iron sequestration. The original hydrogeologic report from the time of Well No. 5's construction indicated that the aquifer at the High School has a capacity of 500 gpm. Subsequent operation of Well No. 5 by the City has indicated that there is less than anticipated capacity from the aquifer. The City currently operates Well No. 5 at a pumping rate of 270 gpm. A full pump curve of the pump in Well No. 5 is available in Appendix I.

### **C. HIGH SERVICE PUMPS**

There are three high service pumps in the City's WTP that pump water through the filters and into the distribution system. These pumps are all identical, six-stage, vertical turbine pumps with a design point of 400 gpm at 243 feet of head. A full pump curve and data sheet is available in Appendix I. The firm capacity of the high service pumps is 800 gpm (1.15 MGD).

### **D. STORAGE OVERVIEW**

The City operates a 500,000 gallon Elevated Water Storage Tank (EWST) in an industrial park in the southern portion of the City. The EWST is operated by calling for high service pumps in the WTP and for Well No. 5 to turn on or off based on the water level in the EWST. Some properties of the EWST are shown in Table 3.

**Table 3: Elevated Water Storage Tank Properties**

Volume	500,000	gallons
Ground Elevation	938	ft
Bottom Capacity Elevation	1,008	ft
Normal Low Water Level	1,036	ft
Normal High Water Level	1,043	ft
Top Capacity Elevation	1,048	ft

The normal low water level equates to a stored volume of approximately 360,000 gallons. The normal high water level equates to a stored volume of approximately 470,000 gallons.

#### E. TRANSMISSION AND DISTRIBUTION MAINS

There are approximately 30 miles of water main in the Dexter system. Sizes range from 4-inch up to 16-inch in diameter. Documented pipe materials include cast iron, ductile iron, and HDPE with ductile iron making up over 90% of the system's water main. Table 4 summarizes Dexter's pipes by size and material.

**Table 4: Summary of Water Main**

Diameter (in)	Cast Iron (ft)	Ductile Iron (ft)	HDPE (ft)	Undocumented Material (ft)	Raw Water DIP (ft)	Total Length (ft)
4	96	0	0	0	0	<b>96</b>
6	0	1,243	0	1,504	1,654	<b>4,400</b>
8	643	96,629	275	10,343	1,012	<b>108,902</b>
12	0	35,914	0	2,499	4,843	<b>43,256</b>
16	0	3,262	0	0	0	<b>3,262</b>
<b>Total</b>	<b>739</b>	<b>137,048</b>	<b>275</b>	<b>14,345</b>	<b>7,509</b>	<b>159,916</b>

### III. POPULATION AND WATER USE

#### A. POPULATION

Current and future population data for the City of Dexter is available from the Southeast Michigan Council of Governments (SEMCOG). While the population estimates for current and future conditions listed are lower than the existing population of the City, the City does view the growth rates shown by SEMCOG to be accurate. Using the existing population and the anticipated growth rates results in the population projections shown in Table 5.

**Table 5: City of Dexter Population Projections**

Time Line	Population	Growth
Present	4,911	--
5-Year	5,016	2.1%
20-Year	5,576	13.5%

**B. SERVICE CONNECTIONS and USER CLASS**

Billing data for the years 2013 – 2015 was provided that included billed water usage for various customer classifications. This information is summarized in Table 6.

**Table 6: User Class and Billed Usage Summary**

Account Class	Number of Accounts in 2016	Billed Usage (1,000 Gallons)			Percent of Accounts	Percent of Usage	Gallons per Day per Connection
		2013	2014	2015			
Church	6	220	285	280	0.4%	0.2%	119
Commercial	186	18,405	16,577	17,232	11.0%	12.7%	256
Government	5	1,524	869	967	0.3%	0.8%	614
Industrial	32	16,867	15,801	17,873	1.9%	12.3%	1,442
Residential	1,451	99,183	89,359	92,403	85.8%	68.4%	177
School	12	8,447	7,373	7,038	0.7%	5.6%	1,740
Total	1,692	144,645	130,264	135,793	100.0%	100.0%	222

**C. EXISTING WATER USAGE**

The City's SCADA system tracks the water pumped from each of the five wells, water pumped from the WTP, and the water level in the EWST. Using this SCADA data, water use within the City was analyzed for several time scales from 2013 – 2015. Monthly water use within the City is shown in Figure 1 and Table 7.

Figure 1: Monthly Water Production

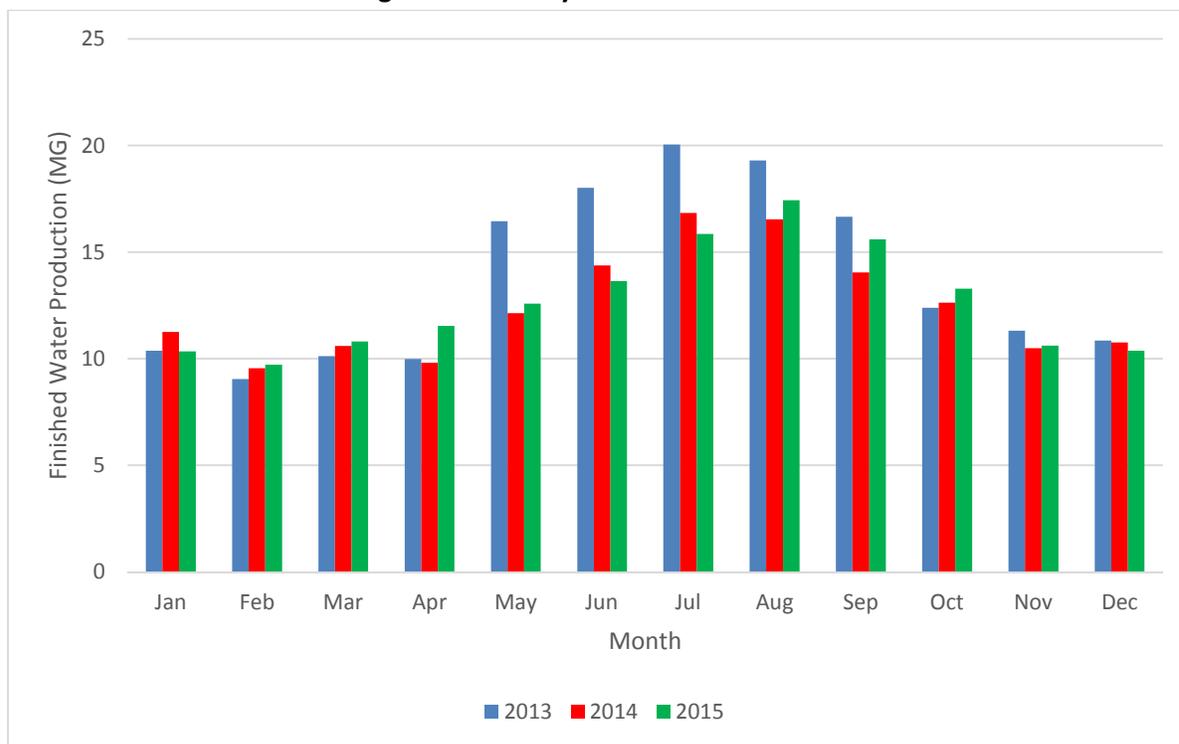


Table 7: Monthly Water Production

	2013	2014	2015
January	10.37	11.26	10.34
February	9.05	9.56	9.73
March	10.12	10.61	10.82
April	9.99	9.81	11.55
May	16.46	12.13	12.59
June	18.02	14.38	13.64
July	20.05	16.84	15.85
August	19.30	16.54	17.45
September	16.66	14.05	15.60
October	12.40	12.63	13.29
November	11.32	10.50	10.61
December	10.85	10.77	10.39
Total	164.60	149.08	151.85
Average Day	0.45	0.41	0.42

As can be seen in Figure 1 and Table 7, for the past three years water use was highest in 2013 due largely to higher summer time irrigation demand than in 2014 and 2015.

Maximum day and peak hour demands were also determined using the SCADA data and are shown in Table 8.

**Table 8: Dexter Water Demands**

Year	Demand (MGD)			Peaking Factor	
	Average Day	Maximum Day	Peak Hour	Max Day	Peak Hour
2013	0.45	0.92 on 7/17/13	1.65 at 7/26/13 5:00 AM	2.0	3.6
2014	0.41	0.75 on 7/24/14	1.30 at 8/8/14 6:00 AM	1.8	3.2
2015	0.42	0.76 on 7/28/15	1.45 at 7/28/15 6:00 AM	1.8	3.5
Average Peaking Factor:				1.9	3.4
Peaking Factor To Use:				2.0	4.0

There were some other hours with a higher indicated demand than what is shown in Table 8, but these were outside of the typical high demand season and due to activities such as hydrant flushing.

**D. FUTURE WATER DEMANDS**

Water demands are expected grow in the future. Growth in water demand is expected to be driven by a steadily growing population.

The population within the City of Dexter is expected to grow by approximately 2% over the next five years and more than 13% over the next 20 years as shown in Table 5. For the purposes of calculating future water demands, this growth in the population can be anticipated to lead to a proportional growth in water demand. Using a current average day demand of 0.45 MGD which occurred in 2013 and the peaking factors in Table 8, a summary of the present and projected water demands within the system is shown in Table 9.

**Table 9: Present and Projected Water Demands**

Time Line	Projected Demands MGD (gpm)		
	Average Day	Maximum Day	Peak Hour
Present	0.45 (313)	0.9 (625)	1.8 (1,250)
5-Year	0.46 (319)	0.92 (638)	1.84 (1,277)
20-Year	0.51 (355)	1.02 (710)	2.04 (1,419)

Previous studies had indicated that the City would experience greater demands than what is shown in Table 9. Part of the reduction in anticipated demands is due to the City implementing mandatory lawn watering restrictions starting in 2013. The restrictions were implemented in response to increasing maximum day and peak hour water demands that would have surpassed the City’s water system capacities if the demands had continued to increase.

## E. FIRE PROTECTION

Besides providing water at adequate pressure to the system users, a secondary purpose of a water system is to provide available water for fire protection. Although this is a secondary purpose of a water system, frequently the considerations for available fire protection can control the design of a water system. For this reason, it is important to define the fire protection that a system should achieve and evaluate the ability of the system to provide the recommended available fire protection.

The required fire protection rates used for this study were based on input from the Dexter Area Fire Department, experiences of other communities, and the fire protection rating system used by the Insurance Services Office (ISO).

While it is important to provide adequate fire protection to protect the community and reduce home-owners' insurance rates, a balance must be maintained between providing fire protection and not constructing oversized facilities to attain fire protection goals. Besides the increase in cost to construct and maintain a water system with oversized facilities, a water system designed to provide high fire protection rates can cause long residence times in the system, which can contribute to deterioration in water quality. It is also important to note that providing fire protection is not a state or federal requirement of a water system.

Therefore, the fire protection recommendations used in this study were selected to represent a balance between providing fire protection and not constructing oversized facilities to attain fire protection goals.

Based on the above discussion, the recommended fire protection rates used in this study range from 1,000 gpm for residential areas to 3,500 gpm for industrial areas. A GIS layer of the City's Zoning was utilized to determine the recommended fire protection for areas within the City. Table 10 summarizes the recommended fire protection for each land use district. It should be noted that the recommended fire protection for various land use districts is based on fire protection for structures without a sprinkler system for fire suppression. For structures with a sprinkler system the fire protection desired to extinguish a fire may be much lower.

**Table 10: Recommended Fire Protection Rates per Zoning District**

Zoning District	Recommended Fire Protection
Single-Family Residential	1,000 gpm for 2 hours
Multi-Family Residential	1,500 gpm for 2 hours
Commercial	2,000 gpm for 2 hours
Industrial	3,500 gpm for 3 hours

## IV. ANALYSIS OF EXISTING CONDITIONS

### A. WELL CAPACITY

As shown in Table 1, the total capacity of the production wells is 1,440 gpm (2.07 MGD). The firm capacity with the largest producing well out of service is 1,070 gpm (1.54 MGD). There is a limiting component, though, with the existing treatment capacity of the Community Wellfield. As shown in Table 2, the WTP has a firm filtering capacity of 600 gpm (0.86 MGD). Therefore, the adjusted firm capacity of the City's water system is 870 gpm (1.25 MGD) which accounts for the firm capacity of the WTP along with Well No. 5 pumping at 270 gpm (0.39 MGD).

The Ten State Standards require that the firm capacity of a system be equal to or greater than the design maximum day demand of the system. The maximum day demands for the system are included in Table 9 for present and future conditions. Presently and in the foreseeable future, the capacity of the wells is sufficient to meet the demands of the system which are expected to be 1.02 MGD on a 20-year maximum demand day.

### B. WATER TREATMENT CAPACITY

As shown in Table 2 the WTP has a firm capacity of 600 gpm (0.86 MGD) based on having three pressure filters each with a capacity of 300 gpm. The firm pumping capacity of the WTP is 800 gpm (1.15 MGD) based on three high service pumps each with a pumping capacity of 400 gpm. The firm pumping capacity of the WTP matches the firm capacity of the Community Wellfield which cannot be increased.

As noted in the above discussion of the Well Capacity, the City's WTP represents a limiting component in the amount of water that is pumped into the City's system to satisfy demands. Because the City also has Well No. 5 available to meet demands, though, the current firm capacity of the WTP along with Well No. 5 is sufficient to meet the projected maximum day demands in the City.

If demands in the City increase beyond what is currently projected, one potential option would be to increase the treatment capacity of the WTP. An additional pressure filter with a 200 gpm (0.29 MGD) capacity could be added to the WTP to increase the firm capacity to 800 gpm (1.15 MGD) to match the firm capacity of the Community Wellfield and the existing high service pumps of the WTP. With Well No. 5, the firm capacity of the system would be 1,070 gpm (1.54 MGD).

### C. STORAGE CAPACITY

The City of Dexter has 500,000 gallons of storage capacity in their EWST. The EWST helps to meet peak hour demands within the system and also provides water for fire protection. In order to determine the adequacy of the storage volume, it needs to be determined that the volume is sufficient to meet domestic demands on a maximum demand day while also providing fire protection for the largest design fire event.

In the event of an emergency, it is assumed that the City's production wells and WTP would be operating at their total capacity. With 900 gpm from the WTP and 340 gpm from Well No. 5, that is

a total of 1,240 gpm that would be pumped into the system to meet domestic and fire demands. With a 20-year maximum day demand of 710 gpm, this leaves 530 gpm from production sources to fight a fire. The maximum fire protection demand is 3,500 gpm for industrial areas as shown in Table 10, meaning that 2,970 gpm would be draining from the EWST to fight an industrial fire.

At 2,970 gpm the EWST would lose 178,200 gallons for each hour that the fire endured. As shown in Table 10, the desired fire protection for industrial areas is 3,500 gpm for three hours. To meet these demands, almost 535,000 gallons of water would need to be provided from storage. Since the total capacity of the EWST is 500,000 gallons, the City's existing storage is not adequate to provide the maximum desired fire protection.

An industrial fire could be fought for a duration of two hours, though, based on the existing production and storage capacity in the City. Providing 3,500 gpm for two hours would drain the EWST by approximately 356,000 gallons. As stated previously, the normal low water level provides a stored volume of 360,000 gallons.

While the City's storage capacity is not adequate to provide the maximum fire protection rate for a duration of three hours as desired, it is not recommended that City increase their storage capacity. Instead the City Fire Department should be made aware of the limitations in fighting an industrial fire and be prepared to provide water by other means such as pumping from the river and hauling in water.

Another important factor in fighting a potential industrial fire is the presence of fire suppression systems in industrial buildings. Fire suppression systems can reduce the amount of water needed to extinguish a fire.

#### **D. PUMPING CAPACITY**

The City operates three high service pumps that distribute water from the WTP detention tank into the entire system. The firm capacity of the high service pumps is 800 gpm (1.15 MGD) which is sufficient to meet the maximum day demands of the system and the treatment capacity of the WTP both now and in the future with the 20-year maximum day demand projected to be 700 gpm (1.02 MGD).

In order to take full advantage of the firm pumping capacity of the high service pumps, though, the City would need to increase the firm filtering capacity of the WTP by installing a 200 gpm filter as referenced previously. It is not expected that the City will need to do this, though, to meet projected water demands.

#### **E. WATER MAINS**

The City's water main is documented in Table 4. The Dexter water distribution system primarily consists of ductile iron material which accounts for over 90% of the water main by length. The remainder of the water main is cast iron or HDPE with some undocumented material. Sizes of water main range from 4-inches to 16-inches in diameter.

The City has been replacing water main smaller than 8-inches over the past several years. Currently, less than 5% of the water main by length is less than 8-inches in diameter. While 4-inch and 6-inch pipe are capable of delivering adequate pressures in a looped residential system, they often limit the available fire protection that can be provided.

Overall, the City's water mains are sufficient to meet domestic and emergency needs. One area with less than sufficient fire protection is identified further on this report in section VII.D.

#### **F. WATER QUALITY ISSUES**

The City of Dexter's drinking water is safe for consumption and meets federal and state requirements. A copy of the 2015 Annual Drinking Water Quality Report is included in Appendix H.

#### **G. POTENTIAL WATER SOURCES**

The wells at the Community Wellfield match the available capacity of the aquifer they pump from, and there is no additional capacity available at this location.

The hydrogeologic report that was written when Well No. 5 was constructed indicated that the aquifer at the High School has a capacity of 500 gpm. Since that time, though, the City has found that they are able to draw less water from Well No. 5 than originally anticipated. They currently pump 270 gpm from Well No. 5 and there are no plans to increase the amount of water pumped from the High School aquifer.

While the current production wells are able to meet the demands of the City, they continue to search for new well sites.

#### **H. BACKUP POWER**

The City has stand-by diesel power generators that automatically power the WTP and production wells in the event of power loss.

### **V. ANALYSIS OF UNACCOUNTED WATER**

A summary of the quantities of water produced by the WTP and Well Number 5 and water distributed to customers as determined from billing records is shown in Table 11.

**Table 11: Summary of Water Loss**

Year	Production (MG)	Billing (MG)	Loss (MG)	Percent Loss
2013	165.2	144.6	20.6	12.4%
2014	149.4	130.3	19.2	12.8%
2015	152.0	135.8	16.2	10.7%

As shown, water loss in the City's system has been between 10% and 13% for the past three years. Typically, it is desirable to have less than 10% of water unaccounted for. Unaccounted for water can often be attributed to one of the following:

- Water loss from the system including breaks
- Hydrant flushing
- Water used for fighting fires
- Water used for construction
- Water used for maintenance
- Other unmetered uses

## **VI. WATER SHORTAGE RESPONSE**

The City does not currently have any emergency connections. The closest potential emergency connection that could be made is with the Scio Township water system. Scio Township has a 16-inch water main along Baker Road approximately 6,700 feet south of a 12-inch main the City of Dexter has at the intersection of Baker Road and Shield Road.

The City is fortunate to draw water from two separate aquifers. If the City was unable to use one aquifer due to equipment malfunction, water main break, or another reason they could rely on the other aquifer. Currently the City is able to produce water at a rate of 900 gpm (1.3 MGD) from the Community Wellfield based on the WTP's total capacity. This is sufficient capacity to meet the maximum day demands if the High School aquifer were unavailable.

If the Community Wellfield or the WTP were unavailable, the High School aquifer is currently able to produce 270 gpm (0.39 MGD) based on the existing well located there. This is less than the average day demands of the City. The City could rely on using solely Well No. 5 and the EWST during short coordinated periods for planned shutdowns of the WTP. If the Community Wellfield or the WTP were unavailable for any extended period of time, though, water use restrictions would be necessary.

The City has an Emergency Response Plan that they keep updated that is available as a separate document.

## Part 16 General Plan

### VII. HYDRAULIC ANALYSIS

A hydraulic model was prepared to evaluate the ability of the water system to provide adequate pressures and fire protection for existing, 5-year, and 20-year conditions. The model was also used to identify and recommend improvements for hydraulic deficiencies, if any. The model results indicate which areas have pressure and fire protection values less than desired.

#### A. COMPUTER MODEL

The computer program used by OHM Advisors for the creation and analysis of the water system is H2OMapWater/MSX Suite 10.0 developed by Innovyze. This program is widely used in the study of municipal water systems and capable of performing analysis of fluid flow in a pipe network under steady state and extended period conditions.

The H2OMapWater program utilizes an enhanced version of the EPANet analysis engine as developed and distributed by the U.S. Environmental Protection Agency. The program uses the conservation of water volume equation for the junctions and energy loss equations for the pipes to form a non-linear set of equations that mathematically represent the system. For a given set of boundary conditions, these equations can be solved to determine flow rate and pressure at any point within the system. This step is called “hydraulic balancing” of the network, and is accomplished by using an iterative technique to solve the non-linear equation set involved. The iterations end when the relative change in flow rates between two successive iterates is less than the specified accuracy (tolerance), and a steady state network solution is reached.

