2023 DWSRF PROJECT PLAN

Water Main Replacements, Lead Service Line Replacements & Complete Distribution System Materials Inventory

Prepared for:

The City of Grosse Pointe Woods
20025 Mack Plaza
Grosse Pointe Woods, Michigan 48236

AEW No. 0160-0462

CITY OF GROSSE POINTE WOODS MICHIGAN
URBIS MAGNA PULCHRITUDINE
CORPORATE SEAL

Prepared by:

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
Shelby Township - Roseville - Livonia
586.726.1234 | www.aewinc.com

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Executive Summary

The City of Grosse Pointe Woods engaged Anderson Eckstein, and Westrick, Inc. (AEW), the City's consulting engineer, to develop a Project Plan in order to apply for a Drinking Water State Revolving Fund (DWSRF) loan through the Michigan Department of Environment, Great Lakes and Energy (EGLE). This Project Plan was prepared for in accordance with DWSRF Project Planning Document Preparation Guidance (January 2023).

The intent of the DWSRF Project is to replace aging water mains, replace known lead service lines and complete investigations for the Complete Distribution System Materials Inventory (CDSMI). The goal of the DWSRF Project is to improve the efficiency and reliability of the water distribution system and comply with recent regulatory requirements.

1. Water Main Replacement Program

Grosse Pointe Woods owns and operates a water distribution system that serves the entire city. Some water mains currently in service are beyond their useful life, and are experiencing a higher frequency of breaks.

The proposed water mains included in the Water Main Replacement Program are:

1. Hidden Lane from the west end to Morningside Drive
2. Lee Court from Vernier Road to the north end
3. Marian Court from River Road to the east end

Preliminary construction cost estimates for the water main replacement projects are included in the Appendix. Maps of the project locations are included in the Appendix. The cost of this project is estimated to be $1,663,064.33.

2. Lead Service Line Replacements Program

Grosse Pointe Woods instituted a water meter inspection program in an effort to identify known lead services lines without the need for excavation. The inspection program has identified over 100 known lead services connected to the Grosse Pointe Woods water distribution system. Due to the recent changes to the Lead and Copper Rule, the City is required to replace at least 5% of known lead water services each year over the next 20 years.

The proposed Lead Service Line Replacement Program would replace all known lead services within the city. A preliminary cost estimate for this project is included in the Appendix. The cost of this project is estimated to be $1,743,510.00.

3. Complete Distribution System Material Inventory

Due to recent regulatory changes, water supplies are required to develop and maintain a CDSMI. The purpose of the CDSMI is to characterize, record, and maintain a comprehensive inventory of distribution system materials, including service line materials on both public and private property. The requirements include physical verification of water service lines.

The proposed CDSMI project would perform all inspections necessary as advertised by current EGLE guidance. A preliminary construction cost estimate for the CDSMI investigations is included in the appendix. The cost of this project is estimated to be $384,315.00

The total cost of the DWSRF Project is $3,790,889.33. The DWSRF loan is anticipated to be financed for a 20-year term at 1.875 percent interest. Debt service must be financed by a sewer system user charge system (UCS) that is consistent with the Environmental Protection Agency (EPA) and EGLE guidelines.

Background

Study and Service Area

The City of Grosse Pointe Woods is located in the north east section of District 1 in Wayne County. Grosse Pointe Woods borders St. Clair Shores to the North, Grosse Pointe Shores to the east, the city of Harper Woods to the west, and the cities of Grosse Pointe Farms and Detroit to the south.

The project study area encompasses the entire city limits of Grosse Pointe Woods. The Study Area Map is presented in Appendix A. The study area map identifies the existing water distribution system.

The study area consists of 3.3 square miles. Existing land use data, by category, was provided by Southeast Michigan Council of Governments (SEMCOG) for the study area and is included in Appendix B (SEMCOG Community Profile).

Single-family residential homes occupy the largest share of the study area's total acreage consisting of 1,199.7 acres, or 57.4 percent, of land are being used for this purpose. Existing single-family development is concentrated in platted subdivisions within the city.

Multiple-family residential occupies 11.3 acres of land. This accounts for 0.6 percent of the study area. Most multiple-family development in the study area is primarily located in the vicinity of the major roads.

Commercial and Office developments occupy 50.7 acres of land, or 2.4 percent of the study area. Office development is located principally along all the principal and minor arterials and the major collector streets located in the city. Most of the commercial developments are located in a linear fashion along Mack Avenue.

Industrial developments occupy 0.4 acres of the study area's land, or 0.0 percent of the study area.

Institutional developments occupy 137 acres of the study area land, or 6.6 percent of the study area. Institutional development is generally scattered throughout the study area.

A table summarizing the acreage and percentage of each category in the study area (that being the entire city) as well as the land use changes from 2015 to 2020 can be found in the SEMCOG Community Profile in Appendix B.

Population

The residential population for Grosse Pointe Woods is 16,487 people, based on 2020 Census data. Seasonal fluctuations due to resorts or tourism are negligible. According to SEMCOG, the population projections for the city in 2030, 2040 and 2045 are 15,004, 14,870 and 15,077 respectively.

Existing Environment Evaluation

Cultural and Historic Resources
The projects discussed in this Project Plan are confined to previously constructed water infrastructure which has already been developed. Consequently, the proposed projects are not expected to impact cultural or historic resources.

Air Quality
There are no known air quality issues in Grosse Pointe Woods.

Wetlands
No wetland areas have been identified within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact wetlands.

Great lakes Shorelands, Coastal Zones, and Coastal Management Areas
Grosse Pointe Woods is a landlocked community surrounded by neighboring communities along the entirety of their border. Consequently, the proposed projects are not expected to impact Great Lakes Shorelands, Coastal Zones, and Coastal Management Areas.

Floodplains
There are no special flood hazards within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact floodplains.

Natural or Wild and Scenic Rivers
There are no Natural or Wild and Scenic Rivers within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact floodplains.

Major Surface Waters
The are no major surface waters within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact major surface waters.

Topography
According to the United States Geographical Survey (USGS) map as shown in Appendix C, Grosse Pointe Woods is relatively flat. Elevations range from approximately 620 ft at the western most portion of the city to 576 ft along the northern border of the city. The elevation of the eastern shoreline of Lake St. Clair is approximately 571 ft. This indicates a difference in elevation in range of 5 feet from the lowest point in the city to Lake St. Clair to 49 feet from the highest point. In general, the average elevation throughout the city is 590 feet.

Geology
There are no geological structures or formations in the vicinity of the proposed projects.

Soil Types
Soil conditions throughout the city are classified generally as being silty sandy clay loam. Much of the city has soil stratum that consists of varying depths of fine sand, medium stiff moist gray silty clay, soft moist gray silt clay and bed rock. A map of the existing soils in Grosse Pointe Woods is included in Appendix D.

Agricultural Resources
There is no agricultural land within the Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact agricultural resources.

Fauna and Flora

The projects discussed in this project plan are confined to previously constructed water infrastructure located in publicly owned property or public Right of Way which has already been developed. Consequently, the proposed projects are not expected to impact any natural habitats. However, the MSU Extensions will be contacted to ascertain whether any species of fauna or flora listed or proposed to be listed in the MNFI as endangered or threatened, or the critical habitat of such species, is found in the vicinity of the proposed projects.

Existing System

The City of Grosse Pointe Woods purchases treated water exclusively from the Great Lakes Water Authority (GLWA). The city has three GLWA connections, which are located at Mack Avenue & Moross, Harper Avenue and Vernier Road, and Eight Mile Road, east of Harper Avenue.

The system is used to provide water service from GLWA to the adjacent City of Grosse Pointe Shores to the east. Grosse Pointe Shores has three metered connections to the Grosse Pointe Woods system, which are located at Vernier Road, east of Morningside Drive, Fairford Road, between Ballantyne and Morningside, and 525 Moorland Drive.

Grosse Pointe Woods is an established community which is fully developed and, as such, the water system spans the entire area of the city. The oldest pipes in the City's system are made of cast iron, and were constructed around 1934. The City is experiencing excessive breaks on the older cast iron mains, which are typically located in residential areas. Additionally, due to the age of the community, and the evolving infrastructure standards over time, many water mains in service today are 6 inches in diameter. The larger transmission mains in the City, ranging from 12" to 24" in diameter, are newer and located along the City's main transportation routes.

The city owns and operates an above ground storage tank and booster station that was constructed as part of a previous DWSRF project. The storage tank is used to reduce peak hour costs to the city by supplementing the water source during high demand hours. The tank fills at times of the day when demand on the GLWA system is low. During peak hours of the day, the booster station pumps water from the tank into the system to reduce the amount of water from GLWA. This results in cost savings to the City and residents.

Fire-fighting demand can severely reduce pressures in a system of small diameter pipe. Undersized pipes create excessive head loss and a corresponding decrease in flow, even when adequate pressures are maintained in larger, nearby mains. The industry standards minimum size for a new water main is 8 inch diameter. However, many of the older water mains in the system are smaller than 8 inches, which could present a problem, especially as the aging system continues to deteriorate.

Need for the Project

Grosse Pointe Woods is currently in compliance with all drinking water standards and has the capacity to serve the affected area. There are currently no orders of enforcement in place.

Grosse Pointe Woods is an established community which is fully developed and, as such, the water system spans the entire area of the city. The goal of the DWSRF project plan is to improve the efficiency of the existing water main system and to restore the structural integrity of sections of the distribution system that have reached the limits of their service life or do not meet current water main standards with respect to size, material, or pressure. Similarly, the goal is also to bring the City into compliance with new regulatory requirements.

As part of the DWSRF Project Plan, the following projects have been proposed:

1. Water Main Replacement Program
2. Lead Service Line Replacement Program
3. Complete Distribution System Material Inventory

Water Main Replacement Program

Much of the City's water system was constructed as the city was developing in the early and mid-1900's. As a result, many of the water mains that are still in-service today are well beyond their anticipated useful life. Additionally, they are smaller than would be considered acceptable by today's industry standards. These factors are believed to contribute to increases in the frequency of water main breaks which are costly to the city to repair and cause disruption to residents, businesses and the travelling public. Water main breaks also have the potential to result in property damage. This project plan identifies three sections of water mains in need of replacement due to the number of water main breaks, size, and age or some combination thereof.

1. Hidden Lane from the west end to Morningside Drive
2. Lee Court from Vernier Road to the north end
3. Marian Court from River Road to the east end

Lead Service Line Replacement Program

Lead water service replacement is required as part of the new community requirements established in EGLE's revised Lead and Copper Rule. The Lead and Copper Rule enacted in June 2018 mandated new action levels for lead and copper based on a 90th percentile level of tap water samples. Along with this, new sampling requirements and methods were developed to improve lead detection in a community's drinking water. An action level exceedance is not a violation but triggers a set of requirements that must be completed to minimize exposure to lead and copper in drinking water. This includes water monitoring/treatment, public education, and lead service line replacement.

Due to the recent changes to lead service line replacements as part of the Lead and Copper Rule, the City is now required to replace all lead and galvanized water service lines affected by a water main replacement project and replace at least 5% of known lead water services each year over the next 20 years. The cost of the lead water service replacements is borne by the City and has not been budgeted for at this time.

Complete Distribution System Material Inventory

As part of the 2018 revisions to the Michigan Safe Drinking Water Act, 1976 PA 399, water supplies are required to develop and maintain a Complete Distribution System Materials Inventory (CDSMI). The purpose of the CDSMI is to characterize, record, and maintain a comprehensive inventory of distribution system materials, including service line materials on both public and private property. The requirements include physical verification of water service lines. The cost of physical verification is borne by the City and has not been budgeted for at this time.

Projected Future Needs

Due to the fact that Grosse Pointe Woods is both fully developed and is also predicted to experience population decline, residential water use is not expected to increase over a period of 20 years and was not considered in this project plan.

Additionally, this project plan does not include construction of new treatment facilities. The projects are intended to address previously identified structural issues or administrative requirements, and are therefore not intended to increase system capacity.

Analysis of Alternatives

As part of this project plan, various alternatives were evaluated to address the needs of the project described above.

No Action

The No Action alternative represents the decision to do nothing to address the needs of the project described above. Abandoning efforts to correct the structural deficiencies will provide inadequate capacity and further deterioration of the water distribution system. Further deterioration will result in more frequent water main breaks and failures. Such failures result in capital expenditures, losses of service for portions of the service area, and potential for property damage. Additionally, The No Action alternative would result in non-compliance with regulatory requirements for water distribution systems. Further, No Action would result in continued use of water services containing lead or galvanized materials putting public health at risk. Therefore, the No Action alternative was determined to not be in the best interest of the City.

Construction Methods for Water Main Replacement

Due to right-of-way limitations and the configuration of customers served, routing options were not considered as part of this analysis.

The three alternative methods of construction evaluated for the water main replacement projects were open cut excavation, horizontal directional drilling (HDD), and pipe bursting. Polyvinyl Chloride (PVC) pipe material was not considered due to recent breaks experienced in the City during PVC water main construction.

The open cut alternative under consideration involves excavating a trench along the length of proposed ductile iron water main installation and backfilling to grade. Open cut installations are generally costlier due to the amount of disturbance to existing surface features in developed areas including roadways, driveways, sidewalk, lawns, trees and other landscaping. Additionally, ductile iron pipe has been subject to extreme lead times and cost increases in the recent past. This effort also involves more material and more energy expended by construction equipment.

The horizontal directional drilling alternative under consideration is a trenchless method of High-Density-Polyethylene (HDPE) water main installation that involves drilling a pilot hole along the intended alignment of the proposed water main. The new fused pipe is then pulled back into the void created by the pilot hole drilling. This method of construction significantly decreases the amount of disturbance to existing surface features, which generally makes this installation more efficient than open cut methods. However, this construction method requires specialized machinery and experienced operators.

The pipe bursting alternative under consideration is a trenchless method of HDPE water main installation that involves pulling the new, fused water main into place by bursting the existing water main into the surrounding soil. This method of construction significantly decreases the amount of disturbance to existing surface features, which generally makes this installation more efficient than open cut methods. However, this method of construction requires special considerations for maintaining service to residents while the host pipe is being burst. These methods include pre-chlorination of the new water main or construction of a temporary, above ground water service.

Optimum Performance of Existing System

This project is intended to address structural issues identified within the water distribution system. Consequently, optimizing performance of the system cannot resolve existing structural issues or aging components. Therefore, the Optimum Performance of Existing System alternative was not considered an applicable option.

Regionalization

The issues identified within the water distribution system are limited to the local service areas in Grosse Pointe Woods. Consequently, the regionalization alternative is not considered viable or practical for the deficiencies evaluated in this project plan.

