DETROIT
RIVERSIDE
CAPITAL

RECEIVED
January 5, 2022
Orion Township
Planning & Zoning

January 4th, 2022

Tammy Girling

Director - Planning & Zoning

2525 Joslyn Road, Lake Orion, MI 48360

RE: The Woodlands – Changes between 1st and 2nd submission

Dear Ms. Girling,

This letter is to inform you of the changes we've made to our PUD application for The Woodlands between the 1st submission (9/22/21) and the 2nd submission (1/5/22). The changes include:

- Increased land size – We have included the adjacent 7-acre parcel (Parcel ID: 09-26-101-021) in our PUD application, bringing the total land size of the PUD application from 20.63 acres to 27.7 acres
- Decreased density – Based on feedback obtained from the planning commission during the November 17th PC meeting, we decided to reduce total density proposed for The Woodlands from 190 units down to 166 units. Due to the increased volume of land plus the reduced number of units, we were able to reduce our total density per acre down from 9.2 units/acre to 5.9 units/acre, a reduction of more than 35%.
- Increased transitional areas/buffers – Based on feedback obtained from the planning consultant review dated October 27th, 2021, we relocated 75 parking spaces to the added land to the East. This allowed us to increase the transitional areas/buffers between The Woodlands and all adjacent residential uses by at least 20 feet, and in some cases, more than 20 feet.
- Addition of restaurant – As a result of the additional land included in the PUD application, we were able to provide the land area and parking requirements to propose a free-standing, high-quality, locally owned restaurant. This is the same restaurant that was going to previously occupy this space under the conditional rezone of the 7-acre parcel.

We have also updated the exterior façade and renderings within our application to illustrate the high-quality architectural design that The Woodlands features. We thank you for your consideration of our application.

All the best,

Michael Wayne

Partner at Detroit Riverside Capital

Phone: 248-953-4891

Email: Michael@detroitriversidecapital.com

DETROIT RIVERSIDE CAPITAL

JANUARY 4, 2021

THE WOODLANDS

APPLICATION FOR A PLANNED UNIT DEVELOPMENT (2ND SUBMISSION)

DETROIT RIVERSIDE CAPITAL
ATTN: MICHAEL WAYNE
3300 Auburn Rd. Suite 300 Auburn Hills, Mi 48326

General Information

Applicant Name: Detroit Riverside Capital

Applicant Contact: Michael Wayne – (248) 953-4891; Michael@DetroitRiversideCapital.com

Project Name: The Woodlands

Subject Parcel ID(s)**: (1)** 09-23-351-024; **(2)** 09-26-101-021

Common Description of Parcel: The subject parcel is at the corner of Lapeer Rd. and Waldon Rd. in Orion Township, MI and continues to the Northwest. The two parcels total 27.7 acres. The current parcels are mostly wooded, and the larger parcel (09-23-351-024) has never been built on.

Legal Description of Parcel: Attached to application package as *Exhibit A*, titled Legal Description

Comprehensive Statement of Intent

The Woodlands is a 166 unit, 202K square foot, market rate, multi-family development containing one-, two-, and three-bedroom dwellings. The residences are spread across two buildings, one 100K and the other 102K in total gross square feet. Perhaps the most unique feature of The Woodlands is the 12-acre nature preserve on the northwest portion of the subject parcel, which will feature a multitude of outdoor activity space. The center of the buildings will feature over 4.5K square feet of additional outdoor amenity space; complete with a pool, grilling area, walking promenade, outdoor resident lounge, and private patios for first floor dwellings. The interior of the building will also feature amenity space complete with an indoor resident lounge, gym, co-working space, golf-simulator, and movie theater, among others.

The Woodlands will be a cornerstone of Orion Township and be among the most high-end residential housing options in the Township. A thoughtful and high-quality exterior fascade will accent the neighboring community, and the project, at-large, will offer a new style of living not currently available in Orion Township. This will attract a growing demographic of millennial and Gen Z renters who are increasingly demanding highly-amenitized, well-designed rental housing options. Ultimately, The Woodlands will be a catalyst for the continued growth of Orion Township and provide high quality housing for Orion Township residents for decades to come.

Market Concept

Detroit Riverside Capital's analysis of the existing multi-family market in Orion Township and the surrounding area indicates that there is significant demand for additional multi-family dwellings. The following is a list of existing multi-family properties within the surrounding area and their respective current occupancy:

1. Heron Springs Townhomes & Apartments - 99%
2. Indian Lake Village Apartments (immediately adjacent to proposed development) - 100%
3. Abbey Ridge Apartments - 100%
4. Parkways of Auburn Hills - 100%

5. Redwood Lake Orion Apartment Homes - 100%

These occupancy rates indicate that the existing supply of apartments within Orion Township and the surrounding area have been fully absorbed and additional supply of multi-family dwellings are needed to sustain growth.

Additionally, the population within a 5-mile-radius of the proposed site is expected to grow by more than 2,300 by 2025, or 2.5%. For Orion Township to capture their respective share of this growing population, with the existing supply fully occupied, additional dwellings must be built to support the growing demand.

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1. *How will a PUD approval result in a recognizable and substantial benefit to the ultimate users of the project and the community?*

The Woodlands has been specifically designed to maximize land preservation of the existing site, per the emphasis provided on this requirement throughout Section 30.03 of the PUD ordinance. Instead of proposing a development that sprawls across the entirety of the 27+ acre property, DRC has designed a project that allows the preservation of over 12 acres of existing natural landscape on the northwest portion of the site. This space will serve, in perpetuity, as a community space for our residents and adjacent community members to utilize for walking, biking, hiking, and other physical or relaxation activities. We will construct paths throughout the preserve that facilitate these activities and will include Gazebos, benches, and even outdoor exercise equipment to enhance the enjoyment of the space. The preserve will also feature a sport court with tennis and basketball courts to provide additional recreation for residents. We are also willing to offer agreements with adjacent parcel owners to grant them access to utilize this nature preserve, expanding the benefit beyond just residents of The Woodlands to the broader community.

This design allows for a more aesthetically pleasing and functional use of the land. Conversely, a garden style, 2-story, sprawling design (like the one featured in our submittal package as *Exhibit B* titled "Alternate Design") would require use of almost the entire parcel, which would eliminate the potential for the nature preserve and only provide for smaller, disjointed preservation areas throughout the site, as opposed to the contiguous 12 acre preserve.

Our unique architectural design also provides for more than 4,500 SF amenity area in the center of the two proposed buildings. This area will feature a pool, outdoor grill, walking promenade, gazebo, and private patios connected to first-floor dwellings. This unique design allows for all interior facing dwellings to overlook this amenity space from exterior facing windows and interior balconies. A space of this size and scale would once again not be possible with a compliant site plan or the "Alternate Design" provided in the packet.

The architectural design of the proposed project would be very high quality, complete with thoughtful exterior fascade materials such as brick, stone, Nichiha wood grain

siding, engineered insulation and finish system, and a combination of metal and asphalt roofing. The interior of the units would also be high-end, complete with stainless steel appliances, quartz countertops, soft-close cabinetry, name-brand plumbing and lighting fixtures, and smart-home elements such as electronic access system and smart thermostats.

The proposed restaurant would also provide a strong benefit to the community. As we heard in our initial public hearing, there is a lack of good quality restaurants along the Lapeer Rd. corridor to service Orion Township. This restaurant will bring a much-needed dining option to the Orion Township community and be owned and operated by local Orion Township residents.

Finally, another community benefit of The Woodlands is the extention of the community safety path from the Waldon Rd. entrance to the Lapeer Rd. entrance of The Woodlands. This would provide a connection point for Waldon Rd. residents to the existing safety path to the north of the proposed development site. Currently, residents must access the path to the North using the existing roadway, which can be dangerous for both pedestrians and vehicle operators.

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2. *Would such benefit otherwise be unfeasible or unlikely to be achieved?*

The interior amenities, exterior amenities, expansive nature preserves, quality level of housing, and unique architectural design delivered to the community by The Woodlands cannot be achieved to the same extent through any other design. A traditional, 2-story, garden-style expansive multi-family project would significantly reduce the amount of open space and nature preservation provided by The Woodlands.

A design that utilizes the existing zoning, single-family residential, is also not feasible on the subject parcel. Through a geotechnical investigation, we confirmed that the water table on the subject parcel is particularly high (approx. 3 to 6 feet below grade). This effectively eliminates the viability for a developer to provide any sub-surface structure (i.e., basement) to a development on this land. Home buying preferences today strongly demand basements, therefore, the natural features of this land (i.e., high water table) threaten the viability of a project utilizing the existing Master Planed land use.

The Woodlands will provide a use that still delivers on the spirit of the underlying master plan, while preserving significant natural features (12+ acres) and designing around the natural born limitations of the land (high water table).

The Woodlands creates a one-of-a-kind project for Orion Township and the future benefit to the community is something DRC is extremely proud of.

3. *Will the proposed type and density of use result in a material increase in the use of public services, facilities, and utilities, in relation to what would be permitted if the property were developed without using the PUD?*

As shown in the density plan provided in the application, the 166 units contained in The Woodlands PUD application requires a density of 5.9 dwelling units per acre. This density is slightly lower than the lowest density multi-family zoning, RM-1. The Woodlands would result in an increased use of public utilities, as compared to that required under the existing zoning. However, in a pre-application meeting with various Township stakeholders, the city's engineering consultant shared that there is ample utility infrastructure adjacent to the subject parcel to support a development of this size. Therefore, The Woodlands does not result in an unreasonable increase in the need for, or impact on, existing public utility infrastructure.

As a part of our due diligence, we also commissioned a traffic impact study with ROWE Professional Services Company to better understand the traffic impacts of The Woodlands. That study is being provided in a separate document. The results suggest that while the existing throughfares surrounding The Woodlands are high-volume roadways, The Woodlands does not present any type of significant negative change on the surrounding traffic volumes.

With respect to public services like police, fire, and EMS services, The Woodlands would not result in a material increase in use, as compared to what is permitted under current zoning. There is no data that suggests that, on average, apartments create a higher volume of public services needs compared to single family homes.

With respect to storm water management, The Woodlands will be designed to meet or exceed all Oakland County Water Resource requirements as it relates to stormwater management. As a part of our due diligence, we commissioned a study through Stonefield Engineering to understand the impacts of the pre-development drainage conditions compared to the post-development drainage conditions. The full Stormwater Management Statement is included in this application as *Exhibit C*. The results showed that the post-development conditions (i.e., once the Woodlands is built) result in a net reduction of 80% in the site's stormwater discharge rate, roughly 40.54 CFS to 8.13 CFS during a 100-year event. This means that water would discharge from inside the property lines to outside the property lines of the subject parcel 80% slower than it currently does.

Some community members who live adjacent to The Woodlands have shared that they currently experience flooding on their properties, and they're concerned that the construction of The Woodlands will make this flooding worse. This study proves that not only will The Woodlands be capable of managing its storm water, but it will also reduce the rate at which this water leaves the site by 80%. This suggests that The Woodlands will not exacerbate any of the existing flooding on adjacent parcels and to the contrary, may play a role in reducing or eliminating flooding on adjacent parcels.

4. *Will the proposed PUD place an unreasonable burden upon the subject and/or surrounding land and /or property owners and occupants/or the natural features?*

The proposed PUD places no unreasonable burden upon the subject parcel, its natural features, the surrounding land, or other property owners. The Woodlands preserves a far greater number of natural features as would otherwise be possible with alternate designs, uses, or existing zoning regulations. The perimeter of The Woodlands has been designed to protect the integrity of surrounding properties by utilizing 5-foot-high natural berms and expansive natural landscape buffers to shield the view of the development from neighboring properties. For certain neighboring properties that can see a portion of the development, the exterior fascade has been designed with high-quality aesthetic in mind. The Woodlands façade has been designed to blend with its natural surroundings and will not create an unsightly view from any neighboring properties.

The updates to The Woodlands between the first and second submissions were made entirely in the interest of the surrounding land and property owners. We relocated 75 parking spaces at key buffer zones to the additional land to the East. This allowed us to increase the buffers/transitional areas by at least 20 feet in all areas where The Woodlands abuts single family houses or condos. We also removed the island feature from the Waldon Rd. entrance, which increased the buffers by 10 feet per side for the single-family homes adjacent to the entrance.

A concern posed by a community member at the initial public hearing suggested he was worried The Woodlands would block the sun from his condo. Included in our second submission is a shadow study, showing the estimated shadows at sunrise and sunset and in both summer and winter periods of the year. As you'll see, the depths of the shadow do not touch any neighboring residence. This means that the shadows during sunrise and sunset created from The Woodlands will not block the sun from shinning on any adjacent residential parcel.

5. Will the proposed development be consistent with the intent and spirit of the Master Plan and community?

Per the 2015 published Orion Township Master Plan, the future land use for this parcel is split between Single-Family Suburban Estates (SE) and Single-Family R-2. Therefore, the intent and spirit of the current use is to provide additional residential housing for Township members. The Woodlands provides this in a manner that is more conducive to the natural features of the parcel.

In addition, The Woodlands was designed specifically to comply with the goals and objectives presented in the 2015 Orion Township Master plan. The core areas of compatibility include the following:

1. Section IV. Environmental Resources Goal A: *To Preserve the Natural Resources of Orion Township*

   The Woodlands is the epitome of nature preservation. The 12-acre nature preserve of The Woodlands will provide for recreational enjoyment by residents and other community members in perpetuity. This is a "win-win" scenario, as The Woodlands unique design allows for the creation of 166 residential dwellings, while still preserving over 60% of the subject parcel in its natural habitat. This allows Orion Township to continue its growth in a controlled and nature-friendly manner.

2. Section VII. Growth Management Goal A: *To guide growth within Orion Township in a rational and sequential manner which will avoid patterns of sprawl and "leapfrog" development. Innovative and flexible approaches for growth management shall be employed which will prevent overcrowding, protect open space, provide a balance of housing options, and minimize traffic congestion*

   The Woodlands represents a rational and sequential growth opportunity for Orion Township. Already surrounded by other residential housing, the subject parcel is the next logical step for this microcosm of Orion Township to continue its growth. The project protects over 12 acres of open space, provides first-of-its-kind amenities, presents a new distinctive housing option, and does not over burden the traffic volumes of its surroundings.

3. Section VIII. Residential Areas Goal A, Objective III: *To provide appropriate areas for housing other than conventional single-family homes.*

   The subject parcel of The Woodlands is currently zoned for single family use. As described herein, single family use is not feasible on this parcel. This is evidenced by PulteGroup, one of the largest single family home builders in the country, passing on developing single family homes on the subject parcel. The Woodlands provides a use for the subject parcel that is consistent with the overall intent and spirit of the master plan and current zoning (i.e., to provide residential housing), but does so in a way that is more feasible given the natural features of the parcel. The Woodlands will provide residents with direct access to the largest thoroughfare in the township, Lapeer Rd., which will support the traffic impact of the proposed developments. The utility capacity in this area is also capable of supporting a development of this size, as confirmed by the Township engineer during a pre-application meeting. The Woodlands enhances the quality of life in this residential area by providing (to our knowledge) the largest privately owned nature preserve in the township. It also provides an extremely high-quality housing option to residents that may otherwise overlook Orion Township as a place to call home.

6. *Will the proposed PUD result in an unreasonable negative economic impact upon surrounding properties in relation to the economic impact that would occur from a more traditional development?*

The Woodlands, or more broadly, the construction of 166 residential dwelling units on the proposed site, will not result in a material negative impact upon surrounding properties. This claim is validated by an article published by the *Joint Center for Housing Studies at Harvard University*. In this article, authors Mark Orbinsky and Debra Stein note two independent studies that look at the effect of multi-family housing on surrounding single-family property values. In both cases, the researchers found that communities that feature more multi-family dwellings enjoyed higher home appreciation values than communities that did not feature multi-family housing options.

Where multi-family housing is present, communities are insulated with a more diverse stock of housing options which provides for a more balanced and functional local economy. This, in turn, leads to a more desirable community resulting in higher home value appreciation over time. There are also growing trends from younger demographics which represent a seemingly permanent shift toward renting. A recent study conducted by Apartment List with over 10K respondents noted that 12% of millennial renters plan to "always rent" - up from 10.7% the year prior. This shift in consumer demand bolsters the need for additional multi-family dwellings and it is critical for communities to adapt to these changing demands to continue to attract new residents for years to come.

7. Does the proposed PUD contain at least as much usable open space as would be required in the Ordinance for the most dominant use in the development?

One of the most unique aspects of The Woodlands is the open space it provides to residents and community members in perpetuity. The 12-acre nature preserve represents 60% of the total parcel, 4x greater than the required amount. Also, between the two proposed buildings will be over 4,500 SF of outdoor amenity, allowing residents to further enjoy the open space surrounding their home.

8. Is the proposed PUD under single ownership or control such that there is a single person or entity having responsibility for completing the project with this Ordinance?

DRC is currently under contract to purchase both subject parcels described herein. This transaction is scheduled to close in 2022. Following that date and throughout the life of construction, DRC will possess sole ownership and proprietary responsibility for the full completion of the project.

Additional Information

The following includes a summary of why the proposed PUD plan is superior to any design achievable with the existing zoning of the subject parcel. The 5 most significant include:

1. Nature Preservation - The Woodlands site plan was designed specifically to preserve surrounding natural areas. A site plan compatible with the underlying zoning would not provide for any significant nature preservation because of the inherent sprawling nature of single-family housing and doing so would threaten the financial viability of the development.

2. Housing diversity - The Woodlands brings a brand-new style of residential housing to Orion Township that does not currently exist. The Woodlands will have a first-of-its-kind amenity package that is unrivaled by any other property in Orion Township, or frankly, the state. As Orion Township's own marketing collateral suggests, it will truly make living feel like a vacation.

3. Resident Diversity - Due to the uniqueness of The Woodlands, it will attract a new demographic and renter profile to Orion Township that it currently loses to other communities due to the lack of this type of housing option in the community. This demographic will include younger professionals who are seeking an active, recreationally driven lifestyle in a community like the Woodlands. This will provide balanced, healthy, and diverse long-term growth for the Orion Township.

4. Unique architectural design - The Woodland presents a significantly more unique architectural design compared to anything possible with the underlying single-family zoning. This plan provides for a unique, one-of-a-kind property for this community. The exterior fascade will be aesthetically pleasing and attractive to all demographics, particularly the young professionals mentioned. The design also provides for unique amenity space not available through other design styles.

5. Increased viability - The underlying conditions of this site present challenges in building a project compliant with the underlying zoning due to the high-water table. This water table makes constructing any subsurface space (i.e., basement) much more challenging, and in some cases, impossible. The Woodlands presents a significantly more viable development that still delivers a larger quantity of residential dwellings and aids Orion Township in its controlled growth strategy.

Exhibit A

Legal Description

LAND DIVISION
LEGAL DESCRIPTIONS OF PROPOSED PARCELS A & B

PARCEL A

A parcel of land in a part of the Northwest 1/4 of Section 26 and part of the Southwest 1/4 of Section 23, Town 04 North, Range 10 East, Orion Township, Oakland County, Michigan described as follows:

Commencing at the North 1/4 Corner of Section 26, also being the South 1/4 Corner of Section 23, thence North 89 degrees 59 minutes 16 seconds West, 793.23 feet along the north line of said Section 26, also being the south line of Section 23 and the south line of Summerfield Condominium (O.C.C.P. 1210 as recorded in Liber 24257, Page 116 OCR) to the **POINT OF BEGINNING**; thence South 02 degrees 35 minutes 30 seconds East, 463.50 feet; thence South 86 degrees 10 minutes 45 seconds West, 299.98 feet to the east line of Lot 4 of Vernier's Farms Subdivision (as recorded in Liber 55, Page 49 O.C.R.); thence along said east line South 02 degrees 35 minutes 30 seconds East, 267.62 feet to the southeast corner of said Lot 4 and the north line of Waldon Road (66 feet wide); thence along said north line, also being the south line of said Lot 4, South 86 degrees 08 minutes 30 seconds West, 120.67 feet; thence North 02 degrees 32 minutes 38 seconds West, 160.00 feet; thence South 86 degrees 08 minutes 30 seconds West, 170.00 feet to the west line of said Lot 4, also being the east line of Lot 3 of said Vernier's Parms; thence along said line North 02 degrees 32 minutes 38 seconds West, 610.71 feet to the northwest corner of said Lot 4, also being the north line of said Vernier's Farms; thence along said north line South 89 degrees 59 minutes 30 seconds West, 446.37 feet; thence North 00 degrees 23 minutes 09 seconds West, 777.28 feet; thence South 89 degrees 36 minutes 27 seconds East, 720.10 feet to the west line of the aforementioned Summerfield Condominium; thence along the west line of said Summerfield Condominium South 01 degrees 36 minutes 52 seconds East, 772.53 feet to a found concrete monument at the northeast corner of said Vernier's Farms and the north line of Section 26, also being the south line of said Section 23 and the south line of said Summerfield Condominium; thence along said section line South 89 degrees 59 minutes 16 seconds East, 300.22 feet to the **POINT OF BEGINNING**. Containing ±20.661 acres.

PARCEL B

A parcel of land in a part of the Northwest 1/4 of Section 26, Town 04 North, Range 10 East, Orion Township, Oakland County, Michigan described as follows:

Commencing at the North 1/4 Corner of Section 26, also being the South 1/4 Corner of Section 23, thence North 89 degrees 59 minutes 16 seconds West, 793.23 feet along the north line of said Section 26, also being the south line of Section 23 and the south line of Summerfield Condominium (O.C.C.P. 1210 as recorded in Liber 24257, Page 116 OCR); thence South 02 degrees 35 minutes 30 seconds East, 463.50 feet; thence South 86 degrees 10 minutes 45 seconds West, 299.98 feet to the east line of Lot 4 of Vernier's Farms Subdivision (as recorded in Liber 55, Page 49 O.C.R.); thence along said east line South 02 degrees 35 minutes 30 seconds East, 267.62 feet to the southeast corner of said Lot 4 and the north line of Waldon Road (66 feet wide); thence along said north line, also being the south line of said Lot 4, South 86 degrees 08 minutes 30 seconds West, 120.67 feet to the **POINT OF BEGINNING**; thence continuing along said line South 86 degrees 08 minutes 30 seconds West, 170.00 feet to the southeast corner of Lot 3 of the aforementioned Vernier's Farms; thence along the east line of said Lot 3, also being the west line of said Lot 4, North 02 degrees 32 minutes 38 seconds West 160.00 feet; thence North 86 degrees 08 minutes 30 seconds East, 170.00 feet; thence South 02 degrees 32 minutes 38 seconds East 160.00 feet to the **POINT OF BEGINNING**. Containing ±0.624 acres.

Parcel ID: 09-23-351-024

PEA, Inc.
2430 Rochester Ct, Ste 100
Troy, MI 48083-1872
t: 248.689.9090
f: 248.689.1044
www.peainc.com

CLIENT: J & V HOLDINGS, INC. 2465 23 MILE ROAD SHELBY TWP., MI 48316	SCALE: NTS	JOB No: 2018-332
	DATE: 11-01-18	DWG. No: 5 of 6

S:\PROJECTS\2018\2018-332 WALDON AND GREENSHIELD ROAD-ORION-JBT\SURVEY-DEPT\18332BND\DWG\18332 WALDON LAND DIVISION.dwg; GWC, DN

First American Title™	ALTA Commitment for Title Insurance ISSUED BY **First American Title Insurance Company**
Schedule C	

Commitment No.: A-6930

The land is described as follows:

Parcel 1:
Part of the Northwest 1/4 of Section 26, Town 4 North, Range 10 East, Orion Township, Oakland County, Michigan, described as follows: Beginning at a point on the West line of Lapeer Road (M-24) distant South 88 degrees 31 minutes 30 seconds West 119.70 feet, South 6 degrees 30 minutes 36 seconds East 214.15 feet and South 6 degrees 43 minutes 26 seconds East 204.25 feet from the North 1/4 corner of said Section 26; thence Southerly along the said West line of Lapeer Road, South 6 degrees 43 minutes 26 seconds East 300.00 feet to the center line of Waldon Road; thence Westerly along the center line of Waldon Road, South 84 degrees 41 minutes 30 seconds West 1007.28 feet; thence North 4 degrees 00 minutes 30 seconds West 300.00 feet; thence North 84 degrees 41 minutes 30 seconds East 993.05 feet to the point of beginning EXCEPT the West 300 feet of said parcel.

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Parcel 2:
Part of the Northwest 1/4 of Section 26, Town 4 North, Range 10 East, Orion Township, Oakland County, Michigan described as follows: Beginning at a point distant South 88 degrees 31 minutes 30 seconds West 119.70 feet and South 06 degrees 30 minutes 36 seconds East 214.15 feet and South 06 degrees 43 minutes 26 seconds East 64.25 feet from the North 1/4 corner, thence South 06 degrees 43 minutes 26 seconds East 140.00 feet; thence South 84 degrees 41 minutes 30 seconds West 693.05 feet, thence North 04 degrees 00 minutes 30 seconds West 185.92 feet; thence North 88 degrees 31 minutes 30 seconds East 686.92 feet to the point of beginning.

Parcel ID: 09-26-101-021

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AMERICAN LAND TITLE ASSOCIATION

Exhibit B

Alternate Design

Sample:
Alternate Design

Note: this design is not being proposed. It is included purely to exemplify an alternate design with a similar unit count that would have a much larger lot coverage area

Exhibit C

Stormwater Management Statement

STONEFIELD

Stormwater Management Statement

To: Village of Lake Orion

Project: Proposed Planned Unit Development
Parcel ID: 09-23-351-024, 09-26-101-021
South Lapeer Road & Waldon Road
Village of Lake Orion. Oakland County, Michigan
DET-210193

Dated: January 4, 2022

Reference: ***P.U.D. Site Plan***
(Prepared by Designhaus Architecture, dated December 21, 2021)
Survey
(Prepared by Stonefield Engineering & Design, LLC, December 21, 2021)

PROJECT DESCRIPTION

Detroit Riverside Capital is proposing to develop the above referenced parcels at the intersection of South Lapeer Road and Waldon Road. The proposed development includes two 3-story, multi-family residential buildings totaling one-sixty six (166) units as well as a 4,000 SF restaurant. Improvements encompassing the proposed buildings consist of off-street parking, stormwater management infrastructure, site lighting, and landscaping while maintaining the forest preserve area to the north. The total site area is 27.26 acres with the development area being approximately 14.8 acres (622,761 SF).

The purpose of this statement is to assess the impact the proposed development will have on the open swale/riverine that discharges to Lower Trout Lake, and demonstrate that the proposed development does not have a negative impact on any of the adjacent properties. The development is designed to follow all regulations set by the *Oakland County Water Resources Commissioner Stormwater Engineering Design Standards (11/22/2021)* to protect the existing stormwater infrastructure and provide runoff quality and volume control for the downstream community.

PRE-DEVELOPMENT DRAINAGE CONDITIONS

Under the existing conditions the site has two main drainage patterns. To the north, there is approximately 13 acres of forest that drains north and northwest to the existing pond areas or woods that will remain undisturbed during construction. As shown on the Topographic Survey in exhibit A, the forest extends south and west, where the surface plateaus and the drainage pattern changes. Currently, this southern portion of the site is undeveloped and the site sheet flows south into an existing pond and Oakland County open swale at an unrestricted rate of 40.54 CFS during the 100-year storm event. This riverine ultimately discharges into Lower Trout Lake.

Refer to the Topographic Survey in Appendix A for existing grading. There is generally a 1.0% to 4.0% slope with some areas of plateau, specifically where the drainage pattern shifts from flowing north to flowing south. All existing runoff patterns look to flow into existing bodies of water that are either on the property, or within 250 feet of the property line.

POST-DEVELOPED DRAINAGE CONDITIONS

Under the proposed conditions, drainage for the approximately 13 acres on the northern portion will remain unchanged. The only development planned in that area is adding gravel or mulch hiking paths for residents and local residents to have access and enjoy the preserved forest area. Due to this lack of development, that area is not included in the design for our detention basin.

For the southern portion of the site, the proposed development will include a stormwater drainage system that will be routed via underground pipe to the proposed basin, which will be located in the southeast corner of the site. The basin will be sized in accordance to Oakland County standards to detain the 100-year storm for the proposed 14.8 acre development area. The proposed improvements will also include adding green infrastructure like bioswales for channel protection and erosion control and water quality. Yard inlets and catch basins will be installed in the areas of proposed improvement and routed to a sediment forebay or mechanical water quality unit before being released into the basin. The basin will discharge to the existing riverine and continue on the same path it does today, ultimately discharging to Lower Trout Lake. Refer to the *Site Development Plans* for general site layout

STORMWATER MANAGEMENT ANALYSIS

The project is designed to conform to the stormwater management requirements set forth by the Oakland County Water Resources Commissioner. This design aims to implement low-impact development design measures and best management practices (BMP's) where feasible to provide an environmentally-conscious and sustainable project that benefits the surrounding community and downstream watershed.

Stormwater Runoff Quantity: The first design intent of this project is to detain all stormwater on-site and release water at a controlled rate to reduce the flooding adjacent properties experience and maintain a controlled flow into the existing riverine. This design will be met by providing a ±103,000 CF detention basin located in the southeast corner of the site. The basin will include the required water quality measures and have a restricted outlet. Analysis of the existing v. proposed site using the rational method shows a **net reduction of 80%** in the site's stormwater discharge rate, from roughly **40.54 CFS to 8.13 CFS** during the 100-year event.

Stormwater Runoff Quality: The second design intent of this project is to ensure quality measures remove floatable solids such as trash and debris to the greatest extent possible to protect the downstream system. This is accomplished by including either a sediment basin or mechanical water quality unit at the upstream end of the detention basin. All county standards for water quality and channel protection will be adhered to.

Should you have any questions, or would seek to discuss the design of this project further, please feel free to contact Stonefield Engineering & Design.

Best regards,

Eric Williams, PE
ewilliams@stonefieldeng.com
Stonefield Engineering and Design, LLC

Michael Nona, PE
mnona@stonefieldeng.com
Stonefield Engineering and Design, LLC

CHARTER TOWNSHIP OF ORION PLANNING COMMISSION

2525 Joslyn Road
Lake Orion, MI 48360
(248) 391-0304 ext. 5000

APPLICATION FOR A PLANNED UNIT DEVELOPMENT

Case Number PC-_____-_____

PROOF OF OWNERSHIP MUST BE INCLUDED IN THE APPLICATION

(Acceptable documentation includes: Warranty Deed, Quit Claim Deed, Land Contract, and Option to Purchase with a Copy of the Warranty Deed. If the applicant is not the property owner, then written authorization from the property owner must be included.)

NOTICE TO APPLICANT

The following application must be completed **(incomplete applications will be returned to the petitioner)** and filed with the Township at least four (4) weeks prior to a scheduled Planning Commission meeting in order to initiate a request for PUD Approval. Regular meetings of the Planning Commission are held on the first and third Wednesday of each month at 7:00 p.m. at the Orion Township Hall, 2525 Joslyn Road, Lake Orion.

Date 1/4/22 Project Name The Woodlands

Applicants Name Detroit Riverside Capital

Applicants Address 3300 Auburn Rd. Suite 300

City Auburn Hills State Mi Zip Code 48326

Phone# (248) 953-4891 Fax # _____ E-Mail Michael@DetroitRiversideCapital.com

#1 Property Owner Name JtV Holdings, LLC

Property Owner Address 2465 23 Mile Rd. Shelby Twp., Mi 48316

Phone# (248) 688-6678 Fax # N/A E-Mail ScottIozon@yahoo.com

Name of Firm/Individual who Prepared the plan Designhaus Architecture

Address 3300 Auburn Rd. Auburn Hills, Mi 48326

Phone# (248) 601-4422 Fax # N/A E-Mail Peter@Designhaus.com

Please Indicate Above The Contact Person For The Proposed Project

#2 Owner: John + Nancy, LLC
Address: 3604 Clarkston Rd. Clarkston, Mi 48348
Phone #: (248) 396-4793
Email: JDCumins@Comcast.net

Property Description:
Location or Address of the Property 3030 S. Lapeer Rd, Lake Orion, MI + adjacent vacant land

Side of Street West Nearest Cross Streets: NW Corner of Waldon + Lapeer Rd.

Sidwell Number(s) (1) 09-23-351-024 (2) 09-26-101-021 Total Acreage 27.7 acres

Subdivision Name (if applicable) N/A

Frontage (in feet): 790' (Waldon) 380 (Lapeer) Depth (in feet) ~ 1,100'

*Please Attach to the Application a Complete Legal Description of the Subject Property

Zoning Classification:
Subject Property RZ, SE, + GB

Adjacent Properties:

North RM-1 + SE South OP + RZ

East RM-1 West RZ + SE

Comprehensive Statement of Intent:
Give a Detailed Description of the Proposed Development (Refer to Section 30.03 (A) of the Orion Township Zoning Ordinance) Please Indicate the Number and Size of the Buildings or Units Being Proposed:

Included in attached plan

Eligibility Standards for PUD Eligibility Approval:
Refer to Section 30.03 (B) of the Orion Township Zoning Ordinance. Please fill out the attachment.

******4 Sets Of The Site/PUD Plan Prepared In Accordance With The Orion Township Zoning Ordinance #78, Section 30.03, Section 30.01 And Any Other Applicable Township Ordinance Requirements Must Be Included As Part Of The Application. Applicable Planning Commission Review Fees Included In Ordinance #41 Are Also Required When Submitting For PUD Approval. Please Note That Section 30.03(C)4 Also Requires A Density-Parallel Plan As Part Of The Application******

I hereby submit this application for PUD Approval, pursuant to the provisions of the Orion Township Zoning Ordinance, Ordinance #78, Section 30.03 and Section 30.01 and any other applicable Township Ordinance requirements. In support of the permit application, I hereby certify that the information provided herein is accurate and the application that has been provided is complete. As the property owner (or having been granted permission to represent the owner as to this application) and on behalf of all owners of this property, I hereby grant the Planning Commission members and Township Building Department staff permission to perform a site walk on the property, without prior notification, as is deemed necessary.

Signature of Applicant _____ Date 1/4/22

******Please Attach The Street Name Approval Form To The Application******

Charter Township of Orion Planning Commission
Eligibility Standards for PUD Approval

Section 30.03 (B)

Please provide **more** than just a "yes" or "no" answer. Use additional sheets of paper if necessary.

1. How will a PUD approval result in a recognizable and substantial benefit to the ultimate users of the project and the community?

   Attached

2. Would such benefit otherwise be unfeasible or unlikely to be achieved?

   "

3. Will the proposed type and density of use result in a material increase in the use of public services, facilities and utilities, in relation to what would be permitted if the property were developed without using the PUD?

   "

4. Will the proposed PUD place an unreasonable burden upon the subject and/or surrounding land and /or property owners and occupants/or the natural features?

   "

5. Will the proposed development be consistent with the intent and spirit of the Master Plan and community?

6. Will the proposed PUD result in an unreasonable negative economic impact upon surrounding properties in relation to the economic impact that would occur from a more traditional development?

7. Does the proposed PUD contain at least as much usable open space as would be required in the Ordinance for the most dominant use in the development?

8. Is the proposed PUD under single ownership or control such that there is a single person or entity having responsibility for completing the project with this Ordinance?

Section 30.03 (C): Project Design Standards

1. Which of the following requirements established in the underlying district (first column), or other applicable sections of the Ordinance will need to be waived in order to grant PUD approval? Insert the proposed amount in the second column. Information should be listed separately for each phase of the development.

Regulations:		**PUD Proposal**
Lot Size	[redacted] 27.7 Acres	
Lot Width	N/A	N/A
Lot Coverage	Max 25%	10%
Min. Floor Area	N/A	N/A
Front Setback	100'	230'
Side Setback	50'	68'
Rear Setback	50'	75'
Height	35'	42'
Parking	428	428
Loading	N/A	2 provided
Fencing	6' High	6' High
Landscaping	Required	Exceeded
Setback For Side Yard Entry Garage	N/A	N/A
Other	N/A	N/A

2. Does the project have adequate:

- Perimeter setback and berming? Provided
- Thoroughfare design? Provided
- Drainage design? Provided
- Utility design? Provided
- underground utilities? Provided
- Insulation of the pedestrian circulation system from vehicular thoroughfares and ways? Provided
- Achievement of an integrated development with respect to signage, lighting, landscaping and building materials? Provided
- Noise reduction and visual screening mechanisms (particularly where nonresidential uses adjoin off-site residentially zoned property)? Provided

Charter Township of Orion
Planning & Zoning Department
2525 Joslyn Rd., Lake Orion MI 48360
P: (248) 391-0304 ext. 5002; Fax (248) 391-1454

Project Name The Woodlands

PC# _____ Parcel#(s) (1) 09-23-351-024
(2) 09-26-101-021

Please select an option below:

☒ **Permission to Post on Web Site**

By signing below as applicant and on behalf of my consultants, we agree to allow the plans for the above named project, in which approval is being sought by the Planning Commission and/or Township Board, to be posted on the Township website.

M Wayne
Signature of Applicant

1/5/22
Date

Michael Wayne
Printed Name of Applicant

SURVEY FOR BUILDER/DEVELOPERS

Did you know Orion Township is located within the Clinton River Watershed?

A watershed is another name for a river basin. It is an area of land that drains into a common body of water. Did you know that rain water and melting snow makes its way into our lakes and the Clinton River after it leaves the parking lot or storm drain? Orion Township, along with our neighboring communities, is in the process of developing a watershed management plan to comply with Federal stormwater permit regulations to improve the quality of stormwater generated from new development and redevelopment. Your opinion on the following questions would be appreciated. Please answer these short questions and return to the Building Department.

1. **Please rate the following governmental goals and objectives.**

	Very Important	Important	Not Important	Don't know
Improving Recreational Quality & Opportunities		X		
Preserving Fish & Wildlife Habitat		X		
Reducing erosion and flooding		X		
Protecting wetlands and woodlands		X		

2. **How significant do you believe the problems caused by soil erosion, chemicals such as fertilizer, oil and pesticides are in the watershed?**

Very Significant	Somewhat Significant	Insignificant	Don't Know
X			

3. **Are you aware of the functional benefits of preserving natural features in stormwater management, such as increasing infiltration capacity and slowing runoff and decreasing infrastructure expenses?**

   YES (circled) NO

4. **Have you experienced a correlation between preservation of natural areas and quality of the development or sales volume?**

   YES (circled) NO

5. **Have you implemented State recommended Best Management Practices (BMPs), such as bio-retention, vegetated swales, or porous pavement in past developments?**

   YES (circled) NO

Over Please

6. Would you be interested in participating in future surveys or volunteer committees?

YES NO

Contact Information

Name	Michael Wayne
Address	
Phone	(248) 953-4891
Email	

The Woodlands

P.U.D. Concept Submittal

Orion Township, MI 48360

INDEX OF DRAWINGS

Revision 2/ 22.01.04	Revision 1/ 21.12.21	PUD Concept Submtl. / 21.09.22	SHEET NO:	DRAWING NAME
			GENERAL	
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			CIVIL	
☐	☐	☐	C1.0	LAND SURVEY
			ARCHITECTURAL	
☐	☐	☐	A1.0	CONTEXT PLAN
☐	☐	☐	A1.1	SITE SECTIONS
☐	☐	☐	A2.0	DENSITY SITE PLAN
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☐	☐		A7.3	EXTERIOR CONCEPT
☐			A8.0	NATURAL FEATURE IDENTIFICATION PLAN

☐ SHEET ISSUED
△1 REVISED
■ SHEET REISSUED

PROJECT TEAM

OWNER
DETROIT RIVERSIDE CAPITAL, LLC
1251 INDIAN MOUND RD.
BLOOMFIELD TOWNSHIP, MI 48301
MICHAEL WAYNE
ALEC HARRIS

ARCHITECT
DESIGNHAUS ARCHITECTURE
3300 AUBURN RD. SUITE 300
AUBURN HILLS, MI 48326
T: 248.601.4422
F: 248.453.5854
PROJECT MANAGER: JOE LATOZAS
PROJECT ARCHITECT:
PETER STUHLREYER, A.I.A

CIVIL ENGINEER
STONEFIELD
607 SHELBY ST. SUITE 200
DETROIT, MI 48226
T:248.247.1115
C:734.546.4941
CONTACT: ERIC WILLIAMS

RECEIVED
January 5, 2022
Orion Township
Planning & Zoning

LOCATION MAP

DESIGNHAUS ARCHITECTURE EST 1998
3300 AUBURN RD.
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DETROIT RIVERSIDE CAPITAL

Revision/Issue	Date
----	----
Revision 2	22.01.04
Revision 1	21.12.21
PUD Concept Submtl.	21.09.22

The Woodlands
P.U.D. Concept Submittal
Orion Township, MI 48360

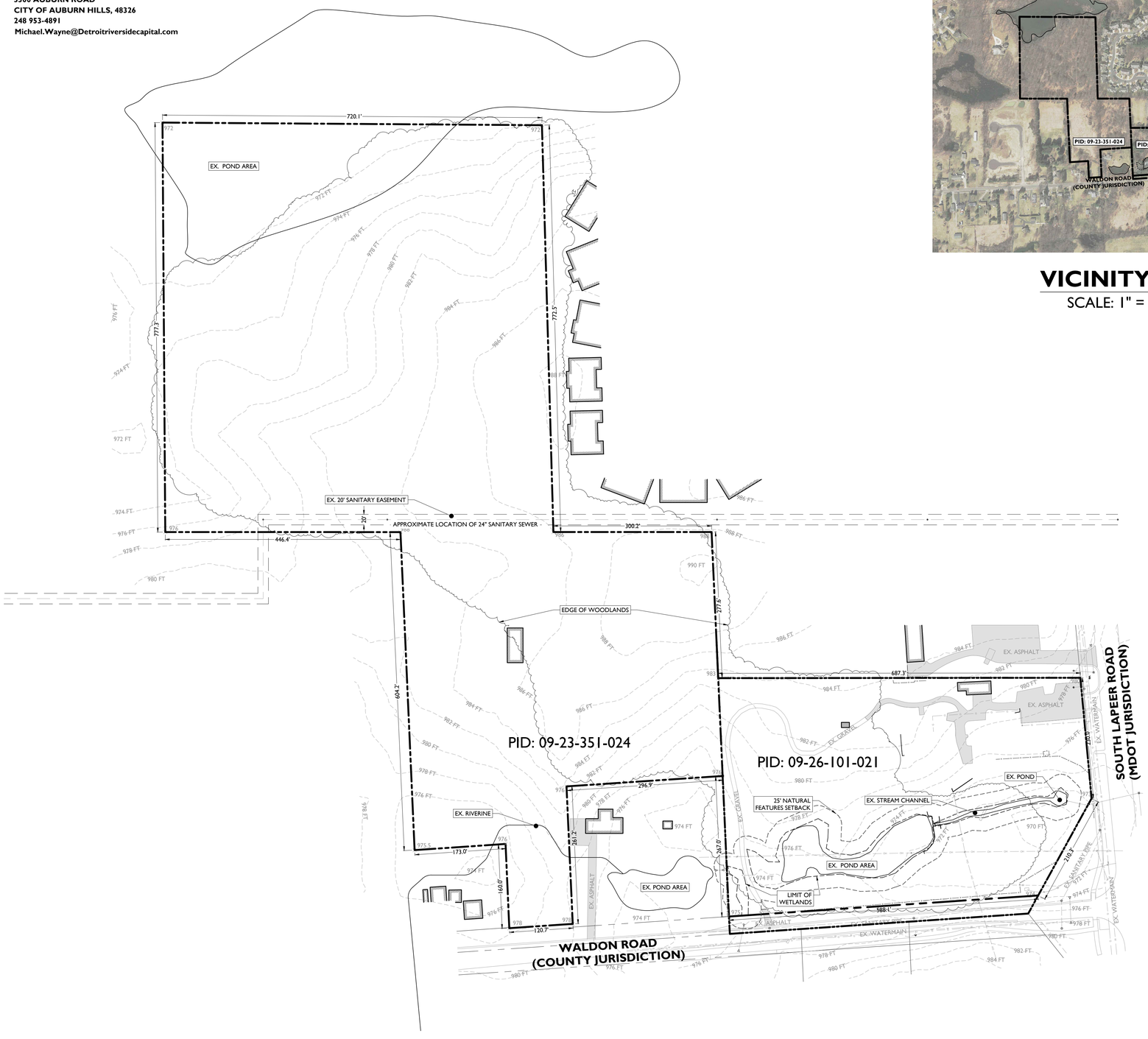
TITLE PAGE

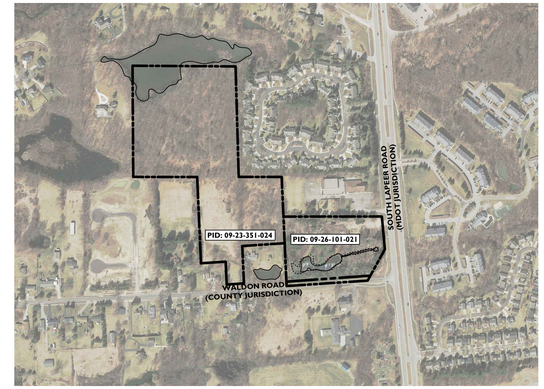
021219

T1.0

APPLICANT

DETROIT RIVERSIDE CAPITAL
3300 AUBURN ROAD
CITY OF AUBURN HILLS, 48326
248 953-4891
Michael.Wayne@Detroitriversidecapital.com





VICINITY MAP

SCALE: 1" = 500'±

SYMBOL	DESCRIPTION
	PROPERTY LINE
	SETBACK LINE
	EASEMENT LINE
	LIMIT OF WETLAND
	WATER PIPE
	SANITARY PIPE
	STORM PIPE
	GAS LINE
	OVERHEAD LINES
	FENCE
	CONTOUR LINE
	EXISTING BUILDING
	ASPHALT PAVEMENT

SITE PROPERTIES

	LOT AREA	SOUTH LAPEER ROAD FRONTAGE	WALDON ROAD FRONTAGE
PID: 09-26-101-021	7.07 AC	230.0 FT	588.1 FT
PID: 09-23-351-024	20.63 AC	0.0 FT	120.7 FT

PARCEL 09-23-351-024

A PARCEL OF LAND IN A PART OF THE NORTHWEST 1/4 OF SECTION 26 AND PART OF THE SOUTHWEST 1/4 OF SECTION 23, TOWN 04 NORTH, RANGE 10 EAST, ORION TOWNSHIP, OAKLAND COUNTY, MICHIGAN DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 26, ALSO BEING THE SOUTH 1/4 CORNER OF SECTION 23, THENCE NORTH 89 DEGREES 59 MINUTES 16 SECONDS WEST, 793.23 FEET ALONG THE NORTH LINE OF SAID SECTION 26, ALSO BEING THE SOUTH LINE OF SECTION 23 AND THE SOUTH LINE OF SUMMERFIELD CONDOMINIUM (O.C.C.P. 1210 AS RECORDED IN LIBER 24257, PAGE 116 OCR) TO THE POINT OF BEGINNING; THENCE SOUTH 02 DEGREES 35 MINUTES 30 SECONDS EAST, 463.50 FEET; THENCE SOUTH 86 DEGREES 10 MINUTES 45 SECONDS WEST, 299.98 FEET TO THE EAST LINE OF LOT 4 OF VERNIER'S FARMS SUBDIVISION (AS RECORDED IN LIBER 55, PAGE 49 O.C.R.); THENCE ALONG SAID EAST LINE SOUTH 02 DEGREES 35 MINUTES 30 SECONDS EAST, 267.62 FEET TO THE SOUTHEAST CORNER OF SAID LOT 4 AND THE NORTH LINE OF WALDON ROAD (66 FEET WIDE); THENCE ALONG SAID NORTH LINE, ALSO BEING THE SOUTH LINE OF SAID LOT 4, SOUTH 86 DEGREES 08 MINUTES 30 SECONDS WEST, 120.67 FEET; THENCE NORTH 02 DEGREES 32
MINUTES 38 SECONDS WEST, 160.00 FEET; THENCE SOUTH 86 DEGREES 08 MINUTES 30 SECONDS WEST, 170.00 FEET TO THE WEST LINE OF SAID LOT 4, ALSO BEING THE EAST LINE OF LOT 3 OF SAID VERNIER'S PARMS; THENCE ALONG SAID LINE NORTH 02 DEGREES 32 MINUTES 38 SECONDS WEST, 610.71 FEET TO THE NORTHWEST CORNER OF SAID LOT 4, ALSO BEING THE NORTH LINE OF SAID VERNIER'S FARMS; THENCE ALONG SAID NORTH LINE SOUTH 89 DEGREES 59 MINUTES 30 SECONDS WEST, 446.37 FEET; THENCE NORTH 00 DEGREES 23 MINUTES 09 SECONDS WEST, 777.28 FEET; THENCE SOUTH 89 DEGREES 36 MINUTES 27 SECONDS EAST, 720.10 FEET TO THE WEST LINE OF THE AFOREMENTIONED SUMMERFIELD CONDOMINIUM; THENCE ALONG THE WEST LINE OF SAID SUMMERFIELD CONDOMINIUM SOUTH 01 DEGREES 36 MINUTES 52 SECONDS EAST, 772.53 FEET TO A FOUND CONCRETE MONUMENT AT THE NORTHEAST CORNER OF SAID VERNIER'S FARMS AND THENORTH LINE OF SECTION 26, ALSO BEING THE SOUTH LINE OF SAID SECTION 23 AND THE SOUTH LINE OF SAID SUMMERFIELD CONDOMINIUM; THENCE ALONG SAID SECTION LINE SOUTH 89 DEGREES 59 MINUTES 16 SECONDS EAST, 300.22 FEET TO THE POINT OF BEGINNING. CONTAINING ±20.661 ACRES.

PARCEL 09-26-101-021
PART OF THE E ½ OF THE NW ¼ OF SECTION 26, T4N, R10E, ORION TOWNSHIP, OAKLAND COUNTY, MICHIGAN DESCRIBED AS BEGINNING AT POINT LOCATED S 88-31-30 W 119.70 FT AND S 06-30-36 E 214.15 FT AND S 06-43-26 E 204.25 FT FROM THE N ¼ CORNER, T4N, R10E; THE S 06-43-26 E 90.02 FT; TH S 27-23-50 W 249.49 FT; TH S 84-41-30 W 567.68 FT; TH N 04-00-30 W 300 FT; TH N 84-41-30 E 693.05 FT TO THE POINT OF BEGINNING. CONTAINING 4.49 ACRES. SUBJECT TO THE RIGHTS OF THE PUBLIC OVER THE SOUTHERLY 33 FT FOR WALDON ROAD.

PART OF THE ½ OF THE NW ¼ OF SECTION 26, T4N, R10E, ORION TOWNSHIP, OAKLAND COUNTY, MICHIGAN DESCRIBED AS BEGINNING AT POINT LOCATED S 88-31-30 W 119.70 FT AND S 06-30-36 E 214.15 FT AND S 06-43-26 E 64.25 FT FROM THE N ¼ CORNER, T4N, R10E, TH S 06-43-26 E 140 FT; TH S 84-41-30 W 693.05 FT; TH N 04-00-30 W 185.92 FT; TH N 88-31-30 E 686.92 FT TO THE POINT OF BEGINNING CONTAINING 2.58 ACRES.

TITLE REPORT NOTE:

A CURRENT TITLE POLICY HAS NOT BEEN FURNISHED AT TIME OF SURVEY, THEREFORE EASEMENTS AND/OR ENCUMBRANCES AFFECTING SUBJECT PARCEL MAY NOT BE SHOWN

SURVEY NOTES:

1. THIS SURVEY IS FOR REFERENCE ONLY. ALL FIELD CONDITIONS SHALL BE VERIFIED

100' 0' 100' 200'
GRAPHIC SCALE IN FEET
1" = 100'

ISSUE	DATE	BY	DESCRIPTION
2	12/21/2021	JT	SURVEY PLAN FOR PROPOSED CONDO DEVELOPMENT
1	09/15/2021	JT	SURVEY PLAN FOR PROPOSED CONDO DEVELOPMENT

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Detroit, MI · New York, NY · Rutherford, NJ
Princeton, NJ · Tampa, FL · Boston, MA
www.stonefieldeng.com
607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

SURVEY

THE WOODLANDS

PROPOSED DEVELOPMENT

PID: 09-23-351-024, 09-26-101-021
SOUTH LAPEER ROAD AND WALDON ROAD
ORION TOWNHIP
OAKLAND COUNTY, MI

J. REID COOKSEY, P.E.
LICENSED PROFESSIONAL ENGINEER

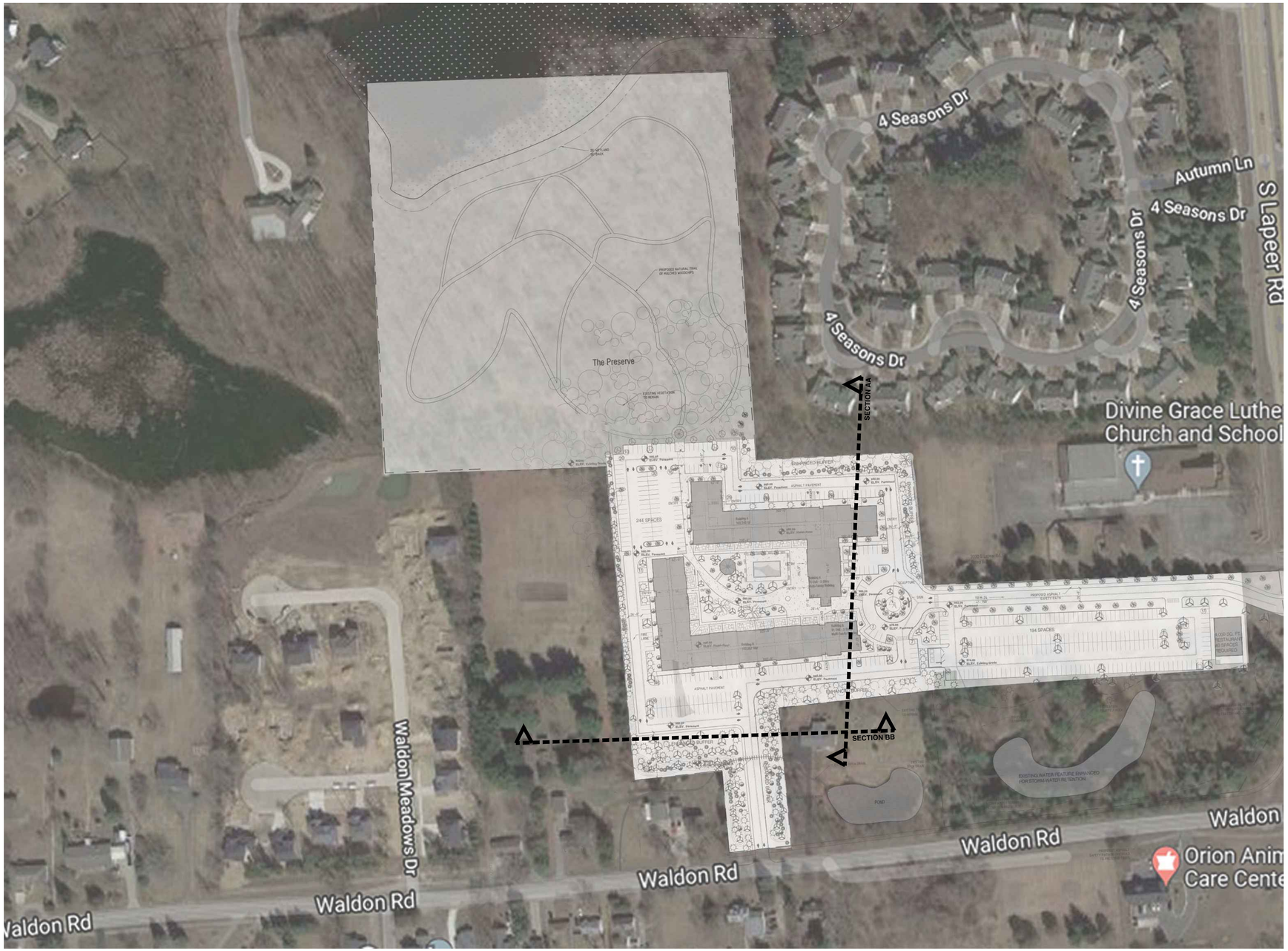
STONEFIELD engineering & design

SCALE: 1" = 100' | PROJECT ID: DET-210193

TITLE: SURVEY

DRAWING: C-1.0

V:\DET\2021\DET-210193-DETROIT RIVERSIDE CAPITAL-NWC LAPEER AND WALDON, ORION TOWNSHIP MI\CADD\PLOT\02-SDST.DWG



1 Context Plan

N.T.S

DESIGNHAUS ARCHITECTURE EST 1998

3300 AUBURN RD.
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DETROIT RIVERSIDE CAPITAL

Revision/Issue	Date
----	----
Revision 2	22.01.04
Revision 1	21.12.21
PUD Concept Submtl.	21.09.22

The Woodlands
Orion Township, MI 48360

CONTEXT PLAN

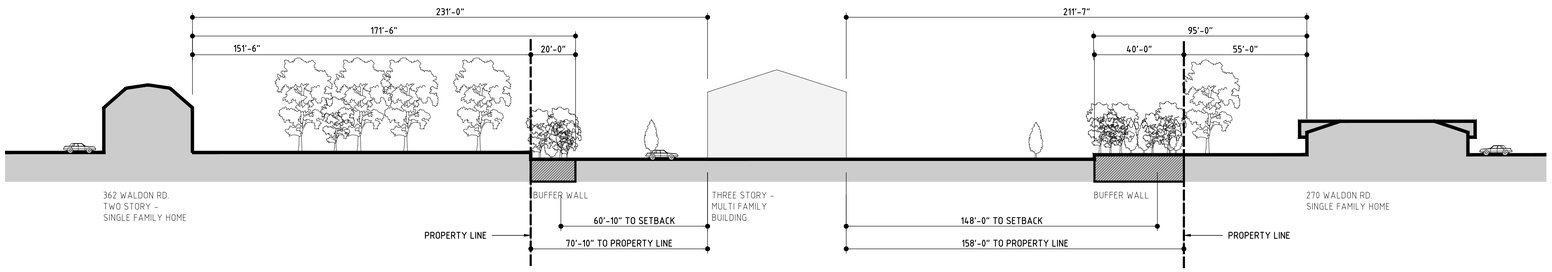
021219

A1.0

A1.0 DRAWING.dwg

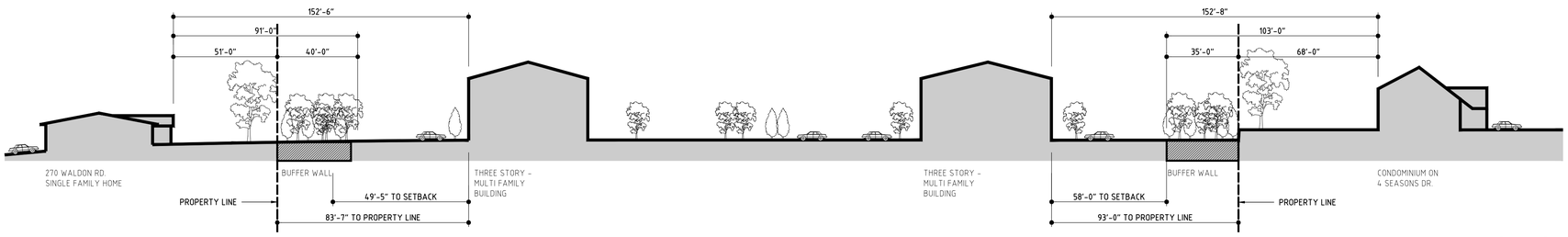
1/4/2022

User



2 SITE SECTION BB

SCALE: 1/32" = 1'



1 SITE SECTION AA

SCALE: 1/32" = 1'

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The Woodlands

P.U.D. Concept Submittal
Orion Township, MI 48360

SITE SECTIONS

021219

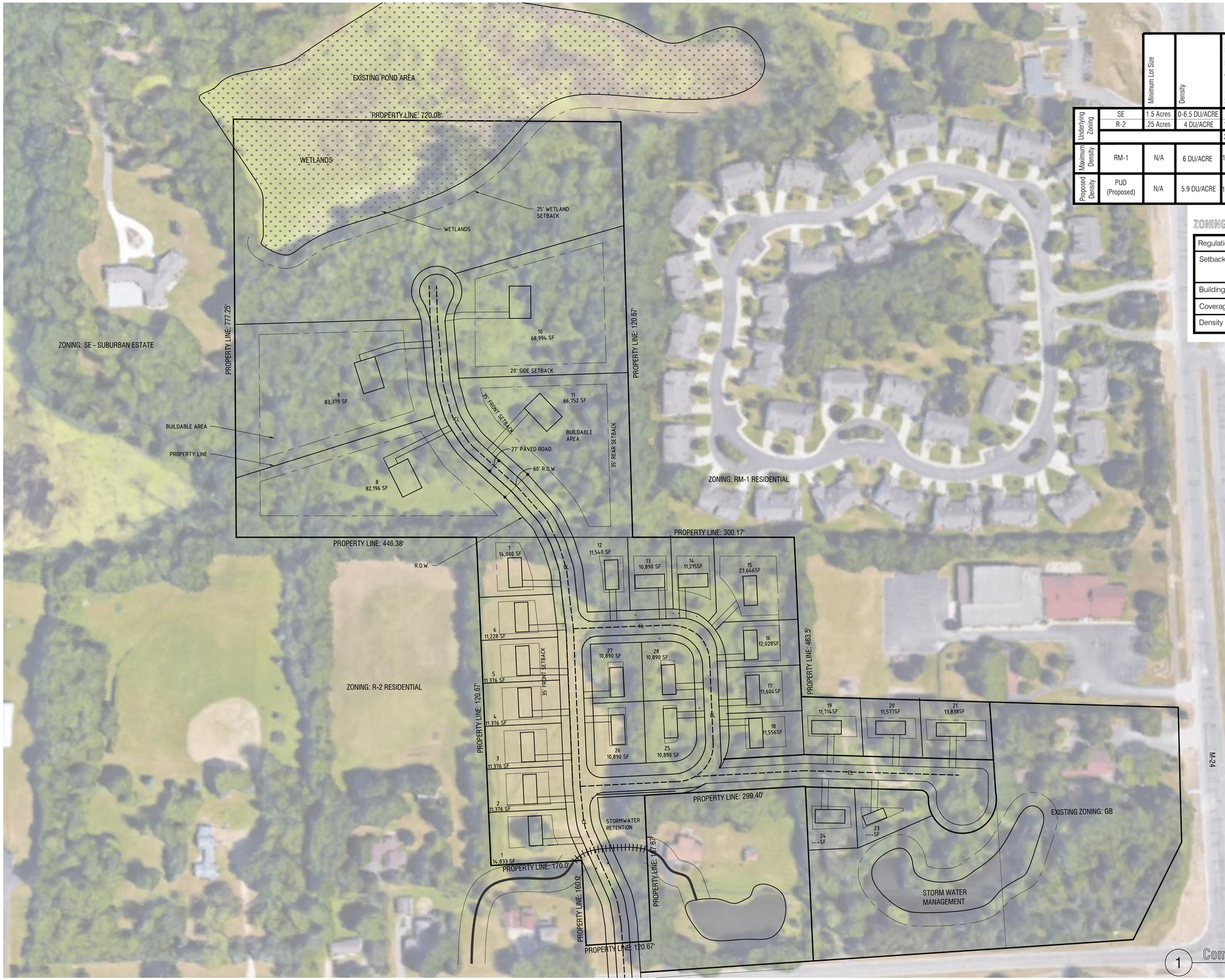
A1.1

210

A1.1 Site Sections.dwg

1/4/2022

User



1 Compliant Site Plan

SCALE: 1" = 80'

NORTH

		Minimum Lot Size	Density	Maximum Dwelling Units	Height	Front Setback	Side Setback	Side Setback	Rear Setback	Maximum Coverage
Underlying Zoning	SE	1.5 Acres	0-6.5 DU/ACRE	4 DU	2 st / 30'	40'	20'	20'	40'	20%
	R-2	.25 Acres	4 DU/ACRE	18 DU	30'	35'	10'	10'	35'	25%
				22 DU						
Maximum Density	RM-1	N/A	6 DU/ACRE	166 DU	2.5 st / 35'	100'	50'	50'	50'	25%
Proposed Density	PUD (Proposed)	N/A	5.9 DU/ACRE	166 DU	3 st / 42'	230'	68'-85'	68'-85'	75'	8.5%

ZONING SCHEDULE OF REGULATIONS

Regulation	Required for R-2
Setbacks	Front: 35' Sides: 10' each/20' total Rear: 35'
Building Height	Maximum: 2 stories/30'
Coverage	Maximum: 25%
Density	See Chart

TOTAL SITE

(1,194,265 Sq.Ft.) 27.70 Acres

AFFECTED ACRES

13 Acres

PRESERVED ACRES

14.7 Acres

PROPOSED PARKING

428

REQUIRED PARKING

388 + 40 (Restaurant) = 428

RELIEF REQUIRED

0

211

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DETROIT RIVERSIDE CAPITAL

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----	----

The Woodlands

Orion Township, MI 48360

DENSITY SITE PLAN

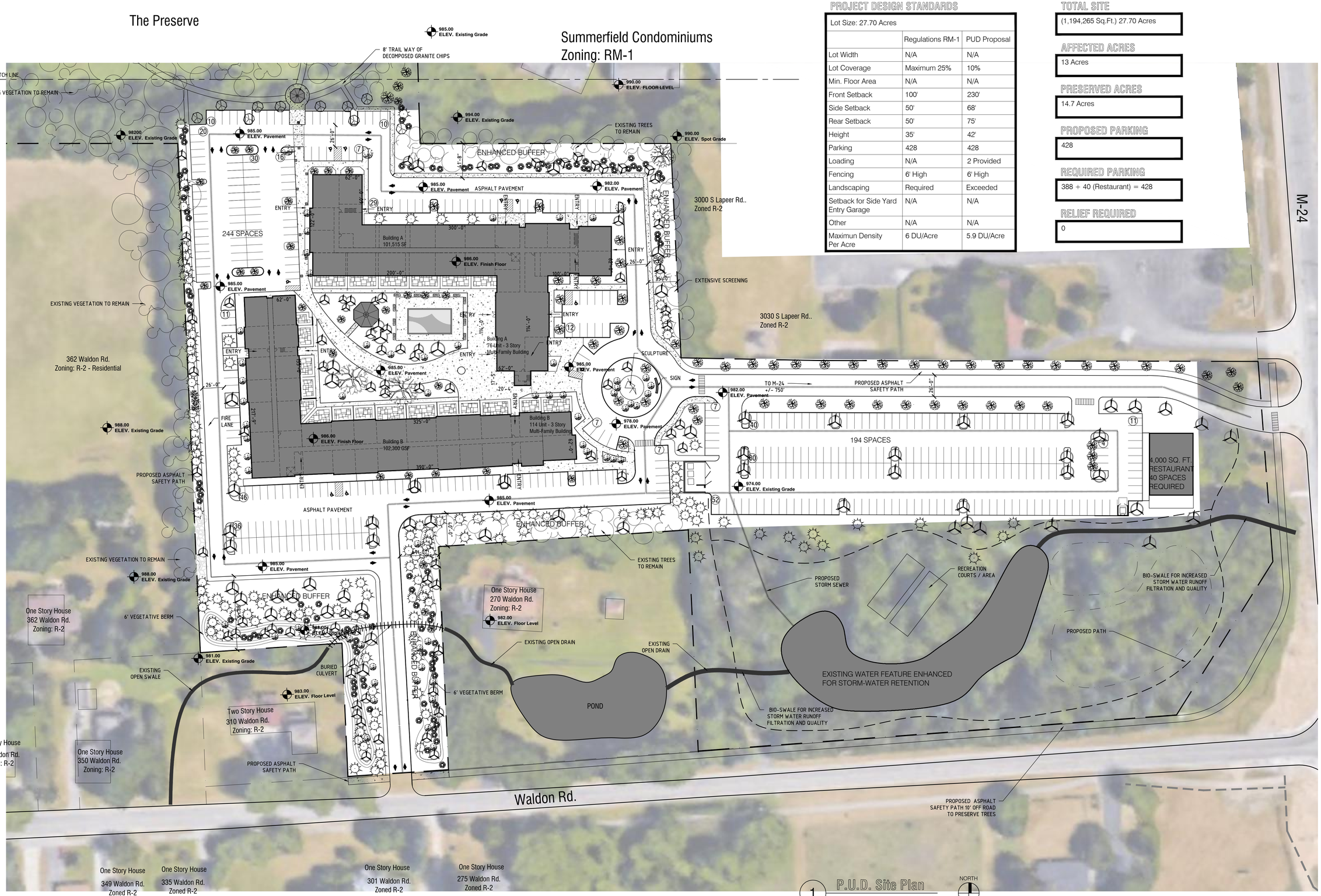
021219

A2.0

A2.0_SITE_PLAN.dwg

1/4/2022

User



1 P.U.D. Site Plan

SCALE: 1" = 50'

PROJECT DESIGN STANDARDS

Lot Size: 27.70 Acres		
	Regulations RM-1	PUD Proposal
Lot Width	N/A	N/A
Lot Coverage	Maximum 25%	10%
Min. Floor Area	N/A	N/A
Front Setback	100'	230'
Side Setback	50'	68'
Rear Setback	50'	75'
Height	35'	42'
Parking	428	428
Loading	N/A	2 Provided
Fencing	6' High	6' High
Landscaping	Required	Exceeded
Setback for Side Yard Entry Garage	N/A	N/A
Other	N/A	N/A
Maximun Density Per Acre	6 DU/Acre	5.9 DU/Acre