The water supply system is represented in the model by pipes and junctions. Junctions represent where pipes are connected and can be used to represent the water demand within the system. The information necessary for the analysis includes pipe length, diameter, and roughness coefficient. Additionally, each junction is given a demand and elevation above sea level. The system GSTs and service pumps are represented in the model and operational settings are input in the model. The program simulates the water flows through the system to determine the flow rates and pressures throughout the system.

The City of Dexter water system model includes the WTP detention tank, high service pumps, Well No. 5, EWST, and transmission and distribution mains (Figure A-1).

The Hazen-Williams friction formula was used to calculate energy losses associated with pipe wall friction. The use of this equation is standard practice to compute pressure losses in a water distribution network. The boundary conditions utilized for the simulations consist of the high service pump operations and EWST operational levels.

#### B. DEMAND DISTRIBUTION

The total system demands shown in Table 9 were the demands that were allocated across the system in the model. The 20 largest water users, shown in Table 12, had their 2015 usage placed at

their actual locations in the model. The remaining system demand was allocated evenly across the rest of the system junctions.

**Table 12: Top 20 City of Dexter Water Users for 2015**

Customer	2015 Average Demand (gpm)
Dexter Fastener	15.82
Walkabout Creek Apartments	12.41
Thomson Shore Inc	6.91
Northern United Brewing Co	6.05
The Cedars	5.71
Dexter School Office (3360 Kensington)	3.99
Dexter Wellness Center	3.26
Trackside Investments (Car Wash/laundromat)	2.52
Alpha Metal Finishing	2.45
Busch's	2.02
Dexter Community Schools (Mill Creek Middle School)	1.97
Industrial Tectonics	1.97
La Fontaine Chevrolet	1.84
Huron Commons Association	1.79
Dexter Capital (Aubree's)	1.71
Dexter's Pub	1.48
Dexter Community Schools (Cornerstone Elementary)	1.13
Terry B's	1.12
Mav Development	1.04
Dexter School Office (2615 Baker)	1.00

**C. CALIBRATION**

The model used for this study was updated from a hydraulic model that was calibrated in 2009. Given that the base model was calibrated recently, no calibration was performed for this model update.

**D. EXISTING PRESSURES AND FIRE PROTECTION**

Existing System Modeling

The pressure analyses that were performed for the existing system included average day, maximum day, and peak hour demand scenarios. The scenarios are based on the following assumptions:

1. Present-day demands from Table 9.

2. Existing system hydraulics not including proposed improvements.
3. WTP detention tank minimum operating HGL of 855.5 feet.
4. Well No. 5 aquifer pumping water level of 821 feet from hydrogeologic reports.
5. Tank levels and pump operations as shown in Table 13.

**Table 13: Model Settings**

Model Parameter	Model Scenario			
	Average Day	Maximum Day	Peak Hour	Fire Protection
WTP High Service Pumps	Off	One Pump On	Two Pumps On	Three Pumps On
Well No. 5	Off	Off	Off	On
EWST Level	32	31	30	28
EWST HGL	1,040	1,039	1,038	1,036

The scenarios in Table 13 for Average Day, Maximum Day, and Peak Hour represent the lowest expected tank levels with the least number of pumps operating for each demand scenario. These were chosen so that the lowest expected pressures would be modeled.

Existing Pressure Results

Figures C-1 through C-3 show existing pressures for the average day, maximum day, and peak hour demand scenarios.

Water systems are required to provide a minimum pressure of 35 psi throughout their distribution system under normal demand conditions. Under emergency conditions, pressures must not go below 20 psi. Ranges of modeled pressures for the existing system are shown in Table 14.

**Table 14: Existing Modeled Pressures**

Scenario	Pressure Range
Average Day	42 - 89 psi
Maximum Day	42 - 89 psi
Peak Hour	41 - 88 psi

As seen in Table 14 and in Figures C-1 to C-3, pressures remain above 35 psi in the distribution system. Pressures are fairly consistent over the different demand scenarios as well.

Existing Fire Protection Modeling

The existing fire protection analysis was performed based on the following assumptions:

1. Present Maximum Day demands from Table 9 of the report.
2. Existing system hydraulics not including proposed improvements.
3. Tank level and high service pump operations for the Fire Flow scenario from Table 13.
4. Residual pressure of 20 psi at each node individually.

Each node in the system was assigned a desired fire protection value based on existing zoning of the parcels within 300' of that given node. When multiple types of zoning were in proximity to a given node, the larger demand was used to determine the desired fire protection of that node. The desired fire protection for the different zoning classifications are shown in Table 10. A fire flow analysis was run for the system nodes to determine the available fire protection at each node without dropping system pressures below 20 psi.

Percent of desired fire protection was taken by dividing the available fire protection at each node by that node's determined desired fire protection.

#### Existing Fire Protection Results

Figure C-4 shows the results of the fire protection analysis of the existing system. Generally, the available fire protection in the City is very good. There are a few locations with less than desired fire protection shown. Two of these locations result from being in residential areas that are located within 300 feet of a zone with higher fire protection requirements. In both cases, the zone with higher protection requirements is protected adequately by hydrants within that zone. Therefore, it is not a concern that the hydrants located in the residential zones provide less protection than is desired for the adjacent zones.

There is one area with poor fire protection. This is near the intersection of Baker Road and Grand Street. There is an industrial parcel here that is served through a dead-end 4-inch main. This 4-inch main limits the available fire protection here to only 400 gpm. Replacing the 4-inch main with an 8-inch main would increase the available fire protection to 3,600 gpm.

## **E. ANALYSIS OF FUTURE CONDITIONS**

#### Future Proposed System Analysis

In order to determine available pressure for the future conditions, 5-year and 20-year pressure analyses were performed. The 5-year and 20-year models were created from the existing model, with the following modifications adopted:

1. New water mains as recommended in the CIP or already planned by the City were added as shown on Figure B-1 in Appendix B to both the 5-Year and 20-Year models.
2. Demands were scaled up to match the projected demands in Table 9.

#### Future Pressure Results

Pressure results for the 5-Year analyses are shown in Figures D-1 through D-3. Pressure results for the 20-Year analyses are shown in Figures E-1 through E-3. Ranges of pressures within each pressure district were unchanged from the Existing system results shown in Table 14.

#### Future Proposed Fire Protection Modeling

The future fire protection analyses were performed based on the following assumptions:

1. Future Maximum Day demands from Table 9 of the report.
2. Future system hydraulics as shown on Figures B-1 and B-2.

3. Tank level and high service pump operations for the Fire Flow scenario from Table 13.
4. Residual pressure of 20 psi at each node individually.

Available fire protection at each hydrant node was determined in the same manner as the existing model. The available fire protection from the model was again compared to the desired fire protection to determine the percent of desired fire protection available at each hydrant node.

Future Fire Protection Results

Figure D-4 shows the results of the fire protection analysis for the 5-Year model. Figure E-4 shows the results of the fire protection analysis for the 20-Year model. The proposed water main improvements improve fire protection as desired near the intersection of Baker Road and Grand Street.

**VIII. SYSTEM RECOMMENDATIONS AND CAPITAL IMPROVEMENT PLAN**

Based on the findings of this study and consultation with the City, the following improvements are recommended for the City’s water system

Water Main Improvements

Three areas were identified for the construction of new water main. These areas are identified in Figure B-1 in Appendix B and summarized in Table 15 below.

**Table 15: Water Main Cost Estimates**

Project	Time Line	Estimated Cost
Replace 100' of 4" Main along Grand St with 8" Main	5 Year	\$ 29,000
Replace 1,500' of 8" Main along Baker Rd with 8" Main	5 – 20 Year	\$ 179,000
Replace 3,100' of 6" Main along 2nd St and Cushing Ct with 8" Main	5 – 20 Year	\$ 448,000
<b>Total Estimated Cost:</b>		<b>\$ 656,000</b>

These water main improvements will replace deteriorating water main, provide greater fire protection for the areas they serve, and/or provide more efficient and reliable service.

## Appendix A

### General Plan

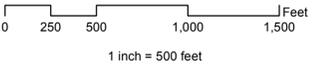
Figure A-1: General Plan

Figure A-2: Pipe Material

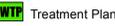
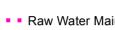
Figure A-3: Pipe Age

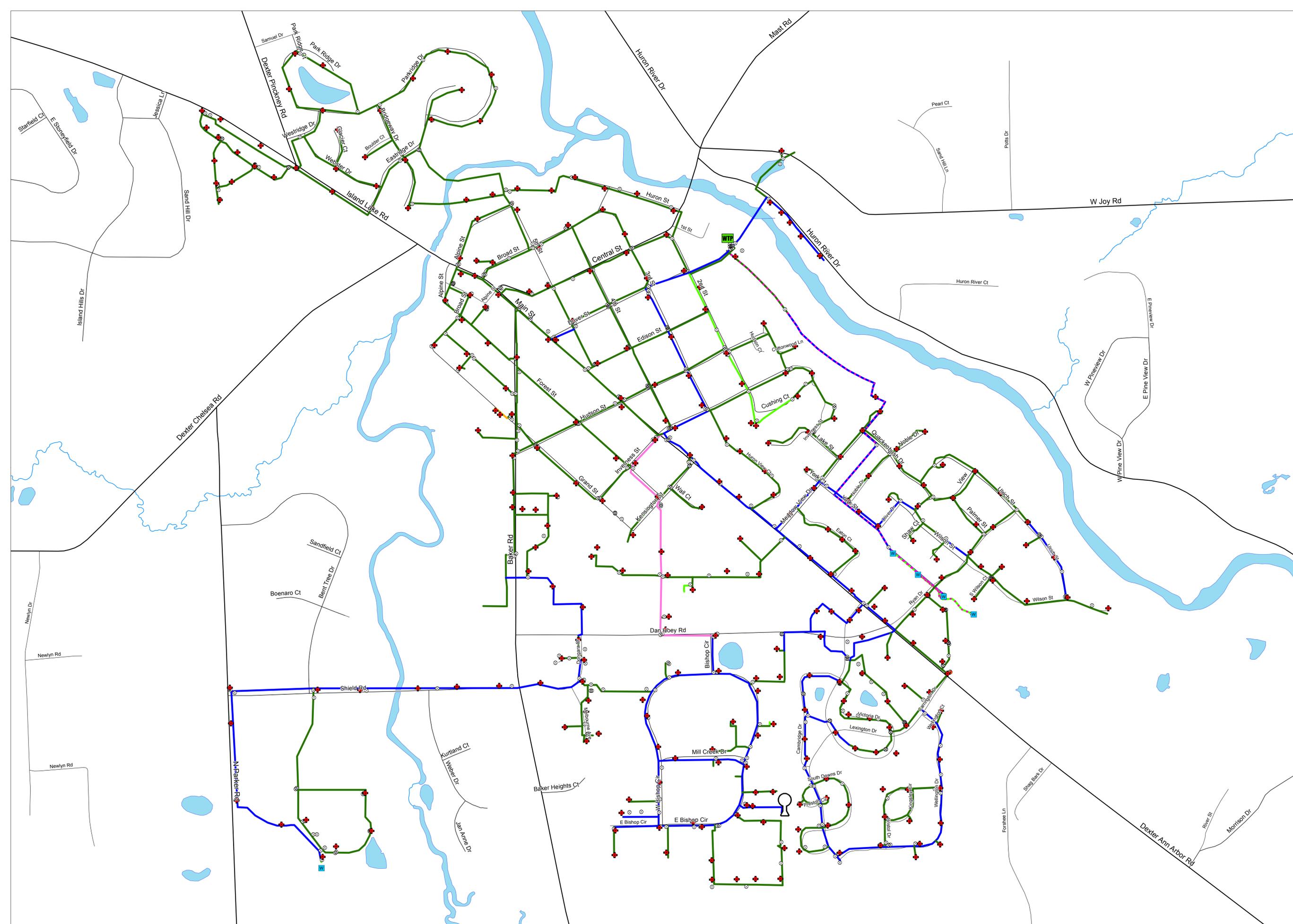


Figure A-1  
General Plan



**Legend**

-  Well
-  Treatment Plant
-  Elevated Storage Tank
-  Hydrant
-  Blow Off Valve
-  System Valve
- Water Main Size**
-  2"
-  4"
-  6"
-  8"
-  10"
-  12"
-  16"
-  Raw Water Main



Source: Data provided by Washtenaw County and the City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

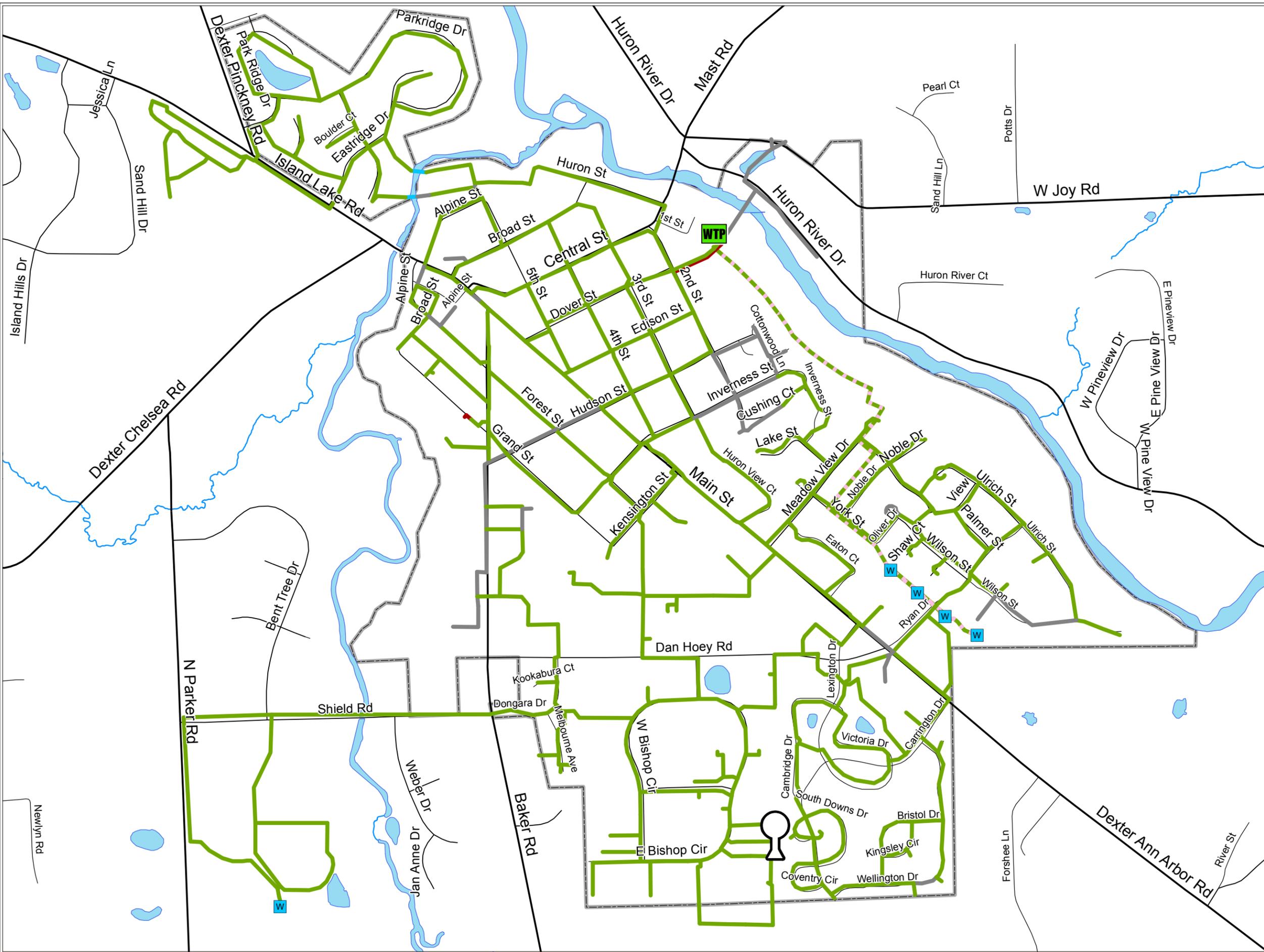
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 2, 2016



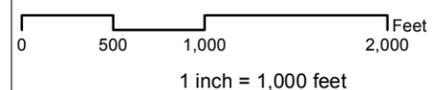


Figure A-2  
Pipe Material



**Legend**

- Well
- Treatment
- EWST
- Pipe Material**
- Cast Iron
- Ductile Iron
- HDPE
- Undocumented
- Raw Water Main



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

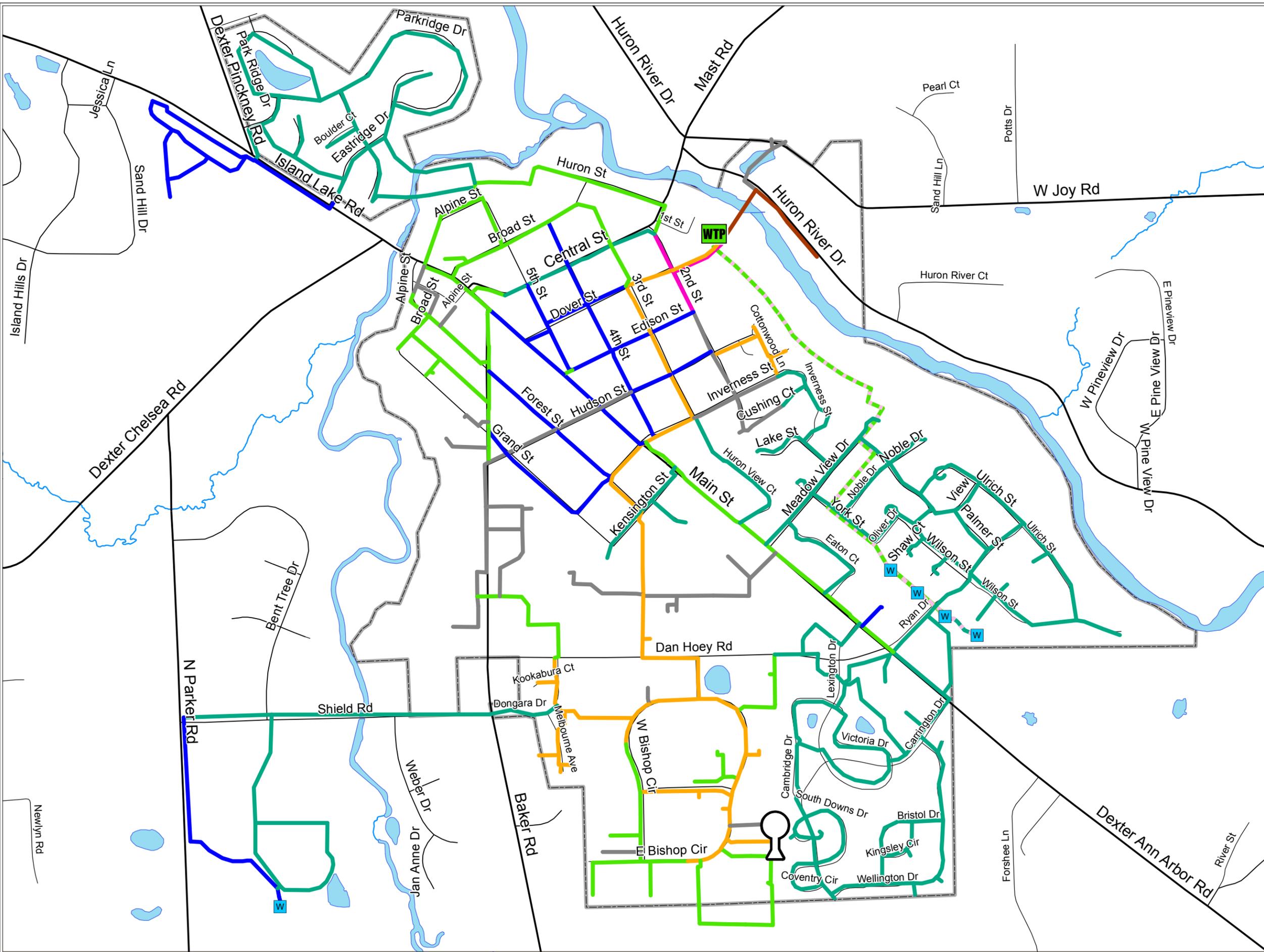
Map Published: September 2, 2016



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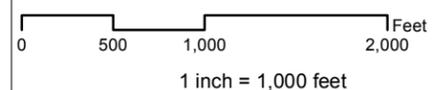


Figure A-3  
Pipe Age



**Legend**

-  Well
-  Treatment
-  EWST
- Decade Installed**
-  1940
-  1970
-  1980
-  1990
-  2000
-  2010
-  Undocumented
-  Raw Water Main



