Old Orion Ct. Development

6780 Old Orion Ct. Rochester Hills, MI 48306

Owner

Mark & Pat Bismack
5319 23 Mile Rd
Shelby Township, MI 48316

Architect

Krieger | Klatt Architects Inc.
400 E. Lincoln Ave
Royal Oak, MI 48067
P.248.414.9270
F.248.414.9275

Civil Engineer

Nowak & Fraus Engineers
46777 Woodward Ave.
Pontiac, MI 48342-5032
P.248.332.7931
F.248.332.8257

ROCHESTER HILLS MICHIGAN

JRMFD2023-0004
PSP2024-0008
Revision #3
Received 4/9/2025

City of Rochester Hills Planning & Economic Development

Site Plan Review

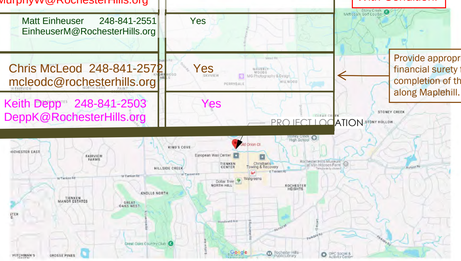
Reviewed for compliance with City Ordinance, Building and Fire Codes
Conditions and mark-ups noted throughout plan set must be addressed prior to final approval

Department	Reviewer	Approved
Assessing	Laurie Taylor 248-841-2417 taylorl@rochesterhills.org	Yes
Building	Jason Rhoades 248-841-2435 RhoadesJa@RochesterHills.org	Yes
Engineering - Utilities	Jason Boughton 248-841-2490 BoughtonJ@RochesterHills.org	Yes
Engineering Legal	Seth Bucholz 248-841-2491 bucholzs@rochesterhills.org	YES Date:04/25/2025
Fire	Lt. Walter Murphy 248-841-2712 MurphyW@RochesterHills.org	Yes
Natural Resources	Matt Einheuser 248-841-2551 EinheuserM@RochesterHills.org	Yes
Planning	Chris McLeod 248-841-2572 mcleodc@rochesterhills.org	Yes
Traffic	Keith Depp 248-841-2503 DeppK@RochesterHills.org	Yes

With Condition.

With Condition.

Provide appropriate financial surety for the completion of the sidewalk along Maplehill.



North
Location Map
NTS

Civil Sheet Index

Sheet No.	Title	SPA 04.24.2024	SPA REV #1 07.15.2024	SPA REV #2 01.13.2025	SPA REV #3 04.04.2025
C0	Cover Sheet	•	•	•	•
C1	Boundary & Topographic Survey	•	•	•	•
C2	Demolition Plan	•	•	•	•
C3	Overall Site & Stringer Dimension Plan	•	•	•	•
C4	Emergency Vehicle Access Plan	•	•	•	•
C5	Paving & Grading Plan	•	•	•	•
C6	Utility Plan	•	•	•	•
C7	Stormwater Management Plan	•	•	•	•
C8	Soil Erosion & Sedimentation Control Plan	•	•	•	•
C9	Notes & Details	•	•	•	•
C10	Notes & Details	•	•	•	•
C11	Notes & Details	•	•	•	•
L1	Tree Preservation Plan	•	•	•	•
L2	Landscape Plan	•	•	•	•
L3	Landscape Notes & Details	•	•	•	•
L4	Landscape Notes & Details Copy 1	•	•	•	•
IR1	Irrigation Plan	•	•	•	•
IR2	Irrigation Notes & Details	•	•	•	•
1of 1	Photometric Plan	•	•	•	•

Architectural Sheet Index

Sheet No	Title	SPA 04.24.2024	SPA REV #1 07.15.2024	SPA REV #2 01.13.2025	SPA REV #3 04.04.2025
G.001	Cover Sheet	•	•	•	•
G.002	Renderings	•	•	•	•
G.003	Renderings	•	•	•	•
G.004	Renderings				•
A.100	Floor Plans	•	•	•	•
A.200	Elevations	•	•	•	•
A.400	Building Sections	•	•	•	•

TRP — Proposed to pay $19,308 into City Tree Fund

LB — Landscape bond $99,428

North
Aerial Map
NTS

Code Analysis

Project Summary / Description

New two-story residential building housing 32 units.

Applicable Codes

ACCESSIBILITY:	2015 MICHIGAN BUILDING CODE / ICC A117.1 - 2009
BUILDING:	2015 MICHIGAN BUILDING CODE
ELECTRICAL:	2023 NATIONAL ELECTRICAL CODE (NEC W/ PART 8 AMENDMENTS)
MECHANICAL:	2021 MICHIGAN MECHANICAL CODE
PLUMBING:	2021 MICHIGAN PLUMBING CODE
ENERGY:	MBC 2015 CHAPTER 13 & MICHIGAN UNIFORM ENERGY CODE 2009 CHAPTER 5 & MICHIGAN UNIFORM ENERGY CODE, PART 10 A. RULES (ANSI/ASHRAE 90.1-2007)

Summary

Topic	Decision / Description	
Use Group	R-2	Sec. 304.1
Construction Type	VA	T.601
Sprinklered	Yes Full 'NFPA 13R' Sprinkler System	
Proposed Building Area	31,000 SF	
Proposed Building Height	TWO-STORIES; 29'-2 1/2" (TO MEDIAN ROOF HEIGHT)	

Chapter 5 - General Building Height and Areas

Code Section / Table	Section / Requirement		
Section 504: Building Height and Number of Stories			
Table 504.3 Allowable Building Height (In Feet) and stories above grade plane	Use Group	Const. Type	Height per Table 504.3
Allowable Building Height	R-2	VA	60
Proposed Building Height			29'-2 1/2"
Section 506: Building Area			
Table 506.2 Allowable Area Factor	Use Group	Const. Type	Area per Table 506.2
Allowable Building Area	R-2	VA	12,000 SF / Floor
506.3 Frontage Increase			9,000 SF / Floor
Total Allowable Area			21,000 SF / Floor
Proposed Building Area			15,500 SF / Floor

The applicant **will** need to submit a Land Improvement Permit (LIP) application with engineer's estimate, fee and construction plans to proceed with the construction plan review process.

PRELIMINARY NOT FOR CONSTRUCTION

KRIEGER KLATT ARCHITECTS
400 E. Lincoln Ave. | Royal Oak, MI 48067
P: 248.414.9270 **F:** 248.414.9275
www.kriegerklatt.com

Client:
Mark & Pat Bismack
5319 23 Mile Rd
Shelby Township,
MI 48316

Project:
Old Orion Ct. Apartments
6780 Old Orion Ct.
Rochester Hills, MI 48306

Issued	Description	By
04.24.2024	SPA	
07.15.2024	SPA REV #1	
01.13.2025	SPA REV #2	
04.04.2025	SPA REV #3	

Seal:

STATE OF MICHIGAN JEFFREY GERALD KLATT ARCHITECT 1301069199 REGISTERED ARCHITECT

Note:
Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:

Sheet Title:
Cover Sheet

Project Number:
Project Number

Scale:
1/4" = 1'-0"

Sheet Number:
G.001

KRIEGER KLATT
ARCHITECTS
400 E. Lincoln Ave. | Royal Oak, MI 48067
P: 248.414.9270 **F:** 248.414.9275
www.kriegerklatt.com

Client:
Mark & Pat Bismack

Project:
Old Orion Ct. Apartments
6780 Old Orion Ct.
Rochester Hills, MI 48306

Issued	Description	By
04.24.2024	SPA	
07.15.2024	SPA REV #1	
01.13.2025	SPA REV #2	
04.04.2025	SPA REV #3	

PRELIMINARY NOT FOR CONSTRUCTION

Perspective View from Orion Rd.

Elevation View from Old Orion Ct.

Perspective View from Old Orion Ct.

Perspective View from Old Orion Ct.

Seal:

Note:
Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:

Sheet Title:
Renderings

Project Number:
Project Number

Scale:

Sheet Number:
G.002

Perspective View from Maplehill Rd.

Perspective View from Southwest

Perspective View from Southwest

Perspective View of Wetland Overlook

KRIEGER KLATT ARCHITECTS

400 E. Lincoln Ave. | Royal Oak, MI 48067
P: 248.414.9270 **F:** 248.414.9275
www.kriegerklatt.com

Client:
Mark & Pat Bismack

Project:
Old Orion Ct. Apartments
6780 Old Orion Ct.
Rochester Hills, MI 48306

Issued	Description	By
04.24.2024	SPA	
07.15.2024	SPA REV #1	
01.13.2025	SPA REV #2	
04.04.2025	SPA REV #3	

PRELIMINARY NOT FOR CONSTRUCTION

Seal:

Note:
Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:

Sheet Title:
Renderings

Project Number:
Project Number

Scale:

Sheet Number:
G.003

JRMFD2023-0004
PSP2024-0008
Revision #3

Received
4/9/2025
City of Rochester Hills
Planning & Economic
Development

KRIEGER KLATT
ARCHITECTS
400 E. Lincoln Ave. | Royal Oak, MI 48067
P: 248.414.9270 **F:** 248.414.9275
www.kriegerklatt.com

Client:
Mark & Pat Bismack

Project:
Old Orion Ct. Apartments
6780 Old Orion Ct.
Rochester Hills, MI 48306

Issued	Description	By
04.04.2025	SPA REV #3	

PRELIMINARY NOT FOR CONSTRUCTION

Perspective View from Maplehill Rd.

Elevation View from Rear Property Line

Aerial of West Property Line Screening

Perspective View of Pocket Park

Seal:

Note:
Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:

Sheet Title:
Renderings

Project Number:
Project Number

Scale:

Sheet Number:
G.004

ROCHESTER HILLS MICHIGAN
JRMFD2023-0004
PSP2024-0008
Revision #3
Received
4/9/2025
City of Rochester Hills
Planning & Economic
Development

Owner / Developer
MARK BISMACK
5319 23 Mile Road
Shelby Township, MI 48306

Architect
KRIEGER KLATT ARCHITECTS
2120 E. 11 Mile Rd.
Royal Oak, MI 48067
Tel. (248) 414-9270
Fax. (248) 414-9275

CONTACT: Jeff Klatt, AIA

Civil Engineer
NOWAK & FRAUS ENGINEERS
46777 Woodward Ave.
Pontiac, MI 48342-5032
Tel. (248) 332-7931
Fax. (248) 332-8257

CONTACTS: Paul Tulikangas, P.E.
Brett Buchholz, P.E.