Monetary Evaluation

A monetary evaluation was performed for each water main replacement alternative identified above, the CDSMI, and the Lead Service Line Replacement Program. Preliminary construction cost estimates for each project and each alternative are included in Appendix E.

Sunk Costs

Per the project planning document guidance, sunk costs were not included as a part of the monetary analysis as they are costs incurred regardless of what alternatives are selected. Sunk costs include the cost to operate and maintain the existing sewer system and pump stations and the associated lands, all outstanding debts and the cost incurred to prepare this project plan.

Present Worth

A present worth analysis, covering the 20-year planning period, was conducted. The discount rate used to calculate the present worth is 2% according to the Federal Office of Management and Budget (OMB). The present worth analysis calculations are included in Appendix F. The present worth was calculated using the following steps:

- Determine the capital cost. The construction costs from the estimates are for current value and are assumed to be present worth.
- Determine the salvage value at 20 years for each alternative using straight-line depreciation.
- Given the future salvage value, the present worth of the salvage value can be calculated as the salvage value at 20 years, multiplied by the single payment present worth factor of 0.4146 to determine present worth from a future amount in 20 years.
- Interest during construction has been calculated as 2.0 percent multiplied by the construction period in years and the total capital cost. The total is then multiplied by 0.5. This is per the guidance document for construction periods less than four (4) years.

- The total present worth is calculated by deducting the present worth of the salvage value at 20 years and the present worth of revenue generated from the sum of the present worth of the capital costs and the interest during construction.
- The equivalent annual cost is calculated by multiplying the total present worth by the capital recovery factor of 0.09439, to determine the annual cost for 20 years based on the total present worth.

Salvage Value

In accordance with the Project Planning Document Preparation Guidance the salvage value at the end of the 20-year planning period was calculated using straight line depreciation with a useful life of 50 years.

Escalation

The proposed projects are not expected to result in the purchase of more land or increases in energy use. Consequently, escalation costs were not considered in the monetary analysis.

Interest During Construction

The construction period is expected to be less than four years. As a result, interest was calculated as one half of the product of the construction period (in years), the total capital expenditures (in dollars), and the real discount rate.

User Costs

The water distribution system is made up of 8,398 residential equivalency units (REU's). Based on the present worth analysis, the equivalent annual cost of the DWSRF projects is $156,564.95. Therefore, the estimated annual costs per REU is $18.64.

Project Delivery Method

The traditional Design-Bid-Build delivery method will be utilized for the DWSRF projects. Therefore, the project delivery method was not considered in the monetary evaluation.

Environmental Evaluation

All improvements proposed within this project plan will be made to existing water infrastructure. Additionally, the construction methods themselves are expected to have minimal environmental impact. Soil erosion and sedimentation control measures are included in the capital cost of the project and enforced during construction.

Technical Considerations

Due to the fact that the service area is fully developed, the proposed projects are confined to previously constructed water infrastructure, and the service area is predicted to experience population decline, there is no need to increase system capacity. Each alternative explored would maintain the existing system capacity. Additionally, each alternative would meet standards established in the "Recommended Standards for Waterworks" as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.

Selected Alternative

Design Parameters

The 8-inch diameter HDPE water main replacement by pipe bursting was identified as the selected alternative. This alternative was selected because it was identified to be the most cost-effective alternative to meet the needs of the project.

The water main segments proposed for replacement are being replaced for age-related structural deficiencies, and not due to lack of capacity to serve residents. Additionally, the new water main will be of equal or greater size than the currently operating water mains. Consequently, a basis of design is not necessary for the proposed project. The new 8-inch water main is expected to improve fire flow rates and reliability of service.

Additionally, the CDMSI and Lead Service Line Replacement projects were selected over the No Action alternative.

Useful Life

Due to the relatively recent application of HDPE materials in water infrastructure, reliable data on service life is not easily accessible. However, due to the chemical properties and resistance to corrosion, HDPE is generally advertised to have a service life exceeding 50 Years. Consequently, the design service life of the proposed projects identified within this Project Plan is 50 years.

Project Maps

See Appendix G for a map identifying all work areas associated with the proposed DWSRF Projects.

Water and Energy Efficiency

All improvements proposed within this project plan will be made to previously constructed water infrastructure to address previously identified structural issues. Once implemented, the improvements will not result in increased water or energy consumption. Consequently, the water and energy efficiency alternatives are not considered as part of this project.

Schedule for Design and Construction

A preliminary schedule for design and construction of the selected alternatives is presented below:

Publish public hearing notice	4/21/23
Conduct formal public meeting	5/15/23
Public comment period ends	5/15/23
City Council approves resolution to proceed with project plan	5/15/23
Project plan submittal to MDEQ	6/1/23
Submit engineering plans for required permits	4/15/24
Part I application due (financial documentation and assurances)	4/15/24
Part II application due (submit approved UCS and project plans)	5/15/24
Publish advertisement for bids	6/1/24

Part III application due (bid tabulation with tentative award)	7/8/24
Order of Approval issued	8/7/24
Loan close	8/28/24
Conduct preconstruction meeting and issue notices to proceed	9/15/24
Start construction	10/1/24
Mitigation of environmental impacts	10/1/24
Project completion	10/1/25

Cost Summary

The total cost of the DWSRF Project is estimated to be $3,790,889.33. The DWSRF loan is anticipated to be financed for a 20-year term at 1.875 percent interest. Debt service must be financed by a sewer system user charge system (UCS) that is consistent with the Environmental Protection Agency (EPA) and EGLE guidelines.

Implementability

The City of Grosse Pointe Woods is a municipal unit organized under the State of Michigan Constitution and statutes and is legally able to own and operate public utilities. The city owns and operates its public water distribution system and combined sewer system. With the exception of the lead service line replacements, the improvements proposed as a part of this project will be completed within city owned utility infrastructure.

The selected alternatives will not pose any issues related to the implementability of the project. Grosse Pointe Woods has the legal authority, managerial capability, and financial means to build, operate, and maintain the system. Grosse Pointe Woods passed a resolution to adopt this Project Plan at the May 15, 2023 City Council meeting.

Environmental and Public Health Impacts

Direct Impacts

Cultural and Historic Resources

The projects discussed in this project plan are confined to previously constructed water infrastructure located in publicly owned property or public Right of Way which has already been developed. Additionally, the National Register of Historical Places does not include any locations within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact cultural or historic resources.

Air Quality

Emissions from heavy equipment can be expected during construction. However, it is expected that these emissions will have a negligible long-term impact on air quality in Grosse Pointe Woods.

Wetlands

No wetland areas have been identified within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact wetlands.

Great lakes Shorelands, Coastal Zones, and Coastal Management Areas

Grosse Pointe Woods is a landlocked community surrounded by neighboring communities along the entirety of their border. Consequently, the proposed projects are not expected to impact Great Lakes Shorelands, Coastal Zones, and Coastal Management Areas.

Floodplains

There are no special flood hazards within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact floodplains.

Natural or Wild and Scenic Rivers

There are no Natural or Wild and Scenic Rivers within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact floodplains.

Major Surface Waters

The are no major surface waters within Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact major surface waters.

Agricultural Resources

There is no agricultural land within the Grosse Pointe Woods. Consequently, the proposed projects are not expected to impact agricultural resources.

Fauna and Flora

The projects discussed in this project plan are confined to previously constructed water infrastructure located in publicly owned property or public Right-of-Way which has already been developed. Consequently, the proposed projects are not expected to impact any natural habitats. However, the MSU Extensions will be contacted to ascertain whether any species of fauna or flora listed or proposed to be listed in the MNFI as endangered or threatened, or the critical habitat of such species, is found in the vicinity of the proposed projects.

Construction Impacts

The proposed work for the project is generally limited to the public right-of-way where streets may be impacted depending on the location of the existing water mains. construction methods are selected to minimize disruptions. Standard traffic and safety control devices meeting MDOT construction standards such as barricades and lighted barrels will be in place to warn and protect residents during construction activities.

Where water main replacement work is taking place within or near road right-of-ways, roads may have to be partially or completely closed to vehicular and/or pedestrian traffic. In addition, construction equipment and vehicles will have to be parked within the road right-of-way for a specified period of time.

Closures may result in the re-routing or postponement of garbage pick-up, mail delivery, parcel delivery and other deliveries to residences and businesses. Access for emergency vehicles and access for handicapped or disabled persons will also require attention.

Consideration must be taken to establish haul routes that minimize impact to residents and businesses. Construction truck traffic will be confined to the construction project itself and accessing the sites from major roads only. No truck traffic will be allowed to be on adjacent residential streets.

During the course of construction, the noise level will be increased as a result of construction equipment and truck traffic.

Where excavations will take place, special attention will be required when stockpiling excavated materials in addition to other material stockpiles and their locations to not interfere with existing drainage patterns and transfer particulates into the drainage system. Soil erosion and sedimentation control measures such as, but not limited to silt sacks, filter fabrics and straw bales will be installed at storm water facilities as part of the construction activities to prevent soil erosion and sedimentation concerns.

The vegetation to be disturbed for this project are grass areas maintained by each property owner. Any disturbed area will be restored. Tree removals may be necessary. Any miscellaneous tree removal will be replaced with a tree of compatible species native to the area.

Any contamination encountered during construction will be remediated by the contractor.

Operational Impacts

The proposed projects will not result in any changes to the current system, operational or otherwise.

Social Impacts

Minor increases in rates may be a social impact of the project if the city chooses to increase rates to finance the loan debt. Additionally, traffic impacts discussed in the Construction Impacts section of the report can be considered a social impact. Long-term impacts related to relocation of business or residents due to these projects are not expected due to the nature of the proposed projects.

Indirect Impacts

Due to the fact that the service area is fully developed, the proposed projects are confined to previously constructed water infrastructure, and the service area is predicted to experience population decline, there are no anticipated indirect impacts to the following aspects:

- Changes in rate, density, or development type
- Changes in land use
- Changes in air or water quality
- Changes to the natural setting or sensitive features
- Impacts on cultural, human, social and economic resources
- Impacts on area aesthetics
- Resource consumption over the useful life of the project

Cumulative Impacts

Due to the fact that the service area is fully developed, the proposed projects are confined to previously constructed water infrastructure, and the service area is predicted to experience population decline, there are no anticipated cummulative impacts as a result of the proposed projects.

Mitigation

Mitigation of Short-Term Construction Related Impacts

General Construction
Many mitigation techniques used to minimize short term construction impacts are standard procedures included in construction contracts. For example, traffic control measures will be included in the construction contract to safely maintain traffic during construction activities.

Allowable work hours are controlled by local ordinances in order to mitigate impacts related to increased noise levels during construction.

Soil Erosion and Sedimentation Control
Soil Erosion and Sedimentation Control (SESC) plans and permit requirements are included in the construction contract as well. SESC measures include the use of inlet filters for catch basins within the project influence area to prevent soils or other construction materials from entering the combined sewer system. Silt fences may also be used to prevent runoff from carrying soils from the construction site and potentially entering waterways.

For all excavated areas, it will be necessary for the contractor to stockpile excavated and backfill materials. During open cut operations, effort will be made to minimize the amount of open trench by backfilling as soon as possible after work is complete. This practice will minimize the amount of material stockpiled on the site, thereby minimizing the potential for sedimentation runoff and airborne particulate/dust problems. All excess soils will be removed from the project site as the work progresses.

The contractor will be required to maintain a safe and clean work site. This includes performing street sweeping as necessary during construction.

Existing Landscape
Any surface features impacted by the construction such as paved surfaces, lawns, or vegetation will be repaired or replaced as part of the construction contract.

Existing Underground Utilities
It is common to encounter existing utilities during excavation. Existing underground utilities that may be encountered include, but are not limited to, electric, gas, communications, water mains, and sewers. Every effort will be made to obtain information regarding underground utilities from all utility owners for inclusion on the construction plans. The contractor will be required to have all construction sites staked by MISS DIG for the location of all underground utilities. It will be the contractor's responsibility to protect all underground utilities during construction.

Culturally and Historically Significant Sites
Per the direction of the State Historical Preservation Office (SHPO), any culturally or historically significant artifacts that are uncovered during excavation require all work to be stopped and the area where the artifact(s) were encountered will be immediately surveyed by SHPO or any of the Tribal Historical Preservation Officers (THPO) who may have stated, by written correspondence, that their tribe has had past influence in the City. If encountered, every effort will be made to accommodate and not disturb any cultural or historically significant artifacts. If necessary, the project will be redesigned to maintain historically significant properties. The proposed excavation is in areas of previously constructed wastewater infrastructure where the

ground has been previously disturbed during original construction. Therefore, we anticipate that culturally or historically significant artifacts will not be encountered.

Natural Water Features

Construction is not expected to occur near wetlands, floodplains, surface waters or natural streams and rivers. Therefore, mitigation related to these features is not considered in this project plan.

Mitigation of Long-Term Impacts

Siting Decisions

Siting decisions are not applicable to the proposed projects as all proposed improvements will be made to underground infrastructure.

Operational Impacts

The proposed projects will not result in any operational impact whatsoever as these locations are confined to water mains that will not operate differently once the improvements are made.

Mitigation of Indirect Impacts

The proposed projects do not involve the expansion of the sewer system or implementation of a wastewater treatment facility. The proposed work will not have an effect on the rate of development, population density, zoning or land use. Therefore, no indirect impacts are foreseen as a part of this project.

Staging of Construction

Due to the varied locations of the proposed projects, staging of the construction will not provide any additional mitigation benefits.

Public Participation

Public Meeting

A public meeting was held at Grosse Pointe Woods City Hall on Monday, May 15, 2023. The following items were discussed.

1. A description of the water quality problems to be addressed by the project and the principal alternatives that were considered.
2. A description of the recommended alternative, including its capital costs and a cost breakdown by project components (e.g., treatment plant, sewer system).
3. A discussion of project financing and costs to users, including the proposed method of project financing and estimated monthly debt retirement; the proposed annual, quarterly, or monthly charge to the typical residential customer; and any special fees that will be assessed.
4. A description of the anticipated social and environmental impacts associated with the recommended alternative and the measures that will be taken to mitigate adverse impacts.

Public Meeting Advertisement

In accordance with the Project Planning Document Preparation Guidance, the advertisement was published on the city's website on Friday, April 28, 2023. The public meeting advertisement is included in Appendix H.

Public Meeting Summary

The following elements from the public meeting are included in Appendix H:

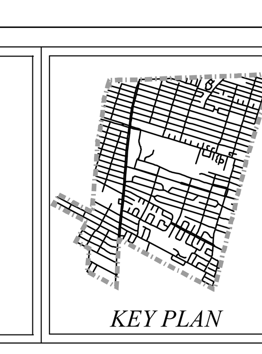
- Summary of the meeting held and what was covered during the meeting.
- List of attendees.
- Concerns raised during the meeting and the responses.
- Written comments received during the public notice period and the responses.
- Changes made to the project because of public comment

Adoption of the Project Planning Document

The resolution to adopt this Project Plan passed at the May 15, 2023 city council meeting is included in Appendix I.