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 22, 2016



## Appendix B

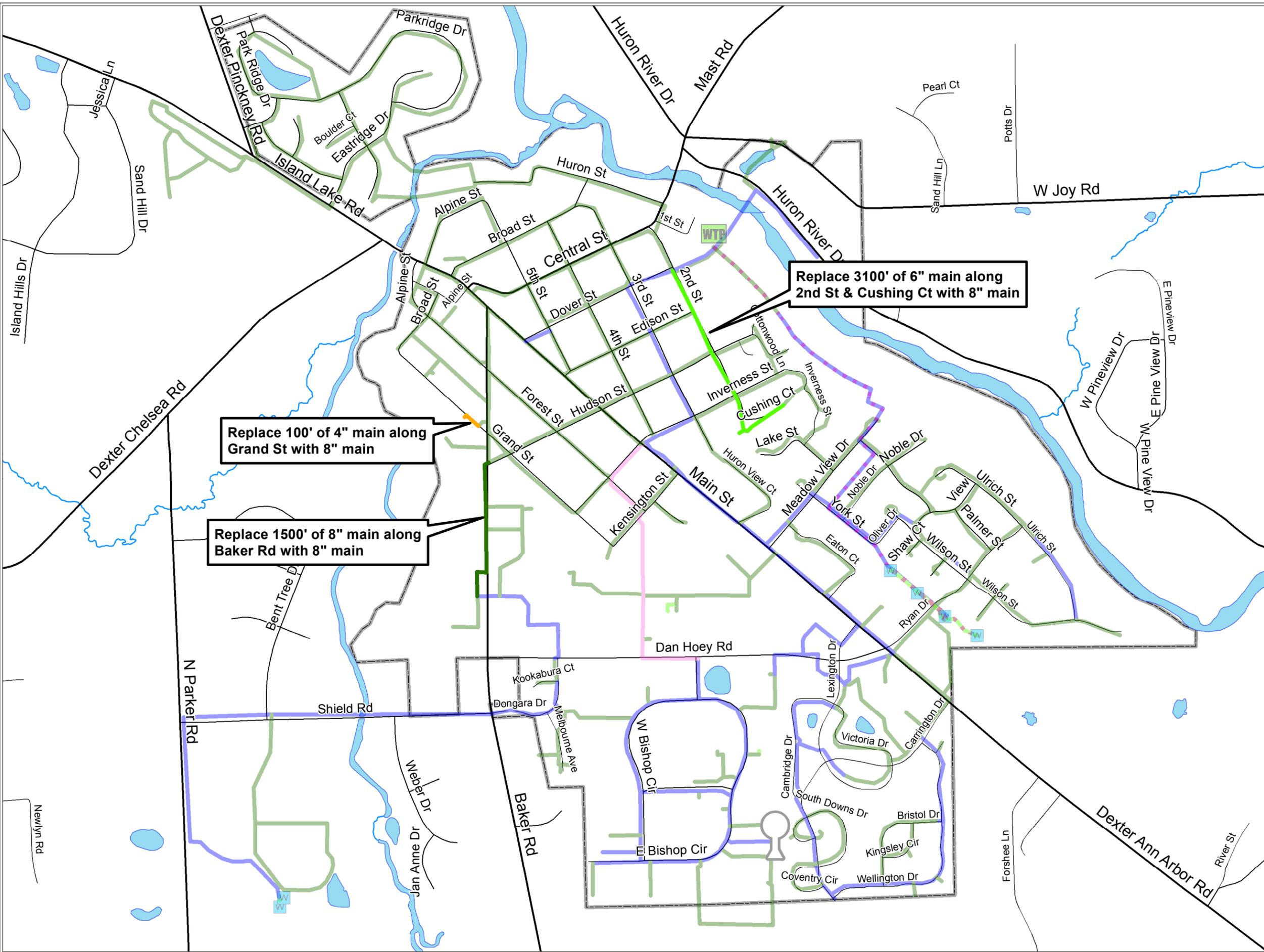
### System Improvements

Figure B-1: CIP – Water Main Projects

Cost Estimates

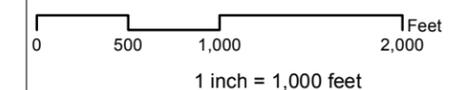


Figure B-1  
CIP - Pipe Replacement



**Legend**

-  Well
  -  Treatment
  -  EWST
- Water Main Size**
-  4"
  -  6"
  -  8"
  -  10"
  -  12"
  -  16"
  -  Raw Water Main



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 2, 2016



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Client: CITY OF DEXTER  
 Project: Water Main Directional Drill  
 OHM JN: 0130-16-0020  
 Sheet: ENGINEER'S OPINION OF PROBABLE COST  
 Date: 7/21/2016 By: ZH  
 Checked: PMD

**PROJECT WORK SHEET**

architects. engineers. planners.

ITEM CODE	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	COST
1	Abandon Water Main	Ft	1501	\$0.50	\$750.50
2	Water Main, 8 inch, Tr Det G	Ft	48	\$64.00	\$3,072.00
3	Water Main, 6 inch, Tr Det G	Ft	0	\$54.00	
4	Connect to Existing Water Main	Ea	2	\$2,500.00	\$5,000.00
5	Cut and Cap Existing Water Main	Ea	14	\$100.00	\$1,400.00
6	Water Main, 8 inch, Directional Drill	Ft	1453	\$72.00	\$104,616.00
7	Water Main, 6 inch, Directional Drill	Ft	0	\$62.00	
8	Fire Hydrant Assembly	Ea	3	\$4,500.00	\$13,500.00
9	Fire Hydrant Rem	Ea	3	\$600.00	\$1,800.00
10	Gate Valve and Well, 8 inch	Ea	3	\$3,500.00	\$10,500.00
11	Gate Valve and Well, 6 inch	Ea	0	\$3,000.00	
12	Water Service, Curb Stop and Box	Ea	9	\$350.00	\$3,150.00
13	Water Service, Type K, Copper, 1 inch, Jumper	Ea	8	\$500.00	\$4,000.00
14	Water Service, Type K, Copper, 1 inch, Long, B	Ea	1	\$1,800.00	\$1,800.00
15	Water Service, Type K, Copper, 1 inch, Short	Ea	9	\$1,400.00	\$12,600.00
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
SUBTOTAL					\$162,188.50
CONTINGENCY					10% \$16,218.85
<b>TOTAL OPINION OF PROBABLE CONSTRUCTION COST =</b>					<b>\$178,407.35</b>

SUBJECT	BY	9/2/2016	1 SHEET NO. 4 OF	JOB NUMBER
	DATE	(print date)		



Client: CITY OF DEXTER  
 Project: Water Main Directional Drill  
 OHM JN: 0130-16-0020  
 Sheet: ENGINEER'S OPINION OF PROBABLE COST  
 Date: 7/21/2016 By: ZH  
 Checked: PMD

**PROJECT WORK SHEET**

architects. engineers. planners.

ITEM CODE	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	COST
1	Abandon Water Main	Ft	1105	\$0.50	\$552.50
2	Water Main, 8 inch, Tr Det G	Ft	6	\$64.00	\$384.00
3	Water Main, 6 inch, Tr Det G	Ft	12	\$54.00	\$648.00
4	Connect to Existing Water Main	Ea	2	\$2,500.00	\$5,000.00
5	Cut and Cap Existing Water Main	Ea	6	\$100.00	\$600.00
6	Water Main, 8 inch, Directional Drill	Ft	273	\$72.00	\$19,656.00
7	Water Main, 6 inch, Directional Drill	Ft	832	\$62.00	\$51,584.00
8	Fire Hydrant Assembly	Ea	2	\$4,500.00	\$9,000.00
9	Fire Hydrant Rem	Ea	2	\$600.00	\$1,200.00
10	Gate Valve and Well, 8 inch	Ea	0	\$3,500.00	
11	Gate Valve and Well, 6 inch	Ea	2	\$3,000.00	\$6,000.00
12	Water Service, Curb Stop and Box	Ea	26	\$350.00	\$9,100.00
13	Water Service, Type K, Copper, 1 inch, Jumper	Ea	25	\$500.00	\$12,350.00
14	Water Service, Type K, Copper, 1 inch, Long, B	Ea	1	\$1,800.00	\$2,340.00
15	Water Service, Type K, Copper, 1 inch, Short	Ea	26	\$1,400.00	\$36,400.00
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
SUBTOTAL					\$154,814.50
CONTINGENCY					10% \$15,481.45
<b>TOTAL OPINION OF PROBABLE CONSTRUCTION COST =</b>					<b>\$170,295.95</b>

SUBJECT	BY	9/2/2016	2 SHEET NO. 4	JOB NUMBER
	DATE	(print date)	OF	.



Client: CITY OF DEXTER  
 Project: Water Main Directional Drill  
 OHM JN: 0130-16-0020  
 Sheet: ENGINEER'S OPINION OF PROBABLE COST  
 Date: 7/21/2016 By: ZH  
 Checked: PMD

**PROJECT WORK SHEET**

architects. engineers. planners.

ITEM CODE	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	COST
1	Abandon Water Main	Ft	2069	\$0.50	\$1,034.50
2	Water Main, 8 inch, Tr Det G	Ft	48	\$64.00	\$3,072.00
3	Water Main, 6 inch, Tr Det G	Ft	6	\$54.00	\$324.00
4	Connect to Existing Water Main	Ea	7	\$2,500.00	\$17,500.00
5	Cut and Cap Existing Water Main	Ea	12	\$100.00	\$1,200.00
6	Water Main, 8 inch, Directional Drill	Ft	855	\$72.00	\$61,560.00
7	Water Main, 6 inch, Directional Drill	Ft	1214	\$62.00	\$75,268.00
8	Fire Hydrant Assembly	Ea	4	\$4,500.00	\$18,000.00
9	Fire Hydrant Rem	Ea	4	\$600.00	\$2,400.00
10	Gate Valve and Well, 8 inch	Ea	4	\$3,500.00	\$14,000.00
11	Gate Valve and Well, 6 inch	Ea	0	\$3,000.00	
12	Water Service, Curb Stop and Box	Ea	25	\$350.00	\$8,750.00
13	Water Service, Type K, Copper, 1 inch, Jumper	Ea	24	\$500.00	\$11,875.00
14	Water Service, Type K, Copper, 1 inch, Long, B	Ea	1	\$1,800.00	\$2,250.00
15	Water Service, Type K, Copper, 1 inch, Short	Ea	25	\$1,400.00	\$35,000.00
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
SUBTOTAL					\$252,233.50
CONTINGENCY					10% \$25,223.35
<b>TOTAL OPINION OF PROBABLE CONSTRUCTION COST =</b>					<b>\$277,456.85</b>



Client: CITY OF DEXTER  
 Project: \_\_\_\_\_  
 OHM JN: \_\_\_\_\_  
 Sheet: ENGINEER'S OPINION OF PROBABLE COST  
 Date: 9/2/2016 By: SS  
 Checked: \_\_\_\_\_

**PROJECT WORK SHEET**

architects. engineers. planners.

ITEM CODE	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	COST
1	Abandon Water Main	Ft	100	\$0.50	\$50.00
2	Water Main, 8 inch, Tr Det G	Ft	100	\$64.00	\$6,400.00
3	Water Main, 6 inch, Tr Det G	Ft	0	\$54.00	
4	Connect to Existing Water Main	Ea	1	\$2,500.00	\$2,500.00
5	Cut and Cap Existing Water Main	Ea	0	\$100.00	
6	Water Main, 8 inch, Directional Drill	Ft	0	\$72.00	
7	Water Main, 6 inch, Directional Drill	Ft	0	\$62.00	
8	Fire Hydrant Assembly	Ea	2	\$4,500.00	\$9,000.00
9	Fire Hydrant Rem	Ea	2	\$600.00	\$1,200.00
10	Gate Valve and Well, 8 inch	Ea	2	\$3,500.00	\$7,000.00
11	Gate Valve and Well, 6 inch	Ea	0	\$3,000.00	
12	Water Service, Curb Stop and Box	Ea	0	\$350.00	
13	Water Service, Type K, Copper, 1 inch, Jumper	Ea	0	\$500.00	
14	Water Service, Type K, Copper, 1 inch, Long, B	Ea	0	\$1,800.00	
15	Water Service, Type K, Copper, 1 inch, Short	Ea	0	\$1,400.00	
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
<b>SUBTOTAL</b>					<b>\$26,150.00</b>
				10%	<b>\$2,615.00</b>
<b>TOTAL OPINION OF PROBABLE CONSTRUCTION COST =</b>					<b>\$28,765.00</b>

## Appendix C

### Existing Model Results

Figure C-1: Existing Average Day Pressures

Figure C-2: Existing Maximum Day Pressures

Figure C-3: Existing Peak Hour Pressures

Figure C-4: Existing Fire Protection



Figure C-1  
Existing Average Day  
Pressure

**Legend**

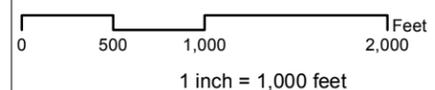
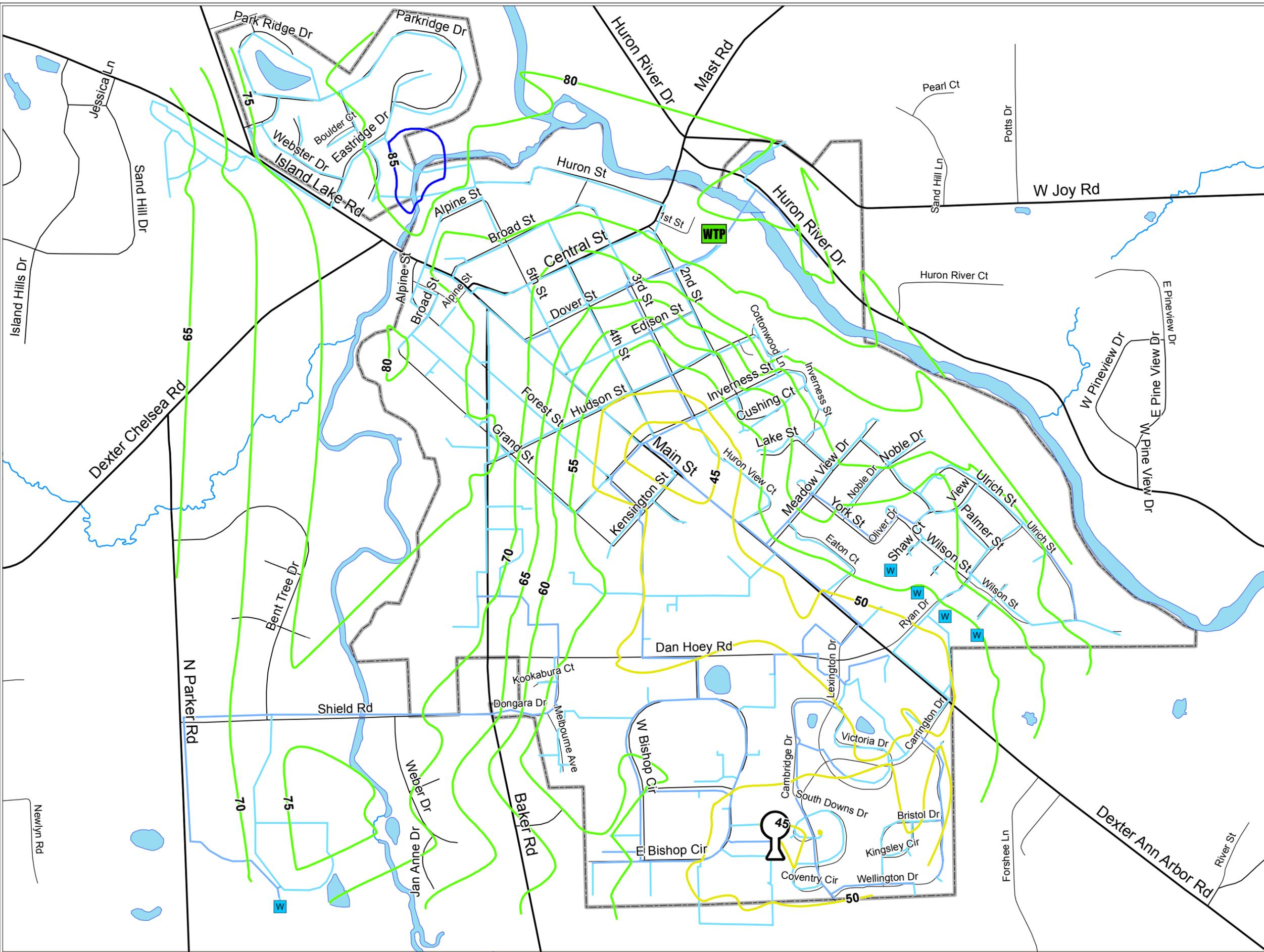
- Well
- Treatment
- EWST

**Water Main**

- 8" and smaller
- 10" and larger

**Modeled Pressure**

- Less than 20 psi (none)
- 25 - 35 psi (none)
- 40 - 50 psi
- 55 - 80 psi
- 85 - 100 psi
- Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016

888.522.6711 | ohm-advisors.com



Figure C-2  
Existing Maximum Day  
Pressure

**Legend**

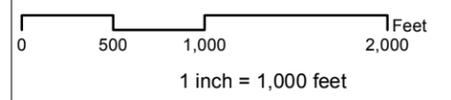
- Well
- Treatment
- EWST

**Water Main**

- 8" and smaller
- 10" and larger

**Modeled Pressure**

- Less than 20 psi (none)
- 25 - 35 psi (none)
- 40 - 50 psi
- 55 - 80 psi
- 85 - 100 psi
- Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

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Map Published: September 1, 2016



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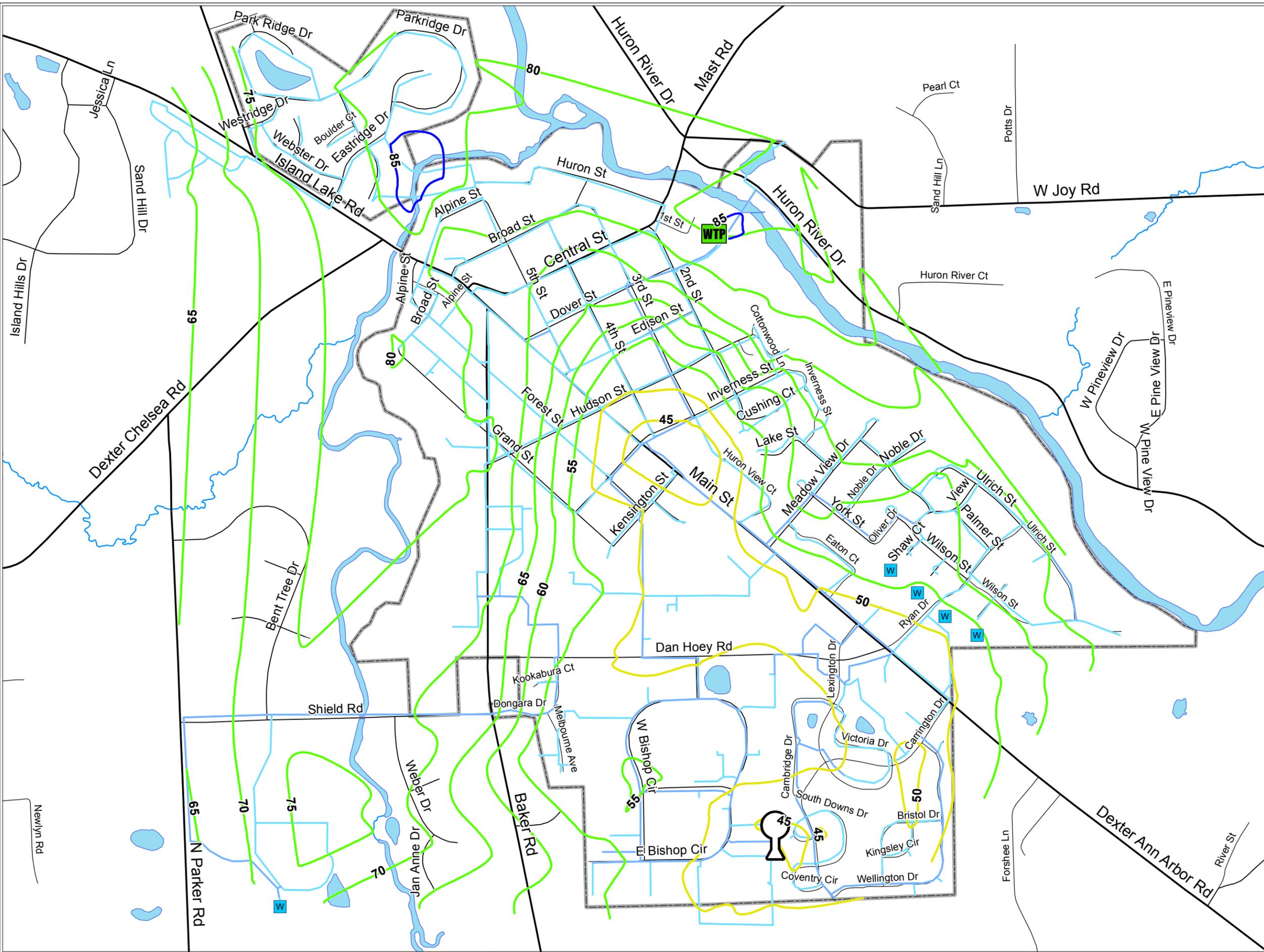