TOTAL SITE

(1,194,265 Sq.Ft.) 27.70 Acres

AFFECTED ACRES

13 Acres

PRESERVED ACRES

14.7 Acres

PROPOSED PARKING

428

REQUIRED PARKING

388 + 40 (Restaurant) = 428

RELIEF REQUIRED

0

212

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AUBURN HILLS, MI 48326
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The Woodlands
Orion Township, MI 48360

P.U.D. SITE PLAN

021219

A3.0

A3.0 PUD SITE PLAN.dwg

1/5/2022

Francesca Schovers

297 W Greenshield Rd
Zoning: SE - SUBURBAN ESTATE

333 W Greenshield Rd
Zoning: SE - SUBURBAN ESTATE

225 W Greenshield Rd
Zoning: SE - SUBURBAN ESTATE

369 W Greenshield Rd
Zoning: SE - SUBURBAN ESTATE

Summerfield Condominiums
Zoning: RM-1 Residential

1 P.U.D. Site Plan
SCALE: 1" = 50'

NORTH

PROJECT DESIGN STANDARDS

Lot Size: 27.70 Acres

	Regulations	PUD Proposal
Lot Width	N/A	N/A
Lot Coverage	Maximum 25%	10%
Min. Floor Area	N/A	N/A
Front Setback	100'	230'
Side Setback	50'	68'
Rear Setback	50'	75'
Height	35'	42'
Parking	428	428
Loading	N/A	2 Provided
Fencing	6' High	6' High
Landscaping	Required	Exceeded
Setback for Side Yard Entry Garage	N/A	N/A
Other	N/A	N/A

TOTAL SITE

(1,194,265 Sq.Ft.) 27.70 Acres

AFFECTED ACRES

13 Acres

PRESERVED ACRES

14.7 Acres

PROPOSED PARKING

428

REQUIRED PARKING

388 + 40 (Restaurant) = 428

RELIEF REQUIRED

0

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DETROIT RIVERSIDE CAPITAL

Revision/Issue	Date
Revision 2	22.01.04
Revision 1	21.12.21
PUD Concept Submtl.	21.09.22

The Woodlands

Orion Township, MI 48360

P.U.D. SITE PLAN

021219

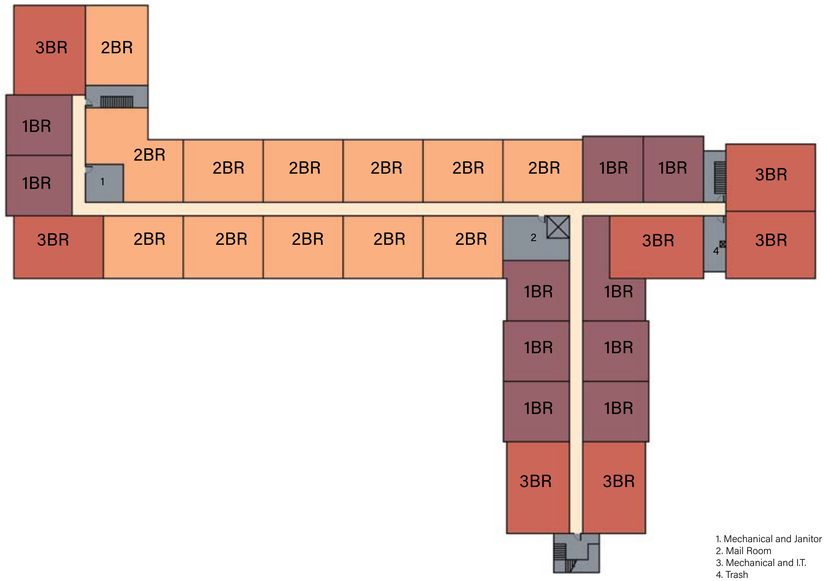
A3.1

213

A3.1 P.U.D. SITE PLAN.dwg

1/4/2022

Mike Pizzola

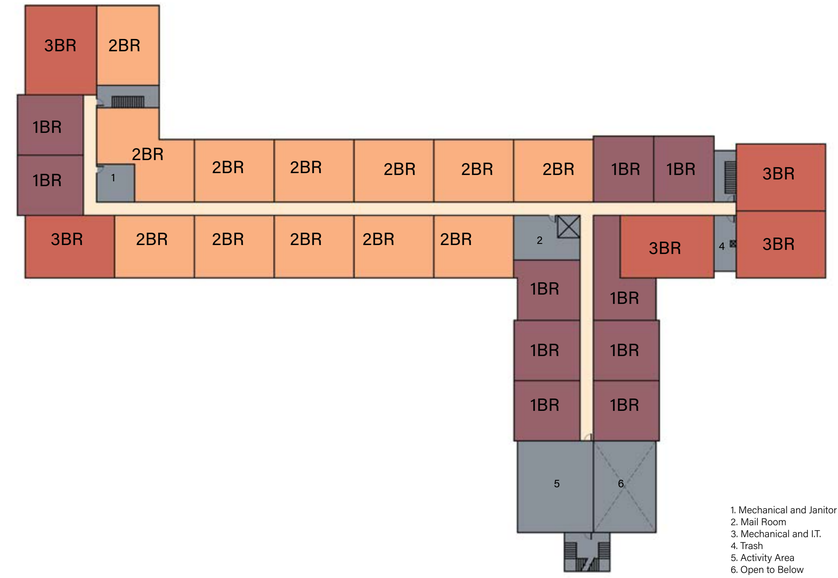


1. Mechanical and Janitor
2. Mail Room
3. Mechanical and I.T.
4. Trash

3 Building A Third Floor Plan

SCALE: 1/32" = 1'

NORTH



1. Mechanical and Janitor
2. Mail Room
3. Mechanical and I.T.
4. Trash
5. Activity Area
6. Open to Below

2 Building A Second Floor Plan

SCALE: 1/32" = 1'

NORTH

UNIT DISTRIBUTION

	FIRST FLOOR			SECOND FLOOR			THIRD FLOOR		
	QTY	AREA	TOTAL	QTY	AREA	TOTAL	QTY	AREA	TOTAL
1 BR A	1	770	770	1	770	770	1	770	770
1 BR B	3	797	2391	8	797	6376	8	797	6376
1 BR C	1	833	833	0	833	0	0	833	0
1 BR D	0	868	0	1	868	868	1	868	868
2 BR A	9	1001	9009	11	1001	11011	11	1001	11011
2 BR B	1	1337	1337	1	1337	1337	1	1337	1337
2 BR C			0			0			0
3 BR A	1	1120	1120	1	1120	1120	1	1120	1120
3 BR B	0	1148	0	0	1148	0	2	1148	2296
3 BR C	1	1176	1176	1	1176	1176	1	1176	1176
3 BR D	2	1200	2400	1	1200	1200	2	1200	2400
3 BR E	1	1280	1280	1	1280	1280	1	1280	1280
CIRC	1	3590	3590	1	3514	3514	1	3760	3760
MECH	1	2797	2797	1	1132	1132	1	1132	1132
AMENITY	1	6052	6052	1	1394	1394			

33504	GSF			33522	GSF			33522	GSF
						BLDG A		75	UNITS
								100548	GSF

UNIT MIX (FULL SITE)

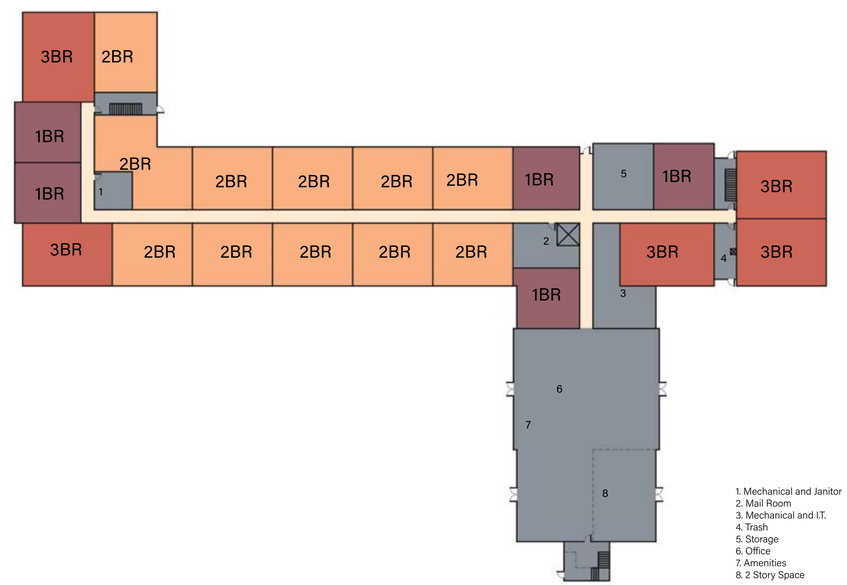
1 BR	71	43%
2 BR	74	45%
3 BR	21	13%
TOTAL	166	

PARKING

2	142	
2	148	
2	42	
	332	
RATIO	2	PER UNIT

GRAND TOTALS

202905	GSF
77%	EFF



1. Mechanical and Janitor
2. Mail Room
3. Mechanical and I.T.
4. Trash
5. Storage
6. Office
7. Amenities
8. 2 Story Space

1 Building A First Floor Plan

SCALE: 1/32" = 1'

NORTH

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DETROIT RIVERSIDE CAPITAL

Revision/Issue	Date
----	----
Revision 2	22.01.04
Revision 1	21.12.21
PUD Concept Submtl.	21.09.22

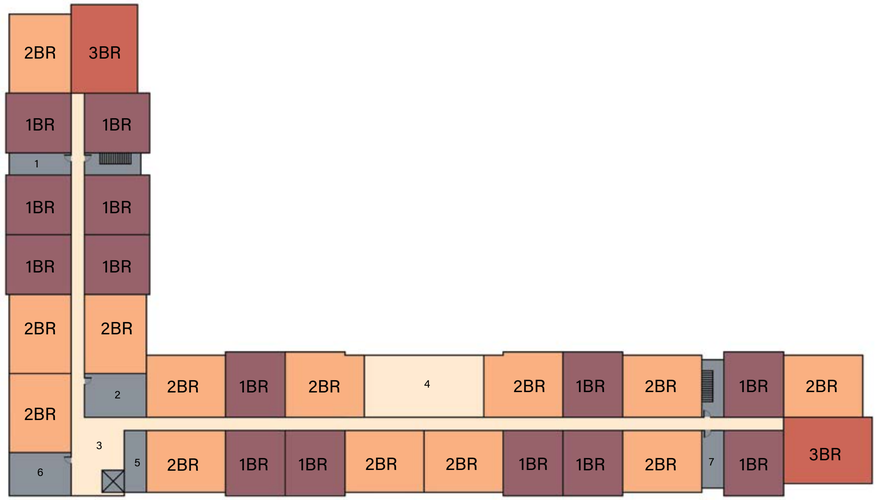
The Woodlands

Orion Township, MI 48360

BUILDING A MIX

021219

A6.0

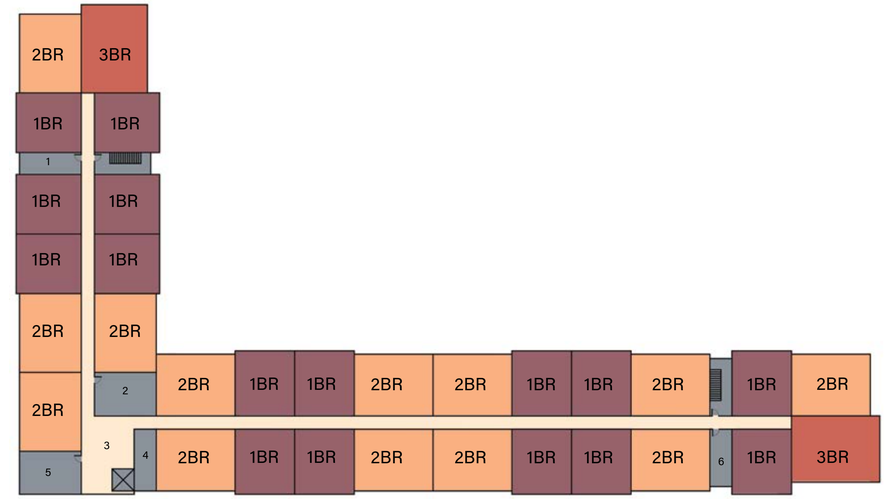


1. Mechanical
2. Mechanical and I.T.
3. Activity Area
4. Meditation Lounge
5. Trash
6. Storage
7. Janitor Closet

3 Building B Third Floor Plan

SCALE: 1/32" = 1'

NORTH



1. Mechanical
2. Mechanical and I.T.
3. Activity Area
4. Trash
5. Storage
6. Janitor Closet

2 Building B Second Floor Plan

SCALE: 1/32" = 1'

NORTH

UNIT DISTRIBUTION

	FIRST FLOOR				SECOND FLOOR				THIRD FLOOR		
	QTY	AREA	TOTAL		QTY	AREA	TOTAL		QTY	AREA	TOTAL
1 BR A	16	797	12752		16	797	12752		14	797	11158
1 BR B											
1 BR C											
2 BR A	14	1001	14014		13	1001	13013		11	1001	11011
2 BR B									2	1042	2084
2 BR C											
3 BR A	1	1200	1200		2	1200	2400		2	1200	2400
3 BR B											
3 BR C											
CIRC	1	3509	3509		1	3282	3282		1	3282	3282
MECH	1	1894	1894		1	1919	1919		1	1919	1919
AMENITY	1	752	752		1	752	752		1	2249	2264

34121	GSF			34118	GSF			34118	GSF
						BLDG B		91	UNITS
								102357	GSF

UNIT MIX (FULL SITE)

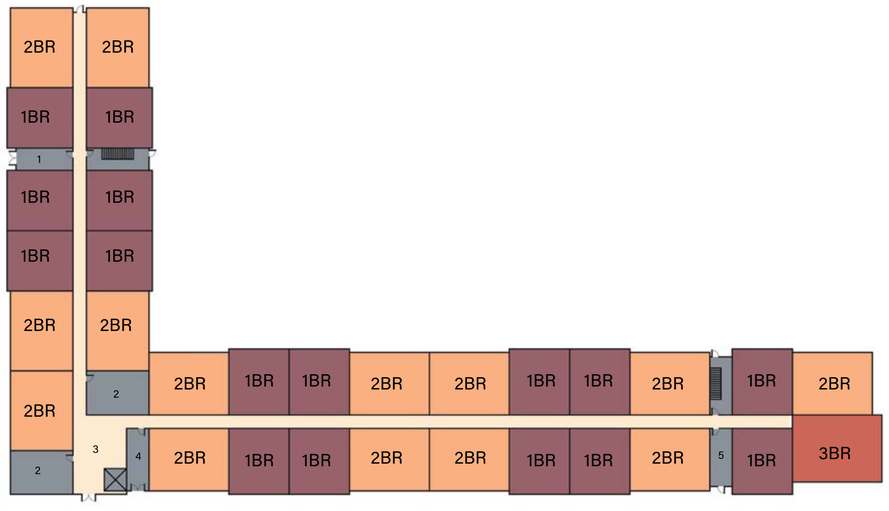
1 BR	71	43%
2 BR	74	45%
3 BR	21	13%
TOTAL	166	

PARKING

2	142	
2	148	
2	42	
	332	
RATIO	2	PER UNIT

GRAND TOTALS

202905	GSF
77%	EFF



1. Mechanical
2. Mechanical/I.T./Mail
3. Activity Area
4. Trash
5. Electric

1 Building B First Floor Plan

SCALE: 1/32" = 1'

NORTH

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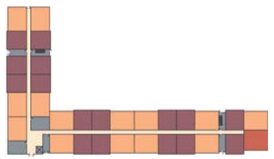
The Woodlands
Orion Township, MI 48360

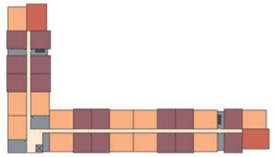
BUILDING B MIX

021219

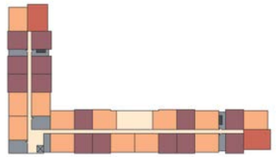
A6.1



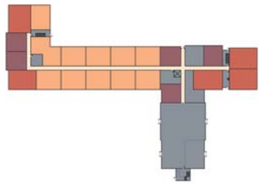
Building B - First Floor



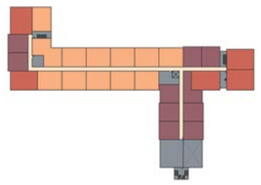
Building B - Second Floor



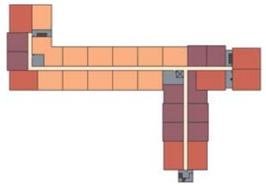
Building B - Third Floor



Building A - First Floor



Building A - Second Floor



Building A - Third Floor

UNIT MIX (FULL SITE)

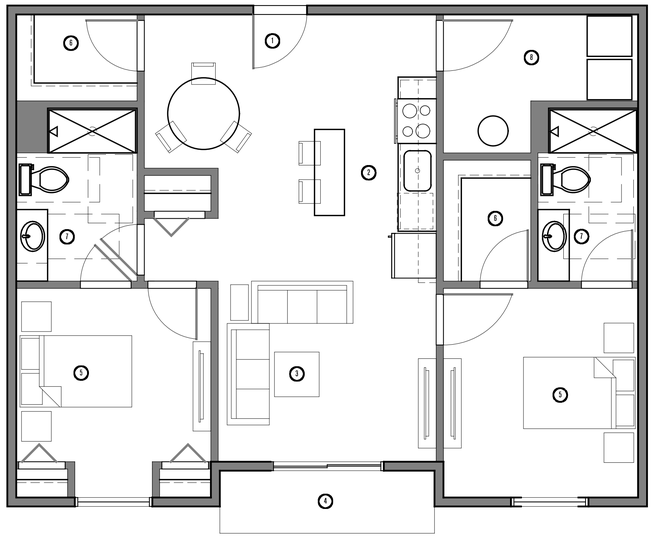
1 BR	71	43%
2 BR	74	45%
3 BR	21	13%
TOTAL	166	

PARKING

2	142	
2	148	
2	42	
	332	
RATIO	2	PER UNIT

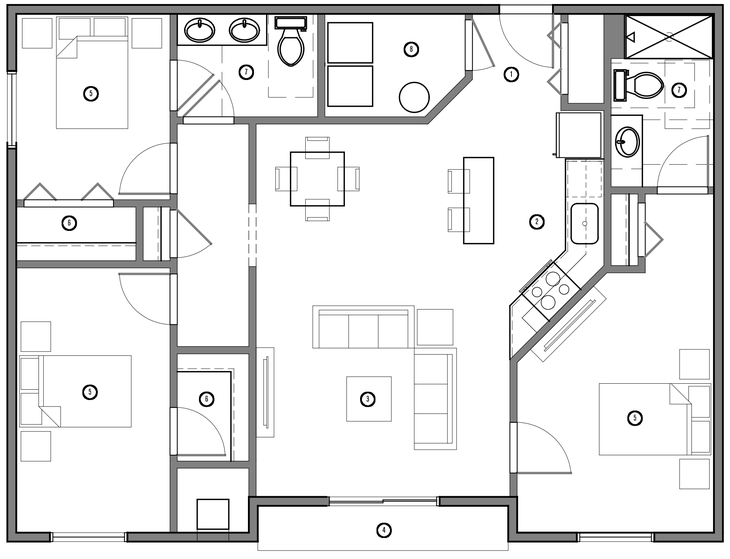
GRAND TOTALS

202905	GSF
77%	EFF



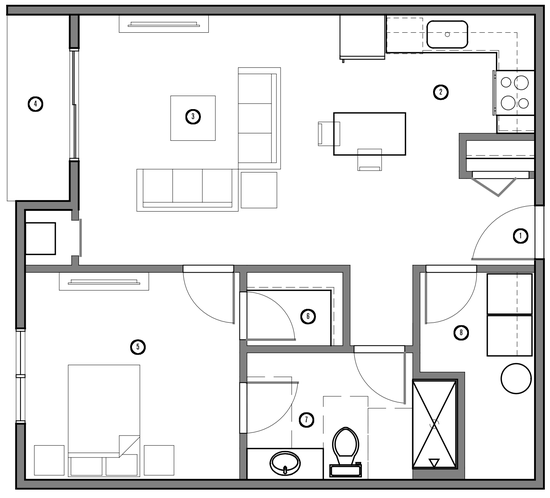
2 TYPICAL 2 BEDROOM UNIT PLAN 977 SQ. FT.

SCALE: 1/4" = 1'



3 TYPICAL 3 BEDROOM UNIT PLAN 1,172 SQ. FT.

SCALE: 1/4" = 1'



1 TYPICAL 1 BEDROOM UNIT PLAN 763 SQ. FT.

SCALE: 1/4" = 1'

ROOM TAGS

1	ENTRY
2	KITCHEN
3	LIVING ROOM
4	BALCONY
5	BEDROOM
6	WALK-IN CLOSET
7	BATHROOM
8	LAUNDRY

UNIT MIX

	QTY.	PERCENTAGE
1 BR	71	43%
2 BR	74	45%
3 BR	21	13%
TOTAL	166	

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DETROIT RIVERSIDE CAPITAL

Revision/Issue	Date
Revision 2	22.01.04
Revision 1	21.12.21
PUD Concept Submtl.	21.09.22

The Woodlands

Orion Township, MI 48360

UNIT PLANS

021219

A6.2

A6.2 UNIT PLANS.dwg

1/4/2022

User

A7.0

021219

CONCEPT ILLUSTRATIONS

The Woodlands

Orion Township, MI 48360

Revision/Issue	Date
PUD Concept Submit.	2.10.22
Revision 1	2.11.2.21
Revision 2	22.01.04
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DESIGNHAUS ARCHITECTURE EST 1998

2 Waldon Facing NE

1 Summer Field Facing South

DESIGNHAUS ARCHITECTURE EST 1998

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DETROIT RIVERSIDE CAPITAL

Revision/Issue	Date
---	---
Revision 2	22.01.04
Revision 1	21.12.21
PUD Concept Submtl.	21.09.22

The Woodlands

Orion Township, MI 48360

ILLUSTRATIONS

021219

A7.1

A7.1 ILLUSTRATIONS.dwg

1/4/2022

Mike Pizzola

4 Sunrise in December

NORTH

2 Sunrise in June

NORTH

3 Sunset in December

NORTH

1 Sunset in June

NORTH

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The Woodlands
P.U.D. Concept Submittal
Orion Township, MI 48360

SHADOW STUDY

021219

A7.2

A7.2 SHADOW STUDY.dwg
1/4/2022
Duncan Schildgen

1 Exterior Conecpt Illustration

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The Woodlands

P.U.D. Concept Submittal
Orion Township, MI 48360

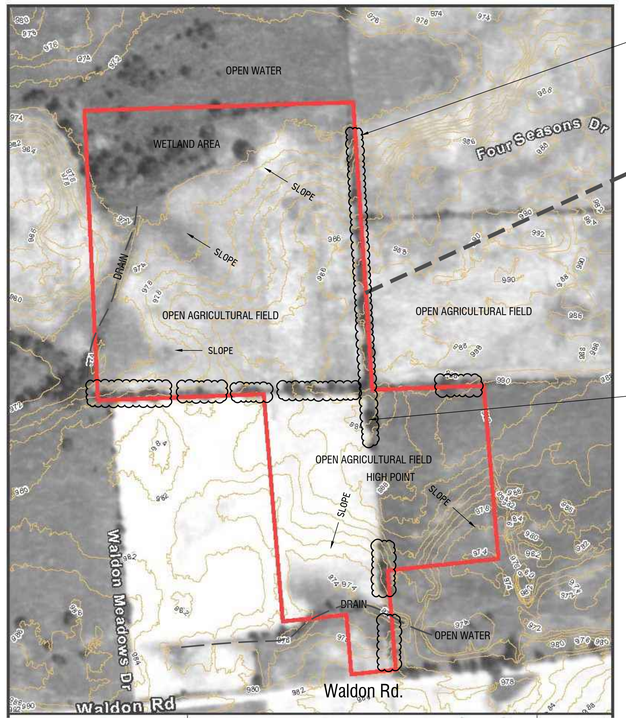
EXTERIOR CONCEPT

021219

A7.3

A7.3 EXTERIOR CONCEPT.dwg
1/4/2022
Duncan Schildgen

1940



2 1940 Aerial Image
SCALE: 1" = 50'

NORTH

AREA OF NOTED LANDMARK TREES

PROJECT BOUNDARY

AREAS OF LANDMARK RED OAK TREES (LOCATED EXCLUSIVELY ALONG PROPERTY LINES AND FENCE ROWS)

1940 IMAGE OF A RED OAK -APPROXIMATELY 20 YEARS OLD.
SAME RED OAK 80 YEARS LATER

2020

1 2020 Aerial Image
SCALE: 1" = 50'

NORTH

Site walk performed Friday November 10, 2021
Time: 1:30 PM
Weather Conditions: 63° / Sunny

Upon walking the perimeter and across the site, NO animal habitats of significant value were observed.

* Plant material across the site consists predominantly of secondary succession plant growth common of abandoned agricultural fields.
* Once the fields were left uncultivated, immediately following the first summer, grasses and annual weeds begin to overtake the open fields.
* By the second year, perennial weeds begin establishment.
* From the second year up to about the tenth year, woody shrubs emerge and increase in density and size.
* After about 25 years, the abandoned field would look like a small forest.
* Beyond that to present day, mixed hardwoods and soft wood trees begin to dominate the site. Species such as Maples, Cottonwoods, Poplar, Box Elder, Walnut, Tree of Heaven, Alder, and Hackberry among others. Few evergreens were observed.
* Areas closest to the wetland areas consist of under-story trees and shrubs such as Serviceberry, Red Osier Dogwood, Multi-Flora Rose, Red Bud, Privet, and Honeysuckle
* It appears that the site was retired from agricultural production around the mid 1980's, and left to revert to its present state today.
* Throughout the years, several Red Oak trees have established along fence rows and property lines. These have remained strong and currently are to be classified as landmark once a tree survey has been completed. Based on article 27.12 - Tree and Woodland Protection, these trees will be identified and great care will be taken to preserve in order for them to continue their dominate stature. Those have to be removed, will be replaced on a 1:1 replacement value throughout the site.

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The Woodlands
P.U.D. Concept Submittal
Orion Township, MI 48360

NATURAL FEATURE IDENTIFICATION PLAN

021219

A8.0

A8.0 Natural Feature Identification Plan.dwg
1/4/2022
Duncan Schildgen

OHM Advancing Communities

January 20, 2022

RECEIVED
JAN 20 2022
Orion Township
Planning & Zoning

Scott Reynolds, Planning Commission Chairperson
CHARTER TOWNSHIP OF ORION
2323 Joslyn Road
Lake Orion, MI 48360

RE: The Woodlands PUD, PC-2021-78
Concept PUD Review #2

Received: January 6, 2022, by Orion Township

Dear Mr. Reynolds:

We have completed our review of The Woodlands Concept PUD plan set. The plans, dated January 4, 2022, were prepared by Stonefield Engineering Design. and were reviewed with respect to the Township's Zoning Ordinance, No. 78, Stormwater Management and Soil Erosion & Sedimentation Control Ordinance, No. 139, and the Township's Engineering Standards.

EXISTING SITE CONDITIONS:

The site is located west of Lapeer Rd. on the north side of Waldon Rd. within the western ½ of Sections 23 and 26 of the Charter Township of Orion. The site has three different zonings. The northern half of the western parcel (09-23-351-024) is zoned Suburban Estates (SE) and is bound by parcels on the north and west zoned Suburban Estates (SE), parcels to the south zoned Single-Family Residential (R-2), and a parcel to the east zoned Multiple Family Residential (RM-1). The southern half of this parcel is zoned Single-Family Residential (R-2) and is bound by parcels on the west zoned Single-Family Residential (R-2), parcels on the north zoned Suburban Estates (SE) and Multiple Family Residential (RM-1), and parcels on the south zoned Single-Family Residential (R-2). The eastern parcel (09-26-101-021) is zoned General Business (GB) and Single-Family Residential (R-2) and is bound by parcels zoned Single Family Residential (R-2) to the north and west, Office & Professional (OP) to the south, and Multiple Family Residential (RM-1) to the east across M-24.

The existing site is 27.70 acres in total. The western parcel contains a single building located near the center of the southern half of the site. The eastern parcel was previously part of the Orion Classic Car Club development. The restaurant and associated parking have been redesigned and included in this submittal. The applicant is also proposing (2) three-story buildings for 190 apartment units. A portion of the required parking for these buildings along with a drive aisle connection to Lapeer Rd. have been included on the eastern parcel adjacent the restaurant. Building A has a 101,515 square-foot building footprint and is located north of building B in the southern portion of the western parcel (09-23-351-0124). Building B has a building footprint of 102,300 square-feet and is located closest to Waldon Rd. The site is heavily wooded except for a portion of the southern half of the site which was used as yard space by the former homeowner. The eastern parcel contains an existing pond and stream channel which outlets to the west through a riverine that crosses the southern part of the western parcel. The existing site drains from the center outward in the western parcel, with ponds and wetlands located south of the site as well as in the northwest corner of the site. The eastern parcel drains toward the existing pond and stream. The wetlands are not represented consistently throughout the site. The wetland delineation report shall be submitted to support

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AUBURN HILLS, MICHIGAN 48326
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F 248.364.3001
OHM-Advisors.com

the wetland lines shown on the plans. Per National Wetlands Inventory maps, the wetland in the northwest corner of the site appears to be contiguous with a larger watercourse that ultimately flows east to Trout Lake.

Along with the two buildings proposed on site, the applicant is proposing to preserve some of the existing vegetation and trees located in the northern half of the western parcel and the southern part of the eastern parcel close to the existing wetlands. There are 8-foot trailways proposed adjacent the wetlands which meander through the woods almost up to the wetland buffer. The wooded area north of the proposed buildings is referred to on the plans as The Preserve. The applicant also shows the existing pond and stream channels being enhanced as part of this development. The pond is called out for storm-water retention, and the channels have slightly revised alignments and are called out as bio-swales for increased storm water runoff filtration and quality.

Legal descriptions for the parcels were included in the Concept PUD.

DENSITY PLAN:

A density plan has been included in the plan set indicating 28 lots are possible based on the underlying zoning. Four of the lots are in the Suburban Estates (SE) zoning located in the northern half of the site, and the remaining 24 lots are located in the southern half of the site zoned Single-Family Residential (R-2). The density plan indicates the use of the existing pond on the eastern parcel and a callout for stormwater retention on the south side of the western parcel as storm water management but does not appear to show any sedimentation prevention (such as a forebay or bio-swales) as required by the ordinance. Including these facilities may result in the loss of a lot. The density plan includes 27-foot-wide roads and 60' right-of-way per ordinance. The buffer for the riverine that crosses the southern part of the western parcel is cut off within the parcel boundary. To stay out of this buffer as required by ordinance, the southern-most lot may need to be removed.

The density plan only has one entrance off Waldon Rd. An additional access point would be required due to the dead-end length of the cul-de-sac (approximately 1000 feet). The Township maximum dead-end length for cul-de-sacs is 600 feet. The addition of a second connection point would likely result in the loss of one to two lots.

Based on the above noted deficiencies in the density plan, a total of two to three lots may need to be removed from the plan. In our opinion, this would result in a total of 25-26 lots instead of the 28 lots indicated.

WATER MAIN & SANITARY SEWER:

There is existing 16-inch water main located along the center of Waldon Rd. and 16-inch main on Lapeer Rd. The applicant did not appear to include a proposed connection point within the plans. The site has direct access to the water main on Waldon Rd. and access to the main on S. Lapeer Rd. will be necessary to loop the system through the eastern parcel. Per the Orion Township water model, there is sufficient capacity to serve the development.

There is existing 10-inch sanitary sewer located along the north side of Waldon Rd. as well as 10-inch sanitary that runs along the west side of S. Lapeer Rd. Additionally there is a 24-inch diameter trunkline sanitary sewer that crosses through the middle of the site. This sanitary sewer and associated easement were represented on the existing conditions but not in the rest of the plans. Per the Orion Township sanitary model, there is sufficient capacity to serve the development.

Preliminary water main and sanitary sewer basis of design calculations shall be provided at Final PUD.

STORMWATER MANAGEMENT:

The western parcel drains outward from the center of the site to the northwest and to the south into one of two drainage courses that both ultimately discharge into larger bodies of water that connect to Lower Trout Lake downstream. The eastern parcel generally drains to the existing water features on site which are also contiguous with Lower Trout Lake.

The proposed PUD shows the existing pond on the eastern parcel being enhanced and used as a retention pond. The existing stream channels on that parcel are called out to be enhanced into bio-swales for increased storm water runoff filtration and quality. Storm sewer is shown extending through the site which outlets directly into the existing pond and a method of sedimentation such as forebay or mechanical treatment will be required prior to the outlet in the existing pond. It appears that the applicant is providing a culvert for the existing wetland stream that crosses the site near Waldon Rd.

Preliminary stormwater management calculations were not included in the plans and will be required at Final PUD. The calculations and design must adhere to the recently revised township standards for stormwater management that promote infiltration and sediment control.

TRAFFIC & CIRCULATION:

There are two proposed entrances into the site, with an access point on Waldon Rd. and another on S. Lapeer Rd. The drive aisles scale at 26 feet in width. The approaches will be under the jurisdiction of the RCOC and MDOT respectively. Drive aisles and turning motions appear to generally facilitate the navigation or the Orion Township Fire Truck, however a turning template should be provided at Final PUD to ensure that the truck can easily navigate through the entire site.

Safety path is provided along the frontage of Waldon Rd., and internal sidewalk is provided throughout the site. The internal sidewalk appears to generally be a minimum of 5 feet wide. There is one location in the northwest corner of the parking lot where the asphalt pathway appears to only be 5 feet wide adjacent the parking spaces. Sidewalk or pathway abutting parking stalls must be increased to 7 feet in width. Sidewalk extends along the drive on the back of the northern edge of the drive aisle and reaches the right-of-way at S. Lapeer Rd. The applicant shows pathway extending along all site frontage from the south connection on Waldon to the north end of the parcel on M-24. Internal sidewalk appears to extend north from the public pathway at Waldon Rd. around the outer edge of the paved lot, and east to the public pathway proposed on Lapeer Rd. The Planning Commission may want to request the applicant extend the pathway west to the stub at Waldon Meadows Condominium and east to the stub on M-24.

A revised traffic impact study was not included with the second submittal. Please note that the comments from the previous review are still outstanding and need to be addressed.

A Traffic Impact Study (TIS) was prepared by ROWE Professional Services Company, and it is dated October 4, 2021. The study included the 190 units of multifamily residential, a mixed-use building comprising 21,116 square feet (SF), and a 4,000 SF sit-down restaurant. The mixed-use will also consist of 13,056 SF of office space, a 1,500 SF meeting room, and 11,556 SF of classic car parking, for 33 classic vehicles to be parked inside the building. The TIS needs to be revised and resubmitted because it fundamentally fails to comply with the requirements of the Orion Township Zoning Ordinance. The TIS shall be revised to incorporate the following comments:

a) Per the Orion Township Zoning Ordinance Section 27.14.D.3., the TIS must include the following presently missing components:
    i. A traffic crash analysis utilizing, at minimum, the most recent three years of data.
    ii. A description of existing road right-of-way (ROW) and any deficiencies in ROW compared to the master planned dimensions.

b) Trip Generation: Per the Orion Township Zoning Ordinance Section 27.14.D.5.b, for any land use code in the Institute of Transportation Engineers (ITE) Trip Generation data set that is statistically significant, the value used for generated trips must be one standard deviation higher than the average value.
    i. The use of 'internal capture' is only to be used with the express approval of the Township. We do not so recommend. The site is laid out such that there is almost no relationship between the residential and non-residential portions of the site. They could easily be completely divorced

from each other. The only potential interaction is between the office/car display building and the restaurant. We are not convinced that this interaction is strong enough to justify an internal capture calculation for reducing the number of external trips.

c) Cumulative Impacts: This TIS references other Orion Township redevelopment. But it then evaluates this development and its adjacent intersections in isolation, as if the other developments will have no influence. The study should evaluate the cumulative traffic impacts from the other development projects located at Four Seasons/Autumn Lane & Lapeer Road and Lake Village Blvd & Lapeer Road. Details on the other proposed developments may be obtained through the Townships Planning Department.

d) It should be noted that unless improvements are already planned and funded by MDOT, RCOC or the Township, the only changes that should be proposed for existing or background conditions would be operational ones, such as signal timing optimization. The TIS will need to directly compare existing, background and future traffic operations WITHOUT improvements, and then what improvements may be needed for future traffic operations.

   i. If new signals are being suggested, then a full signal warrant study of ALL warranting criteria will need to be presented. Reliance on just one criterion, such as Warrant 2 or 3, is not sufficient.

   ii. The study indicates that signalization of the intersection at Lapeer Road (M-24) & Waldon Road will slightly improve LOS from F to D in the AM peak and no improvement in the PM peak (E to E) periods. Similarly, signalization of the intersection at Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road will allow approach and movement to operate with LOS C to E during the AM peak period and F to E during the PM period at the EB. The LOS at the WB will operate from B to D and E to D during the AM and PM peak periods respectively. The study however does not assign responsibility for the cost associated with signalization of this intersection. These new signals will be under the jurisdiction of MDOT and will need to meet the department's requirements and approval.

e) Mitigation: The proposed traffic impact and mitigation is reasonable under the assumptions used in the study. However, with the requested changes to the study area, and modeling the cumulative impacts that would more accurately represents the possible future outcomes, it will be possible to identify adjustments may be necessary to the proposed mitigation.

PAVING & GRADING:

The applicant is noting asphalt for the main parking lot and drive aisles with concrete for the internal sidewalks and asphalt for the safety path. There are also 8-foot mulch trailways proposed in The Preserve area. A proposed path is called out south of the proposed restaurant and parking lot, but no dimensions or material types are called out for his path. The hatching used for sidewalk and public pathway is inconsistent. Please show all pathway (asphalt) and sidewalk (concrete) with the correct hatching. Please verify that there is concrete sidewalk adjacent the handicap stalls located on the south side of Building B. There is a gated and secured refuse and recycling center located on the western side of the eastern parcel which also appears to be the same material as the drive aisles and parking lot. The dumpster pad shall match the Orion Township detail for dumpster pad enclosures. Pavement sections will be required for each of these locations at Final PUD.

Existing grades on site were provided via 2-foot contours. The site reaches an elevation of 990 in the northeast corner of the southern half of the site. The lowest elevation is roughly 970 in the northwest corner of the site by the wetlands. Proposed grades are shown via minimal spot grades throughout the site. More grading information will be required at Final PUD to ensure the site maintains existing drainage patterns and that Township slope requirements are being met in paved areas as well as green space. Maximum slope for green space is 1:4. Drive aisles are to remain under 6% and parking areas are to remain under 4%. All sidewalks and pathway must be ADA compliant.

NATURAL FEATURES:

WOODLANDS

The site is heavily wooded, with the highest density of existing trees in the northern half of the site near the wetland. It appears that a site visit was conducted and indicates what types of trees are located on the western parcel. No information was provided regarding the eastern parcel. A comprehensive tree survey was not provided along with the survey and will be required at Final PUD. Landmark trees and trees proposed for removal must be identified and quantified on the tree survey.

WETLANDS

Per the NWI maps, several wetlands are present on-site. There is a pond and wetland located along the northern property border of the site. There is also a riverine that extends from the pond located south of the western parcel and crosses the site about 200 feet north of Waldon Rd. Lastly, there is a wetland and connected riverine that is located on the eastern parcel, each with proposed improvements. All wetlands onsite appear to be connected to a larger water course that ultimately discharges into Lower Trout Lake. A wetland impact permit from Orion Township and EGLE will be required for any proposed impacts to the wetlands. A copy of the wetland delineation report shall be provided to support the wetland limits shown.

LANDSCAPING:

Landscaping plantings and trees were included on the PUD Site Plan sheet. The proposed trees are primarily located around the perimeter of the site in green space and within the courtyard located in the center of the two buildings. Many existing trees are proposed to remain in the area of The Preserve in the northern half of the site. It is unclear at this time whether the trees and plantings are in proximity of the water main and sanitary sewer for the site, as those utilities were not included in the plans. A landscape plan is required at Final PUD. Utilities shall be shown in gray on the landscape plan so that the separation between trees and utilities can be assessed.

CONCLUSION:

In our opinion, the Concept PUD is not in substantial compliance with the Township's ordinances and engineering standards. We ask that the following comments be addressed:

1. The Traffic Impact Study be revised and resubmitted per comments noted herein and to reflect the recent concept plan changes.
2. Any required mitigation from the TIS should be shown on the plans.
3. A copy of the wetland delineation report should be provided to support the wetland limits shown.
4. The density plan should be revised to include a secondary access point off M-24.

Please feel free to contact us with any questions at (248) 751-3108 or joseph.lehman@ohm-advisors.com.

Sincerely,
OHM Advisors

Joe Lehman, PE
Project Engineer

Mark A. Landis, PE
Project Manager

cc: Chris Barnett, Township Supervisor
David Goodloe, Building Official
Jeff Stout, Director of Public Services
Tammy Girling, Director of Planning and Zoning
Lynn Harrison, Planning and Zoning Coordinator
Jeff Williams, Township Fire Marshal
Bill Basigkow, Water and Sewer Superintendent
Rod Arroyo, Township Planning Consultant
Michael Wayne, Detroit Riverside Capital, LLC
Peter Stuhlreyer, Designhaus, LLC

giffels webster

January 18, 2022
(rev. 02/2/2022)

RECEIVED
FEB 28 2022
Orion Township
Planning & Zoning

Charter Township of Orion
Planning Commission
2424 Joslyn Road
Lake Orion, MI 48360

Planned Unit Development Concept Review

The Woodlands (REVISED with added mixed use component)

Case Number:	PC-2021-78	**Plan Date:**	01/04/2022
Address:	NW Corner – Waldon @ Lapeer	**Zoning:**	SE – Suburban Estates
Parcel ID:	A) 09-23-351-024		R- 2 Single Family Residential
	B) 09-26-101-021		GB – General Business
Area:	27.70 AC	**Reviewer**:	Rod Arroyo
Applicant:	Detroit Riverside Capital		Matt Wojciechowski

Dear Planning Commissioners:
We have completed a review of the application materials and a summary of our findings is below. Comments are provided in *italics*

Project Summary

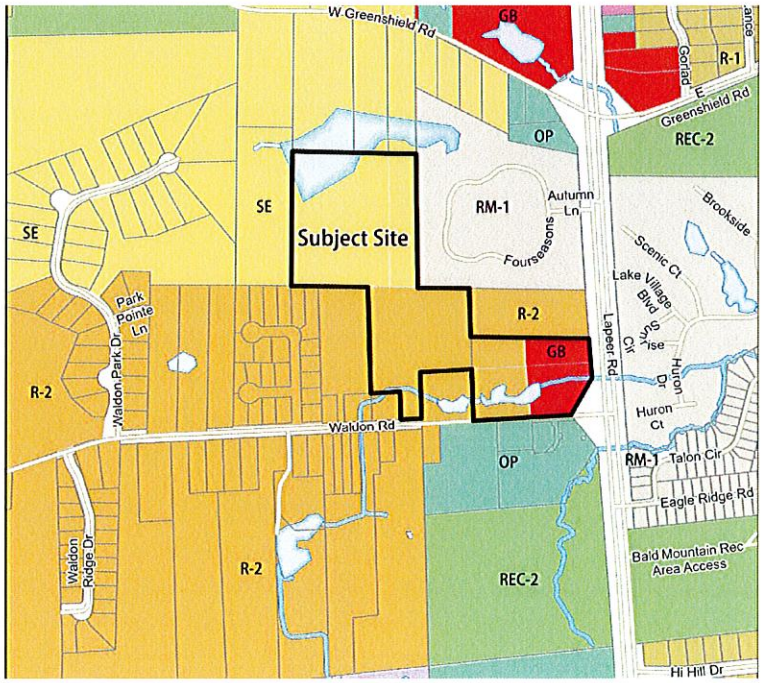
The proposed Planned Unit Development (PUD) is located on the north side of Walton, west of Lapeer Road. The 27-acre site is an irregular shaped lot with access and frontage located on both Walton Road and Lapeer Road. There are significant natural features, including a pond, wetland and woodlands, that are planned to be preserved and accessed via a proposed trailway (the preserve). The western/central portion of the site is proposed to feature two multiple family buildings consisting of 166 units surrounded by 428 parking spaces. The proposed buildings would feature units ranging from studio to three-bedroom units. The eastern half of the site, fronting on S. Lapeer Road, would feature a 4,000 square foot restaurant, with parking provided between the restaurant development to the multi-family portion of the development.

Existing Conditions

1. **Zoning.** Parcel A is a 20.63-acre is split zoned parcel, with SE (Suburban Estates) on the northern half of the property and R-2 (Single Family Residential) on the southern portion of the site. Parcel B is a 7.07-acre parcel is zoned GB. The conditional rezone associated with parcel B (Orion Car club) will be abandoned and the parcel will be rezoned PUD consistent with this proposal.

2. **Adjacent zoning & land uses.**

Direction	Zoning	Use
North	SE - Suburban Estates	Single-family
South	R-2 – Single Family Residential	Single-family
East	RM-1 – Multiple Family Residential	Multiple family (townhomes) at 3.19 dus / acre and R-2 parcels
West	SE & R-2	Single-family (large lots and Waldon Meadows @ 2.38 dus/acre)



SUMMARY

1. **Intent.** The concept plan proposes a density (5.99 units/acre) that exceeds the permitted density in the underlying zoning districts (R-2 allows approximately 3.2 units/acre).

2. **Preservation of natural features.** The northern 12 acres of the site, which contain significant natural features, are proposed to be preserved. A tree survey for the entire site has not yet occurred and is noted to occur at Final PUD. The applicant should address any existing trees surrounding individual proposed buildings that are intended to be preserved.

3. **Improvements in traffic patterns.** The plans show two access points; one to the south providing access to Waldon Road and one to the east with access to Lapeer Road. We defer to the Township Engineer for comment.

4. **Township Master Plan.** The Future Land Use map indicates a designation of Single-Family Medium Low Density (0.5 – 1.0 units/acre) and Single-Family Medium Density (1-3 units/acre) on the site. This designation is a low-density single-family category with a range of one to three dwelling units per acre and lot sizes in the range of 0.25 AC (10,800 sq. ft) to 1.5 acres. This designation corresponds to the existing SE and R-2 zoning districts. The proposal is significantly more intense than the SE and R-2 zoning districts. The Master Plan is currently undergoing a review and update.

5. **Unified Control.** The applicant shall provide sufficient documentation of ownership or control in the form of [purchase] agreements, contracts, covenants, and/or deed restrictions that indicate that the development will be completed in its owned entirety as proposed. This includes the property to the east (Orion Car Club) that would provide access to Lapeer Road and serve as the project primary ingress/egress. The applicant will need to request abandonment of the conditional rezoning on this parcel.

6. **Density plan submittal.** The ultimate density shall be recommended by the Planning Commission and determined by the Township Board and shall be based upon the underlying zoning or a density as designated by the Master Plan. The applicant's proposed density is approximately 5.9x (166 units v. 28 units) higher than the zoning ordinance and future land use plan permits. The Master Plan is currently being updated.

7. **Base zoning regulations and regulatory flexibility.** The proposed project is within RM-1 density; however, the project would not be permitted RM-1 without variances. Several modifications, including overall building height, building length, number of stories and required parking (distance from building) require modifications or deviations from standards to be approved by the Planning Commission and Township Board as part of the PUD process.

8. **Impact of traffic.** The applicant should address how the project was designed to minimize the impact of traffic generated by the proposed development on surrounding uses, as outlined in 30.03.C.7. Details will be reviewed by the Township Engineer.

9. **Transition areas.** It appears that the grade changes adjacent to the existing residential areas to the northeast and south of the site are more than three. We note that a site section drawing was provided, however, the setbacks / buffering from existing residential uses to the north, south and

southwest are not robust for such a significant change in density. The greenbelt to the west is only about 17' wide with about 12' of landscaping.

10. **Natural features and preservation.** The applicant should verify if any animal or plant habitats of significant value exist on the site in accordance with Section 30.03 C.15. Additionally, a Tree Removal Permit will be required for this development in accordance with Section 27.12.

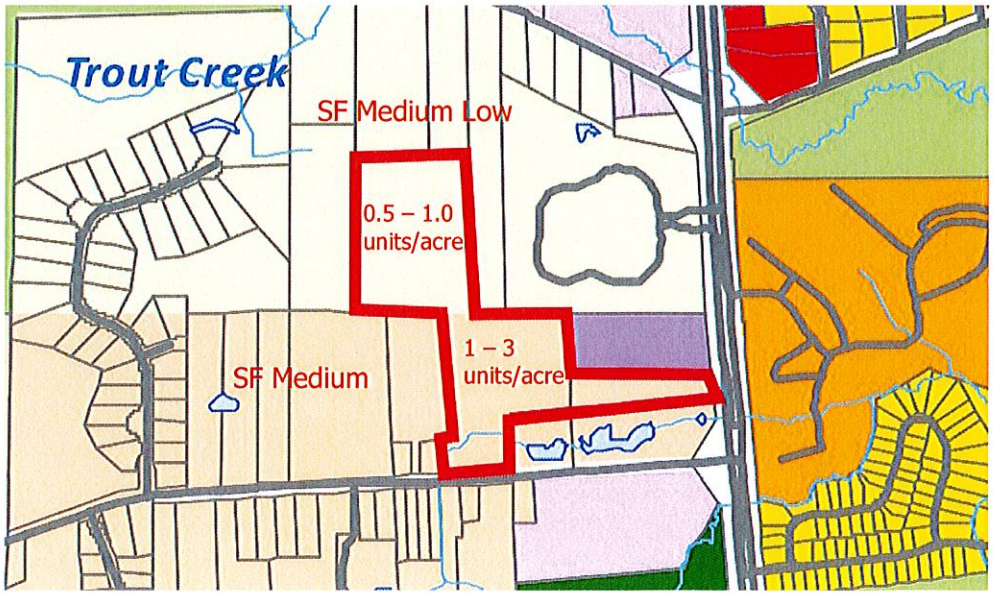
11. **Safety paths / walkways**. A safety path is provided along both road frontages (Waldon and Lapeer) with a proposed connection to the site; however, it is unclear if the internal pathway will be regulated as private property or if public access will be allowed within the development and associated nature preserve.

12. **PUD Eligibility.** Planning Commission should review PUD eligibility criteria as it relates to the proposed development (pgs. 5-7) and PUD project design standards (starting on page 7).

PUD Review Criteria:

A. **Intent**. A Planned Unit Development (PUD) may be applied for in any zoning district. The provisions of this section are not intended as a device for ignoring the Zoning Ordinance and specific standards set forth therein, or the planning upon which it has been based. To that end, provisions of this section are intended to result in land use development substantially consistent with the existing zoning and existing Charter Township of Orion Master Plan, with modifications and departures from generally applicable requirements made in accordance with standards provided in this section to ensure appropriate, fair, and consistent decision-making.

The concept plan proposes a density of 5.99 units/acre, consistent with the Multiple Family Low Density future land use category, which envisions RM-1 zoning to develop a parcel with this designation. The current designation, Single Family Medium density on the southern half, envisions developments of 1-3 units per acre. The Medium Low designation on the northern portion is lower.



B. Eligibility Criteria. To be eligible for Planned Unit Development (PUD) approval, the applicant shall demonstrate that the following criteria will be met.

Please see the application package submitted by the applicant (01/04/2022) for the responses provided to the criteria listed below.

1. **Recognizable benefit.** The PUD should result in a recognizable and substantial benefit, both to the residents of the project and the overall quality of life in the Township. Recognizable benefits include:

   a. **Preservation of natural features**, specifically, but not limited to, woodlands, specimen trees, open spaces, wetlands, and hills.

   The northern 12 acres of the site, which contain significant natural features, are proposed to be preserved along with the eastern portion where stormwater retention is proposed. A tree survey for the entire site has not yet occurred and is noted to occur at Final PUD. The applicant should address any existing trees surrounding individual proposed buildings that are intended to be preserved.

   b. **Preservation of historic buildings.** N/A

   c. **Improvements in traffic patterns** including unified access and conformance with the access management section of the ordinance should be applied.

   The plans show two access points; one to the south providing access to Waldon Road and one to the east with access to Lapeer Road. The Lapeer Road access drive is proposed on property that currently has an approved conditional rezoning and site plan for a Car Club and restaurant.

   d. **Improvements in the aesthetic qualities.** Improvements in the aesthetic qualities of the development itself, such as unique site design features, extensive landscaping, and safety path/greenway connections should be clearly delineated on the site plan so that the planning commission can review the extent of the improvements.

   e. **Improvements in public safety or welfare.** Improvements in public safety or welfare through better water supply, sewage disposal, stormwater management, or control of air pollution and water pollution.

   The applicant has addressed how stormwater would be managed in a letter from Stonefield Engineers dated 01/04/2022.

   f. **High-quality architectural design.**

   The application submitted an exterior concept rendering (A7.3 that should be discussed by the Planning Commission as part of the conceptual review. No materials or material details were submitted.

g. **Provision of transitional areas.**

The application does not address this concept; the Planning Commission may wish to discuss this with the applicant.

Those benefits to the community that are concrete in nature, and therefore easily monitored, **shall be listed on the plans**. Benefits that shall be listed shall include, but not be limited to, historic buildings and natural features to be preserved and specific improvements in water supply, sewage disposal, and stormwater management plans and shall become part of the agreement between the Township and the applicant.

2. **Density impact.** The proposed type and density of use shall not result in an unreasonable increase in the need for or impact to public services, facilities, roads, and utilities in reaction to the use or uses otherwise permitted by this Ordinance and shall not place an unreasonable impact on the subject site and/or surrounding land and/or property owners and occupants and/or the natural environment.

   We defer to the Township Engineer in regarding to impacts related to roads, utilities and potential flooding impacts.

3. **Township Master Plan.** The proposed development shall be consistent with the intent and spirit of the Township Master Plan, and further its implementation. If the proposed development is not consistent with the Master Plan but there has been a change in conditions in the area in that will explain why the proposed PUD is a reasonable use of land, the Planning Commission can consider an amendment to the Master Plan and site plan approval for the proposed development in question

   The Future Land Use map indicates a designation of Single-Family Medium and Medium Low Density for the site. This designation is a low-density single-family category with a range of one to three dwelling units per acre and lot sizes in the range of 0.25 AC (10,800 sq. ft) to 1.5 acres. This designation corresponds to the existing SE and R-2 zoning districts. The proposal is significantly more intense than the SE and R-2 zoning districts.

	FLU Designation	**Zoning**	**Permitted/Planned Density**	**Max units per zoning**
Current	SF Medium Low	SE	0.66 units/acre	28 units
	SF Medium	R-2	3-5 units/acre	
Max. density permitted by Twp. Zoning	Multiple family Medium	RM-2	8 units/acre (Zoning) 9/units/acre (MP)	166 units (Zoning max) 180 units (MP max)
Proposed	*None listed - Exceeds max*	PUD	5.99 units/acre	166 units

4. **Economic impact.** The Planning Commission should determine that in relation to the existing zoning, the proposed development shall not result in a material negative economic impact upon surrounding properties.

5. **Guaranteed open space.** Section 30.03 B.5. states that 15% of the site shall be guaranteed open space including usable active and passive upland spaces and trails. Park-like amenities may be provided, and open space shall be equally available to all residents of the development with maintenance and ownership documentation shall be submitted.

   The applicant shall guarantee to the satisfaction of the Township Planning Commission that all open space portions of the development will be maintained in the manner approved. The 15% threshold is exceeded by the proposal.

6. **Unified control.** The proposed development shall be under single ownership and/or control, such that there is a single person or entity having proprietary responsibility for the full completion of the project.

C. <u>PUD Project Design Standards:</u>

1. **Location.** The subject property is zoned SE, GB and R-2 and is eligible for a PUD development.

2. N/A – project is not proposing single family development

3. **Permitted Uses or Combination of Uses.** A PUD is permitted for single-family detached, attached residential dwellings, commercial uses, industrial uses and mixed-use projects

4. **Plan Submittal**. Any application for a PUD shall be accompanied by three (3) plans:

   - (1) a plan based on existing zoning at the time of application. **See sheet A2.0**
   - (2) a density plan prepared in accordance with this section **See sheet A2.0**
   - (3) a PUD plan. **See sheets A3.0 – A3.1**

   a. **Density Plan Density plan submittal**. The applicant shall prepare, and present to the Planning Commission for review, a density plan for the project that is consistent with State, County, and Township requirements and design criteria for a tentative preliminary plat or site condo, whichever is appropriate. The density plan shall meet all standards for lot size, lot width, setbacks, public roadway improvements and private parks, and contain an area which conceptually <u>would provide sufficient area for stormwater detention</u>. Lots in the density plan shall provide sufficient building envelope size without impacting wetlands regulated by the Michigan Department of Environmental Quality. All structures, buildings, parking lots, streets, roads and driveways shall be set back twenty-five (25) feet from any wetland *.A wetland delineation should be provided for the final PUD to determine the extent of the natural features on the site*

   b. The density plan shall contain the following elements:
      1) Layout of roads and rights-of-way. **Provided**
      2) Lot lines. **Provided**
      3) Wetland boundaries, submerged lands. **Provided**
      4) Floodplains. ***Not provided***

5) Lot numbers and a schedule of lot areas. ***Incomplete – lot areas for lots 23 & 24 not provided.***

6) Areas proposed for stormwater management. **Provided**

c. **Minimum lot area**. The density plan is only used to determine allowable density for a PUD project.

The density plan yields a density of 1.01 units per acre.

d. **Density Credit**. The Planning Commission shall review the design and determine the number of lots that could be feasibly constructed under the density plan. This number, as determined by the Planning Commission, shall be the maximum number of dwelling units allowable for the PUD project, shown on the PUD plan

The density plan provided, based on the minimum acceptable lot size for the existing zoning, yields a maximum density of 28 units for this site. This equates to approximately one unit per acre (1.01) and is consistent with the master plan.

e. **Overall Density**. The overall residential density shall be determined by use of the density plan using the underlying/existing zoning and corresponding lot sizes and/or the Township's Master Plan. The applicant may propose other underlying zoning categories for the consideration of density in the chart provided.

The applicant's proposed density is consistent with that of the RM-1 zoning district

a) RM-1 permits 8 units/acre

b) PUD proposed 5.99 units/acre

5. **Public Services.** The proposed PUD shall not exceed the capacity of existing and available public services, including utilities, public roads, police and fire protection services.

We defer to the township engineer

6. **Base Zoning Regulations**. Unless specifically waived or modified by the Planning Commission and Township Board, all Zoning Ordinance requirements for the underlying zoning district, except for minimum lot area, and other Township regulations, shall remain in full force.

The uses proposed/ multiple family residential and commercial, are not permitted in the underlying SE or R-2 zoning districts. The proposed project would not be permitted by right any zoning district in the Township. Several modifications or variances would be needed in order for the development to meet RM-1 or RM-2 standards, including building height, length and the location of parking.

7. **Impact of traffic.** The PUD shall be designed to minimize the impact of traffic generated by the proposed development on surrounding uses. In determining whether this requirement has been met, consideration shall be given to:
   a. The access to major thoroughfares.
   b. Estimated traffic to be generated by the proposed development.
   c. Proximity and relation to intersections.

d. Adequacy of driver sight distances.
e. Location of and access to off-street parking.
f. Required vehicular turning movements.
g. Provisions for pedestrian traffic.

The applicant should address these points in detail. Defer to Township Engineer for comment.

8. **Regulatory Flexibility.** To encourage flexibility and creativity consistent with the PUD concept, the Planning Commission may recommend, and the Township Board may grant, specific departures from the requirements of the Zoning Ordinance as a part of the approval process.

The following zoning modifications require Planning Commission and Township Board approval:

Zoning Modifications				
Standard	**Permitted / required**		**Proposed PUD**	**Modification**
	SE	**R-2**		
Maximum Height of Structures	2 stories / 30'	30'	3 stories / 42'	Additional 12' in building height & one additional story is requested
Parking Location	Required within 300' of use		Up to 500'	*Waiver from 27.04.A.2.a.*

In addition to the above, another zoning modification is that the number of units exceeds the underlying permitted density by a factor of about 5.9 times.

9. **Compatibility with adjacent uses.** Consideration shall be given to:
   a. The bulk, placement, and materials of construction of proposed structures.
   b. The location and screening of vehicular circulation and parking areas in relation to surrounding development.
   c. The location and screening of outdoor storage, outdoor activity or work areas, and mechanical equipment in relation to surrounding development.
   d. The hours of operation of the proposed uses.
   e. The provision of landscaping and other site amenities.

The applicant should address how the site was designed in relation to potential impacts on adjacent residential areas to the north and east of the site.

10. **Transition areas.** Where the PUD abuts a single-family residential district, the Planning Commission and Township Board may require a transition area. Grading within the transition area shall be minimal unless needed to provide effective buffering or accommodate drainage. If the grade change adjacent to a single-family residential area is to be varied by more than three (3) feet, the site plan shall include cross sections illustrating existing and proposed grades in relation to existing and proposed building heights. Perspective renderings from adjacent residential units are encouraged. The Planning Commission may review the proposed transition area to ensure compatibility

The applicant is proposing tree preservation as a transition area to the abutting single-family residential districts north and east of the site. The Zoning Ordinance requires that if the grade change adjacent to a single-family residential area is to be varied by more than three feet, the site plan shall include cross sections illustrating existing and proposed grades in relation to existing and proposed building heights. The setbacks/buffering from existing residential uses to the north, south and southwest are not robust for such a significant change in density. The Planning Commission and Township Board may require additional screening or setbacks to ensure that the transition area provides a sufficient buffer.

11. **Architectural and site element design.** Residential facades should not be dominated by garages. Where attached garages are proposed, at least 50% of the garages should be side-entry or recessed, where the front of the garage is at least five feet behind the front line of the living portion of the principal dwelling. The intent of encouraging recessed or side entry garages is to enhance the aesthetic appearance of the development and minimize the visual impact resulting from the close clustering of units allowed under these regulations. *N/A*

12. **Access.** Direct access onto a county road or state highway shall be required to a PUD. The nearest edge of any entrance or exit drive shall be located no closer than two hundred (200) feet from any existing street or road intersection (as measured from the nearest intersection right-of-way line).

    Traffic will be reviewed by the Township Engineer.

13. **Internal Roads.** *N/A*

14. **Pedestrian Circulation.** The PUD plan shall provide pedestrian access to all open space areas from all residential/development areas, connections between open space areas, public thoroughfares and connections between appropriate on-site and off-site uses. Trails within the PUD may be constructed of gravel, wood chips or other similar materials, but the Planning Commission and Township Board may require construction of an eight (8) foot wide asphalt safety path through portions of the development. Safety paths are required along all public roads, as denoted in the Master Plan and detailed in the Safety Path Ordinance No. 97.

    A safety path is provided along both road frontages (Waldon and Lapeer) with a proposed connection to the site; however, it is unclear if the internal pathway will be regulated as private property or if public access will be allowed within the development and associated nature preserve.

15. **Natural Features.** The development has been designed to preserve natural features, specifically woodlands, around much of the perimeter of the site and the northern portion.

    The applicant should verify if any animal or plant habitats of significant value exist on the site in accordance with Section 30.03 C.15. Additionally, a Tree Removal Permit will be required for this development in accordance with Section 27.12. A preliminary woodland assessment should be submitted indicating woodlands with landmark trees. A tree survey for the entire site has not yet occurred.

16. **Existing Structures. N/A**

17. **Additional Considerations.** The Planning Commission shall take into account, in considering approval or denial of a particular project, the following considerations, as the same may be relevant to a particular project: drainage and utility design; underground installation of utilities; insulating the pedestrian circulation system from vehicular thoroughfares and ways; achievement of an integrated development with respect to signage, lighting, landscaping and building materials; and noise reduction and visual screening of mechanical equipment

D. Not applicable – mixed use proposed

E. Optional Provisions for Exemplary Projects. The Planning Commission and Township Board may allow an exemplary Planned Unit Development (PUD) to include one (1) or more of the following optional provisions. In order to qualify for an optional provision, the applicant shall demonstrate to the satisfaction of the Planning Commission and Township Board, that the proposed project exceeds the minimum standards for PUD eligibility under Section 30.03 (B).

In order to qualify for development under the optional provisions of this section, architectural standards shall be subject to review by the Planning Commission and Township Board. Buildings shall be harmonious with adjacent uses in terms of texture, materials, roof lines and mass, but there shall be a variation of front facade depth and roof lines to avoid monotony. Building elevations shall be required for all structures.

1. **Density Credit.** A variable density credit may be allowed at the discretion of the Planning Commission and Township Board, based upon a demonstration by the applicant of design excellence in the PUD. Projects qualifying for a density credit shall include no less than two (2) of the following elements (amended 05.18.09). The items in bold are clearly met by the proposal; others may be met subject to additional review and information:

    a. **High level of clustered development, where at least twenty percent (20%) of the PUD is common usable open space.**

    b. Providing perimeter transition areas or greenbelts around all sides of the development that are at least one hundred (100) feet in depth.

    c. The proposed plan is designed to enhance surface water quality and ground water quality.

    d. **Provisions and design that preserve natural features.**

    e. Donation or contribution of land or amenities that represent significant community benefit.

    f. Other similar elements as determined by the Planning Commission and Township Board.

The Planning Commission should consider if these elements apply. We note that open space exceeds 20% and natural features are preserved (two of the required elements).

2. **Multiple-Family Component**. A PUD with a gross area of ten (10) acres or more may incorporate a multiple-family component, provided that all of the following are met:

    a. Front Yard. The minimum building setback from an internal road shall be twenty-five (25) feet from the public street right-of-way or private road easement. The Planning Commission and Township Board may reduce the setback based upon a determination that off-street parking will be adequate, and that the modification will preserve natural features or that the rear yard buffer will be increased by one (1) foot for each one (1) foot of reduction in the front yard setback. In no instance shall the front yard setback be reduced below a minimum of fifteen (15) feet. Buildings that front on two (2) streets shall provide the required front yard setback from both streets. *Project setbacks are met*

    b. Rear Yard. A minimum thirty-five (35) foot rear yard shall be maintained for all buildings. Where the rear of a building abuts the side or rear of another residential structure, the minimum spacing between the structures shall be the combined total of the two (2) setback requirements. *The PC should discuss this standard; see e. below*

    c. Side Yards. A thirty-five (35) foot setback shall be maintained to the side of all buildings. Where two (2) buildings are located side-by-side, twenty (20) feet shall be maintained between the buildings. *This standard is met*

    d. Off-Street Parking Lots. All off-street parking lots serving three (3) or more dwelling units shall provide a ten (10) foot wide greenbelt around the perimeter of the parking lot. *This standard appears to be met*

    e. The building setback requirements may be varied provided they are specifically indicated on the PUD plan and the Planning Commission and Township Board determines the variation does not negatively impact adjacent properties and provides a recognizable benefit. Building setback requirements on the perimeter of the development shall not be reduced below thirty-five (35) feet. *The PC should discuss this standard as it related to the building spacing*

3. Commercial Component. A PUD with a gross area of ten (10) acres or more may incorporate a commercial land use component, provided that all of the following are met:

    a. The commercial component shall be located on a lot of sufficient size to contain all commercial structures, parking, and landscape buffering. *This standard is met*

    b. All commercial uses shall be compatible with the residential area. *The PC should discuss this standard*

c. The Planning Commission finds that the architectural design of the structures is compatible with the balance of the development. *The PC should discuss this standard*

d. All commercial structures are connected to a pedestrian access system servicing the project. *The sidewalk/[pathway network along the north side of the entrance drive off of Lapeer should feature a connection to the restaurant, with a crosswalk placed west of the entrance drive*

e. All parking and loading areas serving the commercial uses shall be to the rear or side of the structure and fully screened from view of any public roadway, except that the Planning Commission may allow up to twenty five percent (25%) of the minimum number of required parking spaces in the front yard. Where the parking lot is visible from residential units or open space, it shall be planted with a landscape buffer consisting of evergreen trees spaced no more than ten (10) feet on center. *This standard is met*

F. Project Standards. In considering any application for approval of a Planned Unit Development (PUD) plan, the Planning Commission and Township Board shall make their determinations on the basis of the standards for site plan approval set forth in Section 30.01, Site Plan Review, as well as the following standards and requirements:

1. **Compliance with the PUD Concept.** The overall design and land uses proposed in connection with a PUD plan shall be consistent with the intent of the PUD concept, as well as with specific design standards set forth herein.

2. **Compatibility with Adjacent Uses.** The proposed PUD plan shall set forth in detail, all specifications with respect to height, setbacks, density, parking, circulation, landscaping, views, and other design features that exhibit due regard for the relationship of the development to surrounding properties, the character of the site, and the land uses. In determining whether this requirement has been met, consideration shall be given to:

   a) The bulk, placement, and materials of construction for the proposed structures.

   b) Pedestrian and vehicular circulation.

   c) The location and screening of vehicular use or parking areas.

   d) The provision of landscaping and other site amenities.

3. **Impact of Traffic**. The proposed PUD shall be designed to minimize the impact of traffic generated by the PUD on surrounding uses.

4. **Protection of Natural Environment**. The proposed PUD shall be protective of the natural environment. It shall comply with all applicable environmental protection laws and regulations.

5. **Compliance with Applicable Regulations**. The proposed PUD shall comply with all applicable federal, state, and local regulations.

6. **Township Master Plan**. The proposed PUD shall be consistent with, and further the implementation of, the Township Master Plan. If the proposed PUD is not consistent with the Master Plan, the Planning Commission and Township Board shall consider reasons for deviating from the Master Plan. This could include one (1) or more of the following:

   a) Changes in surrounding land use or zoning.
   b) Changes in infrastructure, such as roads, sewers, etc.
   c) Community benefit.
   d) Design excellence.