Appendix A

Map of Water Distribution System and Service Area



ANDERSON, ECKSTEIN AND WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS
51301 Schoenherr Rd
Shelby Township
Michigan 48315
Phone 586 726 1234
Fax 586 726 8780
www.aewinc.com

PLOT DATE: 4/17/2023	DRAWING DATE: 4/17/2023		
PLOT SCALE: NTS	DRAWING SCALE:		
PLOT CONFIG:	PROJECT NO: 0160-0462		
SCRIPT FILE:	FILE NAME: WaterMainWall.mxd		
ATTACH XREF:	DRAWN BY: JGS	CHK'D BY: JMM	

CITY OF GROSSE POINTE WOODS MICHIGAN
CORPORATE SEAL

City of Grosse Pointe Woods

Water Main Map

MAP NO.

CAUTION

THIS MAP IS INTENDED FOR REFERENCE PURPOSES ONLY.

ANDERSON, ECKSTEIN AND WESTRICK, INC. AND THE CITY OF GROSSE POINTE WOODS DO NOT GUARANTEE THE ACCURACY OF THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM ALL CLAIMS, SUITS, DEMANDS AND JUDGEMENTS ARISING FROM THE USE OF THIS INFORMATION.

Appendix B

SEMCOG Community Profile

[SEMCOG | Southeast Michigan Council of Governments]

Community Profiles

YOU ARE VIEWING DATA FOR:

City of Grosse Pointe Woods

20025 Mack Plaza Dr
Grosse Pointe Woods,
MI 48236-2343
http://www.gpwmi.us

SEMCOG MEMBER

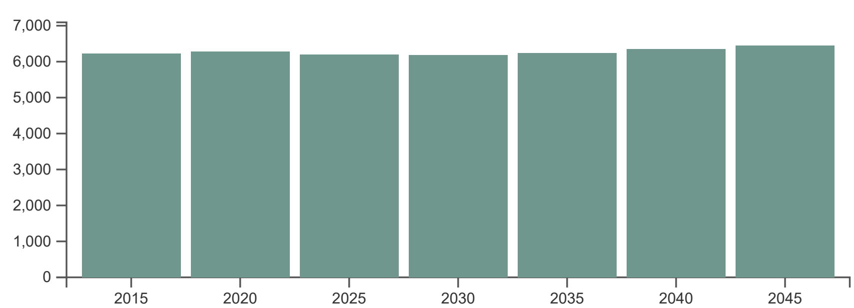
Census 2020 Population:
16,487
Area: 3.3 square miles

VIEW COMMUNITY EXPLORER MAP   VIEW 2020 CENSUS MAP

Economy & Jobs

Link to American Community Survey (ACS) Profiles: **Select a Year** 2017-2021 **Economic**

Forecasted Jobs



Source: **SEMCOG 2045 Regional Development Forecast**

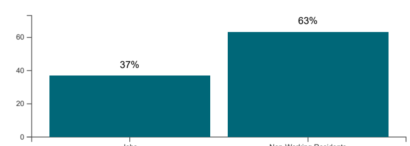
Forecasted Jobs by Industry Sector

Forecasted Jobs By Industry Sector	2015	2020	2025	2030	2035	2040	2045	Change 2015-2045	Pct Change 2015-2045
Natural Resources, Mining, & Construction	240	236	225	228	231	229	230	-10	-4.2%
Manufacturing	62	55	46	40	38	35	31	-31	-50%
Wholesale Trade	124	128	124	125	119	127	128	4	3.2%
Retail Trade	525	503	488	472	441	428	417	-108	-20.6%
Transportation, Warehousing, & Utilities	44	47	42	41	41	40	40	-4	-9.1%
Information & Financial Activities	871	836	782	764	760	765	758	-113	-13%
Professional and Technical Services & Corporate HQ	477	496	493	490	499	521	544	67	14%
Administrative, Support, & Waste Services	684	697	699	710	731	752	767	83	12.1%
Education Services	744	742	730	729	737	744	758	14	1.9%
Healthcare Services	1,068	1,115	1,152	1,170	1,212	1,270	1,323	255	23.9%
Leisure & Hospitality	687	707	708	712	724	736	749	62	9%
Other Services	586	599	591	586	588	588	582	-4	-0.7%
Public Administration	119	121	121	121	121	121	122	3	2.5%
Total Employment Numbers	6,231	6,282	6,201	6,188	6,242	6,356	6,449	218	3.5%

Source: **SEMCOG 2045 Regional Development Forecast**

Daytime Population

Daytime Population	ACS 2016
Jobs	4,634
Non-Working Residents	7,950
Age 15 and under	2,947
Not in labor force	4,519
Unemployed	484
Daytime Population	12,584



Source: **2012-2016 American Community Survey 5-Year Estimates** and **2012-2016 Census Transportation Planning Products Program (CTPP)**. For additional information, visit SEMCOG's **Interactive Commuting Patterns Map**

Note: The number of residents attending school outside Southeast Michigan is not available. Likewise, the number of students commuting into Southeast Michigan to attend school is also not known.

Where Workers Commute From 2016

Rank	Where Workers Commute From *	Workers	Percent
1	**Grosse Pointe Woods**	1,127	24.3%
2	**Detroit**	745	16.1%
3	**St. Clair Shores**	497	10.7%
4	**Warren**	209	4.5%
5	**Clinton Twp**	179	3.9%
6	**Grosse Pointe Park**	176	3.8%
7	**Harper Woods**	153	3.3%
8	**Macomb Twp**	151	3.3%
9	**Grosse Pointe Farms**	112	2.4%
10	**Grosse Pointe**	85	1.8%
-	**Elsewhere**	1,200	25.9%
* Workers, age 16 and over employed in Grosse Pointe Woods		**4,634**	**100%**

Source: **U.S. Census Bureau** - 2012-2016 CTPP/ACS Commuting Data and **Commuting Patterns in Southeast Michigan**

Where Residents Work 2016

Rank	Where Residents Work *	Workers	Percent
1	**Detroit**	1,660	19.8%
2	**Grosse Pointe Woods**	1,127	13.5%
3	**St. Clair Shores**	578	6.9%
4	**Warren**	530	6.3%
5	**Troy**	402	4.8%
6	**Southfield**	360	4.3%
7	**Grosse Pointe**	328	3.9%
8	**Clinton Twp**	283	3.4%
9	**Grosse Pointe Farms**	243	2.9%
10	**Sterling Heights**	193	2.3%
-	**Elsewhere**	2,669	31.9%
* Workers, age 16 and over residing in Grosse Pointe Woods		**8,373**	**100%**

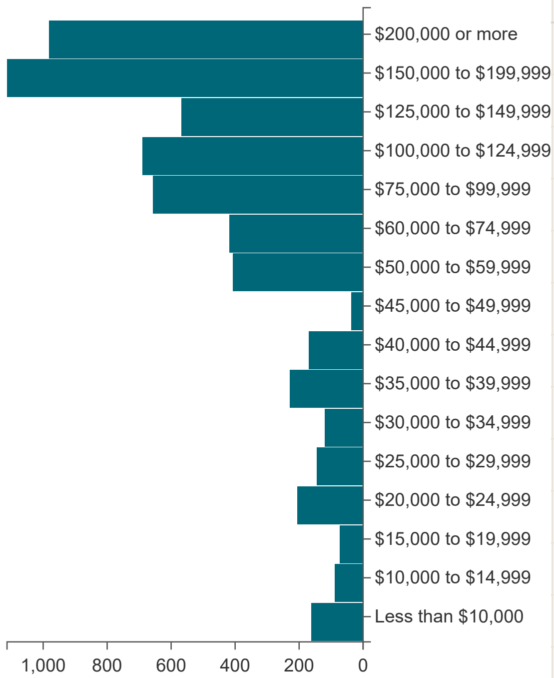
Source: **U.S. Census Bureau** - 2012-2016 CTPP/ACS Commuting Data and **Commuting Patterns in Southeast Michigan**

Household Income

Income (in 2020 dollars)	ACS 2010	ACS 2020	Change 2010-2020	Percent Change 2010-2020
Median Household Income	$102,057	$111,392	$9,335	9.1%
Per Capita Income	$48,206	$50,172	$1,966	4.1%

Source: **U.S. Census Bureau**, **2006-2010 and 2016-2020 American Community Survey 5-Year Estimates**

Annual Household Income



Annual Household Income	ACS 2020
$200,000 or more	981
$150,000 to $199,999	1,113
$125,000 to $149,999	567
$100,000 to $124,999	690
$75,000 to $99,999	656
$60,000 to $74,999	418
$50,000 to $59,999	407
$45,000 to $49,999	36
$40,000 to $44,999	169
$35,000 to $39,999	228
$30,000 to $34,999	120
$25,000 to $29,999	145
$20,000 to $24,999	206
$15,000 to $19,999	72
$10,000 to $14,999	89
Less than $10,000	162
Total	**6,059**

Source: **U.S. Census Bureau**, **2016-2020 American Community Survey 5-Year Estimates**

Poverty

Poverty	ACS 2010	% of Total (2010)	ACS 2020	% of Total (2020)	% Point Chg 2010-2020
Persons in Poverty	606	3.7%	634	4.1%	0.4%
Households in Poverty	307	4.8%	328	5.4%	0.6%

Source: **U.S. Census Bureau**, **2006-2010 and 2016-2020 American Community Survey 5-Year Estimates**

Housing

Link to American Community Survey (ACS) Profiles: **Select a Year** 2017-2021 **Housing**

Building Permits 2000 - 2023

Year	Single Family	Two Family	Attach Condo	Multi Family	Total Units	Total Demos	Net Total
2000	3	0	0	0	3	1	2
2001	2	0	0	0	2	1	1
2002	2	0	0	0	2	1	1
2003	0	0	0	0	0	0	0
2004	2	0	0	0	2	0	2
2005	3	0	0	38	41	1	40
2006	3	0	0	0	3	1	2
2007	2	0	0	0	2	1	1
2008	1	0	0	0	1	0	1
2009	0	0	0	0	0	1	-1
2010	0	0	0	0	0	1	-1
2011	0	0	0	0	0	0	0
2012	0	0	26	0	26	1	25
2013	0	0	14	0	14	1	13
2014	4	0	0	0	4	1	3
2015	1	0	0	5	6	1	5
2016	2	0	0	0	2	1	1
2017	0	0	0	0	0	0	0
2018	2	0	0	0	2	1	1
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2021	0	0	0	0	0	1	-1
2022	1	0	0	0	1	0	1
2023	0	0	0	0	0	0	0
2000 to 2023 totals	28	0	40	43	111	15	96

Source: **SEMCOG Development**

Note: Permit data for most recent years may be incomplete and is updated monthly.

Housing Types

Housing Type	ACS 2010	ACS 2020	Change 2010-2020	New Units Permitted Since 2019
Single Unit	6,359	5,911	-448	1
Multi-Unit	213	321	108	0
Mobile Homes or Other	9	23	14	0
Total	6,581	6,255	-326	1
Units Demolished				-1
Net (Total Permitted Units - Units Demolished)				0

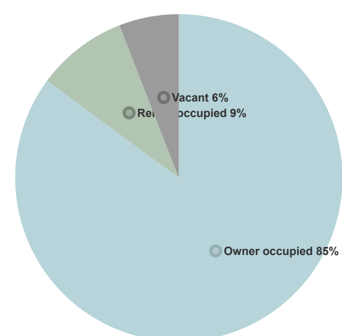
Source: **U.S. Census Bureau**, **2006-2010 and 2016-2020 American Community Survey 5-Year Estimates**, **SEMCOG Development**

Housing Tenure

Housing Tenure	Census 2010	ACS 2020	Change 2010-2020
Owner occupied	5,804	5,522	-282
Renter occupied	612	537	-75
Vacant	403	196	-207
Seasonal/migrant	28	28	0
Other vacant units	375	168	-207
Total Housing Units	6,819	6,255	-564

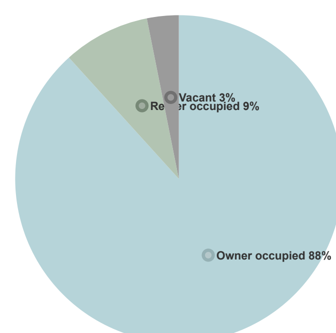
Census

2010



ACS

2020



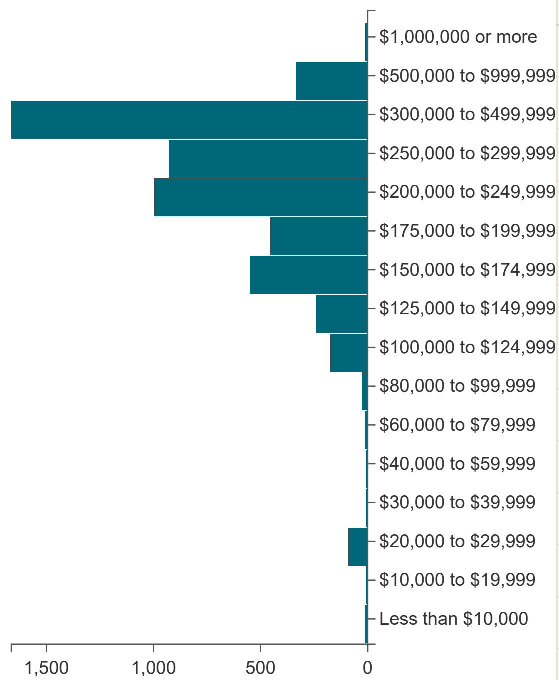
Source: **U.S. Census Bureau**, **2006-2010 and 2016-2020 American Community Survey 5-Year Estimates**

Housing Value and Rent

Housing Value (in 2020 dollars)	ACS 2010	ACS 2020	Change 2010-2020	Percent Change 2010-2020
Median housing value	$297,340	$259,600	$-37,740	-12.7%
Median gross rent	$1,449	$1,485	$36	2.5%

Source: **U.S. Census Bureau**, **2006-2010 and 2016-2020 American Community Survey 5-Year Estimates**