Figure C-3  
Existing Peak Hour  
Pressure

**Legend**

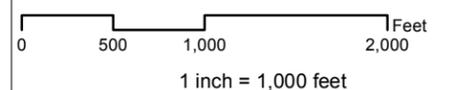
-  Well
-  Treatment
-  EWST

**Water Main**

-  8" and smaller
-  10" and larger

**Modeled Pressure**

-  Less than 20 psi (none)
-  25 - 35 psi (none)
-  40 - 50 psi
-  55 - 80 psi
-  85 - 100 psi
-  Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016

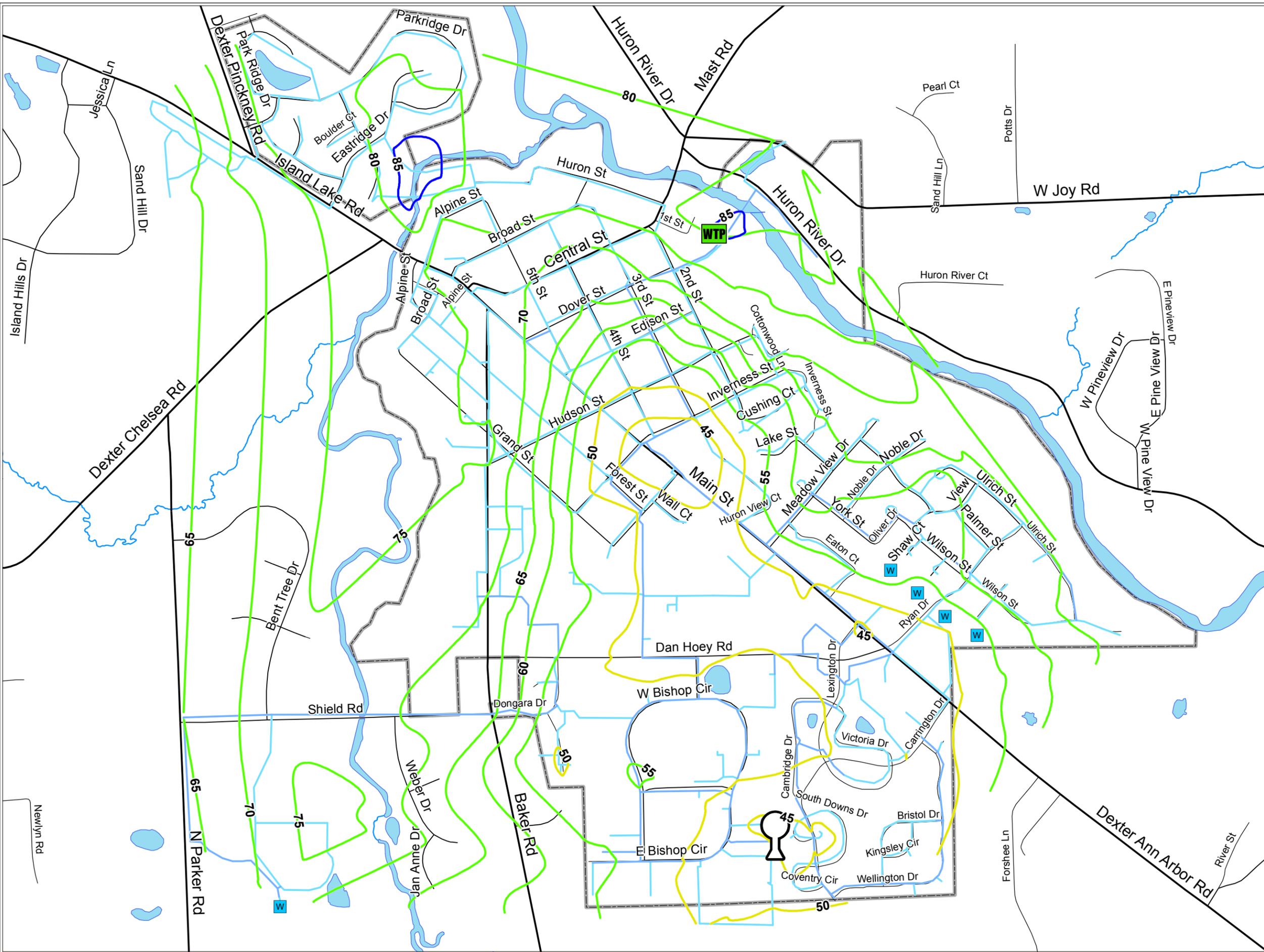
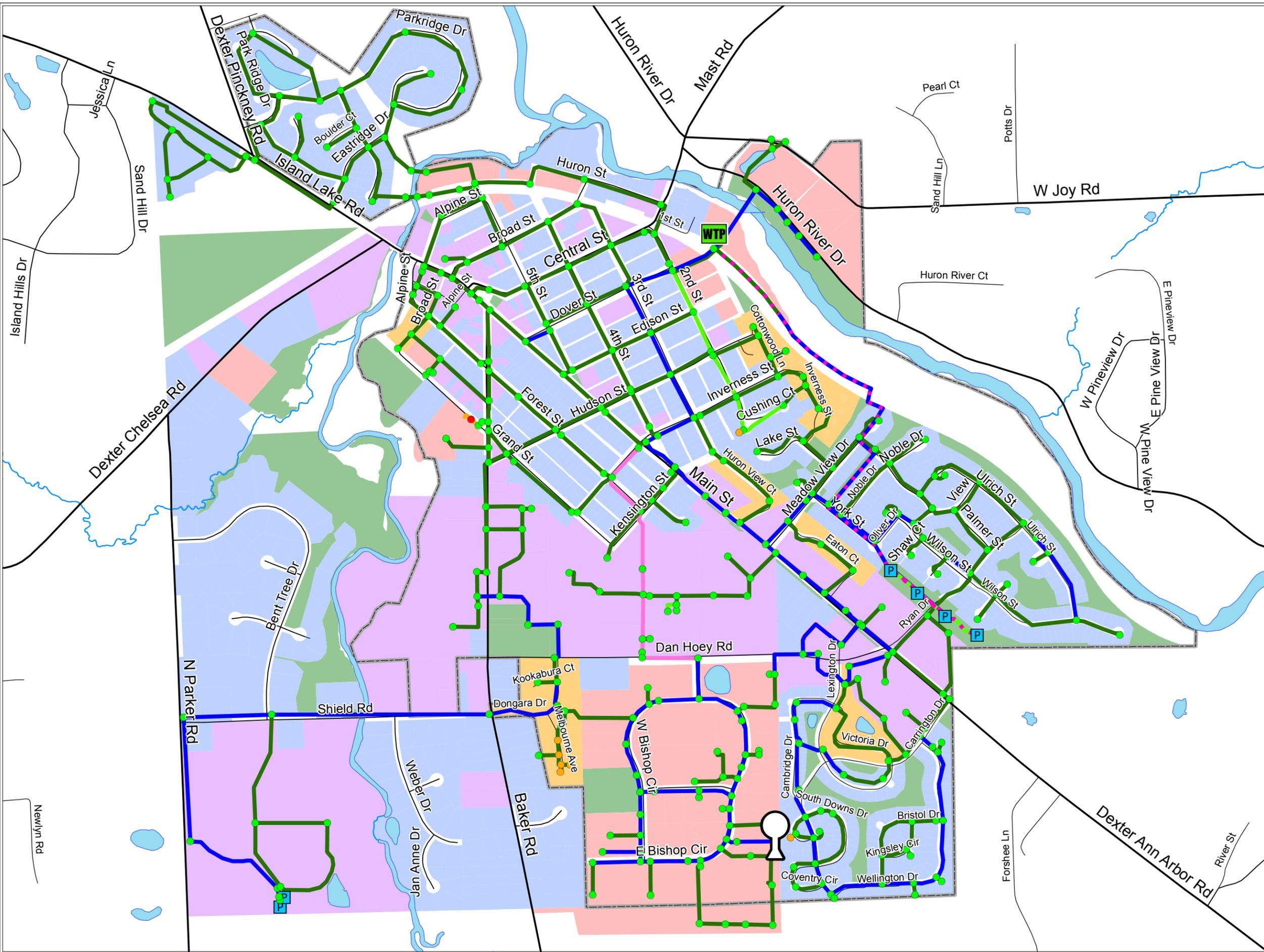




Figure C-4  
Existing Fire Protection



**Legend**

**Water Main Size**

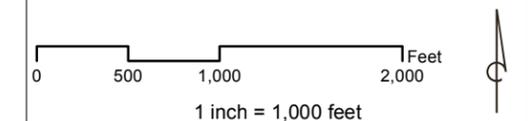
- 4"
- 6"
- 8"
- 10"
- 12"
- 16"
- Raw Water Main

**Land Class (Fire Demand)**

- Open (1,000 gpm)
- Single Family (1,000 gpm)
- Multi-Family (1,500 gpm)
- Commercial (2,000 gpm)
- Industrial (3,500 gpm)

**Percent of Desired Fire Protection**

- Less than 50%
- 50 - 75%
- Greater than 75%



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016

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## Appendix D

### 5-Year Model Results

Figure D-1: 5-Year Average Day Pressures

Figure D-2: 5-Year Maximum Day Pressures

Figure D-3: 5-Year Peak Hour Pressures

Figure D-4: 5-Year Fire Protection



Figure D-1  
5-Year Average Day  
Pressure

**Legend**

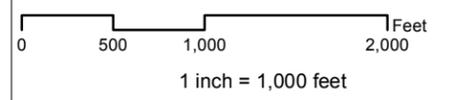
- Well
- Treatment
- EWST

**Water Main**

- 8" and smaller
- 10" and larger

**Modeled Pressure**

- Less than 20 psi (none)
- 25 - 35 psi (none)
- 40 - 50 psi
- 55 - 80 psi
- 85 - 100 psi
- Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016



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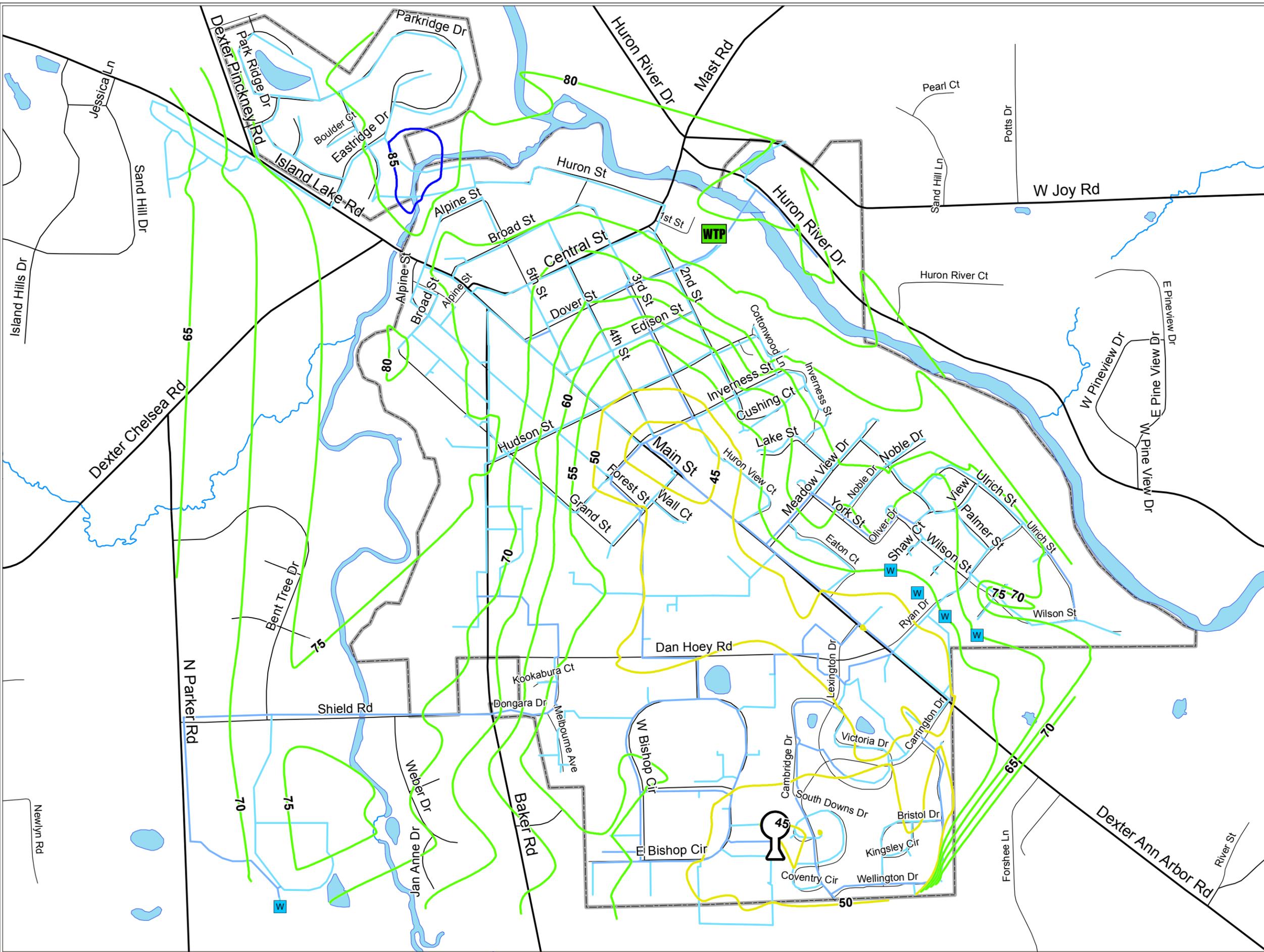




Figure D-2  
5-Year Maximum Day  
Pressure

**Legend**

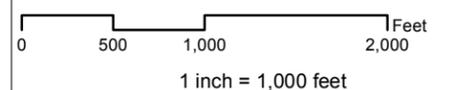
-  Well
-  Treatment
-  EWST

**Water Main**

-  8" and smaller
-  10" and larger

**Modeled Pressure**

-  Less than 20 psi (none)
-  25 - 35 psi (none)
-  40 - 50 psi
-  55 - 80 psi
-  85 - 100 psi
-  Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016



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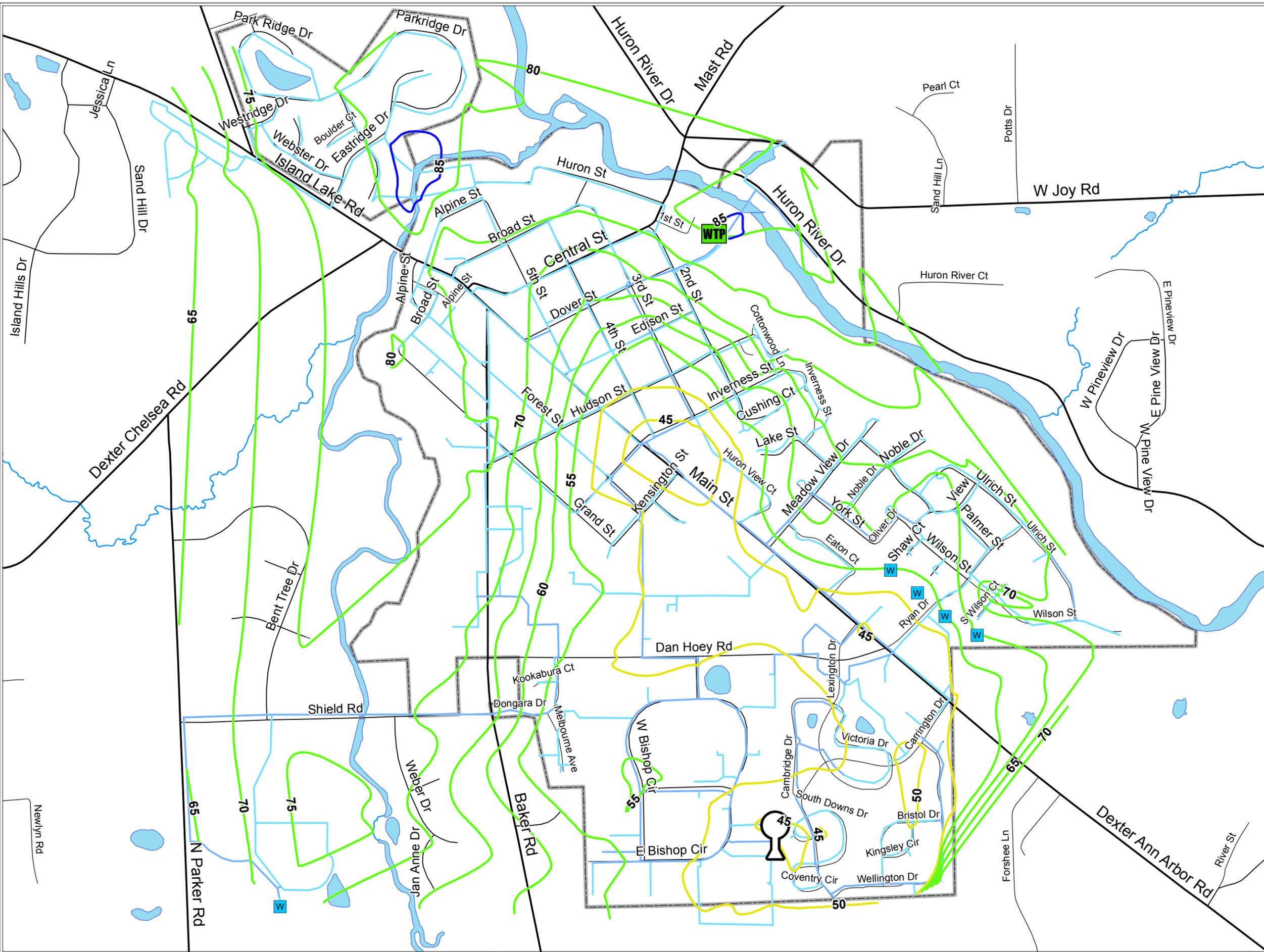




Figure D-3  
5-Year Peak Hour  
Pressure

**Legend**

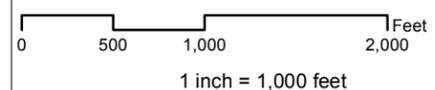
- Well
- Treatment
- EWST

**Water Main**

- 8" and smaller
- 10" and larger

**Modeled Pressure**

- Less than 20 psi (none)
- 25 - 35 psi (none)
- 40 - 50 psi
- 55 - 80 psi
- 85 - 100 psi
- Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016