Next Steps

Planning Commission Action. Following the public hearing, or at a subsequent Planning Commission meeting, the Planning Commission shall review the Concept Plan and shall take one of the following actions:

1) **Approval.** Upon finding that the Concept Plan meets the criteria set forth in the intent and this section, the Planning Commission shall recommend Concept Plan approval to the Township Board. Approval by the Township Board shall constitute approval of the uses, density, and design concept as shown on the Concept Plan and shall confer upon the applicant the right to proceed to preparation of the Final Plan. A recommendation of approval of the Concept Plan by the Planning Commission shall not bind the Township Board to approval of the Final Plan submittals.

2) **Approval with Changes or Conditions.** The Planning Commission may recommend conditional approval to the Township Board, subject to modifications as performed by the applicant.

3) **Postponement.** Upon finding that the Concept Plan does not meet the criteria set forth in the intent of this section, but could meet such criteria if revised, the Planning Commission may recommend postponing action to the Township Board until a revised Concept Plan is submitted.

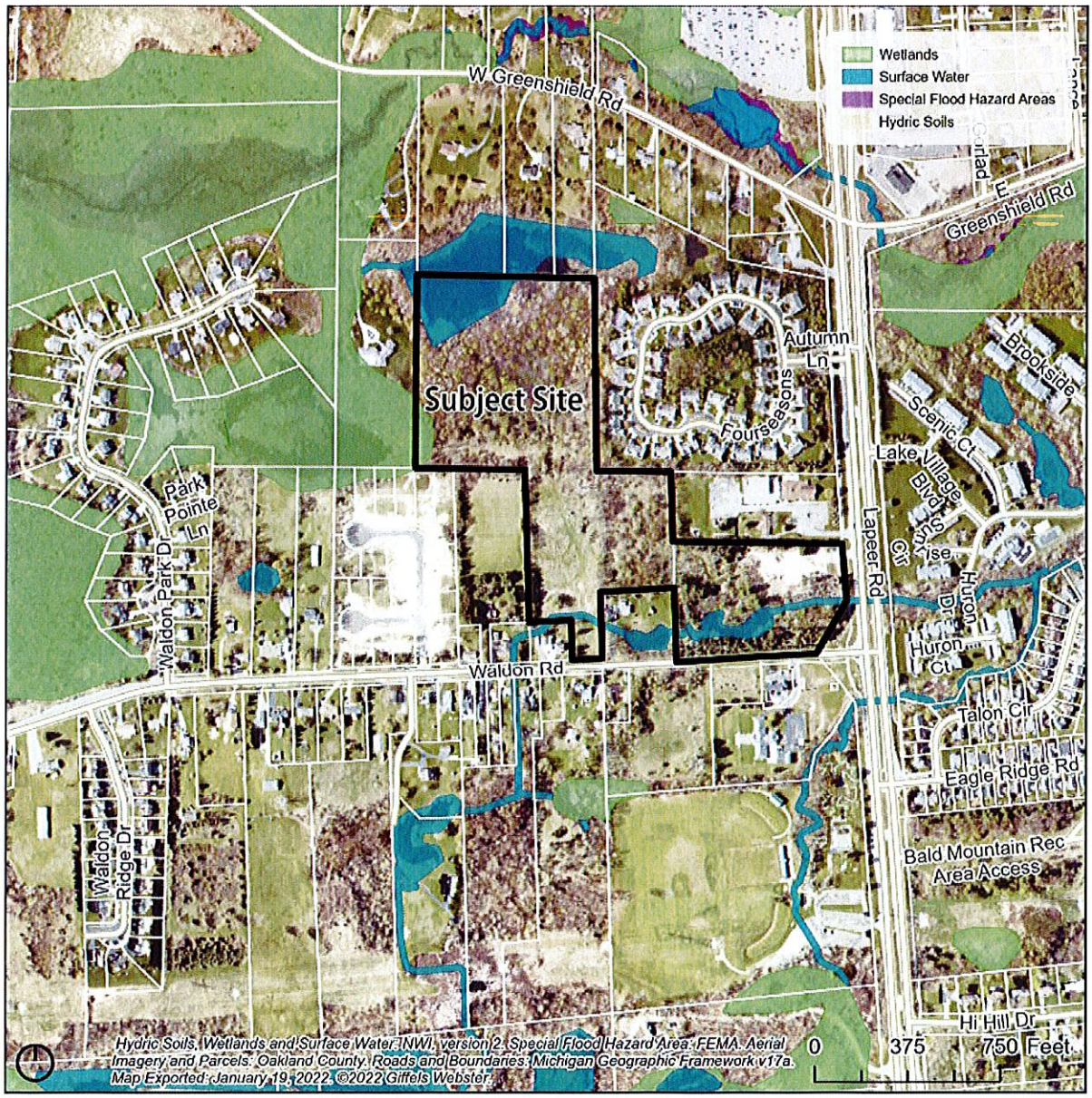
4) **Denial.** Upon finding that the Concept Plan does not meet the criteria set forth in the intent of this section, the Planning Commission shall recommend denial of the Concept Plan to the Township Board.

5) **Request Changes.** If the Planning Commission request changes, the applicant shall submit the revised drawings and/or information within the time frame allotted. Failure to submit the revised plans and/or information within the requisite time frame shall void the request.

Respectfully,
Giffels Webster

Rodney L. Arroyo, AICP
Partner

Matt Wojciechowski, AICP
Senior Planner



Charter Township of Orion

3365 Gregory Rd., Lake Orion MI 48359
www.oriontownship.org

Fire Department
Phone: (248) 391-0304, ext. 2000
Fax: (248) 309-6993

RECEIVED
JAN 20 2022
Orion Township
Planning & Zoning

To: Planning Commission/Planning & Zoning Director
From: Jeff Williams, Fire Marshal
Re: The Woodlands PUD Concept Plan Re-Submittal PC-2021-78
Date: 1/20/2022

The Orion Township Fire Department has completed its review of Application PC-2021-78 for the limited purpose of compliance with Charter Township of Orion Ordinance's, Michigan Building Code, and all applicable Fire Codes.

Based upon the application and documentation provided, the Fire Department has no concerns at this time regarding the concept plan.

If there are any questions, the Fire Department may be reached at 248-391-0304 ext. 2004.

Sincerely,

Jeffrey Williams

Jeff Williams, Fire Marshal
Orion Township Fire Department

Charter Township of Orion

2323 Joslyn • Lake Orion, Michigan 48360 • (248) 391-0304

To: Tammy Girling
Planning & Zoning Director

From: Jeffery T. Stout
Director, Department of Public Services

Date: January 21, 2022

Re: PC-2021-78 The Woodlands PUD Concept Plan
2nd Review

RECEIVED
JAN 21 2022
Orion Township
Planning & Zoning

Dear Tammy,

The Department of Public Services has reviewed the above-mentioned project. We can confirm that the water and sewer systems have adequate capacity for the conceptual project.

If you have any questions, please contact me.

Respectfully Submitted,

Jeffery T. Stout
Director
Department of Public Services

WRC
WATER RESOURCES COMMISSIONER
Jim Nash

RECEIVED
JAN 06 2022
Orion Township
Planning & Zoning

January 6, 2022

Lynn Harrison, Planning & Zoning Coordinator
Charter Township of Orion
Planning & Sonning Department
2525 Joslyn Rd
Lake Orion, MI 48360

Re: The Woodlands PUD – Preliminary Review
OCWRC Submittal No. 0256-2021
Part of the NW ¼ of Section 26, Orion Township

Dear Ms. Harrison,

This office has received a request for information pertaining to possible public facilities under the jurisdiction of this office for the referenced project. The subject plans were submitted by your office for review.

Our review indicates that the proposed project has no direct involvement with any legally established County Drain, Sanitary Sewer or Water Main under the jurisdiction of this office.

- The construction plans did not propose/indicate any sanitary sewer improvements.
- Storm Drainage, Sewage Disposal & Water Supply serving this area are under the jurisdiction of the Orion Township and/or the Oakland County Environmental Health Department. It shall be the responsibility of the local municipality, in their review and approval of the site plan, to ensure compliance with established construction requirements.
- Any proposed public sewer improvements shall require approvals by the Township/OCWRC/GLWA & EGLE.

Related earth disruption must conform to applicable requirements of Part 91, Soil Erosion and Sedimentation Control of the Natural Resource and Environmental Protection Act, Act 451 of the Public Acts of 1994. Application must be made to Orion Township for any required soil erosion permit.

Please call me at 248-897-2748 with any questions or concerns.

Sincerely,

Mark W. Davis

Mark W. Davis
Senior Engineering Systems Coordinator

Electronic copies: Chris Barnett, Twp. Supervisor – Orion Township
Jeff Stout, Twp. DPW Director – Orion Township
Tammy Girling, Twp. Planning & Zoning Director – Orion Township
Mark A. Landis, P.E. – OHM Advisors

ROWE PROFESSIONAL SERVICES COMPANY

Large Firm Resources. Personal Attention.

RECEIVED
January 27, 2022
Orion Township
Planning & Zoning

Memorandum

To: Michael Wayne

From: Brandon M. Hayes, PE, P.Eng., PTOE and Alyssa M. Wambold, PE

Date: January 20, 2022

RE: Revised Traffic Impact Study for The Woodlands PUD

ROWE Professional Services Company has completed a revised Traffic Impact Study (TIS) related to the mixed-use development located in the northwest quadrant of Lapeer Road (M-24) and Waldon Road in Orion Township, MI. The current site plan (included in the materials attached to this report) shows 190 units of multifamily residential, a mixed-use building comprising 21,116 square feet (SF), and a 4,000 SF sit-down restaurant with an anticipated opening date in 2023. The mixed-use building will be the second location of the Orion Classic Car Club and will consist of 13,056 SF of office space, a 1,500 SF meeting room, and 11,556 SF of classic car parking, which allows for 33 classic vehicles to be parked inside the building. This TIS was prepared to determine if any improvements would be necessary to mitigate traffic impacts to the adjacent road network. This report has been completed in accordance with the requirements specified by the Michigan Department of Transportation (MDOT), the Road Commission for Oakland County (RCOC), and Orion Township. These revisions are based off of comments received from Orion Township and their consultant.

TRAFFIC IMPACT STUDY

Traffic Counts

Turning movement counts (TMCs) were collected during the weekday AM (7 a.m. to 9 a.m.) and PM (4 p.m. to 6 p.m.) peak periods on August 24, 2021 at the intersections of:

- Lapeer Road (M-24) & Waldon Road
- Lapeer Road (M-24) & NB to SB Crossover
- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road

Due to the impact of COVID-19, current traffic volume data is not representative of typical operations. Historical traffic data from the MDOT Transportation Data Management System (TDMS) website was referenced. There was a historical traffic count from 2019 on Lapeer Road (M-24) just south of the proposed site. MDOT applied a -20% adjustment rate to project the 2019 counts to 2020. ROWE then applied a +20% adjustment rate to project the TMCs completed in 2021 to “pre-COVID-19” levels.

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All studied intersections are shown in Figure 1 attached to this memorandum. All traffic counts used in this study are attached to this memorandum. The existing adjusted peak hour traffic volumes are shown in Figure 2 attached to this memorandum.

Background Traffic Scenario

Historical traffic data from the MDOT TDMS website was referenced to determine the applicable growth rate for the existing traffic volumes for the project build-out year in 2023. Based on this review, a background growth rate of 0.5 percent was utilized. The background traffic volumes are shown in Figure 3 attached to this memorandum.

Trip Generation

Using the information and methodologies specified in the latest version of Trip Generation (Trip Generation Manual, 10th Edition, 2017), ROWE forecast the weekday AM and PM peak hour trips associated with the proposed development. The Orion Township ordinance and their consulting engineer specified that all trip generation calculations should be completed using the average rate plus one standard deviation above the average rate. To forecast the weekday AM and PM peak hour trips of the Orion Classic Car Club, it was assumed that the traffic generated by the site during the AM and PM peak hours will be from the office space and meeting space. It is unlikely that a classic car would be moved to or from the facility during the weekday AM or PM peak hour. The results of the trip generation forecasts are provided below in Table 1.

Table 1: Trip Generation for Proposed Development

Land Use	Land Use Code	Units	AM Peak Hour			PM Peak Hour			Weekday
			In	Out	Total	In	Out	Total	
Multifamily Housing (Mid-Rise)	221	190 DU	20	67	87	54	35	89	860
General Office Building	710	14,556 SF	27	4	31	5	25	30	217
High-Turnover (Sit-Down) Restaurant	932	4,000 SF	47	38	85	37	24	61	429
Total	**-**	**-**	**94**	**109**	**203**	**96**	**84**	**180**	**1,506**
Pass-By Rates, LUC 932: 43% PM			-	-	-	16	10	26	-
Total New Trips			**94**	**109**	**203**	**80**	**74**	**154**	**1,506**

Not all the traffic generated by the proposed development will be new traffic added onto the adjacent roadway network. As with most new commercial development, a significant amount of the site-generated traffic is considered “pass-by” traffic. Pass-by trips are trips already present on the adjacent roadway network, which are interrupted to visit the site. Pass-by trips are accounted for by reducing the number of forecast new trips to be added to the roadway network; however, actual driveway volumes are not reduced. Pass-by trips are normally expressed as a percentage of trips generated by the new development. These pass-by rates are published in the Trip Generation Handbook.

The Trip Generation Handbook suggests a 43 percent PM pass-by rate for the High-Turnover (Sit-Down) Restaurant. With the application of the pass-by trip factors, the site-generated trips can be classified as “pass-by” and “new” trips. The proposed development is expected to generate 203 total trips during the AM peak hour and 180 total trips during the PM peak hour. However, only 154 of the PM peak hour trips will be new traffic not currently using the adjacent street network, whose primary purpose is to visit the new development.

Trip Distribution

The existing traffic volumes were used to develop a trip distribution model for the AM and PM peak hours for the new traffic that will be generated by the proposed development. Table 2 provides the probable distribution based on the existing traffic patterns.

Table 2: Trip Distribution

Direction	Via	AM Peak Hour		PM Peak Hour	
		To	From	To	From
North	Lapeer Road (M-24)	27%	69%	61%	35%
South	Lapeer Road (M-24)	70%	27%	32%	60%
West	Waldon Rd	3%	4%	7%	5%
Total		**100%**	**100%**	**100%**	**100%**

The trip distribution for the site is shown in Figure 4 attached to this memorandum. The background traffic volumes were combined with the site generated traffic volumes to obtain the total future traffic volumes, which are shown in Figure 5 attached to this memorandum.

Level of Service Analysis

Level of service (LOS) analyses for existing, background, and total future (build) conditions for the AM and PM peak hours were performed for the intersections of:

- Lapeer Road (M-24) & Waldon Road
  - Unsignalized Intersection
- Lapeer Road (M-24) & NB to SB Crossover
  - Unsignalized Intersection
- Lapeer Road (M-24) & SB to NB Crossover/Eagle River Road
  - Unsignalized Intersection
- Lapeer Road (M-24) & Site Driveway 1
  - Proposed driveway approximately 490' north of Waldon Road
- Waldon Road & Site Driveway 2
  - Proposed driveway approximately 1,100' west of Lapeer Road (M-24)

According to the most recent (6th) edition of the Highway Capacity Manual (HCM), LOS is a qualitative measure describing operational conditions of a traffic stream or intersection. LOS ranges from A to F, with LOS A being the best and LOS D generally being considered acceptable in urban/suburban areas. Table 3 presents the criteria for defining the various LOS for signalized and unsignalized intersections.

Table 3: LOS Criteria

LOS	Average Stopped Delay/Vehicle (seconds)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

The results of the LOS analyses for the intersection listed above are summarized in Table 4 through Table 7. Full LOS output reports are attached to this memorandum.

Existing Conditions

The results of the LOS analysis for existing conditions indicated that several approaches and movements of the studied intersections operate at LOS D or better during the AM and PM peak hours, with the following exceptions:

- Lapeer Road (M-24) & Waldon Road
  - The eastbound approach and movements operate at LOS F in the AM peak hour
  - The eastbound approach and movements operate at LOS E in the PM peak hour
- Lapeer Road (M-24) & NB to SB Crossover
  - The westbound approach and movements operate at LOS F in the AM peak hour
- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road
  - The eastbound approach and movements operate at LOS F in the PM peak hour
  - The westbound approach and movements operate at LOS E in the PM peak hour

SimTraffic simulations were not generated for the study network. Due to the significant directional traffic volumes (southbound in the AM peak hour and northbound in the PM peak hour), calibration of the model was unsuccessful in generating a simulation that accurately represented field conditions, as observed in the traffic count videos. Review of the traffic count videos indicated that currently in the AM peak hour, queues at the NB to SB crossover occasionally fill the existing storage length (200') and queues on Waldon Road occasionally extend to 3 to 4 vehicles. In the PM peak hour currently, queues at the SB to NB crossover occasionally fill the existing storage length (250') while queues on Eagle Ridge Road occasionally extend to 3 to 4 vehicles. The nearest southbound signal to the study area is approximately 1,500' north of the NB to SB crossover. The nearest northbound signal to the study area is approximately 4,000' south of the SB to NB crossover/Eagle Ridge Road. The distance of these signals from the studied intersections causes little to no platooning of traffic along NB and SB Lapeer Road (M-24) at the studied intersections.

The operational results for existing conditions are presented in Table 4.

Table 4: LOS Analysis for Existing Conditions

Intersection	Control Type	Approach	AM Peak	PM Peak
Lapeer Road (M-24) & Waldon Road	Stop	Eastbound	F 180.9	E 35.5
	Free	Southbound	A 0.0	A 0.0
	TWSC	**Overall**	**B 10.8**	**A 4.1**
Lapeer Road (M-24) & NB to SB Crossover	Stop	Westbound	F 138.9	D 27.0
	Free	Southbound	A 0.0	A 0.0
	TWSC	**Overall**	**A 7.3**	**A 2.0**
Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road	Stop	Eastbound	C 19.6	F 587.3
		Westbound	B 14.5	E 45.2
	Free	Northbound	A 0.0	A 0.0
	TWSC	**Overall**	**A 2.2**	**E 38.2**

XX.X Average seconds of delay per vehicle

Existing Conditions – With Improvements

The following observations were made, and improvements were recommended, if applicable, at the following intersections due to existing traffic conditions:

- Lapeer Road (M-24) & Waldon Road
  - Signal warrants were reviewed for this intersection, as described in the *Signal Warrants* section later in this report. This intersection meets several signal warrants, including the 8-hour vehicular volume warrant. A signal is included in all "With Improvements" scenarios in this study. MDOT and RCOC should review this intersection due to the existing traffic conditions.
- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road
  - Signal warrants were reviewed for this intersection, as described in the *Signal Warrants* section later in this report. The intersection meets several signal warrants, include the 8-hour vehicular volume warrant. A signal is included in all "With Improvements" scenarios in this study. MDOT should review this intersection due to the existing traffic conditions.

The results of the LOS analysis for existing conditions with the improvements listed previously indicates that most approaches and movements of the studied intersections would operate at LOS D or better during the AM and PM peak hours, with the following exceptions:

- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road
  - The eastbound approaches/movements would operate at LOS E in the AM and PM peak hours

95th percentile queue lengths were reviewed at the studied intersections. Queue lengths will occasionally exceed 500' (20 vehicles) on NB and SB Lapeer Road (M-24) at the new signalized intersections, but these queues will clear within a single signal cycle. Queue lengths on Waldon Road will not exceed 181' (7 vehicles) in the AM peak hour and 250' (10 vehicles) in the PM peak hour. Queue lengths on the SB to NB Crossover or Eagle Ridge Road will not exceed 56' (2 vehicles) in the AM peak hour and 62' (2 vehicles) in the PM peak hour.

The operational results for Existing Conditions – With Improvements are presented in Table 5.

Table 5: LOS Analysis for Existing Conditions – With Improvements

Intersection	Control Type	Approach	AM Peak	PM Peak
Lapeer Road (M-24) & Waldon Road	Stop	Eastbound	D 45.6	D 54.6
	Free	Southbound	D 41.0	A 8.3
	TWSC	**Overall**	**D 41.3**	**B 13.6**
Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road	Stop	Eastbound	E 62.0	E 55.2
		Westbound	D 38.8	D 43.2
	Free	Northbound	B 10.2	D 44.9
	TWSC	**Overall**	**B 15.7**	**D 45.5**

XX.X Average seconds of delay per vehicle

Background Conditions

The results of the LOS analysis for background conditions without the signals described in the *Existing Conditions – With Improvements* scenario indicated that several approaches and movements of the studied intersections would continue to operate at LOS D or better during the

AM and PM peak hours, with the following exceptions:

- Lapeer Road (M-24) & Waldon Road
  - The eastbound approach and movements would continue to operate at LOS F in the AM peak hour
  - The eastbound approach and movements would continue to operate at LOS E in the PM peak hour
- Lapeer Road (M-24) & NB to SB Crossover
  - The westbound approach and movements would continue to operate at LOS F in the AM peak hour
- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road
  - The eastbound approach and movements would continue to operate at LOS F in the PM peak hour
  - The westbound approach and movements would continue to operate at LOS E in the PM peak hour

The operational results for background conditions are presented in Table 6.

Table 6: LOS Analysis for Background Conditions

Intersection	Control Type	Approach	AM Peak	PM Peak
Lapeer Road (M-24) & Waldon Road	Stop	Eastbound	F 193.3	E 36.9
	Free	Southbound	A 0.0	A 0.0
	TWSC	**Overall**	**B 11.5**	**A 4.3**
Lapeer Road (M-24) & NB to SB Crossover	Stop	Westbound	F 149.4	D 27.7
	Free	Southbound	A 0.0	A 0.0
	TWSC	**Overall**	**A 7.9**	**A 2.1**
Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road	Stop	Eastbound	C 19.9	F 619.4
		Westbound	B 14.6	E 46.6
	Free	Northbound	A 0.0	A 0.0
	TWSC	**Overall**	**A 2.2**	**E 40.1**

XX.X Average seconds of delay per vehicle

<u>Background Conditions – With Improvements</u>

The results of the LOS analysis for background conditions with the improvements listed under the *Existing Conditions – With Improvements* scenario indicated that most approaches and movements of the studied intersections would operate at LOS D or better during the AM and PM peak hours, with the following exceptions:

- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road
  - The eastbound approaches/movements would operate at LOS E in the AM and PM peak hours

95th percentile queue lengths were reviewed at the studied intersections. Queue lengths will occasionally exceed 500' (20 vehicles) on NB and SB Lapeer Road (M-24) at the new signalized intersections, but these queues will clear within a single signal cycle. Queue lengths on Waldon Road will not exceeds 166' (7 vehicles) in the AM peak hour and 243' (10 vehicles) in the PM

peak hour. Queue lengths on the SB to NB Crossover or Eagle Ridge Road will not exceed 56' (2 vehicles) in the AM peak hour and 57' (2 vehicles) in the PM peak hour.

The operational results for Background Conditions – With Improvements are presented are presented in Table 7.

Table 7: LOS Analysis for Background Conditions – With Improvements

Intersection	Control Type	Approach	AM Peak	PM Peak
Lapeer Road (M-24) & Waldon Road	Stop	Eastbound	D 45.6	D 55.0
	Free	Southbound	D 43.9	A 8.4
	TWSC	**Overall**	**D 44.0**	**B 13.7**
Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road	Stop	Eastbound	E 61.9[1]	E 55.3
		Westbound	D 38.8	D 43.2
	Free	Northbound	B 10.3	D 48.5
	TWSC	**Overall**	**B 15.8**	**D 48.8**

XX.X Average seconds of delay per vehicle
[1]Delay decreases due to actuated signal

Future Conditions

The results of the LOS analysis for future conditions without the signals described in the *Existing Conditions – With Improvements* scenario indicated that several approaches and movements of the studied intersections would continue to operate at LOS D or better during the AM and PM peak hours, with the following exceptions:

- Lapeer Road (M-24) & Waldon Road
  - The eastbound approach and movements would continue to operate at LOS F in the AM peak hour
  - The eastbound approach and movements would continue to operate at LOS E in the PM peak hour
- Lapeer Road (M-24) & NB to SB Crossover
  - The westbound approach and movements would continue to operate at LOS F in the AM peak hour
  - The westbound approach and movements would operate at LOS E in the PM peak hour
- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road
  - The eastbound approach and movements would continue to operate at LOS F in the PM peak hour
  - The westbound approach and movements would continue to operate at LOS E in the PM peak hour
- Lapeer Road (M-24) & Site Driveway 1
  - The eastbound approach and movements would operate at LOS F in the AM peak hour

The operational results for future conditions are presented in Table 8.

Table 8: LOS Analysis for Future Conditions

Intersection	Control Type	Approach	AM Peak	PM Peak
Lapeer Road (M-24) & Waldon Road	Stop	Eastbound	F 320.9	E 48.3
	Free	Southbound	A 0.0	A 0.0
	TWSC	**Overall**	**C 21.7**	**A 5.9**
Lapeer Road (M-24) & NB to SB Crossover	Stop	Westbound	F 264.4	E 42.6
	Free	Southbound	A 0.0	A 0.0
	TWSC	**Overall**	**C 16.6**	**A 3.7**
Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road	Stop	Eastbound	C 22.1	F 856.4
		Westbound	B 14.9	E 49.1
	Free	Northbound	A 0.0	A 0.0
	TWSC	**Overall**	**A 3.0**	**F 66.4**
Lapeer Road (M-24) & Site Driveway 1	Stop	Eastbound	F 82.7	C 22.7
	Free	Southbound	A 0.0	A 0.0
	TWSC	**Overall**	**A 2.2**	**A 0.6**
Waldon Road & Site Driveway 2	Free	Eastbound	A 0.2	A 0.2
		Westbound	A 0.0	A 0.0
	Stop	Southbound	B 10.4	B 12.8
	TWSC	**Overall**	**A 1.1**	**A 0.8**

XX.X Average seconds of delay per vehicle

Future Conditions – With Improvements

The results of the LOS analysis for background conditions with the improvements listed under the *Existing Conditions – With Improvements* scenario indicated that most approaches and movements of the studied intersections would operate at LOS D or better during the AM and PM peak hours, with the following exceptions:

- Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road
  - The eastbound approaches/movements would operate at LOS E in the PM peak hours

95th percentile queue lengths were reviewed at the studied intersections. Queue lengths will occasionally exceed 550' (22 vehicles) on NB and SB Lapeer Road (M-24) at the new signalized intersections. Site Driveway 1 on Lapeer Road (M-24) will be blocked several times during the AM peak hour by vehicle queues. Queue lengths on Waldon Road will not exceeds 200' (8 vehicles) in the AM peak hour and 297' (12 vehicles) in the PM peak hour. Queue lengths on the SB to NB Crossover or Eagle Ridge Road will not exceed 229' (9 vehicles) in the AM peak hour and 244' (10 vehicles) in the PM peak hour, with the existing turn lane on SB Lapeer Road (M-24) being able to accommodate these queue lengths. Queue lengths at Site Driveway 1 would not exceed 54' (2 vehicles) in the AM peak hour and 57' (2 vehicles) in the PM peak hour. Queue lengths at Site Driveway 2 would not exceed 48' (2 vehicles) in the AM peak hour and 48' (2 vehicles) in the PM peak hour.

Review of the simulations indicated that during the AM peak hour, queue lengths in the northbound left turn lane at the intersection of Lapeer Road (M-24) & NB to SB Crossover will occasionally exceed the existing storage length. It is highly likely that vehicles familiar with the area would not join this long queue length and instead travel 1500' to the north to the next NB to SB Crossover, which is signalized. It is likely that this intersection would meet signal warrants, however, it is not advisable to place a signal at this crossover due to its proximity to the proposed

signal at the intersection of SB Lapeer Road (M-24) & Waldon Road.

The operational results for future conditions – with improvements are presented are presented in Table 9.

Table 9: LOS Analysis for Future Conditions – With Improvements

Intersection	Control Type	Approach	AM Peak	PM Peak
Lapeer Road (M-24) & Waldon Road	Stop	Eastbound	D 54.0	D 53.6
	Free	Southbound	D 37.5	B 10.0
	TWSC	**Overall**	**D 38.6**	**B 15.3**
Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road	Stop	Eastbound	D 50.5	E 57.3
		Westbound	D 35.0	D 44.1
	Free	Northbound	B 13.2	D 50.6
	TWSC	**Overall**	**B 18.1**	**D 51.0**

XX.X Average seconds of delay per vehicle

Turn Lane, Passing Lane, and Taper Warrants

An evaluation was performed in accordance with RCOC requirements to determine if left turn passing lanes or right turn deceleration lanes are required at the site driveways. The results of the analysis indicated that no turn lane treatment is warranted at either site driveway. All turn lane warrant charts are attached to this memorandum.

The results of the analysis are presented in Table 10.

Table 10: Turn Lane Warrants

Intersection	Movement	Result
Lapeer Road (M-24) & Site Driveway 1	SB RT	Existing Turn Lane
Waldon Road and Site Driveway 2	EB LT	Not Warranted
	WB RT	Not Warranted

Signal Warrants

Signal warrants were completed at the intersection of Lapeer Road (M-24) & Waldon Road and at the intersection of Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road in accordance with MDOT requirements. The results of this analysis indicated that several warrants are met at each intersection. All signal warrant charts are attached to this memorandum. The results of this analysis are presented in Table 11 and Table 12.

Table 11: Signal Warrants – Intersection of Lapeer Road (M-24) & Waldon Road

Warrant		Is Warrant Met?	Comments
1: Eight Hour Vehicular Volume	Overall	Yes	
	Condition A	Yes	Hours Met: 11
	Condition B	Yes	Hours Met: 13
	Condition A & B	N/A	Hours Met: N/A
2: Four Hour Vehicular Volume (70%)		Yes	Hours Met: 12
3: Peak Hour Vehicular Volume (70%)	Overall	Yes	
	Condition A	No	
	Condition B	Yes	Hours Met: 12
4: Four Hour Pedestrian Volume (70%)		No	Hours Met: 0
5: School Crossing		No	
6: Coordinated Signal System		No	
7: Crash Experience	Overall	No	Crashes in 5-year period: 38
	Condition A	Yes	Hours Met: 12
	Condition B	Yes	Hours Met: 13
8: Roadway Network		No	
9: Intersection Near at Grade Railroad Crossing		NA	

Table 12: Signal Warrants – Intersection of Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Road

Warrant		Is Warrant Met?	Comments
1: Eight Hour Vehicular Volume	Overall	Yes	
	Condition A	No	Hours Met: 3
	Condition B	Yes	Hours Met: 11
	Condition A & B	N/A	Hours Met: 0
2: Four Hour Vehicular Volume (70%)		Yes	Hours Met: 11
3: Peak Hour Vehicular Volume (70%)	Overall	Yes	
	Condition A	No	
	Condition B	Yes	Hours Met: 7
4: Four Hour Pedestrian Volume (70%)		No	Hours Met: 0
5: School Crossing		No	
6: Coordinated Signal System		No	
7: Crash Experience	Overall	No	Crashes in 5-year period: 0
	Condition A	No	Hours Met: 9
	Condition B	No	Hours Met: 11
8: Roadway Network		No	
9: Intersection Near at Grade Railroad Crossing		N/A	

Crash Analysis

A crash analysis was conducted at the studied intersection. Traffic crash data was reviewed for the most recent completed three years (November 1, 2018 – November 1, 2021) of available data. The results of this analysis indicated there was a total of 75 crashes on these segments. Of these 75 crashes, there were no fatal or serious injury (A) crashes, 2 minor injury (B) crashes, 8 potential injury (C) crashes, and 65 property damage only (O) crashes. None of the crashes involved a pedestrian or bicyclist. Below is a summary of all crash types within the studied segments:

- 41 Rear-End Crashes
  - 35 crashes involved a vehicle failing to stop for a stopped vehicle
    - 32 of these crashes occurred on Waldon Road at SB Lapeer Road (M-24)
  - 4 crashes involved a vehicle failing to stop for a slowing vehicle

- 1 crash involved a vehicle attempting a U-turn
- 1 crash involved a vehicle losing control while attempting to turn

- 15 Single Motor Vehicle Crashes
  - 6 animal crashes
  - 4 crashes in icy/snowy road condition
  - 1 crash involved alcohol
  - 6 crashes involved a vehicle losing control and striking a road sign

- 12 Side-Swipe Crashes
  - 6 crashes involved a vehicle attempting to change lanes without assured clear distance
  - 3 crashes involved a vehicle attempting to turn without assured clear distance
  - 2 crashes involved a vehicle turning from SB Lapper Road (M-24) into the opposing traffic lane on Waldon Road
  - 1 crash involved a fire truck (with light and siren on) striking a stopped vehicle

- 7 Angle Crashes
  - 6 crashes involved a vehicle attempting to turn without assured clear distance
  - 1 crash involved a vehicle attempting to turn; however, the opposing vehicle did not have their headlights on

Of the 75 crashes observed, 38 of these crashes occurred on Waldon Road at SB Lapeer Road (M-24). 36 of these crashes involved a vehicle attempting to turn onto SB Lapeer Road (M-24), and 2 crashes involved a vehicle attempting to turn onto Waldon Road. The high number of crashes for vehicles turning onto SB Lapeer Road (M-24) can be attributed to the lack of gaps in SB Lapeer Road (M-24) traffic. Additionally, the stop sign for Waldon Road is currently 60' behind the right curb of SB Lapeer Road (M-24) and poor stop sign compliance was observed in the traffic collection videos. Vehicles are accustomed to having to pull forward to see opposing traffic and quickly moving when a gap appears. The addition of a signal may help reduce the number of crashes, as vehicles will no longer need to utilize gaps in SB Lapeer Road (M-24) traffic that are smaller than typically desired. A summary of the crash data is attached to this memorandum.

Conclusions and Recommendations for the Traffic Impact Study

The proposed project consists of 190 units of multifamily residential, a 21,116 SF mixed-use building, and a 4,000 SF sit-down restaurant with an anticipated opening date in 2023. The mixed-use building will be the second location of the Orion Classic Car Club and will consist of 13,056 SF of office space, a 1,500 SF meeting room, and 11,556 SF of classic car parking, which allows for 33 classic vehicles to be parked inside the building. The proposed development will have access to Lapeer Road (M-24) via one proposed driveway and Waldon Road via one proposed driveway.

The proposed development is forecast to generate 203 new trips during the AM peak hour (94 inbound and 109 outbound from the site) and 154 new trips during the PM peak hour (80 inbound and 74 outbound from the site).

An operational analysis was performed for existing, background, and total future (build) conditions for the intersections of:

- Lapeer Road (M-24) & Waldon Road
- Lapeer Road (M-24) & NB to SB Crossover

- Lapeer Road (M-24) & SB to NB Crossover/Eagle River Road
- Lapeer Road (M-24) & Site Driveway 1
- Waldon Road & Site Driveway 2

The operational analysis indicated that several approaches of the study intersections would operate at acceptable levels during both the AM and PM peak hours with improvements. There are currently significant directional traffic volumes (southbound in the AM peak hour and northbound in the PM peak hour) along Lapeer Road (M-24) that cause many of the crossovers and side streets to operate poorly. Additionally, the nearest southbound signal to the study area is approximately 1,500' north of the NB to SB crossover, while the nearest northbound signal to the study area is approximately 4,000' south of the SB to NB crossover/Eagle Ridge Road. The distance of these signals from the studied intersections causes little to no platooning of traffic along NB and SB Lapeer Road (M-24) at the studied intersections.

Signal warrants were completed at the intersections of Lapeer Road (M-24) & Waldon Road and Lapeer Road (M-24) & SB to NB Crossover/Eagle River Road. These intersections meet several warrants under existing traffic volumes. Traffic control signals are warranted at both of these locations in the ***current day***, ***without*** the proposed development. During the AM peak hour, site-generated vehicle trips constitute 4.5% of all Total Entering Vehicles (TEV) at the intersection of Lapeer Road (M-24) & Waldon Road and 4.7% of all TEV at the intersection of Lapeer Road (M-24) & SB to NB Crossover/Eagle River Road. During the PM peak hour, site-generated vehicle trips constitute 4.7% of all TEV at the intersection of Lapeer Road (M-24) & Waldon Road and 3.8% of all TEV at the intersection of Lapeer Road (M-24) & SB to NB Crossover/Eagle River Road. Signals are included at these locations in all "With Improvements" scenarios.

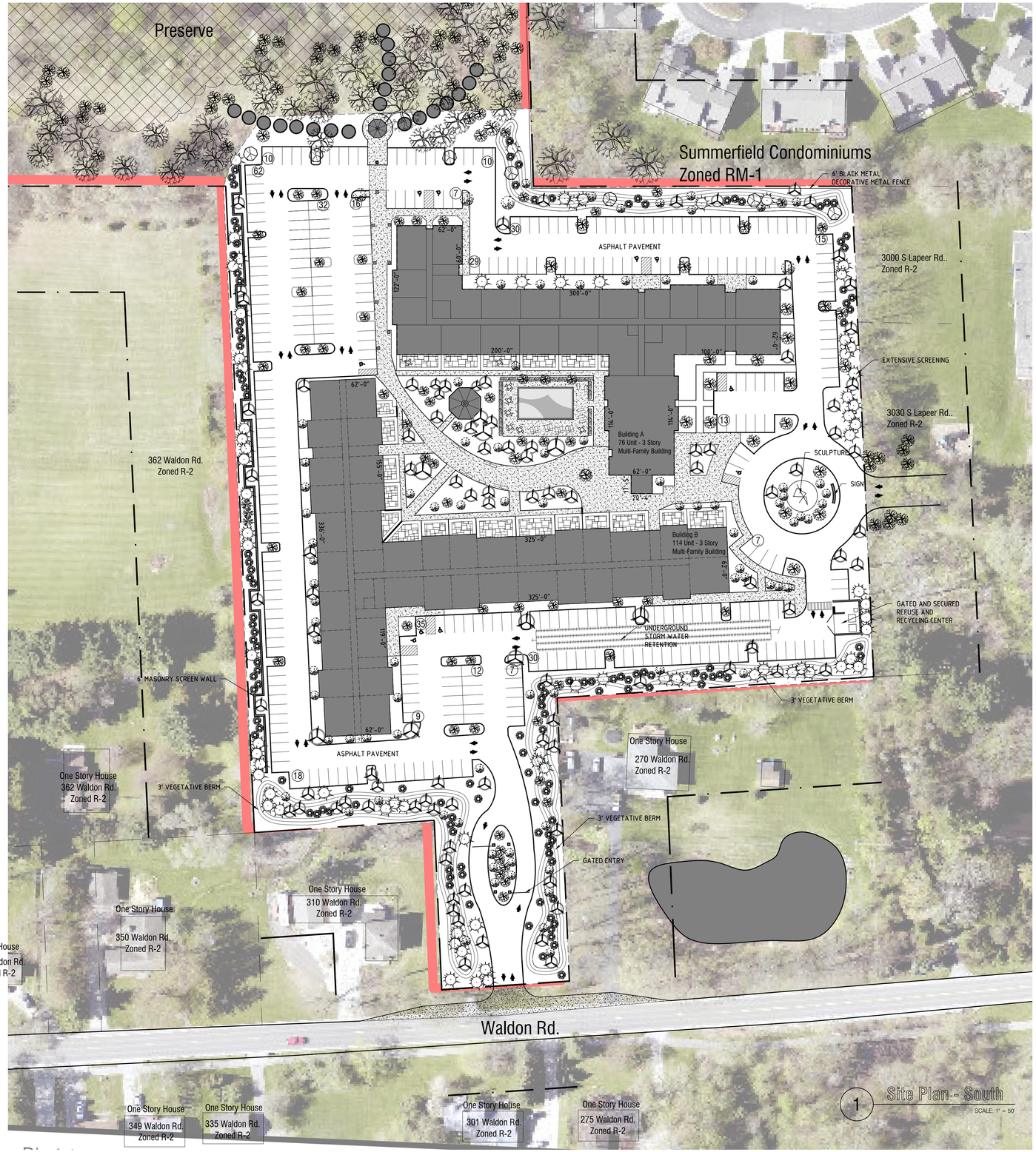
Turn lane warrant analysis at the new site driveways indicated that no turn lane treatment is warranted at either site driveway.

Attachments

R:\Projects\21F0069\Docs\Design\TIS\21F0069 DRC Woodlands PUD Revised TIS.docx

SITE PLAN

DRAWN BY ERIC A. OLSON PLLC



1 Site Plan - South

SCALE: 1" = 50'

DESIGNHAUS ARCHITECTURE EST 1998

3300 AUBURN RD. SUITE 300
AUBURN HILLS, MI 48326

T:248.601.4422 F:248.453.5854

WWW.DESIGNHAUS.COM
INFO@DESIGNHAUS.COM

259

SITE DATA

Regulation	Information
Parcel I.D.	# 15-27-351-007 / 15-27-351-008
Address	Auburn / Livernois Rd., Rochester Hills, MI
Zoning	B1 / RM - 1 / FB - 1
Parcel Area	(249,995 Sq.Ft.) 5.739 Acres

ZONING SCHEDULE OF REGULATIONS

Regulation	Required for R-4	Provided
Setbacks	Front: 25' Sides: 10' each/20' total Rear: 35' 100' from Residential	Front: A-35.0' / B 18.7' / C 17.6' Sides:73.5' / 150.1' Rear: 71.8' / 77.9' / 80.0'
Building Height	Maximum: 2 stories/30'	35' (3 Stories w/ Lower Level)
Coverage	Maximum: 30%	36,062 SF Total Footprint: 23.21%
Density	No max. w/FB overlay	24.11 Units per Acre

BUILDING INFORMATION

Building A (West corner)	1st Floor - 10,532 GSF 2nd Floor - 10,408 GSF Total - 20,940 GSF	
Building B (Middle)	1st Floor - 15,897 GSF 2nd Floor - 31,362 GSF 3rd Floor - 30,818 GSF Total - 78,077 GSF	73 Units
Building C (East)	1st Floor - 17,520 GSF 2nd Floor - 17,488 GSF 3rd Floor - 17,316 GSF Total - 52,324 GSF	47 Units
Total Unit Count	120 Units	
Detached Garage Building F -	3,036 GSF	
		Construction Type IIB

PARKING SUMMARY

Regulation	Required	Provided
Non-Residential	1 Space / 400' = 52 Spaces	
Multi-Family	1.5 Spaces / Unit 120 Units = 180 Spaces	10 Garage Spaces 70 Carport Spaces 165 Open Spaces
Total	232 Total Spaces Required	240 Total Spaces Provided with 12 Accessible Parking Spaces

No.	Revision/Issue	Date
	----	----
	----	----
	----	----
	Design Development	1.1.13

The Woodlands
100 Main Street
Orion Township, MI 48360

P.U.D. Site Plan

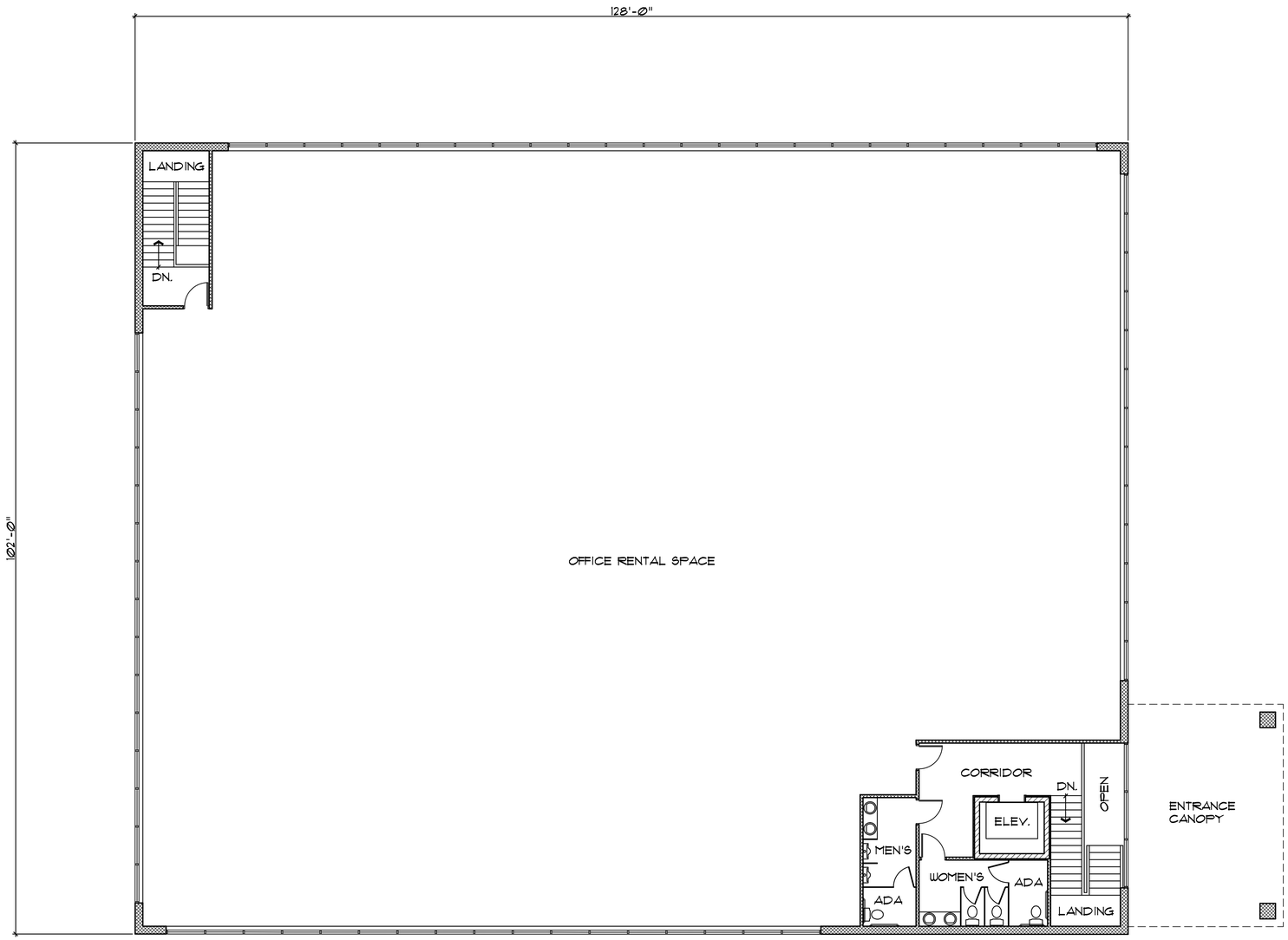
A4.0

021219

S102 Detail Site Plan – South.dwg

8/13/2021

Mike Pizzola



NORTH

MAIN LEVEL FLOOR PLAN

SCALE: 1/8" = 1'-0"

13,056 SQ. FT.

maniaci
associates
incorporated
architects/planners

p.o. box 745
ortonville, mich.
48462-0745
(248)-627-4123
fax 627-2776

ORION CLASSIC CAR CLUB
3030 LAPEER ROAD
ORION TOWNSHIP, MICHIGAN

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project number:
190103

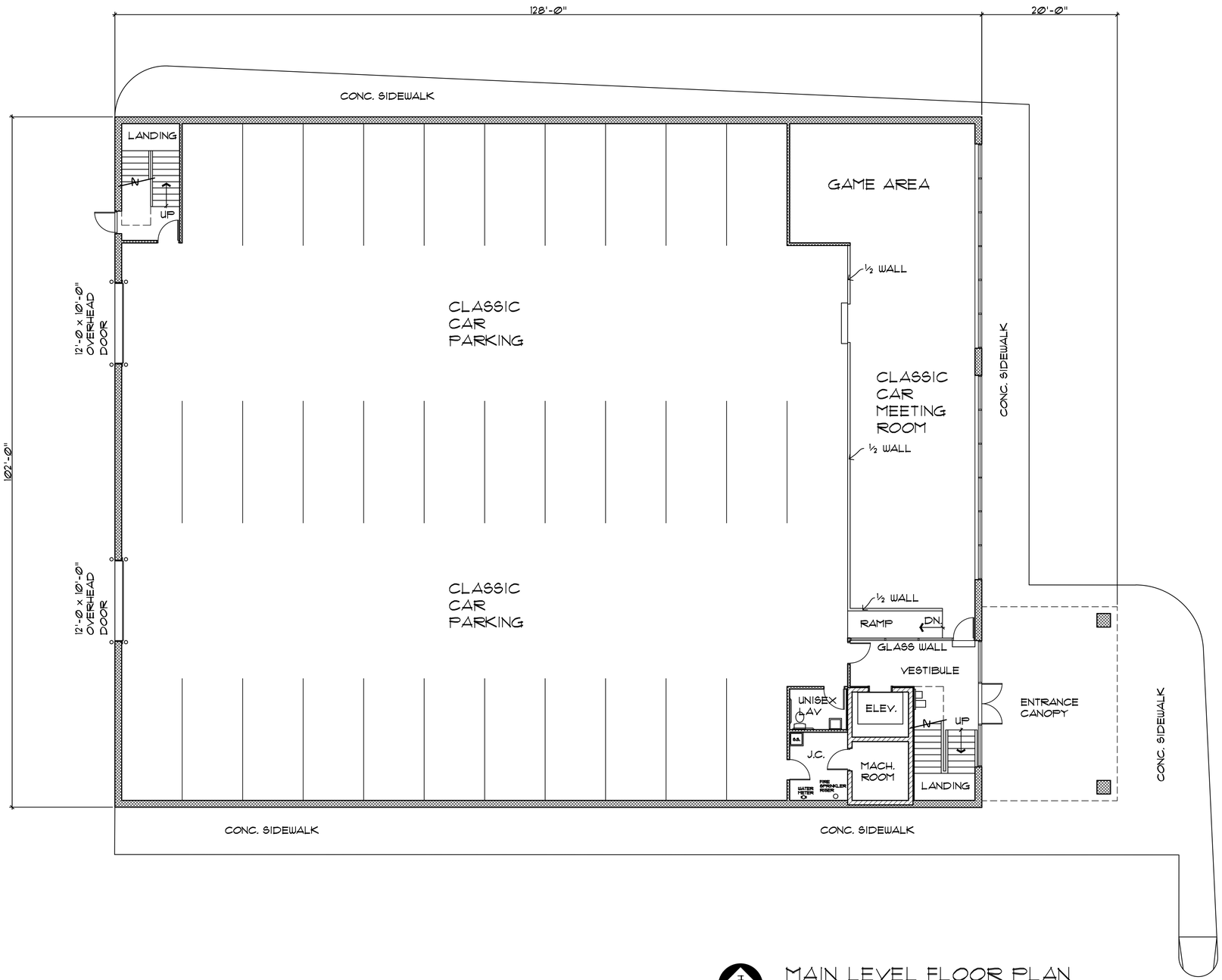
scale:
1/8" = 1'-0"

checked by:
PM

drawn by:
DER

date:
11-25-19

sheet number:
A-2



NORTH

MAIN LEVEL FLOOR PLAN

SCALE: ⅛" = 1'-0"
13,056 SQ. FT.

BUILDING SUMMARY:

TOTAL BUILDING SQUARE FOOTAGE:	26,112
USE CLASSIFICATION:	B - BUSINESS
CONSTRUCTION TYPE:	5 - B (SPRINKLED)
OCCUPANCY (1 PER 100 SQ. FT. GROSS):	261

maniaci associates incorporated
architects/planners

p.o. box 745
ortonville, mich.
48462-0745
(248)-627-4123
fax 627-2776

ORION CLASSIC CAR CLUB

3030 LAPEER ROAD
ORION TOWNSHIP, MICHIGAN

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scale: ⅛" = 1'-0"
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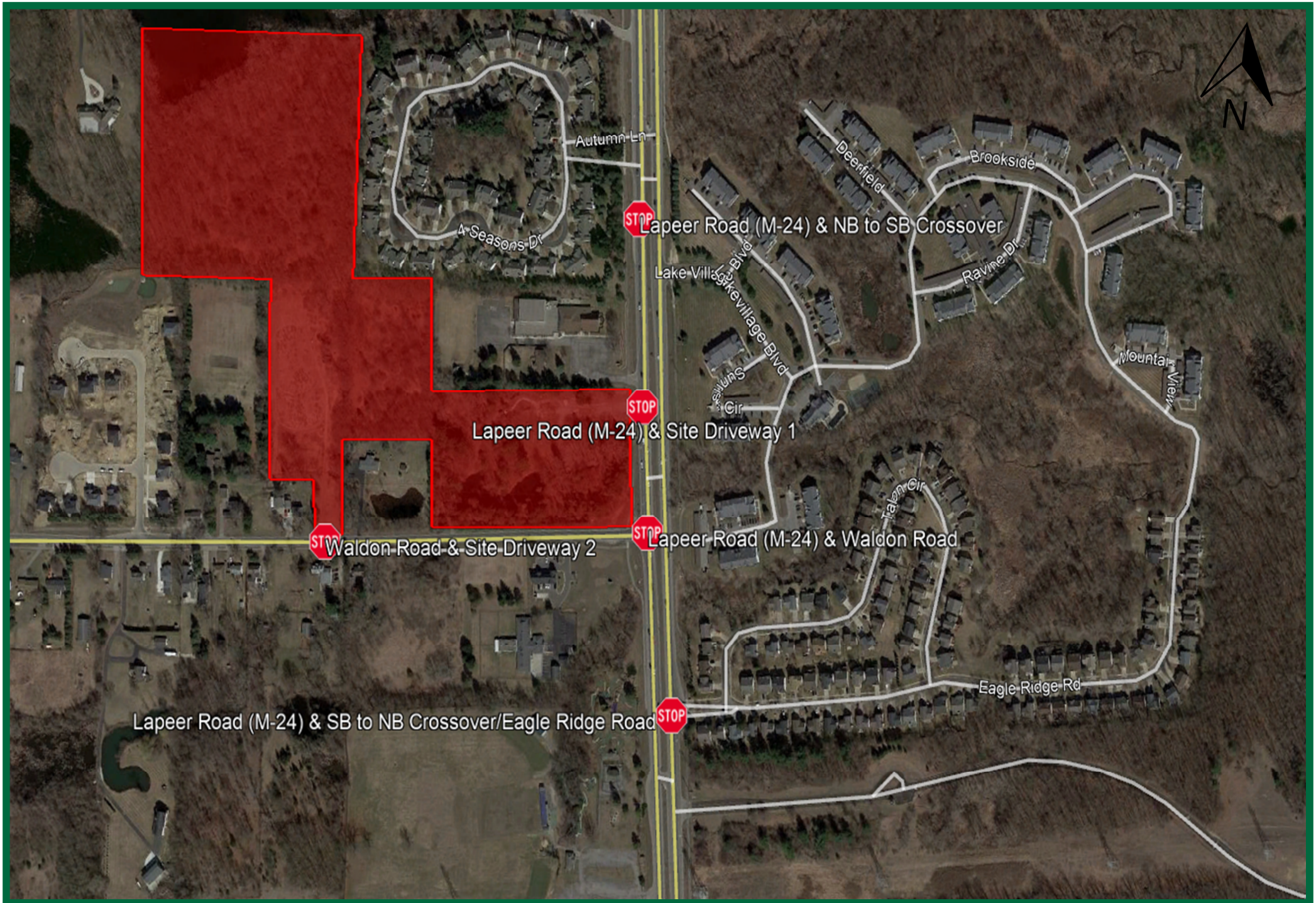
drawn by: DER
date: 11-25-19
sheet number: A-1

REPORT FIGURES



ROWE PROFESSIONAL SERVICES COMPANY

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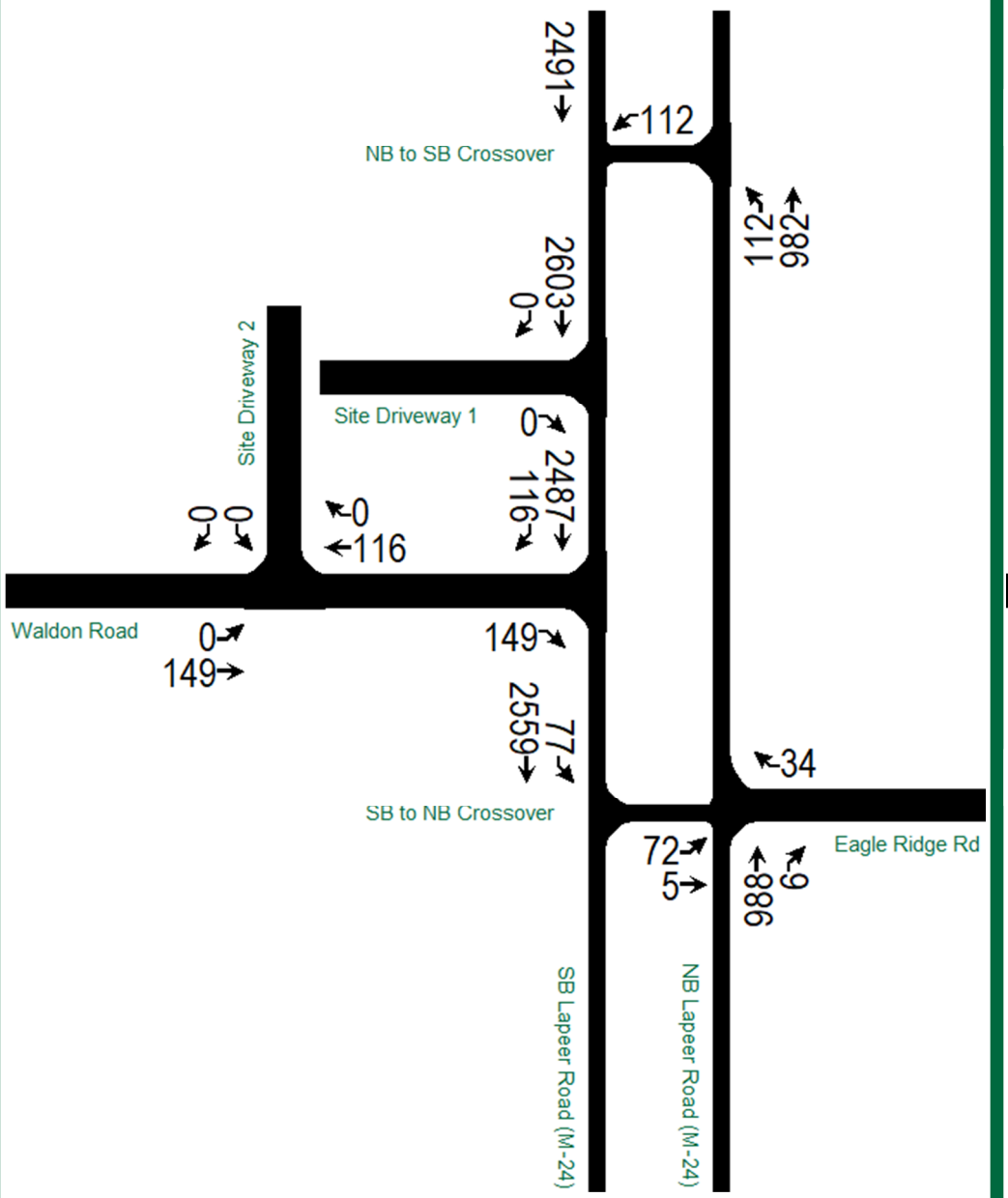
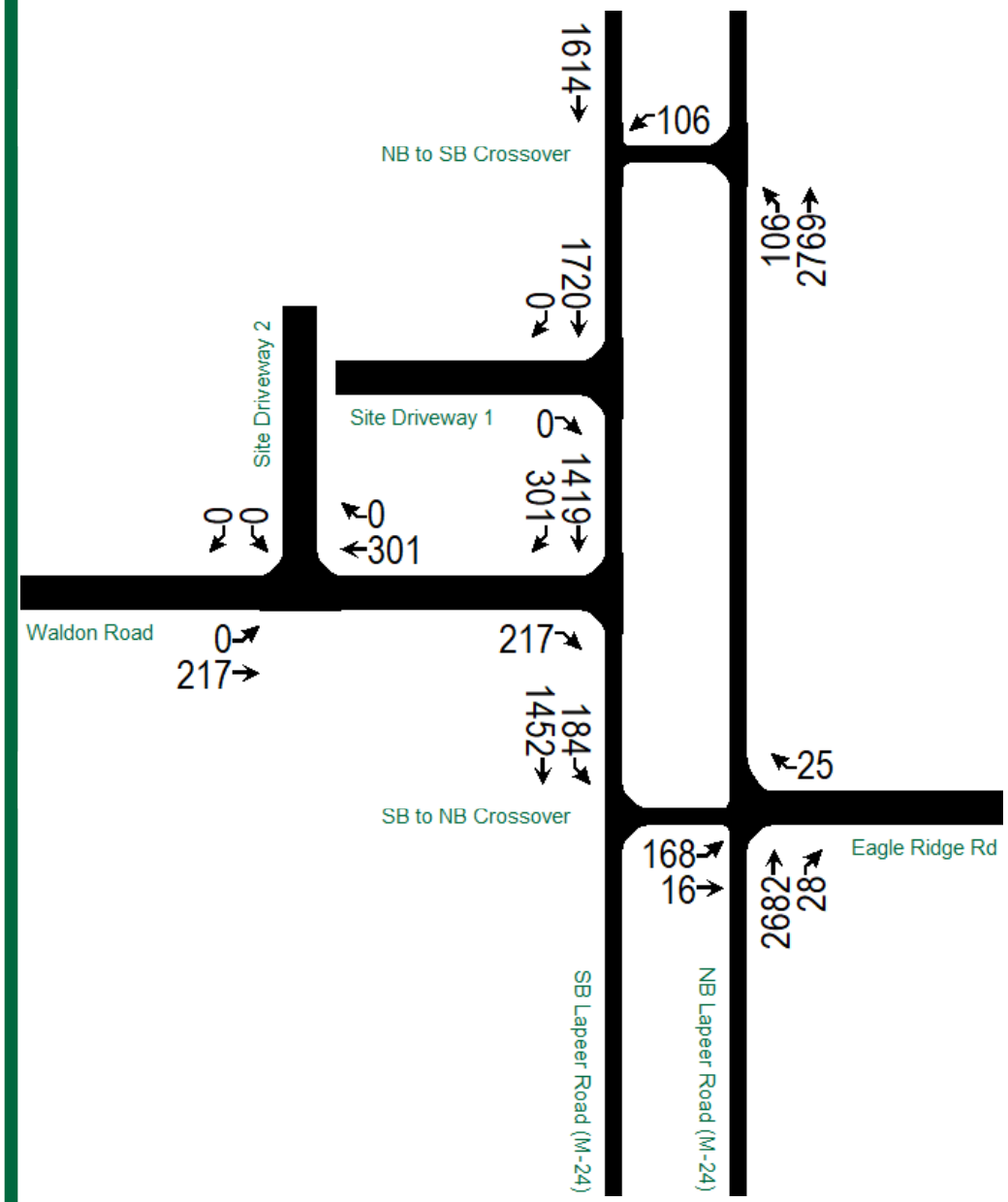
Site Location
The Woodlands PUD TIS
Figure 1

Not to scale – for illustrative purposes only

AM Peak Hour



PM Peak Hour



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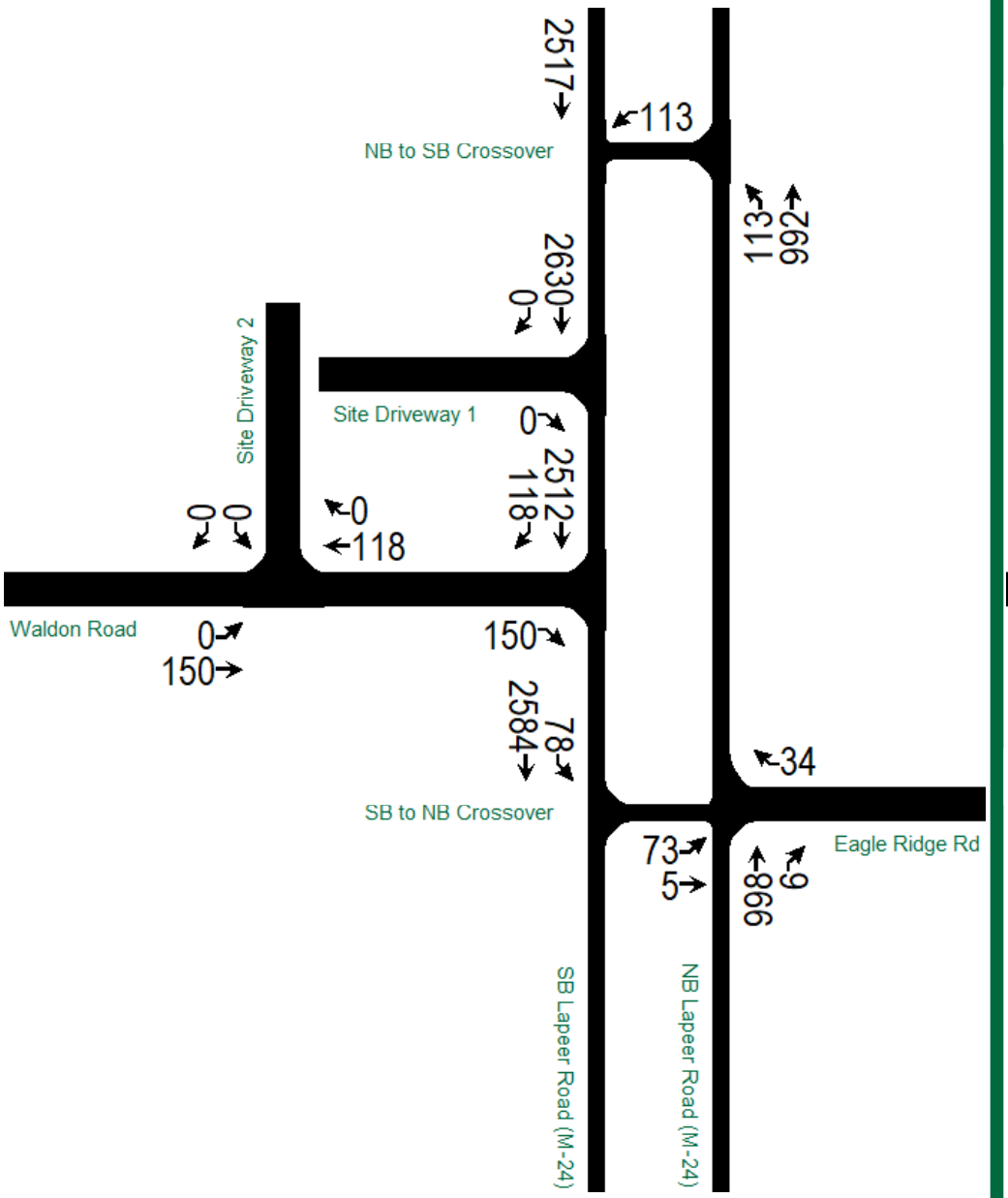
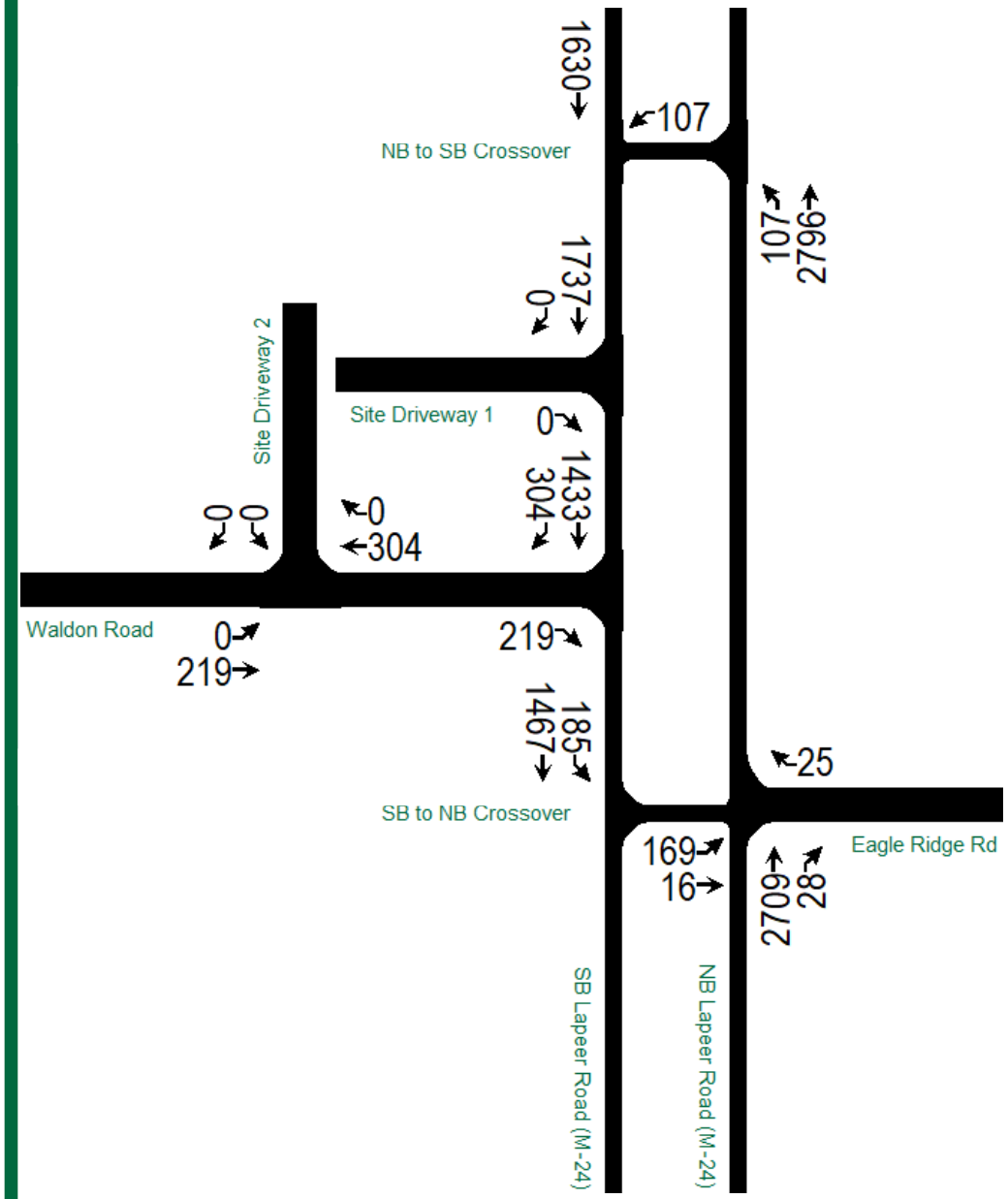
2021 Existing Conditions Volumes
The Woodlands PUD TIS
Figure 2
Not to scale – for illustrative purposes only