Landscape Architect
NOWAK & FRAUS ENGINEERS
46777 Woodward Ave.
Pontiac, MI 48342-5032
Tel. (248) 332-7931
Fax. (248) 332-8257

CONTACT: George Ostrowski, PLA, LEED AP

City of Rochester Hills, Oakland County, Michigan SITE PLAN DOCUMENTS Prepared For Mark Bismack & Krieger Klatt Architects

LOCATION MAP

SHEET INDEX

LEGAL DESCRIPTION - PARCEL ID 15-03-476-018

LAND SITUATED IN THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, STATE OF MICHIGAN, IS DESCRIBED AS FOLLOWS:

PART OF LOT 15 AND ALL OF LOTS 16, 17, 18 AND 19 OF AVON HILLS, BEING A PART OF THE SOUTHEAST 1/4 OF SECTION 3, T.3N., R.11E., AVON TOWNSHIP (NOW CITY OF ROCHESTER HILLS), OAKLAND COUNTY, MICHIGAN, ACCORDING TO THE PLAT THEREOF RECORDED IN LIBER 60 OF PLATS, PAGE 39, OAKLAND COUNTY RECORDS, FURTHER DESCRIBED AS BEGINNING AT THE NORTHWEST CORNER OF SAID LOT 19; THENCE N.63°24'07"E., 200.00 FEET; THENCE S.26°44'34"E., 288.18 FEET; THENCE S.28°14'41"E., 172.98 FEET; THENCE N.87°59'00"W., 487.61 FEET; THENCE N.02°04'26"E., 89.50 FEET; THENCE S.87°59'00"E., 154.58 FEET; THENCE N.06°56'15"W., 130.68 FEET; THENCE N.26°44'34"W., 100.00 FEET TO POINT OF BEGINNING.

LAND AREA: 104,999.21 SQUARE FEET OR 2.41 ACRES

Land Use Summary
must be included on the COVER SHEET for all site plans

Characteristic		Existing Conditions	Proposed Conditions
Total Development Area (ac)		1.33 AC	1.33 AC
Impervious Area (ac)		0.00 AC	1.07 AC
Total Pervious Area (ac)		1.33 AC	0.26 AC
Pervious Area Breakdown by Cover Type			
Pervious Area Land Use Data	*Meadow/fallow/natural areas (non-cultivated)*	1.33 AC	
	Predominant NRCS Soil Type (A, B, C, or D)	D	
	Improved areas (turf grass, landscape, row crops)		0.26 AC
	Predominant NRCS Soil Type (A, B, C, or D)		D
	Wooded Areas		
	Predominant NRCS Soil Type (A, B, C, or D)		
Proposed Pond Area (acres)		N/A – PROPOSED U.G. DETENTION PROVIDES 9,739 CFT	
Required CPVC Volume (cubic feet)		5,147 CFT	
Provided CPVC Volume (cubic feet)		0 CFT (SOILS NOT SUITABLE FOR INFILTRATION)	
Required ED Volume (cubic feet)		7,522 CFT	
Provided ED Volume (cubic feet)		7,522 CFT	

Project Name

Old Orion Court Development

REVISIONS:
04-24-24 SPA
07-15-24 SPA REV 1
11-14-24 OWNER REVIEW
01-13-25 SPA REV 2
04-04-25 SPA REV 3

JRMFD2023-0004
PSP2024-0008
Revision #3

Received
4/9/2025
City of Rochester Hills
Planning & Economic Development

The applicant **will** need to submit a Land Improvement Permit (LIP) application with engineer's estimate, fee and construction plans to proceed with the construction plan review process.

Know what's below Call before you dig.

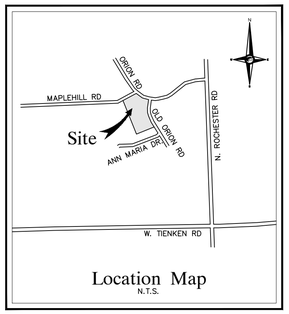
N & F JOB #K176-01

NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NFE-ENGR.COM



Location Map
N.T.S.

SITE DATA

GROSS LAND AREA: 104,999.21 SQUARE FEET OR 2.410 ACRES.
ZONED: FB (FLEXIBLE BUSINESS OVERLAY)

		MINIMUM	MAXIMUM
FRONT YARD ALONG ARTERIAL STREET		15 FT.	70 FT.
SIDE YARD	INTERIOR	NONE	NONE
	PERIMETER	25 FT.*	NONE
REAR YARD	INTERIOR	NONE	NONE
	PERIMETER	50 FT.	NONE

*INCREASE TO MIN. SIDE YEAR SETBACK TO 50' WHEN ADJ. TO RESIDENTIAL

MAX. BUILDING HEIGHT PERMITTED: 2 STORIES/30'

BUILDING SETBACKS: R-1 (ONE FAMILY RESIDENTIAL DISTRICT)
FRONT= 40'(B)
SIDES= 30'(C,D)
REAR= 35'(T)

PER LIBER 2872, PAGE 641:
FOR ALL LOTS ON MAPLEHILL ROAD: ALL BUILDINGS MUST BE LOCATED AT LEAST 10 FEET FROM ANY PROPERTY LINE.

MAX. BUILDING HEIGHT PERMITTED: 2 STORIES/30'

B. ESTABLISHED BUILDING LINE. IN THE EVENT THAT THERE IS AN ESTABLISHED BUILDING LINE ALONG A STREET (AS DETERMINED BY THE OFFICIAL REVIEWING THE APPLICATION), THE FRONT YARD AND/OR SIDE STREET YARD SETBACK REQUIREMENT SHALL BE THE ESTABLISHED BUILDING LINE. THE ESTABLISHED BUILDING LINE IS THE AVERAGE FRONT YARD SETBACK MINUS 10 FEET OF ADJACENT DWELLINGS WITHIN 200 FEET OF EACH SIDE OF THE LOT AND ON THE SAME SIDE OF THE STREET AS THE SUBJECT PARCEL, OR 60 FEET, WHICHEVER IS LESS

C. CORNER LOTS. FOR CORNER LOTS, THE SIDE YARD ABUTTING UPON A STREET SHALL NOT BE LESS THAN 15 FEET IN THE R-4 DISTRICT AND 25 FEET IN THE R-1, R-2, R-3, AND RE DISTRICTS UNLESS A LARGER SETBACK IS REQUIRED BY FOOTNOTE B BECAUSE NEIGHBORING HOUSES ON THE SIDE STREET HAVE A FRONT YARD RELATIONSHIP TO THE SIDE STREET.

D. REDUCED SIDE YARD ON NARROW LOTS. IF THE LOT OR PARCEL IS LESS THAN 60 FEET IN WIDTH, ONE SIDE YARD MAY BE REDUCED TO FIVE FEET PROVIDING THE TOTAL OF THE TWO SIDE YARDS SHALL BE A MINIMUM OF 15 FEET.

T. REAR YARDS ADJACENT TO PARKS OR OPEN SPACE. THE MINIMUM REAR YARD SETBACK REQUIREMENT MAY BE REDUCED TO 30 FEET ON LOTS THAT BORDER ON LAND PERMANENTLY DEDICATED FOR PARK, RECREATION, AND/OR OPEN SPACE PURPOSES, PROVIDED THAT THE DIMENSION OF THE PARK, RECREATION, AND/OR OPEN SPACE LAND SHALL NOT BE LESS THAN 100 FEET MEASURED IN A STRAIGHT LINE NOT MORE THAN 20 DEGREES OFF OF PERPENDICULAR TO THE REAR LOT LINE OF SUCH LOT.

TOTAL PARKING: 0 SPACES INCLUDING 0 BARRIER FREE SPACES.

THE ABOVE SETBACK & HEIGHT REQUIREMENTS WERE OBTAINED FROM THE CITY OF ROCHESTER HILLS ZONING ORDINANCE.

A SURVEYOR CANNOT MAKE A CERTIFICATION ON THE BASIS OF AN INTERPRETATION OR OPINION OF ANOTHER PARTY. THE SETBACKS ARE NOT PLOTTED HEREON. A ZONING ENDORSEMENT LETTER SHOULD BE OBTAINED FROM THE CITY OF ROCHESTER HILLS TO INSURE CONFORMITY AS WELL AS MAKE A FINAL DETERMINATION OF THE REQUIRED BUILDING SETBACK REQUIREMENTS.

CEMETERY NOTE

THERE WAS NO OBSERVABLE EVIDENCE OF CEMETERIES OR BURIAL GROUNDS WITHIN THE SUBJECT PROPERTY.

UTILITY NOTE

ALL UTILITIES ARE UNDERGROUND UNLESS OTHERWISE NOTED.

THE UTILITIES SHOWN ON THIS SURVEY WERE DETERMINED BY FIELD OBSERVATION. ALL LOCATIONS ARE APPROXIMATE. THE LOCATION OF ANY OTHER UNDERGROUND SERVICES WHICH MAY EXIST CAN ONLY BE DEPICTED IF A UTILITY PLAN IS FURNISHED TO THE SURVEYOR.

TOPOGRAPHIC SURVEY NOTES

ALL ELEVATIONS ARE EXISTING ELEVATIONS, UNLESS OTHERWISE NOTED.

UTILITY LOCATIONS WERE OBTAINED FROM MUNICIPAL OFFICIALS AND RECORDS OF UTILITY COMPANIES, AND NO GUARANTEE CAN BE MADE TO THE COMPLETENESS, OR EXACTNESS OF LOCATION.

TREE SURVEY SHOWN PREPARED IN 2018 AND UPDATED IN 2023 BY NFE.

WETLAND NOTE

WETLAND LIMITS SHOWN WERE FLAGGED BY ASTI ON 10-09-2023.

FLOOD HAZARD NOTE

THE PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY; THE PROPERTY LIES WITHIN ZONE X OF THE FLOOD INSURANCE RATE MAP IDENTIFIED AS MAP NO. 26125C0384F BEARING AN EFFECTIVE DATE OF 09/29/2006 .

UPDATED 11/30/23 BY: GEORGE OSTROWSKI, MICHIGAN PLA #1310

Tree Inventory List

Condition Description Notes:
"Good" - no observed structural defects"
"Fair" - minor structural defects, marginal form, some insect activity noted"
"Poor" - major structural defects, poor form, insect infested"

"Structural defects may include decayed wood, cracks, root problems, weak branch unions cankers, poor tree architecture, dead/failed branches due to various causes.