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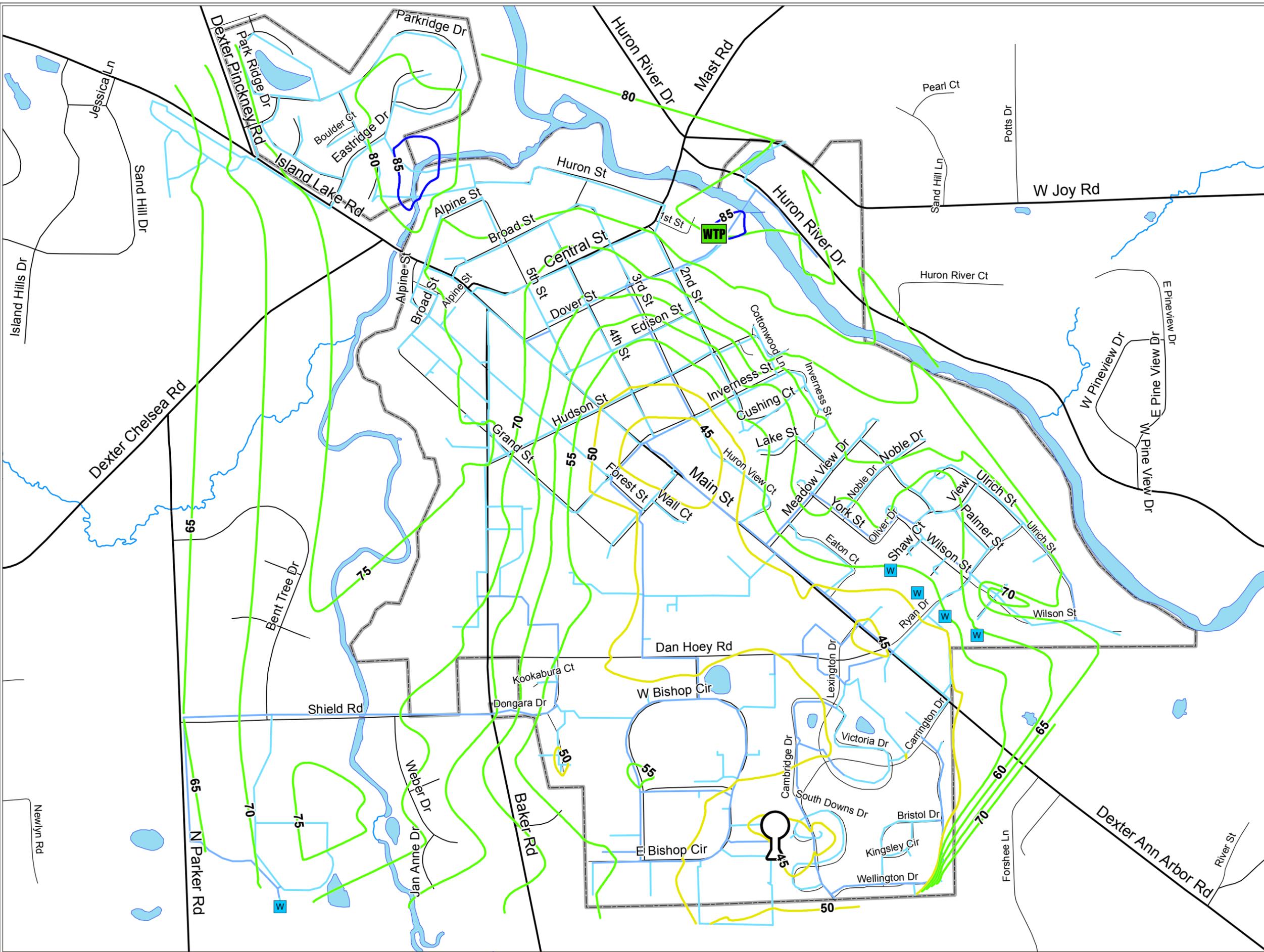
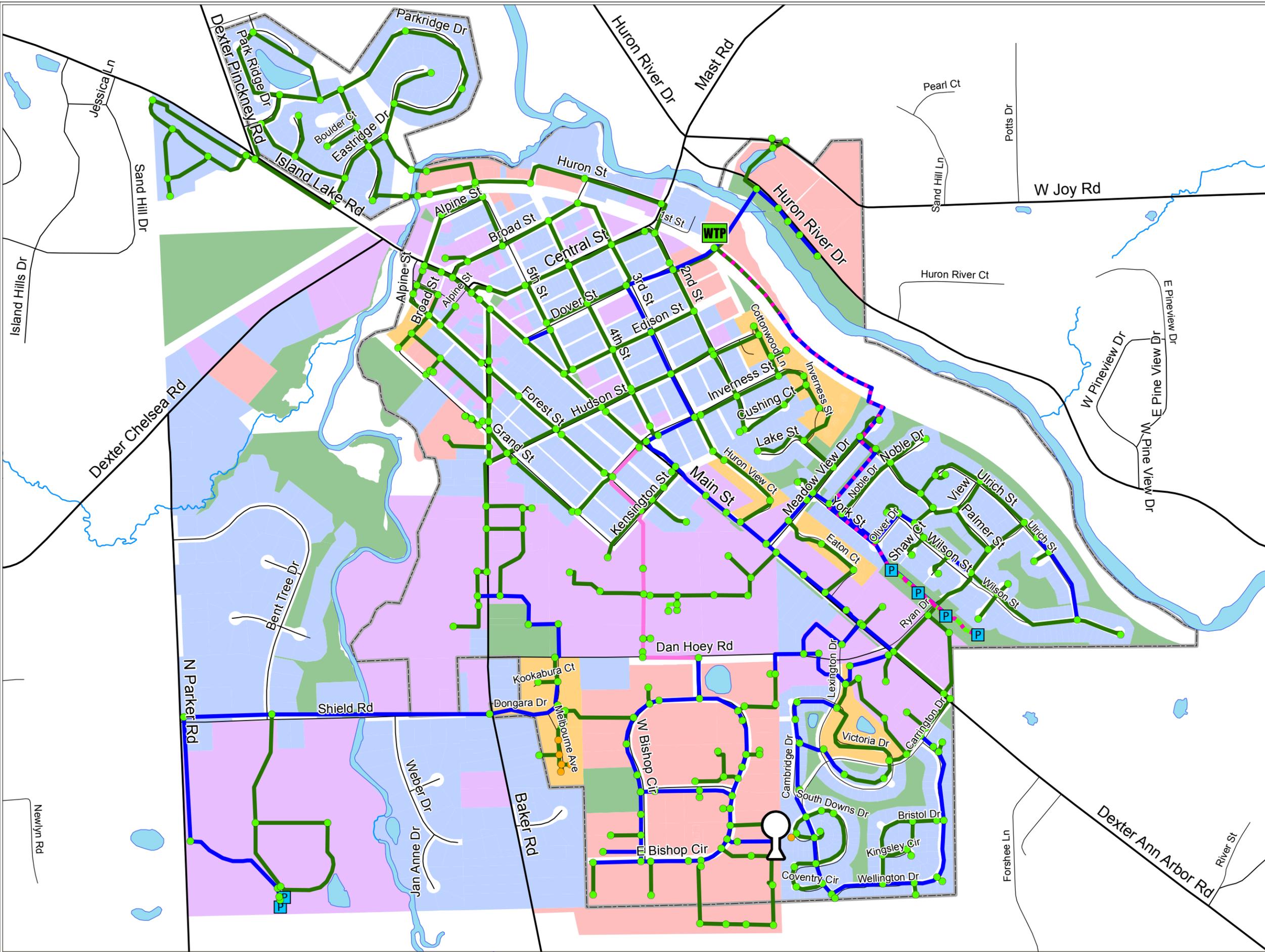




Figure D-4  
5-Year Fire Protection



**Legend**

**Water Main Size**

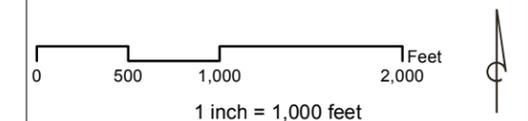
- 6"
- 8"
- 10"
- 12"
- 16"
- Raw Water Main

**Land Class (Fire Demand)**

- Open (1,000 gpm)
- Single Family (1,000 gpm)
- Multi-Family (1,500 gpm)
- Commercial (2,000 gpm)
- Industrial (3,500 gpm)

**Percent of Desired Fire Protection**

- Less than 50%
- 50 - 75%
- Greater than 75%



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016

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## Appendix E

### 20-Year Model Results

Figure E-1: 20-Year Average Day Pressures

Figure E-2: 20-Year Maximum Day Pressures

Figure E-3: 20-Year Peak Hour Pressures

Figure E-4: 20-Year Fire Protection



Figure E-1  
20-Year Average Day  
Pressure

**Legend**

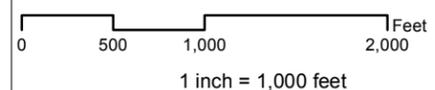
-  Well
-  Treatment
-  EWST

**Water Main**

-  8" and smaller
-  10" and larger

**Modeled Pressure**

-  Less than 20 psi (none)
-  25 - 35 psi (none)
-  40 - 50 psi
-  55 - 80 psi
-  85 - 100 psi
-  Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016

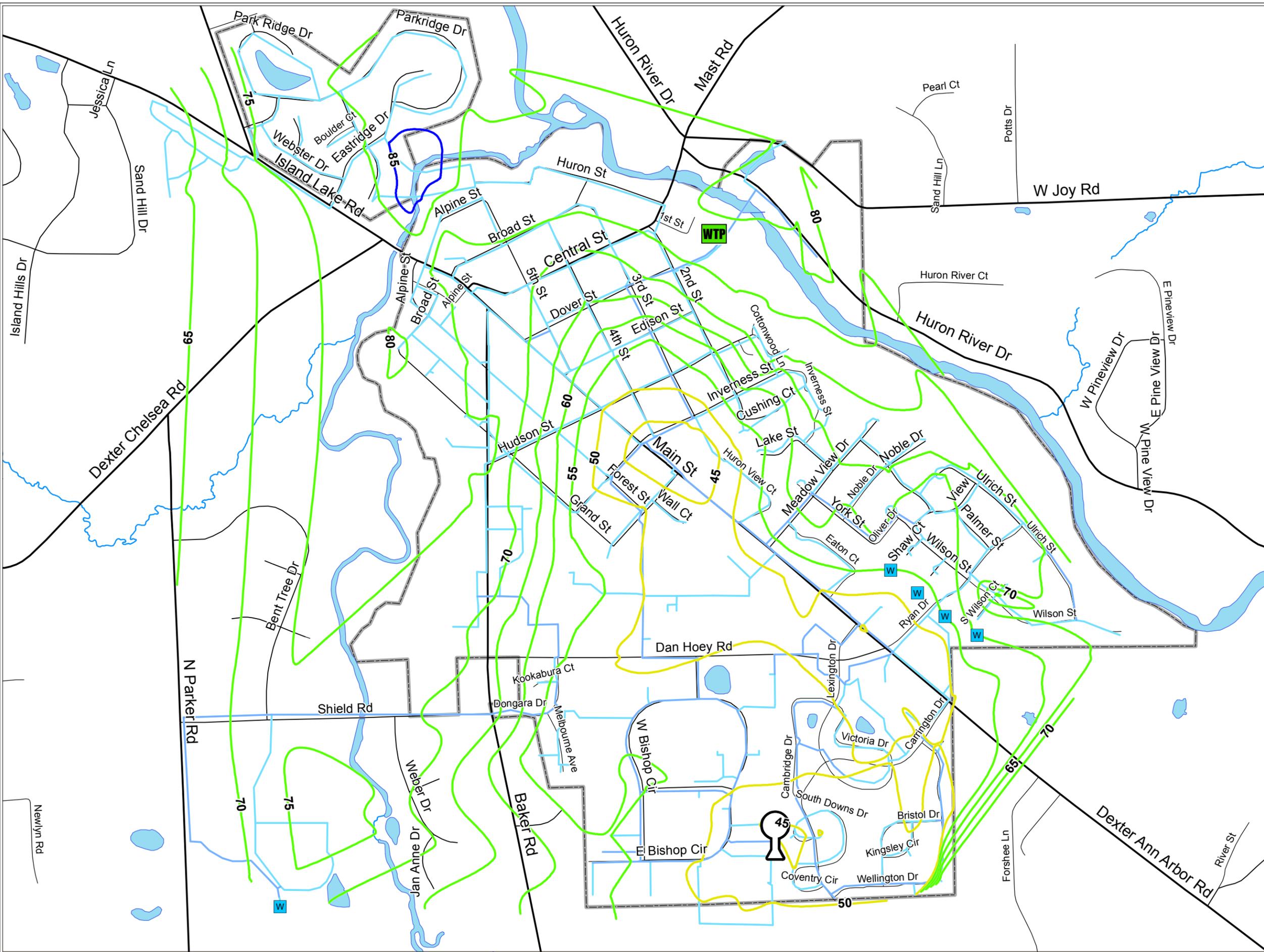




Figure E-2  
20-Year Maximum Day  
Pressure

**Legend**

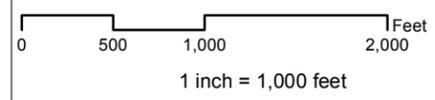
- Well
- Treatment
- EWST

**Water Main**

- 8" and smaller
- 10" and larger

**Modeled Pressure**

- Less than 20 psi (none)
- 25 - 35 psi (none)
- 40 - 50 psi
- 55 - 80 psi
- 85 - 100 psi
- Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016



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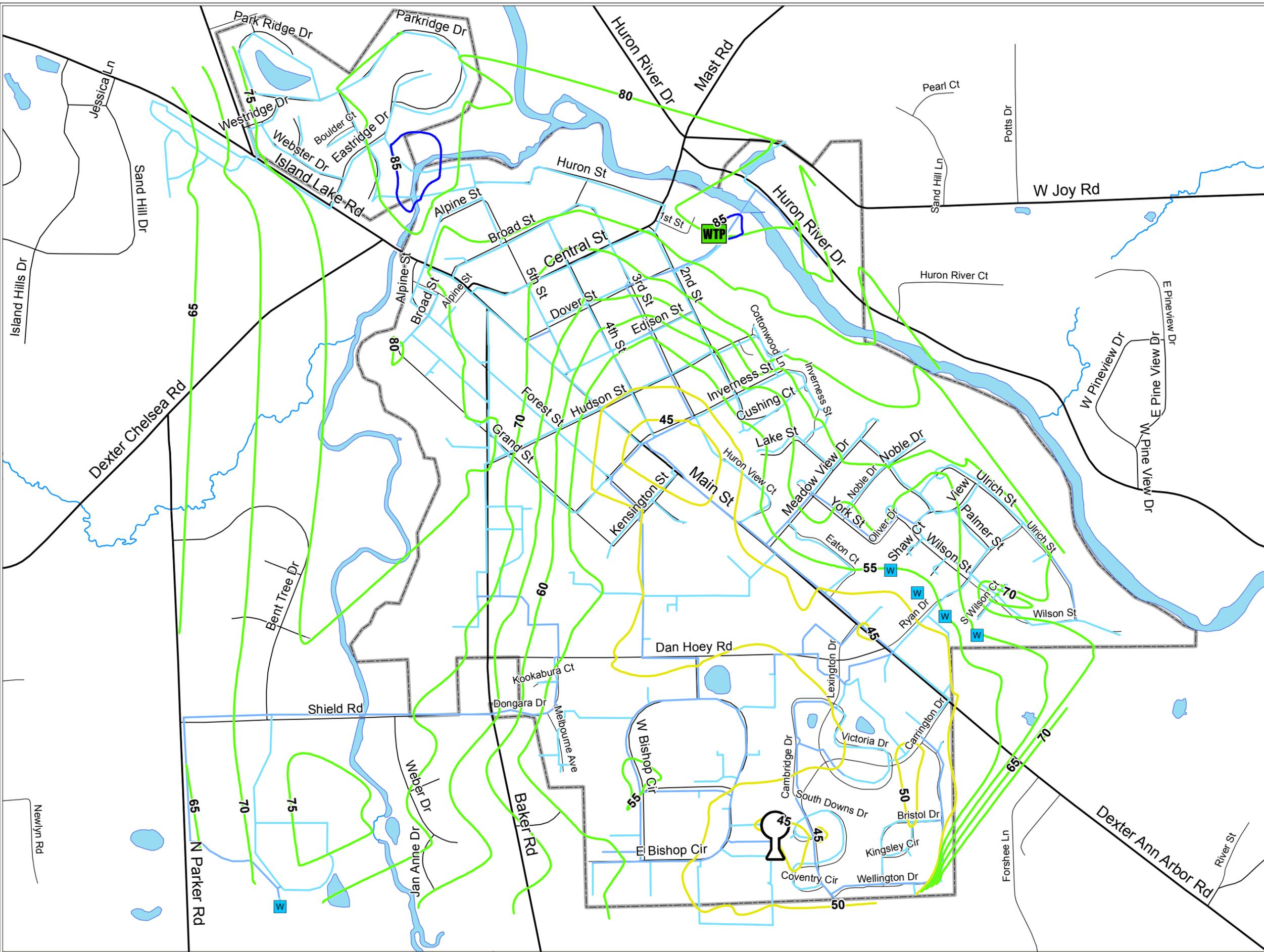




Figure E-3  
20-Year Peak Hour  
Pressure

**Legend**

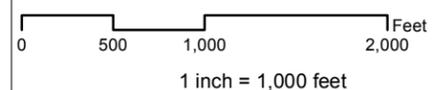
- Well
- Treatment
- EWST

**Water Main**

- 8" and smaller
- 10" and larger

**Modeled Pressure**

- Less than 20 psi (none)
- 25 - 35 psi (none)
- 40 - 50 psi
- 55 - 80 psi
- 85 - 100 psi
- Greater than 100 psi (none)



Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016

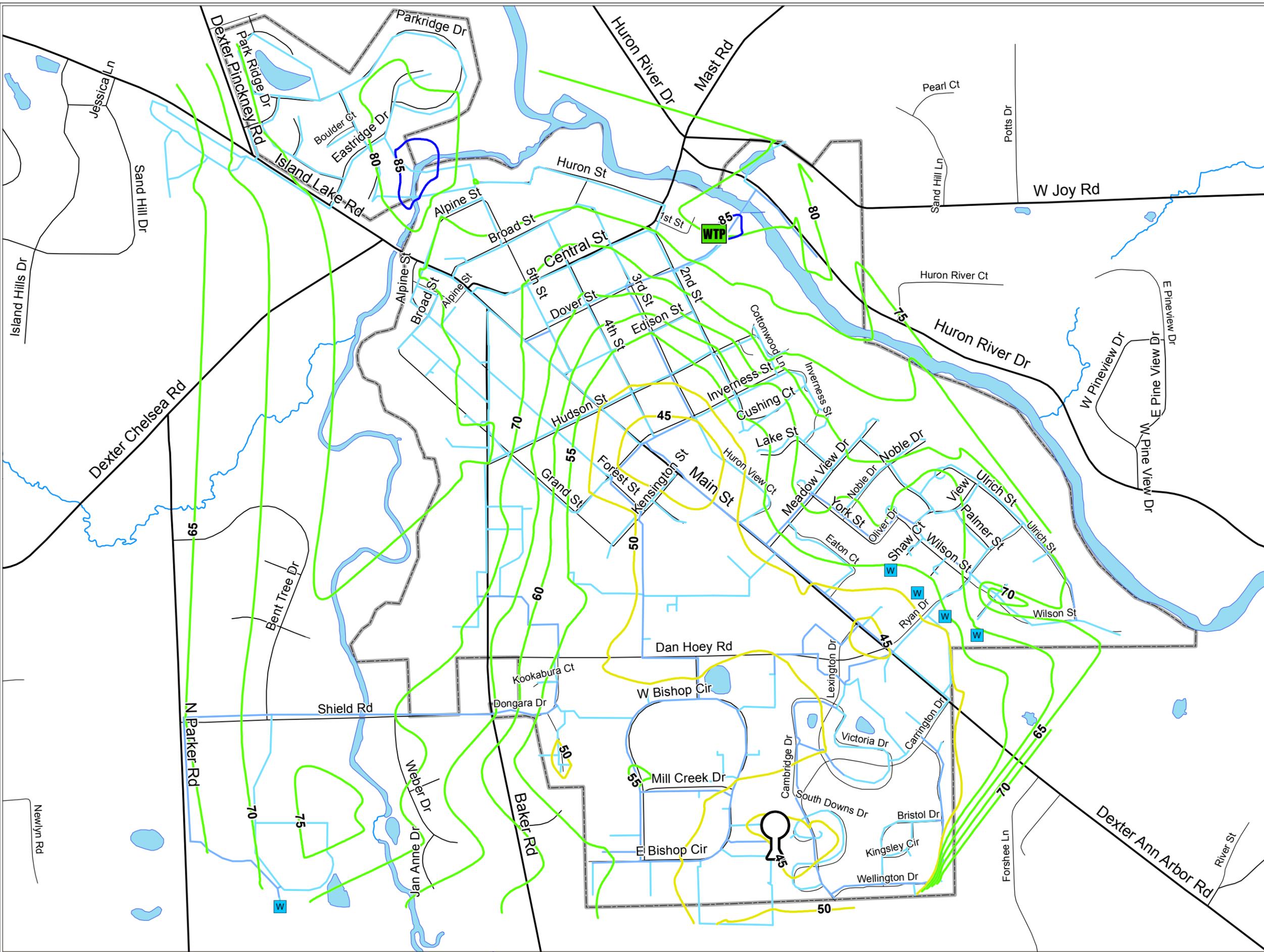
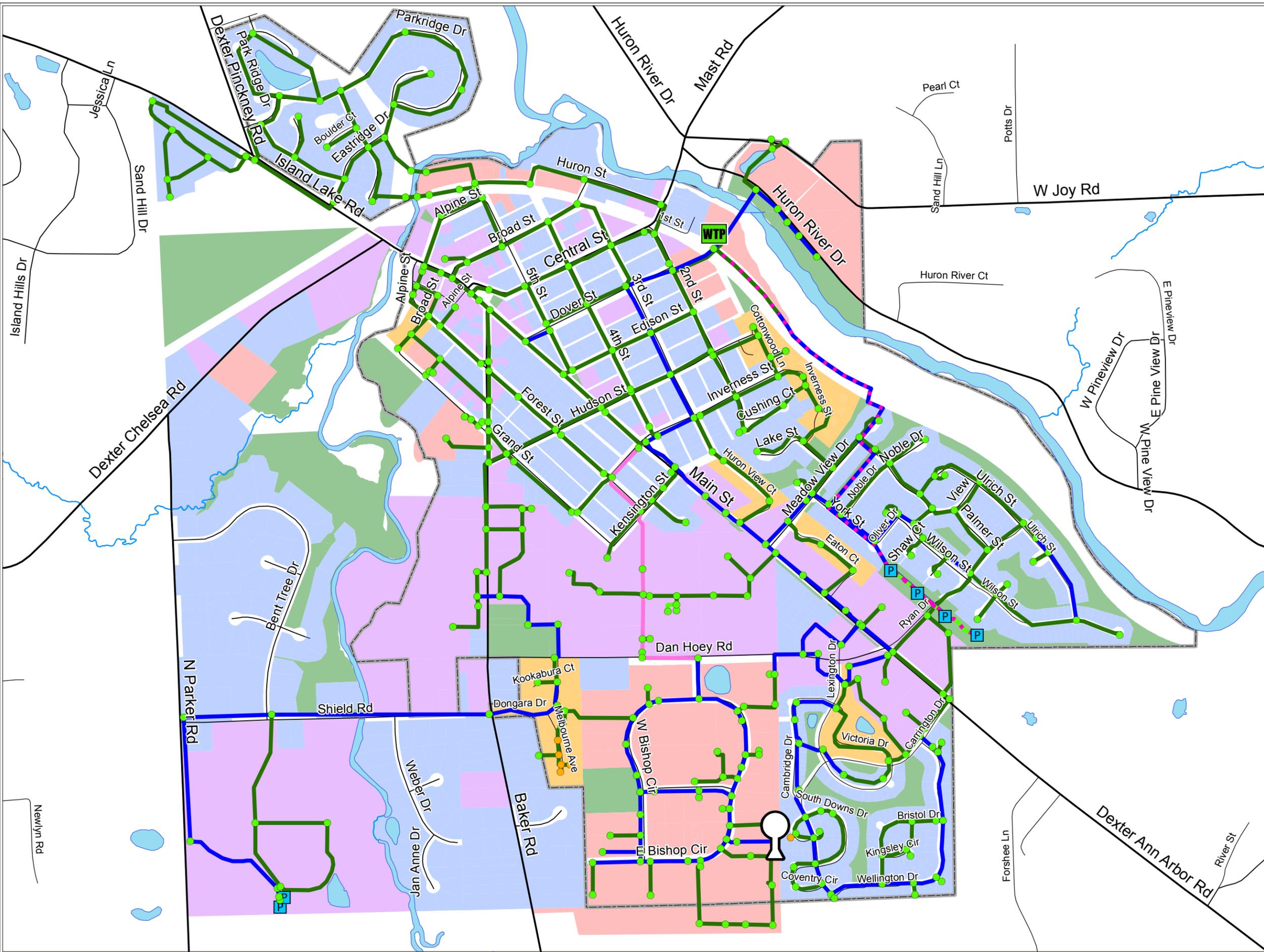