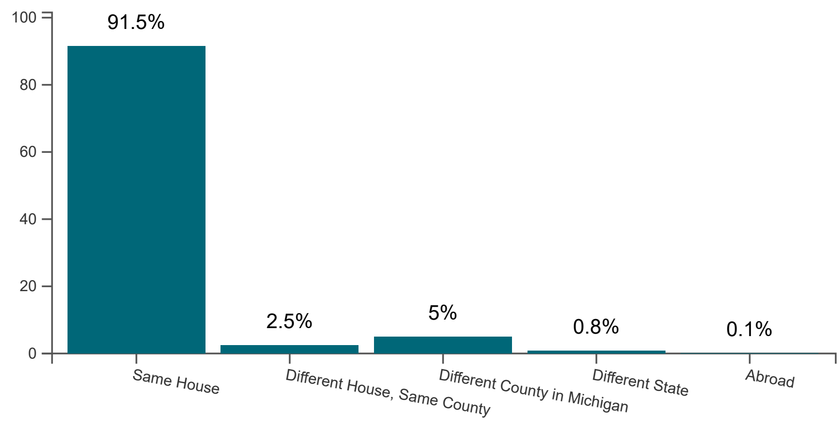
Housing Value



Housing Value	ACS 2020
$1,000,000 or more	11
$500,000 to $999,999	336
$300,000 to $499,999	1,664
$250,000 to $299,999	929
$200,000 to $249,999	995
$175,000 to $199,999	455
$150,000 to $174,999	549
$125,000 to $149,999	242
$100,000 to $124,999	173
$80,000 to $99,999	28
$60,000 to $79,999	12
$40,000 to $59,999	9
$30,000 to $39,999	8
$20,000 to $29,999	89
$10,000 to $19,999	8
Less than $10,000	14
Owner-Occupied Units	5,522

Source: **U.S. Census Bureau**, **2016-2020 American Community Survey 5-Year Estimates**

Residence One Year Ago *



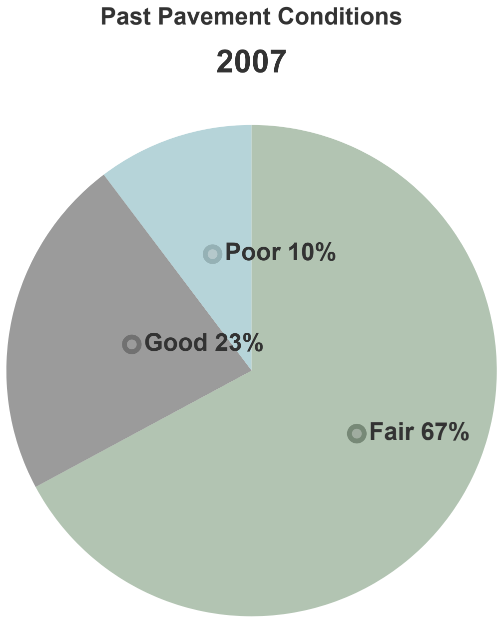
* This table represents persons, age 1 and over, living in City of Grosse Pointe Woods from 2016-2020. The table does not represent person who moved out of City of Grosse Pointe Woods from 2016-2020.

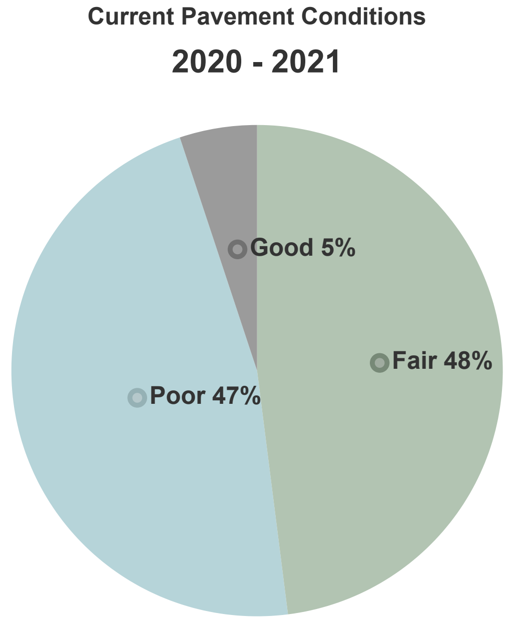
Source: **U.S. Census Bureau**, **2016-2020 American Community Survey 5-Year Estimates**

Transportation

Miles of public road (including boundary roads): 61
Source: **Michigan Geographic Framework**

Pavement Condition (in Lane Miles)





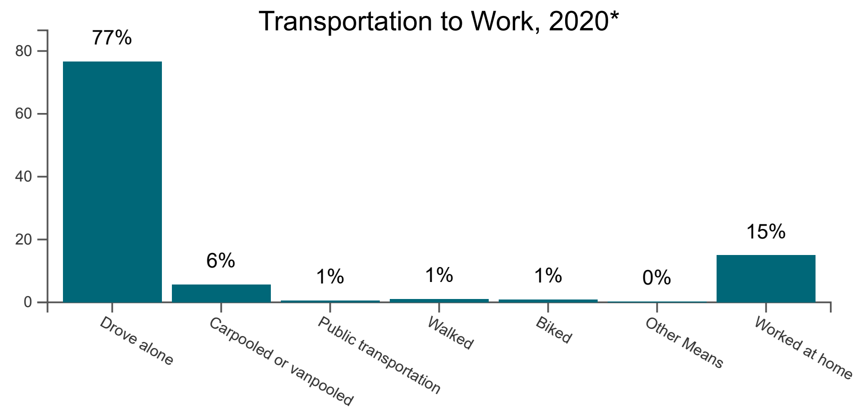
Note: Poor pavements are generally in need of rehabilitation or full reconstruction to return to good condition. Fair pavements are in need of capital preventive maintenance to avoid deteriorating to the poor classification. Good pavements generally receive only routine maintenance, such as street sweeping and snow removal, until they deteriorate to the fair condition.
Source: **SEMCOG**

Bridge Status

Bridge Status	Percent Point Chg 2008-2010
Open	-
Open with Restrictions	-
Closed*	-
Total Bridges	0.0%
Deficient Bridges	-

* Bridges may be closed because of new construction or failed condition.
Note: A bridge is considered deficient if it is structurally deficient (in poor shape and unable to carry the load for which it was designed) or functionally obsolete (in good physical condition but unable to support current or future demands, for example, being too narrow to accommodate truck traffic).
Source: Michigan Structure Inventory and Appraisal Database

Detailed Intersection & Road Data



* Resident workers age 16 and over

Transportation to Work

Transportation to Work	ACS 2010	% of Total (ACS 2010)	ACS 2020	% of Total (ACS 2020)	% Point Chg 2010-2020
Drove alone	7,087	89.1%	5,841	76.6%	-12.5%
Carpooled or vanpooled	304	3.8%	435	5.7%	1.9%
Public transportation	5	0.1%	40	0.5%	0.4%
Walked	85	1.1%	82	1.1%	0%
Biked	55	0.7%	64	0.8%	0.1%
Other Means	93	1.2%	22	0.3%	-0.9%
Worked at home	323	4.1%	1,143	15%	10.9%
Resident workers age 16 and over	7,952	100.0%	7,627	100.0%	0.0%

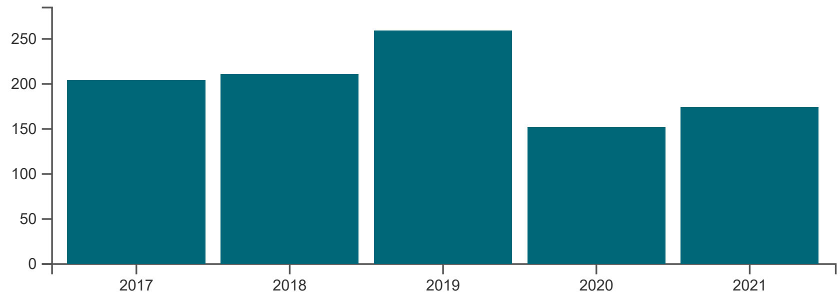
Source: **U.S. Census Bureau**, **2006-2010 and 2016-2020 American Community Survey 5-Year Estimates**

Mean Travel Time to Work

Mean Travel Time To Work	ACS 2010	ACS 2020	Change 2010-2020
For residents age 16 and over who worked outside the home	23.9 minutes	21.6 minutes	-2.3 minutes

Source: **U.S. Census Bureau**, **2006-2010 and 2016-2020 American Community Survey 5-Year Estimates**

Crashes, 2017-2021



Source: **Michigan Department of State Police with the Criminal Justice Information Center** and **SEMCOG**

Note: Crash data shown is for the entire city.

Crash Severity

Crash Severity	2017	2018	2019	2020	2021	Percent of Crashes 2017 - 2021
Fatal	0	1	0	0	0	0.1%
Serious Injury	3	1	3	1	2	1%
Other Injury	27	35	40	20	23	14.5%
Property Damage Only	174	174	216	131	149	84.4%
Total Crashes	204	211	259	152	174	100%

Crashes by Type

Crashes by Type	2017	2018	2019	2020	2021	Percent of Crashes 2017 - 2021
Head-on	3	1	1	2	1	0.8%
Angle or Head-on/Left-turn	46	54	69	32	51	25.2%
Rear-End	44	55	54	38	42	23.3%
Sideswipe	33	40	57	30	32	19.2%
Single Vehicle	15	15	18	13	12	7.3%
Backing	26	27	30	16	15	11.4%
Other or Unknown	37	19	30	21	21	12.8%

Crashes by Involvement

Crashes by Involvement	2017	2018	2019	2020	2021	Percent of Crashes 2017 - 2021
Red-light Running	3	2	2	1	3	1.1%
Lane Departure	38	31	33	31	37	17%
Alcohol	3	7	7	1	6	2.4%
Drugs	4	0	1	1	4	1%
Deer	0	0	1	0	0	0.1%
Train	0	0	0	0	0	0%
Commercial Truck/Bus	4	11	13	3	13	4.4%
School Bus	0	0	0	0	1	0.1%
Emergency Vehicle	3	0	1	2	1	0.7%
Motorcycle	0	0	0	1	0	0.1%
Intersection	54	56	96	40	48	29.4%
Work Zone	1	2	1	1	0	0.5%
Pedestrian	2	2	3	1	2	1%
Bicyclist	9	5	4	1	2	2.1%
Distracted Driver	19	14	18	8	13	7.2%
Older Driver (65 and older)	70	50	77	47	46	29%
Young Driver (16 to 24)	55	57	67	32	47	25.8%
Secondary	1	1	0	1	0	0.3%

High Frequency Intersection Crash Rankings

Local Rank	County Rank	Region Rank	Intersection	Jurisdiction	Annual Avg 2017-2021
1	1347	3,203	Mack Ave @ Vernier Rd	County/City	5.6
2	1479	3,516	Mack Ave @ Vernier Rd	County/City	5.2
3	1832	4,283	Mack Ave @ Lancaster Ave	County	4.4
4	1934	4,518	Mack Ave @ Vernier Rd	County/City	4.2
5	2189	5,059	Harper Ave N @ Allard Ave	City	3.8
6	2189	5,059	Mack Ave @ Littlestone Rd	County	3.8
7	2332	5,352	Mack Ave @ Lancaster Ave	County	3.6
8	2706	6,113	Vernier Rd @ Marter Rd	City	3.2
9	2706	6,113	Mack Ave @ Lochmoor Blvd	County	3.2
10	2883	6,551	Vernier Rd @ Morningside Dr	City	3

Note: Intersections are ranked by the number of reported crashes, which does not take into account traffic volume. Crashes reported occurred within 150 feet of the intersection.
Source: **Michigan Department of State Police with the Criminal Justice Information Center** and **SEMCOG**

High Frequency Road Segment Crash Rankings

Local Rank	County Rank	Region Rank	Segment	From Road - To Road	Jurisdiction	Annual Avg 2017-2021
1	220	786	Mack Ave	Cook Rd - Vernier Rd	County	23
2	268	959	Mack Ave	Cook Rd - Vernier Rd	County	21
3	633	1,911	Mack Ave	Moross Rd - Cook Rd	County	14.6
4	956	2,767	Harper Ave N	E I 94/Allard Ramp - E I 94/M 102 Ramp	City	11.2
5	1072	3,025	Vernier Rd	Harper Ave N - Mack Ave	City	10.4
6	1355	3,796	Mack Ave	Moross Rd - Cook Rd	County	8.6
7	1355	3,796	Vernier Rd	Marter Rd - Morningside Dr	City	8.6
8	1676	4,585	Mack Ave	Vernier Rd - Mack Ave	County	7.2
9	1728	4,709	Marter Rd	Marter Rd - Jefferson Ave	City	7
10	1889	5,135	Mack Ave	Vernier Rd - Mack Ave	County	6.4

Note: Segments are ranked by the number of reported crashes, which does not take into account traffic volume.

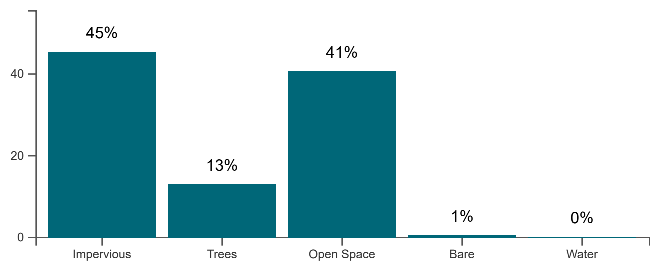
Environment

2020 Land Use

Parcel Land Use	Acres 2015	Acres 2020	Change 2015-2020	Pct Change 2015-2020
Single-Family Residential	1,199.7	1,200.7	1	0.1%
Attached Condo Housing	15.9	9.2	-6.7	-41.9%
Multi-Family Housing	2.1	2.1	0	0%
Mobile Home	0	0	0	0%
Agricultural/Rural Residential	0	0	0	0%
Mixed Use	0	0	0	0%
Retail	12.8	13.9	1.2	9.2%
Office	19.4	17.6	-1.8	-9.3%
Hospitality	3.2	3.3	0.1	1.9%
Medical	15.2	15.9	0.7	4.5%
Institutional	146.7	137	-9.7	-6.6%
Industrial	0.4	0.4	0	0%
Recreational/Open Space	69.2	69.2	0	0%
Cemetery	0	0	0	0%
Golf Course	128.7	128.7	0	0%
Parking	12	12	0	0%
Extractive	0	0	0	0%
TCU	0	0	0	0%
Vacant	19.1	34.4	15.3	80%
Water	0.9	0.9	0	0%
Not Parceled	445.1	445	-0.1	0%
Total	2,090.3	2,090.3	0	0%

1. **Agricultural / Rural Res** includes any residential parcel containing 1 or more homes where the parcel is 3 acres or larger.
2. **Mixed Use** includes those parcels containing buildings with Hospitality, Retail, or Office square footage and housing units.
3. **Not Parceled** includes all areas within a community that are not covered by a parcel legal description.
4. Parcels that do not have a structure assigned to the parcel are considered vacant unless otherwise indicated, even if the parcel is part of a larger development such as a factory, school, or other developed series of lots.