Tree #	Botanical Name	Common Name	Dia.	Type	Other Dia.	Condition	Comments
34	Malus spp	Crabapple	5			good	
35	Malus spp	Crabapple	5			good	
36	Populus deltoides	Cottonwood	13			fair	
154	Acer platanoides	Norway Maple	12.6			good	
155	Acer platanoides	Norway Maple	12.9			poor	rot
156	Picea abies	Norway Spruce	9.2			fair	vines
157	Picea pungenes	Colorado Blue Spruce	19.3			fair	disease
158	Picea pungenes	Colorado Blue Spruce	17.1	twin	14.8	fair	disease
159	Acer rubrum	Red Maple	11.8			good	
160	Acer rubrum	Red Maple	13.1			fair	dieback
161	Picea pungenes	Colorado Blue Spruce	21.6			fair	disease, competition
162	Picea pungenes	Colorado Blue Spruce	16			fair	disease, competition
163	Picea pungenes	Colorado Blue Spruce	13.2			fair	disease
164	Picea pungenes	Colorado Blue Spruce	15			fair	competition
165	Acer negundo	Boxelder	10.4	twin	8.4	good	
166	Acer negundo	Boxelder	14.2	multiple	9.9	poor	rot
167	Acer negundo	Boxelder	16	twin	8	fair	dead
168	Acer negundo	Boxelder	15.8			poor	vines, rot, utility trim
169	Acer negundo	Boxelder	15.3	multiple	15.1,12.1,1	fair	vines
170	Acer negundo	Boxelder	9.2	twin	6	poor	vines, lean
171	Juglans nigra	Black Walnut	16			fair	vines
172	Acer negundo	Boxelder	13.2	multiple	9.3,9.9,3.8,2	fair	vines, competition, rot
173	Acer negundo	Boxelder	8.8			fair	competition
174	Acer negundo	Boxelder	9.9			poor	rot, competition
175	Acer negundo	Boxelder	10.8			fair	rot
176	Acer negundo	Boxelder	12.3			good	
177	Acer rubrum	Red Maple	12.2			good	
178	Ulmus americana	American Elm	11			good	
179	Ulmus americana	American Elm	8.8			fair	competition
180	Ulmus americana	American Elm	11.3			good	
181	Prunus serotina	Black Cherry	7.2			good	
182	Prunus serotina	Black Cherry	14.1			poor	rot
183	Prunus serotina	Black Cherry	15			fair	vines
184	Ulmus americana	American Elm	13			good	
185	Prunus serotina	Black Cherry	8.9			poor	broken top
186	Acer negundo	Boxelder	11.4			fair	competition
187	Salix spp.	Willow	26.2	twin	24	poor	24" trunk broke off
188	Juglans nigra	Black Walnut	10.8			fair	competition
189	Juglans nigra	Black Walnut	14			good	
190	Ulmus americana	American Elm	17			fair	competition
191	Acer negundo	Boxelder	10.4	twin	7	poor	rot, insect
192	Salix spp.	Willow	38			fair	dead
193	Juglans nigra	Black Walnut	10.3			poor	vines
194	Salix spp.	Willow	33.5			fair	vines, dieback
195	Salix spp.	Willow	28			fair	competition, epicormic branching
196	Salix spp.	Willow	13.7			poor	lean, epicormic branching
201	Salix spp.	Willow	18.5			poor	rot, vine, lean
202	Salix spp.	Willow	10.6			poor	split, lean
203	Salix spp.	Willow	20.1			poor	lean, vines
204	Salix spp.	Willow	18.3			fair	epicormic branching, dieback
205	Salix spp.	Willow	22			fair	competition
206	Acer platanoides	Norway Maple	7			poor	suppression
207	Morus alba	White Mulberry	8.7			poor	rot, suppression
208	Ulmus americana	American Elm	29.2			fair	poor fork formation, dieback
209	Morus alba	White Mulberry	10.3			poor	vines, rot
210	Morus alba	White Mulberry	12			poor	vines
211	Ulmus americana	American Elm	13.3			fair	vines
212	Acer negundo	Boxelder	7.2			poor	lean
213	Fraxinus pennsylvanica	Green Ash	10.8			fair	competition
214	Populus deltoides	Eastern Cottonwood	13.3			good	
274	Ulmus americana	American Elm	8.9			fair	utility trim

TITLE NOTES

ALL EXCEPTIONS SHOWN OR NOTED ON THIS SURVEY WERE OBTAINED FROM TITLE COMMITMENT NO. 795174, WITH AN EFFECTIVE DATE OF SEPTEMBER 26, 2017, DATE PRINTED OCTOBER 10, 2017, ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY.

BASIS OF BEARING NOTE

THE BASIS OF BEARING FOR THIS SURVEY WAS ESTABLISHED BY THE CENTER LINE OR ORION ROAD (S26°16'00"E) AS RECORDED IN AVON HILLS ACCORDING TO THE PLAT THEREOF RECORDED IN LIBER 60 OF PLATS, PAGE 39 OF OAKLAND COUNTY RECORDS.

LEGAL DESCRIPTION - PARCEL I.D. 15-03-476-018

LAND SITUATED IN THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, STATE OF MICHIGAN, IS DESCRIBED AS FOLLOWS:

PART OF LOT 15 AND ALL OF LOTS 16, 17, 18 AND 19 OF AVON HILLS, BEING A PART OF THE SOUTHEAST 1/4 OF SECTION 3, T.3N., R.11E., AVON TOWNSHIP (NOW CITY OF ROCHESTER HILLS), OAKLAND COUNTY, MICHIGAN, ACCORDING TO THE PLAT THEREOF RECORDED IN LIBER 60 OF PLATS, PAGE 39, OAKLAND COUNTY RECORDS, FURTHER DESCRIBED AS BEGINNING AT THE NORTHWEST CORNER OF SAID LOT 19; THENCE N.63°24'07"E., 200.00 FEET; THENCE S.26°44'34"E., 288.18 FEET; THENCE N.87°59'00"W., 487.61 FEET; THENCE N.02°04'26"E., 89.50 FEET; THENCE S.87°59'00"E., 154.58 FEET; THENCE N.06°56'15"W., 130.68 FEET; THENCE N.26°44'34"W., 100.00 FEET TO POINT OF BEGINNING.

LAND AREA: 104,999.21 SQUARE FEET OR 2.41 ACRES

SURVEYOR'S CERTIFICATION

WE HEREBY CERTIFY THAT WE HAVE SURVEYED THE PROPERTY SHOWN AND THAT WE HAVE LOCATED AND/OR PLACED MARKER IRONS AT THE CORNERS OF THE PARCEL AS SHOWN.

KEVIN NAVAROLI, P.S.
NO 53503
DATED: 12-07-2023
REVISED:

MISS DIG / UTILITY DISCLAIMER NOTE

A MISS DIG TICKET NUMBER 20231108000528, PURSUANT TO MICHIGAN PUBLIC ACT 174 WAS ENTERED FOR THE SURVEYED PROPERTY. DUE TO THE EXTENDED REPORTING PERIOD FOR UNDERGROUND FACILITY OWNERS TO PROVIDE THEIR RECORDS, THE SURVEY MAY NOT REFLECT ALL THE UTILITIES AT THE TIME THE SURVEY WAS ISSUED ON 12-07-2023. THE SURVEY ONLY REFLECTS THOSE UTILITIES WHICH COULD BE OBSERVED BY THE SURVEYOR IN THE FIELD OR AS DEPICTED BY THE UTILITY COMPANY RECORDS FURNISH PRIOR TO THE DATE THIS SURVEY WAS ISSUED. THE CLIENT AND/OR THEIR AUTHORIZED AGENT SHALL VERIFY WITH THE FACILITY OWNERS AND/OR THEIR AUTHORIZED AGENTS, THE COMPLETENESS AND EXACTNESS OF THE UTILITIES LOCATION.

LEGEND

- MANHOLE — EXISTING SANITARY SEWER
- HYDRANT / GATE VALVE — EXISTING SAN. CLEAN OUT
- MANHOLE / CATCH BASIN — EXISTING WATER MAIN
- EXISTING STORM SEWER
- EX. R.Y. CATCH BASIN
- EXISTING BURIED CABLES
- UTILITY POLE / GUY POLE / GUY WIRE — OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- LS — LANDSCAPED AREA

CITY OF ROCHESTER HILLS
PROJECT #19-042, SEC. 3

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257

SEAL

STATE OF MICHIGAN — KEVIN NAVAROLI — PROFESSIONAL SURVEYOR — No. 53503 — PROFESSIONAL SURVEYOR

PROJECT
Old Orion Court Development

CLIENT
Contact: Mark Bismack

PROJECT LOCATION
Part of the SE ¼ of Section 3
T. 3N., R. 11E.
City of Rochester Hills, Oakland County, Michigan

SHEET
Topographic and Boundary Survey

811 Know what's below Call before you dig.

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
01-13-25	SPA REV 2
04-04-25	SPA REV 3

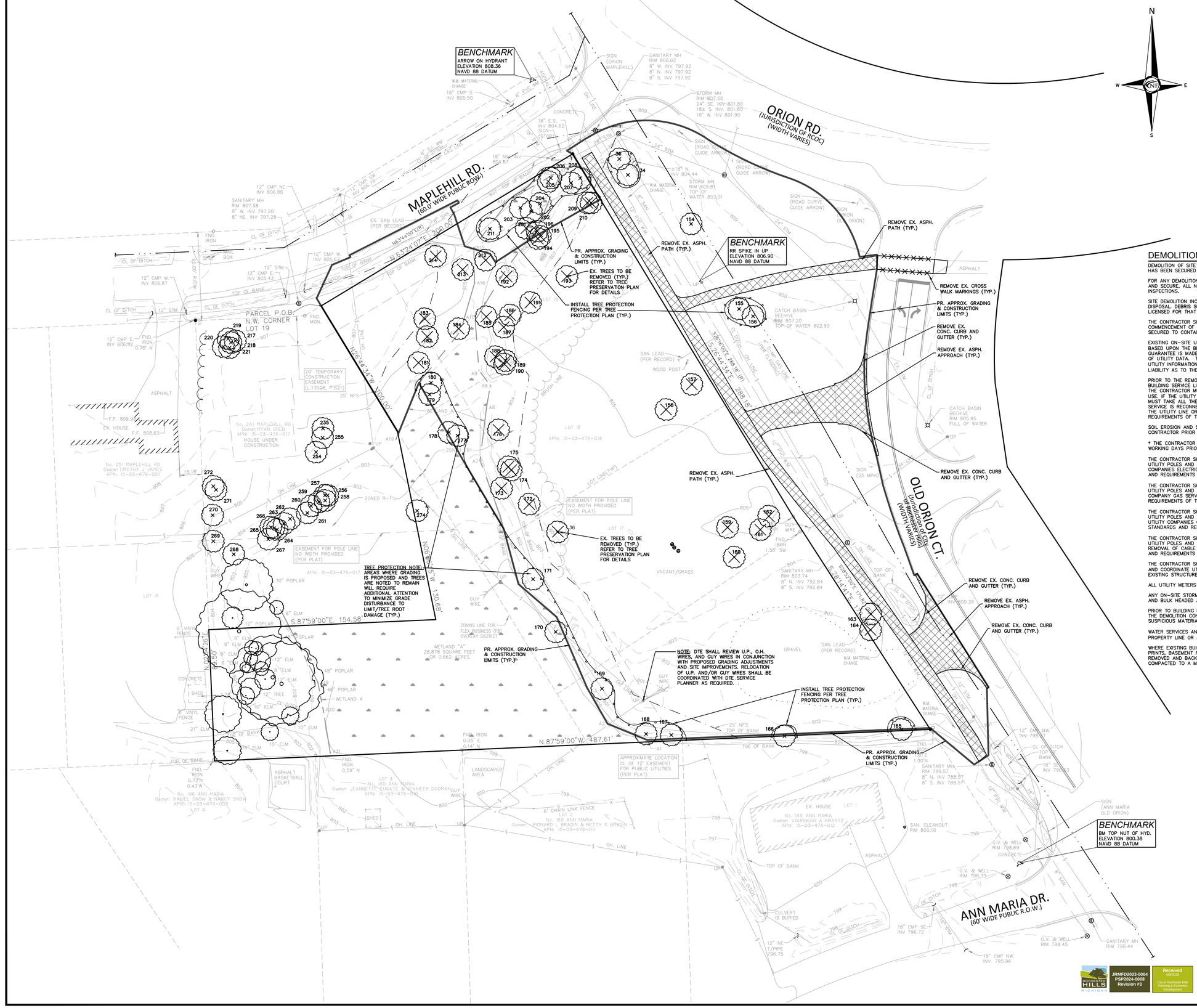
DRAWN BY: D. McConkey
APPROVED BY: K. Navaroli
PROJECT MANAGER: B. Buchholz
DATE: 12-07-2023
SCALE: 1" = 30'

30 15 0 15 30 45

JRMFD2023-0004
PSP2024-0008
Revision #3

Received 4/9/2025
City of Rochester Hills Planning & Economic Development

NFE JOB NO. K176
SHEET NO. C1



Location Map
N.T.S.