Figure E-4  
20-Year Fire Protection



**Legend**

**Water Main Size**

- 6"
- 8"
- 10"
- 12"
- 16"
- Raw Water Main

**Land Class (Fire Demand)**

- Open (1,000 gpm)
- Single Family (1,000 gpm)
- Multi-Family (1,500 gpm)
- Commercial (2,000 gpm)
- Industrial (3,500 gpm)

**Percent of Desired Fire Protection**

- Less than 50%
- 50 - 75%
- Greater than 75%

0 500 1,000 2,000 Feet  
1 inch = 1,000 feet

Source: Data provided by Washtenaw County and City of Dexter. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: September 1, 2016

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## Appendix F

### SEMCOG Data

# Community Profiles

YOU ARE VIEWING DATA FOR:

## City of Dexter

8140 Main St  
Dexter, MI 48130-1092  
<http://www.dextermi.gov/>



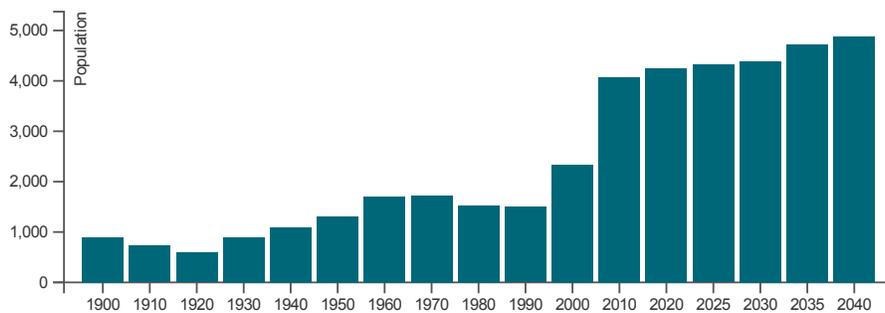
Census 2010 Population:  
4,067  
Area: 1.7 square miles

### Population and Households

Link to American Community Survey (ACS) Profiles:  **Social | Demographic**

**Population and Household Estimates for Southeast Michigan, December 2014**

### Population Forecast

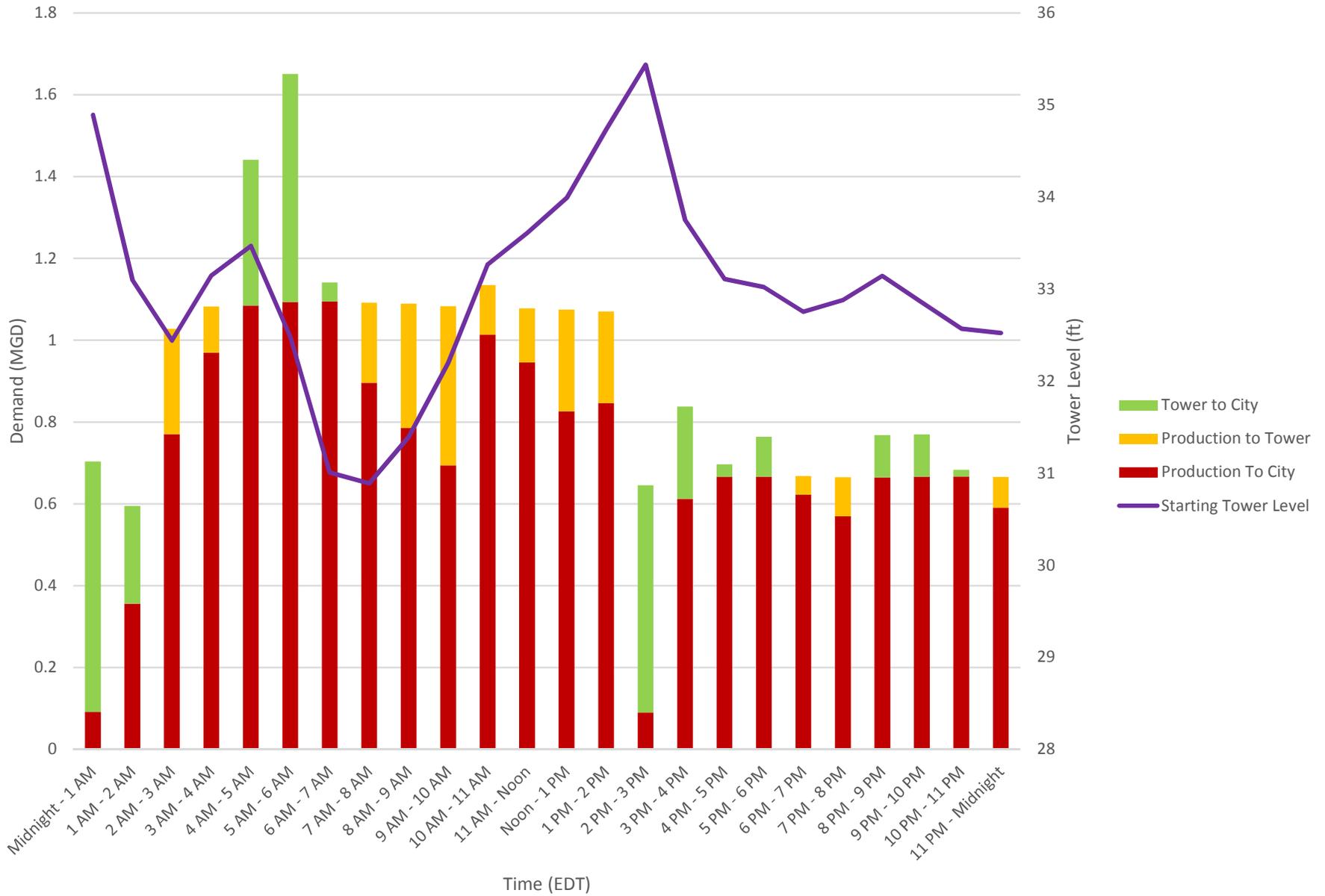


Source: **U.S. Census Bureau** and **SEMCOG 2040 Forecast** produced in 2012.

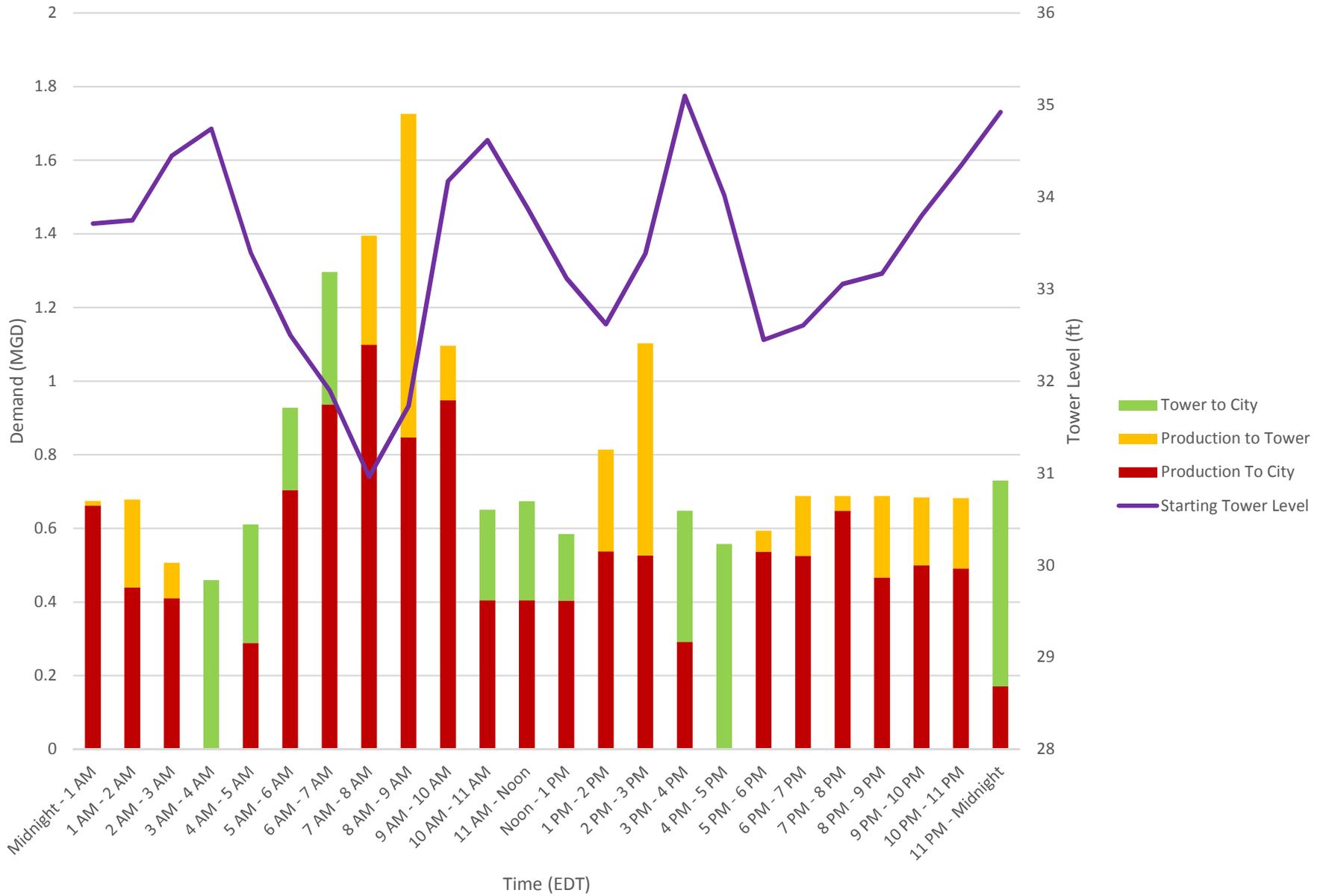
## Appendix G

### Peak Hour Demand Calculations

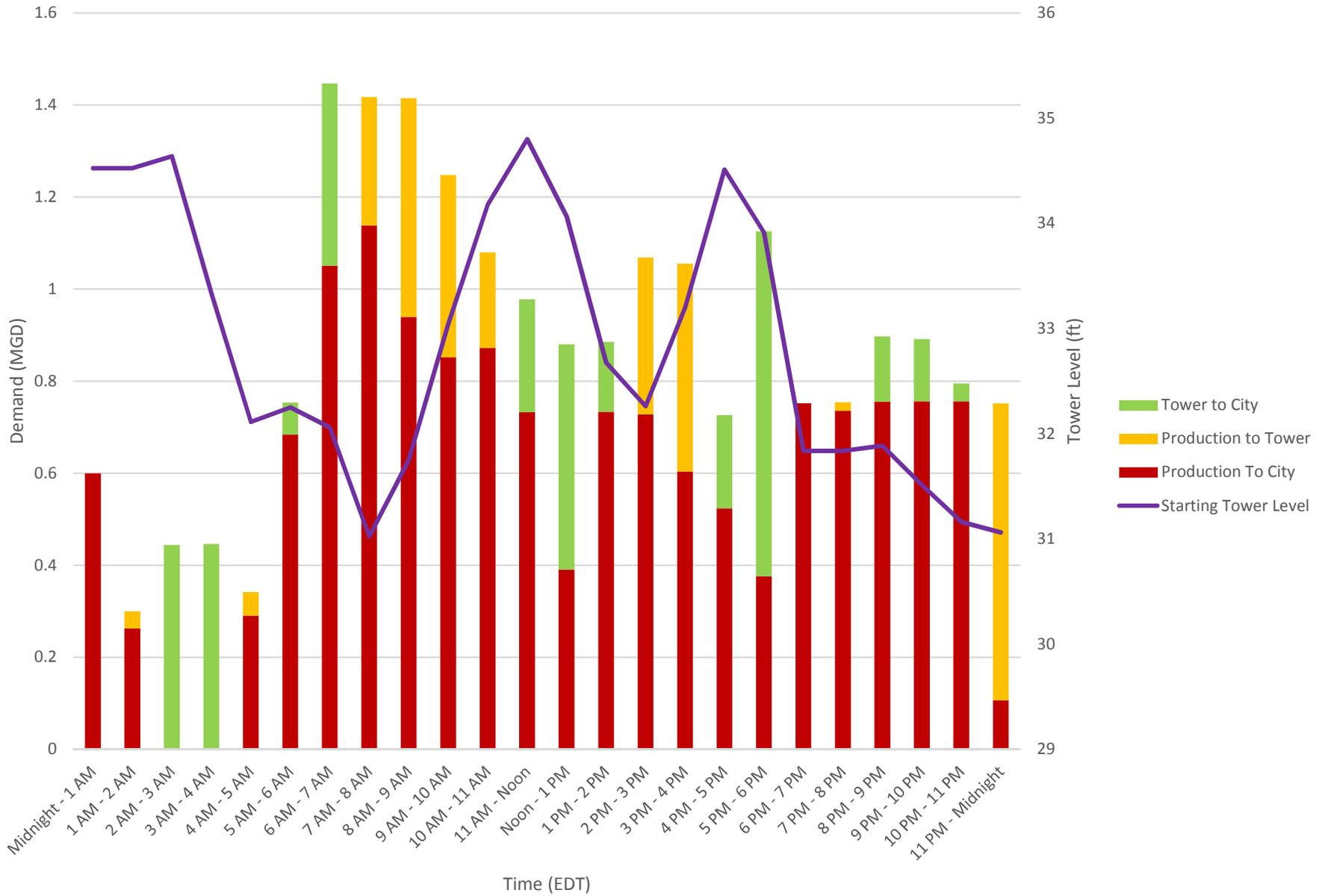
### Dexter Water Demand - 7/26/2013



### Dexter Water Demand - 8/8/2014



### Dexter Water Demand - 7/28/2015



## Appendix H

### 2015 Water Quality Report



# 2015 Drinking Water Quality Report

Dear Customer,

The City of Dexter is once again proud to present to you our Annual Drinking Water Quality Report.

## Why did you get this report?

Drinking water regulations require the City to make this information available to customers each year – it's the law!

## Why should you read it?

Let's face it – this report isn't going to end up on any Best Seller list. A lot of the wording is technical and mandated by law. However, the quality of our water is important, and we want to keep you informed. It can be useful in your everyday life, as well, if you have special health concerns, or just need to adjust the settings on your water softener.

## What does it contain?

This report uses data collected in 2015 to summarize information about your water supply sources, the water system facilities that deliver water to your tap, and the quality of your drinking water. Also included is information about programs underway that ensure that you have safe and dependable drinking water.

## Did we meet all our monitoring requirements in 2015?

We have continued to meet the challenge of providing you with a safe and dependable supply of quality drinking water which meets or exceeds the requirements set forth by the United States Environmental Protection Agency (USEPA) and Michigan Department of Environmental Quality (MDEQ).

## What if you have questions?

Please contact Water Utilities at (734) 426-4572 if you would like help understanding the information provided, or have questions about your drinking water. This report is also available online at [http://dextermi.gov/sites/dextermi.gov/files/client\\_files/documents/water\\_quality\\_report\\_2015.pdf](http://dextermi.gov/sites/dextermi.gov/files/client_files/documents/water_quality_report_2015.pdf).

## Get involved!

The City of Dexter Council meets at 7:30 p.m. on the 2<sup>nd</sup> and 4<sup>th</sup> Mondays of every month in the Dexter Senior Center at 7720 Ann Arbor Street, Dexter, Michigan.

### Quick Reference

#### WATER & SEWER UTILITIES

*Business Line*

(734) 426-4572

Office hours: 7am-330pm

*Emergency Water problems &  
Sewer Backups*

(734) 368-5212

24 hour phone line



### Quick Reference

#### DEXTER CITY OFFICE

(734) 426-8303

[www.dextermi.gov](http://www.dextermi.gov)

*For utility billing & taxes*

Office hours: 9am – 5pm

#### DEXTER PUBLIC WORKS

(734)426-8530

*General maintenance for  
streets, parks, and facilities*

# Water Quality Test Results

Each year, we constantly take water samples in order to determine the levels of any radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants that might be present. This report includes information on all regulated drinking water contaminants detected during the calendar year of 2015. Contaminants which were tested for, but not detected, are not included in this report. Some other contaminants are not required to be monitored every year because they change infrequently.

Regulated Parameter	Your Water Results	Results Range	EPA Limit (MCL, or MRDL)	EPA Goal (MCLG or MRDLG)	Likely Source
Alpha Emitters	1.4 pCi/L	N/A	15 pCi/L	0 pCi/L	Erosion of natural deposits
Arsenic	2 ppb	1 - 3 ppb	10 ppb	0 ppb	Erosion of natural deposits
Barium	0.15 ppm	N/A	2 ppm	2 ppm	Erosion of natural deposits
Chlorine	0.3 ppm	0.1 - 1 ppm	4 ppm	4 ppm	Water additive used to control microbes
Chromium	9 ppb	N/A	100 ppb	100 ppb	Erosion of natural deposits
Combined Radium	1.8 pCi/L	N/A	5 pCi/L	0 pCi/L	Erosion of natural deposits
Fluoride	0.7 ppm	0.5 - 1 ppm	4 ppm	4 ppm	Erosion of natural deposits, water additive for strong teeth
HAA5 (total haloacetic acids)	9 ppb *	0 - 6 ppb	60 ppb	N/A	By-product of drinking water disinfection
Nitrate	0.52 ppm	0.14 - 0.89 ppm	10 ppm	10 ppm	Fertilizer runoff, natural deposits, leaching septic tanks
Selenium	2 ppb	N/A	50 ppb	50 ppb	Erosion of natural deposits
TTHMs (total trihalomethanes)	35 ppb *	0 - 15 ppb	80 ppb	N/A	By-product of drinking water disinfection

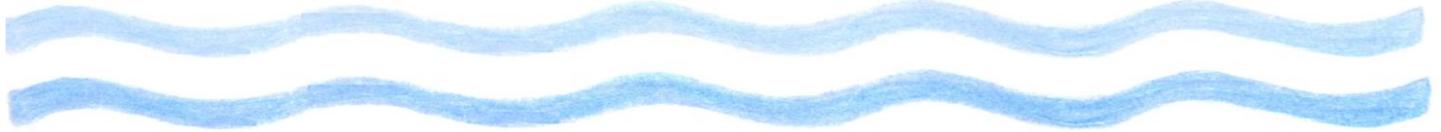
\*The EPA requires us to report HAA5 as a total of 5 tests, and TTHMs as a total of 4 tests.

## Lead and Copper in Drinking Water

Although there is no detectable lead in our source water, tests occasionally show low levels of lead and copper in household tap water. These are primarily caused by the corrosion of household plumbing systems. Elevated levels of lead can cause serious health problems, especially for pregnant women and young children. The City of Dexter is responsible for providing high quality drinking water, but cannot control the composition or condition of your home plumbing. You can minimize the potential for lead exposure by flushing your system before using the water for drinking or cooking. Just run your tap for thirty seconds to two minutes. If you are concerned about the lead levels in your home, you may wish to have your water tested. Information about lead in drinking water, testing methods, and the steps you can take to minimize your exposure is available from the **Safe Drinking Water Hotline (1-800-426-4791)** or at [www.epa.gov/safewater/lead](http://www.epa.gov/safewater/lead).