2020 Land Cover



Source Data

SEMCOG - Detailed Data

Type	Description	Acres	Percent
Impervious	buildings, roads, driveways, parking lots	942.4	45.4%
Trees	woody vegetation, trees	270.6	13%
Open Space	agricultural fields, grasslands, turfgrass	845.1	40.7%
Bare	soil, aggregate piles, unplanted fields	12.4	0.6%
Water	rivers, lakes, drains, ponds	3.9	0.2%
Total Acres		2,074.3	

SEMCOG 2022 Tree Canopy

Type	Acres	Percent
Tree Canopy	698	33.7%

Tree canopy is the layer of tree leaves, needles, branches, and stems that provide tree coverage of the ground, viewed from an aerial perspective.

Appendix C

USGS Topographic Map

USGS
science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

GROSSE POINTE QUADRANGLE
MICHIGAN
7.5-MINUTE SERIES

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid Universal Transverse Mercator, Zone 17T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery....................NAIP, August 2016 - October 2016
Roads....................U.S. Census Bureau, 2016
Names....................GNIS, 1980 - 2019
Hydrography....................National Hydrography Dataset, 2006 - 2019
Contours....................National Elevation Dataset, 2018 - 2019
Boundaries....................Multiple sources; see metadata file 2017 - 2018
Public Land Survey System....................BLM, 2018
Wetlands....................FWS National Wetlands Inventory 2005

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

QUADRANGLE LOCATION

1 Warren
2 Mount Clemens West
3 Mount Clemens East
4 Highland Park
5 Grosse Pointe OE E
6 Detroit
7 Belle Isle

ADJOINING QUADRANGLES

ROAD CLASSIFICATION

Expressway		Local Connector	
Secondary Hwy		Local Road	
Ramp		4WD	
Interstate Route	US Route	State Route	

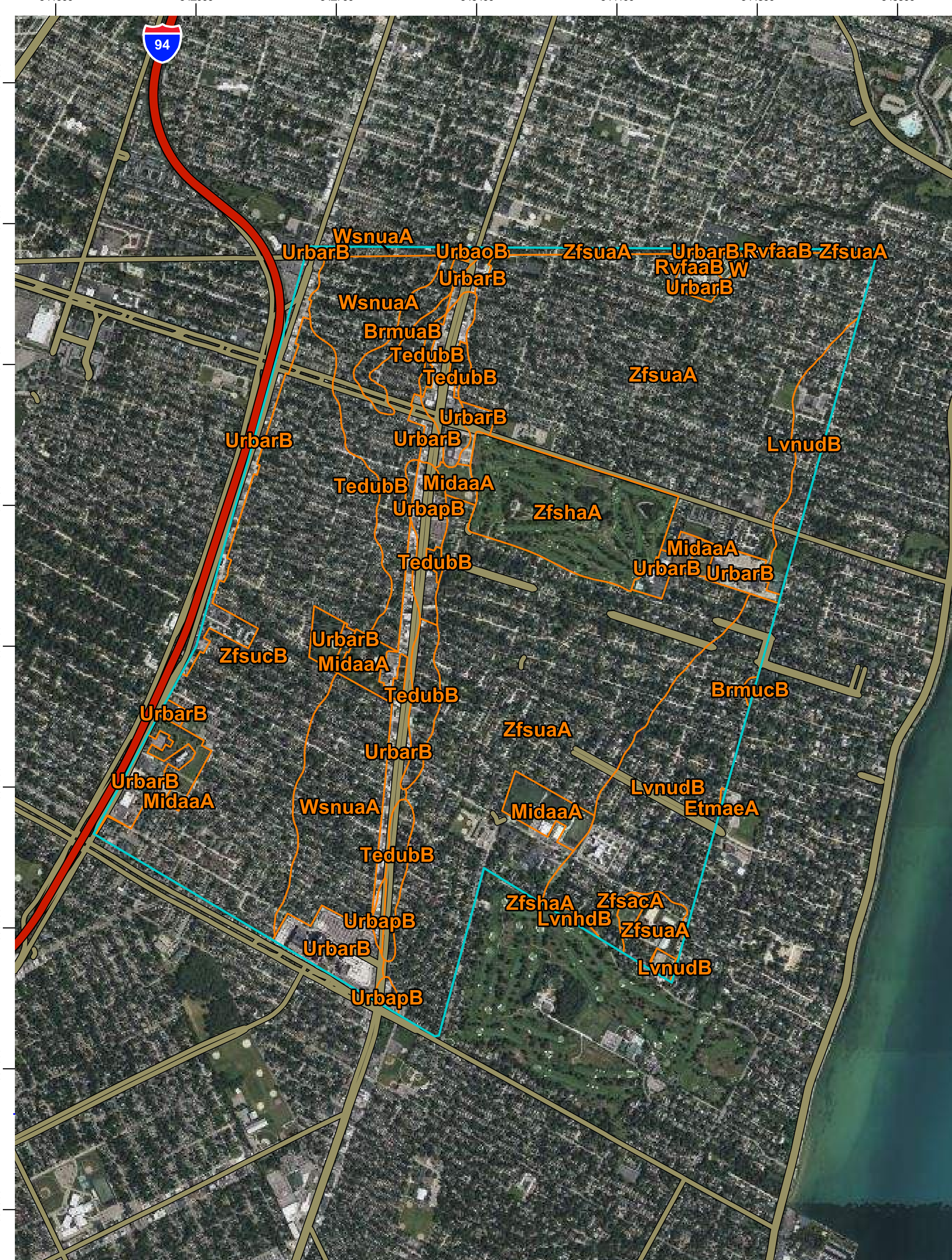
GROSSE POINTE, MI
2019

Appendix D

NRCS Soils Map

82° 55' 57" W | 82° 52' 31" W

42° 27' 41" N | 42° 27' 41" N



42° 24' 19" N | 42° 24' 19" N

341300 342000 342700 343400 344100 344800 345500

82° 55' 57" W | 82° 52' 31" W

Map Scale: 1:30,300 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 400 800 1600 2400

Feet: 0 1000 2000 4000 6000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
Area of Interest (AOI)

Soils
Soil Map Unit Polygons
Soil Map Unit Lines
Soil Map Unit Points

Special Point Features
Blowout
Borrow Pit
Clay Spot
Closed Depression
Gravel Pit
Gravelly Spot
Landfill
Lava Flow
Marsh or swamp
Mine or Quarry
Miscellaneous Water
Perennial Water
Rock Outcrop
Saline Spot
Sandy Spot
Severely Eroded Spot
Sinkhole
Slide or Slip
Sodic Spot
Spoil Area
Stony Spot
Very Stony Spot
Wet Spot
Other
Special Line Features

Water Features
Streams and Canals

Transportation
Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background
Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Macomb County, Michigan
Survey Area Data: Version 19, Aug 29, 2022

Soil Survey Area: Wayne County, Michigan
Survey Area Data: Version 8, Aug 29, 2022

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 5, 2020—Aug 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BrmuaB	Brems-Urban land complex, 0 to 4 percent slopes	0.5	0.0%
RvfaaB	Riverfront sandy loam, 0 to 4 percent slopes	0.6	0.0%
UrbaoB	Urban land-Fortress family complex, 0 to 4 percent slopes	1.0	0.0%
UrbarB	Urban land-Riverfront complex, dense substratum, 0 to 4 percent slopes	3.6	0.1%
W	Water	0.2	0.0%
WsnuaA	Wauseon-Urban land complex, 0 to 2 percent slopes	7.2	0.3%
ZfsuaA	Ziegenfuss-Urban land complex, 0 to 2 percent slopes	10.2	0.4%
Subtotals for Soil Survey Area		**23.2**	**0.9%**
Totals for Area of Interest		**2,460.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BrmuaB	Brems-Urban land complex, 0 to 4 percent slopes	21.4	0.9%
BrmucB	Brems-Urban land complex, loamy substratum, 0 to 4 percent slopes	1.3	0.1%
EtmaeA	Anthroportic Udorthents, dense substratum, 0 to 2 percent slopes	0.4	0.0%
LvnhdB	Livonia-Freesoil sandy loams, dense substratum, 0 to 4 percent slopes	2.1	0.1%
LvnudB	Livonia-Urban land-Freesoil complex, dense substratum, 0 to 4 percent slopes	242.2	9.8%
MidaaA	Midtown gravelly-artifactual sandy loam, 0 to 2 percent slopes	75.4	3.1%
RvfaaB	Riverfront sandy loam, 0 to 4 percent slopes	2.8	0.1%
TedubB	Tedrow-Urban land complex, dense substratum, 0 to 4 percent slopes	51.4	2.1%
UrbaoB	Urban land-Fortress family complex, 0 to 4 percent slopes	2.1	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UrbapB	Urban land-Fortress family complex, dense substratum, 0 to 4 percent slopes	58.5	2.4%
UrbarB	Urban land-Riverfront complex, dense substratum, 0 to 4 percent slopes	185.1	7.5%
W	Water	0.8	0.0%
WsnuaA	Wauseon-Urban land complex, 0 to 2 percent slopes	253.9	10.3%
ZfsacA	Ziegenfuss clay loam, 0 to 1 percent slopes	4.2	0.2%
ZfshaA	Ziegenfuss sandy loam, 0 to 2 percent slopes	121.7	4.9%
ZfsuaA	Ziegenfuss-Urban land complex, 0 to 2 percent slopes	995.1	40.4%
ZfsucB	Ziegenfuss-Urban land-Blount complex, 0 to 4 percent slopes	418.6	17.0%
Subtotals for Soil Survey Area		**2,437.1**	**99.1%**
Totals for Area of Interest		**2,460.3**	**100.0%**

Appendix E

Preliminary Construction Cost Estimates

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: CDSMI 3-Pt Inspections

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

DATE: April 17, 2023

CHECKED BY:

DATE:

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO. 0160-0462

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1 Bonds, Insurance & Mobilization	1	LS	29,000.00	$29,000.00
2 Site Restoration & Cleanup	375	Ea	50.00	$18,750.00
3 Traffic Control, Minor Street Location	334	Ea	30.00	$10,012.50
4 Traffic Control, Major Street Location	41	Ea	500.00	$20,625.00
5 Water Service, Investigate	375	Ea	600.00	$225,000.00
6 Water Service, Building, Investigate	375	Ea	40.00	$15,000.00
7 Water Service, 3-Pt Documentation	375	Ea	5.00	$1,875.00
			Estimated Construction SubTotal	**$320,262.50**
			Design and Engineering (20%)	**$64,052.50**
			Total Estimated Project Cost	**$384,315.00**

Note: 1. Costs provided in this estimate are for budgetary purposes

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Lead Service Line Replacement Program

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

DATE: April 17, 2023

CHECKED BY:

DATE:

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO. 0160-0462

WORK ITEM		QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Bonds, Insurance & Mobilization	1	LS	42,000.00	$42,000.00
2	Site Restoration & Cleanup	1	LS	50,000.00	$35,000.00
3	Curb and Gutter, Rem	1,500	Ft	15.00	$22,500.00
4	Pavt, Rem	1,250	Syd	20.00	$25,000.00
5	Sidewalk, Rem	850	Syd	12.00	$10,200.00
6	Driveway, Rem	750	Syd	12.00	$9,000.00
7	Aggregate Base, 6 inch	2,100	Syd	20.00	$42,000.00
8	Brick Pavers, Rem, Salv, Replace	100	Sft	30.00	$3,000.00
9	Traffic Control, Major Street	1	LS	10,000.00	$10,000.00
10	Traffic Control, Minor Street	1	LS	20,000.00	$20,000.00
11	Deliverables	1	LS	8,000.00	$8,000.00
12	Curb and Gutter, Conc, Match Existing	1,500	Ft	40.00	$60,000.00
13	Pavt Repr, Nonreinf Conc, 8 inch	1,250	Syd	75.00	$93,750.00
14	Sidewalk, Conc, 4 inch	6,200	Sft	7.50	$46,500.00
15	Sidewalk, Conc, 6 inch	1,500	Sft	8.50	$12,750.00
16	Curb Ramp, Conc, 4 inch	25	Sft	9.00	$225.00
17	Curb Ramp, Conc 8 inch	25	Sft	10.00	$250.00
18	Detectable Warning Surface	5	Ft	50.00	$250.00
19	Driveway, Nonreinf Conc, 6 inch	750	Syd	70.00	$52,500.00
20	5/8 to 1-inch Water Serv, Long	65	Ea	8,000.00	$520,000.00
21	1-1/2 inch Water Serv, Long	1	Ea	8,500.00	$8,500.00
22	2 inch Water Serv Long	1	Ea	9,000.00	$9,000.00
23	5/8 inch to 1 inch Water Serv, Short	65	Ea	6,500.00	$422,500.00
				Estimated Construction SubTotal	**$1,452,925.00**
				Design and Engineering (20%)	**$290,585.00**
				Total Estimated Project Cost	**$1,743,510.00**

Note: 1. Costs provided in this estimate are for budgetary purposes

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Hidden Ln Water Main Pipe Bursting

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

PRELIMINARY ENGINEER'S ESTIMATE

DATE: April 17, 2023

AEW PROJECT NO. 0160-0462

CHECKED BY:

DATE:

WORK ITEM		QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	LS	36,000.00	$36,000.00
2	Traffic Control and Maintenance	1	LS	36,000.00	$36,000.00
3	Bonds, Insurance, Contingencies	1	LS	36,000.00	$36,000.00
4	Tree, Rem	10	Ea	3,000.00	$30,000.00
5	Audio Visual Record of Construction Area	1	LS	3,000.00	$3,000.00
6	Pavt Repr, Rem	100	Syd	20.00	$2,000.00
7	Pavt Repr, Nonreinf Conc, 8 inch	100	Syd	70.00	$7,000.00
8	Aggregate Base, 6 inch	100	Syd	15.00	$1,500.00
9	Lane Tie, Epoxy Anchored	100	Ea	6.00	$600.00
10	Sidewalk, Rem	191	Syd	10.00	$1,911.11
11	Sidewalk, Conc, 4 inch	1,290	Sft	5.50	$7,095.00
12	Sidewalk, Conc, 6 inch	430	Sft	7.00	$3,010.00
13	Driveway, Rem	150	Syd	10.00	$1,500.00
14	Driveway, Nonreinf Conc, 6 inch	150	Syd	60.00	$9,000.00
15	Gate Well, Rem	2	Ea	600.00	$1,200.00
16	Hydrant, Rem	4	Ea	750.00	$3,000.00
17	Water Main, HDPE, DR11, 8 inch, Pipe Burst	1,720	Ft	200.00	$344,000.00
18	Gate Well, 60 inch Dia	2	Ea	5,000.00	$10,000.00
19	Gate Valve, 8 inch	2	Ea	8,000.00	$16,000.00
20	Gate Well Cover, GPW	2	Syd	650.00	$1,300.00
21	Fire Hydrant Assembly	4	Ea	10,000.00	$40,000.00
22	Water Main, Connection, 8 inch	2	LS	8,500.00	$17,000.00
23	Water Service, Transfer	40	Ea	850.00	$34,000.00
24	Water Serv,	3	Ea	1,200.00	$3,600.00
25	Water Serv, Long	3	Ea	2,000.00	$6,000.00
26	Lead Service Line Replacement	5	Ea	10,000.00	$50,000.00
27	Temporary Water Services	1	LSUM	55,000.00	$55,000.00
28	Maintenance Gravel	300	Ton	30.00	$9,000.00
29	Sanitary Lead Repair	5	Ea	7,500.00	$37,500.00
30	Pre-Televise Sanitary Lead	20	Ea	175.00	$3,500.00
31	Post-Televise Sanitary Lead	20	Ea	175.00	$3,500.00
32	Proposed Tree	10	Ea	850.00	$8,500.00
33	Restoration	1	LS	10,000.00	$10,000.00
34	Project Cleanup	1	LS	5,000.00	$5,000.00
				Estimated Construction SubTotal	**$832,716.11**
				Design and Engineering (20%)	**$166,543.22**
				Total Estimated Project Cost	**$999,259.33**