DEMOLITION NOTES

DEMOLITION OF SITE IMPROVEMENTS SHALL BE ALLOWED ONLY AFTER AN APPROVED PERMIT HAS BEEN SECURED FROM THE PUBLIC AGENCY HAVING JURISDICTION OVER SAID DEMOLITION.

FOR ANY DEMOLITION WITHIN PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL PAY FOR, AND SECURE, ALL NECESSARY PERMITS AND LIKEWISE SHALL ARRANGE FOR ALL SITE INSPECTIONS.

SITE DEMOLITION INCLUDES THE COMPLETE REMOVAL OF SITE IMPROVEMENTS AND OFF-SITE DISPOSAL. DEBRIS SHALL BE TRANSPORTED TO AN APPROPRIATE DISPOSAL FACILITY THAT IS LICENSED FOR THAT TYPE OF DEBRIS.

THE CONTRACTOR SHALL COORDINATE TRUCK ROUTES WITH THE MUNICIPALITY PRIOR TO COMMENCEMENT OF SITE DEMOLITION. ALL TRUCKS SHALL BE TARPED OR PROPERLY SECURED TO CONTAIN DEMOLITION DEBRIS PRIOR TO LEAVING SITE.

EXISTING ON-SITE UNDERGROUND UTILITIES AND BUILDING SERVICES HAVE BEEN INDICATED BASED UPON THE BEST AVAILABLE UTILITY RECORDS AND/OR ON-SITE INSPECTION. NO GUARANTEE IS MADE BY THE DESIGN ENGINEER, AS TO THE COMPLETENESS OR ACCURACY OF UTILITY DATA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF UTILITY INFORMATION (THE DESIGN ENGINEER MAKES NO GUARANTEE NOR ASSUMES ANY LIABILITY AS TO THE COMPLETENESS AND/OR ACCURACY OF UTILITY DATA).

PRIOR TO THE REMOVAL OR ABANDONMENT OF ANY EXISTING UNDERGROUND UTILITY OR BUILDING SERVICE LINES CALLED FOR IN THE PLANS OR DISCOVERED DURING EXCAVATION, THE CONTRACTOR MUST DETERMINE IF THE UTILITY LINE OR BUILDING SERVICE IS STILL IN USE. IF THE UTILITY LINE OR BUILDING SERVICE IS STILL IN USE/ACTIVE THE CONTRACTOR MUST TAKE ALL THE NECESSARY STEPS TO GUARANTEE THAT THE UTILITY LINE OR BUILDING SERVICE IS RECONNECTED WITHOUT AN INTERRUPTION IN SERVICE. THE RECONNECTION OF THE UTILITY LINE OR BUILDING SERVICE MUST BE IN ACCORDANCE WITH THE STANDARDS AND REQUIREMENTS OF THE APPROPRIATE GOVERNMENTAL AGENCY OR PRIVATE UTILITY COMPANY.

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED BY THE CONTRACTOR PRIOR TO SITE DEMOLITION.

* THE CONTRACTOR SHALL NOTIFY MISS DIG (1-800-482-7171) A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO THE START OF THE SITE DEMOLITION.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH UTILITY COMPANY. REMOVAL OF THE UTILITY COMPANIES ELECTRICAL SERVICES SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND REQUIREMENTS OF THE UTILITY COMPANY.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH UTILITY COMPANY. REMOVAL OF THE UTILITY COMPANY GAS SERVICES SHALL BE IN ACCORDANCE WITH THE STANDARDS AND REQUIREMENTS OF THE UTILITY COMPANY.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH THE UTILITY COMPANY. REMOVAL OF THE UTILITY COMPANIES COMMUNICATION SERVICES SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND REQUIREMENTS OF THE UTILITY COMPANY.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH THE APPROPRIATE CABLE MEDIA COMPANY. REMOVAL OF CABLE SERVICES SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND REQUIREMENTS OF THE CABLE COMPANY.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFICATION OF PRIVATE UTILITY COMPANIES AND COORDINATE UTILITY SERVICE SHUT OFF/DISCONNECT, PRIOR TO DEMOLITION OF EXISTING STRUCTURES OR PROPERTIES.

ALL UTILITY METERS SHALL BE REMOVED BY THE APPROPRIATE UTILITY COMPANY.

ANY ON-SITE STORM SEWER FACILITIES LOCATED DURING DEMOLITION SHALL BE REMOVED AND BULK HEADED AT THE PROPERTY LINE IF INDICATED FOR REMOVAL ON THE PLANS.

PRIOR TO BUILDING DEMOLITION, ALL HAZARDOUS MATERIAL SHALL BE REMOVED BY OTHERS. THE DEMOLITION CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER SHOULD ANY SUSPICIOUS MATERIAL BE FOUND.

WATER SERVICES AND/OR STOP-BOX SHALL BE PRESERVED AND BULK HEADED AT THE PROPERTY LINE OR AS DIRECTED BY THE OWNER'S REPRESENTATION.

WHERE EXISTING BUILDINGS PLANED FOR DEMOLITION FALL WITHIN PROPOSED BUILDING FOOT PRINTS, BASEMENT FLOOR SLABS, FOUNDATION WALLS AND FOOTINGS SHALL BE COMPLETELY REMOVED AND BACK FILLED WITH MDOT CLASS II GRANULAR MATERIAL AND BE MACHINE COMPACTED TO A MINIMUM OF 98% OF MATERIALS MAXIMUM DENSITY.

REMOVAL LEGEND

- INDICATES EXISTING BUILDING TO BE DEMOLISHED
- INDICATES AREAS OF ASPHALT PAVEMENT TO BE REMOVED
- INDICATES AREAS OF CONCRETE PAVEMENT/ SIDEWALK TO BE REMOVED

LEGEND

- MANHOLE
- HYDRANT
- GATE VALVE
- MANHOLE CATCH BASIN
- UTILITY POLE
- GUY POLE
- GUY WIRE
- EXISTING SANITARY SEWER
- EXISTING SAN. CLEAN OUT
- EXISTING WATER MAIN
- EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- EXISTING BURIED CABLES
- OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- EXISTING UTILITY TO BE REMOVED
- EXISTING UTILITY TO BE ABANDONED
- CONSTRUCTION/TREE PROTECTION FENCING
- 12" MAPLE (NOTE #)
- INDICATES EXISTING TREE TO BE REMOVED

JRMFD2023-0004
PSP2024-0008
Revision #3

Received
4/9/2025
City of Rochester Hills Planning & Economic Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL

NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼ of Section 3
T. 3N., R. 11E.
City of Rochester Hills, Oakland County, Michigan

SHEET
Demolition Plan

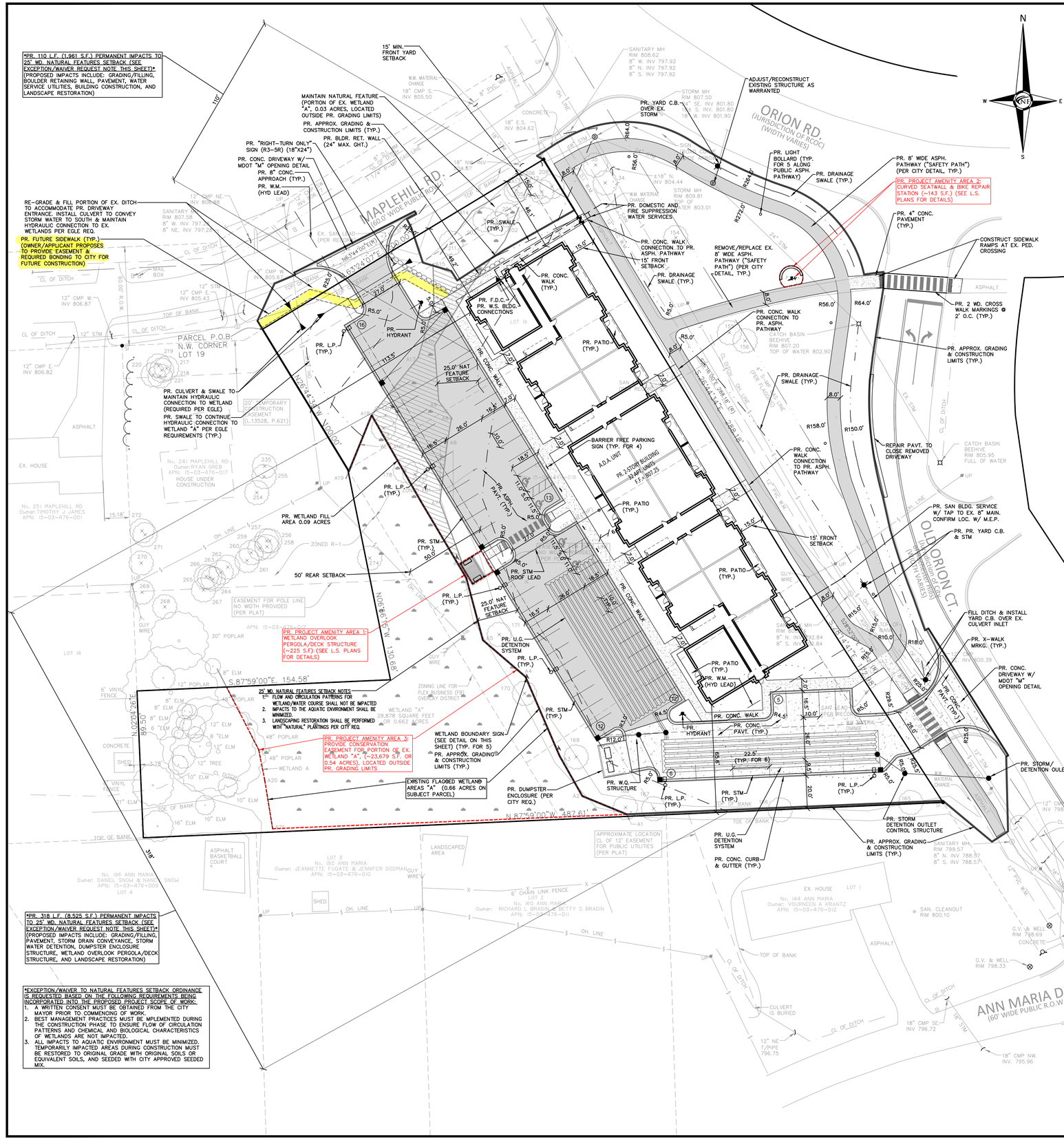
Know what's **below** **Call** before you dig.

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: K. Withrow
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: 1" = 30'

30 15 0 15 30 45

NFE JOB NO. K176-01
SHEET NO. C2

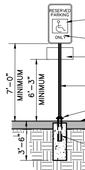


PAVING LEGEND

- PROPOSED CONCRETE PAVEMENT
- PROPOSED CONCRETE WALK
- PROPOSED GRAVEL PATHWAY
- PROPOSED ASPHALT PAVEMENT

LEGEND

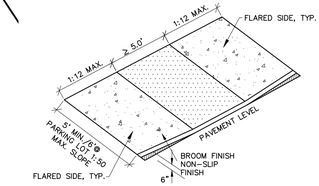
- MANHOLE
- HYDRANT
- GATE VALVE
- MANHOLE CATCH BASIN
- UTILITY POLE
- GUY POLE
- GUY WIRE
- C.O.
- INLET
- C.B.
- EXISTING SANITARY SEWER
- SAN. CLEAN OUT
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- EXISTING BURIED CABLES
- OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- PR. SANITARY SEWER
- PR. WATER MAIN
- PR. STORM SEWER
- PR. R. Y. CATCH BASIN
- PROPOSED LIGHT POLE



BARRIER FREE PARKING SIGN DETAIL

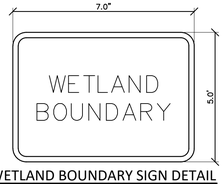
N.T.S.

