MAPS

Location

Zoning

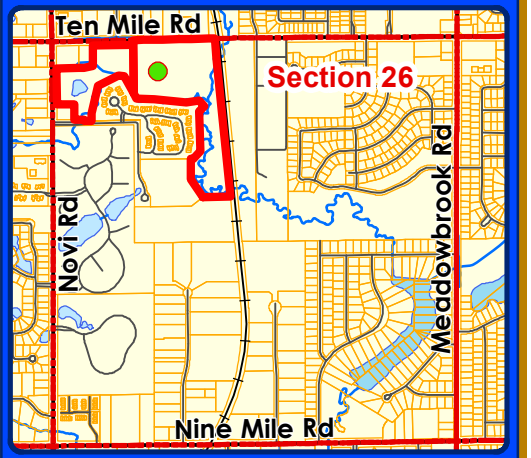
Future Land Use

Natural Features

Floodplain

NOVI TEN PRO
LOCATION





Legend

Subject Property

City of Novi
Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

Map Author: Lindsay Bell
Date: 10/31/23
Project: NOVI-TEN PRO
Version #: 1

Feet
0 80 160 320 480

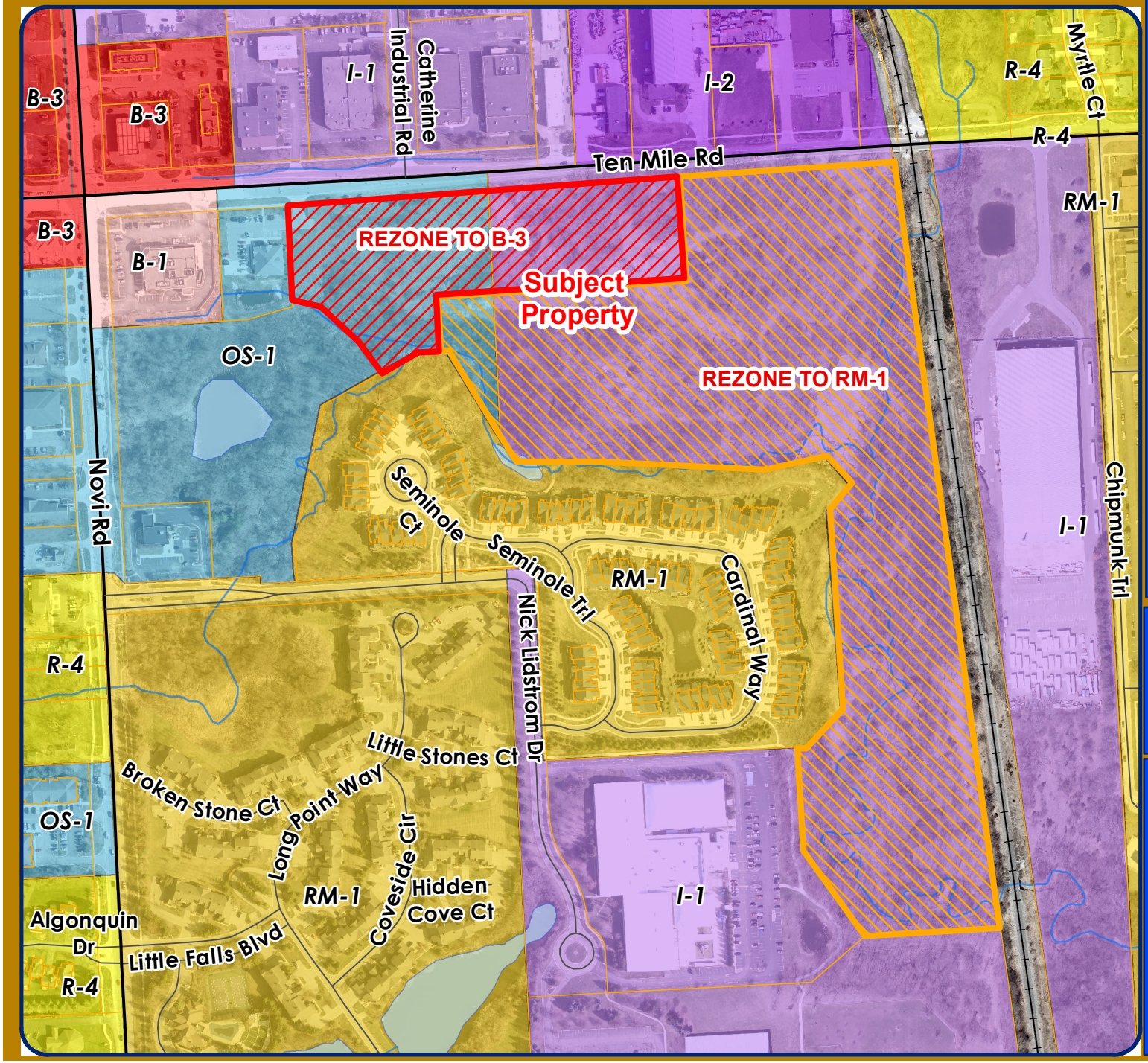
1 inch = 375 feet

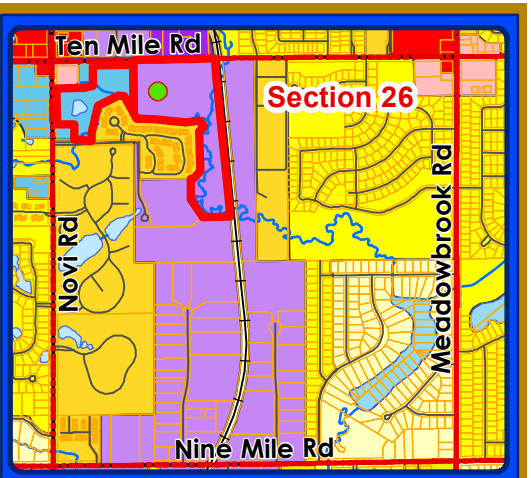
MAP INTERPRETATION NOTICE

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NOVI TEN PRO

ZONING





Legend

- R-4: One-Family Residential District
- RM-1: Low-Density Multiple Family
- B-1: Local Business District
- B-3: General Business District
- I-1: Light Industrial District
- I-2: General Industrial District
- OS-1: Office Service District
- Subject Property

City of Novi
Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

Map Author: Lindsay Bell
Date: 10/31/23
Project: NOVI-TEN PRO
Version #: 1

Feet
0 80 160 320 480

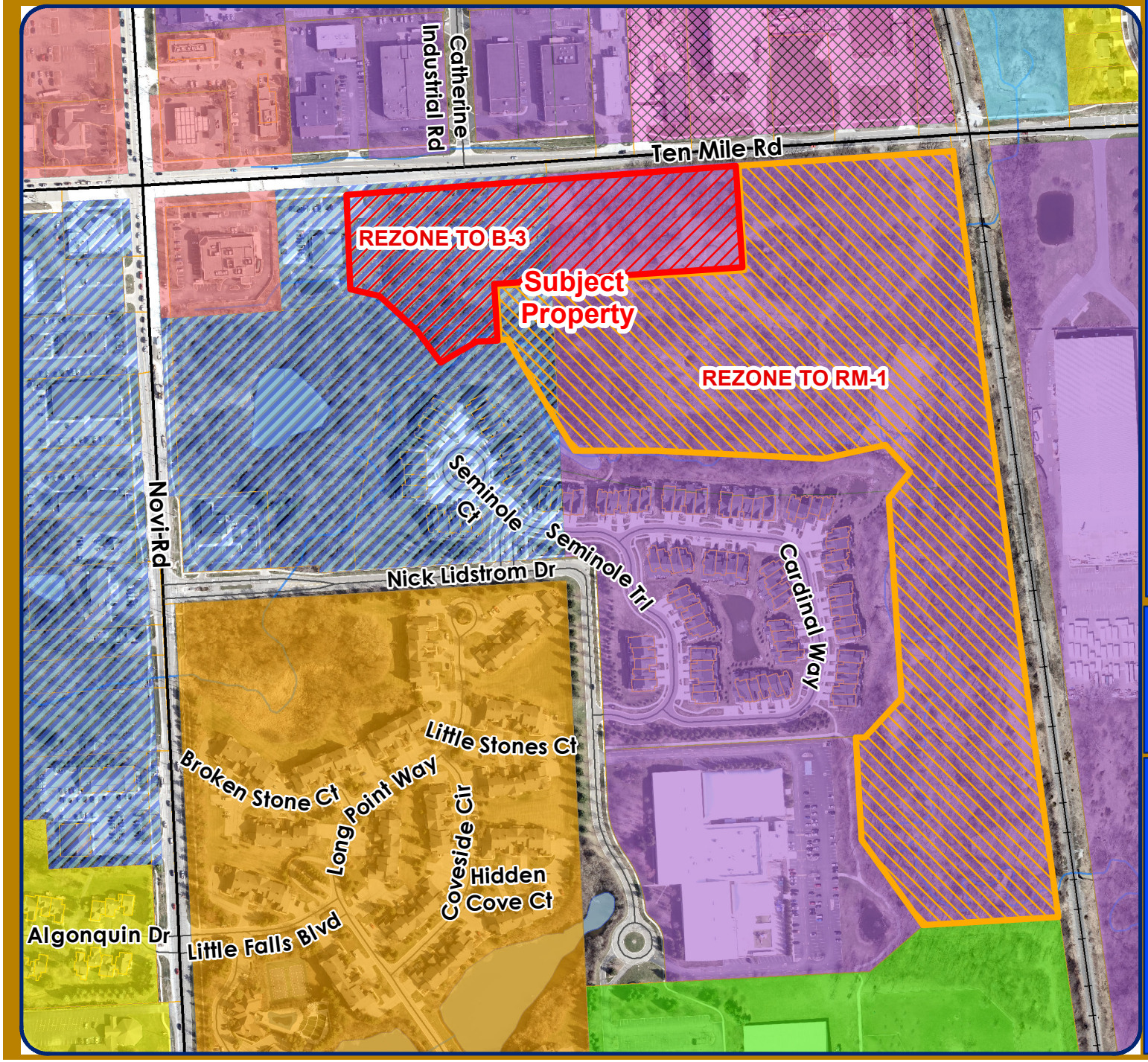
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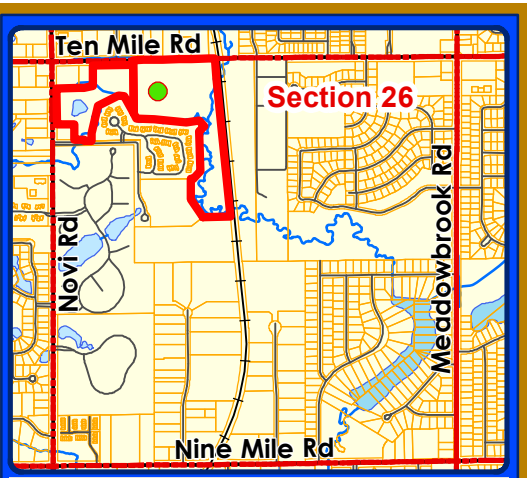
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NOVI TEN PRO

FUTURE LAND USE





Legend

- Single Family
- Multiple-Family Residential
- Community Office
- Industrial, Research, Development and Technology
- Heavy Industrial
- Local Commercial
- Public
- Public Park
- Subject Property

City of Novi
Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

Map Author: Lindsay Bell
Date: 10/31/23
Project: NOVI-TEN PRO
Version #: 1

Feet
0 80 160 320 480

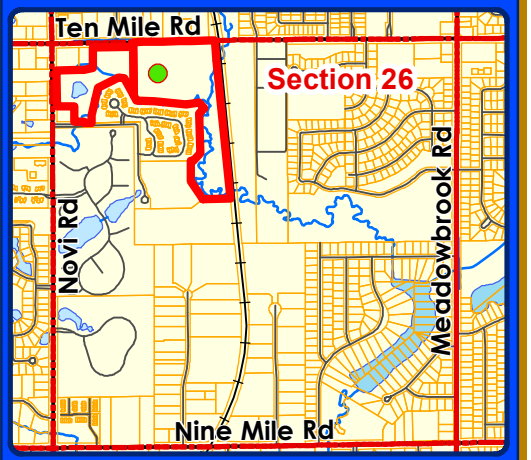
1 inch = 375 feet

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NOVI TEN PRO
FLOODPLAIN AREAS





Legend

FEMA Flood Zone

Flood Zone

AE - Base floodplain

Subject Property

City of Novi
Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

Map Author: Lindsay Bell
Date: 10/31/23
Project: NOVI-TEN PRO
Version #: 1

Feet
0 80 160 320 480

1 inch = 375 feet

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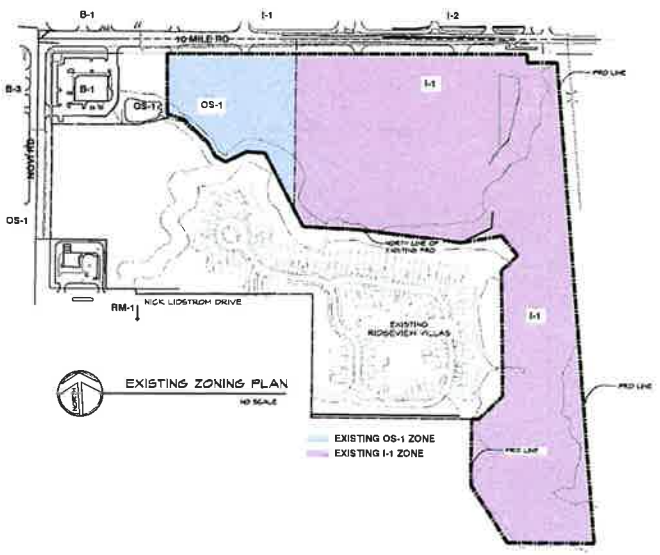
INITIAL PRO CONCEPT PLAN
JANUARY 2, 2024

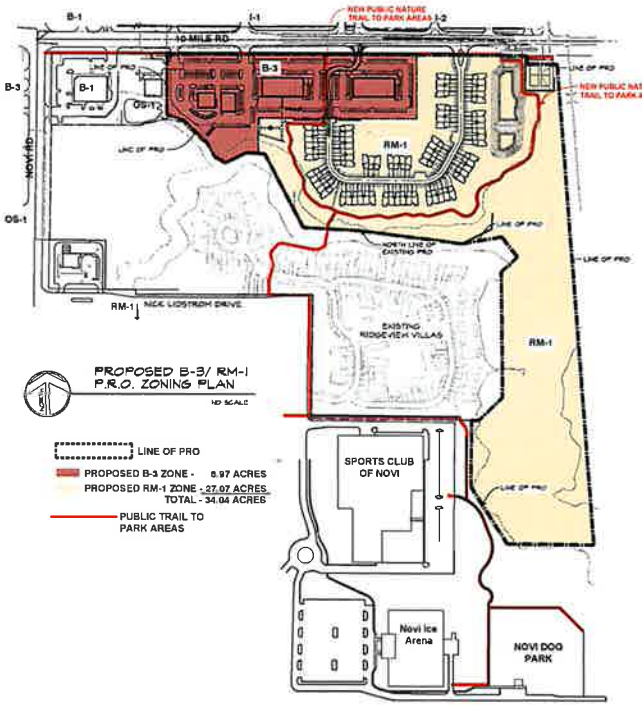
NOVI TEN ASSOCIATES

PROPOSED RE-ZONING & PRO PLAN

WALKABLE RESIDENTIAL & COMMUNITY COMMERCIAL DEVELOPMENT

NOVI, MICHIGAN





PROPOSED PARCEL B1 LEGAL DESCRIPTION (PART OF PARCELS: 22-26-101-028 & 22-26-101-024):

A PARCEL OF LAND LOCATED IN AND BEING PART OF THE NORTHWEST 1/4 OF SECTION 26, TOWN 1 NORTH, RANGE 8 EAST, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN AND BEING MORE PATICULARLY DESCRIBED AS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 26, T1N, R8E, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN; THENCE N86°27 27'E 1354.10 FEET, ALONG THE NORTH SECTION LINE AND THE CENTERLINE OF 10 MILE ROAD (120 FEET WIDE); THENCE S03°32 33'E 60.01 FEET TO THE POINT OF BEGINNING; THENCE N86°27 27'E 1003.81 FEET; THENCE S03°32 33'E 260.00 FEET; THENCE S86°27 27'W 320.00 FEET; THENCE S86°58'01"W 325.46 FEET; THENCE S01°32 15'E 144.88 FEET; THENCE N90°00'00"W 48.69 FEET; THENCE S60°51'08"W 96.39 FEET; THENCE N64°10'09" W 47.98 FEET; THENCE N32°30'06"W 64.67 FEET; THENCE N50°04'25"W 115.03 FEET; THENCE N75°25'58"W 71.24 FEET; THENCE N01°33'33"W 283.46 FEET, TO THE POINT OF BEGINNING, CONTAINING 6.97 ACREAS OF LAND (303,826 SFT), MORE OR LESS AND BEING SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD, IF ANY.

PROPOSED PARCEL B2&3 LEGAL DESCRIPTION (PART OF PARCELS: 22-26-101-028 & 22-26-101-024):

A PARCEL OF LAND LOCATED IN AND BEING PART OF THE NORTHWEST 1/4 OF SECTION 26, TOWN 1 NORTH, RANGE 8 EAST, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN AND BEING MORE PATICULARLY DESCRIBED AS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 26, T1N, R8E, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN; THENCE N86°27 27'E 1354.10 FEET, ALONG THE NORTH SECTION LINE AND THE CENTERLINE OF 10 MILE ROAD (120 FEET WIDE); THENCE S03°32 33'E 60.01 FEET TO THE POINT OF BEGINNING; THENCE N86°27 27'E 1003.81 FEET; THENCE S01°58 33"E 2013.13 FEET; THENCE S86°56 27"W 355.53 FEET; THENCE N35°58 56"W 379.43 FEET; THENCE N03°03 33"W 369.20 FEET; THENCE N86°56 27"E 30.00 FEET; THENCE N43°47 02"E 133.85 FEET; THENCE N04°10 41"W 519.60 FEET; THENCE N41°34 07"E 91.51 FEET; THENCE N41°34 10"W 305.00 FEET; THENCE S76°46 23"W 367.10 FEET; THENCE N86°32 33"W 420.86 FEET; THENCE S89°39 14"W 231.65 FEET; THENCE N31°39 21"W 339.33 FEET; THENCE N90°00'00"W 26.31 FEET; THENCE N03°32 25"W 144.88 FEET; THENCE N86°59'39"E 129.46 FEET; THENCE N86°27 27'E 510.00 FEET; THENCE N03°32 33"W 260.00 FEET, TO THE POINT OF BEGINNING, CONTAINING 27.07 ACREAS OF LAND (1,179,267 SFT), MORE OR LESS AND BEING SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD, IF ANY

PROPOSED PARCEL B4 LEGAL DESCRIPTION (PART OF PARCELS: 22-26-101-028 & 22-26-101-024):

A PARCEL OF LAND LOCATED IN AND BEING PART OF THE NORTHWEST 1/4 OF SECTION 26, TOWN 1 NORTH, RANGE 8 EAST, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN AND BEING MORE PATICULARLY DESCRIBED AS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 26, T1N, R8E, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN; THENCE N86°27 27'E 1003.81 FEET, ALONG THE NORTH SECTION LINE AND THE CENTERLINE OF 10 MILE ROAD (120 FEET WIDE); THENCE S03°32 33'E 60.01 FEET TO THE POINT OF BEGINNING; THENCE N86°27 27'E 573.65 FEET; THENCE S07°58 33"E 1012.13 FEET; THENCE S86°56 27"W 355.38 FEET; THENCE N35°58 56"W 379.43 FEET; THENCE N03°03 33"W 369.20 FEET; THENCE N86°56 27"E 30.00 FEET; THENCE N43°47 02"E 133.85 FEET; THENCE N04°10 41"W 519.60 FEET; THENCE N41°34 07"E 91.51 FEET; THENCE N41°34 10"W 305.00 FEET; THENCE S76°46 23"W 367.10 FEET; THENCE N86°32 33"W 420.86 FEET; THENCE S89°39 14"W 231.65 FEET; THENCE N31°39 21"W 339.33 FEET; THENCE N90°00'00"W 26.31 FEET; THENCE N03°32 25"W 144.88 FEET; THENCE N86°59'39"E 129.46 FEET; THENCE N86°27 27'E 510.00 FEET; THENCE N03°32 33"W 260.00 FEET, TO THE POINT OF BEGINNING, CONTAINING 27.07 ACREAS OF LAND (1,179,267 SFT), MORE OR LESS AND BEING SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD, IF ANY

CLIENT:
NOVI TEN ASSOCIATES
1 WEST SQUARE LAKE RD.
BLOOMFIELD HILLS, MICHIGAN 48302
PH (248) 334-4800

THE TOWNS AT NOVI STATION
MICHIGAN DIVISION OFFICE
28200 TOWN CENTER DR. SUITE 200
NOVI, MICHIGAN 48375
PH (248) 904-1308

ARCHITECT: (EXCLUDING RESIDENTIAL)
SIEGAL/ TUOMAALA ASSOCIATES
ARCHITECTS AND PLANNERS, INC.
29200 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48034
PH (248) 352-0099

CIVIL ENGINEER
SEIDER, KEAST LEHNER
CONSULTING ENGINEERS
29205 COUNTRY CLUB DRIVE
SUITE C8
FARMINGTON HILLS, MICHIGAN 48331
PH (248) 308-5331

DRAWING LIST

TITLE SHEET
P-0 EXISTING AND PROPOSED ZONING

ARCHITECTURAL
P-1 REGIONAL PLAN
P-2 SITE PLAN WITH EXISTING ZONING
P-3 PRO PLAN
P-4 WALKABLE COMMUNITY PLAN
P-5 B-3 ZONING SITE PLAN
P-6 RETAIL BUILDING FLOOR PLANS
P-7 RETAIL BUILDINGS A & B ELEVATIONS
P-8 RETAIL BUILDING C ELEVATIONS
P-9 RESTAURANT BUILDING D ELEVATIONS
P-10 RETAIL BUILDING PHOTOMETRIC LAYOUT
P-11 RETAIL BUILDING PHOTOMETRIC SPECIFICATIONS

CIVIL ENGINEERING
1. COVER SHEET
2. BOUNDARY SURVEY
3. TOPOGRAPHIC SURVEY
4. SOIL BORING LOGS
5. SOIL BORING LOGS
6. PROPOSED PLANNED REZONING OVERLAY PLAN
7. EXISTING AND PROPOSED ZONING
8. STORM WATER MANAGEMENT PLAN
9. OPEN SPACE PLAN
10. TRUCK ROUTING PLAN
11. PHOTOMETRIC LIGHTING PLAN

TOLL RM-1 ARCHITECTURAL PLANS (BY TOLL)
TBI-2 HOME FLOOR PLAN & ELEVATIONS
TBI-3 BUILDING ELEVATIONS
TBR-1 SCHEDULE REGULATING FACADE MATERIALS
TBR-10 SCHEDULE REGULATING FACADE MATERIALS
TBR SCHEDULE REGULATING FACADE MATERIALS

LANDSCAPE (RM-1)
L-1 CONCEPTUAL LANDSCAPE PLAN
L-2 GREENBELT AND ENTRY
L-3 WOODLAND PLAN
L-4 LANDSCAPE DETAILS
L-5 TREE LIST

LANDSCAPE (B-3)
L-1 TREE REMOVAL AND PROTECTION PLAN
L-2 TREE SURVEY
L-3 B-3 ZONING LANDSCAPE PLAN (CONCEPTUAL)

SIEGAL/TUOMAALA ASSOCIATES ARCHITECTS & PLANNERS INC.
29200 northwestern hwy
suite 100
southfield, mi 48034
p • 248 • 352 • 0099
f • 248 • 352 • 0088
www.sta-architects.com



SITE LOCATION MAP

project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN

date/revision:
- Oct 04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
EXISTING AND PROPOSED ZONING

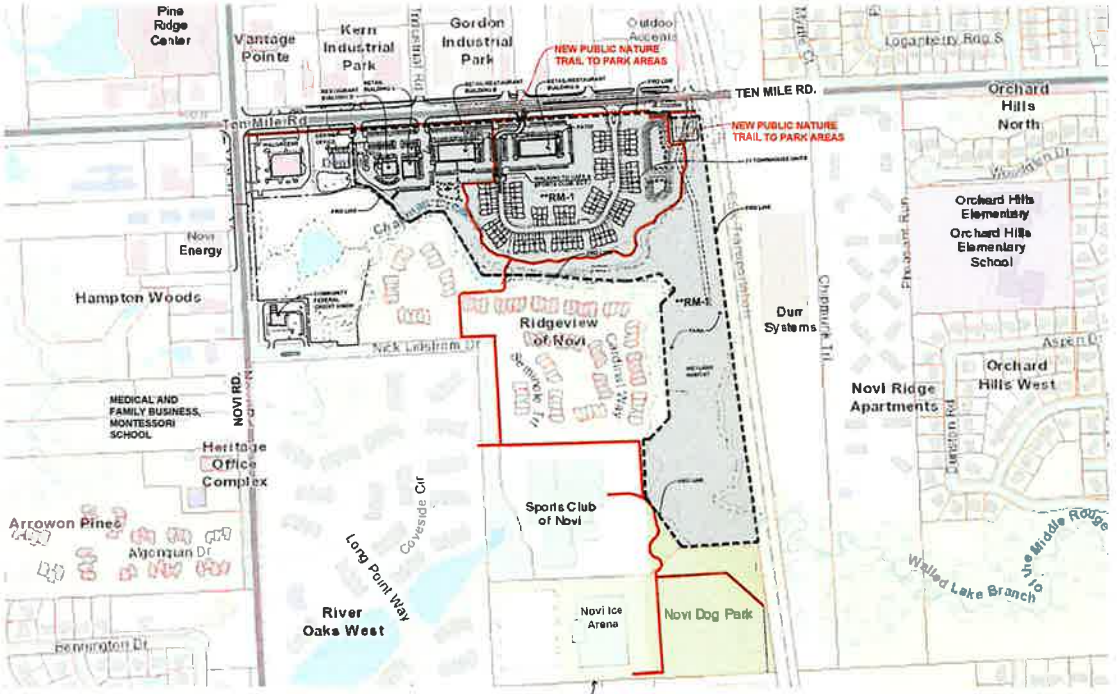
project number:
1537E

sheet number:
P.0

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300 YARDS TO 1/2 MILE NORTH
- LOCAL RETAIL
- RESTAURANT / TAKE-OUT
- AUTOMOTIVE
- ANIMAL EMERGENCY CENTER
- WORSHIP
- USPS OFFICE

1/2 TO 1 MILE WEST
- NOVI CIVIC CENTER
- NOVI PUBLIC SAFETY
- NOVI PUBLIC LIBRARY
- PARKS & SPORTS ARENA
- NOVI HIGH SCHOOL
- WORSHIP



TENNIS SPORTS CLUB AND ARENA FACILITIES, CHILD CARE, DANCE / YOGA, BANQUET ROOMS FOR BIRTHDAY'S, ETC.

PRO LINE

PUBLIC TRAIL TO PARK AREAS

PRO REGIONAL PLAN

NO SCALE

THIS PLAN INDICATES THE PROPOSED RESIDENTIAL AND COMMERCIAL DEVELOPMENT, THAT WILL TIE IN THE EXISTING RESIDENTIAL COMMUNITIES TO THE SOUTH VIA A VIEWING / WALKING PATH THRU THE NATURE ARES, AND TO THE EXISTING RECREATIONAL FACILITIES ALSO TO THE SOUTH, AND CONTINUES NORTHWARD TO SUCH AS THE SIDEWALK CAFE AND OTHER COMMUNITY COMMERCIAL. SEE SHEET P-3 FOR ADDITIONAL INFORMATION.

*B-3 GENERAL BUSINESS DISTRICT:
APPROX 6.97 ACRES

**RM-1 RESIDENTIAL:
APPROX 27.07 ACRES

STA
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suite 100
southfield, mi 48034
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project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN

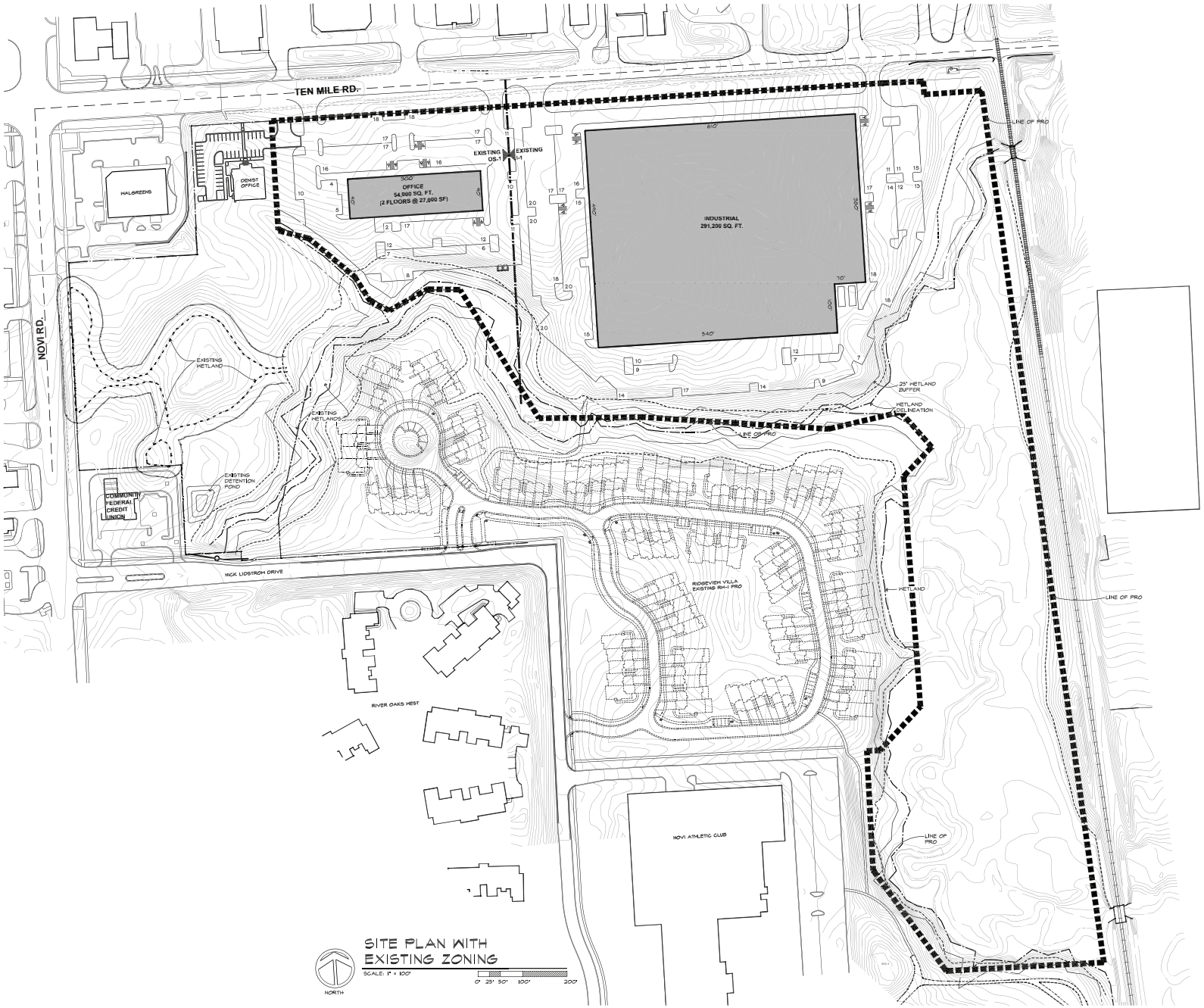
date/revision:
- Oct.04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
PRO REGIONAL PLAN

project number:
1537E

sheet number:
P-1

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suite 160
southfield, mi 48034

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www.sta-architects.com

STATE OF MICHIGAN
LONNY S. ZIMMERMAN
LICENSED
No. 1301021328
REGISTERED ARCHITECT

project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN
SECTION 26

date/revision:
- Oct.04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
Site Plan With Existing Zoning

project number:
1537E

sheet number:
P.2

copyright 02.2022



PRO CONCEPT PLAN

Scale: 1" = 125'-0"

GENERAL NOTES:

1. THE SCREENING BETWEEN RESIDENTIAL AND COMMERCIAL PROPERTY IS PROVIDED ON THE RESIDENTIAL SIDE OF THE PROPERTY BORDER, NOT THE COMMERCIAL SIDE. SAME EFFECTIVE RESULT.

REFERENCED PLAN NOTES:

1. 20 FT WIDE TEMPORARY EMERGENCY ACCESS ROAD TO MEET COUNTY ROAD STANDARDS HERE OR OTHERWISE LOCATED TO 10 MILE ROAD.
2. PICNIC AREA FOR CARRY OUT CAFE FOODS, ETC.
3. GAZEBO AND PICNIC TABLES IN PARK AT WEST END.
4. PROP. 6' HIGH MASONRY WALL OR OTHER CITY APPROVED BUFFER.
5. BREAKAWAY GATE PER CITY OF NOVI STANDARDS
6. NO WALL OR BERM BETWEEN RESIDENTIAL AND COMMERCIAL ZONING AT PARK.

LINE OF PRO

P = 13.87 ACRES PARK/NATURE AREA (CONSERVATION EASEMENT)

PUBLIC TRAIL TO PARK AREAS (SEE SHEET P.4 FOR COMPLETE TRAIL SYSTEM)

35.04 ACRES TOTAL PRO

*B-3 GENERAL BUSINESS DISTRICT ZONING
6.97 ACRES: RETAIL BUILDINGS A, B, & C AND SUPERMARKET

**RM-1 LOW RISE MULTIPLE FAMILY DISTRICT
27.07 ACRES: 71 TOWNHOUSE UNITS & PARK/NATURE AREA

SEE CIVIL ENGINEERING, LANDSCAPE & PHOTOMETRIC DRAWINGS FOR ADDITIONAL INFORMATION

SIEGAL/TUOMAALA ASSOCIATES ARCHITECTS & PLANNERS INC.
29200 northwestern hwy
suite 160
southfield, mi 48034
p+ 248 • 352 • 0099
f + 248 • 352 • 0088
www.sta-architects.com

project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN
SECTION 26

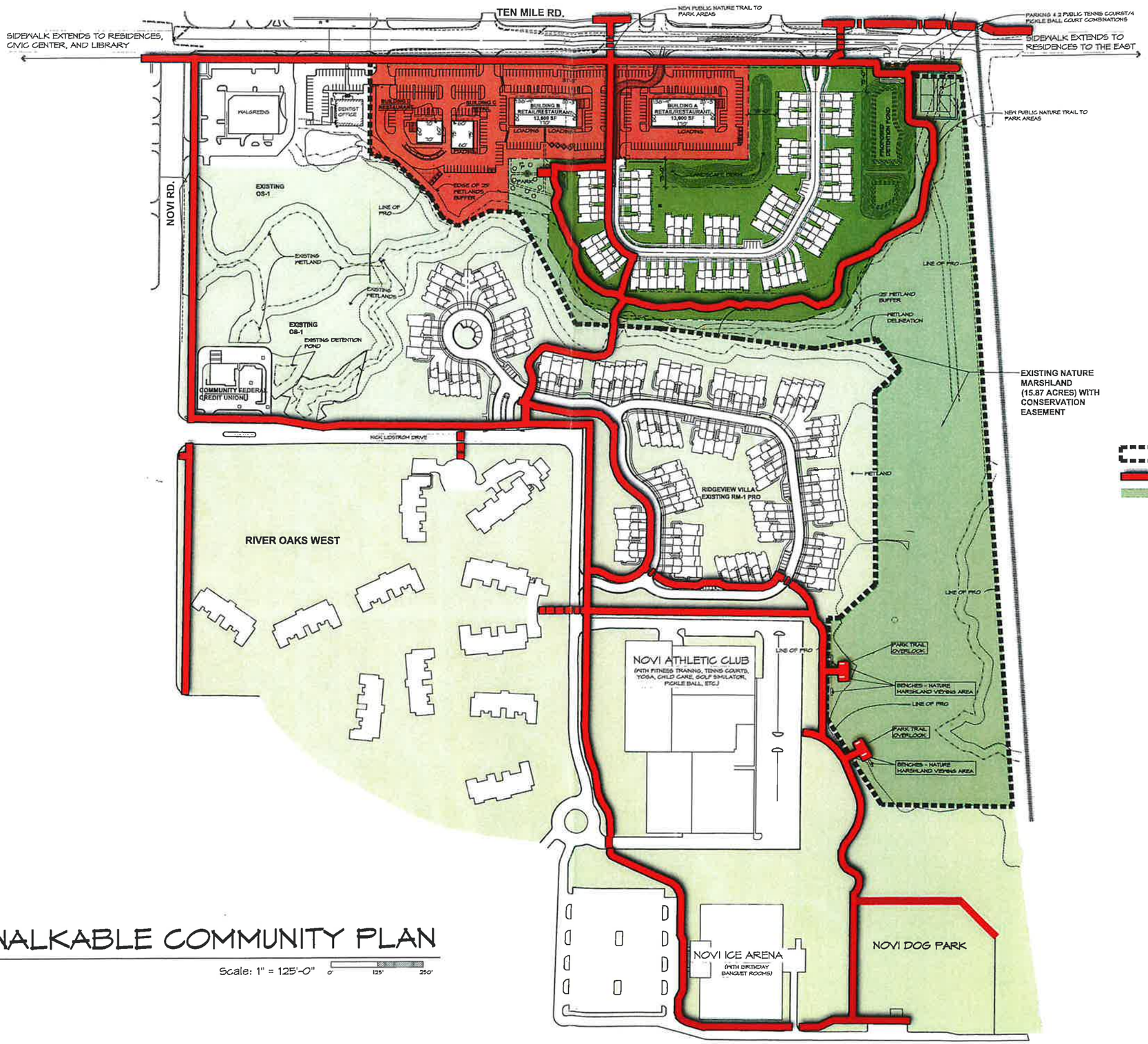
date/revision:
- Oct 04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
PRO PLAN

project number:
1537E

sheet number:
P.3

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WALKABLE COMMUNITY PLAN

NORTH

Scale: 1" = 125'-0" 0' 125' 250'

SIEGAL/TUOMAALA ASSOCIATES ARCHITECTS & PLANNERS INC.

29200 northwestern hwy
suite 160
southfield, mi 48034

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f • 248 • 352 • 0088
www.sta-architects.com

LONNY S. KIMMERMAN ARCHITECT No. 1301021326 LICENSED ARCHITECT

project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN
SECTION 26

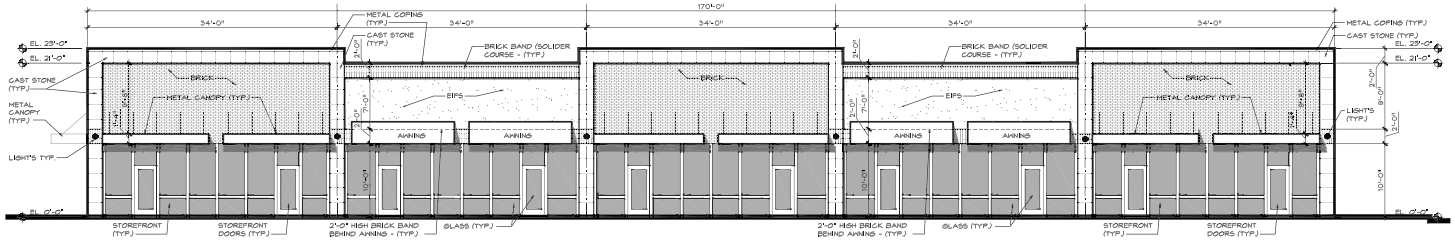
date/revision:
- Oct.04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
WALKABLE COMMUNITY PLAN

project number:
1537E

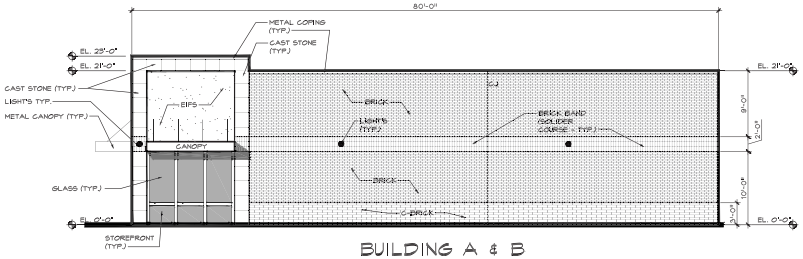
sheet number:
P.4

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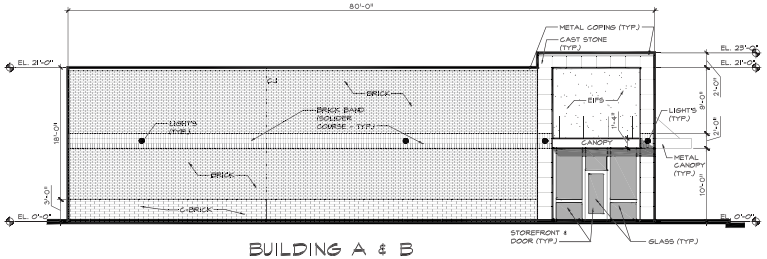
BUILDING A & B
NORTH ELEVATION

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



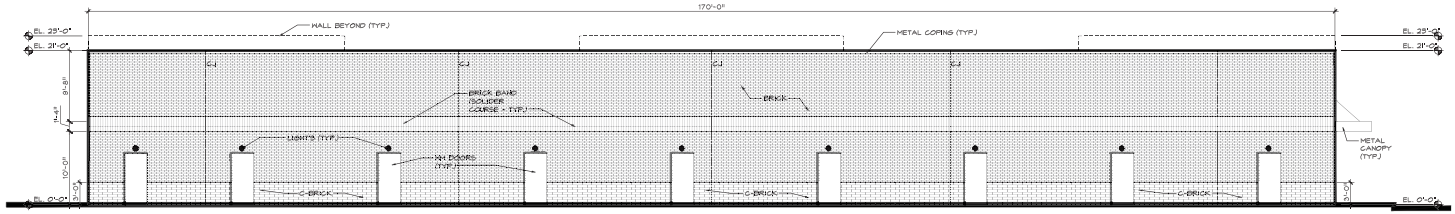
BUILDING A & B
WEST ELEVATION

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



BUILDING A & B
EAST ELEVATION

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



BUILDING A & B
SOUTH ELEVATION

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

RETAIL/RESTAURANT BUILDINGS A & B - FACADE MATERIAL CHART

NORTH

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	1482	51.1%	30% MIN
C-BRICK	-	-	25% MAX
EIFS	448	11.9%	25% MAX
CAST STONE	460	18.3%	25% MAX
METAL PANEL	168	6.7%	50% MAX (CANOPY + FASCIA)
TOTAL VISION GLASS	2508 +1266 3774 SF	100 %	

SOUTH

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	3452	82.1%	30% MIN
C-BRICK	424	12.0%	25% MAX
EIFS	-	-	25% MAX
CAST STONE	-	-	25% MAX
METAL PANEL (DOORS)	184	5.3%	50% MAX
TOTAL	3510 SF	100 %	

WEST

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	1150	72.2%	30% MIN
C-BRICK	142	12.1%	25% MAX
EIFS	108	6.8%	25% MAX
CAST STONE	116	7.3%	25% MAX
METAL PANEL	26.0	1.6%	50% MAX (CANOPY + FASCIA)
TOTAL VISION GLASS	1542S +122 1112 SF	100 %	

EAST

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	1150	72.2%	30% MIN
C-BRICK	142	12.1%	25% MAX
EIFS	108	6.8%	25% MAX
CAST STONE	116	7.3%	25% MAX
METAL PANEL	26.4	1.6%	50% MAX (CANOPY + FASCIA)
TOTAL VISION GLASS	1535 +120 1112 SF	100 %	

WALL MATERIAL BEHIND AWNING IS INDICATED

NOTES:
1. ALL ROOF MOUNTED MECHANICAL EQUIPMENT TO BE SCREENED.
2. SEE SHEETS P.10 & P.11 FOR WALL LIGHT PHOTOMETRICS.

SIEGAL/TUOMAALA ASSOCIATES ARCHITECTS & PLANNERS INC.

29200 northwestern hwy
suite 160
southfield, mi 48034

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f • 248 • 352 • 0088
www.sta-architects.com

project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN
SECTION 26

date/revision:
- Oct.04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
RETAIL BUILDINGS A & B ELEVATIONS

project number:
1537E

sheet number:
P.7

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RETAIL C - FACADE MATERIAL CHART

NORTH

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	447	60.4%	30% MIN
C-BRICK	-	-	25% MAX
EIFS	-	-	25% MAX
CAST STONE	250	31.1%	25% MAX
METAL PANEL	63	8.5%	50% MAX (CANOPY + FASCIA)
TOTAL	740	100 %	
VISION GLASS	+520		
	1260 SF		

WEST

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	1081	72.4%	30% MIN
C-BRICK	171	12.2%	25% MAX
EIFS	84	5.8%	25% MAX
CAST STONE	108	7.4%	25% MAX
METAL PANEL	25	1.7%	50% MAX
TOTAL	1455	100 %	
VISION GLASS	+120		
	1515 SF		

RETAIL C - FACADE MATERIAL CHART (CONTINUED)

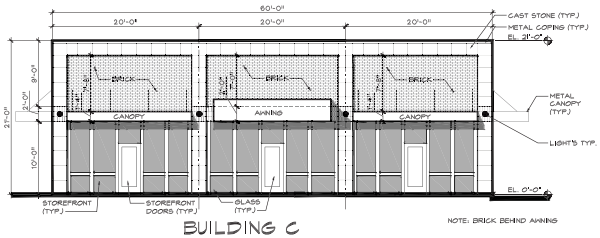
SOUTH

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	1044	82.9%	30% MIN
C-BRICK	153	12.1%	25% MAX
EIFS	-	-	25% MAX
CAST STONE	-	-	25% MAX
METAL PANEL (DOORS)	63	5.0%	50% MAX
TOTAL	1260 SF	100 %	

EAST

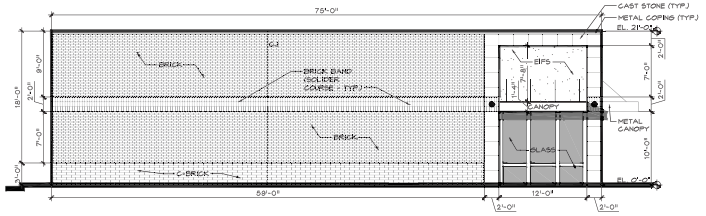
MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	1081	72.4%	30% MIN
C-BRICK	171	12.2%	25% MAX
EIFS	84	5.8%	25% MAX
CAST STONE	108	7.4%	25% MAX
METAL PANEL	25	1.7%	50% MAX
TOTAL	1455	100 %	
VISION GLASS	+120		
	1515 SF		

WALL MATERIAL BEHIND AWNING IS INDICATED



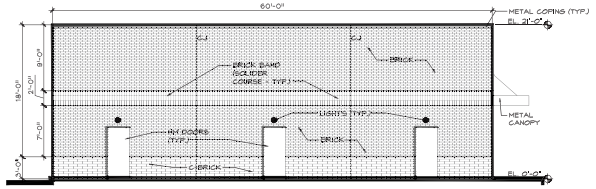
BUILDING C
NORTH ELEVATION

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



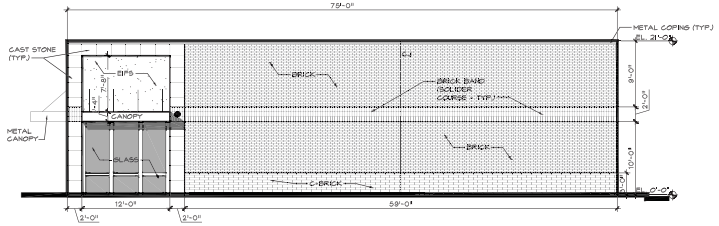
BUILDING C
EAST ELEVATION

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



BUILDING C
SOUTH ELEVATION

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



BUILDING C
WEST ELEVATION

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

NOTES:
1. ALL ROOF MOUNTED MECHANICAL EQUIPMENT TO BE SCREENED.
2. SEE SHEETS P.10 & P.11 FOR WALL LIGHT PHOTOMETRICS.

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date/revision:
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sheet title:
RETAIL BUILDING C ELEVATIONS

project number:
1537E

sheet number:
P.8

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RETAIL D - FACADE MATERIAL CHART

NORTH

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	515	60.5%	30% MIN
C-BRICK	-	-	25% MAX
EIFS	-	-	25% MAX
CAST STONE	320	33.7%	25% MAX
METAL PANEL	55	5.8%	50% MAX (CANOPY + FASCIA)
TOTAL VISION GLASS	950 + 580 1530 SF	100 %	

WEST

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	712	62.5%	30% MIN
C-BRICK	132	11.6%	25% MAX
EIFS	188	14.7%	25% MAX
CAST STONE	108	9.5%	25% MAX
METAL PANEL (COPING)	20	1.7%	50% MAX (CANOPY + FASCIA)
TOTAL VISION GLASS	1140 + 120 1260 SF	100 %	

RETAIL D - FACADE MATERIAL CHART (CONTINUED)

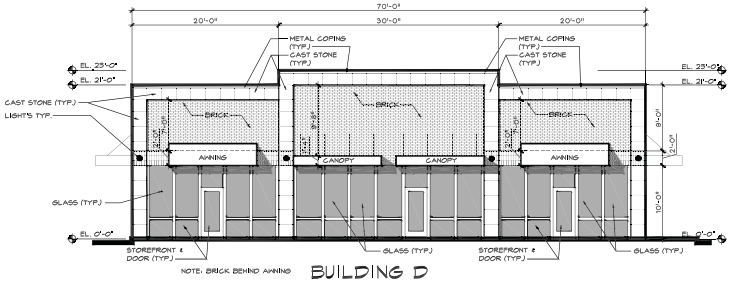
SOUTH

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	1201	81.7%	30% MIN
C-BRICK	183	12.5%	25% MAX
EIFS	-	-	25% MAX
CAST STONE	-		25% MAX
METAL PANEL (DOORS & COPING)	86	5.8%	50% MAX
TOTAL	1470 SF	100 %	

EAST

MATERIAL	AREA (SF)	% TOTAL	ORDINANCE
BRICK	965.8	74.2%	30% MIN
C-BRICK	174	14.3%	25% MAX
EIFS	-	-	25% MAX
CAST STONE	42	3.4%	25% MAX
METAL PANEL (DOORS & COPING)	38.2	3.1%	50% MAX
TOTAL VISION GLASS	1220 + 40 1260 SF	100 %	

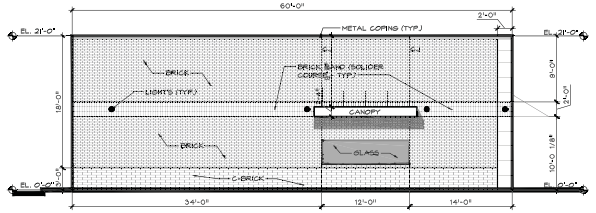
WALL MATERIAL BEHIND AWNING IS INDICATED



NOTE: BRICK BEHIND AWNING

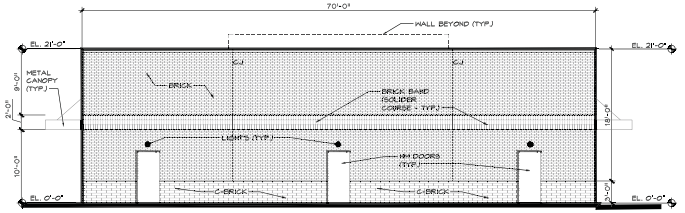
BUILDING D
NORTH ELEVATION

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



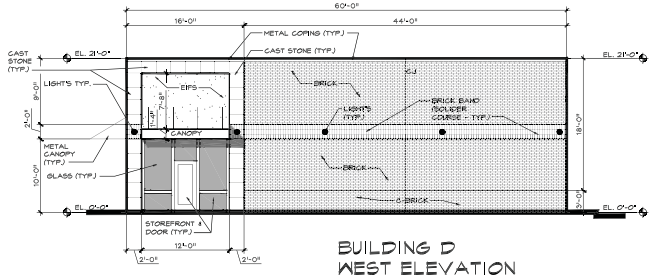
BUILDING D
EAST ELEVATION

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



BUILDING D
SOUTH ELEVATION

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



BUILDING D
WEST ELEVATION

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

NOTES:
1. ALL ROOF MOUNTED MECHANICAL EQUIPMENT TO BE SCREENED.
2. SEE SHEETS P.10 & P.11 FOR WALL LIGHT PHOTOMETRICS.

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RESTAURANT BUILDING D ELEVATIONS

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1537E

sheet number:
P.9

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REZONING AND PLANNED REZONING OVERLAY ("PRO") CONCEPT PLAN

NOVI TEN TOWN HOMES AND RETAIL

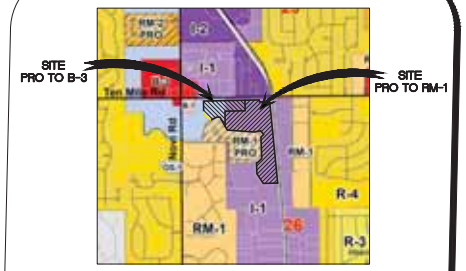
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST,
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN

PREPARED FOR:

NOVI TEN ASSOCIATES, LLC

7 W. SQAURE LAKE ROAD
BLOOMFIELD HILLS, MICHIGAN 48302
248.909.1308

ZONING MAP



PROP. ZONING: PRO TO RM-1
PRO TO B-3



FIRE DEPARTMENT NOTES

1. All fire hydrants & water mains shall be installed & in service prior to above foundation building construction as each phase is built.
2. All roads shall be paved and capable of supporting 35 tons prior to construction above foundation.
3. Building addresses shall be posted facing the street during all phases of construction. Addresses shall be a minimum of three inches in height on a contrasting background.
4. Provide 4–6" diameter concrete filled steel posts 48" above finish grade at each hydrant as required.
5. Fire lanes shall be posted with "Fire Lane – No Parking" signs in accordance with Ordinance #85.99.02.

NOTES

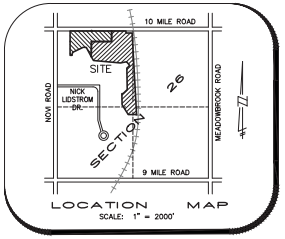
1. ALL WORK SHALL CONFORM TO THE CITY OF NOVI'S CURRENT STANDARDS AND SPECIFICATIONS.
2. THE CONTRACTOR MUST OBTAIN A PERMIT FROM THE CITY OF NOVI FOR ANY WORK WITHIN THE RIGHT–OF–WAY OF NICK LIDSTROM DRIVE.
3. ALL PAVEMENT MARKINGS, TRAFFIC CONTROL SIGNS, AND PARKING SIGNS SHALL COMPLY WITH THE DESIGN AND PLACEMENT REQUIREMENTS OF THE 2011 MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

SCALE

150 0 75 150 300 600

(IN FEET)
Scale: 1 inch = 150 ft.





SOILS MAP



SOIL CLASSIFICATIONS

(PER "SOILS SURVEY OF OAKLAND COUNTY MICHIGAN", UNITED STATES DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE IN COOPERATION WITH MICHIGAN AGRICULTURAL EXPERIMENT STATION, ISSUED MARCH 1982)

10B – MARLETTE SANDY LOAM, 1 TO 6 PERCENT SLOPES
10C – MARLETTE SANDY LOAM, 6 TO 12 PERCENT SLOPES
43 – SLOAN–MARLETTE ASSOCIATION

SHEET INDEX

ENGINEERING PLANS:
1. COVER SHEET
2. BOUNDARY SURVEY
3. TOPOGRAPHIC SURVEY
4.–5. SOIL BORING LOGS
6. PROPOSED PLANNED REZONING OVERLAY PLAN
7. EXISTING AND PROPOSED ZONING
8. STORM WATER MANAGEMENT PLAN
9. OPEN SPACE PLAN
10. TRUCK ROUTING PLAN
11. PHOTOMETRIC LIGHTING PLAN

LANDSCAPE PLANS: (TOLL MULTI–FAMILY)
L–1 CONCEPTUAL LANDSCAPE PLAN
L–2 GREENBELT AND ENTRY
L–3 WOODLAND PLAN
L–4 LANDSCAPE DETAILS
L–5 TREE LIST

ARCHITECTURAL PLANS: (TOLL MULTI–FAMILY)
1–10 BUILDING FLOOR PLAN & ELEVATION
11. SCHEDULE REGULATING FACADE MATERIALS

SEE P SHEETS FOR ADDITIONAL SITE & RETAIL INFORMAITON

LANDSCAPE PLANS PROVIDED BY:

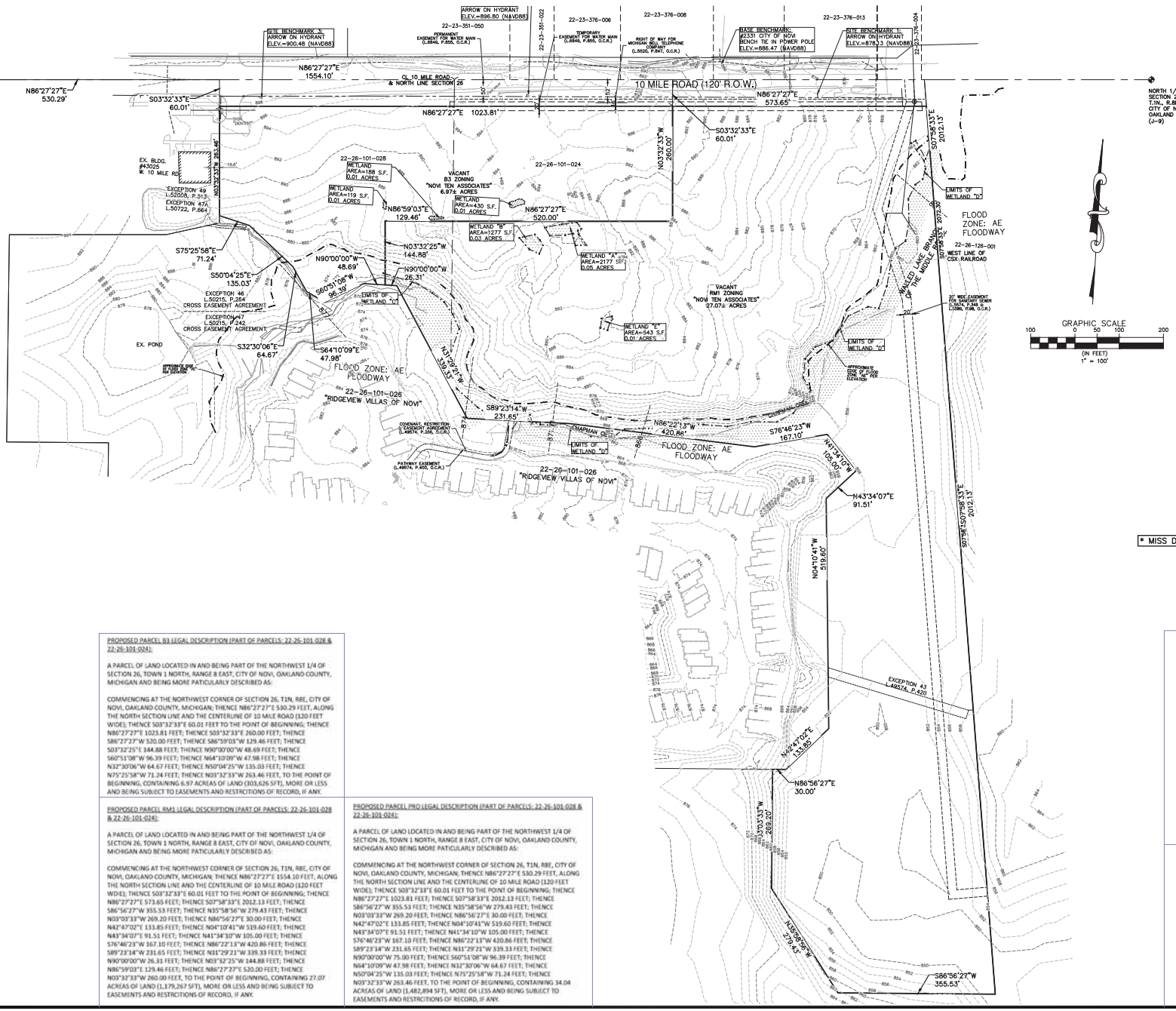
ALLEN DESIGN
557 CARPENTER
NORTHVILLE, MICHIGAN 48167
PHONE: 248.467.4668

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

CITY PROJECT NUMBER
JZ23-0009

REVISIONS			ENGINEER'S SEAL
NO.	ITEM	DATE	
1.	ADD COMMERCIAL PER CLIENT	05-19-22	
2.	ISSUED	02-28-23	
3.	REVISE PRO	01-02-24	

DATE: 05-29-23 | DESIGNED BY: A.A. | CHECKED BY: J.E. | JOB NUMBER: 21-006 | DRAWING FILE: 21006-CS.dwg



* MISS DIG NOT CONTACTED FOR SURVEY *

UTILITY DISCLAIMER NOTE:
ALL WATER MAIN, SEWER LINES AND UNDERGROUND UTILITY LINES HAVE BEEN FIELD LOCATED WHERE VISIBLE. WHEN AVAILABLE, UNDERGROUND LOCATIONS HAVE BEEN TAKEN FROM RECORD DOCUMENTS, AND NO GUARANTEE CAN BE MADE TO THE EXACTNESS OF THESE LOCATIONS.

PROPOSED PARCEL B3 LEGAL DESCRIPTION (PART OF PARCELS: 22-26-101-028 & 22-26-101-024):

A PARCEL OF LAND LOCATED IN AND BEING PART OF THE NORTHWEST 1/4 OF SECTION 26, TOWN 1 NORTH, RANGE 8 EAST, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN AND BEING MORE PATICULARLY DESCRIBED AS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 26, T1N, R8E, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN; THENCE N86°27'27"E 530.29 FEET, ALONG THE NORTH SECTION LINE AND THE CENTERLINE OF 10 MILE ROAD (120 FEET WIDE); THENCE S03°32'33"E 60.01 FEET TO THE POINT OF BEGINNING; THENCE N86°27'27"E 1023.81 FEET; THENCE S01°32'33"E 260.00 FEET; THENCE S86°27'27"W 520.00 FEET; THENCE S86°59'03"W 129.46 FEET; THENCE S03°32'25"E 144.88 FEET; THENCE N90°00'00"W 48.69 FEET; THENCE S60°51'08"W 96.39 FEET; THENCE N64°10'09"W 47.98 FEET; THENCE N32°30'06"W 64.67 FEET; THENCE N50°04'25"W 135.03 FEET; THENCE N75°25'58"W 71.24 FEET; THENCE N03°32'33"W 263.46 FEET, TO THE POINT OF BEGINNING, CONTAINING 6.97 ACREAS OF LAND (303,626 SFT), MORE OR LESS AND BEING SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD, IF ANY.

PROPOSED PARCEL RM1 LEGAL DESCRIPTION (PART OF PARCELS: 22-26-101-028 & 22-26-101-024):

A PARCEL OF LAND LOCATED IN AND BEING PART OF THE NORTHWEST 1/4 OF SECTION 26, TOWN 1 NORTH, RANGE 8 EAST, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN AND BEING MORE PATICULARLY DESCRIBED AS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 26, T1N, R8E, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN; THENCE N86°27'27"E 1554.10 FEET, ALONG THE NORTH SECTION LINE AND THE CENTERLINE OF 10 MILE ROAD (120 FEET WIDE); THENCE S03°32'33"E 60.01 FEET TO THE POINT OF BEGINNING; THENCE N86°27'27"E 573.65 FEET; THENCE S07°58'33"E 2012.13 FEET; THENCE S86°56'27"W 355.53 FEET; THENCE N35°58'56"W 279.43 FEET; THENCE N03°03'33"W 269.20 FEET; THENCE N86°56'27"E 30.00 FEET; THENCE N43°47'02"E 133.85 FEET; THENCE N04°10'41"W 519.60 FEET; THENCE N43°34'07"E 91.51 FEET; THENCE N41°34'10"W 105.00 FEET; THENCE S76°46'23"W 167.10 FEET; THENCE N86°22'13"W 420.86 FEET; THENCE S89°23'14"W 231.65 FEET; THENCE N31°29'21"W 339.33 FEET; THENCE N90°00'00"W 26.31 FEET; THENCE N03°32'25"W 144.88 FEET; THENCE N86°59'03"E 129.46 FEET; THENCE N86°27'27"E 520.00 FEET; THENCE N03°32'33"W 260.00 FEET, TO THE POINT OF BEGINNING, CONTAINING 27.07 ACREAS OF LAND (1,179,267 SFT), MORE OR LESS AND BEING SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD, IF ANY.

PROPOSED PARCEL PRO LEGAL DESCRIPTION (PART OF PARCELS: 22-26-101-028 & 22-26-101-024):

A PARCEL OF LAND LOCATED IN AND BEING PART OF THE NORTHWEST 1/4 OF SECTION 26, TOWN 1 NORTH, RANGE 8 EAST, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN AND BEING MORE PATICULARLY DESCRIBED AS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 26, T1N, R8E, CITY OF NOVI, OAKLAND COUNTY, MICHIGAN; THENCE N86°27'27"E 530.29 FEET, ALONG THE NORTH SECTION LINE AND THE CENTERLINE OF 10 MILE ROAD (120 FEET WIDE); THENCE S03°32'33"E 60.01 FEET TO THE POINT OF BEGINNING; THENCE N86°27'27"E 1023.81 FEET; THENCE S07°58'33"E 2012.13 FEET; THENCE S86°56'27"W 355.53 FEET; THENCE N35°58'56"W 279.43 FEET; THENCE N03°03'33"W 269.20 FEET; THENCE N86°56'27"E 30.00 FEET; THENCE N42°47'02"E 133.85 FEET; THENCE N04°10'41"W 519.60 FEET; THENCE N43°34'07"E 91.51 FEET; THENCE N41°34'10"W 105.00 FEET; THENCE S76°46'23"W 167.10 FEET; THENCE N86°22'13"W 420.86 FEET; THENCE S89°23'14"W 231.65 FEET; THENCE N31°29'21"W 339.33 FEET; THENCE N90°00'00"W 75.00 FEET; THENCE S60°51'08"W 96.39 FEET; THENCE N64°10'09"W 47.98 FEET; THENCE N32°30'06"W 64.67 FEET; THENCE N50°04'25"W 135.03 FEET; THENCE N75°25'58"W 71.24 FEET; THENCE N03°32'33"W 263.46 FEET, TO THE POINT OF BEGINNING, CONTAINING 34.04 ACREAS OF LAND (1,482,894 SFT), MORE OR LESS AND BEING SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD, IF ANY.

BENCHMARKS:
BASE BENCHMARK:
#2331 CITY OF NOVI
BENCH TIE SET IN SOUTH FACE OF POWER POLE LOCATED EAST OF DRIVE #42850 AND 8 FEET NORTH OF BACK OF CURB
ELEVATION=886.47 (NAVD88)

SITE BENCHMARK 1:
ARROW ON HYDRANT
LOCATED SOUTH SIDE OF 10 MILE ROAD
DIRECTLY NORTH OF SUBJECT PROPERTY
ELEVATION=878.13 (NAVD88)

SITE BENCHMARK 2:
ARROW ON HYDRANT
LOCATED SOUTH SIDE OF 10 MILE ROAD
ELEVATION=896.80

SITE BENCHMARK 3:
ARROW ON HYDRANT
LOCATED SOUTH SIDE OF 10 MILE ROAD
ELEVATION=900.48

FLOOD ZONE:
THE PROPERTY FALLS WITHIN FLOOD ZONE X AND ZONE AE, SPECIAL FLOOD HAZARD AND REGULATORY FLOODWAY (BASE FLOOD ELEVATIONS AS NOTED ON PLAN, RANGES FROM 875 TO 863)
MAP No. 26125C0628F & 26125C0629F
DATED: 9/29/2006

LEGEND

	SECTION CORNER
	OVERHEAD UTILITY LINES
	EXISTING FENCE
	EXISTING SANITARY MANHOLE
	EXISTING STORM SQ. CATCH BASIN
	EXISTING STORM ROUND CATCH BASIN
	EXISTING STORM MANHOLE
	EXISTING GAS MARKER
	EXISTING FIRE HYDRANT
	UTILITY POLE
	PUBLIC INFORMATION SIGN
F.I.	FOUND IRON
F.MON.	FOUND MONUMENT
S.I.	SET IRON
P.O.C.	POINT OF COMMENCEMENT
P.O.B.	POINT OF BEGINNING

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
Professional Engineers
Professional Surveyors
Professional Landscape Architects
Professional Planners
Professional Traffic Engineers
Professional Environmental Consultants
Professional Construction Managers
Professional Facility Managers
Professional Project Managers
Professional Program Managers
Professional Consultants
Professional Contractors
Professional Subcontractors
Professional Suppliers
Professional Manufacturers
Professional Distributors
Professional Retailers
Professional Wholesalers
Professional Service Providers
Professional Technology Providers
Professional Software Providers
Professional Hardware Providers
Professional Network Providers
Professional Cloud Providers
Professional Data Providers
Professional Analytics Providers
Professional Artificial Intelligence Providers
Professional Machine Learning Providers
Professional Robotics Providers
Professional Automation Providers
Professional Internet of Things Providers
Professional Blockchain Providers
Professional Cybersecurity Providers
Professional Quantum Computing Providers
Professional Augmented Reality Providers
Professional Virtual Reality Providers
Professional Mixed Reality Providers
Professional Extended Reality Providers
Professional Metaverse Providers
Professional Web3 Providers
Professional Decentralized Finance Providers
Professional Non-Fungible Token Providers
Professional Digital Asset Providers
Professional Cryptocurrency Providers
Professional Stablecoin Providers
Professional Central Bank Digital Currency Providers
Professional Tokenization Providers
Professional Smart Contract Providers
Professional Oracle Providers
Professional Interoperability Providers
Professional Scalability Providers
Professional Sustainability Providers
Professional Environmental, Social, and Governance Providers
Professional Diversity, Equity, and Inclusion Providers
Professional Corporate Social Responsibility Providers
Professional Philanthropy Providers
Professional Volunteerism Providers
Professional Community Engagement Providers
Professional Public Relations Providers
Professional Marketing Providers
Professional Advertising Providers
Professional Sales Providers
Professional Customer Service Providers
Professional Technical Support Providers
Professional Training Providers
Professional Education Providers
Professional Research Providers
Professional Development Providers
Professional Innovation Providers
Professional Entrepreneurship Providers
Professional Leadership Providers
Professional Management Providers
Professional Governance Providers
Professional Compliance Providers
Professional Risk Management Providers
Professional Insurance Providers
Professional Legal Providers
Professional Accounting Providers
Professional Financial Providers
Professional Investment Providers
Professional Banking Providers
Professional Payment Providers
Professional Billing Providers
Professional Collection Providers
Professional Tax Providers
Professional Audit Providers
Professional Consulting Providers
Professional Advisory Providers
Professional Coaching Providers
Professional Mentoring Providers
Professional Networking Providers
Professional Association Providers
Professional Union Providers
Professional Guild Providers
Professional Society Providers
Professional Institute Providers
Professional Academy Providers
Professional College Providers
Professional University Providers
Professional School Providers
Professional Library Providers
Professional Museum Providers
Professional Gallery Providers
Professional Theater Providers
Professional Concert Hall Providers
Professional Stadium Providers
Professional Arena Providers
Professional Convention Center Providers
Professional Hotel Providers
Professional Restaurant Providers
Professional Bar Providers
Professional Nightclub Providers
Professional Casino Providers
Professional Resort Providers
Professional Spa Providers
Professional Gym Providers
Professional Fitness Center Providers
Professional Yoga Studio Providers
Professional Dance Studio Providers
Professional Martial Arts Studio Providers
Professional Swimming Pool Providers
Professional Golf Course Providers
Professional Tennis Court Providers
Professional Basketball Court Providers
Professional Soccer Field Providers
Professional Baseball Field Providers
Professional Football Field Providers
Professional Hockey Rink Providers
Professional Skating Rink Providers
Professional Ski Resort Providers
Professional Snowboarding Park Providers
Professional Surfing Beach Providers
Professional Sailing Club Providers
Professional Yacht Club Providers
Professional Marina Providers
Professional Boat Dock Providers
Professional Fishing Pier Providers
Professional Hunting Lodge Providers
Professional Shooting Range Providers
Professional Archery Range Providers
Professional Paintball Field Providers
Professional Laser Tag Arena Providers
Professional Escape Room Providers
Professional Virtual Reality Arcade Providers
Professional Video Game Arcade Providers
Professional Pinball Arcade Providers
Professional Pool Hall Providers
Professional Bowling Alley Providers
Professional Roller Skating Rink Providers
Professional Ice Skating Rink Providers
Professional Trampoline Park Providers
Professional Adventure Park Providers
Professional Zip Line Course Providers
Professional Rock Climbing Gym Providers
Professional Bouldering Gym Providers
Professional Ropes Course Providers
Professional Obstacle Course Providers
Professional Mud Run Providers
Professional Marathon Providers
Professional Triathlon Providers
Professional Cycling Race Providers
Professional Swimming Race Providers
Professional Track and Field Meet Providers
Professional Cross Country Race Providers
Professional Orienteering Race Providers
Professional Rogaining Race Providers
Professional Adventure Race Providers
Professional Expedition Race Providers
Professional Ultra Race Providers
Professional Endurance Race Providers
Professional Stage Race Providers
Professional Multi-Sport Race Providers
Professional Duathlon Race Providers
Professional Aquathlon Race Providers
Professional Biathlon Race Providers
Professional Pentathlon Race Providers
Professional Decathlon Race Providers
Professional Heptathlon Race Providers
Professional Octathlon Race Providers
Professional Nonathlon Race Providers
Professional Hexathlon Race Providers
Professional Tetrathlon Race Providers
Professional Quadrathlon Race Providers
Professional Pentathlon Race Providers
Professional Hexathlon Race Providers
Professional Heptathlon Race Providers
Professional Octathlon Race Providers
Professional Nonathlon Race Providers
Professional Decathlon Race Providers

NO	DESCRIPTION	DATE
1.	ADD COMMERCIAL PER CLIENT	05-19-22
2.	ISSUED	02-28-23
3.	REVISE PRO	05-02-24

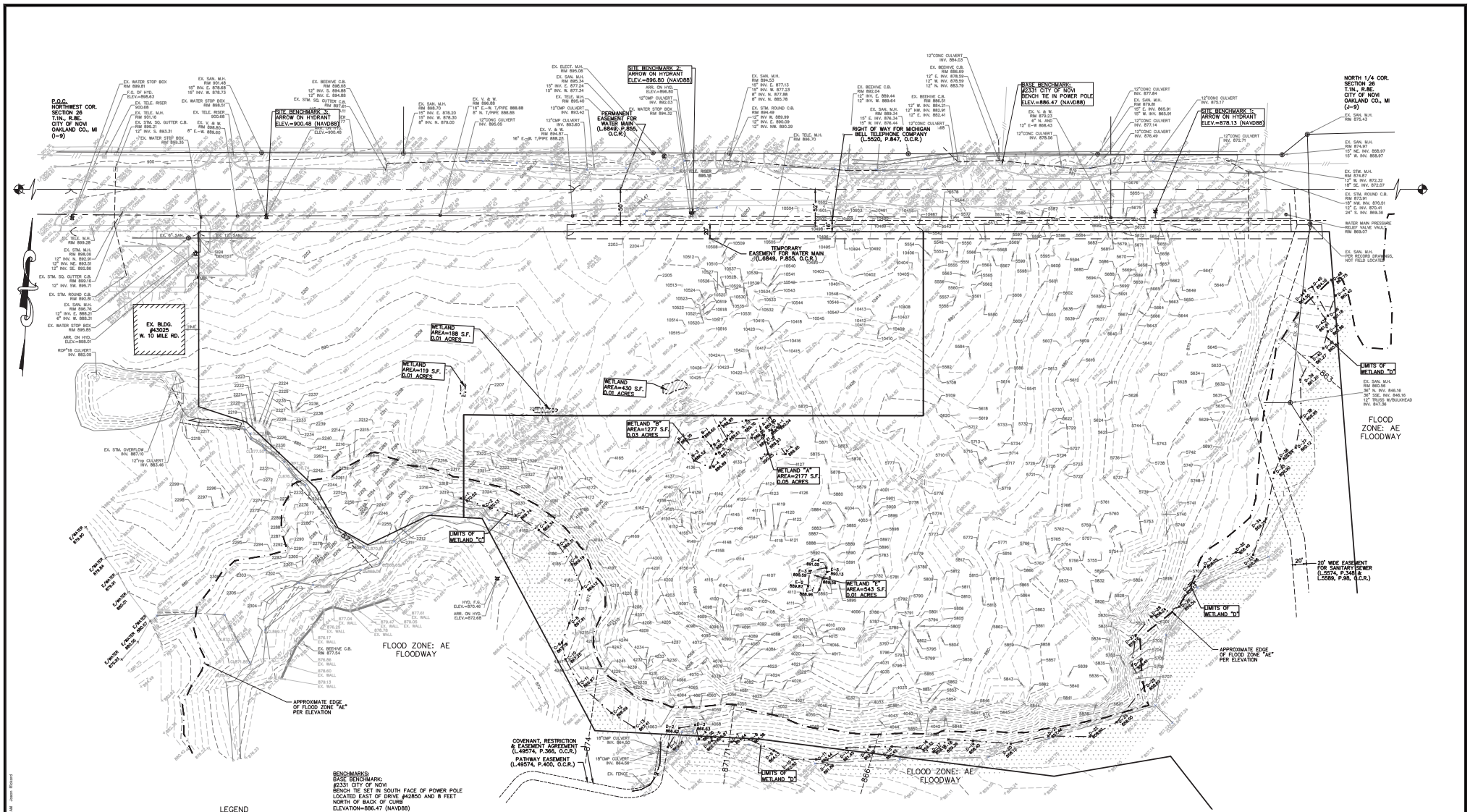
DRAWN BY: N.G.
DATE: 12-29-23
CHECKED BY: J.R.
JOB No.: 21-006

CLIENT:
NOVI TEN ASSOCIATES, LLC
7 W. SQUARE LAKE ROAD
BLOOMFIELD HILLS
MICHIGAN 48302
248.909.1308

PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN
SHEET TITLE:
BOUNDARY SURVEY

SHEET
2

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BENCHMARKS:
BASE BENCHMARK:
#2331 CITY OF NOVI
BENCH TIE SET IN SOUTH FACE OF POWER POLE LOCATED EAST OF DRIVE #42850 AND 8 FEET NORTH OF BACK OF CURB
ELEVATION=886.47 (NAVD88)

SITE BENCHMARK 1:
ARROW ON HYDRANT
LOCATED SOUTH SIDE OF 10 MILE ROAD DIRECTLY NORTH OF SUBJECT PROPERTY
ELEVATION=878.13 (NAVD88)

SITE BENCHMARK 2:
ARROW ON HYDRANT
LOCATED SOUTH SIDE OF 10 MILE ROAD
ELEVATION=896.80

SITE BENCHMARK 3:
ARROW ON HYDRANT
LOCATED SOUTH SIDE OF 10 MILE ROAD
ELEVATION=900.48

FLOOD ZONE:
THE PROPERTY FALLS WITHIN FLOOD ZONE X AND ZONE AE, SPECIAL FLOOD HAZARD AND REGULATORY FLOODWAY (BASE FLOOD ELEVATIONS AS NOTED ON PLAN, RANGES FROM 875 TO 883)
MAP No. 26125C0628F & 26125C0629F
DATED: 9/29/2006

LEGEND

- SECTION CORNER
- OVERHEAD UTILITY LINES
- EXISTING FENCE
- EXISTING SANITARY MANHOLE
- EXISTING STORM SQ. CATCH BASIN
- EXISTING STORM ROUND CATCH BASIN
- EXISTING STORM MANHOLE
- EXISTING GAS MARKER
- EXISTING FIRE HYDRANT
- UTILITY POLE
- PUBLIC INFORMATION SIGN
- F.I. FOUND IRON
- F.MON. FOUND MONUMENT
- S.I. SET IRON
- P.O.C. POINT OF COMMENCEMENT
- P.O.B. POINT OF BEGINNING

UTILITY DISCLAIMER NOTE:
ALL WATER MAIN, SEWER LINES AND UNDERGROUND UTILITY LINES HAVE BEEN FIELD LOCATED WHERE VISIBLE. WHEN AVAILABLE, UNDERGROUND LOCATIONS HAVE BEEN TAKEN FROM RECORD DOCUMENTS, AND NO GUARANTEE CAN BE MADE TO THE EXACTNESS OF THESE LOCATIONS.

GRAPHIC SCALE
60 0 30 60 120
(IN FEET)
1" = 60'

* MISS DIG NOT CONTACTED FOR SURVEY *

811
3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
TOLL FREE FOR THE LOCATION OF UNDERGROUND FACILITIES

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ENGINEERING | SURVEYING

CLIENT:
NOVI TEN ASSOCIATES, LLC
7 W. SQUARE LAKE ROAD
BLOOMFIELD HILLS
MICHIGAN 48302
248.909.1308

DRAWN BY: N.G.
DATE: 05-29-23
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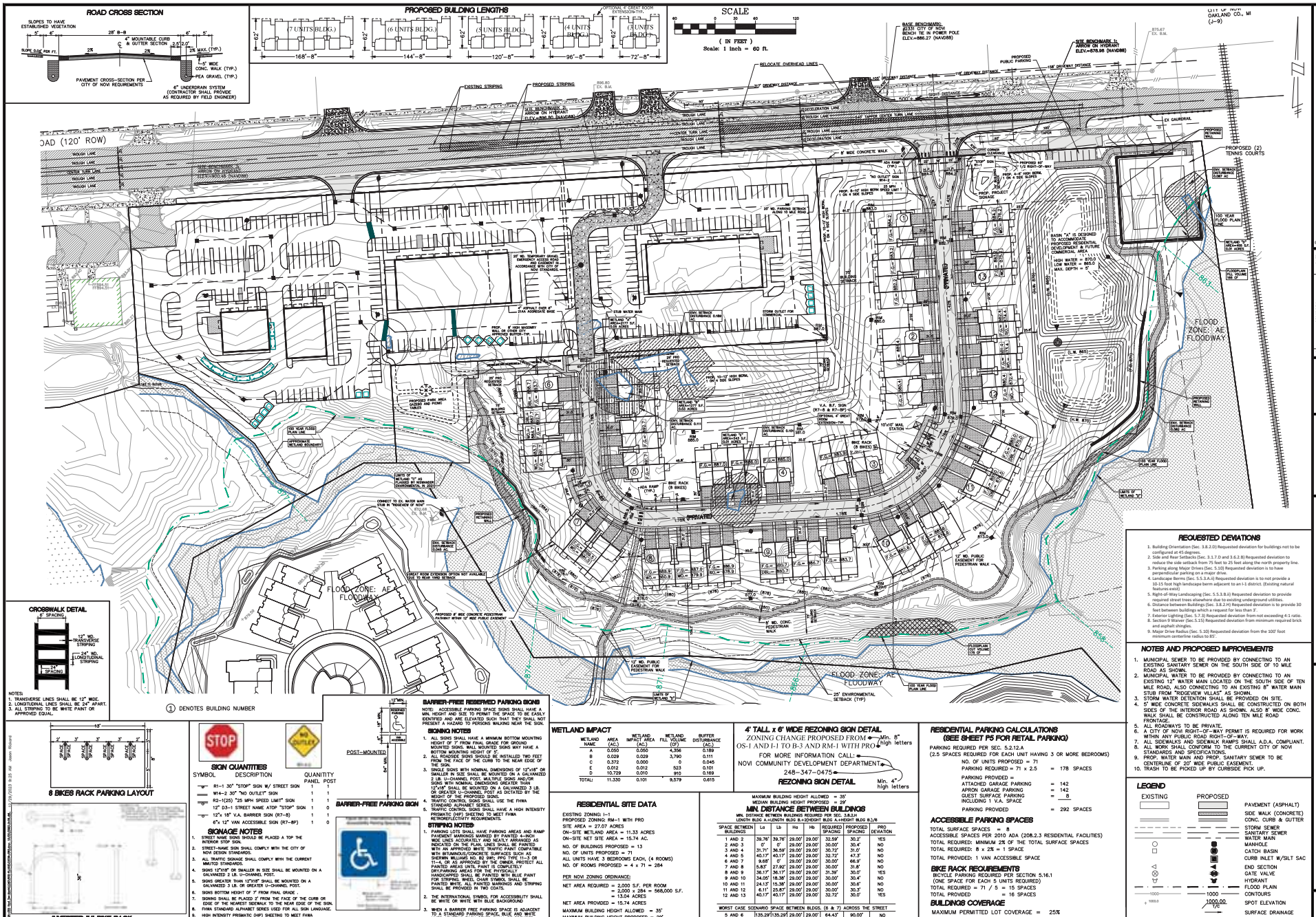
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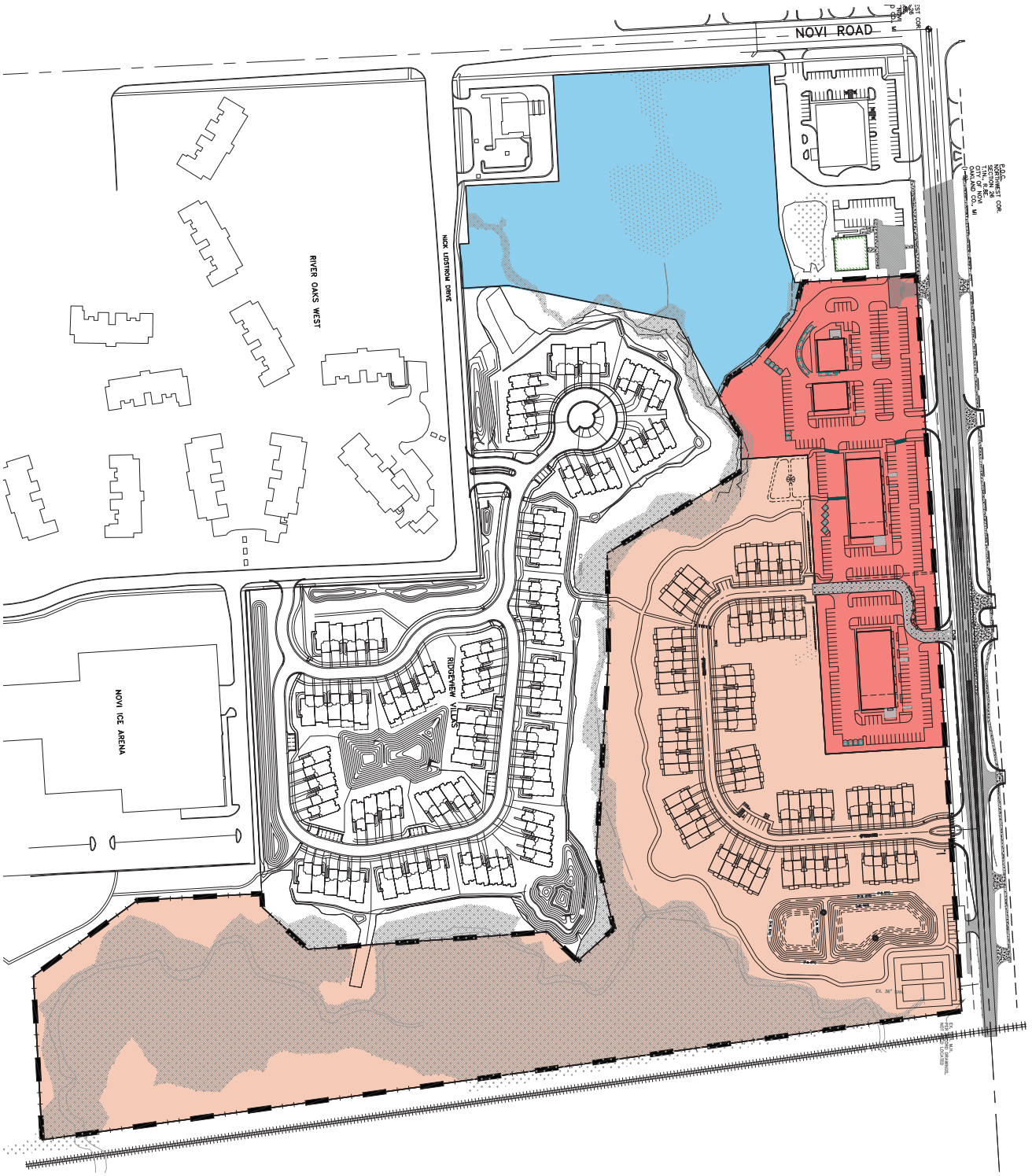
PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN

SHEET TITLE:
TOPOGRAPHIC SURVEY

SHEET
3

21-006 Novi Ten North\CAD\PRO PLANS\21006-TPO.dwg 12/29/2023 8:25 AM Jason Rickard


ROAD CROSS SECTION
SLOPES TO HAVE ESTABLISHED VEGETATION
28' B-B
4" MOUNTABLE CURB & GUTTER SECTION
2.5'
2.5'
6'
5'
SLOPE SLOPE PER FT.
2%
2%
2% MAX. (TYP.)
5' WIDE CONC. WALK (TYP.)
PEA GRAVEL (TYP.)
PAVEMENT CROSS-SECTION PER CITY OF NOVI REQUIREMENTS
6" UNDERDRAIN SYSTEM (CONTRACTOR SHALL PROVIDE AS REQUIRED BY FIELD ENGINEER)
PROPOSED BUILDING LENGTHS
(7 UNITS BLDG.)
(6 UNITS BLDG.)
(5 UNITS BLDG.)
(4 UNITS BLDG.)
(3 UNITS BLDG.)
OPTIONAL 4' GREAT ROOM EXTENSION-TYP.
62'
168'-8"
144'-8"
120'-8"
96'-8"
72'-8"
SCALE
0 30 60 120
(IN FEET)
Scale: 1 inch = 60 ft.
BASE BENCHMARK: #2331 CITY OF NOVI BENCH TIE IN POWER POLE ELEV.=886.27 (NAVD88)
SITE BENCHMARK 1: ARROW ON HYDRANT ELEV.=878.96 (NAVD88)
RELOCATE OVERHEAD LINES
EXISTING STRIPING
PROPOSED STRIPING
SITE BENCHMARK 2: ARROW ON HYDRANT ELEV.=890.55 (NAVD88)
PROPOSED PUBLIC PARKING
150' DRIVEWAY DISTANCE
330' DRIVEWAY DISTANCE
100' DELIVERY DISTANCE
500' SIGHT DISTANCE
DECELERATION LANE
THROUGH LANE
CENTER TURN LANE
EX. DAUDRAL
PROPOSED RETAINING WALL
PROPOSED (2) TENNIS COURTS
8' WIDE CONCRETE WALK
ADA RAMP (TYP.)
"STOP" SIGN
PROPOSED 60' L/S RIGHT-OF-WAY
"NO OUTLET" SIGN
PROP. 4'-0" HIGH BERM, 1 ON 4 SIDE SLOPES
PROP. PROJECT SIGNAGE
PROP. 6'-0" HIGH BERM, 1 ON 4 SIDE SLOPES
BASIN "A" IS DESIGNED TO ACCOMMODATE PROPOSED RESIDENTIAL DEVELOPMENT & FUTURE COMMERCIAL AREA
HIGH WATER = 870.0
LOW WATER = 865.0
MAX. DEPTH = 5'
100 YEAR FLOOD PLAIN LINE
WETLAND "B" 0.64 ACRES
FLOODPLAIN VOLUME "BB" 0'
FLOODPLAIN VOLUME "A" 0'
FLOOD ZONE: AE FLOODWAY
PROP. 4'-0" HIGH BERM, 1 ON 4 SIDE SLOPES
PROP. 15'-0" HIGH BERM, 1 ON 4 SIDE SLOPES
20' PRO REQUIRED SETBACK
30' PRO REQUIRED SETBACK
4" ASPHALT OVER 6" CLASS II AGGREGATE BASE
PROP. 8' HIGH MASONRY WALL OR OTHER CITY APPROVED SCREENING
STUB WATER MAIN
STORM OUTLET FOR BASIN "A"
WETLAND "A" 0.67 ACRES
ENV. SETBACK (MAINTENANCE) 0.0
ENV. SETBACK (MAINTENANCE) 0.111
ENV. SETBACK (MAINTENANCE) 0.105
WETLAND "C" 0.045 ACRES
WETLAND "D" 0.169 ACRES
ENV. SETBACK (MAINTENANCE) 0.101
V.A. B.F. SIGN (R7-8 & R7-8P)
OPTIONAL 4' GREAT ROOM EXTENSION-TYP.
10'x10' MAIL STATION
BIKE RACK (8 BIKES)
PROPOSED PARK AREA GAZEBO AND PICNIC TABLES
100 YEAR FLOOD PLAIN LINE
APPROXIMATE WETLAND BOUNDARY
LIMITS OF WETLAND "A" AS FLAGGED BY ASTI ENVIRONMENTAL IN 2020
CONNECT TO EX. WATER MAIN STUB IN "RIDGEVIEW OF NOVI"
PROPOSED RETAINING WALL
GREAT ROOM EXTENSION OPTION NOT AVAILABLE DUE TO REAR YARD SETBACK
PROPOSED 8' WIDE CONCRETE PEDESTRIAN PATHWAY WITHIN 12' WIDE PUBLIC EASEMENT
FLOOD ZONE: AE FLOODWAY
12' WD. PUBLIC EASEMENT FOR PEDESTRIAN WALK
5' WD. CONC. PEDESTRIAN WALK
25' ENVIRONMENTAL SETBACK (TYP)
LIMITS OF WETLAND "C"
LIMITS OF WETLAND "D"
CROSSWALK DETAIL
6" SPACING
12" WD. TRANSVERSE STRIPING
24" WD. LONGITUDINAL STRIPING
24" SPACING
NOTES:
1. TRANSVERSE LINES SHALL BE 12" WIDE.
2. LONGITUDINAL LINES SHALL BE 24" APART.
3. ALL STRIPING TO BE WHITE PAINT OR APPROVED EQUAL.
1 DENOTES BUILDING NUMBER
8 BIKES RACK PARKING LAYOUT
INVERTED "U" BIKE RACK NOT TO SCALE
SIGN QUANTITIES
SYMBOL DESCRIPTION QUANTITY PANEL POST
R1-1 30" "STOP" SIGN W/ STREET SIGN 1 1
W14-2 30" "NO OUTLET" SIGN 1 1
R2-1(25) "25 MPH SPEED LIMIT" SIGN 1 1
12" D3-1 STREET NAME ATOP "STOP" SIGN 1 0
12"x 18" V.A. BARRIER SIGN (R7-8) 1 1
6"x 12" VAN ACCESSIBLE SIGN (R7-8P) 1 0
SIGNAGE NOTES
1. STREET NAME SIGNS SHOULD BE PLACED A TOP THE INTERIOR STOP SIGN.
2. STREET-NAME SIGN SHALL COMPLY WITH THE CITY OF NOVI DESIGN STANDARDS.
3. ALL TRAFFIC SIGNAGE SHALL COMPLY WITH THE CURRENT MMUTCD STANDARDS.
4. SIGNS 12"x18" OR SMALLER IN SIZE SHALL BE MOUNTED ON A GALVANIZED 2 LB. U-CHANNEL POST.
5. SIGNS GREATER THAN 12"x18" SHALL BE MOUNTED ON A GALVANIZED 3 LB. OR GREATER U-CHANNEL POST.
6. SIGNS BOTTOM HEIGHT OF 7' FROM FINAL GRADE.
7. SIGNING SHALL BE PLACED 2' FROM THE FACE OF THE CURB OR EDGE OF THE NEAREST SIDEWALK TO THE NEAR EDGE OF THE SIGN.
8. FHWA STANDARD ALPHABET SERIES USED FOR ALL SIGN LANGUAGE.
9. HIGH INTENSITY PRISMATIC (HIP) SHEETING TO MEET FHWA RETRO-REFLECTIVITY.
BARRIER-FREE REVERSED PARKING SIGNS
NOTE: ACCESSIBLE PARKING SPACE SIGNS SHALL HAVE A MIN. HEIGHT OF 7' TO PERMIT THE SPACE TO BE EASILY IDENTIFIED AND ARE ELEVATED SUCH THAT THEY SHALL NOT PRESENT A HAZARD TO PERSONS WALKING NEAR THE SIGN.
SIGNING NOTES
1. ALL SIGNS SHALL HAVE A MINIMUM BOTTOM MOUNTING HEIGHT OF 7' FROM FINAL GRADE FOR GROUND MOUNTED SIGNS. WALL MOUNTED SIGNS MAY HAVE A BOTTOM MOUNTING HEIGHT OF 5'.
2. ALL ROADSIDE SIGNS SHOULD BE INSTALLED TWO FEET FROM THE FACE OF THE CURB TO THE NEAR EDGE OF THE SIGN.
3. SINGLE SIGNS WITH NOMINAL DIMENSIONS OF 12"x18" OR SMALLER IN SIZE SHALL BE MOUNTED ON A GALVANIZED 2 LB. U-CHANNEL POST. MULTIPLE SIGNS AND/OR SIGNS WITH NOMINAL DIMENSIONS GREATER THAN 12"x18" SHALL BE MOUNTED ON A GALVANIZED 3 LB. OR GREATER U-CHANNEL POST AS DICTATED BY THE WEIGHT OF THE PROPOSED SIGNS.
4. TRAFFIC CONTROL SIGNS SHALL USE THE FHWA STANDARD ALPHABET SERIES.
5. TRAFFIC CONTROL SIGNS SHALL HAVE A HIGH INTENSITY PRISMATIC (HIP) SHEETING TO MEET FHWA RETROREFLECTIVITY REQUIREMENTS.
STRIPING NOTES
1. PARKING LOTS SHALL HAVE PARKING AREAS AND RAMP PAVEMENT MARKINGS MARKED BY PAINTED 4-INCH WIDE LINES ACCURATELY AND NEATLY ARRANGED AS INDICATED ON THE PLAN. (REF. SEC. 5.3.12) PAINT SHALL BE APPLIED EVENLY AT A RATE OF NOT LESS THAN 90 MILS WET THICKNESS WITH INTUMESCENT/CONCRETE SURFACES. EACH AS SHERWIN WILLIAMS NO. 82 9WU PPG TYPE 11-3 OR 11-4, OR AS APPROVED BY THE OWNER. PROTECT ALL PAINTED AREAS UNTIL PAINT IS COMPLETELY DRY.PARKING AREAS FOR THE PHYSICALLY HANDICAPPED SHALL BE PAINTED WITH BLUE PAINT FOR STRIPING, WHEEL CHAIR SYMBOL SHALL BE PAINTED WHITE. ALL PAINTED MARKINGS AND STRIPING SHALL BE PROVIDED IN TWO COATS.
2. THE INTERNATIONAL SYMBOL FOR ACCESSIBILITY SHALL BE WHITE ON WHITE WITH BLUE BACKGROUND
3. WHEN A BARRIER FREE PARKING SPACE IS ADJACENT TO A STANDARD PARKING SPACE, BLUE AND WHITE LINES ABUTTING EACH OTHER SHALL BE PROVIDED.
POST-MOUNTED
84" MIN.
BARRIER-FREE PARKING SIGN
WETLAND IMPACT
WETLAND NAME | AREA (AC.) | WETLAND IMPACT AREA (AC.) | WETLAND FILL VOLUME (CF) | BUFFER DISTURBANCE (AC.)
A 0.050 0.050 4,356 0.189
B 0.029 0.029 3,790 0.111
C 0.372 0.000 0 0.045
E 0.012 0.012 523 0.101
D 10.729 0.010 910 0.169
TOTAL: 11.330 0.101 9,579 0.615
4' TALL x 6' WIDE REZONING SIGN DETAIL
ZONING CHANGE PROPOSED FROM OS-1 AND I-1 TO B-3 AND RM-1 WITH PRO
FOR MORE INFORMATION CALL:
NOVI COMMUNITY DEVELOPMENT DEPARTMENT
248-347-0475
REZONING SIGN DETAIL
Min. 8" high letters
Min. 4" high letters
RESIDENTIAL SITE DATA
EXISTING ZONING: I-1
PROPOSED ZONING: RM-1 WITH PRO
SITE AREA = 27.07 ACRES
ON-SITE WETLAND AREA = 11.33 ACRES
ON-SITE NET SITE AREA = 15.74 AC.
NO. OF BUILDINGS PROPOSED = 13
NO. OF UNITS PROPOSED = 71
ALL UNITS HAVE 3 BEDROOMS EACH, (4 ROOMS)
NO. OF ROOMS PROPOSED = 4 x 71 = 284
PER NOVI ZONING ORDINANCE:
NET AREA REQUIRED = 2,000 S.F. PER ROOM
= 2,000 x 284 = 568,000 S.F.
= 13.04 ACRES
NET AREA PROVIDED = 15.74 ACRES
MAXIMUM BUILDING HEIGHT ALLOWED = 35'
MAXIMUM BUILDING HEIGHT PROPOSED = 29'
MIN. DISTANCE BETWEEN BUILDINGS
MIN. DISTANCE BETWEEN BUILDINGS REQUIRED PER SEC. 3.8.2.H.
LENGTH BLDG A+LENGTH BLDG B+2(HEIGHT BLDG A+HEIGHT BLDG B)/6
SPACE BETWEEN BUILDINGS | La | Lb | Ha | Hb | REQUIRED SPACING | PROPOSED SPACING | PRO DEVIATION
1 AND 2 | 39.76' | 39.76' | 29.00' | 29.00' | 32.59' | 30.2' | YES
2 AND 3 | 0' | 0' | 29.00' | 29.00' | 30.00' | 30.4' | NO
3 AND 4 | 31.71' | 36.59' | 29.00' | 29.00' | 30.72' | 31.0' | NO
4 AND 5 | 40.17' | 40.17' | 29.00' | 29.00' | 32.72' | 47.3' | NO
6 AND 7 | 9.68' | 0' | 29.00' | 29.00' | 30.00' | 66.8' | NO
7 AND 8 | 5.83' | 27.90' | 29.00' | 29.00' | 30.00' | 31.8' | NO
8 AND 9 | 36.17' | 36.17' | 29.00' | 29.00' | 31.39' | 30.0' | YES
9 AND 10 | 34.05' | 18.38' | 29.00' | 29.00' | 30.00' | 30.4' | NO
10 AND 11 | 24.13' | 15.38' | 29.00' | 29.00' | 30.00' | 30.6' | NO
11 AND 12 | 6.11' | 25.87' | 29.00' | 29.00' | 30.00' | 30.3' | NO
12 AND 13 | 40.17' | 40.17' | 29.00' | 29.00' | 32.72' | 30.0' | YES
WORST CASE SCENARIO SPACE BETWEEN BLDGS. (6 & 7) ACROSS THE STREET
5 AND 6 | 135.29' | 135.29' | 29.00' | 29.00' | 64.43' | 90.00' | NO
REQUESTED DEVIATIONS
1. Building Orientation (Sec. 3.8.2.D) Requested deviation for buildings not to be configured at 45 degrees.
2. Side and Rear Setbacks (Sec. 3.1.7.D and 3.6.2.B) Requested deviation to reduce the side setback from 75 feet to 25 feet along the north property line.
3. Parking along Major Drives (Sec. 5.10) Requested deviation is to have perpendicular parking on a major drive.
4. Landscape Berms (Sec. 5.5.3.A-ii) Requested deviation is to not provide a 10-15 foot high landscape berm adjacent to an I-1 district. (Existing natural features exist)
5. Right-of-Way Landscaping (Sec. 5.5.3.B.i) Requested deviation to provide required street trees elsewhere due to existing underground utilities.
6. Distance between Buildings (Sec. 3.8.2.H) Requested deviation is to provide 30 feet between buildings which a request for less than 3'.
7. Exterior Lighting (Sec. 5.7.3) Requested deviation from not exceeding 4:1 ratio.
8. Section 9 Waiver (Sec 5.15) Requested deviation from minimum required brick and asphalt shingles.
9. Major Drive Radius (Sec. 5.10) Requested deviation from the 100' foot minimum centerline radius to 85'.
NOTES AND PROPOSED IMPROVEMENTS
1. MUNICIPAL SEWER TO BE PROVIDED BY CONNECTING TO AN EXISTING SANITARY SEWER ON THE SOUTH SIDE OF 10 MILE ROAD AS SHOWN.
2. MUNICIPAL WATER TO BE PROVIDED BY CONNECTING TO AN EXISTING 12" WATER MAIN LOCATED ON THE SOUTH SIDE OF TEN MILE ROAD, ALSO CONNECTING TO AN EXISTING 8" WATER MAIN STUB FROM "RIDGEVIEW VILLAS" AS SHOWN.
3. STORM WATER DETENTION SHALL BE PROVIDED ON SITE.
4. 5' WIDE CONCRETE SIDEWALKS SHALL BE CONSTRUCTED ON BOTH SIDES OF THE INTERIOR ROAD AS SHOWN, ALSO 8' WIDE CONC. WALK SHALL BE CONSTRUCTED ALONG TEN MILE ROAD FRONTAGE.
5. ALL ROADWAYS TO BE PRIVATE.
6. A CITY OF NOVI RIGHT-OF-WAY PERMIT IS REQUIRED FOR WORK WITHIN ANY PUBLIC ROAD RIGHT-OF-WAY.
7. ALL SIDEWALKS AND SIDEWALK RAMPS SHALL A.D.A. COMPLIANT.
8. ALL WORK SHALL CONFORM TO THE CURRENT CITY OF NOVI STANDARDS AND SPECIFICATIONS.
9. PROP. WATER MAIN AND PROP. SANITARY SEWER TO BE CENTERLINE OF 20' WIDE PUBLIC EASEMENT.
10. TRASH TO BE PICKED UP BY CURBSIDE PICK UP.
RESIDENTIAL PARKING CALCULATIONS (SEE SHEET P5 FOR RETAIL PARKING)
PARKING REQUIRED PER SEC. 5.2.12.A
(2.5 SPACES REQUIRED FOR EACH UNIT HAVING 3 OR MORE BEDROOMS)
NO. OF UNITS PROPOSED = 71
PARKING REQUIRED = 71 x 2.5 = 178 SPACES
PARKING PROVIDED =
ATTACHED GARAGE PARKING = 142
APRON GARAGE PARKING = 142
GUEST SURFACE PARKING = 8
INCLUDING 1 V.A. SPACE
PARKING PROVIDED = 292 SPACES
ACCESSIBLE PARKING SPACES
TOTAL SURFACE SPACES = 8
ACCESSIBLE SPACES PER 2010 ADA (208.2.3 RESIDENTIAL FACILITIES)
TOTAL REQUIRED: MINIMUM 2% OF THE TOTAL SURFACE SPACES
TOTAL REQUIRED: 8 x 2% = 1 SPACE
TOTAL PROVIDED: 1 VAN ACCESSIBLE SPACE
BIKE RACK REQUIREMENTS
BICYCLE PARKING REQUIRED PER SECTION 5.16.1
(ONE SPACE FOR EACH 5 UNITS REQUIRED)
TOTAL REQUIRED = 71 / 5 = 15 SPACES
TOTAL PROVIDED = 16 SPACES
BUILDING COVERAGE
MAXIMUM PERMITTED LOT COVERAGE = 25%
PROVIDED LOT COVERAGE = 14.8%
LEGEND
EXISTING
PROPOSED
PAVEMENT (ASPHALT)
SIDE WALK (CONCRETE)
CONC. CURB & GUTTER
STORM SEWER
SANITARY SEWER
WATER MAIN
MANHOLE
CATCH BASIN
CURB INLET W/SALT SAC
END SECTION
GATE VALVE
HYDRANT
FLOOD PLAIN
CONTOURS
SPOT ELEVATION
SURFACE DRAINAGE
CLIENT:
NOVI TEN ASSOCIATES, LLC
BLOOMFIELD HILLS
MICHIGAN 48302
248.909.1308
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ENGINEERING | SURVEYING
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NO. | DESCRIPTION | DATE
1. | ADD COMMERCIAL PER CLIENT | 05-15-23
2. | REVISED | 02-28-23
3. | REVISE PRO | 01-05-23
DRAWN BY:
DATE: 05-29-23
CHECKED BY:
JOB No.: 21-006
PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN
SHEET TITLE:
PROPOSED PLANNED REZONING OVERLAY PLAN
SHEET
6



PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN

SHEET TITLE:
EXISTING AND PROPOSED ZONING

SHEET 7

CLIENT:
NOVI TEN ASSOCIATES, LLC
7 W. SQUARE LAKE ROAD
BLOOMFIELD HILLS
MICHIGAN 48302
248.909.1308

DRAWN BY: N.G.
DATE: 05-29-23
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811 3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 (TOLL FREE FOR THE LOCATION OF UNDERGROUND FACILITIES)

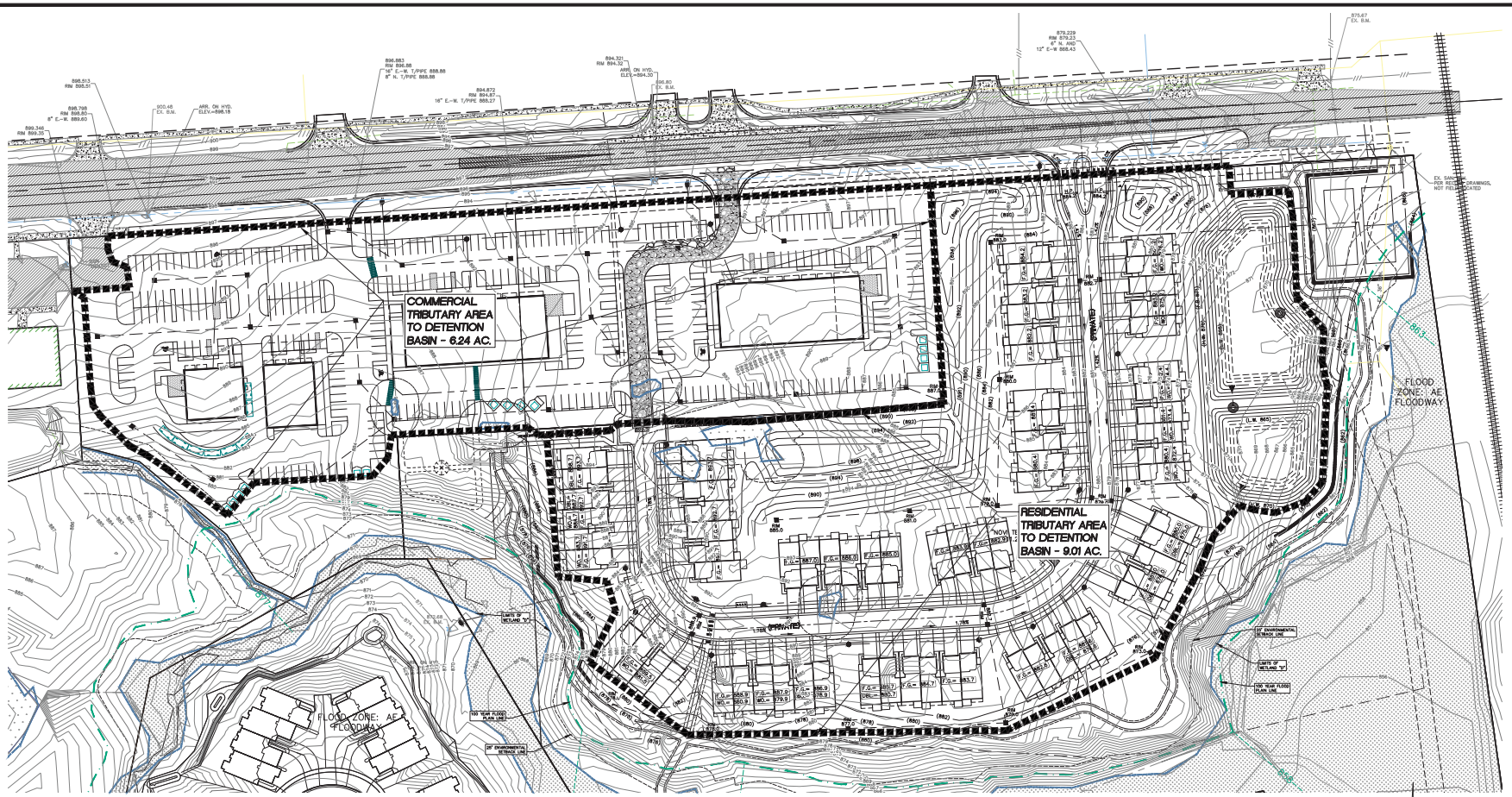
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ENGINEERING | SURVEYING

CLINTON TOWNSHIP OFFICE
THOMPSON TITLE BUILDING
CLINTON TOWNSHIP, MI 48035
586.286.0100

FARMINGTON HILLS OFFICE
FARMINGTON HILLS, MI 48331
248.553.2525



MAINTENANCE SCHEDULE:

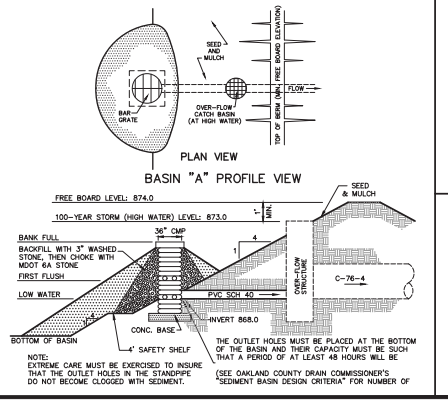
THE PROPERTY OWNER IS RESPONSIBLE FOR THE MAINTENANCE OF THE DETENTION BASIN. MAINTENANCE SHOULD BE PERFORMED FOLLOWING ANY STORM AND SHOULD INCLUDE:

1. CHECKING THE DEPTH OF SEDIMENT DEPOSIT TO ENSURE THE CAPACITY OF THE BASIN IS ADEQUATE FOR STORM WATER AND SEDIMENT DEPOSITION, AND FOR THE REMOVING OF SEDIMENT.
2. CHECKING THE BASIN FOR PIPING, SEEPAGE, OR OTHER MECHANICAL DAMAGE.
3. CHECKING FOR THE PRESENCE OF ANY SOIL CAKING, WHICH WOULD PREVENT PROPER DRAINAGE FROM THE BASIN.
4. CHECKING THE OUTFALL TO ENSURE DRAINAGE IS NOT CAUSING ANY ROSIVE VELOCITIES AND TO ENSURE THE OUTLET IS NOT CLOGGED.
5. ANY PROBLEM DISCOVERED DURING THE MAINTENANCE CHECKS SHOULD BE ADDRESSED IMMEDIATELY.
6. SEDIMENT REMOVED DURING CLEANING SHOULD BE PLACED AT AN UPLAND AREA AND STABILIZED SO THAT IT DOES NOT RE-ENTER THE DRAINAGE COURSE.

STORM WATER DETENTION CALCULATIONS



DETENTION BASIN SEDIMENT FILTER DETAIL



SCALE

60 0 30 60 120 240

(IN FEET)

Scale: 1 inch = 60 ft.

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE) CONCRETE CURB AND GUTTER
		STORM SEWER
		SANITARY SEWER
		WATER MAIN
		MANHOLE
		CATCH BASIN W/STREAM GUARD
		CURB INLET W/SILT SAC
		END SECTION
		GATE VALVE
		HYDRANT
		FLOOD PLAIN
1000	1000	CONTOURS
1000.00	1000.00	SPOT ELEVATION

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NO.	DESCRIPTION	DATE
1.	ADD COMMERCIAL FOR CLIENT	05-15-23
2.	ISSUED	02-28-23
3.	REVISE PRO	01-05-23

MISS DIG 811
3 WORKING DAYS BEFORE YOU DIG
CALL MISS DIG 1-800-482-7171
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DRAWN BY:
DATE: 05-29-23
CHECKED BY:
JOB No.: 21-006

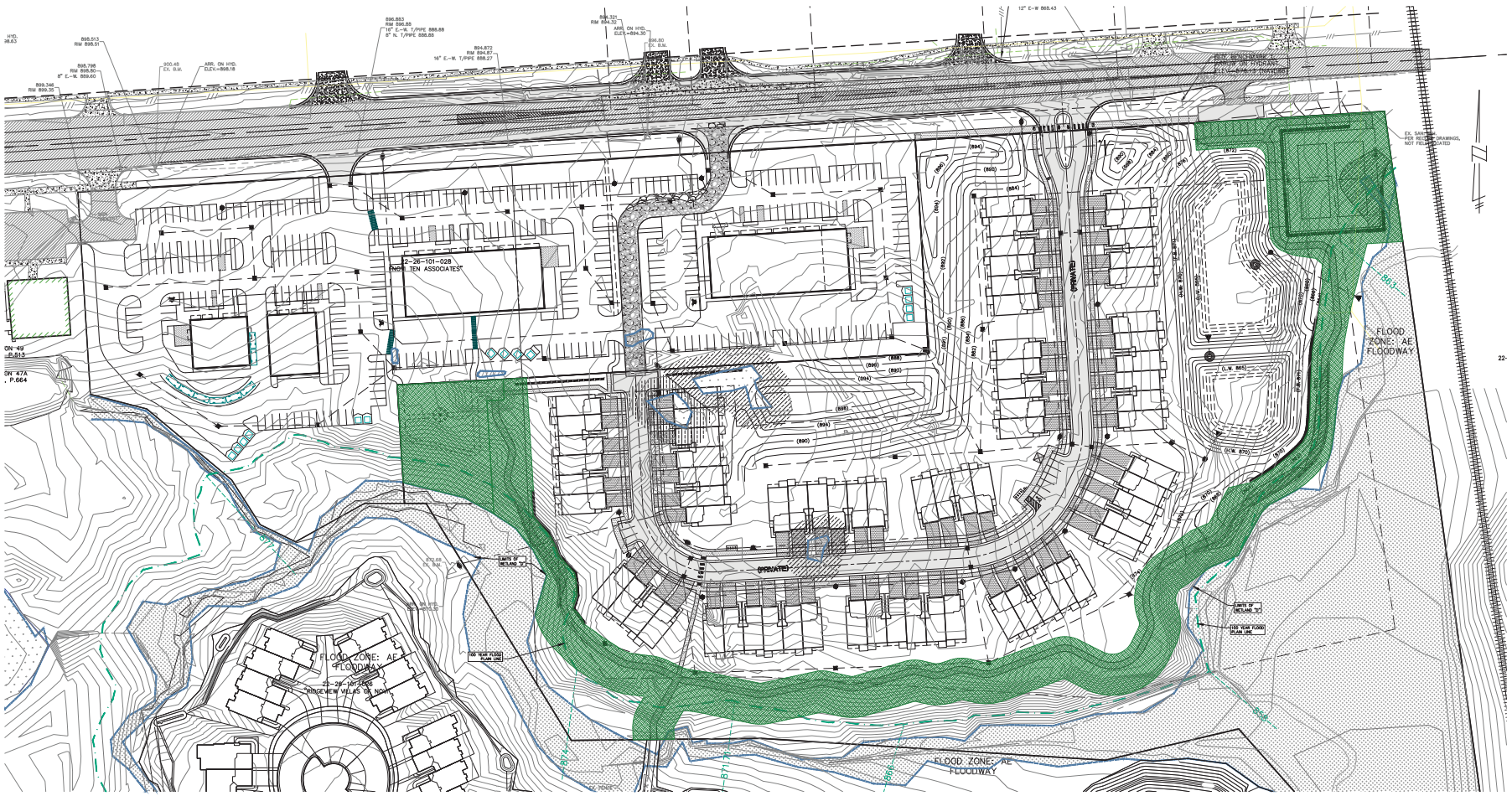
CLIENT:
NOVI TEN ASSOCIATES, LLC
7 MILE & HAGGERTY LAKE ROAD
BLOOMFIELD HILLS
MICHIGAN 48302
248.909.1308

PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN

SHEET TITLE:
STORM WATER MANAGEMENT PLAN

SHEET
8

J:\21-006 Novi Ten Work\CAD\PRO PLANS\21006-PM.dwg 12/28/2023 9:27 AM Jason Roland



SCALE

60 0 30 60 120 240

(IN FEET)

Scale: 1 inch = 60 ft.

Residential Usable Open Space Calculations Sec. 3.1.8.D

TOTAL No. OF RESIDENTIAL UNITS	=	71
USABLE OPEN SPACE REQUIRED	=	200 S.F. PER UNIT
	=	14,200 S.F. = 0.32 AC.
USABLE OPEN SPACE PROVIDED	=	107,423 S.F. = 2.47 AC.

= USABLE OPEN SPACE 50' WIDE MIN

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE)
		CONCRETE CURB AND GUTTER
		STORM SEWER
		SANITARY SEWER
		WATER MAIN
		MANHOLE
		CATCH BASIN
		CURB INLET W/SILT SAC
		END SECTION
		GATE VALVE
		HYDRANT
		FLOOD PLAIN
	1000	CONTOURS
	1000.00 T/C	SPOT ELEVATION
		SURFACE DRAINAGE
		OVERFLOW ROUTE
		TREE FENCE
		SILT FENCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE

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SEIBER KEAST ENGINEERING, LLC
TROY OFFICE | 248.519.2500
SEIBER KEAST SURVEYING, LLC
FARMINGTON HILLS OFFICE | 248.519.2500

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3.	REVISE PRD	01-05-23

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CHECKED BY:
DATE:
JOB No.: 21-006

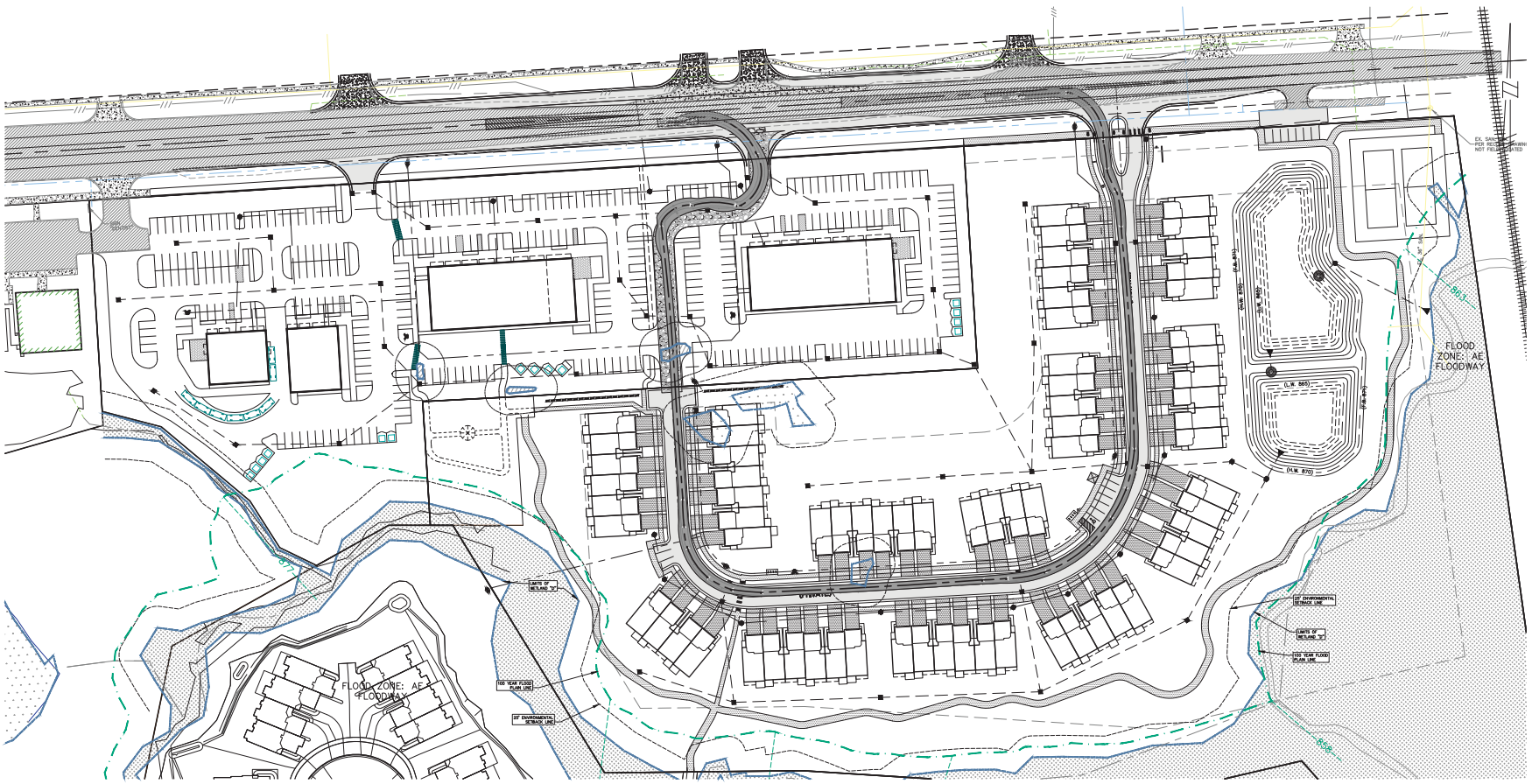
CLIENT:
NOVI TEN ASSOCIATES, LLC
27725 GRAND RIVER AVE
FARMINGTON HILLS
MICHIGAN 48336
248.477.5000

PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN

SHEET TITLE:
OPEN SPACE PLAN

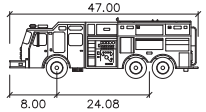
SHEET
9

P:\21-006 Novi Ten North\CAD\PDS FILES\21006-OPEN.dwg, 12/28/2023 9:27 AM, Jason Roland



SCALE

(IN FEET)
Scale: 1 inch = 60 ft.