AM Peak Hour



PM Peak Hour



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2023 Background Conditions Volumes
The Woodlands PUD TIS
Figure 3
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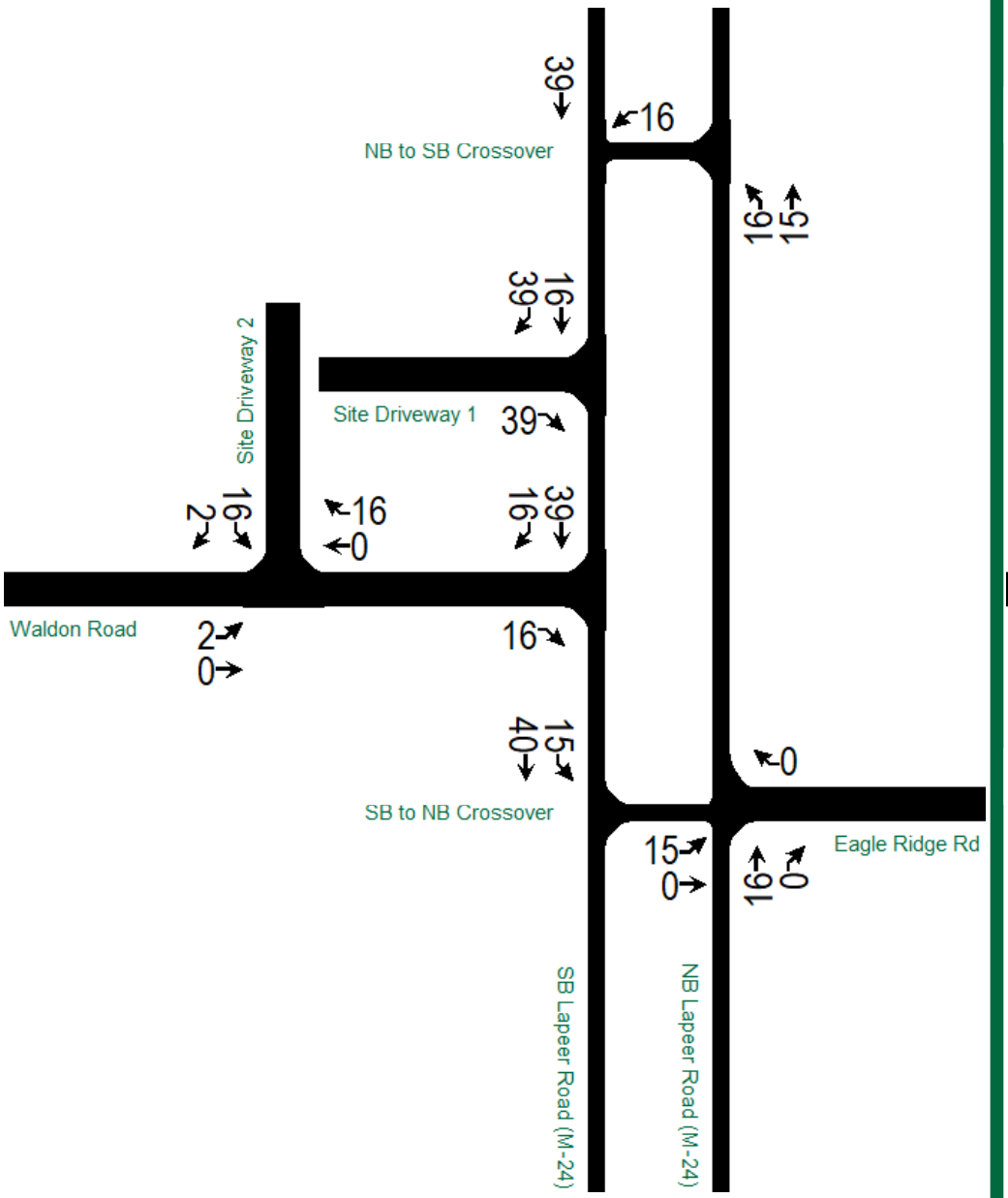
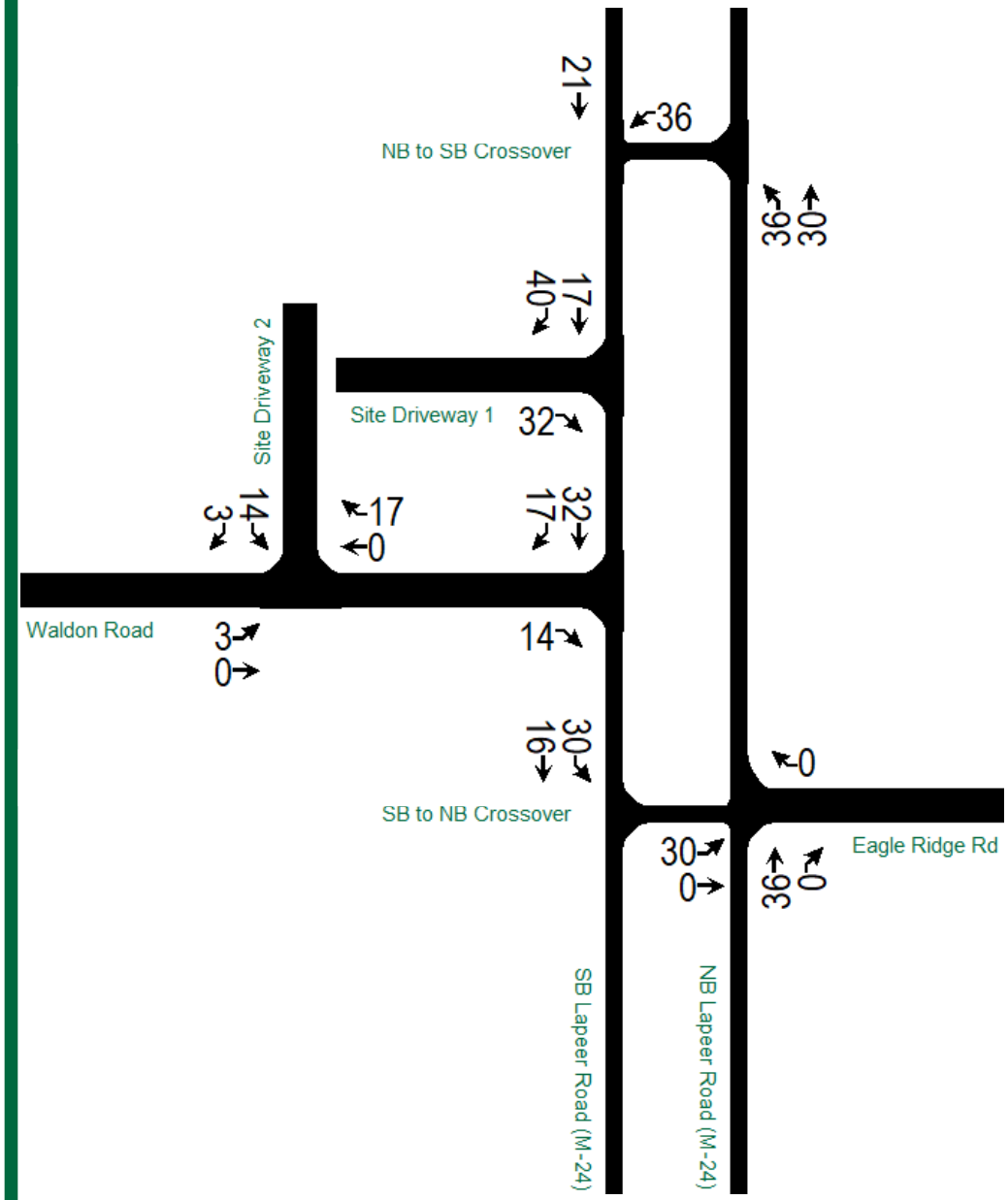
AM Peak Hour



PM Peak Hour



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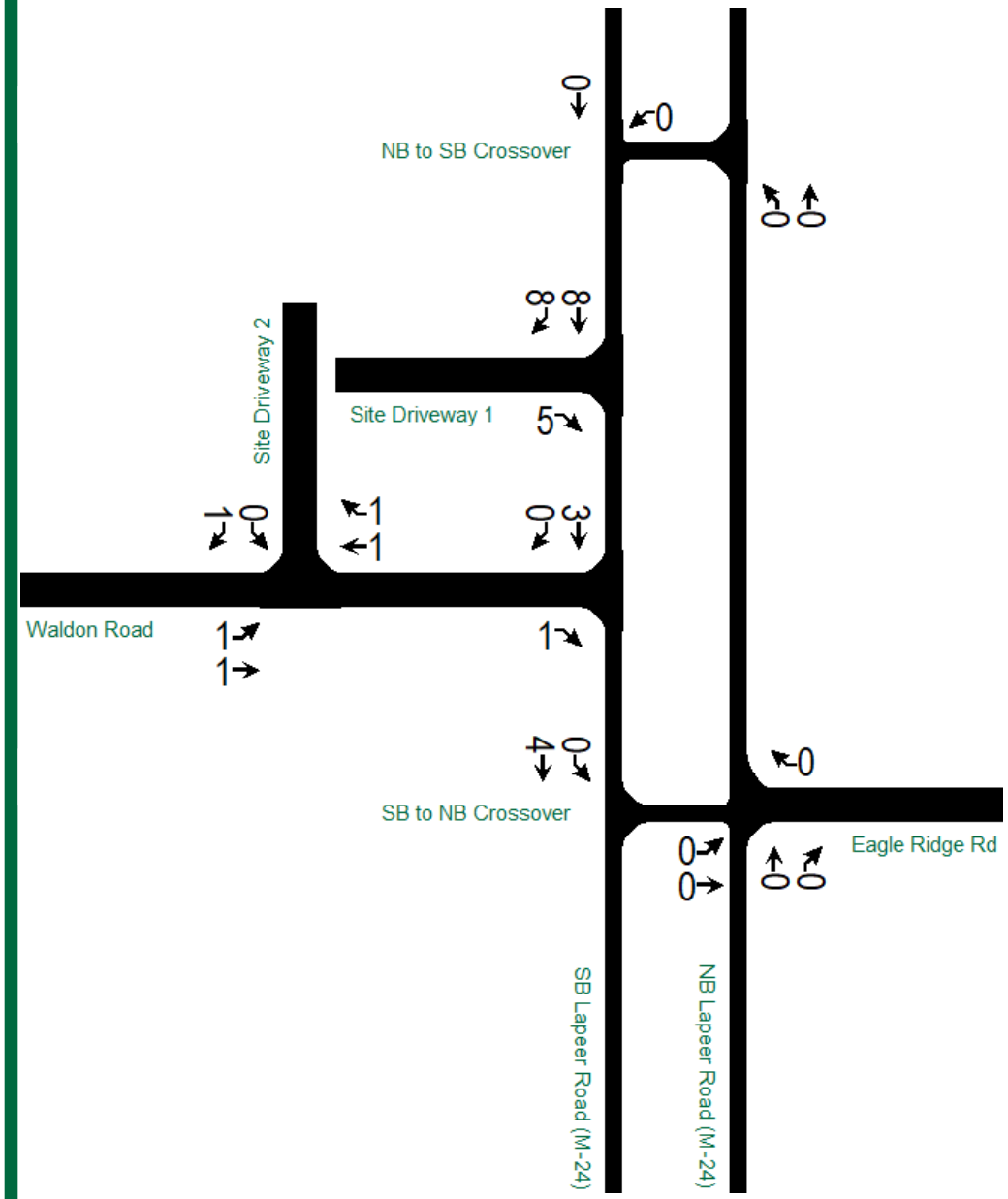
Trip Generation Volumes
The Woodlands PUD TIS
Figure 4
Not to scale – for illustrative purposes only

NO AM PASS-BY TRIPS

PM Peak Hour



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Pass-By Volumes
The Woodlands PUD TIS
Figure 5
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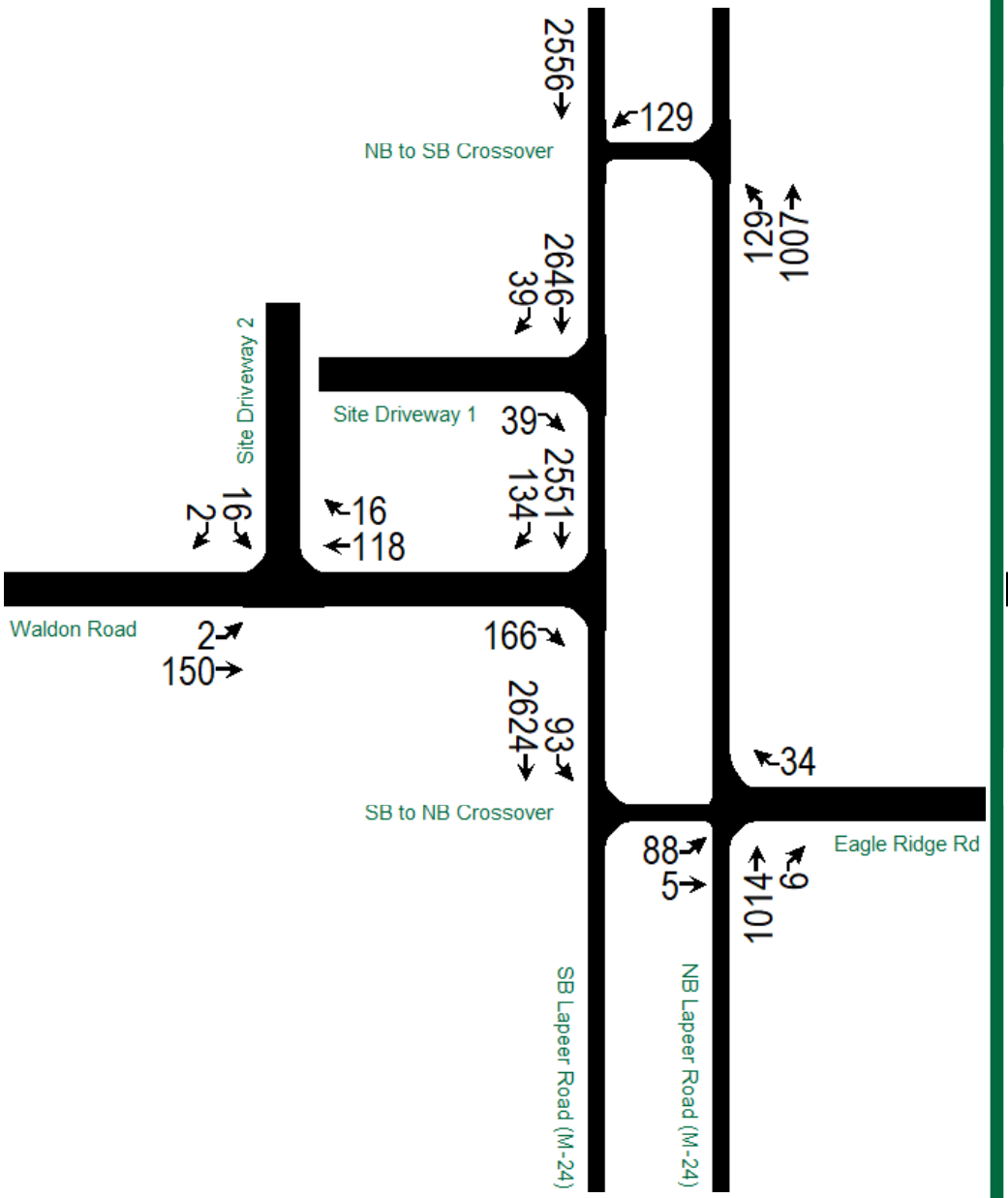
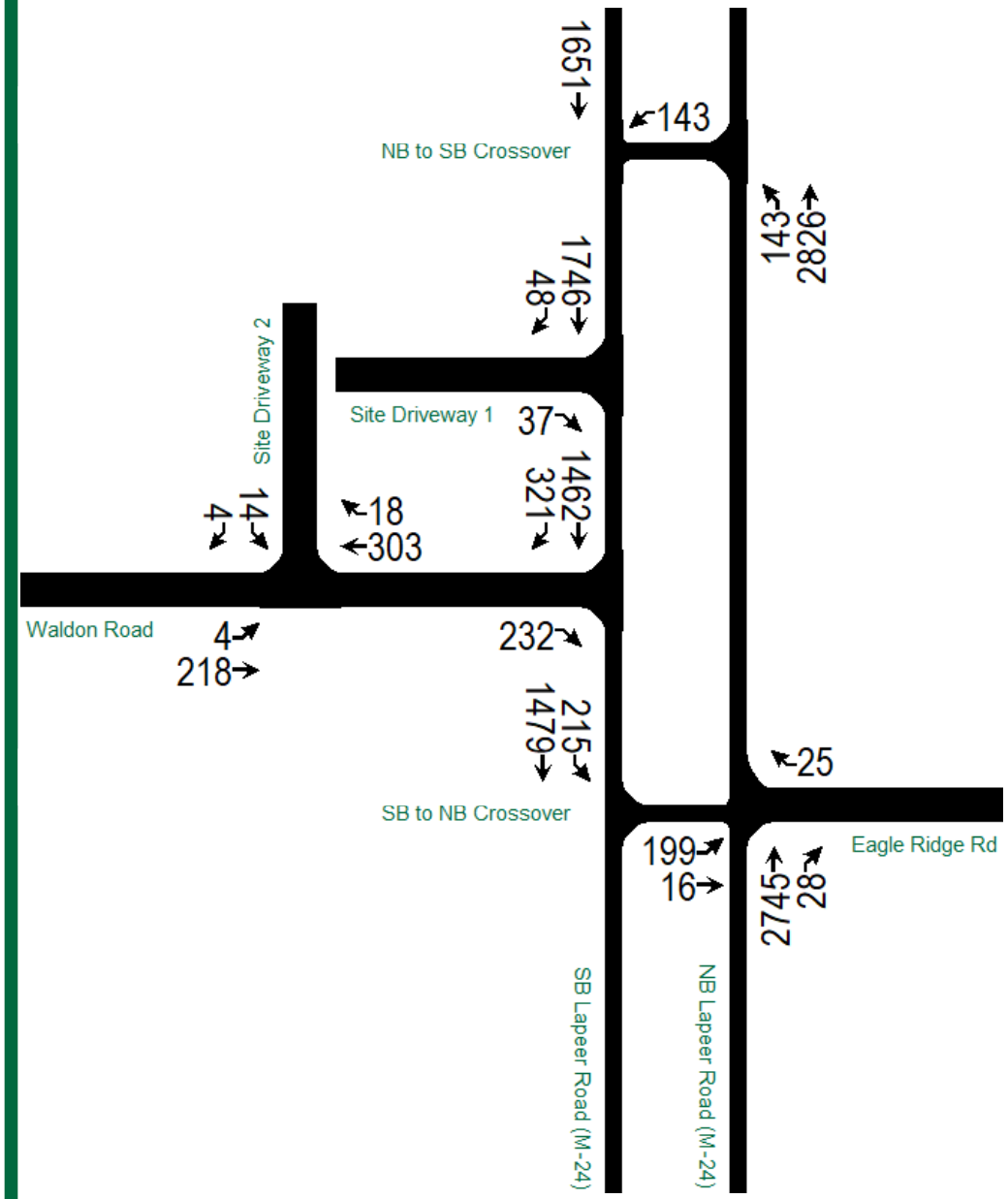
AM Peak Hour



PM Peak Hour



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2023 Future Conditions Volumes
The Woodlands PUD TIS
Figure 6
Not to scale – for illustrative purposes only

TRAFFIC COUNTS

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#1 - M-24 & Waldon Rd	AM Peak 08/24/21		PHF		0.79			0.95			0.86				
			% Heavy		6%			3%			2%				
		2021	Existing		**873**			**1920**	**97**			**124**			
		2021	Existing Adj.		1048			2487	116			149			
		2023	Background		1058			2512	118			150			
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background			**1058**			**2512**	**118**			**150**			
		Site Generated						39	16			16			
		Pass By													
		Total Site Gen			0			39	16			16			
		Total Future			**1058**			**2551**	**134**			**166**			

Count Date:	8/24/2021
Count Year:	2021
Existing Adj. Year:	2021
Existing Adjustment Rate:	1.20
Growth Rate:	0.5%
Buildout Year:	2023
Scenario:	AM Peak
Bckgrd. Dev. A:	
Bckgrd. Dev. B:	
Bckgrd. Dev. C:	

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#2 - M-24 & NB to SB XO	AM Peak 08/24/21		PHF		0.78			0.93						0.75	
			% Heavy		7%			3%						0%	
		2021	Existing		**818**			**2076**					**93**		
		2021	Existing Adj.		982			2491					112		
		2023	Background		992			2517					113		
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background			**992**			**2517**					**113**		
		Site Generated			15			39					16		
		Pass By													
		Total Site Gen			15			39					16		
		Total Future			**1007**			**2556**					**129**		

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#3 - M-24 & SB to NB XO/Eagle Ridge Rd	AM Peak 08/24/21		PHF		0.79			0.95			0.63			0.64	
			% Heavy		7%			3%			0%			0%	
		2021	Existing		**790**	**5**	**64**	**2000**		**60**	**4**				**28**
		2021	Existing Adj.		988	6	77	2559		72	5				34
		2023	Background		998	6	78	2584		73	5				34
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background			**998**	**6**	**78**	**2584**		**73**	**5**				**34**
		Site Generated			16		15	40		15					
		Pass By													
		Total Site Gen			16	0	15	40		15	0				0
		Total Future			**1014**	**6**	**93**	**2624**		**88**	**5**				**34**

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#4 - M-24 & Site Driveway 1	AM Peak 08/24/21		PHF					0.92			0.92				
			% Heavy					2%			2%				
		2021	Existing					**2603**	**0**			**0**			
		2021	Existing Adj.					2603	0			0			
		2023	Background					2630	0			0			
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background						**2630**	**0**			**0**			
		Site Generated						16	39			39			
		Pass By													
		Total Site Gen						16	39			39			
		Total Future						**2646**	**39**			**39**			

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#5 - Waldon Rd & Site Driveway 2	AM Peak 08/24/21		PHF					0.92			0.92			0.92	
			% Heavy					2%			2%			2%	
		2021	Existing				**0**		**0**	**0**	**149**			**116**	**0**
		2021	Existing Adj.				0		0	0	149			116	0
		2023	Background				0		0	0	150			118	0
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background					**0**		**0**	**0**	**150**			**118**	**0**
		Site Generated					16		2	2					16
		Pass By													
		Total Site Gen					16		2	2	0			0	16
		Total Future					**16**		**2**	**2**	**150**			**118**	**16**

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#1 - M-24 & Waldon Rd	PM Peak 08/24/21		PHF		0.95			0.93			0.90				
			% Heavy		2%			2%			1%				
		2021	Existing		**2401**			**1166**	**251**			**181**			
		2021	Existing Adj.		2881			1419	301			217			
		2023	Background		2910			1433	304			219			
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background			**2910**			**1433**	**304**			**219**			
		Site Generated						32	17			14			
		Pass By						-3				-1			
		Total Site Gen			0			29	17			13			
		Total Future			**2910**			**1462**	**321**			**232**			

Count Date:	8/24/2021
Count Year:	2021
Existing Adj. Year:	2021
Existing Adjustment Rate:	1.20
Growth Rate:	0.5%
Buildout Year:	2023
Scenario:	PM Peak
Bckgrd. Dev. A:	
Bckgrd. Dev. B:	
Bckgrd. Dev. C:	

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#2 - M-24 & NB to SB XO	PM Peak 08/24/21		PHF		0.95			0.95						0.76	
			% Heavy		2%			2%						2%	
		2021	Existing		**2243**			**1345**					**88**		
		2021	Existing Adj.		2769			1614					106		
		2023	Background		2796			1630					107		
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background			**2796**			**1630**					**107**		
		Site Generated			30			21					36		
		Pass By													
		Total Site Gen			30			21					36		
		Total Future			**2826**			**1651**					**143**		

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#3 - M-24 & SB to NB XO/Eagle Ridge Rd	PM Peak 08/24/21		PHF		0.95			0.95			0.93			0.60	
			% Heavy		2%			1%			2%			0%	
		2021	Existing		**2235**	**23**	**153**	**1196**		**140**	**13**				**21**
		2021	Existing Adj.		2682	28	184	1452		168	16				25
		2023	Background		2709	28	185	1467		169	16				25
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background			**2709**	**28**	**185**	**1467**		**169**	**16**				**25**
		Site Generated			36		30	16		30					
		Pass By						-4							
		Total Site Gen			36	0	30	12		30	0				0
		Total Future			**2745**	**28**	**215**	**1479**		**199**	**16**				**25**

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#4 - M-24 & Site Driveway 1	PM Peak 08/24/21		PHF					0.92			0.92				
			% Heavy					2%			2%				
		2021	Existing					**1720**	**0**			**0**			
		2021	Existing Adj.					1720	0			0			
		2023	Background					1737	0			0			
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background						**1737**	**0**			**0**			
		Site Generated						17	40			32			
		Pass By						-8	8			5			
		Total Site Gen						9	48			37			
		Total Future						**1746**	**48**			**37**			

Intersection	Time period	Year	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
#5 - Waldon Rd & Site Driveway 2	PM Peak 08/24/21		PHF					0.92			0.92			0.92	
			% Heavy					2%			2%			2%	
		2021	Existing				**0**		**0**	**0**	**217**			**301**	**0**
		2021	Existing Adj.				0		0	0	217			301	0
		2023	Background				0		0	0	219			304	0
		Bckgrd. Dev. A													
		Bckgrd. Dev. B													
		Bckgrd. Dev. C													
		Total Background					**0**		**0**	**0**	**219**			**304**	**0**
		Site Generated					14		3	3					17
		Pass By							1	1	-1			-1	1
		Total Site Gen					14		4	4	-1			-1	18
		Total Future					**14**		**4**	**4**	**218**			**303**	**18**

M-24 and Waldon Road (unsignalized) - TMC

Tue Aug 24, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

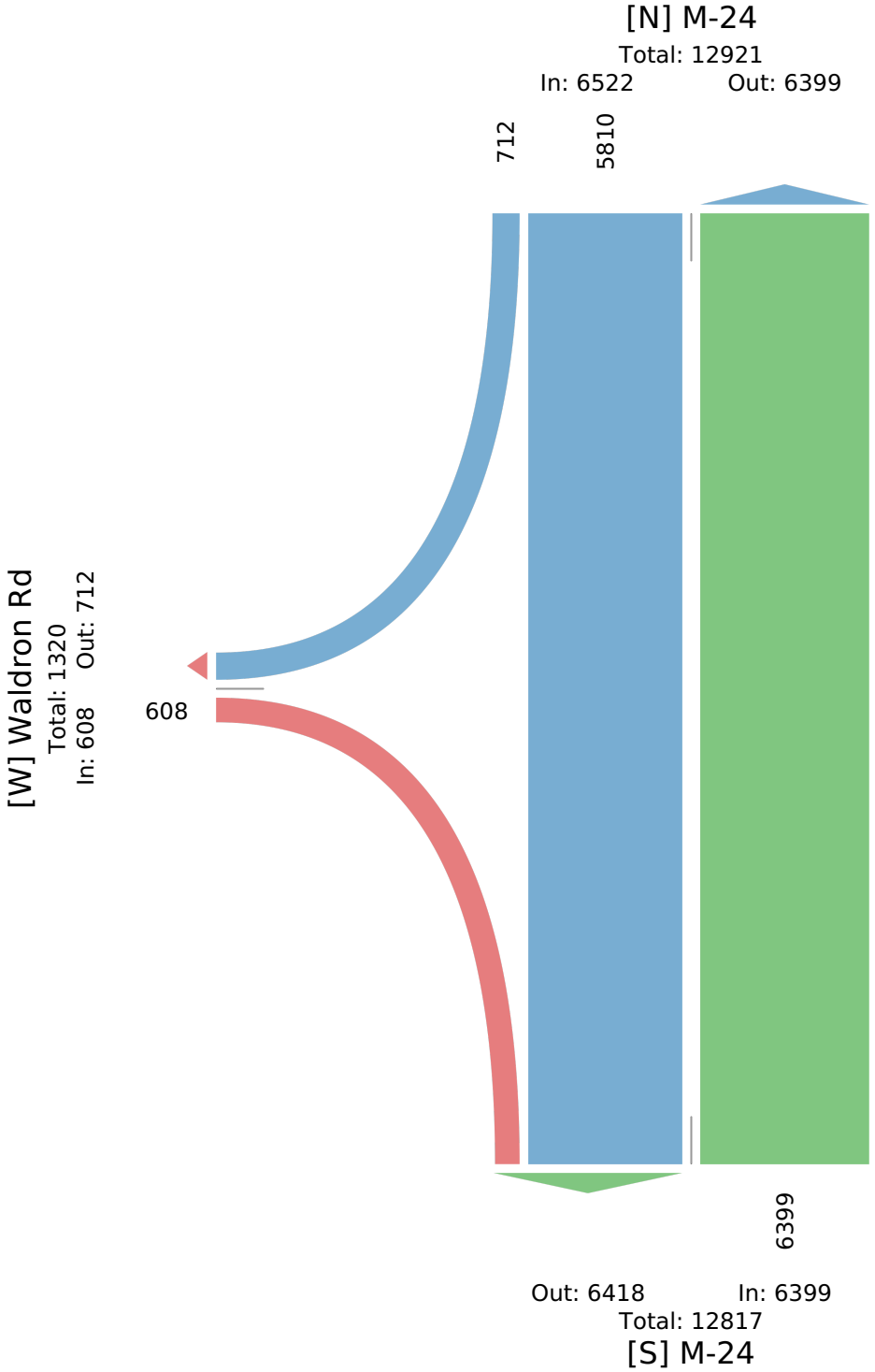
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	M-24				M-24				Waldron Rd				
Direction	Northbound				Southbound				Eastbound				
Time	L	T	U	**App**	T	R	U	**App**	L	R	U	**App**	**Int**
2021-08-24 7:00AM	0	143	0	**143**	435	11	0	**446**	0	10	0	**10**	**599**
7:15AM	0	165	0	**165**	513	14	0	**527**	0	22	0	**22**	**714**
7:30AM	0	214	0	**214**	507	25	0	**532**	0	32	0	**32**	**778**
7:45AM	0	276	0	**276**	469	32	0	**501**	0	34	0	**34**	**811**
Hourly Total	0	798	0	**798**	1924	82	0	**2006**	0	98	0	**98**	**2902**
8:00AM	0	218	0	**218**	431	26	0	**457**	0	36	0	**36**	**711**
8:15AM	0	225	0	**225**	452	32	0	**484**	0	28	0	**28**	**737**
8:30AM	0	254	0	**254**	436	27	0	**463**	0	42	0	**42**	**759**
8:45AM	0	306	0	**306**	341	43	0	**384**	0	60	0	**60**	**750**
Hourly Total	0	1003	0	**1003**	1660	128	0	**1788**	0	166	0	**166**	**2957**
4:00PM	0	541	0	**541**	253	68	0	**321**	0	41	0	**41**	**903**
4:15PM	0	583	0	**583**	265	48	0	**313**	0	60	0	**60**	**956**
4:30PM	0	574	0	**574**	298	70	0	**368**	0	42	0	**42**	**984**
4:45PM	0	605	0	**605**	275	52	0	**327**	0	45	0	**45**	**977**
Hourly Total	0	2303	0	**2303**	1091	238	0	**1329**	0	188	0	**188**	**3820**
5:00PM	0	622	0	**622**	316	64	0	**380**	0	51	0	**51**	**1053**
5:15PM	0	600	0	**600**	277	65	0	**342**	0	43	0	**43**	**985**
5:30PM	0	552	0	**552**	255	85	0	**340**	0	31	0	**31**	**923**
5:45PM	0	521	0	**521**	287	50	0	**337**	0	31	0	**31**	**889**
Hourly Total	0	2295	0	**2295**	1135	264	0	**1399**	0	156	0	**156**	**3850**
Total	0	6399	0	**6399**	5810	712	0	**6522**	0	608	0	**608**	**13529**
% Approach	0%	100%	0%	**-**	89.1%	10.9%	0%	**-**	0%	100%	0%	**-**	-
% Total	0%	47.3%	0%	**47.3%**	42.9%	5.3%	0%	**48.2%**	0%	4.5%	0%	**4.5%**	-
Lights	0	6219	0	**6219**	5618	702	0	**6320**	0	597	0	**597**	13136
% Lights	0%	97.2%	0%	**97.2%**	96.7%	98.6%	0%	**96.9%**	0%	98.2%	0%	**98.2%**	97.1%
Articulated Trucks	0	100	0	**100**	96	3	0	**99**	0	0	0	**0**	199
% Articulated Trucks	0%	1.6%	0%	**1.6%**	1.7%	0.4%	0%	**1.5%**	0%	0%	0%	**0%**	1.5%
Buses and Single-Unit Trucks	0	80	0	**80**	96	7	0	**103**	0	11	0	**11**	194
% Buses and Single-Unit Trucks	0%	1.3%	0%	**1.3%**	1.7%	1.0%	0%	**1.6%**	0%	1.8%	0%	**1.8%**	1.4%

*L: Left, R: Right, T: Thru, U: U-Turn

M-24 and Waldon Road (unsignalized) - TMC
Tue Aug 24, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



M-24 and Waldon Road (unsignalized) - TMC

Tue Aug 24, 2021
Forced Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

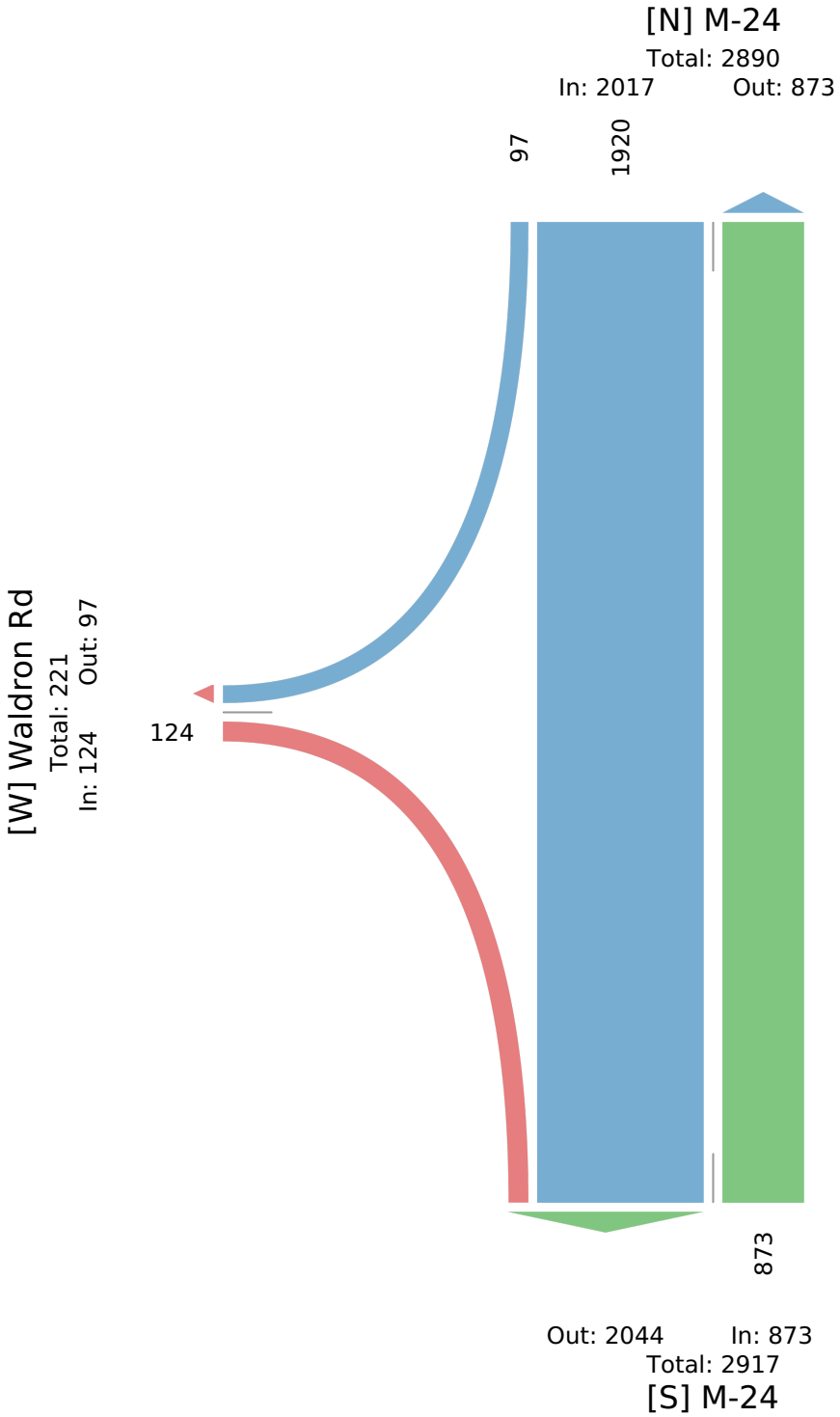
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	M-24 Northbound				M-24 Southbound				Waldron Rd Eastbound				
Time	L	T	U	**App**	T	R	U	**App**	L	R	U	**App**	**Int**
2021-08-24 7:15AM	0	165	0	**165**	513	14	0	**527**	0	22	0	**22**	**714**
7:30AM	0	214	0	**214**	507	25	0	**532**	0	32	0	**32**	**778**
7:45AM	0	276	0	**276**	469	32	0	**501**	0	34	0	**34**	**811**
8:00AM	0	218	0	**218**	431	26	0	**457**	0	36	0	**36**	**711**
Total	0	873	0	**873**	1920	97	0	**2017**	0	124	0	**124**	**3014**
% Approach	0%	100%	0%	**-**	95.2%	4.8%	0%	**-**	0%	100%	0%	**-**	-
% Total	0%	29.0%	0%	**29.0%**	63.7%	3.2%	0%	**66.9%**	0%	4.1%	0%	**4.1%**	-
PHF	-	0.791	-	**0.791**	0.936	0.758	-	**0.948**	-	0.861	-	**0.861**	0.929
Lights	0	816	0	**816**	1861	94	0	**1955**	0	121	0	**121**	2892
% Lights	0%	93.5%	0%	**93.5%**	96.9%	96.9%	0%	**96.9%**	0%	97.6%	0%	**97.6%**	96.0%
Articulated Trucks	0	33	0	**33**	28	1	0	**29**	0	0	0	**0**	62
% Articulated Trucks	0%	3.8%	0%	**3.8%**	1.5%	1.0%	0%	**1.4%**	0%	0%	0%	**0%**	2.1%
Buses and Single-Unit Trucks	0	24	0	**24**	31	2	0	**33**	0	3	0	**3**	60
% Buses and Single-Unit Trucks	0%	2.7%	0%	**2.7%**	1.6%	2.1%	0%	**1.6%**	0%	2.4%	0%	**2.4%**	2.0%

*L: Left, R: Right, T: Thru, U: U-Turn

M-24 and Waldon Road (unsignalized) - TMC
Tue Aug 24, 2021
Forced Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



M-24 and Waldon Road (unsignalized) - TMC

Tue Aug 24, 2021
AM Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

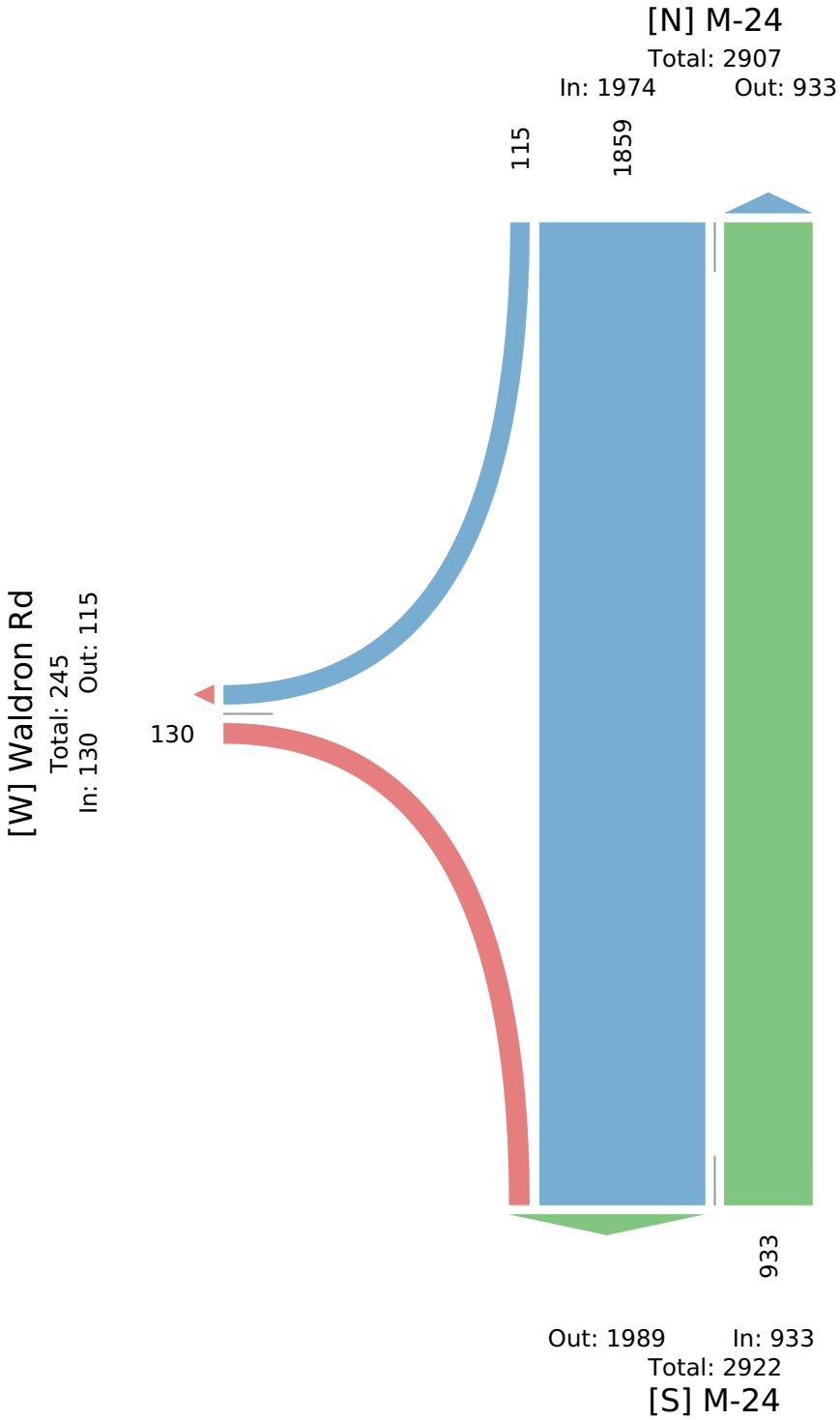
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	M-24 Northbound				M-24 Southbound				Waldron Rd Eastbound				
Time	L	T	U	**App**	T	R	U	**App**	L	R	U	**App**	**Int**
2021-08-24 7:30AM	0	214	0	**214**	507	25	0	**532**	0	32	0	**32**	**778**
7:45AM	0	276	0	**276**	469	32	0	**501**	0	34	0	**34**	**811**
8:00AM	0	218	0	**218**	431	26	0	**457**	0	36	0	**36**	**711**
8:15AM	0	225	0	**225**	452	32	0	**484**	0	28	0	**28**	**737**
Total	0	933	0	**933**	1859	115	0	**1974**	0	130	0	**130**	**3037**
% Approach	0%	100%	0%	**-**	94.2%	5.8%	0%	**-**	0%	100%	0%	**-**	-
% Total	0%	30.7%	0%	**30.7%**	61.2%	3.8%	0%	**65.0%**	0%	4.3%	0%	**4.3%**	-
PHF	-	0.845	-	**0.845**	0.917	0.898	-	**0.928**	-	0.903	-	**0.903**	0.936
Lights	0	880	0	**880**	1790	112	0	**1902**	0	127	0	**127**	2909
% Lights	0%	94.3%	0%	**94.3%**	96.3%	97.4%	0%	**96.4%**	0%	97.7%	0%	**97.7%**	95.8%
Articulated Trucks	0	31	0	**31**	34	1	0	**35**	0	0	0	**0**	66
% Articulated Trucks	0%	3.3%	0%	**3.3%**	1.8%	0.9%	0%	**1.8%**	0%	0%	0%	**0%**	2.2%
Buses and Single-Unit Trucks	0	22	0	**22**	35	2	0	**37**	0	3	0	**3**	62
% Buses and Single-Unit Trucks	0%	2.4%	0%	**2.4%**	1.9%	1.7%	0%	**1.9%**	0%	2.3%	0%	**2.3%**	2.0%

*L: Left, R: Right, T: Thru, U: U-Turn

M-24 and Waldon Road (unsignalized) - TMC
Tue Aug 24, 2021
AM Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



M-24 and Waldon Road (unsignalized) - TMC

Tue Aug 24, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

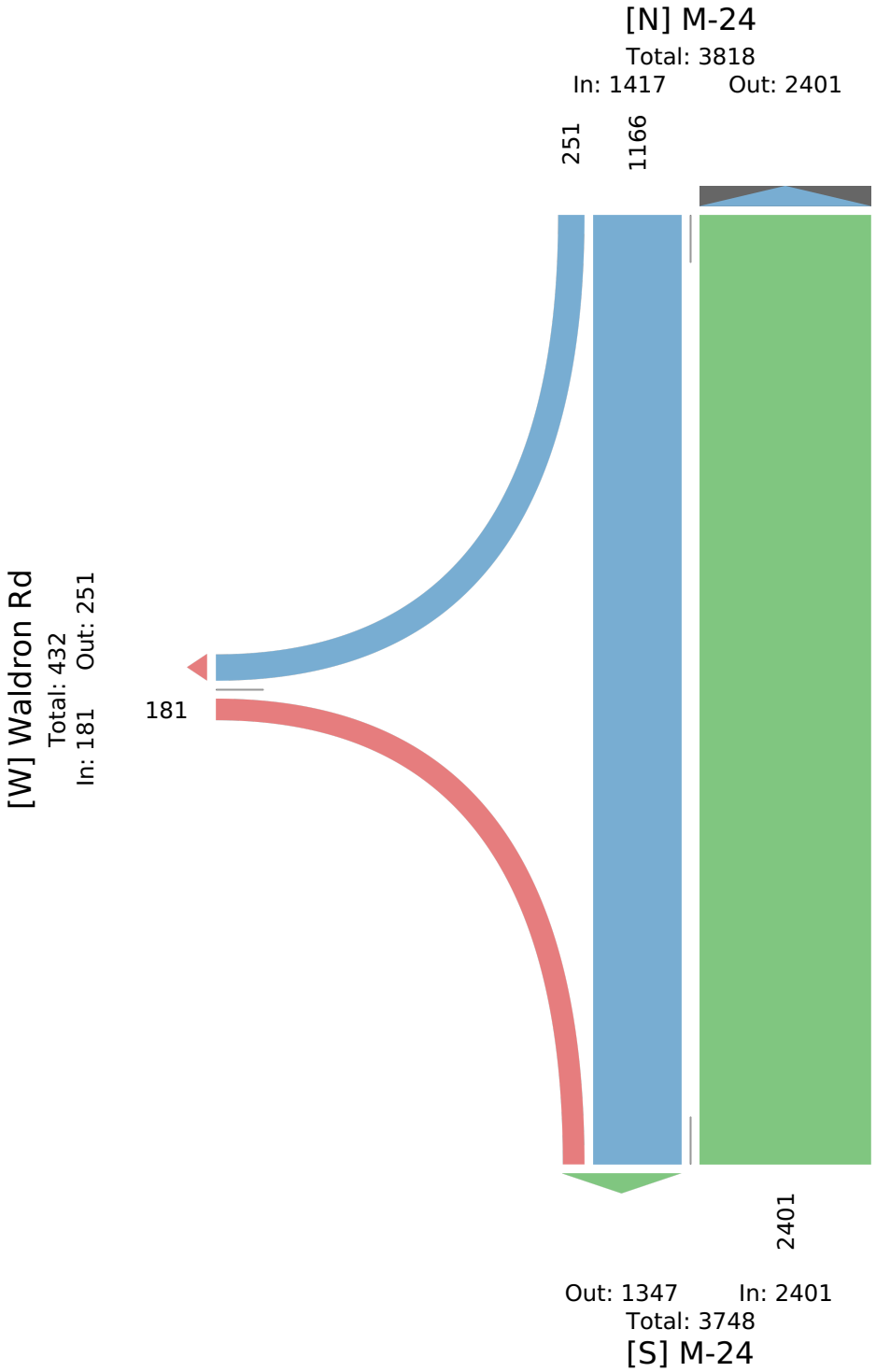
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	M-24 Northbound				M-24 Southbound				Waldron Rd Eastbound				
Time	L	T	U	**App**	T	R	U	**App**	L	R	U	**App**	**Int**
2021-08-24 4:30PM	0	574	0	**574**	298	70	0	**368**	0	42	0	**42**	**984**
4:45PM	0	605	0	**605**	275	52	0	**327**	0	45	0	**45**	**977**
5:00PM	0	622	0	**622**	316	64	0	**380**	0	51	0	**51**	**1053**
5:15PM	0	600	0	**600**	277	65	0	**342**	0	43	0	**43**	**985**
Total	0	2401	0	**2401**	1166	251	0	**1417**	0	181	0	**181**	**3999**
% Approach	0%	100%	0%	**-**	82.3%	17.7%	0%	**-**	0%	100%	0%	**-**	-
% Total	0%	60.0%	0%	**60.0%**	29.2%	6.3%	0%	**35.4%**	0%	4.5%	0%	**4.5%**	-
PHF	-	0.965	-	**0.965**	0.922	0.896	-	**0.932**	-	0.887	-	**0.887**	0.949
Lights	0	2365	0	**2365**	1145	248	0	**1393**	0	180	0	**180**	3938
% Lights	0%	98.5%	0%	**98.5%**	98.2%	98.8%	0%	**98.3%**	0%	99.4%	0%	**99.4%**	98.5%
Articulated Trucks	0	23	0	**23**	7	0	0	**7**	0	0	0	**0**	30
% Articulated Trucks	0%	1.0%	0%	**1.0%**	0.6%	0%	0%	**0.5%**	0%	0%	0%	**0%**	0.8%
Buses and Single-Unit Trucks	0	13	0	**13**	14	3	0	**17**	0	1	0	**1**	31
% Buses and Single-Unit Trucks	0%	0.5%	0%	**0.5%**	1.2%	1.2%	0%	**1.2%**	0%	0.6%	0%	**0.6%**	0.8%

*L: Left, R: Right, T: Thru, U: U-Turn

M-24 and Waldon Road (unsignalized) - TMC
Tue Aug 24, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865975, Location: 42.735796, -83.245096

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Lapeer Road (M-24) and NB-to-SB Crossover - TMC

Tue Aug 24, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865976, Location: 42.738412, -83.245327

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Lapeer Road (M-24) NB-to-SB Crossover Northbound			Lapeer Road (M-24) NB-to-SB Crossover Southbound			
Time	T	U	**App**	T	U	**App**	**Int**
2021-08-24 7:00AM	757	104	**861**	2068	0	**2068**	**2929**
8:00AM	934	90	**1024**	1717	0	**1717**	**2741**
4:00PM	2190	82	**2272**	1307	0	**1307**	**3579**
5:00PM	2095	122	**2217**	1269	0	**1269**	**3486**
Total	5976	398	**6374**	6361	0	**6361**	**12735**
% Approach	93.8%	6.2%	**-**	100%	0%	**-**	-
% Total	46.9%	3.1%	**50.1%**	49.9%	0%	**49.9%**	-
Lights	5799	394	**6193**	6151	0	**6151**	12344
% Lights	97.0%	99.0%	**97.2%**	96.7%	0%	**96.7%**	96.9%
Articulated Trucks	93	1	**94**	107	0	**107**	201
% Articulated Trucks	1.6%	0.3%	**1.5%**	1.7%	0%	**1.7%**	1.6%
Buses and Single-Unit Trucks	84	3	**87**	103	0	**103**	190
% Buses and Single-Unit Trucks	1.4%	0.8%	**1.4%**	1.6%	0%	**1.6%**	1.5%

*T: Thru, U: U-Turn

Lapeer Road (M-24) and NB-to-SB Crossover - TMC
Tue Aug 24, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865976, Location: 42.738412, -83.245327

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Lapeer Road (M-24) NB-to-SB Crossover

[S] Lapeer Road (M-24) NB-to-SB Crossover

Lapeer Road (M-24) and NB-to-SB Crossover - TMC

Tue Aug 24, 2021
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865976, Location: 42.738412, -83.245327

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

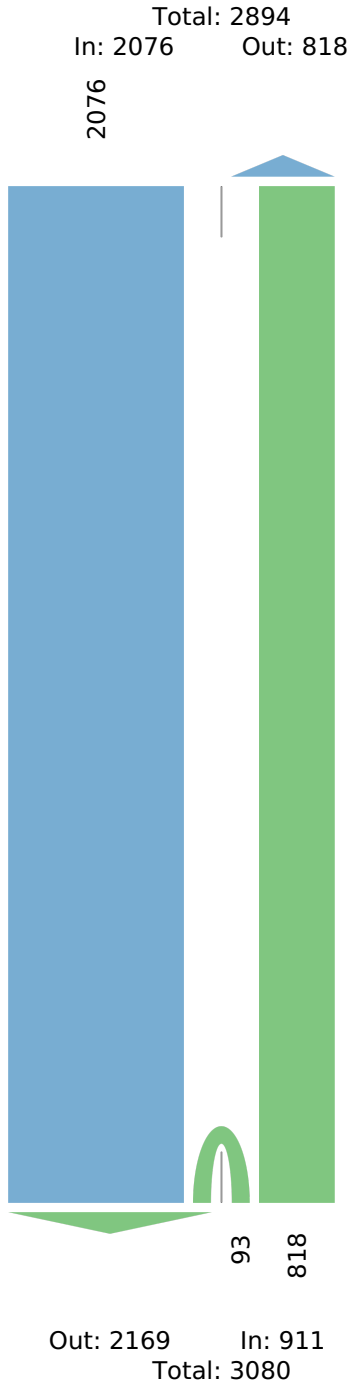
Leg Direction	Lapeer Road (M-24) NB-to-SB Crossover Northbound			Lapeer Road (M-24) NB-to-SB Crossover Southbound			
Time	T	U	**App**	T	U	**App**	**Int**
2021-08-24 7:15AM	158	25	**183**	538	0	**538**	**721**
7:30AM	198	24	**222**	559	0	**559**	**781**
7:45AM	261	31	**292**	516	0	**516**	**808**
8:00AM	201	13	**214**	463	0	**463**	**677**
Total	818	93	**911**	2076	0	**2076**	**2987**
% Approach	89.8%	10.2%	**-**	100%	0%	**-**	-
% Total	27.4%	3.1%	**30.5%**	69.5%	0%	**69.5%**	-
PHF	0.784	0.750	**0.780**	0.928	-	**0.928**	0.924
Lights	762	93	**855**	2009	0	**2009**	2864
% Lights	93.2%	100%	**93.9%**	96.8%	0%	**96.8%**	95.9%
Articulated Trucks	29	0	**29**	32	0	**32**	61
% Articulated Trucks	3.5%	0%	**3.2%**	1.5%	0%	**1.5%**	2.0%
Buses and Single-Unit Trucks	27	0	**27**	35	0	**35**	62
% Buses and Single-Unit Trucks	3.3%	0%	**3.0%**	1.7%	0%	**1.7%**	2.1%

*T: Thru, U: U-Turn

Lapeer Road (M-24) and NB-to-SB Crossover - TMC
Tue Aug 24, 2021
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865976, Location: 42.738412, -83.245327

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Lapeer Road (M-24) NB-to-SB Crossover



[S] Lapeer Road (M-24) NB-to-SB Crossover

Lapeer Road (M-24) and NB-to-SB Crossover - TMC

Tue Aug 24, 2021
PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865976, Location: 42.738412, -83.245327

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Lapeer Road (M-24) NB-to-SB Crossover Northbound			Lapeer Road (M-24) NB-to-SB Crossover Southbound			
Time	T	U	**App**	T	U	**App**	**Int**
2021-08-24 4:15PM	557	19	**576**	309	0	**309**	**885**
4:30PM	543	29	**572**	356	0	**356**	**928**
4:45PM	570	15	**585**	326	0	**326**	**911**
5:00PM	573	25	**598**	354	0	**354**	**952**
Total	2243	88	**2331**	1345	0	**1345**	**3676**
% Approach	96.2%	3.8%	**-**	100%	0%	**-**	-
% Total	61.0%	2.4%	**63.4%**	36.6%	0%	**36.6%**	-
PHF	0.979	0.759	**0.974**	0.945	-	**0.945**	0.965
Lights	2203	86	**2289**	1318	0	**1318**	3607
% Lights	98.2%	97.7%	**98.2%**	98.0%	0%	**98.0%**	98.1%
Articulated Trucks	23	0	**23**	10	0	**10**	33
% Articulated Trucks	1.0%	0%	**1.0%**	0.7%	0%	**0.7%**	0.9%
Buses and Single-Unit Trucks	17	2	**19**	17	0	**17**	36
% Buses and Single-Unit Trucks	0.8%	2.3%	**0.8%**	1.3%	0%	**1.3%**	1.0%

*T: Thru, U: U-Turn

Lapeer Road (M-24) and NB-to-SB Crossover - TMC
Tue Aug 24, 2021
PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865976, Location: 42.738412, -83.245327

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Lapeer Road (M-24) NB-to-SB Crossover

[S] Lapeer Road (M-24) NB-to-SB Crossover

Lapeer Road (M-24) and SB-to-NB crossover / ... - TMC

Tue Aug 24, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865977, Location: 42.734326, -83.244424

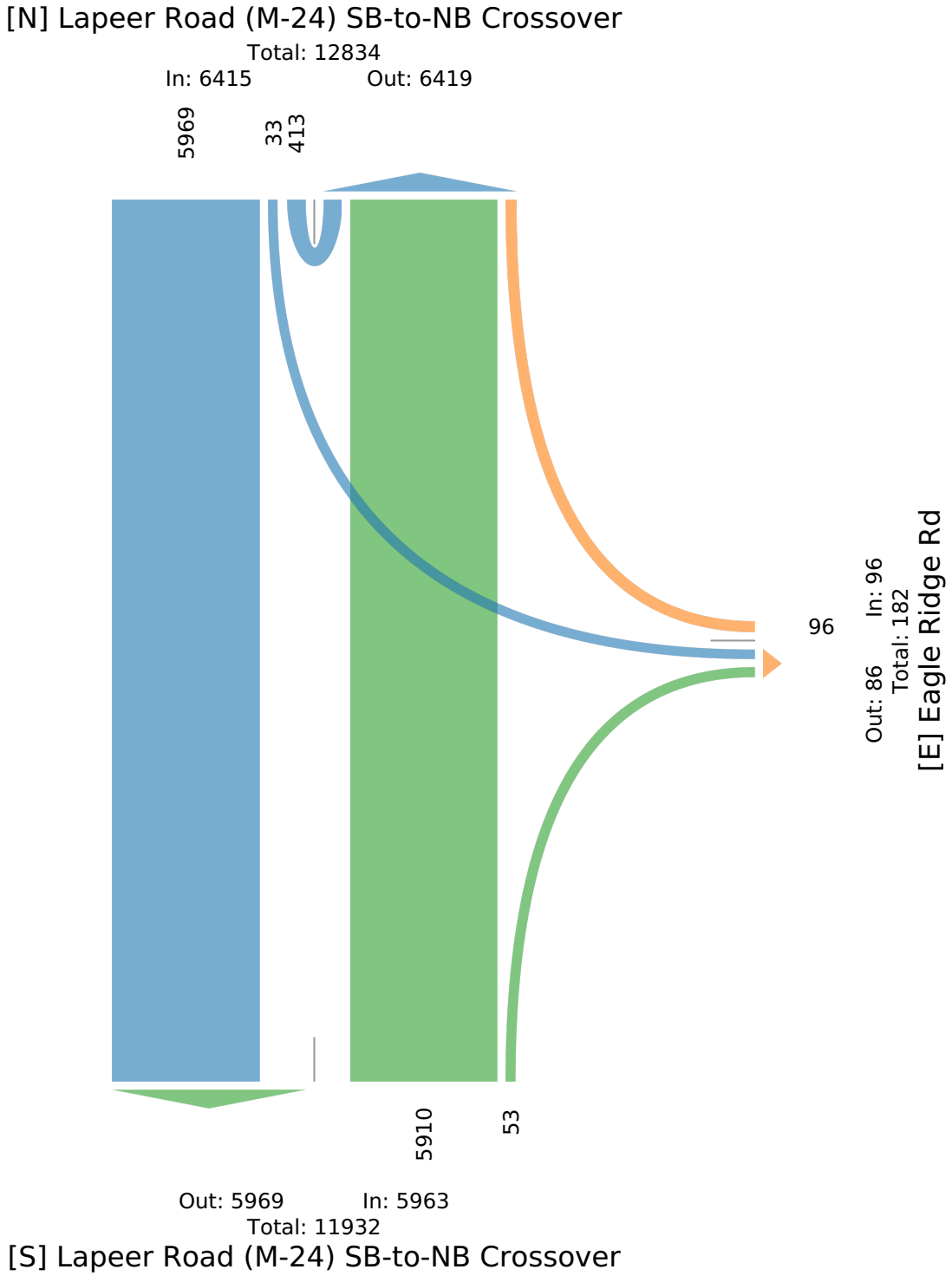
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Lapeer Road (M-24) SB-to-NB Crossover Northbound				Lapeer Road (M-24) SB-to-NB Crossover Southbound				Eagle Ridge Rd Westbound				
Time	T	R	U	**App**	L	T	U	**App**	L	R	U	**App**	**Int**
2021-08-24 7:00AM	739	1	0	**740**	1	2017	44	**2062**	0	26	0	**26**	**2828**
8:00AM	878	9	0	**887**	8	1649	115	**1772**	0	24	0	**24**	**2683**
4:00PM	2145	16	0	**2161**	8	1140	145	**1293**	0	10	0	**10**	**3464**
5:00PM	2148	27	0	**2175**	16	1163	109	**1288**	0	36	0	**36**	**3499**
Total	5910	53	0	**5963**	33	5969	413	**6415**	0	96	0	**96**	**12474**
% Approach	99.1%	0.9%	0%	**-**	0.5%	93.0%	6.4%	**-**	0%	100%	0%	**-**	-
% Total	47.4%	0.4%	0%	**47.8%**	0.3%	47.9%	3.3%	**51.4%**	0%	0.8%	0%	**0.8%**	-
Lights	5733	53	0	**5786**	33	5786	407	**6226**	0	96	0	**96**	12108
% Lights	97.0%	100%	0%	**97.0%**	100%	96.9%	98.5%	**97.1%**	0%	100%	0%	**100%**	97.1%
Articulated Trucks	91	0	0	**91**	0	91	0	**91**	0	0	0	**0**	182
% Articulated Trucks	1.5%	0%	0%	**1.5%**	0%	1.5%	0%	**1.4%**	0%	0%	0%	**0%**	1.5%
Buses and Single-Unit Trucks	86	0	0	**86**	0	92	6	**98**	0	0	0	**0**	184
% Buses and Single-Unit Trucks	1.5%	0%	0%	**1.4%**	0%	1.5%	1.5%	**1.5%**	0%	0%	0%	**0%**	1.5%

*L: Left, R: Right, T: Thru, U: U-Turn

Lapeer Road (M-24) and SB-to-NB crossover / ... - TMC
Tue Aug 24, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865977, Location: 42.734326, -83.244424

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Lapeer Road (M-24) and SB-to-NB crossover / ... - TMC

Tue Aug 24, 2021
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865977, Location: 42.734326, -83.244424

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Lapeer Road (M-24) SB-to-NB Crossover Northbound				Lapeer Road (M-24) SB-to-NB Crossover Southbound				Eagle Ridge Rd Westbound				
Time	T	R	U	**App**	L	T	U	**App**	L	R	U	**App**	**Int**
2021-08-24 7:15AM	151	1	0	**152**	0	530	11	**541**	0	2	0	**2**	**695**
7:30AM	199	0	0	**199**	1	533	8	**542**	0	7	0	**7**	**748**
7:45AM	251	0	0	**251**	0	499	20	**519**	0	11	0	**11**	**781**
8:00AM	189	4	0	**193**	3	438	21	**462**	0	8	0	**8**	**663**
Total	790	5	0	**795**	4	2000	60	**2064**	0	28	0	**28**	**2887**
% Approach	99.4%	0.6%	0%	**-**	0.2%	96.9%	2.9%	**-**	0%	100%	0%	**-**	-
% Total	27.4%	0.2%	0%	**27.5%**	0.1%	69.3%	2.1%	**71.5%**	0%	1.0%	0%	**1.0%**	-
PHF	0.787	0.313	-	**0.792**	0.333	0.938	0.714	**0.952**	-	0.636	-	**0.636**	0.924
Lights	731	5	0	**736**	4	1942	60	**2006**	0	28	0	**28**	2770
% Lights	92.5%	100%	0%	**92.6%**	100%	97.1%	100%	**97.2%**	0%	100%	0%	**100%**	95.9%
Articulated Trucks	30	0	0	**30**	0	28	0	**28**	0	0	0	**0**	58
% Articulated Trucks	3.8%	0%	0%	**3.8%**	0%	1.4%	0%	**1.4%**	0%	0%	0%	**0%**	2.0%
Buses and Single-Unit Trucks	29	0	0	**29**	0	30	0	**30**	0	0	0	**0**	59
% Buses and Single-Unit Trucks	3.7%	0%	0%	**3.6%**	0%	1.5%	0%	**1.5%**	0%	0%	0%	**0%**	2.0%

*L: Left, R: Right, T: Thru, U: U-Turn

Lapeer Road (M-24) and SB-to-NB crossover / ... - TMC
Tue Aug 24, 2021
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865977, Location: 42.734326, -83.244424

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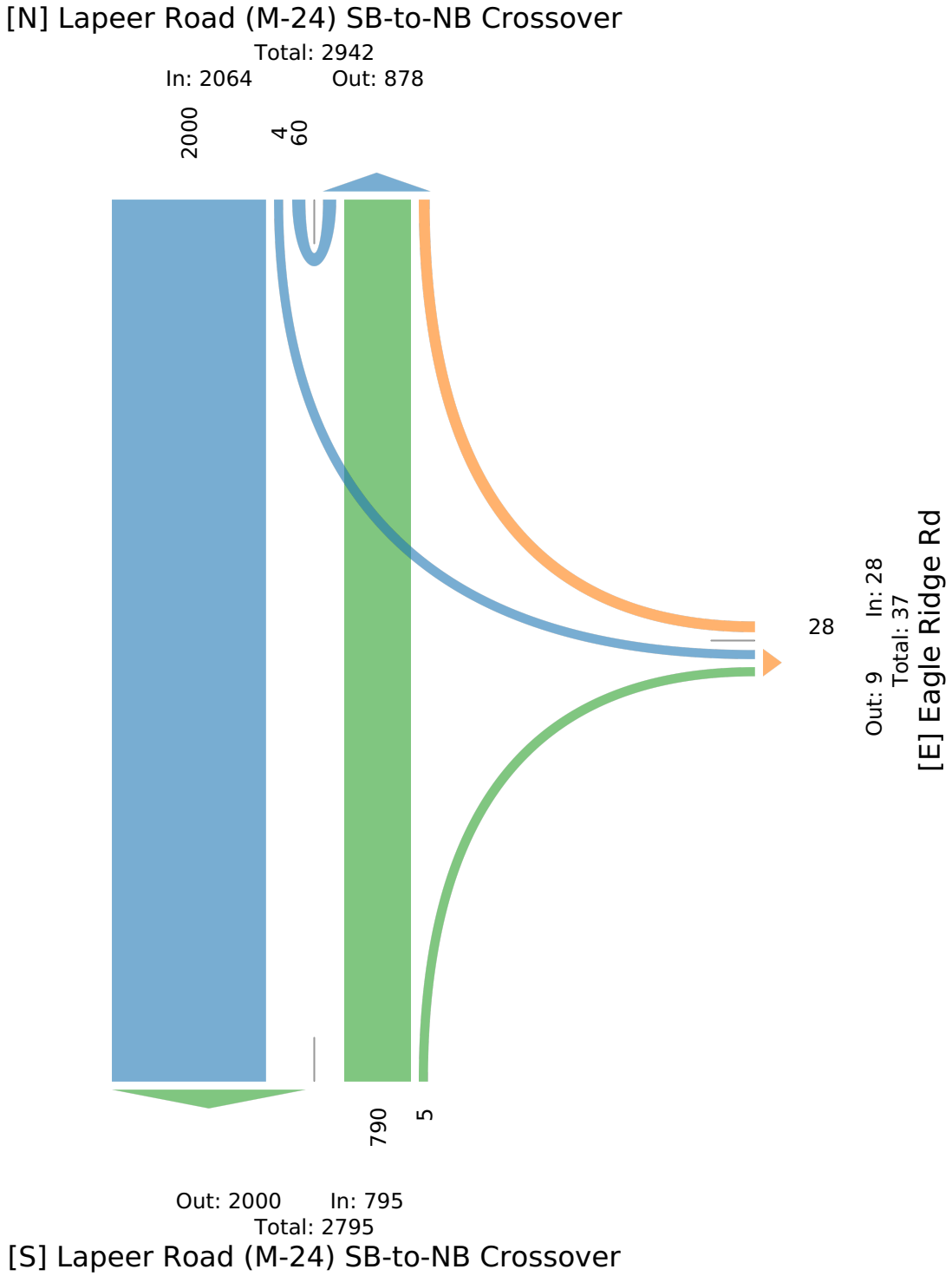