Provide (1) for each accessible parking space



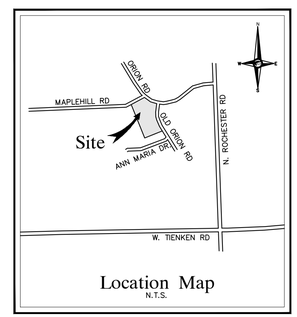
BARRIER FREE RAMP DETAIL

N.T.S.



WETLAND BOUNDARY SIGN DETAIL

N.T.S.



Location Map

N.T.S.

SITE SUMMARY

SITE ADDRESS : 6780 OLD ORION CT., ROCHESTER HILLS, MI 48306
SITE PARCEL I.D. : 15-03-476-018
SITE GROSS LAND AREA :104,999.21 S.F. OR 2.41 ACRES
SITE ZONING: FB (FLEXIBLE BUSINESS OVERLAY)

REQUIRED MINIMUM BUILDING SETBACKS:
FRONT YARD = 15'
SIDES YARD = 25' (50' WHERE ADJACENT TO RESIDENTIAL ZONING)
REAR YARD = 50'

PROPOSED MINIMUM BUILDING SETBACKS:
EAST SIDE (ORION RD. & OLD ORION CT. FRONTAGE): = 15.0'
NORTH SIDE (MAPLEHILL FRONTAGE): = 46.1'
WEST SIDE = 113.5'
SOUTH SIDE = 65.6'

MAX. BUILDING HEIGHT PERMITTED: TWO STORIES OR 30'

PROPOSED BUILDING STORIES & HEIGHT: TWO STORIES, 30' HEIGHT

PROPOSED BUILDING FOOTPRINT:
TOTAL BUILDING FOOTPRINT = 17,889 S.F. OR 0.41 ACRES
BUILDING LOT COVERAGE: 0.41 AC / 2.41 AC = 17.01%

PARKING CALCULATIONS

PARKING REQUIREMENTS
1.5 PARKING SPACES REQUIRED PER EACH DWELLING UNIT.
0.5 SPACES PER DWELLING UNIT FOR VISITOR PARKING

TOTAL DWELLING UNITS = 32 UNITS

TOTAL REQUIRED PARKING = (1.5 SPACES PER UNIT * 32 UNITS) = 48 SPACES
+ (0.5 SPACES PER UNIT * 32 UNITS) = 16 SPACES
=> 64 TOTAL SPACES REQ.

TOTAL PROVIDED PARKING = 64 SPACES

BREAKDOWN OF PROVIDED PARKING:
- 64 EXTERIOR SPACES (INCLUDING 4 BARRIER-FREE, VAN ACCESSIBLE SPACES).

SITE AMENITY SUMMARY

PR. PROJECT AMENITY AREA 1 (WETLAND OVERLOOK STRUCTURE):	225 S.F.
PR. PROJECT AMENITY AREA 2 (BIKE REPAIR STATION):	142 S.F.
PR. PROJECT AMENITY AREA 3 (CONSERVATION EASEMENT):	23,679 S.F.
TOTAL PROPOSED AMENITY AREA: (1.34% OR PR. BUILDING FOOTPRINT AREA)	24,046 S.F.

GENERAL SITE PLAN NOTES

ALL WORK SHALL CONFORM TO APPLICABLE STANDARDS, SPECIFICATIONS, AND REQUIREMENTS FROM THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY WATER RESOURCES COMMISSIONER, ROAD COMMISSION FOR OAKLAND COUNTY, AND MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY.

SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL BUILDING INFORMATION. SEE LANDSCAPE DRAWINGS FOR ADDITIONAL LANDSCAPE INFORMATION.

ALL RADIAL DIMENSIONS SHOWN ARE TO PROPOSED BACK OF CURB, EDGE OF PAVEMENT OR EDGE OF SIDEWALK.

PROPOSED WATER MAIN, INCLUDING HYDRANTS, SHALL BE A PUBLIC UTILITY TO BE SITUATED WITHIN A 20' WIDE PUBLIC EASEMENT (WHEN LOCATED ON PRIVATE PROPERTY), PER CITY OF ROCHESTER HILLS REQUIREMENTS.

LOCATIONS FOR PROPOSED GAS, ELECTRIC, U.G. COMMUNICATIONS AND OTHER FRANCHISED UTILITIES SHALL BE CONFIRMED UPON COORDINATION WITH SERVICE PROVIDERS/PLANNERS.

A SOIL EROSION AND SEDIMENTATION CONTROL PERMIT IS REQUIRED THROUGH THE OAKLAND COUNTY WATER RESOURCE COMMISSIONER'S OFFICE. ALL SOILS SHALL BE CONTROLLED AND CONTAINED ON SITE THROUGHOUT THE COURSE OF THE PROJECT.

PERMIT NOTES

REVIEW AND/OR PERMITTING IS REQUIRED FROM THE FOLLOWING AGENCIES:

SOIL EROSION: O.C.W.R.C
WETLAND USE PERMIT: MI EGLE & CITY OF ROCHESTER HILLS
PUBLIC WATER MAINS: MI EGLE & CITY OF ROCHESTER HILLS
STORM DRAIN & STORM WATER DETENTION: CITY OF ROCHESTER HILLS
PUBLIC R.O.W. (UTILITIES & PAVING): R.C.O.C. (ORION RD.) & CITY OF ROCHESTER HILLS (MAPLEHILL ROAD, OLD ORION COURT)

SIGN NOTE

ANY FUTURE GROUND SIGNS PROPOSED SHALL REQUIRE A SEPARATE SIGN PERMIT & APPROVAL THROUGH THE CITY OF ROCHESTER HILLS.

LOT COMBINATION NOTES

THE ORIGINAL PARCEL (OLD I.D. #15-03-476-016) HAS BEEN COMBINED WITH PART OF PREVIOUS NEIGHBORING PARCEL (OLD I.D. #15-03-476-015) RESULTANT COMBINED PARCEL (15-03-476-018) AREA: 104,999.21 S.F. OR 2.41 ACRES

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL

NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼ of Section 3 T. 3N., R. 11E. City of Rochester Hills, Oakland County, Michigan

SHEET
Overall Site & Stringer Dimension Plan

Know what's below Call before you dig.

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: K. Withrow
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: 1" = 30'

30 15 0 15 30 45

NFE JOB NO. K176-01
SHEET NO. C3

JRMFD2023-0004 PSP2024-0008 Revision #3
Received 4/4/2025 City of Rochester Hills Planning & Economic Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

W:\2020-2000 Files\#2000-FILES\#176-01\Office\Site Prona\#176-01_ST.dwg 4/4/2025 2:24 PM

CITY OF ROCHESTER HILLS
HYDRANT FLOW TEST

Date: 6/26/2024 Time: 8:00 AM Test Performed By: W. Rybak, S. Zoll, M. Greenwood
Location: OLD ORION & Anneman Calculations Performed By: Wayne Rybak

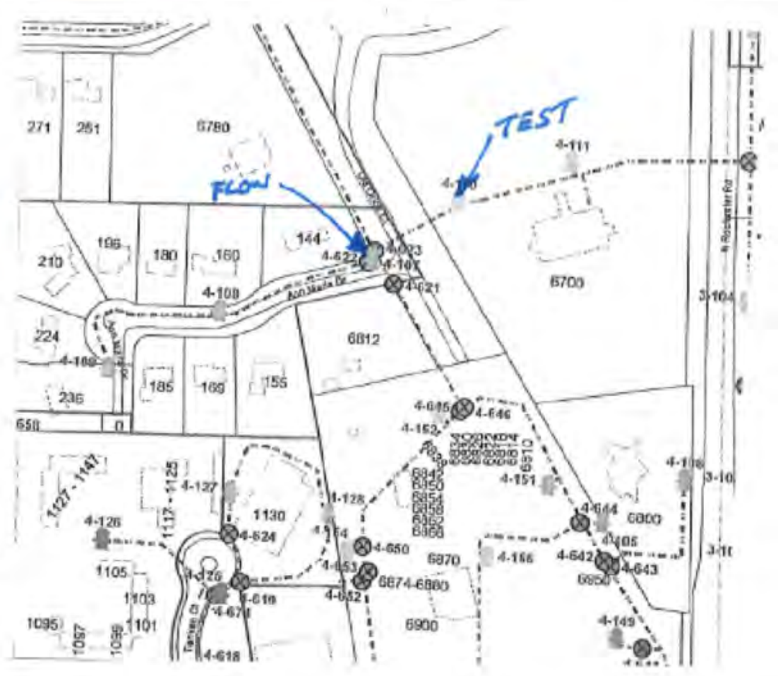
Number of Hydrants Flowing:	1
Number of Outlets Open:	1
Size of Outlet, D (inches):	3 3/4
Friction Loss Coefficient, c_d:	.9
Static Pressure, P_s (psi):	66
Residual Pressure, P_r (psi):	46
Pito Pressure, P_p (psi):	31
Residual Flow, Q_r (GPM):	2103/1745*
Fire Flow at 20 psi, Q_f (GPM):	3297/2740*
Supply Main Size (pito hydrant):	8"
Supply Main Size (static hydrant):	12"