Regulated at the Customer's Tap	Your Water Results	Results Range	Action Level	EPA Goal (MCLG or MRDLG)	Likely Source
Lead	3 ppb	0 results above AL (22 tested)	15 ppb	0 ppb	Erosion of natural deposits, corrosion of plumbing systems
Copper	800 ppb	0 results above AL (22 tested)	1300 ppb	1300 ppb	Erosion of natural deposits, corrosion of plumbing systems

Other Parameters of Interest	Sample Average	Results Range	Likely Source
Chloride	73 ppm	61 - 84 ppm	Erosion of natural deposits, road runoff, industrial processes
Hardness	405 ppm	370 - 440 ppm	Erosion of natural deposits (multiply ppm by .058 to get grains/gallon)
Sodium	40 ppm	24 - 56 ppm	Erosion of natural deposits, road runoff, added by water softeners to remove hardness
Sulfate	43 ppm	19 - 66 ppm	Erosion of natural deposits, industrial processes



#### Terms used in this report:

- **Action Level (AL):** The concentrations of a contaminant which, if exceeded, triggers treatment or other requirements which the water system must follow.
- **Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs (goal) as feasible using the best available treatment technology.
- **Maximum Residual Disinfectant Level (MRDL):** The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **N/A:** Not applicable.
- **Not Detected:** Not detected at or above the minimum reporting level – laboratory analysis indicates that the constituent is not present.
- **pCi/L:** Picocuries per liter (a measure of radioactivity).
- **1 part per million (ppm) or milligrams per liter (mg/L)** corresponds to one minute in two years or a single penny in \$10,000. 1ppm – 1000 ppb.
- **1 part per billion (ppb) or micrograms per liter (µg/L)** corresponds to one minute in 2,000 years or a single penny in \$10,000,000.

#### You can receive news by email!

Are you interested in an easy way to stay current on City information and events? The **City Email Update** is sent out every two weeks, and includes details of upcoming events, project updates, due date reminders, and general news.

Just go to the City of Dexter homepage at [www.dextermi.gov](http://www.dextermi.gov). Click on the "I Want to" button at the top and select 'Receive the City Email Update' from the drop-down menu.

If you have any questions, send them to Courtney Nicholls at [cnicholls@DexterMI.gov](mailto:cnicholls@DexterMI.gov).

Thank you!

## Message from the EPA

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Michigan Department of Environmental Quality (MDEQ) prescribe regulations that limit the amount of certain contaminants allowed in the water we drink.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-suppressed persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA and CDC guidelines on appropriate means to lessen the risk of infections by *Cryptosporidium* and other microbiological contaminants are available from the **Safe Drinking Water Hotline (1-800-426-4791)**.

### Impurities that may be present in untreated water include:

1. Microbial contaminants, such as viruses and bacteria which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
2. Inorganic contaminants, such as salts and metals which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
3. Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
4. Organic chemical contaminants, including synthetic and volatile organic chemicals which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
5. Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

***Cryptosporidium*** is a protozoan parasite that is too small to be seen with a microscope. It is sometimes found in surface waters, especially when the waters contain a high amount of fecal waste from runoff or other activities. Those who are infected with this parasite can experience gastrointestinal illness. The USEPA and the Center for Disease Control (CDC) have published guidelines on ways to reduce the risk of *Cryptosporidium* infection. The guidelines are available from the **Safe Drinking Water Hotline (1-800-426-4791)**





## **Water Mandatory Outdoor Water Restrictions**

In an effort to protect our aquifers, conserve water resources, and help ease peak hour water demands, the City of Dexter has implemented mandatory outdoor water restrictions since 2013.

Outdoor water usage (watering lawns, washing cars, irrigation, etc.) is restricted to odd or even days based on your street address. Residents and businesses with odd-numbered addresses (addresses ending in 1, 3, 5, 7, or 9) are only allowed to water on odd-numbered days. Residents and businesses with even-numbered addresses (ending in 2, 4, 6, 8, or 0) may only water on even-numbered days.

Outdoor watering is also prohibited between 6 am and 10 am. Please adjust the start time(s) for your sprinkler or irrigation system accordingly.

We would like to thank you for your cooperation protecting and conserving our water resources.

### **Why do we have mandatory water restrictions?**

In 2012, Dexter used more water than ever before. This caused increased maintenance and infrastructure costs, and was draining one of our aquifers faster than it can recharge. Water use needed to be reduced, or Dexter risked running out of secure ground water.

People have traditionally watered early in the morning, between 6 am and 10 am. Since this is also the peak use time for other purposes, as people get up and start their day, it places a strain on the pumps that feed the water tower. If the pumps fall behind, water levels in the tower drop, which can result in low water pressure, 'red' water (water with a lot of rust in it), or not enough water being available in an emergency. Increased pumping also requires more electricity, which is most expensive during those same hours.

Reducing overall water use (the odd/even restrictions) will preserve our aquifers. Shifting outdoor water use to other times of day will protect our infrastructure, reduce costs, and ensure that you will get clear water when you want it.



## **From Source to Tap**

The City of Dexter strives to provide the best quality drinking water possible. This report is intended to provide you with useful information about your drinking water and satisfy United States Environmental Protection Agency (EPA) and Michigan Department of Environmental Quality (MDEQ) notification requirements.

### **Where does my water come from?**

Dexter's water comes from two well fields: one in Dexter Community Park, behind LaFontaine Chevrolet; the other behind the new Dexter High School, off Parker Road.

There are four wells in Dexter Community Park. These feed the filtration plant on Central Street. The water is filtered, fluoridated, iron is removed, orthophosphate is added for corrosion control, and disinfected. Then it is pumped into the City water tower for use by the public.

Water from the single well by Dexter High School is treated on-site. It is fluoridated, treated with polyphosphate for iron sequestration and corrosion control, disinfected, and pumped to the water tower for public use.

### **Protected Sources**

In 2003, the State of Michigan conducted tritium testing to determine the relative potential for contamination of our wells by surface pollutants. The Dexter aquifer was classified by the State as "not vulnerable" to casual contamination, and the Dexter Wellhead Program was instituted to help protect against other threats to our water supply.

### **Educational Information**

The sources of drinking water (both tap water and bottled water) include: rivers, lakes, streams, ponds, reservoirs, springs, and wells.

As water travels through the ground it dissolves naturally-occurring minerals and can pick up substances resulting from the presence of animals or from human activity. These include: microbial contaminants, such as viruses and bacteria; inorganic contaminants, such as salts and metals; organic chemical contaminants, pesticides, herbicides, and radioactive substances, which can be naturally-occurring.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants even after treatment. The presence of contaminants does not necessarily indicate that the water poses a health risk.

More information about the contaminants and potential health effects can be obtained by call the EPA's **Safe Drinking Water Hotline** at **(1-800-426-4791)**.

## Appendix I

### Pump Data

**PUMP DATA SHEET Turbine 60 Hz**

Company: Goulds Pumps  
 Name:  
 Date: 02/16/10

Customer:  
 Order No:

**High Service Pumps**



**Pump:**

Size: 9RCLC (6 stages)  
 Type: Lineshaft  
 Synch speed: 1800 rpm  
 Curve: E6409CFPC2  
 Specific Speeds: Ns: 2282  
 Pump Notes for Standard Sizes:  
 Suction Size-6" Discharge Sizes-5",6",8". Curves are certified for  
 water at 60°F only. Consult factory for performance with any other  
 fluid.  
 Vertical Turbine: Bowl size: 9.25 in  
 Max lateral: 0.88 in  
 Thrust K factor: 4.9 lb/ft

**Search Criteria:**

Flow: 400 US gpm Head: 240 ft

**Fluid:**

Water  
 SG: 1  
 Viscosity: 1.105 cP  
 NPSHa: --- ft  
 Temperature: 60 °F  
 Vapor pressure: 0.2563 psi a  
 Atm pressure: 14.7 psi a

**Motor:**

Standard: NEMA  
 Size: 40 hp  
 Speed: 1800  
 Sizing criteria: Max Power on Design Curve

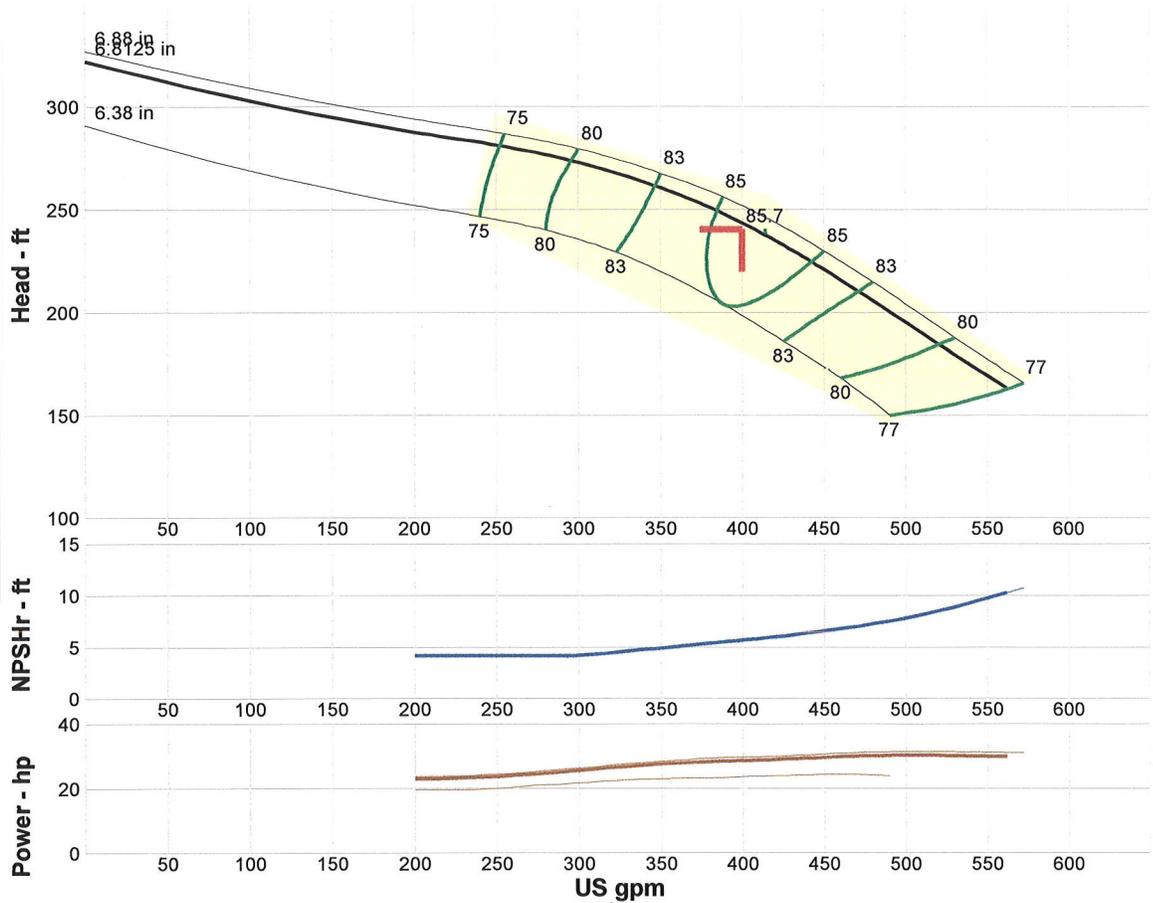
**Pump Limits for Standard Construction:**

Temperature: 120 °F Pressure: 400 psi g  
 Sphere size: --- in

**---- Data Point ----**  
 Flow: 400 US gpm  
 Head: 243 ft  
 Eff: 85.4%  
 Power: 28.7 hp  
 NPSHr: 5.7 ft

**-- Design Curve --**  
 Shutoff Head: 322 ft  
 Shutoff dP: 139 psi  
 Min Flow: --- US gpm  
 BEP: 85.7% eff  
 @ 414 US gpm  
 NOL Pwr: 30.3 hp  
 @ 520 US gpm

**-- Max Curve --**  
 Max Pwr: 31.4 hp  
 @ 530 US gpm



**Performance Evaluation:**

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
480	1770	206	82.5	30.2	7.33
400	1770	243	85.4	28.7	5.7
320	1770	268	81.4	26.5	4.53
240	1770	283	72.2	23.7	4.2
160	1770	---	---	---	---

PUMP DATA SHEET Submersible 60 Hz

Company: Preferred Pump & Equipment, L8ustomer:  
 Name:  
 Date: 03/10/10 Order No:

Well No. 5 Pump



**Pump:**

Size: 9RCLC (6 stages)  
 Type: Submersible  
 Synch speed: 1800 rpm  
 Curve: E6409CFPC1  
 Specific Speeds: Ns: 2290  
 Pump Notes for Standard Sizes:  
 Discharge Sizes-5",6",8"  
 Vertical Turbine:  
 Bowl size: 9.25 in  
 Max lateral: 0.88 in  
 Thrust K factor: 4.9 lb/ft

**Search Criteria:**

Flow: 340 US gpm Head: 232 ft

**Fluid:**

Water  
 Density: 62.25 lb/ft³  
 Viscosity: 1.105 cP  
 NPSHa: --- ft  
 Temperature: 60 °F  
 Vapor pressure: 0.2563 psi a  
 Atm pressure: 14.7 psi a

**Motor:**

Standard: NEMA  
 Size: ~~30~~ <sup>40</sup> hp  
 Speed: 1800

**Pump Limits for Standard Construction:**

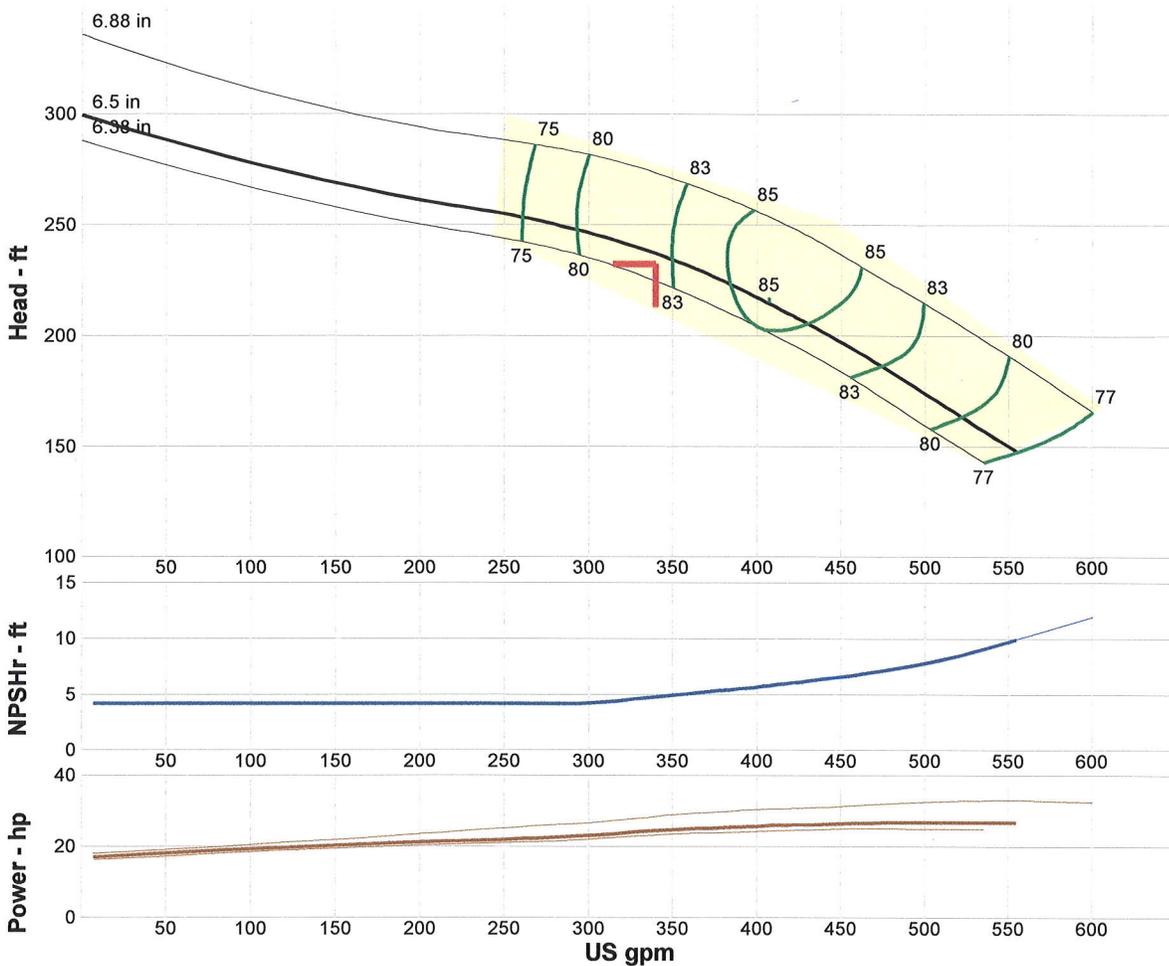
Temperature: 120 °F Pressure: 400 psi g  
 Sphere size: 0.56 in

Sizing criteria: Max Power on Design Curve

**--- Data Point ---**  
 Flow: 340 US gpm  
 Head: 236 ft  
 Eff: 82.5%  
 Power: 24.6 hp  
 NPSHr: 4.82 ft

**-- Design Curve --**  
 Shutoff Head: 300 ft  
 Shutoff dP: 129 psi  
 Min Flow: --- US gpm  
 BEP: 85% eff  
     @ 407 US gpm  
 NOL Pwr: 26.9 hp  
     @ 554 US gpm

**-- Max Curve --**  
 Max Pwr: 33.1 hp  
     @ 550 US gpm



**Performance Evaluation:**

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
408	1770	214	85	25.9	5.83
340	1770	236	82.5	24.6	4.82
272	1770	251	76.8	22.5	4.2
204	1770	261	62.9	21.3	4.2
136	1770	273	42.5	19.9	4.2

**OFFICE OF THE CITY MANAGER**

8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

---

**Memorandum**

**To:** Mayor Keough and City Council  
**From:** Courtney Nicholls, City Manager  
**Re:** Discussion of: PUD Amendment Process  
**Date:** October 5, 2016

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Mayor Keough asked that information on the PUD amendment process and the information from Peter's Building Co. on the PUD amendment be included in the agenda packet for October 10, 2016.

5. Dwelling unit owners shall pay their prorate share of the costs and this requirement shall be specified in the covenants. Assessments levied by the Association may become a lien on the individual properties.

### **Section 19.13 AMENDMENT AND REVISION**

- A. A developer may request a change in an approved area plan, an approved preliminary site plan, or an approved final site plan. A change in an approved preliminary or final site plan, which is determined by the Zoning Administrator to be a major change, as defined in this section, shall require an amendment to the approved area plan. All amendments shall follow the procedures and conditions herein required for original submittal, review, and approval, including a public hearing and notification. A change, which results only in a minor change as defined in this Section and as determined by the Zoning Administrator, shall only require a revision to the approved plan and may be approved by the City Zoning Administrator after notification to the Planning Commission and City Council and provided the minor change will not significantly alter the PUD as approved by the City Council, including the appearance of the development and further provided that such change is minor as defined in this Section 19.13.
- B. A request for an amendment shall be made in writing to the Zoning Administrator and shall clearly state the reasons therefore. Such reasons shall be based upon considerations such as changing social or economic conditions, potential improvements in layout or design features, unforeseen difficulties, or advantages mutually affecting the interest of City of Dexter and the developer, such as technical causes, site conditions, state or federal projects and installations, and statutory revisions. Following payment of the appropriate fee, the developer shall submit the required information to the Zoning Administrator for review.
- C. Changes to be considered major, for which amendment is required pursuant to the procedures and conditions as required for the original submittal as set forth in this Article XIX, shall include one or more of the following:
  1. Change in concept of the development.
  2. Change in use or character of the development.
  3. Change in type of dwelling unit as identified on the approved area plan.
  4. Increase in the number of dwelling units.
  5. Increase and/or decrease in nonresidential floor area of over five (5) percent.
  6. Increase and/or decrease in gross floor area or floor area ratio of the entire PUD of more than one (1) percent.

7. Rearrangement of lots, blocks, and building tracts.
  8. Change in the character or function of any street.
  9. Reduction in land area set aside for common open space or the relocations of such area(s).
  10. Horizontal and/or vertical elevation changes of five (5) percent or more.
- D. Minor changes shall include the following:
1. A change in residential floor area.
  2. An increase in nonresidential floor area of five (5) percent or less.
  3. Horizontal and/or vertical elevation changes of five (5) percent or less.
  4. Designated "Areas not to be disturbed" or open space may be increased.
  5. Plantings approved in the Final PUD Landscape Plan may be replaced by similar types of landscaping on a one-to-one or greater basis.
  6. Changes to building materials to another higher quality material.
  7. Changes in floor plans, which do not alter the character of the use.
  8. Slight modification of sign placement or reduction of size.
  9. Minor variations in layout, which do not constitute major changes.
  10. An increase in gross floor area or floor area ratio of the entire PUD of one (1) percent or less.
- E. The Zoning Administrator shall have authority to determine whether a requested change is major or minor, in accordance with this section. The burden shall be on the applicant to show good cause for any requested change. Upon approval, revised drawings shall each be signed by the petitioner and the owner(s) of record or the legal representative(s) of said owner(s) and submitted for the record.