Note 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from the west end to Morningside

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Marian Ct Water Main Pipe Bursting

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

DATE: April 17, 2023

CHECKED BY:

DATE:

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO. 0160-0462

	WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	LS	21,000.00	$21,000.00
2	Traffic Control and Maintenance	1	LS	21,000.00	$21,000.00
3	Bonds, Insurance, Contingencies	1	LS	21,000.00	$21,000.00
4	Tree, Rem	3	Ea	3,000.00	$9,000.00
5	Audio Visual Record of Construction Area	1	LS	2,500.00	$2,500.00
6	Pavt Repr, Rem	100	Syd	20.00	$2,000.00
7	Pavt Repr, Nonreinf Conc, 8 inch	100	Syd	75.00	$7,500.00
8	Aggregate Base, 6 inch	100	Syd	15.00	$1,500.00
9	Lane Tie, Epoxy Anchored	100	Ea	7.50	$750.00
10	Driveway, Rem	34	Syd	12.00	$405.00
11	Driveway, Nonreinf Conc, 6 inch	34	Syd	65.00	$2,193.75
12	Gate Well, Rem	1	Ea	600.00	$600.00
13	Hydrant, Rem	1	Ea	750.00	$750.00
14	Water Main, HDPE, DR11, 8 inch, Pipe Burst	360	Ft	230.00	$82,800.00
15	Gate Well, 60 inch Dia	1	Ea	5,000.00	$5,000.00
16	Gate Valve, 8 inch	1	Ea	8,000.00	$8,000.00
17	Gate Well Cover, GPW	1	Syd	650.00	$650.00
18	Fire Hydrant Assembly	1	Ea	10,000.00	$10,000.00
19	Water Main, Connection, 8 inch	1	LS	10,000.00	$10,000.00
20	Water Service, Transfer	9	Ea	850.00	$7,650.00
21	Water Serv,	1	Ea	1,200.00	$1,200.00
22	Water Serv, Long	1	Ea	2,000.00	$2,000.00
23	Lead Service Line Replacement	1	Ea	10,000.00	$10,000.00
24	Temporary Water Services	1	LSUM	20,000.00	$20,000.00
25	Maintenance Gravel	100	Ton	30.00	$3,000.00
26	Sanitary Lead Repair	2	Ea	7,500.00	$15,000.00
27	Pre-Televise Sanitary Lead	5	Ea	250.00	$1,125.00
28	Post-Televise Sanitary Lead	5	Ea	250.00	$1,125.00
29	Proposed Tree	3	Ea	850.00	$2,550.00
30	Restoration	1	LS	5,000.00	$5,000.00
31	Project Cleanup	1	LS	2,000.00	$2,000.00
				Estimated Construction SubTotal	**$277,298.75**
				Design and Engineering (20%)	**$55,459.75**
				Total Estimated Project Cost	**$332,758.50**

Note: 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from River Rd to East End

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Lee Ct Water Main Pipe Bursting

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

PRELIMINARY ENGINEER'S ESTIMATE

DATE: April 17, 2023

AEW PROJECT NO. 0160-0462

CHECKED BY:

DATE:

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1 Mobilization	1	LS	21,000.00	$21,000.00
2 Traffic Control and Maintenance	1	LS	21,000.00	$21,000.00
3 Bonds, Insurance, Contingencies	1	LS	21,000.00	$21,000.00
4 Tree, Rem	2	Ea	3,000.00	$6,000.00
5 Audio Visual Record of Construction Area	1	LS	2,500.00	$2,500.00
6 Pavt Repr, Rem	100	Syd	20.00	$2,000.00
7 Pavt Repr, Nonreinf Conc, 8 inch	100	Syd	75.00	$7,500.00
8 Aggregate Base, 6 inch	100	Syd	15.00	$1,500.00
9 Lane Tie, Epoxy Anchored	100	Ea	7.50	$750.00
10 Sidewalk, Rem	36	Syd	12.00	$433.33
11 Sidewalk, Conc, 4 inch	244	Sft	6.00	$1,462.50
12 Sidewalk, Conc, 6 inch	81	Sft	8.00	$650.00
13 Driveway, Rem	41	Syd	12.00	$495.00
14 Driveway, Nonreinf Conc, 6 inch	41	Syd	65.00	$2,681.25
15 Gate Well, Rem	1	Ea	600.00	$600.00
16 Hydrant, Rem	1	Ea	750.00	$750.00
17 Water Main, HDPE, DR11, 8 inch, Pipe Burst	325	Ft	230.00	$74,750.00
18 Gate Well, 60 inch Dia	1	Ea	5,000.00	$5,000.00
19 Gate Valve, 8 inch	1	Ea	8,000.00	$8,000.00
20 Gate Well Cover, GPW	1	Syd	650.00	$650.00
21 Fire Hydrant Assembly	1	Ea	10,000.00	$10,000.00
22 Water Main, Connection, 8 inch	1	LS	10,000.00	$10,000.00
23 Water Service, Transfer	11	Ea	850.00	$9,350.00
24 Water Serv,	3	Ea	1,200.00	$3,600.00
25 Water Serv, Long	3	Ea	2,000.00	$6,000.00
26 Lead Service Line Replacement	1	Ea	10,000.00	$10,000.00
27 Temporary Water Services	1	LSUM	20,000.00	$20,000.00
28 Maintenance Gravel	100	Ton	30.00	$3,000.00
29 Sanitary Lead Repair	2	Ea	7,500.00	$15,000.00
30 Pre-Televise Sanitary Lead	3	Ea	250.00	$750.00
31 Post-Televise Sanitary Lead	3	Ea	250.00	$750.00
32 Proposed Tree	2	Ea	850.00	$1,700.00
33 Restoration	1	LS	5,000.00	$5,000.00
34 Project Cleanup	1	LS	2,000.00	$2,000.00
			Estimated Construction SubTotal	**$275,872.08**
			Design and Engineering (20%)	**$55,174.42**
			Total Estimated Project Cost	**$331,046.50**

Note 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from Vernier Rd to North End

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Hidden Ln Water Main Open Cut

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

DATE: April 17, 2023

CHECKED BY:

DATE:

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO. 0160-0462

WORK ITEM		QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	LS	37,000.00	$37,000.00
2	Traffic Control and Maintenance	1	LS	37,000.00	$37,000.00
3	Bonds, Insurance, Contingencies	1	LS	37,000.00	$37,000.00
4	Tree, Rem	10	Ea	3,000.00	$30,000.00
5	Audio Visual Record of Construction Area	1	LS	3,000.00	$3,000.00
6	Pavt Repr, Rem	150	Syd	20.00	$3,000.00
7	Pavt Repr, Nonreinf Conc, 8 inch	150	Syd	70.00	$10,500.00
8	Aggregate Base, 6 inch	150	Syd	15.00	$2,250.00
9	Lane Tie, Epoxy Anchored	150	Ea	6.00	$900.00
10	Sidewalk, Rem	956	Syd	10.00	$9,555.56
11	Sidewalk, Conc, 4 inch	6,450	Sft	5.50	$35,475.00
12	Sidewalk, Conc, 6 inch	2,150	Sft	7.00	$15,050.00
13	Driveway, Rem	300	Syd	10.00	$3,000.00
14	Driveway, Nonreinf Conc, 6 inch	300	Syd	60.00	$18,000.00
15	Gate Well, Rem	2	Ea	600.00	$1,200.00
16	Hydrant, Rem	4	Ea	750.00	$3,000.00
17	Water Main, DI, 8 inch, Tr Det G	1,720	Ft	200.00	$344,000.00
18	Gate Well, 60 inch Dia	2	Ea	5,000.00	$10,000.00
19	Gate Valve, 8 inch	2	Ea	8,000.00	$16,000.00
20	Gate Well Cover, GPW	2	Syd	650.00	$1,300.00
21	Fire Hydrant Assembly	4	Ea	10,000.00	$40,000.00
22	Water Main, Connection, 8 inch	2	LS	8,500.00	$17,000.00
23	Water Service, Transfer	40	Ea	850.00	$34,000.00
24	Water Serv,	3	Ea	1,200.00	$3,600.00
25	Water Serv, Long	3	Ea	2,000.00	$6,000.00
26	Lead Service Line Replacement	5	Ea	10,000.00	$50,000.00
27	Maintenance Gravel	300	Ton	30.00	$9,000.00
28	Sanitary Lead Repair	5	Ea	7,500.00	$37,500.00
29	Proposed Tree	10	Ea	850.00	$8,500.00
30	Restoration	1	LS	31,000.00	$31,000.00
31	Project Cleanup	1	LS	5,000.00	$5,000.00
				Estimated Construction SubTotal	**$858,830.56**
				Design and Engineering (20%)	**$171,766.11**
				Total Estimated Project Cost	**$1,030,596.67**

Note: 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from the west end to Morningside

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Marian Ct Water Main Open Cut

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

DATE: April 17, 2023

CHECKED BY:

DATE:

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO. 0160-0462

WORK ITEM		QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	LS	23,000.00	$23,000.00
2	Traffic Control and Maintenance	1	LS	23,000.00	$23,000.00
3	Bonds, Insurance, Contingencies	1	LS	23,000.00	$23,000.00
4	Tree, Rem	3	Ea	3,000.00	$9,000.00
5	Audio Visual Record of Construction Area	1	LS	2,500.00	$2,500.00
6	Pavt Repr, Rem	400	Syd	20.00	$8,000.00
7	Pavt Repr, Nonreinf Conc, 8 inch	400	Syd	75.00	$30,000.00
8	Aggregate Base, 6 inch	400	Syd	15.00	$6,000.00
9	Lane Tie, Epoxy Anchored	400	Ea	7.50	$3,000.00
10	Driveway, Rem	68	Syd	12.00	$810.00
11	Driveway, Nonreinf Conc, 6 inch	68	Syd	65.00	$4,387.50
12	Gate Well, Rem	1	Ea	600.00	$600.00
13	Hydrant, Rem	1	Ea	750.00	$750.00
14	Water Main, DI, 8 inch, Tr Det G	360	Ft	240.00	$86,400.00
15	Gate Well, 60 inch Dia	1	Ea	5,000.00	$5,000.00
16	Gate Valve, 8 inch	1	Ea	8,000.00	$8,000.00
17	Gate Well Cover, GPW	1	Syd	650.00	$650.00
18	Fire Hydrant Assembly	1	Ea	10,000.00	$10,000.00
19	Water Main, Connection, 8 inch	1	LS	10,000.00	$10,000.00
20	Water Service, Transfer	9	Ea	850.00	$7,650.00
21	Water Serv,	1	Ea	1,200.00	$1,200.00
22	Water Serv, Long	1	Ea	2,000.00	$2,000.00
23	Lead Service Line Replacement	1	Ea	10,000.00	$10,000.00
24	Maintenance Gravel	100	Ton	30.00	$3,000.00
25	Sanitary Lead Repair	2	Ea	7,500.00	$15,000.00
26	Proposed Tree	3	Ea	850.00	$2,550.00
27	Restoration	1	LS	6,500.00	$6,500.00
28	Project Cleanup	1	LS	2,000.00	$2,000.00
				Estimated Construction SubTotal	**$303,997.50**
				Design and Engineering (20%)	**$60,799.50**
				Total Estimated Project Cost	**$364,797.00**

Note: 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from River Rd to East End

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Lee Ct Water Main
Open Cut

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

PRELIMINARY ENGINEER'S ESTIMATE

DATE: April 17, 2023

AEW PROJECT NO. 0160-0462

CHECKED BY:

DATE:

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1 Mobilization	1	LS	21,000.00	$21,000.00
2 Traffic Control and Maintenance	1	LS	21,000.00	$21,000.00
3 Bonds, Insurance, Contingencies	1	LS	21,000.00	$21,000.00
4 Tree, Rem	2	Ea	3,000.00	$6,000.00
5 Audio Visual Record of Construction Area	1	LS	2,500.00	$2,500.00
6 Pavt Repr, Rem	150	Syd	20.00	$3,000.00
7 Pavt Repr, Nonreinf Conc, 8 inch	150	Syd	75.00	$11,250.00
8 Aggregate Base, 6 inch	150	Syd	15.00	$2,250.00
9 Lane Tie, Epoxy Anchored	150	Ea	7.50	$1,125.00
10 Sidewalk, Rem	181	Syd	12.00	$2,166.67
11 Sidewalk, Conc, 4 inch	1,219	Sft	6.00	$7,312.50
12 Sidewalk, Conc, 6 inch	406	Sft	8.00	$3,250.00
13 Driveway, Rem	83	Syd	12.00	$990.00
14 Driveway, Nonreinf Conc, 6 inch	83	Syd	65.00	$5,362.50
15 Gate Well, Rem	1	Ea	600.00	$600.00
16 Hydrant, Rem	1	Ea	750.00	$750.00
17 Water Main, DI, 8 inch, Tr Det G	325	Ft	240.00	$78,000.00
18 Gate Well, 60 inch Dia	1	Ea	5,000.00	$5,000.00
19 Gate Valve, 8 inch	1	Ea	8,000.00	$8,000.00
20 Gate Well Cover, GPW	1	Syd	650.00	$650.00
21 Fire Hydrant Assembly	1	Ea	10,000.00	$10,000.00
22 Water Main, Connection, 8 inch	1	LS	10,000.00	$10,000.00
23 Water Service, Transfer	11	Ea	850.00	$9,350.00
24 Water Serv,	3	Ea	1,200.00	$3,600.00
25 Water Serv, Long	3	Ea	2,000.00	$6,000.00
26 Lead Service Line Replacement	1	Ea	10,000.00	$10,000.00
27 Maintenance Gravel	100	Ton	30.00	$3,000.00
28 Sanitary Lead Repair	2	Ea	7,500.00	$15,000.00
29 Proposed Tree	2	Ea	850.00	$1,700.00
30 Restoration	1	LS	5,900.00	$5,900.00
31 Project Cleanup	1	LS	2,000.00	$2,000.00
			Estimated Construction SubTotal	**$277,756.67**
			Design and Engineering (20%)	**$55,551.33**
			Total Estimated Project Cost	**$333,308.00**