$Q_r = 29.83 c_d D^2 (P_p)^{0.5}$ #Outlets

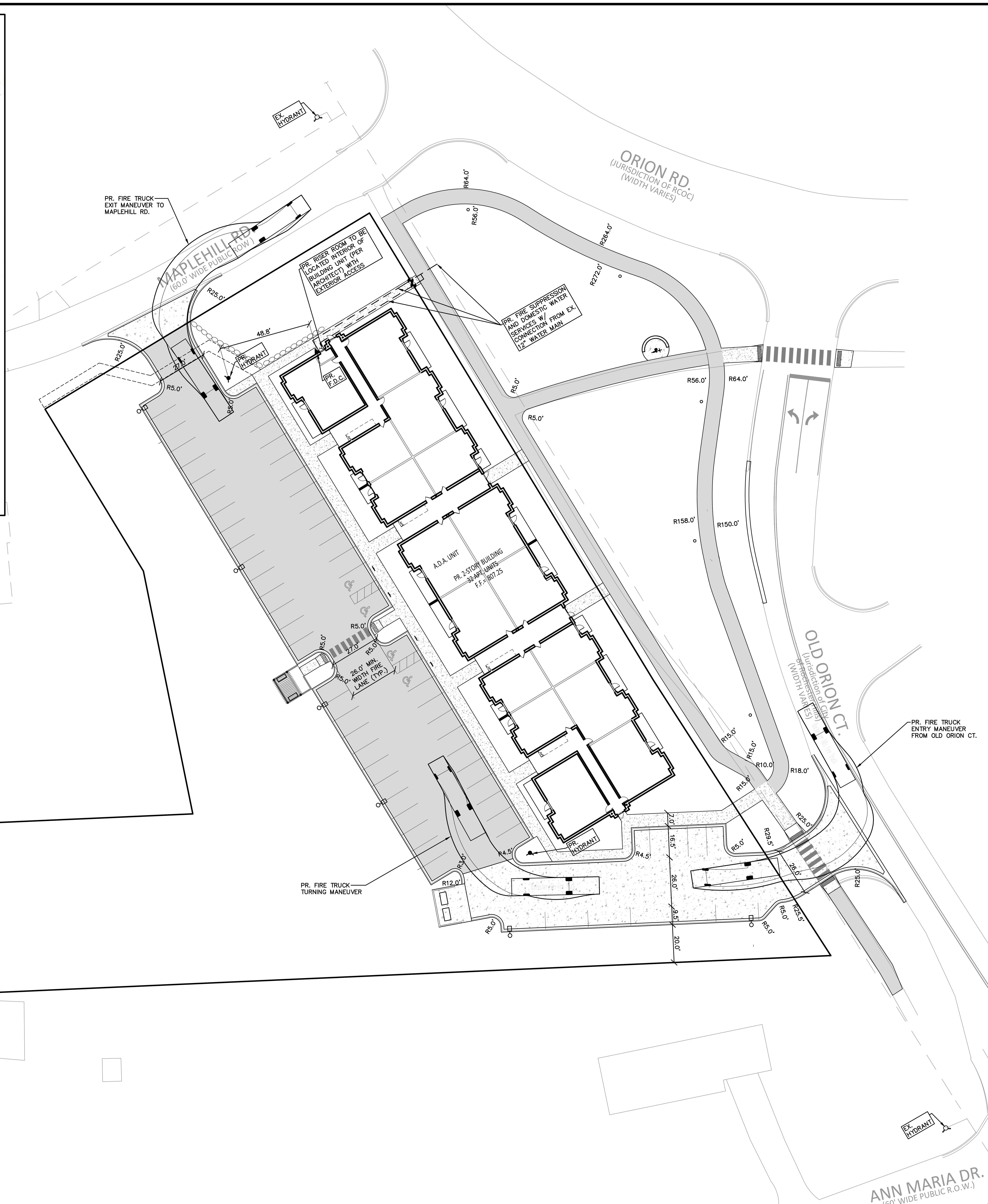
$Q_f = Q_r[(P_s - 20)/(P_s - P_r)]^{0.54}$

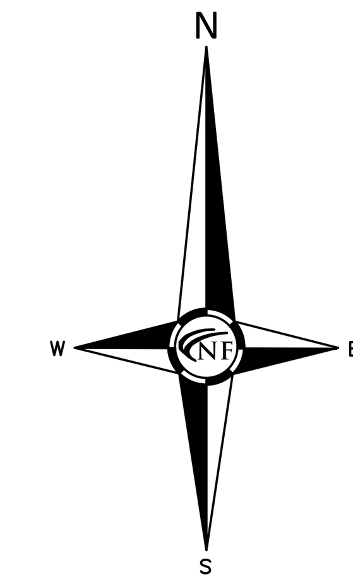
* Multiplied by .83 per NFPA 291

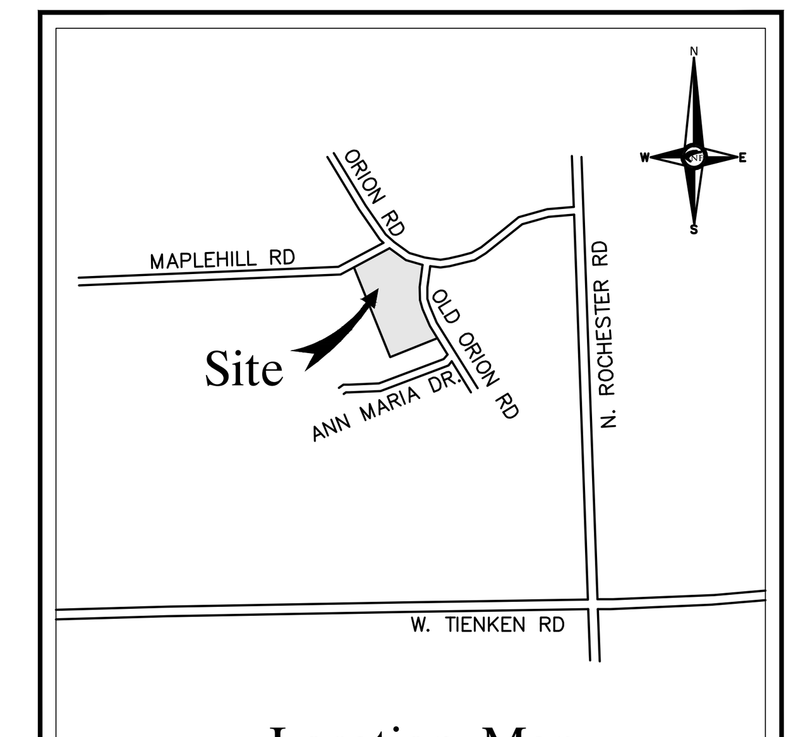
Drawing of Flow Test Site (include location of flow & test hydrant):



Attics to be sprinklered.







Location Map
N.T.S.

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

FIRE DEPARTMENT NOTES

FIRE LANES SHALL BE DESIGNATED BY THE FIRE CODE OFFICIAL, AND SHALL BE CONSPICUOUSLY POSTED ON BOTH SIDES OF THE FIRE LANE, WITH FIRE LANE SIGNS, SPACED NOT MORE THAN 100 FEET APART. FIRE LANE SIGNS SHALL READ "NO STOPPING, STANDING, PARKING, FIRE LANE", AND SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

PROVIDE A WHITE/CLEAR STROBE LIGHT OVER EACH FIRE DEPARTMENT CONNECTION.

PROPOSED BUILDING CONSTRUCTION TYPE: VA W/ NFPA SPRINKLER SYSTEM
TOTAL APPROX. BUILDING SQ. FOOTAGE: 16,193 S.F. (FOOTPRINT)

THE CONSTRUCTION TYPE AND SQUARE FOOTAGE OF BUILDING REQUIRE A FIRE FLOW OF 2000 GPM AND A MINIMUM OF 2 FIRE HYDRANTS, WITH AN AVERAGE SPACING OF 450 FEET.

A KNOX KEY SYSTEM SHALL BE INSTALLED, IN A LOCATION APPROVED BY THE FIRE CODE OFFICIAL. ORDERING INFORMATION IS AVAILABLE FROM THE KNOX COMPANY AT KNOXBOX.COM

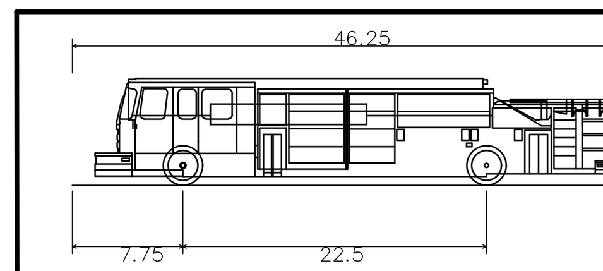
F.D.C. LOCATIONS SHOWN ARE LOCATED AT BUILDINGS PER FIRE DEPARTMENT REQUIREMENTS.

CONSTRUCTION SITES SHALL BE SAFEGUARDED IN ACCORDANCE WITH IFC CHAPTER 14.

OPEN BURNING IS NOT PERMITTED, INCLUDING THE BURNING OF TRASH, DEBRIS, OR LAND CLEARING MATERIALS. OPEN BURNING FOR WARMING OF SAND AND/OR WATER FOR THE PREPARATION OF MORTAR SHALL BE WITHIN CITY OF ROCHESTER HILLS BURN PERMIT GUIDELINES. CONTACT ROCHESTER HILLS FIRE DEPARTMENT FOR PERMIT INFORMATION. – FIRE PREVENTION ORDINANCE CHAPTER 58, SECTION 307.6.2 & 307.6.2.3

THIS PROJECT MAY BE REQUIRED TO PERFORM EMERGENCY RADIO SIGNAL STRENGTH TESTING. TESTING FAILURE WILL REQUIRE INSTALLATION OF AN IN-BUILDING TWO-WAY EMERGENCY RESPONDER COMMUNICATION SYSTEM. CONTACT R.H.F.D. FOR MORE INFORMATION REGARDING THIS REQUIREMENT.

PER CITY OF ROCHESTER HILLS FIRE DEPARTMENT REQUIREMENTS FOR THIS DEVELOPMENT, THE BUILDING ATTICS SHALL BE FIRE SUPPRESSED THROUGHOUT TO SUPPLEMENT THE NFPA 13R SYSTEM.



Rochester Hills Fire Truck	
Overall Length	46.250ft
Overall Width	9.140ft
Overall Body Height	7.915ft
Min Body Ground Clearance	0.826ft
Track Width	9.140ft
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

FIRE LANE SIGN DETAIL
N.T.S.
Provide at spaces per fire department requirements

SEAL
NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE 1/4 of Section 3
T. 3N., R. 11E.
City of Rochester Hills,
Oakland County, Michigan

SHEET
Emergency Vehicle Access Plan

Know what's below
Call before you dig.

EMERGENCY VEHICLE LEGEND

PLAN VIEW PUMPER FIRE TRUCK TURN REVIEW

LEGEND

Symbols	Description
MANHOLE	EXISTING SANITARY SEWER
	SAN. CLEAN OUT
HYDRANT, GATE VALVE	EXISTING WATERMAIN
MANHOLE, CATCH BASIN	EXISTING STORM SEWER
	EX. R. Y. CATCH BASIN
	EXISTING BURIED CABLES
UTILITY POLE, GUY POLE, GUY WIRE	OVERHEAD LINES
	LIGHT POLE
	SIGN
	EXISTING GAS MAIN
C.O., MANHOLE	PR. SANITARY SEWER
HYDRANT, GATE VALVE	PR. WATER MAIN
INLET, C.B., MANHOLE	PR. STORM SEWER
	PR. R. Y. CATCH BASIN
	PROPOSED LIGHT POLE