47' FIRE TRUCK

	feet
Width	: 8.42
Track	: 8.42
Lock to Lock Time	: 6.0
Steering Angle	: 33.3

LEGEND

EXISTING / PROPOSED

- PAVEMENT (ASPHALT)
- SIDE WALK (CONCRETE)
- CONCRETE CURB AND GUTTER
- STORM SEWER
- SANITARY SEWER
- WATER MAIN
- MANHOLE
- CATCH BASIN
- CURB INLET W/SILT SAC
- END SECTION
- GATE VALVE
- HYDRANT
- FLOOD PLAIN
- CONTOURS
- SPOT ELEVATION
- SURFACE DRAINAGE
- OVERFLOW ROUTE
- TREE FENCE
- SILT FENCE
- PROPOSED DRIVEWAY LOCATION
- LIMIT OF DISTURBANCE

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FARMINGTON HILLS, MICHIGAN 48334
PHONE: (248) 553-2525
FAX: (248) 553-2526

NO.	DESCRIPTION	DATE
1.	ADD COMMERCIAL PER CLIENT	05-15-23
2.	ISSUED	02-28-23
3.	REVISE PRO	01-05-23

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DRAWN BY: MJ
DATE: 05-29-23
CHECKED BY: AS
JOB No.: 21-006

CLIENT:
NOVI TEN ASSOCIATES, LLC
BLOOMFIELD LAKE ROAD
BLOOMFIELD HILLS
MICHIGAN 48302
248.909.1308

PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN

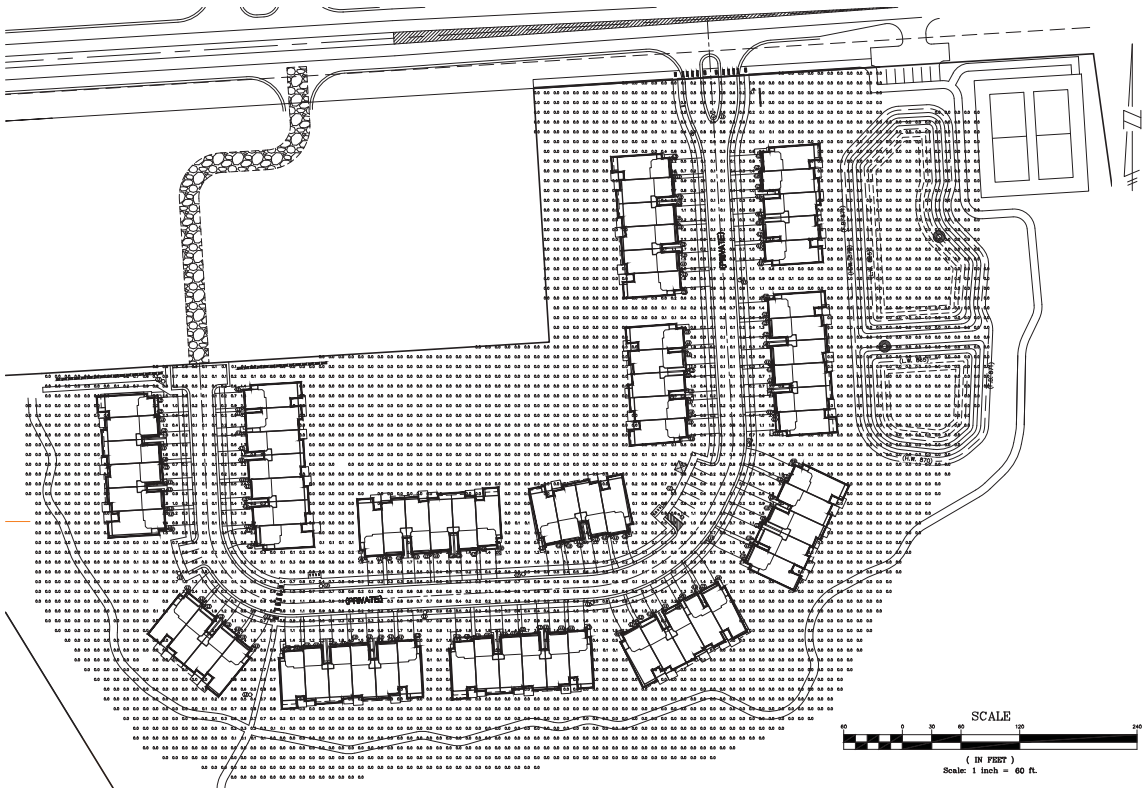
SHEET TITLE:
TRUCK ROUTING PLAN

SHEET
10

J:\21-006 Novi Ten Town\CAD\PRO PLANS\21006-A1.dwg, 12/28/2023 9:28 AM, Jason Roland







GENERAL PHOTOMETRIC SCHEDULE

AVERAGE FOOT–CANDLES	0.25
MAXIMUM FOOT–CANDLES	5.4
MINIMUM FOOT–CANDLES	0.0
MINIMUM TO MAXIMUM FC RATIO	0.00
MAXIMUM TO MINIMUM FC RATIO	5.40 / 0.00
AVERAGE TO MINIMUM FC RATIO	0.25 / 0.00

LUMINAIRE SCHEDULE

CALLOUT	SYMBOL	QUANTITY	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	MOUNTING HEIGHT	LUMENS / LAMP	LAMP DEPRECIATION
L1		10	Holophane	GVD3 P20 40K XXXX GL5LU RB FC	GranVille Gen3, P20 Performance Package, 4000K CCT, 70CRI, Type 5 lunar optic distribution with Ribs and Bands and Full Cover	10'	4044	0.9
L2		136	Generation Brands	8592–12	One light outdoor wall lantern – Med A19 75W (or LED eqv.) bulb	6'–6"	1100	0.9

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NO.	DESCRIPTION	DATE
1.	ADD COMMERCIAL PER CLIENT	05-15-23
2.	REVISED	02-28-23
3.	REVISE PPD	01-02-24

DRAWN BY:
CHECKED BY:
DATE: 05-29-23
JOB No.: 21-006

CLIENT:
NOVI TEN ASSOCIATES, LLC
7700 WEST LAKE ROAD
BLOOMFIELD HILLS
MICHIGAN 48302
248.909.1308

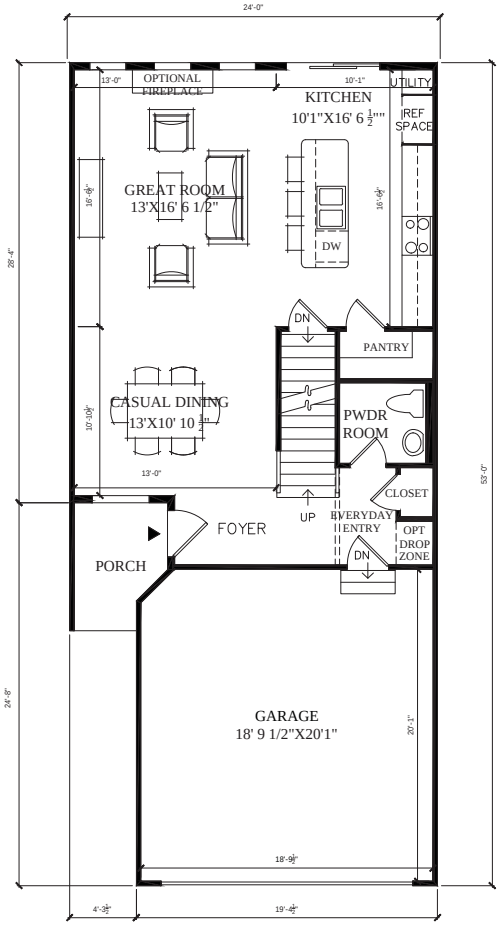
PROJECT NAME:
NOVI TEN TOWN HOMES
SECTION 26, TOWN 1 NORTH, RANGE 8 EAST
CITY OF NOVI, OAKLAND COUNTY, MICHIGAN

SHEET TITLE:
PHOTOMETRIC LIGHTING PLAN

SHEET
11

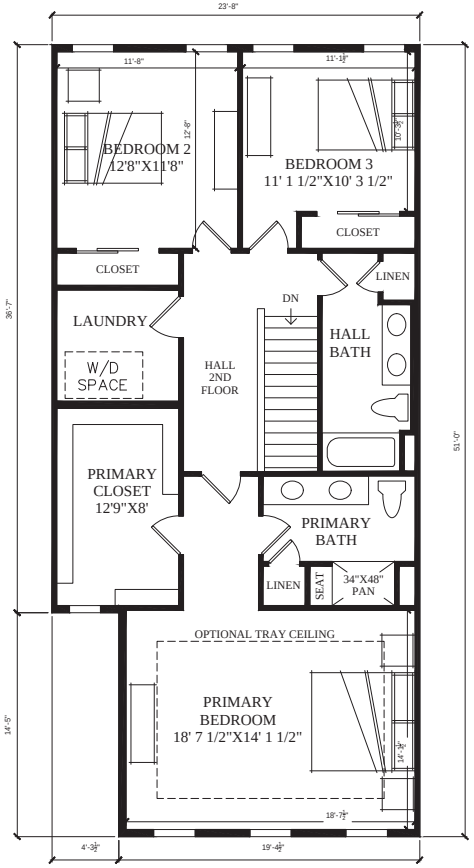
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HOWE - FIRST FLOOR PLAN

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



HOWE - SECOND FLOOR PLAN

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

TOLLARCHITECTURE
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SHEET REVISION INFO

SET REVISION INFO

PRODUCT LINE

MODEL/PROJECT NAME

ELEVATION NAME

DRAWN BY: -

CHECKED BY: -

SHEET DATE: 6-30-2023

SHEET DESCRIPTION: HOWE FLOOR PLANS

SHEET NUMBER: TB-1

SERIAL NUMBER

DATE: Friday, April 28, 2023 - 9:17:29 am

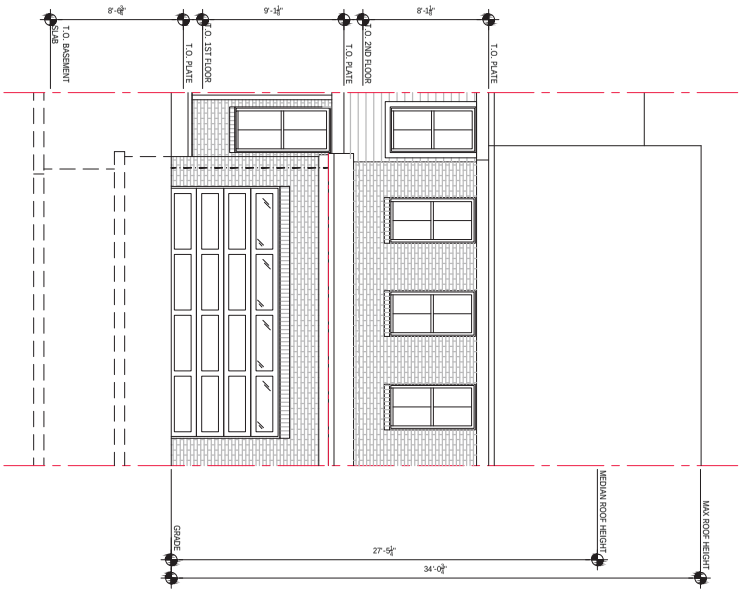
DATE: Friday, June 30, 2023 - 10:27:49 am

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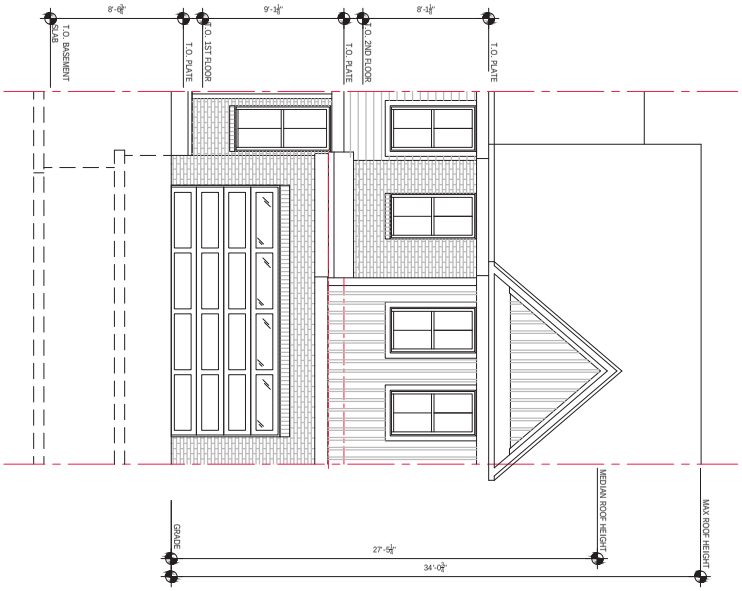
HOWE NEWHAVEN - FRONT ELEVATION

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



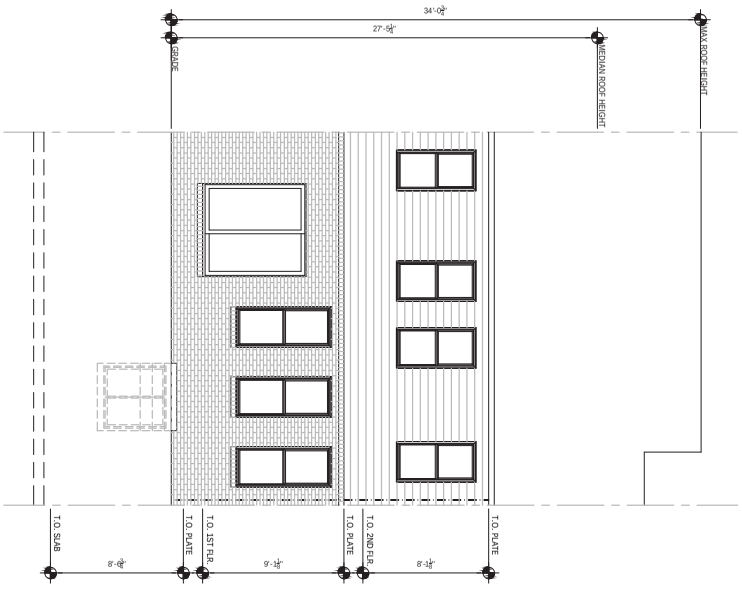
HOWE WETHERBY - FRONT ELEVATION

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



HOWE ALL ELEVATIONS - REAR ELEVATION

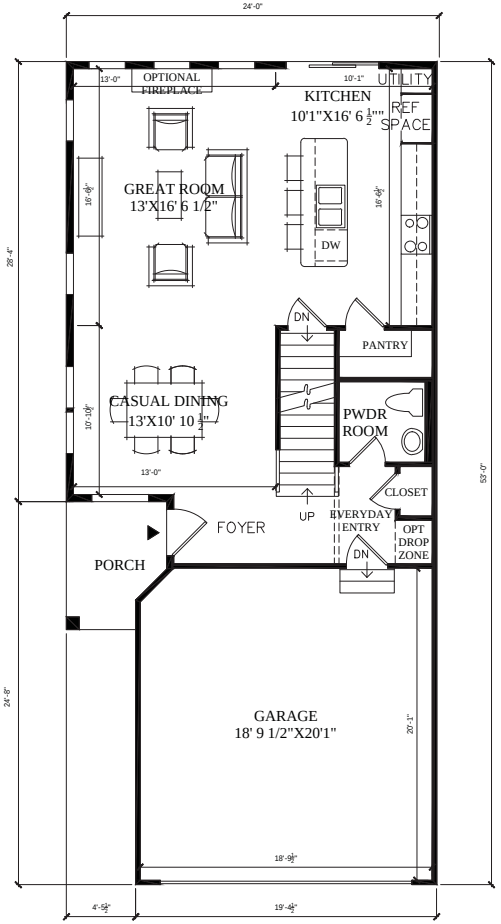
SCALE: 1/8"=1'-0"



SERIAL NUMBER	SHEET DESCRIPTION: HOWE ELEVATIONS	DRAWN BY -	PRODUCT LINE	SHEET REVISION INFO	TOLLARCHITECTURE PHILADELPHIA - ORLANDO DALLAS - LOS ANGELES - SEATTLE 1140 Virginia Drive, Fort Washington, PA 19034 P 215-295-5300 | F 215-295-5314 A Division of Toll Brothers
		CHECKED BY -	MODEL/PROJECT NAME		
		SHEET DATE 6-30-2023		SET REVISION INFO	
	SHEET NUMBER: TB-2		ELEVATION NAME		

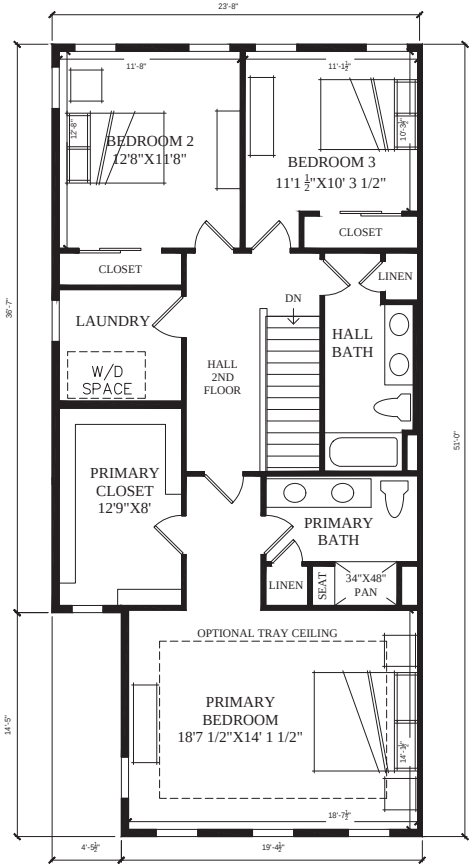
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HOWE ELITE - FIRST FLOOR PLAN

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



HOWE ELITE - SECOND FLOOR PLAN

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

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DALLAS - LOS ANGELES - SEATTLE
1140 Virginia Drive, Fort Washington, PA 19034
P 215.938.8000 | F 215.938.8314
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SHEET REVISION INFO

SET REVISION INFO

PRODUCT LINE

MODEL/PROJECT NAME

ELEVATION NAME

DRAWN BY -

CHECKED BY -

SHEET DATE - 6-30-2023

SHEET DESCRIPTION: HOWE ELITE FLOOR PLANS

SHEET NUMBER: TB-3

SERIAL NUMBER

DATE: Friday, April 28, 2023 - 9:27:49 am

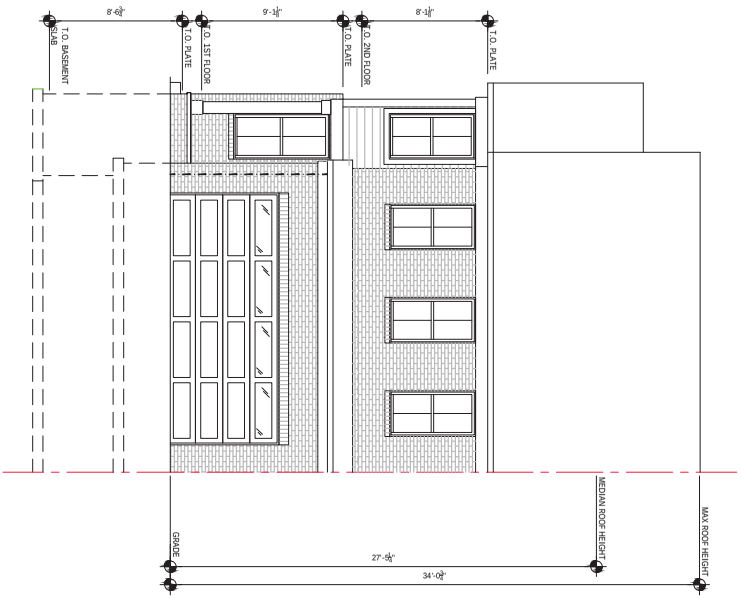
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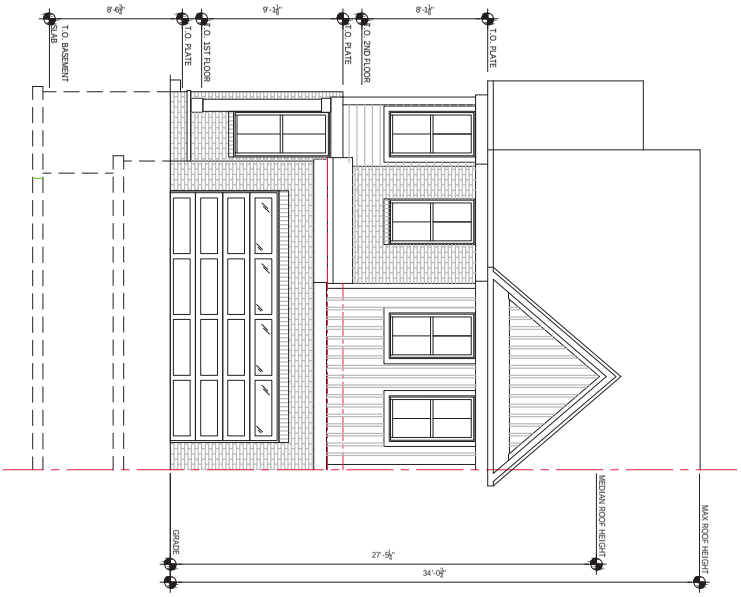
HOWE ELITE NEWHAVEN - FRONT ELEVATION

SCALE: 3/8"=1'-0"



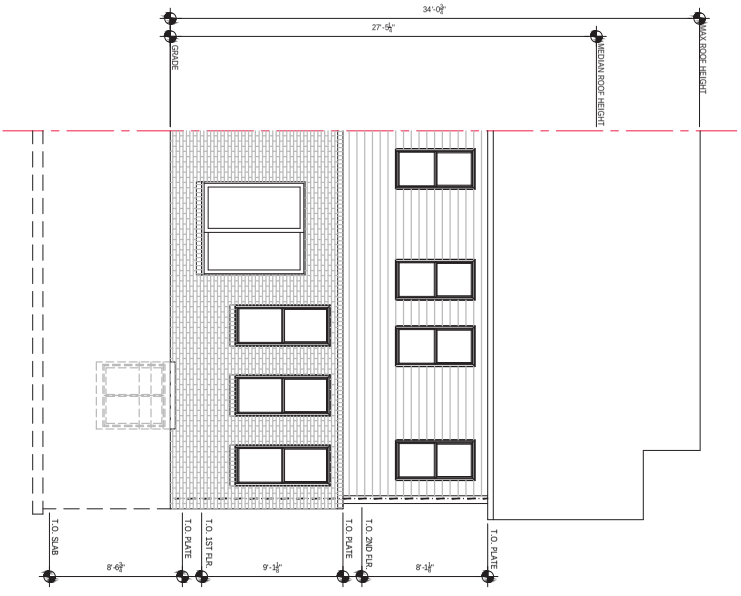
HOWE ELITE WETHERBY - FRONT ELEVATION

SCALE: 3/8"=1'-0"



HOWE ELITE ALL ELEVATIONS - REAR ELEVATION

SCALE: 3/8"=1'-0"



SERIAL NUMBER	SHEET DESCRIPTION: HOWE ELITE ELEVATIONS	DRAWN BY -	PRODUCT LINE	SHEET REVISION INFO	TOLLARCHITECTURE PHILADELPHIA - ORLANDO DALLAS - LOS ANGELES - SEATTLE
		CHECKED BY -	MODEL/PROJECT NAME	SET REVISION INFO	1140 Virginia Drive, Fort Washington, PA 19034 P 215-205-5300 | F 215-205-5314 A Division of Toll Brothers
	SHEET NUMBER: TB-4	SHEET DATE - 6-30-2023	ELEVATION NAME		

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HOWE ELITE WETHERBY - SIDE ELEVATION

SCALE: $\frac{1}{8}$"=1'-0"



HOWE ELITE NEWHAVEN - SIDE ELEVATION

SCALE: $\frac{1}{8}$"=1'-0"

TOLLARCHITECTURE
PHILADELPHIA - ORLANDO
DALLAS - LOS ANGELES - SEATTLE
1140 Virginia Drive, Fort Washington, PA 19034
P 215.938.8300 | F 215.938.8314
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SET REVISION INFO

PRODUCT LINE

MODEL/PROJECT NAME

ELEVATION NAME

DRAWN BY -

CHECKED BY -

SHEET DATE - 6-30-2023

SHEET DESCRIPTION: HOWE ELITE ELEVATIONS

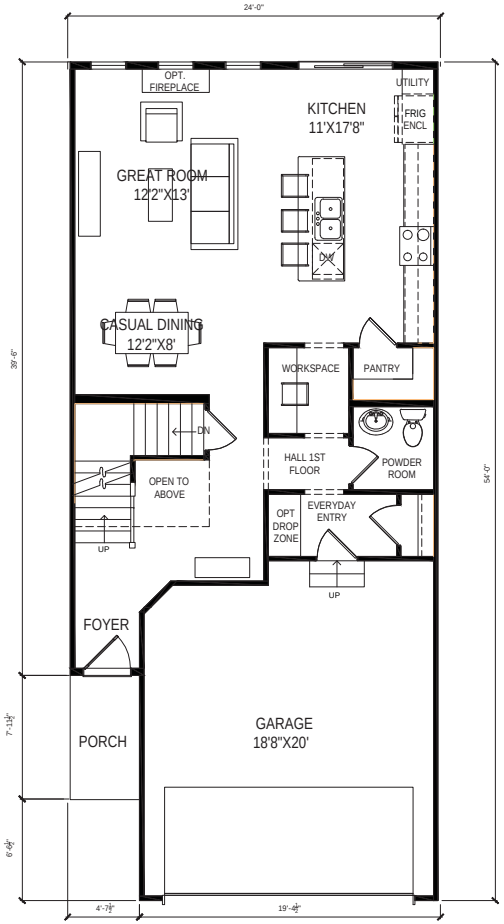
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SERIAL NUMBER

DATE: Friday, April 28, 2023 - 9:27:33 am

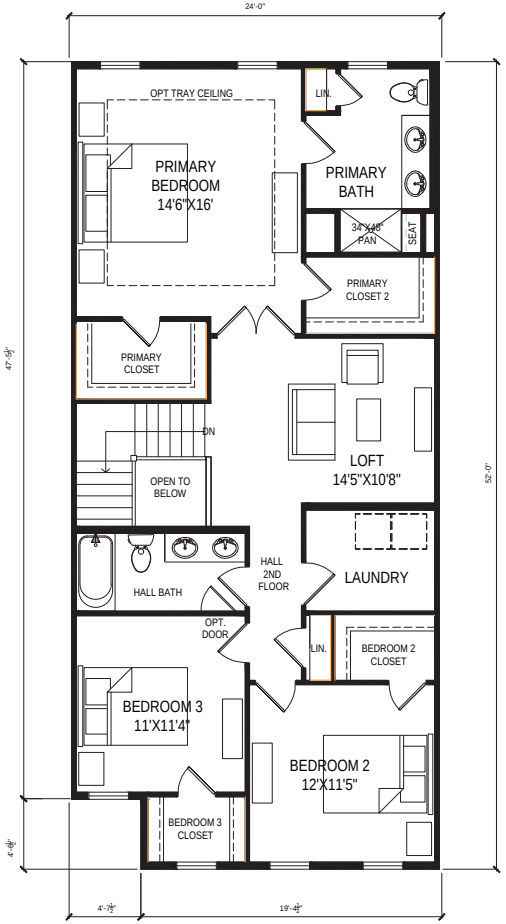
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SANDERS - FIRST FLOOR PLAN

SCALE: $\frac{1}{8}$"=1'-0"



SANDERS - SECOND FLOOR PLAN

SCALE: $\frac{1}{8}$"=1'-0"

TOLLARCHITECTURE
PHILADELPHIA - ORLANDO
DALLAS - LOS ANGELES - SEATTLE
1140 Virginia Drive, Fort Washington, PA 19034
T 215.938.8000 | F 215.938.8314
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SHEET REVISION INFO
SET REVISION INFO
PRODUCT LINE
MODEL/PROJECT NAME
ELEVATION NAME
DRAWN BY -
CHECKED BY -
SHEET DATE - 6-30-2023
SHEET DESCRIPTION: SANDERS FLOOR PLANS
SHEET NUMBER: TB-6
SERIAL NUMBER

DATE: Friday, April 28, 2023 - 9:27:51 am

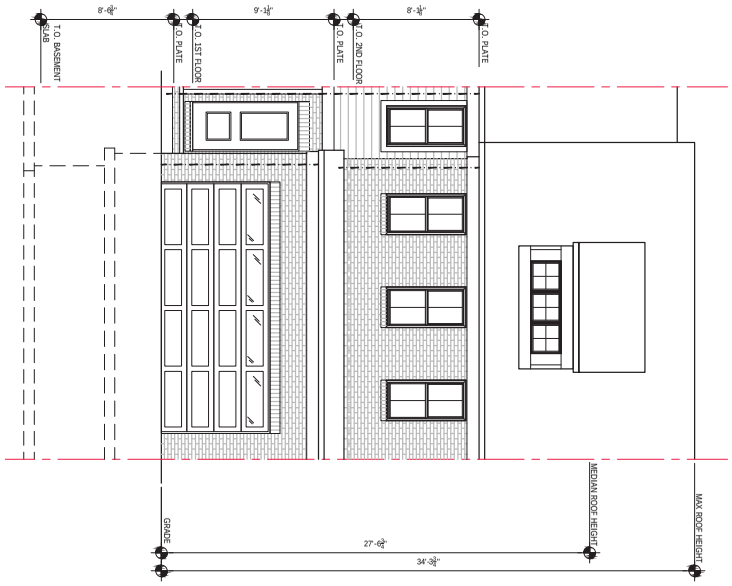
DATE: Friday, June 30, 2023 - 10:27:52 am

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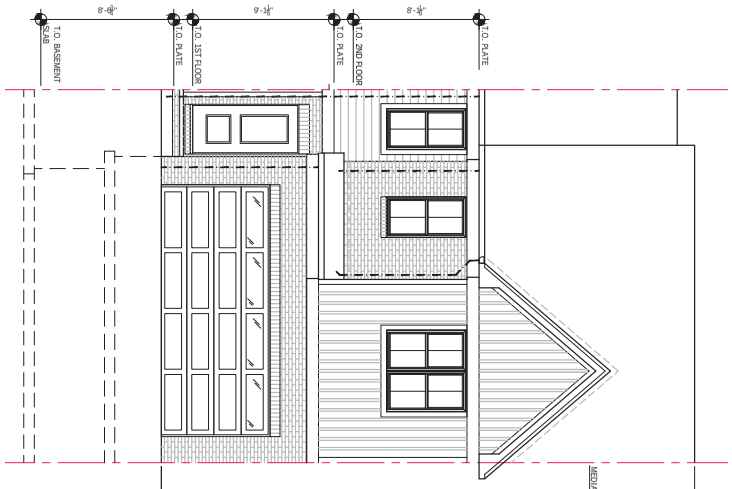
SANDERS NEWHAVEN - FRONT ELEVATION

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



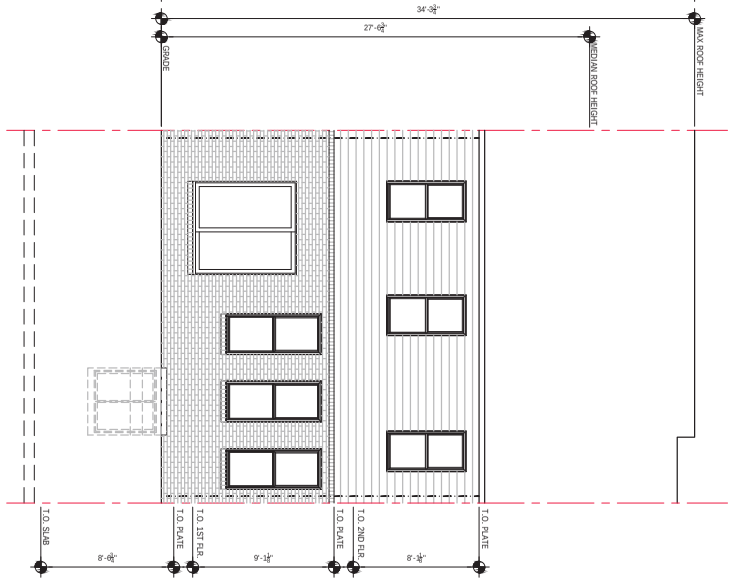
SANDERS WETHERBY - FRONT ELEVATION

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



SANDERS ALL ELEVATIONS - REAR ELEVATION

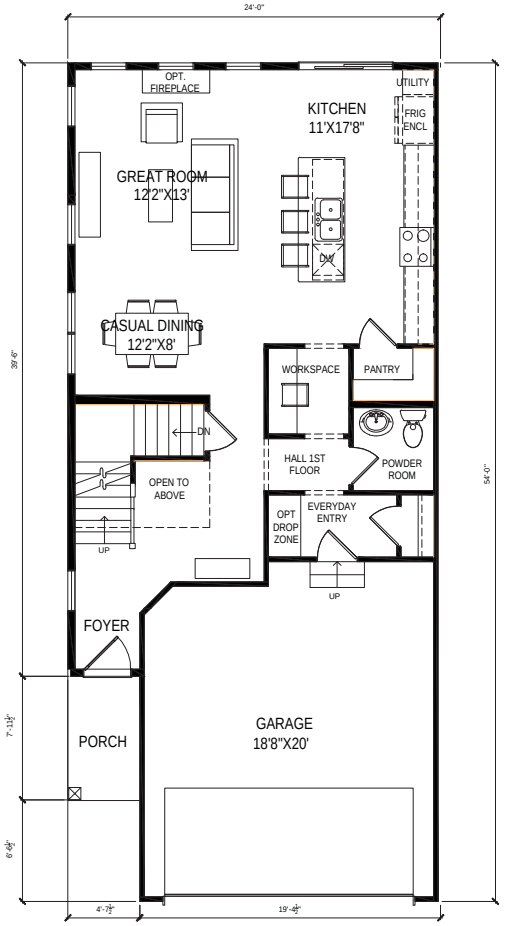
SCALE: 1/8"=1'-0"



SERIAL NUMBER	SHEET DESCRIPTION: SANDERS ELEVATIONS	DRAWN BY -	PRODUCT LINE	SHEET REVISION INFO	TOLLARCHITECTURE PHILADELPHIA - ORLANDO DALLAS - LOS ANGELES - SEATTLE
		CHECKED BY -	MODEL/PROJECT NAME	SET REVISION INFO	1140 Virginia Drive, Fort Washington, PA 19034 P 215-205-5300 | F 215-205-5314 A Division of Toll Brothers
	SHEET NUMBER: TB-7	SHEET DATE: 6-30-2023	ELEVATION NAME		

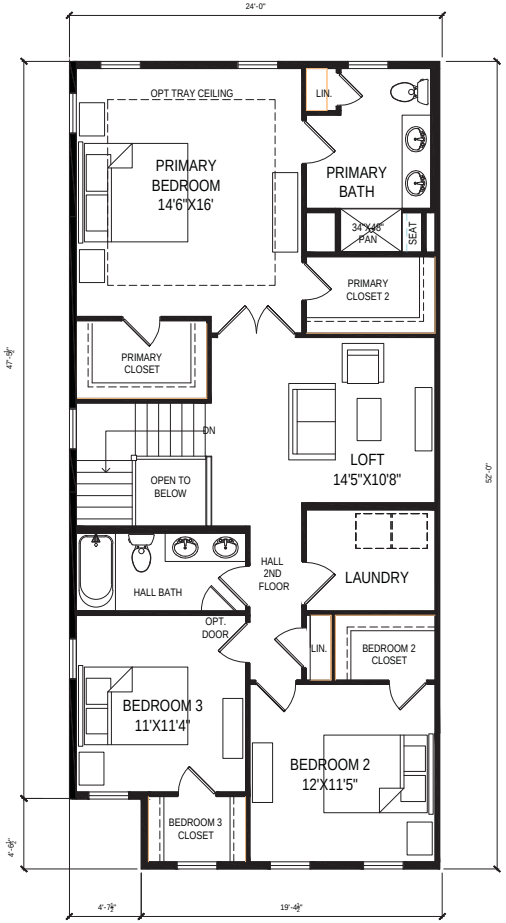
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SANDERS ELITE- FIRST FLOOR PLAN

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



SANDERS ELITE- FIRST FLOOR PLAN

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

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DALLAS - LOS ANGELES - SEATTLE
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SHEET REVISION INFO

SET REVISION INFO

PRODUCT LINE

MODEL/PROJECT NAME

ELEVATION NAME

DRAWN BY -

CHECKED BY -

SHEET DATE - 6-30-2023

SHEET DESCRIPTION: SANDERS ELITE FLOOR PLANS

SHEET NUMBER: TB-8

SERIAL NUMBER

DATE: Friday, April 28, 2023 - 9:17:23 am

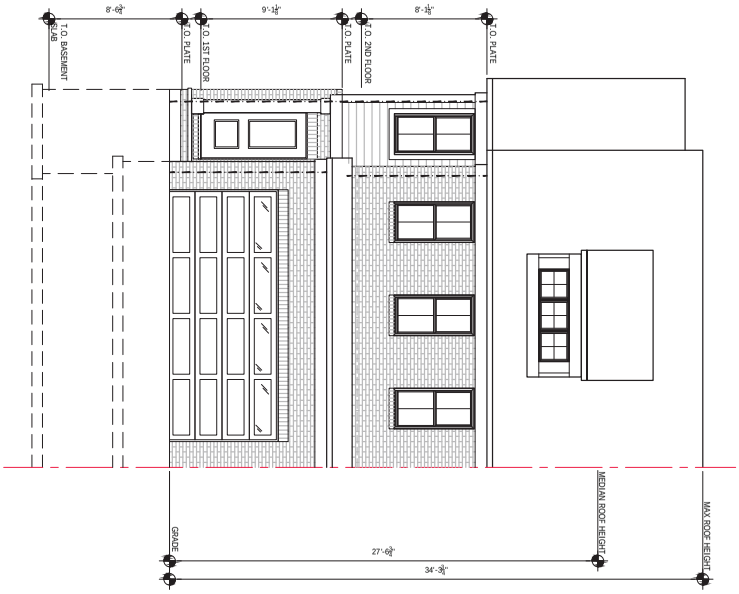
DATE: Friday, June 30, 2023 - 10:27:53 am

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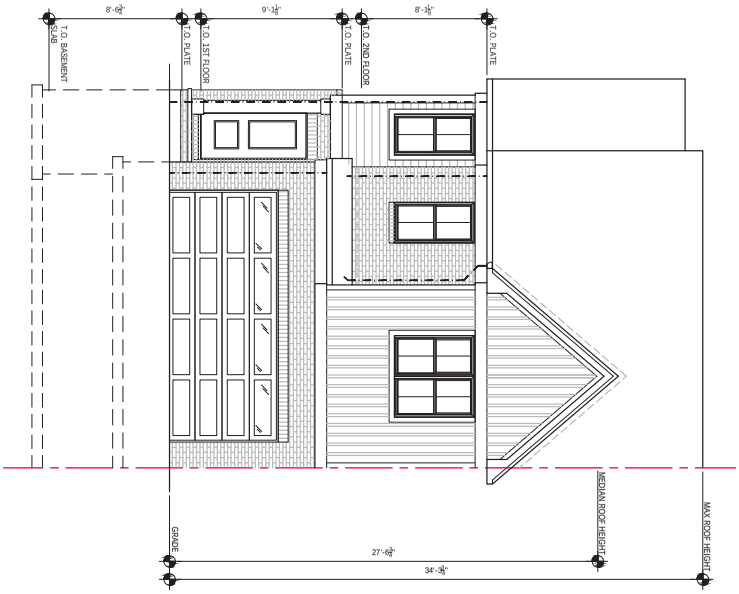
SANDERS ELITE NEWHAVEN - FRONT ELEVATION

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



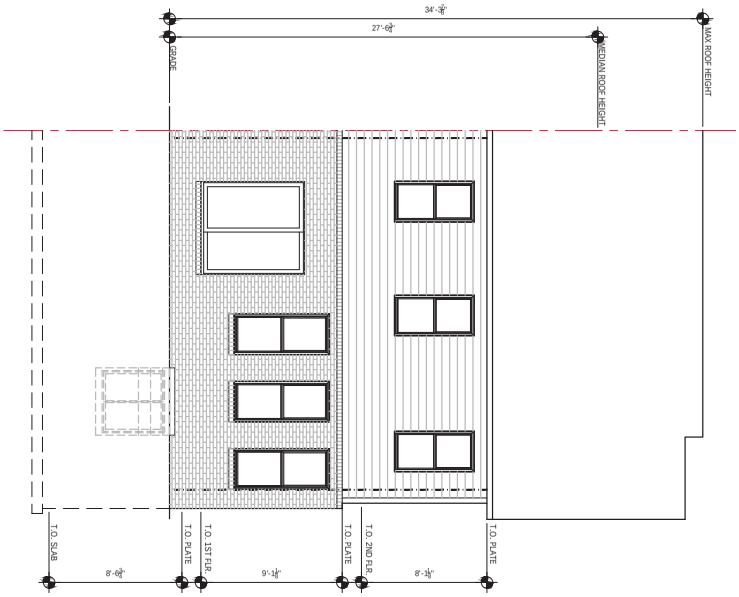
SANDERS ELITE WETHERBY - FRONT ELEVATION

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



SANDERS ELITE ALL ELEVATIONS - REAR ELEVATION

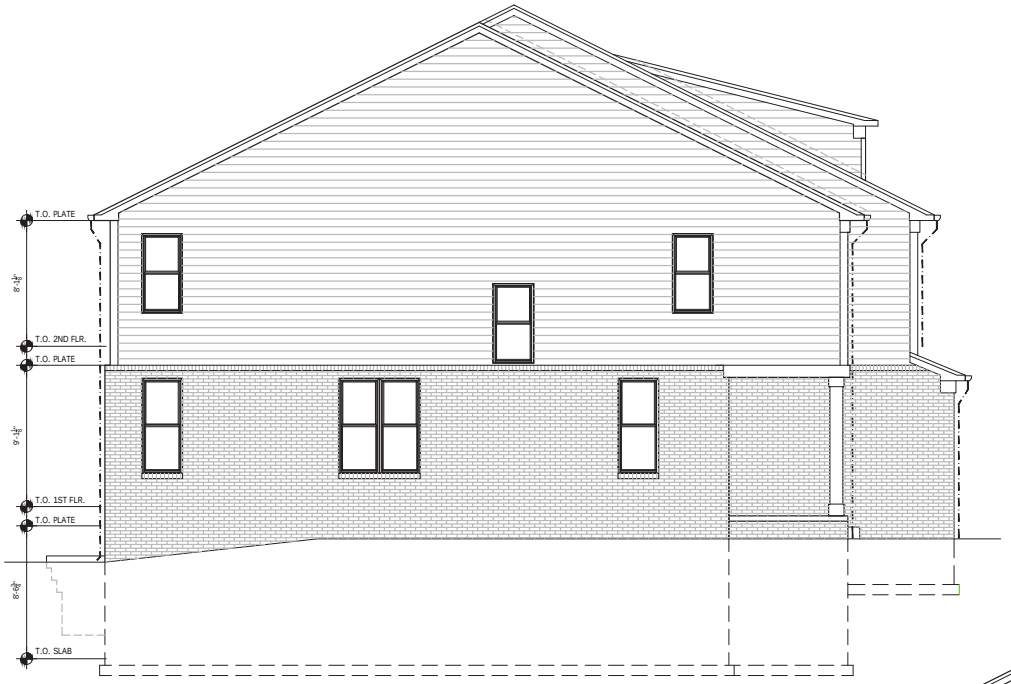
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SERIAL NUMBER	SHEET DESCRIPTION: SANDERS ELITE ELEVATIONS	DRAWN BY - / CHECKED BY - / SHEET DATE 6-30-2023	PRODUCT LINE / MODEL/PROJECT NAME / ELEVATION NAME	SHEET REVISION INFO / SET REVISION INFO	TOLL ARCHITECTURE PHILADELPHIA - ORLANDO DALLAS - LOS ANGELES - SEATTLE 1140 Virginia Drive, Fort Washington, PA 19034 P 215-205-5300 | F 215-205-5314 A Division of Toll Brothers
SHEET NUMBER	TB-9				

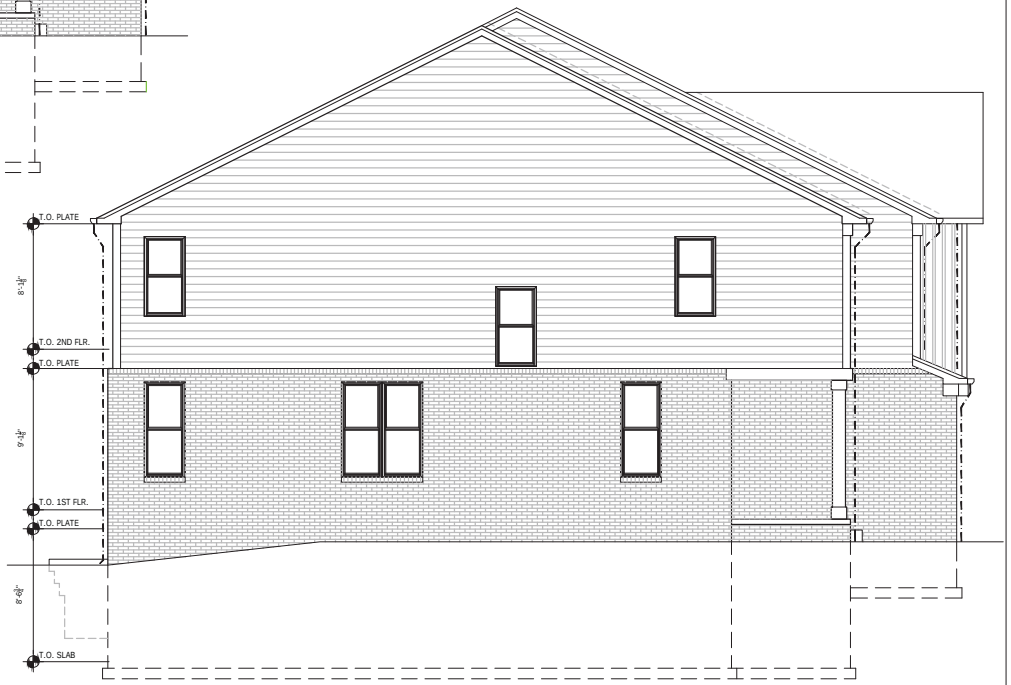
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SANDERS ELITE NEWHAVEN - SIDE ELEVATION

SCALE: $\frac{1}{8}$"=1'-0"



SANDERS ELITE WETHERBY - SIDE ELEVATION

SCALE: $\frac{1}{8}$"=1'-0"

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SHEET REVISION INFO

SET REVISION INFO

PRODUCT LINE

MODEL/PROJECT NAME

ELEVATION NAME

DRAWN BY -

CHECKED BY -

SHEET DATE - 6-30-2023

SHEET DESCRIPTION
SANDERS ELITE ELEVATIONS

SHEET NUMBER
TB-10

SERIAL NUMBER

DATE: Friday, April 28, 2023 - 9:27:23 am

DATE: Friday, April 28, 2023 - 9:27:5 am

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	5.15 Schedule Regulating Façade Materials - RM-1 - Region 1					
	Ordinance					
	Brick Natural Clay - Minimum 30%		Wood Siding, painted, t&g and batten siding - Maximum 50%		Asphalt Shingles - Maximum 50%	
Model/ Elevation	Meets	Deviation Req'd	Meets	Deviation Req'd	Meets	Deviation Req'd
Howe/ Newhaven - Front Elevation	X		X			X-55%
Howe/ Wetherby - Front Elevation		X-22%	X		X	
Howe/ All Elevations - Rear Elevation		X-27%	X		X	
Howe Elite/ Newhaven - Front Elevation	X		X			X-55%
Howe Elite/ Wetherby - Front Elevation		X-22%	X		X	
Howe Elite/ All Elevations- Rear Elevation		X-27%	X		X	
Howe Elite/ Newhaven - Side Elevation	X			X-62%	X	
Howe Elite/ Wetherby - Side Elevation	X			X-59%	X	
Sanders/ Newhaven - Front Elevation	X		X		X	
Sanders/ Wetherby - Front Elevation		X-21%	X		X	
Sanders/ All Elevations - Rear Elevation		X-26%	X		X	
Sanders Elite/ Newhaven - Front Elevation	X		X		X	
Sanders Elite/ Wetherby - Front Elevation		X-22%	X		X	
Sanders Elite/ All Elevations- Rear Elevation		X-26%	X		X	
Sanders Elite/ Newhaven- Side Elevation	X			X-62%	X	
Sanders Elite/ Wetherby- Side Elevation	X			X-58%	X	

DRAWN BY -

CHECKED BY -

SHEET DATE - 6-30-2023

PRODUCT LINE

MODEL/PROJECT NAME

ELEVATION NAME

SHEET REVISION INFO

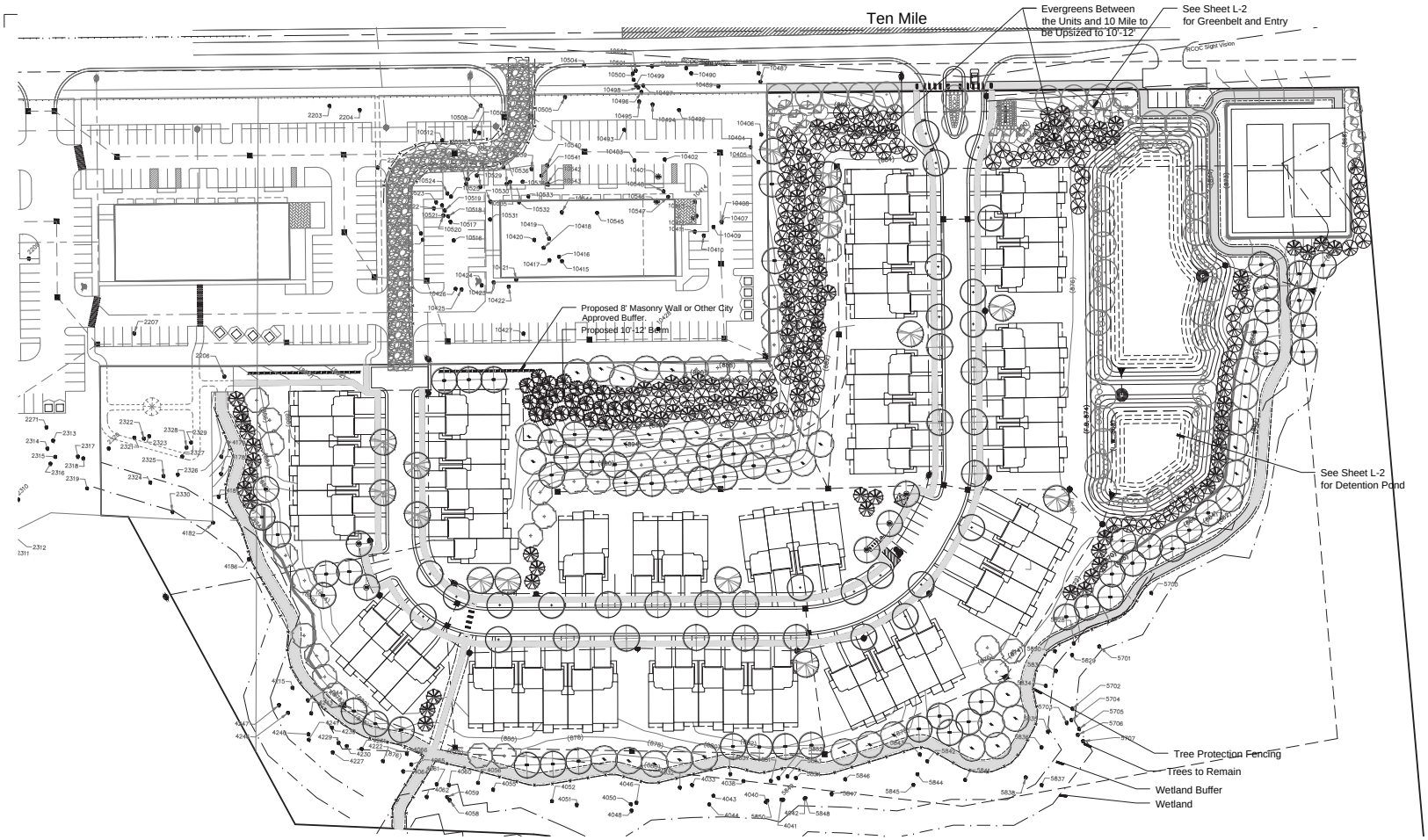
SET REVISION INFO

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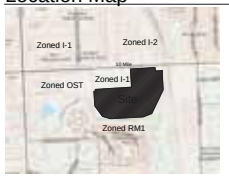
SHEET DESCRIPTION
FACADE MATERIAL SQUARE FOOTAGES

SHEET NUMBER
TB-11

SERIAL NUMBER



Location Map



North
No Scale

Landscape Summary

Street Trees		
Street Frontage		2,368 l.f.
Less Drives	1,136 l.f.	
Net Frontage		1,232 l.f.
Trees Required		35 Trees (1,232 / 35)
Trees Provided		35 Trees
Multi-Family Trees		
Total Units		71 Units
Trees Required		213 Trees (71 x 3)
Trees Provided		213 Trees
Parking Lot Landscaping		
Parking Lot Perimeter		163 l.f.
Trees Required		4.7 Trees (163 / 35)
Trees Provided		5 Trees
Woodland Replacement		
Replacement Required		697 Trees
Total Trees Provided		181 Trees
Trees to be Paid into Fund		516 Trees

Notes:

- Soils Information is Shown on Sheet 2.
- Trees Shall be Planted 10' from Utility Structures Including Hydrants and 5' from Utility Lines.
- Tree Shall not Be Planted within 4' of Property Lines.
- Snow Shall be Deposited Adjacent to Drives and within the Curb Lawn. Any Damaged Trees Shall be Replaced as Needed.
- All Utility Boxes Shall be Screen per Detail on Sheet L-3. Approximately 8-12 Shrubs will be Required per Box.
- No Overhead Lines Exist.
- Phragmites and Japanese Knotweed and not Present on this Site.
- An Irrigation Plan will be Provided for Stamping Sets.

Requested Waivers:

1. Landscape waiver from Sec. 5.5.3.B.ii for deficiency in required trees along Ten Mile due to Water Main Conflict.

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LAND PLANNING / LANDSCAPE ARCHITECTURE
557 Carpenter
Northville, Michigan 48167
e. jca@wideopenwest.com
t. 248.467.4668

Seal:

Title:

Conceptual Landscape Plan

Project:

The Towns at Novi Station
Novi, Michigan

Prepared for:

Toll Brothers
26200 Town Center Drive, Suite 200
Novi, Michigan 48375

Revision:	Issued:
Submission	September 14, 2022
Issued	February 28, 2023
Revised	April 27, 2023
Revised	January 2, 2024

Job Number:
21-027

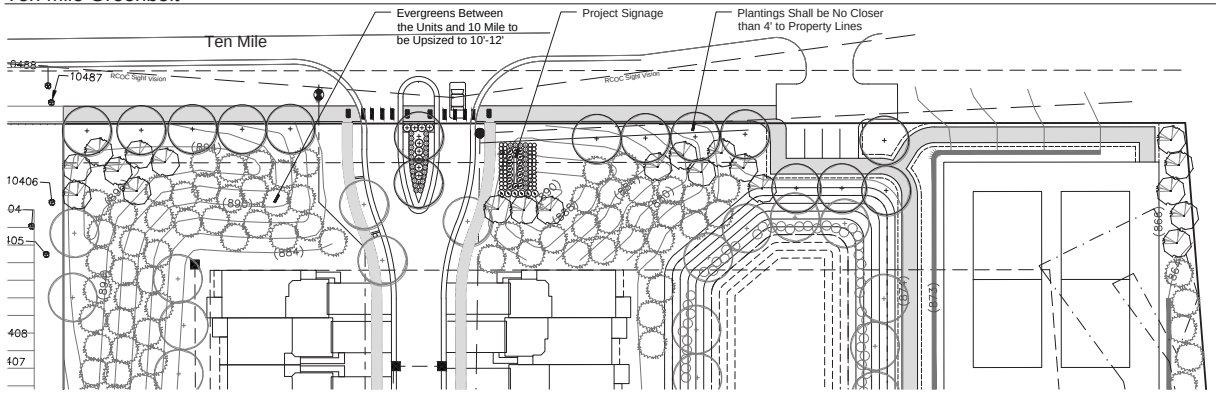
Drawn By: jca
Checked By: jca

0' 25' 50'
NORTH
1"=50'

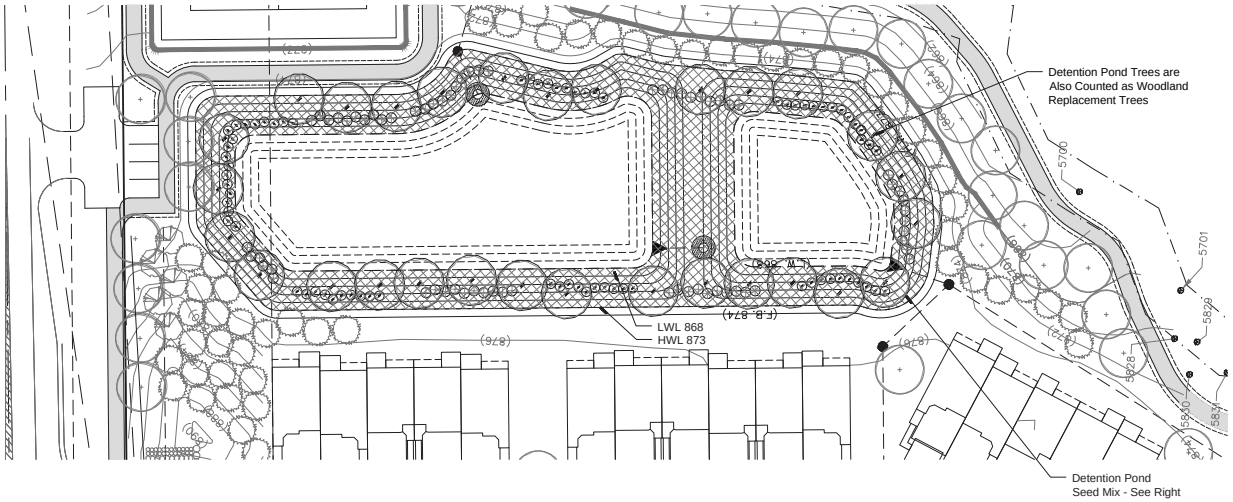
Sheet No.
L-1

811 Know what's below. Call before you dig.

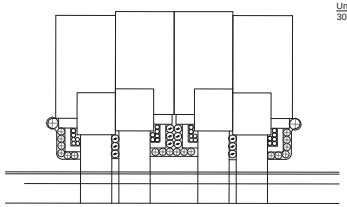
Ten Mile Greenbelt



Detention Pond



Typical Unit



Unit Length	Required Landscape (35%)	Landscape Provided (40.0%)
30'	10.5'	12'

Landscape Summary

Street Lawn	
Total Street Frontage	573 l.f.
Less Drive Opening	149 l.f.
Net Street Frontage	424 l.f.
Trees Required	12.1 Trees (424 / 35)
Trees Provided	0 Trees
Greenbelt Plantings	
Total Street Frontage	573 l.f.
Less Drive Opening	58 l.f.
Net Street Frontage	515 l.f.
Canopy Trees Required	14.7 Trees (515 / 35)
Canopy Trees Provided	15 Trees
Sub-Canopy Trees Required	20.6 Trees (515 / 25)
Sub-Canopy Trees Provided	21 Trees
Detention Pond Plantings	
10' from LWL Elevation	975 l.f.(Elev. 870.5)
Required Planting	680 l.f. (70%)
Planting Provided	695 l.f. (72%)
Pond Frontage for Trees	634'
Trees Required	18.1 Trees (634 / 35)
Trees Provided	29 Trees



20,783 s.f. Total Area

34.2 lbs. per Acre Application Rate
16.3 lbs. of Detention Seed Mix Required
3"-6" of Topsoil with 20%-30% Compost Shall be Placed in this Area.

Note:
Contractor Shall Provide Proof of Seed to be Used in the Form of an Invoice or Photo of the Seed Bag to rmeader@cityofnovi.org for Approval Prior to Installation. If an Unacceptable Seed Mix is Used, the City Reserves the Right to Destroy the Plants and Re-seed with and Acceptable Mix at the Developer's Expense.

ALLENDESIGN
LAND PLANNING / LANDSCAPE ARCHITECTURE
557 Carpenter
Northville, Michigan 48167
e. jca@wideopenwest.com
t. 248.467.4668

Seal:

Title:
Greenbelt and Entry

Project:
The Towns at Novi Station
Novi, Michigan

Prepared for:
Toll Brothers
26200 Town Center Drive, Suite 200
Novi, Michigan 48375

Revision:	Issued:
Submission	September 14, 2022
Issued	February 28, 2023
Revised	April 27, 2023
Revised	January 2, 2024

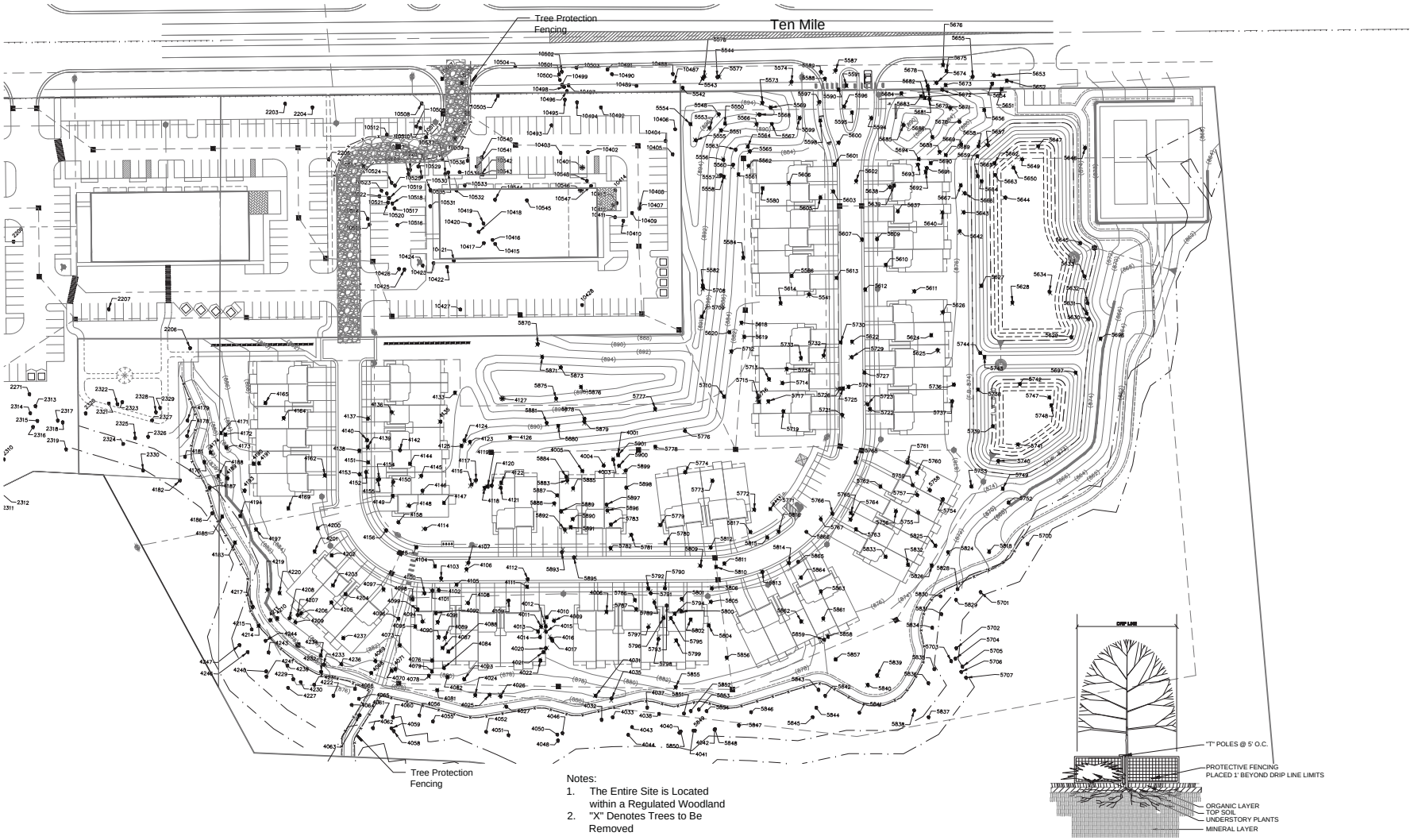
Job Number:
21-027

Drawn By:	Checked By:
jca	jca

0' 15' 30'
NORTH
1"=30'

Sheet No.
L-2

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Notes:

1. The Entire Site is Located within a Regulated Woodland
2. "X" Denotes Trees to Be Removed

1. Either Plastic or Wood Orange Snow Fencing Shall be Installed at or Beyond the Dripline, Unless More Substantial Fencing is Required.
2. Stakes Shall be Metal "T" Poles Spaced no Further than 5' on Center.
3. Fencing Shall not be Installed Closer to the Tree than the Dripline of Those Trees to be Saved. Special Circumstances Shall be Reviewed by the City.
4. Fencing Shall be Erected Prior to Construction. The City Shall be Notified Once the Fencing is Instaled for Inspection.
5. Under no Circumstances Shall the Protective Fencing be Removed Without Proper Approval from the City.
6. No Person Shall Conduct any Activity Within Areas Proposed to Remain. This Shall Include, but not Limited to:
   a. No Solvents or Chemicals Within Protected Areas.
   b. No Building Materials or Construction Equipment Within Protected Areas.
   c. No Grade Changes, Including Fill, Within Protected Areas.
   d. No Removal of Vegetation from the Ground Up Without Permission from the Proper Reviewing Authority, Including the Woodlands Review Board.
   e. Any Required Swale Needs to be Directed Around the Protected Areas. Instances Where Swales are Approved Through a Protected Area, the Swales Need to be HAND DUG. Machinery of Any Kind is Prohibited.
7. Regulated Woodland or Regulated Trees Adjacent to the Property are Also Required to be Protected Whether or not they are Shown on the Plan.

TREE PROTECTION DETAIL

Not to scale

811 Know what's below. Call before you dig

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Northville, Michigan 48167
e. jca@wideopenwest.com
t. 248.467.4668

Seal:

Title:

Woodland Plan

Project:

The Towns at Novi Station
Novi, Michigan

Prepared for:

Toll Brothers
26200 Town Center Drive, Suite 200
Novi, Michigan 48375

Revision:	Issued:
Submission	September 14, 2022
Issued	February 28, 2023
Revised	April 27, 2023
Revised	January 2, 2024

Job Number:

21-027

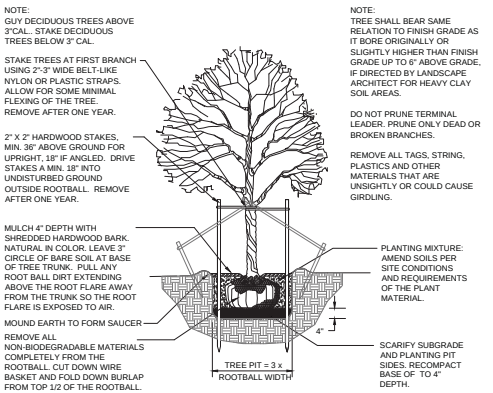
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jca	jca

0' 25' 50'

NORTH
1"=50'

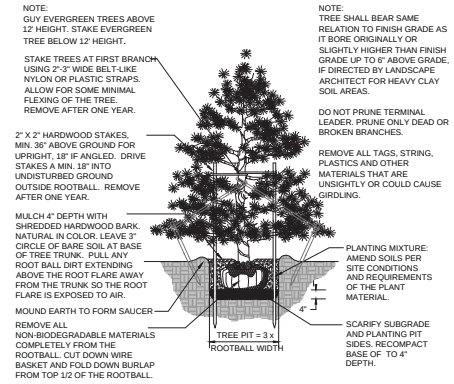
Sheet No.

L-3



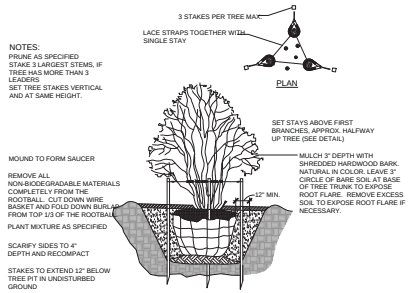
DECIDUOUS TREE PLANTING DETAIL

Not to scale



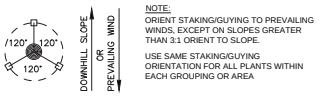
EVERGREEN TREE PLANTING DETAIL

Not to scale

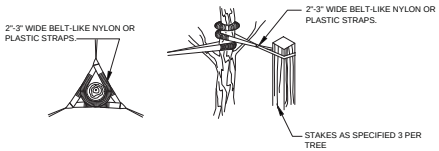


MULTI-STEM TREE PLANTING DETAIL

NOT TO SCALE



STAKING/GUYING LOCATION

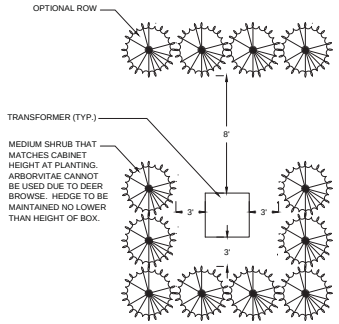


GUYING DETAIL

STAKING DETAIL

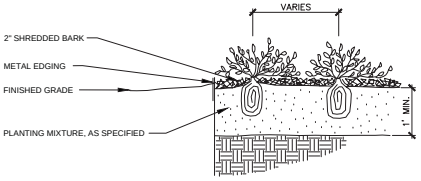
TREE STAKING DETAIL

Not to scale



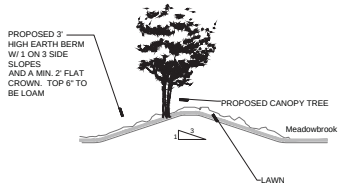
TRANSFORMER SCREENING DETAIL

Not to scale



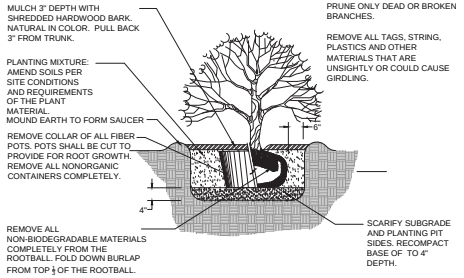
PERENNIAL PLANTING DETAIL

Not to scale



Berm Detail

HORIZONTAL SCALE: 1"=10'



SHRUB PLANTING DETAIL

NOT TO SCALE

LANDSCAPE NOTES

1. All plants shall be north Midwest American region grown, No. 1 grade plant materials, and shall be true to name, free from physical damage and wind burn.
2. Plants shall be full, well-branched, and in healthy vigorous growing condition.
3. Plants shall be watered before and after planting is complete.
4. All trees must be staked, fertilized and mulched and shall be guaranteed to exhibit a normal growth cycle for at least two (2) full years following City approval.
5. All material shall conform to the guidelines established in the most recent edition of the American Standard for Nursery Stock.
6. Provide clean backfill soil, using material stockpiled on site. Soil shall be screened and free of any debris, foreign material, and stone.
7. "Agriform" tabs or similar slow-release fertilizer shall be added to the planting pits before being backfilled.
8. Amended planting mix shall consist of 1/3 screened topsoil, 1/3 sand and 1/3 compost, mixed well and spread to the depth as indicated in planting details.
9. All plantings shall be mulched per planting details located on this sheet.
10. The Landscape Contractor shall be responsible for all work shown on the landscape drawings and specifications.
11. No substitutions or changes of location, or plant types shall be made without the approval of the Landscape Architect.
12. The Landscape Architect shall be notified in writing of any discrepancies between the plans and field conditions prior to installation.
13. The Landscape Contractor shall be responsible for maintaining all plant material in a vertical condition throughout the guaranteed period.
14. The Landscape Architect shall have the right, at any stage of the installation, to reject any work or material that does not meet the requirements of the plans and specifications, if requested by owner.
15. Contractor shall be responsible for checking plant quantities to ensure quantities on drawings and plant list are the same. In the event of a discrepancy, the quantities on the plans shall prevail.
16. The Landscape Contractor shall seed and mulch or sod (as indicated on plans) all areas disturbed during construction, throughout the contract limits.
17. A pre-emergent weed control agent, "Preen" or equal, shall be applied uniformly on top of all mulching in all planting beds.
18. Sod shall be two year old "Baron/Cheriadelphi" Kentucky Blue Grass grown in a sod nursery on loam soil.

CITY OF NOVI NOTES

1. All landscape islands shall be backfilled with a sand mixture to facilitate drainage.
2. All proposed landscape islands shall be curbed.
3. All landscape areas shall be irrigated.
4. Overhead utility lines and poles to be relocated as directed by utility company of record.
5. Evergreen and canopy trees shall be planted a minimum of 10' from a fire hydrant, and manhole, 15' from overhead wires.
6. All plant material shall be guaranteed for two (2) years after City Approval and shall be installed and maintained according to City of Novi standards. Replace Failing Material within 3 Months of Discovering the Need for Replacement. One cultivation per month shall occur in June-August.
7. All proposed street trees shall be planted a minimum of 4' from both the back of curb and proposed walks.
8. All tree and shrub planting beds shall be mulched with shredded hardwood bark, spread to minimum depth of 4". All lawn area trees shall have a 4' diameter circle of shredded hardwood mulch 3" away from trunk. All perennial, annual and ground cover beds shall receive 2" of dark colored bark mulch as indicated on the plant list. Mulch is to be free from debris and foreign material, and shall contain no pieces of inconsistent size.
9. All Substitutions or Deviations from the Landscape Plan Must be Approved in Writing by the City of Novi Prior to their Installation.

NOTES:
THE APPROXIMATE DATE OF INSTALLATION FOR THE PROPOSED LANDSCAPE WILL BE MARCH 15 AND NOVEMBER 15 OF 2024 OR 2025.

THE SITE WILL BE MAINTAINED BY THE DEVELOPER IN ACCORDANCE WITH THE STANDARDS SET FORTH IN THE CITY OF NOVI ZONING ORDINANCE. THIS INCLUDES WEEDING AND WATERING AS REQUIRED BY NORMAL MAINTENANCE PRACTICES.

DEVELOPER SHALL BE RESPONSIBLE FOR REPLACING ANY TREES WITHIN UTILITY EASEMENTS THAT ARE DAMAGED THROUGH NORMAL MAINTENANCE OR REPAIRS.

PLANT MATERIALS SHALL BE GUARANTEED FOR 2 YEARS AND SHALL BE MAINTAINED IN ACCORDANCE WITH CITY ORDINANCES. WARRANTY PERIOD BEGINS AT THE TIME OF CITY APPROVAL. WATERING AS NECESSARY SHALL OCCUR DURING THIS WARRANTY PERIOD.

ANY SUBSTITUTIONS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY.

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Seal:

Title:
Landscape Details

Project:
The Towns at Novi Station
Novi, Michigan

Prepared for:
Toll Brothers
26200 Town Center Drive, Suite 200
Novi, Michigan 48375

Revision:	Issued:
Submission	September 14, 2022
Issued	February 28, 2023
Revised	April 27, 2023
Revised	January 2, 2024

Job Number:
21-027

Drawn By:	Checked By:
jca	jca

Sheet No.
L-4

Tree List

TAG NO.	DIAMETER	COMMON NAME	BOTANICAL NAME	STATUS	Required Replacement	Multi-Stem Replacement
4001	13	Big Tooth Aspen	Populus grandidentata	Remove	2	
4003	14	Big Tooth Aspen	Populus grandidentata	Remove	2	
4004	13	Big Tooth Aspen	Populus grandidentata	Remove	2	
4005	13	Eastern Cottonwood	Populus deltoides	Remove	2	
4009	11	Eastern Cottonwood	Populus deltoides	Remove	1	
4010	10	Eastern Cottonwood	Populus deltoides	Remove	2	
4011	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4012	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4013	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4014	14	Eastern Cottonwood	Populus deltoides	Remove	2	
4015	9	American Elm	Ulmus americana	Remove	1	
4016	12	Eastern Cottonwood	Populus deltoides	Remove	2	
4017	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4020	16	Eastern Cottonwood	Populus deltoides	Remove	2	
4021	14	Eastern Cottonwood	Populus deltoides	Remove	2	
4022	18	Eastern Cottonwood	Populus deltoides	Remove	2	
4023	15	Box elder	Acer negundo	Remove	2	
4024	15	American Elm	Ulmus americana	Remove	2	
4025	12	Box elder	Acer negundo	Remove	2	
4026	14	Box elder	Acer negundo	Remove	2	
4027	12	Black Walnut	Juglans nigra	Remove	2	
4031	17	Box elder	Acer negundo	Remove	2	
4032	16	Black Cherry	Prunus serotina	Save		
4033	10	Black Cherry	Prunus serotina	Save		
4035	11	Black Walnut	Juglans nigra	Remove	1	
4037	10	Black Walnut	Juglans nigra	Save		
4038	13	Black Cherry	Prunus serotina	Save		
4040	24	Box elder	Acer negundo	Save		
4041	10	American Elm	Ulmus americana	Save		
4042	20	American Elm	Ulmus americana	Save		
4043	8	Hawthorn	Crataegus spp.	Save		
4044	12	Box elder	Acer negundo	Save		
4046	12	Black Cherry	Prunus serotina	Save		
4048	13	American Elm	Ulmus americana	Save		
4050	14,14	Black Cherry	Prunus serotina	Save		
4051	14	Black Cherry	Prunus serotina	Save		
4052	14,14	Box elder	Acer negundo	Save		
4055	14	Box elder	Acer negundo	Save		
4056	12	Box elder	Acer negundo	Save		
4058	8	Box elder	Acer negundo	Save		
4059	10	Box elder	Acer negundo	Save		
4060	9	Black Cherry	Prunus serotina	Save		
4061	12	Black Cherry	Prunus serotina	Save		
4062	16	American Elm	Ulmus americana	Save		
4063	17	Black Cherry	Prunus serotina	Remove	2	
4064	10	Red Oak	Quercus rubra	Save		
4065	15	Black Cherry	Prunus serotina	Save		
4066	17	Black Cherry	Prunus serotina	Save		
4068	12	Box elder	Acer negundo	Remove	2	
4069	24	Common Apple	Malus spp.	Remove	3	
4070	14	Box elder	Acer negundo	Remove	2	
4071	8	Box elder	Acer negundo	Remove	1	
4073	8	Box elder	Acer negundo	Remove	1	
4075	16	Box elder	Acer negundo	Remove	2	
4076	13	Box elder	Acer negundo	Remove	2	
4079	8	Box elder	Acer negundo	Remove	1	
4081	14	Box elder	Acer negundo	Remove	2	
4083	14	Box elder	Acer negundo	Remove	2	
4084	8	Box elder	Acer negundo	Remove	1	
4087	8	Box elder	Acer negundo	Remove	1	
4088	12	Box elder	Acer negundo	Remove	2	
4089	15	Box elder	Acer negundo	Remove	2	
4090	9	Box elder	Acer negundo	Remove	1	
4091	12	Box elder	Acer negundo	Remove	2	
4092	15,15,15	Box elder	Acer negundo	Remove	6	
4094	12	Box elder	Acer negundo	Remove	2	
4095	13	Box elder	Acer negundo	Remove	2	
4096	15	Box elder	Acer negundo	Remove	2	
4097	12	Box elder	Acer negundo	Remove	2	
4098	10	Box elder	Acer negundo	Remove	1	
4099	10	Box elder	Acer negundo	Remove	1	
4100	8	Box elder	Acer negundo	Remove	1	
4101	8	Box elder	Acer negundo	Remove	1	
4102	16	Eastern Cottonwood	Populus deltoides	Remove	2	
4103	24	Eastern Cottonwood	Populus deltoides	Remove	3	
4104	18	Eastern Cottonwood	Populus deltoides	Remove	2	
4105	10	Box elder	Acer negundo	Remove	1	
4106	14	Eastern Cottonwood	Populus deltoides	Remove	2	
4107	18	Eastern Cottonwood	Populus deltoides	Remove	2	
4108	16	Eastern Cottonwood	Populus deltoides	Remove	2	
4109	16	Eastern Cottonwood	Populus deltoides	Remove	2	
4111	8	Eastern Cottonwood	Populus deltoides	Remove	1	
4112	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4114	8	Box elder	Acer negundo	Remove	1	
4115	12	Black Cherry	Prunus serotina	Remove	2	
4116	9	Box elder	Acer negundo	Remove	1	
4117	8	Box elder	Acer negundo	Remove	1	
4118	8	Box elder	Acer negundo	Remove	1	
4119	18	Box elder	Acer negundo	Remove	2	
4121	12	Box elder	Acer negundo	Remove	2	
4122	10	Box elder	Acer negundo	Remove	1	
4123	18	Box elder	Acer negundo	Remove	2	
4124	18	Box elder	Acer negundo	Remove	2	
4125	27	Box elder	Acer negundo	Remove	3	
4127	8	White Spruce	Picea glauca	Remove	1	
4135	10,10	Box elder	Acer negundo	Remove		3
4136	13,15,15	Eastern Cottonwood	Populus deltoides	Remove		6
4137	12	Box elder	Acer negundo	Remove	2	
4138	13	Box elder	Acer negundo	Remove	2	
4140	14	Box elder	Acer negundo	Remove	2	
4142	18	Box elder	Acer negundo	Remove	2	
4144	12	Box elder	Acer negundo	Remove	2	
4145	8	Box elder	Acer negundo	Remove	1	
4146	11	Box elder	Acer negundo	Remove	1	
4147	10	Box elder	Acer negundo	Remove	1	
4148	10	Box elder	Acer negundo	Remove	1	
4149	10	Box elder	Acer negundo	Remove	1	
4150	12	Box elder	Acer negundo	Remove	2	
4151	14	Box elder	Acer negundo	Remove	2	
4152	17	Box elder	Acer negundo	Remove	2	
4153	18	Box elder	Acer negundo	Remove	2	
4154	10	Box elder	Acer negundo	Remove	2	
4155	22	Eastern Cottonwood	Populus deltoides	Remove	3	
4156	12	Box elder	Acer negundo	Remove	2	
4158	13	Box elder	Acer negundo	Remove	2	
4164	10	Black Cherry	Prunus serotina	Remove	1	
4165	8,8	Hawthorn	Crataegus spp.	Remove		2
4166	27	American Elm	Ulmus americana	Remove	3	
4171	9	Black Cherry	Prunus serotina	Remove	1	
4172	9,8	Black Cherry	Prunus serotina	Remove		2
4173	13	White Ash	Fraxinus americana	Remove	2	
4174	9	Black Cherry	Prunus serotina	Remove	1	
4179	9	Black Cherry	Prunus serotina	Remove	1	
4180	10	Black Cherry	Prunus serotina	Save		
4181	8	Black Cherry	Prunus serotina	Save		
4182	10	Black Cherry	Prunus serotina	Save		
4183	11	Hawthorn	Crataegus spp.	Save		
4185	9	Box elder	Acer negundo	Remove	1	
4186	9	Black Cherry	Prunus serotina	Remove	1	
4187	12	Box elder	Acer negundo	Save		
4188	11	Black Cherry	Prunus serotina	Remove	1	
4189	9	Black Cherry	Prunus serotina	Remove	1	
4190	14	Black Cherry	Prunus serotina	Remove	2	
4191	11	Box elder	Acer negundo	Remove	1	
4192	12	Common Apple	Malus spp.	Remove	2	
4193	8	Black Cherry	Prunus serotina	Remove	1	
4194	9	Common Apple	Malus spp.	Remove	1	
4196	10	Black Cherry	Prunus serotina	Remove	1	
4201	14	American Elm	Ulmus americana	Remove	2	
4202	10	Black Cherry	Prunus serotina	Remove	1	
4203	12	Black Cherry	Prunus serotina	Remove	2	
4204	12	Black Cherry	Prunus serotina	Remove	2	
4205	9	Common Apple	Malus spp.	Remove	1	
4206	9	Black Cherry	Prunus serotina	Remove	1	
4208	8	Common Apple	Malus spp.	Remove	1	
4209	24	Box elder	Acer negundo	Remove	3	
4210	8,8	Common Apple	Malus spp.	Remove		2
4211	8	Black Cherry	Prunus serotina	Remove	1	
4214	12,12	Black Cherry	Prunus serotina	Remove		3
4215	10,10	Black Cherry	Prunus serotina	Remove		2
4217	12	Black Cherry	Prunus serotina	Remove	2	
4219	8	Black Cherry	Prunus serotina	Remove	1	
4220	14	Black Cherry	Prunus serotina	Remove	2	
4223	29	American Elm	Ulmus americana	Save		
4227	8	Black Cherry	Prunus serotina	Save		
4229	16	Black Cherry	Prunus serotina	Save		
4230	16	Black Cherry	Prunus serotina	Save		

TAG NO.	DIAMETER	COMMON NAME	BOTANICAL NAME	STATUS	Required Replacement	Multi-Stem Replacement
4231	13	Black Cherry	Prunus serotina	Save		
4232	13	Black Cherry	Prunus serotina	Remove	2	
4233	11	Black Cherry	Prunus serotina	Remove	1	
4234	14	Black Cherry	Prunus serotina	Remove	2	
4236	8	Black Cherry	Prunus serotina	Remove	1	
4237	14	Black Cherry	Prunus serotina	Remove	2	
4239	9	Black Cherry	Prunus serotina	Save		
4240	15	Black Cherry	Prunus serotina	Save		
4241	16	Box elder	Acer negundo	Save		
4243	8	Black Cherry	Prunus serotina	Save		
4244	9	Black Cherry	Prunus serotina	Save		
4246	8	Black Cherry	Prunus serotina	Save		
4247	8	Black Cherry	Prunus serotina	Save		
3541	16	Hawthorn	Crataegus spp.	Remove	2	
5542	12,12	Box elder	Acer negundo	Remove		3
5543	17	Box elder	Acer negundo	Remove	2	
5544	14	Box elder	Acer negundo	Remove	2	
5545	8	Box elder	Acer negundo	Remove	1	
3550	8	Box elder	Acer negundo	Remove	1	
5551	8	Box elder	Acer negundo	Remove	1	
5553	12	Box elder	Acer negundo	Remove	2	
5554	10	Box elder	Acer negundo	Remove	1	
5555	12	Box elder	Acer negundo	Remove	2	
3556	14	Box elder	Acer negundo	Remove	2	
5557	16	Box elder	Acer negundo	Remove	2	
5558	12	Box elder	Acer negundo	Remove	2	
5560	10	Box elder	Acer negundo	Remove	1	
5561	10,10	Box elder	Acer negundo	Remove		3
5562	12,12	Box elder	Acer negundo	Remove		5
5563	14	Box elder	Acer negundo	Remove	2	
5564	12	Box elder	Acer negundo	Remove	2	
5565	14	Box elder	Acer negundo	Remove	2	
5566	11	Box elder	Acer negundo	Remove	1	
5567	12	Box elder	Acer negundo	Remove	2	
5568	9	Box elder	Acer negundo	Remove	1	
5569	9	Box elder	Acer negundo	Remove	1	
5573	11	Box elder	Acer negundo	Remove	1	
3574	19	Box elder	Acer negundo	Remove	2	
5577	13	Box elder	Acer negundo	Remove	2	
5578	18	Box elder	Acer negundo	Remove	2	
5580	10	Common Apple	Malus spp.	Remove	2	
5582	10	Common Apple	Malus spp.	Remove	1	
5584	8	Box elder	Acer negundo	Remove	1	
5585	8	Common Pear	Pyrus spp.	Remove	1	
5587	8	Box elder	Acer negundo	Remove	1	
5588	18	Box elder	Acer negundo	Remove	2	
5589	10	Box elder	Acer negundo	Remove	2	
5590	8	Box elder	Acer negundo	Remove	1	
3591	9	Box elder	Acer negundo	Remove	1	
5594	8	White Ash	Fraxinus americana	Remove	1	
5595	12	Box elder	Acer negundo	Remove	2	
5596	11	Box elder	Acer negundo	Remove	1	
5597	9	Box elder	Acer negundo	Remove	1	
5598	16	Box elder	Acer negundo	Remove	2	
5599	13	Box elder	Acer negundo	Remove	2	
5600	18	White Ash	Fraxinus americana	Remove	2	
5601	15,15,15	Common Apple	Malus spp.	Remove		6
5602	11	Hawthorn	Crataegus spp.	Remove	1	
5605	28	Eastern Cottonwood	Populus deltoides	Remove	3	
5606	17	Box elder	Acer negundo	Remove	2	
5607	9	Hawthorn	Crataegus spp.	Remove	1	
5609	9	Eastern Cottonwood	Populus deltoides	Remove	1	
5610	10	Eastern Cottonwood	Populus deltoides	Remove	1	
5611	12	Eastern Cottonwood	Populus deltoides	Remove	2	
5612	24	Box elder	Acer negundo	Remove	3	
5613	27	Box elder	Acer negundo	Remove	3	
5618	8	Box elder	Acer negundo	Remove	1	
5620	10	Hawthorn	Crataegus spp.	Remove	1	
5622	11	Hawthorn	Crataegus spp.	Remove	1	
5623	11	Hawthorn	Crataegus spp.	Remove	1	
5624	24,24	Black Cherry	Prunus serotina	Remove		6
5627	11	Box elder	Acer negundo	Remove	1	
5628	9	Box elder	Acer negundo	Remove	1	
5632	12	Box elder	Acer negundo	Remove	2	
5633	14	Box elder	Acer negundo	Remove	2	
5634	21	Black Walnut	Juglans nigra	Save		
5635	18	Black Cherry	Prunus serotina	Save		
5636	6	Black Cherry	Prunus serotina	Save		
5637	24	Eastern Cottonwood	Populus deltoides	Save		
5638	8	Common Apple	Malus spp.	Save		
5639	10	Box elder	Acer negundo	Remove	1	
5640	20	Box elder	Acer negundo	Remove	2	
5641	12,12	Box elder	Acer negundo	Save		
5642	16	Black Cherry	Prunus serotina	Save		
5643	11	Black Cherry	Prunus serotina	Save		
5644	10	Black Cherry	Prunus serotina	Save		
5645	12	Black Cherry	Prunus serotina	Save		
5646	10	Hawthorn	Crataegus spp.	Save		
5647	9	Hawthorn	Crataegus spp.	Save		
5648	19	Hawthorn	Crataegus spp.	Save		
5649	10	American Elm	Ulmus americana	Save		
5650	18	Box elder	Acer negundo	Save		
3651	24	Black Cherry	Prunus serotina	Save		
5652	10	Black Cherry	Prunus serotina	Save		
5653	14	Black Cherry	Prunus serotina	Save		
5654	12	Black Cherry	Prunus serotina	Save		
5655	16	Box elder	Acer negundo	Remove	2	
5656	24	Box elder	Acer negundo	Remove	3	
5657	10	Box elder	Acer negundo	Remove	2	
5658	19	Box elder	Acer negundo	Remove	3	
5659	8	Box elder	Acer negundo	Remove	1	
5661	28	Box elder	Acer negundo	Remove	3	
5662	13,13	Box elder	Acer negundo	Remove		4
5663	8	Box elder	Acer negundo	Remove	1	
5664	17	Box elder	Acer negundo	Remove	2	
5665	16,16	Box elder	Acer negundo	Save		
3666	10,10	Box elder	Acer negundo	Save		
5670	12	Box elder	Acer negundo	Remove	2	
5671	11	Box elder	Acer negundo	Remove	1	
5673	13	Eastern Cottonwood	Populus deltoides	Remove	2	
5675	32	Box elder	Acer negundo	Remove	4	
5676	20	Box elder	Acer negundo	Remove	3	
5678	12	Box elder	Acer negundo	Remove	2	
5679	10	Box elder	Acer negundo	Remove	1	
5680	12	Box elder	Acer negundo	Remove	2	
5681	12	Box elder	Acer negundo	Remove	2	
5683	7,12	Eastern Cottonwood	Populus deltoides	Remove	2	
5684	21	Eastern Cottonwood	Populus deltoides	Remove	3	
5685	15,15	Big Tooth Aspen	Populus grandidentata	Remove		4
5687	9	American Elm	Ulmus americana	Remove	1	
5688	11,11,11,11	Eastern Cottonwood	Populus deltoides	Remove		4
5690	13,13	Eastern Cottonwood	Populus deltoides	Remove		4
5691	18,18	Eastern Cottonwood	Populus deltoides	Remove		4
5692	16,16	Eastern Cottonwood	Populus deltoides	Remove		4
5693	12,12	Eastern Cottonwood	Populus deltoides	Remove		3
5696	10,10,14	Eastern Cottonwood	Populus deltoides	Remove		5
5697	12	Box elder	Acer negundo	Remove	2	
5698	15	Box elder	Acer negundo	Remove	2	
5699	12	Big Tooth Aspen	Populus grandidentata	Remove	2	
5600	8	Big Tooth Aspen	Populus grandidentata	Remove	1	
5601	13	Big Tooth Aspen	Populus grandidentata	Remove	2	
10401	17	Eastern Red Cedar	Juniperus virginiana	Save		
10402	8,9	Hooey Locust	Gleditsia triacanthos	Save		
10403	18	Box elder	Acer negundo	Save		
10404	16	Box elder	Acer negundo	Save		
10405	14	Box elder	Acer negundo	Save		
10406	11	Box elder	Acer negundo	Save		
10407	22	Box elder	Acer negundo	Save		
10408	9	Box elder	Acer negundo	Save		
10409	12	Box elder	Acer negundo	Save		
10410	15	Box elder	Acer negundo	Save		
10411	9	Box elder	Acer negundo	Save		
10412	15	Box elder	Acer negundo	Save		
10413	8	Box elder	Acer negundo	Save		
10414	10	Box elder	Acer negundo	Save		
10415	24	Box elder	Acer negundo	Save		
10416	20	Box elder	Acer negundo	Save		
10417	10,22	Box elder	Acer negundo	Save		
10418	10,15	Box elder	Acer negundo	Save		
10419	9	Box elder	Acer negundo	Save		
10420	12	Box elder	Acer negundo	Save		
10421	8	Box elder	Acer negundo	Save		
10422	12	Box elder	Acer negundo	Save		
10423	10	Box elder	Acer negundo	Save		
10424	16	Box elder	Acer negundo	Save		

TAG NO.	DIAMETER	COMMON NAME	BOTANICAL NAME	STATUS	Required Replacement	Multi-Stem Replacement
10425	15	Common Apple	Malus spp.	Save		
10426	8	Box elder	Acer negundo	Save		
10427	12,12,18	Box elder	Acer negundo	Save		
10428	10,13	Eastern Cottonwood	Populus deltoides	Save		
10487	11,13	Honey Locust	Gleditsia triacanthos	Save		
10488	18	Honey Locust	Gleditsia triacanthos	Save		
10489	24	Unknown Tree		Save		
10490	13	Honey Locust	Gleditsia triacanthos	Save		
10491	24	Unknown Tree		Save		
10492	18	Honey Locust	Gleditsia triacanthos	Save		
10493	36	Black Cherry	Prunus serotina	Save		
10494	9	Honey Locust	Gleditsia triacanthos	Save		
10495	9	Honey Locust	Gleditsia triacanthos	Save		
10496	8	Honey Locust	Gleditsia triacanthos	Save		
10497	8,8	Box elder	Acer negundo	Save		
10498	8	Box elder	Acer negundo	Save		
10499	8	Box elder	Acer negundo	Save		
10500	9	Box elder	Acer negundo	Save		
10501	10	Box elder	Acer negundo	Save		
10502	10	Box elder	Acer negundo	Save		
10503	11	Box elder	Acer negundo	Save		
10504	30	Silver Maple	Acer saccharinum	Save		
10505	13,33	Silver Maple	Acer saccharinum	Save		
10506	17	Box elder	Acer negundo	Remove	2	
10507	18	Box elder	Acer negundo	Remove	2	
10508	15,24	Box elder	Acer negundo	Save		
10509	13	Box elder	Acer negundo	Save		
10510	13	Box elder	Acer negundo	Save		
10511	12	Box elder	Acer negundo	Remove	2	
10512	12	Box elder	Acer negundo	Save		
10513	8,12,15	Box elder	Acer negundo	Remove		5
10514	18	Box elder	Acer negundo	Save		
10515	8	Box elder	Acer negundo	Save		
10516	24	Box elder	Acer negundo	Save		
10517	13	Box elder	Acer negundo	Save		
10518	13	Box elder	Acer negundo	Save		
10519	8	Box elder	Acer negundo	Save		
10520	12	Box elder	Acer negundo	Save		
10521	12	Box elder	Acer negundo	Save		
10522	9	Box elder	Acer negundo	Save		
10523	12	Box elder	Acer negundo	Save		
10524	10	Box elder	Acer negundo	Save		
10525	18	Box elder	Acer negundo	Save		
10526	13	Box elder	Acer negundo	Save		
10527	11	Box elder	Acer negundo	Save		
10528	11,13	Box elder	Acer negundo	Save		
10529	11	Box elder	Acer negundo	Save		
10530	15	Box elder	Acer negundo	Save		
10531	12	Box elder	Acer negundo	Save		
10532	15	Box elder	Acer negundo	Save		
10533	20	Box elder	Acer negundo	Save		
10534	9	Box elder	Acer negundo	Save		
10535	10	Box elder	Acer negundo	Save		
10536	15,17	Box elder	Acer negundo	Save		
10537	10	Box elder	Acer negundo	Save		
10538	20,20	Box elder	Acer negundo	Remove		5
10539	16	Box elder	Acer negundo	Save		
10540	14	Box elder	Acer negundo	Save		
10541	14	Box elder	Acer negundo	Save		
10542	14	Box elder	Acer negundo	Save		
10543	14	Box elder	Acer negundo	Save		
10544	18	Box elder	Acer negundo	Save		
10545	15,28	Box elder	Acer negundo	Save		
10546	12	Eastern Red Cedar	Juniperus virginiana	Save		
10547	19	Box elder	Acer negundo	Save		
10548	28	Box elder	Acer negundo	Save		
				Single Stem Replacement	965	
				Multi-Stem Replacement		132

Status Key

Save	Tree will be saved
Remove	Tree is located in a regulated woodland and will be removed.

Woodland Summary

Total Trees	535 Trees
Regulated Trees Removed	375 Trees

Replacement Required

Trees 8" - 11"	140 trees x 1=	140 Trees
Trees 11" - 20"	179 trees x 2=	358 Trees
Trees 20" - 30"	21 trees x 3=	63 Trees
Trees 30"+	1 trees x 4=	4 Trees
Multi-Stemmed Trees (34 Trees)		132 Trees
Replacement Required		697 Trees

ALLENDESIGN
LAND PLANNING / LANDSCAPE ARCHITECTURE
557 Carpenter
Northville, Michigan 48167
e. jca@wideopenwest.com
t. 248.467.4668

Seal:

Title:

Tree List

Project:

The Towns at Novi Station
Novi, Michigan

Prepared for:

Toll Brothers
26200 Town Center Drive, Suite 200
Novi, Michigan 48375

Revision:	Issued:
Submission	September 14, 2022
Issued	February 28, 2023
Revised	April 27, 2023
Revised	January 2, 2024

Job Number:

21-027

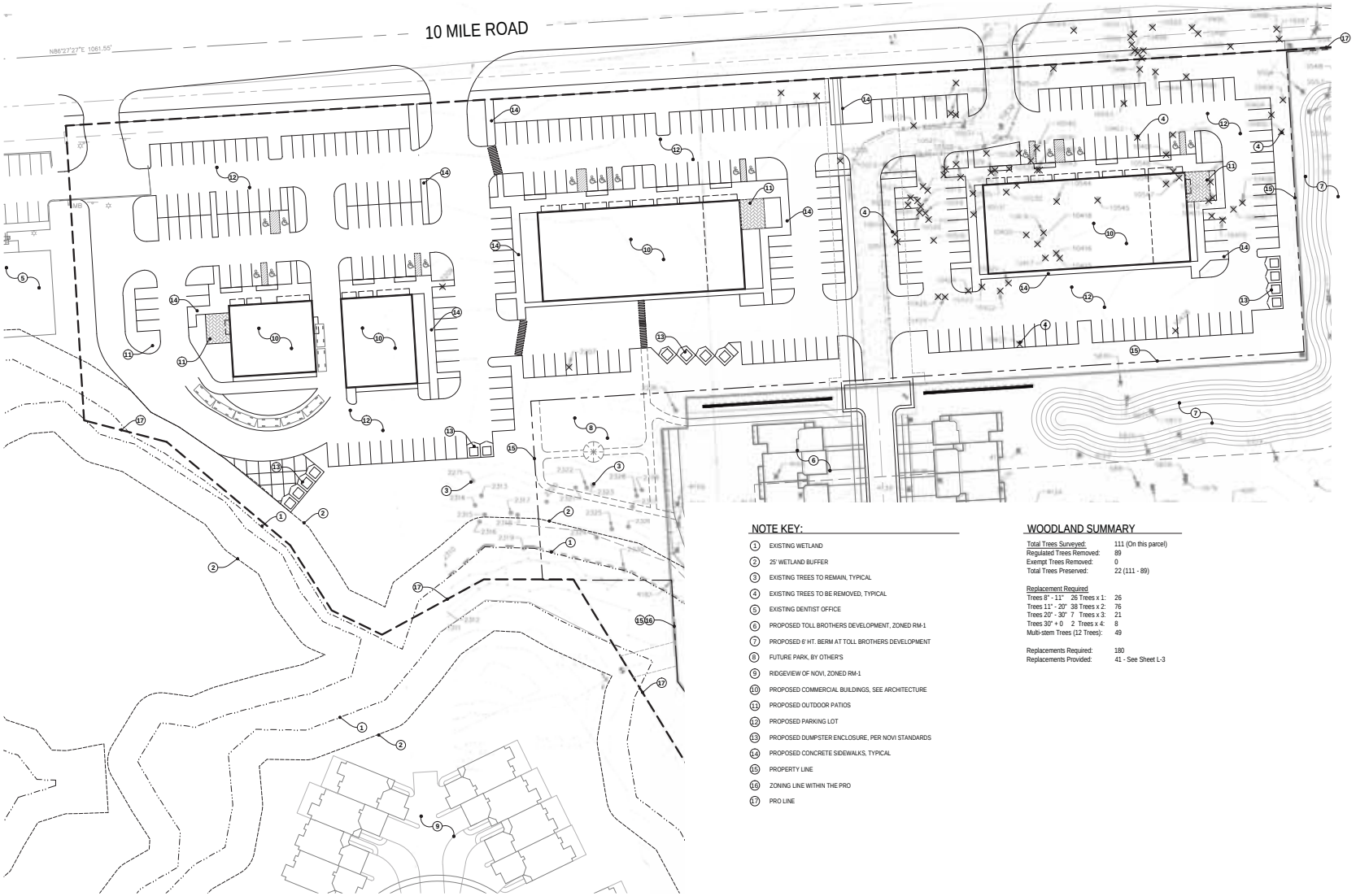
Drawn By:	Checked By:
jca	jca

Sheet No.

L-5

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811
Know what's below.
Call before you dig.



NOTE KEY:

1. EXISTING WETLAND
2. 25' WETLAND BUFFER
3. EXISTING TREES TO REMAIN, TYPICAL
4. EXISTING TREES TO BE REMOVED, TYPICAL
5. EXISTING DENTIST OFFICE
6. PROPOSED TOLL BROTHERS DEVELOPMENT, ZONED RM-1
7. PROPOSED 6' HT. BERM AT TOLL BROTHERS DEVELOPMENT
8. FUTURE PARK, BY OTHER'S
9. RIDGEVIEW OF NOVI, ZONED RM-1
10. PROPOSED COMMERCIAL BUILDINGS, SEE ARCHITECTURE
11. PROPOSED OUTDOOR PATIOS
12. PROPOSED PARKING LOT
13. PROPOSED DUMPSTER ENCLOSURE, PER NOVI STANDARDS
14. PROPOSED CONCRETE SIDEWALKS, TYPICAL
15. PROPERTY LINE
16. ZONING LINE WITHIN THE PRO
17. PRO LINE

WOODLAND SUMMARY

Total Trees Surveyed:	111 (On this parcel)
Regulated Trees Removed:	89
Exempt Trees Removed:	0
Total Trees Preserved:	22 (111 - 89)

Replacement Required

Trees 8" - 11"	26 Trees x 1:	26
Trees 11" - 20"	38 Trees x 2:	76
Trees 20" - 30"	7 Trees x 3:	21
Trees 30" +	0 2 Trees x 4:	8
Multi-stem Trees (12 Trees):		49
Replacements Required:		180
Replacements Provided:		41 - See Sheet L-3

NOT FOR CONSTRUCTION

TREE SURVEY PROVIDED BY:

ALLEN DESIGN
557 Carpenter
Northville, MI 48167
248.467.4668

Dated: 03.28.2023
Job No.: 21-027

SCALE: 1" = 40'-0"

NORTH

VVLA vert verde landscape architecture
734.249.2568 Plymouth, MI
james@vertverde.com

Issued For:

06.23.2023	PRO Submittal
12.22.2023	Revised PRO Submittal

Project:

NOVI TEN PRO

10 Mile Road
Novi, Michigan

Project Sponsor:

Weiss Construction Co.
41001 Grand River Ave.
Novi, MI 48375

Sheet Name:

Tree Removal and Protection Plan

Seal:



Drawn:	JG
Checked:	JG
Date:	06.2023
Scale:	1" = 40'-0"

Project Number:
23.035

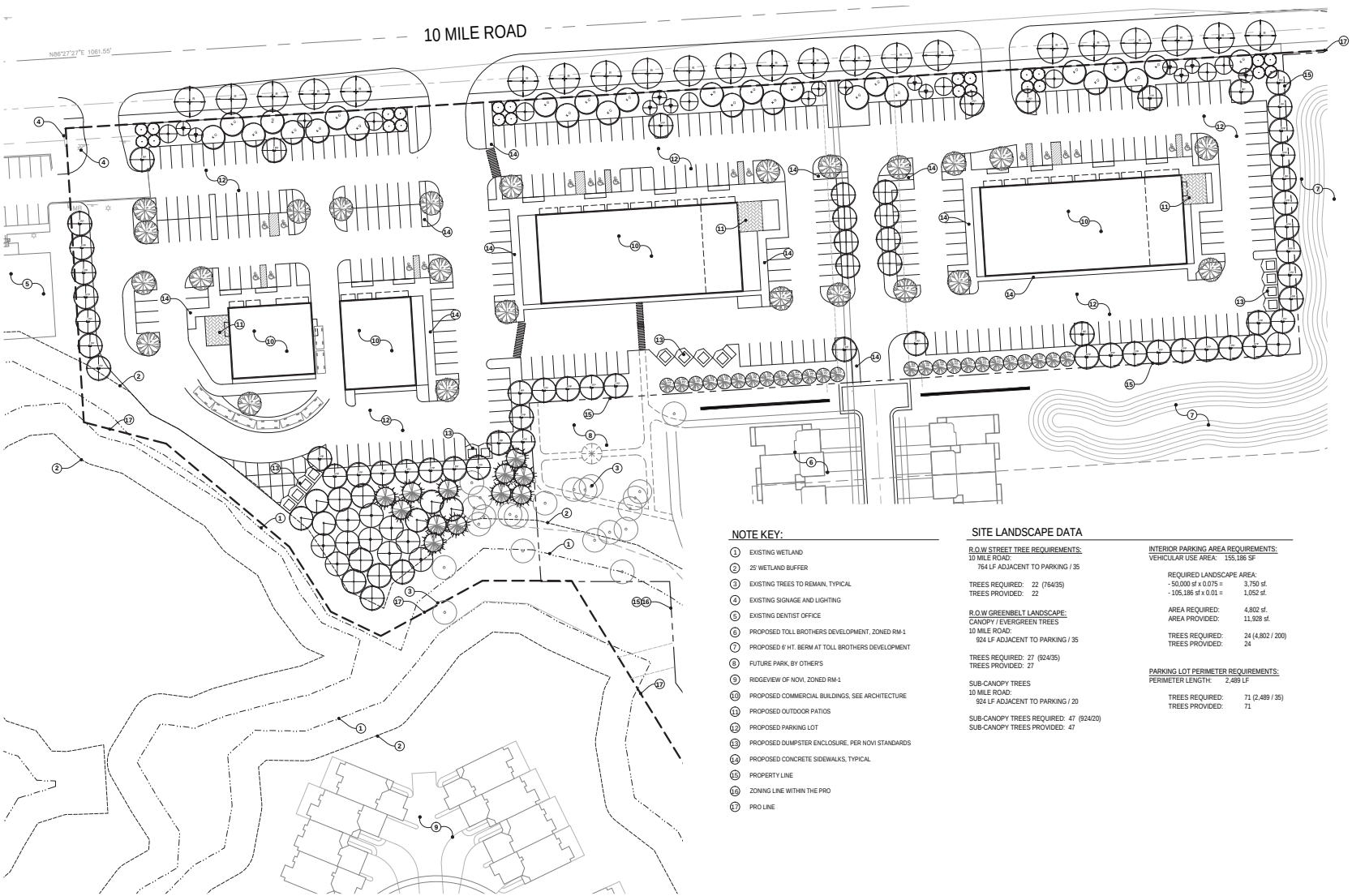
Sheet Number:
L - 1

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TAG NO.	DIAMETER	COMMON NAME	BOTANICAL NAME	STATUS	Required Replacement	Multi-Stem Replacement
4001	13	Big Tooth Aspen	Populus grandidentata	Remove	2	
4003	14	Big Tooth Aspen	Populus grandidentata	Remove	2	
4004	13	Big Tooth Aspen	Populus grandidentata	Remove	2	
4005	13	Eastern Cottonwood	Populus deltoides	Remove	2	
4009	11	Eastern Cottonwood	Populus deltoides	Remove	1	
4010	18	Eastern Cottonwood	Populus deltoides	Remove	2	
4011	16	Eastern Cottonwood	Populus deltoides	Remove	1	
4012	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4013	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4014	14	Eastern Cottonwood	Populus deltoides	Remove	2	
4015	9	American Elm	Ulmus americana	Remove	1	
4016	13	Eastern Cottonwood	Populus deltoides	Remove	2	
4017	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4020	16	Eastern Cottonwood	Populus deltoides	Remove	2	
4021	14	Eastern Cottonwood	Populus deltoides	Remove	2	
4022	18	Eastern Cottonwood	Populus deltoides	Remove	2	
4023	15	Box elder	Acer negundo	Remove	2	
4024	15	American Elm	Ulmus americana	Remove	2	
4025	12	Box elder	Acer negundo	Remove	2	
4026	14	Box elder	Acer negundo	Remove	2	
4027	12	Black Walnut	Juglans nigra	Remove	2	
4031	17	Box elder	Acer negundo	Remove	2	
4032	16	Black Cherry	Prunus serotina	Remove	2	
4033	10	Black Cherry	Prunus serotina	Remove	2	
4035	11	Black Walnut	Juglans nigra	Remove	1	
4037	10	Black Walnut	Juglans nigra	Remove	1	
4038	13	Black Cherry	Prunus serotina	Remove	2	
4040	24	Box elder	Acer negundo	Remove	3	
4041	10	American Elm	Ulmus americana	Remove	1	
4042	20	American Elm	Ulmus americana	Remove	2	
4043	8	Hawthorn	Crataegus spp	Remove	1	
4044	12	Box elder	Acer negundo	Remove	2	
4046	12	Black Cherry	Prunus serotina	Remove	2	
4048	13	American Elm	Ulmus americana	Save		
4050	14,14	Black Cherry	Prunus serotina	Remove		4
4051	14	Black Cherry	Prunus serotina	Remove	2	
4055	14	Box elder	Acer negundo	Remove	2	
4056	12	Box elder	Acer negundo	Remove	2	
4058	8	Box elder	Acer negundo	Save		
4059	10	Box elder	Acer negundo	Save		
4060	9	Black Cherry	Prunus serotina	Remove	1	
4061	12	Black Cherry	Prunus serotina	Remove	2	
4062	16	American Elm	Ulmus americana	Save		
4063	17	Black Cherry	Prunus serotina	Remove	2	
4064	10	Red Oak	Quercus rubra	Remove	1	
4065	15	Black Cherry	Prunus serotina	Remove	2	
4066	17	Black Cherry	Prunus serotina	Remove	2	
4068	12	Box elder	Acer negundo	Remove	2	
4069	24	Common Apple	Malus spp	Remove	3	
4070	14	Box elder	Acer negundo	Remove	2	
4071	8	Box elder	Acer negundo	Remove	1	
4073	8	Box elder	Acer negundo	Remove	1	
4076	18	Box elder	Acer negundo	Remove	2	
4078	13	Box elder	Acer negundo	Remove	2	
4079	8	Box elder	Acer negundo	Remove	1	
4081	14	Box elder	Acer negundo	Remove	2	
4082	14	Box elder	Acer negundo	Remove	2	
4084	8	Box elder	Acer negundo	Remove	1	
4087	8	Box elder	Acer negundo	Remove	1	
4088	12	Box elder	Acer negundo	Remove	2	
4089	13	Box elder	Acer negundo	Remove	2	
4090	9	Box elder	Acer negundo	Remove	1	
4091	12	Box elder	Acer negundo	Remove	2	
4092	15,15,15	Box elder	Acer negundo	Remove		6
4094	12	Box elder	Acer negundo	Remove	2	
4095	13	Box elder	Acer negundo	Remove	2	
4096	15	Box elder	Acer negundo	Remove	2	
4097	12	Box elder	Acer negundo	Remove	2	
4098	10	Box elder	Acer negundo	Remove	1	
4099	19	Box elder	Acer negundo	Remove	1	
4100	8	Box elder	Acer negundo	Remove	1	
4101	8	Box elder	Acer negundo	Remove	1	
4102	16	Eastern Cottonwood	Populus deltoides	Remove	2	
4103	24	Eastern Cottonwood	Populus deltoides	Remove	2	
4104	18	Eastern Cottonwood	Populus deltoides	Remove	2	
4105	15	Box elder	Acer negundo	Remove	2	
4106	14	Eastern Cottonwood	Populus deltoides	Remove	2	
4107	15	Eastern Cottonwood	Populus deltoides	Remove	2	
4108	15	Eastern Cottonwood	Populus deltoides	Remove	2	
4109	15	Eastern Cottonwood	Populus deltoides	Remove	2	
4111	8	Eastern Cottonwood	Populus deltoides	Remove	1	
4112	10	Eastern Cottonwood	Populus deltoides	Remove	1	
4114	8	Box elder	Acer negundo	Remove	1	
4115	12	Black Cherry	Prunus serotina	Remove	2	
4116	9	Box elder	Acer negundo	Remove	1	
4117	8	Box elder	Acer negundo	Remove	1	
4118	8	Box elder	Acer negundo	Remove	1	
4119	18	Box elder	Acer negundo	Remove	2	
4121	12	Box elder	Acer negundo	Remove	2	
4122	19	Box elder	Acer negundo	Remove	1	
4123	18	Box elder	Acer negundo	Remove	2	
4124	18	Box elder	Acer negundo	Remove	2	
4125	22	Box elder	Acer negundo	Remove	3	
4127	8	White Spruce	Picea glauca	Remove	1	
4135	10,10	Box elder	Acer negundo	Remove		3
4136	13,15,15	Eastern Cottonwood	Populus deltoides	Remove		6
4137	12	Box elder	Acer negundo	Remove	2	
4138	13	Box elder	Acer negundo	Remove	2	
4140	14	Box elder	Acer negundo	Remove	2	
4142	18	Box elder	Acer negundo	Remove	2	
4144	12	Box elder	Acer negundo	Remove	2	
4145	8	Box elder	Acer negundo	Remove	1	
4146	11	Box elder	Acer negundo	Remove	1	
4147	10	Box elder	Acer negundo	Remove	1	
4148	10	Box elder	Acer negundo	Remove	1	
4149	10	Box elder	Acer negundo	Remove	1	
4150	12	Box elder	Acer negundo	Remove	2	
4151	14	Box elder	Acer negundo	Remove	2	
4152	17	Box elder	Acer negundo	Remove	2	
4153	18	Box elder	Acer negundo	Remove	2	
4154	18	Box elder	Acer negundo	Remove	2	
4155	22	Eastern Cottonwood	Populus deltoides	Remove	3	
4156	12	Box elder	Acer negundo	Remove	2	
4158	13	Box elder	Acer negundo	Remove	2	
4164	10	Black Cherry	Prunus serotina	Remove	1	
4165	8,8	Hawthorn	Crataegus spp	Remove		2
4169	27	American Elm	Ulmus americana	Remove	3	
4171	9	Black Cherry	Prunus serotina	Remove	1	
4172	8,8	Black Cherry	Prunus serotina	Remove		2
4173	13	White Ash	Fraxinus americana	Remove	2	
4174	9	Black Cherry	Prunus serotina	Remove	1	
4175	9	Black Cherry	Prunus serotina	Remove	1	
4178	10	Black Cherry	Prunus serotina	Remove	1	
4179	8	Black Cherry	Prunus serotina	Remove	1	
4181	10	Black Cherry	Prunus serotina	Remove	1	
4182	11	Hawthorn	Crataegus spp	Save		
4183	9	Box elder	Acer negundo	Save		
4185	9	Black Cherry	Prunus serotina	Save		
4186	12	Box elder	Acer negundo	Save		
4187	11	Black Cherry	Prunus serotina	Remove	1	
4188	9	Black Cherry	Prunus serotina	Remove	1	
4189	14	Black Cherry	Prunus serotina	Remove	2	
4190	11	Box elder	Acer negundo	Remove	1	
4191	12	Common Apple	Malus spp	Remove	2	
4193	8	Black Cherry	Prunus serotina	Remove	1	
4194	9	Common Apple	Malus spp	Remove	1	
4197	10	Black Cherry	Prunus serotina	Remove	1	
4201	14	American Elm	Ulmus americana	Remove	2	
4202	10	Black Cherry	Prunus serotina	Remove	1	
4203	12	Black Cherry	Prunus serotina	Remove	2	
4204	12	Black Cherry	Prunus serotina	Remove	2	
4205	9	Common Apple	Malus spp	Remove	1	
4206	9	Black Cherry	Prunus serotina	Remove	1	
4208	8	Common Apple	Malus spp	Remove	1	
4209	24	Box elder	Acer negundo	Remove	3	
4210	8,8	Common Apple	Malus spp	Remove		2
4211	9	Black Cherry	Prunus serotina	Remove	1	
4214	12,12	Black Cherry	Prunus serotina	Remove		3
4215	19,19	Black Cherry	Prunus serotina	Remove		3
4217	12	Black Cherry	Prunus serotina	Remove	2	
4219	8	Black Cherry	Prunus serotina	Remove	1	
4220	14	Black Cherry	Prunus serotina	Remove	2	
4222	22	American Elm	Ulmus americana	Remove	3	
4227	8	Black Cherry	Prunus serotina	Remove	1	
4229	16	Black Cherry	Prunus serotina	Remove	2	
4230	16	Black Cherry	Prunus serotina	Remove	2	

TAG NO.	DIAMETER	COMMON NAME	BOTANICAL NAME	STATUS	Required Replacement	Multi-Stem Replacement
4231	13	Black Cherry	Prunus serotina	Remove	2	
4232	13	Black Cherry	Prunus serotina	Remove	2	
4253	11	Black Cherry	Prunus serotina	Remove	1	
4234	14	Black Cherry	Prunus serotina	Remove	2	
4236	8	Black Cherry	Prunus serotina	Remove	1	
4237	14	Black Cherry	Prunus serotina	Remove	2	
4239	12	Black Cherry	Prunus serotina	Remove	1	
4240	15	Black Cherry	Prunus serotina	Remove	2	
4241	18	Box elder	Acer negundo	Remove	2	
4243	8	Black Cherry	Prunus serotina	Remove	1	
4244	9	Black Cherry	Prunus serotina	Remove	1	
4246	9	Black Cherry	Prunus serotina	Remove	1	
4247	8	Black Cherry	Prunus serotina	Save		
5641	18	Hawthorn	Crataegus spp	Remove	2	
5642	12,12	Box elder	Acer negundo	Remove		3
5643	17	Box elder	Acer negundo	Remove	2	
5644	14	Box elder	Acer negundo	Remove	2	
5648	8	Box elder	Acer negundo	Remove	1	
5650	8	Box elder	Acer negundo	Remove	1	
5651	8	Box elder	Acer negundo	Remove	1	
5653	12	Box elder	Acer negundo	Remove	2	
5654	11	Box elder	Acer negundo	Remove	2	
5655	12	Box elder	Acer negundo	Remove	2	
5656	14	Box elder	Acer negundo	Remove	2	
5657	16	Box elder	Acer negundo	Remove	2	
5658	12	Box elder	Acer negundo	Remove	2	
5660	10	Box elder	Acer negundo	Remove	1	
5661	19,19	Box elder	Acer negundo	Remove		3
5662	12,12	Box elder	Acer negundo	Remove		3
5663	14	Box elder	Acer negundo	Remove	2	
5664	12	Box elder	Acer negundo	Remove	2	
5665	14	Box elder	Acer negundo	Remove	2	
5666	11	Box elder	Acer negundo	Remove	1	
5667	12	Box elder	Acer negundo	Remove	2	
5668	9	Box elder	Acer negundo	Remove	1	
5669	9	Box elder	Acer negundo	Remove	1	
5673	11	Box elder	Acer negundo	Remove	1	
5674	19	Box elder	Acer negundo	Remove	2	
5677	13	Box elder	Acer negundo	Remove	2	
5678	18	Box elder	Acer negundo	Remove	2	
5680	18	Common Apple	Malus spp	Remove	2	
5682	10	Common Apple	Malus spp	Remove	1	
5684	8	Box elder	Acer negundo	Remove	1	
5686	9	Common Pear	Pyrus spp	Remove	1	
5687	9	Box elder	Acer negundo	Remove	1	
5688	14	Box elder	Acer negundo	Remove	2	
5689	18	Box elder	Acer negundo	Remove	2	
5690	8	Box elder	Acer negundo	Remove	1	
5691	9	Box elder	Acer negundo	Remove	1	
5694	8	White Ash	Fraxinus americana	Remove	1	
5695	12	Box elder	Acer negundo	Remove	2	
5696	11	Box elder	Acer negundo	Remove	1	
5697	9	Box elder	Acer negundo	Remove	1	
5696	16	Box elder	Acer negundo	Remove	2	
5699	13	Box elder	Acer negundo	Remove	2	
5600	16	White Ash	Fraxinus americana	Remove	2	
5661	15,15,15	Common Apple	Malus spp	Remove		6
5662	11	Hawthorn	Crataegus spp	Remove	1	
5665	28	Eastern Cottonwood	Populus deltoides	Remove	3	
5666	17	Box elder	Acer negundo	Remove	2	
5667	9	Hawthorn	Crataegus spp	Remove	1	
5669	9	Eastern Cottonwood	Populus deltoides	Remove	1	
5610	12	Eastern Cottonwood	Populus deltoides	Remove	2	
5611	12	Eastern Cottonwood	Populus deltoides	Remove	2	
5612	24	Box elder	Acer negundo	Remove	3	
5613	27	Box elder	Acer negundo	Remove	3	
5618	8	Box elder	Acer negundo	Remove	1	
5620	10	Hawthorn	Crataegus spp	Remove	1	
5622	11	Hawthorn	Crataegus spp	Remove	1	
5624	19	Hawthorn	Crataegus spp	Remove	1	
5625	18	Black Cherry	Prunus serotina	Remove	2	
5626	11	Hawthorn	Crataegus spp	Remove	1	
5627	18	Box elder	Acer negundo	Remove	2	
5628	13	Box elder	Acer negundo	Remove	2	
5629	10	White Ash	Fraxinus americana	Remove	1	
5630	8	White Ash	Fraxinus americana	Remove	1	
5631	8	White Ash	Fraxinus americana	Remove	1	
5632	11	White Ash	Fraxinus americana	Remove	1	
5633	8	Box elder	Acer negundo	Remove	1	
5634	24,24	Black Cherry	Prunus serotina	Remove		6
5637	11	Box elder	Acer negundo	Remove	1	
5638	9	Box elder	Acer negundo	Remove	1	
5639	12	Box elder	Acer negundo	Remove	2	
5640	12	Box elder	Acer negundo	Remove	2	
5642	12	Box elder	Acer negundo	Remove	2	
5643	15	Box elder	Acer negundo	Remove	2	
5644	15	Box elder	Acer negundo	Remove	2	
5645	8,8	Box elder	Acer negundo	Remove		2
5646	12	Common Apple	Malus spp	Remove	2	
5647	12	Box elder	Acer negundo	Remove	2	
5649	14	Box elder	Acer negundo	Remove	2	
5650	16	White Ash	Fraxinus americana	Remove	2	
5651	19	Box elder	Acer negundo	Remove	2	
5652	13	Box elder	Acer negundo	Remove	2	
5653	13	Box elder	Acer negundo	Remove	1	
5654	10	Eastern Cottonwood	Populus deltoides	Remove	1	
5655	9	Box elder	Acer negundo	Remove	1	
5656	8,16	Box elder	Acer negundo	Remove		3
5657	19	Box elder	Acer negundo	Remove	2	
5658	10	White Ash	Fraxinus americana	Remove	1	
5659	10	Eastern Cottonwood	Populus deltoides	Remove	1	
5662	8	Eastern Cottonwood	Populus deltoides	Remove	1	
5664	10	Eastern Cottonwood	Populus deltoides	Remove	1	
5666	14	Eastern Cottonwood	Populus deltoides	Remove	2	
5667	15	Eastern Cottonwood	Populus deltoides	Remove	2	
5669	18	Box elder	Acer negundo	Remove	2	
5670	24	Box elder	Acer negundo	Remove	3	
5671	18	Box elder	Acer negundo	Remove	2	
5672	10	Box elder	Acer negundo	Remove	1	
5673	14	Box elder	Acer negundo	Remove	2	
5673	12	American Elm	Ulmus americana	Remove	2	
5675	12	Box elder	Acer negundo	Remove	2	
5676	8	Box elder	Acer negundo	Remove	1	
5681	10	Box elder	Acer negundo	Remove	1	
5682	9	Box elder	Acer negundo	Remove	1	
5683	9	Box elder	Acer negundo	Remove	1	
5684	20	Box elder	Acer negundo	Remove	2	
5685	12	Sugar Maple	Acer saccharum	Remove	2	
5686	12	American Elm	Ulmus americana	Remove	2	
5688	10	Box elder	Acer negundo	Remove	1	
5689	12,12	Box elder	Acer negundo	Remove		3
5690	13	Box elder	Acer negundo	Remove	2	
5691	10	Box elder	Acer negundo	Remove	1	
5692	10	Box elder	Acer negundo	Remove	1	
5693	10	Box elder	Acer negundo	Remove	1	
5694	5,12	Box elder	Acer negundo	Remove	2	
5696	14	Box elder	Acer negundo	Remove	2	
5697	10	Black Walnut	Juglans nigra	Remove	1	
5700	9	Sugar Maple	Acer saccharum	Save		
5701	22	Black Walnut	Juglans nigra	Save		
5702	24	Black Walnut	Juglans nigra	Save		
5703	15	Black Walnut	Juglans nigra	Save		
5704	12	Black Walnut	Juglans nigra	Save		
5705	12	Black Walnut	Juglans nigra	Save		
5706	14	Black Walnut	Juglans nigra	Save		
5707	21	Black Walnut	Juglans nigra	Save		
5706	19	Common Apple	Malus spp.	Remove	1	
5710	8	Eastern Cottonwood	Populus deltoides	Remove	1	
5713	13	Common Apple	Malus spp.	Remove	2	
5714	13	Common Apple	Malus spp.	Remove	2	
5715	12	Common Apple	Malus spp.	Remove	2	
5716	9	Common Apple	Malus spp.	Remove	1	
5717	10	Common Apple	Malus spp.	Remove	1	
5719	8,8	Common Apple	Malus spp.	Remove		3
5721	18	Box elder	Acer negundo	Remove	2	
5722	13	Box elder	Acer negundo	Remove	2	
5723	24	Black Cherry	Prunus serotina	Remove	3	
5724	13	Box elder	Acer negundo	Remove	2	
5725	19	Box elder	Acer negundo	Remove	2	
5726	14	Box elder	Acer negundo	Remove	2	
5727	12	Common Apple	Malus spp.	Remove	2	
5729	9	Common Apple	Malus spp.	Remove	1	
5732	24	Black Cherry	Prunus serotina	Remove	3	
5733	8	Black Cherry	Prunus serotina	Remove	1	
5734	9	White Ash	Fraxinus americana	Remove	1	
5736	12	Black Walnut	Juglans nigra	Remove	2	

TAG NO.	DIAMETER	COMMON NAME	BOTANICAL NAME	STATUS	Required Replacement	Multi-Stem Replacement
5737	20	Black Walnut	Juglans nigra	Remove	2	
5738	16	Black Walnut	Juglans nigra	Remove	1	
5739	22	Black Walnut	Juglans nigra	Remove	3	
5740	13	Black Walnut	Juglans nigra	Remove	2	
5741	20	Black Walnut	Juglans nigra	Remove	2	
5743	14	Box elder	Acer negundo	Remove	2	
5744	12	Box elder	Acer negundo	Remove	2	
5747	13	Box elder	Acer negundo	Remove	2	
5748	18	Box elder	Acer negundo	Remove	2	
5749	16	Black Cherry	Prunus serotina	Remove	2	
5752	26	Box elder	Acer negundo	Remove	3	
5753	16	Hawthorn	Crataegus spp	Remove	1	
5755	24	Black Cherry	Prunus serotina	Remove	3	
5756	18	Box elder	Acer negundo	Remove	2	
5757	9	Box elder	Acer negundo	Remove	1	
5758	6,13	Box elder	Acer negundo	Remove	2	
5760	22	Box elder	Acer negundo	Remove	2	
5761	26	Box elder	Acer negundo	Remove	2	
5762	12	Box elder	Acer negundo	Remove	2	
5763	10	Box elder	Acer negundo	Remove	1	
5764	11	Box elder	Acer negundo	Remove	1	
5765	8	Box elder	Acer negundo	Remove	1	
5766	15,15,15	Black Cherry	Prunus serotina	Remove		6
5767	12	Black Cherry	Prunus serotina	Remove	2	
5768	18,18	Box elder	Acer negundo	Remove		5
5771	16	Box elder	Acer negundo	Remove	2	
5772	28	Box elder	Acer negundo	Remove	3	
5773	10	Box elder	Acer negundo	Remove	1	
5774	14	Box elder	Acer negundo	Remove	2	
5776	10	Hawthorn	Crataegus spp	Remove	1	
5777	15,15	Black Walnut	Juglans nigra	Remove	4	
5778	19	Black Walnut	Juglans nigra	Remove	2	
5779	12,12,12,12	Black Cherry	Prunus serotina	Remove		6
5780	18	Black Cherry	Prunus serotina	Remove	2	
5781	12	Box elder	Acer negundo	Remove	2	
5782	12	Box elder	Acer negundo	Remove	2	
5783	11,11	Box elder	Acer negundo	Remove	3	
5786	10	Box elder	Acer negundo	Remove	1	
5787	18	Box elder	Acer negundo	Remove	2	
5789	8	Box elder	Acer negundo	Remove	1	
5790	10,10	Box elder	Acer negundo	Remove	3	
5791	12	Box elder	Acer negundo	Remove	2	
5792	15	Box elder	Acer negundo	Remove	2	
5793	7,13	Box elder	Acer negundo	Remove	2	
5794	13	Box elder	Acer negundo	Remove	2	
5795	10	Box elder	Acer negundo	Remove	1	
5796	13	Box elder	Acer negundo	Remove	2	
5797	8	Box elder	Acer negundo	Remove	1	
5798	6,9	Box elder	Acer negundo	Remove	1	
5799	13	American Elm	Ulmus americana	Remove	2	
5802	17	Box elder	Acer negundo	Remove	2	
5801	6	Box elder	Acer negundo	Remove	1	
5802	16	Eastern Cottonwood	Populus deltoides	Remove	2	
5804	8	Box elder	Acer negundo	Remove	1	
5805	12	Box elder	Acer negundo	Remove	2	
5806	8	Box elder	Acer negundo	Remove	1	
5807	8	Box elder	Acer negundo	Remove	1	
5809	17	Box elder	Acer negundo	Remove	2	
5810	6,6,8	Box elder	Acer negundo	Remove	1	
5811	10	Box elder	Acer negundo	Remove	1	
5812	18	Box elder	Acer negundo	Remove	2	
5813	18	Box elder	Acer negundo	Remove	2	
5814	16	Box elder	Acer negundo	Remove	2	
5815	10,10	Box elder	Acer negundo	Remove	3	
5816	12	Box elder	Acer negundo	Remove	2	
5817	10	Box elder	Acer negundo	Remove	1	
5818	13	Black Walnut	Juglans nigra	Remove	2	
5824	8	Hawthorn	Crataegus spp	Remove	1	
5825	16	Box elder	Acer negundo	Remove	2	
5826	19	Box elder	Acer negundo	Remove	2	
5828	10	Black Walnut	Juglans nigra	Remove	1	
5829	16	Black Walnut	Juglans nigra	Save		
5830	14	American Elm	Ulmus americana	Remove	2	
5831	11	Black Walnut	Juglans nigra	Save		
5832	8	White Ash	Fraxinus americana	Remove	1	
5833	14,14	Box elder	Acer negundo	Remove		4
5834	21	Black Walnut	Juglans nigra	Remove	3	
5835	18	Black Cherry	Prunus serotina	Remove	2	
5836	8	Black Cherry	Prunus serotina	Remove	1	
5837	24	Eastern Cottonwood	Populus deltoides	Save		
5838	6	Common Apple	Malus spp.	Save		
5839	19	Box elder	Acer negundo	Remove	1	
5840	20	Box elder	Acer negundo	Remove	3	
5841	12,12	Box elder	Acer negundo	Remove		3
5842	15	Black Cherry	Prunus serotina	Remove	2	
5843	17	Black Cherry	Prunus serotina	Remove	2	
5844	19	Black Cherry	Prunus serotina	Remove	2	
5845	12	Black Cherry	Prunus serotina	Remove	2	
5846	19	Hawthorn	Crataegus spp.	Remove	1	
5847	9	Hawthorn	Crataegus spp.	Remove	1	
5848	19	Hawthorn	Crataegus spp	Remove	2	
5849	10	American Elm	Ulmus americana	Remove	1	
5850	18	Box elder	Acer negundo	Remove	3	
5851	24	Black Cherry	Prunus serotina	Remove	3	
5852	10	Black Cherry	Prunus serotina	Remove	1	
5853	14	Black Cherry	Prunus serotina	Remove	2	
5854	12	Black Cherry	Prunus serotina	Remove	2	
5855	16	Box elder	Acer negundo	Remove	2	
5856	24	Box elder	Acer negundo	Remove	3	
5857	18	Box elder	Acer negundo	Remove	2	
5858	10	Box elder	Acer negundo	Remove	1	
5859	8	Box elder	Acer negundo	Remove	1	
5861	28	Box elder	Acer negundo	Remove	3	
5862	10,13	Box elder	Acer negundo	Remove	2	
5863	8	Box elder	Acer negundo	Remove	1	
5864	17	Box elder	Acer negundo	Remove	2	
5865	16,16	Box elder	Acer negundo	Save		
5866	16,10	Box elder	Acer negundo	Save		
5870	12	Box elder	Acer negundo	Remove	2	
5871	11	Box elder	Acer negundo	Remove	1	
5873	13	Eastern Cottonwood	Populus deltoides	Remove	2	
5875	32	Box elder	Acer negundo	Remove	4	
5876	26	Box elder	Acer negundo	Remove	3	
5878	12	Box elder	Acer negundo	Remove	2	
5879	10	Box elder	Acer negundo	Remove	1	
5880	12	Box elder	Acer negundo	Remove	2	
5881	12	Box elder	Acer negundo	Remove	2	
5883	7,12	Eastern Cottonwood	Populus deltoides	Remove	2	
5884	21	Eastern Cottonwood	Populus deltoides	Remove	3	
5885	15,15	Big Tooth Aspen	Populus grandidentata	Remove		4
5887	9	American Elm	Ulmus americana	Remove	1	
5888	11,11,11	Eastern Cottonwood	Populus deltoides	Remove		4
5890	13,13	Eastern Cottonwood	Populus deltoides	Remove		4
5891	16,16	Eastern Cottonwood	Populus deltoides	Remove		4
5892	16,16	Eastern Cottonwood	Populus deltoides	Remove		4
5893	12,12	Eastern Cottonwood	Populus deltoides	Remove		3
5896	10,12,14	Eastern Cottonwood	Populus deltoides	Remove		5
5897	10	Box elder	Acer negundo	Remove	2	
5898	15	Box elder	Acer negundo	Remove	2	
5899	12	Big Tooth Aspen	Populus grandidentata	Remove	2	
5900	8	Big Tooth Aspen	Populus grandidentata	Remove	1	
5901	13	Big Tooth Aspen	Populus grandidentata	Remove	2	
10401	17	Eastern Red Cedar	Juniperus virginiana	REMOVE	2	
10402	8,9	Honey Locust	Gleditsia triacanthos	REMOVE		2
10403	18	Box elder	Acer negundo	REMOVE	2	
10404	16	Box elder	Acer negundo	REMOVE	2	
10405	14	Box elder	Acer negundo	REMOVE	2	
10406	11	Box elder	Acer negundo	REMOVE	1	
10407	22	Box elder	Acer negundo	REMOVE	3	
10408	9	Box elder	Acer negundo	REMOVE	1	
10409	12	Box elder	Acer negundo	REMOVE	2	
10410	15	Box elder	Acer negundo	REMOVE	2	
10411	9	Box elder	Acer negundo	REMOVE	1	
10412	19	Box elder	Acer negundo	REMOVE	2	
10413	8	Box elder	Acer negundo	REMOVE	1	
10414	13	Box elder	Acer negundo	REMOVE	2	
10415	24	Box elder	Acer negundo	REMOVE	3	
10416	20	Box elder	Acer negundo	REMOVE	2	
10417	10,22	Box elder	Acer negundo	REMOVE		4
10418	10,16	Box elder	Acer negundo	REMOVE		4
10419	9	Box elder	Acer negundo	REMOVE	1	
10420	12	Box elder	Acer negundo	REMOVE	2	
10421	8	Box elder	Acer negundo	REMOVE	1	
10422	12	Box elder	Acer negundo	REMOVE	2	
10423



NOTE KEY:

1. EXISTING WETLAND
2. 25' WETLAND BUFFER
3. EXISTING TREES TO REMAIN, TYPICAL
4. EXISTING SIGNAGE AND LIGHTING
5. EXISTING DENTIST OFFICE
6. PROPOSED TOLL BROTHERS DEVELOPMENT, ZONED RM-1
7. PROPOSED 6' HT. BERM AT TOLL BROTHERS DEVELOPMENT
8. FUTURE PARK, BY OTHER'S
9. RIDGEVIEW OF NOVI, ZONED RM-1
10. PROPOSED COMMERCIAL BUILDINGS, SEE ARCHITECTURE
11. PROPOSED OUTDOOR PATIOS
12. PROPOSED PARKING LOT
13. PROPOSED DUMPSTER ENCLOSURE, PER NOVI STANDARDS
14. PROPOSED CONCRETE SIDEWALKS, TYPICAL
15. PROPERTY LINE
16. ZONING LINE WITHIN THE PRO
17. PRO LINE

SITE LANDSCAPE DATA

R.O.W STREET TREE REQUIREMENTS:
10 MILE ROAD:
764 LF ADJACENT TO PARKING / 35

TREES REQUIRED: 22 (764/35)
TREES PROVIDED: 22

R.O.W GREENBELT LANDSCAPE:
CANOPY / EVERGREEN TREES
10 MILE ROAD:
924 LF ADJACENT TO PARKING / 35

TREES REQUIRED: 27 (924/35)
TREES PROVIDED: 27

SUB-CANOPY TREES
10 MILE ROAD:
924 LF ADJACENT TO PARKING / 20

SUB-CANOPY TREES REQUIRED: 47 (924/20)
SUB-CANOPY TREES PROVIDED: 47

INTERIOR PARKING AREA REQUIREMENTS:
VEHICULAR USE AREA: 155,186 SF

REQUIRED LANDSCAPE AREA:
- 50,000 sf x 0.075 = 3,750 sf.
- 105,186 sf x 0.01 = 1,052 sf.