Note: 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from Vernier Rd to North End

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Hidden Ln Water Main Directional Drilling

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

PRELIMINARY ENGINEER'S ESTIMATE

DATE: April 17, 2023

AEW PROJECT NO. 0160-0462

CHECKED BY:

DATE:

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1 Mobilization	1	LS	38,000.00	$38,000.00
2 Traffic Control and Maintenance	1	LS	38,000.00	$38,000.00
3 Bonds, Insurance, Contingencies	1	LS	38,000.00	$38,000.00
4 Tree, Rem	10	Ea	3,000.00	$30,000.00
5 Audio Visual Record of Construction Area	1	LS	3,000.00	$3,000.00
6 Pavt Repr, Rem	100	Syd	20.00	$2,000.00
7 Pavt Repr, Nonreinf Conc, 8 inch	100	Syd	70.00	$7,000.00
8 Aggregate Base, 6 inch	100	Syd	15.00	$1,500.00
9 Lane Tie, Epoxy Anchored	100	Ea	6.00	$600.00
10 Sidewalk, Rem	191	Syd	10.00	$1,911.11
11 Sidewalk, Conc, 4 inch	1,290	Sft	5.50	$7,095.00
12 Sidewalk, Conc, 6 inch	430	Sft	7.00	$3,010.00
13 Driveway, Rem	150	Syd	10.00	$1,500.00
14 Driveway, Nonreinf Conc, 6 inch	150	Syd	60.00	$9,000.00
15 Gate Well, Rem	2	Ea	600.00	$1,200.00
16 Hydrant, Rem	4	Ea	750.00	$3,000.00
17 Water Main, HDPE, DR11, 8 inch, Directional Drill	1,720	Ft	250.00	$430,000.00
18 Gate Well, 60 inch Dia	2	Ea	5,000.00	$10,000.00
19 Gate Valve, 8 inch	2	Ea	8,000.00	$16,000.00
20 Gate Well Cover, GPW	2	Syd	650.00	$1,300.00
21 Fire Hydrant Assembly	4	Ea	10,000.00	$40,000.00
22 Water Main, Connection, 8 inch	2	LS	8,500.00	$17,000.00
23 Water Service, Transfer	40	Ea	850.00	$34,000.00
24 Water Serv,	3	Ea	1,200.00	$3,600.00
25 Water Serv, Long	3	Ea	2,000.00	$6,000.00
26 Lead Service Line Replacement	5	Ea	10,000.00	$50,000.00
27 Water Main, Abandon	1	LS	10,000.00	$10,000.00
28 Maintenance Gravel	300	Ton	30.00	$9,000.00
29 Sanitary Lead Repair	5	Ea	7,500.00	$37,500.00
30 Pre-Televise Sanitary Lead	20	Ea	175.00	$3,500.00
31 Post-Televise Sanitary Lead	20	Ea	175.00	$3,500.00
32 Proposed Tree	10	Ea	850.00	$8,500.00
33 Restoration	1	LS	10,000.00	$10,000.00
34 Project Cleanup	1	LS	5,000.00	$5,000.00
			Estimated Construction SubTotal	**$879,716.11**
			Design and Engineering (20%)	**$175,943.22**
			Total Estimated Project Cost	**$1,055,659.33**

Note 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from the west end to Morningside

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CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Marian Ct Water Main Directional Drilling

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

DATE: April 17, 2023

CHECKED BY:

DATE:

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO. 0160-0462

WORK ITEM		QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	LS	22,000.00	$22,000.00
2	Traffic Control and Maintenance	1	LS	22,000.00	$22,000.00
3	Bonds, Insurance, Contingencies	1	LS	22,000.00	$22,000.00
4	Tree, Rem	3	Ea	3,000.00	$9,000.00
5	Audio Visual Record of Construction Area	1	LS	2,500.00	$2,500.00
6	Pavt Repr, Rem	100	Syd	20.00	$2,000.00
7	Pavt Repr, Nonreinf Conc, 8 inch	100	Syd	75.00	$7,500.00
8	Aggregate Base, 6 inch	100	Syd	15.00	$1,500.00
9	Lane Tie, Epoxy Anchored	100	Ea	7.50	$750.00
10	Driveway, Rem	34	Syd	12.00	$405.00
11	Driveway, Nonreinf Conc, 6 inch	34	Syd	65.00	$2,193.75
12	Gate Well, Rem	1	Ea	600.00	$600.00
13	Hydrant, Rem	1	Ea	750.00	$750.00
14	Water Main, HDPE, DR11, 8 inch, Directional Drill	360	Ft	300.00	$108,000.00
15	Gate Well, 60 inch Dia	1	Ea	5,000.00	$5,000.00
16	Gate Valve, 8 inch	1	Ea	8,000.00	$8,000.00
17	Gate Well Cover, GPW	1	Syd	650.00	$650.00
18	Fire Hydrant Assembly	1	Ea	10,000.00	$10,000.00
19	Water Main, Connection, 8 inch	1	LS	10,000.00	$10,000.00
20	Water Service, Transfer	9	Ea	850.00	$7,650.00
21	Water Serv,	1	Ea	1,200.00	$1,200.00
22	Water Serv, Long	1	Ea	2,000.00	$2,000.00
23	Lead Service Line Replacement	1	Ea	10,000.00	$10,000.00
24	Water Main, Abandon	1	LS	5,000.00	$5,000.00
25	Maintenance Gravel	100	Ton	30.00	$3,000.00
26	Sanitary Lead Repair	2	Ea	7,500.00	$15,000.00
27	Pre-Televise Sanitary Lead	5	Ea	250.00	$1,125.00
28	Post-Televise Sanitary Lead	5	Ea	250.00	$1,125.00
29	Proposed Tree	3	Ea	850.00	$2,550.00
30	Restoration	1	LS	5,000.00	$5,000.00
31	Project Cleanup	1	LS	2,000.00	$2,000.00
				Estimated Construction SubTotal	**$290,498.75**
				Design and Engineering (20%)	**$58,099.75**
				Total Estimated Project Cost	**$348,598.50**

Note: 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from River Rd to East End

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Lee Ct Water Main Directional Drilling

OWNER: City of Grosse Pointe Woods

PREPARED BY: Ross Wilberding, PE

PRELIMINARY ENGINEER'S ESTIMATE

DATE: April 17, 2023

AEW PROJECT NO. 0160-0462

CHECKED BY:

DATE:

WORK ITEM		QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	LS	22,000.00	$22,000.00
2	Traffic Control and Maintenance	1	LS	22,000.00	$22,000.00
3	Bonds, Insurance, Contingencies	1	LS	22,000.00	$22,000.00
4	Tree, Rem	2	Ea	3,000.00	$6,000.00
5	Audio Visual Record of Construction Area	1	LS	2,500.00	$2,500.00
6	Pavt Repr, Rem	100	Syd	20.00	$2,000.00
7	Pavt Repr, Nonreinf Conc, 8 inch	100	Syd	75.00	$7,500.00
8	Aggregate Base, 6 inch	100	Syd	15.00	$1,500.00
9	Lane Tie, Epoxy Anchored	100	Ea	7.50	$750.00
10	Sidewalk, Rem	36	Syd	12.00	$433.33
11	Sidewalk, Conc, 4 inch	244	Sft	6.00	$1,462.50
12	Sidewalk, Conc, 6 inch	81	Sft	8.00	$650.00
13	Driveway, Rem	41	Syd	12.00	$495.00
14	Driveway, Nonreinf Conc, 6 inch	41	Syd	65.00	$2,681.25
15	Gate Well, Rem	1	Ea	600.00	$600.00
16	Hydrant, Rem	1	Ea	750.00	$750.00
17	Water Main, HDPE, DR11, 8 inch, Directional Drill	325	Ft	300.00	$97,500.00
18	Gate Well, 60 inch Dia	1	Ea	5,000.00	$5,000.00
19	Gate Valve, 8 inch	1	Ea	8,000.00	$8,000.00
20	Gate Well Cover, GPW	1	Syd	650.00	$650.00
21	Fire Hydrant Assembly	1	Ea	10,000.00	$10,000.00
22	Water Main, Connection, 8 inch	1	LS	10,000.00	$10,000.00
23	Water Service, Transfer	11	Ea	850.00	$9,350.00
24	Water Serv,	3	Ea	1,200.00	$3,600.00
25	Water Serv, Long	3	Ea	2,000.00	$6,000.00
26	Lead Service Line Replacement	1	Ea	10,000.00	$10,000.00
27	Water Main, Abandon	1	LS	5,000.00	$5,000.00
28	Maintenance Gravel	100	Ton	30.00	$3,000.00
29	Sanitary Lead Repair	2	Ea	7,500.00	$15,000.00
30	Pre-Televise Sanitary Lead	3	Ea	250.00	$750.00
31	Post-Televise Sanitary Lead	3	Ea	250.00	$750.00
32	Proposed Tree	2	Ea	850.00	$1,700.00
33	Restoration	1	LS	5,000.00	$5,000.00
34	Project Cleanup	1	LS	2,000.00	$2,000.00
				Estimated Construction SubTotal	**$286,622.08**
				Design and Engineering (20%)	**$57,324.42**
				Total Estimated Project Cost	**$343,946.50**

Note 1. Costs provided in this estimate are for budgetary purposes

2. Limits are from Vernier Rd to North End

Appendix F

Present Worth Analysis

PRESENT WORTH ANALYSIS

No.	Item	Water Main Replacments			CDSMI	Lead Service	CWSRF Selected
		Open Cut	Directional Drilling	Pipe Bursting	3-Point Inspections	Replacements	Project Total
1	Capital Cost	$ 1,728,701.67	$ 1,748,204.33	$ 1,663,064.33	$ 384,315.00	$ 1,743,510.00	$ 3,790,889.33
2	Salvage Value at 20 years	$ 1,037,221.00	$ 1,048,922.60	$ 997,838.60	$ 230,589.00	$ 1,046,106.00	$ 2,274,533.60
3	Present Worth of Salvage	$ 632,985.84	$ 640,126.98	$ 608,951.90	$ 140,721.77	$ 638,408.09	$ 1,388,081.76
4	Interest During Construction	$ 17,287.02	$ 17,482.04	$ 16,630.64	$ 3,843.15	$ 17,435.10	$ 37,908.89
5	Annual O&M Costs	$ -	$ -	$ -	$ -	$ -	$ -
6	Present Worth of O&M	$ -	$ -	$ -	$ -	$ -	$ -
7	Total Present Worth	$ 1,113,002.85	$ 1,125,559.39	$ 1,070,743.07	$ 247,436.38	$ 1,122,537.01	$ 2,440,716.46
8	Equivalent Annual Cost	$ 71,395.94	$ 72,201.40	$ 68,685.09	$ 15,872.33	$ 72,007.53	$ 156,564.95

Notes:

(1) From The Preliminary Cost Estimate.

(2) Salvage Value at the end of the 20-year planning period computed on the basis of straight line depreciation, and a 50-year design life.

(3) Present Worth of Salvage Value at the end of the planning period.

(P/F, Discount Rate = 0.025, 20 years) = 0.61027

(4) Interest During Construction = 0.5 x P x I x C

P = Construction Period in Years = 1 year

i = Discount Rate = 0.025

C = Total Capital Cost

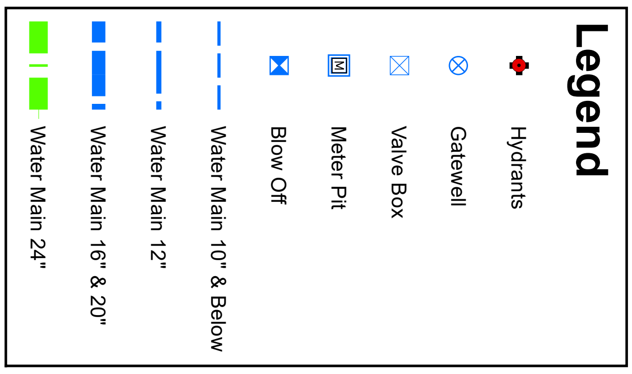
(5) Total Present Worth = Total Capital Cost + Present Worth of O&M + Interest During Construction - Present Worth of Salvage

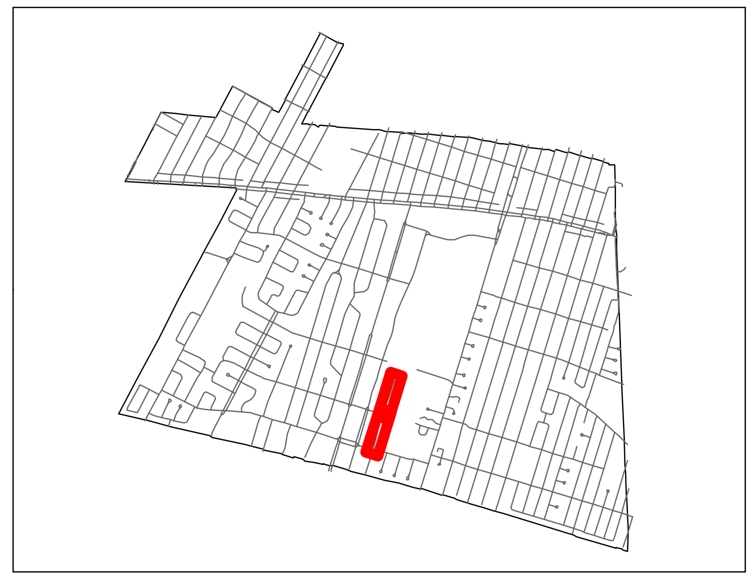
(6) Equivalent Annual Cost = 0.06116 x Total Present Worth