Lapeer Road (M-24) and SB-to-NB crossover / ... - TMC

Tue Aug 24, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865977, Location: 42.734326, -83.244424

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Lapeer Road (M-24) SB-to-NB Crossover Northbound				Lapeer Road (M-24) SB-to-NB Crossover Southbound				Eagle Ridge Rd Westbound				
Time	T	R	U	**App**	L	T	U	**App**	L	R	U	**App**	**Int**
2021-08-24 4:30PM	530	7	0	**537**	2	301	35	**338**	0	2	0	**2**	**877**
4:45PM	560	6	0	**566**	2	286	38	**326**	0	3	0	**3**	**895**
5:00PM	590	5	0	**595**	4	321	31	**356**	0	3	0	**3**	**954**
5:15PM	555	5	0	**560**	5	288	36	**329**	0	13	0	**13**	**902**
Total	2235	23	0	**2258**	13	1196	140	**1349**	0	21	0	**21**	**3628**
% Approach	99.0%	1.0%	0%	**-**	1.0%	88.7%	10.4%	**-**	0%	100%	0%	**-**	-
% Total	61.6%	0.6%	0%	**62.2%**	0.4%	33.0%	3.9%	**37.2%**	0%	0.6%	0%	**0.6%**	-
PHF	0.947	0.821	-	**0.949**	0.650	0.931	0.921	**0.947**	-	0.404	-	**0.404**	0.951
Lights	2199	23	0	**2222**	13	1178	140	**1331**	0	21	0	**21**	3574
% Lights	98.4%	100%	0%	**98.4%**	100%	98.5%	100%	**98.7%**	0%	100%	0%	**100%**	98.5%
Articulated Trucks	19	0	0	**19**	0	6	0	**6**	0	0	0	**0**	25
% Articulated Trucks	0.9%	0%	0%	**0.8%**	0%	0.5%	0%	**0.4%**	0%	0%	0%	**0%**	0.7%
Buses and Single-Unit Trucks	17	0	0	**17**	0	12	0	**12**	0	0	0	**0**	29
% Buses and Single-Unit Trucks	0.8%	0%	0%	**0.8%**	0%	1.0%	0%	**0.9%**	0%	0%	0%	**0%**	0.8%

*L: Left, R: Right, T: Thru, U: U-Turn

Lapeer Road (M-24) and SB-to-NB crossover / ... - TMC
Tue Aug 24, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 865977, Location: 42.734326, -83.244424

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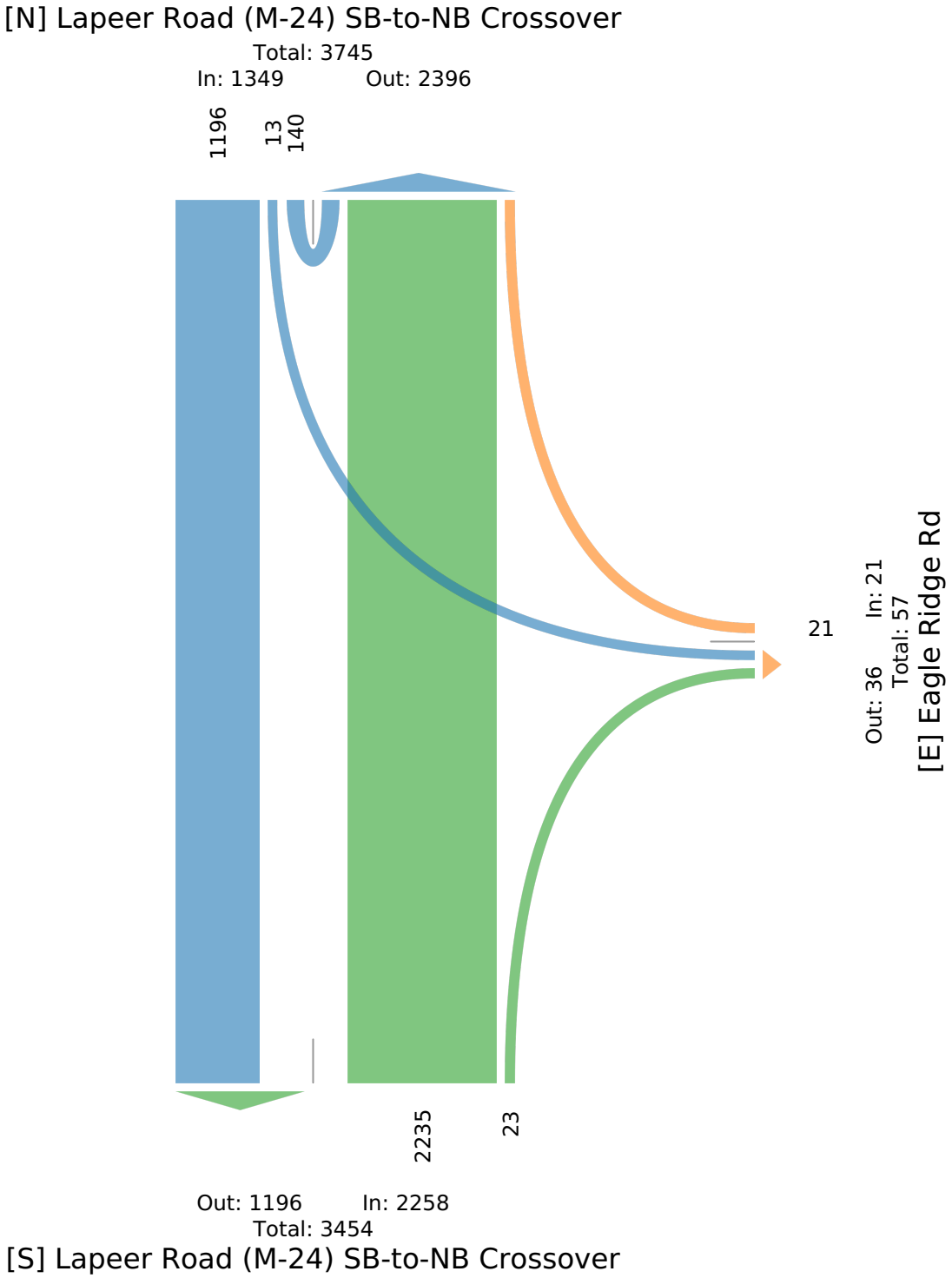


LOS OUTPUT REPORTS

Intersection	
Int Delay, s/veh	10.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	149	0	0	2487	116
Future Vol, veh/h	0	149	0	0	2487	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	86	92	92	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	173	0	0	2618	122

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	1309	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.94	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.32	-	-
Pot Cap-1 Maneuver	0	~ 150	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	~ 150	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	180.9	0
HCM LOS	F	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	150	-	-
HCM Lane V/C Ratio	1.155	-	-
HCM Control Delay (s)	180.9	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	9.6	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	7.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	112	0	0	0	0	2491
Future Vol, veh/h	112	0	0	0	0	2491
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	92	92	92	92	93
Heavy Vehicles, %	0	2	2	2	2	3
Mvmt Flow	149	0	0	0	0	2678

Major/Minor	Minor1		Major2	
Conflicting Flow All	1339	-	-	-
Stage 1	0	-	-	-
Stage 2	1339	-	-	-
Critical Hdwy	6.8	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-
Follow-up Hdwy	3.5	-	-	-
Pot Cap-1 Maneuver	~ 147	0	0	-
Stage 1	-	0	0	-
Stage 2	213	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	~ 147	-	-	-
Mov Cap-2 Maneuver	~ 147	-	-	-
Stage 1	-	-	-	-
Stage 2	213	-	-	-

Approach	WB	SB
HCM Control Delay, s	138.9	0
HCM LOS	F	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	147	-
HCM Lane V/C Ratio	1.016	-
HCM Control Delay (s)	138.9	-
HCM Lane LOS	F	-
HCM 95th %tile Q(veh)	7.6	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	5	0	0	0	34	0	988	6	0	0	0
Future Vol, veh/h	72	5	0	0	0	34	0	988	6	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	92	92	92	64	92	79	79	92	92	92
Heavy Vehicles, %	0	0	2	2	2	0	2	7	7	2	2	2
Mvmt Flow	114	8	0	0	0	53	0	1251	8	0	0	0

Major/Minor	Minor2		Minor1			Major1			
Conflicting Flow All	626	1259	-	-	-	626	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	626	1259	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	373	172	0	0	0	432	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	443	244	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	327	172	-	-	-	432	-	-	-
Mov Cap-2 Maneuver	327	172	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	389	244	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	19.6	14.5	0
HCM LOS	C	B	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	327	283	432
HCM Lane V/C Ratio	-	-	0.233	0.163	0.123
HCM Control Delay (s)	-	-	19.3	20.2	14.5
HCM Lane LOS	-	-	C	C	B
HCM 95th %tile Q(veh)	-	-	0.9	0.6	0.4

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	217	0	0	1419	301
Future Vol, veh/h	0	217	0	0	1419	301
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	90	92	92	93	93
Heavy Vehicles, %	2	1	2	2	2	2
Mvmt Flow	0	241	0	0	1526	324

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	763	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.92	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.31	-	-
Pot Cap-1 Maneuver	0	349	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	349	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	35.5	0
HCM LOS	E	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	349	-	-
HCM Lane V/C Ratio	0.691	-	-
HCM Control Delay (s)	35.5	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	4.9	-	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	106	0	0	0	0	1614
Future Vol, veh/h	106	0	0	0	0	1614
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	92	92	92	92	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	139	0	0	0	0	1699

Major/Minor	Minor1		Major2	
Conflicting Flow All	850	-	-	-
Stage 1	0	-	-	-
Stage 2	850	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	300	0	0	-
Stage 1	-	0	0	-
Stage 2	379	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	300	-	-	-
Mov Cap-2 Maneuver	300	-	-	-
Stage 1	-	-	-	-
Stage 2	379	-	-	-

Approach	WB	SB
HCM Control Delay, s	27	0
HCM LOS	D	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	300	-
HCM Lane V/C Ratio	0.465	-
HCM Control Delay (s)	27	-
HCM Lane LOS	D	-
HCM 95th %tile Q(veh)	2.3	-

Intersection	
Int Delay, s/veh	38.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	168	16	0	0	0	25	0	2682	28	0	0	0
Future Vol, veh/h	168	16	0	0	0	25	0	2682	28	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	92	92	92	60	92	95	95	92	92	92
Heavy Vehicles, %	3	3	2	2	2	0	2	2	2	2	2	2
Mvmt Flow	181	17	0	0	0	42	0	2823	29	0	0	0

Major/Minor	Minor2		Minor1			Major1			
Conflicting Flow All	1412	2852	-	-	-	1412	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	1412	2852	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	-	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	-	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	~ 97	~ 16	0	0	0	130	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	~ 144	36	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	~ 66	~ 16	-	-	-	130	-	-	-
Mov Cap-2 Maneuver	~ 66	~ 16	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	~ 98	36	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	$ 587.3	45.2	0
HCM LOS	F	E	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	66	39	130
HCM Lane V/C Ratio	-	-	1.825	1.985	0.321
HCM Control Delay (s)	-	-	$ 526.6	$ 681.7	45.2
HCM Lane LOS	-	-	F	F	E
HCM 95th %tile Q(veh)	-	-	10.9	8.3	1.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	149	0	0	2487	116
Future Volume (vph)	0	149	0	0	2487	116
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.5			4.5	4.5
Lane Util. Factor		1.00			0.95	1.00
Frt		0.86			1.00	0.85
Flt Protected		1.00			1.00	1.00
Satd. Flow (prot)		1696			3689	1650
Flt Permitted		1.00			1.00	1.00
Satd. Flow (perm)		1696			3689	1650
Peak-hour factor, PHF	0.92	0.86	0.92	0.92	0.95	0.95
Adj. Flow (vph)	0	173	0	0	2618	122
RTOR Reduction (vph)	0	5	0	0	0	27
Lane Group Flow (vph)	0	168	0	0	2618	95
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Turn Type		Prot			NA	Perm
Protected Phases		4			6	
Permitted Phases						6
Actuated Green, G (s)		30.5			90.5	90.5
Effective Green, g (s)		30.5			90.5	90.5
Actuated g/C Ratio		0.23			0.70	0.70
Clearance Time (s)		4.5			4.5	4.5
Vehicle Extension (s)		3.0			3.0	3.0
Lane Grp Cap (vph)		397			2568	1148
v/s Ratio Prot		c0.10			c0.71	
v/s Ratio Perm						0.06
v/c Ratio		0.42			1.02	0.08
Uniform Delay, d1		42.3			19.8	6.4
Progression Factor		1.00			1.00	1.00
Incremental Delay, d2		3.3			22.8	0.1
Delay (s)		45.6			42.6	6.5
Level of Service		D			D	A
Approach Delay (s)	45.6			0.0	41.0	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	5	0	0	0	34	0	988	6	0	0	0
Future Volume (vph)	72	5	0	0	0	34	0	988	6	0	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0				5.0		5.0	5.0			
Lane Util. Factor	0.95	0.95				1.00		0.95	1.00			
Frt	1.00	1.00				0.86		1.00	0.85			
Flt Protected	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (prot)	1805	1821				1730		3551	1589			
Flt Permitted	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (perm)	1805	1821				1730		3551	1589			
Peak-hour factor, PHF	0.63	0.63	0.92	0.92	0.92	0.64	0.92	0.79	0.79	0.92	0.92	0.92
Adj. Flow (vph)	114	8	0	0	0	53	0	1251	8	0	0	0
RTOR Reduction (vph)	46	42	0	0	0	41	0	0	2	0	0	0
Lane Group Flow (vph)	14	20	0	0	0	12	0	1251	6	0	0	0
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	2%	7%	7%	2%	2%	2%
Turn Type	Perm	NA				Prot		NA	Perm			
Protected Phases		4				8		2				
Permitted Phases	4								2			
Actuated Green, G (s)	30.0	30.0				30.0		90.0	90.0			
Effective Green, g (s)	30.0	30.0				30.0		90.0	90.0			
Actuated g/C Ratio	0.23	0.23				0.23		0.69	0.69			
Clearance Time (s)	5.0	5.0				5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0				3.0		3.0	3.0			
Lane Grp Cap (vph)	416	420				399		2458	1100			
v/s Ratio Prot						0.01		c0.35				
v/s Ratio Perm	0.01	0.01							0.00			
v/c Ratio	0.03	0.05				0.03		0.51	0.01			
Uniform Delay, d1	38.8	38.9				38.7		9.5	6.2			
Progression Factor	1.70	1.49				1.00		1.00	1.00			
Incremental Delay, d2	0.0	0.1				0.0		0.8	0.0			
Delay (s)	66.1	58.1				38.8		10.3	6.2			
Level of Service	E	E				D		B	A			
Approach Delay (s)		62.0			38.8			10.2			0.0	
Approach LOS		E			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: SB Lapeer Road (M-24) & Waldon Road

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	229	437	450	66
Average Queue (ft)	94	413	411	20
95th Queue (ft)	181	466	473	48
Link Distance (ft)	1028	415	415	415
Upstream Blk Time (%)		13	13	
Queuing Penalty (veh)		116	110	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SB Lapeer Road (M-24) & NB to SB Crossover

Movement	WB	SB	SB
Directions Served	L	T	T
Maximum Queue (ft)	62	356	344
Average Queue (ft)	60	208	200
95th Queue (ft)	71	471	466
Link Distance (ft)	9	317	317
Upstream Blk Time (%)	87	20	17
Queuing Penalty (veh)	98	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: NB Lapeer Road (M-24)/NB M-24 & SB to NB Crossover/Eagle Ridge Rd

Movement	EB	EB	WB	NB	NB	NB
Directions Served	L	LT	R	T	T	R
Maximum Queue (ft)	31	31	82	342	301	20
Average Queue (ft)	26	12	20	177	113	1
95th Queue (ft)	44	36	56	300	263	9
Link Distance (ft)	12	12	411	444	444	444
Upstream Blk Time (%)	13	8		2	2	
Queuing Penalty (veh)	5	4		0	0	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 334

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	217	0	0	1419	301
Future Volume (vph)	0	217	0	0	1419	301
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.0			5.0	5.0
Lane Util. Factor		1.00			0.95	1.00
Frt		0.86			1.00	0.85
Flt Protected		1.00			1.00	1.00
Satd. Flow (prot)		1713			3725	1667
Flt Permitted		1.00			1.00	1.00
Satd. Flow (perm)		1713			3725	1667
Peak-hour factor, PHF	0.92	0.90	0.92	0.92	0.93	0.93
Adj. Flow (vph)	0	241	0	0	1526	324
RTOR Reduction (vph)	0	54	0	0	0	87
Lane Group Flow (vph)	0	187	0	0	1526	237
Heavy Vehicles (%)	2%	1%	2%	2%	2%	2%
Turn Type		Prot			NA	Perm
Protected Phases		8			6	
Permitted Phases						6
Actuated Green, G (s)		25.0			95.0	95.0
Effective Green, g (s)		25.0			95.0	95.0
Actuated g/C Ratio		0.19			0.73	0.73
Clearance Time (s)		5.0			5.0	5.0
Vehicle Extension (s)		3.0			3.0	3.0
Lane Grp Cap (vph)		329			2722	1218
v/s Ratio Prot		c0.11			c0.41	
v/s Ratio Perm						0.14
v/c Ratio		0.57			0.56	0.19
Uniform Delay, d1		47.6			8.0	5.5
Progression Factor		1.00			1.00	1.00
Incremental Delay, d2		6.9			0.8	0.4
Delay (s)		54.6			8.8	5.8
Level of Service		D			A	A
Approach Delay (s)	54.6			0.0	8.3	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	16	0	0	0	25	0	2682	28	0	0	0
Future Volume (vph)	168	16	0	0	0	25	0	2682	28	0	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0				5.0		5.0	5.0			
Lane Util. Factor	0.95	0.95				1.00		0.95	1.00			
Frt	1.00	1.00				0.86		1.00	0.85			
Flt Protected	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (prot)	1752	1771				1730		3725	1667			
Flt Permitted	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (perm)	1752	1771				1730		3725	1667			
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.92	0.60	0.92	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	181	17	0	0	0	42	0	2823	29	0	0	0
RTOR Reduction (vph)	14	14	0	0	0	14	0	0	6	0	0	0
Lane Group Flow (vph)	84	86	0	0	0	28	0	2823	23	0	0	0
Heavy Vehicles (%)	3%	3%	2%	2%	2%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA				Prot		NA	Perm			
Protected Phases		4				8		2				
Permitted Phases	4								2			
Actuated Green, G (s)	25.0	25.0				25.0		95.0	95.0			
Effective Green, g (s)	25.0	25.0				25.0		95.0	95.0			
Actuated g/C Ratio	0.19	0.19				0.19		0.73	0.73			
Clearance Time (s)	5.0	5.0				5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0				3.0		3.0	3.0			
Lane Grp Cap (vph)	336	340				332		2722	1218			
v/s Ratio Prot						0.02		c0.76				
v/s Ratio Perm	0.05	0.05							0.01			
v/c Ratio	0.25	0.25				0.09		1.04	0.02			
Uniform Delay, d1	44.6	44.6				43.1		17.5	4.8			
Progression Factor	1.21	1.20				1.00		1.00	1.00			
Incremental Delay, d2	1.5	1.5				0.1		27.8	0.0			
Delay (s)	55.3	55.2				43.2		45.3	4.8			
Level of Service	E	E				D		D	A			
Approach Delay (s)		55.2			43.2			44.9			0.0	
Approach LOS		E			D			D			A	

Intersection Summary			
HCM 2000 Control Delay	45.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	122.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: SB Lapeer Road (M-24) & Waldon Road

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	261	230	203	86
Average Queue (ft)	156	150	109	36
95th Queue (ft)	250	219	192	68
Link Distance (ft)	1028	415	415	415
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SB Lapeer Road (M-24) & NB to SB Crossover

Movement	WB
Directions Served	L
Maximum Queue (ft)	64
Average Queue (ft)	44
95th Queue (ft)	68
Link Distance (ft)	9
Upstream Blk Time (%)	34
Queuing Penalty (veh)	36
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: NB Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Rd

Movement	EB	EB	WB	NB	NB	NB
Directions Served	L	LT	R	T	T	R
Maximum Queue (ft)	65	70	79	491	493	476
Average Queue (ft)	32	32	22	463	461	373
95th Queue (ft)	48	51	62	479	492	662
Link Distance (ft)	12	12	411	444	444	444
Upstream Blk Time (%)	61	49		33	42	18
Queuing Penalty (veh)	56	46		0	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 138

Intersection	
Int Delay, s/veh	11.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	150	0	0	2512	118
Future Vol, veh/h	0	150	0	0	2512	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	86	92	92	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	174	0	0	2644	124

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	1322	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.94	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.32	-	-
Pot Cap-1 Maneuver	0	~ 147	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	~ 147	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	193.3	0
HCM LOS	F	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	147	-	-
HCM Lane V/C Ratio	1.187	-	-
HCM Control Delay (s)	193.3	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	10	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	7.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	113	0	0	0	0	2517
Future Vol, veh/h	113	0	0	0	0	2517
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	92	92	92	92	93
Heavy Vehicles, %	0	2	2	2	2	3
Mvmt Flow	151	0	0	0	0	2706

Major/Minor	Minor1		Major2	
Conflicting Flow All	1353	-	-	-
Stage 1	0	-	-	-
Stage 2	1353	-	-	-
Critical Hdwy	6.8	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-
Follow-up Hdwy	3.5	-	-	-
Pot Cap-1 Maneuver	~ 144	0	0	-
Stage 1	-	0	0	-
Stage 2	209	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	~ 144	-	-	-
Mov Cap-2 Maneuver	~ 144	-	-	-
Stage 1	-	-	-	-
Stage 2	209	-	-	-

Approach	WB	SB
HCM Control Delay, s	149.4	0
HCM LOS	F	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	144	-
HCM Lane V/C Ratio	1.046	-
HCM Control Delay (s)	149.4	-
HCM Lane LOS	F	-
HCM 95th %tile Q(veh)	7.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	73	5	0	0	0	34	0	998	6	0	0	0
Future Vol, veh/h	73	5	0	0	0	34	0	998	6	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	92	92	92	64	92	79	79	92	92	92
Heavy Vehicles, %	0	0	2	2	2	0	2	7	7	2	2	2
Mvmt Flow	116	8	0	0	0	53	0	1263	8	0	0	0

Major/Minor	Minor2		Minor1			Major1			
Conflicting Flow All	632	1271	-	-	-	632	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	632	1271	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	369	169	0	0	0	428	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	440	241	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	323	169	-	-	-	428	-	-	-
Mov Cap-2 Maneuver	323	169	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	385	241	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	19.9	14.6	0
HCM LOS	C	B	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	323	280	428
HCM Lane V/C Ratio	-	-	0.239	0.166	0.124
HCM Control Delay (s)	-	-	19.6	20.4	14.6
HCM Lane LOS	-	-	C	C	B
HCM 95th %tile Q(veh)	-	-	0.9	0.6	0.4

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	219	0	0	1433	304
Future Vol, veh/h	0	219	0	0	1433	304
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	90	92	92	93	93
Heavy Vehicles, %	2	1	2	2	2	2
Mvmt Flow	0	243	0	0	1541	327

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	771		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.92		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.31		-	-
Pot Cap-1 Maneuver	0	345		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	345		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	36.9	0
HCM LOS	E	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	345	-	-
HCM Lane V/C Ratio	0.705	-	-
HCM Control Delay (s)	36.9	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	5.1	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	107	0	0	0	0	1630
Future Vol, veh/h	107	0	0	0	0	1630
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	92	92	92	92	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	141	0	0	0	0	1716

Major/Minor	Minor1		Major2	
Conflicting Flow All	858	-	-	-
Stage 1	0	-	-	-
Stage 2	858	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	296	0	0	-
Stage 1	-	0	0	-
Stage 2	376	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	296	-	-	-
Mov Cap-2 Maneuver	296	-	-	-
Stage 1	-	-	-	-
Stage 2	376	-	-	-

Approach	WB	SB
HCM Control Delay, s	27.7	0
HCM LOS	D	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	296	-
HCM Lane V/C Ratio	0.476	-
HCM Control Delay (s)	27.7	-
HCM Lane LOS	D	-
HCM 95th %tile Q(veh)	2.4	-

Intersection	
Int Delay, s/veh	40.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	169	16	0	0	0	25	0	2709	28	0	0	0
Future Vol, veh/h	169	16	0	0	0	25	0	2709	28	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	92	92	92	60	92	95	95	92	92	92
Heavy Vehicles, %	3	3	2	2	2	0	2	2	2	2	2	2
Mvmt Flow	182	17	0	0	0	42	0	2852	29	0	0	0

Major/Minor	Minor2		Minor1			Major1			
Conflicting Flow All	1426	2881	-	-	-	1426	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	1426	2881	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	-	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	-	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	~ 95	~ 16	0	0	0	127	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	~ 141	35	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	~ 64	~ 16	-	-	-	127	-	-	-
Mov Cap-2 Maneuver	~ 64	~ 16	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	~ 95	35	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	$ 619.4	46.6	0
HCM LOS	F	E	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	64	38	127
HCM Lane V/C Ratio	-	-	1.893	2.047	0.328
HCM Control Delay (s)	-	-	$ 559.3	$ 713.1	46.6
HCM Lane LOS	-	-	F	F	E
HCM 95th %tile Q(veh)	-	-	11.2	8.4	1.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	150	0	0	2512	118
Future Volume (vph)	0	150	0	0	2512	118
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.5			4.5	4.5
Lane Util. Factor		1.00			0.95	1.00
Frt		0.86			1.00	0.85
Flt Protected		1.00			1.00	1.00
Satd. Flow (prot)		1696			3689	1650
Flt Permitted		1.00			1.00	1.00
Satd. Flow (perm)		1696			3689	1650
Peak-hour factor, PHF	0.92	0.86	0.92	0.92	0.95	0.95
Adj. Flow (vph)	0	174	0	0	2644	124
RTOR Reduction (vph)	0	5	0	0	0	27
Lane Group Flow (vph)	0	169	0	0	2644	97
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Turn Type		Prot			NA	Perm
Protected Phases		4			6	
Permitted Phases						6
Actuated Green, G (s)		30.5			90.5	90.5
Effective Green, g (s)		30.5			90.5	90.5
Actuated g/C Ratio		0.23			0.70	0.70
Clearance Time (s)		4.5			4.5	4.5
Vehicle Extension (s)		3.0			3.0	3.0
Lane Grp Cap (vph)		397			2568	1148
v/s Ratio Prot		c0.10			c0.72	
v/s Ratio Perm						0.06
v/c Ratio		0.43			1.03	0.08
Uniform Delay, d1		42.3			19.8	6.4
Progression Factor		1.00			1.00	1.00
Incremental Delay, d2		3.3			25.9	0.1
Delay (s)		45.6			45.6	6.5
Level of Service		D			D	A
Approach Delay (s)	45.6			0.0	43.9	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	5	0	0	0	34	0	998	6	0	0	0
Future Volume (vph)	73	5	0	0	0	34	0	998	6	0	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0				5.0		5.0	5.0			
Lane Util. Factor	0.95	0.95				1.00		0.95	1.00			
Frt	1.00	1.00				0.86		1.00	0.85			
Flt Protected	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (prot)	1805	1821				1730		3551	1589			
Flt Permitted	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (perm)	1805	1821				1730		3551	1589			
Peak-hour factor, PHF	0.63	0.63	0.92	0.92	0.92	0.64	0.92	0.79	0.79	0.92	0.92	0.92
Adj. Flow (vph)	116	8	0	0	0	53	0	1263	8	0	0	0
RTOR Reduction (vph)	47	42	0	0	0	41	0	0	2	0	0	0
Lane Group Flow (vph)	14	21	0	0	0	12	0	1263	6	0	0	0
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	2%	7%	7%	2%	2%	2%
Turn Type	Perm	NA				Prot		NA	Perm			
Protected Phases		4				8		2				
Permitted Phases	4								2			
Actuated Green, G (s)	30.0	30.0				30.0		90.0	90.0			
Effective Green, g (s)	30.0	30.0				30.0		90.0	90.0			
Actuated g/C Ratio	0.23	0.23				0.23		0.69	0.69			
Clearance Time (s)	5.0	5.0				5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0				3.0		3.0	3.0			
Lane Grp Cap (vph)	416	420				399		2458	1100			
v/s Ratio Prot						0.01		c0.36				
v/s Ratio Perm	0.01	0.01							0.00			
v/c Ratio	0.03	0.05				0.03		0.51	0.01			
Uniform Delay, d1	38.8	38.9				38.7		9.6	6.2			
Progression Factor	1.69	1.50				1.00		1.00	1.00			
Incremental Delay, d2	0.0	0.1				0.0		0.8	0.0			
Delay (s)	65.7	58.3				38.8		10.3	6.2			
Level of Service	E	E				D		B	A			
Approach Delay (s)		61.9			38.8			10.3			0.0	
Approach LOS		E			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: SB Lapeer Road (M-24) & Waldon Road

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	195	439	444	66
Average Queue (ft)	93	413	411	24
95th Queue (ft)	166	464	470	56
Link Distance (ft)	1028	415	415	415
Upstream Blk Time (%)		14	12	
Queuing Penalty (veh)		120	109	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SB Lapeer Road (M-24) & NB to SB Crossover

Movement	WB	SB	SB
Directions Served	L	T	T
Maximum Queue (ft)	62	367	358
Average Queue (ft)	59	215	207
95th Queue (ft)	70	477	469
Link Distance (ft)	9	317	317
Upstream Blk Time (%)	84	21	18
Queuing Penalty (veh)	96	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: NB Lapeer Road (M-24)/NB M-24 & SB to NB Crossover/Eagle Ridge Rd

Movement	EB	EB	WB	NB	NB	NB
Directions Served	L	LT	R	T	T	R
Maximum Queue (ft)	31	31	66	390	317	108
Average Queue (ft)	26	12	21	193	125	17
95th Queue (ft)	43	35	56	348	309	152
Link Distance (ft)	12	12	411	444	444	444
Upstream Blk Time (%)	15	7		5	4	1
Queuing Penalty (veh)	6	3		0	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 334

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	219	0	0	1433	304
Future Volume (vph)	0	219	0	0	1433	304
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.0			5.0	5.0
Lane Util. Factor		1.00			0.95	1.00
Frt		0.86			1.00	0.85
Flt Protected		1.00			1.00	1.00
Satd. Flow (prot)		1713			3725	1667
Flt Permitted		1.00			1.00	1.00
Satd. Flow (perm)		1713			3725	1667
Peak-hour factor, PHF	0.92	0.90	0.92	0.92	0.93	0.93
Adj. Flow (vph)	0	243	0	0	1541	327
RTOR Reduction (vph)	0	53	0	0	0	88
Lane Group Flow (vph)	0	191	0	0	1541	239
Heavy Vehicles (%)	2%	1%	2%	2%	2%	2%
Turn Type		Prot			NA	Perm
Protected Phases		8			6	
Permitted Phases						6
Actuated Green, G (s)		25.0			95.0	95.0
Effective Green, g (s)		25.0			95.0	95.0
Actuated g/C Ratio		0.19			0.73	0.73
Clearance Time (s)		5.0			5.0	5.0
Vehicle Extension (s)		3.0			3.0	3.0
Lane Grp Cap (vph)		329			2722	1218
v/s Ratio Prot		c0.11			c0.41	
v/s Ratio Perm						0.14
v/c Ratio		0.58			0.57	0.20
Uniform Delay, d1		47.7			8.0	5.5
Progression Factor		1.00			1.00	1.00
Incremental Delay, d2		7.2			0.9	0.4
Delay (s)		55.0			8.9	5.9
Level of Service		D			A	A
Approach Delay (s)	55.0			0.0	8.4	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	16	0	0	0	25	0	2709	28	0	0	0
Future Volume (vph)	169	16	0	0	0	25	0	2709	28	0	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0				5.0		5.0	5.0			
Lane Util. Factor	0.95	0.95				1.00		0.95	1.00			
Frt	1.00	1.00				0.86		1.00	0.85			
Flt Protected	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (prot)	1752	1771				1730		3725	1667			
Flt Permitted	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (perm)	1752	1771				1730		3725	1667			
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.92	0.60	0.92	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	182	17	0	0	0	42	0	2852	29	0	0	0
RTOR Reduction (vph)	14	14	0	0	0	14	0	0	6	0	0	0
Lane Group Flow (vph)	84	87	0	0	0	28	0	2852	23	0	0	0
Heavy Vehicles (%)	3%	3%	2%	2%	2%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA				Prot		NA	Perm			
Protected Phases		4				8		2				
Permitted Phases	4								2			
Actuated Green, G (s)	25.0	25.0				25.0		95.0	95.0			
Effective Green, g (s)	25.0	25.0				25.0		95.0	95.0			
Actuated g/C Ratio	0.19	0.19				0.19		0.73	0.73			
Clearance Time (s)	5.0	5.0				5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0				3.0		3.0	3.0			
Lane Grp Cap (vph)	336	340				332		2722	1218			
v/s Ratio Prot						0.02		c0.77				
v/s Ratio Perm	0.05	0.05							0.01			
v/c Ratio	0.25	0.26				0.09		1.05	0.02			
Uniform Delay, d1	44.6	44.6				43.1		17.5	4.8			
Progression Factor	1.21	1.20				1.00		1.00	1.00			
Incremental Delay, d2	1.5	1.5				0.1		31.4	0.0			
Delay (s)	55.3	55.2				43.2		48.9	4.8			
Level of Service	E	E				D		D	A			
Approach Delay (s)		55.3			43.2			48.5			0.0	
Approach LOS		E			D			D			A	

Intersection Summary			
HCM 2000 Control Delay	48.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	123.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: SB Lapeer Road (M-24) & Waldon Road

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	298	236	198	65
Average Queue (ft)	154	151	112	33
95th Queue (ft)	243	219	183	58
Link Distance (ft)	1028	415	415	415
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SB Lapeer Road (M-24) & NB to SB Crossover

Movement	WB
Directions Served	L
Maximum Queue (ft)	65
Average Queue (ft)	44
95th Queue (ft)	68
Link Distance (ft)	9
Upstream Blk Time (%)	34
Queuing Penalty (veh)	37
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: NB Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Rd

Movement	EB	EB	WB	NB	NB	NB
Directions Served	L	LT	R	T	T	R
Maximum Queue (ft)	63	58	79	490	492	476
Average Queue (ft)	32	30	22	462	462	395
95th Queue (ft)	47	48	57	477	489	652
Link Distance (ft)	12	12	411	444	444	444
Upstream Blk Time (%)	62	52		33	42	18
Queuing Penalty (veh)	57	48		0	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 142

Intersection	
Int Delay, s/veh	21.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	179	0	0	2588	144
Future Vol, veh/h	0	179	0	0	2588	144
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	86	92	92	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	208	0	0	2724	152

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	1362	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.94	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.32	-	-
Pot Cap-1 Maneuver	0	~ 138	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	~ 138	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s$	320.9	0
HCM LOS	F	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	138	-	-
HCM Lane V/C Ratio	1.508	-	-
HCM Control Delay (s)	$ 320.9	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	14.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	16.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰					↑↑
Traffic Vol, veh/h	139	0	0	0	0	2581
Future Vol, veh/h	139	0	0	0	0	2581
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	92	92	92	92	93
Heavy Vehicles, %	0	2	2	2	2	3
Mvmt Flow	185	0	0	0	0	2775

Major/Minor	Minor1		Major2	
Conflicting Flow All	1388	-	-	-
Stage 1	0	-	-	-
Stage 2	1388	-	-	-
Critical Hdwy	6.8	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-
Follow-up Hdwy	3.5	-	-	-
Pot Cap-1 Maneuver	~ 136	0	0	-
Stage 1	-	0	0	-
Stage 2	200	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	~ 136	-	-	-
Mov Cap-2 Maneuver	~ 136	-	-	-
Stage 1	-	-	-	-
Stage 2	200	-	-	-

Approach	WB	SB
HCM Control Delay, s	264.4	0
HCM LOS	F	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	136	-
HCM Lane V/C Ratio	1.363	-
HCM Control Delay (s)	264.4	-
HCM Lane LOS	F	-
HCM 95th %tile Q(veh)	12	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	102	5	0	0	0	34	0	1024	6	0	0	0
Future Vol, veh/h	102	5	0	0	0	34	0	1024	6	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	92	92	92	64	92	79	79	92	92	92
Heavy Vehicles, %	0	0	2	2	2	0	2	7	7	2	2	2
Mvmt Flow	162	8	0	0	0	53	0	1296	8	0	0	0

Major/Minor	Minor2		Minor1			Major1			
Conflicting Flow All	648	1304	-	-	-	648	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	648	1304	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	359	162	0	0	0	418	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	430	232	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	313	162	-	-	-	418	-	-	-
Mov Cap-2 Maneuver	313	162	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	375	232	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	22.1	14.9	0
HCM LOS	C	B	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	313	280	418
HCM Lane V/C Ratio	-	-	0.345	0.221	0.127
HCM Control Delay (s)	-	-	22.4	21.5	14.9
HCM Lane LOS	-	-	C	C	B
HCM 95th %tile Q(veh)	-	-	1.5	0.8	0.4

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	76	0	0	2656	64
Future Vol, veh/h	0	76	0	0	2656	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	83	0	0	2887	70

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	1444	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.94	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.32	-	-
Pot Cap-1 Maneuver	0	121	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	121	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	82.7	0
HCM LOS	F	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	121	-	-
HCM Lane V/C Ratio	0.683	-	-
HCM Control Delay (s)	82.7	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	3.7	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	150	118	26	29	4
Future Vol, veh/h	4	150	118	26	29	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	163	128	28	32	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	156	0	-	0	313	142
Stage 1	-	-	-	-	142	-
Stage 2	-	-	-	-	171	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1424	-	-	-	680	906
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	859	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1424	-	-	-	678	906
Mov Cap-2 Maneuver	-	-	-	-	678	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	859	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1424	-	-	-	699
HCM Lane V/C Ratio	0.003	-	-	-	0.051
HCM Control Delay (s)	7.5	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	242	0	0	1474	332
Future Vol, veh/h	0	242	0	0	1474	332
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	90	92	92	93	93
Heavy Vehicles, %	2	1	2	2	2	2
Mvmt Flow	0	269	0	0	1585	357

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	793	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.92	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.31	-	-
Pot Cap-1 Maneuver	0	334	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	334	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	48.3	0
HCM LOS	E	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	334	-	-
HCM Lane V/C Ratio	0.805	-	-
HCM Control Delay (s)	48.3	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	6.8	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	155	0	0	0	0	1658
Future Vol, veh/h	155	0	0	0	0	1658
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	92	92	92	92	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	204	0	0	0	0	1745

Major/Minor	Minor1		Major2	
Conflicting Flow All	873	-	-	-
Stage 1	0	-	-	-
Stage 2	873	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	289	0	0	-
Stage 1	-	0	0	-
Stage 2	369	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	289	-	-	-
Mov Cap-2 Maneuver	289	-	-	-
Stage 1	-	-	-	-
Stage 2	369	-	-	-

Approach	WB	SB
HCM Control Delay, s	42.6	0
HCM LOS	E	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	289	-
HCM Lane V/C Ratio	0.706	-
HCM Control Delay (s)	42.6	-
HCM Lane LOS	E	-
HCM 95th %tile Q(veh)	4.9	-

Intersection	
Int Delay, s/veh	66.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	214	16	0	0	0	25	0	2757	28	0	0	0
Future Vol, veh/h	214	16	0	0	0	25	0	2757	28	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	92	92	92	60	92	95	95	92	92	92
Heavy Vehicles, %	3	3	2	2	2	0	2	2	2	2	2	2
Mvmt Flow	230	17	0	0	0	42	0	2902	29	0	0	0

Major/Minor	Minor2		Minor1			Major1			
Conflicting Flow All	1451	2931	-	-	-	1451	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	1451	2931	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	-	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	-	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	~ 91	~ 15	0	0	0	122	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	~ 136	33	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	~ 60	~ 15	-	-	-	122	-	-	-
Mov Cap-2 Maneuver	~ 60	~ 15	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	~ 90	33	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	$ 856.4	49.1	0
HCM LOS	F	E	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	60	39	122
HCM Lane V/C Ratio	-	-	2.557	2.408	0.342
HCM Control Delay (s)	-	-	$ 853.1	$ 861.7	49.1
HCM Lane LOS	-	-	F	F	E
HCM 95th %tile Q(veh)	-	-	15.4	10.3	1.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱			↑↑	↱
Traffic Vol, veh/h	0	53	0	0	1753	60
Future Vol, veh/h	0	53	0	0	1753	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	58	0	0	1905	65

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	953	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.94	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.32	-	-
Pot Cap-1 Maneuver	0	260	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	260	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	22.7	0
HCM LOS	C	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	260	-	-
HCM Lane V/C Ratio	0.222	-	-
HCM Control Delay (s)	22.7	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.8	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	217	302	30	25	6
Future Vol, veh/h	6	217	302	30	25	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	236	328	33	27	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	361	0	-	0	595	345
Stage 1	-	-	-	-	345	-
Stage 2	-	-	-	-	250	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1198	-	-	-	467	698
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	792	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1198	-	-	-	464	698
Mov Cap-2 Maneuver	-	-	-	-	464	-
Stage 1	-	-	-	-	712	-
Stage 2	-	-	-	-	792	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1198	-	-	-	496
HCM Lane V/C Ratio	0.005	-	-	-	0.068
HCM Control Delay (s)	8	0	-	-	12.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	179	0	0	2588	144
Future Volume (vph)	0	179	0	0	2588	144
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.5			4.5	4.5
Lane Util. Factor		1.00			0.95	1.00
Frt		0.86			1.00	0.85
Flt Protected		1.00			1.00	1.00
Satd. Flow (prot)		1696			3689	1650
Flt Permitted		1.00			1.00	1.00
Satd. Flow (perm)		1696			3689	1650
Peak-hour factor, PHF	0.92	0.86	0.92	0.92	0.95	0.95
Adj. Flow (vph)	0	208	0	0	2724	152
RTOR Reduction (vph)	0	5	0	0	0	32
Lane Group Flow (vph)	0	203	0	0	2724	120
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Turn Type		Prot			NA	Perm
Protected Phases		4			6	
Permitted Phases						6
Actuated Green, G (s)		26.5			94.5	94.5
Effective Green, g (s)		26.5			94.5	94.5
Actuated g/C Ratio		0.20			0.73	0.73
Clearance Time (s)		4.5			4.5	4.5
Vehicle Extension (s)		3.0			3.0	3.0
Lane Grp Cap (vph)		345			2681	1199
v/s Ratio Prot		c0.12			c0.74	
v/s Ratio Perm						0.07
v/c Ratio		0.59			1.02	0.10
Uniform Delay, d1		46.8			17.8	5.2
Progression Factor		1.00			1.00	1.00
Incremental Delay, d2		7.2			21.5	0.2
Delay (s)		54.0			39.2	5.4
Level of Service		D			D	A
Approach Delay (s)	54.0			0.0	37.5	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	5	0	0	0	34	0	1024	6	0	0	0
Future Volume (vph)	102	5	0	0	0	34	0	1024	6	0	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0				5.0		5.0	5.0			
Lane Util. Factor	0.95	0.95				1.00		0.95	1.00			
Frt	1.00	1.00				0.86		1.00	0.85			
Flt Protected	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (prot)	1805	1818				1730		3551	1589			
Flt Permitted	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (perm)	1805	1818				1730		3551	1589			
Peak-hour factor, PHF	0.63	0.63	0.92	0.92	0.92	0.64	0.92	0.79	0.79	0.92	0.92	0.92
Adj. Flow (vph)	162	8	0	0	0	53	0	1296	8	0	0	0
RTOR Reduction (vph)	57	57	0	0	0	39	0	0	3	0	0	0
Lane Group Flow (vph)	27	29	0	0	0	14	0	1296	5	0	0	0
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	2%	7%	7%	2%	2%	2%
Turn Type	Perm	NA				Prot		NA	Perm			
Protected Phases		4				8		2				
Permitted Phases	4								2			
Actuated Green, G (s)	35.0	35.0				35.0		85.0	85.0			
Effective Green, g (s)	35.0	35.0				35.0		85.0	85.0			
Actuated g/C Ratio	0.27	0.27				0.27		0.65	0.65			
Clearance Time (s)	5.0	5.0				5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0				3.0		3.0	3.0			
Lane Grp Cap (vph)	485	489				465		2321	1038			
v/s Ratio Prot						0.01		c0.36				
v/s Ratio Perm	0.01	0.02							0.00			
v/c Ratio	0.06	0.06				0.03		0.56	0.01			
Uniform Delay, d1	35.2	35.3				35.0		12.3	7.8			
Progression Factor	1.44	1.42				1.00		1.00	1.00			
Incremental Delay, d2	0.1	0.1				0.0		1.0	0.0			
Delay (s)	50.9	50.0				35.0		13.2	7.8			
Level of Service	D	D				D		B	A			
Approach Delay (s)		50.5			35.0			13.2			0.0	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: SB Lapeer Road (M-24) & Waldon Road

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	227	448	444	384
Average Queue (ft)	114	390	385	48
95th Queue (ft)	200	484	496	200
Link Distance (ft)	1028	415	415	415
Upstream Blk Time (%)		7	7	0
Queuing Penalty (veh)		63	68	2
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SB Lapeer Road (M-24) & NB to SB Crossover

Movement	WB	SB	SB
Directions Served	L	T	T
Maximum Queue (ft)	62	303	281
Average Queue (ft)	61	98	87
95th Queue (ft)	63	341	322
Link Distance (ft)	9	317	317
Upstream Blk Time (%)	96	8	7
Queuing Penalty (veh)	133	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: NB Lapeer Road (M-24)/NB M-24 & SB to NB Crossover/Eagle Ridge Rd

Movement	EB	EB	WB	NB	NB	NB
Directions Served	L	LT	R	T	T	R
Maximum Queue (ft)	31	31	99	464	460	199
Average Queue (ft)	26	17	24	300	237	51
95th Queue (ft)	40	41	67	509	488	287
Link Distance (ft)	12	12	411	444	444	444
Upstream Blk Time (%)	40	13		22	14	5
Queuing Penalty (veh)	21	8		0	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: SB Lapeer Road (M-24) & Site Driveway 1

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	57	484	482	66
Average Queue (ft)	32	220	206	8
95th Queue (ft)	54	554	532	44
Link Distance (ft)	715	453	453	
Upstream Blk Time (%)		5	3	
Queuing Penalty (veh)		69	45	
Storage Bay Dist (ft)				25
Storage Blk Time (%)			12	0
Queuing Penalty (veh)			7	0

Intersection: 5: Waldon Road & Site Driveway 2

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	11	52
Average Queue (ft)	0	22
95th Queue (ft)	6	48
Link Distance (ft)	645	500
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: SB Lapeer Road (M-24) & SB to NB Crossover

Movement	SB	SB	SB
Directions Served	L	T	T
Maximum Queue (ft)	259	206	205
Average Queue (ft)	57	14	14
95th Queue (ft)	229	148	151
Link Distance (ft)		505	505
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		4	4
Storage Bay Dist (ft)	250		
Storage Blk Time (%)	7		
Queuing Penalty (veh)	96		

Zone Summary

Zone wide Queuing Penalty: 519

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	242	0	0	1474	332
Future Volume (vph)	0	242	0	0	1474	332
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.0			5.0	5.0
Lane Util. Factor		1.00			0.95	1.00
Frt		0.86			1.00	0.85
Flt Protected		1.00			1.00	1.00
Satd. Flow (prot)		1713			3725	1667
Flt Permitted		1.00			1.00	1.00
Satd. Flow (perm)		1713			3725	1667
Peak-hour factor, PHF	0.92	0.90	0.92	0.92	0.93	0.93
Adj. Flow (vph)	0	269	0	0	1585	357
RTOR Reduction (vph)	0	42	0	0	0	104
Lane Group Flow (vph)	0	227	0	0	1585	253
Heavy Vehicles (%)	2%	1%	2%	2%	2%	2%
Turn Type		Prot			NA	Perm
Protected Phases		8			6	
Permitted Phases						6
Actuated Green, G (s)		28.0			92.0	92.0
Effective Green, g (s)		28.0			92.0	92.0
Actuated g/C Ratio		0.22			0.71	0.71
Clearance Time (s)		5.0			5.0	5.0
Vehicle Extension (s)		3.0			3.0	3.0
Lane Grp Cap (vph)		368			2636	1179
v/s Ratio Prot		c0.13			c0.43	
v/s Ratio Perm						0.15
v/c Ratio		0.62			0.60	0.21
Uniform Delay, d1		46.1			9.7	6.5
Progression Factor		1.00			1.00	1.00
Incremental Delay, d2		7.5			1.0	0.4
Delay (s)		53.6			10.7	7.0
Level of Service		D			B	A
Approach Delay (s)	53.6			0.0	10.0	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	16	0	0	0	25	0	2757	28	0	0	0
Future Volume (vph)	214	16	0	0	0	25	0	2757	28	0	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0				5.0		5.0	5.0			
Lane Util. Factor	0.95	0.95				1.00		0.95	1.00			
Frt	1.00	1.00				0.86		1.00	0.85			
Flt Protected	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (prot)	1752	1768				1730		3725	1667			
Flt Permitted	0.95	0.96				1.00		1.00	1.00			
Satd. Flow (perm)	1752	1768				1730		3725	1667			
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.92	0.60	0.92	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	230	17	0	0	0	42	0	2902	29	0	0	0
RTOR Reduction (vph)	14	14	0	0	0	14	0	0	6	0	0	0
Lane Group Flow (vph)	110	109	0	0	0	28	0	2902	23	0	0	0
Heavy Vehicles (%)	3%	3%	2%	2%	2%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA				Prot		NA	Perm			
Protected Phases		4				8		2				
Permitted Phases	4								2			
Actuated Green, G (s)	24.0	24.0				24.0		96.0	96.0			
Effective Green, g (s)	24.0	24.0				24.0		96.0	96.0			
Actuated g/C Ratio	0.18	0.18				0.18		0.74	0.74			
Clearance Time (s)	5.0	5.0				5.0		5.0	5.0			
Vehicle Extension (s)	3.0	3.0				3.0		3.0	3.0			
Lane Grp Cap (vph)	323	326				319		2750	1231			
v/s Ratio Prot						0.02		c0.78				
v/s Ratio Perm	c0.06	0.06							0.01			
v/c Ratio	0.34	0.33				0.09		1.06	0.02			
Uniform Delay, d1	46.1	46.1				43.9		17.0	4.5			
Progression Factor	1.19	1.20				1.00		1.00	1.00			
Incremental Delay, d2	2.3	2.2				0.1		34.0	0.0			
Delay (s)	57.3	57.3				44.1		51.0	4.5			
Level of Service	E	E				D		D	A			
Approach Delay (s)		57.3			44.1			50.6			0.0	
Approach LOS		E			D			D			A	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	125.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: SB Lapeer Road (M-24) & Waldon Road

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	348	288	256	76
Average Queue (ft)	173	171	127	40
95th Queue (ft)	297	255	221	69
Link Distance (ft)	1028	415	415	415
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SB Lapeer Road (M-24) & NB to SB Crossover

Movement	WB
Directions Served	L
Maximum Queue (ft)	88
Average Queue (ft)	56
95th Queue (ft)	78
Link Distance (ft)	9
Upstream Blk Time (%)	54
Queuing Penalty (veh)	84
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: NB Lapeer Road (M-24) & SB to NB Crossover/Eagle Ridge Rd

Movement	EB	EB	WB	NB	NB	NB
Directions Served	L	LT	R	T	T	R
Maximum Queue (ft)	62	62	74	492	492	477
Average Queue (ft)	33	32	22	463	461	394
95th Queue (ft)	49	49	58	480	483	653
Link Distance (ft)	12	12	411	444	444	444
Upstream Blk Time (%)	64	59		32	39	17
Queuing Penalty (veh)	74	67		0	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: SB Lapeer Road (M-24) & Site Driveway 1

Movement	EB	SB
Directions Served	R	R
Maximum Queue (ft)	69	9
Average Queue (ft)	28	0
95th Queue (ft)	57	6
Link Distance (ft)	715	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		25
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waldon Road & Site Driveway 2

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	38	54
Average Queue (ft)	2	21
95th Queue (ft)	14	48
Link Distance (ft)	645	500
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: SB Lapeer Road (M-24) & SB to NB Crossover

Movement	SB	SB	SB
Directions Served	L	T	T
Maximum Queue (ft)	272	219	58
Average Queue (ft)	140	24	2
95th Queue (ft)	244	124	30
Link Distance (ft)		505	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		
Storage Blk Time (%)	1	0	
Queuing Penalty (veh)	7	0	

Zone Summary

Zone wide Queuing Penalty: 232

TURN LANE WARRANTS

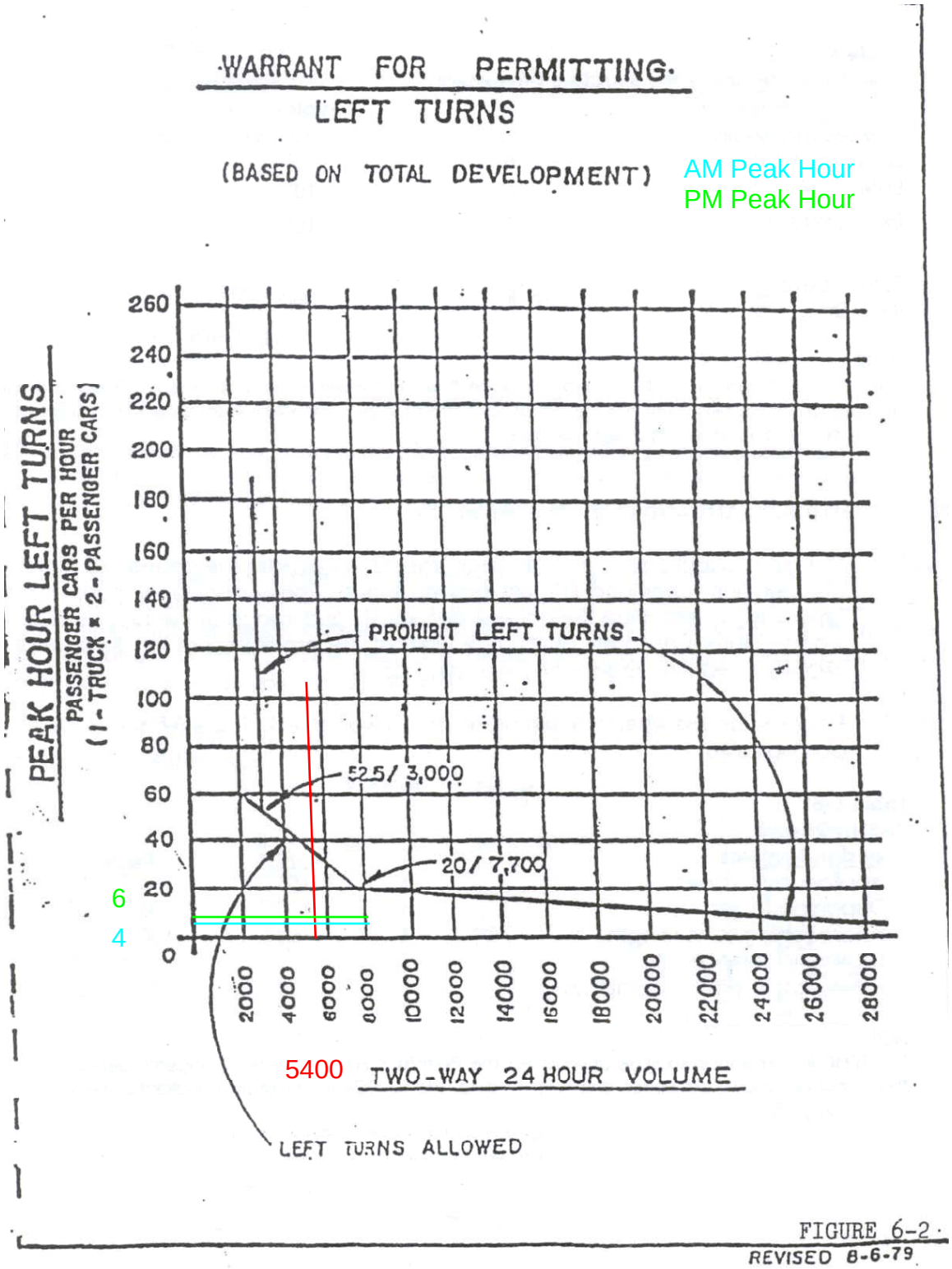


FIGURE 6-2
REVISED 8-6-79

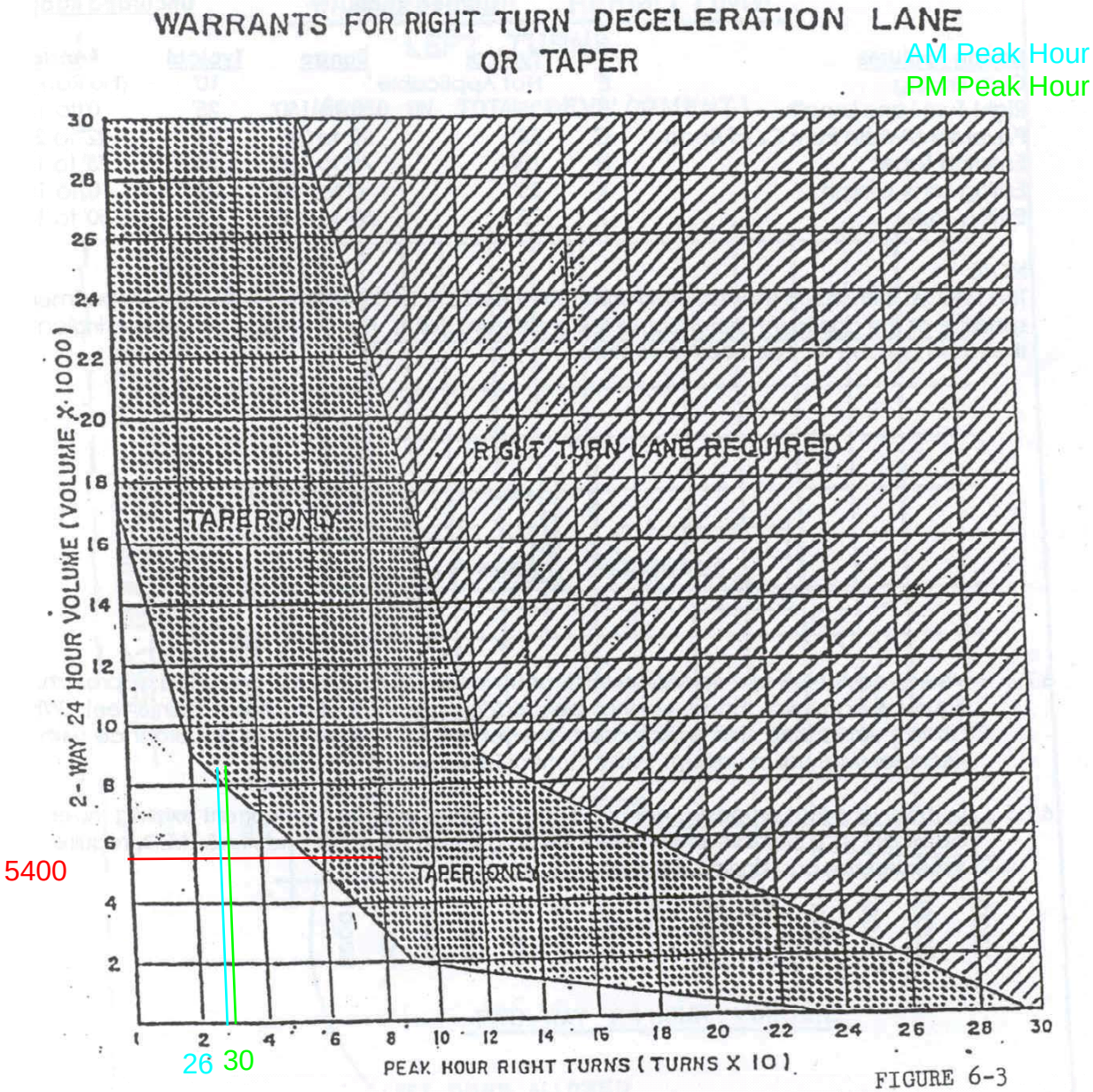

WARRANTS FOR RIGHT TURN DECELERATION LANE
OR TAPER
AM Peak Hour
PM Peak Hour
RIGHT TURN LANE REQUIRED
TAPER ONLY
TAPER ONLY
2-WAY 24 HOUR VOLUME (VOLUME X 1000)
PEAK HOUR RIGHT TURNS (TURNS X 10)
5400
26
30

FIGURE 6-3

SIGNAL WARRANTS

Summary of Warrants

Spot Number:	0		
Major Street:	M-24 Lapeer Road	Minor Street:	Eagle Ridge
Intersection:	M-24 Lapeer Road at Eagle Ridge		
City/Twp:	Orion Twp		
Date Performed:	9/22/2021	Performed By:	ROWE PSC
Date Volumes Collected:	8/24/2021		

Warrant	Condition	Is Warrant Met
Data Validation Error		**NO**
WARRANT 1: Eight-Hour Vehicular Volume		**YES**
	Condition A	NO
	Condition B	YES
	Condition A&B	N/A
WARRANT 2: Four-Hour Vehicular Volume	(70%)	**YES**
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	**YES**
	Condition A	**NO**
	Condition B	**YES**
WARRANT 4: Pedestrian Volume	(70%)	**NO**
	Four Hour	N/A
	Peak Hour	N/A
(Threshold)	HAWK	NO
(Threshold)	RRFB	NO
WARRANT 5: School Crossing		**NO**
WARRANT 6: Coordinated Signal System		**0**
WARRANT 7: Crash Experience		**NO**
	Condition A	NO
	Condition B	NO
WARRANT 8: Roadway Network		**0**
WARRANT 9: Intersection Near a Grade Crossing		**#N/A**

Issue to Be Addressed by Signalization:

Minor Street Delays

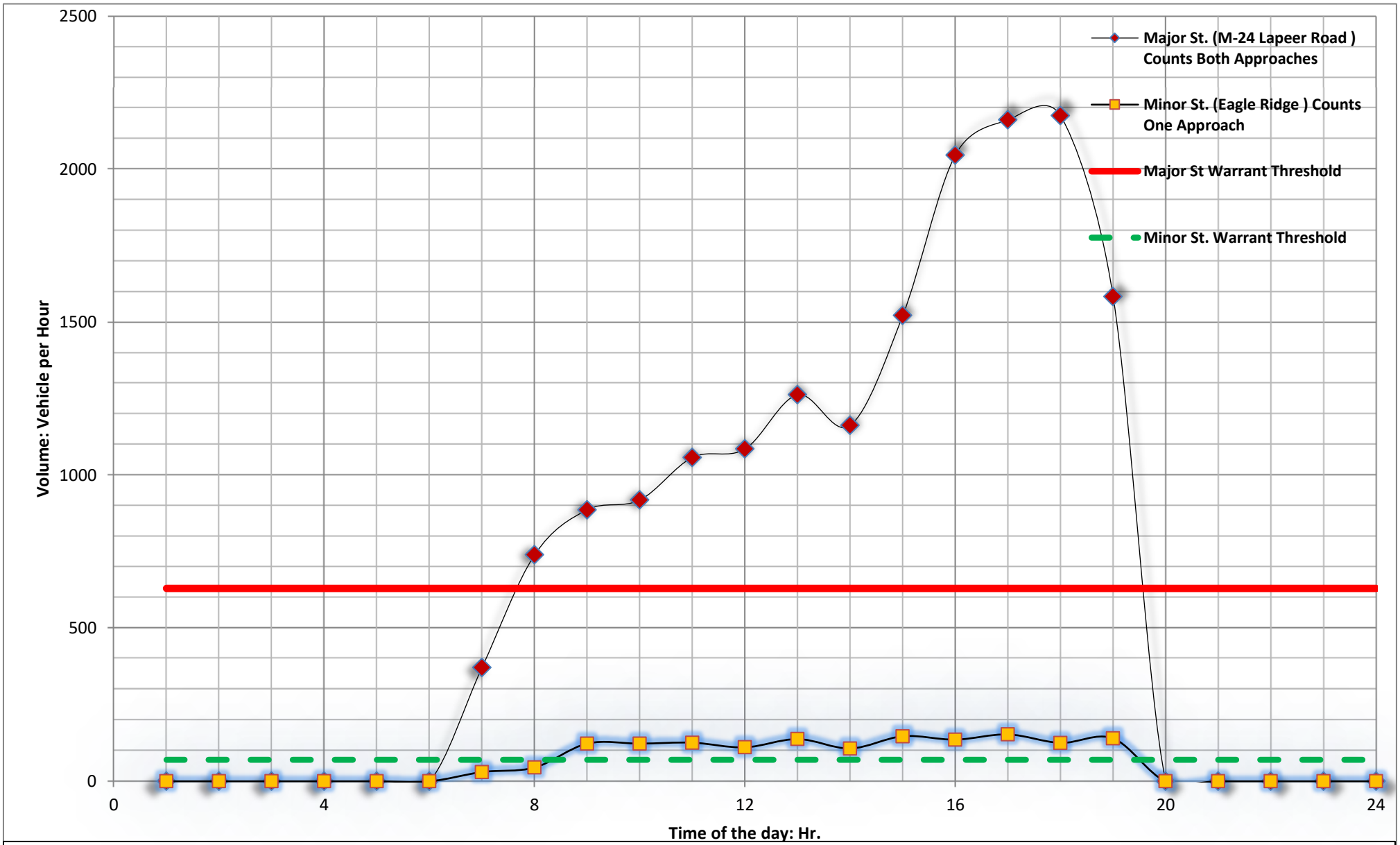


FIGURE 1: WARRANT **1B**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number:

M-24 Lapeer Road @ Eagle Ridge

NO. OF LANES ON MAJOR ST.? 3

NO. OF LANES ON MINOR ST.? 2

Number of Hours that met the Warrant: 11

Does this intersection meet Warrant 1B for signal installation? YES

Data Collection Date: 8/24/2021

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 2: Four-Hour Vehicular Volume

Spot Number:	0		
Intersection:	M-24 Lapeer Road @ Eagle Ridge		
Date	9/22/2021	by	ROWE PSC

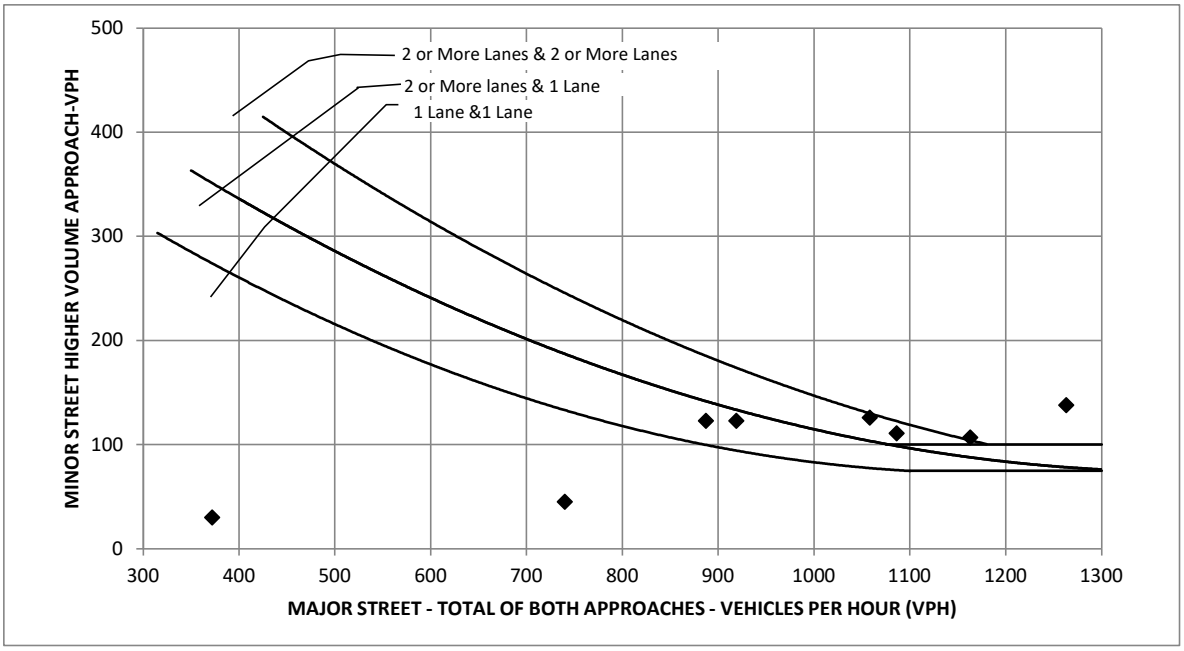
3	**: No. of Lanes on Major St.**
2	**: No. of Lanes on Minor St.**
55	**: Speed limit or 85th Percentile? (MPH)**
NO	**: Is the intersection within an Isolated community?**
0	**: What is the of the population isolated community?**