AREA REQUIRED: 4,802 sf.
AREA PROVIDED: 11,928 sf.

TREES REQUIRED: 24 (4,802 / 200)
TREES PROVIDED: 24

PARKING LOT PERIMETER REQUIREMENTS:
PERIMETER LENGTH: 2,489 LF

TREES REQUIRED: 71 (2,489 / 35)
TREES PROVIDED: 71

NOT FOR CONSTRUCTION

0 20 40 80
SCALE: 1" = 40'-0"

NORTH

VVLA vert verde landscape architecture
734.249.2568 Plymouth, MI
james@vertverde.com

Issued For:
06.23.2023 PRO Submittal
12.22.2023 Revised PRO Submittal

Project:
NOVI TEN PRO
10 Mile Road
Novi, Michigan

Project Sponsor:
Weiss Construction Co.
41001 Grand River Ave.
Novi, MI 48375

Sheet Name:
B3 Zoning Landscape Plan (Conceptual)

Seal:

Drawn: JG
Checked: JG
Date: 06.2023
Scale: 1" = 40'-0"

Project Number:
23.035

Sheet Number:
L - 3

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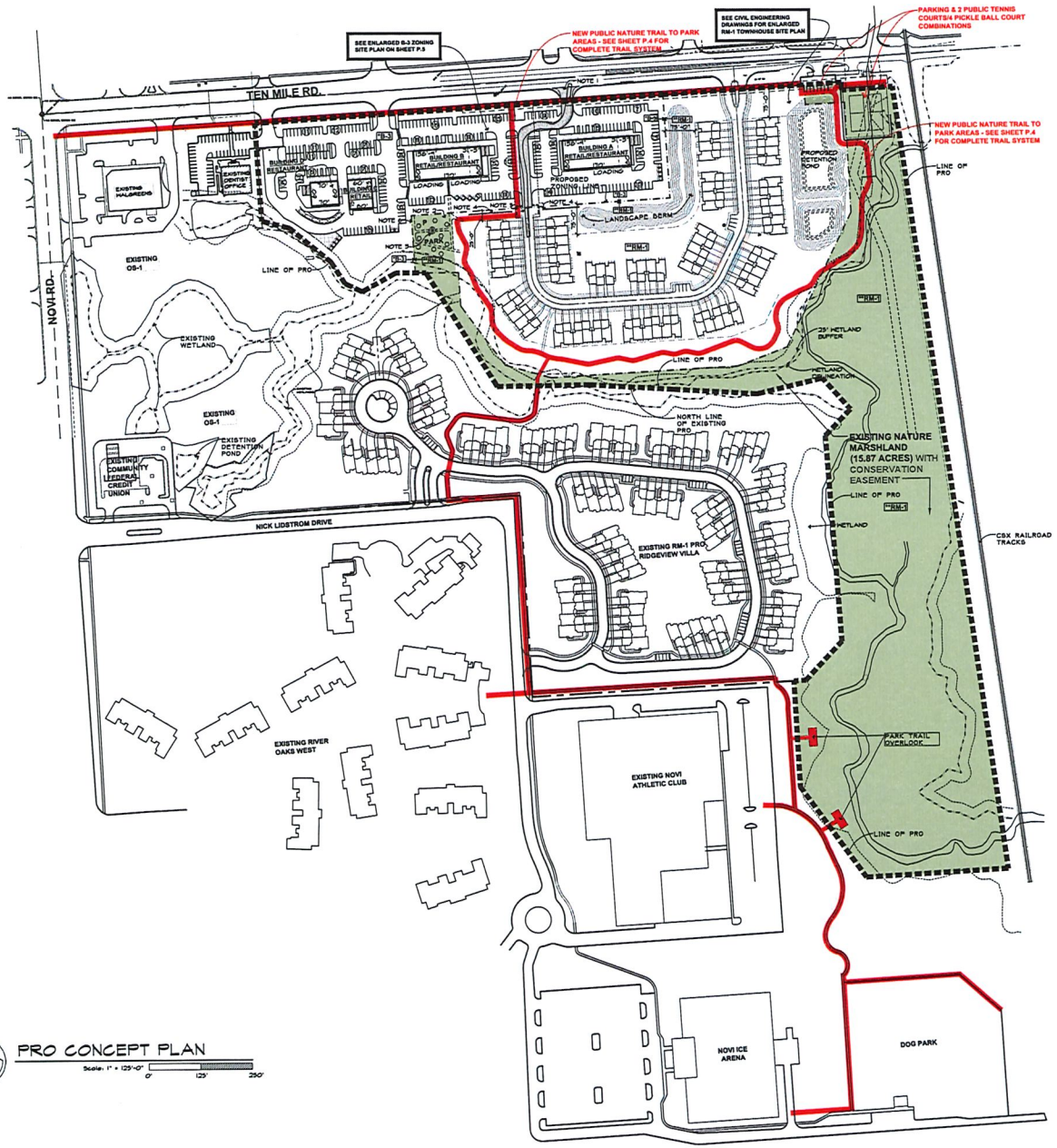
PROJECT NARRATIVE

EXECUTIVE SUMMARY

We respectfully submit the attached 34.04 acre Novi 10 PRO rezoning plan which initially went before your Novi Pre-Application Concept Committee and was met with their approval, as it conforms with traditional and national urban planning goals and the city of Novi's many stated specific goals of good urban planning, including having a "Walkable Community "at this location. We submitted an updated proposal on October 4, 2023 and received comments response on November 3, 2023. This current submission (January 2, 2023) addresses the concerns indicated in the November 3, 2023 review.

The key large elements include 27.07 acres of proposed RM-1 zoning containing 71 residential townhouses bounded by marshland, river, and natural wildlife park area on the east side, containing new combined tennis/pickleball courts and nature overlooks, and bounded on the west side by a park. 15.87 acres of the RM-1 natural and park area which surround the townhouses and extend south as far as the Novi Dog Park will have a conservation easement to protect it from future development. North of the residential property is a 6.97 acre small 35,900 square foot area local retail area which is proposed to be rezoned to B-3, containing new amenities such as a sidewalk cafe and other local services. The goal is to create a **walkable community** with easy pedestrian walking paths connecting these numerous widely varied amenities, all which are conveniently accessible, for a walkable village type community for functional life needs and recreation. This will be beneficial to existing residents in surrounding areas and residents of this proposed new residential development to provide access to the proposed new nature trails, recreation areas, small local retail area, and new walkable connections to other existing complimentary amenities; such as: the sports club, tennis courts, childcare, and the nearby arena facility, with ice rinks, yoga, banquet and children's party rooms, as well as the dog park, and other park area with swing sets , picnic areas and climbing apparatus. Overall, this PRO creates a cohesive array of walkable areas which are a beneficial improvement for the community.

See the two (2) drawings that follow for an overall graphic picture of the Novi-10 PRO:



PRO CONCEPT PLAN

Scale: 1" = 125'-0" (0', 125', 250')

NORTH

GENERAL NOTES:

1. THE SCREENING BETWEEN RESIDENTIAL AND COMMERCIAL PROPERTY IS PROVIDED ON THE RESIDENTIAL SIDE OF THE PROPERTY BORDER, NOT THE COMMERCIAL SIDE. SAME EFFECTIVE RESULT.

REFERENCED PLAN NOTES:

1. 20 FT WIDE TEMPORARY EMERGENCY ACCESS ROAD TO MEET COUNTY ROAD STANDARDS HERE OR OTHERWISE LOCATED TO 10 MILE ROAD.
2. PICNIC AREA FOR CARRY OUT, CAFE FOODS, ETC.
3. GAZEBO AND PICNIC TABLES IN PARK AT WEST END.
4. PROP. 8' HIGH MASONRY WALL OR OTHER CITY APPROVED BUFFER.
5. BREAKAWAY GATE PER CITY OF NOVI STANDARDS
6. NO WALL OR BERM BETWEEN RESIDENTIAL AND COMMERCIAL ZONING AT PARK.

LINE OF PRO

P = 15.87 ACRES PARK/NATURE AREA (CONSERVATION EASEMENT)

PUBLIC TRAIL TO PARK AREAS (SEE SHEET P.4 FOR COMPLETE TRAIL SYSTEM)

35.04 ACRES TOTAL PRO

***B-3 GENERAL BUSINESS DISTRICT ZONING**
6.97 ACRES: RETAIL BUILDINGS A, B, & C AND SUPERMARKET

****RM-1 LOW RISE MULTIPLE FAMILY DISTRICT**
27.07 ACRES: 71 TOWNHOUSE UNITS & PARK/NATURE AREA

SEE CIVIL ENGINEERING, LANDSCAPE & PHOTOMETRIC DRAWINGS FOR ADDITIONAL INFORMATION

STA

SIEGAL/TUOMAALA ASSOCIATES ARCHITECTS & PLANNERS INC.

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suite 160
southfield, mi 48034

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www.sta-architects.com

STATE OF MICHIGAN
LONNY S. ZIMMERMAN
ARCHITECT
No. 1301021328
REGISTERED ARCHITECT

project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN
SECTION 26

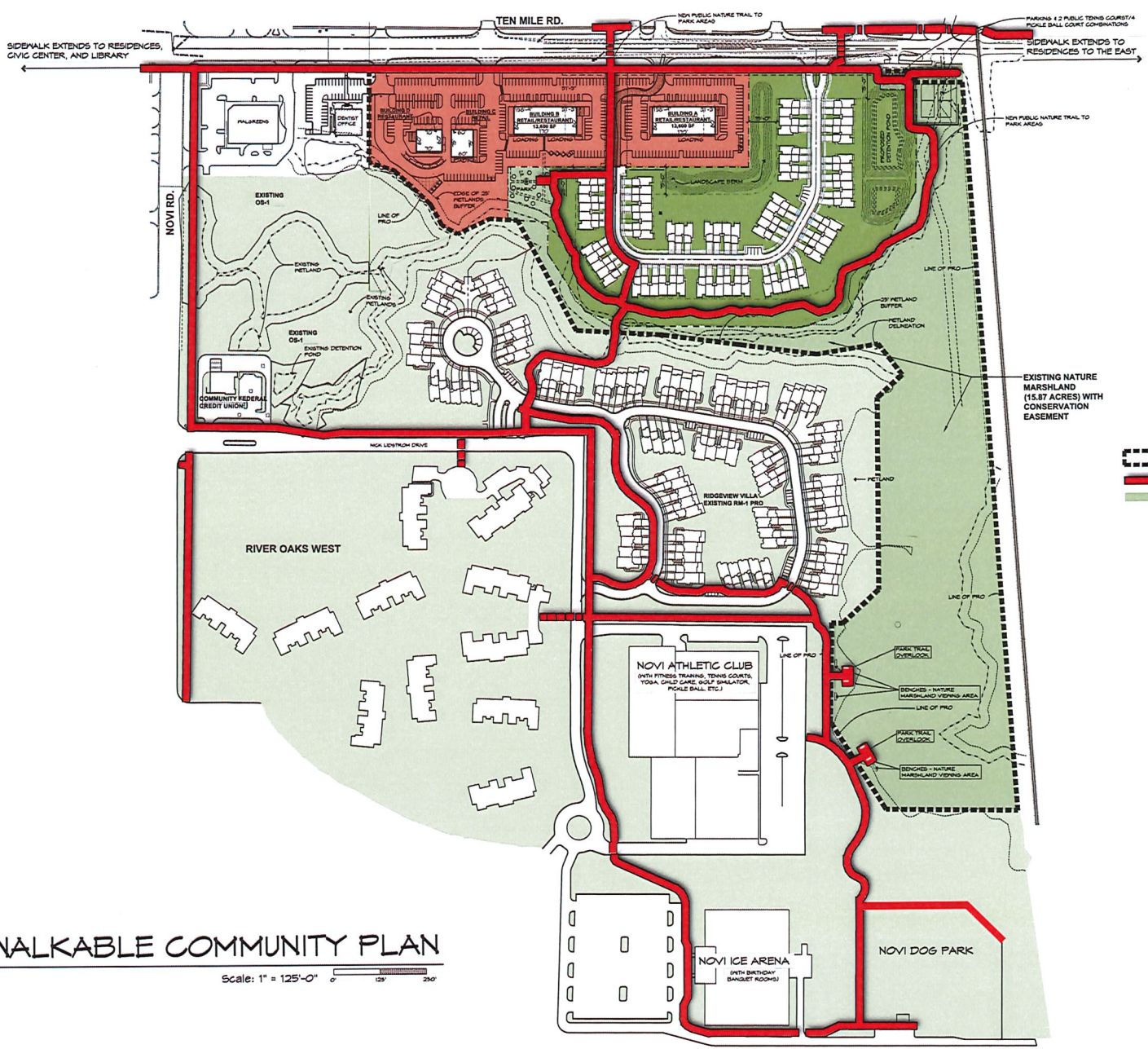
date/revision:
- Oct.04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
PRO PLAN

project number:
1537E

sheet number:
P.3

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WALKABLE COMMUNITY PLAN

Scale: 1" = 125'-0"

NORTH

SIEGAL/TUOMAALA ASSOCIATES ARCHITECTS & PLANNERS INC.

29200 northwestern hwy
suite 160
southfield, mi 48034

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www.sta-architects.com

LONNY S. ZIMMERMAN ARCHITECT No. 1301021328 LICENSED ARCHITECT

project name:
NOVI TEN PRO

project location:
NOVI, MICHIGAN
SECTION 26

date/revision:
- Oct.04, 2023 - Issue PRO
- Jan. 02, 2024 - Revised PRO

sheet title:
WALKABLE COMMUNITY PLAN

project number:
1537E

sheet number:
P.4

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NARRATIVE – INCLUDING BENEFITS & DEVIATIONS

January 2, 2024,

To: City of Novi, Attn: Ms. Barbara McBeth, Novi City Planner
Staff/ Planning Commission/ City Council
Re: Proposed Novi 10 Property PRO Rezoning - Narrative

Dear members:

SUMMARY: We respectfully submit the attached 34.04 acre Novi 10 PRO rezoning plan which initially went before your Novi Pre-Application Concept Committee and was met with their approval, as it conforms with traditional and national urban planning goals and the city of Novi's many stated specific goals of good urban planning, including having a "Walkable Community "at this location. We submitted an updated proposal on October 4, 2023 and received comments response on November 3, 2023. This current submission (January 2, 2024) addresses the concerns indicated in the November 3, 2023 review.

The key large elements include 27.07 acres of proposed RM-1 zoning containing 71 residential townhouses bounded by marshland, river, and natural wildlife park area on the east side, containing new combined tennis/pickleball courts and nature overlooks, and bounded on the west side by a park. 15.87 acres of the RM-1 natural and park area which surround the townhouses and extend south as far as the Novi Dog Park will have a conservation easement to protect it from future development. North of the residential property is a 6.97 acre small 35,900 square foot area local retail area which is proposed to be rezoned to B-3, containing new amenities such as a sidewalk cafe and other local services. The goal is to create a **walkable community** with easy pedestrian walking paths connecting these numerous widely varied amenities, all which are conveniently accessible, for a walkable village type community for functional life needs and recreation. This will be beneficial to existing residents in surrounding areas and residents of this proposed new residential development to provide access to the proposed new nature trails, recreation areas, small local retail area, and new walkable connections to other existing complimentary amenities; such as: the sports club, tennis courts, childcare, and the nearby arena facility, with ice rinks, yoga, banquet and children's party rooms, as well as the dog park, and other park area with swing sets , picnic areas and climbing apparatus. Overall, this PRO creates a cohesive array of walkable areas which are a beneficial improvement for the community. As required by the city PRO process, an additional listing of new community benefits is listed below.

Additionally, an 18 Acre certified charitable donation was requested by the city (Dog Park and Arena Facility land), as detailed in the city's Letter of Commendation at the end of this narration. Novi- 10 gave this land to the city of Novi and would like this to please be considered.

KEY DETAILS: The proposed residential townhouses are compatible with the existing townhouse residential areas that are adjacent and to the south. This PRO proposes to replace the existing industrial zoning and office zoning districts with a multi-family zoning and a commercial zoning district to better reflect the needs of the community, with the residential being townhouses and the commercial being small stores and services. Changing work and life patterns have made the existing OS-1 office zoning less feasible, and there is a large amount of excess unleased office space currently,

with more coming on the market in the years to come. In addition, 2023 data from CoStar Realty Information Inc. indicates a 35% drop in industrial leasing demand in the city of Novi based on absorption of industrial inventory. In contrast to this, local retail and restaurant use are in demand currently and are projected to be even more in demand in Novi's future. The RM-1 proposed 71 townhouse units in the PRO is north of existing multi-family (previous PRO) in a portion of the existing I-1 industrial zoning district. The large 15.87 acre natural park area marshland and wetland to the east is bounded by the railroad tracks and currently zoned I-1 industrial. This area would be unsuitable for industrial development even if there was industrial demand, which is why this PRO proposes to change from I-1 zoning to RM-1 zoning for this 15.87 acres and create a conservation easement for it. This RM-1 zoning is consistent with adjacent existing multi-family developments, and the 11.2 acre balance of the proposed new 27.07 RM-1 zoning is for multi- family townhouses in this PRO. The 15.87 acre natural area will contain a trail network and overlooks, and newly constructed tennis/pickleball courts and their parking spaces.

A portion of the proposed RM-1 townhouses are across 10 Mile Road from parcels zoned I-2 Industrial. To effectively separate the two uses in addition to the 120 foot right- of-way separation distance, the Novi-10 PRO proposes a visual and sound separation by constructing berms with dense landscaping along a portion of the residential development.

The balance of the total 34.04 acre Novi-10 PRO, which is 6.97 acres, will have local commercial neighborhood uses with rezoning proposed from OS-1 and I-1 zoning to B-3 zoning. Specific uses not suitable for this neighborhood have been excluded and are listed below. To facilitate the traffic movement to and from the commercial buildings, the PRO proposes to add an eastbound and a westbound lane to 10 Mile Road, along with tapers at the driveways, with the driveways wide enough to accommodate a separate left turn exit lane onto west bound 10 Mile Road.

In summary, the 27.07 acre 71 townhouses and natural area will be in the proposed RM-1 zoning, while the 35,900 square foot local retail will be in the 6.97 acre proposed B-3 zoning. It is anticipated that this entire project will begin immediately upon approval of this PRO.

ECONOMIC IMPACT: This development will create approximately 100 new permanent fulltime and part time jobs in the new retail stores and restaurants. It is anticipated that combined construction costs for the commercial and the residential projects will be over $35,000,000, which will provide numerous construction jobs.

CONFORMANCE & FURTHERANCE OF NOVI MASTER PLAN GOALS: The following list demonstrates how the proposed development successfully well implements many of the primary clearly stated goals of Novi's 2016 Master Plan including key elements such as a "Walkable Community" and many others. And this is all consistent with traditional planning principles, especially with respect to protecting natural features and natural marshland habitats, which also advance walkability, connectivity, and consistency with the patterns of existing uses on adjacent parcels. The Master Plan makes many statements regarding these concepts, all rightfully so, which benefit the residents of the local community. The Novi 10 PRO plan presented here directly addresses and furthers these stated goals in numerous ways, which create improvements to accommodate the Master Plan, far improved in this location over with the existing industrial and office zoning it replaces. Below are specific descriptions

which demonstrate these PRO improvements and further implementations of the Novi Master Plan's clearly stated goals and defined elements.

1. PARKS AND RECREATION: Master Plan Page 6 – "The city maintains a diverse park system that includes a growing trail network along with active and passive recreation opportunities ... Maintaining and enhancing these strengths will be important to continue the City's success into the future..." benefitting its residents. In furtherance of this same goal, this proposed Novi 10 PRO provides some additional park areas and additional walking paths connecting the existing residential developments to the south and additional residential areas to the northeast along 10 Mile Road, thru this proposed development to access the existing nature trails, and community recreational facilities. (Dog park, sports club, ice arena). The new paths complete connections between such park and recreation spots for all the various residential developments and bring all these features into a walkable, and especially bikeable easy to reach neighborhood system.

2. CONNECTIVITY: Master Plan Page 8 –... The walking and bike path system through and around the proposed PRO, as indicated above, provides neighborhood connectivity, which includes the PRO neighborhood retail, and the various separate existing Novi recreation facilities to the south, as well as the proposed local retail/services area and others in the area. The PRO street adds to the existing vehicular connectivity beyond the walkable and bikeable distance.

3. DIVERSITY: Master Plan Page 10 – "Diversity of housing is important for a balanced community ... young professionals and empty nesters seek a smaller home with lower maintenance..." The townhomes and local retail/services development of the proposed Novi 10 PRO is the correct solution for this recognized goal, especially when factoring in connectivity and reduced auto trips. And this project simply implements more of the City's same judgments that this is a great location for such types of smaller condominium homes.

4. ENVIRONMENT & OPEN SPACE: Master Plan Page 18 – "... Such features contribute greatly to the character of the community, and they can be used to enhance development and improve the quality of life." In furtherance of that exact goal: the Novi 10 PRO substantially contributes with the addition of the 1000's of feet of trails, along with Novi-10's prior contributions of trails here for hiking and viewing of the natural wetland, wildlife area, along the south and east boundary of the PRO area (bordering the railroad to the east) and the other multi-family developments on the around Nick Lidstrom Drive. Substantial additional areas of this nature marshland area will now be defined and protected from potential undesirable future development and encroachments, and 3 acres of this natural area, including tennis/ pickleball courts on 10 Mile Road will be donated to the city of Novi.

5. BENEFICIAL SCENIC NATURE VIEWS AREAS: Master Plan Page 20 – "...floodplains can serve as a great 'viewshed' for development..." The multi-family residential, proposed picnic area and orientation of the local retail/services development of the proposed Novi 10 PRO respects and takes advantage of the beautiful wildlife views in the wetland area, much as the existing, very successful recently built Ridgeview Villa development to the south also does. This natural

area is now contained within the proposed PRO. Further, the nature path system along the natural marshland area with long expansive (1000s of feet new extra hiking areas and bench overlooks, create more such nature viewing areas. Furthermore, removing the industrial development that would occur under the current zoning eliminates the negative views and aesthetic and economic detriments that would **devalue** those residential areas from such Industrial uses, for the life quality of existing residents to the south. The

6. SUPPORTIVE LOCAL RETAIL: Master Plan Page 35 & 36 – "As the number of households increase, new demand for goods and services is created. By 2025, the community can support about 590,000 additional square feet of retail goods space at any and all locations. Accommodating the current and future newly generated demand will provide the opportunity for infills of extra retail amenities such as this plan accomplishes, in addition to filling of other vacancies." The proposed Novi 10 PRO retail plan again addresses this by providing a modest quantity of local retail and services within walking range of many surrounding residents. At this time the specific retail and service providers are not known, but market studies confirm there is current demand and will include small retail and personal services, including uses such as sidewalk café overlooking the marshland, a small restaurant, or specialty market, a small medical or other professional office, childcare, exercise, yoga club, etc. These services will be walkable for the new residents, as well as for the existing residents to the south, and those east on 10 Mile Road. As part of the proposed PRO, we propose to prohibit uses that we believe are objectionable, and not in the community's best interest at this location: Gas station, Automobile Repair, Car Wash, Check Cashing, and Pawn Shop. Marijuana sales (already not permitted in the city of Novi) will also be excluded by the PRO documents in case the city's law is changed to allow it in the future.

The PRO drawings indicate locations for four retail buildings on the B-3 portion, along with the required parking, walkways and landscaping to show one feasible layout. At the time of site plan approval, a final site plan will be indicated with the required civil engineering and landscape. At this point in time, we request that the PRO be approved subject to the final B-3 buildings, parking, landscape, and engineering compliance with Novi standards.

7. "GENERAL GOAL: ENVIRONMENTAL STEWARDSHIP": Master Plan Page 40 –
Item13. Protect and maintain natural features..." Please refer to the comments above, supporting this exactly.
Item 14. Increase recreational opportunities..." Please refer to the comments above regarding the walking paths and new park areas onsite as well as nature trails and hiking connections to such as the Dog Park, etc. which this development will provide.
Item 15. Encourage energy-efficient and environmentally sustainable development through raising awareness and standards that support best practices. The proposed Novi 10 PRO addresses this directly. What better teaching opportunity can there be for young families having easy access to these diverse natural areas and trail...and in their own backyards!

8. WALKABLE ACTIVITIES ACCESS: Master Plan Page 41 – "The City should provide more activities and shopping within walking/cycling distance, such as cities like Ann Arbor or

Northville or Plymouth offer." The Novi 10 PRO does exactly this; promoting connectivity and walkability and potentially reducing day-to-day auto trips.

9. PROTECTING NATURE AREAS: Master Plan Page 59 – "The City of Novi has a long history of protecting natural features." The Novi 10 PRO accomplishes this by preserving the 15.87 acres of open natural land along the east and south sides of the PRO with a conservation easement.

CONCLUSIONS: As demonstrated above, the proposed PRO will be an asset to the community, in conformance with the stated goals and specific elements of Novi Master Plan, and other well recognized practices of sound Urban Planning for the benefit of the City of Novi.

BENEFITS, DEVIATIONS, AND SUBSTANTIAL CONSIDERATIONS

Per PRO Application process, additional info: Many of these items summarized here for this list, are described in greater detail above)

In the Novi 10 PRO plan, both Novi Ten Associates and Toll Brothers will provide the following **Benefits** to the community and the relatively small zoning ordinance **Deviations**. Also included is a list of **Supplemental Substantial Positive Considerations**.

A. BENEFITS:

1. The complete east portion adjacent to the railroad tracks and the south 50 foot wide strip along the wetland of the proposed PRO (15.87 acres of the 27.07 RM-1 rezoning) are being retained as natural area with a conservation easement to preserve and protect its existing marshland and wildlife. This natural area, with wetlands, wraps around the PRO and includes on the west end a proposed new 0.4 acre park/playground located between the proposed residential and retail sites. The proposed trail system, with its overlooks near the Novi Athletic Club becomes a usable and accessible community resource.

2. To help achieve walkability and connectivity of the entire area, a trail system is being added which consists of new paths and existing sidewalks. This walkway system provides connectivity between surrounding existing residential areas and new proposed PRO residential area with all the marshland nature areas, the proposed tennis courts/ pickleball courts, the Novi Athletic Club, Ice Arena, and Dog Park, and with the new proposed local along Ten Mile Road. The retail consists of the new proposed retail and restaurant areas, and the existing Walgreen's and dental office.
   New Walkways and bike paths that overlook 15.87 acre wildlife area and connect this PRO development to the recreation areas: The $3.2 million dollars' worth of Novi 10 land previously donated to the city, initiated by Novi request (18 Acres of land): For the Novi Arena Facility and the Novi Dog Park

3. Two new tennis courts/pickleball courts are being added at the north end of the new conservation area along 10 Mile Road, as well as parking spaces for the courts.
4. Proposed use restrictions not permitting certain automotive and other business uses in the proposed B-3 commercial zoning (Sec. 3.1.12.B & C) are to be part of the PRO. Not permitted uses are:
   A. Vehicle oriented uses- Gas Station, Automotive Repair, and Car wash
   B. Other excluded uses- Check cashing, Pawn shop (Marijuana sales already not permitted in the city of Novi) will also be excluded by the PRO documents in case the city's law is changed to allow it in the future.)
5. Open Space: (Sec. 3.1.7.D) The amount of open space provided for the RM-1 townhouses exceeds the ordinance requirements.
6. Commercial Building Setbacks:
   Front- 30 ft. required.....92 ft. provided
   Rear- 20 ft. required.....83 ft. provided
   Side- 15 ft. required.....93 ft. provided
7. Residential Building Height (Sec. 3.1.7.D)
   35 ft. permitted.....29 ft. max. proposed
8. Commercial Building Height (Sec. 3.1.12.D)
   30 ft. permitted.....23 ft. max. proposed
9. Residential Lot Coverage (Sec. 3.1.7.D)
   25% max. permitted
   14% provided

B. DEVIATIONS:

1. Zoning Ordinance section 3.8.2.D – deviation for proposed residential buildings not to be configured 45 degrees at the property lines normally for aesthetic reasons. Most of the buildings are not on any main road and they front to a substantial irregular shaped 20 acre wetland nature area of a minimum 200 feet wide separation across from Toll's existing multi-family Ridgeview project. Also, please note, this is one of the most common easily granted variance requests: where layouts are dictated by natural land features such as two rivers and large canyon, not created by the applicant.

2. Zoning Ordinance sections 3.1.7.D and 3.6.2.B – deviation for the two residential buildings at the northwest corner of the RM-1 are set back 25 feet from the proposed B-3 district in lieu of the required 75 feet. This has been granted elsewhere in the city and still includes screening between the residential and commercial. That screening is located on the residential edge of the zoning line that separates the residential from the commercial and functions with same screening effect. (Only a small portion, at northwest corner being wall plus landscape, instead of berm). Is on Residential side and none will be on the commercial side of the line. Deviates from Zoning Ordinance section 5.5.3.A.ii but provides same screening! Is still located between the residential and commercial.

3. Zoning Ordinance Section 5.10 – request deviation allowing perpendicular parking on a 'major' drive in the residential.

4. Zoning Ordinance section 5.5.3.A.ii – requires a 10-15 foot high berm with a 6 foot crest next to I-1 district. A PRO deviation is requested to wave this requirement to preserve open viewing to the beautiful natural features instead of the usual berm screening that blocks the views from Industrial.
.
5. Zoning Ordinance Section 5.5.3.B.ii requires trees along 10 Mile Rd. A PRO deviation is requested due to a conflict with the existing water main location, but the total tree count remains in compliance with the ordinance.

6.. Zoning Ordinance Section 3.8.2.H, the distance formula for side-to-side building separation requires 37.56 feet maximum (at the residential buildings) based on the equations provided. 30 feet is provided, being a deviation of 7.56 feet to enable this project to be more viable and provide all such benefits to a modest amount of more residents. This is still far less than density such as R6.

7. Zoning Ordinance Section 5.7.3, Exterior Lighting shall not exceed 4:1 ratio. That is typical commercial practice. For residential, we request a small deviation to fully conform with common municipal lighting standards for residential areas.

8. Section 9 Waiver (Sec.5.15) Requested deviation from minimum required brick and asphalt shingles.

9. Major Drive Radius (Sec. 5.10) Requested deviation from the 100' foot minimum centerline radius to 85'.

C. SUPPLEMENTAL SUBSTANTIAL CONSIDERATIONS:

To provide a more comprehensive picture to the City of Novi administration, staff and expert consultants please note these additional facts that are not specifically detailed in the attached PRO concept package and may not be otherwise apparent until mentioned here.

Regarding Master Plan Goals:

1. SP Designation: Historically, the designations in the Master Plan ((in this case; industrial and office) are not the only uses that are in the best interest of the city. In many instances other zoning or uses have been permitted because they benefit the city. This site and the entire parent parcels, from 10 Mile Road to Arena Drive/Lindstrom Drive comprise well over 100 acres and have substantial geographical features, these include a large deep canyon and low marshland nature area varying from 100 to 400 feet wide in sections and over 1000 feet long and includes a large wetland of over 25 acres. The wetland has a "T" shaped intersection of three substantial river flows that naturally zig zag a bit and crisscross through this property. For these reasons, this property was designated for years by the City as "SP" (Special Planning District), which needed extra attention to accommodate such geographic realities not created by the applicant landowner.

2. Historical Improvements to Master Plan and Zoning: This SP Master Plan overall Property including the adjacent parent parcel, contains uses approved by the city that were not

designated in the master plan, but approved because they were determined by the city to be in the best interest of the community, overall. These prior approved uses include:

a. The land use for the dog park was approved.
b. The land designated as the Arena building (multi-use facility) was approved.
c. The Sports Club of Novi was approved.
d. The residential Ridgeway Villa was approved.
e. These new uses here presented are simply implementing more of the same SP approach, being very compatible and consistent with those same residential and commercial type adjacent uses, approved, in this good pattern of SP special review and the many other clearly stated goals of the city (Walkable amenities etc.).

Conclusion: As with the previous PRO, these same uses and elements are present, including bordering large canyons and wetlands that affected those other portions of this overall area. . And as with the previous parcels, this proposed Novi 10 PRO also is constant with and further implements the ideals and goals of the Master Plan (e.g., walkability, etc.) even though the uses are not specifically named in the Master Plan or on the zoning map.

The same adjacent beneficial uses are currently in place in the immediate surroundings. For example, on directly adjacent lands there is commercial on adjacent street corners and residential to the south. Accordingly, we ask that this same pattern of good planning be approved for continuance here, of what exists on the adjacent lands which fulfill the written goals of the Master Plan: walkable community, with good recreation and other stated benefits etc.

Please also consider the following substantial elements:

1. The Novi 10 PRO proposes upgrades that are deserving approval on their own as legitimately beneficial to the City of Novi and community residents and in conformance with traditional good neighborhood urban planning concepts, even if there were no extra benefits to "boost" this zoning request.
2. Further, as is required as part of the PRO process, we do offer extra NEW benefits for both the residential and commercial areas. These include new walkable trails as well as a small park and picnic area next to the commercial and the residential areas, and other listed. .
3.

Further, while this proposed rezoning should be granted simply as a clear benefit, but please also consider that as a benefit to the residents of Novi, the following : I have been a member of this community for decades and the City of Novi formally came to me many years ago, solely on its own initiative, (we were ourselves proposing no development or any action at all) and City asked that I help them out with a donation of land that they needed for the Novi Arena facility and the Novi Dog Park area but were far short on funds to do so. I did accommodate that request, never asking nor receiving anything then or EVER in exchange for that large donation (18 acres, appraised at $ 3.2 million dollars and audited by the IRS as a pure charitable donation.) The only deed restriction is that such lands be used for children's recreation and other direct resident recreational beneficial uses, (e.g., not for such as a municipal vehicle repair facility)

This land donation was completely initiated and asked for by the City of Novi, for its own goals, etc., and not any Novi 10 Associates goals. The city recognized that charitable good deed with the attached official NOVI LETTER OF COMMENDATION.

Further Perspective: While this previous donation does not count as one of the NEW extra benefits required for the PRO evaluation, it is in fact part of our same parent land parcel, from same owner, same family applicant and Novi is empowered to consider ALL relevant facts in their totality. And so accordingly, I hereby respectfully request that this prior 18 acre ($3.2 million dollar land donation) be recognized for its benefit to the City of Novi. While certainly not determinative, it should not be totally discounted either. Please further note, the reason this is mentioned lastly in the analysis is, as detailed above, even if this was no factor, this proposed project is, on its own, beneficial to the community and in conformance with sound urban planning and the city's stated goals, without any extra such benefits given to the city. And this application is not as some mere typical real estate developer but is from a demonstrated solid member of this community for over 40 years, having lived and worked here for over three generations, and caring about the welfare of our community. And we humbly ask for this project to please be approved expeditiously, as submitted here.

SUMMARIZING: There are numerous examples where the City's actions have recognized that current zoning and/or Master Plan designations can evolve and be updated and improved, including right at this location., to benefit the community and its residents. This site, with its 15.87 acres of meandering wetland marsh wildlife areas, of which 3 acres will be donated to the city of Novi, does deserve such special consideration as designated SP (Special Planning) in the past. Here the surrounding parcels previously developed – the arena facility, the sports club, the dog park, the Ridgeway Villas multifamily, were all uses recognized as beneficial and approved, though none were designated in the zoning or Master Plan at the time. This proposed Novi 10 PRO plan is likewise a natural extension of the same previous concepts and benefits to the community for residential development and consistent commercial uses, including those adjacent across 10 Mile and Novi Roads for easier (close) access without elderly people or a parent with small children having to walk that somewhat greater distance and busy intersection walking. This development also protects the nature features of the larger property and provides new and improved connectivity, for recreation and retail access as recognized and desired by the community in the Master Plan stated goals.

The proposed Novi 10 PRO, with its residential development and retail zoning should all be considered valid and approved, "standing on its own feet", as were all the prior ones as being beneficial for the community.
And especially beneficial, with all the extra benefits above and beyond all regulations, for the city residents.

We have for decades always been good citizens and caring and contributing to this community. Please keep all these benefits in mind during your review process and don't hesitate to contact us if you have any questions or comments. Thank you for your consideration.

Dan Weiss, Novi 10 Associates

COMMUNITY IMPACT STATEMENT

NOVI TEN ASSOCIATES PROPOSED REZONING & PRO CONCEPT PLAN

Walkable Residential &
Commercial Community Development

Community Impact Statement

January 2, 2024 (Revised)

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SITE DESCRIPTION

The Novi Ten Associates Proposed Rezoning & PRO Concept Plan development consists of two separate developments, being the Novi Ten Commercial development and The Towns at Novi Station. They are adjacent and contribute to Novi's written, oft-stated interest of developing Walkable Community areas. Both sections are situated on the south side of Ten Mile Road and approximately 530 feet east of Novi Road. The projects are proposed to be constructed on smaller portions from of two existing "parent" Parcels 22-26-101-028 and 22-26-101-024 which contain approximately 12.24 acres and 30.66 acres, respectively. The westerly section is currently zoned OS-1 (Office Service District) and the easterly area is currently zoned I-1 (Light Industrial District). Also, the site includes some community park and nature trials.

Out of these parent parcels, the Novi Ten Commercial Development will utilize approximately 8.35 acres of the overall PRO area and is requesting to rezone the proposed commercial portion of the development to B-3 (General Business District) under a Planned Rezoning Overlay ("PRO"). The Towns at Novi Station will utilize approximately 11.20 acres of overall parcel(s) and is requesting to rezone to RM-1 (Low Density, Low Rise Multiple Family District) under a PRO. The remainder of the two parent parcels will be simply split and remain in their current condition and under current zoning until further development is requested by the Owner. Much of it, the easterly portion is natural marshland area.

The Novi Ten Commercial Development shown is conceptual in nature and details what could be possible under the proposed Planned Rezoning Overlay to the B-3 General Business District. The conceptual plan shows a potential market, two restaurants, sidewalk café with outdoor seating, and possible childcare or medical office on that 8.35 acres with 1,024 feet of Ten Mile Road Frontage. These conceptual plans will likely change as future land uses and possible users are secured in the future.

The Towns at Novi Station portion of the development is proposed to be Constructed by Toll Brothers, Inc. as shown. Toll Brothers has a long history of successful developments within the City of Novi and other communities, including Island Lake of Novi and the recently completed Ridgeview of Novi located immediately south of this proposed project. Toll Brothers is proposing to construct seventy-one (71) townhome units within fourteen (14) buildings on 11.20 acres with 355 feet of Ten Mile Road frontage.

The whole development road frontage includes 1,379 feet along Ten Mile Road which is under the jurisdiction of the Road Commission for Oakland County. Access to the Site will be provided from the existing Ten Mile Road.

The Walled Lake Branch of the Middle Rouge River ("Middle Rouge River") runs along the Eastern side of the site and will serve as the storm water outlet for the project. The Chapman Creek runs along the south side of the project.

TOPOGRAPHY

Topographically, the site consists mostly of a gently to moderately sloping terrain, highest along Ten Mile Road and sloping down toward the Chapman Creek to the south and the Middle Rouge River to the east. The banks of the Chapman Creek and Middle Rouge River are relatively steep (60%-70%) through the site with the creek and river are roughly 0-5 feet below the remainder of the property. The sites highest elevation on site is in the commercial portion of the property and is approximately 897 feet and slopes at approximately 0.5% towards the Chapman Creek. The highest point on residential portion of the development is approximately 894 feet. Approximately ½ of the residential property flows towards the Chapman Creek and the other half flows toward the Middle Rouge River with 1-10% slopes. There are a few small insignificant pockets of poor drainage in the residential area. Please refer to the site documents.

ADJACENT LAND USES

The proposed developments are surrounded by commercial, industrial and residential uses within the I-1, I-2, B-1, and RM-1 districts (please refer to the site documents):

- North – Industrial uses in the I-1 and I-2 Districts on the other side of Ten Mile Road.
- East – vacant property in the I-1 district, the Middle Rouge River and C&O railroad tracks.
- South – RM-1 residential use.
- West – Vacant OS-1 property fronting on Novi Road and Walgreens and a Dentist office in the B-1 district.

DRAINAGE COURSES

As noted previously the Walled Lake Branch of the Middle Rouge River is located along the easterly side of the site and the Chapman Creek runs along the south side of the site. The Chapman Creek flows east into the Middle Rouge River. The Middle Rouge River runs south and eventually flows into the City of Northville. Both the Chapman Creek and the Middle Rouge River contain City of Novi, EGLE and FEMA regulated floodplains and floodways. At this time, the project is not anticipated to impact any floodplain or floodways and local, state and federal floodplain permitting is not anticipated to be required for the proposed project.

The entire PRO site including both the commercial and residential areas will be drained by means of sheet flow directed into a single proposed storm sewer system. The storm sewer will lead to a single open detention basin in the residential portion of the property. This proposed basin in the residential portion of the property will service the storm water management needs of both the commercial and residential portions of development. The detention basin will ultimately discharge on-site into the Middle Rouge River.

VEGETATION

The site contains both City of Novi regulated and non-regulated woodlands. A woodland survey has been performed on both the commercial and residential portions of the project. Woodland on

the northeast portion of the site is a sparse and becomes denser as the property heads south and east.

WETLANDS

Wetlands have been identified, flagged, and surveyed on the residential portion of the project as detailed on the PRO Site Plan. There are no wetlands identified or located on the Commercial portion of the project.

WILDLIFE

Wildlife commonly found on the site consists of small mammals such as field mice, squirrels, raccoons, fox and rabbits. A variety of small birds normally populate the area.

SOILS CLASSIFICATIONS

The soils classification as provided by the United States Soil Conservation Services Soil Survey of Oakland County, indicates Marlette Sandy Loams with 1 to 12 percent slopes.

MUNICIPAL WATER SUPPLY

Municipal water supply is available to the site by means of an existing 12-inch diameter water main on the south side of Ten Mile Road.

The residential development will connect to the existing 12-inch water main in Ten Mile Road and will provided with a water main secondary loop by connecting to the existing 8-inch water main stub provided by Ridgeview on Novi on the south side of the Chapman Creek. An 8-inch water main stub will be provided at T-turnaround for future connection by the Commercial development. Adequate water supply is anticipated for both domestic and firefighting purposes.

WASTEWATER DISPOSAL

An existing 36-inch Oakland County Water Resource Commission interceptor sewer is located along the eastern portion of the property and will provide sanitary service to the residential portion of the project. A city of Novi sanitary sewer is located on the north side of Ten Mile Road and will provide sanitary sewer service to the proposed commercial portion of the project. No off-site easements are required for the sewer connection.

The residential portion of the development has 71 Multiple Family Residences multiplied by a unit factor of 0.60 single family unit / multiple family unit, resulting in 42.6 equivalent Single-Family units. At a rate of 3.2 people per Single Family residential unit, the service population for the residential portion of the development is 137 people. With a peaking factor of 4.0, the peak flow from the project would be 0.09 cubic feet per second. The capacity of the 36-inch diameter interceptor sanitary sewer is vastly larger than 0.09 cubic feet per second required to service this project, therefore, capacity is sufficient. Additionally, the Oakland County Water Re-

source Commission has already indicated that the proposed project could be serviced by their interceptor sewer.

The retail/commercial portion of the development will be approx. 35,900 square feet of usable area multiplied by a unit factor of 0.40 units / 1,000 square feet of space, resulting in 14.36 equivalent single -family units. At a rate of 3.2 people per Single Family residential unit the service population for the commercial portion of the development is 46 people. With a peaking factor of 4.0, the peak flow from the project would be 0.14 cubic feet per second. The capacity of a 15-inch diameter sanitary sewer at minimum slope (0.15 feet per 100 feet) is 2.50 cubic feet per second, therefore, capacity is sufficient.

PUBLIC UTILITIES

Public utilities such as electricity, telephone, gas, and cable television, are available on Ten Mile Road.

PHASING

The residential development will be constructed in one phase. The commercial development is currently only a Concept Plan and will be developed later when retail/service tenants are identified.

And as soon as the PRO is approved, the development of such as the sidewalk cafes etc. to serve the local, walkable community will be pursued immediately.

ROADWAYS

The interior drives for both the residential and commercial developments are proposed to be private. The proposed two new commercial driveways will be wide enough to allow a separate left turn exit lane. The PRO plans indicate a 20ft wide temporary emergency access road to meet City of Novi standards connecting Toll's northwest drive and 10 Mile Road.

The Traffic Impact Study has been performed for this proposed PRO plan by Midwestern Consulting. The study indicates that the proposed development is not expected to have a significant traffic impact on the overall level of service at the major intersections of Ten Mile Road with Novi Road and with Meadowbrook Road. The study was reviewed by AECOM, the city of Novi's traffic consultants and when reviewed in detail, a December 19, 2023 memo was sent by them with the following: " *...AECOM recommends* ***approval of the Traffic Impact Study with the mitigations/improvements."***

The listed improvements are:
- *Widen eastbound 10 Mile Road to two through lanes, ending with a right-turn lane at the site's easternmost residential driveway.*
- *Widen westbound 10 Mile Road to two through lanes west from the 3rd site driveway to help provide additional capacity for outbound site traffic.*

• *Provide a continuous center lane turn lane to serve the 1st, 2nd, and 3rd commercial driveways.*
• *Provide separate outbound left-turn / right-turn lanes for the site's 2nd and 3rd commercial driveways to allow right-turning traffic to exit the site when vehicles are waiting to turn left.*

These recommendations have been indicated in the proposed PRO documents.

ENVIRONMENTAL CONCERNS

Ecologically, the development will affect the existing vegetation and ground cover to the extent that all existing field grasses and trees will be removed. And in conformance with the Novi Tree ordinance, replacements and other regulated accommodations will be all complied with (Novi Tree Fund). A conservation easement will be added to the 15.87 acres of existing marshland and new park area.

The ground water table will be affected slightly due to the extent of paving and building coverage. However, no deep excavations are planned which would contribute to the lowering of the ground water table. Soil erosion control will be provided on the site in accordance with the City of Novi requirements. Surface water run-off is expected to contain some road salts and oils carried by automobiles. As common, and in conformance with all applicable regulations, most suspended sediments will be removed in the storm water quality/detention basins, and oil and gas separators proposed in the development, to keep such from entering the river.

Air quality will be affected somewhat by automobile emissions. In addition, the net ambient air temperature of the site will be increased slightly due to the loss of vegetation and the addition of pavement and buildings.

Noise levels will increase compared to vacant land due to the additional automobile and truck traffic, and exterior air conditioning units, but will not be higher than the surrounding similar uses and compared to noise levels if the property was developed under existing zoning.

An aesthetic impact will result from the introduction of man-made structures and site improvements, but the building designs will be compatible with surrounding buildings.

Site lighting will be designed to maintain a low profile and prevent light spill and glare onto the adjacent property. A photometric plan and light fixture catalog cuts have been provided in the plan set and complies with all regulations.

Finally, landscaping will soften the overall impact of the development. A total of 252 trees are proposed to be planted. (See the Planting Schedule on the Landscape Plans Sheet L-1). No hazardous or toxic chemicals will be stored on-site except for household cleaners, pesticides and fertilizers used for lawn and plant care. No underground storage tanks, wells, or septic tanks are proposed.

STORM WATER DISPOSAL

Storm water generated on the proposed site will be collected by on site storm sewer and delivered to a single on-site detention located in the residential portion of the development sized to detain the 100-year flood storm event generated from both the commercial and the residential developments. The detention basin will ultimately discharge on-site water, out into the Middle Rouge River.

DEMANDS ON POLICE DEPARTMENT SERVICES

The Novi Police Department is professionally managed and has approximately 70 dedicated and well-trained full-time officers as well as a professional, proactive, and service oriented civilian staff. They have a long track record of managing the City of Novi's public safety needs for a population of 60,000 residents. The population increase of 137 people for the residential portion of the development and a "residential equivalent" of 65 people for the commercial development yields a combined net increase of 202 equivalent residents associated with both developments. This equivalent population increase represents a nominal increase (0.3%) in overall population and ***will not impact police services in any significant way.*** According to the 2008 ICMA report, the NPD received approximately 71,100 calls in a one-year period when the population was approximately 55,000. Therefore, there are approximately 1.3 calls per person annually. Based on those statistics, both developments will generate 262 calls over a one-year period, or 0.7 calls per day. The NPD handles approximately 189 calls per day, so the increase represents a nominal change (0.03%). The increase in demand on Police Department Services is especially small when you consider the increase that could potentially take place under existing zoning versus the increase proposed with the proposed use.

DEMANDS ON FIRE DEPARTMENT SERVICES

The Novi Fire Department has been serving the Novi Community since 1929 and is staffed by a combination of full time and paid-on-call employees who operate from four fire stations located throughout the city. The average call-to-arrival-time in Novi is 341 seconds. The population increase of 137 people for the residential portion of the development and a "residential equivalent" of 65 people for the commercial development yields a combined net increase of 202 equivalent residents associated with both developments. Based on the estimated proposed development population of 202 persons, the total projected annual Fire Department responses is 2. The project is located approximately 1-mile south Fire Station No. 1 located at 42975 Grand River Avenue and 1 mile north of Fire Station No. 3 located at 42785 9 Mile Road. Due to the proximity of two fire stations, response time is expected to be minimal.

The population increase of 202 equivalent residents at both developments represents a nominal increase in overall population (0.3%) and will not impact fire services in any significant way. Over a 15-year period (2002-2017) NFD responded to approx. 25-30 structure fires per year for a population of 60,000. The anticipated additional calls for structure fires at The Towns at Novi Station is statistically negligible.

Per a December 2015 NFPA Report, only 3% of structure fires are from retail stores, so it is anticipated that commercial development of the proposed site will have a minimum impact on fire services.
Over 64% of fire runs nationally are for medical emergencies per the NFPA, and this proposed development will add a very small additional number of medical fire runs compared to the large amount of existing residential and commercial development already present.

REFUSE AND SOLID WASTE DISPOSAL

In the residential portion of the development, refuse and solid waste will be disposed into trash cans and will be picked up by a weekly refuse collection company.

For the commercial portion of the development, refuse and solid waste will be disposed into a dumpster adjacent to the building. Offsite private contractors will collect the trash for final disposal.

EDUCATIONAL DEMANDS ON THE PUBLIC SCHOOL SYSTEM

The total 2014/2015 student enrollment in the Novi Community Schools is 6,266. Of this total, 2,020 were of High School Age (9-12th grade), 1,056 attended Middle School (7-8th grade), and 3,190 were enrolled at the elementary school level. Some impact is expected upon the community educational system due to the expected 20 +/- school age children living in the complex.

ECONOMIC IMPACT

Jobs: The jobs provided by the residential and commercial construction will have a positive direct impact on the economy. Work opportunities are created in the construction industry, as well as in industries that provide products or services to builders and buyers. Additional employment is created local support businesses restaurants, services, for real estate agents, lawyers, and brokers providing new home services. The National Association of Homebuilders estimates that 1.16 full-time equivalent jobs result from building each multifamily unit having a market value of $116,000. The Towns at Novi Station will have an even greater economic impact based on the projected sales prices of between $500,000 - $550,000 per unit.

The proposed commercial development will provide local, walkable retail and services for the new townhome development and the many nearby existing residents, thus providing new permanent local retail, service and professional job/career opportunities. We can expect 50 to 100 new part- and full-time positions to be created, depending on what services eventually occupy the structures to be built and the hours these services are open for business. The Towns at Novi Station employment impact can be calculated as approximately 4 jobs per unit, or 284 jobs. No onsite permanent employees are anticipated for the project.

Government Revenues: The National Association of Homebuilders estimates that $33,494 in government revenues result from each multifamily unit (market value of $116,000.) Adjusting the metric for an average sales price of $525,000, we estimate there would be approximately

$151,589 in government revenues per unit. For The Towns at Novi Station, this calculates to over $10.7 Million in various government revenues. The revenue comes not only in the form of increased property taxes, but also comes from income taxes on worker wages, business taxes, sales taxes, and municipal fees for permits and services.

Property Tax:

Breaking out the property tax from the above calculation, if we assume an assessed value of $525,000/unit (SEV $212,000) and use the City of Novi 2020 homestead tax rates (37.04 mils) the annual property tax revenue generated would be approximately $7,850/unit, or $557,500 annually.

For the food market building in the Commercial development, assuming a square footage of 28,942, a taxable value of $38.16 / sf, and using the City of Novi Millage rate of 41.0707 mils, the annual tax generated from the market will be approximately $45,358.

The proposed retail stores, restaurants, and other approved B-3 uses total 39,500 square feet. Using this square footage, a taxable value of $85.88 / sf, and using the City of Novi Millage rate of 41.0707 mils, the annual tax generated from the market will be approximately $139,300.

SOCIAL IMPACT

The project is located on Ten Mile Road east of Novi Road. The site is currently vacant and undeveloped. Development of The Towns at Novi Station will have a positive social impact on the community. The Towns at Novi Station will provide residents opportunities to participate in active community life and meet their needs for shopping, services, & entertainment within a short drive to the city center. The project is proposed to provide a walkable sidewalk connection to Ridgeview of Novi to the south which provides walkable connectivity to the Novi Dog Park, the Novi Ice Arena and the Sports Club of Novi. The proposed commercial development will be provided with sidewalk connectivity to the proposed Towns at Novi Station, the existing Ridgeview of Novi and the Existing River Oaks Apartments on Novi Road. Also, the park and nature viewing hiking paths and the conservation easement add to the overall community.

End

PLANNING REVIEW
January 24, 2024

PLAN REVIEW CENTER REPORT

Planning Review

January 24, 2024

JZ23-09 NOVI-TEN PRO

Zoning Map Amendment No. 18.740

PETITIONER

Novi Ten Associates

REVIEW TYPE

2nd Revised PRO Concept Plan: Consideration of Eligibility

Rezoning Request from OS-1 Office Service and I-1 Light Industrial to Low-Density Multiple Family RM-1 and B-3 General Business with a Planned Rezoning Overlay

PROPERTY CHARACTERISTICS

Section	26	
Site Location	South of Ten Mile Road, East of Novi Road;	
Site School District	Novi Community School District	
Current Site Zoning	OST, Office Service Technology	
Proposed Site Zoning	RM-1, Low-Density Multiple Family	
Adjoining Zoning	North	I-1 Light Industrial and I-2 General Industrial
	East	I-1 Light Industrial
	West	OS-1, Office Service and B-1 Local Business
	South	RM-1, Low-Density Multiple Family with PRO
Current Site Use	Vacant	
Adjoining Uses	North	Warehouse, Machine suppliers, Contractors, Software/Computer services, Outdoor storage
	East	Vacant, Railroad ROW
	West	Pharmacy, Dental Office
	South	Ridgeview Villas multiple family residential
Site Size	34 acres proposed for rezoning: 6.97 to B-3 and 27 to RM-1	
Parcel ID's	50-22-26-101-024, 50-22-26-101-028 (portions)	
Plan Date	January 2, 2024	

PROJECT SUMMARY

The subject property is located on the south side of Ten Mile Road, east of Novi Road in Section 26 of the City of Novi. The property to be rezoned totals about 34 acres. About 27 acres is proposed to be rezoned to RM-1, Low-Density Multiple Family. The applicant is proposing to develop 71-unit multiple-family residential units in 14 townhouse-style buildings on a portion, while preserving 15.87 acres as a natural area. To the west and north of the residential area, 6.97 acres is proposed to be rezoned to B-3, General Business. The commercial area would be developed with approximately 39,500 square feet of restaurant and retail uses. Three new access points to Ten Mile Road would be constructed – one for the residential section and two for the commercial portion. The commercial piece would also utilize the existing driveway shared with the dental office. Two pickleball/tennis courts with parking spaces at the eastern side of the property would have a separate access drive from 10 Mile. The applicant is requesting to rezone with a Planned Rezoning Overlay.

PRO OPTION

The PRO option creates a "floating district" with a conceptual plan attached to the rezoning of a parcel. As part of the PRO, the underlying zoning is proposed to be changed (in this case from OS-1 and I-1 to RM-1 and B-3), and the applicant submits a detailed conceptual plan for development of the site, along with site-specific conditions relating to the proposed improvements. After Staff and consultant review, the proposed request goes through initial review by the Planning Commission and City Council to review and comment on whether the project meets the requirements of eligibility for a PRO. The applicant can then make any changes to the Concept Plan based on the feedback received, and resubmit for formal review. The Planning Commission holds a public hearing and makes a recommendation to City Council. The City Council reviews the Concept Plan, and if the plan receives tentative approval, it directs the preparation of an agreement between the City and the applicant, which also requires City Council approval. Following final approval of the PRO concept plan and PRO agreement, the applicant will submit for Preliminary and Final Site Plan approval under standard site plan review procedures. If development is not commenced within two years from the effective date of the PRO Agreement it will expire, unless otherwise agreed to by the parties.

RECOMMENDATION

Staff notes concerns about the proposed residential uses' compatibility with the heavy industrial zoning to the north, inconsistency with the recommendations of the Master Plan for Land Use Future Land Use Map, and the estimated increase in traffic. The identified benefits of rezoning are creating a walkable community for the new residential area and the existing residents to the south. The commercial portion would serve as a shopping area for nearby residents, with walkable access proposed from River Oaks West and Ridgeview of Novi, as well as employees of surrounding businesses and other destinations.

PROJECT HISTORY

Conceptual documents for the project were submitted and reviewed by City staff and consultants in a pre-application submittal in July 2021. Comments were provided on the information submitted based on compliance with the Zoning Ordinance and City Codes, but **no recommendations for approval were made at that time**. Since then, a revised Planned Rezoning Overlay ordinance was adopted by City Council.

In March 2023, the Initial PRO Concept Plan was submitted for review. Staff determined that several aspects of the B-3 component did not meet the standards of the PRO Ordinance, as there were no detailed plans, use or size restrictions, or any other conditions presented that would provide an overall benefit to the public that would outweigh the detriments. As presented at that time, the B-3 rezoning would not be eligible for the optional rezoning with Planned Rezoning Overlay.

Since then, the applicant submitted a revised concept plan in October with more details on the B-3 portion of the site, clarification of benefits and deviations, and additional area to be rezoned to RM-1 rather than remaining I-1 Light Industrial. Based on comments received from staff on that review, the applicant asked to have their full traffic study reviewed by the City's consultant, and have again submitted revisions to their concept plan.

REVIEW COMMENTS

This project was reviewed for conformance with the Zoning Ordinance with respect to Article 3 (Zoning Districts), Article 4 (Use Standards), Article 5 (Site Standards), Section 7.13 (Amendments to Ordinance) and any other applicable provisions of the Zoning Ordinance. **Please see the attached chart for additional information pertaining to ordinance requirements.** Items in **bold** below must be addressed and incorporated as part of future submittals or in the PRO Agreement:

1. Supporting Documentation: The applicant has provided the following studies as part of their application packet:
   a. **Narrative:** The statement provided indicates that the proposed rezoning allows for development of a walkable community that will connect existing residents to the south to a commercial destination, and new residents with a pathway network within the site and to nearby destinations. It is not clear whether the off-site pedestrian connections, such as direct connections to the River Oaks Apartments, as shown on Sheet P.4, are intended to be coordinated as a part of the project, and built by the applicant.

      The narrative statement also notes the conditions and deviations proposed for the project, as well as public benefits. Those are detailed later in this review. Additional suggested conditions are provided later in this review.

   b. **Community Impact Statement**: The statement provided was revised January 2, 2024. The statement anticipates the proposed uses would have a minor impact on City services, roads and utilities, and environmental features. Positive social and economic impacts are anticipated. **The applicant should update the statement prior to formal PRO Plan submittal – several of the statements still seem to reflect previous versions of the Concept Plan (such as the size of the commercial and residential areas). In addition, several of the data referenced are from 10+ years ago (School enrollment, NFPA and ICMA reports, etc.) and more recent data should be provided.**

   c. **Rezoning Traffic Impact Study:** AECOM's review of the submitted study (dated November 28, 2022) notes that the change of use will result in a significant increase in traffic on the local road network. The proposed mix of uses is estimated to add approximately 25% more trips compared to existing conditions, or over 6,500 total weekday trips. Development permitted under the current zoning would add about 2,500 daily trips, or 61% less than the proposed change. Such a large increase in daily trips would require changes to the road network to accommodate the new traffic. The applicant is encouraged to meet with the Road Commission for Oakland County as 10 Mile Road is under its jurisdiction. A Full Traffic Study has since been submitted and reviewed by the City's Traffic Consultant. The applicant indicates in the Community Impact Statement that they intend to complete the following improvements identified in the study to mitigate the traffic impacts:

      - *Widen eastbound 10 Mile Road to two through lanes, ending with a right-turn lane at the site's easternmost residential driveway.*
      - *Widen westbound 10 Mile Road to two through lanes west from the 3rd site driveway to help provide additional capacity for outbound site traffic.*
      - *Provide a continuous center turn lane to serve the 1st, 2nd, and 3rd commercial driveways.*
      - *Provide separate outbound left-turn/right-turn lanes for the site's 2nd and 3rd commercial driveways to allow right-turning traffic to exit the site when vehicles are waiting to turn left.*

   d. **Commercial Market Analysis:** The applicant has provided a Market Feasibility Analysis for Commercial Development prepared by The Chesapeake Group, Inc. dated July, 2022. The report indicates there will be a growth in the number of homes and income for Novi residents, which will increase sales by $94 million from 2021-2027. This would support an additional 229,000 square feet of retail goods and services by 2027. The report specifically points out that while most commercial establishments are appropriate for this site, vehicle-oriented purchase and service activity should be excluded based on the goal to enhance walkability of the area. *"Collectively, with the enhanced linkages to existing anchors, the food and food service composition of much of the activity on the site, and the proposed adjacent other housing development with direct pedestrian linkages to the site, the*

commercial will act as a "village center" service the neighboring residential and anchor activity."

e. **Wetland Delineation Reports:** Prepared by Niswander Environmental, dated February 2021, the report covers the area of the RM-1 residential site. Five wetland areas were identified, including 3 small areas that are proposed to be impacted. A separate report prepared by Niswander Environmental, dated June 2023, includes the Commercial area of the site. Three small wetland areas (0.1 acre total) that would be impacted, and one large wetland surrounding Chapman Creek, which is not proposed to be impacted.

f. **Sign Location Plan:** Detail of signage on sheet 3 of Civil drawings. The sign location plan is provided in the binder of materials, and notes the change of wording needed for each sign. **The sign locations and sign details meet the requirements of the Site Plan & Development Manual. The signage should be posted no later than February 1, 2024, to give proper notice prior to the public hearing before the Planning Commission on February 21, 2024.**

2. Intent of the Commercial District: It is the applicant's stated goal to create a Walkable Community, with the commercial area serving as a village center "for functional life needs and recreation." However, the intent and uses permitted in the B-3 district appear at odds with that goal. As stated in Section 3.1.12, the B-3 district "is designed to provide sites for more diversified business types which would be incompatible with the pedestrian movement in the Local Business district or the Community Business district." **Previously the applicant was asked to consider the B-2 Community Business district, which would be more consistent as it is "established to maintain a more pedestrian-friendly environment and to foster a physical development pattern that is well-planned, supportive of moderately intense commercial uses, and aesthetically appealing from both abutting thoroughfares and from within the district." The uses permitted in that district would be more suited to a village center. In response, the applicant states they would prohibit the following B-3 uses: Gas Station, Automobile Repair, Car Wash, Marijuana sales, Check Cashing, and Pawn Shop. Marijuana sales are not permitted in the City of Novi. Other uses that the applicant could consider excluding would be new and used car dealerships, hotel/motel, oil change establishments, and fast-food drive-through facilities, which could be detrimental to a walkable neighborhood.**

3. Drive-Through and Fast Food Restaurants: In the B-3 District, restaurants in the character of a fast food carryout, drive-in, fast food drive-through, or fast food sit-down are only permitted as a Special Land Use, and must meet certain requirements. As shown in the PRO Plan, a drive-through appears to be shown on the east side of building D (Restaurant use). The Ordinance states in Section 4.40 that such uses shall not be permitted less than 60 feet from any residential zoning district, and all drive-through lanes shall be located at least 150 feet from any residential zoning district. Building D is shown as restaurant use, and it appears that the proposed location of the proposed drive-through lane would now meet the requirements (drive through exceeds 156 feet from RM-1 zoning). Commercial buildings A and B also indicate potential restaurant uses, but they are located more than 80 feet from the residential zoning district and no drive-through lanes appear to be proposed. **A condition of development could be to limit the number of drive-through lanes on the site to one, and/or provide a greater minimum distance from the residential district.**

4. Land Division: The applicant proposes to rezone a portion of two larger parcels. It appears that the applicant intends to create three new parcels. **The proposed parcels may require a deviation from City Council to approve the land split. This will need to be clarified if the project moves forward.**

5. Density: In the RM-1 district, low-rise multiple family residential units are permitted, with the maximum density allowed based on the size of the proposed dwelling units. The applicant indicates all 71 proposed units will be three-bedroom units. The maximum density for 3-bedroom units is 5.4 dwelling units per acre (du/ac). This is also confirmed by the room count described in Section 3.8, which states the maximum number of rooms permitted is the land area in square feet divided by 2000. The applicant's room count is 284. **For 284 rooms, the parcel size should be a minimum of 13.04 acres.**

   The size of the RM-1 area is 27.07 acres for the townhome parcel. To calculate density, the net site area of a site should exclude any wetlands greater than 2 acres, and right of way. Sheet 6 (revised) shows the total area of Wetland D is 10.729 acres. The net site area of the RM-1 development parcel as calculated by the applicant is 15.74 acres (excludes all 11.33 acres of wetlands on the site). As a result the density proposed is 4.5 dwelling units per acre (71 units/15.74 acres), which is within the ordinance standard.

6. Adjacent Industrial Uses: On the eastern side of the subject site, the proposed RM-1 residential uses will be directly opposite I-2 General Industrial zoning to the north. The I-2 district permits the most intensive industrial uses in the City, and "is designed primarily for manufacturing, assembling and fabrication activities including large scale or specialized industrial operations, whose physical effects will be felt to some degree by surrounding districts." Because of those likely physical effects, including vibration, noise, and odors, and heavy truck traffic, I-2 zoning has historically not been permitted adjacent to residential uses. Currently the uses on the north side of 10 Mile in the I-2 district include building and landscape contractors, a metal machinery supplier, outdoor storage yards of building supplies and heavy machinery, and an office building. Other uses permitted in the I-2 district could replace those uses in the future, including auto engine and body repair shops, freight/trucking facilities, concrete operations, junkyards, and other production and manufacturing uses. Here and elsewhere in the city, I-2 areas are often separated from residential uses by railroad tracks, or by transitional and less intense zoning districts. Rezoning the property on the south side of Ten Mile to residential might further limit the industrial uses that are currently permitted on the north side of Ten Mile Road and/or require additional landscaping requirements if the industrial uses redevelop per Section 4.57 of the Zoning Ordinance. **The applicant should address how potential negative impacts of the existing and future adjacent industrial uses will be mitigated.**

7. Usable Open Space: The applicant shows the usable open space for the residential portion of the project is a 50-foot wide area along the southern edge of the property, and indicates an 8-foot concrete pathway in a public easement within it. Also included is the 0.4 acre park on the west side (between the residential and retail uses), and the pickleball courts on the northeast side of the site. A gazebo and picnic tables are indicated in the park area. **The applicant could consider providing a playground amenity in the park for children. The total usable open space proposed is 107,423 square feet, or 2.47 acres, which exceeds the amount required by the ordinance by 6.5 times.**

8. Wetland Impact: Wetland delineation was originally only completed for the RM-1 portion of the site. A wetland delineation report dated June 2023 evaluated the B-3 commercial area, and appears to show 3 more small wetland areas. The Wetland impacts are now quantified on Sheet 6, including buffer disturbance. The plans show a total wetland impact area of 0.101 acre, which is below the City's threshold to require mitigation.

9. Non-Motorized Access: The plan proposes the required 8-foot sidewalk along the frontage of 10 Mile Road, and 5-foot sidewalks on both sides of the private drive. Additional 8-foot wide concrete pathways are proposed along the south side of the project, connecting to the commercial portion on the west side, the existing stub path at Ridgeview of Novi to the south, and continuing along the southern edge of the property and back up to 10 Mile Road

(approximately 1,900-2,000 linear feet total). The path largely follows the floodplain line. In some areas it appears there are steep grades – the applicant's engineer should verify whether the pathway will be ADA accessible or will encounter any issues with constructability due to grading, flooding, woodland tree impacts, etc. **If the general public would be permitted to use the trails, an easement would need to be provided to permit such use – a 12-foot wide public easement is indicated on the plans. This would be included as a condition within the PRO Agreement. In the applicant's exhibit of the Walkable Community (P.4), there are two mid-block crossings of Ten Mile Road shown, as well as two pathway access points to River Oaks West which do not currently exist. The applicant should clarify if these items are being proposed for construction.**

10. Plan Review Chart: **The attached chart provides additional comments on many of the Ordinance review standards. Please refer to it in detail.**

11. Other Reviews:
    a. **Engineering:** Engineering previously indicated no objection to the PRO Concept Plan, with additional comments to be addressed in the Site Plan process. Negative impacts to public utilities are not expected with the requested change to residential and commercial use. **Please note that the City is in the process of adopting the Oakland County stormwater management standards. This project is expected to follow those new standards.**
    b. **Landscape:** Landscape review notes concerns with insufficient screening between proposed residential and adjacent commercial and industrial uses, lack of greenbelt berm along 10 Mile Road, and deficiencies in foundation landscaping for the commercial buildings. **Landscape does not recommend approval at this time.**
    c. **Traffic:** Traffic review notes that the applicant would need a deviation for the parking areas on the major drive for the RM-1 area. The traffic study shows that the proposed rezoning would result in substantially more vehicle trips compared to possible development under current zoning. **Therefore, the rezoning would be likely to cause negative impacts to the traffic network without improvements. The full traffic study was reviewed in December. That review letter is included in this packet.**
    d. **Woodlands:** The residential tree removal plan proposes a total of 375 tree removals requiring 697 Woodland Replacement Credits. The plans show 181 credits to be planted on site, and 516 credits paid into the Tree Fund. For the commercial portion: 180 replacements are required. 41 are proposed to be planted on site and a deposit to the tree fund will be made for the remaining credits**.**
    e. **Wetlands:** The previous Wetland review noted that wetland impacts are not consistent with the wetland report for the RM-1 portion of the property. **The wetlands in the B-3 area are now shown, with impacts provided in the table on Sheet 6.**
    f. **Façade:** Façade notes that the residential elevations provided are not compliant with ordinance standards in some areas where the brick component is under the minimum by a small amount. A Section 9 waiver would be supported. The Commercial building elevations are in full compliance with the Façade Ordinance.
    g. **Fire**: Fire recommends conditional approval if comments are addressed in site plan submittals.

LAND USE AND ZONING: FOR SUBJECT PROPERTY AND ADJACENT PROPERTIES

Figure 1: Current Zoning

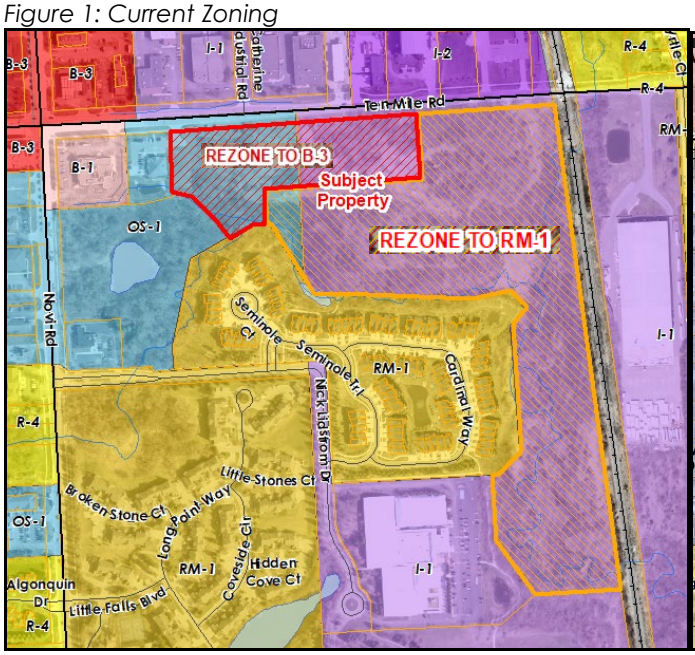
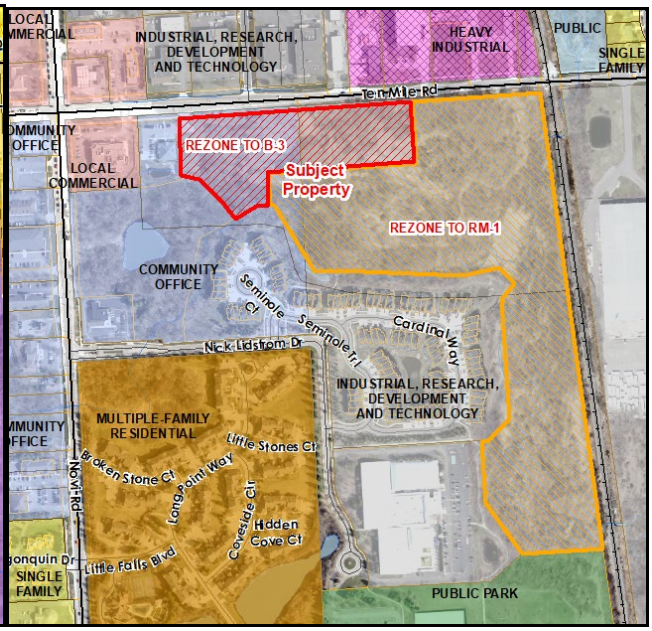


Figure 2: Future Land Use



The following table summarizes the zoning and land use status for the subject property and surrounding properties.

	Existing Zoning	Existing Land Use	Master Plan Land Use Designation
Subject Property	OS-1 Office Service I-1 Light Industrial	Vacant	Industrial Research Service and Technology; Heavy Industrial (Uses consistent with I-1 and I-2, respectively)
Northern Parcels	I-1 Light Industrial I-2 General Industrial	Warehouse, Contractors, Outside Storage, Office	
Eastern Parcels	I-1 Light Industrial	Vacant	Industrial Research Service and Technology
Western Parcels	OS-1: Office Service	Dental Office; Vacant	Community Office
Southern Parcels	RM-1 with PRO	Multifamily residential	Community Office Industrial Research Service and Technology

Compatibility with Surrounding Land Use

The subject property is located along the south side of Ten Mile Road and east of Novi Road. The north side of Ten Mile Road is developed with office, warehouse, outdoor storage and other industrial uses. The area to the south is developed as a multiple-family townhouse development, Ridgeview of Novi, which was approved as a Planned Rezoning Overlay in 2015. To the west is a dental office, and the remaining vacant portion of land owned by the applicant, which fronts on Novi Road. On the east side of the project is the remaining land owned by the applicant, which abuts the railroad tracks and contains a large area of wetland and floodplain associated with the Middle Rouge River. This area is now proposed for rezoning to RM-1, although it appears unlikely that it could ever be developed due to the floodplain.



Figure 3: Names of surrounding developments and businesses

The most noticeable impact of the proposed development on adjacent properties and 10 Mile Road users would be the increase in traffic, as shown in the applicant's traffic study. See additional comments regarding the Rezoning Traffic Study on page 3 and in AECOM's review letter attached. Some potential conflicts with the adjacent users could be the noise and disruption of existing truck traffic to the industrial areas to the north, including loading and unloading functions, on the proposed residents.

The residential use to the south may benefit from having a similar residential use development to the north rather than an industrial development, as well as convenient access to commercial goods and services.

The applicant's narrative notes the commercial area will be developed with "*new end users such as neighborhood sidewalk café, small market, etc.*" In the current submittal additional details of the site are provided, and the applicant has proposed a condition to prohibit certain uses from occupying the site.



Figure 4: FEMA Floodplain areas

Comparison of Zoning Districts

The following tables provide comparisons of the current and proposed zoning classifications. The proposed B-3 district is compared to OS-1 (although there is some area proposed for B-3 that is currently I-1) and the proposed RM-1 area is compared to the current I-1 zoning. It is not a direct comparison, given that the character of the districts are clearly distinct from each other. It represents a change of use from Office to Commercial/Retail, and Industrial to Residential. The requirements for building and parking setbacks, height, buffering and lot coverage are similar for the OS-1 and B-3 districts.

	OS-1 (EXISTING)	B-3 (PROPOSED)
Intent	The OS-1, Office Service District is designed to accommodate uses such as offices, banks, facilities for human care and personal services which can serve as transitional areas between residential and commercial districts and to provide a transition between major thoroughfares and residential districts.	The B-3, General Business district is designed to provide sites for more diversified business types which would often be incompatible with pedestrian movement in the Local Business or the Community Business district.
Principal Permitted Uses	Professional and medical office; Facilities for human care; Financial institutions with accessory drive-in facilities; Personal service establishments; Parking lots; Places of worship;	Retail business and business service uses; Dry cleaning; Business establishments performing services on premises, professional services; Professional and medical offices;

	OS-1 (EXISTING)	B-3 (PROPOSED)
	Publicly owned and operated parks, parkways and outdoor recreational facilities; Public or private health and fitness facilities and clubs	Fueling stations; Auto wash; Bus station; New & used car salesroom/showroom; Tattoo parlors; Public & private health and fitness; Microbrews and brewpubs; Day care and adult day care centers; **See Section 3.1.12.B for full list
Special Land Uses	Mortuary establishments; Publicly owned buildings, telephone exchange, and public utility offices; Day care and adult day care centers; Public or private indoor and private outdoor recreation	Outdoor space for sale of new & used vehicles; Motel; Veterinary hospitals or clinics; Plant material nursery; Public or private indoor/private outdoor recreation; Mini-lube or oil change establishment; Sale of produce and seasonal plant materials outdoors; Fast food carryout, drive-in, drive-through or sit down; **See Section 3.1.12.C for complete list
Lot Size	Except where otherwise provided in this Ordinance, the minimum lot area and width, and the maximum percent of lot coverage shall be determined on the basis of off-street parking, loading, greenbelt screening, yard setback or usable open space requirements as set forth in this Ordinance.	
Lot Coverage		
Building Height	30 feet	30 feet
Building Setbacks	Front: 20 feet Rear: 20 feet Side: 15 feet Exterior side yard setbacks same as front yard	Front: 30 feet Rear: 20 feet Side: 15 feet Exterior side yard setbacks same as front yard
Parking Setbacks See 3.6.2. for additional conditions	Front: 20 feet Rear: 10 feet Side: 10 feet Exterior side yard setbacks same as front	Front: 20 feet Rear: 10 feet Side: 10 feet Exterior side yard setbacks same as front

	I-1 (EXISTING)	RM-1 (PROPOSED)
Intent	The I-1 district is designed so as to primarily accommodate research, office, and light industrial uses, including wholesale activities, warehouses, and industrial operations whose external, physical effects are restricted to the area of the district and in no manner negatively affect any of the surrounding districts.	The RM-1 district is designed to provide sites for multiple-family structures, and related uses, which will generally serve as zones of transition between the non-residential districts, major thoroughfares and freeways and single family districts.
Principal Permitted Uses	Professional office, office sales and service, medical offices; Publicly owned and operated parks, parkways and outdoor recreational facilities;	Multiple-family dwellings; Independent and congregate elderly living facilities; Two-family dwellings; Shared elderly housing;

	I-1 (EXISTING)	RM-1 (PROPOSED)
	Public or private health and fitness facilities and clubs; Research & Development, technical training and design of pilot/experimental products; Data processing & computer centers; Warehousing & wholesale establishments; Manufacturing; Industrial office sales, service and industrial office related uses; Trade or industrial schools; Laboratories experimental, film or testing; Greenhouses; Public utility, telephone exchange, electrical transformer stations and substations, etc. Public or private indoor, private outdoor recreation facilities; Pet boarding facilities; Veterinary hospitals and clinics; Motion picture, television, ratio and photographic production facilities; **See attached copy of Section 3.1.18.B for full list	One-family dwellings; Farms & greenhouses; Public parks, parkways, and outdoor recreation; Cemeteries; Home occupations; Family day care homes
Special Land Uses	See attached copy of Section 3.1.18.C, which would not be permitted on the subject property as it is adjacent to residential	Convalescent homes, assisted living facilities, hospice care facilities and child care centers
Lot Size	Except where otherwise provided in this Ordinance, the minimum lot area and width, and the maximum percent of lot coverage shall be determined on the basis of off-street parking, loading, greenbelt screening, yard setback or usable open space requirements as set forth in this Ordinance.	See Section 3.8.1
Lot Coverage		25%
Building Height	40 feet	35 ft or 2 stories, whichever is less
Building Setbacks	Front: 40 feet Side: 20 feet Rear: 20 feet **Setback increased to 100-feet where adjacent to residential district	Front: 75 feet Rear: 75 feet Side: 75 feet Exterior side yard setbacks same as front
Parking Setbacks See 3.6.2. for additional conditions	Front: 20 feet Rear: 10 feet Side: 10 feet Exterior side yard setbacks same as front **Setback increased to 100-feet where adjacent to residential district	Front: 75 feet Rear: 20 feet Side: 20 feet Exterior side yard setbacks same as front
Usable Open Space	Not applicable	200 square feet per unit

DEVELOPMENT POTENTIAL

The land is currently vacant. Development under the current OS-1 and I-1 zoning could result in a substantial amount of Office, Warehouse, or Research & Development buildings being constructed. On sheet P.2 of the Concept Plan provided, the applicant shows a 54,000 square foot office building on the OS-1 portion, and 291,200 square foot industrial building. However, this plan does

not show stormwater detention, and it is unclear whether the parking and landscaping requirements would be met by the layout proposed.

In 2009, the applicant submitted a PRO Concept Plan proposing to rezone portions of the property to B-2 and the rest to OS-1. Within the B-2 commercial portion a 64,245 square foot Kroger grocery store was proposed, with an additional 26,000 square feet of additional B-2 uses. A neighborhood shopping center with 40,978 square feet, and 18,000 square foot medical office building were also proposed.

The current concept plan proposes a development of 71 units (density of 4.5 dwellings per acre) for a low-density multifamily development which is less than the 5.4 maximum density allowed for three-bedroom units in the RM-1 zoning district on 15.75 acres (343 total number of rooms allowed, 284 rooms proposed). The Master Plan for Land Use does not anticipate residential uses of this property, so no density guidelines are provided on the future land use plan.

In this review letter, staff identifies concerns with compatibility of uses to the north, increase in traffic, and deficiencies in landscaping requirements. **Based on the feedback provided, and any additional comments from the Planning Commission and City Council during their initial consideration, the applicant should consider addressing those comments and revise the plans accordingly before the formal PRO Concept submittal.**

2016 MASTER PLAN FOR LAND USE: GOALS AND OBJECTIVES

The proposed use is currently not recommended by the 2016 Master Plan for Land Use. The following objectives as listed in the Master Plan are applicable for the proposed development. **The applicant should consider revisions to the plan to comply with as many goals as possible. Please refer to staff comments in bold and revisions recommended in bold and underline.**

1. **General Goal: Quality and Variety of Housing**
    a. Provide residential developments that support healthy lifestyles. Ensure the provision of neighborhood open space within residential developments. **The development proposes the required sidewalks along the public and private streets, as well as a walking path behind the units that connect to the development to the south. Two pickleball/tennis courts are proposed on the east side of the site, as well as two scenic overlook points to the east of Novi Athletic Club. The residential units would be within walking distance of several civic amenities as well as retail areas.**
    b. Safe housing and neighborhoods. Enhance the City of Novi's identity as an attractive community in which to live by maintaining structurally safe and attractive housing choices and safe neighborhoods.
    c. Maintain existing housing stock and related infrastructure.
    d. Provide a wide range of housing options. Attract new residents to the City by providing a full range of quality housing opportunities that meet the housing needs of all demographic groups including but not limited to singles, couples, first time home buyers, families and the elderly. **The for-sale units proposed would provide a low-maintenance housing option for buyers interested in a walkable context.**

2. **General Goal: Community Identity**
    a. Maintain quality architecture and design throughout the City. **The proposed elevations are mostly compliant with Façade Ordinance standards but would require a Section 9 waiver, which is supported. Please refer to the façade review letter.**

3. **General Goal: Environmental Stewardship**

a. Protect and maintain the City's woodlands, wetlands, water features, and open space. **The concept plan proposes removal of regulated woodland trees and impacts to several small wetland areas (approximately 0.1 acre). The narrative indicates a 15.87-acre area will be preserved within a wetland/woodland conservation easement.**
b. Increase recreational opportunities in the City. **The Concept plan proposes recreational opportunities for future residents and the general public, primarily in the form of a concrete pedestrian path behind the townhome buildings. The path is shown in a public easement, so would be available to other users besides the residents. Details for the park area should also be provided. The narrative also indicates two nature overlook areas with benches would be provided in the area east of the Novi Athletic Club, as well as 2 pickleball/tennis courts in the northeast corner of the property that would be available to the public.**
c. Encourage energy-efficient and environmentally sustainable development through raising awareness and standards that support best practices. **The applicant should consider sustainable, energy-efficient and best-practice design for site elements and building materials, such as LEED recommended strategies.**

4. General Goal: Infrastructure
a. Provide and maintain adequate water and sewer service for the City's needs. **Please refer to the Engineering memo. No significant concerns are noted.**
b. Provide and maintain adequate transportation facilities for the City's needs. Address vehicular and non-motorized transportation facilities. **The traffic study indicates that the surrounding road network may not accommodate the resulting increase in traffic without improvements.**

5. General Goal: Economic Development / Community Identity
a. Ensure compatibility between residential and non-residential developments. **Please refer to comments about compatibility with surrounding development earlier in this review.**

MAJOR CONDITIONS OF PLANNED REZONING OVERLAY AGREEMENT

The Planned Rezoning Overlay process involves a PRO concept plan and specific PRO conditions in conjunction with a rezoning request. The submittal requirements and the process are codified under the PRO ordinance (Section 7.13.2). Within the process, which is initiated by the applicant, the applicant and City Council can agree on a series of conditions to be included as part of the approval which must be reflected in the Concept Plan and or the PRO agreement.

The PRO conditions must be in material respects, more strict or limiting than the regulations that would apply to the land under the proposed new zoning district. *Development and use of the property shall be subject to the more restrictive requirements shown or specified on the PRO Plan, and/or in the PRO Conditions imposed, and/or in other conditions and provisions set forth in the PRO Agreement.*

The applicant has listed the following benefits/conditions for development:

1. *"The complete east portion adjacent to the railroad tracks and the south 50-foot-wide strip along the wetland of the proposed PRO (15.87 acres of the 27.07 RM-1 rezoning) are being retained as a natural area with a conservation easement to preserve its existing marshland and wildlife. This natural area, with wetlands, wraps around the PRO and includes on the west end a proposed new 0.4 acre park/playground located between the proposed residential and retail sites. The proposed trail system, with its overlooks near the Novi Athletic Club becomes a usable and accessible community resource."*

2. *"To help achieve walkability and connectivity of the entire area, a trail system is being added which consists of new paths and existing sidewalks. This walkway system provides connectivity between surrounding existing residential areas and new proposed PRO residential area with all the marshland nature areas, the proposed tennis courts/pickleball courts, the Novi Athletic Club, Ice Arena, and Dog Park, and with the new proposed local (retail) along Ten Mile Road. The retail consists of the new proposed retail and restaurant areas, and the existing Walgreen's and dental office. New Walkways and bike paths that overlook 15.87 acre wildlife area and connect this PRO development to the recreation areas: The $3.2 million dollars worth of Novi 10 land previously donated to the city, initiated by Novi request (18 acres of land): For the Novi Arena Facility and the Novi Dog Park."*
3. *"Two new tennis courts/pickleball courts are being added at the north end of the new conservation area along 10 Mile Road, as well as parking spaces for the courts."*
4. *Proposed use restrictions not permitting certain automotive and other business uses in the proposed B-3 commercial zoning (Sec. 3.1.12.B & C) are to be part of the PRO. Not permitted uses are:*
    a. *Vehicle Oriented Uses: gas/fueling station, auto repair, and car wash,*
    b. *Other excluded uses: Check cashing, Pawn shop (Marijuana sales already not permitted in the City of Novi will also be excluded by the PRO documents in case the city's law is changed to allow it in the future.)*
5. *Open Space (Section 3.1.7.D) the amount of open space provided for the RM-1 townhouses exceeds ordinance requirements.*
6. *Commercial Building Setbacks:*
    a. *Front: 30 feet required….92 feet provided*
    b. *Rear: 20 feet required….83 feet provided*
    c. *Side: 15 feet required…..93 feet provided*
7. *Residential Building height* (Sec. 3.1.7.D)**:** *29* feet maximum proposed is more limiting than the 35 feet permitted.
8. *Commercial Building Height* (Sec. 3.1.12.D)*:* Twenty-three feet maximum proposed is more limiting than the 30 feet permitted.
9. *Residential Lot Coverage* (Sec. 3.1.7.D)**:** *25% maximum is permitted, 14% is proposed*

Additional conditions to be included in the PRO Agreement, if it should be approved, will likely be added during the review process. For reference suggested conditions as stated in Section 7.13.2 of the Zoning Ordinance are as follows:

1. Establishment of development features such as the location, size, height, area, or mass of buildings, structures, or other improvements in a manner that cannot be required under the Ordinance or the City's Code of Ordinances, to be shown in the PRO Plan.
2. Specification of the maximum density or intensity of development and/or use, as shown on the PRO Plan and expressed in terms fashioned for the particular development and/or use (for example, and in no respect by way of limitation, units per acre, maximum usable floor area, hours of operation, and the like).
3. Provision for setbacks, landscaping, and other buffers in a manner that exceeds what the Ordinance of the Code of Ordinances can require.
4. Exceptional site and building design, architecture, and other features beyond the minimum requirements of the Ordinance or the Code of Ordinances.
5. Preservation of natural resources and/or features, such as woodlands and wetlands, in a manner that cannot be accomplished through the Ordinance or the Code of Ordinances and that exceeds what is otherwise required. If such areas are to be affected by the proposed development, provisions designed to minimize or mitigate such impact.
6. Limitations on the land uses otherwise allowed under the proposed zoning district, including, but not limited to, specification of uses that are permitted and those that are not permitted.
7. Provision of a public improvement or improvements that would not otherwise be required under the ordinance or Code of Ordinances to further the public health, safety, and welfare, protect existing or planned uses, or alleviate or lessen an existing or potential

problem related to public facilities. These can include, but are not limited to, road and infrastructure improvements; relocation of overhead utilities; or other public facilities or improvements.

8. Improvements or other measures to improve traffic congestion or vehicular movement with regard to existing conditions or conditions anticipated to result from the development.
9. Improvements to site drainage (storm water) or drainage in the area of the development not otherwise required by the Code of Ordinances.
10. Limitations on signage.
11. Creation or preservation of public or private parkland or open space.
12. Other representation, limitations, improvements, or provisions that may be approved by City Council.

ORDINANCE DEVIATIONS

Section 7.13.2.D.i.c(2) permits deviations from the strict interpretation of the Zoning Ordinance within a PRO agreement. These deviations must be accompanied by a finding by City Council that "***each Zoning Ordinance provision sought to be deviated would, if the deviation were not granted, prohibit an enhancement of the development that would be in the public interest, and that approving the deviation would be consistent with the Master Plan and compatible with the surrounding areas.***" Such deviations must be considered by City Council, who will make a finding of whether to include those deviations in a proposed PRO agreement. A PRO agreement would be considered by City Council only after tentative approval of the proposed concept plan and rezoning.

Staff has reviewed the applicant's Concept Plan in as much detail as possible to determine what deviations from the Zoning Ordinance are currently shown. The applicant may choose to revise the concept plan to better comply with the standards of the Zoning Ordinance, or may proceed with the plan as submitted with the understanding that those deviations would have to be approved by City Council in a proposed PRO agreement. **The applicant provided a request for certain deviations related to the area to be rezoned to RM-1. No detailed plans are provided for the portion to be rezoned to B-3, and no deviations, conditions or proposed benefits that would outweigh any detriments. The applicant should refer to all review letters and identify what deviations they would seek and what they would revise the plan to conform**.

The following are Ordinance deviations that have been requested by the applicant *shown in italics*. **Staff comments are in bold.**

1. Building Orientation *(Sec. 3.8.2.D): deviation is requested for proposed residential building to not be configured 45 degrees to the property lines normally for aesthetic reasons. Most of the buildings are not on any main road and they front to a substantial irregular shaped 20-acre wetland nature area of a minimum 200 feet wide separation across from Toll's existing multifamily Ridgeview project. Also, please note, this is one of the most common easily granted variance requests: where layouts are dictated by natural land features such as two rivers and large canyon, not created by the applicant.* **This deviation has been commonly requested and granted in both PRO development projects and in by-right multiple family site plan projects.**

2. Side and Rear Setbacks *(Sec 3.1.7.D and Sec 3.6.2.B): A Zoning Ordinance deviation is requested to reduce the side setback from 75 feet to 25 feet along the north property line for two residential buildings abutting the proposed commercial area (B-3). This has been granted elsewhere in the city and still includes screening between the residential and commercial. That screening is located on the residential edge of the zoning line that separates the residential from the commercial and functions with the same screening effect. (Only a small portion, at northwest corner being wall plus landscape, instead of berm.) Deviates from Section 5.5.3.A.ii but provides same screening, as it is located between the uses.*

3. Parking along Major Drives *(Sec. 5.10): A Zoning Ordinance deviation is requested to allow for perpendicular parking on a major drive*. **Angled and perpendicular parking is permitted on a minor drive, but not on a major drive; a total of 8 spaces of on-street perpendicular parking for guests is proposed the Major Drive in two locations.**

4. Major Drive Radius *(Sec. 5.10):* Deviation from the ordinance requirement for a minimum centerline radius of 100 feet, to allow the 85-foot radius shown at the western curve.

5. Landscape Berms (Section 5.5.3.A.ii): *A Zoning Ordinance deviation is requested to not provide a 10 to 15-foot-high landscape berm on a proposed RM-1 district adjacent to an I-1 district. This deviation is requested to wave this requirement to preserve open viewing to the beautiful natural features instead of the usual berm screening that blocks the views from industrial*. **The berm would be unnecessary in this case as the adjacent I-1 area is east of the railroad tracks and would likely result in greater wetland and woodland impacts.**

6. Right-of-Way Landscaping (Section 5.5.3.B.ii): *A deviation for the lack the required street trees and berm along 10 Mile Road due to underground utilities.* **The required trees are to be provided elsewhere. This deviation is supported due to the utility conflicts.**

7. Adjacent to Public Rights-of-Way – Berm/Wall (Zoning Sec. 5.5.3.B.ii, iii)*:* The required 3-foot-tall berm is not proposed. **This deviation is not supported.**

8. Building Foundation Landscaping *(*Zoning Sec 5.5.3.D): None of the commercial buildings meet the requirements for building foundation landscaping. **This deviation is not supported.**

9. Distance between Buildings *(Sec 3.8.2.H): A Zoning Ordinance deviation is requested to reduce the building separation distance from the calculated formula (resulting in 31-32.72 feet required) to a distance of 30 feet between all buildings.* **This deviation of less than 3 feet is considered minor and enables the layout of this project to fit within the available space while minimizing wetland and woodland impacts.**

10. Section 9 Waiver (Section 5.15): Proposed elevations for residential buildings have an underage of minimum required brick on all rear and some front facades (26-27% proposed, 30% minimum required) and an overage of Asphalt shingles (56% front side, 50% maximum allowed). **As the deviations are minor and do not adversely affect the aesthetic quality of the facades, the waiver is supported.**

See other review letters for additional possible deviations to be addressed in future submittals. All deviations from the ordinance requirements shall be identified and included in PRO Agreement. Any additional deviations identified during Site Plan Review (after the Concept Plan and PRO Agreement is approved), will require amendment of the PRO Agreement.

APPLICANT'S BURDEN UNDER PRO ORDINANCE

The Planned Rezoning Overlay ordinance (PRO) requires the applicant to demonstrate that certain requirements and standards are met. The applicant should be prepared to discuss these items, especially in number 1 below, where the ordinance suggests that the enhancement under the PRO request would be unlikely to be achieved or would not be assured without utilizing the Planned Rezoning Overlay. Section 7.13.2.D.ii states the following:

1. *(Sec. 7.13.2.D.ii.a) The PRO accomplishes the integration of the proposed land development project with the characteristics of the project area in such a manner that results in an enhancement of the project area as compared to the existing zoning that*

would be unlikely to be achieved or would not be assured in the absence of the use of a Planned Rezoning Overlay.

2. *(Sec. 7.13.2.D.ii.b) Sufficient conditions shall be included on and in the PRO Plan and PRO Agreement such that the City Council concludes, in its discretion, that, as compared to the existing zoning and considering the site specific land use proposed by the applicant, it would be in the public interest to grant the Rezoning with Planned Rezoning Overlay. In determining whether approval of a proposed application would be in the public interest, the benefits which would reasonably be expected to accrue from the proposal shall be balanced against, and be found to clearly outweigh the reasonably foreseeable detriments thereof, taking into consideration reasonably accepted planning, engineering, environmental and other principles, as presented to the City Council, following recommendation by the Planning Commission, and also taking into consideration the special knowledge and understanding of the City by the City Council and Planning Commission.*

IDENTIFYING BENEFITS TO PUBLIC RESULTING FROM THE REZONING AND THE PROPOSED DEVIATIONS

Section 7.13.2.D.ii states that the City Council must determine that the proposed PRO rezoning would be in the public interest and that the benefits to the public of the proposed PRO rezoning would clearly outweigh the detriments. The following benefits suggested by the applicant (*as listed in their narrative*) appear to qualify as public benefits as resulting from the development proposal:

1. *"The complete east portion adjacent to the railroad tracks and the south 50-foot-wide strip along the wetland of the proposed PRO (15.87 acres of the 27.07 RM-1 rezoning) are being retained as a natural area with a conservation easement to preserve its existing marshland and wildlife. This natural area, with wetlands, wraps around the PRO and includes on the west end a proposed new 0.4 acre park/playground located between the proposed residential and retail sites. The proposed trail system, with its overlooks near the Novi Athletic Club becomes a usable and accessible community resource."* **It would be beneficial to the City to have these wetland and woodland areas permanently protected within conservation easements. This area is covered by floodplain associated with the Walled Lake Branch of the Middle Rouge River, and Chapman Creek, so protecting the land around the rivers would benefit the watershed and wildlife habitat. It is unlikely that this area would ever be proposed for development because of the floodplain.**

2. *"To help achieve walkability and connectivity of the entire area, a trail system is being added which consists of new paths and existing sidewalks. This walkway system provides connectivity between surrounding existing residential areas and new proposed PRO residential area with all the marshland nature areas, the proposed tennis courts/pickleball courts, the Novi Athletic Club, Ice Arena, and Dog Park, and with the new proposed local (retail) along Ten Mile Road. The retail consists of the new proposed retail and restaurant areas, and the existing Walgreen's and dental office. New Walkways and bike paths that overlook 15.87 acre wildlife area and connect this PRO development to the recreation areas: The $3.2 million dollars worth of Novi 10 land previously donated to the city, initiated by Novi request (18 acres of land): For the Novi Arena Facility and the Novi Dog Park."* **The applicant is asked to clarify the intent of this improvement, and whether the applicant will be arranging and conducting off-site improvements.**

3. *"Two new tennis courts/pickleball courts are being added at the north end of the new conservation area along 10 Mile Road, as well as parking spaces for the courts."* **A new curb cut would be required to access the parking area, which may require a driveway spacing deviation. The plan indicates the new courts would be available for public use. The applicant would need to clarify if they intend to be responsible for on-going maintenance of**

the improvements proposed. Additional study of the area proposed for the courts will be needed.

4. The applicant's narrative includes an appeal to consider as a public benefit his previous land donation of 18 acres (valued at $3.2 million) which the city used to construct the Novi Ice Arena and the Dog Park behind it. This donation was acknowledged in a letter of Commendation from former Mayor Richard Clark on January 28, 2000.

This is a PRO in which the applicant seeks both a rezoning and a list of ordinance deviations. In Staff's opinion the proposed benefits to the City could be further clarified, and we have offered some suggestions for the applicant to consider in this and the other review letters.

The Planning Commission and City Council should offer their thoughts on whether the proposed benefits would qualify, and whether they have other ideas for improvements to the proposal.

NEXT STEP: PLANNING COMMISSION CONSIDERATION OF ELIGIBILITY

The Planning Commission will have an opportunity to discuss the initial submittal and eligibility of the rezoning request from OS-1 (Office Service) and I-1 (Light Industrial) to B-3 (General Business) and RM-1 (Multiple Family Low Rise Residential) with a Planned Rezoning Overlay.

As stated in the newly amended PRO Ordinance,

> *In order to be eligible for the proposal and review of a rezoning with PRO, an applicant must propose a rezoning of property to a new zoning district classification, and must, as part of such proposal, propose clearly-identified site-specific conditions relating to the proposed improvements that,*
>
> *(1) are in material respects, more strict or limiting than the regulations that would apply to the land under the proposed new zoning district, including such regulations or conditions as set forth in Subsection C below; and*
>
> *(2) constitute an overall benefit to the public that outweighs any material detriments or that could not otherwise be accomplished without the proposed rezoning.*

(Click here for Full text of the PRO ordinance, including Subsection C)

This item is scheduled for initial review and comment on the PRO Plan on Wednesday, February 21, 2024. **Please ensure that the rezoning signage, as shown on Sheet 6 in the Rezoning Sign Detail, modified as appropriate for the locations in the zoning sign plan, are posted in the appropriate location no later than February 1, 2024, to give proper notice prior to the public hearing before the Planning Commission on February 21, 2024.**

CITY COUNCIL CONSIDERATION OF ELIGIBILITY

Following the Planning Commission's initial review of the proposed project, the City Council will likewise have the opportunity to review the PRO proposal and comment on whether the project is eligible for the PRO process.

If the applicant has any questions concerning the above review or the process in general, do not hesitate to contact me at 248.347.0484 or lbell@cityofnovi.org.