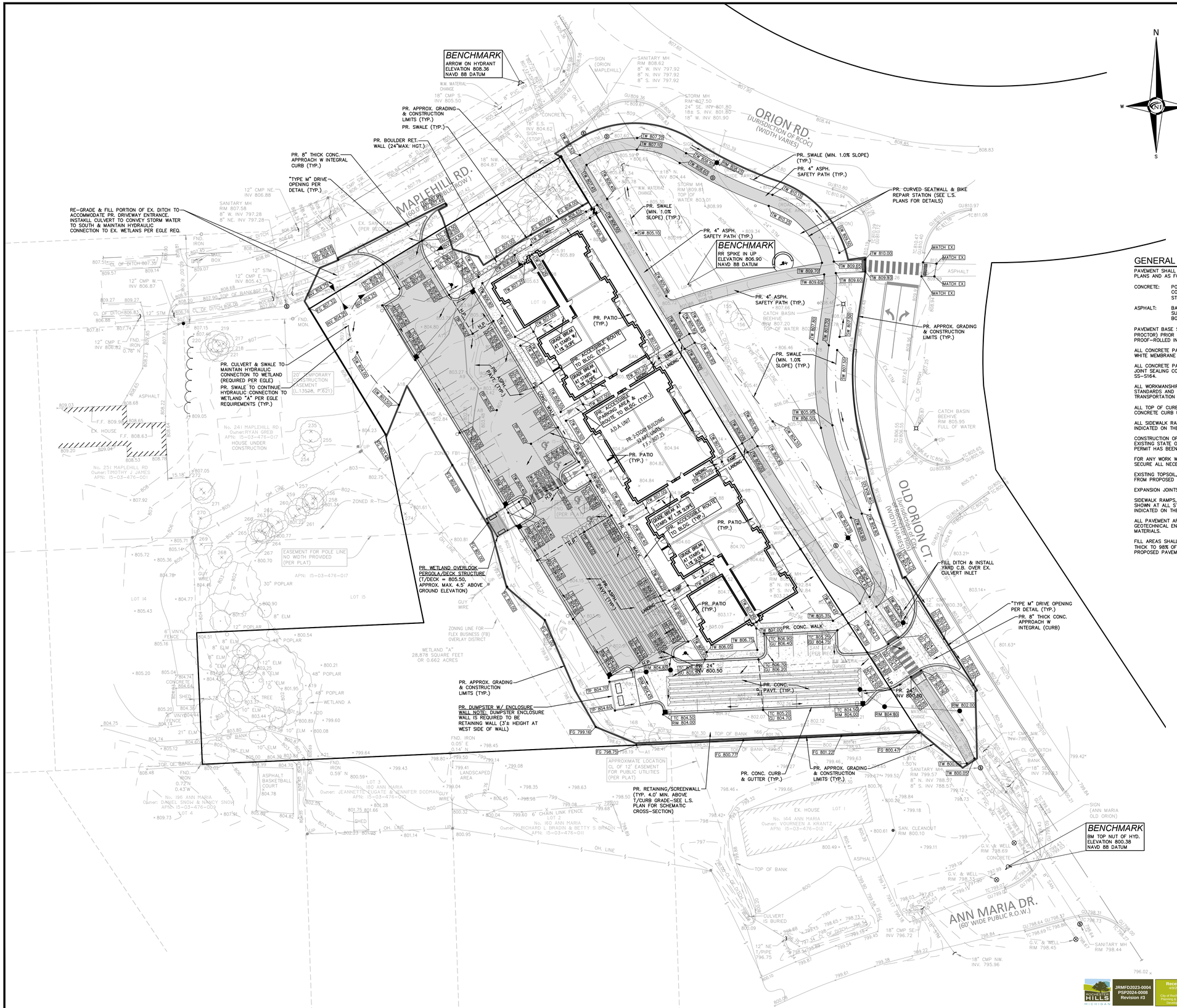
DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

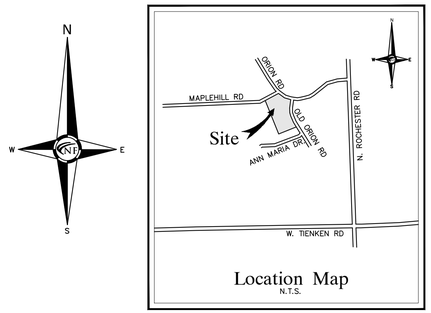
DRAWN BY: K. Withrow
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: 1" = 30'
30 15 0 15 30 45

ROCHESTER HILLS MICHIGAN
JRMFD2023-0004
PSP2024-0008
Revision #3
Received 4/9/2025
City of Rochester Hills Planning & Economic Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

NFE JOB NO. K176-01
SHEET NO. C4





Location Map
N.T.S.

GENERAL PAVING NOTES

PAVEMENT SHALL BE OF THE TYPE, THICKNESS AND CROSS SECTION AS INDICATED ON THE PLANS AND AS FOLLOWS:

CONCRETE: PORTLAND CEMENT TYPE IA (AIR–ENTRAINED) WITH A MINIMUM CEMENT CONTENT OF SIX SACKS PER CUBIC YARD, MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,500 PSI AND A SLUMP OF 1 1/2 TO 3 INCHES.

ASPHALT: BASE COURSE – MDOT BITUMINOUS MIXTURE HMA, 4EML; SURFACE COURSE – MDOT BITUMINOUS MIXTURE HMA, 5EML; BOND COAT – MDOT SS–1H EMULSION AT 0.10 GALLON PER SQUARE YARD;

PAVEMENT BASE SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT. EXISTING SUB–BASE SHALL BE PROOF–ROLLED IN THE PRESENCE OF THE ENGINEER TO DETERMINE STABILITY.

ALL CONCRETE PAVEMENT, DRIVEWAYS, CURB & GUTTER, ETC., SHALL BE SPRAY CURED WITH WHITE MEMBRANE CURING COMPOUND IMMEDIATELY FOLLOWING FINISHING OPERATION.

ALL CONCRETE PAVEMENT JOINTS SHALL BE FILLED WITH HOT POURED RUBBERIZED ASPHALT JOINT SEALING COMPOUND IMMEDIATELY AFTER SAWCUT OPERATION. FEDERAL SPECIFICATION SS–S164.

ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY AND THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, CURRENT EDITION.

ALL TOP OF CURB ELEVATIONS, AS SHOWN ON THE PLANS, ARE CALCULATED FOR A 6" CONCRETE CURB UNLESS OTHERWISE NOTED.

ALL SIDEWALK RAMPS, CONFORMING TO PUBLIC ACT NO. 8, 1993, SHALL BE INSTALLED AS INDICATED ON THE PLANS.

CONSTRUCTION OF A NEW OR RECONSTRUCTED DRIVE APPROACH CONNECTING TO AN EXISTING STATE OR COUNTY ROADWAY SHALL BE ALLOWED ONLY AFTER AN APPROVED PERMIT HAS BEEN SECURED FROM THE AGENCY HAVING JURISDICTION OVER SAID ROADWAY.

FOR ANY WORK WITHIN THE PUBLIC RIGHT–OF–WAY, THE CONTRACTOR SHALL PAY FOR AND SECURE ALL NECESSARY PERMITS AND LIKEWISE ARRANGE FOR ALL INSPECTION.

EXISTING TOPSOIL, VEGETATION AND ORGANIC MATERIALS SHALL BE STRIPPED AND REMOVED FROM PROPOSED PAVEMENT AREA PRIOR TO PLACEMENT OF BASE MATERIALS.

EXPANSION JOINTS SHOULD BE INSTALLED AT THE END OF ALL INTERSECTION RADII.

SIDEWALK RAMPS, CONFORMING TO PUBLIC ACT NO. 8, 1973, SHALL BE INSTALLED AS SHOWN AT ALL STREET INTERSECTIONS AND AT ALL BARRIER FREE PARKING AREAS AS INDICATED ON THE PLANS.

ALL PAVEMENT AREAS SHALL BE PROOF–ROLLED UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF BASE MATERIALS AND PAVING MATERIALS.

FILL AREAS SHALL BE MACHINE COMPACTED IN UNIFORM LIFTS NOT EXCEEDING 9 INCHES THICK TO 98% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT.

PAVING LEGEND

- PROPOSED CONCRETE PAVEMENT
- PROPOSED CONCRETE WALK
- PROPOSED GRAVEL PATHWAY
- PROPOSED ASPHALT PAVEMENT/PATHWAY

LEGEND

- MANHOLE — EXISTING SANITARY SEWER
- HYDRANT / GATE VALVE — SAN. CLEAN OUT
- MANHOLE / CATCH BASIN — EXISTING WATERMAIN
- EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- UTILITY POLE / GUY POLE — EXISTING BURIED CABLES
- GUY WIRE — OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- C.O. / MANHOLE — PR. SANITARY SEWER
- HYDRANT / GATE VALVE — PR. WATER MAIN
- INLET / C.B. / MANHOLE — PR. STORM SEWER
- PR. R. Y. CATCH BASIN
- PROPOSED LIGHT POLE
- TC 600.00 — PR. TOP OF CURB ELEVATION
- GU 600.00 — PR. GUTTER ELEVATION
- TW 600.00 — PR. TOP OF WALK ELEVATION
- TP 600.00 — PR. TOP OF PVMT. ELEVATION
- FG 600.00 — FINISH GRADE ELEVATION

JRMFD2023-0004
PSP2024-0008
Revision #3

Received
4/5/2025
City of Rochester Hills
Planning & Economic Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL
NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼ of Section 3 T. 3N., R. 11E. City of Rochester Hills, Oakland County, Michigan

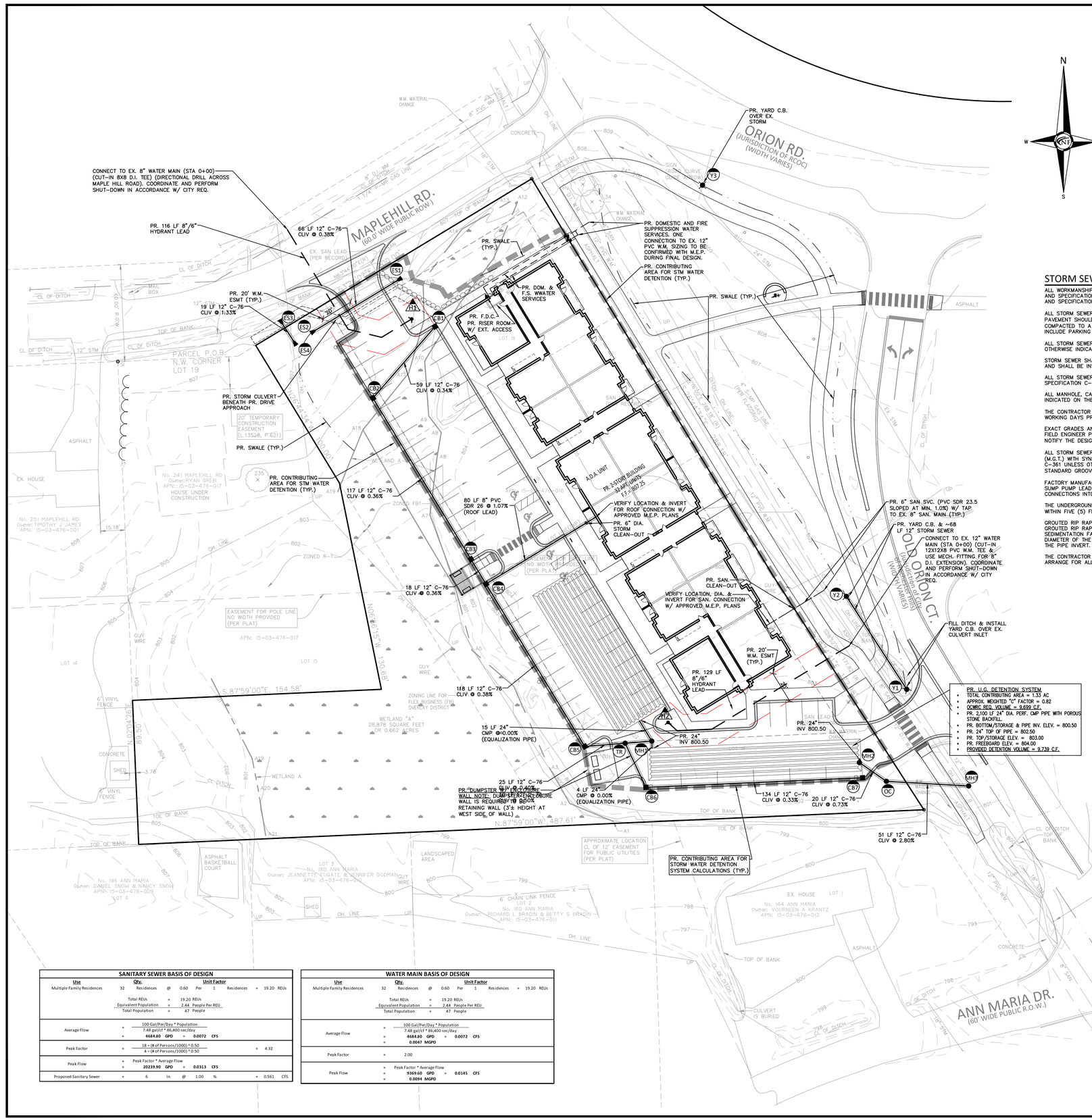
SHEET
Paving and Grading Plan

Know what's below Call before you dig.