How Many Hours Are Met	**11**
Is Warrant (70%) Met?	**YES**

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number:	0		
Intersection:	M-24 Lapeer Road @ Eagle Ridge		
Date	9/22/2021	by	ROWE PSC

3	**: No. of Lanes on Major St.**
2	**: No. of Lanes on Minor St.**
55	**: Speed limit or 85th Percentile? (MPH)**
NO	**: Is the intersection within an Isolated community?**
0	**: What is the of the population isolated community?**



How Many Hours Are Met	**7**
Is Warrant (70%) Met?	**YES**

Summary of Warrants

Spot Number:	0		
Major Street:	M-24 Lapeer Road	Minor Street:	Waldon Rd
Intersection:	M-24 Lapeer Road at Waldon Rd		
City/Twp:	Orion Twp		
Date Performed:	9/22/2021	Performed By:	ROWE PSC
Date Volumes Collected:	8/24/2021		

Warrant	Condition	Is Warrant Met
Data Validation Error		**NO**
WARRANT 1: Eight-Hour Vehicular Volume		**YES**
	Condition A	YES
	Condition B	YES
	Condition A&B	N/A
WARRANT 2: Four-Hour Vehicular Volume	(70%)	**YES**
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	**YES**
	Condition A	**NO**
	Condition B	**YES**
WARRANT 4: Pedestrian Volume	(70%)	**NO**
	Four Hour	N/A
	Peak Hour	N/A
(Threshold)	HAWK	NO
(Threshold)	RRFB	NO
WARRANT 5: School Crossing		**NO**
WARRANT 6: Coordinated Signal System		**0**
WARRANT 7: Crash Experience		**YES**
	Condition A	YES
	Condition B	YES
WARRANT 8: Roadway Network		**0**
WARRANT 9: Intersection Near a Grade Crossing		**#N/A**

Issue to Be Addressed by Signalization:

Minor Street Delays

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 1: Eight-Hour Vehicular Volume

Intersection:	M-24 Lapeer Road @ Waldon Rd		
Date	9/22/2021	by	ROWE PSC

3	**: No. of Lanes on Major St?**
1	**: No. of Lanes on Minor St?**
55	**: Speed limit or 85th Percentile? (MPH)**
NO	**: Is the intersection within an Isolated community?**
0	**: if answer 4 is Yes, then what is the of the population isolated community?**
0%	**: Have other remedial measures been tried?**

USE 70% WARRANTS 1A AND 1B. DO NOT USE COMBINATION OF A & B

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	**N-S**	E-W											
00:01 - 01:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
01:00 - 02:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
02:00 - 03:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
03:00 - 04:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
04:00 - 05:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
05:00 - 06:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
06:00 - 07:00	1731	54	420	105	**NO**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
07:00 - 08:00	2006	98	420	105	**NO**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
08:00 - 09:00	1788	166	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
09:00 - 10:00	1507	148	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
10:00 - 11:00	1506	120	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
11:00 - 12:00	1387	133	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
12:00 - 13:00	1533	160	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
13:00 - 14:00	1388	149	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
14:00 - 15:00	1452	166	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
15:00 - 16:00	1331	161	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
16:00 - 17:00	1329	188	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
17:00 - 18:00	1399	156	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
18:00 - 19:00	1284	146	420	105	**YES**	630	53	**YES**	N/A	N/A	N/A	N/A	**NO**
19:00 - 20:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
20:00 - 21:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
21:00 - 22:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
22:00 - 23:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**
23:00 - 00:00	0	0	420	105	**NO**	630	53	**NO**	N/A	N/A	N/A	N/A	**NO**

Number of Hours that met the warrant 1A =	**11**
Number of Hours that met the warrant 1B =	**13**
Number of Hours that met the warrant 1 A & B =	**0**

A. Is the Minimum Vehicular Volume Warrant Met? (Condition A)	**YES**
B. Is the Interruption of Continuous Traffic Met? (Condition B)	**YES**
C. Combination of Warrants A and B Criteria Met?	**N/A**

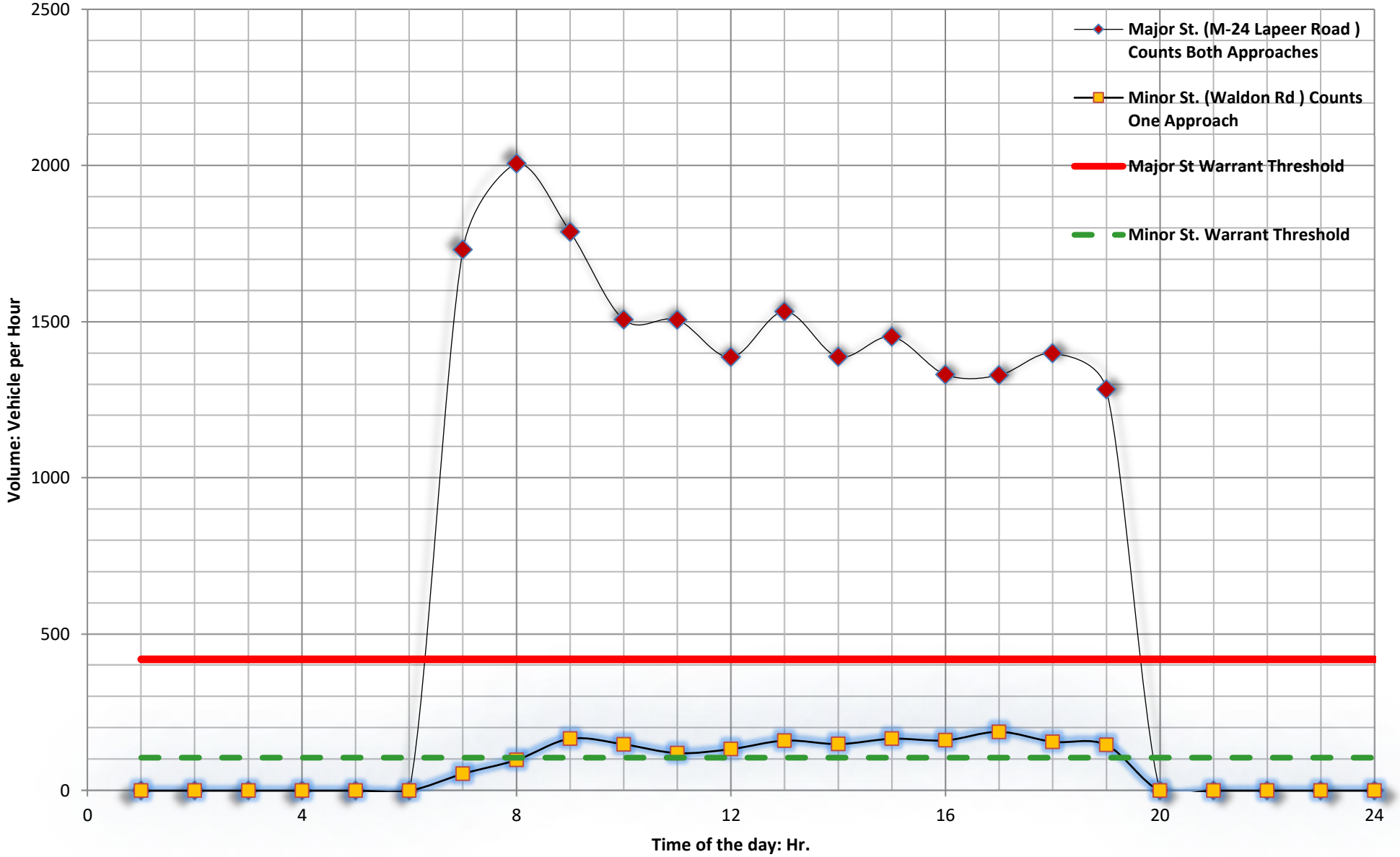


FIGURE 1: WARRANT **1A**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number:

M-24 Lapeer Road @ Waldon Rd

NO. OF LANES ON MAJOR ST.? 3

NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 11

Does this intersection meet Warrant 1A for signal installation? YES

Data Collection Date: 8/24/2021

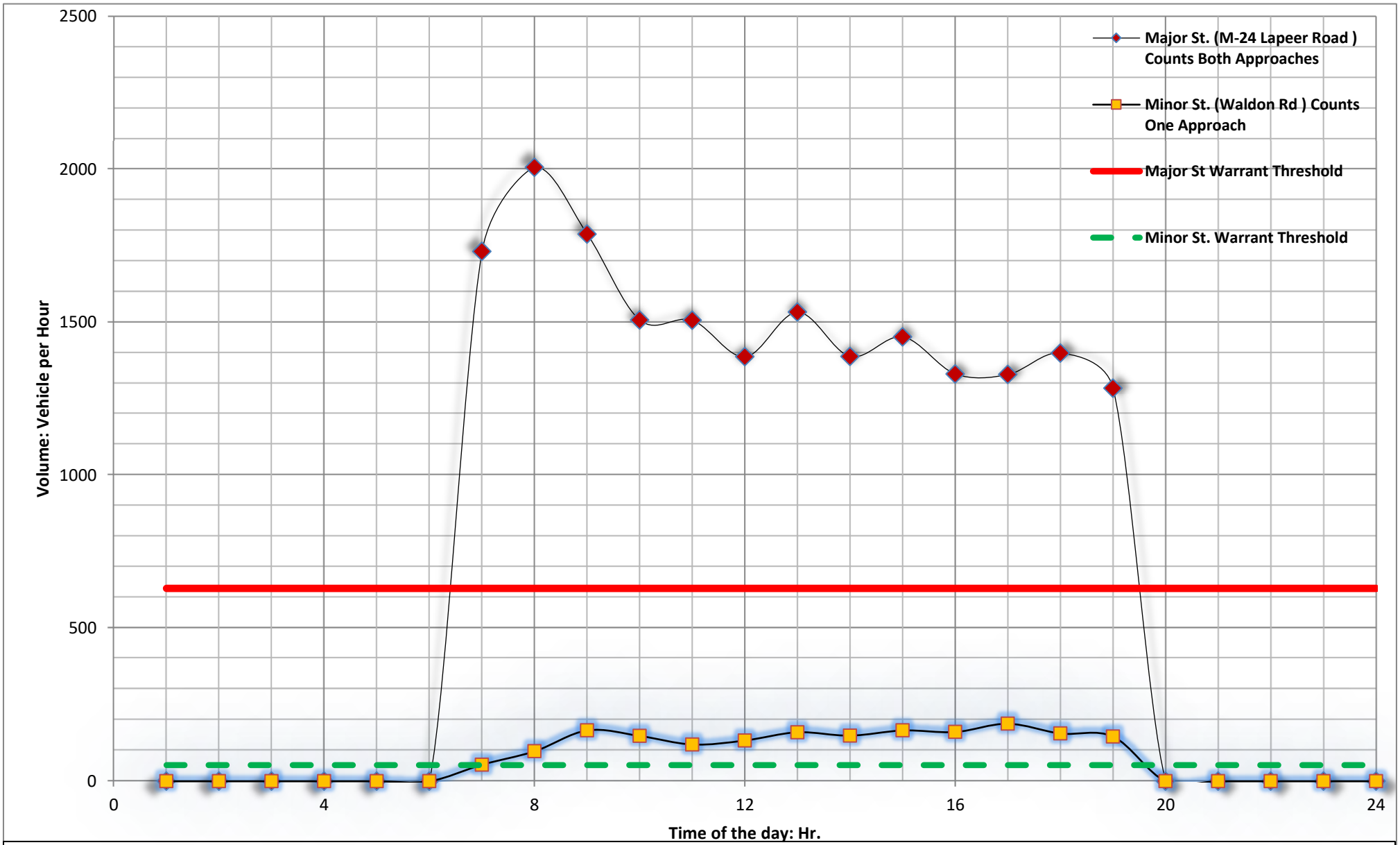


FIGURE 1: WARRANT **1B**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number:

M-24 Lapeer Road @ Waldon Rd

NO. OF LANES ON MAJOR ST.? 3

NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 13

Does this intersection meet Warrant 1B for signal installation? YES

Data Collection Date: 8/24/2021

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 2: Four-Hour Vehicular Volume

Spot Number:	0		
Intersection:	M-24 Lapeer Road @ Waldon Rd		
Date	9/22/2021	by	ROWE PSC

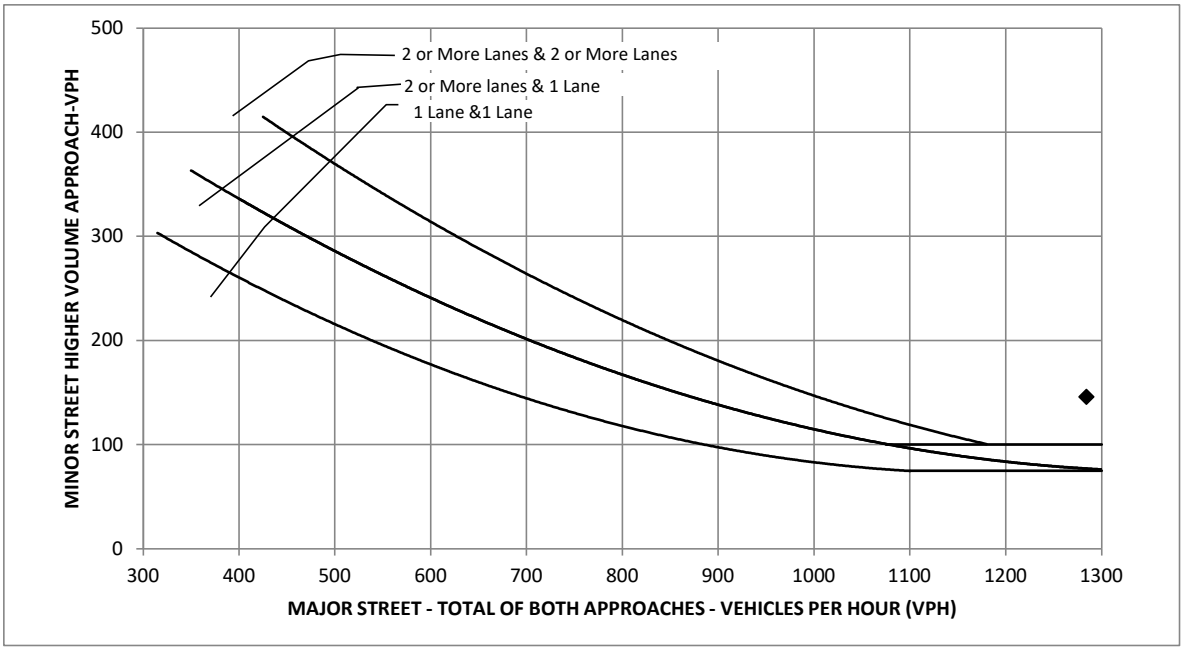
3	**: No. of Lanes on Major St.**
1	**: No. of Lanes on Minor St.**
55	**: Speed limit or 85th Percentile? (MPH)**
NO	**: Is the intersection within an Isolated community?**
0	**: What is the of the population isolated community?**

How Many Hours Are Met	**12**
Is Warrant (70%) Met?	**YES**

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number:	0		
Intersection:	M-24 Lapeer Road @ Waldon Rd		
Date	9/22/2021	by	ROWE PSC

3	**: No. of Lanes on Major St.**
1	**: No. of Lanes on Minor St.**
55	**: Speed limit or 85th Percentile? (MPH)**
NO	**: Is the intersection within an Isolated community?**
0	**: What is the of the population isolated community?**



How Many Hours Are Met	**12**
Is Warrant (70%) Met?	**YES**

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 7: Crash Experience

Spot Number:	0		
Intersection:	M-24 Lapeer Road @ Waldon Rd		
Date	9/22/2021	by	ROWE PSC

3	**: No. of Lanes on Major St?**
1	**: No. of Lanes on Minor St?**
YES	**: Has adequate trial of remedial measure with adequate enforcement been tried?**
YES	**: Are there 5 or more Crashes Susceptable to Correction by Signalization in a 12 Month Period?**

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?
Time	**N-S**	E-W						
00:01 - 01:00	0	0	336	84	**NO**	504	42	**NO**
01:00 - 02:00	0	0	336	84	**NO**	504	42	**NO**
02:00 - 03:00	0	0	336	84	**NO**	504	42	**NO**
03:00 - 04:00	0	0	336	84	**NO**	504	42	**NO**
04:00 - 05:00	0	0	336	84	**NO**	504	42	**NO**
05:00 - 06:00	0	0	336	84	**NO**	504	42	**NO**
06:00 - 07:00	1731	54	336	84	**NO**	504	42	**YES**
07:00 - 08:00	2006	98	336	84	**YES**	504	42	**YES**
08:00 - 09:00	1788	166	336	84	**YES**	504	42	**YES**
09:00 - 10:00	1507	148	336	84	**YES**	504	42	**YES**
10:00 - 11:00	1506	120	336	84	**YES**	504	42	**YES**
11:00 - 12:00	1387	133	336	84	**YES**	504	42	**YES**
12:00 - 13:00	1533	160	336	84	**YES**	504	42	**YES**
13:00 - 14:00	1388	149	336	84	**YES**	504	42	**YES**
14:00 - 15:00	1452	166	336	84	**YES**	504	42	**YES**
15:00 - 16:00	1331	161	336	84	**YES**	504	42	**YES**
16:00 - 17:00	1329	188	336	84	**YES**	504	42	**YES**
17:00 - 18:00	1399	156	336	84	**YES**	504	42	**YES**
18:00 - 19:00	1284	146	336	84	**YES**	504	42	**YES**
19:00 - 20:00	0	0	336	84	**NO**	504	42	**NO**
20:00 - 21:00	0	0	336	84	**NO**	504	42	**NO**
21:00 - 22:00	0	0	336	84	**NO**	504	42	**NO**
22:00 - 23:00	0	0	336	84	**NO**	504	42	**NO**
23:00 - 00:00	0	0	336	84	**NO**	504	42	**NO**

Is there a reduction in the warrant thresholds to 56% =	**YES**
Number of Hours that met the warrant 7A =	**12**
Number of Hours that met the warrant 7B =	**13**

A. Is the Minimum Vehicular Volume Warrant Met Based on Crash Patterns? (Condition A)	**YES**
B. Is the Interruption of Continuous Traffic Met Based on Crash Patterns? (Condition B)	**YES**

CRASH ANALYSIS

Crash Data November 1, 2018 - November 1, 2021

ID #	Date	Crash Type	Road Conditions	Light	Injury	Alcohol	Deer	Cause
2018275236	11/6/2018	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2018280638	11/7/2018	Sideswipe	Wet	Dark - Unlighted	O	Yes	No	Turned into opposing traffic lane
2018318408	11/20/2018	Angle	Dry	Daylight	O	No	No	Attempted to turn right without assured clear distance
2018298780	11/29/2018	Rear End	Dry	Dawn	O	No	No	Failed to stop for stoped traffic
2018305530	12/4/2018	Rear End	Dry	Daylight	C	No	No	Failed to stop for slowing traffic
2018306369	12/6/2018	Sideswipe	Dry	Dark - Unlighted	O	No	No	Attempted to change lanes without assured clear distance
2018314822	12/13/2018	Rear End	Dry	Dark - Unlighted	O	Yes	No	Failed to stop for stoped traffic
2018314806	12/15/2018	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2018320380	12/21/2018	Rear End	Wet	Dark - Lighted	O	No	No	Failed to stop for stoped traffic
201910736	1/2/2019	Sideswipe	Ice	Daylight	O	No	No	Attempted to change lanes without assured clear distance
201914176	1/4/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
201928747	1/19/2019	Single Motor Vehicle	Snow	Dark - Lighted	C	Yes	No	Crossed median
201955688	2/13/2019	Single Motor Vehicle	Slush	Dark - Unlighted	O	No	No	Lost control and struck traffic sign
201966445	2/23/2019	Single Motor Vehicle	Dry	Daylight	O	No	No	Attempted to change lanes without assured clear distance
201970125	3/4/2019	Single Motor Vehicle	Dry	Daylight	O	No	No	Lost control while turning
201971659	3/8/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
201987738	3/31/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2019108685	4/25/2019	Rear End	Dry	Daylight	O	No	No	Attempted a U-turn
2019120836	5/15/2019	Sideswipe	Wet	Daylight	O	No	No	Attempted to change lanes without assured clear distance
2019136307	5/28/2019	Sideswipe	Dry	Daylight	O	No	No	Attempted to pass vehicle in crossover
2019133669	5/30/2019	Rear End	Dry	Dawn	O	No	No	Failed to stop for stoped traffic
2019143122	6/7/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2019149112	6/7/2019	Single Motor Vehicle	Dry	Dark - Lighted	O	No	Yes	Deer Collision
2019160333	6/30/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2019183379	7/30/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for slowing traffic
2019184203	8/1/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for slowing traffic
2019198330	8/20/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2019214231	9/5/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2019222478	9/13/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2019242682	10/8/2019	Angle	Dry	Dark - Unlighted	O	No	No	Attempted to turn left without assured clear distance
2019274977	10/30/2019	Sideswipe	Wet	Dark - Unlighted	O	No	No	Attempted to turn right into the left lane
2019278678	11/7/2019	Rear End	Ice	Daylight	O	No	No	Lost control while turning
2019283960	11/8/2019	Single Motor Vehicle	Dry	Dark - Unlighted	O	No	Yes	Deer Collision
2019290433	11/13/2019	Sideswipe	Snow	Dark - Unlighted	O	No	No	Fire Truck with lights/siren on struck stopped vehicle
2019310056	12/11/2019	Angle	Dry	Daylight	B	No	No	Attempted to turn right without assured clear distance
2019311158	12/12/2019	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2019320493	12/21/2019	Single Motor Vehicle	Dry	Daylight	C	No	No	Vehicle suffered tire failure
2019320688	12/24/2019	Angle	Dry	Daylight	O	No	No	Attempted to turn right without assured clear distance
202011893	1/5/2020	Rear End	Snow	Daylight	O	No	No	Failed to stop for stoped traffic
202018812	1/14/2020	Rear End	Dry	Dark - Lighted	O	No	No	Failed to stop for stoped traffic
202033623	1/31/2020	Rear End	Wet	Daylight	O	No	No	Failed to stop for stoped traffic

ID #	Date	Crash Type	Road Conditions	Light	Injury	Alcohol	Deer	Cause
202036281	2/1/2020	Rear End	Snow	Daylight	O	No	No	Failed to stop for stoped traffic
202036263	2/1/2020	Single Motor Vehicle	Snow	Daylight	O	No	No	Lost control and struck traffic sign
202037149	2/3/2020	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
202053341	2/21/2020	Rear End	Dry	Daylight	B	No	No	Failed to stop for slowing traffic
2020107443	6/14/2020	Sideswipe	Dry	Daylight	O	No	No	Attempted to turn right without assured clear distance
2020120985	6/19/2020	Angle	Dry	Daylight	C	No	No	Attempted to turn right without assured clear distance
2020117469	6/28/2020	Single Motor Vehicle	Dry	Daylight	C	No	No	Lost control and struck traffic sign
2020146737	8/8/2020	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2020158176	8/17/2020	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
2020207624	10/26/2020	Single Motor Vehicle	Dry	Dark - Unlighted	O	No	Yes	Deer Collision
2020224995	10/30/2020	Sideswipe	Dry	Daylight	O	No	No	Attempted to change lanes without assured clear distance
2020215907	11/1/2020	Single Motor Vehicle	Wet	Daylight	O	No	Yes	Deer Collision
2020215353	11/4/2020	Sideswipe	Dry	Daylight	O	No	No	Turned into opposing traffic lane
210004123	1/7/2021	Angle	Wet	Dark - Unlighted	C	No	No	Attempted to turn left without assured clear distance
210004476	1/8/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210007108	1/12/2021	Angle	Wet	Dark - Unlighted	O	No	No	Attempted to turn left, opposing vehicle did not have headlights on
210021432	2/2/2021	Single Motor Vehicle	Dry	Dark - Unlighted	O	No	Yes	Deer Collision
210029542	2/13/2021	Single Motor Vehicle	Snow	Dark - Unlighted	O	No	No	Lost control and struck traffic sign
210052627	3/17/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210057954	3/24/2021	Single Motor Vehicle	Dry	Dark - Unlighted	O	No	No	Driver fell asleep, struck traffic sign
210086983	5/3/2021	Rear End	Wet	Daylight	O	No	No	Failed to stop for stoped traffic
210092425	5/11/2021	Rear End	Dry	Daylight	C	No	No	Failed to stop for stoped traffic
210093907	5/13/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210094736	5/14/2021	Sideswipe	Dry	Daylight	O	No	No	Failed to stop for stopped traffic
210096209	5/16/2021	Sideswipe	Dry	Daylight	O	No	No	Attempted to turn left without assured clear distance
210118273	6/13/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210139548	7/9/2021	Single Motor Vehicle	Dry	Daylight	O	No	Yes	Deer Collision
210143445	7/14/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210157943	8/2/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210171677	8/19/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210181344	9/1/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210190488	9/14/2021	Rear End	Dry	Daylight	O	No	No	Failed to stop for stoped traffic
210192150	9/16/2021	Rear End	Dry	Daylight	C	No	No	Failed to stop for stoped traffic
210214346	10/14/2021	Rear End	Wet	Dark - Unlighted	O	No	No	Failed to stop for stoped traffic

ROWE PROFESSIONAL SERVICES COMPANY

Large Firm Resources. Personal Attention.

January 27, 2022

RECEIVED
January 27, 2022
Orion Township
Planning & Zoning

Michael Wayne
Partner
Detroit Riverside Capital
3300 Auburn Rd.
Auburn Hills, MI 48326

RE: Trip Generation Comparison for Woodlands PUD – Orion Township, MI

Dear Mr. Wayne:

Pursuant to your request, ROWE Professional Services Company has completed a trip generation comparison analysis for the proposed changes to the site plan for the Woodlands PUD project generally located in the northwest quadrant of the Lapeer Road (M-24) and Waldon Road intersection in Orion Twp., MI. This analysis is intended to give you and Orion Township information regarding the difference in vehicle trip generation when comparing the modified site plan with the previously studied site plan.

Through information that you have provided, as well as our review of the materials received via email, we understand the following regarding your proposed project:

- Previously Studied Site Plan:
  - 190 units Multifamily Housing (Mid-Rise)
  - 14,556 SF General Office
  - 4,000 SF Sit-Down Restaurant
- Amended Site Plan:
  - 166 units Multifamily Housing (Mid-Rise)
  - 4,000 SF Sit-Down Restaurant

Using the information and methodologies specified in the latest version of Trip Generation (Trip Generation Manual, 11th Edition, 2021), ROWE forecast the weekday AM and PM peak hour trips associated with the proposed development. The results of the trip generation forecasts are provided below in Table 1 and Table 2.

Table 1: Trip Generation – Previously-Studied Site Plan

Land Use	Land Use Code	Units	AM Peak Hour			PM Peak Hour			Weekday
			In	Out	Total	In	Out	Total	
Multifamily Housing (Mid-Rise)	221	190 DU	20	67	87	54	35	89	860
General Office Building	710	14,556 SF	27	4	31	5	25	30	217
High-Turnover (Sit-Down) Restaurant	932	4,000 SF	47	38	85	37	24	61	429
Total	**-**	**-**	**94**	**109**	**203**	**96**	**84**	**180**	**1,506**
Pass-By Rates, LUC 932: 43% PM			-	-	-	16	10	26	-
Total New Trips			**94**	**109**	**203**	**80**	**74**	**154**	**1,506**

Engineering | Surveying | Aerial Photography/Mapping | Landscape Architecture | Planning
Farmington Hills: 27280 Haggerty Road, Suite C-2 • Farmington Hills, MI 48331 • O (248) 675-1096 • F (800) 974-1704
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Table 2: Trip Generation – Amended Site Plan

Land Use	Land Use Code	Units	AM Peak Hour			PM Peak Hour			Weekday
			In	Out	Total	In	Out	Total	
Multifamily Housing (Mid-Rise)	221	166 DU	17	59	76	48	30	78	838
High-Turnover (Sit-Down) Restaurant	932	4,000 SF	47	38	85	37	24	61	696
Total	**-**	**-**	**64**	**97**	**161**	**85**	**54**	**139**	**1,534**
Pass-By Rates, LUC 932: 43% PM			-	-	-	16	10	26	-
Total New Trips			**64**	**97**	**161**	**69**	**44**	**113**	**1,534**

Not all the traffic generated by the proposed development will be new traffic added onto the adjacent roadway network. As with most commercial developments, a significant amount of the site-generated traffic is considered "pass-by" traffic. Pass-by trips are trips already present on the adjacent roadway network, which are interrupted to visit the site. Pass-by trips are accounted for by reducing the number of forecast new trips to be added to the roadway network; however, actual driveway volumes are not reduced. Pass-by trips are normally expressed as a percentage of trips generated by the new development. These pass-by rates are published in the *Trip Generation Handbook*.

The *Trip Generation Handbook* indicates a 43% PM pass-by rate for LUC 932. With the application of these pass-by trip factors, the site-generated trips can be classified as "pass-by" and "new" trips. The amended site plan is expected to generate 161 total trips during the AM peak hour and 139 total trips during the PM peak hour. However, only 113 of the PM peak hour trips will be new traffic not currently using the adjacent street network, whose primary purpose is to visit the new development.

Compared to the trip generation potential of the previously studied plan, the amended plan is anticipated to generate the following:

- 42 fewer total trips during the AM peak hour (30 fewer inbound trips and 12 fewer outbound trips);
- 41 fewer total trips/new trips during the PM peak hour (11 fewer inbound trips and 30 fewer outbound trips);
- 28 additional daily vehicle trips (when accounting for the Orion Twp. Zoning Ordinance requirement to project vehicle trips using one standard deviation above the average rate).

Given the reduction in vehicle trip generation associated with the updated site plan, it is likely that the delays and LOS values reported in the ROWE study dated January 20, 2022 will be reduced. The Conclusions and Recommendations associated with the study remain valid.

We hope that this letter meets your current needs. Please feel free to contact us if you have any questions.

Sincerely,
ROWE Professional Services Company

Digitally signed by Michael J Labadie
Date: 2022.01.27 09:26:19-05'00'

Michael J. Labadie, PE
Senior Project Manager

Digitally signed by Brandon M. Hayes, PE
Date: 2022.01.27 09:17:16-05'00'

Brandon M. Hayes, PE, P.Eng., PTOE
Project Manager

CHARTER TOWNSHIP OF ORION PLANNING COMMISSION MINUTES
PC-2021-78, THE WOODLANDS PUD CONCEPT
JOINT PUBLIC HEARING WITH THE BOARD OF TRUSTEES
WEDNESDAY, FEBRUARY 2, 2022

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PLANNING COMMISSION MEMBERS PRESENT:

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PLANNING COMMISSION MEMBERS ABSENT:

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BOARD OF TRUSTEE MEMBERS PRESENT:

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BOARD OF TRUSTEE MEMBERS ABSENT:

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CONSULTANTS PRESENT:

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new projects where years after [illegible] the residents are having water problems. He can [illegible] [illegible] trees [illegible] the water [illegible] there has been no grading for drainage and he hears the water rushing through the drainage pipes underneath their road. A new project would [illegible] more water [illegible]; he didn't care if they would a 10-million-gallon detention pond, a detention pond in his backyard [illegible] would be [illegible]. [illegible] [illegible] [illegible] [illegible] trees [illegible] [illegible] property [illegible] been there [illegible] before he came because [illegible] the water has increased. He doesn't see how this project will decrease the water [illegible] 0[illegible]. He didn't [illegible] a [illegible] program [illegible] [illegible] like [illegible] to come [illegible] his backyard and see [illegible] the water [illegible] in his backyard or [illegible] the water rushing through the drainage [illegible] the [illegible] [illegible] trees [illegible] single-family [illegible] [illegible] 23-year [illegible] [illegible] [illegible] [illegible] allow a 3-[illegible] [illegible] with a commercial endeavor included [illegible] [illegible] [illegible] and [illegible] [illegible] [illegible] asked them to decline.

Mr. [illegible] [illegible] 369 [illegible] Greenfield [illegible] [illegible] [illegible] recommend [illegible] the Board reject [illegible] [illegible] [illegible]dland[illegible] 166-[illegible] PUD for 13 specific reasons. The developer has [illegible] [illegible] [illegible] [illegible] are leaving [illegible] order for them to balance [illegible] [illegible] PUD will [illegible] [illegible] [illegible] neighboring properties, [illegible] [illegible] wetlands [illegible] [illegible] protected wetlands [illegible] neighboring properties [illegible] a [illegible] [illegible] [illegible] [illegible] increase wetland areas. Approval [illegible] wetland [illegible] 100[illegible] [illegible] [illegible] the PUD [illegible] [illegible] a public hearing [illegible] increase wetland [illegible] neighboring property [illegible] [illegible] wetlands and developer [illegible] neighboring properties [illegible] [illegible] [illegible] a [illegible] wetland [illegible] neighboring properties [illegible] [illegible] [illegible] a [illegible] [illegible] [illegible] a 5th [illegible] [illegible] a [illegible] [illegible] and [illegible] reduced [illegible] increased [illegible] neighboring property [illegible] [illegible] [illegible] neighboring residents [illegible] [illegible] [illegible] [illegible] developer [illegible] the property [illegible] the [illegible] developer reconsidered due to wetland [illegible] [illegible] PUD [illegible] [illegible] a [illegible] and [illegible] [illegible] Harvard [illegible] [illegible] the developer [illegible] [illegible] neighboring property values will increase due to the PUD [illegible] [illegible] [illegible] [illegible] the Lake [illegible] [illegible] a [illegible] [illegible] [illegible] the developer failed to produce [illegible] [illegible] the claim [illegible] [illegible] the developer [illegible] local real estate professionals regarding property values [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] [illegible] already protected [illegible] wetland [illegible] [illegible] wetland [illegible] [illegible] development [illegible] 25-[illegible] [illegible] the edge [illegible] [illegible] wetlands. Additional [illegible] [illegible] [illegible] [illegible] wetland [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] at least 100 [illegible] the last 10 years [illegible] residency [illegible] [illegible] [illegible] the property [illegible] wildlife [illegible] [illegible] [illegible] accurately reflect the abundance and diverse wildlife in and around [illegible] wetland area. Single-family [illegible] smaller development [illegible] [illegible] the property [illegible] a [illegible] [illegible] [illegible] [illegible] be forced [illegible] Master Plan and [illegible] increase [illegible] developers. [illegible] the PUD will [illegible] [illegible] burden [illegible] [illegible] land and property values [illegible] [illegible] protective [illegible] [illegible] properties [illegible] [illegible] [illegible] and [illegible] [illegible] realistic applicable [illegible] and [illegible] A [illegible] PUD [illegible] 35-45-[illegible] elevated [illegible] all neighboring properties [illegible] PUD [illegible] [illegible] [illegible] the [illegible] Master Plan. D[illegible] adequately [illegible] [illegible] Residents [illegible] [illegible] [illegible] [illegible] [illegible] neighboring [illegible] [illegible] a 42-[illegible] [illegible] a PUD [illegible] architecture. PUD can be achieved [illegible] vacant commercial properties [illegible] [illegible] the elementary school [illegible] [illegible] the village. He asked [illegible] DRC [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] PUD [illegible] [illegible] [illegible] the developer claimed 100[illegible] PUD [illegible] [illegible] [illegible] a [illegible] the developer [illegible] a [illegible] included [illegible] a 120[illegible] projected [illegible] the project and [illegible] the PUD [illegible] at least 50[illegible] [illegible] for a period [illegible] years [illegible] [illegible] and [illegible] [illegible].

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CHARTER TOWNSHIP OF ORION PLANNING COMMISSION MINUTES
PC-2021-78
THE WOODLANDS PLANNED UNIT DEVELOPMENT (PUD)
JOINT PUBLIC HEARING – WEDNESDAY, OCTOBER 20, 2021

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CONSULTANTS PRESENT:

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Mr□□□□□ □l□c□□ □e 3066 □ald□□ Mead□□□ Dr□□a□d □□a□□e□ □ □□ed □□□ Cal□□□r□a□a□d □e □□e□ □□a□ e□er□□□e e□dea□□r□ □□□□ □□□d □□e□□□□□ □□□□□□□e□□e□ □□e □□□□□□□□ □□□□□□□□ are □□r□□□□□□□e□ a□d □□e□ just don't see it. He didn't think that many people here had to put □□ □□□ □□a□□□e□ □ad □□ □a□c□ □□ □□ e□er□ □□□□□□□□□□ere □□□ld □e □el□c□□□er□ □l□□□ □□er L□□ A□□le□□All □□□□e□e 3-4 le□el □□□ld□□□□ all r□□ed □□□ □□□ ca□□□□ □a□e□□□e □□re C□e□□□□□e □M□□ □□ea□□□ □□ □□e □ele□□□□□ □a□□□e□ ca□□□□c□□□r□l □□e □r□□ □□ □□e□e □□ld□□□□□ □□□□le d□ell□□□□ □e□□□□ eac□ □□□er □□a□□□ □□e□□□□□□□ce □□e□ □e□a□a□ar□□e□□□□e□ □□ □□e □all□a□□□□□e□ca□□□□c□□□r□l □□□□ □□□a□□□□□□e□ □□□□□ □ee □□ □□e □□ e□er□ □□□□□□□□ □a□□ □□d□ □a□□ □□e□ □ere □□ □ear□□a□d □□e□ □□□□le□California they couldn't watch it on the news anymore. He was so □□□e□□□ □□□□□ □□a□□e□ □ □□□□□□ee □□□□ □e□□□□ □□e□ □□e □□e□ □e□□le □a□□de□el□□□ e□□□□□□□e□ □□□□□e C□□ID□□□ree le□el □□ld□□□□ □□ L□□ A□□le□are a d□□a□er a□d □e □□□ed □a□□□□□ □□a□□□□ a□d □□e□ca□ □□ □□a □□□le□el □r ca□ □□e □r□ec□□□□□□□ree-le□el □e □□□□□□□□a□l□□e □□□□□□ a □□□ □□ □□□r □ead□ □e d□dn't

□a□□□□e□er □ee □□□e □ce□e□a□a□□ □a□□e □ad □□ □a□c□ □□Cal□□r□a□□□e □ed□□ere □□ □□er□□el□ed □a□□□ey had to send patients up to the Bay area where they lived. They couldn't even go to the hospital □eca□□e □□a□ □□ □□er□□el□ed □eca□□e □□all □□e□e □□□□-de□□□□□area□ □□LA□All □□□e□□□□□ □ere □□□d a□d □□e□ □ere □ea□□□□l area□ □□□□□□□□□r □□e C□□□ID□□□e□c□□ld □al□d□□□ a c□rr□d□r □al□a□ □□□r la□er □□e□are □□□□□ □□ ca□c□ □□□□e □□□□□□□□□a□□□e□ □□□□ld c□□□□der □□e C□□□ID a□□ec□□□□□□□□□□□□□□e □□e□□□□ed □□□ ca□ □□e□ □□□□e □a□□□□c□ □□ ra□□c□

Mr□□ □rd□□ C□□□24□ □□□r □ea□□□□Dr□□e □ □□ed □ere □□ □c□□□er 201□ □r□□ R□c□e□er a□d R□c□e□er □ll□l□□□□ □□ere □□r 22 □ear□□ □□□□r□□□e □a□□ □ □□e □ere □□l□e□re□re□□□e□□□□ □□□ra□d□d□a□d other amenities that this area looked to provide, which seems to be changing now. He didn't send in a le□er □□□□a□□ed □□read □□□c□□cer□□□ □e □□e□ □a□□□□e □□□□e □□□□□e□re□□ed □□□□e de□el□□er□ □e □c□□cer□ed a□□□□□□e de□□□□ □□er□ □ □□□□e □e□□□□□□□e □□ld□□□ □l□c□□□ □□e □□□l□□□□□□c□ □e □e□□□ e□□□□ □□□□□ □□ □□e □ac□ □□□□□ □a□□ eac□ day to lookout. He didn't know how it would affect it he didn't □□□□ □□e □la□□□□e □a□□eard □□a□□e □a□□eard□□e □□□□□□□□□□a□ □□□□□ □□ □e a □r□le□ □ □□e □□□□-l□□e of 190 units when they are looking out, he didn't know what he was going to see, he kne□ □□□a□ e□□re□□ed a□□e□□□ □□□e□□□□□ □er□□□ce□□□□□e □a□□ee□re□der□□□□ □e□□re□□ □ere □e l□□ed□□e □□l□□□ □□□□□e□a□d □e □a□□ee□re□der□□□□ □□□□e area□ □□de□el□□□ e□□□□□e□are □□□al□a□□ □□e □a□e□□e □□der□□□□d □□a□□la□□□□ □□□□□□ □□ll c□a□□e□□□e□e□ec□□□e □r□ac□□□e □□□ld l□□e □□ □a□□□a□□ □r□ac□ □e wasn't sure that would be possible. They are going to have people on balconies, he didn't know how high □□e □□ld□□□□ □ere □□□□□ □□ □e□are □□e □ □□□□□ □□ □e l□□□□□□d□□□ □□ □□□ □r □□e □□□□□ □□ □e l□□□□□□ □□ a□ □□e□ □ □□e □□□□e□ra□c□□□□-de□□□□all □□□□a□□ra□□ □□□□ □ere are □□□e □□□□ □□ □e □□□□□□ed □□□□□ □□e c□□ □le□□ Are □□e□ □□□□□ □□ □e □□ □□e □de □□□ard□ □ere □□e□are a□□□ □□e □□□ □er□eld C□□d□area □r □□□□□□□□□ □□ □e □□□ e□ere □□ □□e □e□□□de □□□□e □□□□ P□ll□□□□ e□a□□e□ □□□□□□□□□□□er□□e □□ l□□□□□□□ □□ □□e area □□□□ □□□□□ □□ □□e l□□□□□□ □□ □□ □□□□ □□□□□ □□ c□a□□e □□e a□ □a□ce □□□□e area□□□e□are □r□□a□l□ □ll □e l□□□□□□a□□□□l□□□all □□e □□□e□ □e reall□e□□□□ □□e □ldl□e a□d □□ □a reall□a□rac□ed □□□ □□La□e □r□□□□□e □a□ral□e□□ □□e □ea□□□ □□□□□area□□e □reall□ □ee□□□a real □□□c□c□a□□e □□□□ □□a second rezoning of the area within their close proximity and didn't know what it is going to become later □□□ □□□ □ □c□ □□□□□ □□□□□ □□c□□□□a□a□er□□ □e □□e□ □□e□al□ed a□□□□□a□□□ere □□ □□ □□ac□□ □□ere □□al□a□□ □□ □ac□□□e□er□□□□□ □□de□el□□□ e□-□□□e a□d □□ □□r□□□□e □□c□□cer□ed a□□□□□□e de□el□□□ e□□ □□r□ad□□□□□l□□e□elec□r□cal □□□er □r□d□are □□□□□r□□□ e□□□□□ □□ □a□dle □□a□□e□d□ □a□e□□□e□ □a□e allergists by the bit, and that is another thing he didn't know if that would be a c□□□□□ □□e □a□a□er□a□ □ell□ □□e □□al□□□ □□□□e ae□□e□c□ □□□□□□ □□ld□□□ □□□□□□ □r□□□□□ed □la□□□□□ □□ □□a□reall□ □□□□□ □□ □□□ □ell □□□ □□e c□rre□□ae□□e□c□ □□□□e area□l□□□a□ □□□ □□e □□□ld □□□e □□□□□□□□□□de□e□d□ □□ □□□ □□□□ □□□

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her home for a very low amount, it is an insult and she couldn’□e□e□ □□ □□□a□d □□d □□e □r□□er□□ □□r □□a□ □a□e a□ □□□□□□□e□ □a□e al□□ □ee□e□c□□ra□ed □□ □a□e le□al ac□□□ □□ re□□□e □er □r□□er□□□□ □□ □□□ld □□e d□ □□a□□ □□e□ □a□d □□ □a□e le□al ac□□□ □□ □rder □□ □re□er□e □□e □al□e □□□er □r□□er□□□□ □□ □□□ld □□□e□□e d□ □□a□□ I□□□ □□rea□e□□□ a□d □□e □□ □□rr□ed□

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M□□Mel□□a □l□□□□310 □ ald□□ Par□Dr□al□□ □a□c□□cer□□a□□□□□□e □ra□□c □□ □ ald□□ Rd□ □□e □□e□ □a□□□ere □a□a □□□d□d□□e □□ La□eer Rd□□□a□□e □□□d□al□□ □□cl□d□□□ □ ald□□ Rd□ □□e □a□e□ □er da□□□□er □□ □c□□□l a□d □c□ □er □□□□□e lea□e□a□□a□□ □□□e □□□c□□□ra□□c e□er□ □ □r□□□□□□□e lea□e□ a□3 □□□ □□□ □c□□ □er □□□□□□e□e□ □□□e a□3 □□□ □□□ □□ □c□ □er □□ r□□□ □□ □e□□□□□ La□eer Rd□ □□e al□□ r□□ read□□□ □□e re□der□□□□ □□ □er □l□□□ed l□□e □□ere □a□ □□e e□ra□ce □□□□ □ ald□□ Rd□□□□□□□□ □□□□□ □□ La□eer Rd□□□a□□ ea□□ □□ere □□ □□e e□ra□ce □□r □re□e□ er□e□c□ □e□cle□□□r all □□e□e □e□cle□ □□c□□e □□a□d □□□□□□□ ald□□ Rd□□□e □□□□□□□□□□a□□ □□ld □e □□□e le□al □r□le□ □□□ere are al□□ destroying some of the wooded property, as well as, wetlands. They can’t currently hear Lapeer Rd. from □□e□ □□□e □□□□□e □□ld a□□□□e □a□□□e □□□la□□□ □□□□e□e c□rre□l□ □r□□□ded □□□ld □e □□□e□□□e d□d read □□e □r□□□□al a□d □□e □a□ □□al□□ □a□d □a□□□e□are c□□□□rac□ed □□ □□□rc□a□e □-acre□ □□ □□e c□r□er □□ La□eer Rd□a□d □ ald□□ Rd□a□ □ell □□□c□ □a□ □□□□□a□□ □□□□□e□e re□der□□□□□□□e □a□al□□ c□□cer□ed □□ □□□□ □□e□ □□r□□□□ □□e□ □□a□□a□□e□□ □□ □□□e □-acre□□ Are □□e□ □□□□□ □□ □□ld □ □□re a□ar□□□e□□c□□ □le□e□ □□ □□a□□-acre□a□ □ell□

M□□De□□rae La□□l□□□3053 □ ald□□ Par□Dr□□er □r□□c□□cer□ □□□e □ra□□c □□□c□ □□e □□e□ □□□□e a □e□ □e□□le □a□e alread□ □r□□□□□□□□□□□e □a□□ed □□ re□□era□e □□□ □ad □□e □ra□□c □□a La□eer a□d □ ald□□ Rd□ □□e al□□ □a□□ed □□ □□□□□□□□□□□a□□□ere are al□a□□ acc□de□□□a□□□e □□□er□ec□□□a□□□e □□□er□ec□□□ □□ La□eer a□d □ ald□□ Rd□l□eac□ □□□□□a□1□5 car□ □□□ere are 2□5 add□□□□al car□□□□□□e a□era□e □□2 car□ □□□□ 3□0□□□e □□e□ □□a□□□e□ □ad □ e□□□□□ed □□e ca□ □□□□ld □e 32□ □□□□□a□□□ □□ll a □□□□□□ca□□□□crea□e □□ □□e □□□ □er □□car□□ □□e □□e□ □□a□□□e□ □ e□□□□□ed □□er □la□ □□ □re□er□e 13-acre□ □□□□ldl□e□□□□e□er□□□e□ are □□ll re□ □□□□□ 21-acre□ □□□a□□re□□ □a□□ll □□e□d□ □□□ □□e a□□□al□□□a□l□e □□ere a□d □□e □a□□re □□ere□l□□□a □er□□e□area □□□ □□□ld □□a□l□□□□ □□e □□e□ □□□e□□e□□e□□ □□e a□□□al□□□ □a□□re el□e□□ere □□ □□□d □□□a□e □□a□ea□er □r□ce□□□□□□ □□□ld □□a□□□r□□ □□e □a□d □a□□□e□□e□□□□ed □□a□□□ ac□□all□□crea□e□□□e □a□e □□□□er □□□e□ □□□□□e d□d □□□□el□e□e □a□□□e a□d □er □□□□a□d □□□□□□□□□□er □□□e □□ree □ear□a□□a□d □ar□□□□e □□□□□ □a□□□e□l□□e a□□□□□□□er □□□e □□□e □a□ral □eel□□□ □a□□□e□ □a□e □□□□□□ □□er □□□d□□□□□□□□□ere □□a l□□□□□□ace □e□□ee□□□e □□□□e□□□□er □□□d□□□□□□□ □ac□□ □□ □□a wetland, and that is a huge selling point to their area. She doesn’t agree, she is technically a millennial and she didn’t necessarily agree □□□□ □□e □ac□□a□□ □le□□□al□al□a□□ □a□□□o rent and didn’t think that □□□ld add □al□e □□ □□er □□□e□□□□e al□□ □a□□ed □□□□□□□□□□□□□e □□c□ □□ra□□ □□ □□e acre □□□□re□□□r □e□a□d crea□e□ □50 □all□□□ □□r□□□□□□ □□e □□c□ □□ra□□ □□ □□e acre □□a □ar□□□□l□□crea□e□2□000 □all□□□

[illegible] Rd [illegible] add [illegible]

M[illegible] Mar[illegible] A[illegible] R[illegible] 301 [illegible] Rd [illegible] All [illegible] 190 a[illegible] rela[illegible] all [illegible] 190 a[illegible] [illegible] Plea[illegible] Cl[illegible] R[illegible] addre[illegible]

M[illegible]elle M[illegible] 2[illegible]5 [illegible] Rd [illegible] M-24 [illegible] 25-50% depending on the development. She doesn't plan to move anytime [illegible] 6:20 a[illegible] M-24 [illegible] Rd [illegible] 200-300 car[illegible] [illegible] ve about this development, as far as, their neighborhood is concerned and she can't [illegible]

M[illegible] e[illegible]d[illegible] R[illegible]a[illegible] - D[illegible]re[illegible]a 301 [illegible]ald[illegible] Rd[illegible] ... [illegible] Rd[illegible] ... eral [illegible] one another and each other's safety and security, and they respect each other's space. She wasn't sure this would remain the same if this complex came in. If they continue to build e[illegible]er[illegible] ... are [illegible] ... [illegible]a [illegible]aca[illegible]

M[illegible] 34[illegible] ... Dr[illegible] ... [illegible] Please [illegible]

Mr[illegible]ll Mc[illegible] 350 [illegible]ald[illegible] ... Ma[illegible]er Pla[illegible] ... [illegible] Pe[illegible]le [illegible]a[illegible]ed about the traffic, he didn't want to spend much time [illegible] M-24 [illegible] ... [illegible] Waldon aren't going to [illegible] R[illegible] ... De[illegible]ere ... M-24 [illegible] ... [illegible] d[illegible]dn't know what the answer was to that but that was his take on the driving. Water run-[illegible] ... D[illegible] P[illegible] ... M-24 [illegible] ... M[illegible] ... isn't [illegible] ... neighbor's driveway across his backyard t[illegible] ... [illegible] into that crick it is bound to back him up. They talk about the vehicles that will be there and he can't argue [illegible] 3-[illegible]edr[illegible] ... c[illegible]ld [illegible] ... didn't want to go there, he didn't think they were going to go up, they are high right now, but in two years [illegible] ... has tried to go to G's at 6 p.m. and that area there is one re[illegible] ... [illegible] 190 [illegible] ... [illegible]c[illegible]rrec[illegible]

Mr[illegible] R[illegible]er[illegible]le 164 [illegible] ... Dr[illegible] ... [illegible]re[illegible]a[illegible] ... eard [illegible] L[illegible]-de[illegible] ... [illegible]

□r□□□□ed □ere□□□□□□□a□rea□□□ al□□e □e □□□ld □e□ □□e□ □□ □□□e □□□□ □□ □eca□□e □□e□are □□□□□ □□ c□a□□e □□e l□□□□□ □□al□□□ □□all □□e □e□□le □a□l□e □□ere□All □□□□e l□□□□□□ r□□ a □□ree-□□□r□a□d all □a□ □ar□□□□ □□ □□□□□ □□ □e □□rr□le □□r □□e re□de□□□ □a□d□l□e □□ere a□d □a□□□□e□□□ □a□□ce □□□e□□e□□ □a□ □□e□ □e□□□ La□e □r□□□ □da□□□□ere □□ □□e □□□□ □a□□□□□er□ □□□ □ □re □a□a□□□□□□ a□d □a□□□ □□e □□rd re□□r□a□d □□a□ □□ed a □□□ □er □□□□ e□□□□□□□□□e l□□ed □□ere □eca□□e □□□□e □eace a□d □□e□□e doesn't live there because there is a resort in his backyard and he doesn't want a resort in his backyard so □lea□e □□□e □□□□ □□□

Mr□□□□ Ra□ □e□335 □ ald□□ Rd□□□e □r□□□□rd □□□□□□ □re□e□a□□□ □ee□ □ □ □re l□□e a □ale□ □□c□a□d □e didn't believe that any of the long-□er□ re□de□□□ □□□ ald□□ Rd□□ □□ld □e □□□ere□□d □□ □ □□□□□ □□□□ □□□□ de□el□□□ e□□□e □a□c□□cer□ed a□□□□□□e □a□er □□e cree□r□□□r□□□□e□□□ □□□ □r□□er□□□e □□e□ □□a□ □□e re□de□□□ □□a □□□□-e□d el□e de□el□□□ e□l□e □a□□ll de□a□d □ec□r□□ a□d l□□□ □□l□□□□□□A□ □□□ and his wife drifted off to sleep the other night listening to the owl's he knew that would be detrimental □□ □□e □ldl□e □□ □□e area□□□e □a□□c c□□cer□□ □a□e □ee□ addre□□ed □e □a□□e □a□e c□□cer□□□□□e□are cer□a□l□ □□□□□□ed □□ □□□□de□el□□□ e□□□

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[illegible]

[illegible]eele thanked everyone for coming out tonight. She said she didn't see at this time a community [illegible] that it is in line with what the zoning is and it doesn't take away from other people's property rights. She [illegible]

[illegible]

[illegible] themselves they couldn't be here on this board if they weren't. They always appreciate the feedback. He [illegible]

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PC-2021-78, The Woodlands

PUD Concept Plan

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Orion Township
Planning & Zoning

LAND PLANNING SOLUTIONS

WETLAND DELINEATION AND DETERMINATION REPORT

For

3030 South Lapeer Road (M-24)
Orion Township
Oakland County, Michigan

Prepared for:

Dr. John Canine
Maximum Living Consultants, Inc.
936 Baldwin Road
Clarkston, Michigan 48348

December 10, 2019

LPS Project No. 19-107

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National Wetlands Inventory Map
NRCS Soils Map
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APPENDIX B: SITE PHOTOGRAPHS

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EXECUTIVE SUMMARY

Land Planning Solutions, LLC (LPS) was contracted by Dr. John Canine, of Maximum Living Consultants, Inc., to perform a wetland delineation and determination for an approximately 7-acre property located in Section 26 (T04S, R10E) of Orion Township, Oakland County, Michigan.

The Area of Investigation (AOI) consisted of two adjoining legal parcels located at the northwest corner of South Lapeer Road (Michigan Highway-24) associated with address 3030 South Lapeer Road. Currently vacant of occupants and/or operations, the AOI is partially developed with a small commercial building, five outbuildings, a residential dwelling, and asphalt and concrete driveways. The remaining undeveloped portions of the AOI consist of dense, deciduous forest vegetation, open water, and drain/stream channels; and characterized as moderate to acutely rolling topographic relief.

A pond (Pond 1), two drain/streams (Drain 1 and Drain 2), and fringe wetland habitat (Wetland 1) along the periphery of the pond/drain features, are documented within the AOI. It is LPS's professional opinion that the wetland (Wetland 1) and drain/streams (Drain 1 and Drain 2) are regulated by the Michigan Department of Environment, Great Lakes and Energy (EGLE) under Part 303, Wetlands Protection and Part 301, Inlands Lakes and Streams, of P.A., 451 Michigan Natural Resources and Environmental Policy Act (NREPA) of 1994, as amended. In addition, Orion Township enforces a Wetland Protection Ordinance which should be evaluated further.

Wetlands in Michigan are regulated by the EGLE, in coordination with the U.S. Army Corps of Engineers (USACE), and the Environmental Protection Agency (EPA). These agencies make their own determinations regarding wetlands in the state of Michigan and have the final decision in matters of jurisdiction and delineation.

The identification of wetland or water features herein is based on the condition of the AOI at the time of the investigation, LPS's past experiences with regulatory agencies, and current regulatory policy. LPS recommends that the wetland boundaries delineated by LPS and their regulatory status be verified by the EGLE prior to commencement of construction activities. It is unlawful to deposit fill, dredge material, drain surface water, or construct a structure in a wetland without a permit from the EGLE. Submittal of a EGLE/USACE Joint Permit Application (JPA) and obtaining a permit from the EGLE would be warranted if work within regulated wetlands, streams or is proposed.

1.0 INTRODUCTION & METHODS

Land Planning Solutions, LLC (LPS) was contracted by Dr. John Canine, of Maximum Living Consultants, Inc., to perform a wetland delineation and determination for an approximately 7-acre property located in Section 26 (T04S, R10E) of Orion Township, Oakland County, Michigan.

The Area of Investigation (AOI) consisted of two adjoining legal parcels located at the northwest corner of Lapeer Road (Michigan Highway-24). The northern parcel (Parcel Identification No. 09-26-101-009) is associated with address 3030 South Lapeer Road and dual-zoned as Residential (R2) and General Business (GB). The southern parcel (Parcel Identification No. 09-26-101-015) is informally associated with address 200 Waldon Road and zoned R2. The AOI is currently vacant of occupants and/or operations, but was historically utilized as a single-family residence (westerly portion) and light commercial operations, most recently a florist (easterly portion). The AOI is improved with one commercial building, one residential dwelling, one detached garage, three greenhouse-style buildings, one shed outbuilding, and asphalt/concrete/pavers driveways. The remaining portions of the AOI consist of light vegetated open field (i.e., unmanicured grass), robust shrub areas, and deciduous forested vegetation. The project site also contains a water complex system that takes on different waterbody type features as it traverses the southern portion of the property. These features are hydrologically connected and consist of open water (i.e., Pond 1), two linear channeled drains (i.e., Drain 1 and Drain 2), and fringe wetland habitat (i.e., Wetland 1) along the periphery of the pond/drain features. The site is characterized with moderate rolling topographic relief.

On September 12, 2019, LPS conducted a field investigation to identify, delineate, and characterize wetlands and water features and assess their regulatory status.

The methodology used to identify wetlands described herein was consistent with Michigan Department of Environment, Great Lakes and Energy (EGLE) and the U.S. Army Corps of Engineers (USACE) wetland delineation rules as outlined in the USACE's *Wetlands Delineation Manual – Technical Report Y-87-1* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Environmental Laboratory 1987; USACE 2012).

Wetlands are characterized according to three diagnostic parameters: vegetation, soils, and hydrology. Plant species associated with wetland versus upland conditions were identified and checked against the *National List of Plant Species* (Lichvar et al. 2016). Soil profiles were examined by using a tile spade to dig to a depth of approximately 14 inches below the ground surface. Horizon thickness, color, texture, and presence of hydromorphic (water-formed) features were noted and compared against the U.S. Department of Agriculture, Natural Resources Conservation Service's (USDA-NRCS) *Field Indicators of Hydric Soils in the United States* (USDA-NRCS 2017). Primary and secondary indicators of hydrology, as described in the USACE's *87 Manual* and *Regional Supplement*, were used to confirm wetland hydrology.

2.0 AVAILABLE MAPPING & DATA

2.1 USGS Topographic Map

The U.S. Geological Survey (USGS) Rochester Quadrangle (USGS 1968; photorevised in 1981) indicates that the AOI is at an elevation of approximately 970 to 980 feet above mean sea level (USGS Topographic Map, **Appendix A**). The topographic map does not depict wetlands, streams or open water within the AOI; however, it depicts contour relief changes traversing the AOI. USGS topographic maps typically show only the more distinct wetland and water features and should be utilized for preliminary analysis only. Field mapping is necessary to determine the actual existence, type, and boundaries of wetlands and water features.

2.2 National Wetland Inventory

The U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, a national wetland mapping program, was reviewed prior to the site inspection (NWI Map, **Appendix A**). The NWI map depicts the presence of a freshwater pond within the AOI, as well as a stream connected to the pond on both the east and western sides and continuing off-site to the east and west adjacent properties (USFWS 2017). The field investigation confirmed the presence of the pond and stream (drains). NWI maps are remotely compiled from aerial photography and may not show all wetlands in a given area, nor accurately characterize all wetlands shown. These maps should be used only for preliminary analysis and field mapping is necessary to determine the actual existence, type, and boundaries of wetlands.

2.3 NRCS Soils Map

The USDA-NRCS Soil Survey was reviewed prior to the site inspection. Three (3) soil map units are mapped intersecting the AOI (NRCS Soil Map, **Appendix A**), both of which are considered hydric types by the USDA-NRCS (Table 1). A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA-NRCS 2017). Hydric soils are one of three diagnostic criteria used to determine whether or not an area is a wetland.

Table 1. NRCS Soil Map Units

Symbol	Soil Unit Name	Drainage Class	Hydric
13B	Oshtemo-Boyer loamy sands	Well Drained	No
44B	Riddles sandy loam	Well Drained	No
45C	Arkport loamy fine sand	Well Drained	No

3.0 RESULTS

3.1 Wetland Conditions & Streams

Wetlands are defined by P.A. 451 of 1994, as:

"...land characterized by the presence of water at a frequency and duration sufficient to support and that under normal circumstances does support wetland vegetation or aquatic life and is commonly referred to as a bog, swamp, or marsh..."

During the site inspection, fringe wetland habitat (i.e., Wetland 1) was identified surrounding the on-site pond and drain features. This wetland system was observed to contain emergent and scrub-shrub-type vegetation at varying datapoints. This wetland system varied in width from 5 to 15 feet of periphery. The southwest corner of this wetland system is intersected by an asphalt driveway overpass but connected by a 24-inch buried culvert. A Site Characteristics Map is provided in Appendix **A**, Site Photographs depicting conditions at the time of the site investigation are provided in **Appendix B** and a Wetland Data Form is provided in **Appendix C**.

Dominant vegetation comprising Wetland 1 included marsh purslane (*Ludwigia palustris*), spotted touch-me-not (*Impatiens capensis*), wild blue flag (*Iris versicolor*), marsh purslane (*Ludwigia palustris*), nodding beggar-ticks (*Bidens cernuus*), enchanter's nightshade (*Circaea lutetiana*), coltsfoot (*Petasites japonicus*), riverbank grape (*Vitis riparia*), boxelder (*Acer negudo*), silver maple (*Acer saccharinum*), green/red ash (*Fraxinus pennsylvanica*), buttonbush (*Cephalanthus occidentalis*), among others. Wetland hydrology was indicated by saturated hydric soils, watermarks on trees, position in the landscape (i.e., flanking the drain/ponds), water-stained leaves, passing the FAC neutral test, aerial photograph evidence, and a high water table.

3.2 Upland Conditions

In addition to the existing buildings and paved improvements within the AOI, upland conditions included tall goldenrod (*Solidago altissima*), pokeweed (*Phytolacca americana*), common teasel (*Dipsacus fullonum*), spotted touch-me-not (*Impatiens capensis*), common buckthorn (*Rhamnus cathartica*), Norway spruce (*Picea abies*), staghorn sumac (*Rhus typhina*), Siberian elm (*Ulmus pumila*), eastern white pine (*Pinus strobus*), black locust (*Robinia pseudoacacia*), among others. Upland areas are higher in elevation than the mapped wetland and contain browner, drier soils than those found in the wetland areas. Soils were generally loamy and lacked the redoximorphic features found in hydric soils.

4.0 REGULATORY CONSIDERATIONS & CONCLUSIONS

4.1 Wetland Regulations by the State of Michigan

Wetlands are protected under Part 303 Wetland Protection, of P.A. 451 of 1994, the Natural Resources and Environmental Protection Act (NREPA, as amended). The EGLE assumes authority over wetlands that are 5 acres or greater in area; contiguous (directly adjacent to) to an inland lake, pond, or stream; within 500 feet of an inland lake, pond, or stream; or within 1,000 feet of a Great Lake, Lake Saint Clair, Saint Mary's River, Saint Clair River, or Detroit River.

The EGLE may also exert regulatory control over isolated wetlands less than five acres in size: "...if the department determines that protection of the area is essential to the preservation of the natural resources of the state from pollution, impairment, or destruction and the department has so notified the owner."
The following activities are prohibited within regulated wetlands without a EGLE permit:

1. The placement of fill material,
2. Dredging,
3. Construction within, and/or
4. The draining of surface water from a wetland.

Table 2. Wetland Summary Data: Wetland Type & Regulatory Status

ID	Type	Status	Reason
Wetland 1	EM/SS	Regulated	Direct connection to a regulated drain/stream and pond

FO = Forested, EM = Emergent, SS = Scrub-shrub

4.2 Inland Lakes and Streams Regulation by the State of Michigan

Inland lakes and streams are protected under Part 301 Inland Lakes and Streams, of the NERPA. The EGLE assumes regulatory authority over natural or artificial inland lakes that are greater than five acres in size, and natural or created streams that have definite banks, a bed, and visible evidence of a continued flow or continued occurrence of water.

The following activities are prohibited within regulated inland lakes and streams without an EGLE permit:

- Dredging or filling bottomland;
- Constructing, enlarging, extending, removing or placing a structure on bottomland;
- Erecting, maintaining or operating a marina;
- Creating, enlarging or diminishing an inland lake or stream;

- Structurally interfering with the natural flow of an inland lake or stream;
- Constructing, dredging, commencing, extending or enlarging an artificial canal, channel, ditch, lagoon, pond, lake, or similar waterway where the purpose is ultimate connection with an existing inland lake or stream, or where any part of the artificial waterway is located within 500 feet of the ordinary high-water mark of an existing inland lake or stream;
- Connecting any natural or artificially constructed waterway, canal, channel, ditch, lagoon, pond, lake or similar water with an existing inland lake or stream for navigation or any other purpose.

With regard to the on-site water complex, Pond 1 feature is approximately 0.85 acres in size and has portions of it improved with steel seawall segments along its edges and also contains a wood control gate and spillway on its eastern boundary.

Fringe wetland habitat (i.e., Wetland 1) surrounds Pond 1 and portions of the drain channels. This emergent and scrub-shrub-type wetland system varies in width from 5 to 15 feet of periphery. The southwest corner of this wetland system is intersected by an asphalt driveway overpass but connected by a 24-inch buried culvert. Common vegetation in this portion of the wetland includes marsh purslane (*Ludwigia palustris*), spotted touch-me-not (*Impatiens capensis*), wild blue flag (*Iris versicolor*), marsh purslane (*Ludwigia palustris*), nodding beggar-ticks (*Bidens cernuus*), enchanter's nightshade (*Circaea lutetiana*), coltsfoot (*Petasites japonicus*), riverbank grape (*Vitis riparia*), boxelder (*Acer negudo*), silver maple (*Acer saccharinum*), green/red ash (*Fraxinus pennsylvanica*), buttonbush (*Cephalanthus occidentalis*), among others. Wetland hydrology was indicated by saturated hydric soils, watermarks on trees, position in the landscape (i.e., flanking the drain/ponds), water-stained leaves, passing the FAC neutral test, aerial photograph evidence, and a high water table.

The two unnamed drains present on the project site (i.e., Drain 1 and Drain 2) are found on the southwestern and southeastern portions of the property 1, respectively. Drain 1 is located on the southwestern portion and originates off-site from the western adjacent property (and beyond) and discharges onto the west/southwestern boundary of the project site via a 24-inch buried pipe. Drain 1 is physically transected by an asphalt driveway overpass, which has a buried culvert underneath for precipitation conveyance discharging into Pond 1.

East of Pond 1's control gate (and a narrow pedestrian bridge), a linear, approximately 5 feet wide channeled, intermittent drain, Drain 2, commences from Pond 1 and extends eastward approximately 180 feet. Drain 2 takes on various characteristics; portions containing standing water and other segments void of water but evident of recent inundation, until its easterly terminus point transitioning to ponded water. The eastern end of the ponded Drain 2 is improved with a control weir connected to a 30-inch corrugated metal pipe extending 34 feet to the eastern property boundary. The output for Drain 2 connects with the stormwater drain tunnel extending underneath Lapeer Road.

Drain 1 and 2, and Pond 1 meet the characteristics of a regulated water feature pursuant to Part 301 of the NREPA.

4.3 Floodplain Regulations

Part 31, Water Resources Protection of the NREPA regulates activities within the 100-year floodway of a river, stream, drain, or watershed with an upland drainage area of two square miles or larger. Temporary crossing of regulated floodplains is generally exempt from permitting if the floodplains will be restored to existing elevations; however, temporary watercourse crossings within the 100-year floodplain or floodway require a permit from the EGLE.

LPS did not conduct a drainage review for this project prior to completion of this report. However, Drain 1 or 2 do not appears to have a drainage area of two square miles or larger and therefore, should not have an associated state regulated floodplain. Coordination with EGLE regarding permitting under Part 31 would be required if project activities involve construction activities within state regulated floodplains.

4.4 Local Regulations

Orion Township

Orion Township currently has a local ordinance regulating wetlands.