Lindsay Bell

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Lindsay Bell, *AICP*, Senior Planner

PLANNING REVIEW CHART: B-3 and RM-1 with PRO Rezoning

Review Date: January 24, 2024
Review Type: 2nd Revised PRO Initial Concept
Project Name: JZ23-09 Novi-Ten Mile
East of Novi Road, South of Ten Mile
Plan Date: January 2, 2024
Prepared by: Lindsay Bell, Senior Planner
E-mail: lbell@cityofnovi.org; **Phone:** (248) 347-0484

*Items in **Bold** need to be addressed by the applicant with next submittal. Items in **Underlined Bold** are possible deviations identified. Underlined items need to be addressed during the Site Plan phase. Italic items are to be noted.*

Item	Required Code	Proposed	Meets Code	Comments
Zoning and Use Requirements				
Master Plan (adopted July 27, 2017)	West: Community Office; East: Industrial, R&D, Tech	6.97 acres with 35,900 sf of commercial/office; 71-unit residential development with PRO overlay on 27.07 acres;	**No**	*Proposed rezoning is not consistent with the 2016 Master Plan*
Area Study	The site does not fall under any special category	NA	NA	
Zoning (Effective January 8, 2015)	OS-1 Office Service; I-1 Light Industrial	B-3 General Business; RM-1 Low Density Low-rise Multi-Residential District	**No**	**Planned Rezoning Overlay proposed – see detailed comments in Planning Review letter**
Uses Permitted (Sec 3.1.21.B & C)	Office and Service Uses Sec. 3.1.21.B. - Principal Uses Permitted. Sec. 3.1.21.C. – Special Land Uses Permitted.	4 commercial buildings ~35,900 square feet shown for B-3 area (assumes restaurants and retail uses) Multiple Family Residential – 71 units	**TBD**	**B-3 use proposed exclusions are gas station, auto repair, car wash, marijuana sales, check cashing and pawn shop**
Phasing	Provide phases lines and detail description of activities in each phase	Applicant indicates Phasing not proposed	NA	
Planned Rezoning Overlay Document Requirements (Section 7.13.2 and SDM: Site development Manual)				
Written Statement (Section 7.13.2) The statement should include the following:	Statement of eligibility for PRO Approval: Describe the rezoning requested including uses proposed, justification for why it makes sense	Provided in narrative	**TBD**	
	How does the project constitute an overall benefit to the public that outweighs any material detriments or could otherwise be accomplished without the rezoning?	Provided in narrative	Yes	**See detailed comments in Planning Review letter**

Item	Required Code	Proposed	Meets Code	Comments
	Deviations and Conditions proposed for inclusion in the PRO Agreement (i.e., Zoning Ordinance deviations, limitation on total units, height or uses, etc)	Some deviations and conditions proposed; Limitation on uses for B-3 portion	**TBD**	**See detailed comments and suggested conditions in Planning Review**
Rezoning Traffic Impact Study Site development Manual	Required regardless of site size, with requirements in SDM	Provided	Yes	*See TIS Review from AECOM*
Community Impact Statement (Sec. 2.2)	Required according to site plan manual (SDM link: Site development Manual)	Provided	Yes	
Rezoning Signs *(Site Plan Development Manual)*	Sign location plan Mock-up of sign details	Provided in binder Provided Sheet 6	Yes Yes	
B-3 Commercial: Height, bulk, density and area limitations (Sec 3.1.12.D)				
Frontage on a Public Street. (Sec. 5.12)	Frontage on a Public Street is required	The site has frontage and access to Ten Mile Road	Yes	
Minimum Zoning Lot Size for each Unit: in Acres	Except where otherwise provided in this Ordinance, the minimum lot area and width, and the maximum percent of lot coverage shall be determined on the basis of off-street parking, loading, greenbelt screening, yard setback or usable open space	42.9 acres total site size of existing parent parcels; **6.97 acres to be rezoned to B-3, 27.07 acres to RM-1**	Yes	*Remaining acreage excluded from PRO to remain OS-1 District*
Minimum Zoning Lot Size for each Unit: Width in Feet			NA	
Maximum % of Lot Area Covered (By All Buildings)	Section 3.6.2.D			
Building Height	30 ft.	23 ft max proposed	Yes	**Building height could be a condition that is more limiting than ordinance allows**
B-3 Building Setbacks (Sec 3.1.12.D)				
Front (along 10 Mile Rd)	30 ft.	90 ft	Yes	**Building setbacks could be a condition that is**

Item	Required Code	Proposed	Meets Code	Comments
Rear (South)	20 ft.	91 ft	Yes	**more limiting than ordinance allows**
Side (East & West)	15 ft.	73 ft	Yes	
B-3 Parking Setback (Sec 3.1.12.D) Refer to applicable notes in Sec 3.6.2				
Front (along 10 Mile Rd)	20 ft.	20 ft	Yes	
Rear (West)	10 ft.	20 ft	Yes	
Side (North & South)	10 ft.	16 ft. min	Yes	
B-3: Note To District Standards (Sec 3.6.2)				
Exterior Side Yard Abutting a Street (Sec 3.6.2.C)	All exterior side yards abutting a street shall be provided with a setback equal to front yard.	No exterior side yards	NA	
Off-Street Parking in Front Yard (Sec 3.6.2.E)	Front yard parking permitted if setback requirements of district and landscaping standards of Section 5.5.3 are observed			**See Landscape review letter for comments**
Setback Abutting a Residential District (Sec 3.6.2.L)	Minimum yard setback shall be 20 feet	20 ft min proposed on east side	Yes	
Wetland/Watercourse Setback (Sec 3.6.2.M)	A setback of 25ft from wetlands and from high watermark course shall be maintained	Buffers are now shown on the plan and area of impact quantified	Yes	**Requires a natural features encroachment authorization**
Parking setback screening *(Sec 3.6.2.P)*	Required parking setback area shall be landscaped per Section 5.5.3.			**See Landscape review letter for comments**
Modification of parking setback requirements *(Sec 3.6.2.Q)*	The Planning Commission may modify parking setback requirements based on conditions listed in Sec 3.6.2.Q		NA	
B-3 District Required Conditions *(Sec. 3.10)*				
Loading Requirements *(Sec. 3.10.3.A)*	No truck well, loading dock, overhead door or other type of service bay door shall face a major thoroughfare, nor an abutting residential district. Pedestrian exits or emergency door are permitted on such building facades.	No truck wells or overhead doors indicated	Yes	
Off-Street Loading and Unloading	Required in the rear yard at a ratio of 10 sf for			

Item	Required Code	Proposed	Meets Code	Comments
(Sec. 5.4)	each front foot to building. Bldg A: 1,700 sf Bldg B: 1,700 sf Bldg C: 600 sf Bldg D: 700 sf	 Bldg A: 2,380 sf Bldg B: 2,380 sf Bldg C: 840 sf Bldg D: 980 sf	 Yes	
Number of Parking Spaces Restaurants Retail (Sec.5.2.12.A)	Restaurant (sit Down): 1 for each 70 sf GFA Retail: 1 for each 200 sf GLFA Assume: Restaurant – 10,700 @ 70 sf = 153 spaces Retail – 26,700 sf / 200 sf = 134 spaces **288 spaces total**	Plan shows total of 298 spaces provided for commercial area	Yes	
Parking Space Dimensions and Maneuvering Lanes (Sec. 5.3.2)	- 90° Parking: 9 ft. x 19 ft. - 24 ft. two way drives 9 ft. x 17 ft. parking spaces allowed along 7 ft. wide interior sidewalks as long as detail indicates a 4" curb at these locations and along landscaping	- 28 ft. two-way drives	Yes	**Refer to Traffic comments for comments on parking dimensions**
Parking stall located adjacent to a parking lot entrance (public or private) (Sec. 5.3.13)	shall not be located closer than twenty-five (25) feet from the street right-of-way (ROW) line, street easement or sidewalk, whichever is closer	Does not apply	NA	
Barrier Free Spaces Barrier Free Code	2 accessible space (including 1 Van accessible) for every 26 to 50 spaces		**TBD**	This would be reviewed in site plan submittal
Barrier Free Space Dimensions Barrier Free Code	- 8' wide with an 8' wide access aisle for van accessible spaces - 8' wide with a 5' wide access aisle for regular accessible spaces		**TBD**	This would be reviewed in site plan submittal
Barrier Free Signs Barrier Free Code	One sign for each accessible parking space.		**TBD**	This would be reviewed in site plan submittal
Corner Clearance (Sec. 5.9)	No fence, wall, plant material, sign or other		**TBD**	Note Corner Clearance zone on site plan and

Item	Required Code	Proposed	Meets Code	Comments
	obstruction shall be permitted within the clear view zone above a height of 2 feet from established street grade			landscape plans – this will be reviewed in site plan submittal
Minimum number of Bicycle Parking (Sec. 5.16.1) Retail/Restaurants/ Business Offices	5% of required auto spaces, min. 2 spaces		TBD	This would be reviewed in site plan submittal along with bike parking layout
Bicycle Parking General requirements *(Sec. 5.16)*	- No farther than 120 ft. from the entrance being served - When 4 or more spaces are required for a building with multiple entrances, the spaces shall be provided in multiple locations - Spaces to be paved and the bike rack shall be inverted "U" design - Shall be accessible via 6 ft. paved sidewalk		TBD	
Bicycle Parking Lot layout *(Sec 5.16.6)*	Parking space width: 7 ft. One tier width: 11 ft. Two tier width: 18 ft. Maneuvering lane width: 4 ft. Parking space depth: 32 in		TBD	
Residential: Height, bulk, density and area limitations (Sec 3.1.8.D)				
Frontage on a Public Street. (Sec. 5.12)	Frontage on a Public Street is required	The site has frontage and access to Ten Mile Road via private street	Yes	
Minimum Parcel Size for each Unit: in Acres (Sec 3.8.1)	RM-1 and RM-2 Required Conditions		Yes	
Minimum Zoning Lot Size for each Unit: Width in Feet (Sec 3.8.1)				
Open Space Area (Sec 3.1.8.D)	200 sf Minimum usable open space per dwelling unit For a total of 71 dwelling units, required Open Space: 14,200 SF Refer to definitions for Usable Open Space and Open Space	Sheet 6 indicates 107,423 sf of usable open space provided - Consists of 50' width surrounding walking path, park with picnic tables/gazebo, and pickleball court area	Yes	**Open space could be a condition that is more strict than ordinance requires**

Item	Required Code		Proposed	Meets Code	Comments
Maximum % of Lot Area Covered (By All Buildings)	25%		14%	Yes	**Lot Coverage could be a condition that is more strict than ordinance requires**
Building Height (Sec. 3.20)	35 ft. or 2 stories whichever is less		29 feet	Yes	**Building height could be a condition that is more strict than ordinance requires**
Minimum Floor Area per Unit (Sec. 3.1.8.D)	Efficiency	400 sq. ft.	Not proposed	NA	
	1 bedroom	500 sq. ft.	Not proposed	NA	
	2 bedroom	750 sq. ft.	Not proposed	NA	
	3 bedroom	900 sq. ft.	1,600-1,900 sq. ft.	Yes	
	4 bedroom	1,000 sq. ft.	Not Proposed	NA	
Maximum Dwelling Unit Density/Net Site Area (Sec. 3.1.8.D)	Efficiency	5%	Not proposed	Yes	**Will ROW be dedicated? Could be considered additional public benefit**
	1 bedroom	10.9 Max 20%	Not proposed		
	2 bedroom	7.3	Not proposed		
	3+ bedroom	5.4	4.5 DUA Total site: 27.07 Acres ROW Area: ?? Acres Wetland: 11.33 **Net Site Area (given by applicant): 15.74 Acres**	Yes	
Residential Building Setbacks (Sec 3.1.8.D)					
Front (along 10 Mile Rd)	75 ft.		75 ft.	Yes	*Additional setbacks required by Sec 3.6.2.B*
Rear (South)	75 ft.		75 ft.	Yes	
Side	75 ft.		75 ft. **25 ft adjacent to B-3 portion**	Yes **No**	**This would be a deviation.**
Parking Setback (Sec 3.1.8.D) (Sec 3.1.12.D) Refer to applicable notes in Sec 3.6.2					
Front (along 10 Mile Rd)	75 ft.		20 ft. on all sides. Parking is provided in the garage and in front of the garage. Proposed parking along the streets meets the setback requirements	Yes	
Rear (West)	20 ft.			Yes	
Side (North & South)	20 ft.			Yes	
Residential: Note to District Standards (Sec 3.6.2)					

Item	Required Code	Proposed	Meets Code	Comments
Building structure setback (Sec 3.6.2.B)	Other than single family or 2-family, building setback shall be minimum of whichever is greater: 1) height of main building; 2) 75 feet; or 3) setback listed in Section 3.1 (50 ft front)	Setbacks of 25 feet for 2 buildings adjacent to B-3 area	**No**	**This would be a deviation for side yard setbacks for 2 buildings adjacent to B-3 area.**
Exterior Side Yard Abutting a Street (Sec 3.6.2.C)	All exterior side yards abutting a street shall be provided with a setback equal to front yard.	No exterior side yards	NA	
Wetland/Watercourse Setback (Sec 3.6.2.M)	A setback of 25 ft from wetlands and from high watermark course shall be maintained	Wetlands exist in several areas of the site; impacts proposed	Yes	**See Wetland Review letter for detailed comments**
RM-1 and RM-2 Required Conditions (Sec 3.8) & (Sec 3.10)				
Total number of rooms (Sec. 3.8.1)	Total No. of rooms < Net site area in SF/2000 **686,070 SF/2000 = 343**	Total number of rooms = 71 units x 4 rooms = **284 rooms**	Yes	*17% less than permitted*
Public Utilities (Sec. 3.8.1)	All public utilities should be available	All public utilities are available	Yes	**See Engineering Review for detailed comments**
Maximum Number of Units (Sec. 3.8.1.A.ii)	Efficiency < 5 percent of the units	Not Proposed	NA	
	1 bedroom units < 20 percent of the units	Not Proposed	NA	
	Balance should be at least 2 bedroom units	All are 3-bedroom units	Yes	
Room Count per Dwelling Unit Size (Sec. 3.8.1.C) *An extra room such as den, library or other extra room count as an additional bedroom	**Dwelling Unit Size** / **Room Count ***		Yes	
	Efficiency / 1	Not proposed		
	1 bedroom / 2	Not proposed		
	2 bedroom / 3	Not proposed		
	3 or more bedrooms / 4	4		
For the purpose of determining lot area requirements and density in a multiple-family district, a room is a living room, dining room or bedroom, equal to at least eighty (80) square feet in area. A room shall not include the area in kitchen, sanitary facilities, utility provisions, corridors, hallways, and storage. Plans presented showing one (1), two (2), or three (3) bedroom units and including a "den," "library," or other extra room shall count such extra room as a bedroom for the purpose of computing density.				
Setback along natural shoreline (Sec. 3.8.2.A)	A minimum of 150 feet along natural shoreline is required.	No natural shoreline exists within the property	NA	

Item	Required Code	Proposed	Meets Code	Comments
Structure frontage (Sec. 3.8.2.B)	Each structure in the dwelling group shall front either on a dedicated public street or approved private drive.	All structures front on proposed private major drive	Yes	
Maximum length of the buildings (Sec. 3.8.2.C)	A single building or a group of attached buildings cannot exceed 180 ft.	Max of ~170 proposed, building entrances proposed	Yes	
Modification of maximum length (Sec. 3.8.2.C)	Planning Commission may modify the extra length up to 360 ft. if		NA	
	Common areas with a minimum capacity of 50 persons for recreation or social purposes			
	Additional setback of 1 ft. for every 3 ft. in excess of 180 ft. from all property lines.			
Building Orientation (Sec. 3.8.2.D)	Where any multiple dwelling structure and/ or accessory structure is located along an outer perimeter property line adjacent to another residential or nonresidential district, said structure shall be oriented at a minimum angle of forty-five (45) degrees to said property line.	Buildings orientations do not appear to meet the minimum requirement for all buildings	**No**	**Applicant requests a deviation in the PRO Agreement**
Yard setback restrictions (Sec. 3.8.2.E)	Within any front, side or rear yard, off-street parking, maneuvering lanes, service drives or loading areas cannot exceed 30% of yard area	No off-street parking or loading area is proposed in exterior yard areas	Yes	
Off-Street Parking or related drives (Sec. 3.8.2.F) Off-street parking and related drives shall be…	No closer than 25 ft. to any wall of a dwelling structure that contains openings involving living areas or	Complies – 25 feet	Yes	
	No closer than 8 ft. for other walls or	In conformance	Yes	
	No closer than 20 ft. from ROW and property line	In conformance	Yes	
Pedestrian Connectivity (Sec. 3.8.2.G)	5 feet sidewalks on both sides of the Private drive are required to permit	5-foot Sidewalks shown along the private drive	Yes	

Item	Required Code	Proposed	Meets Code	Comments
	safe and convenient pedestrian access.			
	Where feasible sidewalks shall be connected to other pedestrian features abutting the site.	Sidewalks shown to connect to Ridgeview pathway	Yes	
	All sidewalks shall comply with barrier free design standards			This would be reviewed in site plan submittal
Minimum Distance between the buildings (Sec. 3.8.2.H)	**(**Total length of building A **+** total length of building B **+** 2(height of building **+** height of building B)**)/**6 **Calculations show 31-36 feet required**	30-31 feet	**No**	**Applicant requests deviation for distance between buildings in a few locations (variance of 1- 3 feet)**
Minimum Distance between the buildings (Sec. 3.8.2.H)	In no instance shall this distance be less than thirty (30) feet unless there is a corner-to-corner relationship in which case the minimum distance shall be fifteen (15) feet.	Buildings are min. of 30 ft. from each other	Yes	
Number of Parking Spaces Residential, Multiple-family (Sec.5.2.12.A)	Two (2) for each dwelling unit having two (2) or less bedrooms and two and one-half (2 ½) for each dwelling unit having three (3) or more bedrooms **For 71 Three-BR units, required spaces = 178 spaces**	142 garage spaces 142 driveway spaces 10 visitor spaces **294 spaces total**	Yes	
Parking Space Dimensions and Maneuvering Lanes (Sec. 5.3.2)	- 90° Parking: 9 ft. x 19 ft. - 24 ft. two way drives - 9 ft. x 17 ft. parking spaces allowed along 7 ft. wide interior sidewalks as long as detail indicates a 4" curb at these locations and along landscaping	- 28 ft. two-way drives - Parking shown in garages and driveways - Parking spaces along drive - would need a deviation	Yes	**Refer to Traffic comments for comments on parking dimensions**
Parking stall located adjacent to a parking lot entrance (public or private) (Sec. 5.3.13)	- shall not be located closer than twenty-five (25) feet from the street right-of-way (ROW) line, street easement or sidewalk, whichever is closer	Does not apply	NA	

Item	Required Code	Proposed	Meets Code	Comments
Barrier Free Spaces Barrier Free Code	2 accessible space (including 1 Van accessible) for every 26 to 50 spaces	1 spaces provided		This would be reviewed in site plan submittal
Barrier Free Space Dimensions Barrier Free Code	- 8' wide with an 8' wide access aisle for van accessible spaces - 8' wide with a 5' wide access aisle for regular accessible spaces			
Barrier Free Signs Barrier Free Code	One sign for each accessible parking space.			
Corner Clearance (Sec. 5.9)	No fence, wall plant material, sign or other obstruction shall be permitted within the clear view zone above a height of 2 feet from established street grade			This would be reviewed in site plan submittal
Minimum number of Bicycle Parking (Sec. 5.16.1) Multiple-family residential	One (1) space for each five (5) dwelling units **Required: 15 Spaces**	8 spaces in two locations; 16 spaces	Yes	
Bicycle Parking General requirements (Sec. 5.16)	No farther than 120 ft. from the entrance being served	4 racks – 2 separate locations	Yes	
	When 4 or more spaces are required for a building with multiple entrances, the spaces shall be provided in multiple locations			
	Spaces to be paved and the bike rack shall be inverted "U" design Shall be accessible via 6 ft. paved sidewalk			
Bicycle Parking Lot layout *(Sec 5.16.6)*	Parking space width: 7 ft. One tier width: 11 ft. Two tier width: 18 ft. Maneuvering lane width: 4 ft. Parking space depth: 32 in	Shown	Yes	**See new layout dimensions of recently adopted text amendment**
5.10 Additional Road Design, Building Setback, And Parking Setback Requirements, Multiple-Family Uses				
Road standards *(Sec. 5.10)*	A private drive network within a cluster, two - family, multiple-family, or non-residential uses and	Major drive 28 feet wide	Yes	*Proposed road is "major drive" with direct access to exterior public road*

	developments shall be built to City of Novi Design and Construction Standards for local street standards (28 feet back-to-back width)			
Major Drives	– Width: 28 feet	Proposed major drive is 28 feet wide	Yes	
Minor Drive	– Cannot exceed 600 feet – Width: 24 feet with no on-street parking – Width: 28 feet with parking on one side – Parking on two sides is not allowed – Needs turn-around if longer than 150 feet	No minor drive proposed	NA	
Parking on Major and Minor Drives (Sec. 5.10)	– Angled and perpendicular parking, permitted on minor drive, but not from a major drive; – minimum centerline radius: 100 feet – Adjacent parking and on-street parking shall be limited near curves with less than two-hundred thirty (230) feet of centerline radius – Minimum building setback from the end of a parking stall shall be 25 feet in residential districts.	**On-street perpendicular parking is proposed on the Major Drive** **Minimum centerline radius is 85-120'**	**No** **No**	**Deviation for major road standards: on-street perpendicular parking, minimum centerline radius, and parking near curve greater than 230 ft?**
Accessory and Roof top Structures				
Dumpster Sec 4.19.2.F	- Located in rear yard - Attached to the building or - No closer than 10 ft. from building if not attached - Not located in parking setback - If no setback, then it cannot be any closer than 10 ft, from property line. - Away from Barrier free Spaces	Individual trash pick-up for residential units Dumpsters shown for commercial appear to be 20 feet from residential	Yes	

Dumpster Enclosure Sec. 21-145. (c) Chapter 21 of City Code of Ordinances	- Screened from public view - A wall or fence 1 ft. higher than height of refuse bin - And no less than 5 ft. on three sides - Posts or bumpers to protect the screening - Hard surface pad. - Screening Materials: Masonry, wood or evergreen shrubbery	Trash screening enclosures shown	Yes	*Details will be reviewed in site plan submittals*
Roof top equipment and wall mounted utility equipment Sec. 4.19.2.E.ii	All roof top equipment must be screened and all wall mounted utility equipment must be enclosed and integrated into the design and color of the building	Not shown	TBD	*Details will be reviewed in site plan submittals*
Roof top appurtenances screening	Roof top appurtenances shall be screened in accordance with applicable facade regulations, and shall not be visible from any street, road or adjacent property.	No roof top equipment for residential	TBD	
Sidewalks and Other Requirements				
Non-Motorized Plan	Proposed Off-Road Trails and Neighborhood Connector Pathways.	8-foot concrete pathway proposed; Mid-block crossings?	Yes	**Show any off-road trails proposed, especially if offered as a public benefit**
Sidewalks (Subdivision Ordinance: Sec. 4.05)	Sidewalks are required on both sides of proposed drives	5-ft Sidewalks are proposed on both sides of the proposed private drive	Yes?	
Public Sidewalks (Chapter 11, Sec.11-276(b), Subdivision Ordinance: Sec. 4.05)	A 8-foot sidewalk is required along 10 Mile Road	Sidewalk proposed	Yes	
Entryway lighting Sec. 5.7	One street light is required per entrance.			Applicant to work with engineering and DTE on the location and type of the fixtures proposed in the right of way for residential community
Building Code and Other Requirements				
Building Code	Building exits must be connected to sidewalk		NA	**Barrier-free requirements?**

	system or parking lot.			
Design and Construction Standards Manual	Land description, Sidwell number (metes and bounds for acreage parcel, lot number(s), Liber, and page for subdivisions).			**Provide a legal description of proposed parcels with formal Concept Plan submittal**
General layout and dimension of proposed physical improvements	Location of all existing and proposed buildings, proposed building heights, building layouts, (floor area in square feet), location of proposed parking and parking layout, streets and drives, and indicate square footage of pavement area (indicate public or private).	Generally provided	Yes	**Refer to all review letters for additional information requested.**
Economic Impact	- Total cost of the proposed building & site improvements - Number of anticipated jobs created (during construction & after building is occupied, if known)	- $35 million construction cost - 100 new permanent full and part-time jobs, numerous construction jobs		
Other Permits and Approvals				
Development/ Business Sign (City Code Sec 28.3) Sign permit applications may be reviewed an part of Preliminary Site Plan or separately for Building Office review.	The leading edge of the sign structure shall be a minimum of 10 ft. behind the right-of-way. Entranceway shall be a maximum of 24 square feet, measured by completely enclosing all lettering within a geometric shape. Maximum height of the sign shall be 5 ft.			**Show the location of any entranceway signs if proposed;** **Deviations from sign ordinance may be included in PRO submittal if variances are anticipated**
Development and Street Names	Development and street names must be approved by the Street Naming Committee before Preliminary Site Plan approval	Novi Ten Commercial and Towns at Novi Station proposed		Submit a Project & Street Naming Application to get all names approved
Property Split	The proposed property split must be submitted to the Assessing Department for approval.			Property combinations/splits must be approved before final site plan approval

Other Legal Requirements				
PRO Agreement (Sec. 7.13.2.D(3)	A PRO Agreement shall be prepared by the City Attorney and the applicant (or designee) and approved by the City Council, and which shall incorporate the PRO Plan and set forth the PRO Conditions and conditions imposed			If tentative approval is granted, Council will direct City Attorney to prepare the agreement, which will then be shared with applicant for negotiation
Master Deed/Covenants and Restrictions	Applicant is required to submit this information for review with the Final Site Plan submittal	Not applicable at this moment		If proposed, Master Deed draft shall be submitted prior to Stamping Set approval.
Conservation easements	Conservation easements may be required for woodland impacts	Conservation easements would be required if a condition in the PRO Agreement		Draft documents would be required prior to stamping set approval.
Lighting and Photometric Plan (Sec. 5.7)				
Intent (Sec. 5.7.1)	Establish appropriate minimum levels, prevent unnecessary glare, reduce spillover onto adjacent properties & reduce unnecessary transmission of light into the night sky		Yes	
Lighting Plan (Sec. 5.7.A.i)	Site plan showing location of all existing & proposed buildings, landscaping, streets, drives, parking areas & exterior lighting fixtures	Provided separately for commercial and residential area	Yes	
Building Lighting (Sec. 5.7.2.A.iii)	Relevant building elevation drawings showing all fixtures, the portions of the walls to be illuminated, illuminance levels of walls and the aiming points of any remote fixtures.	Not provided		**Provide building lighting at time of site plan submittal**
Lighting Plan (Sec.5.7.2.A.ii)	Specifications for all proposed & existing lighting fixtures	Provided	Yes	**Provide hours of operation**
	Photometric data	Provided	Yes	
	Fixture height	25 feet commercial	Yes	
	Mounting & design	Provided	Yes	
	Glare control devices (Also see Sec. 5.7.3.D)			
	Type & color rendition of lamps	Provided – see below	TBD	
	Hours of operation	Not shown		

Required Conditions (Sec. 5.7.3.A)	Height not to exceed maximum height of zoning district (or 25 ft. where adjacent to residential districts or uses)	Commercial: 25 feet max Residential: 6-10 feet proposed	Yes	
Required Conditions (Sec. 5.7.3.B)	- Electrical service to light fixtures shall be placed underground - Flashing light shall not be permitted - Only necessary lighting for security purposes & limited operations shall be permitted after a site's hours of operation	Notes provided	Yes	
Indoor Lighting *(Sec. 5.7.3.H)*	- Indoor lighting shall not be the source of exterior glare or spillover		TBD	
Security Lighting (Sec. 5.7.3.H) Lighting for security purposes shall be directed only onto the area to be secured.	- All fixtures shall be located, shielded and aimed at the areas to be secured. - Fixtures mounted on the building and designed to illuminate the facade are preferred		TBD	
Color Spectrum Management *(Sec. 5.7.3.F)*	Non-Res and Multifamily: For all permanent lighting installations - minimum Color Rendering Index of 70 and Correlated Color Temperature of no greater than 3000 Kelvin	CRI 70 for all fixtures Appears 4000K CCT is proposed	**No**	*Clarify Correlated Color Temperature of fixtures – may not exceed 3000 Kelvin*
Parking Lot Lighting *(Sec. 5.7.3.J)*	- Provide the minimum illumination necessary to ensure adequate vision and comfort. - Full cut-off fixtures shall be used to prevent glare and spillover.	Appears to be proposed		
Min. Illumination (Sec. 5.7.3.L)	Parking areas: 0.2 min	0.4 fc	Yes	**Provide missing minimum illumination levels**
	Loading & unloading areas: 0.4 min	1.3 fc min	Yes	
	Walkways: 0.2 min			
	Building entrances, frequent use: 1.0 min			
	Building entrances, infrequent use: 0.2 min			

Average Light Level *(Sec.5.7.3.L)*	Average light level of the surface being lit to the lowest light of the surface being lit shall not exceed 4:1	Commercial: 3.8:1 Residential: 2.5:1	Yes	*Revise calculations to show only lit areas (exclude 0.0 fc values to calculate ratio)*
Max. Illumination adjacent to Non-Residential *(Sec. 5.7.3.L)*	When site abuts a non-residential district, maximum illumination at the property line shall not exceed 1 foot candle	0.5 max shown	Yes	
Max. Illumination adjacent to Residential *(Sec. 5.7.3.M)*	- Fixture height not to exceed 25 feet - Cut off angle of 90 degrees or less - No direct light source shall be visible at the property line adjacent to residential at ground level - Maximum illumination at the prop line not to exceed 0.5 fc.	Max 25 feet shown 0.2 fc max shown at residential property line	Yes	

NOTES:
1. This table is a working summary chart and not intended to substitute for any Ordinance or City of Novi requirements or standards.
2. The section of the applicable ordinance or standard is indicated in parenthesis. Please refer to those sections in Article 3, 4 and 5 of the zoning ordinance for further details
3. Please include a written response to any points requiring clarification or for any corresponding site plan modifications to the City of Novi Planning Department with future submittals.

ENGINEERING REVIEW
October 27, 2023

PLAN REVIEW CENTER REPORT

10/27/2023

Engineering Review

Novi-Ten PRO

JZ23-0009

Applicant

Novi Ten Associates

Review Type

Revised Concept Plan Review

Property Characteristics

- Site Location: S of Ten Mile Road and East of Novi Road
- Site Size: 42.90 acres
- Plan Date: 10/4/2023
- Design Engineer: STA Siegal/Tuomaala Associates

Project Summary

- Proposed 71-unit residential condominiums with site access via 10 Mile Road. Private roads proposed.
- Construction of an approximately 39,500 square-foot building and associated parking. Site access would be provided via two proposed entrances on 10 Mile Road.
- Construction of a 5-foot-wide concrete sidewalk on both sides of the proposed private road, an 8-foot-wide concrete walk along a 10 Mile Road frontage, and an 8-foot-wide concrete pedestrian pathway extended from the existing path on the south side of the proposed improvement.
- Water service would be provided by an 8-inch extension from the existing 16-inch water main along the south side of 10 Mile Road and the existing 8-inch water main stub.
- Sanitary sewer service would be provided by connecting to an existing sanitary sewer along the south side of 10 Mile Road.
- Storm water would be collected by a single storm sewer collection system and detained in a basin sized for the 100-year storm event. The basin would subsequently dewater into the existing wetland east of basin footprint.

Recommendation

We have no objection to the rezoning; Approval of the revised Concept Plan is recommended with the following items to be addressed in the next submittal.

Comments:

The revised Concept Plan meets the general requirements of Chapter 11 with the following items to be addressed at the time of Preliminary Site Plan submittal (further engineering detail will be required at the time of the final site plan submittal):

General

1. A full engineering review was not performed due to the limited information provided in this submittal. Further information related to the utilities, easements, etc. will be required to provide a more detailed review.
2. The site plan shall be designed in accordance with the Design and Construction Standards (Chapter 11).
3. A right-of-way permit will be required from the City of Novi and Road Commission for Oakland County.
4. Any off-site easements must be executed prior to final approval of the plans. Drafts shall be submitted at the time of the Preliminary Site Plan submittal. The site plan is not considered feasible until it is confirmed that sewer can be extended to the property.
5. Submit a wetland permit application for the proposed 8-foot wide pathway at the time of Preliminary Site Plan submittal.
6. A letter from either the applicant or the applicant's engineer must be submitted with the Preliminary Site Plan submittal highlighting the changes made to the plans and addressing each of the comments in this review.
7. Show and label the master planned 60-foot half width right-of-way for 10 Mile Road. Label the additional right-of-way width to be dedicated along 10 Mile Road as "proposed" right-of-way.
8. Provide ADA ramps at accessible parking spaces.
9. Site distance measurements along Ten Mile shall be provided on the plans.
10. Clarify whether irrigation is proposed.

Utilities

11. The development under the proposed rezoning (62.8 REUs) would be either slightly higher or significantly lower than the range possible under the existing zoning (50.72 – 167.2 REUs). Therefore, the proposed impacts to the water and sewer system present no concerns.
12. The water main along Ten Mile is 16-inch. The plans currently show it as 12-inch. revise note #2 on sheet #6 accordingly.
13. OCWRC should be contacted to discuss their need to provide better access to the sewer along the east of this site. If discussions have already occurred, please provide information indicating OCWRC will be able to approve the proposed plan.

14. Our records show that there is an existing 8-inch sanitary crossing 10 Mile Road from the north side that we prefer you extend to serve your property.
15. OCWRC should be contacted to discuss the sanitary sewer connection to determine if they will allow a connection to the 36-inch interceptor manhole, which is under their jurisdiction. Show the existing utilities on the plans and the proposed connection to each. If discussions have already occurred, please provide information indicating OCWRC will be able to approve the proposed sewer connection.
16. Differentiate between existing and proposed utilities on the plans and indicate proposed connections.
17. Provide a basis of design for the proposed sanitary sewer and water main on the utility plan.
18. Provide a 20-foot easement over the proposed water main and sanitary sewer.
19. A tapping sleeve, valve and well shall be provided at every connection to existing mains.
20. The Non-Domestic User Survey form for sanitary sewer flow shall be submitted to the City so it can be forwarded to Oakland County.
21. The fire chief shall approve final locations of all hydrants.

Paving & Grading

22. Provide at least 3-foot of buffer distance between the sidewalk and any fixed objects, including hydrants and irrigation backflow devices. Include a note on the plan where the 3-foot separation cannot be provided.
23. Dimensions of parking stalls abutting a curb or sidewalk are to the face of curb or walk. All other dimensions are to back of curb unless otherwise indicated.
24. Provide existing topography and 2-foot contours extending at least 100 feet past the site boundary. Any off-site drainage entering this site shall be identified.
25. The proposed sidewalk on Ten Mile Road must be extended up to the east property line, or a variance will be required.

Storm Water Management Plan

26. Provide a sheet or sheets titled "Storm Water Management Plan" (SWMP) that complies with the Storm Water Ordinance and Chapter 5 of the new Engineering Design Manual (refer to the runoff coefficients, 1V:4H allowable basin slopes, etc.).
27. The SWMP must detail the storm water system design, calculations, details, and maintenance as stated in the ordinance.
28. Rather than a sediment forebay, a permanent water surface and storage volume are preferred. Refer to section 5.6.1 A. of the Engineering Design Manual for depth and volume requirements for wet detention basins.
29. A minimum permanent pool depth of 3 feet shall be provided. Where a permanent pool is provided for meeting the quality performance standards,

the volume of the permanent pool shall be equal to or greater than the first flush volume.

30. An adequate maintenance access route to the basin outlet structure and any other pretreatment structures shall be provided (15 feet wide, maximum slope of 1V:5H, and able to withstand the passage of heavy equipment). Verify the access route does not conflict with proposed landscaping.
31. A 25-foot vegetated buffer shall be provided around the perimeter of each storm water basin. This buffer cannot encroach onto adjacent lots.
32. Provide details for the outlet control structure.
33. Provide release rate calculations for the three design storm events (first flush, bank full, and 100-year).
34. The storm sewer connection to the future commercial area will need to be sized to accommodate the future flows.

Flood Plain

35. Application for a City floodplain permit shall be submitted as soon as possible to begin the review process. The City's floodplain consultant will review the submittal and provide initial comments regarding the review process.

Soil Erosion and Sediment Control

36. A SESC permit is required. A full review has not been completed at this time but will be completed once a complete package has been submitted, according to the permit application requirements.

Off-Site Easements

37. Any off-site easements must be executed prior to final approval of the plans. Drafts shall be submitted at the time of the Preliminary Site Plan submittal.

Please contact Adam Yako at 248-735-5695 with any questions.

Adam Yako
Project Engineer

LANDSCAPE REVIEW
January 9, 2024

PLAN REVIEW CENTER REPORT

January 9, 2024

Novi-Ten

Revised PRO Concept Site Plan - Landscaping

Review Type	**Job #**
Revised PRO Concept Plan – Landscaping Review	JZ23-0009

Property Characteristics

- Site Location: Ten Mile Road east of Novi Road
- Site Acreage: 19.6 ac. (residential section is 11.2 ac.)
- Site Zoning: Current: I-1.
  Proposed: Commercial B-3, Residential RM-1
- Adjacent Zoning: North: I-1 and I-2, East: I-1, South: RM-1 PRO, West: OS-1
- Plan Date: January 2, 2024

Ordinance Considerations

This project was reviewed for conformance with Chapter 37: Woodland Protection, Zoning Article 5.5 Landscape Standards, the Landscape Design Manual and any other applicable provisions of the Zoning Ordinance. Please follow guidelines of the Zoning Ordinance and Landscape Design Guidelines. This review and the accompanying landscape chart are summaries and are not intended to substitute for any Ordinance.

Items in **bold** below must be addressed and incorporated as part of the PRO review. Underlined items should be included for the Preliminary Site Plans and *Underlined and italicized* items must be included on Final Site Plans.

RECOMMENDATION:

This project is **not recommended for Conceptual Plan Approval.** The residential portion of the project is mostly acceptable, except for the composition of the woodland replacements, but the commercial section requires significant deviations that are not recommended by staff.

LANDSCAPE DEVIATIONS REQUIRED PER PLANS PROVIDED:

Residential:

- No street trees along are proposed along 10 Mile Road – *supported by staff due to utility conflicts (would also be supported for Commercial section if utility conflicts were there too)*
- Deficiency in greenbelt canopy trees proposed – *supported by staff due to provision of publicly accessible tennis courts in greenbelt*.

Commercial:

- No street trees can be planted along 10 Mile Road due to a conflict with the existing water main – *supported by staff*
- Lack of greenbelt berm along 10 Mile Road – *not supported by staff*
- Deficiency in foundation landscaping for every building – *not supported by staff*

General Notes:

- **Please put the City's Project Number, JZ23-0009, on the STA cover sheet as well.**
- The residential building layout is different between the civil drawings and the residential landscape plan (L-1). **Please correct this inconsistency.**
- **Please use different sheet numbers for the Commercial and MF Residential properties (so**

there aren't 2 L-1s, eg).

- **Please add building numbers or letters to each of the buildings shown on the Residential and Commercial landscape plans**.

Please work to remove the unsupported deviations noted above.

Ordinance Considerations

Existing Trees (Sec 37 Woodland Protection, Preliminary Site Plan checklist #17 and LDM 2.3 (2))

1. Tree survey and charts are provided for both sections.
2. Woodland replacement calculations are provided for both sections.
   a. **Commercial:** 180 replacements are required. 41 are proposed to be planted on site and a deposit to the tree fund will be made for the remaining credits**.**
   b. **MF Residential:** 697 replacements are required. 181 are proposed to be planted on site and a deposit to the tree fund will be made for the remaining credits**.**
3. **The calculations need to be revised to reflect that evergreens only count as 0.67 woodland replacement credits.**
4. **Only 10% of the planted replacement credits may be evergreen trees. The rest need to be deciduous canopy trees.**
5. Please show conservation easement boundaries for all woodland replacement trees.

Adjacent to Residential - Buffer (Zoning Sec. 5.5.3.A.ii and iii) (Both sections)

1. The project is adjacent to commercial property on the west, to multi-family residential on the south and to industrial property and the railroad to the east. Within the site, residential abuts commercial.
2. A 6-8 foot tall wall or landscaped berm is required between residential property and office/commercial uses.
3. The plan indicates a landscaped berm west of Residential Buildings 1 and 2 and Commercial Building A. The berm crest is only 3-4 feet above the commercial parking lot and approximately 6-8 feet above the bottom of the slope. The slope is heavily landscaped with evergreen trees. The deficiency in berm height requires a deviation that may be supported by staff if satisfactory evidence of the berm's screening is provided.
4. The plan also shows two 8 foot masonry walls planted north of Residential Buildings 5 and 6 with evergreen trees planted along the adjacent parking lot perimeter**. It would be preferable to have a line of densely planted narrow evergreen shrubs planted on the residential side of the walls to the evergreen trees planted along the parking lot perimeter. Please change that.**

COMMERCIAL SECTION

Adjacent to Public Rights-of-Way – Berm/Wall, Buffer and Street Trees (Zoning Sec. 5.5.3.B.ii, iii)

1. The required 3 foot tall berm is not proposed. **This would require a landscape deviation**. *It would not be supported by staff.*
2. **There is an option for fewer greenbelt plantings for projects in the B-1, B-2 and B-3 districts. If desired, the applicant may revise their calculations and plans per these requirements.**
3. The required street trees are proposed, but the utility conflict along Ten Mile road between the existing water main and the sidewalk prevents the required street trees from being planted. **Please do not show the trees as being planted (leave the calculation) and request a landscape deviation for them**. *It will be supported by staff.*

Parking Lot Landscaping (Zoning Sec. 5.5.3.C.)

1. It appears that the proposed interior and perimeter parking lot trees are provided but **some of the required perimeter trees should be added along the southwest boundary,**

and canopy trees should be used along the perimeter south of Commercial Buildings A and B.

2. **See the landscape chart for a more detailed discussion of the parking lot landscaping.**

Building Foundation Landscaping (Zoning Sec 5.5.3.D)

1. It appears that none of the buildings' foundation landscaping meets the requirements. **These deficiencies would require landscape deviations**. *They would not be supported by staff.*
2. **Please add the required foundation landscaping around all of the buildings.**

RESIDENTIAL SECTION

Adjacent to Public Rights-of-Way – Berm/Wall, Buffer and Street Trees (Zoning Sec. 5.5.3.B.ii, iii)

1. The required greenbelt berm and landscaping appear to be provided. The evergreen tree symbols used are not easily distinguished from the others. **Please clearly label what trees are greenbelt trees versus multi-family unit trees or woodland replacement trees.**
2. As with the Commercial section, the utility conflict along Ten Mile road prevents the required street trees from being planted. **Please do not show the trees as being planted (leave the calculation) and request a landscape deviation for them**. *It will be supported by staff.*

Multi-Family Residential/Attached Dwelling Unit Landscaping (Zoning Sec 5.5.3.F.iii)

1. Multi-family unit trees
   a. As 71 townhouse units are proposed, 213 trees are required, up to 25% of which can be subcanopy trees.
   b. 213 trees are proposed on the site, some of which are along the interior drive, many of which are on the berm between the residential portion of the development and the commercial section, and some of which are in the greenbelt. Until species are proposed, it's difficult to determine the makeup of the trees proposed.
2. Interior Drive Trees
   a. Based on the length of the interior drive, 35 interior drive trees are required. 35 trees, plus 5 multi-family unit trees are proposed along the streets.
   b. Please place one tree along the long edge of each of the parking bays to help shade them.
3. Building Foundation Landscaping
   a. A sample foundation detail shows that 40% of the building fronts will be landscaped, exceeding the 35% required.
   b. Please include plant labels on the Final Site Plans at the latest and add the plants to the plant list and cost estimate.

GENERAL REQUIREMENTS APPLICABLE TO BOTH SECTIONS

Plant List (LDM 4, 10)

1. Not provided.
2. Please add plant labels to the plan view and provide a plant list on the Preliminary Site Plans, or Final Site Plans at the latest.
3. The plants should meet the requirements detailed on the landscape chart.
4. Only 10% of the woodland replacement trees planted on the site can be evergreen trees. It appears that most of the proposed replacement trees are evergreen. **Please adhere to the requirement.**

Planting Notations and Details (LDM 10)

1. Provided for the Residential plans but not the Commercial Plans.
2. As the Commercial and Residential landscaping may well be done by different contractors, please include the planting notes and details with each set of plans.

Storm Basin Landscape (Zoning Sec 5.5.3.E.iv and LDM 3)

1. Conceptual landscaping indicates that all landscaping will be provided.
2. Woodland replacement trees may be used to meet the tree requirement, but they must be protected by an easement.

Irrigation (LDM 10)

Please provide the plans for an automatic irrigation system, or alternative plans for providing sufficient water for the plants' establishment and long-term survival on the Final Site Plans.

If the applicant has any questions concerning the above review or the process in general, do not hesitate to contact me at 248.735.5621 or rmeader@cityofnovi.org.



Rick Meader – Landscape Architect

LANDSCAPE REVIEW SUMMARY CHART – Revised PRO Concept Plan

Review Date: January 9, 2024
Project Name: JZ23-09: Novi Ten
Project Location: Ten Mile Road east of Novi Road
Plan Date: January 2, 2024
Prepared by: Rick Meader, Landscape Architect E-mail: rmeader@cityofnovi.org; Phone: (248) 735-5621

Items in **Bold** need to be addressed by the applicant before approval of the PRO Concept Plan. Underlined items need to be addressed on Preliminary Site Plans. *Underlined and italicized* items need to be addressed for Final Site Plan.

LANDSCAPE DEVIATIONS REQUIRED PER PLANS PROVIDED:
Residential:

- No street trees along 10 Mile Road in residential section – *supported by staff due to utility conflicts (would also be supported for Commercial section if utility conflicts were there too)*
- Deficiency in greenbelt canopy trees – *supported by staff due to provision of publicly accessible pickleball courts in greenbelt.*

Commercial:

- No street trees can be planted along 10 Mile Road due to a conflict with the existing water main – *supported by staff*
- Lack of greenbelt berm along 10 Mile Road in the Commercial section – *not supported by staff*
- Deficiency in foundation landscaping for every building – *not supported by staff*

General Notes:

- **Please put the City's Project Number, JZ23-0009, on the STA cover sheet as well.**
- The residential building layout is different between the civil drawings and the residential landscape plan (L-1). **Please correct this inconsistency.**
- **Please use different sheet numbers for the Commercial and MF Residential properties (so there aren't 2 L-1s, eg).**
- **Please add building numbers or letters to each of the buildings shown on the Residential and Commercial landscape plans**.

Item	Required	Proposed	Meets Code	Comments
Landscape Plan Requirements – Basic Information (LDM (2))				
Landscape Plan *(Zoning Sec 5.5.2, LDM 2.e)*	• New commercial or residential developments • Addition to existing building greater than 25% increase in overall footage or 400 SF whichever is less. • 1"-20' minimum with proper North. Variations from this scale can be approved by LA	• Residential Landscape Plan is 1"=50' • Residential greenbelt, detention pond and foundation plans are 1"=30' • Commercial Landscape Plan is 1"=40' • No Commercial Foundation plans are provided	• Yes • Yes • Yes • TBD	When they are provided, the commercial foundation landscape plans should be no smaller than 1"=20'

Item	Required	Proposed	Meets Code	Comments
Project Name/Address *(LDM 2.a.)*	Name and location of the project	• Yes • Location map is provided	Yes	
Owner/Developer Contact Information *(LDM 2.a.)*	Name, address and telephone number of the owner and developer or association	Toll Brothers	Yes	
Landscape Architect contact information *(LDM 2.b.)*	Name, Address and telephone number of RLA/PLA/LLA who created the plan	**Commercial:** James Gray – Vert Verde **Residential:** Jim Allen – Allen Design	Yes	
Sealed by LA. *(LDM 2.g.)*	Requires original signature	Yes		Live signature is required on final stamping sets
Survey information *(LDM 2.c.)*	Legal description or boundary line survey	Civil Sheets 2 and 3	Yes	
Miss Dig Note (800) 482-7171 *(LDM.3.a.(8))*	Show on all plan sheets	Yes	Yes	
EXISTING CONDITIONS				
Existing plant material **Existing woodlands or wetlands** *(LDM 2.e.(2))*	• Show location type and size. • Label to be saved or removed. • Plan shall state if none exists.	• Wetlands are delineated • Residential Tree survey and removals are on the Residential Landscape Plans Sheets L-3 and L-5 • Commercial tree survey and removals are on the Commercial Landscape Plans Sheets L-1 and L-2 • Residential tree replacement calculations on L-5. • Commercial tree replacement calculations on L-1	• Yes • Yes • Yes • Yes • Yes	
Natural Features protection		25-foot environmental setbacks are shown on both the Commercial and Residential	Yes	

Item	Required	Proposed	Meets Code	Comments
		Landscape Plans		
Soil type *(LDM.2.r.)*	As determined by Soils survey of Oakland county	Civil Cover Sheet	Yes	
Zoning *(LDM 2.f.)*	Site: I-1 and OS-1 Proposed: RM and B3 North: I-1 and I-2 East: I-1; West: OS-1 South: RM-1	<u>Shown on Civil Cover Sheet</u> • Site: I-1 • Proposed RM-1 for Residential, B-3 for Commercial • East: I-1 • South: RM-1 PRO • West: OS-1 • North: I-1 & I-2	Yes	
PROPOSED IMPROVEMENTS				
Existing and proposed improvements *(LDM 2.e.(4))*	Existing and proposed buildings, easements, parking spaces, vehicular use areas, and R.O.W	• Detailed residential plan and conceptual commercial plans are shown on PRO Concept Plan. • All Residential and Commercial elements are shown on the landscape plans. • The residential building layout is different on the civil plans from the layout on Residential Sheet L-1.	• Yes • Yes • No	**Please make the civil and landscape plans' layouts consistent.**
Existing and proposed utilities *(LDM 2.e.(4))*	• Overhead and underground utilities, including hydrants, water, sanitary and storm lines and structures. • Light posts should also be shown.	• Utility structures and lines are shown faintly on the Residential plans • No utilities are shown on the Commercial plans • No light posts are shown on any of the landscape plans.	• Yes • No	**1. Please add all proposed utility lines and structures to the Commercial landscape plans and resolve conflicts such that all of the required trees can be planted.** **2. Please add all proposed light posts to both Residential and Commercial Landscape Plans and resolve all conflicts**
Proposed topography - 2' contour minimum	Provide proposed contours at 2' interval	• Proposed contours are	• Yes • No	**1. Please show all required berms on a**

Item	Required	Proposed	Meets Code	Comments
(LDM 2.e.(1))		shown on P3 and Civil Sheet 6 • Contours don't always work with catch basin rim elevations. • Contours aren't consistent across all sheets	• No	**grading plan.** **2. Please make contours work with adjacent catch basin rim elevations.** **3. Please show grading consistently between plans throughout the set (contours on P3 and Civil Sheet 6 and Landscape plan are not the same).** **4. Please label the contours with their elevations.**
Clear Zones *(LDM 2.e.(5))*	RCOC clear vision zones for 10 Mile Road entry points	• RCOC clear vision zone is shown on the Residential Landscape Plan. • No clear vision zone is shown on the Commercial Landscape Plan.	• Yes • No	**1.** *Please provide RCOC clear vision zones for all entry points to 10 Mile Road on landscape plan.* **2.** *Keep all trees and shrubs over 30" out of clear zones.*
LANDSCAPING REQUIREMENTS				
Berms and ROW Planting				
• All berms shall have a maximum slope of 33%. Gradual slopes are encouraged. Show 1ft. contours • Berm should be located on lot line except in conflict with utilities. • Berms should be constructed with 6" of topsoil.				
Residential Adjacent to Non-residential (Sec 5.5.3.A) & (LDM 1.a)				
Berm requirements *(Zoning Sec 5.5.A)*	Residential adjacent to Commercial requires: • 6-8 foot high landscaped berm or wall • 10-15 foot high wall or berm for drive-in restaurants. • 10-15 foot high wall or berm for industrial • Opacity 80% winter, 90% summer. Residential adjacent to Industrial requires: • 10-15 foot high wall or berm for industrial • Opacity 80% winter, 90% summer. • As the development does not directly abut	• A landscaped berm approximately 3-4 feet tall is proposed between the Residential Buildings 1 and 2 and Commercial Building A (the crest is approximately 3 feet higher than the commercial parking lot and 6-8 feet higher than the bottom of the slope). • An 8-foot high masonry wall is provided	• No • Yes	**1. A landscape waiver will be required for the masonry wall.** **2. While it will provide solid screening from ground level, narrow, tall evergreen shrubs that will provide better screening for the second floor of the residential units facing the walls should be added in front of the wall.** *3. If additional screening is provided in sufficient density to provide 80-90% blockage, the waiver could be supported by staff.*

Item	Required	Proposed	Meets Code	Comments
	the industrial property to the east, no screening berm is required.	between the commercial section and the north side of the westernmost residential buildings. Evergreen plantings are indicated behind the wall, on the Commercial section. • No berm is provided along the east side of the property.		4. No berm is required along the east side of the property as the adjoining industrial property there is on the other side of the railroad. **5. Please provide cross sections for the areas between and including Residential Buildings 1 and 2 and Commercial Building A and Residential Building 5 and Commercial Building A that shows the proposed blocking of the commercial from the residential since the required berm is not provided in either situation. Landscape deviations are required for both so this will help to garner support for that request.**
Planting requirements *(LDM 1.a.)*	LDM Novi Street Tree List	• Dense plantings are proposed on berm • No plantings are proposed in front of the 8-foot masonry walls but evergreen trees are shown along the adjacent parking lot perimeter.	• Yes • No	**Please add dense narrow evergreen shrubs in front of the walls to add additional screening between the residential buildings and the commercial property. This would be preferable to the evergreen trees shown along the parking lot perimeter.**
Adjacent to Public Rights-of-Way (Sec 5.5.B) and (LDM 1.b)				
ROW Landscape Screening Requirements Chart *(Sec 5.5.3.B. ii)*				
Greenbelt width (2)(3) (5)	• **Commercial (B3) adj to pkg:** 20 ft • **MF Residential:** Not adj to pkg: 34 ft	• **Commercial:** 20 ft • **MF Residential:** 75 ft	• Yes • Yes	
Min. berm crest width	• **Commercial (B3) adj to pkg:** 2 ft • **MF Residential:** 2 ft	• **Commercial:** 0 ft • **MF Residential:** 2 ft	• No • Yes	**1. Please provide the required berms in the commercial section.** **2.** *Lack of a required berm is a deficiency*

Item	Required	Proposed	Meets Code	Comments
				that would not be supported by staff.
Min. berm height (9)	• **Commercial (B3) adj to pkg:** 2 ft • **MF Residential:** 2 ft	• **Commercial:** 0 ft • **MF Residential:** unclear	• Yes • TBD	**1. See above** **2. Please add contour labels so the provided berms' heights can be determined.**
3' wall	(4)(7)	None proposed		
Canopy deciduous or large evergreen trees Notes (10)(12)	**Commercial: (B3) adj to pkg:** • 1 tree per 70 lf • (1020-30-30-30)/70 = 13 trees **MF Residential (not adj to pkg):** • 1 tree per 35 lf • (570-56)/35 = 15 trees	• Commercial: 27 trees • MF Residential: 13 trees	• Yes • No	1. The calculations for the commercial section may be corrected to use the third Commercial option in Table 5.5.3.B.ii.f to increase the visibility of the site from 10 Mile Road if desired. 2. **Please clearly label the greenbelt trees on Residential Sheet L-2.** Multi-family unit trees or replacement trees cannot be used to meet that requirement. **2. The deficiency in trees provided in the MF residential greenbelt would require a landscape deviation.** *As the deficiency is due to the tennis courts offered as a public amenity, the waiver for 2 missing trees would be supported by staff.*
Sub-canopy deciduous trees Notes (10)(12)	**Commercial: (B3) adj to pkg:** • 1 tree per 40 lf • (1020-30-30-30)/40 = 23 trees **MF Residential (not adj to pkg):** • 1 tree per 35 lf • (570-56)/25 = 21 trees	• Commercial: 47 trees • MF Residential trees: Unclear	• Yes • TBD	**See above**
Shrubs Notes (10)(12)	**Commercial: (B3) adj to pkg:**	• None	TBD	**If the applicant desires to use the third option in**

Item	Required	Proposed	Meets Code	Comments
	• 3 shrubs per 40 lf • 3*(1020-30-30-30)/40 = 70 shrubs			**Table 5.5.3.B.ii.f, please add the calculations for the required shrubs and add the required shrubs to the greenbelt, on top of or in front of the berm.**
Canopy deciduous trees in area between sidewalk and curb	**Commercial: (B3) adj to pkg:** • 1 tree per 40 lf • (1020-30-30-30)/40 = 23 trees **MF Residential:** • 1 tree per 35 lf • (570-56)/25 = 21 trees	• No trees are proposed in the right-of-way in front of the MF residential section due to conflicts with existing utilities in the right-of-way. • Street trees are shown in front of the Commercial section, but the water main there doesn't leave enough room for the trees.	• No • Yes	1. Please add calculations for the trees required based on the Commercial 10 Mile Road frontage. 2. *As the existing 12" water main along 10 Mile Road does not allow room for the street trees, the requested deviation is supported by staff.*
Multi-Family Residential (Sec 5.5.3.F.ii)				
Building Landscaping *(Zoning Sec 5.5.3.E.ii.)*	• 3 deciduous canopy trees or large evergreen trees per dwelling unit on the first floor. • 71 units * 3 = 213 trees • 25% can be subcanopy trees.	• Calculations are provided. • It appears that 213 trees are provided	Yes	Please use an evergreen tree symbol more easily distinguished from the replacement tree evergreen symbols on the Residential plans so the counts can be verified.
Interior Street Landscaping	• 1 deciduous canopy tree along interior roads for every 35 lf (both sides), excluding driveways, interior roads adjacent to public rights-of-way and parking entry drives. • Trees in boulevard islands do not count toward street tree requirement • (2368-1136)/35=35 trees	• Calculations are provided. • 35 trees plus 5 multi-family unit trees	Yes	

Item	Required	Proposed	Meets Code	Comments
Foundation Landscaping	35% of building façades facing road should be landscaped	A standard unit landscaping detail is provided on Sheet L-2 that shows 40% of the units façade will be landscaped	Yes	*Please add detailed landscaping on the Final Site Plans.*
Woodland Replacements (Section 37-8) – Both Commercial and Residential				
Woodland Replacement Trees	Requirements per Section 37 **Commercial:** 180 replacements are required **MF Residential:** 697 replacements are required	**Commercial:** • 41 trees • Contribution to tree fund for 139 credits **MF Residential:** • 181 trees – most appear to be evergreen trees • Contribution to tree fund for 516 credits	TBD	**1. Woodland replacement trees must be located in areas where they can be protected by a conservation easement.** **2. Woodland replacement trees may be used to meet the detention basin tree requirement if they will be protected by an easement.** **3. No more than 10% of the credits planted may be evergreens.** **4. Evergreen replacements receive 0.67 credits per tree. Please show the calculation that includes this. A greater contribution to the tree fund may be necessary.** 5. **Please use evergreen symbols more easily distinguished from the evergreen symbols used for multi-family unit trees to make counting them easier.** 6. **Please clearly indicate what trees on the Commercial section are replacements.**
Parking Area Landscape Requirements (Zoning Sec 5.5.3.C & LDM 5) – Commercial only				
General requirements	• Clear sight distance	It does not appear	TBD	

Item	Required	Proposed	Meets Code	Comments
(LDM 1.c)	within parking islands • No evergreen trees	that any plantings will block visibility across islands in the Commercial section but not all plantings are shown at this time.		
Name, type and number of ground cover (LDM 1.c.(5))	As proposed on planting islands	Not indicated	TBD	
General *(Zoning Sec 5.5.3.C)*				
Parking lot Islands *(a, b. i)*	• A minimum of 200 SF to qualify • 200sf landscape space per tree planted in island. • 6" curbs • Islands minimum width 10' BOC to BOC	**Commercial:** • Island areas are not indicated. • Some islands may be too small. **MF Residential:** No islands are proposed	TBD	**1. Please show the SF of each island/corner intended to serve as landscape islands.** **2. Any undersized island should be enlarged to at least the minimum area.**
Curbs and Parking stall reduction *(c)*	Parking stall can be reduced to 17' with 4" curb adjacent to a sidewalk of minimum 7 ft.	**Commercial:** All spaces are 19 feet long **MF Residential:** All spaces are 17 feet long with a 7 foot adjacent walk	• Yes • Yes	**If desired, the spaces abutting open space or walks could be shortened to 17 feet to reduce the amount of paving if 2 feet of overhang is provided.**
Contiguous space limit *(i)*	Maximum of 15 contiguous spaces	No bay is longer than 15 spaces.	Yes	
Category 1: For OS-1, OS-2, OSC, OST, B-1, B-2, B-3, NCC, EXPO, FS, TC, TC-1, RC, Special Land Use or non-residential use in any R district *(Zoning Sec 5.5.3.C.iii)*				
A = Total square footage of vehicular use areas x 7.5%	• A = x SF x 7.5% • A = 50,000 sf * 7.5% = 3750 sf	Calculation provided	Yes	
B = Total square footage of additional paved vehicular use areas over 50,000 SF x 1 %	• B = x SF x 1% • B = (155,186-50,000)sf * 1% = 1,052 sf	Calculation provided	Yes	
All Categories				
C = A+B Total square footage of landscaped islands	• C = A + B • C = 3750+1052 = 4802sf	• 11,928 sf • Island areas are not labeled	TBD	**Please label each island's area in SF so the area provided can be verified.**
D = C/200 Number of canopy trees required	• D = C/200 = x trees • D = 4802/200 = 24 trees	24 trees	Yes	
Parking Lot Perimeter Trees	• 1 Canopy tree per 35 lf • Interior drive trees should be used as perimeter trees along	71 trees	TBD	**1. Please add a line showing the perimeter line used for the calculation.**

Item	Required	Proposed	Meets Code	Comments
	the two bays (1 per bay, based on their length) • 2489/35 = 71 trees If the reduced requirement allowed by Table 5.5.3.2.ii.f is used, the perimeter tree requirement along the north edge of the Commercial parking lot can be reduced to just 1 per 70 lf.			**2. Perimeter trees need to be added along the southwest corner of the commercial section. If they are native species, they may be planted in the wetland buffer.** **3.** Greenbelt canopy trees may be double-counted as parking lot perimeter trees if they are within 15 feet of the parking lot. **4.** A line of evergreens is shown as perimeter trees between the 8 foot walls and the parking lot. **This is not acceptable as perimeter trees should be canopy trees.**
Building Foundation Landscaping Requirements - for Commercial only (*Sec 5.5.3.D)*				
Interior Site Landscaping SF	• Equal to entire perimeter of the building (less entrances) x 8 • Landscape areas may be no less than 4 feet wide/deep • No less than 75% of a building's perimeter should be landscaped, but ideally all but entries should be landscaped • Landscaping does not count lawn areas	• No calculations are provided • Some foundation landscape areas are indicated as blank areas • Planters are shown behind the curb in front of the commercial buildings	No	**1. Please provide calculations for each building** **2. Each building should meet the requirements.** **3. Please provide more information about the planters – in-ground or elevated, and their area in SF.** **4. Label the SF of each foundation landscape provided.** **5. Any deficiency in landscaping provided would require a landscape waiver.** *It would not be supported by staff.*
Frontage landscaping *(Sec 5.5.3.D.d)*	No less than 60% of a façade facing a public road shall be landscaped with a mix of trees, shrubs, perennials, annuals	• None of the building foundations has landscaping at the building front • It appears that 4'	TBD	Provide planting plans for the buildings' foundation landscaping in the Final Site Plans.

Item	Required	Proposed	Meets Code	Comments
	and/or ornamental grasses	wide planters are proposed in front of the buildings, near the parking lot but it isn't clear whether they will be sufficient		
Parking land banked	NA	None		
Miscellaneous Landscaping Requirements				
Plantings around Fire Hydrant *(d)*	• No plantings with matured height greater than 12' within 10 ft. of fire hydrants, manholes, catch basins or other utility structures. • Trees may also not be planted within 10 feet of an underground sanitary sewer line.	**Commercial:** No utilities are shown on the landscape plan **MF Residential:** Correct spacing appears to have been provided	• TBD • Yes	**1. Please add the utility lines and structures to the Commercial Landscape Plan.** **2. If the proposed utility layout prevents the planting of required trees, the utility layout may need to be corrected.**
Landscaped area *(g)*	Areas not dedicated to parking use or driveways exceeding 100 sq. ft. shall be landscaped	No groundcovers or detailed landscaping is shown on the Commercial landscape plan	TBD	1. Please indicate groundcovers or areas of other landscaping with hatching at a minimum. 2. Detailed plans can be provided on the Final Site Plans.
Name, type and number of ground cover (LDM 1.c.(5))	As proposed on planting islands	Not indicated on either plan except for the detention pond	No	**See above**
Snow deposit *(LDM.2.q.)*	Show snow deposit areas on plan in locations where landscaping won't be damaged	**Commercial:** Not indicated **MF Residential:** A note indicates that snow will be deposited along the street in the curb lawn	• No • Yes	Please show at least 2 potential snow deposit areas on the Commercial section.
Transformers/Utility boxes *(LDM 1.e from 1 through 5)*	• A minimum of 2 ft. separation between box and the plants • Ground cover below 4" is allowed up to pad. • No plant materials within 8 ft. from the doors	• City screening detail is included on Sheet L-4 • A note on L-1 indicates that all transformer boxes shall be screened per that detail. • No transformers	TBD	**1.** Please show transformers and other utility boxes when their locations are determined. **2.** Add an estimated number of shrubs for each transformer's screening to the

Item	Required	Proposed	Meets Code	Comments
		are shown on either landscape plan		plant list per the city utility landscape detail.
Detention/Retention Basin Planting requirements *(Sec. 5.5.3.E.iv)*	• Clusters of large native shrubs shall cover 70-75% of the basin rim area, 10 feet above the permanent water level. • Canopy trees shall be placed along east, west and south sides of the pond to help shade the pond. Woodland replacement trees may be used to meet this requirement if a conservation easement protecting them is provided. • 10" to 14" tall grass along sides of basin • Refer to wetland for basin mix • Include seed mix details on landscape plan	• Conceptual shrubs are shown that meet the requirement. • Woodland replacement trees are shown meeting the requirement for the canopy trees. This is allowed. • A seed mix is shown on Sheet L-2.	• Yes • Yes • Yes	
Phragmites and Japanese Knotweed Control	Any populations of Phragmites australis or Invasive Knotweed found on the site must be eliminated	A note indicates that no Phragmites or Japanese Knotweed were found on the site	Yes	If any is found during construction, it must be chemically treated to completely eliminate it from the site.
Plant List (LDM 2.h. and 4) – Include all cost estimates				
Quantities and sizes		No plant list is provided.		Provide a plant list on the landscape plans for each section (separate plant lists)
Root type		No	No	See above
Botanical and common names	• At least 50% of the species used shall be native to Michigan • Non-woodland replacement tree diversity must follow guidelines of Landscape Design Manual Section 4. • Species on the City's Prohibited Species List (LDM Table 11.b(2)b	No plant list is provided	TBD	1. See above 2. Please label all plantings on the plan view on the Final Site Plans, at the latest.

Item	Required	Proposed	Meets Code	Comments
	may not be used			
Type and amount of lawn		Not indicated	TBD	Need for final site plan
Cost estimate (LDM 2.t)	For all new plantings, mulch and sod as listed on the plan	Not provided	TBD	Need for final site plan
Landscape Notes and Details– Utilize City of Novi Standard Notes – as the areas are likely to be built by different contractors, please include the below information with both the Residential and Commercial sets of plans.				
Planting Details/Info (LDM 2.i) – Utilize City of Novi Standard Details				
Canopy Deciduous Tree	Refer to LDM for detail drawings	Sheet L-4	Yes	
Evergreen Tree		Sheet L-4	Yes	
Shrub		Sheet L-4	Yes	
Multi-stem tree		Sheet L-4	Yes	
Perennial/ Ground Cover		Sheet L-4	Yes	
Tree stakes and guys	Wood stakes, fabric guys.	Sheet L-4	Yes	
Cross-Section of Berms (LDM 2.j)				
Slope, height and width	• Label contour lines • Maximum 33% slope • Constructed of loam • 6" top layer of topsoil	No	No	Provide details on landscape plans for all berms
Type of Ground Cover		No	No	Indicate on cross section
Setbacks from Utilities	Overhead utility lines and 15 ft. setback from edge of utility or 20 ft. setback from closest pole, 10 feet from structures, hydrants	No overhead utilities exist on the site or along 10 Mile Road.	NA	
Walls (LDM 2.k & Zoning Sec 5.5.3.vi)				
Material, height and type of construction footing	Freestanding walls should have brick or stone exterior with masonry or concrete interior	• Two 8-foot screening walls are proposed between the westernmost residential buildings and the Commercial sections • Several retaining walls are indicated, but none in the right-of-way	TBD	Please add TW/BW elevations for retaining walls.
Walls greater than 3 ½		Detailed wall plans	TBD	

Item	Required	Proposed	Meets Code	Comments
ft. should be designed and sealed by an Engineer		for screening walls and retaining walls taller than 3.5 feet should be submitted for review with building drawings.		
Notes (LDM 2.i) – Utilize City of Novi Standard Details				
Installation date *(LDM 2.l. & Zoning Sec 5.5.5.B)*	• Provide intended date • Between Mar 15 – Nov 15	• Sheet L-4 • Between Mar 15-Nov 15 2024 or 2025	Yes	
Maintenance & Statement of intent *(LDM 2.m & Zoning Sec 5.5.6)*	• Include statement of intent to install and guarantee all materials for 2 years. • Include a minimum one cultivation in June, July and August for the 2-year warranty period.	Notes included on Sheet L-4	Yes	
Plant source *(LDM 2.n & LDM 3.a.(2))*	Shall be northern nursery grown, No.1 grade.	Note included on Sheet L-4		
Establishment period *(Zoning Sec 5.5.6.B)*	**2 yr. Guarantee**	Note included on Sheet L-4		
Approval of substitutions. *(Zoning Sec 5.5.5.E)*	City must approve any substitutions <u>in writing</u> prior to installation.	Note included on Sheet L-4		
General Landscape Requirements (LDM 3)				
General Conditions *(LDM 3.a)*	Plant materials shall not be planted within 4 ft. of property line	No	No	<u>Please add a callout stating this on the west end of the Commercial landscape plan.</u>
Irrigation plan *(LDM 2.s.)*	A method of providing water for establishment and long-term survival must be provided	No		**1.** <u>Please add the irrigation plan or information as to how plants will be watered sufficiently for establishment and long- term survival on the Final Site Plans.</u> **2.** <u>If xeriscaping is used, please provide information about plantings included.</u> **3.** <u>This information is required on the Final Site Plans.</u> **4.** <u>If an irrigation system</u>

Item	Required	Proposed	Meets Code	Comments
				will be used, it should meet the requirements stated at the bottom of this chart.
Other information *(LDM 2.u)*	Required by Planning Commission	NA		
Landscape tree credit *(LDM3.b.(d))*	• Substitutions to landscape standards for preserved canopy trees outside woodlands and wetlands should be approved by LA. • Refer to Landscape tree Credit Chart in LDM	None taken		
Plant Sizes for ROW, Woodland replacement and others *(LDM 3.c)*	Canopy Deciduous shall be 3" and sub-canopy deciduous shall be 2.5" caliper. Refer to section for more details	No plant list is provided	TBD	Include correct sizes on plant list.
Plant size credit *(LDM3.c.(2))*	NA	No		
Prohibited Plants *(LDM 3.d)*		No		
Recommended trees for planting under overhead utilities *(LDM 3.e)*	Label the distance from the overhead utilities	A note indicates that there are no overhead utilities on the site.	Yes	A site visit confirms that overhead wires along 10 Mile Road are on the north side of the road.
Collected or Transplanted trees *(LDM 3.f)*		None proposed		
Nonliving Durable Material: Mulch *(LDM 4)*	• Trees shall be mulched to 3" depth and shrubs, groundcovers to 2" depth • Specify natural color, finely shredded hardwood bark mulch. • Include in cost estimate.	Indicated on details on Sheet L-3	Yes	

NOTES:
1. This table is a working summary chart and not intended to substitute for any Ordinance or City of Novi requirements or standards.
2. The section of the applicable ordinance or standard is indicated in parenthesis. For the landscape requirements, please see the Zoning Ordinance landscape section 5.5 and the Landscape Design Manual for the appropriate items under the applicable zoning classification.
3. Please include a written response to any points requiring clarification or for any corresponding site plan modifications to the City of Novi Planning Department with future submittals.

Irrigation System Requirements

1. Any booster pump installed to connect the project's irrigation system to an existing irrigation system must be downstream of the RPZ.
2. The RPZ must be installed in accordance with the 2015 Michigan Plumbing Code.
3. The RPZ must be installed in accordance with the manufacture installation instructions for winterization that includes drain ports and blowout ports.
4. The RPZ must be installed a minimum of 12-inches above FINISHED grade.
5. Attached is a handout that addresses winterization installation requirements to assist with this.
6. A plumbing permit is required.
7. The assembly must be tested after installation with results recorded on the City of Novi test report form.

WOODLAND REVIEW
October 27, 2023

October 27, 2023

Lindsay Bell
City Planner
Department of Community Development
City of Novi
45175 W. Ten Mile Road
Novi, Michigan 48375

RE: Novi Ten Associates PRO Concept; PRZ23-001
Woodland Review of Revised PRO Concept Plan; Revised
MSG Project No. 2300772

Dear Ms. Bell:

The Mannik & Smith Group, Inc. (MSG) completed a project site evaluation relative to the *Novi Ten Associates Proposed Re-Zoning and PRO Concept Plan* prepared by Siegal/Tuomaala Associates dated October 4, 2023, stamped received October 10, 2023 by the City of Novi (Plan). The subject parcels are located south of Ten Mile Road and east of Novi Road in Section 26 and total approximately 42.9 acres (subject property). The tax parcel numbers associated with the subject property are 50-22-26-101-024 and -028 (Figure 1). The "PRO Line" (as depicted in the Plan) is reported to encompass 19.55 acres of the subject property. The proposed development area is generally defined by the "PRO Line" and is referenced as the Site in this letter (Figure 2). The Plan depicts construction of townhomes, commercial buildings, and other improvements at the Site.

MSG reviewed the pre-submittal plan set for conformance with the City of Novi's Woodland Protection Ordinance, Chapter 37. Based on review of the Pro Concept Plan, the City of Novi Official Regulated Woodlands Map, and a site visit the proposed development site contains City-Regulated Woodlands (Figure 1).

The following Woodland Regulations apply to this site:

Woodland Regulation	Required
Woodland Permit (Chapter 37, Section 37-26)	YES
Tree Replacement (Chapter 37, Section 37-8) & Financial Guarantee (Chapter 26.5-5)	YES
Tree Protection (Fence) (Chapter 37, Section 37-9) & Financial Guarantee (Chapter 26.5-5)	YES
Woodland Conservation Easement (Chapter 37-30 (e))	YES

Woodland Impacts

Davey Resource Group (DRG) conducted a site visit on behalf of MSG on March 14, 2023, to review the regulated woodlands on the site (refer to DRG's March 15, 2023 letter). Trees regulated by Chapter 37 include those that are 8-inches or greater DBH (diameter at breast height, 4.5-feet above existing grade) located within a regulated woodland and any tree 36-inches or greater DBH, irrespective of whether it is located in a regulated woodland.

2365 Haggerty Road South, Canton, Michigan 48188 Tel: 734.397.3100 Fax: 734.397.3131 www.MannikSmithGroup.com

DRG noted that the site has patches of woodland, open areas, and wetlands. Portions of the site appear to have been previously disturbed and many of the tree species growing on the site are considered pioneer species, or species that would naturally grow on a site following disturbance. The woodlands are considered low to moderate quality with a mix of bottomland and upland tree species including, American elm, black cherry, cottonwood, silver maple, black walnut, and box elder. Trees range in 8" -33" in diameter with most trees between 10" and 20" in diameter.

There are reportedly 646 regulated woodland trees 8" or greater in diameter (DBH) on the site in the areas proposed for zoning RM-1 and B-3. The plan proposes the removal of 464 regulated woodland trees.

It is anticipated that the following review comments will be addressed in the site plan approval process.

Woodland Review Comments

1. A Woodland Use Permit is required to perform construction on any site containing regulated woodlands. The Woodland Use Permit for this project requires Planning Commission approval.

   To determine woodland fence inspection fees for the Woodland Use Permit - the applicant shall provide the cost (labor and supplies) for installation (including the initial location staking) and removal of tree protection fencing.

   The tree protection fence is to be installed outside the dripline of the trees to be protected. Current depiction of the placement of the tree protection fence may impact trees 4186 and 5830.

2. Tree Removals and Replacements. The plan proposes the removal of 464 regulated woodland trees, which requires 877 woodland replacement credits.

Tree Size (DBH)	Number of Trees		Ratio Replacement/ Removed Tree	Replacements Required		Total Replacements Required
	RM-1	B-3		RM-1	B-3	
8-11"	140	26	1	140	26	166
>11-20"	179	38	2	358	76	434
>20-29"	21	7	3	63	21	84
>29+"	1	2	4	4	8	12
Multi-Stem	34	12	Add Stems/8	132	49	181
Regulated Woodland Trees Removed	375	89				
Total Regulated Woodland Trees Removed	464					
Total Replacement Credits Required				697	180	**877**

3. Woodland Replacements. Woodland replacement credits can be provided by:
   a. Planting the woodland tree replacement credits on-site.

   b. Payment to the City of Novi Tree Fund at a rate of $400/woodland replacement credit.

   c. Combination of on-site tree planting and payment into the City of Novi Tree Fund ($400/woodland replacement credit).

Sheet L-1 of the Plan, *Conceptual Landscape Plan*, prepared by Allen Design, proposes the planting of the 171 woodland replacement credits on-site in zone RM-1 and payment into the Tree Fund for the remaining 526 woodland replacement credits.

Sheet L-1 and L-3 of the Plan, *Tree Removal and Protection Plan* and *B3 Zoning Landscape Plan (Conceptual)* respectively, prepared by Vert Verde Landscape Architecture, proposes the planting of the 106 woodland replacement credits on-site in zone B-3. It is assumed that the remaining 74 woodland replacement credits will be paid into the Tree Fund, though not stated on the plans.

In total, 277 woodland replacement credits are to be planted on-site in zones RM-1 and B-3 and 600 woodland replacement credits are to be paid into the Tree Fund.

The Landscape Plans prepared by Allen Design and Vert Verde Landscape Architecture need to be revised to include the size and species of the woodland replacement trees to be planted on site.

4. Financial Guarantees
    a. A woodland fence guarantee of $6,000 ($5,000 x 120%) is required per Chapter 26.5-37. The financial guarantee shall be paid prior to issuance of the City of Novi Woodland Use Permit.

    b. Woodland Replacement Financial Guarantee of $110,800 (277 required woodland replacement credits x $400 per woodland replacement credit) is required as part of the Woodland Use Permit fees to ensure planting of the on-site Woodland Replacement tree credits.

        Based on inspection of the installed on-site Woodland Replacement trees, the Woodland Replacement Financial Guarantee shall be returned to the Applicant. The Applicant is responsible for requesting this inspection. Following acceptance of the planted woodland replacement trees, a 2-year performance bond must be paid to ensure the continued health and survival of the replacement trees (see Comment 6).

    c. Tree Fund Payment. The applicant is required to pay $240,000 (600 woodland replacement credits x $400 per woodland replacement credit) into the City of Novi Tree Fund. This fee is not refundable.

    d. The applicant shall guarantee trees for two growing seasons after installation and the City's acceptance, per The City's Performance Guarantees Ordinance. A two-year maintenance bond in the amount of $27,700 (25 percent of the value of the trees but in no case less than $1,000.00), shall be required to ensure the continued health of the trees following acceptance (Chapter 26.5, Section 26.5-37).

        Based on a successful inspection 2 years after installation of the on-site Woodland Replacement trees, the Woodland Replacement Performance Guarantee shall be returned to the Applicant. The Applicant is responsible for requesting this inspection.

5. Woodland Guarantee Inspection.
    If the woodland replacements, street trees or landscaping guarantee period is scheduled to end during the period of time when inspections are not conducted (November 15th – April 15th) the Applicant is responsible for contacting the Bond Coordinator and Woodland/Landscape Inspector in late summer/early fall prior to the 2 year expiration to schedule an inspection. The Applicant is responsible for walking the entire site to confirm that all of the material has survived and is healthy. If any material is missing, dead or dying, replacements should be made prior to requesting the inspection. Once this occurs the Applicant should contact the Bond Coordinator to schedule the

inspection (Angie Sosnowski at asosnowski@cityofnovi.org / 248-347- 0441) and complete the inspection request form. If additional inspections are needed, then additional inspection fees will be required to be paid by the applicant. Based upon a successful inspection for the 2 year warranty the Landscape/Woodland/Street trees financial guarantee will be returned to the Applicant.

6. Conservation Easement.

   The Applicant may be required to provide preservation/conservation easements as directed by the City of Novi Community Development Department for any areas of woodland replacement trees. The applicant shall demonstrate that all proposed woodland replacement trees and existing regulated woodland trees to remain will be guaranteed to be preserved as planted with a conservation easement or landscape easement to be granted to the city. This language shall be submitted to the City Attorney for review. The executed easement must be returned to the City Attorney within 60 days of the issuance of the City of Novi Woodland permit. Any associated easement boundaries shall be indicated on the Plan.

Please contact the undersigned if you have any questions regarding the matters addressed in this letter.

Sincerely,

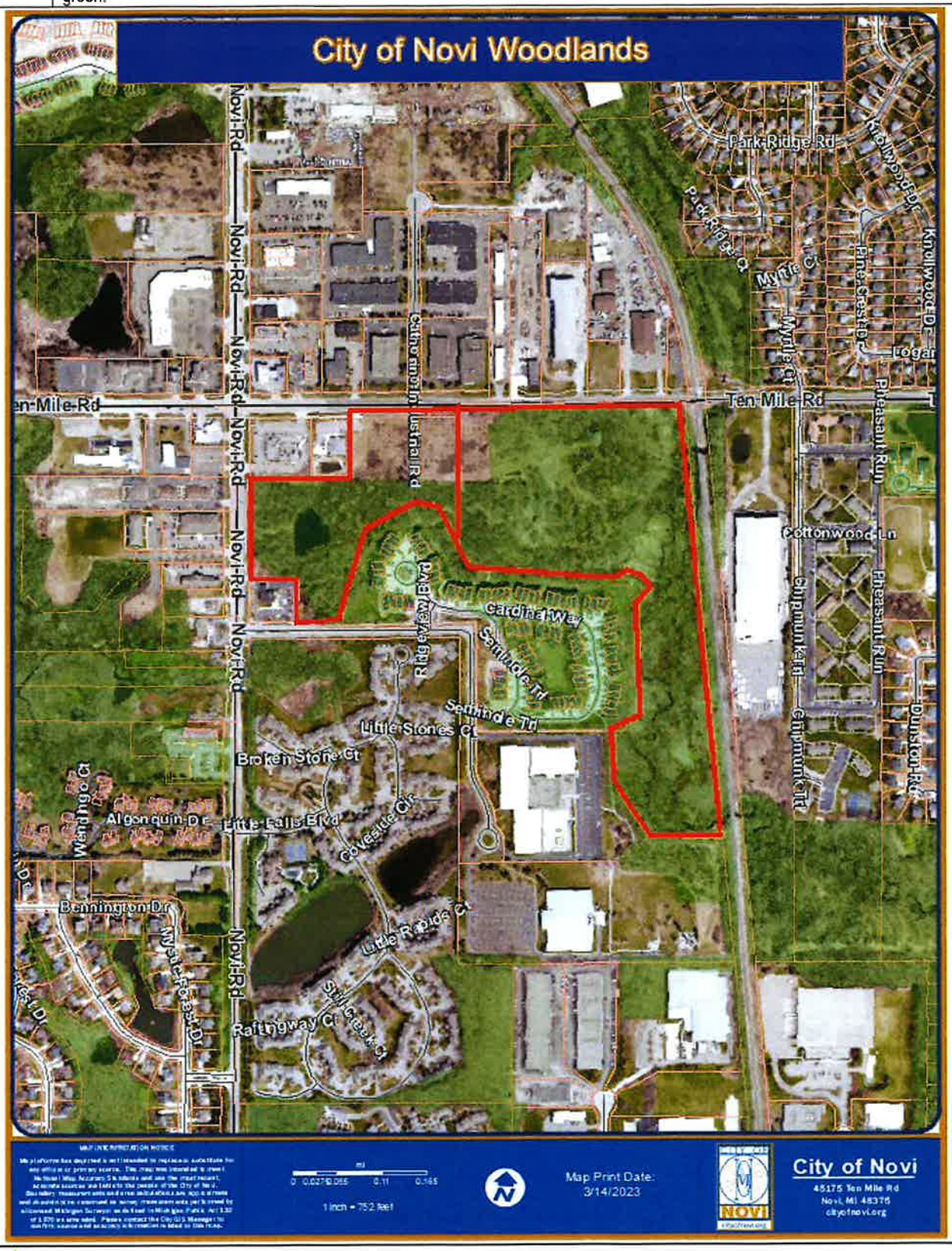
The Mannik & Smith Group, Inc.

Keegan Mackin
Environmental Scientist

Douglas Repen, CDT
Project Manager
Certified Storm Water Management Operator

CC: Barbara McBeth, City of Novi Planner
James Hill, City of Novi Planner
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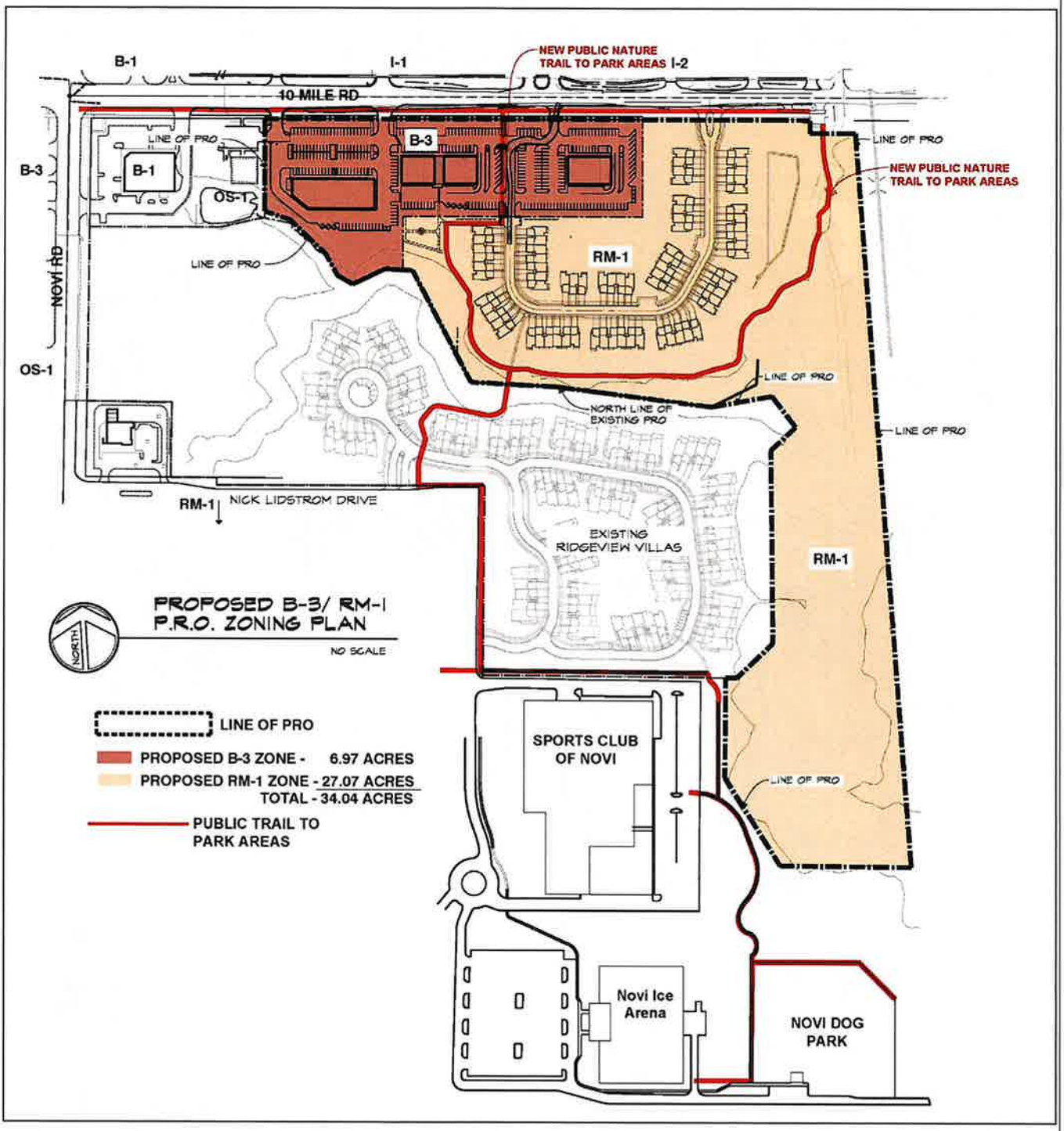
Figure 1	City of Novi Regulated Woodland Map. Approximate tax parcel limits are shown in red. Regulated Woodland areas are shown in green.



Mannik Smith Group
TECHNICAL SKILL. CREATIVE SPIRIT.
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Novi Ten Associates PRO Revised Concept; PRZ23-001
Woodland Review of Revised PRO Concept Plan, Revised
MSG Project No. 2300772

Figure 2 | Excerpt from the Plan. The "Site" is shaded areas.



WETLAND REVIEW
October 27, 2023

October 27, 2023

Lindsay Bell
City Planner
Department of Community Development
City of Novi
45175 W. Ten Mile Road
Novi, Michigan 48375

RE: Novi Ten Associates PRO Concept; JZ23-09
Wetland Review of Revised PRO Concept Plan; Revised
MSG Project No. 2300772

Dear Ms. Bell:

The Mannik & Smith Group, Inc. (MSG) completed a project site evaluation relative to:

- *Novi Ten Associates Proposed Re-Zoning and PRO Concept Plan* prepared by Siegal/Tuomaala Associates dated October 4, 2023 and stamped received October 10, 2023 by the City of Novi (Plan);
- *Wetland Delineation Report (v.2), West 10 Mile Road – Parcel # 22-26-101-024* prepared by Niswander Environmental (Niswander) dated February 2021; and
- *Wetland Delineation Report, West 10 Mile Road* prepared by Niswander dated June 2023.

The subject parcels are located south of Ten Mile Road and East of Novi Road in Section 26 and total approximately 42.9 acres (subject property). The tax parcel numbers associated with the subject property are 50-22-26-101-024 and -028 (Figure 1). The "PRO Line" (as depicted in the Plan) is reported to encompass 34.04 acres of the subject property. The proposed development area is generally defined by the "PRO Line" and is referenced as the Site in this letter (Figure 2). The Plan depicts construction of townhomes, commercial buildings, and other improvements at the Site. The Plan divides the Site into two areas: zone RM-1 (residential use) and zone B-3 (commercial use).

Published Data

Upon review of published resources, the subject property appears to contain or immediately borders:

- ☒ City-regulated wetlands, as identified on the City of Novi Wetlands interactive map website. Note that both wetland and subject property limits depicted on the City's map are considered approximations (Figure 1).
- ☒ Wetlands that are regulated by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). The Walled Lake Branch of the Middle Rouge River and Chapman Creek bisect the subject property. EGLE typically regulates wetlands that are located within 500 feet of an inland lake, pond, stream, or river, and/or isolated wetlands of an area of 5 acres or more.
- ☒ Wetlands as identified on National Wetland Inventory (NWI) and Michigan Resource Inventory System (MIRIS) maps, as identified on the EGLE Wetlands Viewer interactive map website (Figure 3). NWI and MIRIS wetlands are identified through interpretation of topographic data and aerial photographs by the associated governmental bodies.
- ☒ Hydric (wetland) soil as mapped by the U.S. Department of Agriculture, Natural Resource Conservation Service, as identified on the EGLE Wetlands Viewer interactive map website (Figure 3).

MSG Wetland Boundary Verification
The Plan depicts the locations of five wetlands in zone RM-1 of the Site that were designated Wetlands A through E, with Wetlands C and D extending beyond the Site limits. Four wetlands were found in zone B-3 (Wetlands 1 through 4), but no wetlands are depicted in zone B-3 of the Site on the Plan. The *Application for Site Plan and Land Use Approval* form submitted with the Plan proposes to disturb/fill 0.09 acres of wetland in zone RM-1 and 0.05 acres of wetland in zone B-3.

Proposed Impacts
The proposed impacts to Site wetlands as described in the Plan and Niswander's reports are summarized below.

	Wetland	Area within Site	Wetland Impact Area	Wetland Fill Volume (CF)	Type	Buffer Area within Site	Buffer Impact Area	Regulated by City?	Regulated by EGLE?
Northern Portion of Zone RM-1	A	0.05 Acre	0.05 Acre	4356	Emergent	0.189 Acre	0.189 Acre	Yes	Yes
	B	0.04 Acre*	0.029 Acre	3790	Emergent	0.111 Acre	0.111 Acre	Yes	Yes
	C	0.101 Acre**	0.00 Acre	0	Emergent/ Scrub-Shrub	Not provided	0.045 Acre	Yes	Yes
	D	0.45 Acre***	0.00 Acre	0	Emergent/ Scrub-Shrub	Not provided	0.082	Yes	Yes
	E	0.012 Acre****	0.012 Acre	523	Emergent	0.101 Acre	0.101 Acre	Yes	Yes
Zone B-3	1	0.02 Acre	Not provided	Not provided	Emergent	Not provided	Not provided	Yes	Yes
	2	0.01 Acre	Not provided	Not provided	Emergent/Forested	Not provided	Not provided	Yes	Yes
	3	0.01 Acre	Not provided	Not provided	Forested	Not provided	Not provided	Yes	Yes
	4	0.53 Acre	Not provided	Not provided	Emergent/Forested	Not provided	Not provided	Yes	Yes

* The Plan depicts Wetland B as 0.03 acre, but Niswander identified 0.04 acre.
** The Plan depicts Wetland C as 0.101 acre, but Niswander identified 0.27 acre.
*** The Plan depicts Wetland D as 0.012 acre, but Niswander identified 0.45 acre.
**** The Plan depicts Wetland E as 0.012 acre, but Niswander identified 0.1 acre.

Based on the Plan, it appears Wetlands A, B, and E are proposed to be filled. Wetlands C and D are depicted to be outside the proposed construction area, but impact(s) to their associated natural resource setback (buffer) are quantified on the Plan. A full impact assessment cannot be made because the proposed wetland and wetland buffer impact areas in zone B-3 and the southern portion of zone RM-1 have not been accurately depicted and quantified. For example, in addition to previously mentioned inconsistencies, the impact associated with pedestrian walk through Wetland D and its buffer have not been included on the Plan.

Permits and Regulatory Status
Based on available information, the following wetland-related items appear to be required for this project:

Item	Required / Not Required
City Wetland Permit	Required; Non-Minor
Wetland Mitigation	To be determined: may be required according to Novi Ordinance (less than 0.25 acre of impact total with current delineation data); however an EGLE permit may require mitigation by purchasing approved wetland credits or other means.
Environmental Enhancement Plan	Required
Wetland Buffer Authorization	Required
EGLE Wetland Permit	To be determined by EGLE

Item	Required / Not Required
Wetland Conservation Easement	Not required unless mitigation is constructed within Novi

MSG concurs with Niswander's opinion that each of the delineated wetlands would be regulated by EGLE due to their proximity to (i.e. within 500 feet of) Chapman Creek and/or the Walled Lake Branch of the Middle Rouge River.

The City of Novi Code of Ordinances, Chapter 12, Article V defines an essential wetland as meeting one or more of the criteria listed in subsections 12-174(b)(1) through (10) . It is MSG's opinion that wetlands A through E provide the functional characteristics of storm water storage capacity and wildlife habitat, and accordingly meet the criteria for an essential wetland. The boundaries and functional characteristics of Wetlands 1 through 4 have not yet been verified onsite.

Mitigation is required per Section 12-176 of the Novi Code of Ordinances when an activity results in 0.25 acre or greater of impairment or destruction of wetland areas that are determined to be essential wetland area, two acres in size or greater, or contiguous to a lake, pond, river, or stream. The Novi Code of Ordinances, Section 12-176 – Mitigation, states "Where an activity results in the impairment or destruction of wetland areas of less than one-quarter (¼) acre that are determined to be essential under subsection 12-174(b), are two (2) acres in size or greater or are contiguous to a lake, pond, river or stream, additional planting or other environmental enhancement shall be required onsite within the wetlands or wetland and watercourse setback where the same can be done within the wetland and without disturbing further areas of the site."

Additionally, conditions set forth within a required EGLE wetland use permit must be incorporated into the Site Plan, as follows: "If a permit granted by the department of natural resources and environment allows activities not allowed by the use permit granted under this article, the restrictions of the permit granted under this article shall govern. If a permit granted by the department of natural resources and environment imposes additional restrictions upon the activities, such restrictions shall be conditions of the permit granted under this article (Novi Code of Ordinances, Section 12-173(f))."

According to the *Application for Site Plan and Land Use Approval* form, the total proposed impact to City and EGLE regulated wetlands is 0.14 acre. Based on the total being less than 0.25 acre, mitigation is not required by the City but an environmental enhancement plan will be required. An environmental enhancement plan typically includes the removal of non-native species and/or planting of native wetland species within affected wetland(s) to compensate for lost wildlife habitat. Planting of native species with subsequent protection from mowing around a detention basin has also been approved as an enhancement plan.

EGLE is the final authority of the location and regulatory status of wetlands in Michigan. MSG recommends the client request a pre-application meeting with EGLE to determine the State jurisdictional status and mitigation requirements if work affecting the potentially State-regulated wetlands is proposed.

Given that a City Wetland permit cannot be issued for EGLE-regulated wetlands until EGLE has issued a wetland use permit, the applicant is advised both City and EGLE requirements would apply to a mitigation plan, if applicable.

In addition to wetlands, the City of Novi regulates wetland and watercourse buffers/setbacks. Article 24, Schedule of Regulations, of the Zoning Ordinance states: "There shall be maintained in all districts a wetland and watercourse setback, as provided herein, unless and to the extent, it is determined to be in the public interest not to maintain such a setback. The intent of this provision is to require a minimum setback from wetlands and watercourses". The established wetland and watercourse buffers/setback limit is 25 feet horizontal feet, regardless of grade change.

Comments

1. **All inconsistencies between the Plans and other associated Site documents regarding wetland/buffer size, location, impact, fill, etc. must be corrected.**

2. The City of Novi *Site Plan and Development Manual* requires the boundary lines of any watercourses or wetlands on the Site be clearly flagged or staked and such flagging or staking shall remain in place throughout the conduct of permit activity. MSG recommends the wetland delineation markers be maintained for reference for the duration of the project.

Please contact the undersigned if you have any questions regarding the matters addressed in this letter.

Sincerely,
The Mannik & Smith Group, Inc.

Keegan Mackin
Environmental Scientist

Douglas Repen, CDT
Project Manager
Certified Storm Water Management Operator

CC: Barbara McBeth, City of Novi Planner
Lindsay Bell, City of Novi Planner
James Hill, City of Novi Planner
Ian Hogg, City of Novi Planner
Sarah Marchioni, City of Novi Project Coordinator
Rick Meader, City of Novi Landscape Architect
Diana Shanahan, City of Novi Planning Assistant
Heather Zeigler, City of Novi Planner

FIGURES

Figure 1	City of Novi Regulated Wetland Map. Approximate tax parcel limits are shown in teal. Regulated Wetland areas are shown in blue.



Mannik Smith Group

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Tel: 734.397.3100 Fax: 734.397.3131

Novi Ten Associates PRO Concept; JZ23-09
Wetland Review of Revised PRO Concept Plan, Revised
MSG Project No. 2300772

Figure 2 | Excerpt from the Plan. The "Site" is shaded areas.

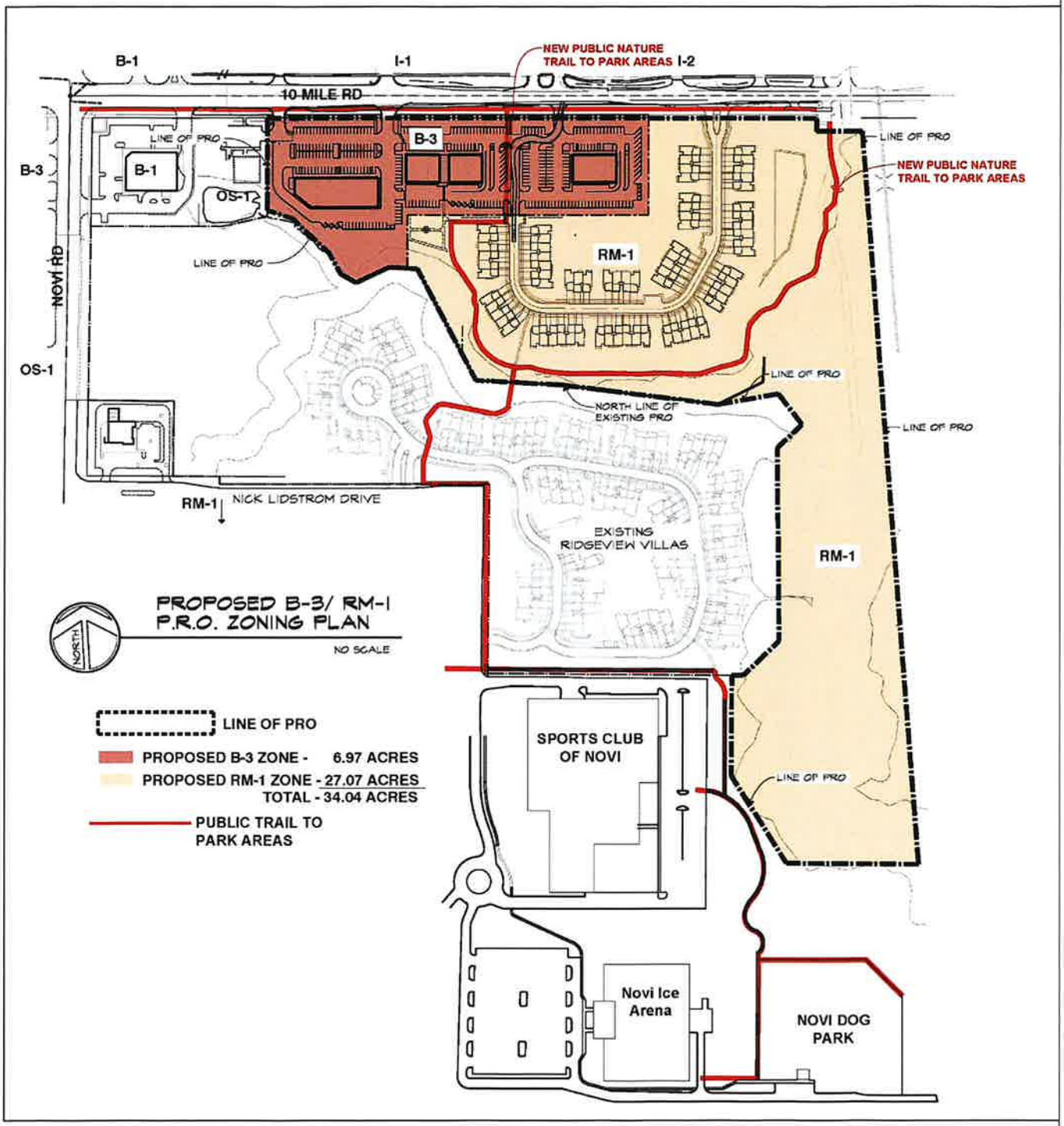


Figure 3 | EGLE Wetlands Viewer Map. Approximate subject property boundary is shown in red.

Wetlands Map Viewer



March 9, 2023

Part 303 Final Wetlands Inventory

- Wetlands as identified on NWI and MIRIS maps
- Soil areas which include wetland soils
- Wetlands as identified on NWI and MIRIS maps and soil areas which include wetland soils

1:9,572

0 0.07 0.15 0.3 mi

0 0.13 0.25 0.5 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC (c) OpenStreetMap contributors, and the GIS User Community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Disclaimer. This map is not intended to be used to determine the specific

Mannik Smith GROUP

2365 Haggerty Road South, Canton, Michigan 48188
Tel: 734.397.3100 Fax: 734.397.3131

Novi Ten Associates PRO Concept; JZ23-09
Wetland Review of Revised PRO Concept Plan, Revised
MSG Project No. 2300772

TRAFFIC REVIEW
January 25, 2024

AECOM
27777 Franklin Road
Southfield
MI, 48034
USA
aecom.com

Project name:
JZ23-09 – Novi Ten PRO 2nd Revised Concept Traffic Review

To:
Barbara McBeth, AICP
City of Novi
45175 10 Mile Road
Novi, Michigan 48375

From:
AECOM

Date:
January 25, 2024

CC:
Lindsay Bell, James Hill, Heather Zeigler, Humna Anjum, Diana Shanahan, Adam Yako

Memo

Subject: JZ23-09 – Novi Ten PRO 2nd Revised Concept Traffic Review

The PRO second revised concept site plan was reviewed to the level of detail provided and AECOM recommends **denial** for the applicant to move forward until the comments below are addressed to the satisfaction of the City.

GENERAL COMMENTS

1. The applicant, Novi Ten Associates, is proposing a residential and commercial development consisting of 71 housing units, as of this time 39,500 SF total of retail/restaurants, and park area. An architectural plan for the commercial phase was provided and the comments for that phase are *italicized* below.
2. The development is located on 10 Mile Road, east of Novi Road. 10 Mile Road is under the jurisdiction of Oakland County.
3. The site is zoned OS-1 and I-1. The applicant is seeking to rezone the commercial area to B-3 and the residential to RM through a PRO Agreement.
4. The following traffic-related deviations are being requested by the applicant:
    a. Perpendicular parking on a major drive.
    b. Major drive curve of radius less than 100'.
5. The following traffic-related deviations will be required if plans are not changed and required to be obtained at the PRO stage:
    a. Opposite and same-side driveway spacing.

TRAFFIC IMPACTS

1. AECOM performed an initial trip generation based on the ITE Trip Generation Manual, 10th Edition, as follows. This does not include the business area, due to lack of information from the applicant.

    ITE Code: 220 – Multifamily Housing (Low-Rise) and Strip Retail Plaza <40K (822), High Turnover (Sit-Down) Restaurant (932)
    Development-specific 71 Dwelling Units and 35,900 SF (26,700 SF assumed retail, 9,200 SF assumed restaurant)
    Zoning Change: OS-1 and I-1 to RM-1 and B-3

Trip Generation Summary	Estimated Trips	Estimated Peak-Direction Trips	City of Novi Threshold	Above Threshold?
AM Peak-Hour Trips	196 (45+63+88)	120 (34+38+48)	100	Yes
PM Peak-Hour Trips	310 (51+176+83)	171 (32+88+51)	100	Yes
Daily (One-Directional) Trips	2,970 (530+1454+986)	N/A	750	Yes

2. The City of Novi generally requires a traffic impact study/statement if the number of trips generated by the proposed development exceeds the City's threshold of more than 750 trips per day or 100 trips per either the AM or PM peak hour, or if the project meets other specified criteria.

Trip Impact Study Recommendation	
Type of Study:	**Justification**
RTIS	Zoning change for OS-1 and I-1 to RM and B-3. RTIS portions of the provided TIS have been reviewed in a separate letter. Conclusion of the RTIS review: the daily trips (6,560) are **significantly higher for the proposed land uses** under the new zoning vs daily trips (2,566) under the existing zoning. However, the applicant is proposing to reduce the gross floor area to 35,900 SFT from 60,000 SFT as part of the second revised PRO concept plan since the RTIS study was submitted. The applicant could revise the RTIS to show the changes in the net impact.
TIS	A TIS review was previously provided under a separate letter. The TIS study indicates a large number of trips from this proposed development on the surrounding road networks and driveways. The study concluded with a list of **significant roadway improvements** including the addition of through lanes and a central left turn lane on 10 Mile Road within the study area in support of the shopping plaza. However, we do not agree with the widening of 10 Mile Road only tied to the site driveways as suggested in the report rather it should be tied to the major intersection movements for the safety and drivers' expectancy. **The commercial part of this project is dependent on these mitigations/improvements being implemented.**

TRAFFIC REVIEW

The following table identifies the aspects of the plan that were reviewed. Items marked O are listed in the City's Code of Ordinances. Items marked with ZO are listed in the City's Zoning Ordinance. Items marked with ADA are listed in the Americans with Disabilities Act. Items marked with MMUTCD are listed in the Michigan Manual on Uniform Traffic Control Devices.

The values in the 'Compliance' column read as 'met' for plan provision meeting the standard it refers to, 'not met' stands for provision not meeting the standard and 'inconclusive' indicates applicant to provide data or information for review and 'NA' stands for not applicable for subject Project. The 'remarks' column covers any comments reviewer has and/or 'requested/required variance' and 'potential variance'. A potential variance indicates a variance that will be required if modifications are not made or further information provided to show compliance with the standards and ordinances. The applicant should put effort into complying with the standards; the variances should be the last resort after all avenues for complying have been exhausted. Indication of a potential variance does not imply support unless explicitly stated.

EXTERNAL SITE ACCESS AND OPERATIONS				
No.	**Item**	**Proposed**	**Compliance**	**Remarks**
1	Driveway Radii | O Figure IX.3	35' and *not indicated*	**Partially Met**	Could reduce to meet standard of 25' for local street. *Provide dimension for commercial phase driveways in future submittal.*
2	Driveway Width | O Figure IX.3	22' and *30' and not indicated*	**Partially Met**	Indicate the length of island. *Provide dimension for all commercial phase driveways in future submittal to ensure there is adequate space for separate left-turn and right-turn lanes.*
3	Driveway Taper | O Figure IX.11			
3a	Taper length	100'	Met	
3b	Tangent	50'	Met	
4	Emergency Access | O 11-194.a.19	2 access points	Met	Applicant has indicated commercial property not to be developed at this time. The access for the 2nd entrance for the residential section must be built at the same time as the residential section. **Details of the gate and applicable signs should be provided in future submittals.**
5	Driveway sight distance | O Figure VIII-E	500+ and *not indicated*	**Partially Met**	*Provide dimensions for commercial phase driveways in future submittal.*
6	Driveway spacing			
6a	Same-side | O 11.216.d.1.d	Not indicated	**Inconclusive**	**45 mph speed limit dictates 230' spacing**. The applicant indicated they have preliminary approval from RCOC on the driveway locations.
6b	Opposite side | O 11.216.d.1.e	105' and 118', *Directly across from existing driveways*	**Partially Met**	Applicant should consider moving the driveway to be across from one of the two existing driveways near it. The applicant indicated they have preliminary approval from RCOC on the driveway locations. **A deviation would be required if City standards are not met.**
7	External coordination (Road agency)	Applicant indicated permit required	**Partially Met**	Include details of what work is to occur in the RCOC right of way and maintenance of traffic plans for the work.
8	External Sidewalk | Master Plan & EDM	8'	Met	

EXTERNAL SITE ACCESS AND OPERATIONS				
No.	**Item**	**Proposed**	**Compliance**	**Remarks**
9	Sidewalk Ramps | EDM 7.4 & R-28-K	Indicated and *not indicated*	**Partially Met**	ADA ramps labeled at residential entrance only, include sidewalk ramp detail in future submittals.
10	Any Other Comments:			

INTERNAL SITE OPERATIONS				
No.	**Item**	**Proposed**	**Compliance**	**Remarks**
11	Loading zone | ZO 5.4	N/A and *170' x 10', 170' x 10', 60' x 10', and 70' x 10'*	Met	
12	Trash receptacle | ZO 5.4.4	Individual trash collection and *provided for each of the 4 buildings*	Met	
13	Emergency Vehicle Access	Turning movements provided	Met	
14	Maneuvering Lane | ZO 5.3.2	N/A and *24'*	Met	
15	End islands | ZO 5.3.12			
15a	Adjacent to a travel way	N/A and *partially dimensioned*	**Inconclusive**	*Provide radii dimensions for commercial phase end islands in future submittal. Note end islands adjacent to travel way are to be 3' shorter than adjacent space.*
15b	Internal to parking bays	N/A and *partially dimensioned*	**Inconclusive**	*Provide dimensions for commercial phase end islands in future submittal.*
16	Parking spaces | ZO 5.2.12	10 backing onto street	**Not Met**	Perpendicular parking on major drive, see No.30. See Planning review letter for number of parking spaces required.
17	Adjacent parking spaces | ZO 5.5.3.C.ii.i	<15 spaces without an island	Met	
18	Parking space length | ZO 5.3.2	19' typical and *17' and 19'*	Met	
19	Parking space Width | ZO 5.3.2	9' typical and *9'*	Met	
20	Parking space front curb height | ZO 5.3.2	6" and *not indicated*	**Partially Met**	*Provide for commercial phase in future submittal. Note 4" curb required in front of 17' parking space and 6" everywhere else.*
21	Accessible parking – number | ADA	1 and *16*	Met	

INTERNAL SITE OPERATIONS				
No.	**Item**	**Proposed**	**Compliance**	**Remarks**
22	Accessible parking – size | ADA	8' with 8' aisle	Met	Applicant could consider providing the aisle on the passenger side of the space.
23	Number of Van-accessible space | ADA	1 and *not indicated*	**Partially Met**	One (1) space is required to be van accessible. *Label which spaces are van accessible in future submittal.*
24	Bicycle parking			
24a	Requirement | ZO 5.16.1	16 spaces *and not indicated*	**Partially Met**	One (1) space for every 5 dwellings, total of 15 spaces required. *5% of required automobile spaces, minimum two (2) spaces.*
24b	Location | ZO 5.16.1	2 locations and *not indicated*	**Partially Met**	Applicant could consider providing 4 locations with 4 spaces each instead of 2 locations with 8 spaces each. *Label in commercial phase in future submittal.*
24c	Clear path from Street | ZO 5.16.1	6' clear path and *not indicated*	**Partially Met**	*Dimension in commercial phase in future submittal.*
24d	Height of rack | ZO 5.16.5.B	3'	Met	
24e	Other (Covered / Layout) | ZO 5.16.1	Layout provided	**Not Met**	**Refer to Text Amendment 18.301 for revised standard layout details.**
25	Sidewalk – min 5' wide | Master Plan	5' wide minimum and *4' and 7'*	**Partially Met**	*4' does not meet 5' minimum requirement at building A. Dimension all sidewalk widths in commercial phase.*
26	Sidewalk ramps | EDM 7.4 & R-28-J	Detectable warning strip indicated and *not indicated*	**Partially Met**	Applicant should provide details for proposed ramps. *Label ramps in commercial phase in future submittal.*
27	Sidewalk – distance back of curb | EDM 7.4	6' and *0'*	Met	
28	Cul-De-Sac | O Figure VIII-F	N/A	-	-
29	Drive-Thru | ZO 5.3.11.I	*Not dimensioned*	**Inconclusive**	*Dimension stacking spaces and centerline radius in future submittal. Indicate board location.*
30	Minor/Major Drives | ZO 5.10	Private road qualifies as major drive. 10 perpendicular spaces and 85', 100', and 120' curves	**Not Met**	Major drives are not permitted perpendicular parking. Minimum curve radius allowed for major drives is 100', applicant is proposing 85' curve. **Applicant has indicated they are requesting both deviations.**
31	Any Other Comments:	**Add radius in future submittals for the T-turnaround to ensure compliance with Figure VIII-I.**		

SIGNING AND STRIPING				
No.	**Item**	**Proposed**	**Compliance**	**Remarks**
32	Signing: Sizes | MMUTCD	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
33	Signing table: quantities and sizes	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
34	Signs 12" x 18" or smaller in size shall be mounted on a galvanized 2 lb. U-channel post | MMUTCD	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
35	Signs greater than 12" x 18" shall be mounted on a galvanized 3 lb. or greater U-channel post | MMUTCD	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
36	Sign bottom height of 7' from final grade | MMUTCD	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
37	Signing shall be placed 2' from the face of the curb or edge of the nearest sidewalk to the near edge of the sign | MMUTCD	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
38	FHWA Standard Alphabet series used for all sign language | MMUTCD	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
39	High-Intensity Prismatic (HIP) sheeting to meet FHWA retro-reflectivity | MMUTCD	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
40	Parking space striping notes	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
41	The international symbol for accessibility pavement markings | ADA	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
42	Crosswalk pavement marking detail	Included and *not included*	**Partially Met**	*Provide for commercial phase in future submittal.*
43	Any Other Comments:	Applicant could provide crosswalk signs at the mid-block crossing.		

Note: Hyperlinks to the standards and Ordinances are for reference purposes only, the applicant and City of Novi to ensure referring to the latest standards and Ordinances in its entirety.

Should the City or applicant have questions regarding this review, they should contact AECOM for further clarification.

Sincerely,

AECOM

Paula K. Johnson, PE
Senior Transportation Engineer

Saumil Shah, PMP
Project Manager

TRAFFIC IMPACT STUDY REVIEW
December 20, 2023

AECOM
27777 Franklin Road
Southfield
MI, 48034
USA
aecom.com

Project name:
JSP23-09 – Novi Ten TIS Traffic Review

From:
AECOM

Date:
December 20, 2023

To:
Barbara McBeth, AICP
City of Novi
45175 10 Mile Road
Novi, Michigan 48375

CC:
Lindsay Bell, James Hill, Ian Hogg, Heather Zeigler, Diana Shanahan

Memo

Subject: JSP23-09 – Novi Ten TIS Traffic Review

The Traffic Impact Study was reviewed to the level of detail provided and AECOM recommends **approval of the Traffic Impact Study with the mitigations/improvements**.

GENERAL COMMENTS

1. The memo will provide comments on a section-by-section basis following the format of the submitted report.
2. The project is located on the south side of 10 Mile Road between Novi Road and the Railroad tracks.
3. The development consists of 71 townhouse residential units (low rise) and approximately 60,000 SF of neighborhood retail.
4. The development is a PRO plan, and the site would need to be rezoned from its existing mix of I-1 and OS-1.

BACKGROUND DATA

1. The following roadways were included in the study:
    a. 10 Mile Road: East/West, 45 mph, 2 lanes divided
    b. The intersections and site driveways were included in the study.
        - 10 Mile Road & Novi Road
        - 10 Mile Road & Meadowbrook Road
        - Site Driveways (4 shown in concept plan)
        - Other Existing Driveways

2. Applicant collected turning movements that occurred between the hours of 6:00 AM-7:00 PM on March 16th, 2022 at 2 intersections (10 Mile Road and Novi Road and Meadowbrook Road) and 4 driveways.

EXISTING CONDITIONS

1. The overall Level of Service (LOS) at the major road intersections is D or better while following movement experiencing higher delay LOS E or F at:
    a. Northbound and southbound movements at 10 Mile and Meadowbrook Road (LOS E)
    b. Eastbound left at 10 Mile and Novi Road (LOS F)
    c. Southbound Third Driveway/Double Driveway at 10 Mile Road (LOS E)

BACKGROUND (NO BUILD) CONDITIONS 2024

1. A conservative 0.2% annual growth rate was used to determine the build year five years from 2022, based on the SEMCOG traffic volume forecasts.
2. Overall operations at the intersections are not expected to change significantly compared to existing conditions.

SITE TRIP GENERATION

1. A total of 6560 daily trips are anticipated based on the ITE trip generation codes.
2. A total of 40% of trips are considered as pass-by trips during the afternoon peak hours and a relevant reference is provided in the Appendix from the ITE manual. And a net increase of approx. 250 trips during the morning peak hour and approx. 400 trips during the evening peak hour are considered for a traffic impact study on the surrounding road network.

SITE TRAFFIC ASSIGNMENT

1. Adjacent street volumes were used to calculate site trip distribution.
    a. The largest portion of the traffic is assumed to be coming from/going to Novi Road followed by 10 Mile Road and Meadowbrook Road.

FUTURE CONDITIONS

1. Operations at the signalized intersections are not expected to deteriorate at the following movements:
    a. Westbound 10 Mile Road (LOS E)
    b. Eastbound left at 10 Mile and Novi (LOS F in both existing and build conditions)
    c. LOS F for 3rd Site Driveway with the significantly excessive delay of approx. 2500 sec.
    d. Movements at Northbound and Southbound approaches at Meadowbrook continue to experience higher delays at LOS E.
2. Excessive delay at 3rd site driveway will lead ultimately to the driveway not being utilized by the commuters of this proposed development and will end up adding more traffic on other driveways and circulation within the development. This might start a cascade of effects on other driveways also failing especially when all the driveways are on 10 Mile Road.

CONCLUSIONS

1. The study concluded with a list of recommendations that will improve the failing level of service and traffic conditions as per the following:
    - Widen eastbound 10 Mile Road to two through lanes, ending with a right-turn lane at the site's easternmost residential driveway.
    - Widen westbound 10 Mile Road to two through lanes west from the 3rd site driveway to help provide additional capacity for outbound site traffic.
    - Provide a continuous center lane turn lane to serve the 1st, 2nd, and 3rd commercial driveways.
    - Provide separate outbound left-turn / right-turn lanes for the site's 2nd and 3rd commercial driveways to allow right-turning traffic to exit the site when vehicles are waiting to turn left.

    However, we do not agree with the widening of 10 Mile Road tied to the site driveways as suggested in the report rather it should be tied to the major intersection movements for the safety and drivers' expectancy.

2. The study indicates a large number of trips from this proposed development on the surrounding road networks and driveways. The study concluded with a list of significant roadway improvements including the addition of through lanes and a central left turn lane on 10 Mile Road within the study area in support of the shopping plaza. **The commercial part of this project is dependent on these mitigations/improvements being implemented.**

Should the City or applicant have questions regarding this review, they should contact AECOM for further clarification.

Sincerely,

AECOM



Saumil Shah, PMP
Project Manager



Jeff Wood, PE, PTOE
Senior Traffic Engineer

FAÇADE REVIEW
January 22, 2024

DRN & ASSOCIATES, ARCHITECTS, PC
Phone: (248) 880-6523
E-Mail: dnecci@drnarchitects.com
Web: drnarchitects.com
50850 Applebrooke Dr., Northville, MI 48167

January 22, 2024

City of Novi Planning Department
45175 W. 10 Mile Rd.
Novi, MI 48375-3024

Façade Review Status:
Residential Units – Section 9 Waiver Recommended.
Commercial Buildings – Full Compliance

Attn: Ms. Barb McBeth – Director of Community Development

Re: FACADE ORDINANCE REVIEW
Novi-Ten PRO, JSP23-09 Second Revised Concept
Façade Region: 1, Zoning District: RA

Dear Ms. McBeth:
The drawings provided by Toll Architecture dated 6/30/2023 for 4 typical residential townhome units have not changed since our prior review. The drawings for the commercial buildings by Siegal Tuomaala Architects dated 1/2/2024 have been significantly revised since our prior review.

Residential Unit 1 Howe, Newhaven (Drawings Dated 6/30/23)	Front	Rear	Left	Right	Ordinance Maximum (Minimum)
Brick	34%	**27%**	43%	43%	100% (30% Min)
Horizontal Siding	1%	21%	45%	45%	50% (Note 10)
Asphalt Shingles	**58%**	49%	7%	7%	50% (Note 14)
Wood Trim	7%	3%	5%	5%	15%

Residential Unit 2 Howe, Weatherby (Drawings Dated 6/30/23)	Front	Rear	Left	Right	Ordinance Maximum (Minimum)
Brick	**26%**	**27%**	43%	43%	100% (30% Min)
Horizontal Siding	1%	21%	45%	45%	50% (Note 10)
Vertical Siding	16%	0%	7%	7%	25%
Asphalt Shingles	47%	49%	5%	5%	50% (Note 14)
Wood Trim	10%	3%	5%	5%	15%

Residential Unit 3 Sanders, Newhaven (Drawings Dated 6/30/23)	Front	Rear	Left	Right	Ordinance Maximum (Minimum)
Brick	34%	**27%**	43%	43%	100% (30% Min)
Horizontal Siding	3%	21%	45%	45%	50% (Note 10)
Asphalt Shingles	**56%**	49%	7%	7%	50% (Note 14)
Wood Trim	7%	3%	5%	5%	15%

Residential Unit 4 Sanders, Weatherby (Drawings Dated 6/30/23)	Front	Rear	Left	Right	Ordinance Maximum (Minimum)
Brick	**26%**	**27%**	43%	43%	100% (30% Min)
Horizontal Siding	1%	21%	45%	45%	50% (Note 10)
Vertical Siding	18%	0%	7%	7%	25%
Asphalt Shingles	45%	49%	5%	5%	50% (Note 14)
Wood Trim	10%	3%	5%	5%	15%

Residential Units - Our prior recommendation for a Section 9 Waiver for the deviations highlighted above remains unchanged. As shown above the percentage of Brick is below the minimum amount required by the Ordinance and the percentage of Asphalt Shingles exceeds the maximum amount allowed by the Ordinance on several elevations. In this case the deviations are minor in nature and do not adversely affect the aesthetic quality of the facades. A Section 9 Waiver is therefore recommended for the underage of Brick (3%) and overage of Asphalt Shingles (8%) on the front and rear facades. The precise type of tongue and groove (T&G) and Batten Wood Siding in not clearly indicated on the drawings. It is recommended that a sample board as required by Section 5.15.4.D of the Ordinance and/or a colored rendering be provided to indicate the colors and type of all façade materials.

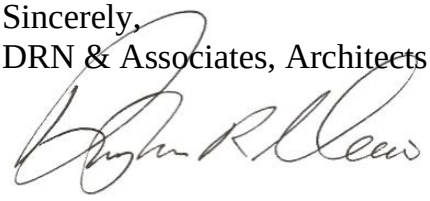
Commercial Bldg. A & B (Drawings Dated 1/2/24)	North Front	South Rear	East	West	Ordinance Maximum (Minimum)
Brick	57%	83%	72%	72%	100% (30% Min)
C-Brick	0%	12%	12%	12%	25%
EIFS	18%	0%	7%	7%	25%
Cast Stone	18%	0%	7%	7%	50%
Awning	0%	0%	0%	2%	10%
Flat Metal Panel	7%	5%	2%	0%	50%

Commercial Bldg. C (Drawings Dated 1/2/24)	North Front	South Rear	East	West	Ordinance Maximum (Minimum)
Brick	60%	83%	73%	73%	100% (30% Min)
C-Brick	0%	12%	12%	12%	25%
EIFS	0%	0%	6%	6%	25%
Cast Stone	31%	0%	7%	7%	50%
Awning	0%	0%	0%	0%	10%
Flat Metal Panel	9%	5%	2%	2%	50%

Commercial Bldg. D (Drawings Dated 1/2/24)	North Front	South Rear	East	West	Ordinance Maximum (Minimum)
Brick	60%	82%	79%	62%	100% (30% Min)
C-Brick	0%	12%	14%	12%	25%
EIFS	0%	0%	0%	15%	25%
Cast Stone	34%	0%	4%	9%	50%
Awning	0%	0%	0%	0%	10%
Flat Metal Panel	6%	6%	3%	2%	50%

Commercial Buildings – The revisions made to the commercial buildings generally represent improvements with respect to Façade Ordinance compliance. All facades remain in full compliance with the Façade Ordinance. The drawings indicate “all roof mounted mechanical equipment to be screened”. The applicant should specify the material to be used for the roof screens; the screen’s material must comply with the Façade Ordinance. A dumpster enclosure detail is not provided. The dumpster enclosure should have Brick to match the primary buildings on 3 sides.

Sincerely,
DRN & Associates, Architects PC



Douglas R. Necci, AIA

FIRE REVIEW
January 22, 2024

CITY COUNCIL

Mayor
Justin Fischer

Mayor Pro Tem
Laura Marie Casey

Dave Staudt

Brian Smith

Ericka Thomas

Matt Heintz

City Manager
Victor Cardenas

Director of Public Safety
Chief of Police
Erick W. Zinser

Fire Chief
John B. Martin

Assistant Chief of Police
Scott R. Baetens

Assistant Fire Chief
Todd Seog

Novi Public Safety Administration
45125 Ten Mile Road
Novi, Michigan 48375
248.348.7100
248.347.0590 fax

cityofnovi.org

January 22, 2024

TO: Barbara McBeth - City Planner
Lindsay Bell - Plan Review Center
James Hill – Plan Review Center
Heather Zeigler – Plan Review Center
Diana Shanahan – Planning Assistant

RE: Novi Ten PRO Concept

PRZ23-0001

Project Description:
Build 13 multi-tenant structures and 3 commercial buildings.