## **Section 19.14 EXPIRATION OF PLAN APPROVALS**

- A. An area plan or a preliminary site plan, where applicable, shall expire two (2) years after approval unless a final site plan for the first phase of the project, or for the entire property in the PUD if development is not to occur in phases, is submitted to



The City of  
**DEXTER**  
Michigan

Michigan

**OFFICE OF COMMUNITY DEVELOPMENT**

8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

**MAJOR OR MINOR SITE PLAN AMENDMENT REQUEST**

\$300.00

Rec# 59035  
Date: 9/23/2016

*[Handwritten initials]*  
*[Handwritten \$300]*

APPLICANT/OWNER: Peters Building Co., James G. Haeussler, President

APPLICANT OWNER SIGNATURE: *[Handwritten Signature]*

PROJECT NAME/ZONING: PUD

ADDRESS: 172 S. Industrial Drive, P.O. Box 577, Saline, MI 48176

EMAIL ADDRESS: jhaeussler@petersbuilding.com

PHONE/FAX: Office (734) 429-4200 Cell (734) 260-9678 Fax (734) 429-2678

1. **MAJOR AMENDMENT (Per Section 19.13) check all that apply**

- Change in concept of the development.
- Change in use or character of the development.
- Change in type of dwelling unit as identified on the approved area plan.
- Increase in the number of dwelling units.
- Increase and/or decrease in nonresidential floor area of over five (5) percent.
- Increase and/or decrease in gross floor area or floor area ratio of the entire PUD of more than one (1) percent.
- Rearrangement of lots, blocks, and building tracts.
- Change in the character or function of any street.
- Reduction in land area set aside for common open space or the relocations of such area(s).
- Horizontal and/or vertical elevation changes of five (5) percent or more.

OR

**MINOR AMENDMENT (PER Section 19.13) check all that apply**

- A change in residential floor area.
- An increase in nonresidential floor area of five (5) percent or less.
- Horizontal and/or vertical elevation changes of five (5) percent or less.
- Designated "Areas not to be disturbed" or open space may be increased.
- Plantings approved in the Final PUD Landscape Plan may be replaced by similar types of landscaping on a one-to-one or greater basis.
- Changes to building materials to another higher quality material.
- Changes in floor plans, which do not alter the character of the use.
- Slight modification of sign placement or reduction of size.
- Minor variations in layout, which do not constitute major changes.
- An increase in gross floor area or floor area ratio of the entire PUD of one (1) percent or less.

2. Description of the Proposed Amendment: (attach separate narrative if necessary): \_\_\_\_\_  
 Minor Amendment - Increase In Lot Coverage For PUD R1-B From \_\_\_\_\_  
 30% to 34% For The Following Units: #66,#112,#115,#128,#195.  
 \_\_\_\_\_  
 \_\_\_\_\_

3. Reasons why the amendment is being requested, the burden shall be on the applicant to show good cause for any requested change: (changing social or economic conditions, potential improvements in layout or design features, unforeseen difficulties or advantages mutually affecting the interest of the City and the developer such as technical causes, site conditions or state or federal projects and installations or statutory revisions): \_\_\_\_\_  
 See Attached Information  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

4. Additional Information: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\*\* The Community Development Director shall have authority to determine whether a requested change is major or minor, in accordance with the ordinance. The burden shall be on the applicant to show good cause for any requested change. Upon approval, revised drawings shall each be signed by the petitioner and the owner(s) of record or the legal representative(s) of said owner(s) and submitted for the record.

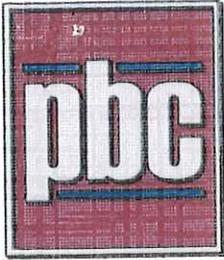
*For Office Use Only*

Planning Commission Notification/Action \_\_\_\_\_  
 City Council Notification/Action \_\_\_\_\_

\_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ Date: \_\_\_\_\_

REASONS FOR DENIAL:	CONDITIONS OF APPROVAL:

APPROVAL STAMP



**PETERS BUILDING CO.**

172 S. INDUSTRIAL DRIVE • P.O. BOX 577  
SALINE, MICHIGAN 48176  
www.petersbuilding.com

(734) 429-4200

FAX: (734) 429-2678

RESIDENTIAL • COMMERCIAL • DEVELOPMENT

To: Michelle Aniol, Zoning Administrator  
From: Peters Building Co. - James G. Haeussler, President  
Date: 9/23/2016  
Re: Dexter Crossing PUD Minor Amendment Ordinance  
Increase In Lot Coverage Ratio From 30% to 34%

**PUD Planning And Development Regulations For Planned Units Development Districts  
Section 19.13 - Amendment and Revision (current ordinance as amended in 2007)**

A developer may request a change in an approved area plan, an approved preliminary site plan, or an approved final site plan. A change, which results only in a minor change as defined in this Section and as determined by the Zoning Administrator, shall only require a revision to the approved plan and may be approved by the City Zoning Administrator after notification to the Planning Commission and the City Council and providing the minor change will not significantly alter the PUD as approved by City Council, including the appearance of the development & further provided that such change is minor as defined in this Section 19.13.

**We respectfully request consideration for a minor amendment to increase the lot coverage ratio from 30% to 34% for the following five units 66, 112, 115, 128, 195. If approved the increased lot coverage ratio will allow for a ranch or a two-story floorplan with a reasonable sized deck consistent with other homes in the subdivision without exceeding the revised lot coverage ratio.**

In a review of approved decks in Dexter Crossing the average deck is just under 300 sq.ft. with 15% over 400 sq. ft., 30% over 300 sq.ft., 35% over 200 sq.ft., 20% under 200 sq.ft. Enclosed is the map and the details for the remaining units in Dexter Crossing that Peters Building Co. controls. Eleven (11) of the units do not require an increase in the lot coverage ratio based on the square footage of the units. With their configuration of the building envelope the majority of the units only accommodate a two-story home which does not require as large a foot print as a ranch home.

For a comparison approach on the units being considered for the PUD minor amendment we utilized either a ranch or two story home and a 10 x 20 deck with steps. Depending on the elevations we utilized 220 sq.ft. deck for standard elevations and 275 sq.ft. for walkout elevations.

Unit #	Unit Address	Lot Sq.Ft.	Footprint	Lot %	Deck	Lot %
66	3544 Lexington Circle	8312 sq.ft.	2409 sq.ft.	28.98%	275 sq.ft.	32.24%
112	465 Preston Circle	5983 sq.ft.	1650 sq.ft.	27.57%	220 sq.ft.	33.25%
115	475 Preston Circle	6394 sq.ft.	1650 sq.ft.	25.81%	220 sq.ft.	29.24%
128	3652 S. Downs Drive	7738 sq.ft.	2172 sq.ft.	28.06%	275 sq.ft.	31.62%
195	511 Coventry Circle	6525 sq.ft.	1864 sq.ft.	28.56%	275 sq.ft.	32.78%

Note: Lot 198 was part of the 2005 minor amendment with a lot coverage ratio of 35%

**Page 2:**

If the minor amendment is granted it would not be our intention to allow the foot print of the home to increase over 30% of the lot coverage. A lot coverage ratio increase to 34% would give the future homeowners the ability to add a reasonable sized porch or deck consistent with the other homes already built in the subdivision.

Thanking you in advance for the opportunity under the PUD Planning Ordinance to bring forth this request that will benefit the homeowners as well as the Dexter Crossing subdivision. For questions or if any additional information is required for the PUD minor amendment I may be reached daily at (734) 429-4200 or on my cell at (734) 260-9678.

## Article XIX

# PUD PLANNING AND DEVELOPMENT REGULATIONS FOR PLANNED UNIT DEVELOPMENT DISTRICTS (Excerpt)

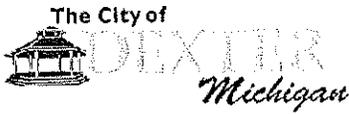
### Current Ordinance (after 2007 amendment):

#### Section 19.13 AMENDMENT AND REVISION

- A. A developer may request a change in an approved area plan, an approved preliminary site plan, or an approved final site plan. A change in an approved preliminary or final site plan, which is determined by the Zoning Administrator to be a major change, as defined in this section, shall require an amendment to the approved area plan. All amendments shall follow the procedures and conditions herein required for original submittal, review, and approval, including a public hearing and notification. A change, which results only in a minor change as defined in this Section and as determined by the Zoning Administrator, shall only require a revision to the approved plan and may be approved by the City Zoning Administrator after notification to the Planning Commission and City Council and provided the minor change will not significantly alter the PUD as approved by the City Council, including the appearance of the development and further provided that such change is minor as defined in this Section 19.13.
- B. A request for an amendment shall be made in writing to the Zoning Administrator and shall clearly state the reasons therefore. Such reasons shall be based upon considerations such as changing social or economic conditions, potential improvements in layout or design features, unforeseen difficulties, or advantages mutually affecting the interest of City of Dexter and the developer, such as technical causes, site conditions, state or federal projects and installations, and statutory revisions. Following payment of the appropriate fee, the developer shall submit the required information to the Zoning Administrator for review.
- C. Changes to be considered major, for which amendment is required pursuant to the procedures and conditions as required for the original submittal as set forth in this Article XIX, shall include one or more of the following:
1. Change in concept of the development.
  2. Change in use or character of the development.
  3. Change in type of dwelling unit as identified on the approved area plan.
  4. Increase in the number of dwelling units.
  5. Increase and/or decrease in nonresidential floor area of over five (5) percent.
  6. Increase and/or decrease in gross floor area or floor area ratio of the entire PUD of more than one (1) percent.

***PUD Planning and Development Regulations  
for Planned Unit Development Districts***

7. Rearrangement of lots, blocks, and building tracts.
  8. Change in the character or function of any street.
  9. Reduction in land area set aside for common open space or the relocations of such area(s).
  10. Horizontal and/or vertical elevation changes of five (5) percent or more.
- D. Minor changes shall include the following:
1. A change in residential floor area.
  2. An increase in nonresidential floor area of five (5) percent or less.
  3. Horizontal and/or vertical elevation changes of five (5) percent or less.
  4. Designated "Areas not to be disturbed" or open space may be increased.
  5. Plantings approved in the Final PUD Landscape Plan may be replaced by similar types of landscaping on a one-to-one or greater basis.
  6. Changes to building materials to another higher quality material.
  7. Changes in floor plans, which do not alter the character of the use.
  1. Slight modification of sign placement or reduction of size.
  9. Minor variations in layout, which do not constitute major changes.
  10. An increase in gross floor area or floor area ratio of the entire PUD of one (1) percent or less.
- E. The Zoning Administrator shall have authority to determine whether a requested change is major or minor, in accordance with this section. The burden shall be on the applicant to show good cause for any requested change. Upon approval, revised drawings shall each be signed by the petitioner and the owner(s) of record or the legal representative(s) of said owner(s) and submitted for the record.



**OFFICE OF COMMUNITY DEVELOPMENT**

8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

**STAFF REPORT**

**To:** Mayor Keough and City Council  
Courtney Nicholls, City Manager

**From:** Michelle Aniol, Community Development Manager

**Date:** September 20, 2016

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**ZBA UPDATES**

- The ZBA considered two cases on September 19, 2016 and took the following action:
  - o The first case called for a 1.3-foot variance from Section 3.02, sub-section E of the City of Dexter Zoning Ordinance, to allow a detached accessory structure to be 8.7 feet from a principal structure (i.e. the house), for property at 8058 Huron Street. Following the public hearing and a thorough discussion, the ZBA, in a 3-2 split vote, granted the requested variance, subject to a 4-foot unobstructed distance be maintained between the shed and the existing planter. The Board cited substantial justice and extraordinary circumstances as contributing to their decision. A copy of the decision accompanies this report.
  - o The second case, called for a variance to increase the maximum lot coverage by 2%, from 30% to 32%, for property at 3544 Lexington. The request was made to facilitate the construction of a 14-foot x 14-foot deck and stairway. Following the public hearing and a thorough discussion, the ZBA voted unanimously to deny the requested variance. The Board cited no practical difficulty, no extraordinary circumstances, and no substantial justice. A copy of the decision accompanies this report.

During its deliberation, the Board questioned whether this issued would be better handled through an amendment to the Dexter Crossing PUD, as it was in 2005.

As Council will recall, in 2005 Peter's Building Company requested and obtained an amendment to the Area Plan for Dexter Crossing Residential, to allow the maximum lot coverage to be 35%, for the following 5 lots:

- a) 193 (515 Coventry)
- b) 194 (513 Coventry)
- c) 198 (505 Coventry)
- d) 201 (499 Coventry)
- e) 214 (3635 South Downs)

The size of the lots ranged from 6,387 square feet to 6,829 square feet. In granting the amendment to the PUD, the Planning Commission and Village Council determined these lots were substantially smaller than the minimum lot area required in the R-1B districts. The lot size for 3544 Lexington is 8,312 square feet.

It may be helpful to remember that when Dexter Crossing was developed, the emphasis was on smaller, narrower lots, clustered together to maximize and preserve open space. The housing type being developed at that time was predominately single family 2-story detached structures, which could fit on a narrower lot. Over the last twenty years, as baby boomers matured and became empty nesters, and subsequently retirees, the trend has shifted from 2-story homes to single story ranch homes. The width and square footage of a

ranch home is generally greater than the width and square footage of a 2-story colonial home.

Mr. Haeussler contacted staff the following morning regarding the process for requesting an amendment to the Dexter Crossing PUD. Staff explained that unlike in 2005, when the Planning Commission had the authority to determine whether a requested change to an approved area, preliminary or final site plan was major or minor, the ordinance was amended in 2007 to give the Zoning Administrator that responsibility (Section 19.13). Furthermore, if the requested change is determined to be minor, the Zoning Administrator has the authority to approve the change, after notification to the Planning Commission and City Council. Lastly, in 2005 the Planning Commission determined the above cited PUD amendment was considered a minor change. A copy of the current and former standards in Section 19.13 accompanies this report.

Mr. Haeussler indicated he would be submitting a change request by Friday, September 23<sup>rd</sup>.

### MISCELLANEOUS UPDATES

- On Monday, September 14, 2016 the state legislature sent the following bills to the Governor:
  - 1) HB 4210 would amend the current Medical Marijuana Act to legalize the manufacture and use of marijuana-infused products
  - 2) HB 4209 would legalize and regulate the sale of medical marijuana through dispensaries, and
  - 3) HB 4827 would establish a licensing and regulation framework for medical marijuana growers, processors, secure transporters, provisioning centers, and safety compliance facilities (i.e. a "seed-to-sale" tracking system for medical marijuana).

HB 4209 and 4827 are tie-barred to each other, meaning neither could take effect unless both are enacted. As of the date of this report, the Governor had not signed the legislation into law.

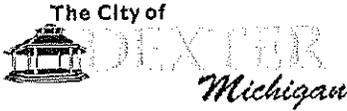
According to the legislative analysis by the House Fiscal Agency, HB 4209 would allow a municipality to enact an ordinance to authorize one or more types of marijuana facilities, and limit the number of each type of facility, within its boundaries; charge an annual local licensing fee up to \$5,000; and enact other ordinances related to marijuana facilities such as zoning ordinances. *A facility could not be licensed unless an authorizing ordinance has been adopted.*

Municipalities adopting authorizing ordinance must approve each applicant for a new state operating license before the Medical Marijuana Licensing Board can consider an application. Information obtained by the municipality from an applicant for this purpose would be exempt from FOIA requests.

Copies of the bills are provided separately from your physical packet, for your reading pleasure. You can also access the pending legislation and review legislative analyses on the Michigan Legislatures website:

[https://www.legislature.mi.gov/\(S\(12yy4txbt3n1zaibk3vhkvcz\)\)/mileg.aspx?page=Home](https://www.legislature.mi.gov/(S(12yy4txbt3n1zaibk3vhkvcz))/mileg.aspx?page=Home)

- Staff attended an on-site meeting between Steve Brouwer (Grandview Commons), Dominic Ramono (MEDC CAT), Nathan Voght (Washtenaw County Brownfield Coordinator), and AKT Peerless (Brownfield Consultant for Grandview Commons), on Thursday, September 15<sup>th</sup>. The purpose of the meeting with Dominic up-to-speed on the project. Our previous CAT representative left MEDC earlier this summer.
- Staff will be out of the office on Friday, September 23<sup>rd</sup>, and will return Monday, September 26<sup>th</sup>.



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**NOTICE OF DECISION**

**TO:** City Council and Planning Commission  
**FROM:** Michelle Aniol, Community Development Director  
**DATE:** September 20, 2016  
**RE:** **ZBA #2016-05, 3544 Lexington – Variance to increase maximum lot coverage**  
**Applicant: Elizabeth Ritter**  
**Property Owner: Peters Building Company**

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On September 19, 2016 the Zoning Board of Appeals conducted a public hearing to consider a variance request, submitted by Elizabeth Ritter for property located at 3544 Lexington (08-08-08-260-066). Ms. Ritter requested the following variance from Section 20.01, Schedule of Regulations of the City of Dexter Zoning Ordinance, to allow the construction of a 14-foot by 14-foot deck:

1. A variance to increase the maximum lot coverage from 30% to 32%

The applicant cites practical difficulties associated with the property. A copy of application and staff's review accompany this decision.

The following ZBA members were present: Phil Mekas, Chairman, Jon Rush, Chris Wallaker, Zach Michels and Marni Schmid.

The applicant was represented by the property owner and builder, Jim Haeussler, of Peters Building Company.

Staff provided the following information before reviewing the criteria for considering a variance:

- **Zoning:** The subject site is located on the south side of Lexington Court. The subject site, and all adjacent property is zoned Dexter Crossing Planned Unit Development (PUD) with an underlying zoning of R-1B, One Family Residential – Small Lot. Improvements, such as a deck, are permitted, subject to yard setbacks and maximum lot coverage requirements. According to Section 20.01, Schedule of Regulations for Principal Buildings – Residential, the maximum lot coverage in the R-1B District is 30%.
- **Background:** In the 2005, Peter's Building Company requested and obtained an amendment to the Area Plan for Dexter Crossing Residential, to allow the maximum lot coverage to be 35%, for the following 5 lots:
  - a) 193 (515 Coventry)
  - b) 194 (513 Coventry)
  - c) 198 (505 Coventry)
  - d) 201 (499 Coventry)
  - e) 214 (3635 South Downs)

The size of the lots ranged from 6,387 square feet to 6,829 square feet. In granting the amendment to the PUD, the Planning Commission and Village Council determined these lots were substantially smaller than the minimum lot area required in the R-1B districts.

In addition, that same year the Zoning Board of Appeals granted a variance to the homeowner of lot 129 (3656 South Downs), to allow a maximum lot coverage not to exceed 34%. The variance was granted based upon findings of substantial justice and extraordinary circumstances. The homeowner suffered from multiple sclerosis, the yard was not level enough for the wheelchair to maneuver easily, and a larger deck was needed to accommodate his wheelchair. The area of the lot in this case was 7,244 square feet, which is 556 square feet less than the minimum lot area required in the R-1B District.

Mr. Haeussler gave a brief presentation in which he clarified that Peters Building Company is the owner of the property, and built the house for the applicant. Peters was not the developer of Dexter Crossing. Mr. Haeussler also addressed the 2005 PUD amendment, and said it was a proactive measure. He stated that this situation was a mistake, and regretted that it wasn't caught sooner. He stated the applicant hired another company to build the deck, and that Peters Building Company did not specifically create this problem, except that "we" built the house for a homeowner that lived in California.

Mr. Haeussler distributed a handout from another ZBA Case (2014-05), which pertained to a lot in Dexter Crossing, in which a setback variance was requested, and was granted. He also distributed another handout of photos of houses with elevated decks in the vicinity of the subject property, to show that an elevated deck would be consistent with current conditions. He reiterated that no one did anything deliberately to cause this situation.

The Board questioned if an amendment to the PUD for Dexter Crossing should have been the next step.

Chairman Mekas opened the public hearing at 8:36 pm. Comments from the public included the following:

- Kate Stafford, 6867 Wellington Drive stated she serves on the Dexter Crossing Homeowners Association (HOA) Board and spoke in support of the variance.
- Gary Northrup, 6924 Wellington Drive, stated the applicant is his sister-in-law and that he was speaking on her behalf. He stated that the applicant does not blame Peter's Building Company for the mistake and does not want to see the applicant punished for the oversight. He asked the ZBA to grant the variance.

Comments from the ZBA, after the public hearing, included the following:

- Mr. Haeussler was asked what he considered a self-created practical difficulty. Mr. Haeussler stated it was something where there was not deliberate or intention to create.
- What if I'm building a house and I max out the 2,000 square feet for the house and then I come back and want a shed, would that be self-created.
- How is this lot unique?
- How does the PUD impact the development? Two-story homes fit, but a ranch doesn't?
- Shouldn't this go back to the Planning Commission, as a PUD amendment?
- What if we limit the deck to 10' x 10' without a roof; steps add 75 sq. ft., and allow for increased coverage plus steps as proposed?

Following the public hearing and a thorough discussion, the ZBA voted unanimously to deny the requested variance. The Board cited no practical difficulty, no extraordinary circumstances, and no substantial justice.