The **Township regulates activities in wetlands pursuant to Ordinance 107 – Wetlands Protection.** Under the authority of Ordinance No. 107 (adopted May 16, 1994), Orion Township regulates wetlands that are:

a. Contiguous to an inland lake or pond, or a river or stream.
b. Not contiguous to an inland lake or pond, or river or stream; and more than two acres in size.
c. Not contiguous to an inland lake or pond, or a river or stream; and five acres or less if the Department of Natural Resources determines that protection of the area is essential to the preservation of the natural resources of the state from pollution, impairment, or destruction and the Department has so notified the owner.
d. Two acres or less in size if the Township determines that the protection of the area is essential to the preservation of the natural resources of the Township from pollution, impairment or destruction and provided that the Township has made a determination that the wetland meets at least one of the following criteria:
    1. The site supports State or Federal endangered or threatened plants, fish, or wildlife appearing on a list specified in Section 6 of the Endangered Species Act of 1974, Act No. 203 of the Public Acts of 1974, being Section 299.226 of the Michigan Compiled Laws.
    2. The Site represents what is identified as a locally rare or unique ecosystem.
    3. The site supports plants or animals of an identified local importance.
    4. The site provides groundwater recharge documented by a public agency.
    5. The site provides flood and storm control by the hydrologic absorption and storage capacity of the wetland.
    6. The site provides wildlife habitat by providing breeding, nesting, or feeding grounds or cover for forms of wildlife, waterfowl, including migratory water fowl and rare, threatened, or endangered wildlife species.
    7. The site provides protection of subsurface water resources and provision of valuable watersheds and recharging groundwater supplies.
    8. The site provides pollution treatment by serving as a biological and chemical oxidation basin.
    9. The site provides erosion control by serving as a sedimentation area and filtering basin, absorbing silt and organic matter.
    10. The site provides sources of nutrients in water cycles and nursery grounds and sanctuaries for fish.

In addition, for all platted subdivision developments (residential, commercial, industrial), the Township requires a 25-foot setback from wetlands for building construction, and a 10-foot setback from wetlands for driveways or parking areas (per the Township's Subdivision Regulations Ordinance No. 27). (Note: because Orion does not define "contiguous" in its ordinance, for purposes of determination of jurisdiction we assume the State definition of "contiguous".)

Prior to commencement of any proposed work activities, consideration should be given to contact township officials directly, if project activities involve work in wetlands, drains or open waters.

Oakland County

LPS inquired with Oakland County to verify if Drain 1 or 2 falls under the jurisdiction of the County. According to an email correspondence on October 1, 2019 with Mr. Mark Davis, Senior Systems Engineering Coordinator, Oakland County Water Resources Commission, the on-site drains are not a designated Oakland County drain. However, Mr. Davis indicated that he thought it is likely also under the jurisdiction of the township or a private subdivision. He also stated that the storm drain adjacent to the AOI's eastern property boundary would fall under the Michigan Department of Transportation's jurisdiction (Davis, M.).

4.5 Conclusions

Wetlands in Michigan are regulated by the EGLE, in coordination with the USACE, and the EPA. These agencies make their own determinations as to what is or is not wetland and have the final decision in matters of jurisdiction and delineation. Variability in boundary determinations may be due to, but not limited to, the agency representative conducting the determination, wetland policy, and the time of year the site was examined. In addition, the wetland boundaries and extent on a site can change over time depending upon numerous factors including, but not limited to, changes in vegetation, drainage, weather patterns, and activities on adjacent parcels that may alter the pattern of the wetland on the subject property. The identification of wetland or water features herein is based on the condition of the site at the time of our investigation, our past experiences with regulatory agencies, and current regulatory policy.

Based on the criteria outlined in Part 301, Inland Lakes and Streams, and Part 303, Wetland Protection of the NREPA of 1994 (1994 P.A. 451, as amended), it is LPS's opinion that Wetland 1, Drain 1 and 2, and Pond 1 located within the AOI should be considered regulated by the EGLE. In addition, the Orion Township enforces a Wetland Ordinance which should be evaluated further.

If regulated wetland impacts are proposed, LPS recommends the determinations contained in this report be verified by the EGLE through the Wetland Identification Program (WIP) or an on-site pre-application meeting. Submittal of an EGLE/USACE Joint Permit Application (JPA) and obtaining a permit is warranted for activities within regulated wetlands and regulated streams. It is unlawful to deposit fill, dredge material, drain surface water, or construct a structure in a regulated wetland without a permit from the EGLE.
Respectfully submitted,

LAND PLANNING SOLUTIONS

Matthew Carmer

Matthew Carmer
Professional Wetland Scientist #1746
Principal Scientist

5.0 REFERENCES

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Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual. Wetlands Research Program - Technical Report Y-87-1." U.S. Army Corps of Engineers.

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USFWS. 2017. "NWI." National Wetlands Inventory - Wetlands Mapper (Last Modified May 5, 2019). 2017. https://www.fws.gov/wetlands/data/Mapper.html.

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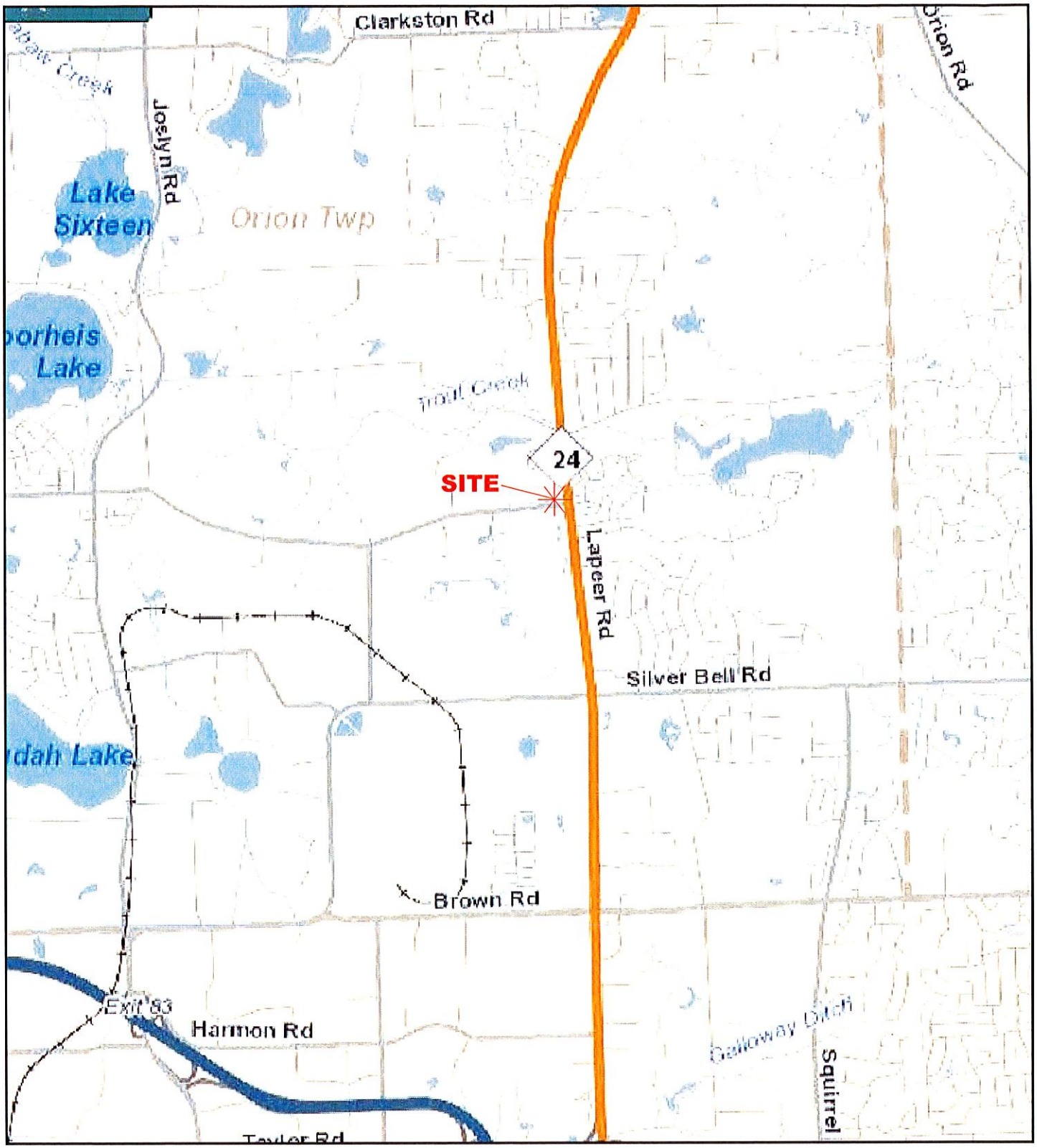
APPENDIX A: Mapping



Source: MEGLE, 2019

Site Location Map For:

Maximum Living Consultants, Inc.

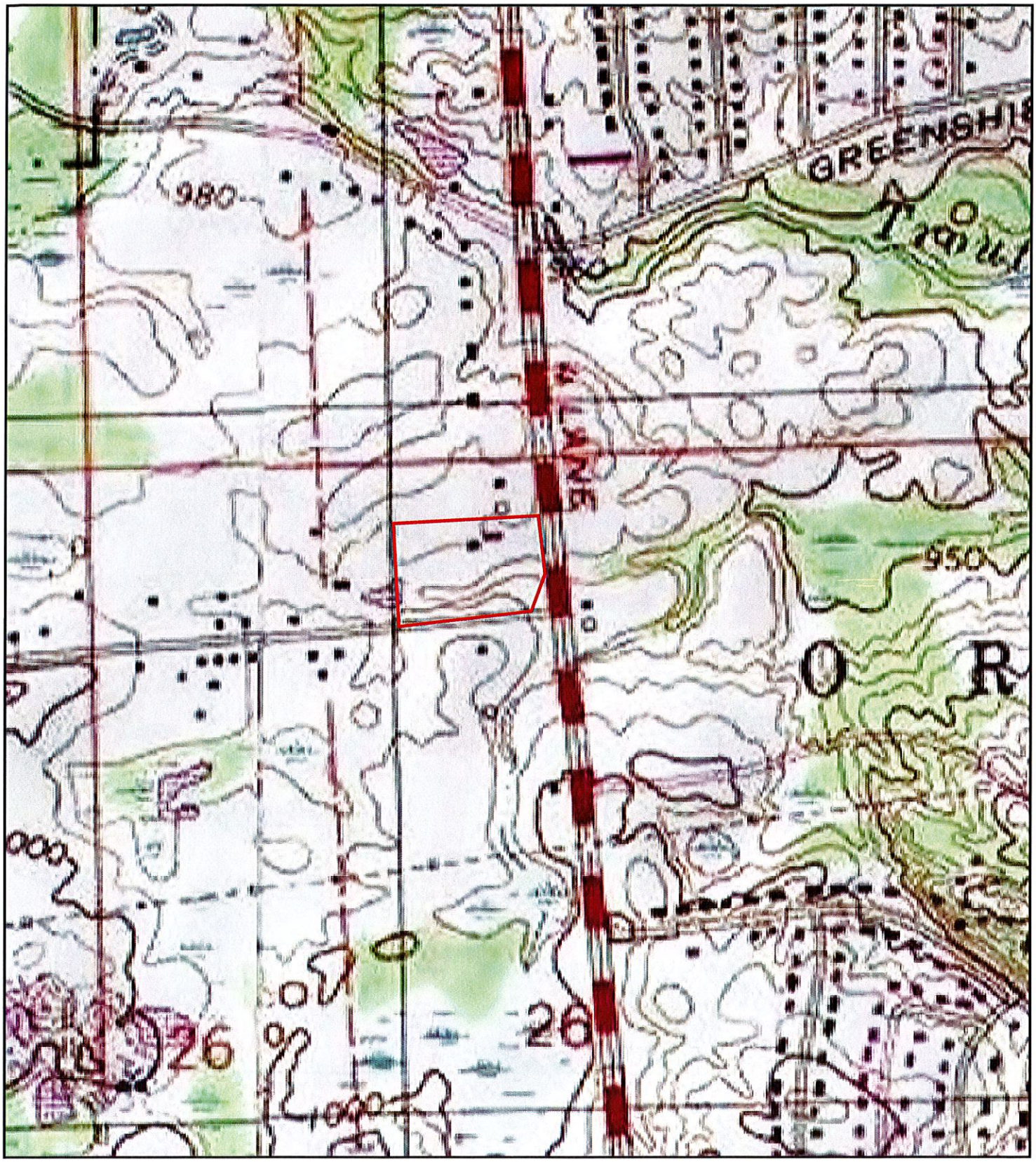
Orion Township (T4S, R10E) Oakland County, MI

N W E S

Not to Scale

Land Planning Solutions, LLC
3000 Green Road
Unit 130104
Ann Arbor, MI 48113
248-890-7612

DATE	10/25/2019
PROJECT NUMBER	19-107
SHEET NUMBER	Fig. 1



Source: USGS, 2019

0 300' 600'

USGS Topographic Map For:

Maximum Living Consultants, Inc.

Orion Township (T4S, R10E) Oakland County, MI

N
W E
S

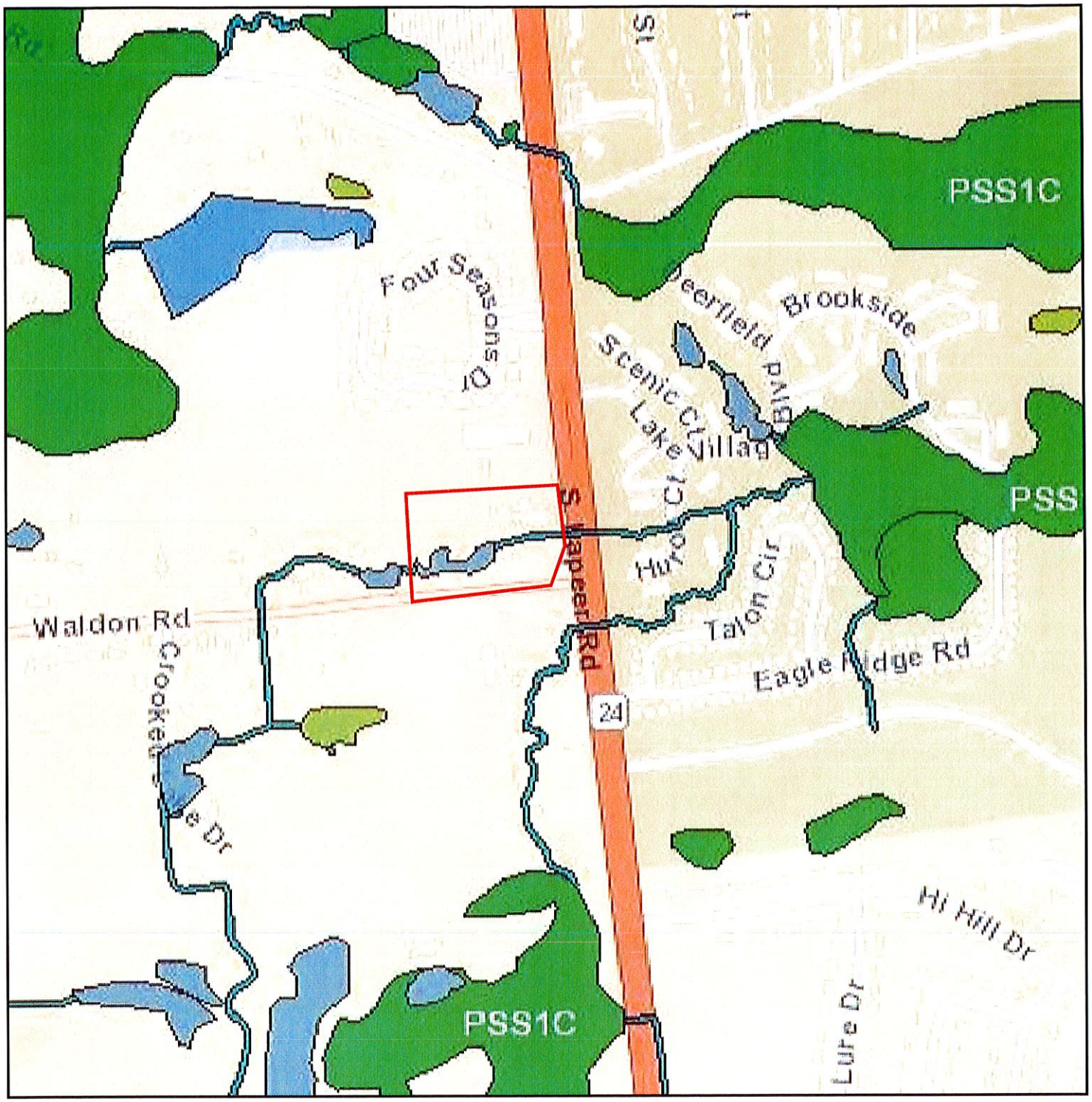
Approx. Scale = 1" = 600'

Land Planning Solutions, LLC
3000 Green Road
Unit 130104
Ann Arbor, MI 48113
248-890-7612

DATE
10/25/2019

PROJECT NUMBER
19-107

SHEET NUMBER
Fig. 2



Source: USFWS, 2019

0 300' 600'

National Wetland Inventory Map For:

Maximum Living Consultants, Inc.

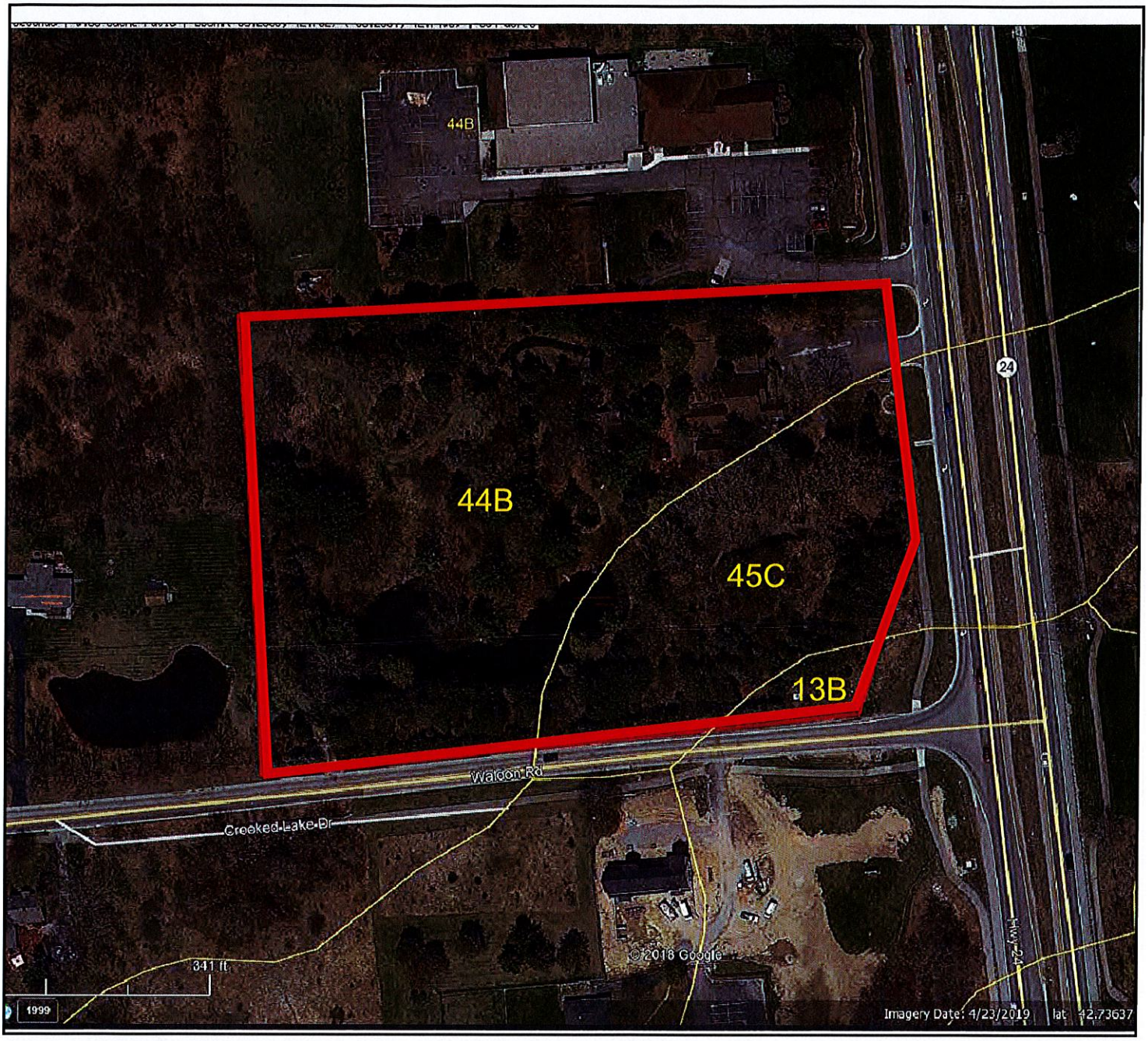
Orion Township (T4S, R10E) Oakland County, MI

N W E S

Approx. Scale = 1" = 600'

Land Planning Solutions, LLC
3000 Green Road
Unit 130104
Ann Arbor, MI 48113
248-890-7612

DATE	10/25/2019
PROJECT NUMBER	19-107
SHEET NUMBER	Fig. 3



Symbol	Unit Name	Description	Hydric (Y/N)
13B	Oshtemo-Boyer loamy sands	Well drained	No
44B	Riddles sandy loam	Well drained	No
45C	Arkport loamy fine sand	Well drained	No

Source: NRCS/Google, 2019

0 75' 150'

NRCS Soils Map For:

Maximum Living Consultants, Inc.

Orion Township (T4S, R10E) Oakland County, MI

N W E S

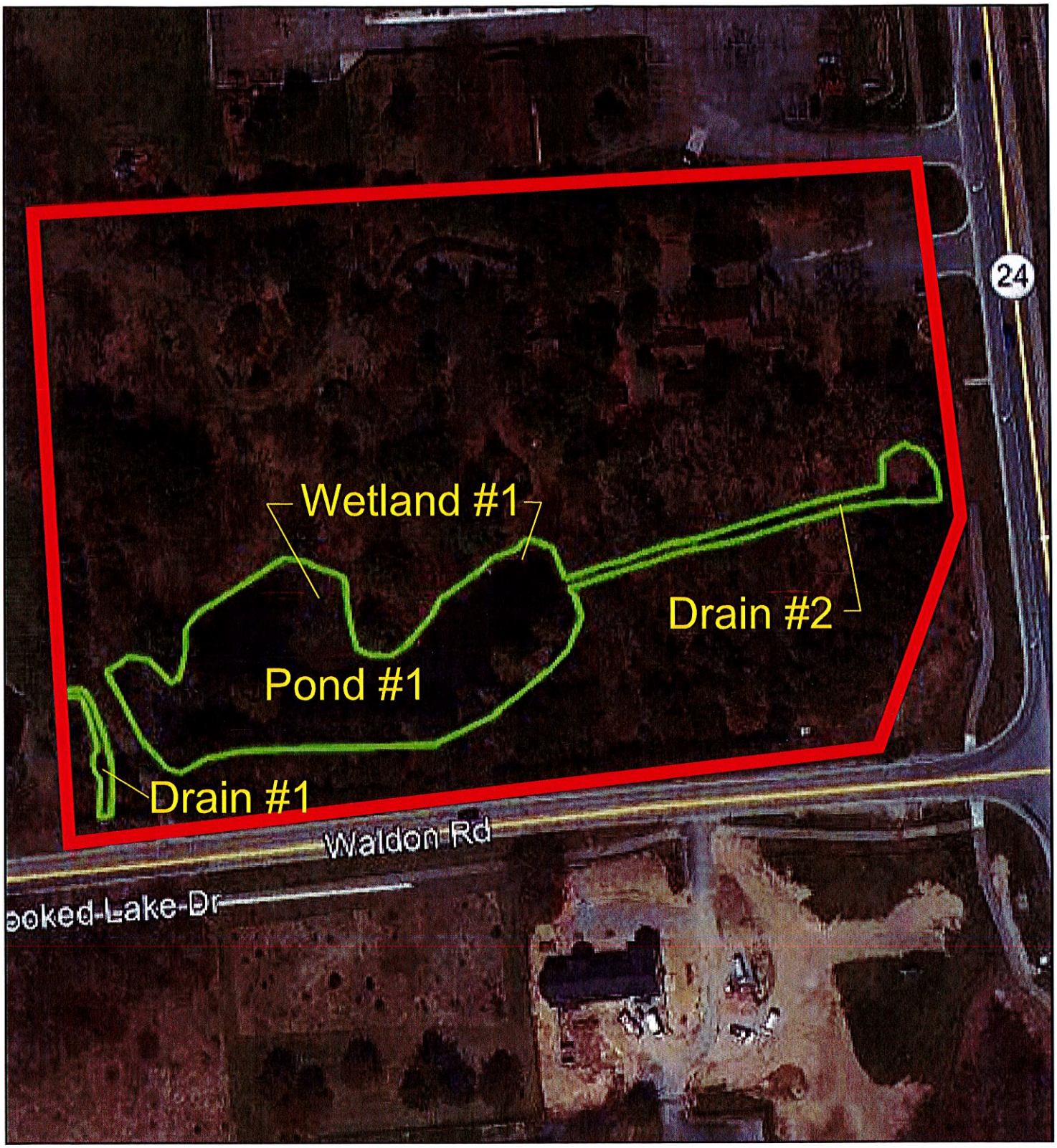
Approx. Scale = 1" = 150'

Land Planning Solutions, LLC
3000 Green Road
Unit 130104
Ann Arbor, MI 48113
248-890-7612

DATE 10/25/2019

PROJECT NUMBER 19-107

SHEET NUMBER Fig. 4



Source: Google Earth, 2018 Image

0 50' 100'

Wetland Flagging Map For:

Maximum Living Consultants, Inc.

Orion Township (T4S, R10E) Oakland County, MI

N W E S

Approx. Scale = 1" = 100'

Land Planning Solutions, LLC
3000 Green Road
Unit 130104
Ann Arbor, MI 48113
248-890-7612

DATE 10/25/2019

PROJECT NUMBER 19-107

SHEET NUMBER Fig. 5

APPENDIX B: Photographic Log

Photo 1. General view of the subject site/Area of Inventory (AOI) and vacant commercial building located on northeastern portion of site access off of Lapeer Road (associated with 3030 S. Lapeer Road)

Photo 2. Typical view of the existing vacant outbuildings observed on the subject site associated with former commercial/residential site occupants

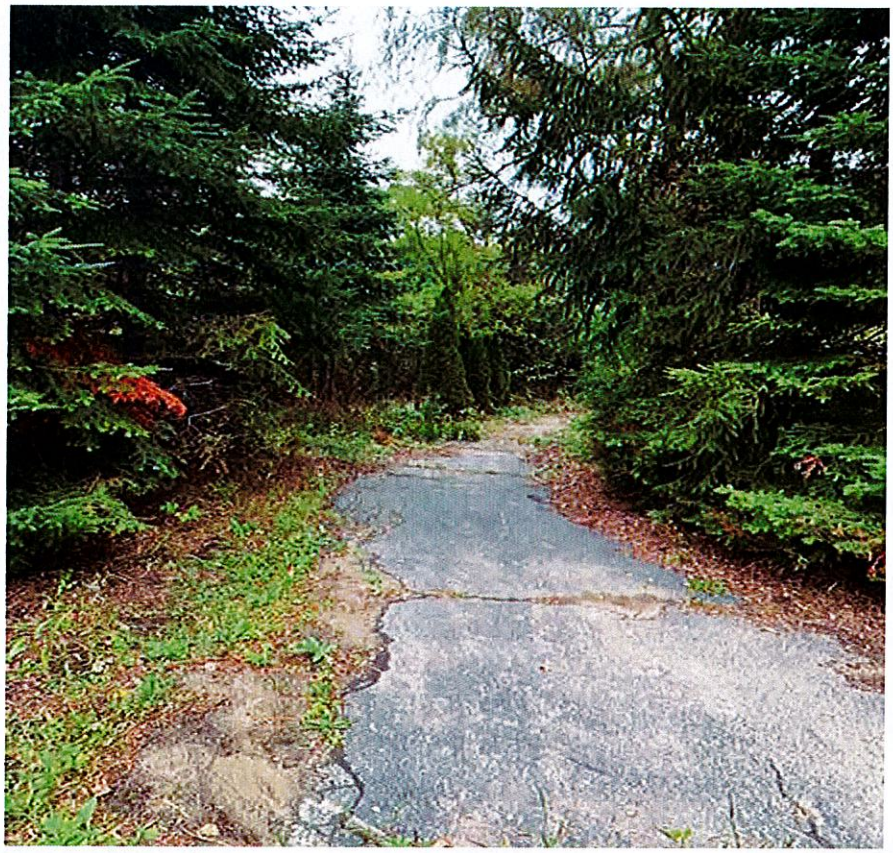


Photo 3. View of asphalt driveway located on western portion of AOI

Photo 4. View of upland towpath located on northern portion of AOI

Photo 5. View of typical upland vegetation observed within AOI

Photo 6. View of Pond 1 located on central-western portion of AOI with portions of it improved with steel seawall View of small pond located on west/southwestern portion of AOI

Photo 7. View of bridge located on western edge of Pond 1, equipped with wood control gate at outlet point connecting to Drain 2

Photo 8. Interior view of Pond 1-to-Drain 2 wood control gate and overflow outlet pipe

Photo 9. View of Drain 2 depicting its intermittent channeling, with pockets of standing water, located on eastern portion of AOI

Photo 10. Another view of the on-site intermittent drain/stream channel (Drain 2) within AOI

Photo 11. View of buried drain pipe outlet located on west/southwestern portion of AOI connecting the western adjacent property's pond flowing to Drain 1

Photo 12. View of drain culvert under asphalt driveway overpass located on southwestern portion of AOI connecting to Drain 1 (and portion of wetland system) to Pond 1

Photo 13. View of buried 30-inch drain/stream pipe segment on eastern property line, designed to discharge into 60-inch municipal stormwater main located underneath Lapeer Road (M-24)

Photo 14. View of Drain 2 with wood pedestrian trail bridge in background

Photo 15. View of fringe wetland habitat observed along periphery edges of pond and drain features

Photo 16. View of a typical on-site soil test pit; vertical profile depicting characteristics of hydric and saturated soils indicative of wetland habitat (along portions of pond/drain periphery)

APPENDIX C: Wetland Data Form

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Orion Classic Car Club Project City/County: Orion Twp, Oakland Sampling Date: 9-12-19

Applicant/Owner: Maximum Living Consultants, Inc. State: MI Sampling Point: DP-1

Investigator(s): Matthew Carmer, PWS, CWB Section, Township, Range: Sec 26; T04, R10E

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope %: ____

Subregion (LRR or MLRA): LRR R Lat: 42.735906 Long: -83.246145 Datum: NAD83

Soil Map Unit Name: Riddles sandy loam NWI classification: emergent/scrub shub

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 1
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DP-1

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	20	Yes	FAC
2. *Acer negundo*	20	Yes	FAC
3. *Acer saccharinum*	1	No	FACW
4. *Fraxinus pennsylvanica*	1	No	FACW
5.			
6.			
7.			
	42	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15' radius)			
1. *Cephalanthus occidentalis*	15	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	

Herb Stratum (Plot size: 5' radius)			
1. *Ludwigia palustris*	50	Yes	OBL
2. *Impatiens capensis*	10	No	FACW
3. *Iris versicolor*	5	No	OBL
4. *Bidens cernua*	5	No	OBL
5. *Lycopus americanus*	1	No	OBL
6. *Circaea alpina*	1	No	FACW
7. *Tussilago farfara*	1	No	FACU
8.			
9.			
10.			
11.			
12.			
	73	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	76	x 1 =	76
FACW species	13	x 2 =	26
FAC species	40	x 3 =	120
FACU species	1	x 4 =	4
UPL species	0	x 5 =	0
Column Totals:	130 (A)		226 (B)

Prevalence Index = B/A = 1.74

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1						Muck	
3-6	10YR 4/2	90	10YR 5/6	10	C	M	Sandy	
6-16	10YR 2/1						Sandy	covered with muck

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- x Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Charter Township of Orion

2323 Joslyn Rd., Lake Orion MI 48360
www.oriontownship.org

Planning & Zoning Department
Phone: (248) 391-0304, ext. 5000

TO: Charter Township of Orion Board of Trustees

FROM: Charter Township of Orion Planning Commission

DATE: March 2, 2022

RE: PC-2021-78, The Woodlands PUD Concept & Eligibility Request

---

The applicant, Detroit Riverside Capital, is requesting PUD Concept approval for PC-2021-78, The Woodlands, located on a vacant parcel located east of 310 Waldon Road, (Sidwell #09-23-351-024) and 3030 S. Lapeer Road, (Sidwell #09-26-101-021). The request is to rezone the properties from Suburban Estates (SE), Single Family Residential-2 (R-2), and General Business (GB) to Planned Unit Development (PUD) to construct a 166 multi-family unit development and a restaurant.

Two Joint Public Hearings were held. The second was held because the applicant added a parcel to the PUD that was not in the initial application and as such was not part of the first Joint Public Hearing. The Planning Commission held the second joint Public Hearing with the Board of Trustees on February 2, 2022 and on the same meeting the following motion was passed to forward a recommend to the Board of Trustees to deny the Concept Plan:

> *Moved by Vice-Chairman Gross, seconded by Secretary St. Henry, that relative to PC-2021-78, The Woodlands PUD Concept and Eligibility plan, the Planning Commission forwards a recommendation to the Township Board to* ***deny*** *PC-2021-78, The Woodlands Planned Unit Development Concept and Eligibility plan, located on a vacant parcel located east of 3010 Waldon Rd., Sidwell #09-23-351-024 and 3030 S. Lapeer Rd., Sidwell #09-26-101-021 for plans date stamped received January 5, 2022. This recommendation to deny is based on the following findings of fact: that there is no recognizable benefit to the community and is not consistent with the intent of the PUD Concept or the PUD Ordinance: 1) the proposed Planned Unit Development for 166 dwelling units is based on a density on a total of the 27-acres which includes 7-acres of currently GB zoning property and is not consistent or comply with the underlying zoning or Master Plan designation for the subject property; 2) the property is not compatible with adjacent low-density residential uses as identified on the Master Plan and with the existing zoning and will have a negative impact on surrounding properties; 3) there is a lack of compliance with the zoning ordinance requirements for residential development of multiple-family designation such as being an excess of the building height of 42-ft. versus 30-ft. required; 4) excess building length 380-ft. versus 200-ft. maximum, and excess parking location, two buildings from 300-ft. to 500-ft.; 5) the potential negative impact on the traffic at Waldon and Lapeer Roads, although improvements have been identified in a preliminary traffic study they have not been addressed as to how they would be implemented; 6) a concern on high-quality architectural design, his opinion that the mass and bulk of the buildings are not consistent with the existing development in the area and do not comply with the respective zoning ordinance requirements; 7) there is no design provided for the restaurant provided in the PUD.*

Discussion on the motion:

Mr. Wayne said when they look at the site, they talked about some of the challenges, the existing zoning, and what is possible, they outlined that it is financially impossible to build as zoned. From that perspective that would imply that the property must be rezoned to be built on at some point trusting that their estimates are accurate. He asked in thinking about the need to have there be a viable path forward, is it multi-family specifically that is a concern? For example, if they were to look at RM-1 and try to apply for RM-1 with an ordinance and they were able to eliminate it if they have four issues currently, they are able to just need one variance on RM-1 would a rezone to RM-1 with a variance present a different perspective from the Planning Commission or not? Chairman Reynolds replied that they are there to evaluate what is in front of them. He thought that all of them are going to have different thoughts and perspectives on what would make everything work. He thought that there have been a number of items that have been discussed including in the motion that is on the table now to talk about underlying zoning. They are aware as a Commission the economics of the Township. They are aware of the missing middle they are working on their Master Plan and they have discussed this extensively. He thought the struggle they have here is, once again, is that they look at all of these factors as a whole and there is a push and pull. They understand that economics influence a site and they also acknowledge that existing zoning does along with the zoning parameters which they layout. They ask for straight zone projects to apply for, yes there is a process of variances but in a lot of ways, it is very similar to a PUD. Is there any way that they could come to a different conclusion on this project, he was sure there were. Does it fit within the economics? Maybe not. Does it fit with compatibility? Maybe. They are always there to consider further thoughts and future projects. He commended them for what they brought forth and the effort that they have put forth in front of them. He thought that there were still some factors here that needed to be considered in part of this development.

Chairman Reynolds said this is a PUD this is a recommendation from the Planning Commission. This forwards on to the Board and this is a multi-step process, so this recommendation to deny this PC case and the facts that were provided would be forwarded to the Board of Trustees for their discussion at a later meeting date.

Roll call vote was as follows**: Walker, yes; Brackon, yes; St. Henry, yes; Gross, yes; Urbanowski, yes; Gingell, yes; Reynolds, yes.* ***Motion carried 7-0

In that the applicant modified their application after the first Joint Public Hearing, only the most recent plan, with the additional parcel added, is being forwarded to you. I have also included consultant reviews for the most recent plan, the amended application, the minutes from both Joint Public Hearings, the Planning Commission meeting minutes from February 2, 2022, citizen letters, a wetland report (not reviewed by consultant), a traffic study, and a Trip Generation Comparison. If you have any questions, please feel free to contact me at (248) 391-0304 x 5000.

Objection to rezoning of property east of 310 Waldon Rd, Sidwell #09-23-351-024. PC-2021-78, The Woodlands planned Unit Development.

Objection #1 - Density & Location

a. The proposed "190-unit multi-family development" does not fit with the surrounding area developments. The area is all single-family homes along Waldon Road aside from 1 duplex property.
b. The proposed 190 units is too dense for the area proposed, the property would be better suited for single family homes or duplex style home / condos, this would be in better alignment with the surrounding area.
c. The proposed property is landlocked with only one location to enter & exit, a complex with 190 multi-family units should have more than 1 entrance / exit location for fire & emergency vehicles.

Objection #2 - Safety & Infrastructure

a. The location of the proposed development has no sidewalks along the north side of Waldon road.
b. There is no way to safely cross Lapeer Road in this area (you would need to go north 1 mile to Scripts Road intersection to cross Lapeer Road but there is no continuous sidewalk to get there from Waldon road).
c. There is no traffic light at Waldon & Lapeer roads. The intersection of Waldon & Lapeer is already very dangerous and congested, the addition of 190 more families will only exacerbate this problem.
d. Lapeer Road has a 55 MPH speed limit in this area (and many vehicles are going much faster than), this is too high of a speed limit for an area that is becoming more populated.

All these factors stated in objection #2 raise concerns about the safety of adding 190 more families to this area and the lack of infrastructure to support them. The residents of the proposed complex will be landlocked and will not be able to walk or bike from their complex which will ultimately lead to the unsafe crossing of Waldon and Lapeer Roads. If the township moves forward with rezoning of this property the following items should also be considered; adding a traffic light at Waldon & Lapeer, adding sidewalks to the north side of Waldon, adding sidewalks along the west side of Lapeer Road (between Waldon Road and Scripts Road), adding a crosswalk on Lapeer Road and reducing the speed limit on Lapeer Road.

Objection #3 - Detroit Riverside Capital (DRC)

a. According to the DRC website "DRC was founded to progress the availability of "walk-able downtown" housing options in communities that have traditionally only offered housing in the form of single-family homes in neighborhoods surrounding their downtown areas". In regards to the quote from the DRC's own webpage, I do not see any walkable areas or downtown areas in the proposed area, what if anything does this developer bring to the table that will enhance the quality of life for the new or existing residents in this area of Orion Township?

Thank you for your time and consideration,

Michael & Alina Caldwell
336 Four Seasons Dr
Lake Orion, MI 48360

RECEIVED
OCT 12 2021
Orion Township
Planning & Zoning

RECEIVED

OCT 12 2021

Orion Township
Planning & Zoning

To - Charter Township of Orion
Planning Commission

I want to registar my objection to the Proposed zoning change on parcel PC-2021-78 - The Woodlands at 310 Walden Road -
Sidwell # 09-23-351-024.

Planning to put 190 units on a small property in a long established area of single family homes is unconscionable & unscrupulous.

Phyllis Cunningham
266 Four Seasons Dr.
Lake Orion, MI 48360

Oct 9, 2021

Planning Commission
Orion Twp Hall
2525 Joslyn Rd
Lake Orion, MI 48360

RECEIVED
OCT 13 2021
Orion Township
Planning & Zoning

Dear Mr. Reynolds:

We reside on Four Seasons Dr in Summerfield Condo Assoc. and have been residing here for twenty-two years.
We strongly oppose the rezoning of the property for a 190-unit family building.
This will have an impact on traffic on Waldon Rd. The property directly behind our Condo bldg is the location of the wetland area, which may be jeopardized if this rezoning is approved.
Thank you

Norbert Saje
NORBERT SAJE

Sylvia Saje
SYLVIA SAJE

212 Four Seasons
Lake Orion MI 48360
248-393-2395

Oct 12, 2021

To: Planning Commission
Lake Orion Township

RECEIVED
OCT 13 2021
Orion Township
Planning & Zoning

I want to express my Strong opposition to the plan to rezone the property at 310 Walden Rd, Sidwell # 09-23-351-024.

Putting an apartment complex of 190 units in a long established area of Single Family homes should not be allowed.

Current traffic issues will be exacerbated — Property values will be depressed.

Mike Cunningham

266 Four Seasons Dr.

RECEIVED

OCT 14 2021

Orion Township
Planning & Zoning

From: K.M. Sweeney <sweeney1217@gmail.com>
Sent: Thursday, October 14, 2021 8:31 AM
To: Tammy Girling <tgirling@oriontownship.org>; Mike Flood <mflood@oriontownship.org>
Subject: Regading opposition to PC-2021-78, The Woodlands Planned Unit Development

October 13, 2021

Dear Council,

My husband and I are homeowners in Summerfield Subdivision and will not be able to attend the Charter Township of Orion Planning Commission joint public hearing with the Board of Trustees on Wednesday, October 20, 2021. Therefore, I am writing this letter to voice my disapproval regarding the following proposal.

> PC-2021-78, The Woodlands Planned Unit Development (PUD), located at a vacant parcel east of 310 Waldon Road, Sidwell #09-23-351-024. The applicant, Detroit Riverside Capital, is proposing to rezone the property from Suburban Estates (SE) & Single Family Residential-2 (R-2) to Planned Unit Development (PUD) to construct a 190-unit multi-family development.

The proposal to rezone this property to a Planned Unit Development (PUD) for a 190 unit multi-family development is wrong for our community on so many levels.

- Four years ago in 2017 Pulte Homes completed their 338 housing development that was built on the former Bald Mountain golf course adding at a minimum 700 additional drivers to a road system that was already antiquated.
- Adding an additional of at least 200+ more drivers in this location will increase an already overloaded traffic flow and be critically unsafe at Walden and Lapeer.
- Pedestrians (walkers and bike riders) on both Lapeer and Walden will be at a much higher safety risk.
- Destroying the wetlands for this development will reduce and/or eliminate the beautiful wildlife that is enjoyed within our community.
- Summerfield Subdivision is home to a diverse population of homeowners that includes widows, senior citizens, and singles. On the whole, to rezone for a PUD raises a major concern for an increase crime including theft, property damage, or worse.
- A development such as this has a very real potential of reducing property values in our community.

During the past 18+months because of COVID it is apparent that we have experienced a different way of living, as we have heard of many times "a new normal". Our immediate surroundings have become more vivid and precious. We need to consider what our role is as caretakers for Orion Township and how our living here has made it better not bigger for generations to come.

Please do not approve this rezoning proposal, consider what the risk and reward is long term. Other communities around us are unable to offer what we have acquired from our previous Orion Township caretakers.

Thank you for your service in our community and concern for what the future will be for Orion Township.
Sincerely,

Kathy Sweeney

RECEIVED

OCT 15 2021

Orion Township
Planning & Zoning

I am a homeowner in Summerfield Subdivision and will be able to attend the Charter Township of Orion Planning Commission joint public hearing with the Board of Trustees on Wednesday, October 20, 2021. Therefore, I am writing this letter to voice my DISAPPROVAL regarding the following proposal.

> PC-2021-78, The Woodlands Planned Unit Development (PUD), located at a vacant parcel east of 310 Waldon Road, Sidwell #09-23-351-024. The applicant, Detroit Riverside Capital, is proposing to rezone the property from Suburban Estates (SE) & Single Family Residential-2 (R-2) to Planned Unit Development (PUD) to construct a 190-unit multi-family development.

The proposal to rezone this property to a Planned Unit Development (PUD) for a 190 unit multi-family development is wrong for our community on so many levels.

> Adding an additional number of drivers close to 400 on a daily basis in this location will increase an already overloaded traffic flow and be critically unsafe at Walden and Lapeer. The intersection of Waldon and M-24 is already congested and unsafe.
>
> Pedestrians (walkers and bike riders) on both Lapeer and Walden will be at a much higher safety risk.
>
> Destroying the wetlands for this development will reduce and/or eliminate the beautiful wildlife that is enjoyed within our community. Where has the vacation living gone when all the green areas are being destroyed.
>
> Summerfield Subdivision is home to a diverse population of homeowners that includes widows, senior citizens, and singles. On the whole, to rezone for a PUD raises a major concern for an increase crime including theft, property damage, or worse.
>
> A development such as this has a very real potential of reducing property values in our community.

During the past 18+months because of COVID it is apparent that we have experienced a different way of living, as we have heard of many times "a new normal". Our immediate surroundings have become more vivid and precious. We need to consider what our role is as caretakers for Orion Township and how our living here has made it better not bigger for generations to come.

Please do not approve this rezoning proposal, consider what the risk and reward is long term. Other communities around us are unable to offer what we have acquired from our previous Orion Township caretakers.

Thank you for your service in our community and concern for what the future will be for Orion Township.

Theresa Brown

RECE...

OCT 15

Orion Towns...
Planning & Zoning

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> PC-2021-78, The Woodlands Planned Unit Development (PUD), located at a vacant parcel east of 310 Waldon Road, Sidwell #09-23-351-024. The applicant, Detroit Riverside Capital, is proposing to rezone the property from Suburban Estates (SE) & Single Family Residential-2 (R-2) to Planned Unit Development (PUD) to construct a 190-unit multi-family development.

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> Summerfield Subdivision is home to a diverse population of homeowners that includes widows, senior citizens, and singles. On the whole, to rezone for a PUD raises a major concern for an increase crime including theft, property damage, or worse.
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> A development such as this has a very real potential of reducing property values in our community.

During the past 18+months because of COVID it is apparent that we have experienced a different way of living, as we have heard of many times "a new normal". Our immediate surroundings have become more vivid and precious. We need to consider what our role is as caretakers for Orion Township and how our living here has made it better not bigger for generations to come.

Please do not approve this rezoning proposal, consider what the risk and reward is long term. Other communities around us are unable to offer what we have acquired from our previous Orion Township caretakers.

Thank you for your service in our community and concern for what the future will be for Orion Township.

Sincerely,

Mary Mansfield

RECEIVED

OCT 15 2021

Orion Township
Planning & Zoning

Planning Commission

Orion Township Hall

2525 Joslyn Road

Lake Orion, Michigan 48360

October 15, 2021

Re: PC-2021-78 The Woodlands Planned Unit Development from Single Family Residential to Planned Unit Development

This letter comes to you in regard to the proposed change in rezoning of this property. I have numerous concerns in this change being made. You would be adding to the already incredible amount of traffic that uses Waldon Road to reach Lapeer Road. Issues such as residential density, noise factor, additional burden on schools and busing, disturbing natural resources and the effect it would have on my neighborhood Summerfield.

I am greatly opposed to this change from single family medium density dwelling to multi-unit housing. The negative impact will be great.

Thank you for your consideration of this most important issue.

Anne Earle

Anne Earle

354 Four Seasons Drive

Lake Orion, MI 48360

254 Four Seasons Drive
Lake Orion, MI 48360

RECEIVED
OCT 18 2021
Orion Township
Planning & Zoning

October 14, 2021

Planning Commission
Orion Township Hall
2525 Joslyn Road
Lake Orion, MI 48360

Attn: Planning Commission

RE: PC-2021-78, The Woodlands Planned Unit Development (PUD)
Located at a vacant parcel east of 310 Waldon, Sidwell #09-23-351-024

I am sorry that I will not be able to appeal in person due to a recent surgery.

I am opposed to this rezoning for the following reasons:

Increased traffic/vehicles on a very busy Lapeer Road @ Waldon Road

Area is loaded with single family homes and should remain zoned for them

Increased lighting in the area would be necessary for security . . . which would brighten our quiet condominium community in a negative manner

Wild life that is in our area and up against Bald Mountain State Park would be affected and forced out

There is no fencing shown on the picture the Township Hall provided our neighbors, so the huge parking lot and tall buildings would be an eyesore and seen from every angle in our complex.

Please accept my opposition to this complex and keep this space zoned for Suburban Estates and Single Family Residential.

Thank you,

Cheryl Querro

Cheryl Querro
254 Four Seasons Drive
Lake Orion, MI 48360

Beverly Rolfsen
103 Four Seasons Drive
Lake Orion, Mi 48360

Lake Orion Planning Commission

I am writing this letter to express my opposition to Plan PC-2021-78 Woodland Plan Development.

As a homeowner in Summerfield Condos, I was drawn to the development by its natural beauty with the beautiful woods and wildlife throughout. It makes "living a vacation."

The planned apartment building will add to the already congested highway and impact the safety of drivers on it. It is very difficult at times to enter at Lapeer Rd presently. This will add an additional 350-400 automobiles to a congested situation.

Disturbing the landscape can cause harm to the wildlife I currently enjoy and enhances my surroundings. It will change the subdivision that I currently enjoy. We are now surrounded by woods.

Property values for the condos are likely to be impacted by the development. It will change the landscape I enjoy and add noise to the area. As a homeowner I have worked to improve my condo and upgrade its value.

Please take all into consideration for reviewing the plan.

Thank you.

Beverly Rolfsen

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OCT 18 2021

Orion Township
Planning & Zoning

Planning Commission
Orion Township Hall
2525 Joslyn Rd.
Orion Twp., Michigan 48360

October 17, 2021

I am writing to express my strong opposition to PC-2021-78, the proposed rezoning of the vacant parcel East of 310 Waldon Road, Sidwell #09-23-351-024 from single family residential to multi-family dwelling. Building multi-family housing will cause additional traffic and safety problems, destroy local wildlife habitat, and potentially lower the property values of the existing community.

Current traffic on Lapeer Road is often congested with people traveling to and from businesses and existing housing. Traffic is very heavy on Lapeer Road as it is used by many to access I75. I also understand that a restaurant and car club will soon be constructed near the corner of Walden Road and Lapeer Road adding to current traffic issues.

A very large multi-family housing community, Indian Lake Village Apartments, is located on the East side of Lapeer Road and is very close to one that would be constructed on Walden Road. Adding a similar housing community within a mile or so would just add to the congestion on Lapeer Road.

Property values are likely to go down in the area if additional multi-family apartments are built. Multi-family dwellings are inconsistent with the neighborhoods developed in the area and would create a more transient feel to the community. Most people are not attracted to an area where a large concentration of "renters" exist.

I urge you to disapprove the proposed rezoning. I know my opinions are shared by many of my neighbors in the Summerfield Condominium complex who may not have managed to attend a meeting or write a letter.

Thank you for your continued service and support of our communities.

Barbara VanRaaphorst

Barbara VanRaaphorst
134 Four Seasons Drive
Lk. Orion, Mi 48360

RECEIVED
OCT 18 2021
Orion Township
Planning & Zoning

October 15, 2021

RECEIVED

OCT 18 2021

Orion Township
Planning & Zoning

Planning Commission
Orion Township Hill
2525 Joslyn Rd.
Lake Orion, MI 48360

Planning Commission:

As per your letter concerning PC-2021-78, The Woodlands Planned Unit Development, we are responding in opposition to this zoning change.

We believe that your 2015 Master Plan Trout Creek area has been designated as a single family medium density dwelling.

To now change these plans will be detrimental to the residents surrounding and abutting this area. We do not feel that this is in the best interest of the above mentioned residents.

First of all, traffic is already horrendous in and around Waldon Rd. and Lapeer Rd.

The noise level of a 190 unit multi family development is again not in the best interests of surrounding areas.

Sanitation, utility usage will also be affected.

This type of building will not enhance our property or the value of our property. It will do just the opposite.

Disturbing conservation and natural resources is also a concern.

Just because a developer with money wants these changes, does not make it the right thing to do for the whole of the community.

Thank you,

John and Sue Falvo
242 Four Seasons Dr.
Lake Orion, MI 48360

John Falvo
Sue A. Falvo

The proposed PUD places no unreasonable burden upon the subject parcel, its natural features, the surrounding land, or other property owners. As mentioned, The Woodlands preserves a far greater number of natural features as would otherwise be possible with alternate designs, uses, or existing zoning regulations. The perimeter of The Woodlands has been designed to protect the integrity of surrounding properties by utilizing 5-foot-high natural berms and 30+ foot wide natural landscape buffers to shield the view of the development from neighboring properties. In the event neighboring properties can see the new development, the exterior fascade has been design with quality and high-end aesthetic in mind. The Woodlands will blend with its natural surroundings and will not create an unsightly view from any neighboring properties.

The Woodlands has been specifically designed to maximize land preservation of the existing site, per the emphasis provided on this requirement throughout Section 30.03 of the PUD ordinance. Instead of proposing a development that sprawls across the entirety of the 20+ acre property, DRC has designed a project that allows the preservation of over 12 acres of existing natural landscape on the northwest portion of the site. This space will serve, in perpetuity, as a community space for our residents to utilize for walking, biking, hiking, and other physical or relaxation activities. We will construct paths throughout the preserve that facilitate these activities and will include Gazebos, benches, and even outdoor exercise equipment to enhance the enjoyment of the space. The preserve will also feature a sport court with tennis and basketball courts to provide additional recreation for residents. We are also willing to offer agreements with adjacent parcel owners to grant them access to utilize this nature preserve, expanding the benefit beyond just residents of The Woodlands to the broader community.

A design that utilizes the existing zoning, single-family residential, is also not feasible on the subject parcel. Through a geotechnical investigation, we confirmed that the water table on the subject parcel is particularly high (approx. 3 to 6 feet below grade). This effectively eliminates the viability for a developer to provide any sub-surface structure (i.e., basement) to a development on this land. Home buying preferences today strongly demand basements, therefore, the natural features of this land (i.e., high water table) threaten the viability of a project utilizing the existing Master Planed land use.

10-18-2021

RECEIVED
OCT 19 2021
ORION TOWNSHIP CLERK

To the Orion Planning Commission,

As a resident of Summerfield Condos that border the proposed rezoning

PC-2021-78, The Woodlands Planned Unit Development (PUD) located at 310 Waldon Road,

I **strongly oppose** this rezoning. It should remain single family residential parcel as it was intended.

The impact on the roads, Waldon and Lapeer would be negative. Vehicles run the stop sign at Lapeer and Waldon Rd. It is not safe now. Increase the traffic flow from two directions into and out of the proposed 190 , three story unit is a disaster waiting to happen.

It would stress the infrastructure that is taxed now. The flooding of basements here is a regular occurrence due to the water table. The cement to build this supposed complex will divert water into neighboring areas that can not handle the current water now. The extra sewage from these multi-family units goes where?

This rezoning will directly impact home values in the area. According to the map of the plan, the parking is so close to our residents. What is the code enforcement to stop this should this go through?

Included in this letter are copies from the Orion Twp. Master Plan. These were in place for a very good reason.

Is this meeting just a formality by the commission and it has already been decided to move forward with the rezoning? Has the township forgotten what is in the best interest of the residents?

Does the saying "living in Lake Orion is a vacation turning into a nightmare" the new logo?

Prove me wrong. Or is this about the almighty dollar.

Linda Stein

#289 Four Seasons Dr.

Dear Orion Township Planning Commission.

As a tax paying member of Orion Township,

I am opposed to the rezoning of parcel #09-23-351-024. This land is on the east side of 310 Waldon Road. Rezoning this land from single family-residential to planned unit development is not in the best interest of the community. First, has the board considered the traffic congestion that already exists along M-24. Adding 190 units to this land has the potential to add hundreds of extra vehicles to the road. More traffic, more accidents, more wear and tear on our roads- and we know that Michigan roads are not built to last. Second, this planned unit development will have an impact on

s local wildlife- both plant and animals. As this land is currently undisturbed the construction of a large multi-leveled building has the potential to destroy habitats of animals and plants alike. And while there is a small green spaced in the plans it is not nearly enough to make up for what will be destroyed. Third, Lake Orion Community Schools has many schools close to capacity. The schools do not have the room for the potential number of students that this planned unit development would bring in. The schools do not have the space for too many more students.

In closing, it is my sincere hope that you will act in what is the best interest of the current residents of the Lake Orion Community. Orion Township does not need a 190 unit multi-leveled building development. A development that puts strain on our infrastructure and destroys habitats.

I do know that many of my neighbors also feel that rezoning land #09-23-351-024 is disadvantageous to the people, land, and animals of Orion Township.

Sincerely,

Sharon M. McQueen

Sharon McQueen

229 Four Seasons Drive

Lake Orion, MI 48360

RECEIVED

OCT 19 2021

Orion Township
Planning & Zoning

Debra Walton

From: Jonathon Zupancic <jpzupancic@gmail.com>
Sent: Wednesday, October 20, 2021 11:17 AM
To: Debra Walton
Subject: Regarding PC-2021-78 The Woodlands

RECEIVED
OCT 20 2021
Orion Township
Planning & Zoning

To- Charter Township Of Orion Planning Commission

I want to register my objection to the proposed zoning change on parcel PC 2021-78 The Woodlands.

The proposal to rezone this property to a 190 unit multi-family development is wrong for the Orion community on multiple levels. Our concerns are:

-Infrastructure Concerns: Traffic: Does Waldon Road have the capacity to handle another minimum of 190 cars with the potential of having multiple residents at this new development? It could mean 400+ additional vehicles. Additionally, turning on to M-24 from Waldon during rush hour is already boarding on danger due to the lack of traffic lights; adding this traffic would add to this danger.

-Infrastructure Concerns: Power Grid. Having lived on Waldon Road for only six months, we have already had multiple brownouts as well as multiple power outages. How does adding more homes/apartment complexes affect the power grid?

Environmental Concerns: Flooding: We have seen multiple storms that have contributed to flooding over the past summer. By taking away a large area of natural woods and making it primarily concrete, ensure that we as a Lake Orion community get more flooding?

-Environmental Concerns: Light Pollution: One of the many actives people like to do is look towards the night sky and see the night sky. As Lake Orion continues to grow, where does the balance between growth and nature fall in priorities? Will this new development have street lights? One would assume they would for safety reasons but by doing so; this contributes to light pollution that robs everyone of the experience of the night sky.

-General Concerns: In the proposal, the developer mentions several apartments buildings and how they are at or near capacity. However, the developer did not mention Orion Cove, which sits in Lake Orion, or Sycamore Creek, in Auburn Hills, and their capacity? Is this because the proposed development would need to be "affordable housing" but more "high-end" living? Within our community, we have seen Pulte build multiple projects within a few miles where the homes are well above $300,000. So ultimately, what purpose does this development serve? Heron Springs is a high-end apartment with rent being above $1600 per month. Does Lake Orion need more "high-end" living?

In closing, please disapprove of this rezoning proposal. We are all caretakers for the Lake Orion community. Growth for the sake of growth is, in my opinion, what Lake Orion does not need.

Thank You,
Jonathon Zupancic

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This message is intended only for the named recipient. If you are not the intended recipient you are notified that disclosing, copying, distributing or taking any action in reliance on the contents of this information is strictly prohibited.

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OCT 20 2021

Orion Township
Planning & Zoning

Amy Reynolds
419 Waldon Meadows Ct.
Lake Orion MI 48359

October 20, 2021

Lake Orion Zoning Committee
2525 Joslyn Rd
Lake Orion MI 48360
Dear Lake Orion Zoning Committee Members,

I am writing to express my strong opposition to PC-2021-78, the proposed rezoning of the property from Suburban Estates to Planned Unit Development to construct a 190-unit multi-family development. While the local community may be unable to prevent development, that will be detrimental to the area, nearly all residents in the surrounding neighborhoods are completely opposed to the addition of multi-family housing that will cause traffic and safety problems, create more problems with schools, destroy local wildlife habitat, and potentially lower the property values of the existing community.

Traffic and safety of pedestrians are major areas of concern. Traffic backs up on east Waldon as people try to turn onto Lapeer Road. Additionally, the traffic on both sides of Waldon will create a disproportionately surge during morning and evening rush hours, causing traffic issues during critical times for the existing Waldon Road area neighborhoods. The traffic surge during morning rush hours will also negatively impact safety for children, as some students walk to school in the mornings. In general, the area traffic is continuing to increase, and heavy traffic is already common from Lapeer Road to Joslyn Road while traveling on Waldon Road, which may not have been anticipated during the rezoning proposal. Lapeer Road is constantly moving and, at certain pockets, can be backed up, making it difficult to enter off Waldon Road. If there were additional 190-units added, it would make travel nearly impossible at the Waldon Road and Lapeer Road intersection.

Wildlife has been observed in the area, and any development will destroy their habitat. Any planned development of the property should consider the continuing impact to local wildlife habitat. Another impact of this proposed rezoning is that our property values are likely to go down in the area if multi-family apartments are built. Multi-family dwellings are inconsistent with the neighborhoods developed in the area. The change in zoning will affect a very large area in my backyard. These new uses will include multi-family rental apartments, intended for lower incomes, built on smaller lots at high density. When moving to Lake Orion and choosing our home, we were excited about the value our property would bring to the area. It is disappointing to learn how this proposed rezoning would greatly impact our neighborhood.

I was disappointed that only a handful of my neighbors received notification on this proposal and we did not receive any. When my partner and I decided to build a house, we chose the city of Lake Orion for numerous reasons. We are very disappointed to learn of this proposal and even more disappointed that we learned of it on social media and were not notified by the city. I know my opinions are shared by many who have wrote letters and will be attending the meeting in person.

Thank you for your continued service and support of our communities.

Regards,
Amy Reynolds

RECEIVED

OCT 20 2021

Orion Township
Planning & Zoning

Nick Welshans
419 Waldon Meadows Ct.
Lake Orion MI 48359

October 20, 2021

Lake Orion Zoning Committee
2525 Joslyn Rd
Lake Orion MI 48360

Dear Lake Orion Zoning Committee Members,

I am writing to express my strong opposition to PC-2021-78, the proposed rezoning of the property from Suburban Estates to Planned Unit Development to construct a 190-unit multi-family development. I believe this will be detrimental to the area because the addition of multi-family housing will cause traffic and safety problems, create more problems with schools, destroy local wildlife habitat, and potentially lower the property values of the existing community.

Traffic and safety of pedestrians are major areas of concern. Traffic backs up on Waldon as people try to turn onto Lapeer Road. The additional traffic on both sides of Waldon will create a disproportionately large surge during rush hour, and that morning traffic surge will negatively impact safety for those children that walk to school in the mornings. In general, the area traffic is continuing to increase and heavy traffic is already common from Lapeer Road to Joslyn Road while traveling on Waldon Road, which may not have been anticipated during the rezoning proposal. If there were additional 190-units added, it would make travel nearly impossible at the Waldon Road and Lapeer Road intersection.

Wildlife has been observed in the area, and any development will destroy their habitat. Any planned development of the property should consider the continuing impact to local wildlife habitat and our environment, including the noise pollution this sort of development would bring. Another impact of this proposed rezoning is that our property values are likely to go down in the area if multi-family apartments are built. Multi-family dwellings are inconsistent with the neighborhoods developed in the area and this change in zoning will affect a very large area in the back of my neighborhood. When moving to Lake Orion and choosing our home, we chose this area specifically because we wanted a quiet neighborhood of single family homes. It is disappointing to learn how this proposed rezoning would greatly impact our neighborhood and my desire to stay in Lake Orion.

I was disappointed that only a handful of my neighbors received notification on this proposal and we did not receive any. We are very disappointed to learn of this proposal and even more disappointed that we learned of it on social media and were not notified by the city. The purpose of this letter is to express my opposition of rezoning, but I would additionally like a response as to why I was not notified of this rezoning or meeting on this matter. While my property itself does not back up to the proposed site, my neighborhood does and I will surely be impacted by this.

Thank you for your service and support of our communities.

Nick Welshans

Ms. Terry M. Clissold

322 Four Seasons Drive

Lake Orion, MI 48360

(248) 892-3510

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OCT 20 2021

Orion Township
Planning & Zoning

October 18, 2021

Planning Commission

Orion Township Hall

2525 Joslyn Road

Lake Orion, MI 48360

Re: PC-2021-78, The Woodlands Planned Unit Development (PUD), located at a vacant parcel east of 310 Waldon Road, Sidwell #09-23-351-024.

Dear Planning Commission:

I live at the Summerfield Condominium community, which is located behind the above listed proposed development. I am concerned about the water drainage issue that will take place if this proposed development is built.

How will water drainage be addressed so the water does not drain onto the Summerfield Condominium property? The proposed development will have concrete for parking of the residents and their guests, and water will travel off the concrete onto Summerfield Condominium property unless routed elsewhere. How and where will the water be routed?

I look forward to hearing back from the Planning Commission regarding this water drainage issue.

Sincerely,

Terry M. Clissold

Debra Walton

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OCT 20 2021

Orion Township
Planning & Zoning

From: Brian Zakalowski <brizak79@gmail.com>
Sent: Wednesday, October 20, 2021 2:28 PM
To: Debra Walton
Subject: Apartments on Waldon

I am writing to voice my opposition to the proposed apartment complex on Waldon. My girlfriend and I are in the process of building a house in the Waldon Meadows subdivision. We chose that sub because of its small size and quiet surroundings, backing up to Bald Mountain. We figured this would be a great place to raise a family. The addition of a 3 story apartment complex will negate all of this! Added traffic on Waldon, the added noise, and statistically higher crime rates. We are saying NO to the rezoning of this property, and would like it to stay single family ONLY. Thank you.

Brian Zakalowski

Debra Walton

From: Ron Schoenstein <ron.schoenstein@gmail.com>
Sent: Wednesday, October 20, 2021 2:38 PM
To: Debra Walton
Subject: Proposed Waldon/Lapeer Road Condo Development

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OCT 20 2021
Orion Township
Planning & Zoning

Good Afternoon Debbie,

We are aware of the hearing taking place about the new proposed condominium development which is to be located right behind our new subdivision Waldon Meadows. We would like to strongly object to the building or development of this land due to the following reason.

We object to The Woodlands apartments based on the following reasons:

- Traffic and transport: new apartment buildings will drastically increase traffic, impact on local air quality, safety of pedestrians and drivers. There will be a significant negative impact on the health of current Lake Orion citizens. The high volume of car traffic will impede the local citizens and their ability safely to get to their workplaces Waldon Road has only two lanes and Lapeer Road traffic is already harsh.
- The number of students at schools will increase which mean that quality of education might go down and there is a doubt that new schools will be able to keep up this this explosion is additional demand as a new development is built.
- Safety. Today Lake Orion and Orion Township are safe area for living and growing families. Small apartments and constantly change of renters with checking background will increase issues with a public safety.

Moreover, building apartment complex will cause a decline in the value of our current housing development, also we have concerns that we could be faced with increase of safety and traffic issues. When we move to Lake Orion only after we checked school ratings and safety concerns first. These glowing reviews directly impacted our decision to move here to Lake Orion and Orion Township. We would like to keep our community safe for each other and great for growing families.

Sincerely,
Ronald Schoenstein

3093 Waldon Meadows Dr.,
Lake Orion, MI 48359

Debra Walton

From: Schuette-Haataja, Meredith <mhaataja@dcds.edu>
Sent: Wednesday, October 20, 2021 2:27 PM
To: Debra Walton
Subject: Proposed apartment complex on Waldon

RECEIVED
OCT 20 2021
Orion Township
Planning & Zoning

I m writing to state my opposition to the apartment complex proposed for Waldon between Gidings and Lapeer. I live at 321 Waldon Ridge Dr and already struggle with the traffic trying to get onto Lapeer Rd. Just yesterday I was rear ended trying to do just that.

Please note my opposition in your ongoing discuss of this matter.

Thank you,
Meredith Haataja
248-214-3175
--

Meredith Haataja
Math Department

DETROIT COUNTRY DAY SCHOOL
22305 West Thirteen Mile Road
Beverly Hills, Michigan 48025
O: 248.430.1677
mhaataja@dcds.edu

RECEIVED

OCT 20 2021

Orion Township
Planning & Zoning

From: Jill Bann <jcallist9@gmail.com>
Sent: Wednesday, October 20, 2021 3:12 PM
To: Tammy Girling <tgirling@oriontownship.org>; Mike Flood <mflood@oriontownship.org>; Chris Barnett <cbarnett@oriontownship.org>
Subject: The Woodlands Planned Unit Development

To Whom It May Concern:

I would like to write you to express my extreme opposition for the proposed zoning change on 310 Waldon Road, Sidewell #09-23-351-024.

I live in the Waldon Park Subdivision, just West of the proposed development and this would not only negatively impact my home value, but it would also negatively impact traffic on Waldon Road. The intersection at Waldon and M24 is already quite congested, especially in the morning. With no traffic light on M24 it makes for the potential of even longer backups and/or accidents if a 190 unit goes in on Waldon Road. Also, this area is filled with wetlands and building on them will likely negatively impact the area's ecosystem and potentially cause worse flooding for our community as wetlands produce much less runoff water than a parking lot or structure.

I am unable to attend the meeting regarding this zoning proposition, but I wanted my opposition to be heard. If you have any questions or concerns, please let me know.