Comments:

- **All** fire hydrants **MUST** be installed and operational prior to any combustible material is brought on site. **IFC 2015 3312.1**
- For new buildings and existing buildings, you **MUST** comply with the International Fire Code Section 510 for Emergency Radio Coverage. This shall be completed by the time the final inspection of the fire alarm and fire suppression permits.
- Fire lanes will be designated by the Fire Chief or his designee when it is deemed necessary and shall comply with the Fire Prevention Ordinances adopted by the City of Novi. The location of all "fire lane – no parking" signs are to be shown on the site plans. ***(Fire Prevention Ord.)***
- The minimum width of a posted fire lane is 20 feet. The minimum height of a posted fire lane is 14 feet. ***(D.C.S Sec. 158-99(a).)***
- All new multi-residential buildings shall be numbered. Each number shall be a minimum 10 inches high, 1 inch wide and be posted at least 15 feet above the ground on the building where readily visible from the street. ***(Fire Prevention Ord.).***
- The distribution system in all developments requiring more than eight hundred (800) feet of water main shall have a minimum of two (2) connections to a source of supply and shall be a looped system. ***(D.C.S. Sec. 11-68(a))***
- The ability to serve at least two thousand (2,000) gallons per minute in single-family detached residential; three thousand (3,000) gallons per school areas; and at least four thousand (4,000) gallons per minute in office, industrial and shopping centers is essential. ***(D.C.S. Sec.11-68(a))***
- Water mains shall be put on the plans for review.

- Water mains greater than 25', shall be at least 8" in diameter. Shall be put on plans for review. ***(D.S.C. Sec.11-68(C)(1)(c)***
- Fire hydrant spacing shall be measured as "hose laying distance" from fire apparatus. Hose laying distance is the distance the fire apparatus travels along improved access routes between hydrants or from a hydrant to a structure.
- Hydrants shall be spaced approximately three hundred (300) feet apart online in commercial, industrial, and multiple-residential areas. In cases where the buildings within developments are fully fire suppressed, hydrants shall be no more than five hundred (500) feet apart. The spacing of hydrants around commercial and/or industrial developments shall be considered as individual cases where special circumstances exist upon consultation with the fire chief. ***(D.C.S. Sec. 11-68 (f)(1)c)***
- Fire department connections shall be located on the street side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or as otherwise approved by the code official. ***(International Fire Code 912.2.1)***
- With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of fire department connections shall be approved. ***(International Fire Code 912.2)***
- Proximity to hydrant: In any building or structure required to be equipped with a fire department connection, the connection shall be located within one hundred (100) feet of a fire hydrant. ***(Fire Prevention Ord. Sec. 15-17 912.2.3)***
- A hazardous chemical survey is required to be submitted to the Planning & Community Development Department for distribution to the Fire Department at the time any Preliminary Site Plan is submitted for review and approval. Definitions of chemical types can be obtained from the Fire Department at (248) 735-5674.
- Water mains and fire hydrants shall be installed prior to construction above the foundation. Note this on all plans.
- Site plan shall provide more than one point of external access to the site. A boulevard entranceway shall not be considered as providing multiple points of access. Multiple access points shall be as remote from one another as is feasible. The requirement for secondary access may be satisfied by access through adjacent property where an easement for such access is provided. Secondary access shall not be required under the following circumstances:
- Secondary access road for residential development cannot have a temporary topping on the road. Road shall be finished with grass pavers, asphalt, or cement.

- Fire apparatus access drives to and from buildings through parking lots shall have a minimum fifty (50) feet outside turning radius and designed to support a minimum of thirty-five (35) tons. ***(D.C.S. Sec 11-239(b)(5))***

Recommendation:

Approved with Conditions

Sincerely,



Kevin S. Pierce-Fire Marshal
City of Novi – Fire Dept.

cc: file

APPLICANT RESPONSE LETTERS

February 15, 2024
Ms. Lindsay Bell, AICP, Senior Planner
Community Development- Planning Division
City of Novi
45175 Ten Mile Road
Novi, MI 48375

Response Letter: JZ23-09 Novi-10 PRO 2nd Review Initial PRO Plan

Dear Ms. Bell,

As requested, we are submitting this response letter for inclusion in the Planning Commission packet for the February 21, 2024 Planning Commission meeting. Rezoning signs were installed on the site on January 30. Team members expected to attend the Planning Commission meeting:

Daniel Weiss,	Novi-10 Associates, LLC
Scott Hansen	Toll Brothers
Jason Iacoangeli	Toll Brothers
Lonny Zimmerman, AIA	Siegal Tuomaala Associates Architects & Planners, Inc.
Jason Rickard, PE,	Seiber, Keast, Lehner Engineering, Surveying
Michael Cool	Midwestern Consulting, LLC (Traffic Consulting)

This letter incorporates the responses from the civil engineer (SKL Engineering) and the residential landscape architect (Allen Design), however their individual response letters are attached for reference. Responses are as follows:

PLANNING REVIEW

PROJECT SUMMARY:
Recommendation:
Our responses will address in detail the staff concerns regarding, "residential use's compatibility with heavy industrial to the north, inconsistency with the recommendations of the Master Plan for Land Use Future Land Use Map, and the estimated increase in traffic", all of which are ameliorated by the responses that follow in this letter.

REVIEW COMMENTS: (Only items requiring a response are indicated below)
1b. Community Impact Statement:
All statements are being revised to reflect the current plans and all data is being updated. It should be noted that updated data does not change the ability of the municipal services to support the proposed PRO.

1c. Rezoning Traffic Impact Study:
Our traffic consultant has been working with AECOM for traffic coordination. The site (even with more commercial space that was assumed for the traffic impact study) is not expected to significantly degrade the level of service at the major intersections in the area. The owners have expressed a willingness to provide our traffic consultant's recommended road improvements along 10 Mile Road and at the site driveways and will be coordinating with the Road Commission of Oakland County, since the road is their jurisdiction. Discussions have taken place between the civil engineering team and the RCOC regarding the placement of the residential drive onto Ten Mile Road, which they approved in June of 2022, if a passing lane is added, which is shown on the drawings. All other improvements will be coordinated and adjusted as the County requires.

1d. Commercial Market Analysis:
As the market study recommends, most vehicle oriented uses will not be permitted, as explained in the narrative that accompanied the submission. The pedestrian linkages recommended by the market analysis for the retail portion of the PRO are clearly implemented with the Walkable Community Plan (Drawing P.4) that is an integral part of the project. This plan links the proposed townhouses, the existing townhouses to the south and the other surrounding residential developments with the proposed PRO retail development along Ten Mile Road, with the Novi Athletic Club and the Ice Arena to the south, with the park to the west, and with the large natural conservation easement area to the east. This linkage also connects with the proposed new public tennis/ pickleball courts built as part of this project.

1f. Sign Location Plan:
The public hearing notification signs were posted on site prior to the required February 1, 2024 date.

2. Intent of The Commercial District:
The commercial district is committed to being a Village Center for the community. The 3 nearby corners of 10 Mile Road and Novi Road are all zoned B-3, so that is the most consistent choice we have made, with certain use exclusions. Additional use exclusions as suggested by the staff for car dealerships, oil change facilities, and hotels/ motels which are detrimental to a walkable neighborhood center. However, the B-3 offers special use options such as a drive-thru restaurant and a neighborhood gym, which are not present in the B-2 district and are compatible with a "Village Center" environment.

3. Drive-Through and Fast Food Restaurants:
As indicated the drawings show one drive-thru for a restaurant which exceeds all of the setback requirements. The drive thru has been located at the farthest building on the proposed commercial plan from the proposed residential parcel. We are not

opposed to limiting the number of drive-thru restaurants to one, as shown and the type of restaurant desired is a neighborhood type (such as Panera Bread) rather than a typical "fast food" restaurant.

4. Land Division:
As indicated in the review, the two larger parcels will need to be split as part of this PRO. If a City Council deviation is required, it will be pursued.

5. Density:
As indicated in the review, the RM-1 density complies with the ordinance.

6. Adjacent Industrial Uses:
The proposed PRO project is seeking a rezoning from I-1 Light Industrial to a Planned Rezoning Overlay (PRO) to achieve RM-1 Zoning for a portion of the PRO, which is consistent with the RM-1 rezoning of the PRO project to the south, Ridgeview Villas which was approved in 2015. The townhouse developer, Toll Brothers, has built hundreds of residential developments around the country, and from their experience and detailed site analysis, the separation distance and the berms with dense landscaping will provide the necessary separation to mitigate concerns regarding the viability of this townhouse community. If Toll Brothers felt this to be a problem, they would not have become invested in this location.
The heavy industrial zoning district is located on the north side of Ten Mile Road, which has a 120 ft. right-of-way. Although the current uses in this district are generally not heavy industry, it is recognized that it may be heavy industry in the future. The proposed townhouses begin 75 feet away from the south right-of-way line with 6 to 10 foot high berm in most of the 75 feet which will be planted with 10 ft. to 12 ft. high evergreens. This dense landscaping and berms will mitigate the visual and acoustical effects of the industrial area to the north and the traffic on Ten Mile Road.
This neighborhood block that is bound to the north by 10 Mile Road, to the east by the railroad line, to the south by 9 Mile Road, and to the West by Novi Road has largely developed as a residential area. This proposed development would ensure that the last remaining area of undeveloped I-1 zoned property is re-zoned to RM-1 zoning. This will have the impact of protecting those adjacent residential users from future industrial development on the south side of Ten Mile Road.
Regarding the east side of the property abutting I-1 Industrial zoning along the rail line, the closest unit will be approximately 360' feet away from the rail line with the existing vegetation remaining in place. This will provide ample screening to industrial building that is in place.
Overall, the impact to the site from an environmental standpoint will be minimal as the housing is clustered to the north outside of the wetland area and flood plain keeping the 15.87-acre area intact and untouched by development. This design leaves most of the site in its natural state and works to limit the amount of impervious surface. The developer is willing to place the wetland and floodplain area on the residential parcel

into a conservation easement per the City's request.
The Novi-10 project will preserve the overall character of the neighborhood and will build upon the past community planning efforts that have created this very walkable and connected residential neighborhood where retaining the I-1 Industrial zoning in place could lead to other less community friendly outcomes.
In summary the rezoning request for the RM-1 zoning utilizing the PRO process will provide the City of Novi the assurance that the Novi-10 project will preserve the overall character of the neighborhood and will build upon the past community planning efforts that have created this very walkable and connected residential neighborhood

7. Usable Open Space:
As indicated in the review, the residential portion of this PRO proposes 6.5 times the amount of usable open space as required by the ordinance. As suggested in the review, a playground amenity can be added to the small park area west of the townhouses.

9. Non-Motorized Access:
As indicated in the review the public will be permitted (and in fact encouraged) to use the new trail system provided. Public access to the trail system can be included in the PRO agreement as well as the two access points to River Oaks West.

10. Plan Review Chart:
Responses to these items will follow.

11. Other Reviews:
a. Engineering: New stormwater management standards will be followed as adapted by the city.
b. Landscape: Corrections will be made to the landscape plans to comply.
c. Traffic: As indicated in the response above, our traffic consultant has been working with the city's traffic consultant. An additional center lane has been added and the necessary tapers. Improvements proposed will be coordinated with Oakland County since Ten Mile Road is their jurisdiction.
d. Woodlands: No issues
e. Wetlands: No issues
f. Façade: A residential façade waiver would be supported. A commercial façade complies.
g. Fire: All comments will be complied with.

LAND USE AND ZONING: SUBJECT PROPERTY AND ADJACENT PROPERTIES:
(Only items requiring a response are indicated below)
Compatibility with Surrounding Land Use:
The traffic study and the follow up discussions with AECOM led to the additional

center land being added to Ten Mile Road. Discussions with the RCOC are planned for their input.

Comparison of Zoning Districts:
Principal Uses Permitted in the proposed B-3 zoning district will be modified by the prohibition of certain specified uses.

Development Potential:
Our market study indicates that there is a current and projected commercial demand and the residential demand is present based on Toll's market analysis for this location. This compares with a very weak office and industrial demand as exemplified by the fact that this area has not developed as zoned.
All feedback and additional comments from the Planning Commission and City Council will be addressed as requested.

2016 MASTER PLAN FOR LAND USE: GOALS AND OBJECTIVES
The submitted PRO plan is consistent with the five listed goals and objectives. We have responses to several of the comments.
As indicated in **Goal 3c Environmental Stewardship**, this development will encourage energy efficient design and where applicable using LEED strategies such as energy efficiency, sustainably produced materials, high indoor air quality and insulation materials for the commercial development. EV charging stations will be located in the commercial area.
For the residential area Toll Brothers will be providing following:

- EV Charging Infrastructure
  - 240-volt Outlet, Prewired in Every Garage
- Sustainable Building Materials
  - Energy Star Rated Appliances
  - Low Maintenance Exterior Materials
    - Brick
    - Cement Board Siding
    - 30-Year Architectural Shingles
  - Low-e, Energy Star Rated Windows
  - High-Efficiency Insulation
    - 2x6 Walls – R19 Insulation
    - Blown-in Attic Insulation
    - Spray Sealed Ducts
    - R11 Blanket Insulation – Basement Walls

The commentary in **Goal 4b Infrastructure** indicates that the road network may not accommodate the resulting increase in traffic. Working with the city's traffic consultant and the Road Commission of Oakland County, the road system is proposed to be upgraded to accommodate the increased traffic.
The comment **Goal 5a Economic Development/ Community Identity** appears to express a concern about the compatibility of this development. This concern is

mitigated by this entire project. The proposed townhouse portion is consistent with the townhouses directly to its south and west. The proposed commercial portion, with the use restrictions proposed create a neighborhood "Village Center" environment which is all tied together with a connecting walkway system which also connects this PRO to the ice arena, athletic club and dog park to the south.

MAJOR CONDITIONS OF PLANNED REZONING OVERLAY AGREEMENT

Additional conditions to be included in the PRO agreement:

There are 12 items listed, and all are acceptable as part of the agreement. Most are already shown on the drawings or included in the accompanying written documents. The balance is in the process of being developed and finalized.

ORDINANCE DEVIATIONS

The review indicates "No detailed plans are provided for the portion to be rezoned to B-3…". This is incorrect. The submission package included site plans (Drawing P.3-P.5), floor plans (Drawing P.6), and building elevations (Drawings P.7-P.9) as well as photometric lighting layout and details (Drawings P.10-P.11). No specific deviations for the commercial, only, are requested because as of now there are none.

List deviations with responses:

1. **Building Foundation Landscaping**
   This information will be added to the drawings for the commercial buildings. No deviation is requested.

2. **Section 9 Waiver**
   This deviation is only for the residential buildings and is supported by the staff. No commercial Section 9 waiver is requested.

IDENTIFYING BENEFITS TO PUBLIC RESULTING FROM THE REZONING AND THE PROPOSED DEVIATIONS:

1. As the review indicates, there is agreement with the conservation easement proposed for the 15.87 acre natural marshland area.
2. Off-site improvements proposed in the PRO will be paid for by the PRO ownership.
3. The two new tennis/ pickleball courts accessible from Ten Mile Road will be paid for and constructed by the PRO ownership and then donated to the city of Novi. The city will then assume control and care for the courts.
4. The previous land donation to the city of Novi was acknowledged.

The review indicates that some benefits can be clarified and has offered suggestions in the specific reviews that follow, the clarifications will be done, and additional benefits added as applicable.

NEXT STEP; PLANNING COMMISSION CONSIDERATION OF ELIGIBILITY:

As stated in the newly amended PRO Ordinance,

In order to be eligible for the proposal and review of a rezoning with PRO, an applicant must propose a rezoning of property to a new zoning district classification, and must, as part of such proposal, propose clearly-identified site-specific conditions relating to the proposed improvements that,

(1) are in material respects, more strict or limiting than the regulations that would apply to the land under the proposed new zoning district…":

The PRO proposes uses which will not be permitted in the commercial portion of the PRO, substantially less residential lot coverage than permitted by the ordinance, additional commercial building setbacks from Ten Mile Road and the other sides, less residential and commercial building heights than the ordinance

(2) constitute an overall benefit to the public that outweighs any material detriments or that could not otherwise be accomplished without the proposed rezoning.

The public benefits of the PRO include a conservation easement over a large 15.87 acre portion of the site, so it will remain a natural marshland in perpetuity; a public trail system connecting the commercial and residential portions of the PRO with surrounding residential and municipal areas and with the natural marshland area and overlooks; Tennis/ Pickleball courts that will be donated to the city for public use; a small park on the west side of the new townhouses; and 6.5 times the required usable open space for the new townhouse area.

PLANNING REVIEW CHART:

Master Plan: The 2016 master plan does not reflect current market condition. This PRO does.
Zoning: The proposed PRO changes the zoning.
Uses Permitted: The PRO proposes exclusions for the B-3 uses.
Written Statement: Provided in the narrative, as indicated.
B-3 Limitations: Limitations shown will be included in the final conditions.
B-3 Off-Street Parking: Parking front yard setbacks Ok. Landscape to be corrected.
B-3 Wetland Setbacks: Any required authorizations will be obtained.
B-3 Parking Setback Screening: Will update to comply.
B-3 Parking Space Dimensions: Will update parking space lengths at sidewalks.
B-3 Barrier Free Spaces: Quantity shown is correct for future site plan review.
B-3 Bicycle Parking: This will be shown for future site plan review.

Residential:
Parking on Major and Minor Drives: We are asking for a deviation for parking on a Major drive because our site layout only has one drive access. The alternative would be to have no visitor parking, so we believe this is a warranted deviation. We are asking for a deviation for a minimum centerline radius of 100 feet to 85 feet. The fire truck access route is not affected by this reduction on radius, so we believe this is a warranted deviation.

Permits and Approvals: Signage will be added.
Building Lighting & Photometrics: Building lighting and photometrics were included in the submittal. These will be updated as necessary, including adding hours of operation, proper color spectrum management and missing illumination levels.

LANDSCAPE REVIEW CENTER REPORT:

Commercial:
- A greenbelt berm will be added along Ten Mile Road.
- Foundation Landscape will be added with the necessary area calculations. Sufficient space exists.

General Notes:
- City's project number will be added to cover sheet.
- Residential building layout between civil and residential landscape drawings will be coordinated.
- Landscape sheet numbers will be changed for the commercial landscape.

Commercial Section:
- Adjacent to Right-of Way: Berm and landscaping will be revised. A deviation is indicated for utility conflicts along Ten Mile Road.
- Parking Lot Landscaping: Perimeter trees will be modified as required.
- Building Foundation Landscaping: The planting has not been shown on the drawings. There is sufficient area for it and it will be added along with the necessary calculations.

General Requirements applicable to both sections:
- Plant lists will be added.
- Planting notes and details will be added for the commercial portion.
- Irrigation plans will be provided.

LANDSCAPE REVIEW SUMMARY CHART

General Notes:
- Project number to be put on title sheet.
- Different landscape sheet numbers to be used between residential and commercial sheets.
- Building numbers or letters to be put on landscape plans.

Landscape Plan:

- Commercial foundation landscaping will be added.

Existing and Proposed Improvements:

- Residential civil and landscape plan layouts will be coordinated.
- Adjacent to Residential - Buffer (Zoning Sec. 5.5.3.A.ii and iii) (Both sections)
  Evergreen plantings will be added to 8' masonry walls north of buildings 5 and 6.

Existing and Proposed Utilities:

- Utility lines and structures will be added to the commercial sheets.
- Light posts will be shown on residential and commercial, and conflicts resolved.
- Civil contours will be made to work with catch basin rims and labeled.

Berm Requirements:

- A landscape waiver will be obtained for the wall, as required.
- Evergreen shrubs will be added at residential areas where required.
- Screening shrub density will be verified.
- Cross sections will be added to show the blocking of the commercial from the residential and berms added if possible.
- Dense narrow evergreens will be substituted for screening in front of walls as requested.
- Adjacent to Public Rights-of-Way – Berm/Wall, Buffer and Street Trees (Zoning Sec. 5.5.3.B.ii, iii)
  The greenbelt trees will be uniquely labeled when a detailed landscape plan is required. Greenbelt trees are shown as dark symbols while all others plantings are half-toned.
- Additional evergreens will be shown adjacent to the masonry walls.
- While the berm west of buildings 1 and 2 is approximately 3' higher from the commercial property, it is approximately 10' higher than the finished floors of the residential units. This achieves the intent of the required berms.
- A berm cross sections will be shown on the next submission.

Min. Berm Crest Width:

- Berms at parking will be added.

Min. Berm Height:

- Berms will be added at commercial, and contours added as required.
- ROW Landscape Screening Chart (Sec 5.5.3.B.ii)
  Berm contours are currently shown but half toned. They will be darkened for the next submission.

Shrubs:

- Will show calculations.

Canopy Deciduous Trees Btw. Sidewalk and Curb:

- Commercial calculations will be added.

Woodland Replacement Trees:

- As stated above, a new evergreen tree symbol will be used. Currently, 181 replacement trees are shown to be planted. 18 trees are evergreen (10%) and 163 trees are deciduous (90%). The remaining trees are the required multi-family trees. The proposed mix of evergreen and deciduous trees meets the woodland replacement requirements.
- Commercial site will indicate which are replacement trees.

Parking Lot Islands:

- Parking lot islands will comply and will be at least the minimum required size.

Curbs and Parking Stall Reduction:

- Parking spaces abutting sidewalks in the commercial lot will be made 17 feet long and sidewalks 7 feet wide.

Landscape Island Square Footage:

- Each island will be labeled in the commercial lot.

Parking Lot Perimeter Trees:

- Calculation line will be added.
- Commercial Southwest perimeter trees will be verified.
- Evergreen perimeter trees 8 ft walls will be modified.

Interior Site Landscaping SF:

- Required commercial interior site landscaping information will be added and calculations provided.

Planting Around Fire Hydrant;

- Utility lines will be shown added to the commercial landscape plan.

Name, Type, and Number of Ground Cover:

- This information will be added to drawings.

Transformers/ Utility Boxes:

- Thie transformers will be shown, and screening information provided.

Botanical and Common Plant Names:

- This will be added as required.

Cross Section of Berms:

- Details of berms will be added.

Walls:

- Screen wall and retaining wall material and height will be indicated.
- Engineer's seal to be provided where required.

General Conditions:

- No planting within 4 ft. of property line in commercial will be noted and shown.

Irrigation Plan:

- Information will be shown.

AECOM REVIEW MEMO- TRAFFIC:

Pages 1 and 2 of this response letter indicate the discussions that occurred between the PRO traffic consultant and AECOM and the addition of a center turn lane and tapers. RCOC, which has jurisdiction over Ten Mile Road, is being consulted for their input.

The offset of the residential driveway from the driveway across ten Mile Road has been approved by the RCOC.

External Site Operations:

- 4. Emergency Access. We will add details of the gate and applicable signs on future submittal.
- 9. Sidewalk Ramps. We will include sidewalk ramp details in future submittal.

Internal Site Operations:

- 24. Bicycle parking will be indicated
- 25. 4 ft. sidewalks indicated at the loading areas of commercial buildings are not required and have been eliminated.
- 31. We will add radius in future submittals will ad a radius for the T-turnaround
- 32.-43. Signage and missing striping for parking and drives will be included in future submittal.

FAÇADE REVIEW:

- A color rendering of residential buildings will be provided as required.
- Commercial building roof screen materials will comply with the ordinance and be shown if required. It is possible that roof mounted mechanical equipment will be completely concealed by the building parapet in which case there will be no visible roof units and no additional screening required. This is still being evaluated.
- The dumpster enclosure will be brick and match the brick of the buildings.

FIRE DEPARTMENT

- All fire department requirements listed will be complied with.

END

This completes the applicant's response to the PRO 2nd submittal City of Novi reviews received on January 26, 2024. We will be prepared to discuss this proposed PRO with the Planning Commission at the February 21, 2024 Planning Commission meeting.

Respectfully submitted,

Lonny S. Zimmerman, AIA, NCARB
President

SIEGAL TUOMAALA ASSOCIATES
ARCHITECTS AND PLANNERS, INC.

attachments:- SKL Response Letter
-Allen Design response Letter

cc. Daniel Weiss, Novi-10 Associates
Scott Hanson, Toll Brothers
Jason Iacoangeli Toll Brothers
Jason Ermine, PE SKL Engineers, Surveyors
Jason Rickard, PE SKL Engineers, Surveyors

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

JASON M. EMERINE, PE
ROBERT J. EMERINE, PE
ROBERT R. DROUILLARD, PS

February 9, 2024

City of Novi
45175 Ten Mile Road
Novi, Michigan 48375

Attention: **Lindsay Bell, Senior Planner**

Regarding: **JZ23-09 NOVI-TEN PRO**
PRO – Rev3

In accordance with the Plan ***PRO Review January 24, 2024***, below are the required responses pertaining to issues noted in the various review letters. For your reference, comments requiring corrective action from each review are listed below with Seiber Keast Lehner's ("SKL") responses shown in **blue**.

Planning Review - Dated January 24, 2024

Review Concerns

6. Adjacent Industrial Uses: The proposed PRO project is seeking a rezoning from I-1 Light Industrial to a Planned Rezoning Overlay (PRO) to achieve RM-1 Zoning which is consistent with the RM-1 rezoning with PRO project to the south, Ridgeview Villas approved in 2015. This neighborhood block that is bound to the north by 10 Mile Road, to the east by the railroad line, to the south by 9 Mile Road, and to the West by Novi Road has largely developed as a residential area. This proposed development would ensure that the last remaining area of undeveloped I-1 zoned property is re-zoned to RM-1 zoning. This will have the impact of protecting those adjacent residential users from future industrial development on the south side of Ten Mile Road.

Further, it is understood that the area north of 10 Mile Road is zoned I-2 Industrial which is a more intense form of industrial zoning. However, based on a survey of the current businesses many of the industrial buildings have transited away from heavy industrial uses and are now occupied by offices and other businesses such as dance studios and gymnastics facilities. To further protect the future residents of the Towns at Novi Station from changes in use across 10 Mile Road, the development will provide additional screening at the 10 Mile Road boundary to include 6-10'-foot-high landscaped berms that will be planted with 10-12' tall evergreens. Regarding the east side of the property with abutting I-1 Industrial zoning along the rail line, the closest unit will be approximately 360' feet away from the rail line with the existing vegetation remaining in place. This will provide ample screening to industrial building that is in place.
Overall, the impact to the site from an environmental standpoint will be minimal as the housing is clustered to the north outside of the wetland area and flood plain keeping the 15.87-acre area intact and untouched by development. This design leaves most of the site in its natural state and works to limit the amount of impervious surface. The developer is willing to place the wetland and floodplain area on the residential parcel into a conservation easement per the City's request.

In summary the rezoning request for the RM-1 zoning utilizing the PRO process will provide the City of Novi the assurance that the Novi-10 project will preserve the overall character of the neighborhood and will build upon the past community planning efforts that have created this very walkable and connected residential neighborhood where retaining the I-1 Industrial zoning in place could lead to other less community friendly outcomes.

11. Other Reviews: a) Engineering. We will follow the Oakland County stormwater management standards if the City of Novi adopts their standards.

2016 Master Plan for Land Use: Goals and Objectives

3. c. Sustainable, energy-efficient and best-practice design. Toll Brothers for the residential portion of the project are providing the following:

- EV Charging Infrastructure
  - 240-volt Outlet, Prewired in Every Garage
- Sustainable Building Materials
  - Energy Star Rated Appliances
  - Low Maintenance Exterior Materials
    - Brick
    - Cement Board Siding
    - 30-Year Architectural Shingles
  - Low-e, Energy Star Rated Windows
  - High-Efficiency Insulation
    - 2x6 Walls – R19 Insulation
    - Blown-in Attic Insulation
    - Spray Sealed Ducts
    - R11 Blanket Insulation – Basement Walls

4. b. Adequate transportation facilities: We will work with RCOC and the City for the improvements needed for 10 Mile Road.

Identifying benefits to public resulting from the rezoning and the Proposed Deviations

1. Added benefit: The developer has agreed to permanently protect with a conservation easement the floodplain associated with the Walled Lake Branch of the Middle Rouge River and Chapman Creek as a part of this residential development.

Traffic Review - Dated January 25, 2024

General Comments

5. Opposite and same-side driveway spacing. We have a Preliminary Plan Review from the RCOC allowing the location of the proposed driveway with the addition of a WB passing lane be added.

Traffic Review

4. Emergency Access. We will add details of the gate and applicable signs on future submittal.
9. Sidewalk Ramps. We will include sidewalk ramp details in future submittal.
31. Any Other Comments. We will add radius in future submittals for the T-turnaround.

Sincerely,
Seiber Keast Lehner, Inc.

Ms. Lindsay Bell
NOVI-TEN PRO
February 9, 2024

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

Jason M. Emerine, PE, CFM
Partner

ALLENDESIGN
LAND PLANNING / LANDSCAPE ARCHITECTURE

557 Carpenter · Northville, MI 48167
e. jca@wideopenwest.com
t. (248) 467-4668

February 7, 2024

Mr. Rick Meader, Landscape Architect
City of Novi Community Development
45175 West 10 Mile
Novi, MI 48375

RE: The Townes at Novi Station

Dear Mr. Meader:

Below are our responses to your review dated January 9, 2024.

Landscape Comments:

- The City's Project Number will be added to the plans.
- The latest site plan will be used in the next submission.
- Sheet numbers will be updated to differentiate between the residential and commercial plans.
- Building numbers will be shown for the residential units.
- Evergreen plantings will be added to 8' masonry walls north of buildings 5 and 6.
- The greenbelt trees will be uniquely labeled when a detailed landscape plan is required.
- Proposed lighting will be added to the plans.
- A berm cross sections will be shown on the next submission. It should be noted that while the berms are not 10' tall from the property line, they are 10' tall from finished floor to top of berm.

If you have any questions or comments regarding this response, please contact me at your convenience.

Sincerely,

James C. Allen
Allen Design L.L.C.

Lonny Zimmerman

From: Michael R. Cool <MRC@midwesternconsulting.com>
Sent: Tuesday, December 26, 2023 11:30 AM
To: Lonny Zimmerman
Cc: Daniel Weiss
Subject: RE: JSP23-08 Novi Ten TIS Traffic Review
Attachments: Driveway Geo.JPG; Standard Approach.JPG; 5 Lane CS.JPG

CAUTION: EXTERNAL SENDER
This is from an external sender.
Be careful opening any attachments, clicking on links, or replying to the message.

I added some jpgs with some rough geometrics and the county driveway standards.

The geometrics per the traffic study is as follows:

Carry 5-Lane cross section to just past double driveway.

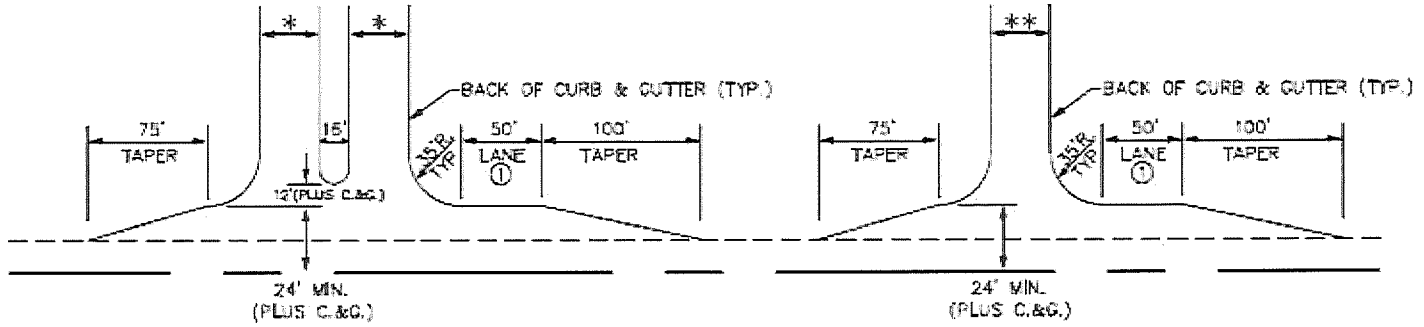
WB Lane begins just east of that 2nd driveway with the driveway radius 35', 50' lane, and 100' taper.

Center Left Turn Lane (CLTL) extends past that driveway further with radius (35') + 50 lane + 550' taper (calculated by width (12*45) and speed = 540' rounded to 550'.)

EB lane carries down to residential driveway and ends as a RT only lane.

Then that would all need to be reviewed and approved/adjusted by the RCOC.

Sincerely,
Michael R. Cool, P.E.
Midwestern Consulting
248-321-9662



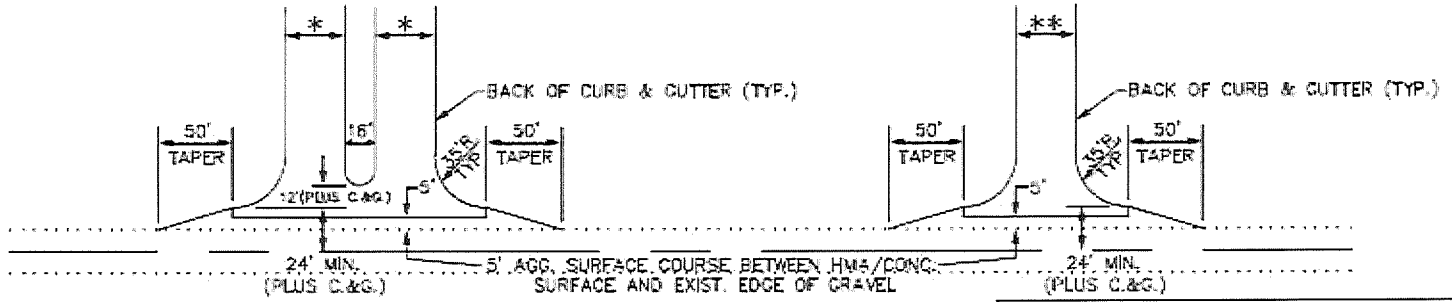
① MAY BE REDUCED TO 25' ON EXISTING ROADS WITH POSTED SPEED LIMITS OF 40 MPH OR LESS

STANDARD & BOULEVARD APPROACH
TO PAVED ROADS

* BOULEVARD WIDTH B.C. TO B.C.:
21' — IN SINGLE FAMILY RESIDENTAL DEVELOPMENTS.
27' — IN INDUSTRIAL DEVELOPMENTS.

– GEOMETRICS MAY BE ALTERED BY THE R.C.O.C. BASED UPON TRAFFIC ENGINEERING REQUIREMENTS OR SPECIFIC NEED.
– ACCEL./DECEL. LANES AND TAPERS MAY OR MAY NOT BE REQUIRED ALONG 5 LANE, BLVD., OR CURBED ROADS BASED ON TRAFFIC ENGINEERING REQUIREMENTS AND THE CORRIDOR.

** PER ROAD CROSS SECTION



STANDARD & BOULEVARD APPROACH
TO GRAVEL ROADS

ROAD COMMISSION FOR OAKLAND COUNTY
SUBDIVISION STANDARD PLAN
FOR
TYPICAL APPROACH GEOMETRICS

FIGURE 2-4

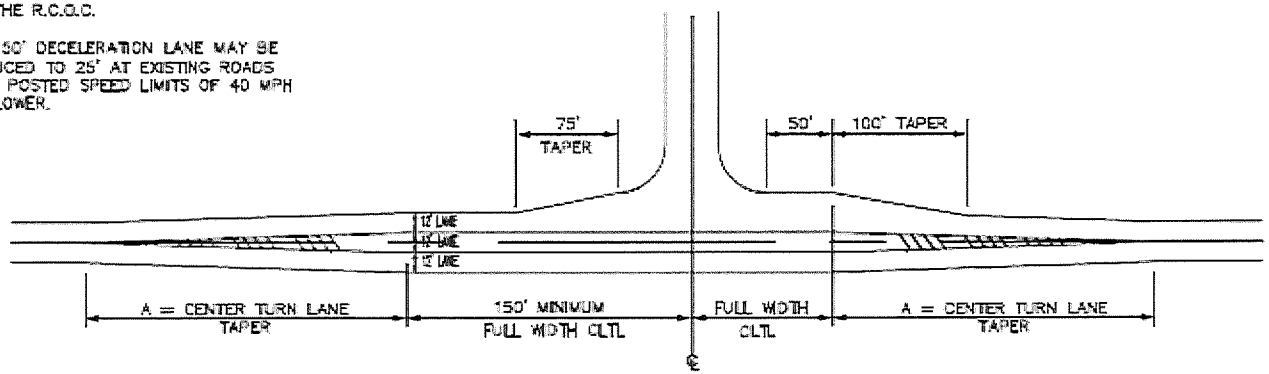
NOTES:

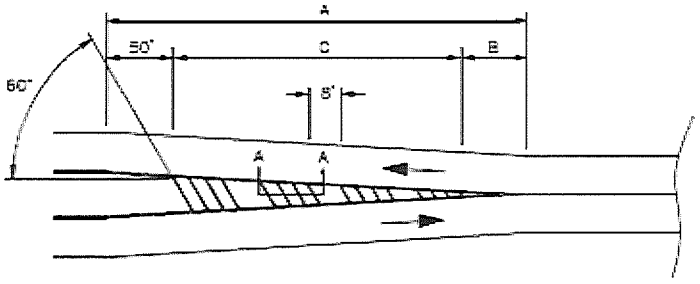
ON CURVED ROADS THE LENGTH AND ALIGNMENT OF LANE TAPERS AND FULL WIDENINGS MAY VARY AS DIRECTED BY THE R.C.O.C.

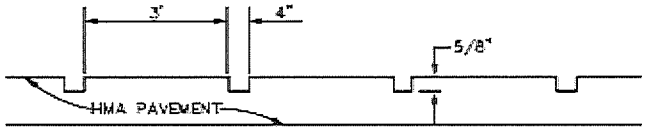
THE 50' DECELERATION LANE MAY BE REDUCED TO 25' AT EXISTING ROADS WITH POSTED SPEED LIMITS OF 40 MPH OR LOWER.

NOTES:

GEOMETRICS MAY BE ALTERED BY THE R.C.O.C. BASED ON TRAFFIC ENGINEERING REQUIREMENTS.







SECTION A—A
CORRUGATED HMA DIVIDER – DEPRESSED

W = LANE SHIFT
S = POSTED OR DESIGN SPEED

$A = \frac{W \times S^2}{60}$	≤ 40 M.P.H.	≥ 45 M.P.H. $W \times S$	ROUNDED TO NEXT 25'
$B = 2.25 / (\frac{W}{A})$			ROUNDED TO NEAREST FOOT
$C = A - (50 + B)$			ROUNDED TO NEAREST FOOT

ROAD COMMISSION FOR OAKLAND COUNTY
SUBDIVISION STANDARD PLAN
FOR
CENTER LEFT TURN GEOMETRICS
WITH A STANDARD APPROACH

FIGURE 2-6

AECOM
27777 Franklin Road
Southfield
MI, 48034
USA
aecom.com

Project name:
JSP23-09 – Novi Ten TIS Traffic Review

From:
AECOM

Date:
December 19, 2023

To:
Barbara McBeth, AICP
City of Novi
45175 10 Mile Road
Novi, Michigan 48375

CC:
Lindsay Bell, James Hill, Ian Hogg, Heather Zeigler, Diana Shanahan

Memo

Subject: JSP23-09 – Novi Ten TIS Traffic Review

The Traffic Impact Study was reviewed to the level of detail provided and AECOM recommends **approval of the Traffic Impact Study with the mitigations/improvements;** the applicant should review the comments provided below and provide a revised study to the City.

Condition: Improvements/mitigations with comments are

GENERAL COMMENTS

1. The memo will provide comments on a section-by-section basis following the format of the submitted report.
2. The project is located on the south side of 10 Mile Road between Novi Road and the Railroad tracks.
3. The development consists of 71 townhouse residential units (low rise) and approximately 60,000 SF of neighborhood retail.
4. The development is a PRO plan, and the site would need to be rezoned from its existing mix of I-1 and OS-1.

BACKGROUND DATA

1. The following roadways were included in the study:
    a. 10 Mile Road: East/West, 45 mph, 2 lanes divided
    b. The intersections and site driveways were included in the study.
        - 10 Mile Road & Novi Road
        - 10 Mile Road & Meadowbrook Road
        - Site Driveways (4 shown in concept plan)
        - Other Existing Driveways

2. Applicant collected turning movements that occurred between the hours of 6:00 AM-7:00 PM on March 16th, 2022 at 2 intersections (10 Mile Road and Novi Road and Meadowbrook Road) and 4 driveways.

EXISTING CONDITIONS

1. The overall Level of Service (LOS) at the major road intersections is D or better while following movement experiencing higher delay LOS E or F at:
    a. Northbound and southbound movements at 10 Mile and Meadowbrook Road (LOS E)
    b. Eastbound left at 10 Mile and Novi Road (LOS F)
    c. Southbound Third Driveway/Double Driveway at 10 Mile Road (LOS E)

BACKGROUND (NO BUILD) CONDITIONS 2024

1. A conservative 0.2% annual growth rate was used to determine the build year five years from 2022, based on the SEMCOG traffic volume forecasts.
2. Overall operations at the intersections are not expected to change significantly compared to existing conditions.

SITE TRIP GENERATION

1. A total of 6560 daily trips are anticipated based on the ITE trip generation codes.
2. A total of 40% of trips are considered as pass-by trips during the afternoon peak hours and a relevant reference is provided in the Appendix from the ITE manual. And a net increase of approx. 250 trips during the morning peak hour and approx. 400 trips during the evening peak hour are considered for a traffic impact study on the surrounding road network.

SITE TRAFFIC ASSIGNMENT

1. Adjacent street volumes were used to calculate site trip distribution.
    a. The largest portion of the traffic is assumed to be coming from/going to Novi Road followed by 10 Mile Road and Meadowbrook Road.

FUTURE CONDITIONS

1. Operations at the signalized intersections are not expected to deteriorate at the following movements:
    a. Westbound 10 Mile Road (LOS E)
    b. Eastbound left at 10 Mile and Novi (LOS F in both existing and build conditions)
    c. LOS F for 3rd Site Driveway with the significantly excessive delay of approx. 2500 sec.
    d. Movements at Northbound and Southbound approaches at Meadowbrook continue to experience higher delays at LOS E.
2. Excessive delay at 3rd site driveway will lead ultimately to the driveway not being utilized by the commuters of this proposed development and will end up adding more traffic on other driveways and circulation within the development. This might start a cascade of effects on other driveways also failing especially when all the driveways are on 10 Mile Road.

CONCLUSIONS

1. The study concluded with a list of recommendations that will improve the failing level of service and traffic conditions as per the following:
    - Widen eastbound 10 Mile Road to two through lanes, ending with a right-turn lane at the site's easternmost residential driveway.
    - Widen westbound 10 Mile Road to two through lanes west from the 3rd site driveway to help provide additional capacity for outbound site traffic.
    - Provide a continuous center lane turn lane to serve the 1st, 2nd, and 3rd commercial driveways.
    - Provide separate outbound left-turn / right-turn lanes for the site's 2nd and 3rd commercial driveways to allow right-turning traffic to exit the site when vehicles are waiting to turn left.

    However, we do not agree with the widening of 10 Mile Road tied to the site driveways as suggested in the report rather it should be tied to the major intersection movements for the safety and drivers' expectancy.

2. The study indicates a large number of trips from this proposed development on the surrounding road networks and driveways. The study concluded with a list of significant roadway improvements including the addition of through lanes and a central left turn lane on 10 Mile Road within the study area in support of the shopping plaza. **The commercial part of this project is dependent on these mitigations/improvements being implemented.**

Should the City or applicant have questions regarding this review, they should contact AECOM for further clarification.

Sincerely,

AECOM

Saumil Shah, PMP
Project Manager

Jeff Wood, PE, PTOE
Senior Traffic Engineer

PLANNING COMMISSION MINUTES - EXCERPT

FEBRUARY 21, 2024

PLANNING COMMISSION MINUTES

CITY OF NOVI
Regular Meeting
February 21, 2024 7:00 PM

Council Chambers | Novi Civic Center
45175 Ten Mile Road, Novi, MI 48375 (248) 347-0475

CALL TO ORDER

The meeting was called to order at 7:00 PM.

ROLL CALL

Present:	Member Becker, Member Dismondy, Member Lynch, Chair Pehrson, Member Roney
Absent Excused:	Member Avdoulos, Member Verma
Staff:	Barb McBeth, City Planner; Beth Saarela, City Attorney; Lindsay Bell, Senior Planner; Adam Yako, Plan Review Engineer; Saumil Shah, Traffic Consultant

PLEDGE OF ALLEGIANCE

Chair Pehrson led the meeting attendees in the recitation of the Pledge of Allegiance.

APPROVAL OF AGENDA

Motion made by Member Lynch and seconded by Member Roney to approve the February 21, 2024 Planning Commission Agenda.

VOICE VOTE ON MOTION TO APPROVE THE FEBRUARY 21, 2024 PLANNING COMMISSION AGENDA MOVED BY MEMBER LYNCH AND SECONDED BY MEMBER RONEY. *Motion carried 5-0.*

AUDIENCE PARTICIPATION

Chair Pehrson invited members of the audience who wished to address the Planning Commission during the first audience participation to come forward. Seeing no one, Chair Pehrson closed the first public audience participation.

CORRESPONDENCE

There was not any correspondence.

COMMITTEE REPORTS

There were no Committee reports.

CITY PLANNER REPORT

There was no City Planner report.

CONSENT AGENDA - REMOVALS AND APPROVALS

There were no Consent Agenda – Removals and Approvals.

PUBLIC HEARINGS

1. **NOVI-TEN PRO JZ23-09 WITH REZONING 18.740**
   Public hearing at the request of Novi-Ten Associates for initial submittal and eligibility discussion for a Zoning Map Amendment from Light Industrial (I-1) and Office Service (OS-1) to Low Density Multiple Family (RM-1) and General Business (B-3) with a Planned Rezoning Overlay. The subject site is approximately 34-acres and is located east of Novi Road, south of Ten Mile Road (Section 26). The applicant is proposing to develop a 71-unit multiple-family townhome development on the RM-1 portion, and approximately 35,900 square feet of commercial space on the B-3 portion.

Planner Lindsay Bell relayed the applicant is proposing to rezone about 34 acres south of Ten Mile Road, to the east of Novi Road, utilizing the Planned Rezoning Overlay option. The site is currently vacant and was historically part of the original Erwin Orchard, which operated in Novi from 1920-1983. The Ridgeview of Novi development is to the south, along with the Novi Athletic Club and Novi Ice Arena & Dog Park. The railroad tracks border the eastern property line. North of Ten Mile Road are industrial uses, and commercial uses are to the west.

The current zoning of the property is I-1 Light Industrial on the eastern side, and OS-1 Office Service on the western side. The adjacent parcels on the west are also OS-1. The Ridgeview development to the south is zoned RM-1 with a PRO, while the Athletic Club and Ice Arena area is I-1, as is the area east of the railroad tracks. North of 10 Mile Road is zoned I-2 and I-1.

The Future Land Use Map identifies this property as Community Office on the west and Industrial Research Development Technology on the east. To the south and east is planned for Industrial, north of the site is planned for industrial and heavy industrial, and on the western side is community office.

There is floodplain area associated with Chapman Creek and Walled Lake Branch of the Middle Rouge along the southern property boundary and along the eastern side of the site extending down toward the dog park. The natural features map also indicates extensive wetland area within the floodplain, and regulated woodlands are present in most areas of the site.

The applicant is proposing to utilize the Planned Rezoning Overlay to rezone about 7 acres of the property to B-3 General Business, and about 27 acres to RM-1 Low Density Multiple Family. The initial PRO plan shows a total of 71 attached 2-story townhome units on the site. The RM-1 residential portion is accessed by one entrance off Ten Mile Road, with a secondary emergency access drive to commercial portion of the project. Parking is provided in garages, on garage aprons, and in a few small bays of surface parking for visitors.

For the B-3 commercial portion, the current concept plan shows a total of 35,900 square feet in four separate buildings. Access to the B-3 site would be from three curb cuts on Ten Mile Road – one is the existing shared driveway with Maly Dental office, and the other two are new. The plan notes retail and restaurant uses within the commercial buildings but generally other uses permitted in the B-3 district could be tenants in those spaces. However, the applicant does offer to prohibit certain uses as a condition of the PRO Agreement, including a gas station, auto repair, car wash, marijuana sales, check cashing and pawn shops.

The applicant describes the project as creating a walkable community, with links to the existing paved trail in Ridgeview, which would connect to Nick Lidstrom Drive and to the nature trail behind the Novi Sports Club and dog park area. They also propose a paved path around the proposed townhouses that would be available to the public and two new overlook areas in the marshland area. A park area with seating is proposed between the commercial and residential area, and two pickleball/tennis courts are proposed in the northeast corner of the site, which are proposed to be donated to the City for public use.

Staff notes some concern that the pickleball courts may create a noise disturbance to the closest residential units, and that the associated parking area requires another curb cut on Ten Mile Road. Grading required for this area may also impact the flood zone. Therefore, the applicant may want to reconsider the pickleball courts, and instead provide a more low-impact nature park that would fit with City Council's goal to develop more walkable pocket parks, and even connect to the dog park to the south.

Staff and consultants have identified some issues with the proposed rezoning and PRO Plan. First, the proposed zoning districts indicated do not match the Future Land Use map guidance. Staff has concerns with the proposed residential use's compatibility with the adjacent I-2 Heavy Industrial to the north. However, it is adjacent to similar multiple family communities on the south side, and there are also similar commercial uses in this area to the west.

One of the biggest issues with the proposal is the traffic impacts. The applicant's traffic study notes that a significant increase in the number of vehicle trips are expected. A number of road improvements to Ten Mile could help accommodate this increase, including extending the 5-lane cross-section further east to at least the residential driveway. Also note that the traffic study assumed the commercial development size was 60,000 square feet, while the current proposal for 35,900 square feet could lessen those impacts. Driveway spacing and major drive deviations are also likely to be required with the current proposal.

The Engineering review notes there is capacity for the water and sewer demands for the proposed use in the public utilities, and stormwater detention is to be provided in a single storm sewer detention system on the east side of the site, with controlled outlet into the floodplain to the east.

The proposed landscaping is generally in conformance with the ordinance. The applicant has added screening between the residential and commercial portions of the property and have indicated that the deficiencies in foundation landscaping and greenbelt berm in the commercial portion will be corrected in the site plan submittal stage if this project moves forward. Landscaping waivers for street trees and greenbelt canopy trees along Ten Mile Road are supported by staff due to conflicts with existing underground utilities.

The Façade review notes that the commercial buildings are in full compliance with the Ordinance. For the residential buildings, Section 9 façade waivers would be required for an underage of brick on the rear and some front facades of the townhomes, and an overage of asphalt shingles on some front facades. These waivers are supported as they are minor in nature and do not adversely affect the overall aesthetic quality of the homes.

Wetland impacts have been minimized, with approximately 0.1 acre (or less than 0.9% of the total wetland area) of permanent impact to a few small pockets of wetlands in the upland area. A large portion of the site, 15.87 acres of wetland, woodlands, and floodplain area, is proposed to be protected in a conservation easement to ensure permanent preservation. This could be considered a public benefit.

This initial public hearing is an opportunity for the members of the Planning Commission to hear public comment, and to review and comment on whether the project meets the requirements of eligibility for Planned Rezoning Overlay proposal. Following the Planning Commission public hearing, the project would then go to the City Council for its review and comment on the eligibility.

After this initial round of comments by the public bodies, the applicant may choose to make any changes, additions, or deletions to the proposal based on feedback received. The subsequent submittal would then be reviewed by City staff and consultants, and then the project would be scheduled for another public hearing before the Planning Commission. Following the second public hearing on the formal PRO Plan the Planning Commission would make a recommendation for approval or denial to City Council.

Tonight the Planning Commission is asked to hold the public hearing, and to review and comment on the proposed rezoning. Members may offer feedback for the applicant to consider that would be an enhancement to the project and surrounding area, including suggesting site-specific conditions, revisions to the plans or the deviations requested, and other impressions.

The applicant, Dan Weiss from Novi-10 Associates, along with Scott Hansen from Toll Brothers, architect Lonny Zimmerman, as well as other members of their team, are here representing the project tonight. Staff and our traffic consultant are also available to answer any questions.

Chair Pehrson invited the applicant to address the Planning Commission.

Lonnie Zimmerman, Siegal Tuomaala Architects, relayed property owner Dan Weiss, Scott Hansen with Toll Brothers, Jason Iacoangeli with Toll Brothers, Mike Cool, traffic consultant with AECOM, and Jason Rickard with SKL Engineering are with him tonight.

Originally, about 120 acres were owned by Dan Weiss's family, partially sold off over a period of years. Mr. Weiss' family has been in Novi as residents and businesses owners for years, and he still has a business in Novi. In addition to selling off a lot of his property, Mr. Weiss donated 18 acres to the City for the Ice Arena, Sports Club, and Dog Park. Mr. Weiss' OS-1 and I-1 parcel have been on the market for many years with no interest.

The Novi-10 team looked at the Future Land Use plan, the current zoning, and market conditions. The Future Land Use plan shows these parcels as I-1 and OS-1. The market has changed, and everybody knows that lifestyles have changed since COVID, there is much less demand for office space. We see that represented with this parcel. We've also looked at the industrial aspect and found statistics from 2023 for the City of Novi by CoStar Realty Information Services which show a significant drop in industrial demand in Novi. That set the basis for what is the logical change of direction for the property.

Mr. Zimmerman has a market study which shows that commercial is a very viable option and local commercial, which is the type of use proposed, is going to be a significant and acceptable use for the property. It's basically a family friendly retail type of environment. In the proposed agreement for the PRO the uses will be limited, there will be no gas stations, auto repair, car washes, pawn shops, check cashing or that sort of thing.

The townhouses are a very logical extension of what is there now. To the south is Ridgeview Villas, which was also developed by Toll Brothers, to the southwest are River Oaks and Saddle Creek apartments.

Mr. Zimmerman feels that the proposal complies with the Master Plan even though the zoning doesn't match the Future Land Use plan. In looking at elements in the Master Plan, this is right on target. First is the walkable community as listed in the Master Plan, which is the reason for the trail system. The trail runs all the way from Ten Mile Road, connecting adjacent retail and residential through the site, continuing south all the way to a final connection with the dog park, the Novi Ice Arena, and the Sports Club. The connectivity through this whole area links the new retail with a lot of residential in the area.

Secondly, a conservation easement to preserve wetlands, woodlands, and animal habitats has been designated on 15.87 acres west along the railroad tracks from the dog park up to Ten Mile Road. That's in perpetuity so nothing will be developed there. Just as the Master Plan calls for connectivity, it also calls for environmental stewardship and this is a representation of that.

As was also mentioned, there are two proposed tennis/pickleball courts on Ten Mile Road along with parking spaces being donated to the City and this is an important part of making this a whole usable area for the community.

As far as the traffic is concerned, Mr. Zimmerman has been working with AECOM. Traffic consultant Mike Cool is here. The level of service is not changed by this project. A widening for Ten Mile Road is proposed by adding a center left turn lane, that with the proper tapers, will go all the way across the Ten Mile Road portion of the site including the residential area. The commercial drives will have three lanes, a left turn exit, a right turn exit, and an entry line.

The Novi-10 team has been talking to engineers with the Oakland County Road Commission. The proposed residential entrance, which doesn't align with the driveway across the street, has been approved by the Road Commission as an acceptable situation. The two new drives proposed at the commercial portion do align with the driveways across the street and engineers will be working with the Oakland County Road Commission to firm up design plans for Ten Mile Road to accommodate traffic.

The commercial portion has been reduced to 35,900 square feet from the original proposal of 60,000

square feet to help with the process as well.

Regarding the separation between the RM-1 and the I-2, Mr. Zimmerman displayed renderings produced by Toll Brothers. Scott Hansen relayed that the renderings show the residential area in summer and winter, a view from the entrance that reflects how berms and trees will help screen the first two units, and a view from the units looking out to Ten Mile at first floor level. Mr. Zimmerman added that there is almost 300 feet from the setback line of the I-2 to the setback line of the RM-1, so 120 feet right of way, then 100 feet and 75 feet. The berm at the residential is 6-10 feet high and the evergreens are upsized to be 10-12 feet high.

Mr. Zimmerman stated in conclusion that the proposed residential connects with the Toll Brothers development to the south. They really know residential and wouldn't be building it here if they felt it wasn't going to be a success. It ties in with the commercial and is a good fit for Novi along with the walkable system. It has a very family friendly vibe.

Chair Pehrson opened the Public Hearing and invited members of the audience who wished to participate to approach the podium.

Elena Wayne, 42776 Cardinal Way, relayed that she is new to Novi having recently moved back to the area from Arizona. This proposal is somewhat shocking. There are strip malls already here that are empty, this proposed strip mall is not necessary. Seeing that wetlands and areas that have beautiful mature trees will be destroyed to build more homes that probably aren't necessary is a little shocking as well, and disheartening.

Ms. Wayne moved here to be in an area that is family friendly. She would like to point out that driving around Novi, especially this Ten Mile area, there is strip mall after strip mall. Why do we need another strip mall. Why would we destroy an area to have a strip mall for businesses that could move into a strip mall that's already empty.

Ms. Wayne would also like to point out that although this is being referred to as a walkable area, when the train is going through there is a backup on Ten Mile. What are we accounting for here? Do we really need strip malls? Do we really need more homes? Let's keep Novi family friendly and have a beautiful habitat for animals and trees.

Linda Tyza, 23987 Seminole Court, referred to the floodplain map showing the stripes which are zone AE, a special hazard. Ms. Tyza has a map from 2006, a lot has happened since then. There has been a lot of fill. The map shows there are lines shown going right through houses in Ridgeview which can't be because there is a house there, which proves that it is not an up-to-date map, and that is up to FEMA to correct.

What happens is when an area gets filled in the developer files a LOMA, a letter of map amendment due to the fill process. Around Ridgeview where there is fill, there is a wall with rocks that bring the property up so it is not in the flood zone, except for Ms. Tyza's house. Houses in the flood zone, with these walls around them, have water that runs from west to east. Zooming out a little bit further on the map, farther west has a huge area that's designated a flood zone. Driving around that area you see a lot of standing water.

The water moves from west to east and goes around Ms. Tyza's house. She is located on the far west side. If a flood were to happen and the flood zone needed more area, it could spread out to the trees in the habitant and that wall would stop it from going to the homes. But if was free to expand out further, if Toll Brothers puts that the group of homes in there, the northernmost part of her subdivision there would have a wall and a retainer wall on the other side to make sure that that was not in the flood zone.

Chair Pehrson informed Ms. Tyza her 3 minutes were up and asked her to summarize. She inquired if she could use her husband's 3 minutes. Chair Pehrson replied she could get back in line.
A resident (no name given), on Seminole Court, relayed she lives in Ridgeview of Novi, backing up to where the property in this rezoning area is being discussed. She is very concerned and a little bit frustrated, her comments mirror some of the first comments that were raised. She is happy to be able to connect with the Planning Commission and thanked them for the opportunity.

When the resident purchased her condo, she was told by Toll Brothers that this back area was protected wetlands, and it would never be developed or destroyed. Now she is hearing a different story which is a bit frustrating. She paid a premium for a back lot that would be butting up to this beautiful nature and wetlands area. Now based on this, there's potential that she will be looking at condos, traffic, and commercial property, it is frustrating in that it is really going to create a lack of privacy for her home.

From a Ten Mile perspective, the road is already overwhelmed by the current traffic that we have. The resident understands there are proposed plans in place to put a left-hand turn lane there, which is great for the overwhelming amount of current traffic, but Ten Mile is just not equipped to be able to handle a massive establishment like this. The resident has some very serious concerns about the traffic impact.

To mirror the first comments that were made, the City has so many unoccupied commercial buildings and so many new residential developments, particularly townhomes. It is a little disconcerting that the Commission or the City would entertain adding another one on to the list when we have some really beautiful nature that we can preserve at this time and really allow our city to flourish in other areas.

Tammy Spangler, 42908 Cardinal Way, thanked the Planning Commission for the opportunity for residents to be able to share their opinions and perspectives. In 2017, when she and her husband made plans to purchase a home in the Detroit metro area, they decided on Novi for two reasons. They were looking for a location where there would be woodlands and wetlands and an area with lots of pocket parks and other park areas. They saw the Toll Brothers development at Ridgeview, and decided they liked the area. They purchased a premium lot so they could enjoy the wildlife. Now she is learning that this prized green space, along with the wetlands of the creek basin, are going to be spoiled by this development.

For every inch of concrete or square foot that goes into the new development, it is going to be impacting the drainage and the capacity of that area with storm runoff and flooding. It is going to impact so much and that's a huge concern. They will be cutting down 460+ trees. Sadly, what happens in a lot of cities is that we cut down trees, and then plant ornamental trees that are not even native species to our state, as Ms. Spangler saw from her time on a Planning Commission up north for a bike trail through the city. That is unfortunate because cities throughout the United States are all homogeneous and generic, then the developments all look the same.

While researching, Ms. Spangler found that the City of Novi has a Code of Ordinances and City Charter that includes two ordinances. One focuses specifically on wetlands protection and the other focuses on woodlands protection. The information says the City finds that rapid growth, the spread of development, and increasing demands upon natural resources have had the effect of encroaching upon, despoiling, or eliminating many of the trees and other forms of vegetation. The most important part stated is woodland growth protects public health through the absorption of air pollutants and contamination, through buffering in the reduction of excessive noise, wind, storms and visual screening, and through its cooling effect in the summer months. Woodlands provide for public safety through the prevention of erosion, siltation, and flooding. Trees and woodland growth are an essential component of the general welfare of the city. Protecting woodlands, including trees and other forms of vegetation, of the city for their economic support of local property values when allowed to remain uncleared or unharvested and for their natural beauty, wilderness character of geological, ecological or historical significance.

Ms. Spangler does not have time to share the details of the wetlands ordinance but requested that copies she brought with excerpts from the woodlands and wetlands ordinance be filed with meeting record.

Paula Guhlke, 23884 Seminole Trail, has lived in her home for almost five years. To her right is a pond that freezes in the winter, drains pretty slowly in the summer, but fills back up in the winter, fall and spring. After the last four or five days of rain that we had, it was at least three times as big, and you could hear the water cascading through a trickle. It's not a trickle when that pond empties, you can hear it running from Ms. Guhlke's deck.

When Ms. Guhlke moved in, she had turkeys at her window wall pecking, thinking they had met a new friend. Now there are coyotes, which Ms. Guhlke wouldn't mind if they moved on. There are deer, rabbits, and a mama duck that decided to nest on her deck and who successfully introduced seven more

ducklings to the environment. Looking out at that and enjoying four seasons is wonderful and Ms. Guhlke would hate to lose that. Toll Brothers will do a beautiful job, as they did with Ridgeview. It will be aesthetic, but it's not what Ms. Guhlke wants to look at from her deck all year.

Safety issues are another concern. Ridgeview is a subdivision that is private, with no trespassing posted at both entries. If there is a walkway from Ten Mile all the way through, 24 hours a day, right back by Ms. Guhlke's window wall, she is not sure what can be back there at any time of the day. It will be a straight throughway to get from Ten Mile to wherever and not have to be seen from the outside.

Ms. Guhlke asked the Planning Commission to think about all the aspects and how much residents care about where they live. Developers deserve to develop, and people who own land deserve to sell it, but please consider all aspects.

Karen Chopjian, 23991 Seminole Court, would like to speak about the plans, including building additional strip malls and 70 three-story townhouses by Toll Brothers. To do this, 34 acres would be excavated, including the destruction of nearly 400 trees. This would have a significant impact to her neighborhood as well as the woodlands and wildlife that are presently there.

Looking at the FEMA flood zone map, it looks like they are turning Ridgeview into a watershed. It's an idea that Toll Brothers has now that doesn't need to be here in this location. It looks like original owners were told a perceived myth by Toll brothers that the adjacent land was considered wetlands and not able to be developed. It looks like those who live by the proposed development, after paying a lot premium to back into woods, now will have the builder wipe out the woodlands a few years later. Ms. Chopjian is worried that her property will be devalued.

Charles Bates, 42876 Cardinal Way, was a homeowner in Novi in 1976. He moved around a little bit, but when it came time to retire and get comfortable, he moved back to Novi. Toll Brothers was a great company, they were very well respected. Mr. Bates paid a premium for his lot, which he thought would always look on the wildlife area. He is slowly finding the wildlife leaving. He has water right now behind his house, where it's a floodplain. He sees water every time it rains, every time it snows, that's where the water is going to flow.

Mr. Bates has some big, beautiful trees near him. He did not know turkeys could nest in trees, he thought they were so big that they could only walk on the ground, but they nest in the trees. He has had ducks jump up onto his patio railing, and a deer walk up to his window to stare back at him. It is something that he really loves and appreciates.

One thing that is proposed that drives Mr. Bates crazy is pickleball courts, you don't want them in a suburban area. You hear them bang and bang and bang, other communities have really been up in arms over them. Mr. Bates is not sure why it is part of this proposal to put pickleball courts in.

Mr. Bates has always been in favor of what has been done in Novi, but is not in favor of tearing down trees in his backyard to put in new trees that his grandchildren will have to wait to see a turkey sitting in.

Mark Alafita, 42844 Cardinal Way, stated there are a lot of things on his list that have already been addressed. There is no need for more strip malls. There are concerns about traffic on Ten Mile Road. There are concerns about adhering to the Novi Code of Ordinances relating to woodlands protection. There are big concerns about flooding. Since the new development goes so close to Ridgeview, that water is going to have nowhere else to go. It's going to affect Ridgeview residents as the FEMA maps already show, and as you've already heard, it affects quite a few people.
Mr. Alafita would like to share a story because he thinks it's powerful. By coincidence, the Ridgeview HOA had an annual meeting last week. Residents along the property line that would be bordering this proposed development all relayed the same story that Mr. Alafita had. He remembers it like it was yesterday, sitting with his Toll Brothers Rep expressing concern over what could happen in the adjacent space because he loved the beauty as it is now. The answer he got back was there is no need to worry, that is wetlands. Nothing will be built on that. It is zoned for industrial, but if anything is built, it's going to be further to the front by Ten Mile. It is certainly not going to be coming close to Ridgeview. Mr. Alafita

understands Toll Brothers can say one thing, and then another developer can come in and say what they'd like to do. But when the very developer who told him that is the one who is proposing this, that's when he calls foul play on that.

Mr. Alafita agrees with Mr. Zimmerman's comments about the post COVID environment needs being different. However, we've also learned post COVID that people have really learned to appreciate their woodlands, their water lands, nature, protecting the animals around us, and the green space. Mr. Alafita requests that the Planning Commission reject the proposal on rezoning this area, because if anything were to be developed there, he doesn't know what that would be, but he would rather deal with the devil he doesn't know than the devil he does know.

Linda Tyza, 23987 Seminole Court, relayed she spoke earlier about the two fill areas and the letter of map amendments due to the fill process, already on the Ridgeview side. That is why nobody is in the flood zone, but the same thing will happen on the other side. The people will have a retainer wall, so they won't be in the flood zone. When you look at the flood plain, you can see that the part between the two plans is going to be narrower than it is. You can already see that because the areas to the left are so much wider and bigger, that if we were to have a big storm there could be a bottleneck. When that bottlenecks, it will back up.

Ms. Tyza lives in building #2, lot #6, and when she closed on her home, she was told that her house was in the flood zone, which she did not know. Another letter of map amendments (LOMA) was done, and it came back that her structure is in X500, but the land associated with her is in the flood zone. There is no barrier there, there's no fill, so if there is flooding, it'll just go right between the two houses, Ms. Tyza's and her neighbor's house and the other side.

Rob Fridenberg, 23844 Winnsborough Drive, lives In the Mystic Forest subdivision. His concern is more about the traffic. There have been many times independent of a train coming through that westbound Ten Mile is backed up almost to Busch's during rush hour. Mr. Fridenberg assumes that the Planning Commission has reviewed the traffic study data and the assumptions that were put into it. He inquired if it is possible for residents to review the document as well, to understand how many vehicles are assumed by the residents, what is the impact on traffic during different times of day and also when the train is coming through. He assumes there is data on how long a train typically closes that intersection.

Chris Friedenberg, 23844 Winnsborough Drive, in the Mystic Forest subdivision is further removed from the residents in the Ridgewood sub but feels really bad for them being told that there wasn't going to be development behind them. She would be very upset if that was her house and agrees with everybody who spoke before her regarding traffic and taking down the woodlands.

Ms. Fridenberg understands the developer needs to make a profit, but if there could be something less invasive, with no residential development, that would be best. Or alternately build detached condos, something that's one story. Ms. Fridenberg works with senior citizens, and they can't do stairs. She doesn't know of any single level developments anywhere in Novi. She does not think we need two-story condos, we have enough of them. There are a lot of senior citizens, the population is aging, think about their needs. Ms. Fridenberg thanked the Planning Commission for listening.

Joy Carter, 23951 Seminole Court, is concerned about the type of housing that's being proposed. Typically, three-story homes are bought by people who are trying to rent them, not live in them, so there is often a lot of turnover in those areas. Ms. Carter has a concern about that because the homeowners are absentee owners.
Ms. Carter knows that the developer is purporting the development will be walkable. She has six grandchildren and there is no way she would walk anywhere around Ten Mile with that traffic. No way. She does not know what this walkable idea is, but it doesn't sound like it can be achieved.

Ms. Carter expressed concern that residents are here talking about their concerns, but that minds have already been made up. That is one thing she is unappreciative of if that is the case. She is hoping that this is an open forum where Planning Commissioners are actually listening to the residents in the community.

The flood zone is just another crazy thing where, like the person before said, lines are going through and stopping at homes which Ms. Carter is smack dab in the middle of. She is unappreciative of all the casualness with which this is being approached. It's not about the developer, there is plenty of land. It's not about the opportunity at this site, they would just move forward. It's about the people that have chosen to live here. Ms. Carter has been here for 20 years; she has chosen to live here. She does not want it to become the same place she left, where a lot of people don't live there, with a lot of vacant buildings, it is an eyesore. Ms. Carter asked the Planning Commission to think about that and about their positions of stewardship to make sure to do the right thing and look out for the people that are supporting them.

Beth Mier, 42764 Cardinal Way, wanted to echo what the last two ladies spoke about, the first floor or ranch style homes. Ms. Mier spent a lot of time trying to find a ranch or something with a first-floor bedroom in Novi. Her mother is 83 years old and is moving in with her, so it would be great to find something without three stories where an older person could live.

Ms. Mier relayed she has video of the whole flood zone from the last couple of weeks when we had the big snowstorm, followed by the massive rain. She took it before she received notice of this proposal because it was so beautiful back there and she wanted to show people how great her backyard looked with the stream moving. She can email it to anyone who would like to see it. It shows all the flooding that goes on behind Ridgeview, although she is at the end of the sub where it doesn't affect her as much.

Ms. Mier also has concerns about the walkability. She has a seven year old living with her. She has seen strange people coming out from the woods near the Sports Club and the dog park. When she takes her dog out at 11:00 PM there are people coming out of the woods. It concerns her as to what kind of traffic there might be if there is a walk from Ten Mile all the way to the dog park. Due to concerns about what is going on in the woods at night, Ms. Mier put a camera on her condo.

Ken Mac, 42787 Cardinal Way, already submitted his objection in writing, his wife did as well. He has more of a technical comment or question for Toll Brothers on the renderings. Mr. Mac is confused because the documents he saw at the City indicated three-story townhomes without basements. He has heard both three-story and two-story proposed.

Mr. Mac lives in Ridgeview in two-story villas with basements and was told the proposed residential units will be three-story townhomes, which have more transient residents. As for the other points made, people can't age in place in a three-story home because it's nothing but stairs. Chair Pehrson clarified the renderings shown are two-story. Mr. Mac stated that there was documentation on the website that indicated three stories and asked for accurate renderings to be shown. If the reality is three-story homes, they would tower over the two-story homes that are only about 200 feet apart.

Mr. Mac stated Ridgeview units are quality. Toll Brothers does nice work in terms of stone and brick. The renderings shown a little bit ago, especially from the Ten Mile view, appeared to be nothing but Hardy board siding. It will look pretty bad and cheap from Ten Mile to see siding and no stone or brick. Mr. Mac would like to see more technical details added to the renderings.

Ravi Jasti, 42808 Cardinal Way, has two concerns. First, about four weeks ago, there was a day all the snow melted. Near Mr. Jasti's house there was almost one and half feet of water on the land behind his home flowing on the wetlands. He would welcome anyone anytime they would like to look at that area. If something is constructed on the adjacent parcel and if there is a lot of snow, Mr. Jasti imagines there is a chance it could go to three or four feet, and a chance water will get into his basement.
Mr. Jasti's second concern is about the connecting walkway to Ten Mile Road. If it is connected to the Ridgeview community, it is disturbing the privacy for the Ridgeview residents. There is a chance people will come into the community from Ten Mile Road. A lot of times, Mr. Jasti will see people providing internet, or providing something else such as security service, come and knock on his door to talk about something, so the connecting walkway is going to give access to people to come directly into Ridgeview and is going to be a big concern security wise.

Barbara Vanderhoff, 24323 Hampton Hill Road in Meadowbrook Glens, stated as it currently stands, there are a number of times during the day that it is very difficult to get out on to Ten Mile from where she lives.

The traffic is backed up from Novi Road to Meadowbrook Road. When someone else mentioned Busch's, Ms. Vanderhoff wanted to emphasize that is not an exaggeration, it takes some work to get out of the subdivision.

In addition, a number of years ago, right across from the Meadowbrook Glens entrance and exit onto Ten Mile, new homes were built. They pleasantly overlook the playground at Orchard Hills Elementary School and then come up to what were beautiful wetlands right across Ten Mile from the end of Ms. Vanderhoff's street. It was lovely to leave the subdivision or come home to all the animals and wildlife in the neighboring subdivision. Ms. Vanderhoff had been so proud prior to that to be part of a City that protected its woodlands. The builder agreed to reconfigure the area for animals, birds, and other wildlife. In the past Ms. Vanderhoff saw a doe with her fawn drinking at the pond there, there were always a great number of birds and there were nesting turtles. The homes were built and to this day, there's never been another deer. There hasn't even been another bird return to the small pond that's across from the entrance to her subdivision. It's a huge disappointment. Ms. Vanderhoff hopes the Planning Commission will take into consideration everything that everybody is saying and keep the loveliness of our city.

Saurabh Mall, 23880 Seminole Trail, relayed most of the issues he has have already been covered but wanted to emphasize that he basically moved from Northville to Novi to the Ridgeview community because he liked that there was no adjacent development taking place. He has also lived in many, many communities, east side, north side, all around the Metro area. He has seen what overdevelopment does to a city. It cuts out the city, takes all the things out, and basically the property values go to nothing. Now the question is, with all the things that are happening in Novi with malls and everything else, do we need another development like this? What does it do long term for the city? That is for the Planning Commission to decide.

Limin Chen, 23924 Seminole Trail, agrees with the prior speakers. She was the first resident to purchase a condo in Ridgeview of Novi in 2017. She had just moved to Michigan in 2016 and lived in Novi while they waited for the new Toll Brothers development to be built in this area. She strongly remembers she and her husband confirmed with the sales agents whether any development in the future would be in the backyard of the home they preferred to purchase. The answer was no, there were no future plans to develop that area, it is a conservation area to protect the environment. So, they decided to sign the contract and were the first to move in.

When they first moved in, every morning and night the deer came to Ms. Chen's front door and there were turkeys walking along. But now, almost seven years later, she does not see the turkeys and the deer are coming less and less. She can see the wildlife is disappearing in her area. So, as the gentleman before Ms. Chen asked, what is the long-term plan for Novi? Is it just building and developing more, or do we need more concern for the balance of people and wildlife?

Chris Fridenberg, 23844 Winnsborough, added to her prior statement to say she does not believe Novi needs any more pickleball courts. She recently read online that there is one being added on Meadowbrook by the Novi Senior Center. We just don't need it. Less cement is better. Leave the trees.

Lisa Jacquin, 42795 Cardinal Way, wanted to echo all the comments of her neighbors, but also give her voice to hopefully reject this proposal for a couple reasons. She has lived in Novi for 25 years. She raised her kids here primarily because of the schools, which are top notch in the state, but the broader city honestly could use a little help around city planning. We don't need any more strip malls. We do not need any more fast-food restaurants. Ms. Jacquin is single, and her kids are grown. When she goes out, she heads to Northville, to a community with character. Honestly, as was said earlier, Novi is losing that character. We just don't need any more development and the roads can't handle the population as it is. Again, Ms. Jacquin is echoing most of the sentiment already heard, but wanted to add her voice as well.

Seeing no other audience members who wished to speak, Chair Pehrson asked Member Lynch to read into the record correspondence received. Member Lynch relayed that 18 responses were received, all opposed, and two of the people who sent in a response also spoke this evening. All the objections stated in the responses received were similar to what was expressed in the public hearing.

Chair Pehrson closed the public hearing and turned the matter over to the Planning Commission for consideration.

Member Lynch stated he went out to the Ridgeview subdivision to take a look. He recalls when Ridgeview was approved. He was a little concerned about it since it was an industrial site and next to the dog park and Sports Club. It is really nicely developed; Toll Brothers did a nice job. Member Lynch walked towards the back to see what is there and saw water flowing, like a stream. He did not go all the way back as his hiking days are long gone.

Member Lynch clarified his understanding of current zoning on the site, which is OS-1 and I-1, and that the site includes a fair amount of wetland area. He heard comments that residents were told there would be nothing built on the wetland area and can see that this proposal does not include development in the wetland conservation area.

Since there is no two-way communication with the public during the public hearing portion of the meeting by Commission rules, Member Lynch will try to address some of the questions he heard.

The traffic study is available in the Planning Commission packet on the website if anyone wants to read it. Member Lynch expressed concern with the railroad tracks and traffic, which have been a problem for the past 25 years he's lived here.

The developer mentioned the installation of a center turn lane. Member Lynch drove down Ten Mile for better understanding and inquired to Mr. Zimmerman whether the tennis courts are proposed to be located in the vicinity just west of the railroad tracks near Ten Mile. Mr. Zimmerman confirmed this is correct. Member Lynch initially thought that trying to back out on to Ten Mile from the proposed parking for the courts wasn't a good idea, but saw the way it is set up, granted it wasn't in peak rush hour, that it may work due to the lane the developer is proposing to install. Member Lynch suggested that instead of two proposed tennis courts, that the developer think about proposing four pickleball courts, the parking and some benches when they go before City Council, it would be cheaper. Member Lynch knows the cost since his subdivision decided to install pickleball courts. The public indicated in a survey that they would like to see more pickleball courts in Novi. The City would like to get pickleball courts on this side of the City but ran out of money with Meadowbrook Commons, only four courts were able to be installed there. Mr. Zimmerman responded that the thought was to have two courts that can be multipurpose as two tennis courts or four pickleball courts, but whatever the City wants, they would be happy to do.

Member Lynch inquired what the walking trail would be made of. Mr. Zimmerman responded that the material has not been determined yet, but it will be a hard surface material.

Member Lynch inquired if the residential units are basically the same as Ridgeview. Mr. Hansen responded that they are two-story townhomes, with 2 car front entry garages similar to Ridgeview, but with a different floor plan and elevation from Ridgeview. Ridgeview's product is a villa, so a wider, deeper, bigger unit. This is similar but not the same. Member Lynch inquired as to the target price. Mr. Hansen indicated that pricing is not yet set at this stage, it adjusts a lot, but will be priced based on new comparable construction in the area at the time it is built.
Member Lynch inquired about another proposal Toll Brothers has in conjunction with Singh. Mr. Hansen responded that Toll Brothers currently has another application in with the City for a PRO called Elm Creek. Member Lynch inquired if any consideration has been given to having an elevator option in any of the units. Mr. Hansen responded that Elm Creek does have first floor primary bedrooms but not an elevator option. Member Lynch indicated he was asking the question to try to help when the applicant goes before Council since there is an aging population and there are people that would pay for an elevator.

Member Lynch also suggested that the applicant show City Council a comparison between what could be built with the current I-1 zoning versus the residential proposal in terms of environmental impact and how much of the habitat will be saved. It goes without saying, that just like Ridgeview, it survives the 100-year flood plain with the runoff from the new development going right to the detention basins. Member Lynch suggested that the developer clearly demonstrate that since any time new development comes

in there are a lot of concerns from nearby residents as to how it might affect them. Member Lynch inquired if the one detention basin takes care of the whole site and where the discharge is. Mr. Hansen responded that it does take care of the entire site and discharges on the west side of the railroad tracks.

Relating to the landscape, Member Lynch is always a proponent of not putting money into the tree fund by trying to plant as much as possible back on site. The area has some nice typography. Member Lynch suggested that more trees be considered between the new residential area and Ridgeview to help buffer.

As far as the walking trails are concerned, 40,000 voters want to see a walkable Novi. Member Lynch is not that concerned about the migration from Ten Mile. There are no roads connecting the two subdivisions so there is really only one way in and out of Ridgeview and two ways out for the new proposal. Mr. Hansen clarified that the second new residential access dead ends where it meets the commercial area and will be gated for fire access only.

Member Lynch suggested that the little park on the northwest could probably be a private amenity for the proposed residential area since it is such a small park, he does not see any benefit to the City.

Member Becker inquired through the Chair that the Planning Commission is only providing comments at this point. Chair Pehrson confirmed the Planning Commission is not approving the proposal at this point, only providing comments.

Member Becker thinks that an important point made was that so many residents in Ridgeview we told something by their builder regarding the wetland areas. What we've heard tonight is that no more than 0.1 acre of the wetlands on the total property are going to be impacted by the actual construction. Of the total site, there is a total of 15.87 acres that are going to remain a conservation easement.

We hear a lot about stormwater. Where the townhouses are going to be built now, there is unmanaged stormwater. With a development like this, it infers that stormwater has to be managed. According to where the detention basin is and how that is going to be focused there, Member Becker does not have concerns about the stormwater heading south. It looks like it is going to be managed and taken away from Ridgeview.

Member Becker wanted to relay that the Planning Commissioners have been listening and showed his notes written from all the public comments made tonight and the 18 letters received. They have been listening but won't always agree with the opinions expressed.

Another interesting thing to consider is that Ridgeview would not exist without a PRO. It would be an industrial development since that is what zoning indicated at the time, but now there are lovely villas to live in because the PRO was approved. Change is happening and people don't want 4,000 square foot homes on one acre lots anymore. Our diversity as a community means we need diverse residential options.

Keep in mind that there is a lot of Novi that was Future Land Use planned or zoned for something, and it was changed for a better option. Member Becker looks at this proposal and thinks it is a good use. It is 71 units and is a type of residence that we may find a lot more attractive, and 15.87 acres won't be touched. The alternative is that a developer comes in and puts a huge industrial complex north of Ridgeview because that is what it is currently zoned for, and we could not stop it. This is our chance to consider something that may be a lot more favorable.

Regarding the proposed trail, Member Becker recommends that the developer meet with the Ridgeview HOA and talk about how the walkway could be restructured a little. He sees the concerns about how the walkway funnels people through. Mr. Hansen noted that there is a public sidewalk easement that is built right up to the property line. That was incorporated into Ridgeview Villas and is something dedicated for public use. It runs basically from the property line of Ridgeview out to Nick Lidstrom Drive. That is the only section that is considered public, the rest of the sidewalks in Ridgeview are considered private.

Member Dismondy inquired to clarify that the new development is just connecting walkway into what already exists. Mr. Hansen replied that the easement already exists.

Member Dismondy can totally understand how residents feel disappointed that they were told that nothing would be built behind them and then come to find out there will be. The industrial zoning was approved long ago and would be much more invasive to have to look at through the trees than some hopefully similar type of townhomes, though neither is ideal for the residents of Ridgeview. Member Dismondy would like to make sure that the developer works with the neighbors on reassuring them that drainage will be properly handled, and even though there is a traffic study, make sure it is explained to residents in layman's terms and make sure that the county is endorsing it.

Regarding more strip malls, Member Dismondy agrees there are already a lot in Novi. It makes sense to get the site approved for retail versus office since no one is going to put an office building there. Nobody will put retail there until it is leased. It won't be built and sit vacant since you probably couldn't even get a loan to do that anyway. If tenants want to be there, then the building will be built, so that could be some reassurance for the neighbors.

Member Roney stated it is hard to add much to what fellow Commissioners have already said. One thing he did want to address is that the question before the Planning Commission tonight is whether this proposal is eligible for a PRO. Member Roney thinks it could be, but it is not there yet. Going through the packet there are a lot of details that still need to be resolved.

Member Roney shares concerns on the retail area if it looks like a strip mall, but it doesn't necessarily have to look that way. If it did that would be a no go for Member Roney.

In terms of the pickleball courts, Member Roney loves them, he plays pickleball. The Director of Parks and Rec may have concerns about noise from the courts. Member Roney has had conversations with the Director as to where to put more pickleball courts, that is the biggest thing he deals with is location.

To the west of this property, there is another small parcel. To enhance that conservation easement, maybe add that parcel in as well. It looks to be mostly wetlands; it'd be difficult to develop anyways.

Mr. Hansen added that if you look at the grading plan, the pickleball court was set down about six feet from the top of the pond. Not only are the units on that side of the community walkouts, but then the pickleball courts are down even further. So that wall will help kind of buffer the sound from the pickleball court.

Chair Pehrson stated he agrees with Member Roney, a PRO is the only way this is going to be approved going forward for whatever it is going to be. Whatever its final course, we are not there yet. We don't have all the right information based upon some of the comments from the residents and fellow Commissioners.
Chair Pehrson inquired whether the pickleball courts would be lit to manage the usage of that to only daytime hours. Mr. Zimmerman responded that they would be donated to the City. Chair Pehrson suggested they remain unlit and that additional berm be added in the area to help suppress noise.

Every time a development comes forward with any kind of walking path, there is concern about security. Rather than talk about it in terms of everybody's opinion, Chair Pehrson would like to have the petitioner to look at the walking path in terms of security. Data is needed from the police department to understand other developments that have walking paths through their neighborhoods as to what the increase or decrease was of any kind of security issue.

Relative to the water flow and the water management plan, in addition to the water retention area, there needs to be additional swales or a different plan for the topography between the two developments to assure the folks that are there now that they are not going to be in any additional threat of water flow into that area, and that can be done very easily on whatever plan comes eventually forward to the

Planning Commission.

For both the townhome occupancy rate and the business occupancy rate, Chair Pehrson would like to see what data suggests now relative to where we are in today's time frame, not data from two or three, or four or five, years ago. What are the occupancy rates for both of those businesses? Chair Pehrson doesn't consider the retail area a strip mall. This really seems to be two outbuildings that are going to have multiple tenants. It's not a strip mall like what is at Ten Mile and Meadowbrook Road, but Chair Pehrson would like to see what the occupancy rates really are so that the Planning Commission can make an assessment and have an understanding as to viability of the project. There is a whole other business side that we are not going to get into.

The biggest problem that Chair Pehrson has with the plan right now is the traffic. He does not know if the applicant has ever driven up and down Ten Mile and seen the traffic backed up from Meadowbrook Road all the way to Novi Road. It's not infrequent, it happens multiple times during the week. Add a train in there and that might be something that helps the traffic flow just because people are turning around and they're tired of waiting for the train to go by. Chair Pehrson does not know, even with the applicant's generous offer to add a turn and the deceleration lane, how that's really going to improve that area for the number of traffic trips that are estimated, especially if the added outbuildings in the B-3 area have any kind of drive thru.

We have seen the utter failure of a development that we all agreed to, which is Starbucks at Beck Road and Grand River. The traffic flow for that particular business is ridiculous because it does back up at times on to Beck Road. We have to put some forward thinking into what the potential might be for that kind of drive-through so that we don't end up with anything that's going to include traffic further on to Ten Mile.

When the Planning Commission started looking at this piece of property, way back when, before anything was there before, after maybe Annie's Donuts and the apple orchard and things of that nature, it was going to be a Kroger. We all had heartburn with the Kroger going there just because of the size, the scale, and what it was going to do to the surrounding area. That would have been ten times worse than what this is, but again, we are not at a point where Chair Pehrson would be comfortable at all approving anything relative to the PRO from what we see here. He thinks there is a need to understand some of the comments made, so there are some real hard facts to work with, then incorporate those into the PRO.

This agenda item was discussed, but a motion on the item was not required.

MATTERS FOR CONSIDERATION

1. **JSP22-19 SAKURA NOVI ARTWORK APPROVAL**
   Approval at the request of Sakura Novi, LLC for artwork to be permanently displayed on Building C. The subject property is located north of Grand River Avenue and east of Town Center Drive. A condition of the PRO Agreement for the project was for the artwork proposed for Building C to be approved by the City with site plan approval for Phase 1 but was deferred by the Planning Commission in July.

The Sakura Novi PRO Agreement includes the condition that the "Developer shall include high-quality Japanese-themed artwork as part of the design of Building C, to be approved by the City at the time of site plan approval for Phase 1". The elevations indicated a window area on the south-facing façade of Building C, which faces Grand River, as the location for an "Illuminated Spandrel Glass Art Mural Panel."

On July 27, 2023, the Planning Commission approved an extension of the necessary approval for the artwork piece in order to not delay the construction of the overall project. In approving the extension, the Planning Commission motion included the following conditions:

1. The applicant shall provide a model, drawings and/or high-quality rendering of the proposed artwork before the first Temporary Certificate of Occupancy will be issued for Sakura Novi, and not later than 12 months from the date of Final Stamping Set approval.
2. The artwork will be placed on a Planning Commission agenda for review and approval.

The applicant has opted to present a surface-applied 3D image, or sculpture, as opposed to the

COMMERCIAL MARKET ANALYSIS

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THE CHESAPEAKE GROUP, INC

BUILDING A FOUNDATION FOR THE FUTURE



MARKET FEASIBILITY ANALYSIS FOR COMMERCIAL DEVELOPMENT NEAR THE INTERSECTION OF TEN AND NOVI ROADS IN NOVI

JULY, 2022

PREPARED BY

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Market Assessment

THE CHESAPEAKE GROUP, INC
BUILDING A FOUNDATION FOR THE FUTURE

The following is a market feasibility assessment for the development of commercial development just east of the intersection of Ten Mile and Novi Roads in Novi, Michigan. The proposed development consists of about 60,000 square feet of mixed-use retail and service space on approximately ten acres of land fronting on Ten Mile Road.

The assessment was prepared by The Chesapeake Group (TCG). TCG is the premier economic analysis and development firm in the United States, having prepared more than 1,500 analyses and plans since its inception. TCG has established a national reputation with all commercial, residential, industrial, entrepreneurial, entertainment, arts, technology, and institutional development in established and emerging communities.

The Chesapeake Group's mission is to facilitate sustainable land use, business development, redevelopment, and expansion in rural, suburban, and urban settings. TCG has been involved in numerous projects in Michigan for more than twenty-five years and maintains an office in the state. Current public sector client efforts in Michigan are located in White Lake Township, Novi, and the City of Cadillac. TCG project areas during Covid include those in Adrian, Cadillac, Chesterfield Township, Novi, Genoa Township, Hillsdale, Laingsburg, Madison Heights, Meridian, Orion Township, and Sparta.

Before Covid, additional project areas in Michigan include Ada Township, Allendale Township, Canadian Lakes, Fennville, Grand Rapids, Hastings, Holt-Delhi Township, Hudsonville, Huron County, Kalamazoo, Lathrup Village, Mackinaw, Manton, Muskegon, Muskegon Heights, Northville, Norton Shores, Prot Huron, Shelby Township, Spring Lake, Troy, Walker-Standale, Wixom, and Zeeland.

TCG has previously been involved with several efforts in Novi. TCG is also the only consultant involved with the State of Michigan's Redevelopment Ready Community Certification Program for recent administrations and the former "Cool Cities Neighborhood Program" during previous administrations.

CONTEXT

Novi is one of the most dynamic cities within the growing households in Oakland County. Growth in homes or rooftops creates new demand for commercial activity through increased spending and need for more services.

Oakland County has seen substantial household growth since 2011, or the close of the Great Recession. More than 29,000 new housing units were permitted in Oakland County between 2011 and 2021. Of these units, about 23,000 were single-family, detached homes, and roughly 6,000 were attached multi-household units.

*Table 1 - New Housing Units Permitted in Oakland County for Select 2011 through 2021 Time Period**

Oakland County	Total	Annual Average
Total Units	29,022	2638
Units in Single-Family Structures	23,060	2096
Units in All Multi-Family Structures	5,962	542
Units in 2-unit Multi-Family Structures	208	19
Units in 3- and 4-unit Multi-Family Structures	725	66
Units in 5+ Unit Multi-Family Structures	5,029	457

*Developed by The Chesapeake Group, Inc., 2022. Based on HUD's permit database.

Novi reported growth in housing units permitted between 2011 and 2021. A total of just over 2,750 new homes were permitted during those years. The increase represents about 9.5 percent of the Oakland County total.

*Table 2 - New Housing Units Permitted in Novi for Select Periods from 2011 through 2021**

Total 2011 through 2021	Annual Average 2011 - 2021	2018-2021	Annual Average 2018-2921
2758	251	772	193

*Developed by The Chesapeake Group, Inc., 2022. Based on HUD's permit database.

Future growth in rooftops can be based on recent history. Utilization of the historical patterns indicates a range for new units for Oakland County and Novi. For Oakland County, the range in annual average units permitted range is from about 2,640 to 2,780. Utilization of the lower estimate for future projects results in the potential growth by 2030 of about 23,750 new permitted units. Utilizing the lower units contributes to a lower estimation of demand for commercial goods and services. It allows for short-term downturns due to fluctuating national and regional economic conditions.

For Novi, the average annual permits issued for 2011 through 2021 was 251, and the yearly average number permitted between 2018 and 2021 was 193. Employing the smaller number results in the potential for about an additional 1,740 units by 2030.

*Table 3 - New Housing Units Permitted in Novi for Select Periods from 2011 through 2021 and Low Estimate for 2030**

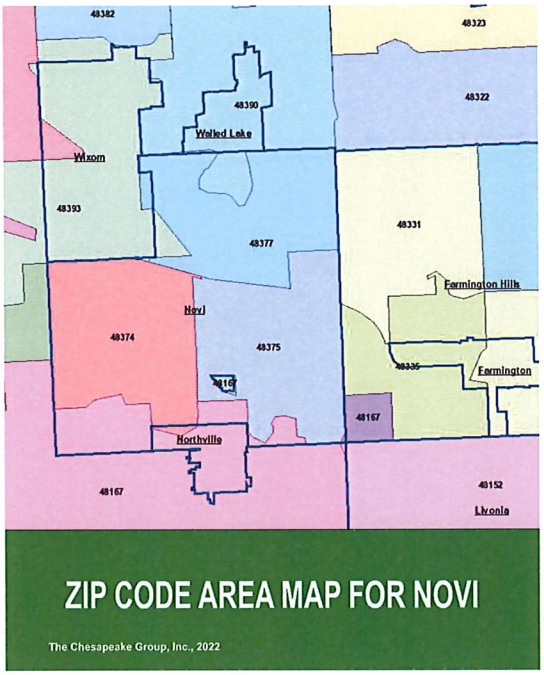
Total 2011-2021	Annual Average 2011-2021	Annual Average 2018-2021	Units added 2030 (low estimate)
2758	251	193	1737

*Developed by The Chesapeake Group, Inc., 2022. Based on HUD's permit database.

Household incomes are the primary source of spending in a community for commercial goods and services. According to the United States Census, the population for 2021 in Novi was estimated at about 66,500. The number of households was 24,130, and the median average household income was estimated at around $93,940.

The median household income is generally well below, often forty to sixty percent below the mean household income, with the latter income a better reflection of actual purchasing ability.

There are three zip code areas in which residents of Novi reside. These three zip codes are 48375, 48377, and 48374. Surveys conducted by TCG in the past two years in other communities near Novi contained a significant number of residents of those zip codes. The compilation of those responses indicates that the mean average income is over $120,000. Yet, to provide the most conservative estimate of current and future demand for commercial goods and services, the Census's median average income is used to define the demand.



SURROUNDINGS

The site is within walking distance of both residential and non-residential activity. Most demand for commercial results from household spending often near homes but also near employment or other activity generators.

One significant facility within walking distance is the Novi Ice Arena. The Arena opened over twenty years ago. The Arena offers two NHL-regulation-sized ice sheets, heated viewing areas with capacities of 200 and 750, skate rentals, and meeting space. The Arena hosts numerous programs, including the Novi Youth Hockey Association, Figure Skating Club of Novi, Novi High School, Northville High School, and the City of Novi after-school programs. Its offerings include adult hockey, tournaments, instructional programs for hockey and skating, drop-in open hockey and skating, and private lessons attracting people throughout the year.



Adjacent to the Novi Ice Arena and closer to the site is the Novi Athletic Club. West of the site within a reasonable walk is the Novi Civic Center, including municipal offices, meeting and event spaces for lease for a range of activities, and sports fields at the Ella Mae Power Park. Within a few block radius is also multi and single-family housing developments.

RETAIL GOODS AND RELATED SERVICES DEMAND FORECASTS

Existing rooftops in municipal areas like Novi drive spending on retail goods and related services. New rooftops also increases spending and demand for retail goods and related supportable space. It is noted that no jurisdiction can be expected to capture all demand created by any market, including its residents. Spending will occur in many places, including operations near home and work. Online purchases, vacation spending, and other activity diminish local sales. On the other hand, people living nearby, working within the area, employed nearby, and those coming to the site for various purposes will spend money in Novi and the specific location, as proven by the existing Walgreens and other adjacent or near non-residential activity. Some dollars are exported, while others are imported.

The estimates of demand for retail goods and related services are based on the existing households, the growth in rooftops, and an assumed modest income growth after 2022 (average annual rate of less than one-half percent) over and beyond inflation. The noted sales are inconstant dollars, excluding inflation.

Three market areas are defined, providing different estimates of opportunities but all reaching similar conclusions as to the viability of retail goods and related services space on the site at Ten Mile and Novi Roads.

The first market area is the smallest of the three based on rooftops, including only those within the municipal boundaries of the City of Novi.

- Novi resident-generated retail goods and related services sales are estimated at $2.3 billion at the beginning of 2022.
- The sales are expected to grow to about $2.4 billion, or $94 million by 2027, based on the anticipated growth in rooftops and a very modest increase in real income,

*Table 4 – Novi Resident Generated Retail Goods and Related Services Sales for 2022 and 2027 and the Change from 2022 to 2027**

Category	2021	2027	change 2021-27
Food	204,479,000	212,909,000	8,430,000
Eat/Drink	330,715,000	344,349,000	13,634,000
General Merchandise	292,731,000	304,799,000	12,068,000
Furniture	70,510,000	73,417,000	2,907,000
Transportation	273,170,000	284,432,000	11,262,000
Drugstore	166,040,000	172,885,000	6,845,000
Apparel	176,958,000	184,253,000	7,295,000
Hardware	179,005,000	186,384,000	7,380,000
Vehicle Service	232,683,000	242,276,000	9,593,000
Miscellaneous	348,229,000	362,585,000	14,356,000
TOTAL	$2,274,520,000	$2,368,290,000	$93,770,000

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

- Novi residents are expected to support 7.25 million square feet of space at any and all locations at the beginning of 2022.
- An additional 229,000 square feet of retail goods and services space will be supportable by 2027.
- There is also the potential to capture exported space in "Eat/Drink" or food services, "General Merchandise," and "Miscellaneous" retail.

*Table 5 – Novi Resident Generated Retail Goods and Related Services Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027**

Category	2021	2027	2021-27
Food	325,270	338,679	13,409
Eat/Drink	787,417	819,879	32,462
General Merchandise	1,737,439	1,809,064	71,627
Furniture	162,289	168,979	6,691
Transportation	895,278	932,188	36,909
Drugstore	162,784	169,495	6,711
Apparel	490,979	511,221	20,241
Hardware	729,441	759,510	30,073
Vehicle Service	566,463	589,817	23,354
Miscellaneous	1,390,669	1,448,000	57,331
TOTAL	7,248,029	7,546,832	298,808

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

- Most commercial opportunities are appropriate for the site. However, to enhance walkability with surrounding housing and non-residential anchors, vehicle-oriented purchase and services activity is eliminated from future growth opportunities. Therefore, Novi residents will support about 6 million square feet of non-vehicle space by 2027, increasing space by about 240,000 square feet over 2022.
- Retail and entertainment are today and will continue to be linked in the future linked so that one creates an experience, not merely a shopping trip or a trip to a restaurant. The catalytic activity and focus would be food service establishments as Covid-19's impact diminishes.

*Table 6 – Novi Resident Generated Retail Goods and Related Services Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027, Excluding Vehicle Service and Purchase Space**

Category	2021	2027	2021-27
Food	325,270	338,679	13,409
Eat/Drink	787,417	819,879	32,462
General Merchandise	1,737,439	1,809,064	71,627
Furniture	162,289	168,979	6,691
Drugstore	162,784	169,495	6,711
Apparel	490,979	511,221	20,241
Hardware	729,441	759,510	30,073
Miscellaneous	1,390,669	1,448,000	57,331
TOTAL	5,788,309	6,026,854	238,545

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

The second market area is a three-mile radius. In this case, it closely resembles the first market area in scale and resident households.

- Novi and very nearby residents generate retail goods and related services sales of about $3.3 billion at the beginning of 2022.
- The sales are expected to grow to $3.4 billion, or by $108 million by 2027, based on the anticipated growth in rooftops and a very modest increase in real income,

*Table 7 – Residents of a Three-Mile Radius Generated Retail Goods and Related Services Sales for 2022 and 2027 and the Change from 2022 to 2027**

Category	2021	2027	change 2021-27
Food	295,029,000	304,736,000	9,707,000
Eat/Drink	477,166,000	492,865,000	15,699,000
General Merchandise	422,361,000	436,257,000	13,896,000
Furniture	101,734,000	105,081,000	3,347,000
Transportation	394,138,000	407,105,000	12,967,000
Drugstore	239,568,000	247,450,000	7,882,000
Apparel	255,320,000	263,720,000	8,400,000
Hardware	258,274,000	266,771,000	8,497,000
Vehicle Service	335,723,000	346,768,000	11,045,000
Miscellaneous	502,436,000	518,966,000	16,530,000
TOTAL	$3,281,750,000	$3,389,721,000	$107,971,000

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

- Residents with a three-mile radius are expected to support about 10.5 million square feet of space at any and all locations at the beginning of 2022.
- An additional 344,000 square feet of retail goods and related services space will be supportable by 2027.

*Table 8 – Residents of a Three-Mile Radius Supportable Retail Goods and Related Services Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027**

Category	2021	2027	2021-27
Food	469,310	484,750	15,442
Eat/Drink	1,136,110	1,173,488	37,379
General Merchandise	2,506,825	2,589,304	82,477
Furniture	234,154	241,858	7,704
Drugstore	234,871	242,598	7,727
Apparel	708,399	731,705	23,306
Hardware	1,052,459	1,087,085	34,625
Vehicle Service	817,312	844,201	26,889
Miscellaneous	2,006,500	2,072,514	66,012
TOTAL	10,457,675	10,801,734	344,058

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

- Suppose vehicle-oriented activity is eliminated from the future growth opportunities. N that case, residents within the three-mile radius will support about 8.6 million square feet of non-vehicle space by 2027, increasing space by about 275,000 square feet over the beginning of 2022.

*Table 9 – Residents of a Three-Mile Radius Supportable Retail Goods and Related Services Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027, Excluding Vehicle Purchase and Service Space**

Category	2021	2027	2021-27
Food	469,310	484,750	15,442
Eat/Drink	1,136,110	1,173,488	37,379
General Merchandise	2,506,825	2,589,304	82,477
Furniture	234,154	241,858	7,704
Drugstore	234,871	242,598	7,727
Apparel	708,399	731,705	23,306
Hardware	1,052,459	1,087,085	34,625
Miscellaneous	2,006,500	2,072,514	66,012
TOTAL	8,350,649	8,625,329	274,672

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

The third is the largest in terms of both geographic area and rooftops. The five-mile radius associated with this market is the typical or normal area served by neighborhood and community scale retail goods and related services associated with the roughly ten-acre scale of the site.

- Residents within a five-mile radius generate an estimated $7.2 billion in retail goods and related services sales at the beginning of 2022.
- The sales are expected to grow to about $7.3 billion, or $133 million by 2027, based on the anticipated growth in rooftops and a very modest increase in real income,

*Table 10 – Residents of a Five-Mile Radius Generated Retail Goods and Related Services Sales for 2022 and 2027 and the Change from 2022 to 2027**

Category	2021	2027	change 2021-27
Food	645,160,000	657,181,000	12,021,000
Eat/Drink	1,043,451,000	1,062,894,000	19,443,000
General Merchandise	923,605,000	940,814,000	17,210,000
Furniture	222,469,000	226,614,000	4,145,000
Transportation	861,888,000	877,947,000	16,060,000
Drugstore	523,878,000	533,640,000	9,761,000
Apparel	558,325,000	568,729,000	10,403,000
Hardware	564,784,000	575,308,000	10,524,000
Vehicle Service	734,147,000	747,827,000	13,679,000
Miscellaneous	1,098,709,000	1,119,182,000	20,472,000
TOTAL	$7,176,417,000	$7,310,135,000	$133,718,000

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

- Residents with a five-mile radius are expected to support about 22.9 million square feet of space at any and all locations at the beginning of 2022.
- An additional 426,000 square feet of retail goods and related services space will be supportable by 2027.

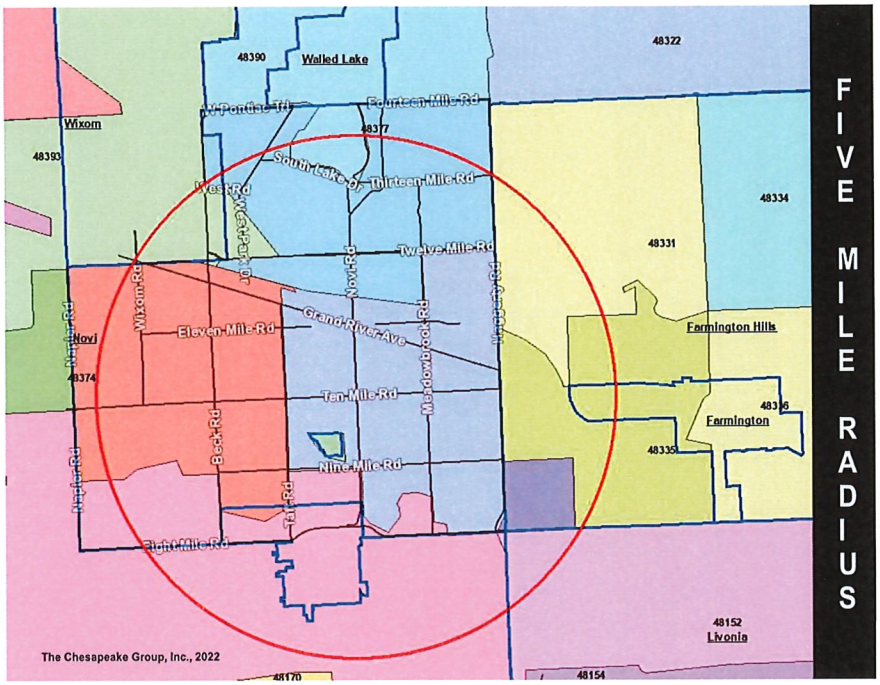


*Table 11 – Residents of a Five-Mile Radius Supportable Retail Goods and Related Services Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027**

Category	2021	2027	2021-27
Food	1,026,272	1,045,395	19,122
Eat/Drink	2,484,407	2,530,700	46,293
General Merchandise	5,481,844	5,583,984	102,147
Furniture	512,043	521,583	9,540
Transportation	2,824,722	2,877,353	52,634
Drugstore	513,606	523,176	9,570
Apparel	1,549,102	1,577,970	28,864
Hardware	2,301,479	2,344,365	42,885
Vehicle Service	1,787,268	1,820,572	33,301
Miscellaneous	4,387,743	4,469,505	81,758
TOTAL	22,868,486	23,294,603	426,114

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

- Suppose vehicle-oriented purchase and service activity is eliminated from the future growth opportunities. Residents within the five-mile radius will support about 18.3 million square feet of non-vehicle space by 2027, increasing space by about 340,000 square feet over the beginning of 2022.

*Table 12 – Residents of a Five-Mile Radius Supportable Retail Goods and Related Services Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027, Excluding Vehicle Purchase and Service Space**

Category	2021	2027	2021-27
Food	1,026,272	1,045,395	19,122
Eat/Drink	2,484,407	2,530,700	46,293
General Merchandise	5,481,844	5,583,984	102,147
Furniture	512,043	521,583	9,540
Drugstore	513,606	523,176	9,570
Apparel	1,549,102	1,577,970	28,864
Hardware	2,301,479	2,344,365	42,885
Miscellaneous	4,387,743	4,469,505	81,758
TOTAL	18,258,517	18,598,705	340,179

*Developed by The Chesapeake Group, Inc., 2022. Further breakdown of retail goods and related services demand is found in the appendix.

Site Development Potential

As previously defined, the proposed development consists of about 60,000 square feet of mixed-use retail and service space on approximately ten acres of land fronting on Ten Mile Road. While the specific tenant mix is currently unknown now, food and food services are likely to be a significant component of the development. Tenants may include a small market, sidewalk cafes, a bakery, and "Panera Breads-type" operations mixed with other miscellaneous retail and services. The proposed development is viable given current and anticipated growth in supportable space based on the three defined markets.

Novi Residents Only

- The site's development would represent only 0.8 percent of the space supported by Novi residents alone.
- The site's development would represent slightly less than one percent of the space supported by Novi residents alone, excluding vehicle sales and services space.
- The site's development would represent about twenty percent of the anticipated growth space supported by Novi residents alone by 2027.

Three-mile Area Residents

- The site's development would represent only 0.6 percent of the space supported by residents within three miles.
- The site's development would represent slightly less than 0.7 percent of the space supported by three-mile area residents alone, excluding vehicle sales and services space.
- The site's development would represent about fourteen percent of the anticipated growth space supported by three-mile area residents by 2027.

Five-mile Area Residents or the Traditional Market Area for Neighborhood and Community Commercial

- The site's development would represent only 0.26 percent of the space supported by residents within five-miles or the traditional neighborhood and community-scaled commercial centers.
- The site's development would represent slightly more than 0.3 percent of the space supported by five-mile area residents alone, excluding vehicle sales and services space.
- The site's development would represent about seventeen percent of the anticipated growth space supported by three-mile area residents by 2027.

The following is also noted for the above three market estimates.

- Amounts less than three percent are considered insignificant from a statistical perspective. Therefore and in all cases, the proposed development does not adversely impact demand for existing commercial. The development does not hinder and affords the opportunity for further growth in retail space on other sites.
- From the smallest to the largest market, space supported by growth should have no adverse impact on any existing businesses that maintain their competitiveness since the sales and space are derived from new households and income that does not presently exist.
- As part of the effort, TCG conducted a survey of available retail spaces in Novi that indicates the following.

    - The retail space market is viable based on achievable rent levels.
    - Rent levels for spaces built between 2010 and the present, rents range generally range from $30 to $40 per square foot. Most spaces built since 2010 lease for $35 to $40 per square foot.
    - Even those built before 2010 most often lease for $20 to $30 per square foot, with some exceeding $30 per square foot.

COMPATIBILITY AND WALKABILITY

The site has significant potential to enhance the walkable nature of this area of Novi.

1. The development will generally consist of non-big box operations that, by nature, impede walking to and through development.

2. Several operations are expected to be in the food and food services arena, enhancing the potential to serve the noted anchors in the area for lunch, dinner, and other times without having to get in and out of a vehicle.

3. Adjacent to the site on the east and south is an additional fourteen acres of new housing. The development will likely contain about seventy-three-bedroom condominiums and will have walking and driving access to the commercial site.

4. This additional housing will also create the opportunity for enhanced pedestrian linkage to some of the area's anchors, like the ice arena and Novi Athletic Club. It also provides the opportunity for improved connections to other existing residential neighborhoods to the east and south.

5. Collectively, with the enhanced linkages to existing anchors, the food and food service composition of much of the activity on the site, and the proposed adjacent other housing development with direct pedestrian linkages to the site, the commercial will act as a "village center" serving the neighboring residential and anchor activity.

Appendix

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*Permits Issued for New Housing Units for Oakland County from 2011 through 2021**

Oakland County	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Total Units	3,174	2,475	2,842	2,642	3,707	3,196	2,645	2,458	2,705	1,901	1,277
Units in Single-Family Structures	2,044	1,935	1,976	2,482	2,744	2,143	2,180	2,114	2,296	1,880	1,266
Units in All Multi-Family Structures	1,130	540	866	160	963	1,053	465	344	409	21	11
Units in 2-unit Multi-Family Structures	20	14	0	16	4	60	58	16	14	6	0
Units in 3 & 4-unit Multi-Fam Structures	127	111	83	71	105	49	44	49	60	15	11
Units in 5+ Unit Multi-Family Structures	983	415	783	73	854	944	363	279	335	0	0

*Developed by The Chesapeake Group, Inc., 2022, based on HUD data.

*Permits Issued for New Housing Units for Novi from 2011 through 2021**

Novi	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Total Units	114	321	190	147	516	184	289	203	197	322	275
Units in Single-Family Structures	114	218	190	147	181	184	173	198	197	316	275
Units in All Multi-Family Structures	0	103	0	0	335	0	116	5	0	6	0
Units in 2-unit Multi-Family Structures	0	0	0	0	0	0	0	0	0	6	0
Units in 3 & 4-unit Multi-Fam Structures	0	0	0	0	32	0	0	0	0	0	0
Units in 5+ Unit Multi-Family Structures	0	103	0	0	303	0	116	5	0	0	0

*Developed by The Chesapeake Group, Inc., 2022, based on HUD data.

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*Novi Resident Generated Retail Goods and Related Services Sales and Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027, Excluding Vehicle Service and Purchase Space**

Sub-category	2021 Sales	2027 Sales	2021-27 Sales	2021 Space	2027 Space	2021-27 Space
Food	204,479,000	212,909,000	8,430,000	325,270	338,679	13,409
Supermarkets	170,739,965	177,779,015	7,039,050	258,697	269,362	10,665
Independents	16,358,320	17,032,720	674,400	40,896	42,582	1,686
Bakeries	4,498,538	4,683,998	185,460	14,995	15,613	618
Dairies	2,658,227	2,767,817	109,590	7,384	7,688	304
Others	10,223,950	10,645,450	421,500	3,298	3,434	136
Eat/Drink	330,715,000	344,349,000	13,634,000	787,417	819,879	32,462
General Merchandise	292,731,000	304,799,000	12,068,000	1,737,439	1,809,064	71,627
Dept. Stores	103,626,774	107,898,846	4,272,072	431,778	449,579	17,800
Variety Stores	21,076,632	21,945,528	868,896	123,980	129,091	5,111
Jewelry	20,198,439	21,031,131	832,692	28,449	29,621	1,173
Sporting Goods/Toys	31,907,679	33,223,091	1,315,412	127,631	132,892	5,262
Discount Dept.	109,774,125	114,299,625	4,525,500	997,947	1,039,088	41,141
Antiques, etc.	1,463,655	1,523,995	60,340	6,364	6,626	262
Others	4,683,696	4,876,784	193,088	21,290	22,167	878
Furniture	70,510,000	73,417,000	2,907,000	162,289	168,979	6,691
Furniture	10,647,010	11,085,967	438,957	34,345	35,761	1,416
Home Furnishings	14,666,080	15,270,736	604,656	54,319	56,558	2,239
Store/Office Equip.	11,140,580	11,599,886	459,306	23,210	24,166	957
Music Instr./Suppl.	3,031,930	3,156,931	125,001	15,160	15,785	625
Radios,TV, etc.	31,024,400	32,303,480	1,279,080	35,255	36,709	1,454
Transportation	273,170,000	284,432,000	11,262,000	895,278	932,188	36,909
New/Used Vehicles	95,609,500	99,551,200	3,941,700	239,024	248,878	9,854
Tires, Batt., Prts.	120,467,970	125,434,512	4,966,542	501,950	522,644	20,694
Marine Sales/Rentals	14,478,010	15,074,896	596,886	39,130	40,743	1,613
Auto/Truck Rentals	42,614,520	44,371,392	1,756,872	115,174	119,923	4,748
Drugstore	166,040,000	172,885,000	6,845,000	162,784	169,495	6,711
Apparel	176,958,000	184,253,000	7,295,000	490,979	511,221	20,241
Men's and Boy's	23,181,498	24,137,143	955,645	57,954	60,343	2,389
Women's and Girl's	58,750,056	61,171,996	2,421,940	158,784	165,330	6,546
Infants	3,716,118	3,869,313	153,195	12,387	12,898	511
Family	49,194,324	51,222,334	2,028,010	196,777	204,889	8,112
Shoes	36,984,222	38,508,877	1,524,655	42,028	43,760	1,733
Jeans/Leather	707,832	737,012	29,180	2,359	2,457	97
Tailors/Uniforms	3,185,244	3,316,554	131,310	15,926	16,583	657
Others	1,238,706	1,289,771	51,065	4,764	4,961	196
Hardware	179,005,000	186,384,000	7,380,000	729,441	759,510	30,073
Hardware	86,638,420	90,209,856	3,571,920	315,049	328,036	12,989
Lawn/Seed/Fertil.	3,401,095	3,541,296	140,220	10,003	10,416	412
Others	88,965,485	92,632,848	3,667,860	404,389	421,058	16,672
Vehicle Service	232,683,000	242,276,000	9,593,000	566,463	589,817	23,354
Gasoline	79,112,220	82,373,840	3,261,620	54,560	56,810	2,249
Garage, Repairs	153,570,780	159,902,160	6,331,380	511,903	533,007	21,105
Miscellaneous	348,229,000	362,585,000	14,356,000	1,390,669	1,448,000	57,331
Advert. Signs, etc.	5,571,664	5,801,360	229,696	20,261	21,096	835
Barber/Beauty shop	21,241,969	22,117,685	875,716	106,210	110,588	4,379
Book Stores	16,018,534	16,678,910	660,376	88,992	92,661	3,669
Bowling	8,009,267	8,339,455	330,188	80,093	83,395	3,302
Cig./Tobacco Dealer	2,437,603	2,538,095	100,492	4,875	5,076	201
Dent./Physician Lab	13,929,160	14,503,400	574,240	42,859	44,626	1,767
Florist/Nurseries	26,117,175	27,193,875	1,076,700	61,452	63,986	2,533
Laundry, Dry Clean	11,839,786	12,327,890	488,104	39,466	41,093	1,627
Optical Goods/Opt.	8,357,496	8,702,040	344,544	23,879	24,863	984
Photo Sup./Photog.	24,027,801	25,018,365	990,564	68,651	71,481	2,830
Printing	28,206,549	29,369,385	1,162,836	102,569	106,798	4,228
Paper/Paper Prod.	14,973,847	15,591,155	617,308	74,869	77,956	3,087
Gifts/Cards/Novel.	49,796,747	51,849,655	2,052,908	165,989	172,832	6,843
Newsstands	2,785,832	2,900,680	114,848	5,572	5,801	230
Video Rent/Sales	45,269,770	47,136,050	1,866,280	226,349	235,680	9,331
Others	69,645,800	72,517,000	2,871,200	278,583	290,068	11,485
TOTAL	2,274,520,000	2,368,289,000	93,770,000	7,248,029	7,546,832	298,808

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*Residents of a Three-Mile Radius Sales and Supportable Retail Goods and Related Services Space in Square Feet for 2022 and 2027 and the Change from 2022 to 2027, Excluding Vehicle Purchase and Service Space**

Sub-category	2021 Sales	2027 Sales	2021-27 Sales	2021 Space	2027 Space	2021-27 Space
Food	295,029,000	304,736,000	9,707,000	469,310	484,750	15,442
Supermarkets	246,349,215	254,454,560	8,105,345	373,256	385,537	12,281
Independents	23,602,320	24,378,880	776,560	59,006	60,947	1,941
Bakeries	6,490,638	6,704,192	213,554	21,635	22,347	712
Dairies	3,835,377	3,961,568	126,191	10,654	11,004	351
Others	14,751,450	15,236,800	485,350	4,759	4,915	157
Eat/Drink	477,166,000	492,865,000	15,699,000	1,136,110	1,173,488	37,379
General Merchandise	422,361,000	436,257,000	13,896,000	2,506,825	2,589,304	82,477
Dept. Stores	149,515,794	154,434,978	4,919,184	622,982	643,479	20,497
Variety Stores	30,409,992	31,410,504	1,000,512	178,882	184,768	5,885
Jewelry	29,142,909	30,101,733	958,824	41,046	42,397	1,350
Sporting Goods/Toys	46,037,349	47,552,013	1,514,664	184,149	190,208	6,059
Discount Dept.	158,385,375	163,596,375	5,211,000	1,439,867	1,487,240	47,373
Antiques, etc.	2,111,805	2,181,285	69,480	9,182	9,484	302
Others	6,757,776	6,980,112	222,336	30,717	31,728	1,011
Furniture	101,734,000	105,081,000	3,347,000	234,154	241,858	7,704
Furniture	15,361,834	15,867,231	505,397	49,554	51,185	1,630
Home Furnishings	21,160,672	21,856,848	696,176	78,373	80,951	2,578
Store/Office Equip.	16,073,972	16,602,798	528,826	33,487	34,589	1,102
Music Instr./Suppl.	4,374,562	4,518,483	143,921	21,873	22,592	720
Radios,TV, etc.	44,762,960	46,235,640	1,472,680	50,867	52,541	1,674
Transportation	394,138,000	407,105,000	12,967,000	1,291,735	1,334,231	42,497
New/Used Vehicles	137,948,300	142,486,750	4,538,450	344,871	356,217	11,346
Tires, Batt., Prts.	173,814,858	179,533,305	5,718,447	724,229	748,055	23,827
Marine Sales/Rentals	20,889,314	21,576,565	687,251	56,458	58,315	1,857
Auto/Truck Rentals	61,485,528	63,508,380	2,022,852	166,177	171,644	5,467
Drugstore	239,568,000	247,450,000	7,882,000	234,871	242,598	7,727
Apparel	255,320,000	263,720,000	8,400,000	708,399	731,705	23,306
Men's and Boy's	33,446,920	34,547,320	1,100,400	83,617	86,368	2,751
Women's and Girl's	84,766,240	87,555,040	2,788,800	229,098	236,635	7,537
Infants	5,361,720	5,538,120	176,400	17,872	18,460	588
Family	70,978,960	73,314,160	2,335,200	283,916	293,257	9,341
Shoes	53,361,880	55,117,480	1,755,600	60,639	62,634	1,995
Jeans/Leather	1,021,280	1,054,880	33,600	3,404	3,516	112
Tailors/Uniforms	4,595,760	4,746,960	151,200	22,979	23,735	756
Others	1,787,240	1,846,040	58,800	6,874	7,100	226
Hardware	258,274,000	266,771,000	8,497,000	1,052,459	1,087,085	34,625
Hardware	125,004,616	129,117,164	4,112,548	454,562	469,517	14,955
Lawn/Seed/Fertil.	4,907,206	5,068,649	161,443	14,433	14,908	475
Others	128,362,178	132,585,187	4,223,009	583,464	602,660	19,195
Vehicle Service	335,723,000	346,768,000	11,045,000	817,312	844,201	26,889
Gasoline	114,145,820	117,901,120	3,755,300	78,721	81,311	2,590
Garage, Repairs	221,577,180	228,866,880	7,289,700	738,591	762,890	24,299
Miscellaneous	502,436,000	518,966,000	16,530,000	2,006,500	2,072,514	66,012
Advert. Signs, etc.	8,038,976	8,303,456	264,480	29,233	30,194	962
Barber/Beauty shop	30,648,596	31,656,926	1,008,330	153,243	158,285	5,042
Book Stores	23,112,056	23,872,436	760,380	128,400	132,625	4,224
Bowling	11,556,028	11,936,218	380,190	115,560	119,362	3,802
Cig./Tobacco Dealer	3,517,052	3,632,762	115,710	7,034	7,266	231
Dent./Physician Lab	20,097,440	20,758,640	661,200	61,838	63,873	2,034
Florist/Nurseries	37,682,700	38,922,450	1,239,750	88,665	91,582	2,917
Laundry, Dry Clean	17,082,824	17,644,844	562,020	56,943	58,816	1,873
Optical Goods/Opt.	12,058,464	12,455,184	396,720	34,453	35,586	1,133
Photo Sup./Photog.	34,668,084	35,808,654	1,140,570	99,052	102,310	3,259
Printing	40,697,316	42,036,246	1,338,930	147,990	152,859	4,869
Paper/Paper Prod.	21,604,748	22,315,538	710,790	108,024	111,578	3,554
Gifts/Cards/Novel.	71,848,348	74,212,138	2,363,790	239,494	247,374	7,879
Newsstands	4,019,488	4,151,728	132,240	8,039	8,303	264
Video Rent/Sales	65,316,680	67,465,580	2,148,900	326,583	337,328	10,745
Others	100,487,200	103,793,200	3,306,000	401,949	415,173	13,224
TOTAL	3,281,749,000	3,389,719,000	107,970,000	10,457,675	10,801,734	344,058

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Sub-category	2021 Sales	2027 Sales	2021-27 Sales	2021 Space	2027 Space	2021-27 Space
Food	645,160,000	657,181,000	12,021,000	1,026,272	1,045,395	19,122
Supermarkets	538,708,600	548,746,135	10,037,535	816,225	831,434	15,208
Independents	51,612,800	52,574,480	961,680	129,032	131,436	2,404
Bakeries	14,193,520	14,457,982	264,462	47,312	48,193	882
Dairies	8,387,080	8,543,353	156,273	23,297	23,732	434
Others	32,258,000	32,859,050	601,050	10,406	10,600	194
Eat/Drink	1,043,451,000	1,062,894,000	19,443,000	2,484,407	2,530,700	46,293
General Merchandise	923,605,000	940,814,000	17,210,000	5,481,844	5,583,984	102,147
Dept. Stores	326,956,170	333,048,156	6,092,340	1,362,317	1,387,701	25,385
Variety Stores	66,499,560	67,738,608	1,239,120	391,174	398,462	7,289
Jewelry	63,728,745	64,916,166	1,187,490	89,759	91,431	1,673
Sporting Goods/Toys	100,672,945	102,548,726	1,875,890	402,692	410,195	7,504
Discount Dept.	346,351,875	352,805,250	6,453,750	3,148,653	3,207,320	58,670
Antiques, etc.	4,618,025	4,704,070	86,050	20,078	20,452	374
Others	14,777,680	15,053,024	275,360	67,171	68,423	1,252
Furniture	222,469,000	226,614,000	4,145,000	512,043	521,583	9,540
Furniture	33,592,819	34,218,714	625,895	108,364	110,383	2,019
Home Furnishings	46,273,552	47,135,712	862,160	171,384	174,577	3,193
Store/Office Equip.	35,150,102	35,805,012	654,910	73,229	74,594	1,364
Music Instr./Suppl.	9,566,167	9,744,402	178,235	47,831	48,722	891
Radios,TV, etc.	97,886,360	99,710,160	1,823,800	111,235	113,307	2,073
Transportation	861,888,000	877,947,000	16,060,000	2,824,722	2,877,353	52,634
New/Used Vehicles	301,660,800	307,281,450	5,621,000	754,152	768,204	14,053
Tires, Batt., Prts.	380,092,608	387,174,627	7,082,460	1,583,719	1,613,228	29,510
Marine Sales/Rentals	45,680,064	46,531,191	851,180	123,460	125,760	2,300
Auto/Truck Rentals	134,454,528	136,959,732	2,505,360	363,391	370,161	6,771
Drugstore	523,878,000	533,640,000	9,761,000	513,606	523,176	9,570
Apparel	558,325,000	568,729,000	10,403,000	1,549,102	1,577,970	28,864
Men's and Boy's	73,140,575	74,503,499	1,362,793	182,851	186,259	3,407
Women's and Girl's	185,363,900	188,818,028	3,453,796	500,984	510,319	9,335
Infants	11,724,825	11,943,309	218,463	39,083	39,811	728
Family	155,214,350	158,106,662	2,892,034	620,857	632,427	11,568
Shoes	116,689,925	118,864,361	2,174,227	132,602	135,073	2,471
Jeans/Leather	2,233,300	2,274,916	41,612	7,444	7,583	139
Tailors/Uniforms	10,049,850	10,237,122	187,254	50,249	51,186	936
Others	3,908,275	3,981,103	72,821	15,032	15,312	280
Hardware	564,784,000	575,308,000	10,524,000	2,301,479	2,344,365	42,885
Hardware	273,355,456	278,449,072	5,093,616	994,020	1,012,542	18,522
Lawn/Seed/Fertil.	10,730,896	10,930,852	199,956	31,561	32,150	588
Others	280,697,648	285,928,076	5,230,428	1,275,898	1,299,673	23,775
Vehicle Service	734,147,000	747,827,000	13,679,000	1,787,268	1,820,572	33,301
Gasoline	249,609,980	254,261,180	4,650,860	172,145	175,353	3,207
Garage, Repairs	484,537,020	493,565,820	9,028,140	1,615,123	1,645,219	30,094
Miscellaneous	1,098,709,000	1,119,182,000	20,472,000	4,387,743	4,469,505	81,758
Advert. Signs, etc.	17,579,344	17,906,912	327,552	63,925	65,116	1,191
Barber/Beauty shop	67,021,249	68,270,102	1,248,792	335,106	341,351	6,244
Book Stores	50,540,614	51,482,372	941,712	280,781	286,013	5,232
Bowling	25,270,307	25,741,186	470,856	252,703	257,412	4,709
Cig./Tobacco Dealer	7,690,963	7,834,274	143,304	15,382	15,669	287
Dent./Physician Lab	43,948,360	44,767,280	818,880	135,226	137,745	2,520
Florist/Nurseries	82,403,175	83,938,650	1,535,400	193,890	197,503	3,613
Laundry, Dry Clean	37,356,106	38,052,188	696,048	124,520	126,841	2,320
Optical Goods/Opt.	26,369,016	26,860,368	491,328	75,340	76,744	1,404
Photo Sup./Photog.	75,810,921	77,223,558	1,412,568	216,603	220,639	4,036
Printing	88,995,429	90,653,742	1,658,232	323,620	329,650	6,030
Paper/Paper Prod.	47,244,487	48,124,826	880,296	236,222	240,624	4,401
Gifts/Cards/Novel.	157,115,387	160,043,026	2,927,496	523,718	533,477	9,758
Newsstands	8,789,672	8,953,456	163,776	17,579	17,907	328
Video Rent/Sales	142,832,170	145,493,660	2,661,360	714,161	727,468	13,307
Others	219,741,800	223,836,400	4,094,400	878,967	895,346	16,378
TOTAL	7,176,416,000	7,310,136,000	133,718,000	22,868,486	23,294,603	426,114

*Developed by The Chesapeake Group, Inc., 2022,

TRAFFIC IMPACT STUDY

Traffic Impact Study
Novi / Ten Project

Novi, Michigan

(Version 02, November 28, 2022)

Prepared For:

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CONSULTING

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- Turning Movement Count Data
- ITE Trip Generation Information
- Signal Timing Plans
- HCM Output

This traffic impact study has been prepared by:

Michael R. Cool

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1.0 Executive Summary

The proposed Novi-Ten development, which consists of a conceptual neighborhood shopping plaza and 71 townhouse residential units, is located on the south side of 10 Mile Road between Novi Road and the Railroad tracks. It is not expected to have a significant traffic impact on the overall level of service at the major intersections of Ten Mile Road with Novi Road and with Meadowbrook Road.