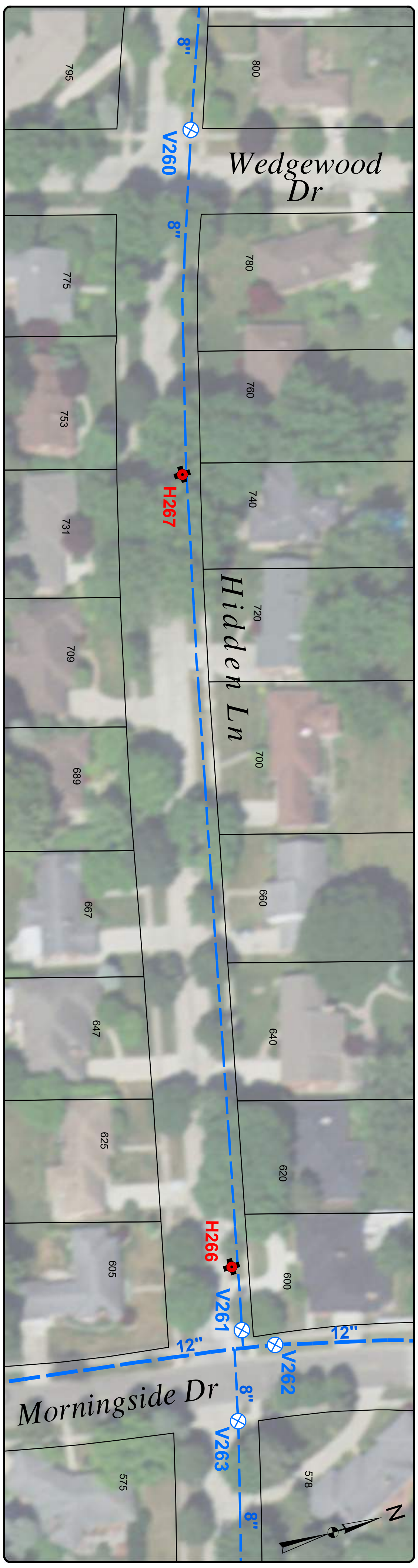
(A/P, Discount Rate = 0.025, 20 years) = 0.06415

Appendix G

Project Location Maps







ANDERSON, ECKSTEIN AND WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS
51301 Schoenherr Rd
Shelby Township
Michigan 48315
Phone 586 726 1234
Fax 586 726 8780
www.aewinc.com

DATE PRINTED: April 17, 2023	DATE CREATED: April 14, 2023
SCALE: 1 inch = 100 Feet	MAP DOCUMENT: Hidden Ln Water Main.mxd
PROJECT NO: 0160-0462	CREATED BY: JGS / CHECKED BY: RW

CITY OF GROSSE POINTE WOODS MICHIGAN
URBIS MAGNA PULCHRITUDINE
CORPORATE SEAL

City of Grosse Pointe Woods

Hidden Ln Water Main

REFERENCE SHEET NUMBER	PAGE NAME
INDEX	INDEX

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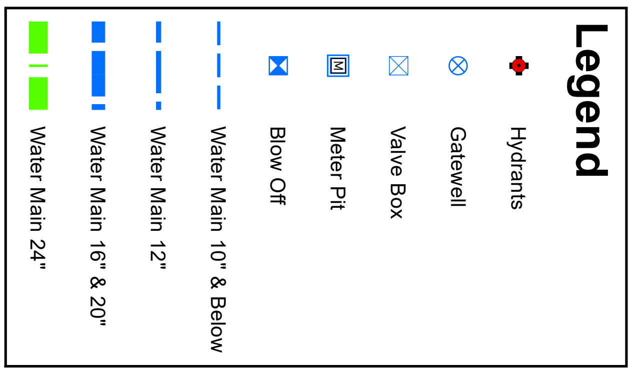

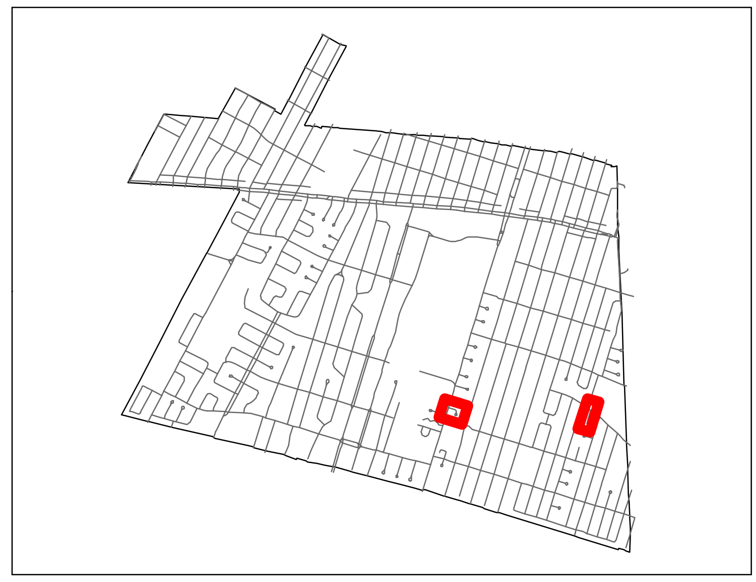

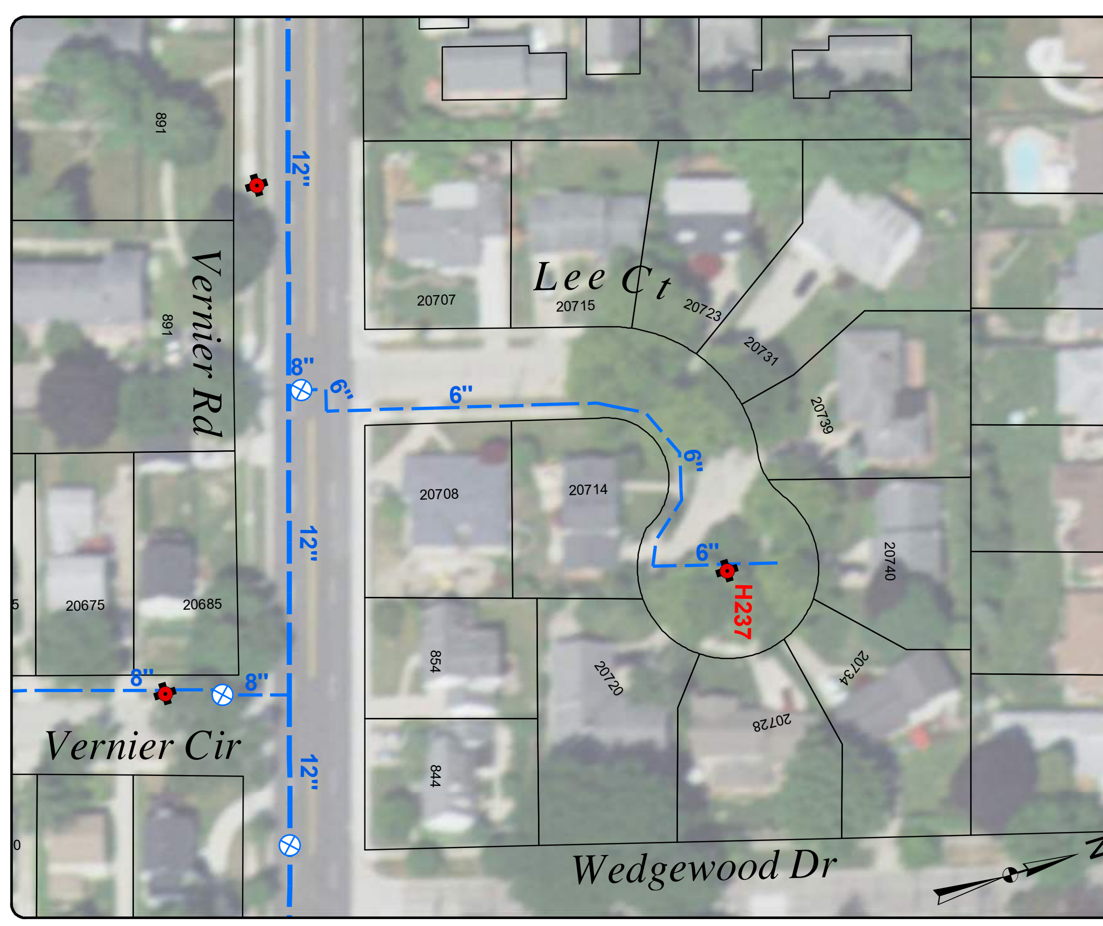

ANDERSON, ECKSTEIN AND WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS

DATE PRINTED: April 17, 2023	DATE CREATED: April 14, 2023
SCALE: 1 inch = 100 Feet	MAP DOCUMENT: Courts Water Main.mxd
PROJECT NO: 0160-0462	CREATED BY: JGS / CHECKED BY: RW

City of Grosse Pointe Woods

Lee Ct & Marian Ct Water Main

REFERENCE SHEET NUMBER	PAGE NAME
INDEX	INDEX

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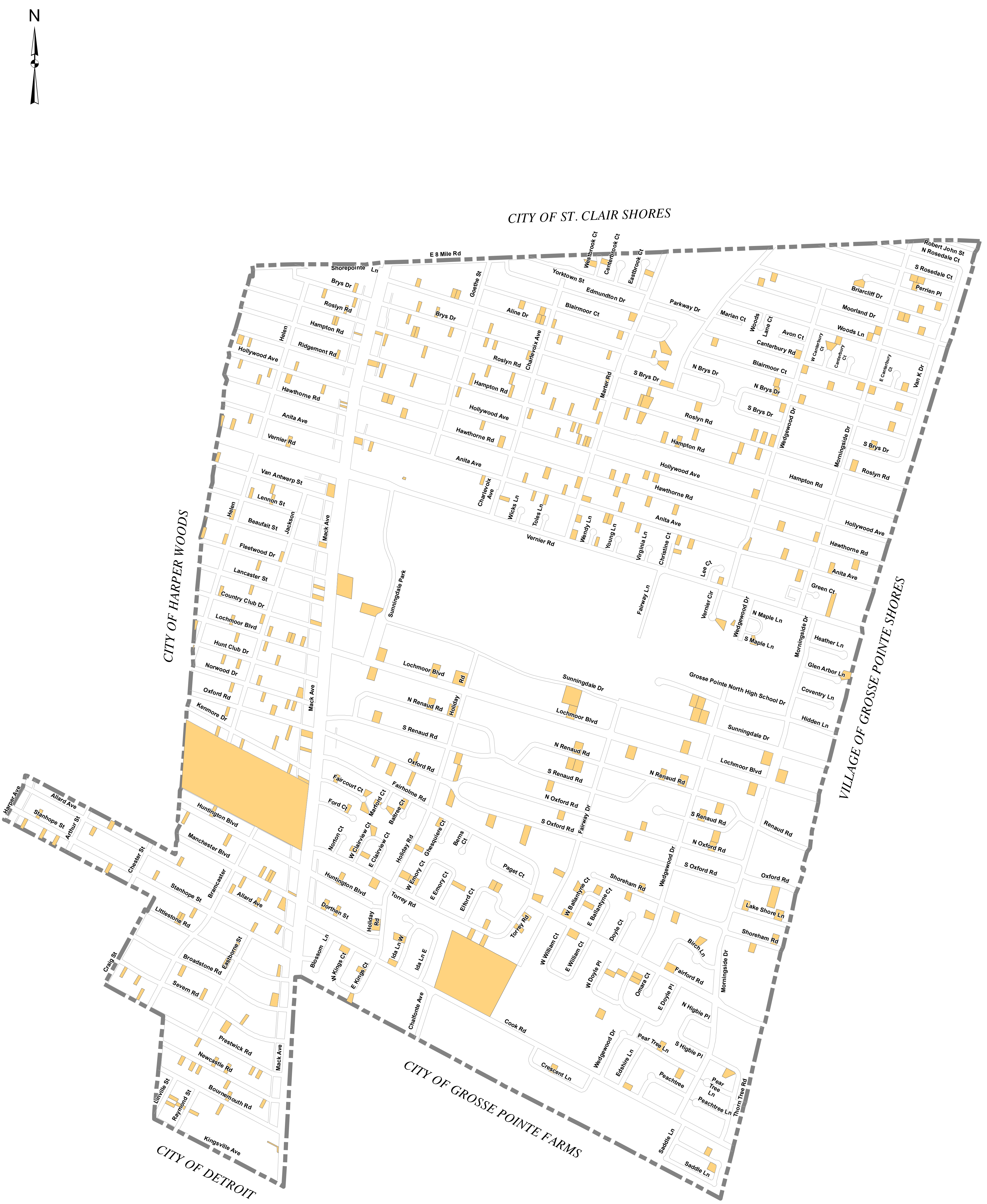


Legend

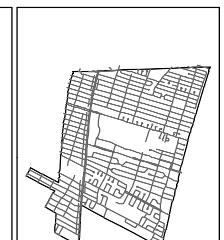
CDSMI Inspection Locations

ANDERSON, ECKSTEIN AND WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS

DATE PRINTED: April 14, 2023	DATE CREATED: April 14, 2023	
SCALE: NTS	MAP DOCUMENT: OverallRehab.mxd	
PROJECT NO: 0160-0462	CREATED BY: JGS	CHECKED BY: RW

City of Grosse Pointe Woods

CDSMI Inspection Locations



REFERENCE SHEET NUMBER	PAGE NAME
INDEX	INDEX

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Appendix H

Public Meeting Advertisement and Summary

NOTICE OF PUBLIC MEETING
Drinking Water State Revolving Fund (DWSRF) Loan Project

The City of Grosse Pointe Woods will hold a public meeting on the proposed Drinking Water State Revolving Fund (DWSRF) Project for the purpose of receiving comments from interested persons.

The meeting will be held at 6:00 p.m. on Monday, May 15, 2023 in the Community Center in the Grosse Pointe Woods City Hall, 20025 Mack Plaza Dr, Grosse Pointe Woods, Michigan 48236.

The purpose of the proposed project is to improve the reliability of the water distribution system and comply with recent regulatory changes.

Project construction will involve replacement of aging water mains throughout the City, lead service line replacements, and investigations for Complete Distribution System Material Inventory.

The estimated cost to users for the proposed project is expected to be approximately $3.8M utilizing a low-interest loan over a 20-year period.

Copies of the draft plan detailing the proposed project will be available for inspection on the city website. The plan will be available beginning on Friday, April 28, 2023.

Written comments received before the public meeting concludes on Monday, May 15, 2023, will receive a written response in the final project plan. Written comments should be sent to the city's consulting engineer preparing the final project plan. Direct written comments to Anderson, Eckstein and Westrick, ATTN: Ross Wilberding, Project Manager, 51301 Schoenherr Road, Shelby Township, Michigan 48315 or by e-mail at rwilberding@aewinc.com.

Appendix I

City Council Resolution to Adopt Project Planning Document