Thanks,
Jill Bann
jcallist9@gmail.com
2800 Waldon Park Drive
248-219-6801

RECEIVED

OCT 20 2021

Orion Township
Planning & Zoning

From: ashley zettel <ashleyzettel@gmail.com>
Sent: Wednesday, October 20, 2021 3:38 PM
To: Tammy Girling <tgirling@oriontownship.org>
Subject: Rezoning proposal on M-24 & Waldon Rd

My name is Ashley Zettel and I live on Waldon Park Drive in Orion, fairly close to the new 190-unit single family propasal for M-24 and Waldon Rd. My husband and I, along with the rest of our association, are very concerned about the building of such a high amout of residencies in an area with a large amount of traffic to begin with. Aside from the decrease this will likely cause to our property value, I am also concerned how this will affect the large wetland behind our property, where a great deal of wildlife calls home. Having moved here in 2010, we have enjoyed many water loving birds, such as the blue hering, sandhill crains and egrets. We also have a great deal of amphibians and turtles that call the area home. I feel that coupled with the new subdivision that is already being built across from this wetland, that any other development that will likely have run off to this area will only damage or eliminate its inhabitants. Its sad that increased land development also causes a great deal of land dwelling wildlife to become displaced as well and a building of this size and capacity will ruin the unique rual feel this area of orion has provided its residents for many years.

Thank you for your time and consideration in this matter,

Richard & Ashley Zettel
2829 Waldon Park Dr
Orion

To the members of the Orion Township Planning Commission and Board of Trustees:

Re: PC-2021-78 The Woodlands Planned Unit Development at 310 Walden Rd. impact on Summerfield Condominium Property, it's owners and value.

I object to the proposal to rezone this property from Suburban Estates & Single Family Residential-2 (R-2) to Planned Unit Development (PUD) to construct a 190-unit multi-family development for the following reasons:

1. **Rainwater Control**
   I have serious concerns about exacerbation of our existing water problems behind our buildings all along the southern property line that would adjoin the proposed 190 unit development buildings and parking lot. The township zoning board may not be aware that we have a ground water drainage problem on the property that years of effort by our Association has been unable to cure. Some of the affected units have experienced water in their basements, some multiple times. Our lawn care company had to suspend mowing back there more than a few times this summer because of too much water standing for many days. The proposed building side of the property line is quite a bit higher in elevation than even the berm that runs along the tree line. There would have to be considerable runoff from the buildings and parking lots in this proposal that would create a huge rainwater burden added to the burden we already have.

   The building and parking lot density of *any* multi-family proposal would encounter this rainwater management concern. A single family residential plan, as it is currently zoned, would leave more open ground to absorb rainwater and design flexibility to avoid furthering the problem on the Summerfield side of the property line.

2. **Air Quality**
   Vehicle emissions from 190 units, many of which would have more than one vehicle, adds a lot more exhaust especially during peak commuting hours. Already exhaust from M-24 is very heavy at these times and can be smelled from inside my unit that is a few buildings west of the road. Even with windows closed and HVAC operation the air intake brings it in the building. I am sure you are well aware of the contribution of exhaust to asthma and other health problems. The proposal also would reduce trees and vegetation to process the existing exhaust in this area.

   A single-family plan on that property would have far less vehicles associated with the residences, and more lawn and trees than a big parking lot with buildings in the middle.

   There is also already the emissions and smells from the dump and the Environmental Wood Solutions processes affecting this area on top of the Lapeer Rd. exhaust.

3. **Appropriateness to the area**
   That area of the township is semi-rural suburban and an apartment rental complex is not homogeneous to the surrounding area. It would change the attributes that drew us to reside in Summerfield in this part of the township: destroying natural wooded vistas, displacing wildlife, adding noise and as mentioned above negatively impacting air quality.

Per the Orion Township Master Plan, the future use as single family medium low and medium density is entirely as it should be. It is a good plan for the area and the township should not deviate from it's plan.

A 100+ (nearly 200 preliminary) PUD of the nature proposed belongs in a more urban part of the township. This is not a walk-to-downtown area in line with DRC's mission and a walk-to-downtown area is where such a PUD belongs.

4. **Nearby Property Values**
   I acknowledge that a large residential project would bring in more tax dollars per square acre than a single-family neighborhood. At the same time, it would reduce the property values of the Summerfield units bordering the project which in turn would reduce property values of all Summerfield units and negatively affect the property tax collection on existing properties – in Summerfield and along Waldon Rd. As it is now we can expect our property values to continue to rise well into the foreseeable future.

   The developer has managed to find two studies to the contrary, however it is entirely possible that studies also exist to support the opposite conclusion if one looks hard enough.

5. **Traffic**

   Despite what the traffic study portends, there is no way 190 new residential units will not impact the traffic on Waldon and on Lapeer Rds. That density is too high not to have an effect. Besides increasing time and trouble on motorists, it increases the danger to the wildlife in this area. There will always be significant wildlife due to the proximity of Bald Mountain State Park land. The wildlife does not know to remain only on the park property.

Even though our own subdivision is a multi-family PUD, the density of residents on our property and the design of our 2-unit buildings (that have the appearance of houses) is much different than tall, large apartment buildings and very much closer to a single-family concept.

The mission of the township should be to safeguard and improve quality of life for it's residents. Decisions based on potential tax revenue alone endanger that mission.
Good quality of life has a cost that is worth investing in.

Please deny the proposed zoning change for the sake of the residents that already reside in the area.

RECEIVED

OCT 20 2021

Orion Township
Planning & Zoning

Thank you,

Susan L Johnston
348 Four Seasons Dr
Lake Orion MI 48360

October 20, 2021

Received at the meeting

October 18, 2021

Planning Commission
Orion Township Hill
2525 Joslyn Rd.
Lake Orion, MI 48360

Planning Commission:

As per your letter concerning PC-2021-78, The Woodlands Planned Unit Development, we are responding in opposition to this zoning change.

We believe that your 2015 Master Plan Trout Creek area has been designated as a single family medium density dwelling.

To now change these plans will be detrimental to the residents surrounding and abutting this area. We do not feel that this is in the best interest of the above mentioned residents.

First of all, traffic is already horrendous in and around Waldon Rd. and Lapeer Rd.

The noise level of a 190 unit multi family development is again not in the best interests of surrounding areas.

Sanitation, utility usage will also be affected.

This type of building will not enhance our property or the value of our property. It will do just the opposite.

Disturbing conservation and natural resources is also a concern.

Just because a developer with money wants these changes, does not make it the right thing to do for the whole of the community.

Thank you,
Lorie Cook
Lorie Cook
236 Four Seasons Dr.
Lake Orion, MI 48360

1. edit Does any housing complex such as your proposing have to have a certain amount of units for low income?

From: Dave Bann <dave.bann@gmail.com>
Sent: Wednesday, October 20, 2021 5:51 PM
To: Tammy Girling <tgirling@oriontownship.org>
Subject: Opposition to Proposed Zoning Change at 310 Waldon Road

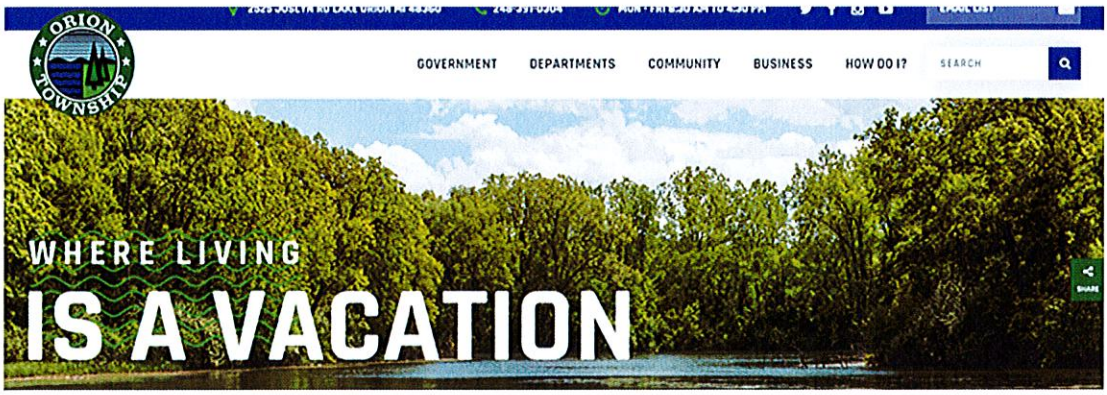
RECEIVED
OCT 21 2021
Orion Township
Planning & Zoning

Dear Tammy,

I am writing to state my vehement opposition to the proposed zoning change at 310 Waldon Road, Sidewell #09-23-351-024.

"Pride of ownership" is real and keeps communities, like Orion Township, safe, clean, and an attractive place to live. The proposed PUD does not accomplish any of the stated Township goals, and actually moves us further away from the type of community we all want Orion Township to be.

Orion Township very rightly boasts as being a place "where living is a vacation." How does a Planned **URBAN** Development fit with the culture and aesthetics of such a community? Common sense should tell you any studies that have concluded the proposed PUD is good in any way for Orion Township are completely and totally false.



The proposal to destroy wetlands and all wildlife living in it will cause significant harm to the wonderful community so many of us

are happy to call home. Just this month, for example, rain caused significant flooding in the immediate area of the proposed PUD. A development such as this will exacerbate the drainage issue, causing damage to my home and surrounding property, as well as that of my neighbors and the community at large.

Additionally, the traffic that will result from the 500 residents that will move in to the area that is only 7 acres will create a substantial bottleneck at the intersections on both sides of the proposed development, neither of which currently have traffic lights (M-24 & Waldon to the East, and Giddings & Waldon to the West).

Please do not allow this development to move forward. The land was and continues to be properly zoned so as to protect the people and wildlife who already call this area home, as well as all of Orion Township.

Please make the right decision here.

Thank you,

Dave Bann
2800 Waldon Park Drive
Orion Township, MI 48359
(248) 657 - 2000 Cell
dave.bann@gmail.com

RECEIVED

OCT 21 2021

Orion Township
Planning & Zoning

From: Erika Proctor <erikaproctorphoto@gmail.com>
Sent: Wednesday, October 20, 2021 6:53 PM
To: Chris Barnett <cbarnett@oriontownship.org>
Cc: Tammy Girling <tgirling@oriontownship.org>
Subject: 310 Waldon Zoning Change

Hi Chris and Tammie. This is Erika Proctor (hi Chris!). I'm off Park Pointe Lane which is part of the small Waldon Park sub off of Waldon Rd. I just learned about the zoning change at 310 Waldon today and really wish I could be there for the meeting. I have many concerns with the zoning change. The traffic on Waldon road with so many apartments, the loss of semi rural feel which is why so many of us live off Waldon road. I also have another concern. As I know you recall we had horrible flooding two weeks ago. 100 year floods are no longer every 100 years. How do we deal with all this rain when it happens?

You should know that for every inch of rain, a 1 acre forest will produce 750 gallons of runoff water. A parking lot that is one acre produces 27,000 gallons of run off water (see link below). Can you imagine how much worse that flood would have been in the surrounding homes without the acres of forests and trees that are part of the 310 Waldon development? Remember it's not a matter of if we have another rain like that, but when. We can't afford to cram every square inch of Orion Township with concrete and buildings. We need to expand responsibly and the only thing that makes sense there is single family homes. Even then we'll have more runoff, but that's another topic for another day about how we need more native trees and plants in our area.

Please give this serious thought.

http://vcnva.org/conserving-and-expanding-tree-canopy-for-cleaner-and-healthier-communities/

Thank you Chris and Tammie

-Erika Proctor

--
Erika Proctor Photography
Email: erikaproctorphoto@gmail.com
Website: www.erikaproctorphotography.com
Phone: (248) 266-2137

Marie and Steve Eynon -369 W Greenshield Rebuttal to Detroit Riverside Capital Statements at Proposed Zoning Change 10/20/21 Hearing

- Petitioner stated the storm water runoff would be handled via drains in the parking lots. There are no storm drains in the area per Orion Township or Oakland County drain maps to capture development runoff. This ensures the proposed development storm water runoff will drain into open creeks and ponds flooding surrounding properties.

- Petitioner stated traffic study indicated a 2.7% and 3.1% am/pm traffic increase due to the development. This is incorrect. Page 46 of the Rowe study states- <u>in the current day without the proposed</u> <u>development</u> these numbers reflect the total entering vehicles (TEV) in the am/pm peak hours. These percentages were determined without the development in place. (The added traffic estimate provided later in the study is based upon a PUD "urban parking model"; a misleading input in the ROWE study.)

- Petitioner made numerous references to the diversity the development would bring to the community using millennials and empty nester retirees in presentation examples. The respondents stating their objections at the meeting reflected this same diversity: millennials and retirees, from our community contradicting the Public Good DRC purports to serve. It is already served by millennials and retirees who object to this PUD!

- Petitioner stated that people are resistant to change, lamenting that was the big reason for the groundswell of objections to the PUD. This too is inaccurate, there was no groundswell of objections to the Waldon Meadows SEV rezoning for single family homes that are now completing within 400 yards of the proposed PUD. Multiple respondents stated they had no problem with the 12 acres being developed as single family, or site condos.

- The petitioner said the proposed 42 foot building height would be negated by lower PUD elevation by showing a section cut that did not support this statement. The elevation shown was not low enough to block line of site from 42 foot high buildings into neighboring properties contrary to petitioner's assertions. (Please also note the design is not yet complete and a flat roof concept would allow for rooftop amenities/activities at a higher line of sight into neighboring properties.)

- Petitioner stated they would save as many trees as possible ensuring privacy to surrounding properties. With primarily deciduous trees losing leaves every fall, this assertion is incorrect October through May.

- Petitioner stated the development would increase comparative property values based on a Harvard study without providing the study in their rezoning and variance request. What are the parameters of the study? Who paid for the study? Our realtor with 30+ years of expertise in Oakland County found this assertion laughable.

- Petitioner referenced what may be the "public good" portion of this PUD; a "nature preserve" in the wetland area of the property. As of the meeting date they had not applied for EGLE wetland permits. Pathways and a dog park were mentioned. (Basketball and tennis courts were in the zoning and variance application.) This is a water fowl nesting and amphibian habitat making walkways, a proposed dog park, basketball and /or tennis courts within or next to a nature preserve incongruent. Petitioner magnanimously offered a potential agreement to allow neighboring properties to access the nature preserve. Per EGLE website, wetlands permits require the proposed activity allows for public access. Could this be the reason for their offer? Would the proposed agreement be a mechanism to gain indemnification for damages caused by flooding and invasion of privacy from the PUD?

- Other requirements for wetlands permits state the proposed activity needs to be dependent upon being located in a wetland. This PUD is not dependent upon a wetland location, to the contrary; petitioner claimed buildable space constraints require 42 foot height buildings to make this proposed PUD viable. Additionally the proposed PUD would be adjacent to the Bald Mountain State Recreational Area which includes hiking trails, camping, kayaking, hunting, and a gun range available to all state residents. About 2 miles north on Josyln Rd is an exceptional community dog park. Orion Township has 4 additional parks, 3 trails, and 6 playgrounds providing all residents ample choices for outdoor activities without destroying waterfowl nesting wetlands for PUD rezoning and variances..... How is this PUD in the public good or interest?

- Petitioner indicated he "felt comfortable" with using 70% of suburban parking requirements, based on the urban model where the number of vehicles per bedroom is lower. This is ZERO walkability location, yet petitioner ignored the parking plan underserves "Luxury Lifestyle" residents by at least 30%. (Perhaps petitioner believes residents paying a premium to rent want the long walk from Waldon road or the car club complex to get home?) Is this a luxury PUD or not?

- Petitioner asserts in a pre-application meeting with various city stakeholders, the city's engineering consultant shared that there is ample utility infrastructure adjacent to the subject parcel to support a development of this size. Please provide the signed preliminary report and advise if it included Fast Charge Electric Vehicle stations demanded by luxury buyers for the projected 40% EVs registrants. What should we expect next? Perhaps a study showing the area already requires added electrical substations paid for by the public writ large?

- Petitioner responded that PUD is 100% funded by DRC at an estimated budget of $36 million. Who is funding DRC? DRC are self-proclaimed turnaround specialists with only one development that is ~ 500% smaller in scope and complexity already located in a downtown walkable area. Who is backstopping DRC on this Zero walkability score wetland development? Does DRC funding include state, federal or NGO loans or grants? Does any of this funding require community or developer performances not yet stated?

- **Petitioner has not enumerated what hardships they are relieving in order for them to balance out the impact that this will have on our quiet enjoyment of our property. This includes flooding, noise and light pollution, as well as reduced privacy, increased traffic and property devaluation the PUD will create. It is not incumbent upon the neighboring residents to bear the impact of an ill-conceived turnaround by a secondary developer buying a parcel from another developer in a fire sale after the first developer discovered the wetland constraints.**

- Petitioner made numerous misleading, vague, caveated, and incorrect statements. It leads to this question; is the petitioner trying to hide facts because this PUD is primarily a turnaround opportunity, or was he overwhelmed by the complexity, and ill prepared to answer the challenges put forth by residents? Residents who invested in their community with their money, unlike the petitioner who stated they will own and manage the property for "some period of time" before moving on to the next investment opportunity (turnaround).

Hand Delivered to: **Orion Township Planning Commission**
Orion Township Trustees
Orion Township Treasurer

On:

RECEIVED
OCT 26 2021
Orion Township
Planning & Zoning

Courtney Keisman

Subject: FW: The Woodlands /Detroit Riverside Capital proposal for Orion Twp MI

RECEIVED
JAN 18 2022
Orion Township
Planning & Zoning

From: STEVE EYNON <smeynon@comcast.net>
Sent: Tuesday, January 18, 2022 10:38 AM
To: primeaur@michigan.gov
Cc: Tammy Girling <tgirling@oriontownship.org>
Subject: The Woodlands /Detroit Riverside Capital proposal for Orion Twp MI

Mr Primeau,

Detroit Riverside Capital is proposing a development of 166 apartments on two vacant parcels; east of 310 Waldon Road (Sid 09-23-351-024) and S Lapeer Road (Sid 09-26-101-021) located in the Charter Township of Orion MI. Part of this proposal includes a 12 acre "nature preserve" which will be located in the wetlands portion of the property.

At the last township meeting in October of 2021, Detroit Riverside Capital indicated they would be approaching EGLE for a permit to create a "nature preserve" in the wetlands area. The purpose of the "nature preserve" was presented at the meeting as providing walking trails, dog park, and basketball courts.

Criteria for granting a permit the applicant needs to demonstrate the proposed activity is 1. Primarily dependent upon being located in the wetland area. 2. There are no feasible and prudent alternatives to the proposed activity.
3. An unacceptable disruption to aquatic resources will not occur.

Regarding items 1 & 2. Walking trails, dog park, and basketball courts are not dependent on a wetlands location. The Township of Orion has 4637 acres of land located within the Bald Mountain Recreation area and, "Home to three major trail systems (including the Iron Belle Trail), a state park, large county park, five local parks, and 89 bodies of water (42 of which are over five acres), Orion Township is rich in recreation and open space. Almost one-quarter of the Township is preserved for recreation, more than any of the surrounding Townships. In addition, Orion Township has over 47 miles of safety paths ideal for walking, running, or biking, which are the connector system allowing residents to safely enjoy the natural landscapes and features of our township while promoting a healthy lifestyle."

All of the above recreation areas are already available by bike ride, walking or short drive from the proposed site. Additionally Orion Oaks Park off of Joslyn Road includes the County's largest dog park (at 24 acres). Located less than 5 miles from proposed site.

The changes to the wetlands area to create the walking paths, dog park, and basketball courts cannot be created without disrupting aquatic resources.
The recent "Waldon Meadows" development of single family homes directly to the east of the proposed site removed 10 acres of trees, tall grass, and underbrush right up to the pond forcing wildlife further east. This includes Turtles, Cranes, Geese, Ducks, Snakes, Frogs and Heron. The area that Detroit Riverside would like to develop will remove even more local nesting and habitat for wildlife survival.

Finally, in The Village of Orion, there is another multi family development proposing a vacant school building conversion. Would it make more sense for developers such as Detroit Riverside to utilize vacant industrial, commercial or public buildings? Why not use resources already available with the infrastructure in place for these types of developments rather than continue to strip the land of natural resources while leaving vacant buildings to decay?

Thank you for your time and consideration.

Regards

Marie Eynon
Steve Eynon
369 W Greenshield Rd
Orion Township MI 48360

248-705-7748

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FEB 0 1 2022

Orion Township
Planning & Zoning

February 1, 2022

Attention: Orion Planning Commission

This letter is to inform the commission that I strongly object to the rezoning of 310 Waldon Road by Detroit Riverside Capital. This parcel is now zoned SE. The proposed change to R-2 and General Business will be detrimental to the community in which it exists. Constructing 166 multi-family dwellings is not the appropriate use of the land, as it will overwhelm the infrastructure and cause undue hardship to the residents who live on Waldon Rd.

The residents of Waldon Road have strived to maintain a healthy, ecologically sound, and friendly place to live. Although the builders have commented that they will provide green space for nature, they fail to understand that Bald Mountain State Park is practically in the back yard of 310 Waldon Rd. and that green space exists along the southern portion of Waldon Road behind the residences. Adding more green space will not enhance our environment. Adding 166 apartments will cause ecological hardship, however, by decreasing water runoff due to increased paving and will disrupt peace and quiet of our living spaces. Please do not allow for this rezoning to occur. We depend on Orion Township to follow the Master Plan to ensure that our properties will not suffer from poor planning. To permit this rezoning will result in decreased property value and increased stress in our neighborhood.

Mary Ann Ryan

301 Waldon Rd.

Orion, MI 48359

248-931-1872

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Planning & Zoning

February 1, 2022

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Mary Ann Ryan

301 Waldon Rd.

Orion, MI 48359

248-931-1872

Tammy Girling

From: William McNabb <mcnabbwr@gmail.com>
Sent: Wednesday, February 2, 2022 3:52 PM
To: Tammy Girling
Subject: Woodland Public Hearing

Being unable to attend the joint meeting and public hearing tonight, I would like to submit this email into public record. My name is William McNabb and I live at 350 Waldon Rd adjacent to the property on the agenda for the public hearing. I totally oppose any re-zoning of this property from single family to multiple family. It my understanding that the same developer has changed their plans in hopes of convincing the board to allow the change in zoning. I have lived here for 44 years and have watched new developments go in increasing traffic dramatically. The last thing we need is a multi family development in my backyard. Please don't allow this, so we can maintain some what of a rural setting. Thank you.

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FEB 02 2022
Orion Township
Planning & Zoning

2/2/22

Re: Woodlands Planned Unit Development

Dear members of the Orion Township Planning Commission and Board of Trustees,

We urge you to deny the request from Detroit Riverside Capital to rezone the vacant parcel east of 310 Waldon Road from Suburban Estates/Single Family Residential to a Planned Unit Development in order to construct a 166 multi-family unit development and restaurant.

There are several reasons for our opposition to this proposed project.

1) The zoning change in density from single family to multi-family, along with a commercial business, is not a mere tweak, but a draconian shift in character and intent, and it is inconsistent with the surrounding housing on Waldon Road between S. Lapeer Rd. and Giddings Rd.
2) The environmental impact on the wetlands will be harmful to the waterfowl, amphibians, and other wildlife on this property.
3) The challenging nature of this parcel, with its high water table, is not suitable for a major development like this and construction will have a negative impact on neighboring homes in the form of flooding, drainage issues, and storm water run-off.
4) Traffic on an already crowded Waldon Road will increase, causing delays and frustration for those driving school buses, autos, motorcycles, and emergency vehicles, as well as pedestrians and bicyclists trying to cross the road.

Waldon Road residents, including those who live in the three subdivisions along this stretch of Waldon between S. Lapeer and Giddings—expect the members of our local government to respect our wishes to retain the original zoning for this parcel, or even to consider what else might be an appropriate and creative use of this property. I know that homeowners are disgruntled and upset about the expansion of the Eagle Valley Landfill to the south; some newer residents were misinformed about the expansion, and some longtime residents fought the expansion and feel that their voices went unheard by previous administrations. Imagine if Orion Township were to consider purchasing the vacant parcel at 310 Waldon Road to the north and creating a nature preserve? Limited development of the parcel would preserve the fragile ecosystem of this area and provide a sanctuary for Orion Township residents.

Thank you for your thoughtful consideration of this matter.

Respectfully,

Amy and Tom Keyzer
2857 Waldon Park Dr.
Orion, MI 48359
248-393-1201
amykeyzer@aol.com

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FEB 02 2022

Orion Township
Planning & Zoning

Marie Eynon Objections to The Woodlands PUD request 2/2/22 Meeting
369 W Greenshield Rd Orion Township

DRC's 2nd application asserts the Rowe traffic study shows the new development does not present a significant change in traffic volumes. This is false. The Rowe study on file concludes that currently, without the development there is significant directional traffic volumes along m-24 causing many crossovers and side streets to operate poorly. The study also concluded that future conditions with improvements, meaning traffic lights, would result in LOS D(level of service) with the exceptions of Lapeer and waldon road intersection and the North bound crossover which would be LOS E. Level D is considered acceptable while level E would be lower than acceptable. This is with added traffic lights. Nowhere in the study does it indicate no significant change to traffic volumes will occur. DRC is not indicating any willingness to install the needed traffic signals which will only lower the LOS E expectations.

The Harvard article DRC uses as proof that surrounding property values will increase as a result of the development is false. The article was published in 2007. Without DRC producing the article how can we evaluate to determine its relativity to the current situation? This is important since this article is the sole proof that the development will be an overall benefit to the community by increasing surrounding property values trying to satisfy a rezoning requirement.

DRC is proposing a 12 acre preserve to include walking paths, benches, gazebos, & outdoor exercise equipment. This is not a preserve it is a type of park or recreation area. Preserved lands are protected and/or conservation areas. The changes to this area will upset the wildlife in the area and push them further into already developed areas and M-24. Walking the area in November and concluding no habitats existed is misleading as most wildlife is hibernating or migrated at that time. The promise to offer an agreement to adjacent parcel owners for access to the preserve is another false attempt to fulfill another rezoning requirement of benefitting the community. No mention of the type of agreement is presented. Is it a legal agreement requiring any takers to give up their rights to the peaceful enjoyment of their property? Offering agreements to a few property owners is not beneficial to the community as a whole.
DRC's promise to keep the preserve area in perpetuity is empty. We are standing here today to rezone this property that supposedly is protected. There is nothing to stop a new owner from coming before the board and making a request to change the zoning again sometime in the future as the need arises.

Does the proposed restaurant have a signed agreement in place to assure the building will be occupied? Are there provisions in place if the restaurant fails? Restaurants have a high failure rate leaving the area strapped with a vacant building.

DRC asserts the proposed preserve area as a reason this project can't be provided elsewhere. The area is surrounded by Bald Mountain recreation area which encompasses almost 5000 acres of recreational land. Land which residents don't need to be offered an agreement to use. This is another false assertion in an attempt to satisfy a requirement regarding the unfeasibility of achieving the project without the the rezoning.

DRC referenced an apartment list study that showed 12% of millennial renters always rent, up from 10.7% . Well, conversely 88% don't. It reflects what millennials are thinking at the time of the study. Will they answer the same next year, 2 years? As millennials age will they still always rent? This does not prove long term economic impact on the surrounding area. DRC can't assert that millennials will be living in the development forever.

DRC's reference to housing and resident diversity is baseless. Our community is diverse as evidenced by community members who attend these meetings. To suggest anything else is insulting. To allow rezoning that goes against the master plan and its intention based on the needs of a generation of people who are going to age into different needs is short sighted.
The question why not 2 stories was asked at the last meeting. DRC responded it was not feasible. What? It's not a community benefit if the buildings are 2 stories? Millennials won't rent in a 2 story building? No. This is strictly about squeezing as much profit out of the land while providing no benefit to the community. This proposal harms the community to the benefit of the developer's bottom line. DRC won't make a commitment to retain ownership which strongly reflects a commitment to profit and less to community.

Courtney Keisman

Subject: FW: 310 Waldon Proposal

From: Penny Shults <pshults@oriontownship.org>
Sent: Thursday, February 3, 2022 9:34 AM
To: Tammy Girling <tgirling@oriontownship.org>
Subject: Fwd: 310 Waldon Proposal

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Orion Township
Planning & Zoning

Penny Shults

Begin forwarded message:

> **From:** Erika Proctor <erikaproctorphoto@gmail.com>
> **Date:** February 2, 2022 at 4:27:04 PM EST
> **To:** Penny Shults <pshults@oriontownship.org>
> **Subject: 310 Waldon Proposal**
>
> Hi, I cannot make the meeting so I am relaying my message again. I am Erika Proctor at 514 Park Pointe Lane.
>
> I have many concerns with the zoning change and I truly hope it is denied. The potential traffic on Waldon road with so many apartments, the loss of semi rural feel which is why so many of us live off Waldon road. Although we are near Lapeer Road the landscape of Waldon road is vastly different from Lapeer Road.
>
> We had horrible flooding last year. 100 year floods are no longer every 100 years. How do we deal with all this rain when it happens?
>
> You should know that for every inch of rain, a 1 acre forest will produce 750 gallons of runoff water. A parking lot that is one acre produces 27,000 gallons of run off water (see link below). Can you imagine how much worse that flood would have been in the surrounding homes without the acres of forests and trees that are part of the 310 Waldon development? We can't afford to cram every square inch of Orion Township with concrete and buildings. As it is MANY of my neighbors in the Waldon Park subdivision where I live, have had more water issues in their yard and basement as the surrounding areas have become more developed. Just that new little subdivision by us (Waldon Meadows) has caused more issues. I am afraid of the flooding this massive project could cause even with normal weather at best.
>
> Please give this serious thought.
>
> http://vcnva.org/conserving-and-expanding-tree-canopy-for-cleaner-and-healthier-communities/
>
> Thank you,
> Erika Proctor
> (248) 842-6432

-Erika Proctor

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Erika Proctor Photography
Email: erikaproctorphoto@gmail.com
Website: www.erikaproctorphotography.com
Phone: (248) 266-2137

Courtney Keisman

RECEIVED
FEB 03 2022
Orion Township
Planning & Zoning

Subject: FW: Please Do Not Rezone 310 Waldon Road

From: Dave Bann <dave.bann@gmail.com>
Sent: Thursday, February 3, 2022 3:31 PM
To: Penny Shults <pshults@oriontownship.org>; Tammy Girling <tgirling@oriontownship.org>; Chris Barnett <cbarnett@oriontownship.org>; Donni Steele <dsteele@oriontownship.org>; Brian Birney <bbirney@oriontownship.org>; Mike Flood <mflood@oriontownship.org>
Cc: Jill Bann <jcallist9@gmail.com>
Subject: Please Do Not Rezone 310 Waldon Road

Good Afternoon Orion Township Board Members,

I am writing in vehement opposition to the proposed development and rezoning of property located on or near 310 Waldon Road. Please do not allow the project, and significant harm it will cause to the community, to move forward.

Harm will come to the community by way of the proposal as follows:

1. Water runoff and drainage
    - The creek that is typically dry behind my house has already overflowed several times over the last couple of years. Speaking with my neighbors, they too report the wetlands have "grown" far larger since the Waldon Meadows subdivision was built. The land is already stressed, and the proposed development will greatly exacerbate drainage issues and will burden those of us who already call this area home with what can only be described as a "mess" of swampy water caused by over-building the land.
2. Traffic congestion
    - Waldon is already a "pass thru" route for many making their work and school commutes. Leaving my neighborhood, I most often go West on Waldon, then South on Giddings to avoid the significant traffic jam on Waldon caused by too many cars not able to turn on to Lapeer/M-24. Regardless of any additional driveways or other traffic mitigation efforts, adding a community such as the one

proposed to an already congested area will do nothing but turn Waldon into a parking lot, where driver's take ill-advised risks just to get on to M-24. More accidents will happen and/or more traffic lights will need to be installed, both of which will slow traffic and further congest the area.

3. Wildlife
    - The property is adjacent to Bald Mountain State Park, where deer, turkey, coyote, cranes, hawks, and countless other wildlife call home. A major attraction to the area, by both residents and visitors, is the "Up North" feel the area has, which is in large part due to the abundant wildlife. The more we destroy that environment, the less our cherished community will look like our cherished community. Killing thousands of plants and animals in an effort to encroach on State Park lands directly runs in contrast to the spirit of the community.
4. Community Aesthetics
    - Orion Township attracts people who are tied to Metro Detroit (city) living but who desire an escape from the concrete jungle. Frankly, short term solutions end up being long-term problems. The addition of this community will undoubtedly be a short-run success, as more residents mean more businesses, tax revenue, and an opportunity to enhance existing or develop new resources. However, the people who already live in the area will not continue to do so over the long-run with developments such as this in such close proximity. You will lose current owners who deeply care about the community and want what's best for it, and will instead have a mostly transient, renting, group of temporary residents who will use the community, OUR COMMUNITY, as a stepping stone to their future permanent residences.
    - No, people who rent are not "bad people" as I have often heard from my neighbors. They do not commit more crimes or endanger the community more than land and home owners do. However, "pride of ownership" does exist and is real. If you do not plan to live in the community permanently, then you really and truly do not care what is best for it. Increased taxes for

infrastructure improvements and other community assets will be voted down by people who do not want to pay for something in a community in which they soon will no longer be living. Please do not make Orion Township a short-term stepping stone to a "better" community. And by "better," I mean a community with more permanent residents as opposed to those who are short-term renters.

5. Property Values
    - My wife and I looked at the neighborhood across M-24 on Eagle Ridge Road, that is adjacent to Indian Lake Village apartments, but did not like the apartment complex connected to it for many of the same reasons listed above. We bought a home across M-24 for nearly $100,000 more in large part because it was not so close to the apartment/rental community. We are not the only ones that think this way. Bluntly, building the proposed PUD on the land will decrease values of the surrounding homes. Homeowners do not want to live next to a rental community. In the short-run, housing prices will likely remain unchanged. But over time, as other houses and communities experience a rise in value, homes surrounding the proposed development will stay stagnant as a direct result of the proximity to the proposed development.

The spirit of Orion Township, where "living is a vacation," does not align with multi-story multi-family dwellings and all the negatives that come along with them.

The land likely can (and perhaps possibly should be) developed at some point in the future. I am not opposed to progress in general or the concept of developing this parcel. However, the proposed PUD will absolutely be a detriment to the community and those who are currently happy to live in it.

Please do not allow this to happen.

Sincerely,

Dave Bann

(248) 657 - 2000 Cell
dave.bann@gmail.com
www.linkedin.com/in/davebann

6. CONSENT AGENDA

A. 2021 Planning Commission Annual Report

Moved by Vice-Chairman Gross, seconded by Commissioner Walker, to approve the consent agenda. **Motion carried**.

Chairman Reynolds recessed the regular meeting and opened the Joint Public Hearing with the Board of Trustees at 7:05 p.m. for case PC-2021-78, The Woodlands Planned Unit Development (PUD) Concept, located east of 310 Waldon Road, (Sidwell #09-23-351-024), and 3030 S. Lapeer Road, (Sidwell #09-26-101-021). The applicant, Detroit Riverside Capital, is proposing to rezone the properties from Suburban Estates (SE), Single Family Residential (R-2), and General Business (GB) to Planned Unit Development (PUD) to construct a 166 multi-family unit development and a restaurant.

Chairman Reynolds closed the PC-2021-78 Joint Public Hearing at 8:23 p.m. and reconvened the regular Planning Commission meeting at 8:29 p.m.

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7. NEW BUSINESS

A. PC-2021-78, The Woodlands PUD Concept Plan, located a vacant parcel located east of 310 Waldon Road, (Sidwell #09-23-351-024) and 3030 S. Lapeer Road, (Sidwell #09-26-101-021).

Mr. Michael Wayne said it was important to take a step back and actually consider why there are there complicating things and proposing a PUD in the first place and why they are not just proposing a development that complies with the existing zoning. He added that in order to assess that they have to assess some of the existing zoning challenges that exist with the property as zoned R-2 and SE. The first one of those is related to fire code requirements. He showed the board the density plan and how it can be developed as it is currently zoned. It is a very long driveway that goes to a dead-end cul-de-sac which is about 1,000-ft. long. The Township has an ordinance that says that that can only be a max of 600-ft. long unless there was a secondary connecting point. If they just take the one parcel alone and forget the 7-acres there is nowhere to put a secondary access point on that parcel so it creates a limitation. Whether the road is only 600-ft. or it is a full 1,000-ft. the other parcel is needed to add a secondary drive aisle. In any event, it reduces the number of lots that are feasible. Every time you reduce the number of lots that are feasible it threatens the economic viability of the project.

Mr. Wayne stated that the second thing is, that sometimes there can be interior fire suppression required with single-family homes. If they were to propose single-family homes but propose a density that exceeded 30-units while there is only one way in and one way out to that development all of those would need to be fire suppressed and that is extremely cost prohibited in a single-family environment.

Mr. Wayne said the next challenge of single-family zoning is the high-water table. A geotechnical report that they conducted indicated that the subject parcel has groundwater at levels of about 3-6-ft. below grade. This makes the development of basements extremely challenging for obvious reasons, they are trying to dig a 10-ft. basement and there is water 3-ft. below the ground. It is very complicated in order to dewater the basement digs and to appropriately install the foundations and a lot of times it is completely cost-prohibitive. That really limits the demands of the developed home if it doesn't have a basement.

Mr. Wayne stated that these two things really lead to the economic viability of developing something that is consistent with the parcel as zoned. When they think about developing this parcel there are four main components the first is earthwork and site prep. In this case, based on a per-acre estimate this would be roughly about 4 million dollars. If they look at utility improvements it is another 2 million dollars. If they think about the roadway installation that is another half of a million dollars. Just for the sake of example if they predict the land cost from 2-3 million dollars that gives them a range of total development between 8 ½ and 9 ½ million dollars. Based on OHM's review of their density plan they stipulated that they felt they showed 28 single-family homes, they felt that they could get 26, dividing that by 26 just their raw cost of land per lot would be in the $330,000 - $370,000 range.

Mr. Wayne said that there is a standard rule of thumb that the land value of a single-family home should never really exceed about 25% of those homes' total value so they are talking about 1.2-1.4-million-dollar homes that would need to be built here just to support those land development costs. The problem is these are not 1.2-1.4-million-dollar lots. He showed them an example of single-family homes recently sold at similar densities to the R-2, the lot sizes are about 1/3 of an acre, and the fully developed home in this example which an average is 3-4 bedrooms is selling anywhere between $550,000 - $650,000. As they illustrated before there is no way to build and sell a house on this site for the market value. Clearly, these homes would not be economically viable and would not be demanded by the market based on comparable sales in the area.

Mr. Wayne said now that they understand the complications with the single-family, he wanted to explain why multi-family is so needed in Orion Township. First, they look at the existing supply and it is at capacity. This doesn't leave a whole lot of room for growth. He showed them the newest six main-built properties in Orion Township. Four out of the six of them are completely full with a waitlist, the other two are at 98% occupancy. This is not just a recent trend this is the 5-year average occupancy in Orion Township is about 97% so this is consistent for occupancy to remain this high and the challenge is, all of the supply is now spoken for so they need to create new supply.

Mr. Wayne said when they assess the new supply of units in Orion Township over the last 60-years about 80% of the units were built, which may be a little bit higher than 85% of the units were built-in Orion Township were built before 2000. Only about 350 or so have been built since. What is interesting to look at what was built since then is the rate at which those apartments were absorbed into the market.

Mr. Wayne showed them a graph of units built over the last 60 years (in orange), and a graph of the new units and how many of those units were rented (in blue). The orange bar shows how many of those units were rented. The orange bar almost exceeds the full amount in the same year. All of these properties are not only being built but they are being absorbed quickly and prove that there is a tremendous demand for this type of product.

Mr. Wayne said that Orion Township is growing, it is inevitable and it is happening around them. One of the biggest examples of that is of course the GM Plant, a 1.3-billion-dollar investment bringing 2,000-3,000 new jobs. What a shame it would be if those people could not find a place to live in Orion Township. The cool thing is their project timeline would line up nicely with when GM is planning to finish that building and they could satisfy housing demand needs for the new GM employment with The Woodlands because it sits about 3-miles away. Extremely convenient, a great option for new GM employees, they mentioned American Battery 7-million-dollar investment and 100 new employees, and then as it relates to the Palace redevelopment this is something that everyone has heard about as well, and this project is being conducted by the Schostack Group, and have been family friends with the Schostack's for some time now.

They have an interest in joining them on this project. They have come to a preliminary agreement to joint-venture with a group like the Schostack's and that is something they are very excited about.

Mr. Wayne when they think about building this asset and the other investments that they are making in this surrounding area this is an area they are excited about in the long term, this is a long-term focus for them. Having the Schostack's being a part of that is something that they would be tremendously excited about. Absent to that they are building about 1 million square feet of office space at the old site of the palace, and will create thousands of jobs. So, with those three developments, they have over 3,000 and close to 4,000 new jobs within a three-mile radius of this area, and they have no supply of apartments to put them in.

Mr. Wayne said that this is a new product type for the area. He showed them some samples of some existing products in the area and showed them what The Woodlands would look like. He wanted to show them that it is a unique product that delivers on the need and does so in a way that is enticing to this growing demographic of renters.

Mr. Wayne said a lot of people are unclear as to what is really driving all the growth in the apartment sector. The first is it is easy maintenance so people are obviously tasked with mowing the lawn and plowing their driveway when they live in an apartment. This gives them the gift of time so they have plenty of extra time not taking care of their home. They like the fact that they are flexible and are not tied down to a mortgage. Obviously, The Woodlands is presenting some great amenities and so that is a benefit to them as well. When they think about saving money a lot of people think that apartments are typically more expensive but when they consider the total cost of homeownership and compare the two figures it is actually typical that apartment renting wins out as far as a lower-cost option. Mr. Wayne added that increased safety and a great community are two of the other reasons. All of this combined with a tremendous amount of new demands.

Mr. Wayne said that a record of 82% of renters says that renting is more affordable than owning. There is also a rent.com survey of over 1,000 renters between the ages of 18-34 that found that nearly 8 out of 10 of them don't plan on trading their apartment homes anytime soon. People like renting they are doing it and demanding it more. They need to give them this new product type and this new location to be able to deliver that and that is their objective.

Mr. Wayne said now that they know that multi-family is needed in Orion Township, why is this site a good fit? They showed the improved site plan previously and wanted to call attention to is how some of the metrics that they are proposing compared to some of the metrics of the R-2 and RM-1 zoning categories. From a maximum lot coverage perspective, they are less than half of the permitted maximum coverage at 8.5%, from a density perspective they are below the RM-1 level and thought that fit nicely with surrounding RM-1 densities. In order to do that they need 12 extra feet as compared to the R-2 zoning and about 7 extra feet if they were to compare that to RM-1 zoning. He is 6-ft. 8in. so basically a "him" in relation to an RM-1 and how that would compare to that. The height isn't something that they take lightly but they also recognize that the site on one portion sits below the adjacent homes, so that inherently reduces some of the height. When they factor in the giant existing trees that are to remain, they thought that will help to naturally create some barriers against the height and also the new buffers that they were talking about from close proximity. If there is a 13-ft. buffer and a big building behind it 100-ft. away he didn't think that he would be able to see that building from behind that 13-ft. buffer, so that is the assumption that they are making and that is one of the things that helps to mitigate the request.

Mr. Wayne said that also in exchange for the height, they are providing significantly more setback than what would be required in an R-2 or an RM-1 zoning ordinance so 230-ft. away when the ordinance calls for 100-ft. on the front setback, and then again on the sides and the rear they are 50% more in those cases.

Mr. Wayne stated that they didn't get a chance to readdress some of the stormwater management and exactly how that system works.

Mr. Heffernan stated that first they were asked how is this going to impact the neighbors, and how the basin and their infrastructure were going to work. He said basically, one of the biggest challenges is the flooding. There is a large grade change going north to south, 14-ft. or so. All of that water is actually flowing south towards their neighbors. With any development, there is no increase in the overall volume going to this area. Rain comes from the sky falls to the ground, now what would change is the water flows a little bit faster over pavement than it does over grass. The actual rates from a development standpoint would increase leading to more flooding if there was no infrastructure installed in place. However, as required with any development infrastructure would be put in place in the terms of the berms and landscaping as buffers, imagine a berm providing a divider between these adjacent parcels and theirs, naturally rerouting the flow back towards their site and maintaining all of the water.

Mr. Heffernan said the infrastructure placed within the parking areas, within the grass areas, by turns of catch basins, and yard inlets. The infrastructure will actually retain all of that water on-site, all 15-acres, that was flown to the creek and the pond to the south will no longer be flowing there. In fact, their plan is to reroute all the stormwater flow away from their neighbors and discharge downstream. It is better for them and the neighbors, and overall would benefit all parties involved.

Mr. Heffernan stated that where they would put the basin, basically, it is a large holding tank, think of a bathtub, the water goes in and they control the size of that outlet. What they have sized it for is a 100-year storm, that storm happens once every 100-years if they are lucky, they would have one of them in their lifetime, hopefully, they don't have two. He added that this basin will be oversized to aid all of their concerns with overtaxing the infrastructure. That would be in two parts, the forebay basically acts as a small holding tank, let all of the impurities work by gravity, settle out, and then into the detention basin where it will be held like a bathtub and let out over time. Now if you think of a bathtub, if they let all water come in it would overtax the system but the little hole at the end only a little bit goes at a time and therefore benefits anyone downstream, the ponds or the roads drain further downstream. They will be rerouted around the neighbors, it will be benefiting them, and it will still be maintaining the natural areas as these are above-ground basins planning them with buffers and landscaping, it still beautiful, and provides a good opportunity to maintain the natural beauty of The Woodlands.

Mr. Heffernan said regarding upkeep, anytime they are dealing with the County they have to enter into a stormwater maintenance agreement basically keep the infrastructure, sewers, basins, everything maintained over their lifetime. That is required and it will be maintained in perpetuity.

Mr. Heffernan stated that there were a couple of comments about the EGLE wetlands. If they look at EGLE's interactive map online it is updated as developments appear, this area doesn't have any wetlands in this lower corner by M24 and Waldon. Now where there are wetlands, that is where they are putting the natural preservation area in that pond to the north. There is a big reason why they are developing where they are. Anytime they propose development in a wetland triggers EGLE, they can't do anything without their approval, legally. They will not be

impacting any wetlands nor are there any wetlands actually located in this exact area, they are designing it around them. He added that that goes for floodplains as well, as they did a check.

Mr. Wayne said when they think about the spectrum of densities in Orion Township they wanted to look at where do they fall from the lowest amount of residential density up to the very highest. When they look at the spectrum they see the SF, SE, and SR districts in between .4 – 1.4 units/acre. R-1, R-2, and R-3 at about 3.1-5.2 units/acre, RM-1 at 6 units/acre, RM-2 at 8 units/acres, Gingellville Overlay at 9 units/acres, and Gingellville Overlay, if permitted, could go to as much as 20 units/acre. They found this interesting because their perspective was that at 9.2 units/acre previously they were pushing the envelop and beyond anywhere that amount of density would be permitted in the Township. As they pulled that back to 5.9 units/acre they found that The Woodlands actually scores up pretty nicely in the center of the spectrum sitting right at 5.9 units/acre. Furthermore, when they look at some other neighboring properties some recently permitted, approved, or constructed developments, take Baldwin Square Townhomes for an example, it sits at 9 units/acre located in the Gingellville Overlay district but sits about 50% higher. There is 50% greater multi-family density in other areas of the Township so they are scaling that back to be more in keeping with what is surrounding them. In the case of The Pearl of Orion, they read that is about 12 units/acre from a residential density perspective, so about double the density that The Woodlands is. When they look at the projects with the parcels right next to The Woodlands they see Summerfield Condo community zoned RM-1 borders The Woodlands, Indian Lake Village zoned RM-1 immediately east of The Woodlands, 3120 S. Lapeer just recently rezoned obviously to the south of The Woodlands, and then also 2410 S. Lapeer rezoned north of the Home Depot to be an RM-2 designation. The Woodlands is not looking for anything out of the ordinary compared to what adjacent neighboring parcels have from a density perspective.

Mr. Wayne said that The Woodlands sits in the lower 1/3 of the Township. From traffic traveling perspective if they were to place The Woodlands in a different area of Orion Township, say one that was more north or perhaps even further to the west all of those people are still working in the same places. What they found from the Orion Township website is that 85-90% of people in Orion Township work in all communities that require them to go south. They all know that Lapeer Rd. is a high traffic area but if they put apartment development or a residential development further north then that is just a further way to travel through the community to get to where they need to go or inevitably going based on what the data on the Township website shows them. Lastly, being 3.2 miles away from GM and Palace and about 7-miles away from Chrysler shows that they are situated perfectly to help service a lot of this work traffic from this location. Being in this lower cortile in terms of the proximity of all of Orion Township they think is a benefit and actually why multi-family should go here.

Mr. Wayne stated that there was a fundamental question and one they hadn't touched on yet about will a proposed development be consistent with the intent and spirit of the Master Plan. They interpret that literally, yes, this development meets the intent and spirit, why? Because it is still delivering high-quality housing supply to a growing community. The intent of the residential zoning is being delivered presidential products simply at a higher density. They felt that the intent and spirit from a literal perspective are still being met. When they look at the broader goals there are really 7 key categories that are mentioned as community-wide goals developed from residents. Commercial areas, and industrial areas, are not applicable. When they are analyzing these goals, they think that The Woodlands can achieve three out of five or 60% of the goals of the Master Plan. To him, that is aligning with the intent and spirit of the Master Plan.

Mr. Wayne said in the case of environmental resources, obviously, preserving the natural resources of Orion Township is paramount. They can see an objective one, two, and three,

they feel that they achieve those objectives with The Woodlands project. Growth Management is calling for a balance of housing options. The Woodlands is a balance of housing options. It is also saying that direct higher-density residential commercial should be located in the appropriate areas in order to maintain the real character of low-density areas.

Mr. Wayne said what is interesting about hearing that this property is not viewed as the right area is that being right next to Lapeer and being in that southern quartile that they just demonstrated could actually suggest that it is the perfect, the most appropriate because of those factors and as a result he thought achieved its goal. He added that the residential area is talking about high-quality housing types at various densities that protect the natural features of the Township.

Mr. Wayne stated that in terms of the PUD eligibility criteria it ultimately comes down to this question is the PUD eligible? They are preserving nature, improving aesthetic qualities of the development itself, and the surrounding features. They are improving the stormwater management scenario for the surrounding property owners and they are providing high-quality architectural design. By checking the box on those four items they think they are providing a recognizable benefit. If there is anything that they can do in terms of a more specific public benefit like fixing a sidewalk in this area, they would consider it, but from this perspective, they feel they are achieving that. Density is basically saying that it shouldn't result in any unreasonable increase and that it defines unreasonable increase as an unacceptable significant adverse effect on the quality of the surrounding community and the natural environment in comparison to the impact associated with conventional development.

Mr. Wayne said when they think about the northern part of The Woodlands if it is developed as it is proposed through The Woodlands it remains preserved. If it is developed by the way that it is currently zoned none of that area gets preserved. They feel like in that respect it is actually providing a benefit to that adjacent area by keeping their backyard preserved as opposed to developing into single-family homes.

Mr. Wayne stated that as far as the Master Plan is concerned, they feel like they certainly achieve the intent and spirit of that. Guaranteed open space stipulates that they need at least 15% as they mentioned they are about 60% so they are about four times the required amount. The amenities with the open space must include park-like amenities such as gazebos, seating areas, playscapes, etc., all of this is what they plan to feature in the actual preserve area. With respect to unified control at this moment, they have the option to purchase both parcels by the time they are developing the parcel they will have sole unified ownership of both parcels.

Mr. Wayne said they feel that in all six areas of eligibility, they meet and they meet with enthusiasm. In this environment in this new proposal with this new design, they feel that they had mitigated a lot of the issues that have been brought up by the public and fellow members of the Planning Commission. They think that they propose a project that would certainly be a benefit in the long term to Orion Township.

Engineer Landis read through his review date stamped January 20, 2022.

Chairman Reynolds asked Engineer Landis to touch base on wetland, where do they stand on that if it was reviewed or not? And is that typical for a concept PUD to have that and be reviewing it. Engineer Landis said it was their understanding initially that there was a wetland delineation done in particular for the wetland to the north because that impacts the density plan. They did receive late another copy of the wetland delineation that was for the previous Classic Car Club. If they recall that plan was reviewed and approved, they did receive a wetland permit for that particular site. Obviously, it is not the same impact what they are proposing is

something different, so it would have to be reviewed again. It was his understanding that if they do look at the MERS maps there is obviously a wetland complex to the north, limits to be confirmed by a wetland consultant. In the wetlands on the south, there is a ravine or stream type that flows through the south. He was confident with what they are showing there matches what was in the previous Classic Car Club study.

Planner Arroyo read through his review date stamped January 18, 2022.

Chairman Reynolds said for a concept PUD review they did have preliminary reviews from their Fire Marshal, Public Services, and WRC. There were no major issues being brought forth from those entities. WRC review mentioned some future permitting necessities that would be addressed by the next steps, and OHM Advisors engineering review process.

Chairman Reynolds said he appreciated the comprehensive discussion or presentation that they had here tonight. He commended the amount of research and forethought that has gone into this. He appreciated the fact that this is not the first time they have been here but rather the second and they are trying to actively listen to the conversations and build upon that for a better project for their community. Himself, he still struggles with the density being proposed and the location. He acknowledges that there is multi-family potential along M24 and he didn't have a major issue with that, nor does he have a problem with multi-family going into residential districts as a market demand product, they have seen that in other places. Where he does have an issue is having a tall building reduced buffers and a harsh transition between existing residential home, R-2 uses, Suburban Estate (SE), and then also RM density. He appreciated what is proposed but still had a lot of reservations about the project as it is proposed and still as a concept PUD, didn't know if he was all for everything being proposed. He had some issues with the restaurant component and the distance to parking.

Chairman Reynolds said that the high-end architecture didn't think that was a community benefit he thought it was a development benefit. Preserving wooded areas or wetland areas that are harder to develop or are not developable is not a community benefit either. He struggled with the concept PUD eligibility and also with some of the things that were being proposed.

Vice-Chairman Gross stated that he had a question relative to the pond that is proposed on the south side of the development that the stream runs through. He asked if that pond was under their control? It seemed like it was on an adjoining property. The pond on the south side of the property that fronts onto Waldon Rd. Mr. Wayne said there are two there, the one on the more eastern portion that part is included in the seven acres but the one to the west that was in front of 270 Waldon is not. Vice-Chairman Gross asked if that is where they are proposing the retention pond? Mr. Wayne replied that the retention pond would be the one further east.

Vice-Chairman Gross said that the density was one of the major factors. The density issues impact's a lot of the provisions of the ordinance. The density is six times what the underlining zoning is he thought was an issue that needed to be addressed by the Commission whether they agree with that or don't agree with that. The density is also based upon the 27-acres of which only 20-acres is actually residential and there are 7-acres of (GB) but are taking credit for the entire 27-acre parcel. He didn't think that the proposal was consistent with complying with the underlying zoning or the Master Plan designation. He knew that the attorney has indicated that they can make adjustments to certain regulations but there are excessive requirements in the building ordinance. The building height is in excess of what the ordinance requires, the building length is in excess of what the ordinance provides for, and the parking location is in excess of what is in the ordinance. He assumed that all of those previsions in the ordinance have some logic behind them relative to height, length, and how far people have to walk from their cars.

Vice-Chairman Gross said that the high-quality architectural design is one of the criteria of the PUD and he wasn't sure that the mass and bulk of the buildings are consistent with the existing development in the area, and in his opinion, in compliance with being a high-architectural design because of the bulk of the buildings and the mass of the buildings. There are no carports or garages, the length of the parking to the units, flat facades, there are no balconies. The proposed restaurant did not provide any design criteria to what it would look like which is required under the PUD ordinance. He added that potential traffic, they talked about that ad nauseam, improvements have been identified but not addressed.

Trustee Urbanowski stated that she appreciated them paying attention to the things that were said earlier. She thought that they would make a good neighbor wherever they build but she had an issue with this particular area. Mostly because of the density, and she understood their reasoning behind it. In her opinion, they really need to stick with the underlying zoning. If it was a little bit off, a little bit of a deviation would probably not be that big of a deal but there are quite a few deviations and they are in her opinion significant.

Trustee Urbanowski had a question regarding the restaurant. She didn't think that it was mentioned regarding the traffic that would be coming in and out of that one driveway onto Lapeer would be both residential and for the restaurant, so it would be a mix of traffic going in and out of there. It wouldn't just be however many cars are coming out of the apartment complex. She asked if this was a sit-down restaurant, is this a drive-thru restaurant what are the hours of operation? She knew that they did say that they did take that into consideration but that was just something that she noticed. She was concerned about the stormwater and the effects on the environment again. They are a Tree City and she would like them to respect that as much as possible. She thought that looking at that density plan where they had that four lots that were closer to the wetlands and they had something about clearcutting it in order to put those homes in that area, she disagreed with that, it wouldn't have to be clearcut to be four houses. She thought that the density was too much in this area. She agreed that they do need apartments. They are getting a lot of businesses that are coming here, GM obviously, she would love for them to live here but she thought they compared some other places like The Baldwin Commons and all of that those are in an area that they had anticipated having more traffic and that is why they fixed Baldwin Rd. and had the roundabout so that they could accommodate that and was what they wanted and expected to be there. On Waldon Rd. to her it is too dense, and she was concerned about the height as well, the three stories. She thought it would be a beautiful project somewhere she just didn't think it was the right fit for it in her opinion.

Mr. Wayne asked when they mentioned the density aspect and that it does not fit, was the concern density specifically related to it being multi-family density, or related more to just the total number of units in that area? Trustee Urbanowski replied it is the total number of units because of the traffic. She added that it does affect their public services as well. They have to be very mindful of their Fire Department, Police Department, a lot of those things, of adding too much all at once.

Mr. Wayne replied that the particular parcel is currently zoned the way it is but when they just look at what it is near it is still in that RM-1 category. He asked if it is bordering RM-1 to the north has it to the east, and to the south, how is it too dense when the density is consistent with those other neighboring properties? Trustee Urbanowski said she agreed that they are consistent and that is why the one to the south had that one right before they came to them, but they are setting that right in the middle of single-family homes. It is the transition area and is not consistent with what is surrounding it.

Mr. Wayne said there is also the R-2 parcel to the north which is even higher density 8 units/acre, it is also on Lapeer, it is a half of a mile to the north, and is arguably going to create even more traffic onto Waldon. He felt that being at 6 in relation to that and some of these other ones around was kind of tucking it in and fitting it into where it needed to be and there are other areas where more density or similar density in their immediate vicinity is either existing or it has been approved or will be built. It is challenging for them when they look at this density to think that it doesn't fit.

Secretary St. Henry said he was a little torn because he thought he was the most outspoken of the Planning Commissioner's in regard to the need for multiple housing options in their community if they want to remain a strong community for many decades to come. There is no question that there is plenty of growth and commercial developments especially in the automotive industry and some of the related supply businesses. There is a question in his mind that while he may not personally like these exteriors of these building's he has seen a development like this out west, up north, and thought it would be a very nice development. It will fill up those price points that are realistic for upscale development. He did have concerns not only of the Planning Commission but of the citizens, and for those of them that have lived here for a long time with traffic, especially within that location, within a mile or so of the school complex. At 7 a.m. in the morning just the other day he could not believe the thousands of cars going in and out of the school complex up and down Lapeer Rd. coming out of the feeders such as Waldon. It has been an issue in this Township for 20-years it has only gotten worse. He didn't think that they want to make, especially in this particular area of the Township, the traffic issues any worse whatsoever. He did have an issue with the three-story design, it does not meet the ordinance. He did recognize that there are RM-1 developments around this particular location. The only thing he could say about that is that the majority of those developments with the exception of Willow Creek were developed 25-30 years ago, in the early '90s, and this Township was completely different then. There was probably 30% less traffic on Lapeer Rd. because of all the development that had not taken place yet in Oxford and further north.

Secretary St. Henry said that timing is everything, if they would have offered this development 25-years ago when all of this was open space and these were easy pieces of property to develop this may be a different conversation, but it is not. Now it is 2022 and this community was much different back then. There is no question that there is a need for this type of middle-housing and he supported that, he was not convinced that this was the right location. They recognize that progress is going to take place but they live here and they have to find that middle ground between progress and respecting the wishes and concerns of the citizens that have lived here for many years and the need to manage the historical character of this community. They know what the demands are and they know people want to live here. He thought this would be a very nice development that would attract a lot of people of all ages and backgrounds, but wasn't convinced that this was the right place.

Commissioner Gingell agreed with everything they had said. She had a hard time with the three-story development coming in at this location too. She thought it was too far north even though on the other side of Lapeer Rd. they have some large developments like this. She thought she had a hard time going through two residential properties to access the development. She knew that wasn't going to help their property values, and they are going to have that traffic by them all day and night, and she can't support that. She has been going from 28 to 166 is too many. The public access she thought was concerning in the back because she wouldn't know how that would be accessed if people would also be using the drive throughs for that or cutting through the condominium development to get to that.

Secretary St. Henry said they did mention that if they did move the development further north somewhere and the fact that it would be further along that the people would have to drive to

potentially to the Orion Township/Auburn Hills businesses. He said they mentioned that 80-90% of the people work outside of Orion Township. People have historically moved here not because they wanted to work and live right next door to each other, this is not like one of the southern suburbs of Oakland County. Folks here are trading drive convenience for open space and more trees. People don't mind driving they know they have to drive to get places. He thought if they relocated this very nice development further north or someplace off the beaten path people would still be very attracted to this and would drive it took them an extra 15-minutes.

Mr. Wayne said it was mentioned that if the property was further north people wouldn't mind the drive. The two-part point there is that not only did they have to drive as far but they also don't have to congest the upper two-thirds of Orion Township. It was also mentioned to relocate this site somewhere off the beaten path, to his understanding density of this level has to be on a major thoroughfare adjacent to it, in this case, they are on Lapeer Rd. If they were to go find land north of this also along Lapeer Rd., are they going to hear the same concerns about traffic and then in that case they are driving even further on Lapeer Rd. especially in the areas of the north where it is more congested. He thought that the point of saying it was in the lower third is that it's, yes, it is going to be on this Lapeer Rd. corridor of travel but two-thirds of it will get skipped because it is to the south of there. So, they have to build near a major thoroughfare and by doing so in this lower third it avoids the upper two-thirds.

Chairman Reynolds said they could go round and round about density and where it should be and where could it be. His perspective is development is going to occur in the Township. They welcome high-quality architecture and nice developments in their backyard. The struggle he is looking at is the PUD is a tool and why they are considering a PUD. Not all of the arguments are strong enough for him to justify that right now. Then when they take PUDs and understand that they are a creative development tool to understand that they do have challenging sites in the Township, and they do know there has to be compromise and delineation from certain underlining factors. That doesn't mean that all of those factors are out the window. From a Master Plan standpoint, yes, they outline many of the criteria that they have provided them but they are also looking at compatibility, need, all of those other factors. A big struggle for him is the transitions. When they take a look at RM zoning, they are delineating significantly on buffers even though they have spoken to two buffers. Setbacks are vastly provided and certain instances but are underprovided in others because of where this property is located at. To have a property that delineates from a handful of those underlying zoning components significant to where they are looking at here tonight makes the conversation harder to consider. He didn't want to focus on just one item but rather the idea as a whole. They were there to consider the concept eligibility of this as a PUD, and they knew this was one step in a multi-step process of a PUD. They have mentioned many items here tonight but fundamentally even with all the nice this and wonderful that they are also here to consider some of those basic factors of the PUD eligibility and also compare it to adjacent zonings and what the underlying if it was to be considered how does that look in comparison to other property sites.

Mr. Wayne said that he heard a lot of talks tonight about trees and the importance of trees in this neighborhood and obviously nature preservation was something they felt they were hitting on the head but also as it relates to trying to screen some of these issues and prevent against some of those more deficient setbacks, the solution if vertical, it's tall, its trees, and its buffers. When they do that, as an example, if they were to build basically what would equal a 13-ft. tall wall behind an adjacent single-family home then out their back window they are not looking at a car in their parking lot they are not looking at the building they can't even see it because they are looking at this wall of pine trees that now exist there. While he understands that in certain areas the setbacks are above the requirements but as for those areas where they are less or maybe smaller than would be desired, he thought was the most obvious perimeter of their

property as they are going north. Immediately on the other side of that while it is still single-family zoning is still a vacant farm field. They are not bordering a neighborhood on that as an example, they are not proposing that small of a buffer as if there were 20 houses immediately with their backyards right there. They are interpreting what exists and trying to put the buffers in place, the site design in a way that maximizes the areas as best they can around single-family. That was the intention of increasing the buffers to the residential to the south and also to the condos to the north. Given the fixed box that they have to work in here and given the part that they are working so hard to preserve these are the fit parameters and he felt that they did their best to help mitigate that. He thought that whatever can't be done with horizontal distance can be done with vertical distance.

Moved by Vice-Chairman Gross, seconded by Secretary St. Henry, that relative to PC-2021-78, The Woodlands PUD Concept and Eligibility plan, the Planning Commission forwards a recommendation to the Township Board to **deny** PC-2021-78, The Woodlands Planned Unit Development Concept and Eligibility plan, located on a vacant parcel located east of 3010 Waldon Rd., Sidwell #09-23-351-024 and 3030 S. Lapeer Rd., Sidwell #09-26-101-021 for plans date stamped received January 5, 2022. This recommendation to deny is based on the following findings of fact: that there is no recognizable benefit to the community and is not consistent with the intent of the PUD Concept or the PUD Ordinance: 1) the proposed Planned Unit Development for 166 dwelling units is based on a density on a total of the 27-acres which includes 7-acres of currently GB zoning property and is not consistent or comply with the underlying zoning or Master Plan designation for the subject property; 2) the property is not compatible with adjacent low-density residential uses as identified on the Master Plan and with the existing zoning and will have a negative impact on surrounding properties; 3) there is a lack of compliance with the zoning ordinance requirements for residential development of multiple-family designation such as being an excess of the building height of 42-ft. versus 30-ft. required; 4) excess building length 380-ft. versus 200-ft. maximum, and excess parking location, two buildings from 300-ft. to 500-ft.; 5) the potential negative impact on the traffic at Waldon and Lapeer Roads, although improvements have been identified in a preliminary traffic study they have not been addressed as to how they would be implemented; 6) a concern on high-quality architectural design, his opinion that the mass and bulk of the buildings are not consistent with the existing development in the area and do not comply with the respective zoning ordinance requirements; 7) there is no design provided for the restaurant provided in the PUD.

Discussion on the motion:

Mr. Wayne said when they look at the site, they talked about some of the challenges, the existing zoning, and what is possible, they outlined that it is financially impossible to build as zoned. From that perspective that would imply that the property must be rezoned to be built on at some point trusting that their estimates are accurate. He asked in thinking about the need to have there be a viable path forward, is it multi-family specifically that is a concern? For example, if they were to look at RM-1 and try to apply for RM-1 with an ordinance and they were able to eliminate it if they have four issues currently, they are able to just need one variance on RM-1 would a rezone to RM-1 with a variance present a different perspective from the Planning Commission or not? Chairman Reynolds replied that they are there to evaluate what is in front of them. He thought that all of them are going to have different thoughts and perspectives on what would make everything work. He thought that there have been a number of items that have been discussed including in the motion that is on the table now to talk about underlying zoning. They are aware as a Commission the economics of the Township. They are aware of the missing middle they are working on their Master Plan and they have discussed this extensively. He thought the struggle they have here is, once again, is that they look at all of these factors as a whole and there is a push and pull. They

understand that economics influence a site and they also acknowledge that existing zoning does along with the zoning parameters which they layout. They ask for straight zone projects to apply for, yes there is a process of variances but in a lot of ways, it is very similar to a PUD. Is there any way that they could come to a different conclusion on this project, he was sure there were. Does it fit within the economics? Maybe not. Does it fit with compatibility? Maybe. They are always there to consider further thoughts and future projects. He commended them for what they brought forth and the effort that they have put forth in front of them. He thought that there were still some factors here that needed to be considered in part of this development.

Chairman Reynolds said this is a PUD this is a recommendation from the Planning Commission. This forwards on to the Board and this is a multi-step process, so this recommendation to deny this PC case and the facts that were provided would be forwarded to the Board of Trustees for their discussion at a later meeting date.

Roll call vote was as follows: Walker, yes; Brackon, yes; St. Henry, yes; Gross, yes; Urbanowski, yes; Gingell, yes; Reynolds, yes. **Motion carried 7-0**

8. UNFINISHED BUSINESS
None.

9. PUBLIC COMMENTS
None.

10. COMMUNICATIONS
None.

11. PLANNERS REPORTS
None.

12. COMMITTEE REPORTS
None.

13. PUBLIC HEARINGS
None.

14. CHAIRMAN'S COMMENTS
Chairman Reynolds asked the Planning Commissioner's to take their final look at the Master Plan. It is going to be coming forth to them here at 6 p.m. at their second meeting in February. The goal would be to move that into the mandatory 63-day review period. If they have some of their concluding thoughts, please bring those forth so if there are any items, they can actually include that in motion would be his request so they can keep this process moving along. That will be in their packets. They still need to have that 2nd Open House. They still have the opportunity to revise. If there is something significantly wrong with what they see and where they should be talking about it.

15. COMMISSIONERS' COMMENTS
Commissioner Walker stated that he wasn't sure that they should have a discussion like they do with the applicants. When they say "what should they do" is that their job? He didn't think that anything gets accomplished during that. To ask them what they think he should do makes him feel somewhat uncomfortable. Are they there to help him accomplish his project, or are they to pass judgment on what he has?