The level of service at Novi Road and Ten Mile Road is currently a D and will remain a D during both morning and afternoon peak hours for all scenarios.

The level of service at Ten Mile Road and Meadowbrook Road is currently a C during the morning peak hour and a D during the afternoon peak hour and the level of service does not change in the background and forecast scenarios.

The client has prepared a parallel plan with light industrial and office space under the existing zoning, which is currently OS-1 and I-1. The proposed PRO plan would generate slightly less traffic during the morning peak hour and slightly more traffic during the afternoon peak hour compared to the existing zoning. Given the similar trip generation, the PRO plan and the parallel plan would likely have similar traffic impacts during the peak hours of the day on the surrounding intersections of 10 Mile Road with Novi Road and Meadowbrook Road.

When the commercial portion of the site is developed, Ten Mile Road may need the following improvements to address the various concerns at the site driveways:

- In lieu of separate right-turn deceleration lanes at each driveway, widen eastbound 10 Mile Road to two-through lanes ending at a right-turn deceleration lane at the residential driveway.
- Extend the center left-turn lane along 10 Mile Road from where it currently ends at Catherine Industrial to service all commercial driveways.
- Widen westbound 10 Mile Road to two through lanes west from the 3rd commercial site driveway to help improve capacity.
- Provide separate left-turn and right-turn outbound lanes at the 2nd (middle) and 3rd (east) commercial driveways, to help facilitate right-turns out of the site, when a left-turning vehicle is waiting for a gap in traffic.

2.0 Introduction

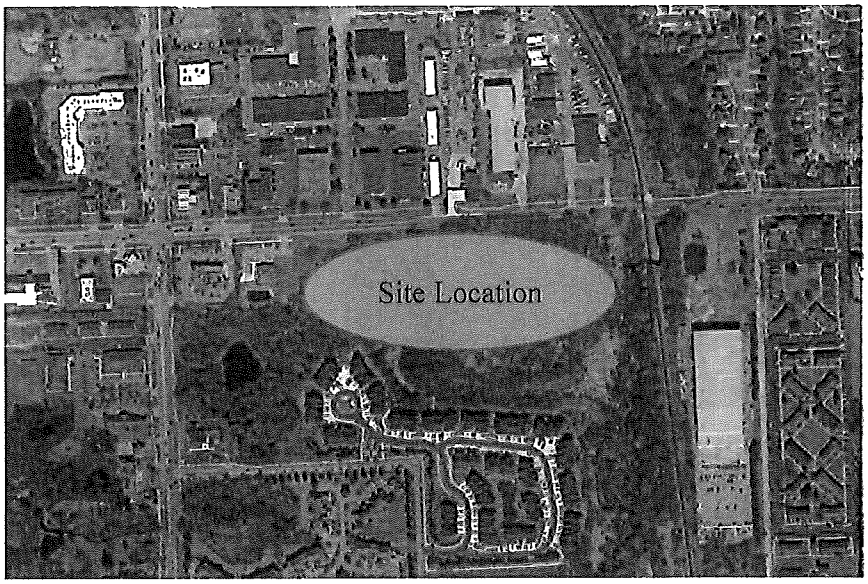
A development consisting of 71 townhouse residential units (low rise) and approximately 60,000 SF of neighborhood retail is planned for a site located on the south side of 10 Mile Road between Novi Road and the railroad tracks. The development is a PRO plan and the site would need to be rezoned from its existing mix of I-1 and OS-1. A concept plan for the site indicates that there may be a total four driveways that access the site from 10 Mile Road, one of which is already exists and currently provides access to a small business located at 43025 10 Mile Road.

This traffic study will focus on the site traffic impacts on the study area of this project which includes the major intersections of 10 Mile Road with Novi Road and Meadowbrook Road as well as the four proposed site driveways and the relevant commercial driveways on the north side of 10 Mile Road, such as Catherine Industrial, the driveway pair near the 3rd commercial site driveway, the Tremar driveway, and the western Wrenchers' driveway down near the railroad.

3.0 Area Description & Site Plan

3.1 Proposed Site Location and Surroundings

The Novi/Ten site is located on the south side of 10 Mile Road, east of Novi Road, west of the railroad crossing (and Meadowbrook Road. The site is surrounded by residential areas to the south, east, and further west beyond Novi Road. To the north of the site are light industrial type uses and a small amount of commercial to the west.



3.2 Existing Zoning

The site is currently zoned for OS-1 and I-1 for which there is a parallel plan with 103,300 SF of office space, and 281,700 SF of light industrial space, allowable under the current zoning. The trip generation for this parallel plan is included later in the report.

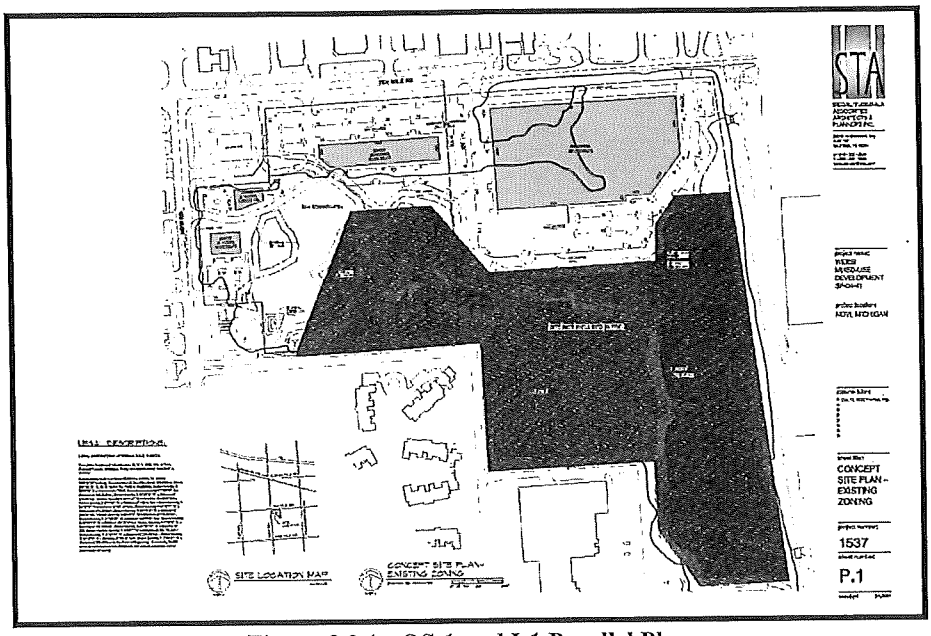


Figure 3.2.1 - OS-1 and I-1 Parallel Plan

3.3 Proposed Zoning and Site Plan

The proposed development is a PRO project with 71 townhouse residential units and conceptual retail space. The exact size, layout, and use of the proposed commercial space is unknown at this point. Because of this, this study conservatively assumes that the neighborhood style shopping plaza will be 60,000 SF.

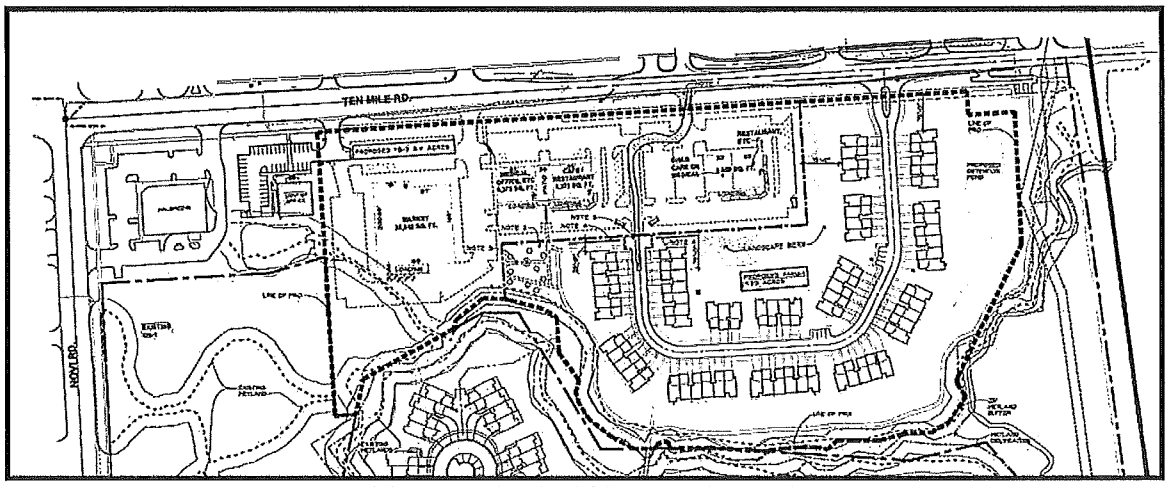


Figure 3.3.1 – Novi / 10 PRO Concept Plan

3.4 Project Scope and Study Intersections

The intersections, numbered from west to east, that are considered within the traffic influence area of this development and that are analyzed in this traffic study are as follows:

- Major Intersections
  - 10 Mile Road & Novi Road
  - 10 Mile Road & Meadowbrook Road
- Site Driveways (4 shown in concept plan)
  - 10 Mile Road & Shared 1st Commercial Driveway
  - 10 Mile Road & Catherine Industrial Drive / 2nd Commercial Driveway
  - 10 Mile Road & 3rd Commercial Driveway / Double Driveways
  - 10 Mile Road & 4th Proposed Residential Driveway
- Other Relevant Driveways
  - 10 Mile Road & Tremar's Driveway
  - 10 Mile Road & Wrenchers' Driveway

The traffic study scope is limited to just the aforementioned intersections as the residential portion is relatively small, and the conceptual retail portion, which can be categorized as a neighborhood shopping plaza, is meant to service the local area and is not expected to pull traffic from I-96 to the North.

Both Novi Road and 10 Mile Roads are under the jurisdiction of the Road Commission for Oakland County and are classified as other principal arterials.

Novi Road, at 10 Mile Road, is five-lanes wide with a speed limit of 45 MPH. The intersection is controlled with a traffic signal that includes permitted/protected style left-turn phasing in either direction.

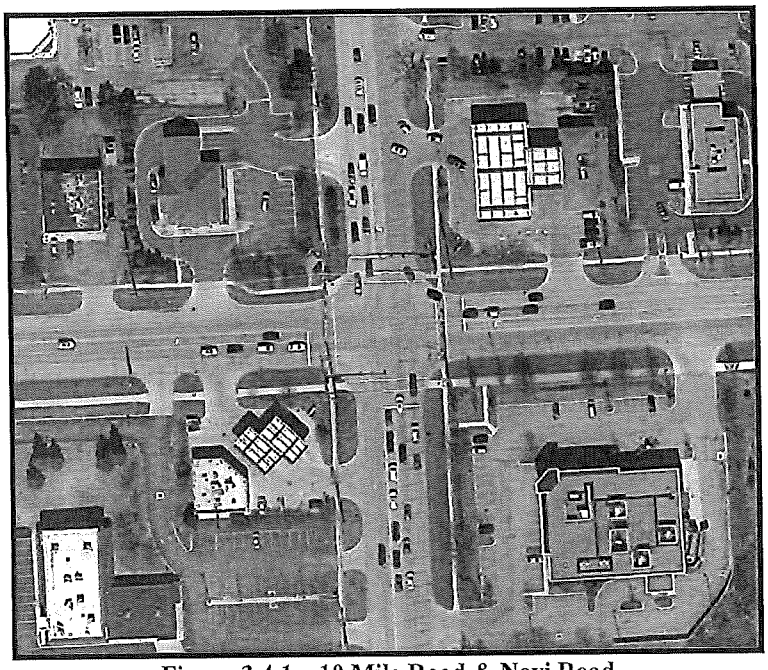


Figure 3.4.1 – 10 Mile Road & Novi Road

10 Mile Road is five-lanes wide near the intersection with Novi Road, however it narrows down to three-lanes just east of Catherine Industrial Drive, and narrows again down to two-lanes wide, with deceleration lanes for a few businesses on the north side of the road and one left-turn passing lane at the Tremar Driveway. East of the railroad tracks, 10 Mile Road eventually widens back to a four-lane and then a five-lane cross section as it approaches Meadowbrook Road. The speed limit on 10 Mile Road is 45 MPH.

Meadowbrook Road is a City of Novi roadway and classified as a minor arterial. At its intersection with 10 Mile Road, Meadowbrook Road is 4 lanes wide, with a separate left-turn, through-lane, and right-turn lane on the northbound and southbound approaches. The speed limit on Meadowbrook Road is 40 MPH to the north, and 30 MPH to the south.



Figure 3.4.2 – 10 Mile Road & Meadowbrook Road

The 1st commercial site driveway (1002) will share access with a dental business at an existing driveway which is aligned across from another business on the north side of 10 Mile Road. The 2nd commercial site driveway (1003) is located directly across from Catherine Industrial Drive.



Figure 3.4.3 – Driveways at 1002 and 1003.

The other two driveways are approximately located at the red arrows illustrated in Figure 3.4.4. The 3rd commercial driveway will also serve as the emergency access route for the residential portion of the site. The 4th driveway will only serve the residential portion of the site and will not carry any commercial traffic.

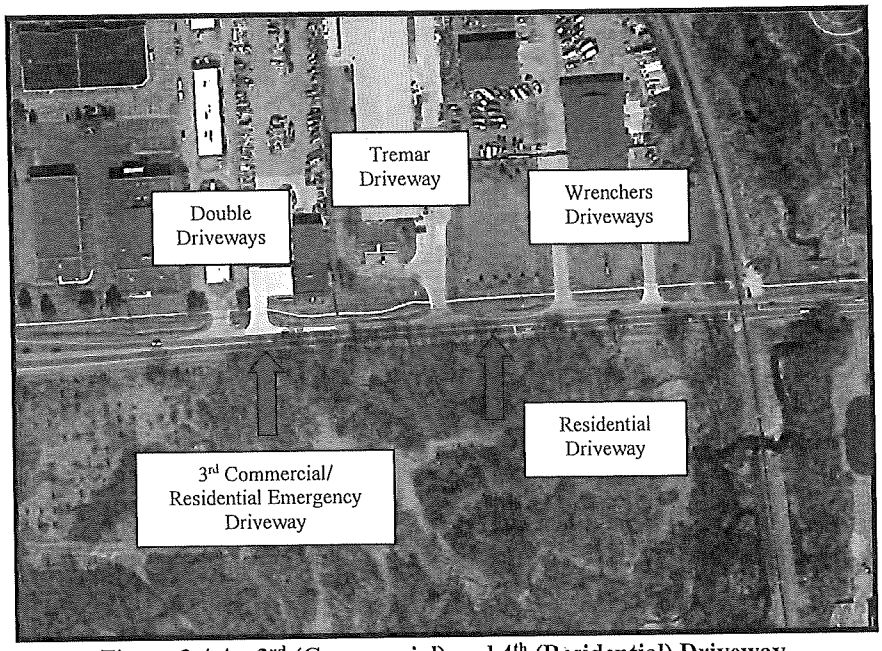


Figure 3.4.4 – 3rd (Commercial) and 4th (Residential) Driveway.

4.0 Data Collection & Existing Traffic Volumes

4.1 Twenty-Four Hour Traffic Volumes

Historical 24-hr volume data for this traffic study have been acquired from the Southeast Michigan Council of Governments (SEMCOG) traffic count database (TCDS). The traffic cameras at Novi Road and Meadowbrook Road have accumulated a significant data set of the yearly AADT's for each intersection's approach which is summarized in Tables 4.1.1 and 4.1.2.

Table 4.1.1 – 24-Hr AADT Volumes at 10 Mile Road & Novi Road

Year	EB	WB	NB	SB	Total
2022*	**9793**	**8282**	**9695**	**10552**	**38322**
2019	8355	7391	9890	10385	36021
2018	7765	7697	10045	10608	36115
2017	8445	7859	10532	10698	37534
2016	9456	8118	10328	10800	38702
2015	9746	8376	10487	11010	39619
2014	9308	7754	9645	10131	36838
2013	9864	8568	10178	10532	39142
2012	9825	8687	9844	10232	38588
2010	9543	8468	9655	9569	37235

Table 4.1.2 – 24-Hr AADT Volumes at 10 Mile Road & Meadowbrook Road

Year	EB	WB	NB	SB	Total
2022	7687	7488	3645	4706	23526
2019	7620	8223	3586	5016	24445
2018	7321	8135	3867	4820	24143
2017	8359	7707	4082	4456	24604
2016	10938	7162	3762	4182	26044
2015	7340	8032	4151	4755	24278
2014	7102	7508	4106	4329	23045

*The 2022 entries are a quick estimate based on our 13 hour traffic count at the intersections, factored by 1.225 to bring the 13 hour count to a 24 hour count. The factor was derived from a February 27th 2018 traffic count at 10 Mile/Novi using the same 13 hours relative to its 24 hour volume. The 2018 count summary is included in the Appendix.

4.2 Turning Movement Counts

Video cameras were installed at each of the study intersections in order to record the various turning movements that occurred between the hours of 6:00 AM-7:00 PM on March 16th, 2022. The video files were uploaded to www.spacksolutions.com 's counting service, then downloaded and processed. The intersections are listed below:

- 1001 – 10 Mile Road and Novi Road
- 1002 – 10 Mile Road and Shared Driveway
- 1003 – 10 Mile Road and Catherine Industrial Drive
- 1004 – 10 Mile Road and existing driveway pair across from 3rd site driveway.
    - Counts at this location were limited to just 7-9 AM, 4-6 PM.
- 1006 – 10 Mile Road & Tremar's Driveway
- 1008 – 10 Mile Road & Wrenchers' Driveway
- 1009 – 10 Mile Road & Meadowbrook Road

These morning and afternoon peak hour counts include all personal vehicles, commercial truck traffic, pedestrians, and bicycle traffic. A summary of these turning movement counts is included in the Appendix.

Figure 4.2.1 shows the existing morning and afternoon peak hour traffic volumes.

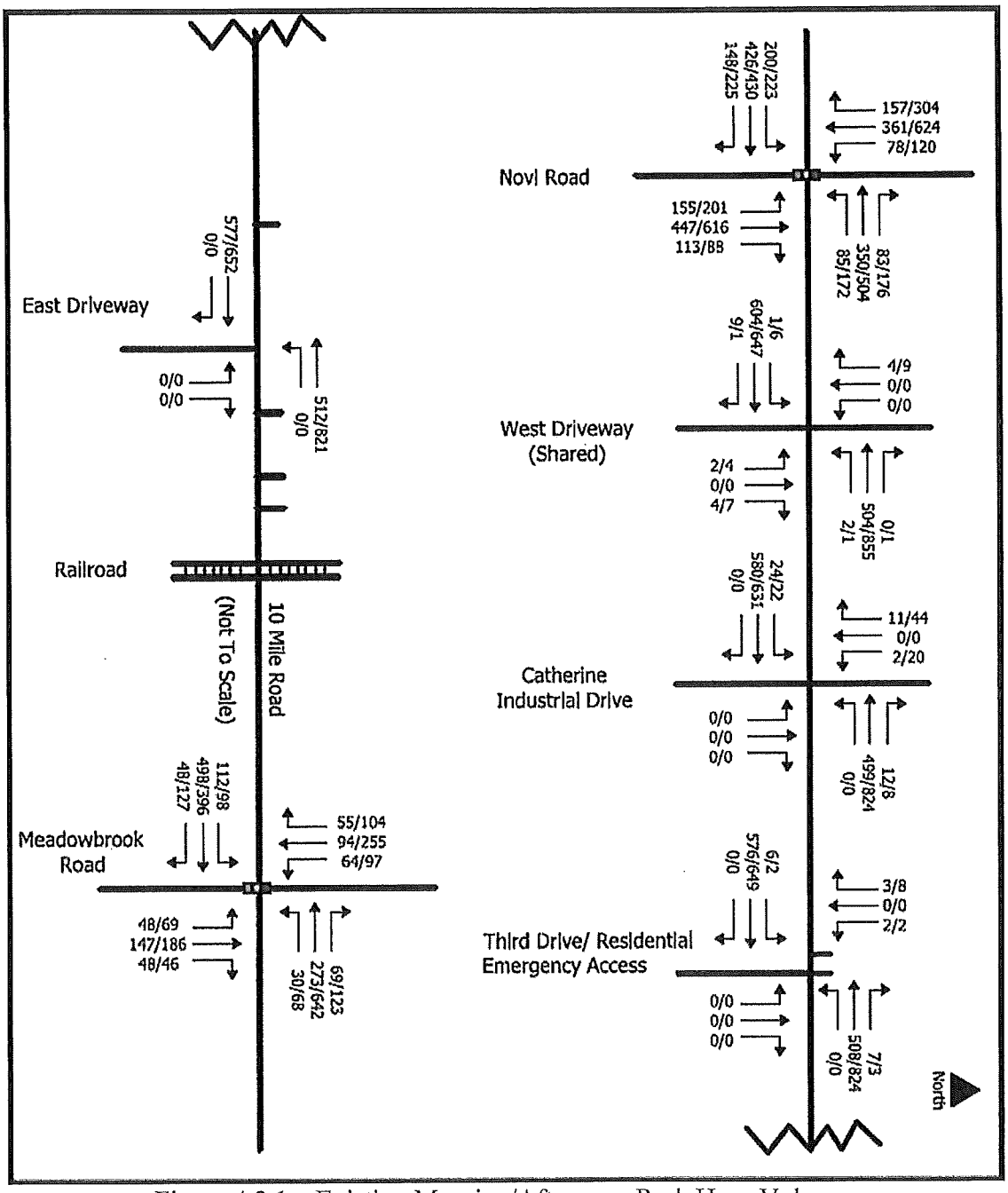


Figure 4.2.1 – Existing Morning/Afternoon Peak Hour Volumes

5.0 Background Growth

Typically traffic volumes may grow over time due to development in the surrounding area. The existing traffic volumes are increased by a background growth rate to estimate the background traffic conditions that will be present when the proposed site has reached its build-out.

Based on the historical AADT data contained in Tables 4.1.1-2, traffic volumes in the area have been in a slight decline, even when ignoring all of 2020 and 2021 due to the effects of COVID, and even excluding the current 2022 count.

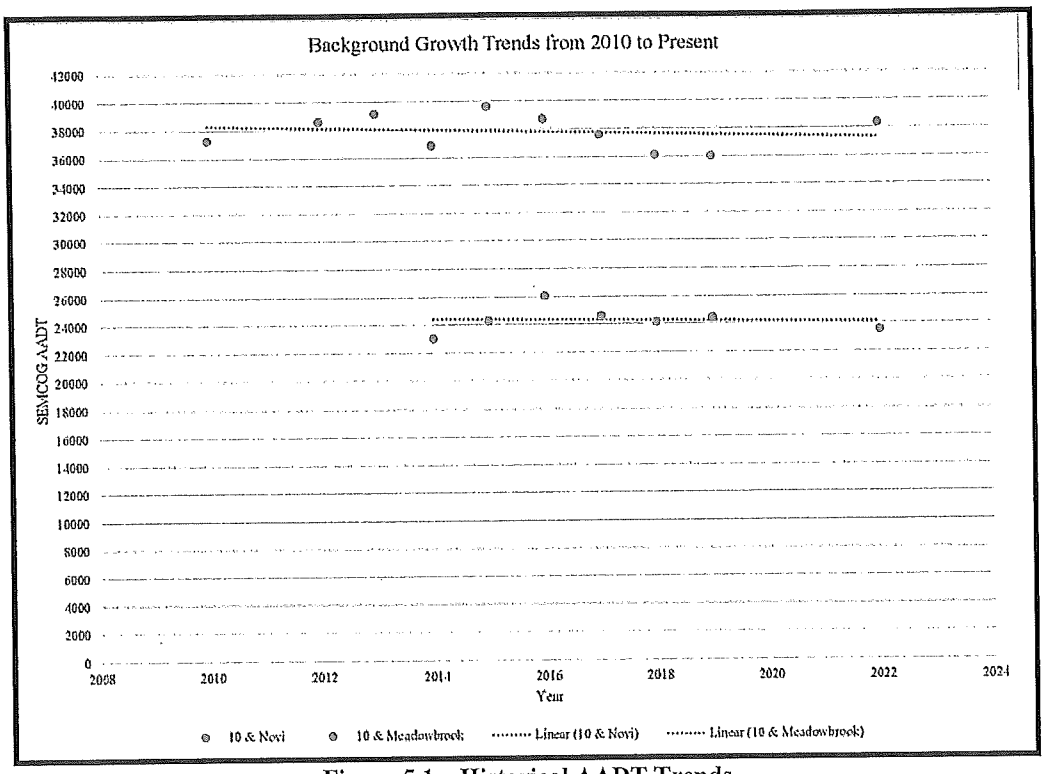


Figure 5.1 – Historical AADT Trends

Despite the downward trend in traffic volumes, this study will conservatively assume a background growth rate of 0.2% / year for five years to estimate the traffic conditions that might be present at buildout of the site. That growth estimate was based on a comparison of the 2022 counts with a 2018 traffic count, which is attached in the Appendix.

Figure 5.2 shows the background volumes for the morning and afternoon peak hours.

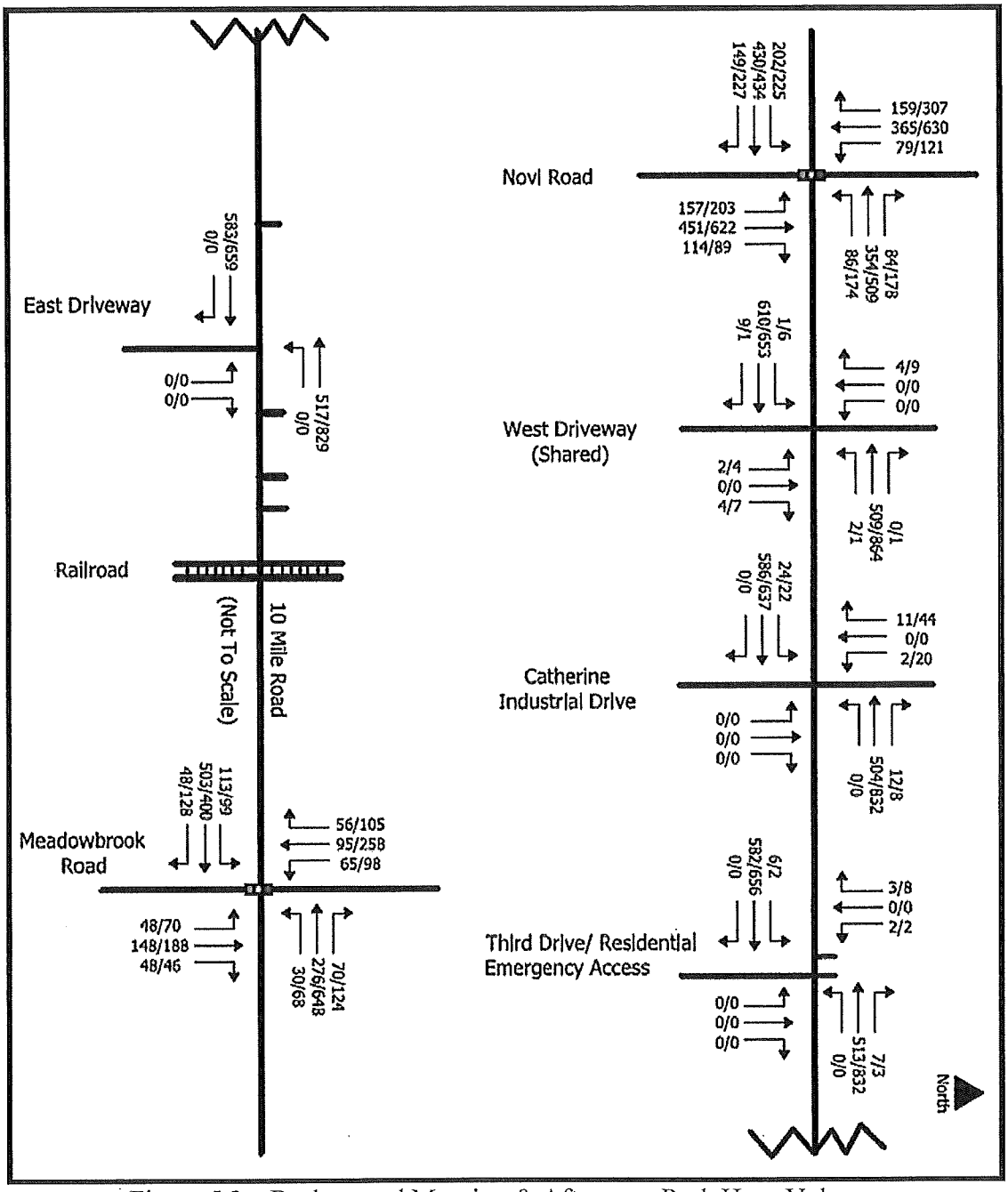


Figure 5.2 – Background Morning & Afternoon Peak Hour Volumes

6.0 Trip Generation

6.1 Methodology

Trip generation for this traffic study is based upon the rates and equations contained in the Institute of Transportation Engineer's (ITE) **Trip Generation Manual**, 11th Edition. The **Trip Generation Manual** is a publication that contains a wealth of traffic data on a wide variety of land uses that fall within the categories of residential, lodging, recreational, institutional, industrial, medical, office, retail, and services. The **Trip Generation Manual** is typically used if no local data for a specific land use is readily available.

6.2 Trip Generation Summary – Proposed Development

The eventual configuration of buildings, sizes, and land uses within the retail portion of the site is unknown at this point in time. So instead of performing an analysis on the concept plan's particular land use mix, this study will use the broader and encompassing Shopping Plaza category in the ITE Trip Generation Manual. As mentioned previously in this study, the size of the shopping plaza was raised to 60,000 to conservatively accommodate for various possible reconfigurations of building sizes and uses. The residential portion of the site is considered Multifamily (Low Rise). The trip generation for the proposed development is summarized in Table 6.2.1.

Table 6.2.1 Trip Generation – Proposed Development

Proposed Trip Generation Table

	ITE	Size	Weekday	Morning Peak Hour			Afternoon Peak Hour		
Land Use	Code	SF/Units	24-Hr	Enter	Exit	Total	Enter	Exit	Total
Base Vehicular Trips									
Shopping Plaza	821	60,000	6030	131	81	212	278	301	579
Multi Family LR	220	71	530	11	34	45	32	19	51
Trips present at site driveways			6560	142	115	257	310	320	630
Applied Pass By Reduction (Shopping Plaza Only, PM Peak Hour)									
Pass by Rate	40%			0	0	0	-111	-120	-231
Net New Trips to Area				142	115	257	199	200	399

The ITE Trip Generation Manual 11th edition web app has pass-by data for the Shopping Plaza category. The data covers 15 shopping plazas of various sizes that range from 45,000 to 145,000 SF. The average pass-by rate for those plazas was and average of 40% in the afternoon peak hour. Therefore this study assumes that 40% of the commercial traffic at this development will come from existing traffic on Ten Mile Road and not add new trips to the area during the afternoon peak hour.

6.3 Trip Generation Summary – Parallel Plan

The client has estimated that a total of 385,000 square feet of office and light industrial space could be built on this site if developed under the existing I-1 and OS-1 zoning instead of the proposed PRO plan. Comparing the findings in tables 6.2.1 and 6.3.1, the parallel plan would generate similar new traffic to the area, with more traffic in the morning peak hour and less traffic in the afternoon peak hour.

Table 6.3.1 - Trip Generation Parallel Plan

	ITE	Size	Weekday	Morning Peak Hour			Afternoon Peak Hour		
Land Use	Code	SF/Units	24-Hr	Enter	Exit	Total	Enter	Exit	Total
Office	710	103,300	1,194	151	21	172	29	142	171
Light Industrial	110	281,700	1,372	183	25	208	26	157	183
		385,000	2,566	334	46	380	55	299	354

7.0 Trip Distribution

Trip Distribution for both the proposed development and the other background developments are based upon the existing traffic patterns in the area. The uses within the retail portion of the site are expected to service the local neighborhoods and isn't expected to draw any significant amounts of traffic from outside of the local area such as from traffic on the I-96 freeway.

However, comments raised by the City's Traffic consultant and the RCOC, indicated that they believed more traffic may come to/from the north on Novi Road than what was previously assumed in our preliminary methodology memorandum which was based on existing travel patterns. Therefore, an additional 4% percent of the site's traffic is assigned to and from the north on Novi Road, pulling 2% each from the west on 10 Mile Road and from the south on Novi Road. The percentages are shown below in Table 7.1.

Table 7.1 – Trip Distribution – Novi/Ten Development (New Trips)

Inbound From	%	AMIN	%	PMIN		%	AMOUT	%	PMOUT
North on Novi Road	24%	34	28%	56		27%	31	27%	54
South on Novi Road	23%	33	18%	36		17%	20	21%	42
West on 10 Mile Road	25%	36	18%	36		19%	22	21%	42
East on 10 Mile Road	13%	18	19%	38		20%	23	12%	24
North on Meadowbrook	7%	10	10%	20		11%	13	9%	18
South on Meadowbrook	8%	11	7%	14		6%	6	10%	20
	100%	142	100%	200		100%	115	100%	200

Pass by trips are taken from existing traffic on 10 Mile Road during the afternoon peak hour with an assumed 55% westbound / 45% eastbound split. Westbound pass-by trips that enter the site are assumed to exit the site to the west, and vice versa for eastbound traffic. Pass by traffic is only assigned to the three commercial driveways.

Figures 7.1 and 7.2 show the generated traffic volumes for the morning and afternoon peak hours and Figure 7.3 shows the forecast traffic volumes for the morning and afternoon peak hours which is the summation of the background and generated traffic volumes.

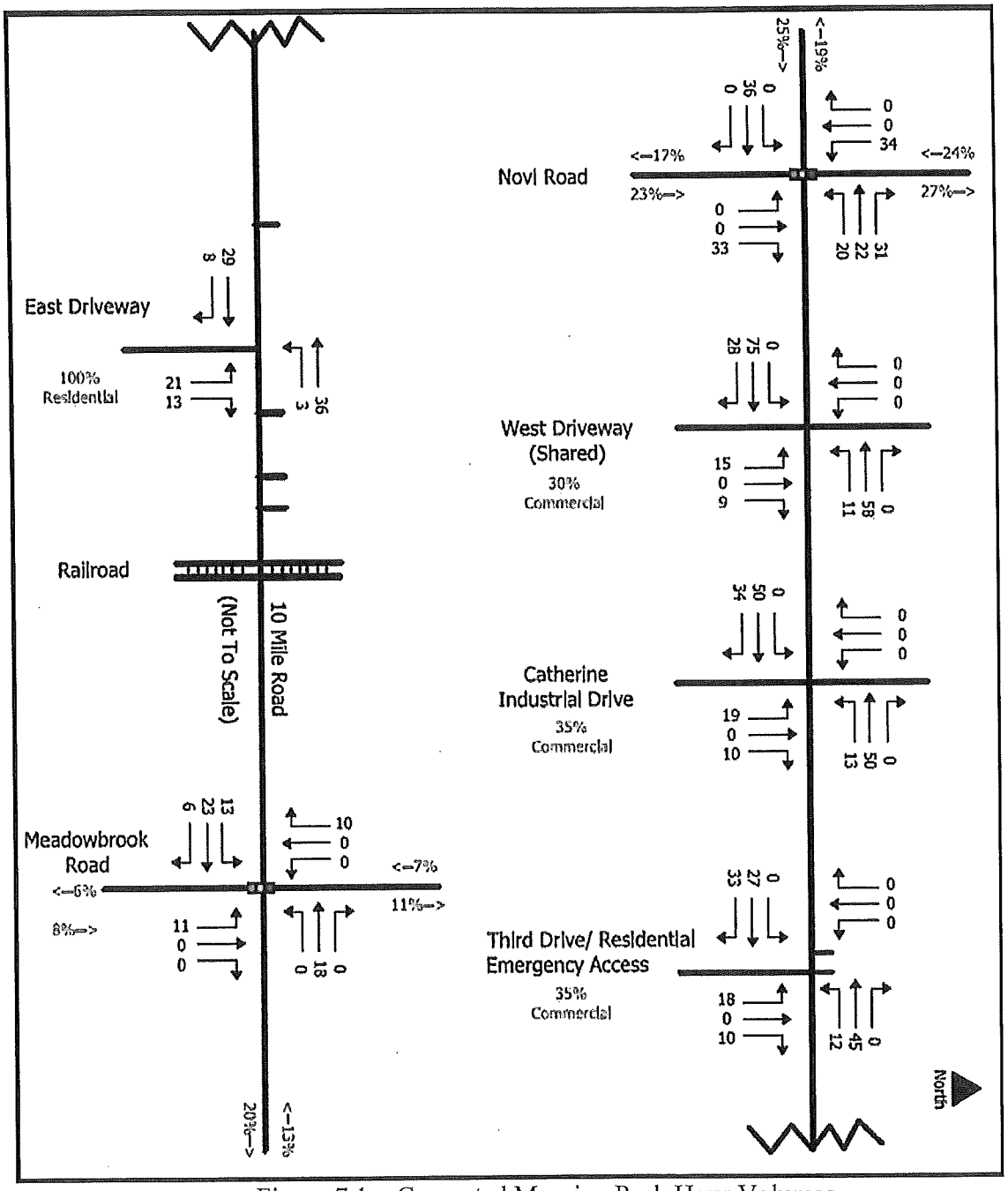


Figure 7.1 – Generated Morning Peak Hour Volumes

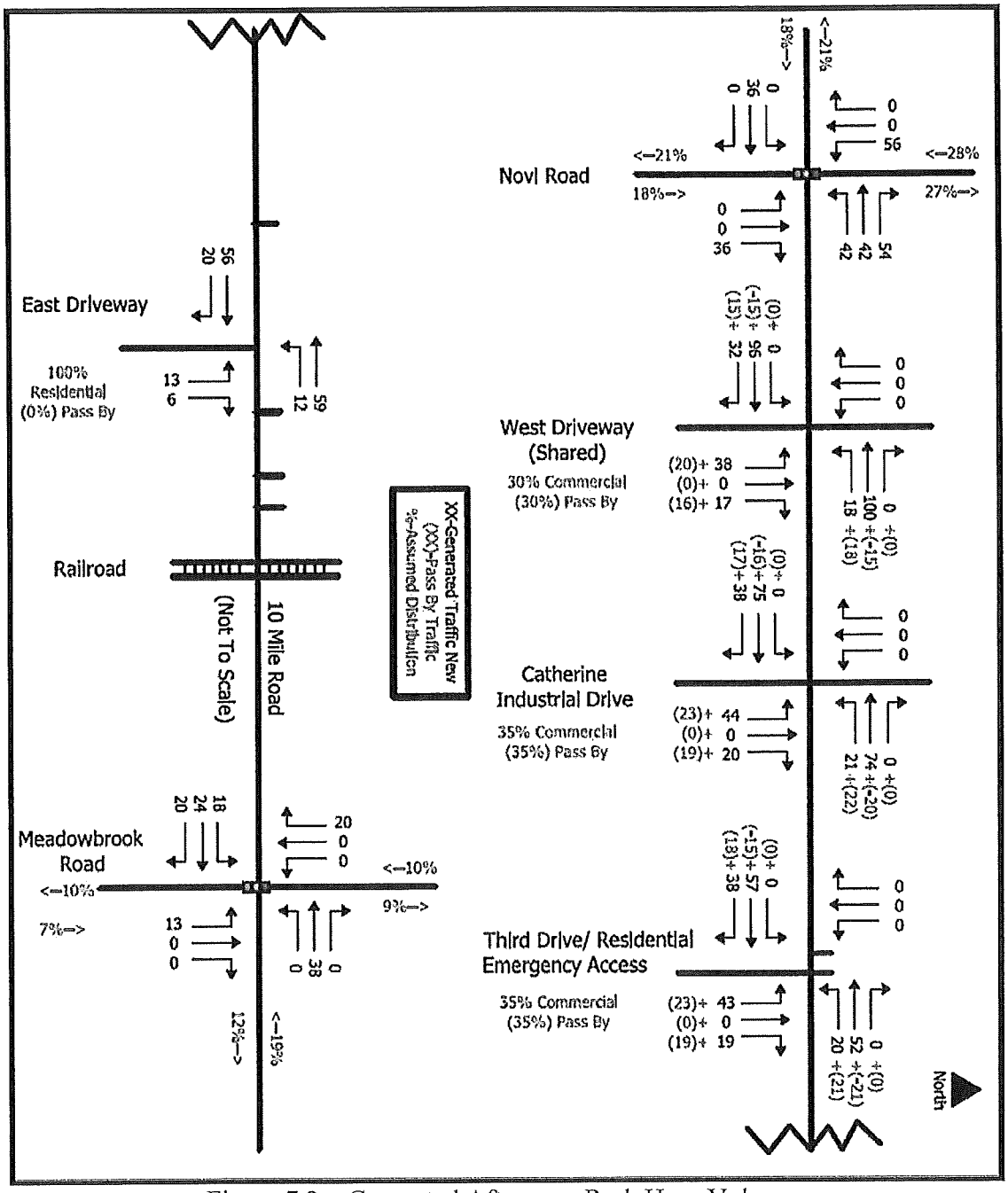


Figure 7.2 – Generated Afternoon Peak Hour Volumes

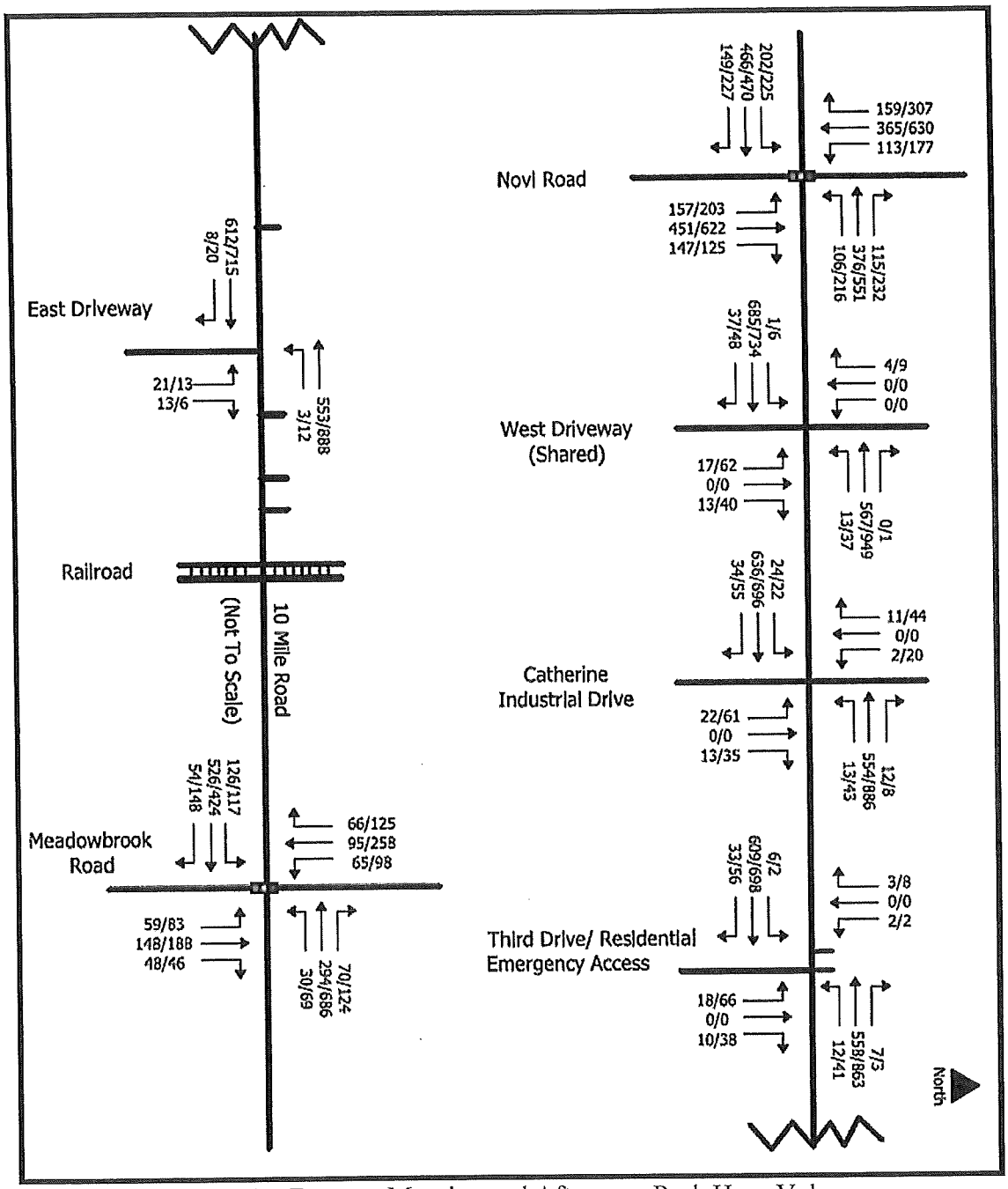


Figure 7.3 – Forecast Morning and Afternoon Peak Hour Volumes

8.0 Capacity Analysis

8.1 Methodology and Analysis Tools

Capacity analysis for this traffic study utilizes the Synchro/SimTraffic (Version 11) program to create a traffic model of the existing, background growth (if needed), and forecast traffic scenarios. Synchro provides the **Highway Capacity Manual**'s (HCM) level of service for each study intersection, while the SimTraffic model provides an alternative and sometimes more realistic analysis of traffic conditions and impacts where queuing at intersections may impact other driveways, or delays for other turning movements at the same or other nearby intersections.

Neither analysis method is perfect as the equations within the **Highway Capacity Manual** may result in unrealistically long delays at busy unsignalized intersections. Sometimes the vehicle behavior within the SimTraffic model does not always match reality, such as where human drivers would more easily change lanes to avoid a blockage, or instances where more drivers in reality "sneak" through an intersection at the end of a signal phase to turn left.

Synchro - HCM Level-of-service (LOS)

The Highway Capacity Manual assigns the following level-of-service grades to the ranges of control delay in seconds for unsignalized and signalized intersections. Generally LOS D is considered the limit of acceptable delay, although there are many situations where providing road improvements needed to improve a failing intersection LOS grade may be realistically unattainable for a sole developer or even undesirable to a community:

Table 8.1 – Highway Capacity Manual
Level of Service Delay Ranges and Grades

Unsignalized Level-of-service Grades						
Delay (sec.)	0-10	10-15	15-25	25-35	35-50	50+
LOS	A	B	C	D	E	F

Signalized Level-of-service Grades						
Delay (sec.)	0-10	10-20	20-35	35-55	55-80	80+
LOS	A	B	C	D	E	F

The HCM Level of Service grades for each scenario and study intersection is the basis upon which improvements are recommended in this traffic impact study. Any turning movement with a HCM level of service E or F is highlighted and improvements are recommended to mitigate those poor level of service grades.

8.2 Capacity Analysis: Intersection 1001 - 10 Mile Road & Novi Road

Table 8.2.1 shows the capacity analysis results for the 10 Mile Road and Novi Road intersection for the morning and afternoon peak hours of the day. Background growth and the proposed development traffic is not anticipated to significantly impact the average LOS of the intersection, which is currently a D and will remain a D. Future adjustments to the signal, such as providing slightly more green time to the EB/WB left-turn phase, could be considered which may improve the average intersection delay slightly to 45.9 seconds/vehicle during the afternoon peak hour.

Table 8.2.1 – Capacity Analysis – 10 Mile Road & Novi Road

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB Novi Road			SB Novi Road			Int.
AM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	200	426	148	85	350	83	155	447	113	78	361	157	2603
Background Vol.	202	430	149	86	354	84	157	451	114	79	365	159	2630
Generated Vol.	0	36	0	20	22	31	0	0	33	34	0	0	176
Forecast Vol.	202	466	149	106	376	115	157	451	147	113	365	159	2806
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	48.9	46.2	46.7	36.7	53.9	54.6	19.3	24.3	24.4	18.9	25.3	25.5	36.5
Background Delay	49.6	46.2	46.7	36.5	54.0	54.7	19.5	24.6	24.7	19.1	25.6	25.8	36.7
Forecast Delay	49.0	46.1	46.5	35.1	55.6	56.4	21.2	28.6	28.8	21.1	27.6	27.8	38.4
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	-0.6	-0.1	-0.2	-1.4	1.6	1.7	1.7	4.0	4.1	2.0	2.0	2.0	1.7
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	D	D	D	D	D	D	B	C	C	B	C	C	D
Background LOS	D	D	D	D	D	D	B	C	C	B	C	C	D
Forecast LOS	D	D	D	D	**E**	**E**	C	C	C	C	C	C	D

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB Novi Road			SB Novi Road			Int.
PM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	223	430	225	172	504	176	201	616	88	120	624	304	3683
Background Vol.	225	434	227	174	509	178	203	622	89	121	630	307	3719
Generated Vol.	0	36	0	42	42	54	0	0	36	56	0	0	266
Forecast Vol.	225	470	227	216	551	232	203	622	125	177	630	307	3985
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	87.0	45.1	45.7	43.5	49.0	49.6	32.5	29.3	29.3	22.4	38.0	38.3	42.4
Background Delay	90.6	45.0	45.6	43.9	49.1	49.6	34.1	29.7	29.7	22.6	38.7	39.1	43.0
Forecast Delay	91.6	41.5	41.8	59.2	49.8	50.4	42.9	37.0	37.1	26.9	45.0	45.6	46.7
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	1.0	-3.5	-3.8	15.3	0.7	0.8	8.8	7.3	7.4	4.3	6.3	6.5	3.7
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	**F**	D	D	D	D	D	C	C	C	C	D	D	D
Background LOS	**F**	D	D	D	D	D	C	C	C	C	D	D	D
Forecast LOS	**F**	D	D	**E**	D	D	D	D	D	C	D	D	D

8.3 Capacity Analysis: Intersection 1002 - 10 Mile Road & Shared 1st Driveway

Table 8.3.1 shows the capacity analysis results for the 1st site driveway, located on the western end of the site, if no improvements are made to the intersection.

Table 8.3.1 – Capacity Analysis – 10 Mile Road & Shared 1st Driveway

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB 1st Driveway			SB Driveway			Int.
AM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	1	604	9	2	504	0	2	0	4	0	0	4	1130
Background Vol.	1	610	9	2	509	0	2	0	4	0	0	4	1141
Generated Vol.	0	75	28	11	58	0	15	0	9	0	0	0	196
Forecast Vol.	1	685	37	13	567	0	17	0	13	0	0	4	1337
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	9.1	0.0	0.0	9.1	0.0	0.0	11.3	11.3	11.3	11.0	11.0	11.0	0.1
Background Delay	9.2	0.0	0.0	9.1	0.0	0.0	11.3	11.3	11.3	11.1	11.1	11.1	0.1
Forecast Delay	9.5	0.0	0.0	9.8	0.0	0.0	13.2	13.2	13.2	11.5	11.5	11.5	0.5
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.3	0.0	0.0	0.7	0.0	0.0	1.9	1.9	1.9	0.4	0.4	0.4	0.4
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	B	B	B	B	B	B	A
Background LOS	A	A	A	A	A	A	B	B	B	B	B	B	A
Forecast LOS	A	A	A	A	A	A	B	B	B	B	B	B	A

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB 1st Driveway			SB Driveway			Int.
PM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	6	647	1	1	855	1	4	0	7	0	0	9	1531
Background Vol.	6	653	1	1	864	1	4	0	7	0	0	9	1546
Generated Vol.	0	96	32	18	100	0	38	0	17	0	0	0	301
Forecast Vol.	6	749	33	19	964	1	42	0	24	0	0	9	1847
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	9.9	0.0	0.0	9.4	0.0	0.0	12.1	12.1	12.1	11.7	11.7	11.7	0.3
Background Delay	9.9	0.0	0.0	9.4	0.0	0.0	12.1	12.1	12.1	11.8	11.8	11.8	0.3
Forecast Delay	10.3	0.0	0.0	10.2	0.0	0.0	17.6	17.6	17.6	12.2	12.2	12.2	1.7
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.4	0.0	0.0	0.8	0.0	0.0	5.5	5.5	5.5	0.4	0.4	0.4	1.4
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	B	B	B	B	B	B	A
Background LOS	A	A	A	A	A	A	B	B	B	B	B	B	A
Forecast LOS	B	A	A	B	A	A	C	C	C	B	B	B	A

8.4 Capacity Analysis: Intersection 1003 - 10 Mile Road & Catherine / 2nd Driveway

Table 8.4.1 shows the capacity analysis results for the intersection of 10 Mile Road and Catherine/2nd Site Driveway assuming no improvements are made to the intersection.

Table 8.4.1 – Capacity Analysis – 10 Mile Road & Catherine / 2nd Driveway

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB 2nd Driveway			SB Catherine Industrial			Int.
AM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	24	580	0	0	499	12	0	0	0	2	0	11	1128
Background Vol.	24	586	0	0	504	12	0	0	0	2	0	11	1139
Generated Vol.	0	50	34	13	50	0	19	0	10	0	0	0	176
Forecast Vol.	24	636	34	13	554	12	19	0	10	2	0	11	1315
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.3
Background Delay	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	11.9	11.9	0.3
Forecast Delay	9.7	0.0	0.0	9.3	0.0	0.0	12.4	12.4	12.4	13.2	13.2	13.2	0.6
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.3	0.0	0.0	9.3	0.0	0.0	12.4	12.4	12.4	1.3	1.3	1.3	0.3
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	A	A	A	B	B	B	A
Background LOS	A	A	A	A	A	A	A	A	A	B	B	B	A
Forecast LOS	A	A	A	A	A	A	B	B	B	B	B	B	A

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB 2nd Driveway			SB Catherine Industrial			Int.
PM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	22	631	0	0	824	8	0	0	0	20	0	44	1549
Background Vol.	22	637	0	0	832	8	0	0	0	20	0	44	1563
Generated Vol.	0	75	38	21	74	0	44	0	20	0	0	0	272
Forecast Vol.	22	712	38	21	906	8	44	0	20	20	0	44	1835
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3	16.3	16.3	1.0
Background Delay	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	16.7	16.7	1.0
Forecast Delay	10.2	0.0	0.0	9.9	0.0	0.0	16.2	16.2	16.2	26.7	26.7	26.7	2.4
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.3	0.0	0.0	9.9	0.0	0.0	16.2	16.2	16.2	10.0	10.0	10.0	1.4
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	A	A	A	C	C	C	A
Background LOS	A	A	A	A	A	A	A	A	A	C	C	C	A
Forecast LOS	B	A	A	A	A	A	C	C	C	D	D	D	A

8.5 Capacity Analysis: Intersection 1004 - 10 Mile Road & 3rd Driveway

Table 8.5.1 shows the capacity analysis results for the intersection of 10 Mile Road and the 3rd site driveway assuming no improvements at this intersection. Eastbound and westbound 10 Mile Road is a single thru lane at this driveway which has a dramatic effect on the unsignalized LOS for the northbound and southbound approaches to the intersection.

Table 8.5.1 – Capacity Analysis – 10 Mile Road & 3rd Driveway

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB 3rd Driveway			Double Driveway			Int.
AM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	6	576	0	0	508	7	0	0	0	2	0	3	1102
Background Vol.	6	582	0	0	513	7	0	0	0	2	0	3	1113
Generated Vol.	0	27	33	12	45	0	18	0	10	0	0	0	145
Forecast Vol.	6	609	33	12	558	7	18	0	10	2	0	3	1258
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.8	32.8	32.8	0.2
Background Delay	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.4	33.4	33.4	0.2
Forecast Delay	9.5	0.0	0.0	9.6	0.0	0.0	125.1	125.1	125.1	53.2	53.2	53.2	2.7
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.2	0.0	0.0	9.6	0.0	0.0	125.1	125.1	125.1	19.8	19.8	19.8	2.5
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	A	A	A	D	D	D	A
Background LOS	A	A	A	A	A	A	A	A	A	D	D	D	A
Forecast LOS	A	A	A	A	A	A	**F**	**F**	**F**	**F**	**F**	**F**	A

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB 3rd Driveway			Double Driveway			Int.
PM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	2	649	0	0	824	3	0	0	0	2	0	8	1488
Background Vol.	2	656	0	0	832	3	0	0	0	2	0	8	1503
Generated Vol.	0	57	38	20	52	0	43	0	19	0	0	0	229
Forecast Vol.	2	713	38	20	884	3	43	0	19	2	0	8	1732
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.8	39.8	39.8	0.4
Background Delay	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.9	41.9	41.9	0.4
Forecast Delay	9.9	0.0	0.0	10.8	0.0	0.0	2478.0	2478.0	2478.0	112.5	112.5	112.5	143.9
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.2	0.0	0.0	10.8	0.0	0.0	2478.0	2478.0	2478.0	70.6	70.6	70.6	143.5
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	A	A	A	**E**	**E**	**E**	A
Background LOS	A	A	A	A	A	A	A	A	A	**E**	**E**	**E**	A
Forecast LOS	A	A	A	B	A	A	**F**	**F**	**F**	**F**	**F**	**F**	**F**

8.6 Capacity Analysis: Intersection 1007 - 10 Mile Road & Residential Driveway

Table 8.6.1 shows the capacity analysis results for the intersection of 10 Mile Road and the Residential Site Driveway.

Table 8.6.1 – Capacity Analysis – 10 Mile Road & Residential Driveway

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB Residential Drive			(None)			Int.
AM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	0	577	0	0	512	0	0	0	0	0	0	0	1089
Background Vol.	0	583	0	0	517	0	0	0	0	0	0	0	1100
Generated Vol.	0	29	8	3	36	0	21	0	13	0	0	0	110
Forecast Vol.	0	612	8	3	553	0	21	0	13	0	0	0	1210
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Background Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forecast Delay	0.0	0.0	0.0	9.1	0.0	0.0	11.8	0.0	11.2	0.0	0.0	0.0	0.3
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.0	0.0	0.0	9.1	0.0	0.0	11.8	0.0	11.2	0.0	0.0	0.0	0.3
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
Background LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
Forecast LOS	A	A	A	A	A	A	B	A	B	A	A	A	A

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB Residential Drive			(None)			Int.
PM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	0	652	0	0	821	0	0	0	0	0	0	0	1473
Background Vol.	0	659	0	0	829	0	0	0	0	0	0	0	1488
Generated Vol.	0	29	8	3	36	0	21	0	13	0	0	0	110
Forecast Vol.	0	688	8	3	865	0	21	0	13	0	0	0	1598
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Background Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forecast Delay	0.0	0.0	0.0	9.8	0.2	0.0	31.7	0.0	15.2	0.0	0.0	0.0	0.5
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.0	0.0	0.0	9.8	0.2	0.0	31.7	0.0	15.2	0.0	0.0	0.0	0.5
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
Background LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
Forecast LOS	A	A	A	A	A	A	D	A	C	A	A	A	A

8.7 Capacity Analysis: Intersection 1009 - 10 Mile Road & Meadowbrook Road

Table 8.7.1 shows the capacity analysis result for the intersection of 10 Mile Road and Meadowbrook Road. Overall, the proposed development isn't expected to significantly impact the intersections of 10 Mile Road and Meadowbrook Road. The intersection's level of service isn't expected to change from a C during the morning peak hour and a D during the afternoon peak hour.

Table 8.7.1 – Capacity Analysis – 10 Mile Road & Meadowbrook Road

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB Meadowbrook			SB Meadowbrook			Int.
AM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	112	498	48	30	273	69	48	147	48	64	94	55	1486
Background Vol.	113	503	48	30	276	70	48	148	48	65	95	56	1500
Generated Vol.	13	23	6	0	18	0	11	0	0	0	0	10	81
Forecast Vol.	126	526	54	30	294	70	59	148	48	65	95	66	1581
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	13.3	26.6	26.6	14.8	24.2	24.3	50.6	57.8	49.0	58.7	58.7	55.1	34.6
Background Delay	13.5	26.7	26.7	14.9	24.2	24.4	50.6	57.8	48.9	58.8	58.8	55.2	34.6
Forecast Delay	14.0	27.1	27.1	15.4	24.4	24.5	51.0	57.8	48.9	58.8	58.9	56.8	34.8
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	0.5	0.4	0.4	0.5	0.2	0.1	0.4	0.0	0.0	0.0	0.1	1.6	0.2
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	B	C	C	B	C	C	D	**E**	D	**E**	**E**	**E**	C
Background LOS	B	C	C	B	C	C	D	**E**	D	**E**	**E**	**E**	C
Forecast LOS	B	C	C	B	C	C	D	**E**	D	**E**	**E**	**E**	C

Scenario	EB 10 Mile Road			WB 10 Mile Road			NB Meadowbrook			SB Meadowbrook			Int.
PM Peak Hour	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
Existing, Background, Generated, and Forecast Traffic Volumes													
Existing Vol.	98	396	127	68	642	123	69	186	46	97	255	104	2211
Background Vol.	99	400	128	69	648	124	70	188	46	98	258	105	2233
Generated Vol.	18	24	20	0	38	0	14	0	0	0	0	20	134
Forecast Vol.	117	424	148	69	686	124	84	188	46	98	258	125	2367
Existing, Background, and Forecast Highway Capacity Manual (HCM) average delay (seconds)													
Existing Delay	26.3	34.1	34.3	19.4	39.4	39.5	58.6	55.7	47.1	51.6	54.0	45.5	41.7
Background Delay	26.8	34.2	34.4	19.7	39.7	39.7	58.7	55.7	47.0	51.6	53.9	45.3	41.8
Forecast Delay	29.1	35.1	35.4	20.8	40.9	41.0	60.9	55.7	47.0	51.5	53.7	46.2	42.6
Traffic Impact = Change in Average Delay from Background to Forecast													
Traffic Impact	2.3	0.9	1.0	1.1	1.2	1.3	2.2	0.0	0.0	-0.1	-0.2	0.9	0.8
Highway Capacity Manual (HCM) Level of Service Grades (LOS)													
Existing LOS	C	C	C	B	D	D	**E**	**E**	D	D	D	D	D
Background LOS	C	C	C	B	D	D	**E**	**E**	D	D	D	D	D
Forecast LOS	C	D	D	C	D	D	**E**	**E**	D	D	D	D	D

9.0 Site Access & Circulation

Driveway Spacing and Access Management

The concept plane shows 4 driveways along 10 Mile Road which are located as follows:

- 1st Driveway, aligned from existing commercial driveway.
- 2nd Driveway, aligned from Catherine Industrial Drive
- 3rd Driveway, aligned across from a pair of commercial driveways.
- Residential Driveway, positioned roughly 120' between the Tremar Driveway and the western Wrencher's driveway.

Per the RCOC (200') and Novi spacing standards (150' upstream, 200' downstream), the residential driveway does not meet the standard spacing requirements, however we understand that the RCOC has tentatively agreed (by emails) that the residential driveway can remain in its proposed location provided that a right-turn deceleration lane and left-turn passing lane is provided as shown on the concept site plan. All other site driveways are aligned across from driveways on the north side of 10 Mile Road.

The 3rd site driveway will also serve as the emergency access route for the residential portion of the development.

Sight Distance

The recommended intersection sight distance for a 45 MPH Road per RCOC standards is 500' for a 2-3 lane roadway and 530' for a 4-5 lane roadway.

All site driveway locations were found to have adequate sight distance.

Right-Turn Lanes

According to the RCOC rules and regulations for street development and their associated geometric guides a standard driveway should have a right-turn deceleration lane unless it's on a 5-lane roadway and isn't justified by anticipated traffic volumes. Since the 1st driveway is located on a five-lane cross-section, we reviewed the driveway with respect to the Michigan Department of Transportation's (MDOT) Right-Turn Warrant Graph. Notes in the RCOC geometric guide states that a taper or lane may or may not be required based on engineering needs for the corridor at the discretion of RCOC:

- 1st Driveway (Qualifies for a Right Turn Taper, per MDOT standards)
  - AM 29 right turns, 722 approach.
  - PM 42 right turns, 782 approach

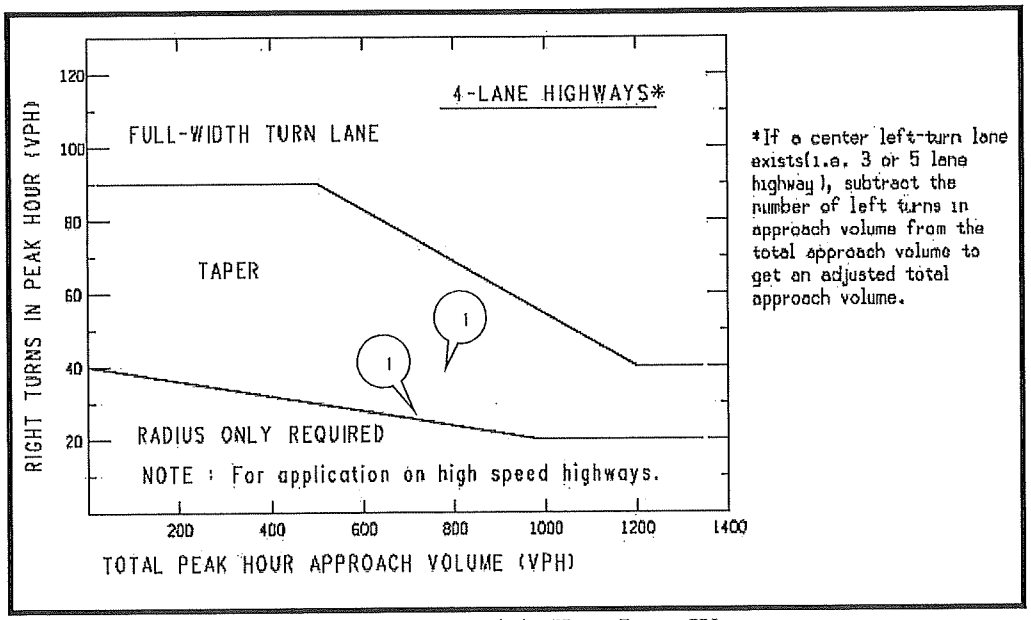


Figure 9.1 MDOT Right Turn Lane Warrant

The remaining four driveways all are located where there is only a single eastbound lane on 10 Mile Road, therefore each other site driveway should include a right-turn deceleration lane as recommended by RCOC standard driveway designs.

Left-Turn Lanes

Similarly, a passing lane or center-left turn lane should be installed at a driveway when warranted per the following graph.

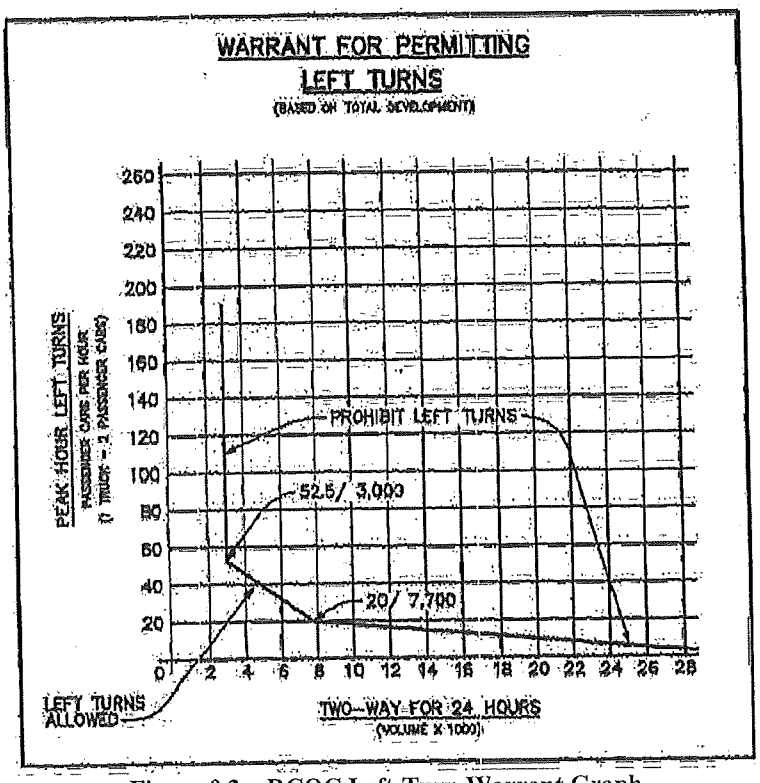


Figure 9.2 – RCOC Left-Turn Warrant Graph

Our 2022 counts at the Tremar and Wrencher's Driveways near the eastern end of the site indicated that there were about 13,000 vehicles in a 13-hour window from 6:00 AM to 7:00 PM. Based on a 2018 count at 10 Mile Road and Novi Road, the ratio of the same 13 hours versus the full 24-hours creates a factor of about 1.225. Therefore, it is reasonable to assume that the current 24-hour volume at this eastern end of the site is about 16,000 (15,925 rounded up). Conservatively assuming, with no reductions for pass-by traffic, that 35% of the proposed 6573 weekday trips will travel to and from the east on 10 Mile Road, then the forecast traffic volumes would be around 2,300 trips higher or around 18,300 vehicles per day near the eastern end of the site. Therefore, 10-11 left-turns into a driveway would justify a center left turn lane.

The projected number of left-turns into each of the site driveways during the busier PM peak hour is 37, 43, 41, and 12 from west to east. Therefore all site driveways warrant a center left-turn lane or left-turn passing lane. The RCOC has indicated that a left-turn passing lane should be provided at the residential driveway in lieu of realignment and a center left-turn lane, as shown on the site plan.

Conceptual Recommendations
When the conceptual neighborhood retail portion of the site is developed, the following improvements may be needed:

- Widen eastbound 10 Mile Road to two through lanes, ending with a right-turn lane at the site's easternmost residential driveway.
- Widen westbound 10 Mile Road to two through lanes west from the 3rd site driveway to help provide additional capacity for outbound site traffic.
- Provide a continuous center lane turn lane to serve the 1st, 2nd and 3rd commercial driveways.
- Provide a separate outbound left-turn / right-turn lanes for the site's 2nd and 3rd commercial driveways to allow right-turning traffic to exit the site when vehicles are waiting to turn left.

The following table briefly summarizes the average delays for outbound left turning and right-turning traffic, and the corresponding queues for outbound traffic at each of the site driveways if all of the recommendations are implemented.

Table 9.1 Forecast conditions at the site driveways if mitigated.

	Mitigated Forecast AM				Mitigated Forecast PM			
Intersection	Vol L/R	Delay L/R	LOS	Q95%	Vol L/R	Delay L/R	LOS	Q95%
1002 - 1st Driveway	17/13	13.2	B	0.0	62/40	17.6	C	1.7
1003 - 2nd Driveway	19/10	22.4/9.4	C/A	0.3/0	67/39	52.6/9.8	F/A	2.4/0.2
1004 - 3rd Driveway	18/10	20.4/9.3	C/A	0.2/0	66/38	35.0/9.7	E/A	1.6/0.2
1007 - Residential Drive	21/13	11.8/11.2	B/B	0.1/0.1	13/6	31.7/15.2	D/C	0.3/0.1

Delays are still expected to be long for outbound traffic, however the additional laneage on 10 Mile Road and separate left and right turn lanes on the 2nd and 3rd site driveways will help reduce queues on site.

10.0 Historical Crash Data

The Michigan Traffic Crash Facts (www.michigantrafficcrashfacts.org) website database has crash data at the intersections of 10 Mile Road with Novi Road, Catherine Industrial, and Meadowbrook Road. According to SEMCOG's database the ranking of the Novi, Catherine, and Meadowbrook intersections are 11th, 93rd, and 27th, respectively in comparison with crashes at other Novi intersections in the last 5 years.

The intersection of 10 Mile Road and Novi Road has about 18.8 crashes per year based on crash data from 2011 to 2020. Out of those 188 crashes, 2 involved serious injury, 12 involved minor injury, 30 had possible injury, and the remaining 144 crashes involved property damage only.

Table 10.1 – Crash History (2011-2020) - 10 Mile Road and Novi Road

Crash Year	Head-On	Head-On - Left Turn	Angle	Rear-End	Rear-End - Left	Rear-End - Right	Sideswipe - Same	Sideswipe - Opposite	Backing	Other/Un known	Other	Total
2011	0	2	2	5	0	0	1	0	0	1	0	11
2012	0	3	4	6	0	0	1	2	0	1	0	17
2013	0	1	4	8	1	0	1	0	0	1	0	16
2014	0	2	7	10	0	1	6	0	0	0	0	26
2015	0	2	6	3	0	0	1	0	0	3	0	15
2016	0	2	7	10	0	0	2	0	0	0	2	23
2017	0	1	9	13	0	0	2	1	0	0	1	27
2018	0	1	9	7	0	0	3	0	1	0	2	23
2019	1	1	5	12	0	0	3	0	1	0	0	23
2020	0	0	2	3	0	0	1	0	0	0	1	7
Totals	**1**	**15**	**55**	**77**	**1**	**1**	**21**	**3**	**2**	**6**	**6**	**188**

Worst Injury	Head-On	Head-On - Left Turn	Angle	Rear-End	Rear-End - Left	Rear-End - Right	Sideswipe - Same	Sideswipe - Opposite	Backing	Other/Un known	Other	Total
Suspected Serious Injury (A)	0	1	0	1	0	0	0	0	0	0	0	2
Suspected Minor Injury (B)	1	2	5	2	0	0	0	0	0	2	0	12
Possible Injury (C)	0	3	7	14	1	0	1	0	0	2	2	30
No Injury (O)	0	9	43	60	0	1	20	3	2	2	4	144
Total Crash Count	**1**	**15**	**55**	**77**	**1**	**1**	**21**	**3**	**2**	**6**	**6**	**188**

The intersection of 10 Mile Road and Catherine Industrial has about 1.1 crashes per year based on crash data from 2011 to 2020. Out of those 11 crashes, 1 involved minor injury, 2 had possible injury, and the remaining 8 crashes involved property damage only.

Table 10.2 – Crash History (2011-2020) - 10 Mile Road and Catherine Industrial

Crash Year	Head-On - Left Turn	Angle	Rear-End	Rear-End - Right Turn	Sideswipe - Same Direction	Other	Total
2012	0	1	0	0	0	0	1
2013	0	1	0	1	0	0	2
2014	0	0	0	0	1	0	1
2018	0	1	2	0	0	0	3
2019	1	2	0	0	0	1	4
Totals	**1**	**5**	**2**	**1**	**1**	**1**	**11**

Worst Injury in Crash	Head-On - Left Turn	Angle	Rear-End	Rear-End - Right Turn	Sideswipe - Same Direction	Other	Total
Suspected Minor Injury (B)	1	0	0	0	0	0	1
Possible Injury (C)	0	2	0	0	0	0	2
No Injury (O)	0	3	2	1	1	1	8
Totals	**1**	**5**	**2**	**1**	**1**	**1**	**11**

The intersection of 10 Mile Road and Meadowbrook has about 8.4 crashes per year based on crash data from 2011 to 2020. Out of those 84 crashes, 1 involved serious injury, 5 involved minor injury, 12 had possible injury, and the remaining 66 crashes involved property damage only.

Table 10.3 – Crash History (2011-2020) - 10 Mile Road and Meadowbrook Road

Crash Year	Single Motor Vehicle	Head-On - Left Turn	Angle	Rear-End	Sideswipe - Same Direction	Backing	Other/Un known	Total
2011	0	2	3	4	1	0	1	11
2012	0	0	3	4	0	0	1	8
2013	0	0	4	1	0	0	0	5
2014	0	0	0	1	1	0	2	4
2015	1	1	1	3	0	0	0	6
2016	0	1	3	5	2	1	0	12
2017	0	1	3	9	2	0	0	15
2018	0	1	6	3	0	0	0	10
2019	1	1	1	4	1	0	0	8
2020	1	0	2	2	0	0	0	5
Total Crash Count	**3**	**7**	**26**	**36**	**7**	**1**	**4**	**84**

Worst Injury in Crash	Single Motor Vehicle	Head-On - Left Turn	Angle	Rear-End	Sideswipe - Same Direction	Backing	Other/Un known	Total
Suspected Serious Injury (A)	0	0	1	0	0	0	0	1
Suspected Minor Injury (B)	0	0	3	0	0	0	2	5
Possible Injury (C)	2	0	6	4	0	0	0	12
No Injury (O)	1	7	16	32	7	1	2	66
Total Crash Count	**3**	**7**	**26**	**36**	**7**	**1**	**4**	**84**

11.0 Summary

The proposed Novi-Ten development, which consists of a conceptual neighborhood shopping plaza and 71 townhouse residential units, is located on the south side of 10 Mile Road between Novi Road and the Railroad tracks. It is not expected to have a significant traffic impact on the overall level of service at the major intersections of Ten Mile Road with Novi Road and with Meadowbrook Road.

The level of service at Novi Road and Ten Mile Road is currently a D and will remain a D during both morning and afternoon peak hours for all scenarios.

The level of service at Ten Mile Road and Meadowbrook Road is currently a C during the morning peak hour and a D during the afternoon peak hour and the level of service does not change in the background and forecast scenarios.

The client has prepared a parallel plan with light industrial and office space under the existing zoning, which is currently OS-1 and I-1. The proposed PRO plan would generate slightly less traffic during the morning peak hour and slightly more traffic during the afternoon peak hour compared to the existing zoning. Given the similar trip generation, the PRO plan and the parallel plan would likely have similar traffic impacts during the peak hours of the day on the surrounding intersections of 10 Mile Road with Novi Road and Meadowbrook Road.

When the commercial portion of the site is developed, Ten Mile Road may need the following improvements to address the various concerns at the site driveways:

- In lieu of separate right-turn deceleration lanes at each driveway, widen eastbound 10 Mile Road to two-through lanes ending at a right-turn deceleration lane at the residential driveway.
- Extend the center left-turn lane along 10 Mile Road from where it currently ends at Catherine Industrial to service all commercial driveways.
- Widen westbound 10 Mile Road to two through lanes west from the 3rd commercial site driveway to help improve capacity.
- Provide separate left-turn and right-turn outbound lanes at the 2nd (middle) and 3rd (east) commercial driveways, to help facilitate right-turns out of the site, when a left-turning vehicle is waiting for a gap in traffic.

Appendix

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Novi Road
Weather:

File Name : TMC_1001_10 Mile & Novi_Mar-16-2022
Site Code : 1001
Start Date : 3/16/2022
Page No : 1

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Novi Road Northbound				Novi Road Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
06:00 AM	12	23	4	0	11	10	11	1	2	27	6	0	3	18	5	0	133
06:15 AM	24	25	7	0	11	15	9	0	3	35	2	0	5	29	10	0	175
06:30 AM	16	43	6	0	9	25	9	0	6	33	10	0	9	34	13	0	213
06:45 AM	34	57	16	0	5	51	3	0	6	56	16	0	14	52	8	0	318
Total	86	148	33	0	36	101	32	1	17	151	34	0	31	133	36	0	839
07:00 AM	34	53	12	0	11	58	12	0	22	64	12	0	11	49	26	0	364
07:15 AM	50	92	31	0	6	56	9	0	29	69	20	0	14	80	28	0	484
07:30 AM	59	103	30	0	14	89	19	0	32	98	26	0	10	82	43	0	605
07:45 AM	44	96	50	0	25	133	29	0	62	127	33	0	24	96	56	0	775
Total	187	344	123	0	56	336	69	0	145	358	91	0	59	307	153	0	2228
08:00 AM	59	108	42	0	26	78	15	0	29	106	23	0	21	95	27	1	630
08:15 AM	38	119	26	0	20	50	20	0	32	116	31	0	23	88	31	0	594
08:30 AM	51	111	17	0	20	62	14	0	24	96	24	0	25	59	26	0	529
08:45 AM	50	138	44	0	11	71	26	0	34	112	42	0	17	102	43	0	690
Total	198	476	129	0	77	261	75	0	119	430	120	0	86	344	127	1	2443
09:00 AM	68	100	32	0	24	72	24	1	21	69	26	0	18	71	32	0	558
09:15 AM	39	83	21	0	20	47	18	0	16	99	27	0	17	62	33	0	482
09:30 AM	43	83	27	0	15	61	25	0	19	76	19	0	18	62	24	0	472
09:45 AM	45	70	14	0	22	61	32	0	21	100	19	0	26	79	40	0	529
Total	195	336	94	0	81	241	99	1	77	344	91	0	79	274	129	0	2041
10:00 AM	39	54	17	1	17	51	38	0	16	66	20	0	21	71	33	1	445
10:15 AM	37	55	15	0	20	60	28	0	15	101	16	0	25	67	22	0	461
10:30 AM	34	73	11	0	15	54	30	0	17	76	12	0	14	76	25	0	437
10:45 AM	35	56	13	0	21	53	21	0	27	83	15	0	25	83	36	0	468
Total	145	238	56	1	73	218	117	0	75	326	63	0	85	297	116	1	1811
11:00 AM	46	58	14	0	25	58	32	0	14	78	14	0	19	48	43	0	449
11:15 AM	50	63	19	0	21	54	32	0	18	113	19	0	21	104	29	0	543
11:30 AM	49	76	17	0	22	53	30	0	14	115	27	0	27	80	34	0	544
11:45 AM	44	75	29	0	30	64	35	0	17	111	12	0	28	95	44	0	584
Total	189	272	79	0	98	229	129	0	63	417	72	0	95	327	150	0	2120
12:00 PM	60	74	22	0	25	78	40	0	25	114	20	0	24	80	55	0	617
12:15 PM	52	47	17	0	30	68	41	0	18	129	26	0	29	90	60	0	607
12:30 PM	57	83	14	0	27	73	33	0	17	95	20	0	23	93	58	0	593
12:45 PM	54	66	12	0	31	80	30	0	20	106	20	0	30	108	47	0	604
Total	223	270	65	0	113	299	144	0	80	444	86	0	106	371	220	0	2421
01:00 PM	48	54	14	0	36	63	41	0	17	104	20	0	35	100	42	0	574
01:15 PM	49	52	18	0	27	64	26	0	18	105	27	0	36	101	43	0	566
01:30 PM	43	53	23	0	21	79	31	0	23	93	16	0	20	84	59	0	545
01:45 PM	49	50	25	0	32	72	24	1	26	118	16	0	34	109	52	0	608
Total	189	209	80	0	116	278	122	1	84	420	79	0	125	394	196	0	2293
02:00 PM	44	70	17	0	16	88	37	0	20	98	22	0	33	90	53	0	588
02:15 PM	40	63	29	0	20	77	19	0	35	108	23	0	36	90	52	1	593
02:30 PM	42	98	37	1	24	102	34	0	31	108	24	0	35	95	66	0	697
02:45 PM	61	113	55	0	26	77	34	0	44	111	34	0	26	121	57	0	759
Total	187	344	138	1	86	344	124	0	130	425	103	0	130	396	228	1	2637
03:00 PM	67	98	50	0	38	93	49	0	20	123	24	0	40	116	39	0	757
03:15 PM	51	90	33	0	30	80	29	0	35	133	26	0	24	145	64	0	740
03:30 PM	55	111	35	0	29	101	47	2	29	127	13	0	24	103	58	2	736

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Novi Road
Weather:

File Name : TMC_1001_10 Mile & Novi_Mar-16-2022
Site Code : 1001
Start Date : 3/16/2022

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Novi Road Northbound				Novi Road Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:45 PM	65	63	37	0	25	91	35	0	39	159	28	0	29	123	74	0	768
Total	238	362	155	0	122	365	160	2	123	542	91	0	117	487	235	2	3001
04:00 PM	63	76	39	0	37	118	38	1	35	158	22	0	33	122	52	1	795
04:15 PM	55	75	51	0	28	93	28	0	31	144	16	1	40	136	74	0	772
04:30 PM	58	91	56	0	51	129	40	0	34	146	21	2	23	112	78	0	841
04:45 PM	57	92	46	0	43	127	37	0	38	136	34	0	29	149	69	2	859
Total	233	334	192	0	159	467	143	1	138	584	93	3	125	519	273	3	3267
05:00 PM	52	103	54	0	39	142	48	0	49	159	22	0	23	159	83	0	933
05:15 PM	56	124	59	1	34	114	34	0	51	164	20	0	42	148	70	2	919
05:30 PM	54	104	66	0	65	139	42	0	43	136	22	0	27	159	66	0	923
05:45 PM	61	99	46	0	34	109	52	0	58	157	24	0	28	158	85	1	912
Total	223	430	225	1	172	504	176	0	201	616	88	0	120	624	304	3	3687
06:00 PM	61	104	42	1	41	122	31	3	48	144	26	1	22	117	70	2	835
06:15 PM	52	70	39	1	20	93	29	3	32	125	22	0	36	124	88	0	734
06:30 PM	55	82	42	0	28	97	30	0	36	119	15	0	33	116	88	0	741
06:45 PM	41	52	40	0	37	96	32	0	47	125	22	0	35	140	107	0	774
Total	209	308	163	2	126	408	122	6	163	513	85	1	126	497	353	2	3084
*** BREAK ***																	
Grand Total	2502	4071	1532	5	1315	4051	1512	12	1415	5570	1096	4	1284	4970	2520	13	31872
Apprch %	30.9	50.2	18.9	0.1	19.1	58.8	21.9	0.2	17.5	68.9	13.6	0	14.6	56.6	28.7	0.1	
Total %	7.9	12.8	4.8	0	4.1	12.7	4.7	0	4.4	17.5	3.4	0	4	15.6	7.9	0	
Cars & Peds	2477	4016	1502	5	1298	3987	1476	9	1391	5442	1082	3	1263	4867	2485	9	31312
% Cars & Peds	99	98.6	98	100	98.7	98.4	97.6	75	98.3	97.7	98.7	75	98.4	97.9	98.6	69.2	98.2
H.V. & Bikes	25	55	30	0	17	64	36	3	24	128	14	1	21	103	35	4	560
% H.V. & Bikes	1	1.4	2	0	1.3	1.6	2.4	25	1.7	2.3	1.3	25	1.6	2.1	1.4	30.8	1.8
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

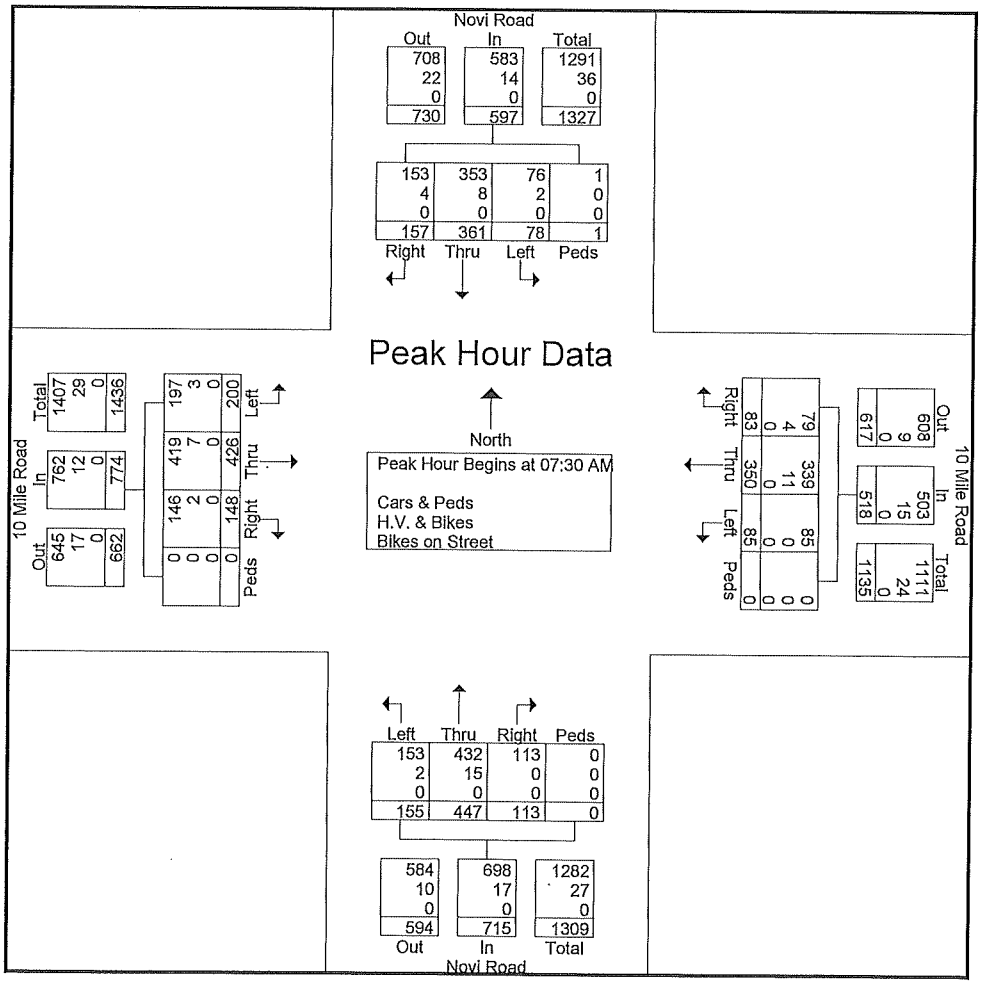
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Novi Road
Weather:

File Name : TMC_1001_10 Mile & Novi_Mar-16-2022
Site Code : 1001
Start Date : 3/16/2022
Page No : 3

	10 Mile Road Eastbound					10 Mile Road Westbound					Novi Road Northbound					Novi Road Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	59	103	30	0	192	14	89	19	0	122	32	98	26	0	156	10	82	43	0	135	605
07:45 AM	44	96	50	0	190	25	133	29	0	187	62	127	33	0	222	24	96	56	0	176	775
08:00 AM	59	108	42	0	209	26	78	15	0	119	29	106	23	0	158	21	95	27	1	144	630
08:15 AM	38	119	26	0	183	20	50	20	0	90	32	116	31	0	179	23	88	31	0	142	594
Total Volume	200	426	148	0	774	85	350	83	0	518	155	447	113	0	715	78	361	157	1	597	2604
% App. Total	25.8	55	19.1	0		16.4	67.6	16	0		21.7	62.5	15.8	0		13.1	60.5	26.3	0.2		
PHF	.847	.895	.740	.000	.926	.817	.658	.716	.000	.693	.625	.880	.856	.000	.805	.813	.940	.701	.250	.848	.840
Cars & Peds	197	419	146	0	762	85	339	79	0	503	153	432	113	0	698	76	353	153	1	583	2546
% Cars & Peds	98.5	98.4	98.6	0	98.4	100	96.9	95.2	0	97.1	98.7	96.6	100	0	97.6	97.4	97.8	97.5	100	97.7	97.8
H.V. & Bikes	3	7	2	0	12	0	11	4	0	15	2	15	0	0	17	2	8	4	0	14	58
% H.V. & Bikes	1.5	1.6	1.4	0	1.6	0	3.1	4.8	0	2.9	1.3	3.4	0	0	2.4	2.6	2.2	2.5	0	2.3	2.2
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



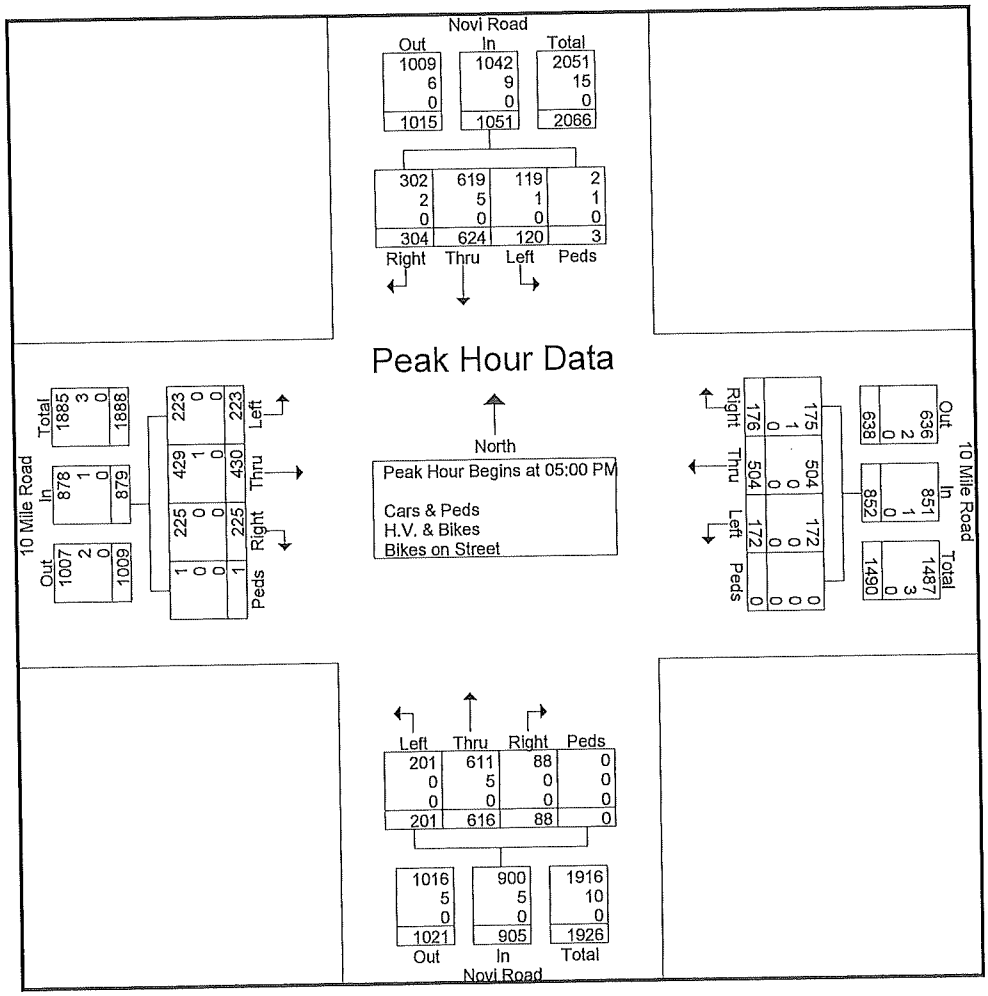
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Novi Road
Weather:

File Name : TMC_1001_10 Mile & Novi_Mar-16-2022
Site Code : 1001
Start Date : 3/16/2022
Page No : 4

	10 Mile Road Eastbound					10 Mile Road Westbound					Novi Road Northbound					Novi Road Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	52	103	54	0	209	39	142	48	0	229	49	159	22	0	230	23	159	83	0	265	933
05:15 PM	56	124	59	1	240	34	114	34	0	182	51	164	20	0	235	42	148	70	2	262	919
05:30 PM	54	104	66	0	224	65	139	42	0	246	43	136	22	0	201	27	159	66	0	252	923
05:45 PM	61	99	46	0	206	34	109	52	0	195	58	157	24	0	239	28	158	85	1	272	912
Total Volume	223	430	225	1	879	172	504	176	0	852	201	616	88	0	905	120	624	304	3	1051	3687
% App. Total	25.4	48.9	25.6	0.1		20.2	59.2	20.7	0		22.2	68.1	9.7	0		11.4	59.4	28.9	0.3		
PHF	.914	.867	.852	.250	.916	.662	.887	.846	.000	.866	.866	.939	.917	.000	.947	.714	.981	.894	.375	.966	.988
Cars & Peds	223	429	225	1	878	172	504	175	0	851	201	611	88	0	900	119	619	302	2	1042	3671
% Cars & Peds	100	99.8	100	100	99.9	100	100	99.4	0	99.9	100	99.2	100	0	99.4	99.2	99.2	99.3	66.7	99.1	99.6
H.V. & Bikes	0	1	0	0	1	0	0	1	0	1	0	5	0	0	5	1	5	2	1	9	16
% H.V. & Bikes	0	0.2	0	0	0.1	0	0	0.6	0	0.1	0	0.8	0	0	0.6	0.8	0.8	0.7	33.3	0.9	0.4
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Shared Driveway
Weather:

File Name : TMC_1002_10 Mile & Shared_Mar-16-2022
Site Code : 1002
Start Date : 3/16/2022
Page No : 1

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Shared Driveway Northbound				Existing Driveway Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
06:00 AM	1	33	0	0	0	33	1	0	0	0	0	0	0	0	0	0	68
06:15 AM	0	33	1	0	1	25	0	0	0	0	0	0	0	0	0	0	60
06:30 AM	2	63	0	0	0	44	0	0	0	0	0	0	0	0	0	0	109
06:45 AM	3	79	2	0	0	57	1	0	0	0	0	0	0	0	0	0	142
Total	6	208	3	0	1	159	2	0	0	0	0	0	0	0	0	0	379
07:00 AM	3	80	1	0	0	75	1	0	0	0	0	0	0	0	0	0	160
07:15 AM	0	126	2	0	0	70	0	0	0	0	0	0	0	0	0	0	198
07:30 AM	1	136	2	0	0	120	0	0	0	0	0	0	0	0	1	2	262
07:45 AM	0	144	6	0	2	182	0	0	1	0	2	0	0	0	1	1	339
Total	4	486	11	0	2	447	1	0	1	0	2	0	0	0	2	3	959
08:00 AM	0	151	0	0	0	105	0	0	1	0	2	0	0	0	0	0	259
08:15 AM	0	173	1	0	0	97	0	0	0	0	0	0	0	0	2	0	273
08:30 AM	1	155	1	0	0	83	0	0	0	0	1	1	0	0	2	1	245
08:45 AM	2	207	3	0	2	106	0	0	0	0	0	0	0	0	3	0	323
Total	3	686	5	0	2	391	0	0	1	0	3	1	0	0	7	1	1100
09:00 AM	0	143	1	0	1	112	1	1	0	0	1	1	0	0	2	0	263
09:15 AM	1	129	1	0	0	92	0	0	0	0	0	0	0	0	2	0	225
09:30 AM	1	121	1	0	1	92	1	0	1	0	1	0	0	0	0	0	219
09:45 AM	0	117	1	0	0	113	0	0	0	0	0	0	0	0	1	1	233
Total	2	510	4	0	2	409	2	1	1	0	2	1	0	0	5	1	940
10:00 AM	2	90	1	0	0	101	0	0	0	0	0	0	0	0	1	0	195
10:15 AM	0	94	1	0	0	111	0	0	1	0	0	0	0	0	0	0	207
10:30 AM	1	99	1	0	0	89	0	0	1	0	0	0	0	0	0	0	191
10:45 AM	0	99	2	0	1	91	0	0	1	0	1	0	0	0	0	1	196
Total	3	382	5	0	1	392	0	0	3	0	1	0	0	0	1	1	789
11:00 AM	1	89	1	0	1	107	0	0	1	0	2	0	0	0	0	0	202
11:15 AM	1	112	0	0	1	107	1	0	2	0	1	0	1	0	2	0	228
11:30 AM	0	127	2	0	0	99	1	0	0	0	1	0	1	0	2	0	233
11:45 AM	0	120	3	0	0	144	1	0	0	0	0	0	0	0	1	0	269
Total	2	448	6	0	2	457	3	0	3	0	4	0	2	0	5	0	932
12:00 PM	1	118	0	0	0	135	1	0	1	0	1	0	0	0	1	1	259
12:15 PM	1	100	0	0	0	146	0	0	1	0	0	0	2	0	1	0	251
12:30 PM	1	128	1	0	0	123	1	0	1	0	0	0	0	0	0	1	256
12:45 PM	1	125	0	0	1	148	1	0	2	0	1	0	0	0	1	2	282
Total	4	471	1	0	1	552	3	0	5	0	2	0	2	0	3	4	1048
01:00 PM	1	115	0	0	1	123	0	0	5	0	1	0	0	0	1	0	247
01:15 PM	0	117	2	0	0	127	1	1	1	0	0	1	0	0	1	0	251
01:30 PM	0	94	0	0	0	116	2	0	0	0	0	0	2	0	0	2	216
01:45 PM	0	99	3	0	1	136	0	0	0	0	0	0	1	0	1	2	243
Total	1	425	5	0	2	502	3	1	6	0	1	1	3	0	3	4	957
02:00 PM	0	126	2	0	0	133	0	1	1	0	0	1	0	0	0	1	265
02:15 PM	2	116	1	0	0	128	0	0	0	0	0	0	0	0	1	2	250
02:30 PM	1	160	0	0	1	148	0	0	1	0	0	0	0	0	2	1	314
02:45 PM	1	169	2	0	0	136	0	0	3	0	0	0	0	0	1	2	314
Total	4	571	5	0	1	545	0	1	5	0	0	1	0	0	4	6	1143
03:00 PM	0	146	0	0	1	165	1	0	1	0	0	0	0	0	0	0	314
03:15 PM	0	151	1	0	1	155	0	0	1	0	2	0	0	0	0	1	312
03:30 PM	2	144	0	0	0	156	0	0	1	0	1	0	0	0	1	2	307

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Shared Driveway
Weather:

File Name : TMC_1002_10 Mile & Shared_Mar-16-2022
Site Code : 1002
Start Date : 3/16/2022
Page No : 2

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Shared Driveway Northbound				Existing Driveway Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:45 PM	0	121	1	0	0	162	1	0	4	0	0	0	0	0	2	2	293
Total	2	562	2	0	2	638	2	0	7	0	3	0	0	0	3	5	1226
04:00 PM	0	129	2	0	1	177	0	0	1	0	3	0	0	0	0	4	317
04:15 PM	1	134	0	0	0	156	0	0	0	0	0	0	0	0	1	0	292
04:30 PM	1	133	0	0	0	212	0	0	0	0	0	0	0	0	2	3	351
04:45 PM	0	162	0	0	1	218	0	0	2	0	2	0	0	0	0	1	386
Total	2	558	2	0	2	763	0	0	3	0	5	0	0	0	3	8	1346
05:00 PM	2	141	1	0	0	219	0	0	2	0	5	0	0	0	3	4	377
05:15 PM	1	190	0	0	0	206	1	0	0	0	0	0	0	0	4	4	406
05:30 PM	3	154	0	0	0	212	0	0	0	0	0	0	0	0	2	3	374
05:45 PM	0	146	0	0	0	190	0	0	0	0	0	0	0	0	0	1	337
Total	6	631	1	0	0	827	1	0	2	0	5	0	0	0	9	12	1494
06:00 PM	0	146	0	0	0	171	0	0	0	0	0	0	0	0	0	6	323
06:15 PM	2	135	0	0	0	141	0	0	0	0	0	0	0	0	2	3	283
06:30 PM	2	134	0	1	0	138	0	0	0	0	0	0	0	0	1	2	278
06:45 PM	0	107	0	0	0	179	0	0	0	0	0	0	0	0	1	0	287
Total	4	522	0	1	0	629	0	0	0	0	0	0	0	0	4	11	1171
*** BREAK ***																	
Grand Total	43	6460	50	1	18	6711	17	3	37	0	28	4	7	0	49	56	13484
Apprch %	0.7	98.6	0.8	0	0.3	99.4	0.3	0	53.6	0	40.6	5.8	6.2	0	43.8	50	
Total %	0.3	47.9	0.4	0	0.1	49.8	0.1	0	0.3	0	0.2	0	0.1	0	0.4	0.4	
Cars & Peds	41	6370	50	0	18	6609	17	3	37	0	28	3	7	0	47	39	13269
% Cars & Peds	95.3	98.6	100	0	100	98.5	100	100	100	0	100	75	100	0	95.9	69.6	98.4
H.V. & Bikes	2	89	0	1	0	102	0	0	0	0	0	1	0	0	2	17	214
% H.V. & Bikes	4.7	1.4	0	100	0	1.5	0	0	0	0	0	25	0	0	4.1	30.4	1.6
Bikes on Street	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Shared Driveway
Weather:

File Name : TMC_1002_10 Mile & Shared_Mar-16-2022
Site Code : 1002
Start Date : 3/16/2022
Page No : 3

	10 Mile Road Eastbound					10 Mile Road Westbound					Shared Driveway Northbound					Existing Driveway Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	1	136	2	0	139	0	120	0	0	120	0	0	0	0	0	0	0	1	2	3	262
07:45 AM	0	144	6	0	150	2	182	0	0	184	1	0	2	0	3	0	0	1	1	2	339
08:00 AM	0	151	0	0	151	0	105	0	0	105	1	0	2	0	3	0	0	0	0	0	259
08:15 AM	0	173	1	0	174	0	97	0	0	97	0	0	0	0	0	0	0	2	0	2	273
Total Volume	1	604	9	0	614	2	504	0	0	506	2	0	4	0	6	0	0	4	3	7	1133
% App. Total	0.2	98.4	1.5	0		0.4	99.6	0	0		33.3	0	66.7	0		0	0	57.1	42.9		
PHF	.250	.873	.375	.000	.882	.250	.692	.000	.000	.688	.500	.000	.500	.000	.500	.000	.000	.500	.375	.583	.836
Cars & Peds	1	593	9	0	603	2	492	0	0	494	2	0	4	0	6	0	0	4	2	6	1109
% Cars & Peds	100	98.2	100	0	98.2	100	97.6	0	0	97.6	100	0	100	0	100	0	0	100	66.7	85.7	97.9
H.V. & Bikes	0	10	0	0	10	0	12	0	0	12	0	0	0	0	0	0	0	0	1	1	23
% H.V. & Bikes	0	1.7	0	0	1.6	0	2.4	0	0	2.4	0	0	0	0	0	0	0	0	33.3	14.3	2.0
Bikes on Street	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bikes on Street	0	0.2	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1

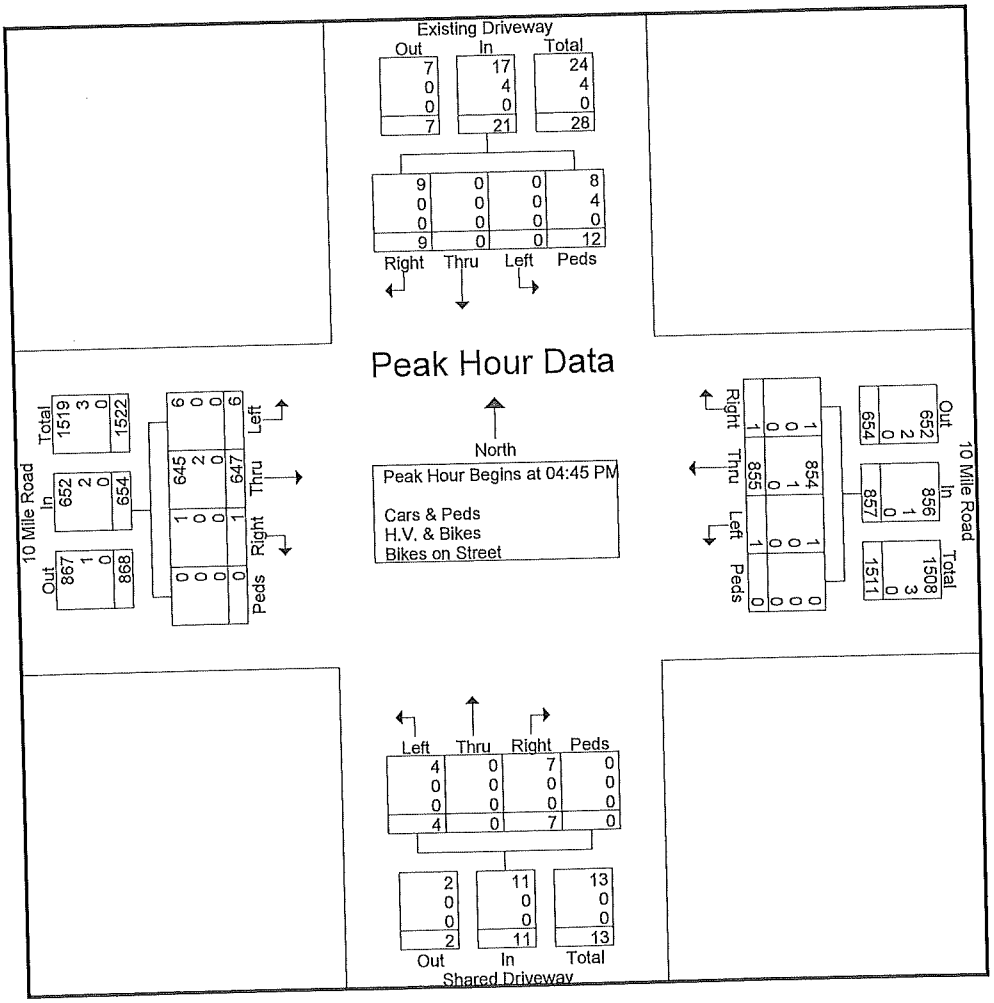
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Shared Driveway
Weather:

File Name : TMC_1002_10 Mile & Shared_Mar-16-2022
Site Code : 1002
Start Date : 3/16/2022
Page No : 4

	10 Mile Road Eastbound					10 Mile Road Westbound					Shared Driveway Northbound					Existing Driveway Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	162	0	0	162	1	218	0	0	219	2	0	2	0	4	0	0	0	1	1	386
05:00 PM	2	141	1	0	144	0	219	0	0	219	2	0	5	0	7	0	0	3	4	7	377
05:15 PM	1	190	0	0	191	0	206	1	0	207	0	0	0	0	0	0	0	4	4	8	406
05:30 PM	3	154	0	0	157	0	212	0	0	212	0	0	0	0	0	0	0	2	3	5	374
Total Volume	6	647	1	0	654	1	855	1	0	857	4	0	7	0	11	0	0	9	12	21	1543
% App. Total	0.9	98.9	0.2	0		0.1	99.8	0.1	0		36.4	0	63.6	0		0	0	42.9	57.1		
PHF	.500	.851	.250	.000	.856	.250	.976	.250	.000	.978	.500	.000	.350	.000	.393	.000	.000	.563	.750	.656	.950
Cars & Peds	6	645	1	0	652	1	854	1	0	856	4	0	7	0	11	0	0	9	8	17	1536
% Cars & Peds	100	99.7	100	0	99.7	100	99.9	100	0	99.9	100	0	100	0	100	0	0	100	66.7	81.0	99.5
H.V. & Bikes	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	4	4	7
% H.V. & Bikes	0	0.3	0	0	0.3	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	33.3	19.0	0.5
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Catherine
Weather:

File Name : TMC_1003_10 Mile & Catherine_Mar-16-2022
Site Code : 1003
Start Date : 3/16/2022
Page No : 1

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Site Driveway #2 Northbound				Catherine Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
06:00 AM	0	34	0	0	0	34	0	0	0	0	0	0	0	0	0	0	68
06:15 AM	1	32	0	0	0	28	1	0	0	0	0	0	0	0	0	0	62
06:30 AM	2	60	0	0	0	45	0	0	0	0	0	0	0	0	0	0	107
06:45 AM	5	73	0	0	0	56	9	0	0	0	0	0	1	0	1	0	145
Total	8	199	0	0	0	163	10	0	0	0	0	0	1	0	1	0	382
07:00 AM	1	80	0	0	0	78	4	0	0	0	0	0	3	0	1	0	167
07:15 AM	8	117	0	0	0	72	1	0	0	0	0	0	1	0	3	0	202
07:30 AM	5	129	0	0	0	118	1	0	0	0	0	0	0	0	2	2	257
07:45 AM	2	144	0	0	0	185	2	0	0	0	0	0	0	0	4	1	338
Total	16	470	0	0	0	453	8	0	0	0	0	0	4	0	10	3	964
08:00 AM	9	140	0	0	0	104	7	0	0	0	0	0	2	0	2	0	264
08:15 AM	8	167	0	0	0	92	2	0	0	0	0	0	0	0	3	0	272
08:30 AM	9	142	0	0	0	81	4	0	0	0	0	0	3	0	2	2	243
08:45 AM	5	202	0	0	0	108	0	0	0	0	0	0	2	0	0	0	317
Total	31	651	0	0	0	385	13	0	0	0	0	0	7	0	7	2	1096
09:00 AM	7	135	0	0	0	109	6	0	0	0	0	0	0	0	5	1	263
09:15 AM	6	125	0	0	0	87	4	0	0	0	0	0	0	0	5	0	227
09:30 AM	8	112	0	0	0	95	2	0	0	0	0	0	2	0	4	0	223
09:45 AM	9	108	0	0	0	108	2	0	0	0	0	0	0	0	2	1	230
Total	30	480	0	0	0	399	14	0	0	0	0	0	2	0	16	2	943
10:00 AM	5	85	0	0	0	95	5	0	0	0	0	0	1	0	8	1	200
10:15 AM	7	86	0	0	0	111	1	0	0	0	0	0	2	0	1	0	208
10:30 AM	0	96	0	0	0	89	3	0	0	0	0	0	1	0	2	0	191
10:45 AM	8	91	0	0	0	88	4	0	0	0	0	0	0	0	5	1	197
Total	20	358	0	0	0	383	13	0	0	0	0	0	4	0	16	2	796
11:00 AM	2	88	0	0	0	106	3	0	0	0	0	0	2	0	3	0	204
11:15 AM	3	110	0	0	0	103	4	0	0	0	0	0	1	0	5	0	226
11:30 AM	9	115	0	0	0	99	2	0	0	0	0	0	1	0	3	1	230
11:45 AM	4	120	0	0	0	139	1	0	0	0	0	0	5	0	5	0	274
Total	18	433	0	0	0	447	10	0	0	0	0	0	9	0	16	1	934
12:00 PM	2	116	0	0	0	131	6	0	0	0	0	0	1	0	8	1	265
12:15 PM	3	98	0	0	0	135	2	0	0	0	0	0	3	0	9	0	250
12:30 PM	3	124	0	0	0	123	9	0	0	0	0	0	4	0	2	0	265
12:45 PM	2	125	0	0	0	148	2	0	0	0	0	0	2	0	3	2	284
Total	10	463	0	0	0	537	19	0	0	0	0	0	10	0	22	3	1064
01:00 PM	4	112	0	0	0	119	3	0	0	0	0	0	2	0	5	0	245
01:15 PM	6	111	0	0	0	122	5	0	0	0	0	0	3	0	4	1	252
01:30 PM	3	93	0	0	0	115	4	0	0	0	0	0	3	0	8	0	226
01:45 PM	2	98	0	0	0	134	2	0	0	0	0	0	2	0	2	2	242
Total	15	414	0	0	0	490	14	0	0	0	0	0	10	0	19	3	965
02:00 PM	4	122	0	0	0	124	0	0	0	0	0	0	3	0	7	2	262
02:15 PM	0	114	0	0	0	125	1	0	0	0	0	0	5	0	6	2	253
02:30 PM	5	155	0	0	0	147	2	0	0	0	0	0	3	0	3	1	316
02:45 PM	5	153	0	0	0	127	3	0	0	0	0	0	3	0	6	2	299
Total	14	544	0	0	0	523	6	0	0	0	0	0	14	0	22	7	1130
03:00 PM	8	145	0	0	0	161	2	0	0	0	0	0	3	0	15	0	334
03:15 PM	4	148	0	0	0	146	4	0	0	0	0	0	5	0	9	1	317
03:30 PM	3	143	0	0	0	147	7	0	0	0	0	0	2	0	16	2	320

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Catherine
Weather:

File Name : TMC_1003_10 Mile & Catherine_Mar-16-2022
Site Code : 1003
Start Date : 3/16/2022
Page No : 2

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Site Driveway #2 Northbound				Catherine Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:45 PM	7	113	0	0	0	154	4	0	0	0	0	0	5	0	6	3	292
Total	22	549	0	0	0	608	17	0	0	0	0	0	15	0	46	6	1263
04:00 PM	5	126	0	0	0	164	3	0	0	0	0	0	2	0	12	3	315
04:15 PM	5	124	0	0	0	153	4	0	0	0	0	0	3	0	7	0	296
04:30 PM	4	127	0	0	0	206	3	0	0	0	0	0	0	0	9	3	352
04:45 PM	11	155	0	0	0	214	2	0	0	0	0	0	6	0	8	1	397
Total	25	532	0	0	0	737	12	0	0	0	0	0	11	0	36	7	1360
05:00 PM	4	140	0	0	0	205	2	0	0	0	0	0	5	0	17	5	378
05:15 PM	3	187	0	0	0	205	4	0	0	0	0	0	2	0	7	4	412
05:30 PM	4	149	0	0	0	200	0	0	0	0	0	0	7	0	12	2	374
05:45 PM	8	138	0	0	0	180	1	0	0	0	0	0	0	0	12	2	341
Total	19	614	0	0	0	790	7	0	0	0	0	0	14	0	48	13	1505
06:00 PM	2	141	0	0	0	164	1	0	0	0	0	0	3	0	7	7	325
06:15 PM	0	136	0	0	0	141	0	0	0	0	0	0	1	0	1	1	280
06:30 PM	3	129	0	0	0	136	1	0	0	0	0	0	1	0	3	4	277
06:45 PM	1	108	0	0	0	173	1	0	0	0	0	0	2	0	4	0	289
Total	6	514	0	0	0	614	3	0	0	0	0	0	7	0	15	12	1171
*** BREAK ***																	
Grand Total	234	6221	0	0	0	6529	146	0	0	0	0	0	108	0	274	61	13573
Apprch %	3.6	96.4	0	0	0	97.8	2.2	0	0	0	0	0	24.4	0	61.9	13.8	
Total %	1.7	45.8	0	0	0	48.1	1.1	0	0	0	0	0	0.8	0	2	0.4	
Cars & Peds	226	6134	0	0	0	6426	145	0	0	0	0	0	106	0	266	46	13349
% Cars & Peds	96.6	98.6	0	0	0	98.4	99.3	0	0	0	0	0	98.1	0	97.1	75.4	98.3
H.V. & Bikes	8	87	0	0	0	102	1	0	0	0	0	0	2	0	8	15	223
% H.V. & Bikes	3.4	1.4	0	0	0	1.6	0.7	0	0	0	0	0	1.9	0	2.9	24.6	1.6
Bikes on Street	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

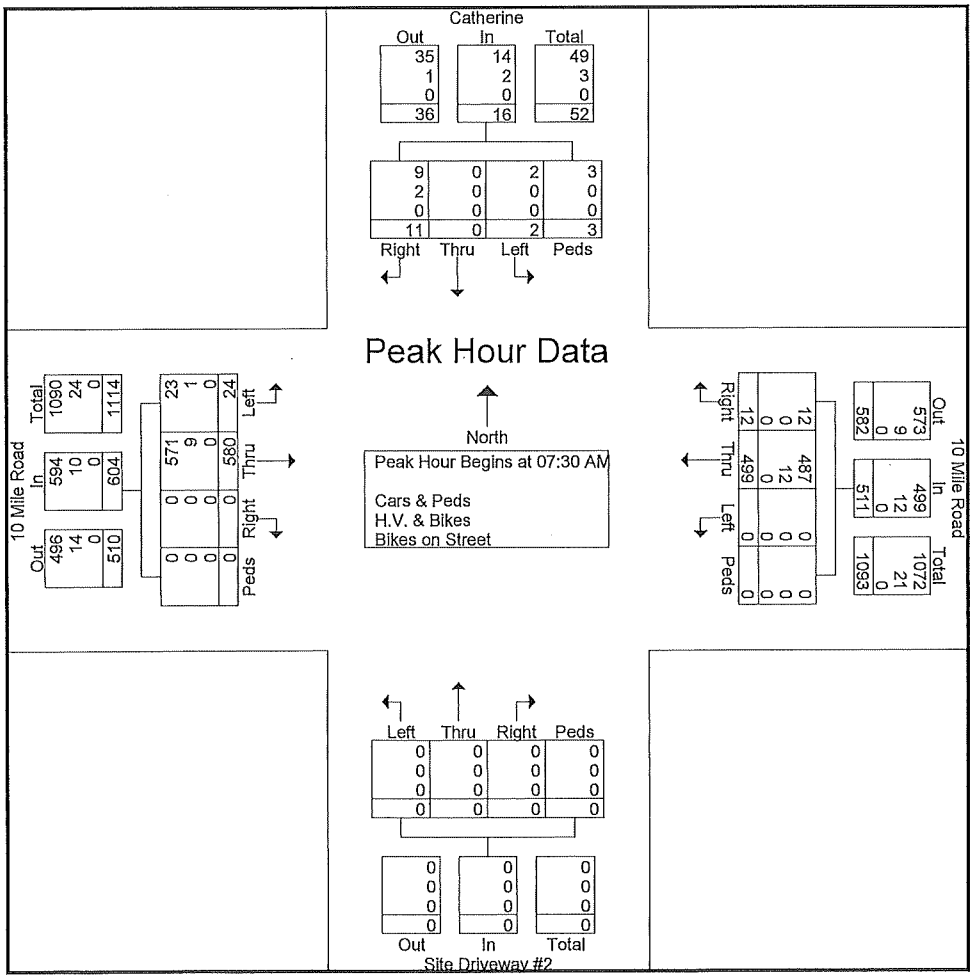
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Catherine
Weather:

File Name : TMC_1003_10 Mile & Catherine_Mar-16-2022
Site Code : 1003
Start Date : 3/16/2022
Page No : 3

	10 Mile Road Eastbound					10 Mile Road Westbound					Site Driveway #2 Northbound					Catherine Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	5	129	0	0	134	0	118	1	0	119	0	0	0	0	0	0	0	2	2	4	257
07:45 AM	2	144	0	0	146	0	185	2	0	187	0	0	0	0	0	0	0	4	1	5	338
08:00 AM	9	140	0	0	149	0	104	7	0	111	0	0	0	0	0	2	0	2	0	4	264
08:15 AM	8	167	0	0	175	0	92	2	0	94	0	0	0	0	0	0	0	3	0	3	272
Total Volume	24	580	0	0	604	0	499	12	0	511	0	0	0	0	0	2	0	11	3	16	1131
% App. Total	4	96	0	0		0	97.7	2.3	0		0	0	0	0		12.5	0	68.8	18.8		
PHF	.667	.868	.000	.000	.863	.000	.674	.429	.000	.683	.000	.000	.000	.000	.000	.250	.000	.688	.375	.800	.837
Cars & Peds	23	571	0	0	594	0	487	12	0	499	0	0	0	0	0	2	0	9	3	14	1107
% Cars & Peds	95.8	98.4	0	0	98.3	0	97.6	100	0	97.7	0	0	0	0	0	100	0	81.8	100	87.5	97.9
H.V. & Bikes	1	9	0	0	10	0	12	0	0	12	0	0	0	0	0	0	0	2	0	2	24
% H.V. & Bikes	4.2	1.6	0	0	1.7	0	2.4	0	0	2.3	0	0	0	0	0	0	0	18.2	0	12.5	2.1
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



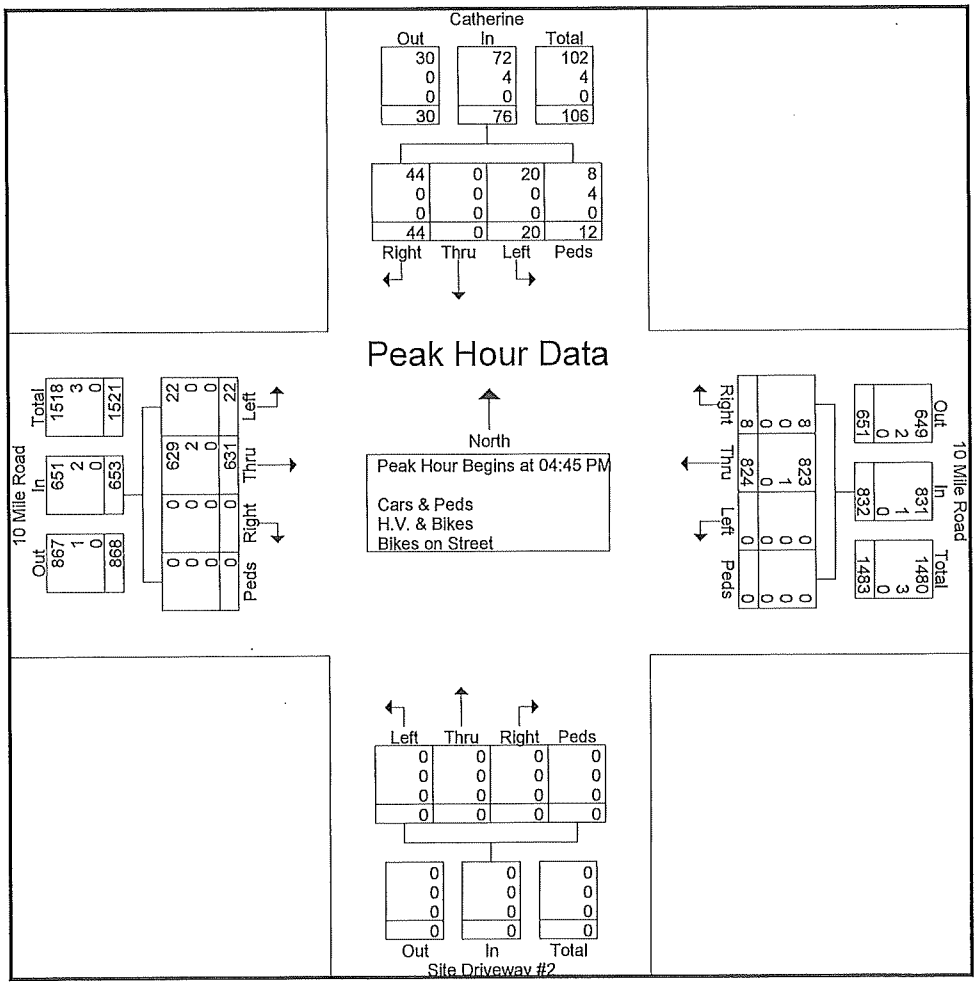
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Catherine
Weather:

File Name : TMC_1003_10 Mile & Catherine_Mar-16-2022
Site Code : 1003
Start Date : 3/16/2022
Page No : 4

	10 Mile Road Eastbound					10 Mile Road Westbound					Site Driveway #2 Northbound					Catherine Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	11	155	0	0	166	0	214	2	0	216	0	0	0	0	0	6	0	8	1	15	397
05:00 PM	4	140	0	0	144	0	205	2	0	207	0	0	0	0	0	5	0	17	5	27	378
05:15 PM	3	187	0	0	190	0	205	4	0	209	0	0	0	0	0	2	0	7	4	13	412
05:30 PM	4	149	0	0	153	0	200	0	0	200	0	0	0	0	0	7	0	12	2	21	374
Total Volume	22	631	0	0	653	0	824	8	0	832	0	0	0	0	0	20	0	44	12	76	1561
% App. Total	3.4	96.6	0	0		0	99	1	0		0	0	0	0		26.3	0	57.9	15.8		
PHF	.500	.844	.000	.000	.859	.000	.963	.500	.000	.963	.000	.000	.000	.000	.000	.714	.000	.647	.600	.704	.947
Cars & Peds	22	629	0	0	651	0	823	8	0	831	0	0	0	0	0	20	0	44	8	72	1554
% Cars & Peds	100	99.7	0	0	99.7	0	99.9	100	0	99.9	0	0	0	0	0	100	0	100	66.7	94.7	99.6
H.V. & Bikes	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	4	4	7
% H.V. & Bikes	0	0.3	0	0	0.3	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	33.3	5.3	0.4
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: 42900-42916 Driveways
Weather:

File Name : TMC_1004_10 Mile & DD_Mar-16-2022
Site Code : 1004
Start Date : 3/16/2022
Page No : 1

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Site Driveway #3 Northbound				42900-42916 Driveways Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
07:00 AM	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
07:15 AM	1	0	0	0	0	0	4	0	0	0	0	0	2	0	0	2	9
07:30 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
Total	6	0	0	0	0	0	7	0	0	0	0	0	2	0	3	4	22
08:00 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
08:15 AM	1	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	7
08:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
Total	3	0	0	0	0	0	4	0	0	0	0	0	0	0	5	0	12
*** BREAK ***																	
04:00 PM	2	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3
04:45 PM	1	0	0	0	0	0	3	0	0	0	0	0	0	0	2	1	7
Total	3	0	0	0	0	0	4	0	0	0	0	0	1	0	6	3	17
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	4	10
05:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	5
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3
05:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3
Total	2	0	0	0	0	0	0	0	0	0	0	0	1	0	7	11	21
*** BREAK ***																	
Grand Total	14	0	0	0	0	0	15	0	0	0	0	0	4	0	21	18	72
Apprch %	100	0	0	0	0	0	100	0	0	0	0	0	9.3	0	48.8	41.9	
Total %	19.4	0	0	0	0	0	20.8	0	0	0	0	0	5.6	0	29.2	25	
Cars & Peds	13	0	0	0	0	0	15	0	0	0	0	0	4	0	21	11	64
% Cars & Peds	92.9	0	0	0	0	0	100	0	0	0	0	0	100	0	100	61.1	88.9
H.V. & Bikes	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	8
% H.V. & Bikes	7.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38.9	11.1
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

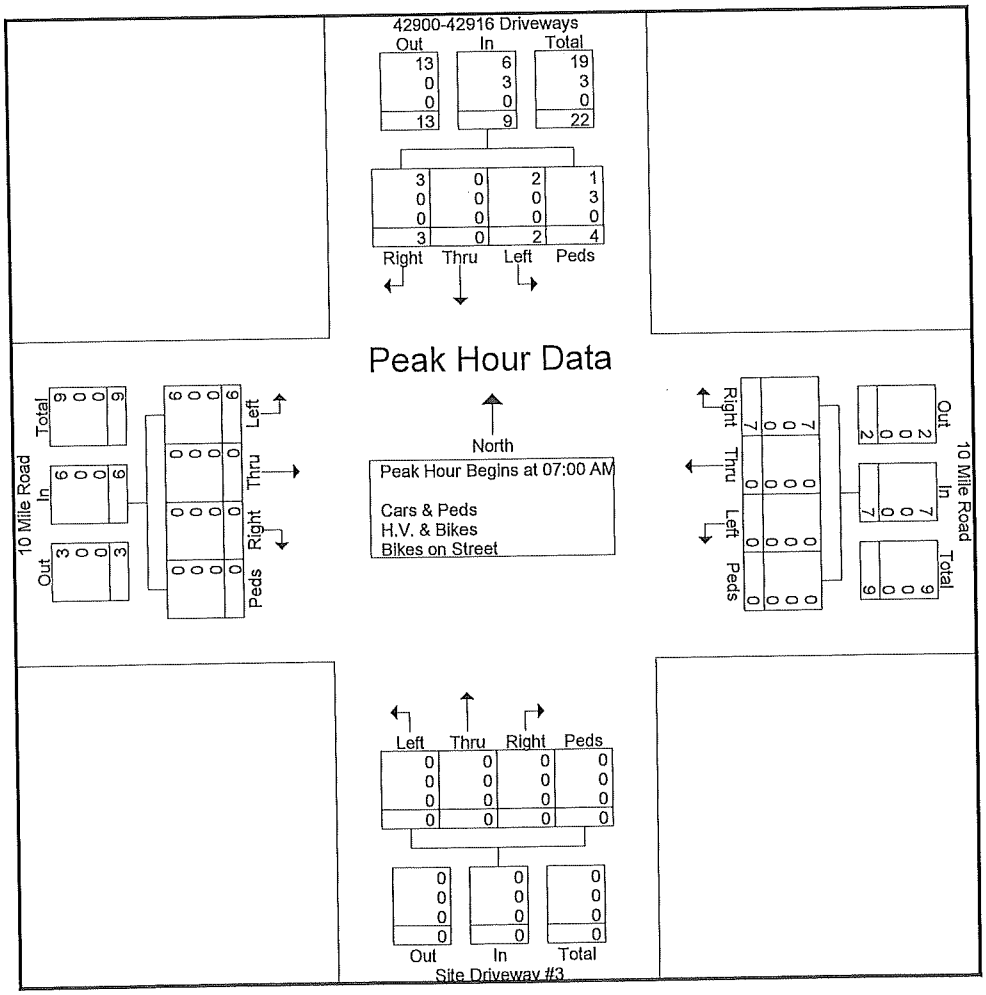
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: 42900-42916 Driveways
Weather:

File Name : TMC_1004_10 Mile & DD_Mar-16-2022
Site Code : 1004
Start Date : 3/16/2022
Page No : 2

	10 Mile Road Eastbound					10 Mile Road Westbound					Site Driveway #3 Northbound					42900-42916 Driveways Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
07:15 AM	1	0	0	0	1	0	0	4	0	4	0	0	0	0	0	2	0	0	2	4	9
07:30 AM	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	1	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4	4
Total Volume	6	0	0	0	6	0	0	7	0	7	0	0	0	0	0	2	0	3	4	9	22
% App. Total	100	0	0	0		0	0	100	0		0	0	0	0		22.2	0	33.3	44.4		
PHF	.300	.000	.000	.000	.300	.000	.000	.438	.000	.438	.000	.000	.000	.000	.000	.250	.000	.250	.500	.563	.611
Cars & Peds	6	0	0	0	6	0	0	7	0	7	0	0	0	0	0	2	0	3	1	6	19
% Cars & Peds	100	0	0	0	100	0	0	100	0	100	0	0	0	0	0	100	0	100	25.0	66.7	86.4
H.V. & Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
% H.V. & Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75.0	33.3	13.6
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



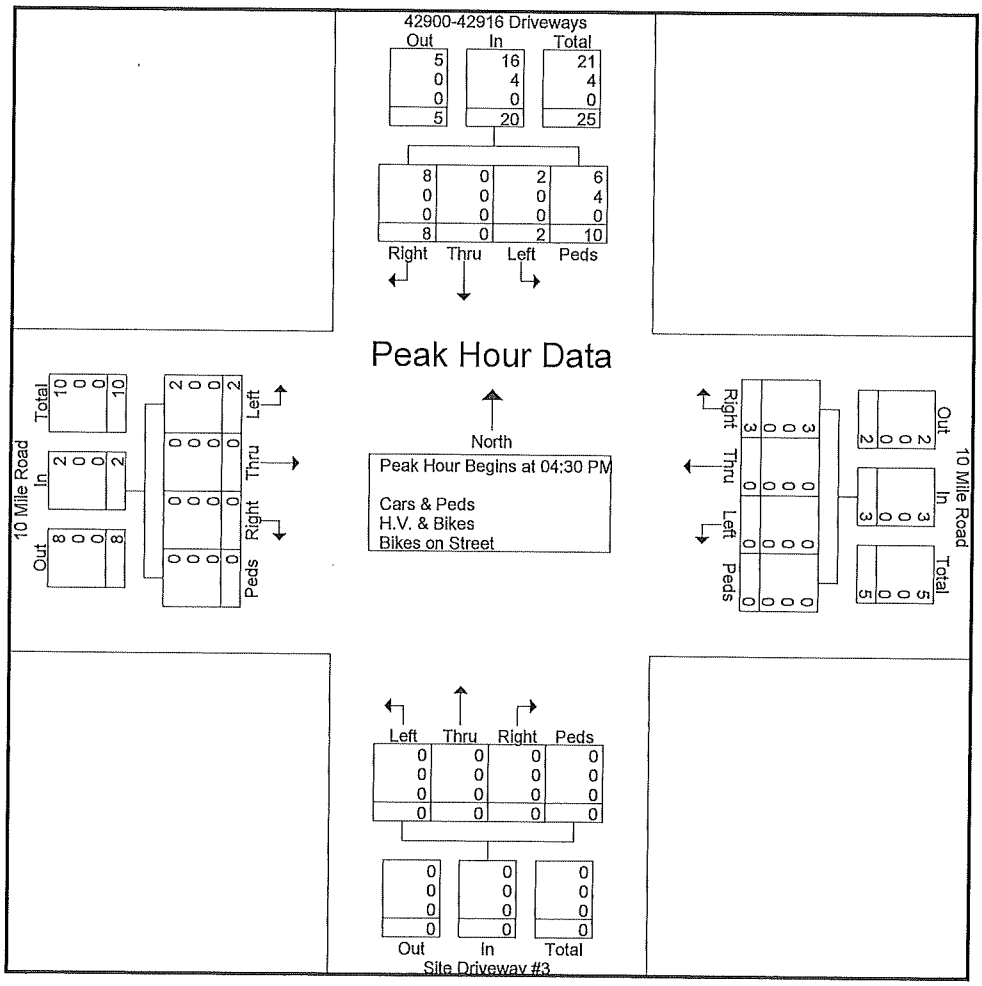
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: 42900-42916 Driveways
Weather:

File Name : TMC_1004_10 Mile & DD_Mar-16-2022
Site Code : 1004
Start Date : 3/16/2022
Page No : 3

	10 Mile Road Eastbound					10 Mile Road Westbound					Site Driveway #3 Northbound					42900-42916 Driveways Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3	3
04:45 PM	1	0	0	0	1	0	0	3	0	3	0	0	0	0	0	0	0	2	1	3	7
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	4	10	10
05:15 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	5
Total Volume	2	0	0	0	2	0	0	3	0	3	0	0	0	0	0	2	0	8	10	20	25
% App. Total	100	0	0	0		0	0	100	0		0	0	0	0		10	0	40	50		
PHF	.500	.000	.000	.000	.500	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.500	.000	.400	.625	.500	.625
Cars & Peds	2	0	0	0	2	0	0	3	0	3	0	0	0	0	0	2	0	8	6	16	21
% Cars & Peds	100	0	0	0	100	0	0	100	0	100	0	0	0	0	0	100	0	100	60.0	80.0	84.0
H.V. & Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4
% H.V. & Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40.0	20.0	16.0
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Tremar
Weather:

File Name : TMC_1006_10 Mile & Tremar_Mar-16-2022
Site Code : 1006
Start Date : 3/16/2022
Page No : 1

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				None Northbound				Tremar Driveway Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
06:00 AM	0	35	0	0	0	34	0	0	0	0	0	0	0	0	0	0	69
06:15 AM	0	31	0	0	0	28	0	0	0	0	0	0	0	0	0	0	59
06:30 AM	0	58	0	0	0	47	0	0	0	0	0	0	0	0	0	0	105
06:45 AM	0	70	0	0	0	67	0	0	0	0	0	0	0	0	0	0	137
Total	0	194	0	0	0	176	0	0	0	0	0	0	0	0	0	0	370
07:00 AM	0	79	0	0	0	81	0	0	0	0	0	0	0	0	0	0	160
07:15 AM	0	120	0	0	0	73	2	0	0	0	0	0	0	0	0	0	195
07:30 AM	1	122	0	0	0	120	3	0	0	0	0	0	0	0	1	1	248
07:45 AM	0	151	0	0	0	189	0	0	0	0	0	0	0	0	0	1	341
Total	1	472	0	0	0	463	5	0	0	0	0	0	0	0	1	2	944
08:00 AM	0	135	0	0	0	111	1	0	0	0	0	0	0	0	0	0	247
08:15 AM	1	169	0	0	0	88	0	0	0	0	0	0	0	0	1	0	259
08:30 AM	1	143	0	0	0	85	2	0	0	0	0	0	1	0	0	2	234
08:45 AM	0	210	0	0	0	110	0	0	0	0	0	0	0	0	0	0	320
Total	2	657	0	0	0	394	3	0	0	0	0	0	1	0	1	2	1060
09:00 AM	1	127	0	0	0	115	0	0	0	0	0	0	0	0	1	1	245
09:15 AM	0	128	0	0	0	89	0	0	0	0	0	0	0	0	0	0	217
09:30 AM	2	108	0	0	0	96	0	0	0	0	0	0	0	0	0	0	206
09:45 AM	1	116	0	0	0	109	0	0	0	0	0	0	1	0	1	1	229
Total	4	479	0	0	0	409	0	0	0	0	0	0	1	0	2	2	897
10:00 AM	0	83	0	0	0	98	0	0	0	0	0	0	0	0	0	2	183
10:15 AM	0	90	0	0	0	111	1	0	0	0	0	0	0	0	0	1	203
10:30 AM	0	95	0	0	0	92	0	0	0	0	0	0	0	0	1	0	188
10:45 AM	0	97	0	0	0	92	0	0	0	0	0	0	0	0	0	1	190
Total	0	365	0	0	0	393	1	0	0	0	0	0	0	0	1	4	764
11:00 AM	0	86	0	0	0	110	2	0	0	0	0	0	0	0	2	0	200
11:15 AM	0	114	0	0	0	105	0	0	0	0	0	0	1	0	0	0	220
11:30 AM	0	110	0	0	0	101	1	0	0	0	0	0	0	0	0	1	213
11:45 AM	1	130	0	0	0	136	0	0	0	0	0	0	0	0	1	0	268
Total	1	440	0	0	0	452	3	0	0	0	0	0	1	0	3	1	901
12:00 PM	0	111	0	0	0	135	1	0	0	0	0	0	0	0	0	1	248
12:15 PM	0	104	0	0	0	131	0	0	0	0	0	0	0	0	0	0	235
12:30 PM	0	124	0	0	0	133	0	0	0	0	0	0	0	0	1	0	258
12:45 PM	1	130	0	0	0	147	0	0	0	0	0	0	1	0	0	2	281
Total	1	469	0	0	0	546	1	0	0	0	0	0	1	0	1	3	1022
01:00 PM	1	107	0	0	0	121	0	0	0	0	0	0	0	0	1	0	230
01:15 PM	0	120	0	0	0	123	1	0	0	0	0	0	0	0	0	1	245
01:30 PM	0	93	0	0	0	122	0	0	0	0	0	0	0	0	0	0	215
01:45 PM	0	100	0	0	0	129	0	0	0	0	0	0	0	0	2	3	234
Total	1	420	0	0	0	495	1	0	0	0	0	0	0	0	3	4	924
02:00 PM	0	119	0	0	0	126	0	0	0	0	0	0	0	0	0	0	245
02:15 PM	1	124	0	0	0	121	0	0	0	0	0	0	1	0	0	2	249
02:30 PM	0	155	0	0	0	153	0	0	0	0	0	0	0	0	0	1	309
02:45 PM	2	137	0	0	0	122	0	0	0	0	0	0	1	0	1	2	265
Total	3	535	0	0	0	522	0	0	0	0	0	0	2	0	1	5	1068
03:00 PM	0	163	0	0	0	163	0	0	0	0	0	0	0	0	0	0	326
03:15 PM	0	158	0	0	0	148	1	0	0	0	0	0	1	0	0	1	309
03:30 PM	1	137	0	0	0	153	0	0	0	0	0	0	0	0	1	2	294

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Tremar
Weather:

File Name : TMC_1006_10 Mile & Tremar_Mar-16-2022
Site Code : 1006
Start Date : 3/16/2022
Page No : 2

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				None Northbound				Tremar Driveway Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:45 PM	0	121	0	0	0	153	0	0	0	0	0	0	0	0	0	5	279
Total	1	579	0	0	0	617	1	0	0	0	0	0	1	0	1	8	1208
04:00 PM	1	129	0	0	0	166	0	0	0	0	0	0	0	0	0	3	299
04:15 PM	0	131	0	0	0	155	0	0	0	0	0	0	0	0	1	1	288
04:30 PM	1	122	0	0	0	211	0	0	0	0	0	0	3	0	1	1	339
04:45 PM	0	164	0	0	0	213	0	0	0	0	0	0	1	0	0	1	379
Total	2	546	0	0	0	745	0	0	0	0	0	0	4	0	2	6	1305
05:00 PM	0	142	0	0	0	201	0	0	0	0	0	0	1	0	1	2	347
05:15 PM	0	194	0	0	0	206	0	0	0	0	0	0	0	0	1	4	405
05:30 PM	0	150	0	0	0	201	0	0	0	0	0	0	0	0	1	2	354
05:45 PM	0	143	0	0	0	179	0	0	0	0	0	0	1	0	0	2	325
Total	0	629	0	0	0	787	0	0	0	0	0	0	2	0	3	10	1431
06:00 PM	0	142	0	0	0	163	0	0	0	0	0	0	0	0	0	6	311
06:15 PM	0	137	0	0	0	142	0	0	0	0	0	0	0	0	0	0	279
06:30 PM	0	127	0	0	0	138	0	0	0	0	0	0	0	0	0	2	267
06:45 PM	0	115	0	0	0	172	0	0	0	0	0	0	0	0	0	0	287
Total	0	521	0	0	0	615	0	0	0	0	0	0	0	0	0	8	1144
*** BREAK ***																	
Grand Total	16	6306	0	0	0	6614	15	0	0	0	0	0	13	0	19	55	13038
Apprch %	0.3	99.7	0	0	0	99.8	0.2	0	0	0	0	0	14.9	0	21.8	63.2	
Total %	0.1	48.4	0	0	0	50.7	0.1	0	0	0	0	0	0.1	0	0.1	0.4	
Cars & Peds	15	6221	0	0	0	6513	14	0	0	0	0	0	13	0	16	39	12831
% Cars & Peds	93.8	98.7	0	0	0	98.5	93.3	0	0	0	0	0	100	0	84.2	70.9	98.4
H.V. & Bikes	1	85	0	0	0	100	1	0	0	0	0	0	0	0	3	16	206
% H.V. & Bikes	6.2	1.3	0	0	0	1.5	6.7	0	0	0	0	0	0	0	15.8	29.1	1.6
Bikes on Street	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

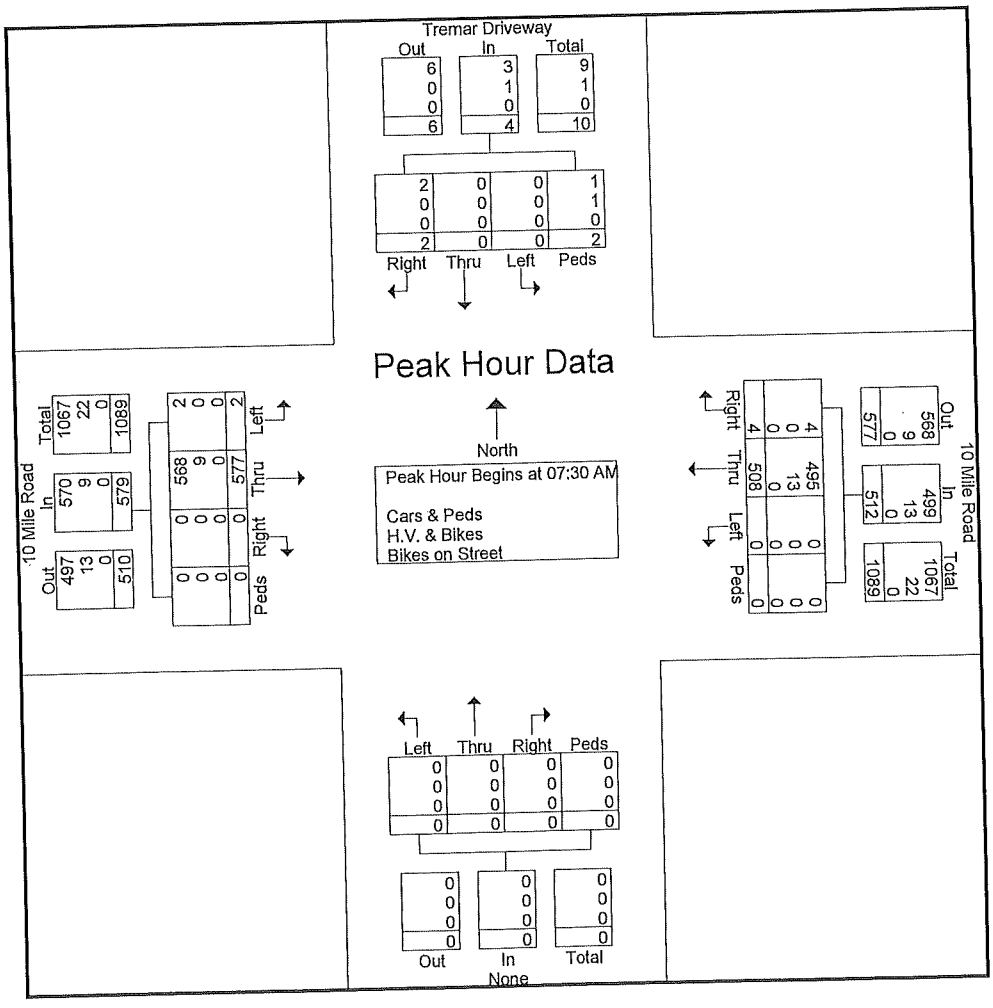
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Tremar
Weather:

File Name : TMC_1006_10 Mile & Tremar_Mar-16-2022
Site Code : 1006
Start Date : 3/16/2022
Page No : 3

	10 Mile Road Eastbound					10 Mile Road Westbound					None Northbound					Tremar Driveway Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	1	122	0	0	123	0	120	3	0	123	0	0	0	0	0	0	0	1	1	2	248
07:45 AM	0	151	0	0	151	0	189	0	0	189	0	0	0	0	0	0	0	0	1	1	341
08:00 AM	0	135	0	0	135	0	111	1	0	112	0	0	0	0	0	0	0	0	0	0	247
08:15 AM	1	169	0	0	170	0	88	0	0	88	0	0	0	0	0	0	0	1	0	1	259
Total Volume	2	577	0	0	579	0	508	4	0	512	0	0	0	0	0	0	0	2	2	4	1095
% App. Total	0.3	99.7	0	0		0	99.2	0.8	0		0	0	0	0		0	0	50	50		
PHF	.500	.854	.000	.000	.851	.000	.672	.333	.000	.677	.000	.000	.000	.000	.000	.000	.000	.500	.500	.500	.803
Cars & Peds	2	568	0	0	570	0	495	4	0	499	0	0	0	0	0	0	0	2	1	3	1072
% Cars & Peds	100	98.4	0	0	98.4	0	97.4	100	0	97.5	0	0	0	0	0	0	0	100	50.0	75.0	97.9
H.V. & Bikes	0	9	0	0	9	0	13	0	0	13	0	0	0	0	0	0	0	0	1	1	23
% H.V. & Bikes	0	1.6	0	0	1.6	0	2.6	0	0	2.5	0	0	0	0	0	0	0	0	50.0	25.0	2.1
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



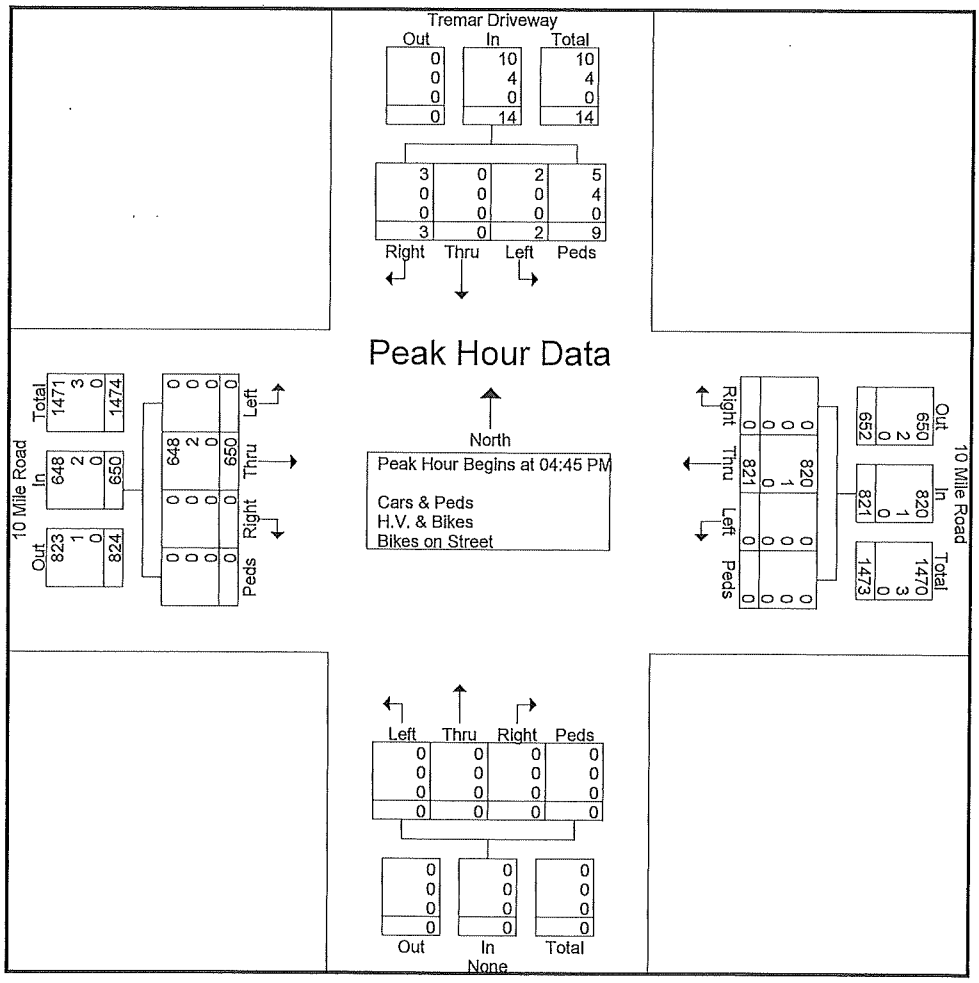
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Tremar
Weather:

File Name : TMC_1006_10 Mile & Tremar_Mar-16-2022
Site Code : 1006
Start Date : 3/16/2022
Page No : 4

	10 Mile Road Eastbound					10 Mile Road Westbound					None Northbound					Tremar Driveway Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	164	0	0	164	0	213	0	0	213	0	0	0	0	0	1	0	0	1	2	379
05:00 PM	0	142	0	0	142	0	201	0	0	201	0	0	0	0	0	1	0	1	2	4	347
05:15 PM	0	194	0	0	194	0	206	0	0	206	0	0	0	0	0	0	0	1	4	5	405
05:30 PM	0	150	0	0	150	0	201	0	0	201	0	0	0	0	0	0	0	1	2	3	354
Total Volume	0	650	0	0	650	0	821	0	0	821	0	0	0	0	0	2	0	3	9	14	1485
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0		14.3	0	21.4	64.3		
PHF	.000	.838	.000	.000	.838	.000	.964	.000	.000	.964	.000	.000	.000	.000	.000	.500	.000	.750	.563	.700	.917
Cars & Peds	0	648	0	0	648	0	820	0	0	820	0	0	0	0	0	2	0	3	5	10	1478
% Cars & Peds	0	99.7	0	0	99.7	0	99.9	0	0	99.9	0	0	0	0	0	100	0	100	55.6	71.4	99.5
H.V. & Bikes	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	4	4	7
% H.V. & Bikes	0	0.3	0	0	0.3	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	44.4	28.6	0.5
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Wrenchers Driveway
Weather:

File Name : TMC_1008_10 Mile & Wrenchers_Mar-16-2022
Site Code : 1008
Start Date : 3/16/2022
Page No : 1

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				None Northbound				Wrenchers Driveway Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
06:00 AM	0	35	0	0	0	34	0	0	0	0	0	0	0	0	0	0	69
06:15 AM	0	31	0	0	0	28	0	0	0	0	0	0	0	0	0	0	59
06:30 AM	1	57	0	0	0	47	0	0	0	0	0	0	0	0	0	0	105
06:45 AM	0	70	0	0	0	68	0	0	0	0	0	0	0	0	0	0	138
Total	1	193	0	0	0	177	0	0	0	0	0	0	0	0	0	0	371
07:00 AM	0	78	0	0	0	82	0	0	0	0	0	0	0	0	0	0	160
07:15 AM	0	119	0	0	0	74	0	0	0	0	0	0	0	0	0	0	193
07:30 AM	0	121	0	0	0	123	2	0	0	0	0	0	0	0	0	1	247
07:45 AM	0	151	0	0	0	186	2	0	0	0	0	0	0	0	1	1	341
Total	0	469	0	0	0	465	4	0	0	0	0	0	0	0	1	2	941
08:00 AM	2	133	0	0	0	111	3	0	0	0	0	0	0	0	1	0	250
08:15 AM	0	169	0	0	0	88	0	0	0	0	0	0	0	0	0	0	257
08:30 AM	0	145	0	0	0	88	0	0	0	0	0	0	0	0	1	2	236
08:45 AM	0	210	0	0	0	109	0	0	0	0	0	0	0	0	0	0	319
Total	2	657	0	0	0	396	3	0	0	0	0	0	0	0	2	2	1062
09:00 AM	2	125	0	0	0	115	0	0	0	0	0	0	0	0	0	1	243
09:15 AM	0	127	0	0	0	89	0	0	0	0	0	0	0	0	0	0	216
09:30 AM	0	107	0	0	0	95	0	0	0	0	0	0	0	0	1	0	203
09:45 AM	0	117	0	0	0	108	0	0	0	0	0	0	0	0	2	1	228
Total	2	476	0	0	0	407	0	0	0	0	0	0	0	0	3	2	890
10:00 AM	0	82	0	0	0	98	0	0	0	0	0	0	0	0	0	0	180
10:15 AM	1	90	0	0	0	112	0	0	0	0	0	0	0	0	0	3	206
10:30 AM	0	95	0	0	0	92	1	0	0	0	0	0	0	0	0	0	188
10:45 AM	0	97	0	0	0	93	0	0	0	0	0	0	0	0	0	1	191
Total	1	364	0	0	0	395	1	0	0	0	0	0	0	0	0	4	765
11:00 AM	0	85	0	0	0	108	1	0	0	0	0	0	0	0	2	0	196
11:15 AM	0	116	0	0	0	104	0	0	0	0	0	0	0	0	1	0	221
11:30 AM	0	108	0	0	0	104	1	0	0	0	0	0	1	0	0	0	214
11:45 AM	0	132	0	0	0	135	0	0	0	0	0	0	0	0	0	0	267
Total	0	441	0	0	0	451	2	0	0	0	0	0	1	0	3	0	898
12:00 PM	0	112	0	0	0	135	0	0	0	0	0	0	1	0	3	1	252
12:15 PM	0	104	0	0	0	129	1	0	0	0	0	0	0	0	0	0	234
12:30 PM	0	122	0	0	0	132	0	0	0	0	0	0	0	0	2	0	256
12:45 PM	1	131	0	0	0	146	0	0	0	0	0	0	1	0	0	2	281
Total	1	469	0	0	0	542	1	0	0	0	0	0	2	0	5	3	1023
01:00 PM	0	107	0	0	0	125	0	0	0	0	0	0	0	0	1	0	233
01:15 PM	2	118	0	0	0	125	1	0	0	0	0	0	1	0	0	0	247
01:30 PM	0	90	0	0	0	123	0	0	0	0	0	0	0	0	0	1	214
01:45 PM	0	103	0	0	0	128	0	0	0	0	0	0	0	0	0	3	234
Total	2	418	0	0	0	501	1	0	0	0	0	0	1	0	1	4	928
02:00 PM	1	116	0	0	0	126	0	0	0	0	0	0	0	0	0	0	243
02:15 PM	0	128	0	0	0	121	1	0	0	0	0	0	0	0	1	3	254
02:30 PM	0	155	0	0	0	154	0	0	0	0	0	0	0	0	0	1	310
02:45 PM	3	130	0	0	0	122	0	0	0	0	0	0	0	0	1	3	259
Total	4	529	0	0	0	523	1	0	0	0	0	0	0	0	2	7	1066
03:00 PM	1	164	0	0	0	163	0	0	0	0	0	0	0	0	0	0	328
03:15 PM	0	162	0	0	0	149	0	0	0	0	0	0	0	0	1	1	313
03:30 PM	0	137	0	0	0	155	0	0	0	0	0	0	0	0	0	1	293

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Wrenchers Driveway
Weather:

File Name : TMC_1008_10 Mile & Wrenchers_Mar-16-2022
Site Code : 1008
Start Date : 3/16/2022

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				None Northbound				Wrenchers Driveway Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:45 PM	0	122	0	0	0	153	0	0	0	0	0	0	0	0	0	5	280
Total	1	585	0	0	0	620	0	0	0	0	0	0	0	0	1	7	1214
04:00 PM	1	126	0	0	0	164	0	0	0	0	0	0	0	0	2	3	296
04:15 PM	0	131	0	0	0	155	0	0	0	0	0	0	0	0	0	1	287
04:30 PM	0	124	0	0	0	212	0	0	0	0	0	0	0	0	0	3	339
04:45 PM	0	167	0	0	0	213	0	0	0	0	0	0	0	0	0	1	381
Total	1	548	0	0	0	744	0	0	0	0	0	0	0	0	2	8	1303
05:00 PM	0	141	0	0	0	200	0	0	0	0	0	0	0	0	1	5	347
05:15 PM	0	195	0	0	0	205	0	0	0	0	0	0	1	0	2	4	407
05:30 PM	0	148	0	0	0	204	0	0	0	0	0	0	0	0	0	2	354
05:45 PM	0	145	0	0	0	177	0	0	0	0	0	0	0	0	0	2	324
Total	0	629	0	0	0	786	0	0	0	0	0	0	1	0	3	13	1432
06:00 PM	0	139	0	0	0	164	0	0	0	0	0	0	1	0	1	8	313
06:15 PM	0	139	0	0	0	140	0	0	0	0	0	0	0	0	1	2	282
06:30 PM	0	127	0	0	0	139	0	0	0	0	0	0	0	0	0	0	266
06:45 PM	0	114	0	0	0	172	0	0	0	0	0	0	0	0	1	0	287
Total	0	519	0	0	0	615	0	0	0	0	0	0	1	0	3	10	1148
*** BREAK ***																	
Grand Total	15	6297	0	0	0	6622	13	0	0	0	0	0	6	0	26	62	13041
Apprch %	0.2	99.8	0	0	0	99.8	0.2	0	0	0	0	0	6.4	0	27.7	66	
Total %	0.1	48.3	0	0	0	50.8	0.1	0	0	0	0	0	0	0	0.2	0.5	
Cars & Peds	14	6210	0	0	0	6524	12	0	0	0	0	0	6	0	22	46	12834
% Cars & Peds	93.3	98.6	0	0	0	98.5	92.3	0	0	0	0	0	100	0	84.6	74.2	98.4
H.V. & Bikes	1	86	0	0	0	97	1	0	0	0	0	0	0	0	4	16	205
% H.V. & Bikes	6.7	1.4	0	0	0	1.5	7.7	0	0	0	0	0	0	0	15.4	25.8	1.6
Bikes on Street	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Wrenchers Driveway
Weather:

File Name : TMC_1008_10 Mile & Wrenchers_Mar-16-2022
Site Code : 1008
Start Date : 3/16/2022
Page No : 3

	10 Mile Road Eastbound					10 Mile Road Westbound					None Northbound					Wrenchers Driveway Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	121	0	0	121	0	123	2	0	125	0	0	0	0	0	0	0	0	1	1	247
07:45 AM	0	151	0	0	151	0	186	2	0	188	0	0	0	0	0	0	0	1	1	2	341
08:00 AM	2	133	0	0	135	0	111	3	0	114	0	0	0	0	0	0	0	1	0	1	250
08:15 AM	0	169	0	0	169	0	88	0	0	88	0	0	0	0	0	0	0	0	0	0	257
Total Volume	2	574	0	0	576	0	508	7	0	515	0	0	0	0	0	0	0	2	2	4	1095
% App. Total	0.3	99.7	0	0		0	98.6	1.4	0		0	0	0	0		0	0	50	50		
PHF	.250	.849	.000	.000	.852	.000	.683	.583	.000	.685	.000	.000	.000	.000	.000	.000	.000	.500	.500	.500	.803
Cars & Peds	2	564	0	0	566	0	496	6	0	502	0	0	0	0	0	0	0	1	1	2	1070
% Cars & Peds	100	98.3	0	0	98.3	0	97.6	85.7	0	97.5	0	0	0	0	0	0	0	50.0	50.0	50.0	97.7
H.V. & Bikes	0	9	0	0	9	0	12	1	0	13	0	0	0	0	0	0	0	1	1	2	24
% H.V. & Bikes	0	1.6	0	0	1.6	0	2.4	14.3	0	2.5	0	0	0	0	0	0	0	50.0	50.0	50.0	2.2
Bikes on Street	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bikes on Street	0	0.2	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1

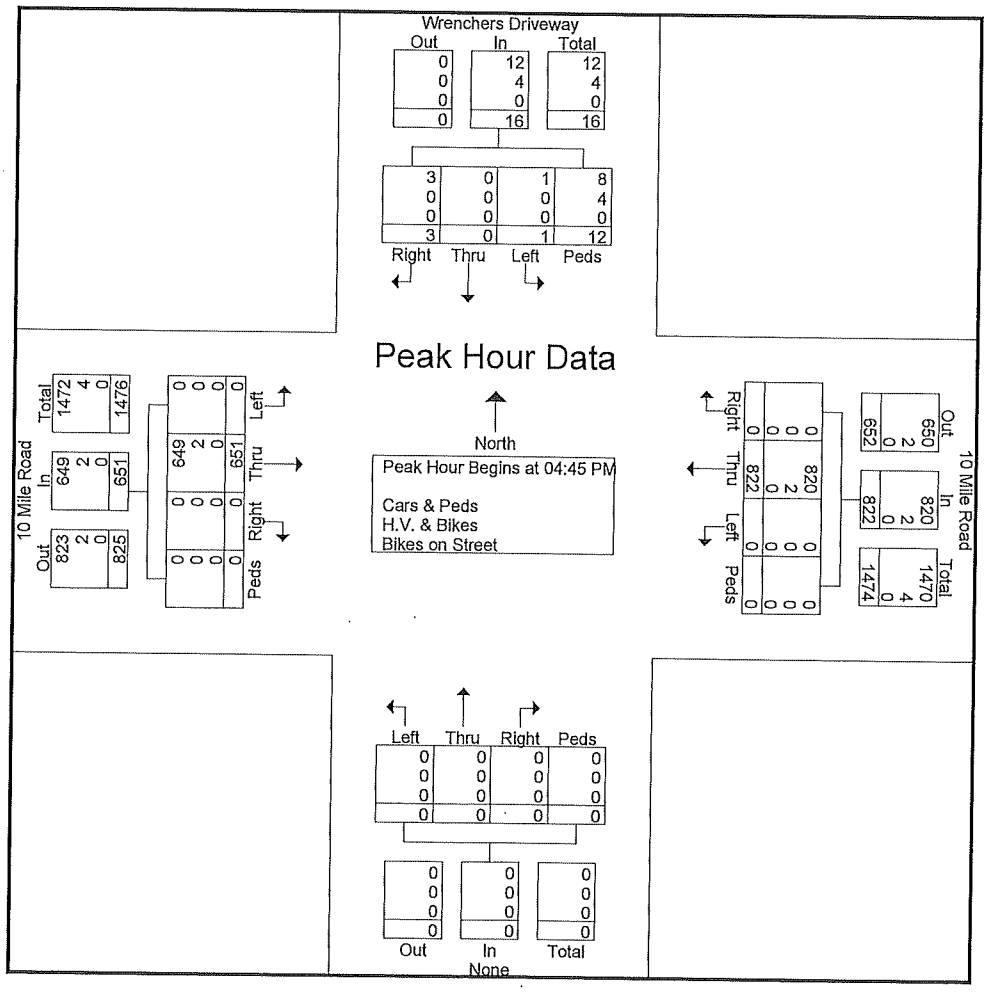
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Wrenchers Driveway
Weather:

File Name : TMC_1008_10 Mile & Wrenchers_Mar-16-2022
Site Code : 1008
Start Date : 3/16/2022
Page No : 4

	10 Mile Road Eastbound					10 Mile Road Westbound					None Northbound					Wrenchers Driveway Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	167	0	0	167	0	213	0	0	213	0	0	0	0	0	0	0	0	1	1	381
05:00 PM	0	141	0	0	141	0	200	0	0	200	0	0	0	0	0	0	0	1	5	6	347
05:15 PM	0	195	0	0	195	0	205	0	0	205	0	0	0	0	0	1	0	2	4	7	407
05:30 PM	0	148	0	0	148	0	204	0	0	204	0	0	0	0	0	0	0	0	2	2	354
Total Volume	0	651	0	0	651	0	822	0	0	822	0	0	0	0	0	1	0	3	12	16	1489
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0		6.2	0	18.8	75		
PHF	.000	.835	.000	.000	.835	.000	.965	.000	.000	.965	.000	.000	.000	.000	.000	.250	.000	.375	.600	.571	.915
Cars & Peds	0	649	0	0	649	0	820	0	0	820	0	0	0	0	0	1	0	3	8	12	1481
% Cars & Peds	0	99.7	0	0	99.7	0	99.8	0	0	99.8	0	0	0	0	0	100	0	100	66.7	75.0	99.5
H.V. & Bikes	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	4	4	8
% H.V. & Bikes	0	0.3	0	0	0.3	0	0.2	0	0	0.2	0	0	0	0	0	0	0	0	33.3	25.0	0.5
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Meadowbrook Road
Weather:

File Name : tmc_1009_10 mile & meadowbrook_mar-16-2022
Site Code : 1009
Start Date : 3/16/2022
Page No : 1

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Meadowbrook Road Northbound				Meadowbrook Road Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
*** BREAK ***																	
06:00 AM	1	33	3	0	3	24	4	0	3	9	2	0	3	1	2	0	88
06:15 AM	2	25	1	0	3	19	5	0	5	11	6	0	3	4	1	0	85
06:30 AM	7	56	1	0	5	34	7	0	2	14	6	0	3	2	9	0	146
06:45 AM	6	70	5	0	10	47	9	0	3	12	5	0	5	10	8	0	190
Total	16	184	10	0	21	124	25	0	13	46	19	0	14	17	20	0	509
07:00 AM	13	62	5	0	1	43	12	0	12	20	8	0	6	8	4	0	194
07:15 AM	16	85	9	0	6	40	10	0	11	38	10	0	8	22	6	0	261
07:30 AM	14	116	5	0	6	71	9	0	20	18	7	0	14	16	16	1	313
07:45 AM	17	95	11	0	11	93	10	0	34	38	12	0	11	19	33	0	384
Total	60	358	30	0	24	247	41	0	77	114	37	0	39	65	59	1	1152
08:00 AM	33	112	13	0	8	77	21	0	12	30	9	0	13	19	9	0	356
08:15 AM	19	138	11	0	8	55	17	0	10	33	7	0	16	23	7	0	344
08:30 AM	17	117	11	0	5	65	17	0	14	36	12	0	18	29	15	0	356
08:45 AM	43	131	13	0	9	76	14	0	12	48	20	0	17	23	24	0	430
Total	112	498	48	0	30	273	69	0	48	147	48	0	64	94	55	0	1486
09:00 AM	38	112	20	0	15	67	22	0	14	23	13	0	17	16	17	0	374
09:15 AM	31	80	12	0	5	69	18	0	12	28	5	0	7	18	16	0	301
09:30 AM	18	77	5	0	8	59	16	0	7	32	6	0	14	34	18	0	294
09:45 AM	26	76	7	0	7	59	12	0	18	34	7	0	22	25	22	0	315
Total	113	345	44	0	35	254	68	0	51	117	31	0	60	93	73	0	1284
10:00 AM	15	65	8	1	6	68	12	0	11	21	6	0	13	27	25	0	278
10:15 AM	10	61	14	0	7	68	15	0	10	21	10	0	13	27	11	0	267
10:30 AM	19	78	9	2	3	58	12	0	8	27	6	0	13	16	16	1	268
10:45 AM	17	64	12	0	12	69	14	0	19	23	5	0	14	28	16	1	294
Total	61	268	43	3	28	263	53	0	48	92	27	0	53	98	68	2	1107
11:00 AM	19	54	13	0	4	68	14	0	14	22	7	0	8	28	20	0	271
11:15 AM	18	81	9	0	6	73	13	0	19	24	9	0	22	19	17	0	310
11:30 AM	26	66	14	0	7	79	17	0	15	28	8	0	16	26	18	0	320
11:45 AM	19	94	19	0	6	105	19	0	25	29	7	0	24	31	29	0	407
Total	82	295	55	0	23	325	63	0	73	103	31	0	70	104	84	0	1308
12:00 PM	16	83	18	0	11	78	25	0	21	32	13	0	23	35	24	1	380
12:15 PM	18	83	13	0	17	82	19	0	17	26	12	0	22	38	21	0	368
12:30 PM	20	78	18	0	12	94	32	0	12	32	7	0	20	43	21	0	389
12:45 PM	26	89	21	0	12	104	19	0	20	39	11	0	29	43	22	0	435
Total	80	333	70	0	52	358	95	0	70	129	43	0	94	159	88	1	1572
01:00 PM	26	64	16	0	14	101	17	0	17	42	14	0	26	27	22	0	386
01:15 PM	21	83	16	0	10	86	20	0	15	26	6	0	18	40	19	0	360
01:30 PM	12	51	5	0	4	67	13	0	11	32	7	0	19	42	25	0	288
01:45 PM	13	80	15	0	7	90	18	0	15	25	15	0	16	36	18	1	349
Total	72	278	52	0	35	344	68	0	58	125	42	0	79	145	84	1	1383
02:00 PM	15	82	13	0	13	95	17	0	10	24	11	0	26	40	26	1	373
02:15 PM	19	76	17	0	6	79	24	0	18	30	13	0	24	41	20	0	367
02:30 PM	27	85	22	0	12	92	32	1	21	37	11	1	22	41	31	1	436
02:45 PM	23	92	20	0	19	100	22	0	17	35	11	0	23	52	25	0	439
Total	84	335	72	0	50	366	95	1	66	126	46	1	95	174	102	2	1615
03:00 PM	30	96	28	0	15	99	21	0	23	42	13	0	43	53	34	0	497
03:15 PM	26	90	27	0	10	116	14	0	23	49	8	0	40	33	23	1	460
03:30 PM	23	94	28	0	17	129	20	2	17	29	16	2	27	46	29	1	480

Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Meadowbrook Road
Weather:

File Name : tmc_1009_10 mile & meadowbrook_mar-16-2022
Site Code : 1009
Start Date : 3/16/2022
Page No : 2

Groups Printed- Cars & Peds - H.V. & Bikes - Bikes on Street

	10 Mile Road Eastbound				10 Mile Road Westbound				Meadowbrook Road Northbound				Meadowbrook Road Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:45 PM	21	92	33	0	16	110	21	0	26	39	12	0	24	60	27	1	482
Total	100	372	116	0	58	454	76	2	89	159	49	2	134	192	113	3	1919
04:00 PM	20	93	25	0	22	132	26	0	18	39	15	0	28	45	22	0	485
04:15 PM	17	80	20	2	15	120	25	0	21	48	8	0	29	68	25	3	481
04:30 PM	21	108	29	1	15	148	19	0	22	53	11	0	15	65	28	0	535
04:45 PM	26	95	40	2	21	170	23	0	14	41	11	1	26	55	26	0	551
Total	84	376	114	5	73	570	93	0	75	181	45	1	98	233	101	3	2052
05:00 PM	17	96	26	1	18	153	25	0	17	53	9	1	19	59	27	2	523
05:15 PM	32	91	26	0	15	169	39	1	23	46	15	0	30	75	20	3	585
05:30 PM	23	114	35	2	14	150	36	0	15	46	11	0	22	66	31	2	567
05:45 PM	20	98	28	3	16	144	25	0	20	44	15	0	18	65	24	1	521
Total	92	399	115	6	63	616	125	1	75	189	50	1	89	265	102	8	2196
06:00 PM	25	103	15	2	15	116	12	0	17	38	9	0	24	53	23	0	452
06:15 PM	15	101	19	0	7	108	16	0	12	30	13	0	17	38	20	0	396
06:30 PM	23	77	23	0	11	102	21	0	11	47	2	2	15	46	26	2	408
06:45 PM	22	69	18	0	12	113	23	1	17	32	9	0	27	47	29	1	420
Total	85	350	75	2	45	439	72	1	57	147	33	2	83	184	98	3	1676
*** BREAK ***																	
Grand Total	1041	4391	844	16	537	4633	943	5	800	1675	501	7	972	1823	1047	24	19259
Apprch %	16.5	69.8	13.4	0.3	8.8	75.7	15.4	0.1	26.8	56.2	16.8	0.2	25.1	47.2	27.1	0.6	
Total %	5.4	22.8	4.4	0.1	2.8	24.1	4.9	0	4.2	8.7	2.6	0	5	9.5	5.4	0.1	
Cars & Peds	1027	4336	836	15	526	4579	936	3	791	1665	491	5	950	1806	1021	23	19010
% Cars & Peds	98.7	98.7	99.1	93.8	98	98.8	99.3	60	98.9	99.4	98	71.4	97.7	99.1	97.5	95.8	98.7
H.V. & Bikes	14	55	8	1	11	54	7	2	9	10	10	2	22	17	26	1	249
% H.V. & Bikes	1.3	1.3	0.9	6.2	2	1.2	0.7	40	1.1	0.6	2	28.6	2.3	0.9	2.5	4.2	1.3
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

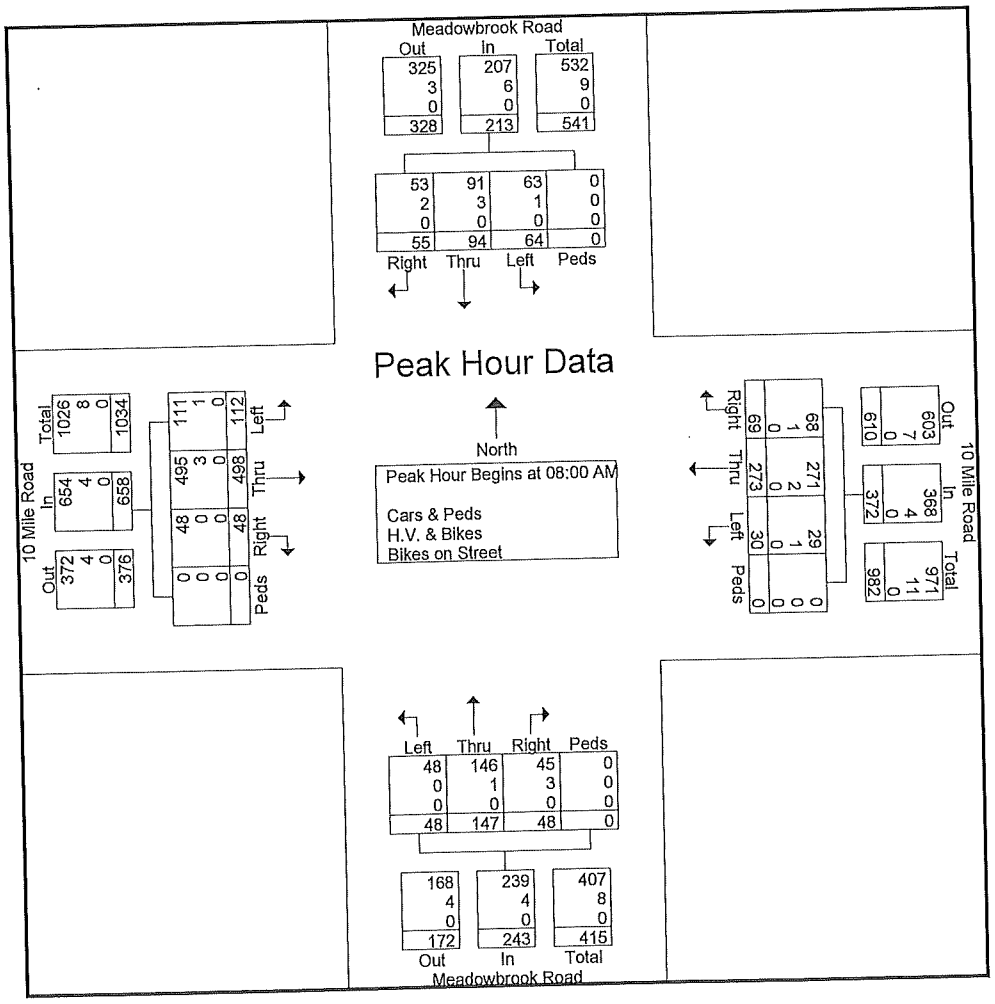
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
(734) 995-0200

Intersection
E/W: 10 Mile Road
N/S: Meadowbrook Road
Weather:

File Name : tmc_1009_10 mile & meadowbrook_mar-16-2022
Site Code : 1009
Start Date : 3/16/2022
Page No : 3

	10 Mile Road Eastbound					10 Mile Road Westbound					Meadowbrook Road Northbound					Meadowbrook Road Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	33	112	13	0	158	8	77	21	0	106	12	30	9	0	51	13	19	9	0	41	356
08:15 AM	19	138	11	0	168	8	55	17	0	80	10	33	7	0	50	16	23	7	0	46	344
08:30 AM	17	117	11	0	145	5	65	17	0	87	14	36	12	0	62	18	29	15	0	62	356
08:45 AM	43	131	13	0	187	9	76	14	0	99	12	48	20	0	80	17	23	24	0	64	430
Total Volume	112	498	48	0	658	30	273	69	0	372	48	147	48	0	243	64	94	55	0	213	1486
% App. Total	17	75.7	7.3	0		8.1	73.4	18.5	0		19.8	60.5	19.8	0		30	44.1	25.8	0		
PHF	.651	.902	.923	.000	.880	.833	.886	.821	.000	.877	.857	.766	.600	.000	.759	.889	.810	.573	.000	.832	.864
Cars & Peds	111	495	48	0	654	29	271	68	0	368	48	146	45	0	239	63	91	53	0	207	1468
% Cars & Peds	99.1	99.4	100	0	99.4	96.7	99.3	98.6	0	98.9	100	99.3	93.8	0	98.4	98.4	96.8	96.4	0	97.2	98.8
H.V. & Bikes	1	3	0	0	4	1	2	1	0	4	0	1	3	0	4	1	3	2	0	6	18
% H.V. & Bikes	0.9	0.6	0	0	0.6	3.3	0.7	1.4	0	1.1	0	0.7	6.3	0	1.6	1.6	3.2	3.6	0	2.8	1.2
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



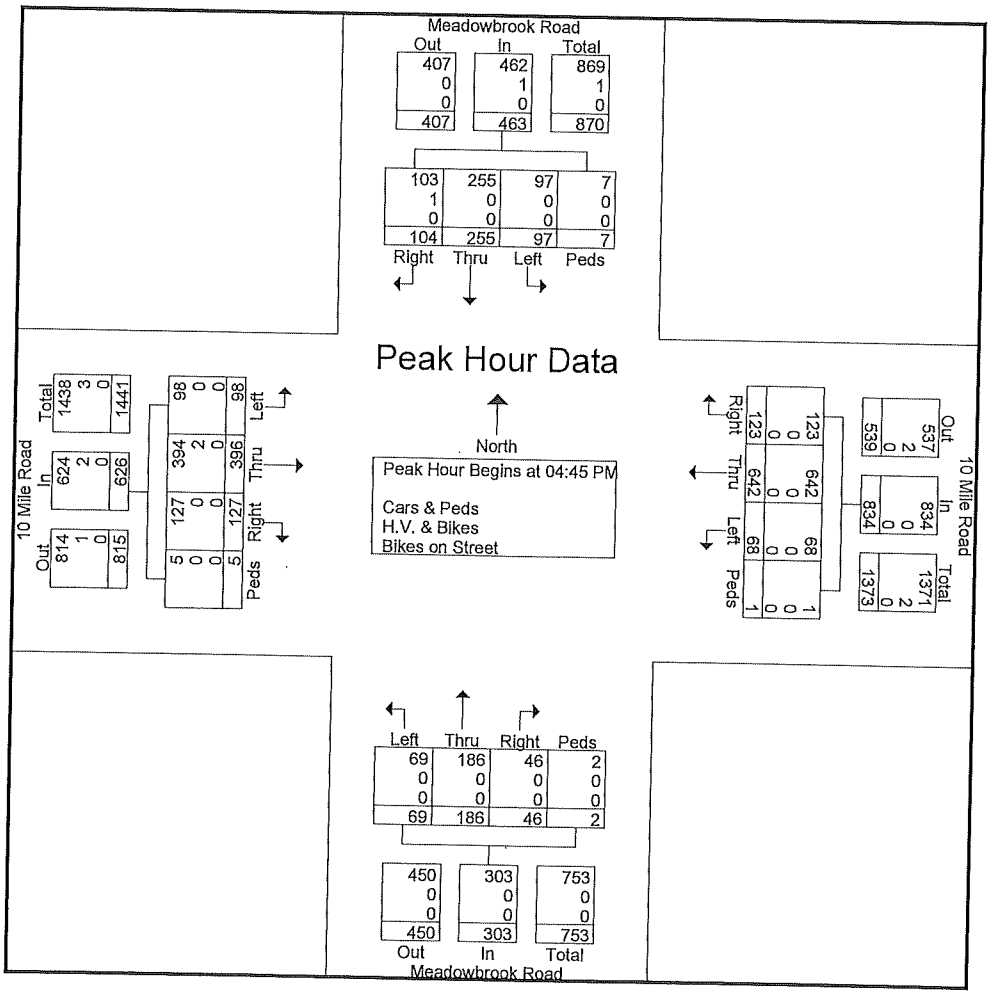
Midwestern Consulting

3815 Plaza Drive
Ann Arbor, MI, 48108
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Intersection
E/W: 10 Mile Road
N/S: Meadowbrook Road
Weather:

File Name : tmc_1009_10 mile & meadowbrook_mar-16-2022
Site Code : 1009
Start Date : 3/16/2022
Page No : 4

	10 Mile Road Eastbound					10 Mile Road Westbound					Meadowbrook Road Northbound					Meadowbrook Road Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	26	95	40	2	163	21	170	23	0	214	14	41	11	1	67	26	55	26	0	107	551
05:00 PM	17	96	26	1	140	18	153	25	0	196	17	53	9	1	80	19	59	27	2	107	523
05:15 PM	32	91	26	0	149	15	169	39	1	224	23	46	15	0	84	30	75	20	3	128	585
05:30 PM	23	114	35	2	174	14	150	36	0	200	15	46	11	0	72	22	66	31	2	121	567
Total Volume	98	396	127	5	626	68	642	123	1	834	69	186	46	2	303	97	255	104	7	463	2226
% App. Total	15.7	63.3	20.3	0.8		8.2	77	14.7	0.1		22.8	61.4	15.2	0.7		21	55.1	22.5	1.5		
PHF	.766	.868	.794	.625	.899	.810	.944	.788	.250	.931	.750	.877	.767	.500	.902	.808	.850	.839	.583	.904	.951
Cars & Peds	98	394	127	5	624	68	642	123	1	834	69	186	46	2	303	97	255	103	7	462	2223
% Cars & Peds	100	99.5	100	100	99.7	100	100	100	100	100	100	100	100	100	100	100	100	99.0	100	99.8	99.9
H.V. & Bikes	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
% H.V. & Bikes	0	0.5	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	1.0	0	0.2	0.1
Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes on Street	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Land Use: 710
General Office Building

Description

A general office building is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building houses multiple tenants that can include, as examples, professional services, insurance companies, investment brokers, a banking institution, a restaurant, or other service retailers. A general office building with a gross floor area of 10,000 square feet or less is classified as a small office building (Land Use 712). Corporate headquarters building (Land Use 714), single tenant office building (Land Use 715), medical-dental office building (Land Use 720), office park (Land Use 750), research and development center (Land Use 760), and business park (Land Use 770) are additional related uses.

Additional Data

If two or more general office buildings are in close physical proximity (within a close walk) and function as a unit (perhaps with a shared parking facility and common or complementary tenants), the total gross floor area or employment of the paired office buildings can be used for calculating the site trip generation. If the individual buildings are isolated or not functionally related to one another, trip generation should be calculated for each building separately.

For study sites with reported gross floor area and employees, an average employee density of 3.3 employees per 1,000 square feet GFA (or roughly 300 square feet per employee) has been consistent through the 1980s, 1990s, and 2000s. No sites counted in the 2010s reported both GFA and employees.

The average building occupancy varies considerably within the studies for which occupancy data were provided. The reported occupied gross floor area was 88 percent for general urban/suburban sites and 96 percent for the center city core and dense multi-use urban sites.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The average numbers of person trips per vehicle trip at the eight center city core sites at which both person trip and vehicle trip data were collected are as follows:

- 2.8 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 2.9 during Weekday, AM Peak Hour of Generator
- 2.9 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 3.0 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 18 dense multi-use urban sites at which both person trip and vehicle trip data were collected are as follows:

- 1.5 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.5 during Weekday, AM Peak Hour of Generator
- 1.5 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 1.5 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 23 general urban/suburban sites at which both person trip and vehicle trip data were collected are as follows:

- 1.3 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.3 during Weekday, AM Peak Hour of Generator
- 1.3 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 1.4 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), California, Colorado, Connecticut, Georgia, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, Montana, New Hampshire, New Jersey, New York, Ontario (CAN)Pennsylvania, Texas, Utah, Virginia, and Washington.

Source Numbers

161, 175, 183, 184, 185, 207, 212, 217, 247, 253, 257, 260, 262, 273, 279, 297, 298, 300, 301, 302, 303, 304, 321, 322, 323, 324, 327, 404, 407, 408, 419, 423, 562, 734, 850, 859, 862, 867, 869, 883, 884, 890, 891, 904, 940, 944, 946, 964, 965, 972, 1009, 1030, 1058, 1061

General Office Building
(710)

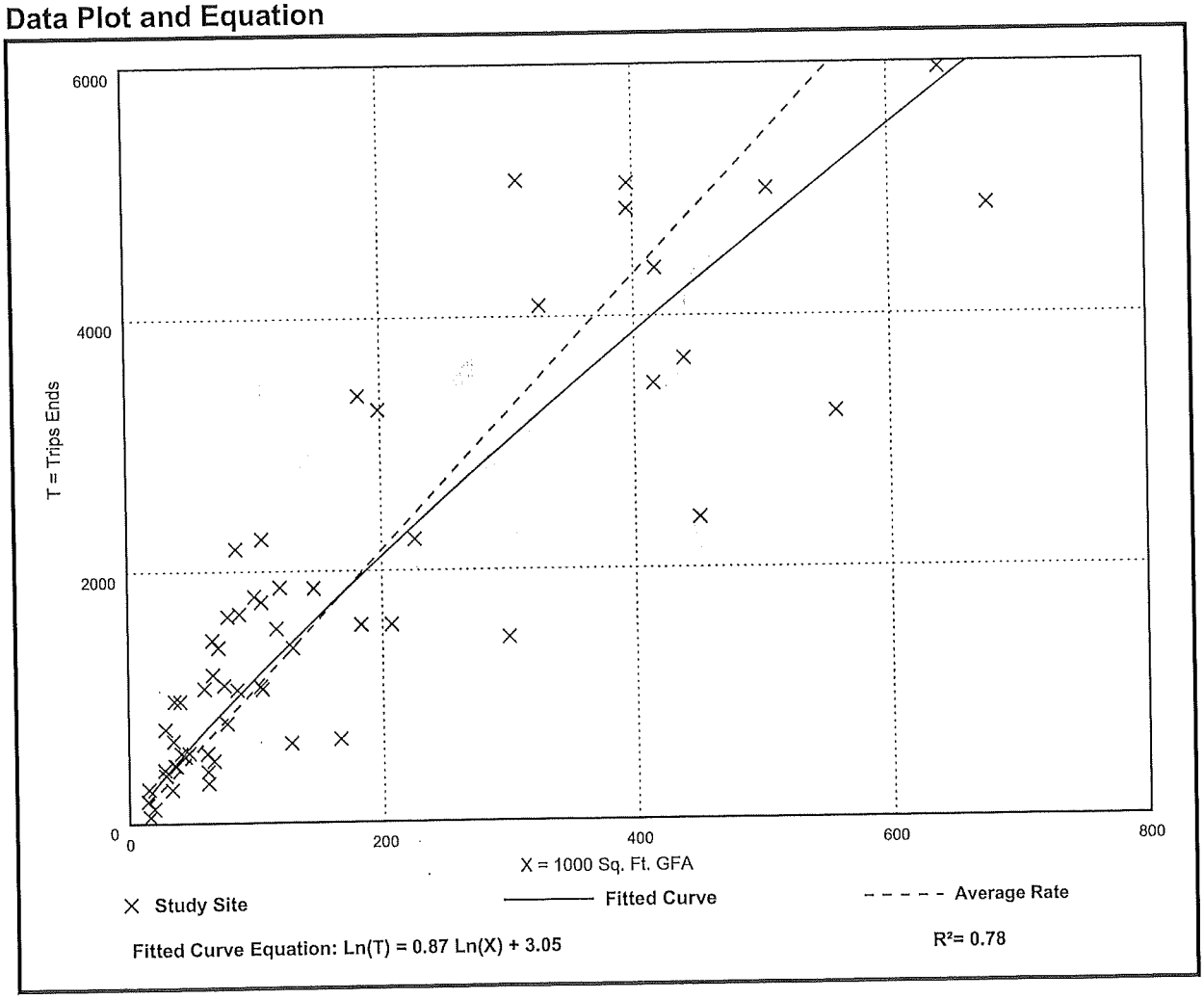
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 59
Avg. 1000 Sq. Ft. GFA: 163
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.84	3.27 - 27.56	4.76

Data Plot and Equation



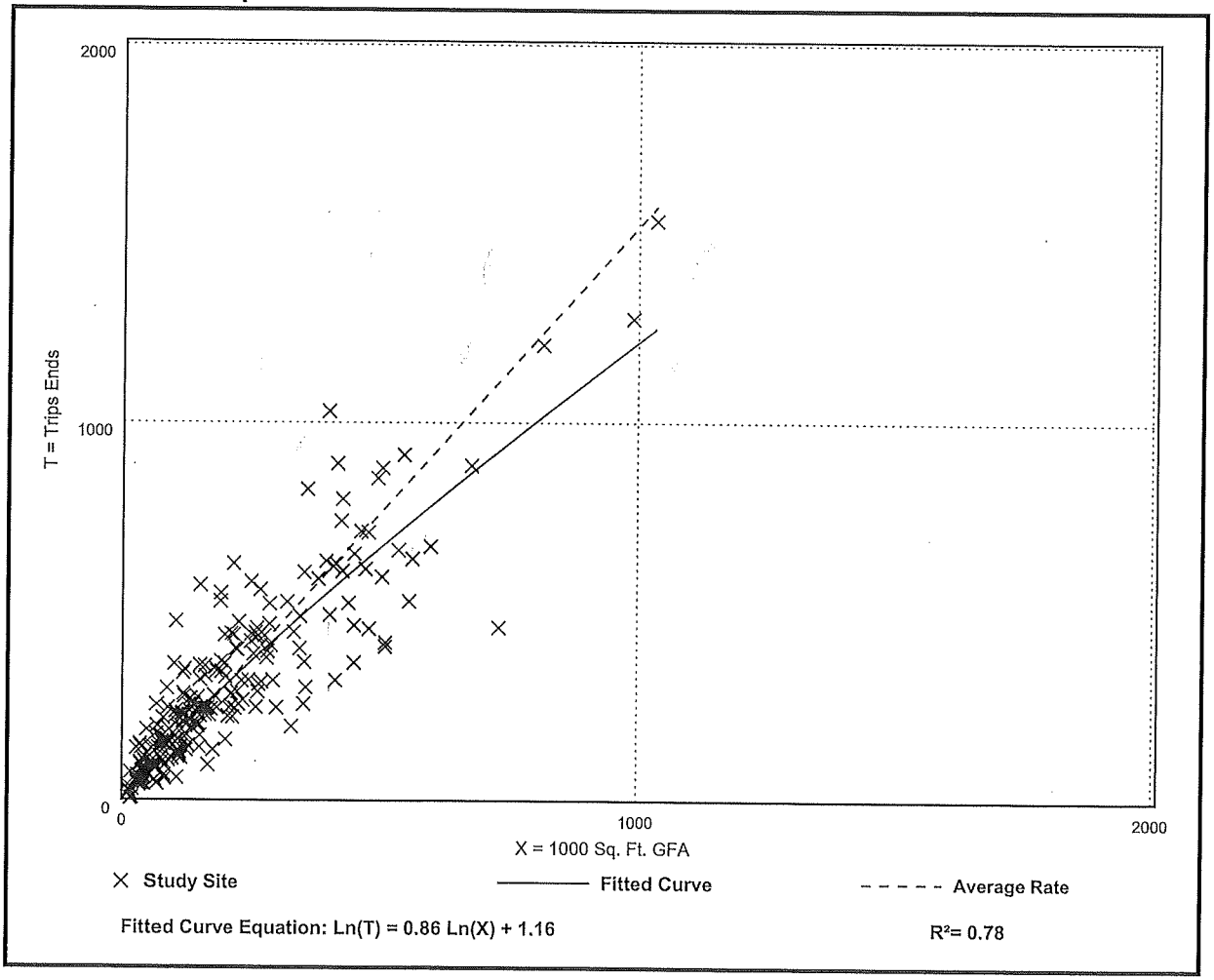
General Office Building
(710)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 221
Avg. 1000 Sq. Ft. GFA: 201
Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.52	0.32 - 4.93	0.58

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.86 Ln(X) + 1.16

R^2= 0.78

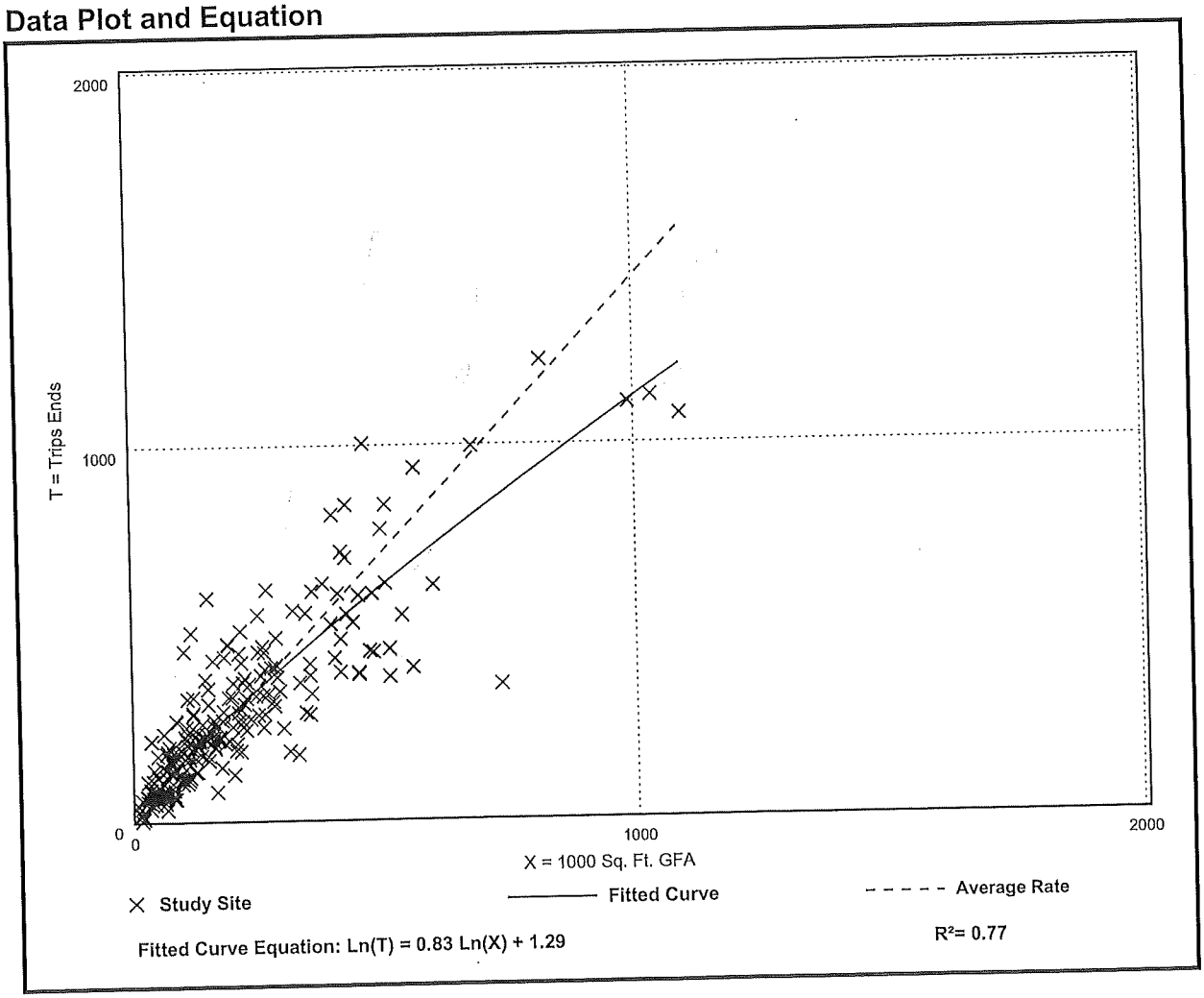
General Office Building
(710)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 232
Avg. 1000 Sq. Ft. GFA: 199
Directional Distribution: 17% entering, 83% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.44	0.26 - 6.20	0.60

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.83 Ln(X) + 1.29

R^2= 0.77

Land Use: 110
General Light Industrial

Description

A light industrial facility is a free-standing facility devoted to a single use. The facility has an emphasis on activities other than manufacturing and typically has minimal office space. Typical light industrial activities include printing, material testing, and assembly of data processing equipment. Industrial park (Land Use 130) and manufacturing (Land Use 140) are related uses.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 2000s, and the 2010s in Colorado, Connecticut, Indiana, New Jersey, New York, Oregon, Pennsylvania, and Texas.

Source Numbers

106, 157, 174, 177, 179, 184, 191, 251, 253, 286, 300, 611, 874, 875, 912

General Light Industrial
(110)

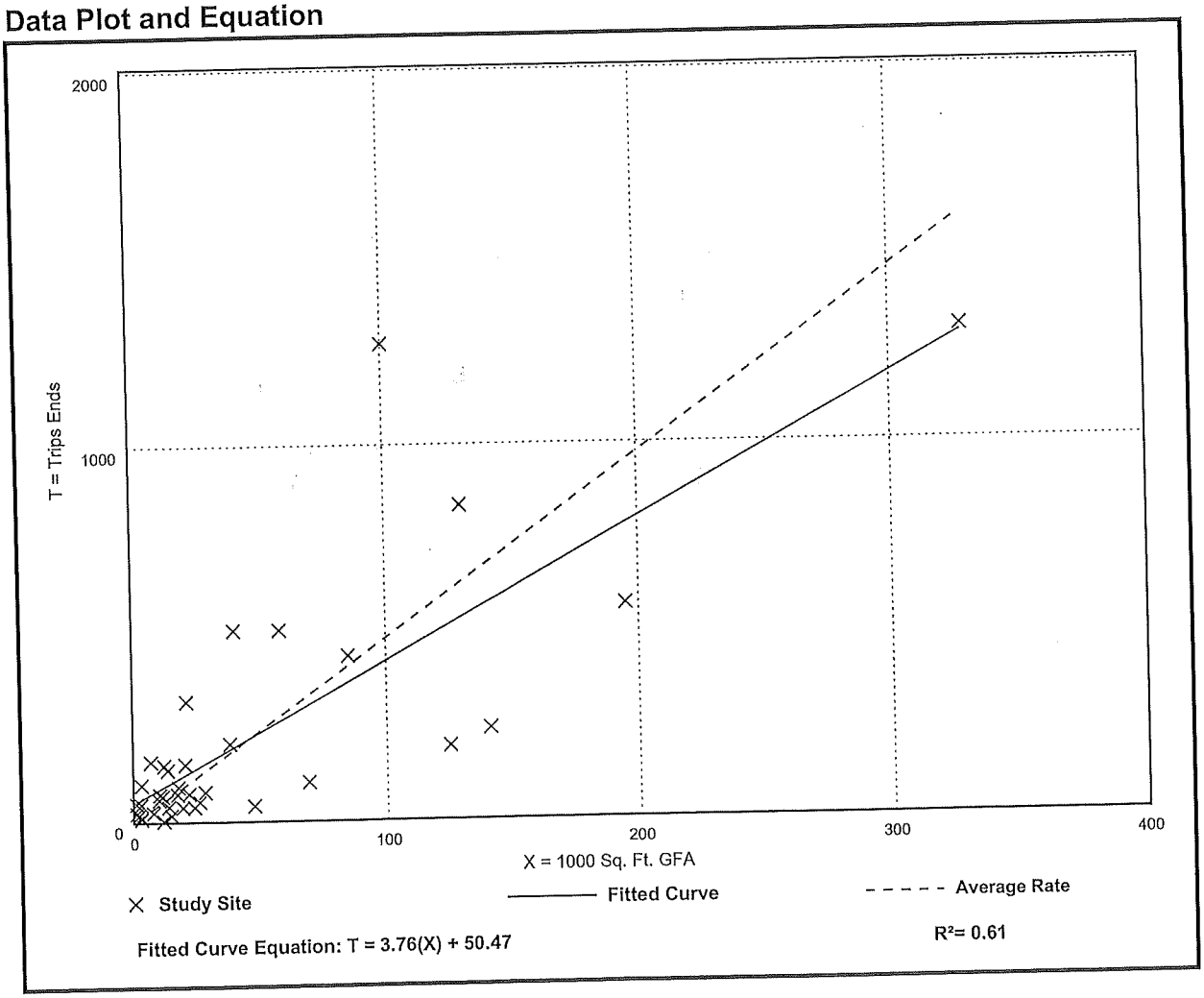
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 37
Avg. 1000 Sq. Ft. GFA: 45
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.87	0.34 - 43.86	4.08

Data Plot and Equation



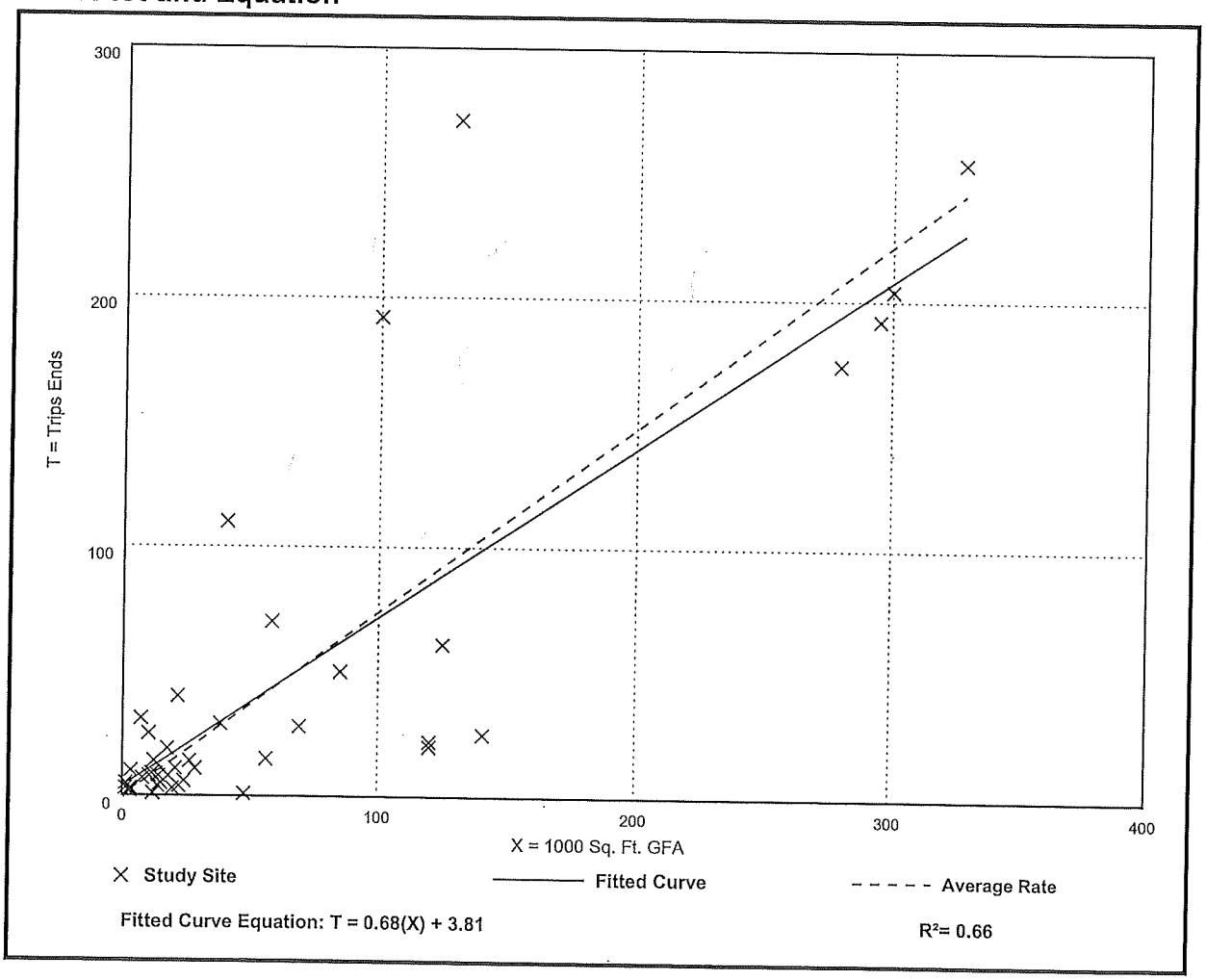
General Light Industrial
(110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 41
Avg. 1000 Sq. Ft. GFA: 65
Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.02 - 4.46	0.61

Data Plot and Equation



Fitted Curve Equation: T = 0.68(X) + 3.81

R^2= 0.66

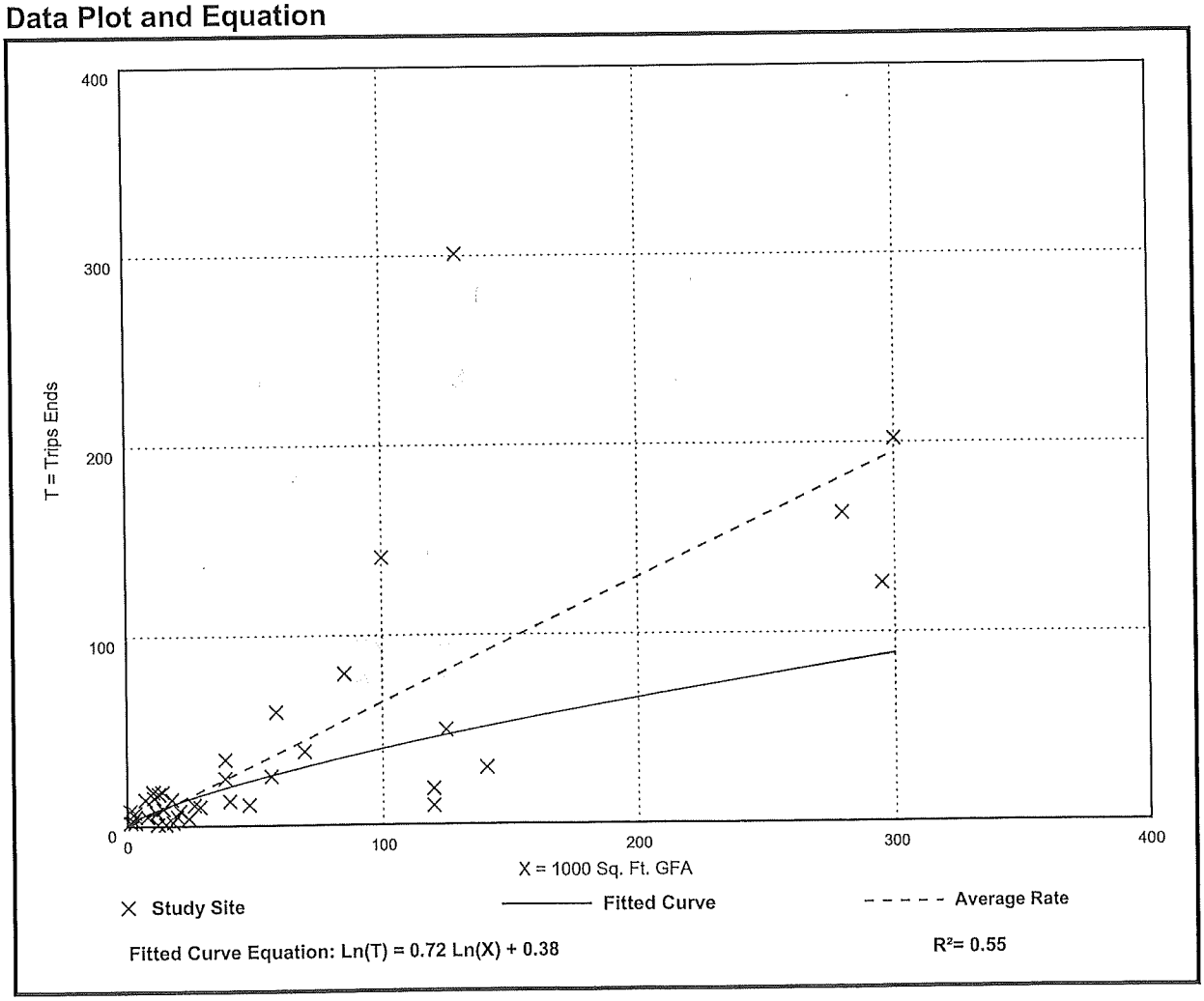
General Light Industrial
(110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 40
Avg. 1000 Sq. Ft. GFA: 58
Directional Distribution: 14% entering, 86% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.65	0.07 - 7.02	0.56

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.72 Ln(X) + 0.38

R^2= 0.55

Land Use: 821
Shopping Plaza (40-150k)

Description

A shopping plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has between 40,000 and 150,000 square feet of gross leasable area (GLA). The term "plaza" in the land use name rather than "center" is simply a means of distinction between the different shopping center size ranges. Various other names are commonly used to categorize a shopping plaza within this size range, depending on its specific size and tenants, such as neighborhood center, community center, and fashion center.

Its major tenant is often a supermarket but many sites are anchored by home improvement, discount, or other stores. A shopping plaza typically contains more than retail merchandising facilities. Office space, a movie theater, restaurants, a post office, banks, a health club, and recreational facilities are common tenants. A shopping plaza is almost always open-air and the GLA is the same as the gross floor area of the building.

The 150,000 square feet GLA threshold value between shopping plaza and shopping center (Land Use 820) is based on an examination of trip generation data. For a shopping plaza that is smaller than the threshold value, the presence or absence of a supermarket within the plaza has a measurable effect on site trip generation. For a shopping center that is larger than the threshold value, the trips generated by its other major tenants mask any effects of the presence or absence of an on-site supermarket.

The 40,000 square feet GFA threshold between shopping plaza and strip retail plaza (Land Use 822) was selected based on an examination of the overall shopping center/plaza database. No shopping plaza with a supermarket as its anchor is smaller than 40,000 square feet GLA.

Shopping center (>150k) (Land Use 820), strip retail plaza (<40k) (Land Use 822), and factory outlet center (Land Use 823) are related uses.

Land Use Subcategory

The presence or absence of a supermarket in a shopping plaza has been determined to have a measurable effect on site trip generation. Therefore, data are presented for two subcategories for this land use: sites with a supermarket anchor and sites without a supermarket.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Connecticut, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Texas, Vermont, Virginia, Washington, and Wisconsin.

Source Numbers

105, 110, 156, 159, 186, 198, 204, 211, 213, 239, 259, 260, 295, 301, 304, 305, 307, 317, 319, 358, 376, 390, 400, 404, 437, 444, 446, 507, 580, 598, 658, 728, 908, 926, 944, 946, 960, 973, 974, 1004, 1009, 1025, 1069

Shopping Plaza (40-150k) - Supermarket - Yes (821)

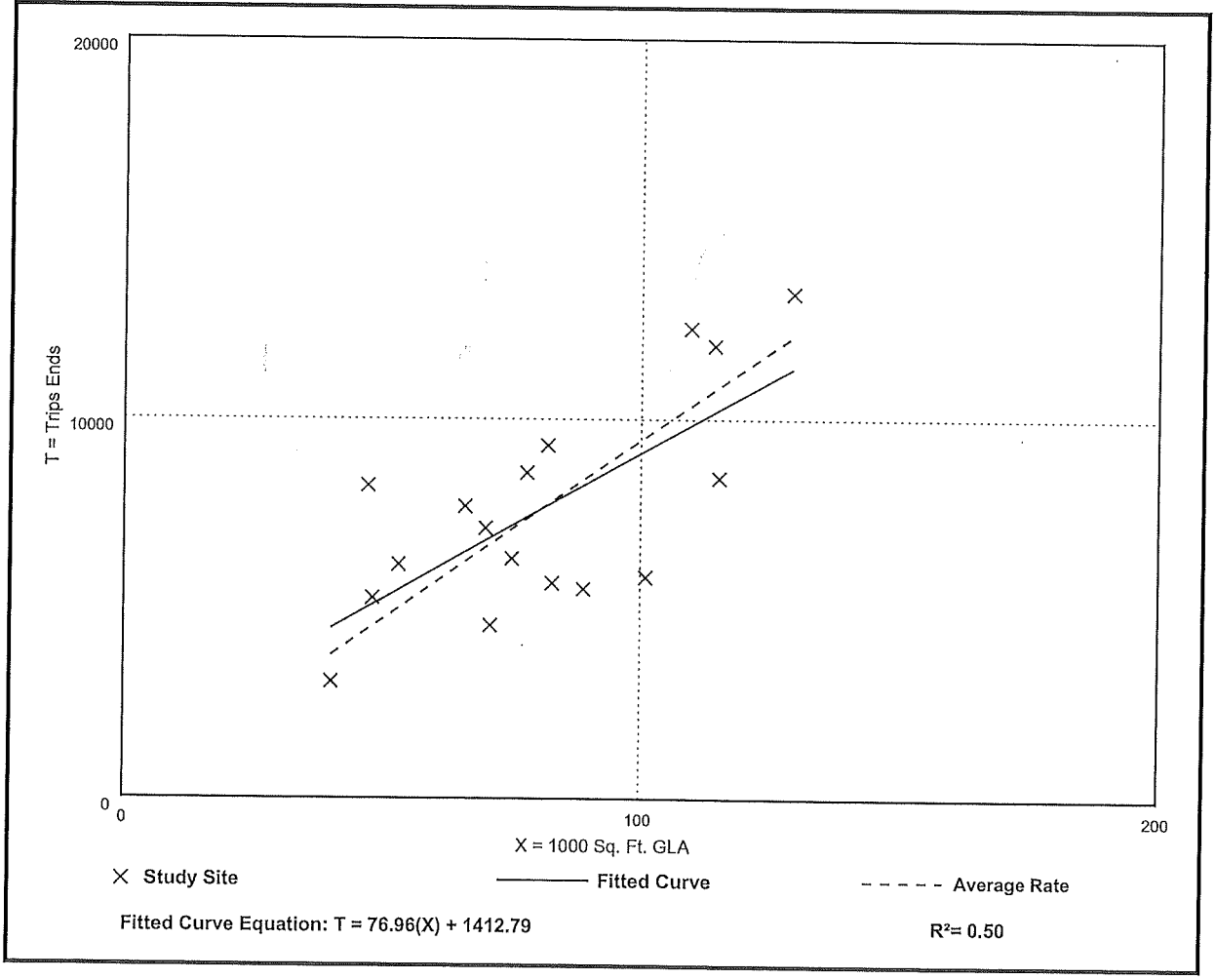
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 17
Avg. 1000 Sq. Ft. GLA: 81
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
94.49	57.86 - 175.32	26.55

Data Plot and Equation



Fitted Curve Equation: T = 76.96(X) + 1412.79

R^2= 0.50

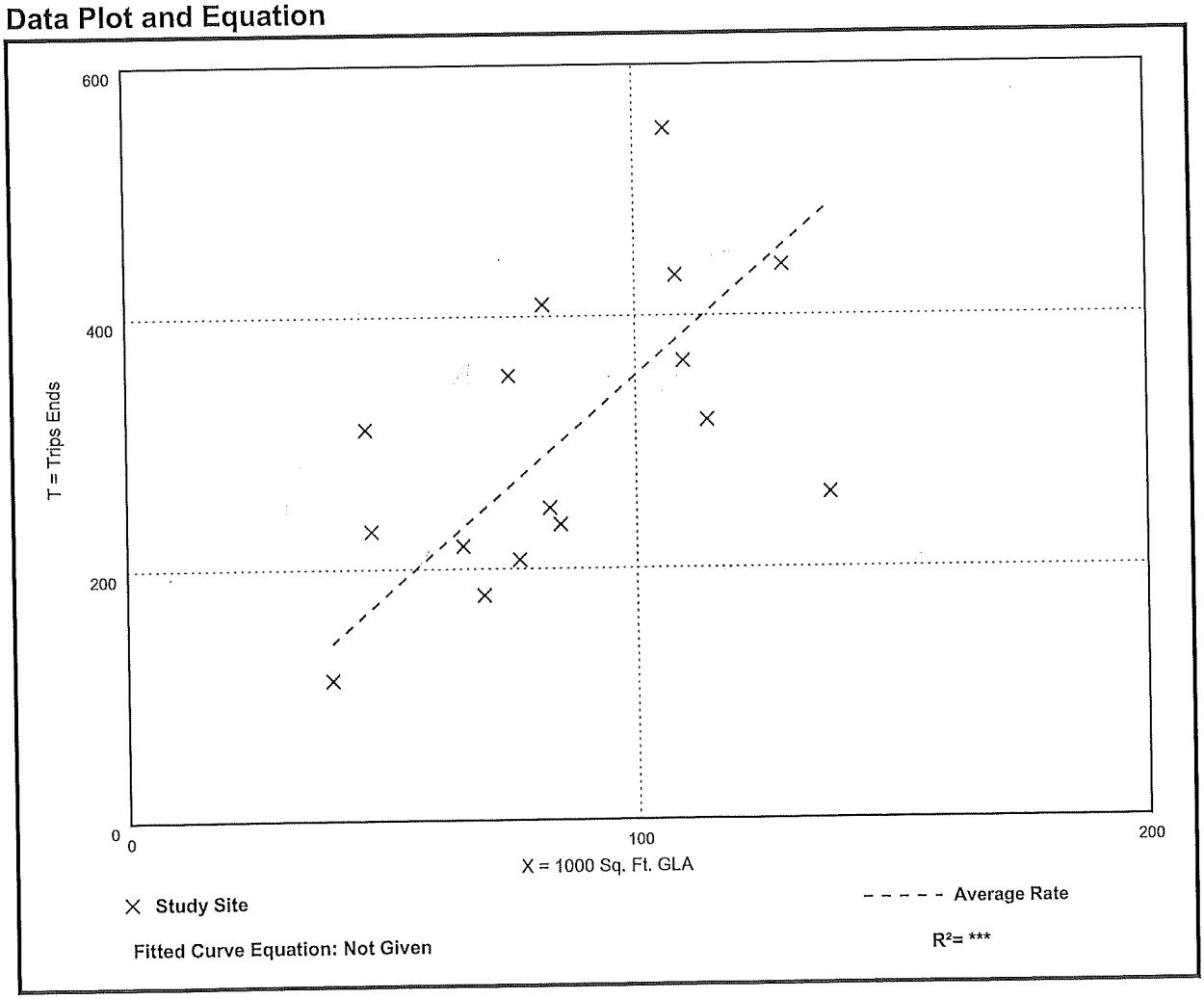
Shopping Plaza (40-150k) - Supermarket - Yes (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 16
Avg. 1000 Sq. Ft. GLA: 86
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.53	1.88 - 6.62	1.17

Data Plot and Equation



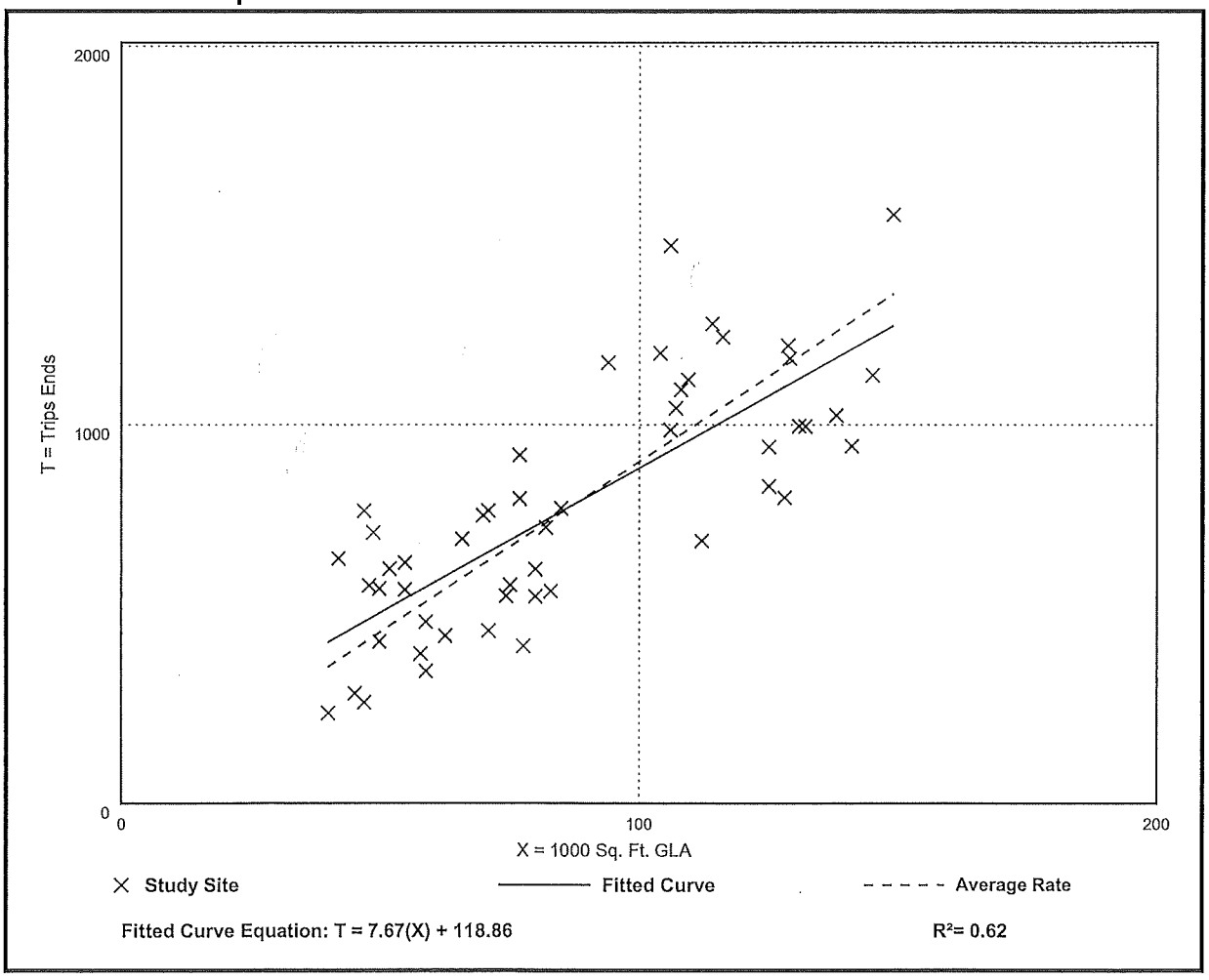
Shopping Plaza (40-150k) - Supermarket - Yes (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 51
Avg. 1000 Sq. Ft. GLA: 87
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
9.03	5.35 - 16.45	2.37

Data Plot and Equation



Fitted Curve Equation: T = 7.67(X) + 118.86

R^2= 0.62

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	821
Land Use	Shopping Plaza (40 - 150k)
Setting	General Urban/Suburban
Time Period	Weekday PM Peak Period
# Data Sites	15
Average Pass-By Rate	40%

Pass-By Characteristics for Individual Sites

GLA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source
					Primary (%)	Diverted (%)	Total (%)		
45	Florida	1992	844	56	24	20	44	—	30
50	Florida	1992	555	41	41	18	59	—	30
52	Florida	1995	665	42	33	25	58	—	30
53	Florida	1993	162	59	—	—	41	—	30
57.23	Kentucky	1993	247	31	53	16	69	2659	34
60	Florida	1995	1583	40	38	22	60	—	30
69.4	Kentucky	1993	109	25	42	33	75	1559	34
77	Florida	1992	365	46	—	—	54	—	30
78	Florida	1991	702	55	23	22	45	—	30
82	Florida	1992	336	34	—	—	66	—	30
92.857	Kentucky	1993	133	22	50	28	78	3555	34
100.888	Kentucky	1993	281	28	50	22	72	2111	34
121.54	Kentucky	1993	210	53	30	17	47	2636	34
144	New Jersey	1990	176	32	44	24	68	—	24
146.8	Kentucky	1993	—	36	39	25	64	—	34

OAKLAND COUNTY ROAD COMMISSION
TRAFFIC - SAFETY DEPARTMENT
SIGNAL WORK ORDER

LOCATION: Novi & 10 Mile DATE 6/22/21

CITY/TOWNSHIP: Novi BY: Dawn Bierlein

COUNTY#: 26 STATE#: _____ CHARGES: WO 00026 G

PLEASE PERFORM THE FOLLOWING:

_____ ELECTRICAL DEVICE: ____ INSTALL _____ MODERNIZE _____ MAINTENANCE

_____ UNDERGROUND: _____

_____ EDISON OK: _____ YES _____ NO JOB#: _____

_____ COORDINATE W/DISTRICT 7: _____

	DIAL..	1	1	1	1		2	2	2	2		3	3	3	3		4	4	4	4
	SPLIT.	1	2	3	4		1	2	3	4		1	2	3	4		1	2	3	4
_____	CHANGE TIMING.....																			
_____	CHANGE OFFSET.....																			
_____	CHANGE CYCLE LENGTH.....																			
_____	ADD DIAL/SPLIT.....																			

_____ CHANGE BREAKOUT OR EPROM: _____

_____ CHANGE HOURS OF OPERATION:

OLD: _____

NEW: _____

_____ REPROGRAM TBC

_____ INSTALL INTERCONNECT: _____ TBC _____ MINITROL _____ TONE

_____ MBT OK: _____ YES _____ NO

_____ NO CHANGE - RECORD CORRECTION

_X_ OTHER: Build TS2 P cabinet for contractor with Mod 60 SCATS controller, Gridsmart camera, Opticom, and PCTEL antenna. (Use existing Digi – Inspector to install)

(Rev1)

APPROVED BY: _____ DATE: 10/24/21

DATE INSTALLED: _____

INSTALLED BY: _____

INTERSECTION :- 26 NOVI & 10 MILE
DESCRIPTION PROMS :- X00020R / F4808
CONTROLLER TYPE :- STANDARD PERSONALITY CONTROLLER
SOFTWARE TYPE :- MOD 60 SCATS S30 (TS2)
INPUTS :-

1. SB NOVI LT (NL) NOTE: ALL DETECTION IS GRIDSMART
2. SB NOVI LT ADV (NL)
3. SB NOVI L (LK)
4. SB NOVI R (LK)
5. EB 10 MILE LT (NL)
6. EB 10 MILE LT ADV (NL)
7. EB 10 MILE L (LK)
8. EB 10 MILE R (LK)
9. NB NOVI LT (NL)
10. NB NOVI LT ADV (NL)
11. NB NOVI L (LK)
12. NB NOVI R (LK)
13. WB 10 MILE LT (NL)
14. WB 10 MILE LT ADV (NL)
15. WB 10 MILE L (LK)
16. WB 10 MILE R (LK)

Opticom 1: TB2 PREEMPT INPUT 3 (NB & SB NOVI)
Opticom 2: TB2 PREEMPT INPUT 4 (EB & WB 10 MILE)

PED 2: NB NOVI PED (EAST LEG) P.B. (WA)
PED 4: WB 10 MILE PED (NORTH LEG) P.B. (WB)
PED 6: SB NOVI PED (WEST LEG) P.B. (WC)
PED 8: EB 10 MILE PED (SOUTH LEG) P.B. (WD)

APPROACHES :-

A APPR 1 : SB NOVI	A APPR 2 : NB NOVI
B APPR 1 : EB 10 MILE LT	B APPR 2 : WB 10 MILE LT
C APPR 1 : EB 10 MILE	C APPR 2 : WB 10 MILE
D APPR 1 : SB NOVI LT	D APPR 2 : NB NOVI LT

FLEXIDATA:-

SEQUENCE	A,B,C,D	A,B,C,D
AUTO REL		
R- REL	A	A
R+ REL	B	B
Q- REL	C	C
Q+ REL	D	D
LOOKAHEAD		

PEDESTRIANS:-
2. NB NOVI PED (EAST LEG) P.B.
4. WB 10 MILE PED (NORTH LEG) P.B.
6. SB NOVI PED (WEST LEG) P.B.
8. EB 10 MILE PED (SOUTH LEG) P.B.

SPECIAL FEATURES :-
Controller Software must be 2070/M52 S30 or later (VC=5).
The personality revision number is currently 1 (=A).

Ped outputs mapped to phases as follows: ped 2 = 9, ped 4 = 10, ped 6 = 11 and ped 8 = 12. VC5 software reports them as mapped.

Left turns are permissive to NCHRP flashing yellow recommendation. Signal groups 13,14,15,16 provide flashing yellow (green aspect), yellow and red, i.e. upper aspects of 4 section turn display. Signal groups 1,3,5,7 provide the green (bottom) aspect, i.e. turn arrow.

A STAGE HAS A PERMANENT DEMAND. DEMAND FOR STAGES B, C, D IN FLEXI AND

ISOLATED. SET XSF8 (XL Value = 80) TO DISABLE.

Night Flash code: Set Y+ to activate the night flash in Flexilink
Signal Group 1 and 5 non-locked detectors will not call stage D directly.
If XSF7 is set signal Group 1 and 5 detectors will call stage C and then
stage D.

IN MASTERLINK AND FLEXILINK:
Z- ON CAUSES D1 TURN TO APPEAR AND HOLD IN D STAGE
Z+ ON CAUSES D2 TURN TO APPEAR AND HOLD IN D STAGE
Z- & Z+ ON CAUSES BOTH TURNS TO APPEAR AND HOLD IN D

The XSF bits below will call & extend or only call the LT phase.
XSF09 (XH Value = 01) sets MAX recall for SG1 left turn.
XSF10 (XH Value = 02) sets min recall for SG1 left turn.
XSF11 (XH Value = 04) sets MAX recall for SG3 left turn.
XSF12 (XH Value = 08) sets min recall for SG3 left turn.
XSF13 (XH Value = 10) sets MAX recall for SG5 left turn.
XSF14 (XH Value = 20) sets min recall for SG5 left turn.
XSF15 (XH Value = 40) sets MAX recall for SG7 left turn.
XSF16 (XH Value = 80) sets min recall for SG7 left turn.

B1-C O/L OR B2-C O/L MAY APPEAR IN B1 OR B2 RESPECTIVELY
HOWEVER IF THE OVERLAP TERMINATES IN B THEN THE C AMBER
AND C RED TIMES ARE USED FOR B STAGE

Set BT = nS in SCATS data to enable Z5 flag in B stage to C.
This allows termination of o/lap phase minimum timer if the
appropriate phase o/lap is to occur and C is next, otherwise
phase minimum is guaranteed by phase minimum timer.

Flash rate for FYA is set with Timesettings 28 and 29.
TSM28=0.6 (on rate), TSM29=0.4 (off rate)

BACKPANEL :- SIZE P44-16 TS2 CABINET

LOAD SWITCH 1:	SB NOVI LT (G: green arrow)	CL	-
LOAD SWITCH 2:	NB NOVI	A	FLR
LOAD SWITCH 3:	EB 10 MILE LT (G: green arrow)	DL	-
LOAD SWITCH 4:	WB 10 MILE	B	FLR
LOAD SWITCH 5:	NB NOVI LT (G: green arrow)	AL	-
LOAD SWITCH 6:	SB NOVI	C	FLR
LOAD SWITCH 7:	WB 10 MILE LT (G: green arrow)	BL	-
LOAD SWITCH 8:	EB 10 MILE	D	FLR
LOAD SWITCH 9:	NB NOVI PED (EAST LEG)	WA	
LOAD SWITCH 10:	WB 10 MILE PED (NORTH LEG)	WB	
LOAD SWITCH 11:	SB NOVI PED (WEST LEG)	WC	
LOAD SWITCH 12:	EB 10 MILE PED (SOUTH LEG)	WD	
LOAD SWITCH 13(OLA):	SB NOVI LT	CL	FLR
	G: flashing yellow arrow, Y: yellow arrow, R: red arrow		
LOAD SWITCH 14(OLB):	EB 10 MILE LT	DL	FLR
	G: flashing yellow arrow, Y: yellow arrow, R: red arrow		
LOAD SWITCH 15(OLC):	NB NOVI LT	AL	FLR
	G: flashing yellow arrow, Y: yellow arrow, R: red arrow		
LOAD SWITCH 16(OLD):	WB 10 MILE LT	BL	FLR
	G: flashing yellow arrow, Y: yellow arrow, R: red arrow		

MMU 2 :- (MENU : SET/VIEW CONFIG)

Field Check Enable	Channel 1: G Channel 2: G, Y, R Channel 3: G Channel 4: G, Y, R Channel 5: G Channel 6: G, Y, R Channel 7: G Channel 8: G, Y, R Channel 13: G, Y, R Channel 14: G, Y, R Channel 15: G, Y, R Channel 16: G, Y, R
Dual Indication Enable:	R+G: Channel 2,4,6,8,9,10,11,12,13,14,15,16 R+Y: Channel 2,4,6,8,13,14,15,16 G+Y: Channel 2,4,6,8,13,14,15,16
Red Fail Enable:	Enable: Channel 2,4,6,8,13,14,15,16
Y & R Clearance Disable:	Channel 2,4,6,8,13,14,15,16 Enabled
Flashing Yellow Arrow:	Select mode B Enable: Channel Pair 1-13,3-14,5-15,7-16
Unit Options:	All OFF except: Recurrent pulse LED Guard Program Memory Card
Program Card:	Compatible Channels: 1-5, 1-6, 1-11, 1-13, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-12, 3-14, 3-16, 4-7, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-13, 5-15, 6-9, 6-11, 6-13, 6-15, 7-10, 7-14, 7-16, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 13-15, 14-16. Min Flash Time: 4+2+1 Min Yellow Change Disable: 9,10,11,12 Voltage Monitor Latch: NONE

Note :- Add Jumper 16 MMU Flash - 116 Monitor ST Out

```
*********************************
* CONTROLLER INFORMATION SHEET *
*      FOR SITE NO.  26        *
*     DAWN BIERLEIN            *
*          22-JUNE-2021        *
*********************************
```

CHECKSUMS
TIMES: AA/252
PERS: AC/254
TOTAL: 06/006

FLEXILINK PLAN DATA

Intersection # 26 **State #** _____ **Date:** 06/22/21 **Prepared By:** Dawn Bierlein

Intersection: Novi & 10 Mile **City:** Novi

Hours of Operation: 7 Days: 24 Hours **Approved By:** Rachel Jones

Hours of Flashing: None

		PL0	PL1	PL2	PL3	PL4	PL5	PL6	PL7	PL8
0	CL		100	120	120	80				
1	A		0	0	0	0				
2	B		40	48	39	29				
3	C		52	66	55	41				
4	D		88	106	104	68				
5	E									
6	F									
7	G									
8	R-									
9	R+									
10	Of (Y-)		0	0	0	0				
11	Y+	C								
12	Z-									
13	Z+									
14	Q-									
15	Q+									
16	XH									
17	XL									

NOTE: Stages with 1 second of phase time are skipped. Blank entries are default values equal to 0.
Except for an AWA controller, entries #8 to #15 (=254) and 'C' entry means continuous (=255).

							Timers		
Phase	Direction	Min	Max	ECO	Amber	All Red	Gap	Hdwy	Waste
A	Novi	10.0	50.0		4.3	2.0	3.0	1.2	6.0
B	10 Mile LT	4.0	15.0		4.3	2.0	3.0	1.2	6.0
C	10 Mile	10.0	50.0		4.3	2.0	3.0	1.2	6.0
D	Novi LT	4.0	15.0		4.3	2.0	3.0	1.2	6.0
E									
F									
G									

	Day	Hours	Plan#
SC1	14	0:00	4
SC2	8	6:00	2
SC3	8	9:00	1
SC4	8	15:00	3
SC5	8	19:00	4
SC6	13	18:00	4
SC7			
SC8			
SC9			
SC10			

Pedestrian Crossing Times

	Direction	Walk	CL 1	CL 2
2	NB Novi Ped (East Leg)	7.0	14.0	3.3
4	WB 10 Mile Ped (Nort Leg)	7.0	15.0	3.3
6	SB Novi Ped (West Leg)	7.0	14.0	3.3
8	EB 10 Mile Ped (South Leg)	7.0	15.0	3.3

TSM15 (Opticom Min Time) = 10
TSM16 (Opticom Alarm Time) = 200
Flash Rate Timesettings TSM28=0.6 (on rate); TSM29=0.4 (off rate)

DAY OF WEEK CODE NUMBER

0	End of Schedule	4	WED	8	MON-FRI	12	MON,FRI,SAT
1	SUN	5	THUR	9	MON-SAT	13	SAT,SUN
2	MON	6	FRI	10	TUE,WED,THU	14	EVERY DAY
3	TUE	7	SAT	11	MON,FRI	15	NEVER

Normal Operating Mode

Isolated	
Flexilink	
Masterlink	X
Master Isolated	
Flexi Isolated	

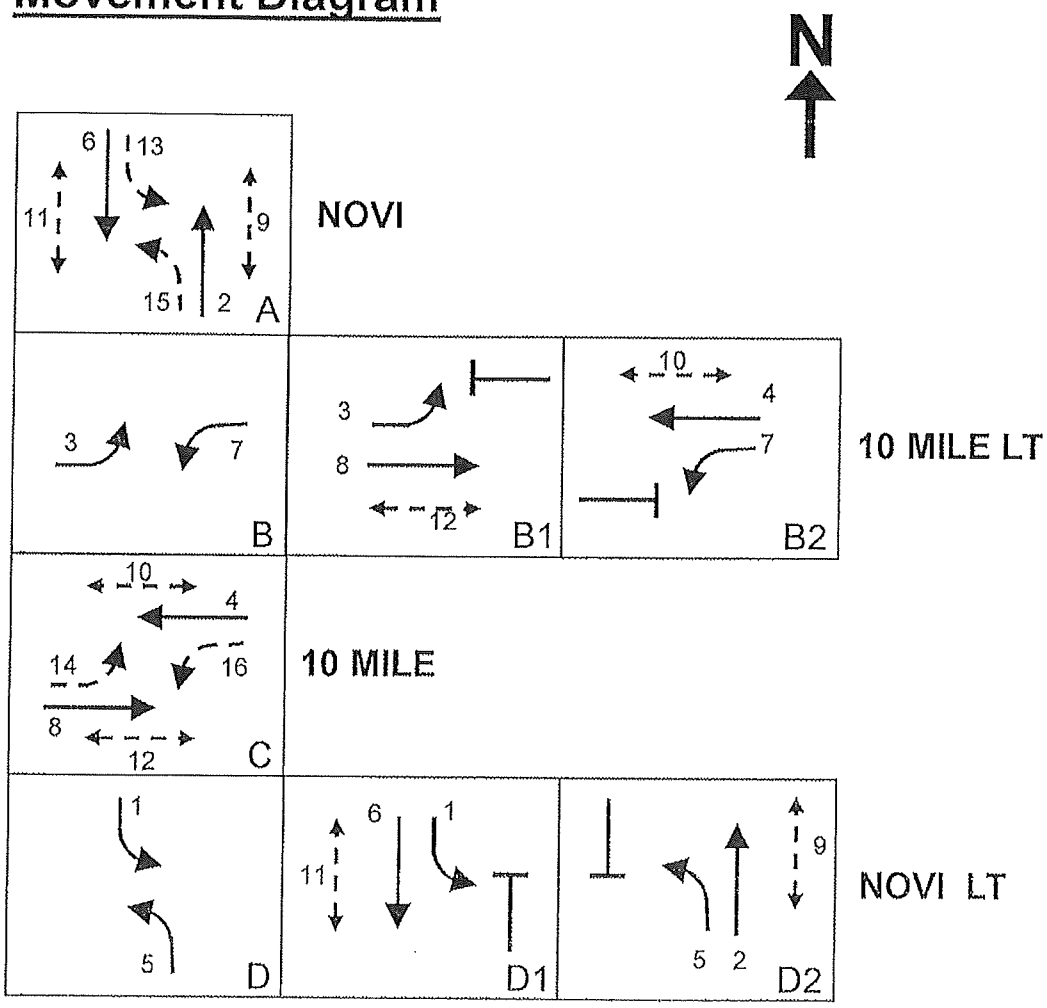
TS2 Gridsmart Detectors BIU #1

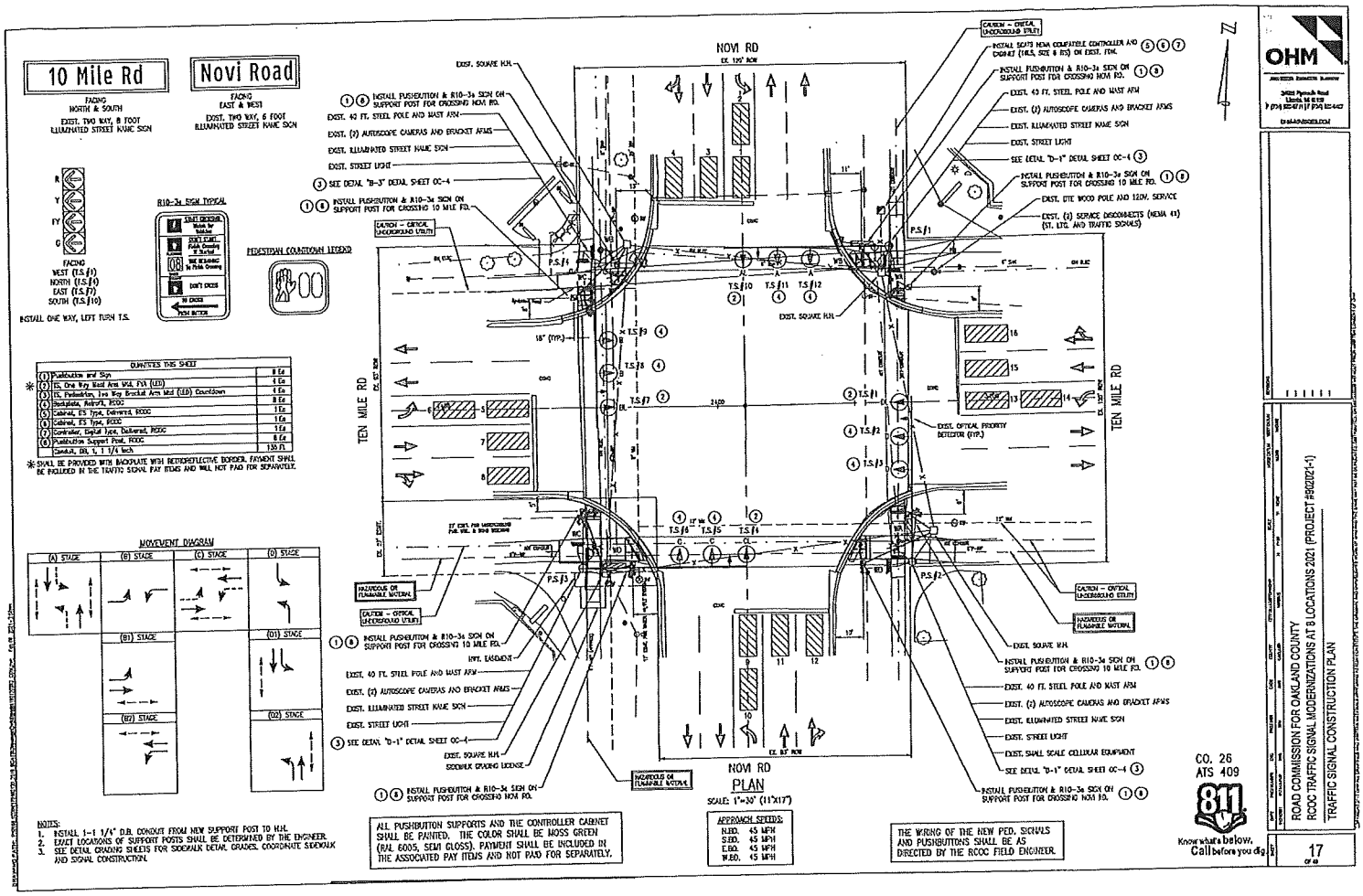
CO# 26

Detector # on print	Description	Phase	Output
1	SB Novi LT	1	1
2	SB Novi LT Adv	1	2
3	SB Novi Thru L	6	3
4	SB Novi Thru R	6	4
5	EB 10 Mile LT	3	5
6	EB 10 Mile LT Adv	3	6
7	EB 10 Mile Thru L	8	7
8	EB 10 Mile Thru R	8	8
9	NB Novi LT	5	9
10	NB Novi LT Adv	5	10
11	NB Novi Thru L	2	11
12	NB Novi Thru R	2	12
13	WB 10 Mile LT	7	13
14	WB 10 Mile LT Adv	7	14
15	WB 10 Mile Thru L	4	15
16	WB 10 Mile Thru R	4	16

#26 – NOVI & 10 MILE

- **Movement Diagram**





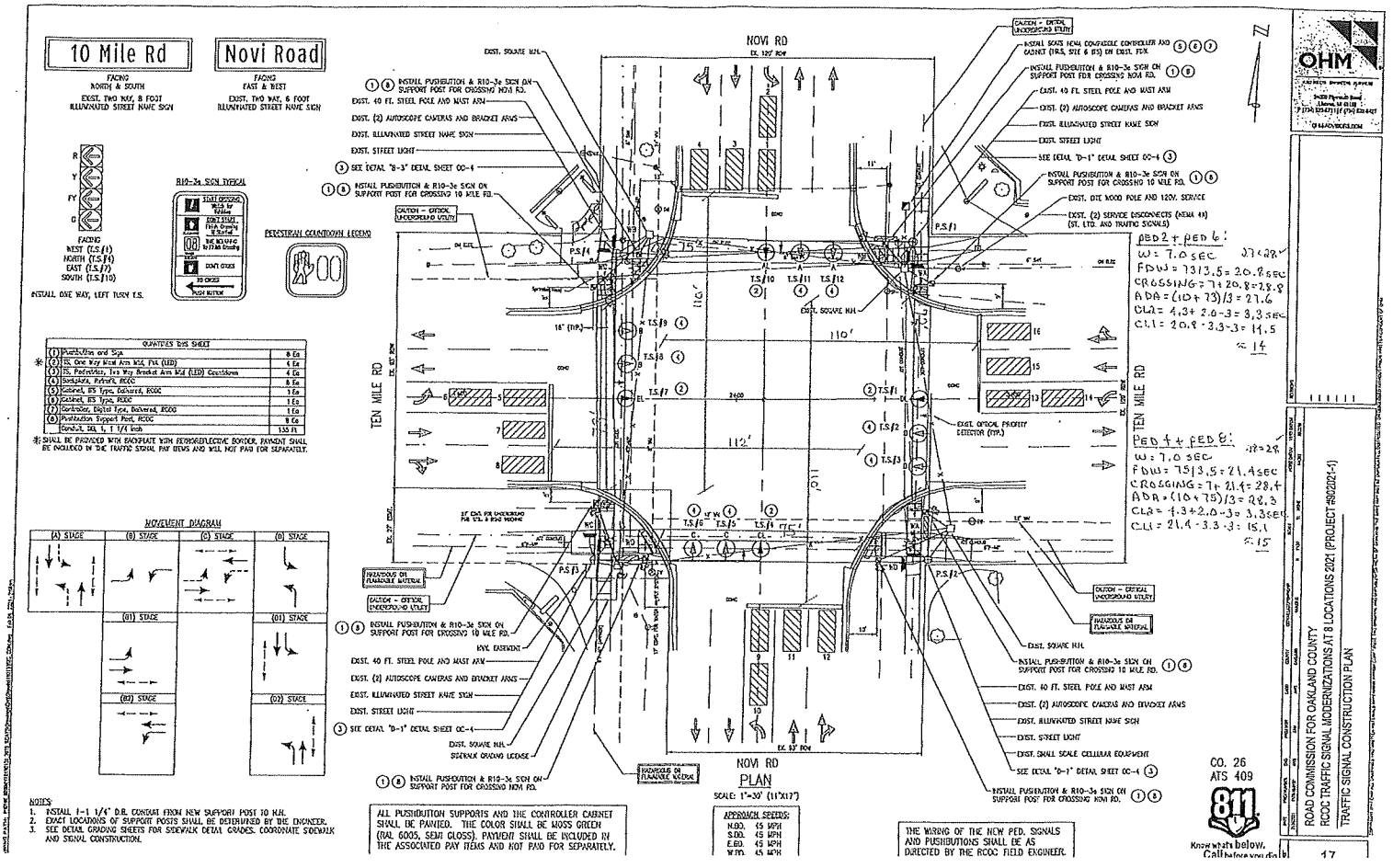
NOTES:
1. INSTALL 1-1 1/4" D.B. CONDUIT FROM NEW SUPPORT POST TO H.H.
2. EXACT LOCATIONS OF SUPPORT POSTS SHALL BE DETERMINED BY THE ENGINEER.
3. SEE DETAIL GRADING SHEETS FOR SIDEWALK DETAIL GRADES. COORDINATE SIDEWALK AND SIGNAL CONSTRUCTION.

NB NOVI: 45 @ 110'
Y = 4.3
R = 2.0

WB 10MILE: 45 @ 110'
Y = 4.3
R = 2.0

SB NOVI: 45 @ 110'
Y = 4.3
R = 2.0

EB 10MILE: 45 @ 112'
Y = 4.3
R = 2.0



NOTES:
1. INSTALL 1-1 1/4" DIA. CONDUIT FROM NEW SUPPORT POST TO H.H.
2. EXACT LOCATIONS OF SUPPORT POSTS SHALL BE DETERMINED BY THE ENGINEER.
3. SEE DETAIL GRADING SHEETS FOR SIDEWALK DETAIL GRADES. COORDINATE SIDEWALK AND SIGNAL CONSTRUCTION.

PED 2 + PED 6:
W = 7.0 SEC
FDW = 73 13.5 = 20.8 SEC
CROSSING = 7 + 20.8 = 28.8
ADA = (10 + 73)/3 = 27.6
CLA = 4.3 + 2.0 - 3 = 3.3 SEC
CLI = 20.8 - 3.3 - 3 = 14.5
≈ 14

PED 4 + PED 8:
W = 7.0 SEC
FDW = 75 13.5 = 21.4 SEC
CROSSING = 7 + 21.4 = 28.4
ADA = (10 + 75)/3 = 28.3
CLA = 4.3 + 2.0 - 3 = 3.3 SEC
CLI = 21.4 - 3.3 - 3 = 15.1
≈ 15

CO. 26
ATS 409

OHM

ROAD COMMISSION FOR OAKLAND COUNTY
RCOC TRAFFIC SIGNAL MODERNIZATIONS AT 8 LOCATIONS 2021 (PROJECT #SM2021-1)
TRAFFIC SIGNAL CONSTRUCTION PLAN

Know what's below. Call before you dig.

OAKLAND COUNTY ROAD COMMISSION
TRAFFIC - SAFETY DEPARTMENT
SIGNAL WORK ORDER

LOCATION: 10 Mile & Meadowbrook DATE: 8/7/18

CITY/TOWNSHIP: NOVI BY: E LABIANO

COUNTY#: 446 STATE#: - CHARGES: 53821.0981 (Labor & Materials)

PLEASE PERFORM THE FOLLOWING:

_____ ELECTRICAL DEVICE: ____ INSTALL _____ MODERNIZE _____ MAINTENANCE

_____ UNDERGROUND: _____

_____ EDISON OK: _____ YES _____ NO JOB#: _____ SEP 10 2018

_____ COORDINATE W/DISTRICT 7: _____

DIAL..	1	1	1	1		2	2	2	2		3	3	3	3		4	4	4	4
SPLIT.	1	2	3	4		1	2	3	4		1	2	3	4		1	2	3	4
_____ CHANGE TIMING.....																			
_____ CHANGE OFFSET.....																			
_____ CHANGE CYCLE LENGTH.....																			
_____ ADD DIAL/SPLIT.....																			

_____ CHANGE BREAKOUT OR EPROM: _____

_____ CHANGE HOURS OF OPERATION:

OLD: _____

NEW: _____

_____ REPROGRAM TBC

_____ INSTALL INTERCONNECT: _____ TBC _____ MINITROL _____ TONE

_____ MBT OK: _____ YES _____ NO

_____ NO CHANGE - RECORD CORRECTION

X OTHER: PLEASE SWAP OUT EXISTING FLIR CAMERAS WITH AIS-IV CAMERAS (8 CAMERAS) PLEASE CALL TOC TO CONFIRM CAMERAS AND COMMS.TURN ON LED GUARD IN MMU UNIT OPTIONS- CONFIRM: Jumper 16 MMU Flash - 116 Monitor ST Out

** Personality not changed, paperwork updated for AIS-IV cameras **

APPROVED BY: _____ DATE: 8/20/18

DATE INSTALLED: 9/6/18

INSTALLED BY: PRATHN LARSON

INTERSECTION :- 446 10 Mile & Meadowbrook
DESCRIPTION PROMS :- X00446 / F4808
CONTROLLER TYPE :- STANDARD PERSONALITY CONTROLLER
SOFTWARE :- MOD 52 SCATS S30
INPUTS :-

 1. NB Meadowbrook LT (LK)
 2. NB Meadowbrook LT Adv (LK)
 3. NB Meadowbrook Thru L (LK)
 4. NB Meadowbrook Thru R (LK)
 5. WB 10 Mile LT (NL)
 6. WB 10 Mile LT Adv (NL)
 7. WB 10 Mile Thru L (LK)
 8. WB 10 Mile Thru R (LK)
 9. SB Meadowbrook LT (LK)
10. SB Meadowbrook LT Adv (LK)
11. SB Meadowbrook Thru L (LK)
12. SB Meadowbrook Thru R (LK)
13. EB 10 Mile LT (NL)
14. EB 10 Mile LT Adv (NL)
15. EB 10 Mile Thru L (LK)
16. EB 10 Mile Thru R (LK)

NOTE: ALL DETECTORS ARE AUTOSCOPE (RACKVISION, AIS-IV CAMERAS).

Opticom 1: TB2 PREEMPT INPUT 3 (CALLS EB & WB 10 Mile).
Opticom 2: TB2 PREEMPT INPUT 4 (CALLS NB & SB Meadowbrook).

PED 2: WB 10 Mile (North Leg) P.B.
PED 4: SB Meadowbrook (West Leg) P.B.
PED 6: EB 10 Mile (South Leg) P.B.
PED 8: NB Meadowbrook (East Leg) P.B.

APPROACHES :-

A APP 1 : EB 10 Mile Thru L,R	A APP 2 : WB 10 Mile Thru L,R
B APP 1 : EB 10 Mile LT,LT Adv	B APP 2 : WB 10 Mile LT,LT Adv
C APP 1 : NB Meadowbrook Thru L,R	C APP 2 : SB Meadowbrook Thru L,R
D APP 1 : NB Meadowbrook LT,LT Adv	D APP 2 : SB Meadowbrook LT,LT Adv

FLEXIDATA :-

SEQUENCE	A,B,C,D	A,B,C,D
AUTO REL		
R- REL	A	A
R+ REL	B	B
Q- REL	C	C
Q+ REL	D	D

PEDESTRIANS :-

2. WB 10 Mile (North Leg) (P-)
4. SB Meadowbrook (West Leg) (P-)
6. EB 10 Mile (South Leg) (P+)
8. NB Meadowbrook (East Leg) (P+)

SPECIAL FEATURES :-
Personality revision is 1 (=A).
A Stage has permanent demand. Demand for B,C and D stages in flexi and isol.
Set ZNEG to disable.
Pedestrians have automatic introduction using SCATS Y-.
EB 10 Mile LT has flashing red display (filter) in A stage(s).
NB Meadowbrook LT has flashing red display (filter) in C stage(s).
WB 10 Mile LT has flashing red display (filter) in A stage(s).
SB Meadowbrook LT has flashing red display (filter) in C stage(s).
Opticom 1 calls EB & WB 10 Mile.
Opticom 2 calls NB & SB Meadowbrook.

BACKPANEL :- SIZE P44-16 CABINET

LOAD SWITCH 1 - EB Ten Mile LT	CL	FLR
LOAD SWITCH 2 - WB Ten Mile	A	FLR
LOAD SWITCH 3 - NB Meadowbrook LT	DL	FLR
LOAD SWITCH 4 - SB Meadowbrook	B	FLR
LOAD SWITCH 5 - WB Ten Mile LT	AL	FLR
LOAD SWITCH 6 - EB Ten Mile	C	FLR
LOAD SWITCH 7 - SB Meadowbrook LT	BL	FLR
LOAD SWITCH 8 - NB Meadowbrook	D	FLR
LOAD SWITCH 9 - WB 10 Mile (North Leg)	WA	
LOAD SWITCH 10- SB Meadowbrook (West Leg)	WB	
LOAD SWITCH 11- EB 10 Mile (South Leg)	WC	
LOAD SWITCH 12- NB Meadowbrook (East Leg)	WD	

MMU 2: (MENU : SET/VIEW CONFIG)

Field Check Enable:
Channel 1: G, Y, R
Channel 2: G, Y, R
Channel 3: G, Y, R
Channel 4: G, Y, R
Channel 5: G, Y, R
Channel 6: G, Y, R
Channel 7: G, Y, R
Channel 8: G, Y, R

Dual Indication Enable:
R+G: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
R+Y: 1, 2, 3, 4, 5, 6, 7, 8
G+Y: 1, 2, 3, 4, 5, 6, 7, 8

Red Fail Enable: Enable: Channel 1,2,3,4,5,6,7,8

Y & R Clearance Disable: Channel 1,2,3,4,5,6,7,8 Enabled

Flashing Yellow Arrow: None

Unit Options:
All OFF except:
Recurrent pulse
LED Guard
Program Memory Card

Program Card:
Compatible Channels:
1-5,2-6,2-9,2-11,3-7,4-8,4-10,4-12,6-9,6-11,8-10,
8-12,9-11,10-12
Min Flash Time : 4+2+1
Min Yellow Change Disable: 9,10,11,12
Voltage Monitor Latch: None

Note :- Add Jumper 16 MMU Flash - 116 Monitor ST Out

```
*********************************
* CONTROLLER INFORMATION SHEET *
*     FOR SITE NO. 446         *
*     DAWN BIERLEIN            *
*       23-Sep-2013            *
*********************************
```

CHECKSUMS:
TIMES: 82 / 202
PERS: 0F / 017
TOTAL: 8D / 215

FLEXILINK PLAN DATA

Intersection # 446 **State #** _____ **Date:** 09/23/13 **Prepared By:** Dawn Bierlein

Intersection: Meadowbrook & Ten Mile **City:** Novi

Flash: None **Approved By:** Rachel Jones

		PL0	PL1	PL2	PL3	PL4	PL5	PL6	PL7	PL8
0	CL		80	120	120					
1	A		0	0	0					
2	B		28	55	46					
3	C		40	67	58					
4	D		68	102	100					
5	E									
6	F									
7	G									
8	R-									
9	R+									
10	Y-		44	17	92					
11	Y+	C								
12	Z-									
13	Z+									
14	Q-									
15	Q+									
16										
17										

NOTE: STAGES WITH ONE SECOND PHASE TIMES ARE SKIPPED
BLANK ENTRIES ARE DEFAULT VALUES = 0 FOR ENTRIES #0 - #7, #16 - #17
254 FOR ENTRIES #8 - #15 'C' ENTRY MEANS CONTINOUS = 255

							Timers		
Phase	Direction	Min	Max	ECO	Amber	All Red	Gap	Hdwy	Waste
A	EB & WB 10 Mile	10.0	30.0		4.3	1.7	3.0	1.2	6.0
B	EB & WB 10 Mile LT	5.0	15.0		4.3	1.7	3.0	1.2	6.0
C	NB & SB Meadowbrook	10.0	20.0		3.9	2.5	3.5	1.2	6.0
D	NB & SB Meadowbrook LT	5.0	15.0		3.9	2.5	3.0	1.2	6.0
E									
F									
G									

TSM15 = Opticom Min Alarm Time = 10
TSM16 = Opticom Max Alarm Time = 200

	Day	Hours	Plan#
SC1	8	6:00	2
SC2	8	9:00	1
SC3	8	15:00	3
SC4	8	19:00	1
SC5	14	0:00	1
SC6			
SC7			
SC8			
SC9			
SC10			

Pedestrian Crossing Times

Direction	Walk	CL 1	CL 2
WB 10 Mile (North Leg)	7.0	12.0	3.0
SB Meadowbrook (West Leg)	7.0	13.0	3.4
EB 10 Mile (South Leg)	7.0	14.0	3.0
NB Meadowbrook (East Leg)	7.0	13.0	3.4

Normal Operating Mode

Isolated	Flexilink	Masterlink	Master Isolated	Flexi Isolated
		X		

DAY OF WEEK CODE NUMBER

0	End of Schedule	4	WED	8	MON-FRI	12	MON,FRI,SAT
1	SUN	5	THUR	9	MON-SAT	13	SAT,SUN
2	MON	6	FRI	10	TUE,WED,THU	14	EVERY DAY
3	TUE	7	SAT	11	MON,FRI	15	NEVER

TS2 Autoscope AIS-IV Cameras

CO#446 - 10 MILE & MEADOWBROOK

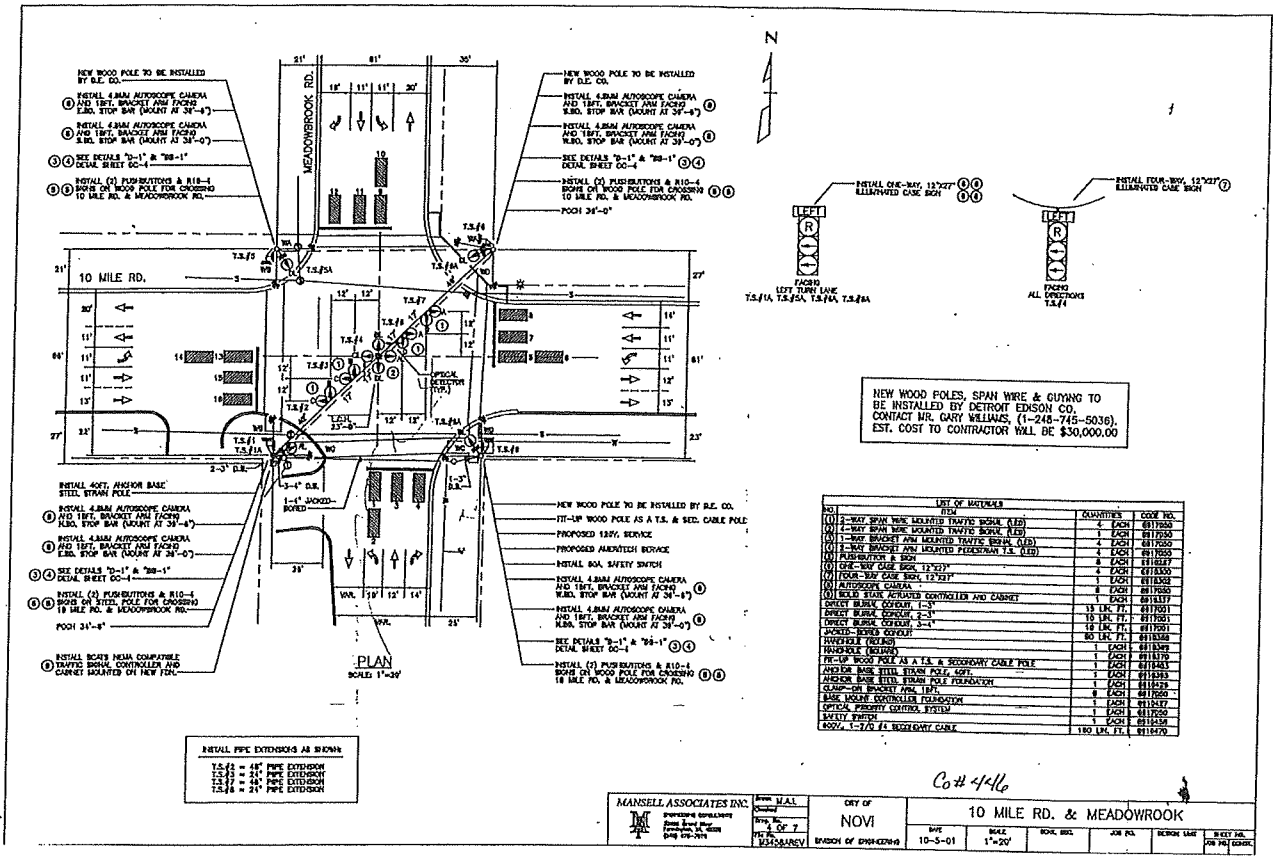
Camera #	Rack Select Switch Position / Detector BIU	Input/Output LED	Description	Detector Number on Print	Phase
1	1	1	NB Meadowbrook LT	1	3
1	1	2	NB Meadowbrook LT Adv	2	3
2	1	3	NB Meadowbrook Thru L	3	8
2	1	4	NB Meadowbrook Thru R	4	8
3	1	5	WB Ten Mile LT	5	5
3	1	6	WB Ten Mile LT Adv	6	5
4	1	7	WB Ten Mile Thru L	7	2
4	1	8	WB Ten Mile Thru R	8	2
5	1	9	SB Meadowbrook LT	9	7
5	1	10	SB Meadowbrook LT Adv	10	7
6	1	11	SB Meadowbrook Thru L	11	4
6	1	12	SB Meadowbrook Thru R	12	4
7	1	13	EB Ten Mile LT	13	1
7	1	14	EB Ten Mile LT Adv	14	1
8	1	15	EB 10 Mile Thru L	15	6
8	1	16	EB 10 Mile Thru R	16	6

Input / Output Indicators

TS2 Rack Select Switch Position 1 - Detectors 1-16
TS2 Rack Select Switch Position 2 - Detectors 17-32
TS2 Rack Select Switch Position 3 - Detectors 33-48
TS2 Rack Select Switch Position 4 - Detectors 49-64
TS2 Rack Select Switch Position 5 - Red Phases
TS2 Rack Select Switch Position 6 - Green Phases
TS2 Rack Select Switch Position 7-10 - All OFF

MVP Status LEDs

TS2 Rack Select Switch Position 1-7 - Cameras 1-4
TS2 Rack Select Switch Position 8 - Cameras 5-8
TS2 Rack Select Switch Position 9-10 - NOT USED



NEW WOOD POLES, SPAN WIRE & GUYING TO BE INSTALLED BY DETROIT EDISON CO. CONTACT MR. GARY WILLIAMS, (1-248-745-5036). EST. COST TO CONTRACTOR WILL BE $30,000.00

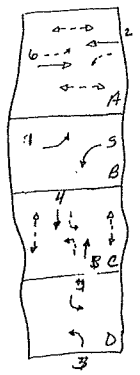
NO.	LIST OF MATERIALS ITEM	QUANTITIES		CODE NO.
(1)	2-WAY, SPAN WIRE, MOUNTED TRAFFIC SIGNAL (LED)	4	EACH	6817650
(2)	4-WAY SPAN WIRE MOUNTED TRAFFIC SIGNAL (LED)	1	EACH	6817650
(3)	1-WAY BRACKET ARM MOUNTED TRAFFIC SIGNAL (LED)	4	EACH	6817650
(4)	2-WAY BRACKET ARM MOUNTED PEDESTRIAN T.S. (LED)	4	EACH	6817650
(5)	PUSHBUTTON & SIGN	8	EACH	6818627
(6)	ONE-WAY CASE SIGN, 12"x27"	4	EACH	6818300
(7)	FOUR-WAY CASE SIGN, 12"x27"	1	EACH	6818300
(8)	AUTOSCOPE CAMERA	1	EACH	6818302
(9)	SOLID STATE ACTUATED CONTROLLER AND CABINET	8	EACH	6817650
	DIRECT BURIAL CONDUIT, 1-3"	1	EACH	6818117
	DIRECT BURIAL CONDUIT, 2-3"	15	LIN. FT.	6817001
	DIRECT BURIAL CONDUIT, 3-4"	10	LIN. FT.	6817001
	JACKED-BORED CONDUIT	10	LIN. FT.	6817001
	HANDHOLE (SIGNAL)	80	LIN. FT.	6818368
	HANDHOLE (SIGNAL)	1	EACH	6818349
	FIT-UP WOOD POLE AS A T.S. & SECONDARY CABLE POLE	1	EACH	6818370
	ANCHOR BASE STEEL STRAIN POLE, 40FT.	1	EACH	6818483
	ANCHOR BASE STEEL STRAIN POLE FOUNDATION	1	EACH	6818343
	CLAMP-ON BRACKET ARM, 18FT.	1	EACH	6818429
	BASE MOUNT CONTROLLER FOUNDATION	9	EACH	6817650
	OPTICAL PRIORITY CONTROL SYSTEM	1	EACH	6818427
	SAFETY SWITCH	1	EACH	6818250
	600V, 1-2/0 #4 SECONDARY CABLE	1	EACH	6818458
		180	LIN. FT.	6818470

INSTALL PIPE EXTENSIONS AS SHOWN
T.S.#3 = 45' PIPE EXTENSION
T.S.#5 = 21' PIPE EXTENSION
T.S.#7 = 45' PIPE EXTENSION
T.S.#8 = 21' PIPE EXTENSION

Co# 4446

MANSELL ASSOCIATES INC.	Drawn M.A.L.	CITY OF	10 MILE RD. & MEADOWBROOK				
	Checked	NOVI					
	Proj. No. 4 OF 7	DIVISION OF ENGINEERING	DATE 10-5-01	SCALE 1"=20'	BOOK, PAGE	JOB NO.	SECTION, LEAF	SHEET NO. FOR THIS DRAWING
	FILE NO. 834SIGNREV							

Movement Diagram



HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	426	148	85	350	83	155	447	113	78	361	157
Future Volume (veh/h)	200	426	148	85	350	83	155	447	113	78	361	157
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1969	1953	1953	1953	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	215	458	159	123	507	120	191	552	140	92	425	185
Peak Hour Factor	0.93	0.93	0.93	0.69	0.69	0.69	0.81	0.81	0.81	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	2	2	2
Cap, veh/h	274	635	219	249	608	143	430	1314	332	381	1080	465
Arrive On Green	0.10	0.23	0.23	0.07	0.20	0.20	0.06	0.44	0.44	0.04	0.42	0.42
Sat Flow, veh/h	1875	2729	940	1860	2980	702	1875	2957	747	1875	2545	1097
Grp Volume(v), veh/h	215	313	304	123	315	312	191	348	344	92	311	299
Grp Sat Flow(s),veh/h/ln	1875	1870	1798	1860	1856	1826	1875	1870	1834	1875	1870	1771
Q Serve(g_s), s	10.9	18.5	18.8	6.2	19.5	19.7	7.0	15.3	15.4	3.3	13.8	14.0
Cycle Q Clear(g_c), s	10.9	18.5	18.8	6.2	19.5	19.7	7.0	15.3	15.4	3.3	13.8	14.0
Prop In Lane	1.00		0.52	1.00		0.38	1.00		0.41	1.00		0.62
Lane Grp Cap(c), veh/h	274	435	418	249	378	372	430	831	815	381	794	752
V/C Ratio(X)	0.78	0.72	0.73	0.49	0.83	0.84	0.44	0.42	0.42	0.24	0.39	0.40
Avail Cap(c_a), veh/h	274	525	505	302	521	513	430	831	815	418	794	752
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	42.4	42.5	35.1	45.8	45.9	18.5	22.8	22.8	18.6	23.8	23.9
Incr Delay (d2), s/veh	13.7	3.8	4.2	1.5	8.1	8.7	0.7	1.6	1.6	0.3	1.5	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.8	13.6	13.3	5.1	14.6	14.6	5.3	11.0	10.9	2.5	10.2	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	46.2	46.7	36.7	53.9	54.6	19.3	24.3	24.4	18.9	25.3	25.5
LnGrp LOS	D	D	D	D	D	D	B	C	C	B	C	C
Approach Vol, veh/h		832			750			883			702	
Approach Delay, s/veh		47.1			51.3			23.3			24.5	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	59.6	14.6	34.2	14.0	57.2	18.0	30.8
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	7.7	41.7	11.7	33.7	7.7	41.7	11.7	33.7
Max Q Clear Time (g_c+I1), s	5.3	17.4	8.2	20.8	9.0	16.0	12.9	21.7
Green Ext Time (p_c), s	0.0	4.0	0.1	2.8	0.0	3.5	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	604	9	2	504	0	2	0	4	0	0	4
Future Vol, veh/h	1	604	9	2	504	0	2	0	4	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	69	69	69	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	14	14	14
Mvmt Flow	1	686	10	3	730	0	3	0	7	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	730	0	0	696	0	0	1059	1424	686	1433	1434	365
Stage 1	-	-	-	-	-	-	688	688	-	736	736	-
Stage 2	-	-	-	-	-	-	371	736	-	697	698	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.51	6.71	7.11
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.71	5.71	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.31	5.71	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.633	4.133	3.433
Pot Cap-1 Maneuver	872	-	-	*887	-	-	*559	*421	*593	*436	*398	604
Stage 1	-	-	-	-	-	-	*560	*490	-	*356	*402	-
Stage 2	-	-	-	-	-	-	*622	*424	-	*542	*476	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	872	-	-	*887	-	-	*551	*419	*593	*429	*396	604
Mov Cap-2 Maneuver	-	-	-	-	-	-	*551	*419	-	*429	*396	-
Stage 1	-	-	-	-	-	-	*559	*489	-	*356	*401	-
Stage 2	-	-	-	-	-	-	*613	*423	-	*535	*476	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	11.3	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	578	872	-	-	* 887	-	-	604
HCM Lane V/C Ratio	0.017	0.001	-	-	0.003	-	-	0.011
HCM Control Delay (s)	11.3	9.1	-	-	9.1	-	-	11
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

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

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	580	0	0	499	12	0	0	0	2	0	11
Future Vol, veh/h	24	580	0	0	499	12	0	0	0	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	75	-	25	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	13	13	13
Mvmt Flow	28	674	0	0	734	18	0	0	0	3	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	752	0	0	674	0	0	1097	1482	674	1473	1473	376
Stage 1	-	-	-	-	-	-	730	730	-	743	743	-
Stage 2	-	-	-	-	-	-	367	752	-	730	730	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.495	6.695	7.095
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.695	5.695	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.295	5.695	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.6235	4.1235	3.4235
Pot Cap-1 Maneuver	856	-	-	*926	-	-	*583	*331	*618	*337	*326	596
Stage 1	-	-	-	-	-	-	*584	*511	-	*354	*400	-
Stage 2	-	-	-	-	-	-	*626	*417	-	*566	*498	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	856	-	-	*926	-	-	*556	*320	*618	*329	*315	596
Mov Cap-2 Maneuver	-	-	-	-	-	-	*556	*320	-	*329	*315	-
Stage 1	-	-	-	-	-	-	*564	*494	-	*342	*400	-
Stage 2	-	-	-	-	-	-	*612	*417	-	*548	*482	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	12
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	856	-	-	* 926	-	-	530
HCM Lane V/C Ratio	-	0.033	-	-	-	-	-	0.031
HCM Control Delay (s)	0	9.3	-	-	0	-	-	12
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.1

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

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↑	↱		↔			↔	
Traffic Vol, veh/h	6	576	0	0	508	7	0	0	0	2	0	3
Future Vol, veh/h	6	576	0	0	508	7	0	0	0	2	0	3
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	7	670	0	0	747	10	0	0	0	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	758	0	0	670	0	0	1439	1442	670	1432	1432	748
Stage 1	-	-	-	-	-	-	684	684	-	748	748	-
Stage 2	-	-	-	-	-	-	755	758	-	684	684	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	853	-	-	891	-	-	68	81	584	70	83	416
Stage 1	-	-	-	-	-	-	536	477	-	408	423	-
Stage 2	-	-	-	-	-	-	401	415	-	539	480	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	852	-	-	891	-	-	66	79	584	69	82	416
Mov Cap-2 Maneuver	-	-	-	-	-	-	66	79	-	69	82	-
Stage 1	-	-	-	-	-	-	529	471	-	402	423	-
Stage 2	-	-	-	-	-	-	396	415	-	532	473	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	32.8
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	852	-	-	891	-	-	138
HCM Lane V/C Ratio	-	0.008	-	-	-	-	-	0.06
HCM Control Delay (s)	0	9.3	0	-	0	-	-	32.8
HCM Lane LOS	A	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑	↱	Y	
Traffic Vol, veh/h	2	577	508	4	0	2
Future Vol, veh/h	2	577	508	4	0	2
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	68	68	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	2	679	747	6	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	754	0	-	0	1092	748
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	344	-
Critical Hdwy	4.13	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.219	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	854	-	-	-	*372	416
Stage 1	-	-	-	-	*471	-
Stage 2	-	-	-	-	*804	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	853	-	-	-	*370	416
Mov Cap-2 Maneuver	-	-	-	-	*370	-
Stage 1	-	-	-	-	*469	-
Stage 2	-	-	-	-	*804	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	853	-	-	-	416
HCM Lane V/C Ratio	0.003	-	-	-	0.008
HCM Control Delay (s)	9.2	0	-	-	13.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	577	0	0	512	0	0
Future Vol, veh/h	577	0	0	512	0	0
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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	68	68	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	679	0	0	753	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	679	0	1056	679
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	377	-
Critical Hdwy	-	-	4.145	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.2285	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	*922	-	*584	*618
Stage 1	-	-	-	-	*584	-
Stage 2	-	-	-	-	*664	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*922	-	*584	*618
Mov Cap-2 Maneuver	-	-	-	-	*584	-
Stage 1	-	-	-	-	*584	-
Stage 2	-	-	-	-	*664	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	*922	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

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

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		⅄	
Traffic Vol, veh/h	2	574	508	7	0	2
Future Vol, veh/h	2	574	508	7	0	2
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	69	69	60	60
Heavy Vehicles, %	2	2	3	3	50	50
Mvmt Flow	2	675	736	10	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	747	0	-	0	1421	374
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	679	-
Critical Hdwy	4.13	-	-	-	7.35	7.65
Critical Hdwy Stg 1	-	-	-	-	6.55	-
Critical Hdwy Stg 2	-	-	-	-	6.15	-
Follow-up Hdwy	2.219	-	-	-	3.975	3.775
Pot Cap-1 Maneuver	859	-	-	-	*364	521
Stage 1	-	-	-	-	*344	-
Stage 2	-	-	-	-	*517	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	858	-	-	-	*362	521
Mov Cap-2 Maneuver	-	-	-	-	*362	-
Stage 1	-	-	-	-	*342	-
Stage 2	-	-	-	-	*516	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	858	-	-	-	521
HCM Lane V/C Ratio	0.003	-	-	-	0.006
HCM Control Delay (s)	9.2	0	-	-	12
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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

HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	223	430	225	172	504	176	201	616	88	120	624	304
Future Volume (veh/h)	223	430	225	172	504	176	201	616	88	120	624	304
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	242	467	245	198	579	202	212	648	93	126	657	320
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	248	605	316	265	691	240	298	1319	189	351	922	449
Arrive On Green	0.08	0.25	0.25	0.08	0.25	0.25	0.08	0.40	0.40	0.06	0.38	0.38
Sat Flow, veh/h	1890	2394	1248	1890	2731	950	1890	3310	474	1890	2457	1197
Grp Volume(v), veh/h	242	367	345	198	399	382	212	369	372	126	504	473
Grp Sat Flow(s),veh/h/ln	1890	1885	1756	1890	1885	1796	1890	1885	1899	1890	1885	1768
Q Serve(g_s), s	9.7	21.7	21.9	9.4	24.1	24.2	8.2	17.5	17.6	4.9	27.4	27.4
Cycle Q Clear(g_c), s	9.7	21.7	21.9	9.4	24.1	24.2	8.2	17.5	17.6	4.9	27.4	27.4
Prop In Lane	1.00		0.71	1.00		0.53	1.00		0.25	1.00		0.68
Lane Grp Cap(c), veh/h	248	477	444	265	477	454	298	751	757	351	708	664
V/C Ratio(X)	0.97	0.77	0.78	0.75	0.84	0.84	0.71	0.49	0.49	0.36	0.71	0.71
Avail Cap(c_a), veh/h	248	671	625	265	671	639	298	751	757	395	708	664
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.3	41.6	41.7	32.5	42.5	42.5	24.9	27.0	27.0	21.8	31.9	31.9
Incr Delay (d2), s/veh	49.6	3.5	4.0	11.0	6.5	7.0	7.6	2.3	2.3	0.6	6.0	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.4	15.4	14.7	8.6	17.3	16.7	7.4	12.7	12.8	3.8	19.0	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.0	45.1	45.7	43.5	49.0	49.6	32.5	29.3	29.3	22.4	38.0	38.3
LnGrp LOS	F	D	D	D	D	D	C	C	C	C	D	D
Approach Vol, veh/h		954			979			953			1103	
Approach Delay, s/veh		56.0			48.1			30.0			36.3	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	54.1	16.0	36.6	16.0	51.4	16.0	36.6
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	9.7	32.7	9.7	42.7	9.7	32.7	9.7	42.7
Max Q Clear Time (g_c+I1), s	6.9	19.6	11.4	23.9	10.2	29.4	11.7	26.2
Green Ext Time (p_c), s	0.1	3.5	0.0	3.9	0.0	1.8	0.0	4.1

Intersection Summary	
HCM 6th Ctrl Delay	42.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	647	1	1	855	1	4	0	7	0	0	9
Future Vol, veh/h	6	647	1	1	855	1	4	0	7	0	0	9
Conflicting Peds, #/hr	8	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	60	60	60	66	66	66
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	7	752	1	1	900	1	7	0	12	0	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	909	0	0	753	0	0	1218	1677	752	1684	1678	459
Stage 1	-	-	-	-	-	-	766	766	-	911	911	-
Stage 2	-	-	-	-	-	-	452	911	-	773	767	-
Critical Hdwy	4.115	-	-	4.115	-	-	7.3	6.5	6.2	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	752	-	-	*815	-	-	*514	*287	*545	*290	*286	554
Stage 1	-	-	-	-	-	-	*514	*450	-	*299	*356	-
Stage 2	-	-	-	-	-	-	*562	*356	-	*514	*450	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	746	-	-	*815	-	-	*497	*282	*545	*279	*281	550
Mov Cap-2 Maneuver	-	-	-	-	-	-	*497	*282	-	*279	*281	-
Stage 1	-	-	-	-	-	-	*509	*446	-	*294	*353	-
Stage 2	-	-	-	-	-	-	*547	*353	-	*498	*446	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	12.1	11.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	527	746	-	-	* 815	-	-	550
HCM Lane V/C Ratio	0.035	0.009	-	-	0.001	-	-	0.025
HCM Control Delay (s)	12.1	9.9	-	-	9.4	-	-	11.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

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

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	631	0	0	824	8	0	0	0	20	0	44
Future Vol, veh/h	22	631	0	0	824	8	0	0	0	20	0	44
Conflicting Peds, #/hr	0	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	75	-	25	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	70	70	70
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	0	0	0
Mvmt Flow	26	734	0	0	867	8	0	0	0	29	0	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	883	0	0	734	0	0	1220	1669	734	1665	1665	446
Stage 1	-	-	-	-	-	-	786	786	-	879	879	-
Stage 2	-	-	-	-	-	-	434	883	-	786	786	-
Critical Hdwy	4.115	-	-	4.115	-	-	7.315	6.515	6.215	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.115	5.515	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.515	5.515	-	6.1	5.5	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	3.5095	4.0095	3.3095	3.5	4	3.3
Pot Cap-1 Maneuver	769	-	-	*853	-	-	*536	*261	*569	*266	*265	565
Stage 1	-	-	-	-	-	-	*537	*470	-	*313	*368	-
Stage 2	-	-	-	-	-	-	*574	*365	-	*538	*471	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	763	-	-	*853	-	-	*464	*250	*569	*257	*254	561
Mov Cap-2 Maneuver	-	-	-	-	-	-	*464	*250	-	*257	*254	-
Stage 1	-	-	-	-	-	-	*519	*454	-	*300	*365	-
Stage 2	-	-	-	-	-	-	*510	*362	-	*520	*455	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	16.3
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	763	-	-	* 853	-	-	410
HCM Lane V/C Ratio	-	0.034	-	-	-	-	-	0.223
HCM Control Delay (s)	0	9.9	-	-	0	-	-	16.3
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.8

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

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↱		↕			↕	
Traffic Vol, veh/h	2	649	0	0	824	3	0	0	0	2	0	8
Future Vol, veh/h	2	649	0	0	824	3	0	0	0	2	0	8
Conflicting Peds, #/hr	1	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	60	60	60
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	2	755	0	0	867	3	0	0	0	3	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	876	0	0	755	0	0	1634	1635	755	1632	1632	873
Stage 1	-	-	-	-	-	-	759	759	-	873	873	-
Stage 2	-	-	-	-	-	-	875	876	-	759	759	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	775	-	-	808	-	-	33	42	538	33	43	352
Stage 1	-	-	-	-	-	-	503	442	-	348	370	-
Stage 2	-	-	-	-	-	-	347	369	-	503	442	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	771	-	-	808	-	-	32	42	538	33	42	350
Mov Cap-2 Maneuver	-	-	-	-	-	-	32	42	-	33	42	-
Stage 1	-	-	-	-	-	-	501	441	-	345	368	-
Stage 2	-	-	-	-	-	-	334	367	-	501	441	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	39.8
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	771	-	-	808	-	-	120
HCM Lane V/C Ratio	-	0.003	-	-	-	-	-	0.139
HCM Control Delay (s)	0	9.7	0	-	0	-	-	39.8
HCM Lane LOS	A	A	A	-	A	-	-	E
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↱	↰	
Traffic Vol, veh/h	0	650	821	0	2	3
Future Vol, veh/h	0	650	821	0	2	3
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	70	70
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	774	864	0	3	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	869	0	-	0	1256	869
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	387	-
Critical Hdwy	4.115	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2095	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	779	-	-	-	*297	354
Stage 1	-	-	-	-	*414	-
Stage 2	-	-	-	-	*780	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	775	-	-	-	*294	352
Mov Cap-2 Maneuver	-	-	-	-	*294	-
Stage 1	-	-	-	-	*412	-
Stage 2	-	-	-	-	*776	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	775	-	-	-	326
HCM Lane V/C Ratio	-	-	-	-	0.022
HCM Control Delay (s)	0	-	-	-	16.3
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

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

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱		↰↑↑	↰	↱
Traffic Vol, veh/h	652	0	0	821	0	0
Future Vol, veh/h	652	0	0	821	0	0
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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	95	95	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	776	0	0	864	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	776	0	1208	776
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	432	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	838	-	188	396
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	623	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	838	-	188	396
Mov Cap-2 Maneuver	-	-	-	-	188	-
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	623	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	838	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

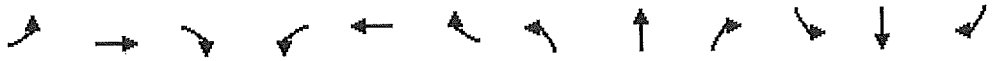
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		⅄	
Traffic Vol, veh/h	0	651	822	0	1	3
Future Vol, veh/h	0	651	822	0	1	3
Conflicting Peds, #/hr	8	0	0	8	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	60	60
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	775	865	0	2	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	873	0	-	0	1648	441
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	775	-
Critical Hdwy	4.115	-	-	-	6.6	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2095	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	776	-	-	-	*343	570
Stage 1	-	-	-	-	*374	-
Stage 2	-	-	-	-	*514	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	770	-	-	-	*338	566
Mov Cap-2 Maneuver	-	-	-	-	*338	-
Stage 1	-	-	-	-	*371	-
Stage 2	-	-	-	-	*510	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	770	-	-	-	484
HCM Lane V/C Ratio	-	-	-	-	0.014
HCM Control Delay (s)	0	-	-	-	12.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	396	127	68	642	123	69	186	46	97	255	104
Future Volume (veh/h)	98	396	127	68	642	123	69	186	46	97	255	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	109	440	141	73	690	132	77	207	51	108	283	116
Peak Hour Factor	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	629	937	298	706	1050	201	139	262	222	243	336	282
Arrive On Green	0.25	0.33	0.33	0.25	0.33	0.33	0.04	0.13	0.13	0.08	0.17	0.17
Sat Flow, veh/h	1890	2812	893	1890	3151	602	1890	1984	1678	1890	1984	1667
Grp Volume(v), veh/h	109	294	287	73	413	409	77	207	51	108	283	116
Grp Sat Flow(s),veh/h/ln	1890	1885	1820	1890	1885	1868	1890	1984	1678	1890	1984	1667
Q Serve(g_s), s	0.0	14.8	15.0	0.0	22.4	22.5	0.9	12.1	3.3	0.3	16.6	7.5
Cycle Q Clear(g_c), s	0.0	14.8	15.0	0.0	22.4	22.5	0.9	12.1	3.3	0.3	16.6	7.5
Prop In Lane	1.00		0.49	1.00		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	629	628	607	706	628	623	139	262	222	243	336	282
V/C Ratio(X)	0.17	0.47	0.47	0.10	0.66	0.66	0.55	0.79	0.23	0.44	0.84	0.41
Avail Cap(c_a), veh/h	629	628	607	706	628	623	274	589	498	309	589	494
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	31.6	31.7	19.3	34.1	34.2	55.2	50.5	46.6	50.3	48.3	44.5
Incr Delay (d2), s/veh	0.1	2.5	2.6	0.1	5.3	5.4	3.4	5.3	0.5	1.3	5.7	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	11.2	11.1	2.1	16.1	16.1	4.3	10.6	2.5	5.5	13.4	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.3	34.1	34.3	19.4	39.4	39.5	58.6	55.7	47.1	51.6	54.0	45.5
LnGrp LOS	C	C	C	B	D	D	E	E	D	D	D	D
Approach Vol, veh/h		690			895			335			507	
Approach Delay, s/veh		32.9			37.8			55.1			51.6	
Approach LOS		C			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.9	46.0	11.4	26.7	35.9	46.0	15.9	22.2
Change Period (Y+Rc), s	* 6	* 6	6.4	6.4	* 6	* 6	6.4	6.4
Max Green Setting (Gmax), s	* 6	* 40	13.6	35.6	* 6	* 40	13.6	35.6
Max Q Clear Time (g_c+I1), s	2.0	17.0	2.9	18.6	2.0	24.5	2.3	14.1
Green Ext Time (p_c), s	0.0	3.2	0.1	1.7	0.1	4.2	0.2	1.3

Intersection Summary	
HCM 6th Ctrl Delay	41.7
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	202	430	149	86	354	84	157	451	114	79	365	159
Future Volume (veh/h)	202	430	149	86	354	84	157	451	114	79	365	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1969	1953	1953	1953	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	217	462	160	125	513	122	194	557	141	93	429	187
Peak Hour Factor	0.93	0.93	0.93	0.69	0.69	0.69	0.81	0.81	0.81	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	2	2	2
Cap, veh/h	274	639	220	250	613	145	425	1307	330	377	1074	464
Arrive On Green	0.10	0.23	0.23	0.07	0.21	0.21	0.06	0.44	0.44	0.04	0.42	0.42
Sat Flow, veh/h	1875	2731	938	1860	2976	704	1875	2958	746	1875	2544	1098
Grp Volume(v), veh/h	217	315	307	125	319	316	194	351	347	93	314	302
Grp Sat Flow(s),veh/h/ln	1875	1870	1798	1860	1856	1825	1875	1870	1834	1875	1870	1771
Q Serve(g_s), s	10.9	18.6	18.9	6.3	19.8	20.0	7.1	15.5	15.6	3.3	14.0	14.2
Cycle Q Clear(g_c), s	10.9	18.6	18.9	6.3	19.8	20.0	7.1	15.5	15.6	3.3	14.0	14.2
Prop In Lane	1.00		0.52	1.00		0.39	1.00		0.41	1.00		0.62
Lane Grp Cap(c), veh/h	274	438	421	250	382	376	425	826	810	377	790	748
V/C Ratio(X)	0.79	0.72	0.73	0.50	0.83	0.84	0.46	0.43	0.43	0.25	0.40	0.40
Avail Cap(c_a), veh/h	274	525	505	302	521	513	425	826	810	413	790	748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	42.3	42.4	34.9	45.7	45.7	18.8	23.0	23.1	18.8	24.1	24.1
Incr Delay (d2), s/veh	14.5	3.8	4.3	1.5	8.3	9.0	0.8	1.6	1.7	0.3	1.5	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.9	13.7	13.4	5.1	14.8	14.8	5.4	11.2	11.1	2.6	10.4	10.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.6	46.2	46.7	36.5	54.0	54.7	19.5	24.6	24.7	19.1	25.6	25.8
LnGrp LOS	D	D	D	D	D	D	B	C	C	B	C	C
Approach Vol, veh/h		839			760			892			709	
Approach Delay, s/veh		47.3			51.4			23.6			24.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	59.3	14.6	34.4	14.0	57.0	18.0	31.0
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	7.7	41.7	11.7	33.7	7.7	41.7	11.7	33.7
Max Q Clear Time (g_c+I1), s	5.3	17.6	8.3	20.9	9.1	16.2	12.9	22.0
Green Ext Time (p_c), s	0.0	4.0	0.1	2.8	0.0	3.6	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	36.7
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	610	9	2	509	0	2	0	4	0	0	4
Future Vol, veh/h	1	610	9	2	509	0	2	0	4	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	69	69	69	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	14	14	14
Mvmt Flow	1	693	10	3	738	0	3	0	7	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	738	0	0	703	0	0	1070	1439	693	1448	1449	369
Stage 1	-	-	-	-	-	-	695	695	-	744	744	-
Stage 2	-	-	-	-	-	-	375	744	-	704	705	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.51	6.71	7.11
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.71	5.71	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.31	5.71	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.633	4.133	3.433
Pot Cap-1 Maneuver	866	-	-	*887	-	-	*559	*406	*593	*417	*384	600
Stage 1	-	-	-	-	-	-	*560	*490	-	*352	*398	-
Stage 2	-	-	-	-	-	-	*619	*421	-	*542	*476	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	866	-	-	*887	-	-	*551	*405	*593	*411	*382	600
Mov Cap-2 Maneuver	-	-	-	-	-	-	*551	*405	-	*411	*382	-
Stage 1	-	-	-	-	-	-	*559	*489	-	*352	*397	-
Stage 2	-	-	-	-	-	-	*610	*420	-	*535	*476	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	11.3	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	578	866	-	-	* 887	-	-	600
HCM Lane V/C Ratio	0.017	0.001	-	-	0.003	-	-	0.011
HCM Control Delay (s)	11.3	9.2	-	-	9.1	-	-	11.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

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

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	586	0	0	504	12	0	0	0	2	0	11
Future Vol, veh/h	24	586	0	0	504	12	0	0	0	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	75	-	25	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	13	13	13
Mvmt Flow	28	681	0	0	741	18	0	0	0	3	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	759	0	0	681	0	0	1108	1496	681	1487	1487	380
Stage 1	-	-	-	-	-	-	737	737	-	750	750	-
Stage 2	-	-	-	-	-	-	371	759	-	737	737	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.495	6.695	7.095
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.695	5.695	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.295	5.695	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.6235	4.1235	3.4235
Pot Cap-1 Maneuver	850	-	-	*887	-	-	*559	*356	*593	*374	*351	593
Stage 1	-	-	-	-	-	-	*560	*490	-	*351	*397	-
Stage 2	-	-	-	-	-	-	*622	*414	-	*543	*477	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	850	-	-	*887	-	-	*532	*344	*593	*365	*340	593
Mov Cap-2 Maneuver	-	-	-	-	-	-	*532	*344	-	*365	*340	-
Stage 1	-	-	-	-	-	-	*541	*474	-	*339	*397	-
Stage 2	-	-	-	-	-	-	*608	*414	-	*525	*462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	11.9
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	850	-	-	* 887	-	-	541
HCM Lane V/C Ratio	-	0.033	-	-	-	-	-	0.03
HCM Control Delay (s)	0	9.4	-	-	0	-	-	11.9
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.1

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

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↱		↕			↕	
Traffic Vol, veh/h	6	582	0	0	513	7	0	0	0	2	0	3
Future Vol, veh/h	6	582	0	0	513	7	0	0	0	2	0	3
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	7	677	0	0	754	10	0	0	0	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	765	0	0	677	0	0	1453	1456	677	1446	1446	755
Stage 1	-	-	-	-	-	-	691	691	-	755	755	-
Stage 2	-	-	-	-	-	-	762	765	-	691	691	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	848	-	-	882	-	-	66	78	575	67	81	412
Stage 1	-	-	-	-	-	-	528	472	-	404	420	-
Stage 2	-	-	-	-	-	-	397	412	-	531	474	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	847	-	-	882	-	-	64	77	575	67	79	412
Mov Cap-2 Maneuver	-	-	-	-	-	-	64	77	-	67	79	-
Stage 1	-	-	-	-	-	-	521	466	-	398	420	-
Stage 2	-	-	-	-	-	-	392	412	-	524	468	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	33.4
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	847	-	-	882	-	-	135
HCM Lane V/C Ratio	-	0.008	-	-	-	-	-	0.062
HCM Control Delay (s)	0	9.3	0	-	0	-	-	33.4
HCM Lane LOS	A	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	583	513	4	0	2
Future Vol, veh/h	2	583	513	4	0	2
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	68	68	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	2	686	754	6	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	761	0	-	0	1102	755
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	347	-
Critical Hdwy	4.13	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.219	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	849	-	-	-	*366	412
Stage 1	-	-	-	-	*468	-
Stage 2	-	-	-	-	*804	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	848	-	-	-	*364	412
Mov Cap-2 Maneuver	-	-	-	-	*364	-
Stage 1	-	-	-	-	*466	-
Stage 2	-	-	-	-	*804	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	848	-	-	-	412
HCM Lane V/C Ratio	0.003	-	-	-	0.008
HCM Control Delay (s)	9.3	0	-	-	13.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	583	0	0	517	0	0
Future Vol, veh/h	583	0	0	517	0	0
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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	68	68	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	686	0	0	760	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	686	0	1066	686
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	380	-
Critical Hdwy	-	-	4.145	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.2285	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	*922	-	*584	*618
Stage 1	-	-	-	-	*584	-
Stage 2	-	-	-	-	*662	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*922	-	*584	*618
Mov Cap-2 Maneuver	-	-	-	-	*584	-
Stage 1	-	-	-	-	*584	-
Stage 2	-	-	-	-	*662	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	*922	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

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

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		⅄	
Traffic Vol, veh/h	2	580	513	7	0	2
Future Vol, veh/h	2	580	513	7	0	2
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	69	69	60	60
Heavy Vehicles, %	2	2	3	3	50	50
Mvmt Flow	2	682	743	10	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	754	0	-	0	1435	378
Stage 1	-	-	-	-	749	-
Stage 2	-	-	-	-	686	-
Critical Hdwy	4.13	-	-	-	7.35	7.65
Critical Hdwy Stg 1	-	-	-	-	6.55	-
Critical Hdwy Stg 2	-	-	-	-	6.15	-
Follow-up Hdwy	2.219	-	-	-	3.975	3.775
Pot Cap-1 Maneuver	854	-	-	-	*350	517
Stage 1	-	-	-	-	*341	-
Stage 2	-	-	-	-	*517	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	853	-	-	-	*348	517
Mov Cap-2 Maneuver	-	-	-	-	*348	-
Stage 1	-	-	-	-	*339	-
Stage 2	-	-	-	-	*516	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	853	-	-	-	517
HCM Lane V/C Ratio	0.003	-	-	-	0.006
HCM Control Delay (s)	9.2	0	-	-	12
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	503	48	30	276	70	48	148	48	65	95	56
Future Volume (veh/h)	113	503	48	30	276	70	48	148	48	65	95	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1969	1969	1969	1953	1953	1953
Adj Flow Rate, veh/h	128	572	55	34	314	80	63	195	63	78	114	67
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.76	0.76	0.76	0.83	0.83	0.83
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	3	3	3
Cap, veh/h	815	1419	136	713	1219	306	240	241	204	138	163	138
Arrive On Green	0.22	0.41	0.41	0.22	0.41	0.41	0.08	0.12	0.12	0.04	0.08	0.08
Sat Flow, veh/h	1890	3476	334	1890	2986	749	1875	1969	1668	1860	1953	1655
Grp Volume(v), veh/h	128	310	317	34	196	198	63	195	63	78	114	67
Grp Sat Flow(s),veh/h/ln	1890	1885	1924	1890	1885	1850	1875	1969	1668	1860	1953	1655
Q Serve(g_s), s	0.0	14.0	14.0	0.0	8.3	8.5	0.0	11.6	4.1	1.0	6.8	4.6
Cycle Q Clear(g_c), s	0.0	14.0	14.0	0.0	8.3	8.5	0.0	11.6	4.1	1.0	6.8	4.6
Prop In Lane	1.00		0.17	1.00		0.41	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	815	770	786	713	770	755	240	241	204	138	163	138
V/C Ratio(X)	0.16	0.40	0.40	0.05	0.26	0.26	0.26	0.81	0.31	0.57	0.70	0.49
Avail Cap(c_a), veh/h	815	770	786	713	770	755	271	469	398	240	466	395
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.4	25.1	25.2	14.9	23.4	23.5	50.0	51.3	48.0	55.2	53.5	52.5
Incr Delay (d2), s/veh	0.1	1.6	1.5	0.0	0.8	0.8	0.6	6.4	0.9	3.6	5.4	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	10.4	10.6	0.8	6.7	6.7	3.2	10.2	3.2	4.3	6.4	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.5	26.7	26.7	14.9	24.2	24.4	50.6	57.8	48.9	58.8	58.9	55.2
LnGrp LOS	B	C	C	B	C	C	D	E	D	E	E	E
Approach Vol, veh/h		755			428			321			259	
Approach Delay, s/veh		24.5			23.6			54.6			57.9	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.5	55.0	16.1	16.4	32.5	55.0	11.4	21.1
Change Period (Y+Rc), s	* 6	* 6	6.4	6.4	* 6	* 6	6.4	6.4
Max Green Setting (Gmax), s	* 6	* 49	11.6	28.6	* 6	* 49	11.6	28.6
Max Q Clear Time (g_c+I1), s	2.0	16.0	2.0	8.8	2.0	10.5	3.0	13.6
Green Ext Time (p_c), s	0.0	3.7	0.1	0.7	0.1	2.2	0.1	1.1

Intersection Summary	
HCM 6th Ctrl Delay	34.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	434	227	174	509	178	203	622	89	121	630	307
Future Volume (veh/h)	225	434	227	174	509	178	203	622	89	121	630	307
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	245	472	247	200	585	205	214	655	94	127	663	323
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	248	612	318	265	696	243	294	1309	188	347	916	446
Arrive On Green	0.08	0.26	0.26	0.08	0.26	0.26	0.08	0.40	0.40	0.06	0.37	0.37
Sat Flow, veh/h	1890	2396	1246	1890	2727	953	1890	3310	474	1890	2456	1197
Grp Volume(v), veh/h	245	371	348	200	404	386	214	373	376	127	509	477
Grp Sat Flow(s),veh/h/ln	1890	1885	1757	1890	1885	1795	1890	1885	1899	1890	1885	1768
Q Serve(g_s), s	9.7	21.9	22.1	9.4	24.4	24.5	8.4	17.9	17.9	4.9	27.8	27.8
Cycle Q Clear(g_c), s	9.7	21.9	22.1	9.4	24.4	24.5	8.4	17.9	17.9	4.9	27.8	27.8
Prop In Lane	1.00		0.71	1.00		0.53	1.00		0.25	1.00		0.68
Lane Grp Cap(c), veh/h	248	481	449	265	481	459	294	746	751	347	703	659
V/C Ratio(X)	0.99	0.77	0.78	0.75	0.84	0.84	0.73	0.50	0.50	0.37	0.72	0.72
Avail Cap(c_a), veh/h	248	671	625	265	671	639	294	746	751	390	703	659
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	41.4	41.5	32.4	42.3	42.4	25.3	27.3	27.3	22.0	32.3	32.3
Incr Delay (d2), s/veh	53.2	3.6	4.1	11.5	6.7	7.2	8.8	2.4	2.4	0.6	6.4	6.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.9	15.6	14.9	8.7	17.5	16.9	7.6	12.9	13.0	3.9	19.3	18.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	90.6	45.0	45.6	43.9	49.1	49.6	34.1	29.7	29.7	22.6	38.7	39.1
LnGrp LOS	F	D	D	D	D	D	C	C	C	C	D	D
Approach Vol, veh/h		964			990			963			1113	
Approach Delay, s/veh		56.8			48.2			30.7			37.0	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	53.8	16.0	36.9	16.0	51.1	16.0	36.9
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	9.7	32.7	9.7	42.7	9.7	32.7	9.7	42.7
Max Q Clear Time (g_c+I1), s	6.9	19.9	11.4	24.1	10.4	29.8	11.7	26.5
Green Ext Time (p_c), s	0.1	3.5	0.0	4.0	0.0	1.6	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	43.0
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	653	1	1	864	1	4	0	7	0	0	9
Future Vol, veh/h	6	653	1	1	864	1	4	0	7	0	0	9
Conflicting Peds, #/hr	8	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	60	60	60	66	66	66
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	7	759	1	1	909	1	7	0	12	0	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	918	0	0	760	0	0	1230	1693	759	1700	1694	463
Stage 1	-	-	-	-	-	-	773	773	-	920	920	-
Stage 2	-	-	-	-	-	-	457	920	-	780	774	-
Critical Hdwy	4.115	-	-	4.115	-	-	7.3	6.5	6.2	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	746	-	-	*815	-	-	*514	*275	*545	*275	*275	551
Stage 1	-	-	-	-	-	-	*514	*450	-	*296	*352	-
Stage 2	-	-	-	-	-	-	*558	*352	-	*514	*450	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	740	-	-	*815	-	-	*497	*270	*545	*265	*270	547
Mov Cap-2 Maneuver	-	-	-	-	-	-	*497	*270	-	*265	*270	-
Stage 1	-	-	-	-	-	-	*509	*446	-	*291	*349	-
Stage 2	-	-	-	-	-	-	*543	*349	-	*498	*446	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	12.1	11.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	527	740	-	-	*815	-	-	547
HCM Lane V/C Ratio	0.035	0.009	-	-	0.001	-	-	0.025
HCM Control Delay (s)	12.1	9.9	-	-	9.4	-	-	11.8
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

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

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	637	0	0	832	8	0	0	0	20	0	44
Future Vol, veh/h	22	637	0	0	832	8	0	0	0	20	0	44
Conflicting Peds, #/hr	0	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	75	-	25	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	70	70	70
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	0	0	0
Mvmt Flow	26	741	0	0	876	8	0	0	0	29	0	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	892	0	0	741	0	0	1231	1685	741	1681	1681	450
Stage 1	-	-	-	-	-	-	793	793	-	888	888	-
Stage 2	-	-	-	-	-	-	438	892	-	793	793	-
Critical Hdwy	4.115	-	-	4.115	-	-	7.315	6.515	6.215	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.115	5.515	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.515	5.515	-	6.1	5.5	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	3.5095	4.0095	3.3095	3.5	4	3.3
Pot Cap-1 Maneuver	763	-	-	*853	-	-	*536	*251	*569	*254	*255	562
Stage 1	-	-	-	-	-	-	*537	*470	-	*309	*365	-
Stage 2	-	-	-	-	-	-	*570	*361	-	*538	*471	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	757	-	-	*853	-	-	*464	*241	*569	*245	*244	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	*464	*241	-	*245	*244	-
Stage 1	-	-	-	-	-	-	*519	*454	-	*296	*362	-
Stage 2	-	-	-	-	-	-	*506	*358	-	*520	*455	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	16.7
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	757	-	-	* 853	-	-	399
HCM Lane V/C Ratio	-	0.034	-	-	-	-	-	0.229
HCM Control Delay (s)	0	9.9	-	-	0	-	-	16.7
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.9

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

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰↑	↱		↕			↕	
Traffic Vol, veh/h	2	656	0	0	832	3	0	0	0	2	0	8
Future Vol, veh/h	2	656	0	0	832	3	0	0	0	2	0	8
Conflicting Peds, #/hr	1	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	60	60	60
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	2	763	0	0	876	3	0	0	0	3	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	885	0	0	763	0	0	1651	1652	763	1649	1649	882
Stage 1	-	-	-	-	-	-	767	767	-	882	882	-
Stage 2	-	-	-	-	-	-	884	885	-	767	767	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	769	-	-	797	-	-	31	40	527	32	41	348
Stage 1	-	-	-	-	-	-	493	435	-	344	367	-
Stage 2	-	-	-	-	-	-	343	366	-	493	435	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	765	-	-	797	-	-	30	40	527	31	40	346
Mov Cap-2 Maneuver	-	-	-	-	-	-	30	40	-	31	40	-
Stage 1	-	-	-	-	-	-	491	433	-	340	365	-
Stage 2	-	-	-	-	-	-	330	364	-	491	433	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	41.9
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	765	-	-	797	-	-	114
HCM Lane V/C Ratio	-	0.003	-	-	-	-	-	0.146
HCM Control Delay (s)	0	9.7	0	-	0	-	-	41.9
HCM Lane LOS	A	A	A	-	A	-	-	E
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	657	829	0	2	3
Future Vol, veh/h	0	657	829	0	2	3
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	70	70
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	782	873	0	3	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	878	0	-	0	1269	878
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	391	-
Critical Hdwy	4.115	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2095	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	773	-	-	-	*289	350
Stage 1	-	-	-	-	*410	-
Stage 2	-	-	-	-	*780	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	769	-	-	-	*287	348
Mov Cap-2 Maneuver	-	-	-	-	*287	-
Stage 1	-	-	-	-	*408	-
Stage 2	-	-	-	-	*776	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	769	-	-	-	321
HCM Lane V/C Ratio	-	-	-	-	0.022
HCM Control Delay (s)	0	-	-	-	16.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

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

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	659	0	0	829	0	0
Future Vol, veh/h	659	0	0	829	0	0
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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	95	95	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	785	0	0	873	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	785	0	1222	785
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	437	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	832	-	185	392
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	619	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	832	-	185	392
Mov Cap-2 Maneuver	-	-	-	-	185	-
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	619	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	832	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

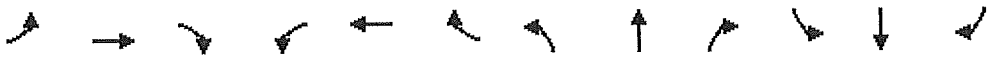
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		⅄	
Traffic Vol, veh/h	0	658	830	0	1	3
Future Vol, veh/h	0	658	830	0	1	3
Conflicting Peds, #/hr	8	0	0	8	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	60	60
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	783	874	0	2	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	882	0	-	0	1665	445
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	783	-
Critical Hdwy	4.115	-	-	-	6.6	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2095	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	770	-	-	-	*328	566
Stage 1	-	-	-	-	*370	-
Stage 2	-	-	-	-	*514	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	764	-	-	-	*322	562
Mov Cap-2 Maneuver	-	-	-	-	*322	-
Stage 1	-	-	-	-	*367	-
Stage 2	-	-	-	-	*510	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	764	-	-	-	474
HCM Lane V/C Ratio	-	-	-	-	0.014
HCM Control Delay (s)	0	-	-	-	12.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	400	128	69	648	124	70	188	46	98	258	105
Future Volume (veh/h)	99	400	128	69	648	124	70	188	46	98	258	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	110	444	142	74	697	133	78	209	51	109	287	117
Peak Hour Factor	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	623	938	297	700	1051	200	139	264	223	244	340	286
Arrive On Green	0.25	0.33	0.33	0.25	0.33	0.33	0.04	0.13	0.13	0.08	0.17	0.17
Sat Flow, veh/h	1890	2814	892	1890	3153	601	1890	1984	1678	1890	1984	1667
Grp Volume(v), veh/h	110	296	290	74	417	413	78	209	51	109	287	117
Grp Sat Flow(s),veh/h/ln	1890	1885	1821	1890	1885	1869	1890	1984	1678	1890	1984	1667
Q Serve(g_s), s	0.0	14.9	15.1	0.0	22.7	22.7	1.0	12.2	3.3	0.5	16.8	7.5
Cycle Q Clear(g_c), s	0.0	14.9	15.1	0.0	22.7	22.7	1.0	12.2	3.3	0.5	16.8	7.5
Prop In Lane	1.00		0.49	1.00		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	623	628	607	700	628	623	139	264	223	244	340	286
V/C Ratio(X)	0.18	0.47	0.48	0.11	0.66	0.66	0.56	0.79	0.23	0.45	0.84	0.41
Avail Cap(c_a), veh/h	623	628	607	700	628	623	274	589	498	307	589	495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	31.6	31.7	19.6	34.2	34.2	55.2	50.4	46.5	50.3	48.2	44.3
Incr Delay (d2), s/veh	0.1	2.5	2.7	0.1	5.4	5.5	3.5	5.3	0.5	1.3	5.7	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.0	11.3	11.2	2.2	16.3	16.2	4.3	10.6	2.5	5.5	13.5	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.8	34.2	34.4	19.7	39.7	39.7	58.7	55.7	47.0	51.6	53.9	45.3
LnGrp LOS	C	C	C	B	D	D	E	E	D	D	D	D
Approach Vol, veh/h		696			904			338			513	
Approach Delay, s/veh		33.1			38.1			55.1			51.4	
Approach LOS		C			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.6	46.0	11.4	27.0	35.6	46.0	16.0	22.4
Change Period (Y+Rc), s	* 6	* 6	6.4	6.4	* 6	* 6	6.4	6.4
Max Green Setting (Gmax), s	* 6	* 40	13.6	35.6	* 6	* 40	13.6	35.6
Max Q Clear Time (g_c+I1), s	2.0	17.1	3.0	18.8	2.0	24.7	2.5	14.2
Green Ext Time (p_c), s	0.0	3.3	0.1	1.7	0.1	4.3	0.2	1.3

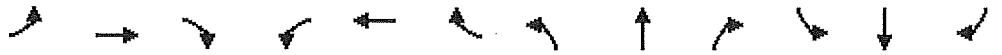
Intersection Summary	
HCM 6th Ctrl Delay	41.8
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	202	466	149	106	376	115	157	451	147	113	365	159
Future Volume (veh/h)	202	466	149	106	376	115	157	451	147	113	365	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1969	1953	1953	1953	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	217	501	160	154	545	167	194	557	181	133	429	187
Peak Hour Factor	0.93	0.93	0.93	0.69	0.69	0.69	0.81	0.81	0.81	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	2	2	2
Cap, veh/h	272	684	217	269	636	194	405	1131	366	355	1020	440
Arrive On Green	0.10	0.25	0.25	0.08	0.23	0.23	0.06	0.41	0.41	0.06	0.40	0.40
Sat Flow, veh/h	1875	2792	887	1860	2799	854	1875	2778	900	1875	2544	1098
Grp Volume(v), veh/h	217	335	326	154	361	351	194	374	364	133	314	302
Grp Sat Flow(s),veh/h/ln	1875	1870	1808	1860	1856	1798	1875	1870	1807	1875	1870	1771
Q Serve(g_s), s	10.6	19.7	20.0	7.5	22.4	22.5	7.4	17.8	17.9	5.0	14.5	14.8
Cycle Q Clear(g_c), s	10.6	19.7	20.0	7.5	22.4	22.5	7.4	17.8	17.9	5.0	14.5	14.8
Prop In Lane	1.00		0.49	1.00		0.48	1.00		0.50	1.00		0.62
Lane Grp Cap(c), veh/h	272	458	443	269	422	409	405	761	735	355	750	710
V/C Ratio(X)	0.80	0.73	0.74	0.57	0.85	0.86	0.48	0.49	0.49	0.38	0.42	0.42
Avail Cap(c_a), veh/h	272	525	508	302	521	505	405	761	735	366	750	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	41.7	41.7	33.1	44.5	44.5	20.3	26.4	26.4	20.4	25.9	25.9
Incr Delay (d2), s/veh	15.2	4.4	4.8	2.1	11.1	11.9	0.9	2.3	2.4	0.7	1.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.7	14.4	14.2	6.2	16.7	16.5	5.7	12.7	12.5	3.8	10.7	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	46.1	46.5	35.1	55.6	56.4	21.2	28.6	28.8	21.1	27.6	27.8
LnGrp LOS	D	D	D	D	E	E	C	C	C	C	C	C
Approach Vol, veh/h		878			866			932			749	
Approach Delay, s/veh		47.0			52.3			27.2			26.5	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	55.1	15.9	35.7	14.0	54.4	18.0	33.6
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	7.7	41.7	11.7	33.7	7.7	41.7	11.7	33.7
Max Q Clear Time (g_c+I1), s	7.0	19.9	9.5	22.0	9.4	16.8	12.6	24.5
Green Ext Time (p_c), s	0.0	4.2	0.1	2.9	0.0	3.6	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	38.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	685	37	13	567	0	17	0	13	0	0	4
Future Vol, veh/h	1	685	37	13	567	0	17	0	13	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	69	69	69	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	14	14	14
Mvmt Flow	1	778	42	19	822	0	28	0	22	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	822	0	0	820	0	0	1229	1640	778	1672	1682	411
Stage 1	-	-	-	-	-	-	780	780	-	860	860	-
Stage 2	-	-	-	-	-	-	449	860	-	812	822	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.51	6.71	7.11
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.71	5.71	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.31	5.71	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.633	4.133	3.433
Pot Cap-1 Maneuver	805	-	-	*773	-	-	*487	*355	*516	*336	*306	563
Stage 1	-	-	-	-	-	-	*487	*427	-	*298	*350	-
Stage 2	-	-	-	-	-	-	*560	*372	-	*472	*415	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	805	-	-	*773	-	-	*472	*345	*516	*316	*298	563
Mov Cap-2 Maneuver	-	-	-	-	-	-	*472	*345	-	*316	*298	-
Stage 1	-	-	-	-	-	-	*487	*426	-	*298	*341	-
Stage 2	-	-	-	-	-	-	*540	*363	-	*452	*414	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	13.2	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	490	805	-	-	*773	-	-	563
HCM Lane V/C Ratio	0.102	0.001	-	-	0.024	-	-	0.012
HCM Control Delay (s)	13.2	9.5	-	-	9.8	-	-	11.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0

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

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	636	34	13	554	12	19	0	10	2	0	11
Future Vol, veh/h	24	636	34	13	554	12	19	0	10	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	75	-	25	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	13	13	13
Mvmt Flow	28	740	40	19	815	18	21	0	11	3	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	833	0	0	780	0	0	1262	1687	760	1684	1698	417
Stage 1	-	-	-	-	-	-	816	816	-	862	862	-
Stage 2	-	-	-	-	-	-	446	871	-	822	836	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.495	6.695	7.095
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.695	5.695	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.295	5.695	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.6235	4.1235	3.4235
Pot Cap-1 Maneuver	798	-	-	*849	-	-	*535	*249	*567	*238	*233	560
Stage 1	-	-	-	-	-	-	*535	*469	-	*299	*351	-
Stage 2	-	-	-	-	-	-	*562	*368	-	*520	*457	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	798	-	-	*849	-	-	*499	*235	*567	*224	*220	560
Mov Cap-2 Maneuver	-	-	-	-	-	-	*499	*235	-	*224	*220	-
Stage 1	-	-	-	-	-	-	*517	*452	-	*289	*343	-
Stage 2	-	-	-	-	-	-	*536	*360	-	*492	*441	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	12.4	13.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	521	798	-	-	* 849	-	-	455
HCM Lane V/C Ratio	0.061	0.035	-	-	0.023	-	-	0.036
HCM Control Delay (s)	12.4	9.7	-	-	9.3	-	-	13.2
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	0.1

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

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↱		↕			↕	
Traffic Vol, veh/h	6	609	33	12	558	7	18	0	10	2	0	3
Future Vol, veh/h	6	609	33	12	558	7	18	0	10	2	0	3
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	7	708	38	18	821	10	20	0	11	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	832	0	0	746	0	0	1606	1609	727	1605	1618	822
Stage 1	-	-	-	-	-	-	741	741	-	858	858	-
Stage 2	-	-	-	-	-	-	865	868	-	747	760	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	801	-	-	801	-	-	40	50	531	41	50	377
Stage 1	-	-	-	-	-	-	488	439	-	354	376	-
Stage 2	-	-	-	-	-	-	348	370	-	484	426	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	800	-	-	801	-	-	38	47	531	38	47	377
Mov Cap-2 Maneuver	-	-	-	-	-	-	38	47	-	38	47	-
Stage 1	-	-	-	-	-	-	480	432	-	348	360	-
Stage 2	-	-	-	-	-	-	329	354	-	467	420	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	125.1	53.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	57	800	-	-	801	-	-	83
HCM Lane V/C Ratio	0.534	0.009	-	-	0.022	-	-	0.1
HCM Control Delay (s)	125.1	9.5	0	-	9.6	0	-	53.2
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	2.1	0	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	620	570	4	0	2
Future Vol, veh/h	2	620	570	4	0	2
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	68	68	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	2	729	838	6	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	845	0	-	0	1208	839
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	369	-
Critical Hdwy	4.13	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.219	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	789	-	-	-	*302	369
Stage 1	-	-	-	-	*427	-
Stage 2	-	-	-	-	*804	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	788	-	-	-	*301	369
Mov Cap-2 Maneuver	-	-	-	-	*301	-
Stage 1	-	-	-	-	*425	-
Stage 2	-	-	-	-	*804	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	788	-	-	-	369
HCM Lane V/C Ratio	0.003	-	-	-	0.009
HCM Control Delay (s)	9.6	0	-	-	14.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	612	8	3	553	21	13
Future Vol, veh/h	612	8	3	553	21	13
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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	68	68	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	720	9	4	813	23	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	729	0	1135	720
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	415	-
Critical Hdwy	-	-	4.145	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.2285	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	*884	-	*560	*593
Stage 1	-	-	-	-	*560	-
Stage 2	-	-	-	-	*636	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*884	-	*555	*593
Mov Cap-2 Maneuver	-	-	-	-	*555	-
Stage 1	-	-	-	-	*560	-
Stage 2	-	-	-	-	*631	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	555	593	-	-	* 884	-
HCM Lane V/C Ratio	0.041	0.024	-	-	0.005	-
HCM Control Delay (s)	11.8	11.2	-	-	9.1	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

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

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		⅄	
Traffic Vol, veh/h	2	622	552	7	0	2
Future Vol, veh/h	2	622	552	7	0	2
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	69	69	60	60
Heavy Vehicles, %	2	2	3	3	50	50
Mvmt Flow	2	732	800	10	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	811	0	-	0	1542	406
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	736	-
Critical Hdwy	4.13	-	-	-	7.35	7.65
Critical Hdwy Stg 1	-	-	-	-	6.55	-
Critical Hdwy Stg 2	-	-	-	-	6.15	-
Follow-up Hdwy	2.219	-	-	-	3.975	3.775
Pot Cap-1 Maneuver	813	-	-	-	*343	494
Stage 1	-	-	-	-	*316	-
Stage 2	-	-	-	-	*474	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	812	-	-	-	*341	494
Mov Cap-2 Maneuver	-	-	-	-	*341	-
Stage 1	-	-	-	-	*314	-
Stage 2	-	-	-	-	*474	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	812	-	-	-	494
HCM Lane V/C Ratio	0.003	-	-	-	0.007
HCM Control Delay (s)	9.4	0	-	-	12.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	526	54	30	294	70	59	148	48	65	95	66
Future Volume (veh/h)	126	526	54	30	294	70	59	148	48	65	95	66
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1969	1969	1969	1953	1953	1953
Adj Flow Rate, veh/h	143	598	61	34	334	80	78	195	63	78	114	80
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.76	0.76	0.76	0.83	0.83	0.83
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	3	3	3
Cap, veh/h	805	1411	144	700	1236	292	240	241	204	138	163	138
Arrive On Green	0.22	0.41	0.41	0.22	0.41	0.41	0.08	0.12	0.12	0.04	0.08	0.08
Sat Flow, veh/h	1890	3455	352	1890	3026	715	1875	1969	1668	1860	1953	1655
Grp Volume(v), veh/h	143	326	333	34	206	208	78	195	63	78	114	80
Grp Sat Flow(s),veh/h/ln	1890	1885	1921	1890	1885	1856	1875	1969	1668	1860	1953	1655
Q Serve(g_s), s	0.0	14.8	14.9	0.0	8.7	8.9	0.0	11.6	4.1	1.0	6.8	5.6
Cycle Q Clear(g_c), s	0.0	14.8	14.9	0.0	8.7	8.9	0.0	11.6	4.1	1.0	6.8	5.6
Prop In Lane	1.00		0.18	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	805	770	784	700	770	758	240	241	204	138	163	138
V/C Ratio(X)	0.18	0.42	0.42	0.05	0.27	0.27	0.33	0.81	0.31	0.57	0.70	0.58
Avail Cap(c_a), veh/h	805	770	784	700	770	758	270	469	398	240	466	395
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.9	25.4	25.4	15.3	23.6	23.7	50.2	51.3	48.0	55.2	53.5	53.0
Incr Delay (d2), s/veh	0.1	1.7	1.7	0.0	0.9	0.9	0.8	6.4	0.9	3.6	5.4	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	11.0	11.2	0.8	7.1	7.1	4.0	10.2	3.2	4.3	6.4	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	27.1	27.1	15.4	24.4	24.5	51.0	57.8	48.9	58.8	58.9	56.8
LnGrp LOS	B	C	C	B	C	C	D	E	D	E	E	E
Approach Vol, veh/h		802			448			336			272	
Approach Delay, s/veh		24.8			23.8			54.5			58.3	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.5	55.0	16.1	16.4	32.5	55.0	11.4	21.1
Change Period (Y+Rc), s	* 6	* 6	6.4	6.4	* 6	* 6	6.4	6.4
Max Green Setting (Gmax), s	* 6	* 49	11.6	28.6	* 6	* 49	11.6	28.6
Max Q Clear Time (g_c+I1), s	2.0	16.9	2.0	8.8	2.0	10.9	3.0	13.6
Green Ext Time (p_c), s	0.0	3.9	0.1	0.7	0.1	2.3	0.1	1.1

Intersection Summary	
HCM 6th Ctrl Delay	34.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	470	227	216	551	232	203	622	125	177	630	307
Future Volume (veh/h)	225	470	227	216	551	232	203	622	125	177	630	307
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	245	511	247	248	633	267	214	655	132	186	663	323
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	246	706	340	283	736	310	270	1073	216	328	840	409
Arrive On Green	0.08	0.29	0.29	0.08	0.29	0.29	0.08	0.34	0.34	0.08	0.34	0.34
Sat Flow, veh/h	1890	2466	1187	1890	2571	1084	1890	3127	629	1890	2456	1197
Grp Volume(v), veh/h	245	390	368	248	464	436	214	395	392	186	509	477
Grp Sat Flow(s),veh/h/ln	1890	1885	1768	1890	1885	1770	1890	1885	1871	1890	1885	1768
Q Serve(g_s), s	9.7	22.4	22.5	9.7	28.0	28.0	8.8	20.9	20.9	7.6	29.2	29.2
Cycle Q Clear(g_c), s	9.7	22.4	22.5	9.7	28.0	28.0	8.8	20.9	20.9	7.6	29.2	29.2
Prop In Lane	1.00		0.67	1.00		0.61	1.00		0.34	1.00		0.68
Lane Grp Cap(c), veh/h	246	539	506	283	539	507	270	647	642	328	645	605
V/C Ratio(X)	1.00	0.72	0.73	0.88	0.86	0.86	0.79	0.61	0.61	0.57	0.79	0.79
Avail Cap(c_a), veh/h	246	671	629	283	671	630	270	647	642	330	645	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	38.6	38.6	34.2	40.6	40.6	28.0	32.7	32.8	24.7	35.6	35.6
Incr Delay (d2), s/veh	56.5	2.9	3.2	25.0	9.2	9.8	14.9	4.2	4.3	2.2	9.5	10.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.6	15.7	15.0	11.3	19.9	19.0	8.5	15.1	15.0	6.2	20.7	19.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	91.6	41.5	41.8	59.2	49.8	50.4	42.9	37.0	37.1	26.9	45.0	45.6
LnGrp LOS	F	D	D	E	D	D	D	D	D	C	D	D
Approach Vol, veh/h		1003			1148			1001			1172	
Approach Delay, s/veh		53.9			52.1			38.3			42.4	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.9	47.5	16.0	40.6	16.0	47.4	16.0	40.6
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	9.7	32.7	9.7	42.7	9.7	32.7	9.7	42.7
Max Q Clear Time (g_c+I1), s	9.6	22.9	11.7	24.5	10.8	31.2	11.7	30.0
Green Ext Time (p_c), s	0.0	3.2	0.0	4.2	0.0	0.9	0.0	4.3

Intersection Summary	
HCM 6th Ctrl Delay	46.7
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	734	48	37	949	1	62	0	40	0	0	9
Future Vol, veh/h	6	734	48	37	949	1	62	0	40	0	0	9
Conflicting Peds, #/hr	8	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	60	60	60	66	66	66
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	7	853	56	39	999	1	103	0	67	0	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1008	0	0	909	0	0	1445	1953	853	2015	2009	508
Stage 1	-	-	-	-	-	-	867	867	-	1086	1086	-
Stage 2	-	-	-	-	-	-	578	1086	-	929	923	-
Critical Hdwy	4.115	-	-	4.115	-	-	7.3	6.5	6.2	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	690	-	-	*738	-	-	*465	*168	*494	*127	*143	515
Stage 1	-	-	-	-	-	-	*465	*407	-	*234	*295	-
Stage 2	-	-	-	-	-	-	*474	*295	-	*465	*407	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	685	-	-	*738	-	-	*431	*156	*494	*104	*133	511
Mov Cap-2 Maneuver	-	-	-	-	-	-	*431	*156	-	*104	*133	-
Stage 1	-	-	-	-	-	-	*461	*403	-	*230	*277	-
Stage 2	-	-	-	-	-	-	*437	*277	-	*398	*403	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	17.6	12.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	454	685	-	-	*738	-	-	511
HCM Lane V/C Ratio	0.374	0.01	-	-	0.053	-	-	0.027
HCM Control Delay (s)	17.6	10.3	-	-	10.2	-	-	12.2
HCM Lane LOS	C	B	-	-	B	-	-	B
HCM 95th %tile Q(veh)	1.7	0	-	-	0.2	-	-	0.1

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

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	696	55	43	886	8	67	0	39	20	0	44
Future Vol, veh/h	22	696	55	43	886	8	67	0	39	20	0	44
Conflicting Peds, #/hr	0	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	75	-	25	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	70	70	70
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	0	0	0
Mvmt Flow	26	809	64	45	933	8	73	0	42	29	0	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	949	0	0	873	0	0	1450	1932	841	1949	1960	479
Stage 1	-	-	-	-	-	-	893	893	-	1035	1035	-
Stage 2	-	-	-	-	-	-	557	1039	-	914	925	-
Critical Hdwy	4.115	-	-	4.115	-	-	7.315	6.515	6.215	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.115	5.515	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.515	5.515	-	6.1	5.5	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	3.5095	4.0095	3.3095	3.5	4	3.3
Pot Cap-1 Maneuver	727	-	-	*776	-	-	*488	*160	*518	*140	*149	538
Stage 1	-	-	-	-	-	-	*489	*428	-	*252	*312	-
Stage 2	-	-	-	-	-	-	*485	*309	-	*490	*429	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	721	-	-	*776	-	-	*400	*144	*518	*119	*134	534
Mov Cap-2 Maneuver	-	-	-	-	-	-	*400	*144	-	*119	*134	-
Stage 1	-	-	-	-	-	-	*471	*412	-	*241	*291	-
Stage 2	-	-	-	-	-	-	*403	*289	-	*433	*413	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	16.2	26.7
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	437	721	-	-	*776	-	-	256
HCM Lane V/C Ratio	0.264	0.035	-	-	0.058	-	-	0.357
HCM Control Delay (s)	16.2	10.2	-	-	9.9	-	-	26.7
HCM Lane LOS	C	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1	0.1	-	-	0.2	-	-	1.6

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

Intersection	
Int Delay, s/veh	143.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↱		↕			↕	
Traffic Vol, veh/h	2	698	56	41	863	3	66	0	38	2	0	8
Future Vol, veh/h	2	698	56	41	863	3	66	0	38	2	0	8
Conflicting Peds, #/hr	1	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	60	60	60
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	2	812	65	43	908	3	72	0	41	3	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	917	0	0	877	0	0	1851	1852	845	1869	1881	914
Stage 1	-	-	-	-	-	-	849	849	-	1000	1000	-
Stage 2	-	-	-	-	-	-	1002	1003	-	869	881	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	748	-	-	661	-	-	~ 15	20	443	14	19	334
Stage 1	-	-	-	-	-	-	417	376	-	295	324	-
Stage 2	-	-	-	-	-	-	295	322	-	396	352	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	744	-	-	661	-	-	~ 13	18	443	11	16	332
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 13	18	-	11	16	-
Stage 1	-	-	-	-	-	-	415	374	-	292	280	-
Stage 2	-	-	-	-	-	-	246	278	-	357	350	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	$ 2478.1	112.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	20	744	-	-	661	-	-	49
HCM Lane V/C Ratio	5.652	0.003	-	-	0.065	-	-	0.34
HCM Control Delay (s)	$ 2478.1	9.9	0	-	10.8	0	-	112.5
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	14.5	0	-	-	0.2	-	-	1.2

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	733	901	0	2	3
Future Vol, veh/h	0	733	901	0	2	3
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	70	70
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	873	948	0	3	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	953	0	-	0	1390	953
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	437	-
Critical Hdwy	4.115	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2095	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	724	-	-	-	*247	317
Stage 1	-	-	-	-	*378	-
Stage 2	-	-	-	-	*756	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	721	-	-	-	*244	315
Mov Cap-2 Maneuver	-	-	-	-	*244	-
Stage 1	-	-	-	-	*376	-
Stage 2	-	-	-	-	*752	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	18.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	721	-	-	-	282
HCM Lane V/C Ratio	-	-	-	-	0.025
HCM Control Delay (s)	0	-	-	-	18.1
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

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

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	715	20	12	888	13	6
Future Vol, veh/h	715	20	12	888	13	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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	95	95	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	851	24	13	935	14	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	875	0	1345	851
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	494	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	769	-	154	359
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	580	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	769	-	149	359
Mov Cap-2 Maneuver	-	-	-	-	149	-
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	560	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	26.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	149	359	-	-	769	-
HCM Lane V/C Ratio	0.095	0.018	-	-	0.016	-
HCM Control Delay (s)	31.7	15.2	-	-	9.8	0.2
HCM Lane LOS	D	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		Y	
Traffic Vol, veh/h	0	720	901	0	1	3
Future Vol, veh/h	0	720	901	0	1	3
Conflicting Peds, #/hr	8	0	0	8	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	60	60
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	857	948	0	2	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	956	0	-	0	1813	482
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	857	-
Critical Hdwy	4.115	-	-	-	6.6	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2095	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	722	-	-	-	*277	536
Stage 1	-	-	-	-	*339	-
Stage 2	-	-	-	-	*466	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	716	-	-	-	*273	532
Mov Cap-2 Maneuver	-	-	-	-	*273	-
Stage 1	-	-	-	-	*336	-
Stage 2	-	-	-	-	*462	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	716	-	-	-	430
HCM Lane V/C Ratio	-	-	-	-	0.016
HCM Control Delay (s)	0	-	-	-	13.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	424	148	69	686	124	83	188	46	98	258	125
Future Volume (veh/h)	117	424	148	69	686	124	83	188	46	98	258	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	130	471	164	74	738	133	92	209	51	109	287	139
Peak Hour Factor	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	611	915	316	681	1062	191	139	264	223	245	341	286
Arrive On Green	0.25	0.33	0.33	0.25	0.33	0.33	0.04	0.13	0.13	0.08	0.17	0.17
Sat Flow, veh/h	1890	2746	949	1890	3185	574	1890	1984	1678	1890	1984	1667
Grp Volume(v), veh/h	130	322	313	74	437	434	92	209	51	109	287	139
Grp Sat Flow(s),veh/h/ln	1890	1885	1810	1890	1885	1874	1890	1984	1678	1890	1984	1667
Q Serve(g_s), s	0.0	16.5	16.7	0.0	24.1	24.1	1.9	12.2	3.3	0.5	16.8	9.0
Cycle Q Clear(g_c), s	0.0	16.5	16.7	0.0	24.1	24.1	1.9	12.2	3.3	0.5	16.8	9.0
Prop In Lane	1.00		0.52	1.00		0.31	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	611	628	603	681	628	625	139	264	223	245	341	286
V/C Ratio(X)	0.21	0.51	0.52	0.11	0.69	0.70	0.66	0.79	0.23	0.45	0.84	0.49
Avail Cap(c_a), veh/h	611	628	603	681	628	625	274	589	498	307	589	495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	32.2	32.2	20.7	34.7	34.7	55.4	50.4	46.5	50.2	48.1	44.9
Incr Delay (d2), s/veh	0.2	3.0	3.2	0.1	6.2	6.3	5.3	5.3	0.5	1.3	5.6	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.1	12.3	12.1	2.2	17.3	17.2	5.2	10.6	2.5	5.5	13.5	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	35.1	35.4	20.8	40.9	41.0	60.7	55.7	47.0	51.5	53.7	46.2
LnGrp LOS	C	D	D	C	D	D	E	E	D	D	D	D
Approach Vol, veh/h		765			945			352			535	
Approach Delay, s/veh		34.2			39.4			55.8			51.3	
Approach LOS		C			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.6	46.0	11.4	27.0	35.6	46.0	16.1	22.4
Change Period (Y+Rc), s	* 6	* 6	6.4	6.4	* 6	* 6	6.4	6.4
Max Green Setting (Gmax), s	* 6	* 40	13.6	35.6	* 6	* 40	13.6	35.6
Max Q Clear Time (g_c+I1), s	2.0	18.7	3.9	18.8	2.0	26.1	2.5	14.2
Green Ext Time (p_c), s	0.0	3.5	0.1	1.8	0.1	4.3	0.2	1.3

Intersection Summary	
HCM 6th Ctrl Delay	42.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	202	466	149	106	376	115	157	451	147	113	365	159
Future Volume (veh/h)	202	466	149	106	376	115	157	451	147	113	365	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1969	1953	1953	1953	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	217	501	160	154	545	167	194	557	181	133	429	187
Peak Hour Factor	0.93	0.93	0.93	0.69	0.69	0.69	0.81	0.81	0.81	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	2	2	2
Cap, veh/h	272	684	217	269	636	194	405	1131	366	355	1020	440
Arrive On Green	0.10	0.25	0.25	0.08	0.23	0.23	0.06	0.41	0.41	0.06	0.40	0.40
Sat Flow, veh/h	1875	2792	887	1860	2799	854	1875	2778	900	1875	2544	1098
Grp Volume(v), veh/h	217	335	326	154	361	351	194	374	364	133	314	302
Grp Sat Flow(s),veh/h/ln	1875	1870	1808	1860	1856	1798	1875	1870	1807	1875	1870	1771
Q Serve(g_s), s	10.6	19.7	20.0	7.5	22.4	22.5	7.4	17.8	17.9	5.0	14.5	14.8
Cycle Q Clear(g_c), s	10.6	19.7	20.0	7.5	22.4	22.5	7.4	17.8	17.9	5.0	14.5	14.8
Prop In Lane	1.00		0.49	1.00		0.48	1.00		0.50	1.00		0.62
Lane Grp Cap(c), veh/h	272	458	443	269	422	409	405	761	735	355	750	710
V/C Ratio(X)	0.80	0.73	0.74	0.57	0.85	0.86	0.48	0.49	0.49	0.38	0.42	0.42
Avail Cap(c_a), veh/h	272	525	508	302	521	505	405	761	735	366	750	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	41.7	41.7	33.1	44.5	44.5	20.3	26.4	26.4	20.4	25.9	25.9
Incr Delay (d2), s/veh	15.2	4.4	4.8	2.1	11.1	11.9	0.9	2.3	2.4	0.7	1.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.7	14.4	14.2	6.2	16.7	16.5	5.7	12.7	12.5	3.8	10.7	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	46.1	46.5	35.1	55.6	56.4	21.2	28.6	28.8	21.1	27.6	27.8
LnGrp LOS	D	D	D	D	E	E	C	C	C	C	C	C
Approach Vol, veh/h		878			866			932			749	
Approach Delay, s/veh		47.0			52.3			27.2			26.5	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	55.1	15.9	35.7	14.0	54.4	18.0	33.6
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	7.7	41.7	11.7	33.7	7.7	41.7	11.7	33.7
Max Q Clear Time (g_c+I1), s	7.0	19.9	9.5	22.0	9.4	16.8	12.6	24.5
Green Ext Time (p_c), s	0.0	4.2	0.1	2.9	0.0	3.6	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	38.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	685	37	13	567	0	17	0	13	0	0	4
Future Vol, veh/h	1	685	37	13	567	0	17	0	13	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	69	69	69	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	14	14	14
Mvmt Flow	1	778	42	19	822	0	28	0	22	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	822	0	0	820	0	0	1229	1640	778	1672	1682	411
Stage 1	-	-	-	-	-	-	780	780	-	860	860	-
Stage 2	-	-	-	-	-	-	449	860	-	812	822	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.51	6.71	7.11
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.71	5.71	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.31	5.71	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.633	4.133	3.433
Pot Cap-1 Maneuver	805	-	-	*773	-	-	*487	*355	*516	*336	*306	563
Stage 1	-	-	-	-	-	-	*487	*427	-	*298	*350	-
Stage 2	-	-	-	-	-	-	*560	*372	-	*472	*415	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	805	-	-	*773	-	-	*472	*345	*516	*316	*298	563
Mov Cap-2 Maneuver	-	-	-	-	-	-	*472	*345	-	*316	*298	-
Stage 1	-	-	-	-	-	-	*487	*426	-	*298	*341	-
Stage 2	-	-	-	-	-	-	*540	*363	-	*452	*414	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	13.2	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	490	805	-	-	*773	-	-	563
HCM Lane V/C Ratio	0.102	0.001	-	-	0.024	-	-	0.012
HCM Control Delay (s)	13.2	9.5	-	-	9.8	-	-	11.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0

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

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	636	34	13	554	12	19	0	10	2	0	11
Future Vol, veh/h	24	636	34	13	554	12	19	0	10	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	200	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	13	13	13
Mvmt Flow	28	740	40	19	815	18	21	0	11	3	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	833	0	0	780	0	0	1262	1687	390	1288	1698	417
Stage 1	-	-	-	-	-	-	816	816	-	862	862	-
Stage 2	-	-	-	-	-	-	446	871	-	426	836	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.76	6.76	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.76	5.76	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.76	5.76	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.63	4.13	3.43
Pot Cap-1 Maneuver	796	-	-	1154	-	-	243	126	*823	*214	113	555
Stage 1	-	-	-	-	-	-	658	602	-	*294	346	-
Stage 2	-	-	-	-	-	-	561	367	-	*752	566	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	796	-	-	1154	-	-	228	120	*823	*203	108	555
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	120	-	*203	108	-
Stage 1	-	-	-	-	-	-	635	581	-	*284	340	-
Stage 2	-	-	-	-	-	-	538	361	-	*716	546	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	17.9	13.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	228	823	796	-	-	1154	-	-	438
HCM Lane V/C Ratio	0.091	0.013	0.035	-	-	0.017	-	-	0.037
HCM Control Delay (s)	22.4	9.4	9.7	-	-	8.2	-	-	13.5
HCM Lane LOS	C	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	0.1	-	-	0.1	-	-	0.1

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

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	609	33	12	558	7	18	0	10	2	0	3
Future Vol, veh/h	6	609	33	12	558	7	18	0	10	2	0	3
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	68	68	68	92	92	92	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	7	708	38	18	821	10	20	0	11	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	832	0	0	746	0	0	1188	1609	373	1231	1623	417
Stage 1	-	-	-	-	-	-	741	741	-	863	863	-
Stage 2	-	-	-	-	-	-	447	868	-	368	760	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4	3.3
Pot Cap-1 Maneuver	796	-	-	1146	-	-	261	139	*848	*241	138	590
Stage 1	-	-	-	-	-	-	687	626	-	*320	374	-
Stage 2	-	-	-	-	-	-	560	368	-	*804	615	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	795	-	-	1146	-	-	254	136	*848	*234	134	589
Mov Cap-2 Maneuver	-	-	-	-	-	-	254	136	-	*234	134	-
Stage 1	-	-	-	-	-	-	681	620	-	*317	368	-
Stage 2	-	-	-	-	-	-	547	362	-	*787	609	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	16.4	15
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	254	848	795	-	-	1146	-	-	367
HCM Lane V/C Ratio	0.077	0.013	0.009	-	-	0.015	-	-	0.023
HCM Control Delay (s)	20.4	9.3	9.6	-	-	8.2	-	-	15
HCM Lane LOS	C	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0	0	-	-	0	-	-	0.1

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

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	2	620	570	4	0	2
Future Vol, veh/h	2	620	570	4	0	2
Conflicting Peds, #/hr	1	0	0	1	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	85	85	68	68	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	2	729	838	6	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	845	0	-	0	1211	423
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	369	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	787	-	-	-	*289	585
Stage 1	-	-	-	-	*388	-
Stage 2	-	-	-	-	*804	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	786	-	-	-	*287	584
Mov Cap-2 Maneuver	-	-	-	-	*287	-
Stage 1	-	-	-	-	*386	-
Stage 2	-	-	-	-	*804	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	786	-	-	-	584
HCM Lane V/C Ratio	0.003	-	-	-	0.006
HCM Control Delay (s)	9.6	0	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	612	8	3	553	21	13
Future Vol, veh/h	612	8	3	553	21	13
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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	68	68	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	720	9	4	813	23	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	729	0	1135	720
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	415	-
Critical Hdwy	-	-	4.145	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.2285	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	*884	-	*560	*593
Stage 1	-	-	-	-	*560	-
Stage 2	-	-	-	-	*636	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*884	-	*555	*593
Mov Cap-2 Maneuver	-	-	-	-	*555	-
Stage 1	-	-	-	-	*560	-
Stage 2	-	-	-	-	*631	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	555	593	-	-	* 884	-
HCM Lane V/C Ratio	0.041	0.024	-	-	0.005	-
HCM Control Delay (s)	11.8	11.2	-	-	9.1	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

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

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		Y	
Traffic Vol, veh/h	2	622	552	7	0	2
Future Vol, veh/h	2	622	552	7	0	2
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	69	69	60	60
Heavy Vehicles, %	2	2	3	3	50	50
Mvmt Flow	2	732	800	10	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	811	0	-	0	1542	406
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	736	-
Critical Hdwy	4.13	-	-	-	7.35	7.65
Critical Hdwy Stg 1	-	-	-	-	6.55	-
Critical Hdwy Stg 2	-	-	-	-	6.15	-
Follow-up Hdwy	2.219	-	-	-	3.975	3.775
Pot Cap-1 Maneuver	813	-	-	-	*343	494
Stage 1	-	-	-	-	*316	-
Stage 2	-	-	-	-	*474	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	812	-	-	-	*341	494
Mov Cap-2 Maneuver	-	-	-	-	*341	-
Stage 1	-	-	-	-	*314	-
Stage 2	-	-	-	-	*474	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	812	-	-	-	494
HCM Lane V/C Ratio	0.003	-	-	-	0.007
HCM Control Delay (s)	9.4	0	-	-	12.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	526	54	30	294	70	59	148	48	65	95	66
Future Volume (veh/h)	126	526	54	30	294	70	59	148	48	65	95	66
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1969	1969	1969	1953	1953	1953
Adj Flow Rate, veh/h	143	598	61	34	334	80	78	195	63	78	114	80
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.76	0.76	0.76	0.83	0.83	0.83
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	3	3	3
Cap, veh/h	805	1411	144	700	1236	292	240	241	204	138	163	138
Arrive On Green	0.22	0.41	0.41	0.22	0.41	0.41	0.08	0.12	0.12	0.04	0.08	0.08
Sat Flow, veh/h	1890	3455	352	1890	3026	715	1875	1969	1668	1860	1953	1655
Grp Volume(v), veh/h	143	326	333	34	206	208	78	195	63	78	114	80
Grp Sat Flow(s),veh/h/ln	1890	1885	1921	1890	1885	1856	1875	1969	1668	1860	1953	1655
Q Serve(g_s), s	0.0	14.8	14.9	0.0	8.7	8.9	0.0	11.6	4.1	1.0	6.8	5.6
Cycle Q Clear(g_c), s	0.0	14.8	14.9	0.0	8.7	8.9	0.0	11.6	4.1	1.0	6.8	5.6
Prop In Lane	1.00		0.18	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	805	770	784	700	770	758	240	241	204	138	163	138
V/C Ratio(X)	0.18	0.42	0.42	0.05	0.27	0.27	0.33	0.81	0.31	0.57	0.70	0.58
Avail Cap(c_a), veh/h	805	770	784	700	770	758	270	469	398	240	466	395
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.9	25.4	25.4	15.3	23.6	23.7	50.2	51.3	48.0	55.2	53.5	53.0
Incr Delay (d2), s/veh	0.1	1.7	1.7	0.0	0.9	0.9	0.8	6.4	0.9	3.6	5.4	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	11.0	11.2	0.8	7.1	7.1	4.0	10.2	3.2	4.3	6.4	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	27.1	27.1	15.4	24.4	24.5	51.0	57.8	48.9	58.8	58.9	56.8
LnGrp LOS	B	C	C	B	C	C	D	E	D	E	E	E
Approach Vol, veh/h		802			448			336			272	
Approach Delay, s/veh		24.8			23.8			54.5			58.3	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.5	55.0	16.1	16.4	32.5	55.0	11.4	21.1
Change Period (Y+Rc), s	* 6	* 6	6.4	6.4	* 6	* 6	6.4	6.4
Max Green Setting (Gmax), s	* 6	* 49	11.6	28.6	* 6	* 49	11.6	28.6
Max Q Clear Time (g_c+I1), s	2.0	16.9	2.0	8.8	2.0	10.9	3.0	13.6
Green Ext Time (p_c), s	0.0	3.9	0.1	0.7	0.1	2.3	0.1	1.1

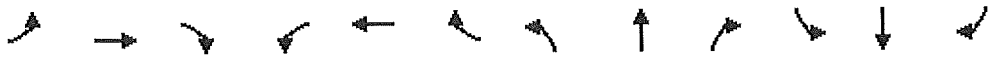
Intersection Summary	
HCM 6th Ctrl Delay	34.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1001: Novi Road & 10 Mile Road

11/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	470	227	216	551	232	203	622	125	177	630	307
Future Volume (veh/h)	225	470	227	216	551	232	203	622	125	177	630	307
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	245	511	247	248	633	267	214	655	132	186	663	323
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	276	703	338	313	733	309	258	1022	206	315	803	391
Arrive On Green	0.10	0.28	0.28	0.10	0.28	0.28	0.08	0.33	0.33	0.08	0.33	0.33
Sat Flow, veh/h	1890	2466	1187	1890	2571	1084	1890	3127	629	1890	2456	1197
Grp Volume(v), veh/h	245	390	368	248	464	436	214	395	392	186	509	477
Grp Sat Flow(s),veh/h/ln	1890	1885	1768	1890	1885	1770	1890	1885	1871	1890	1885	1768
Q Serve(g_s), s	11.0	22.4	22.5	11.2	28.0	28.0	9.1	21.4	21.4	7.8	29.9	29.9
Cycle Q Clear(g_c), s	11.0	22.4	22.5	11.2	28.0	28.0	9.1	21.4	21.4	7.8	29.9	29.9
Prop In Lane	1.00		0.67	1.00		0.61	1.00		0.34	1.00		0.68
Lane Grp Cap(c), veh/h	276	537	504	313	537	504	258	616	611	315	616	578
V/C Ratio(X)	0.89	0.73	0.73	0.79	0.86	0.86	0.83	0.64	0.64	0.59	0.83	0.83
Avail Cap(c_a), veh/h	276	655	614	313	655	615	258	616	611	315	616	578
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	38.7	38.7	29.6	40.7	40.7	29.2	34.4	34.4	26.0	37.3	37.3
Incr Delay (d2), s/veh	27.4	3.2	3.5	12.9	9.9	10.5	20.0	5.0	5.1	2.9	12.0	12.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.2	15.8	15.1	10.0	20.1	19.2	9.1	15.5	15.5	6.4	21.6	20.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	41.9	42.2	42.5	50.6	51.3	49.2	39.4	39.5	28.9	49.3	50.0
LnGrp LOS	E	D	D	D	D	D	D	D	D	C	D	D
Approach Vol, veh/h		1003			1148			1001			1172	
Approach Delay, s/veh		46.0			49.1			41.6			46.3	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	45.5	18.0	40.5	16.0	45.5	18.0	40.5
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	9.7	31.7	11.7	41.7	9.7	31.7	11.7	41.7
Max Q Clear Time (g_c+I1), s	9.8	23.4	13.2	24.5	11.1	31.9	13.0	30.0
Green Ext Time (p_c), s	0.0	2.9	0.0	4.1	0.0	0.0	0.0	4.1

Intersection Summary	
HCM 6th Ctrl Delay	45.9
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	734	48	37	949	1	62	0	40	0	0	9
Future Vol, veh/h	6	734	48	37	949	1	62	0	40	0	0	9
Conflicting Peds, #/hr	8	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	60	60	60	66	66	66
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	7	853	56	39	999	1	103	0	67	0	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1008	0	0	909	0	0	1445	1953	853	2015	2009	508
Stage 1	-	-	-	-	-	-	867	867	-	1086	1086	-
Stage 2	-	-	-	-	-	-	578	1086	-	929	923	-
Critical Hdwy	4.115	-	-	4.115	-	-	7.3	6.5	6.2	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	690	-	-	*738	-	-	*465	*168	*494	*127	*143	515
Stage 1	-	-	-	-	-	-	*465	*407	-	*234	*295	-
Stage 2	-	-	-	-	-	-	*474	*295	-	*465	*407	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	685	-	-	*738	-	-	*431	*156	*494	*104	*133	511
Mov Cap-2 Maneuver	-	-	-	-	-	-	*431	*156	-	*104	*133	-
Stage 1	-	-	-	-	-	-	*461	*403	-	*230	*277	-
Stage 2	-	-	-	-	-	-	*437	*277	-	*398	*403	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	17.6	12.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	454	685	-	-	*738	-	-	511
HCM Lane V/C Ratio	0.374	0.01	-	-	0.053	-	-	0.027
HCM Control Delay (s)	17.6	10.3	-	-	10.2	-	-	12.2
HCM Lane LOS	C	B	-	-	B	-	-	B
HCM 95th %tile Q(veh)	1.7	0	-	-	0.2	-	-	0.1

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

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	696	55	43	886	8	67	0	39	20	0	44
Future Vol, veh/h	22	696	55	43	886	8	67	0	39	20	0	44
Conflicting Peds, #/hr	0	0	0	0	0	8	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	200	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	70	70	70
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	0	0	0
Mvmt Flow	26	809	64	45	933	8	73	0	42	29	0	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	949	0	0	873	0	0	1450	1932	437	1492	1960	479
Stage 1	-	-	-	-	-	-	893	893	-	1035	1035	-
Stage 2	-	-	-	-	-	-	557	1039	-	457	925	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.52	6.52	6.92	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.52	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.52	-	6.5	5.5	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.51	4.01	3.31	3.5	4	3.3
Pot Cap-1 Maneuver	725	-	-	1093	-	-	174	84	*799	*160	80	538
Stage 1	-	-	-	-	-	-	629	577	-	*252	312	-
Stage 2	-	-	-	-	-	-	485	308	-	*756	555	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	719	-	-	1093	-	-	145	77	*799	*141	74	534
Mov Cap-2 Maneuver	-	-	-	-	-	-	145	77	-	*141	74	-
Stage 1	-	-	-	-	-	-	606	556	-	*241	297	-
Stage 2	-	-	-	-	-	-	410	293	-	*690	535	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.4	36.9	23.5
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	145	799	719	-	-	1093	-	-	285
HCM Lane V/C Ratio	0.502	0.053	0.036	-	-	0.041	-	-	0.321
HCM Control Delay (s)	52.6	9.8	10.2	-	-	8.4	-	-	23.5
HCM Lane LOS	F	A	B	-	-	A	-	-	C
HCM 95th %tile Q(veh)	2.4	0.2	0.1	-	-	0.1	-	-	1.3

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

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	698	56	41	863	3	66	0	38	2	0	8
Future Vol, veh/h	2	698	56	41	863	3	66	0	38	2	0	8
Conflicting Peds, #/hr	1	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	95	95	95	92	92	92	60	60	60
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	2	812	65	43	908	3	72	0	41	3	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	917	0	0	877	0	0	1389	1852	439	1412	1883	462
Stage 1	-	-	-	-	-	-	849	849	-	1002	1002	-
Stage 2	-	-	-	-	-	-	540	1003	-	410	881	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	746	-	-	1088	-	-	202	99	*802	*191	93	552
Stage 1	-	-	-	-	-	-	683	614	-	*264	323	-
Stage 2	-	-	-	-	-	-	499	322	-	*756	588	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	742	-	-	1088	-	-	190	94	*802	*175	88	549
Mov Cap-2 Maneuver	-	-	-	-	-	-	190	94	-	*175	88	-
Stage 1	-	-	-	-	-	-	681	612	-	*262	308	-
Stage 2	-	-	-	-	-	-	468	307	-	*715	586	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	25.8	14.8
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	190	802	742	-	-	1088	-	-	385
HCM Lane V/C Ratio	0.378	0.052	0.003	-	-	0.04	-	-	0.043
HCM Control Delay (s)	35	9.7	9.9	-	-	8.4	-	-	14.8
HCM Lane LOS	E	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.6	0.2	0	-	-	0.1	-	-	0.1

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑↑	↑↑↱		⅄	
Traffic Vol, veh/h	0	733	901	0	2	3
Future Vol, veh/h	0	733	901	0	2	3
Conflicting Peds, #/hr	5	0	0	5	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	84	84	95	95	70	70
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	873	948	0	3	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	953	0	-	0	1390	479
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	437	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	723	-	-	-	*236	538
Stage 1	-	-	-	-	*340	-
Stage 2	-	-	-	-	*756	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	720	-	-	-	*234	535
Mov Cap-2 Maneuver	-	-	-	-	*234	-
Stage 1	-	-	-	-	*338	-
Stage 2	-	-	-	-	*752	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	720	-	-	-	353
HCM Lane V/C Ratio	-	-	-	-	0.02
HCM Control Delay (s)	0	-	-	-	15.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

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

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	715	20	12	888	13	6
Future Vol, veh/h	715	20	12	888	13	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	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	95	95	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	851	24	13	935	14	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	875	0	1345	851
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	494	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	769	-	154	359
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	580	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	769	-	149	359
Mov Cap-2 Maneuver	-	-	-	-	149	-
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	560	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	26.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	149	359	-	-	769	-
HCM Lane V/C Ratio	0.095	0.018	-	-	0.016	-
HCM Control Delay (s)	31.7	15.2	-	-	9.8	0.2
HCM Lane LOS	D	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑↑↱		⅄	
Traffic Vol, veh/h	0	720	901	0	1	3
Future Vol, veh/h	0	720	901	0	1	3
Conflicting Peds, #/hr	8	0	0	8	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	60	60
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	857	948	0	2	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	956	0	-	0	1813	482
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	857	-
Critical Hdwy	4.115	-	-	-	6.6	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2095	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	722	-	-	-	*277	536
Stage 1	-	-	-	-	*339	-
Stage 2	-	-	-	-	*466	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	716	-	-	-	*273	532
Mov Cap-2 Maneuver	-	-	-	-	*273	-
Stage 1	-	-	-	-	*336	-
Stage 2	-	-	-	-	*462	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	716	-	-	-	430
HCM Lane V/C Ratio	-	-	-	-	0.016
HCM Control Delay (s)	0	-	-	-	13.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	424	148	69	686	124	83	188	46	98	258	125
Future Volume (veh/h)	117	424	148	69	686	124	83	188	46	98	258	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	130	471	164	74	738	133	92	209	51	109	287	139
Peak Hour Factor	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	611	915	316	681	1062	191	139	264	223	245	341	286
Arrive On Green	0.25	0.33	0.33	0.25	0.33	0.33	0.04	0.13	0.13	0.08	0.17	0.17
Sat Flow, veh/h	1890	2746	949	1890	3185	574	1890	1984	1678	1890	1984	1667
Grp Volume(v), veh/h	130	322	313	74	437	434	92	209	51	109	287	139
Grp Sat Flow(s),veh/h/ln	1890	1885	1810	1890	1885	1874	1890	1984	1678	1890	1984	1667
Q Serve(g_s), s	0.0	16.5	16.7	0.0	24.1	24.1	1.9	12.2	3.3	0.5	16.8	9.0
Cycle Q Clear(g_c), s	0.0	16.5	16.7	0.0	24.1	24.1	1.9	12.2	3.3	0.5	16.8	9.0
Prop In Lane	1.00		0.52	1.00		0.31	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	611	628	603	681	628	625	139	264	223	245	341	286
V/C Ratio(X)	0.21	0.51	0.52	0.11	0.69	0.70	0.66	0.79	0.23	0.45	0.84	0.49
Avail Cap(c_a), veh/h	611	628	603	681	628	625	274	589	498	307	589	495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	32.2	32.2	20.7	34.7	34.7	55.4	50.4	46.5	50.2	48.1	44.9
Incr Delay (d2), s/veh	0.2	3.0	3.2	0.1	6.2	6.3	5.3	5.3	0.5	1.3	5.6	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.1	12.3	12.1	2.2	17.3	17.2	5.2	10.6	2.5	5.5	13.5	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	35.1	35.4	20.8	40.9	41.0	60.7	55.7	47.0	51.5	53.7	46.2
LnGrp LOS	C	D	D	C	D	D	E	E	D	D	D	D
Approach Vol, veh/h		765			945			352			535	
Approach Delay, s/veh		34.2			39.4			55.8			51.3	
Approach LOS		C			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.6	46.0	11.4	27.0	35.6	46.0	16.1	22.4
Change Period (Y+Rc), s	* 6	* 6	6.4	6.4	* 6	* 6	6.4	6.4
Max Green Setting (Gmax), s	* 6	* 40	13.6	35.6	* 6	* 40	13.6	35.6
Max Q Clear Time (g_c+I1), s	2.0	18.7	3.9	18.8	2.0	26.1	2.5	14.2
Green Ext Time (p_c), s	0.0	3.5	0.1	1.8	0.1	4.3	0.2	1.3

Intersection Summary	
HCM 6th Ctrl Delay	42.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.