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: J. Lawrey
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. K176-01
SHEET NO. C5



PR. U.G. DETENTION SYSTEM

- TOTAL CONTRIBUTING AREA = 1.33 AC
- APPROX. WEIGHTED "C" FACTOR = 0.82
- OCWRC REQ. VOLUME = 9,699 C.F.
- PR. 2,100 LF 24" DIA. PERF. CMP PIPE WITH POROUS STONE BACKFILL.
- PR. BOTTOM/STORAGE & PIPE INV. ELEV. = 800.50
- PR. 24" TOP OF PIPE = 802.50
- PR. TOP/STORAGE ELEV. = 803.00
- PR. FREEBOARD ELEV. = 804.00
- PROVIDED DETENTION VOLUME = 9,739 C.F.

LEGEND

MANHOLE	EXISTING SANITARY SEWER
	SAN. CLEAN OUT
HYDRANT, GATE VALVE	EXISTING WATER MAIN
MANHOLE, CATCH BASIN	EXISTING STORM SEWER
	EX. R. Y. CATCH BASIN
	EXISTING BURIED CABLES
UTILITY POLE, GUY POLE, GUY WIRE	OVERHEAD LINES
☼	LIGHT POLE
	SIGN
	EXISTING GAS MAIN
C.O., MANHOLE	PR. SANITARY SEWER
HYDRANT, GATE VALVE	PR. WATER MAIN
INLET, C.B., MANHOLE	PR. STORM SEWER
	PR. R. Y. CATCH BASIN
	SAND BACKFILL (95 % DENSITY)
☼	PROPOSED LIGHT POLE

Location Map
N.T.S.

STORM SEWER NOTES

ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY. THE MUNICIPALITY STANDARD NOTES, DETAILS AND SPECIFICATIONS SHALL BE INCORPORATED AS PART OF THEIR PLANS.

ALL STORM SEWER TRENCHES UNDER OR WITHIN THREE (3) FEET OF EXISTING OR PROPOSED PAVEMENT SHOULD BE BACKFILLED WITH MDOT CLASS II MATERIAL (SAND) AND BE MACHINE COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S MAXIMUM DENSITY. PAVEMENT SHALL INCLUDE PARKING LOTS, DRIVE APPROACHES, CURB & GUTTER AND ADJACENT WALLS.

ALL STORM SEWER PIPE SHALL BE INSTALLED ON CLASS "B" BEDDING OR BETTER UNLESS OTHERWISE INDICATED ON THE PLANS.

STORM SEWER SHALL BE OF THE TYPE, SIZE & CLASS DESIGNATION INDICATED ON THE PLANS AND SHALL BE INSTALLED AT THE PROPOSED LINE AND GRADE INDICATED.

ALL STORM SEWER PIPE SHALL BE REINFORCED CONCRETE PIPE CONFORMING TO ASTM SPECIFICATION C-76, CL IV.

ALL MANHOLE, CATCH BASIN, INLET, REAR YARD DRAIN FRAMES AND COVERS SHALL BE AS INDICATED ON THE PLANS IN ACCORDANCE WITH MUNICIPALITY STANDARDS.

THE CONTRACTOR SHALL NOTIFY MISS DIG (1-800-482-7171) A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.

EXACT GRADES AND INVERTS OF PROPOSED STORM SEWER ARE TO BE CHECKED WITH THE FIELD ENGINEER PRIOR AND DURING INSTALLATION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE DESIGN ENGINEER OF ANY PLAN INCONSISTENCY AN/OR UTILITY CONFLICTS.

ALL STORM SEWER PIPE JOINTS SHALL BE "PREMIUM JOINT" MODIFIED GROOVED TONGUE, (M.G.T.) WITH SYNTHETIC RUBBER GASKETS CONFORMING TO ASTM SPECIFICATION C-443 & C-361 UNLESS OTHERWISE INDICATED ON THE PLANS. ALTERNATE JOINT CONNECTION MAYBE STANDARD GROOVED TONGUE WITH COLD MASTIC (DEWITT #10 JOINT COMPOUND OR EQUAL).

FACTORY MANUFACTURED PRECAST TEE SECTIONS SHALL BE USED FOR ROOF DRAINS AND/OR SUMP PUMP LEADS AND LATERALS WHERE INDICATED ON THE PLANS. BLIND TOP CONNECTIONS INTO STORM SEWER WILL NOT BE PERMITTED BY BREAKING PIPE WALL.

THE UNDERGROUND SITE CONTRACTOR SHALL INSTALL ALL STORM SEWER BUILDING LEADS TO WITHIN FIVE (5) FEET OF PROPOSED BUILDING.

GROUTED RIP RAP SHALL BE INSTALLED AT THE ENDS OF ALL CULVERTS AND END SECTIONS. GROUTED RIP RAP SHALL LIKEWISE BE INSTALLED AT OUTLET POINTS IN DETENTION AND SEDIMENTATION FACILITY. THE MINIMUM WIDTH OF THE RIP RAP SHALL BE TWICE THE OUTSIDE DIAMETER OF THE PIPE. THE RIP RAP SHALL EXTEND FROM THE BOTTOM OF THE SLOPE TO THE PIPE INVERT.

THE CONTRACTOR SHALL PAY FOR AND SECURE ALL NECESSARY PERMITS AND LIKEWISE ARRANGE FOR ALL SITE INSPECTION.

Storm Drainage Structure Schedule

Structure Name	Structure Details
#CB1 PR. 2' DIA. STORM INLET	PR. RIM 806.20 PR. 12" SW. INV. 801.78
#CB2 PR. 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 806.30 PR. 12" SE. INV. 801.16 PR. 12" NE. INV. 801.58
#CB3 PR. 4' DIA. SHALLOW STORM CB W/ 2' SUMP	PR. RIM 805.00 PR. 12" NW. INV. 801.58 PR. 12" SE. INV. 801.16
#CB4 PR. 4' DIA. SHALLOW STORM CB W/ 2' SUMP	PR. RIM 804.75 PR. 12" NW. INV. 801.10 PR. 8" NE. INV. 802.00 PR. 12" SE. INV. 801.10
#CB5 PR. 4' DIA. SHALLOW STORM CB W/ 2' SUMP	PR. RIM 804.25 PR. 12" NW. INV. 800.65 PR. 12" E. INV. 800.65
#CB6 PR. 4' DIA. SHALLOW STORM CB W/ 3' SUMP	PR. RIM 803.00 PR. 12" NW. INV. 800.55 PR. 12" E. INV. 801.15
#CB7 PR. 2' DIA. STORM INLET	PR. RIM 802.58 PR. 12" W. INV. 800.70
#ES1 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" SW. INV. 804.50
#ES2 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" NE. INV. 804.25
#ES3 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" SE. INV. 804.75
#ES4 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" NW. INV. 804.50
#MH1 PR. 4' MANHOLE	PR. RIM 804.32 PR. 12" W. INV. 800.50 PR. 24" S. INV. 800.50 PR. 24" NW. INV. 800.50
#MH2 PR. 24" DIA. CMP RISER MH	PR. RIM 804.50 PR. 12" SE. INV. 800.50
#MH3 PR. 4' DIAMETER STORM MANHOLE AT OUTLET TO EX. CULVERT (CONSTRUCT ONLINE)	PR. RIM 802.92 PR. 12" W. INV. 798.92
#OC PR. 5' DIA. OUTLET CONTROL MANHOLE W RESTRICTED OUTLET RISER (PER DETAIL)	PR. RIM 804.35 PR. 12" NW. INV. 800.35 PR. 12" E. INV. 800.35
#TR PR. WATER QUALITY PRE-TREATMENT STRUCTURE	PR. RIM 804.55 PR. 12" W. INV. 800.55 PR. 12" SE. INV. 800.70 PR. 12" E. INV. 800.55
#Y1 PR. 4' DIA. R.Y.C.B. W/ 2' SUMP	PR. RIM 804.23 PR. 12" NW. INV. 800.39
#Y2 PR. 4' DIA R.Y.C.B. W/ 2' SUMP	PR. RIM 803.84 PR. 12" SE. INV. 800.00
#Y3 PR. 4' DIA. R.Y.C.B. W/ 2' SUMP (CONSTRUCT ONLINE VERIFY INV. ELEV. IN FIELD)	PR. RIM 808.25

SANITARY SEWER BASIS OF DESIGN

Use		Qty.			Unit Factor					
Multiple Family Residences		32	Residences	@	0.60	Per	1	Residences	=	19.20 REUs
		Total REUs		=	19.20	REUs				
		Equivalent Population		=	2.44	People Per REU				
		Total Population		=	47	People				
Average Flow	=	100 Gal/Per/Day * Population / 7.48 gal/cf * 86,400 sec/day								
	=	**4684.80**	**GPD**	=	**0.0072**	**CFS**				
Peak Factor	=	18 + (# of Persons/1000) ^ 0.50 / 4 + (# of Persons/1000) ^ 0.50							=	4.32
Peak Flow	=	Peak Factor * Average Flow								
	=	**20239.90**	**GPD**	=	**0.0313**	**CFS**				
Proposed Sanitary Sewer	=	6	In.	@	1.00	%			=	0.561 CFS

WATER MAIN BASIS OF DESIGN

Use		Qty.			Unit Factor					
Multiple Family Residences		32	Residences	@	0.60	Per	1	Residences	=	19.20 REUs
		Total REUs		=	19.20	REUs				
		Equivalent Population		=	2.44	People Per REU				
		Total Population		=	47	People				
Average Flow	=	100 Gal/Per/Day * Population / 7.48 gal/cf * 86,400 sec/day								
	=	**4684.80**	**GPD**	=	**0.0072**	**CFS**				
	=	**0.0047**	**MGPD**							
Peak Factor	=	2.00								
Peak Flow	=	Peak Factor * Average Flow								
	=	**9369.60**	**GPD**	=	**0.0145**	**CFS**				
	=	**0.0094**	**MGPD**							

NF ENGINEERS

CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL
NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court
Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼
of Section 3
T. 3N., R. 11E.
City of Rochester Hills,
Oakland County, Michigan

SHEET
Utility Plan

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

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: J. Lawrey
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: 1" = 30'
30 15 0 15 30 45

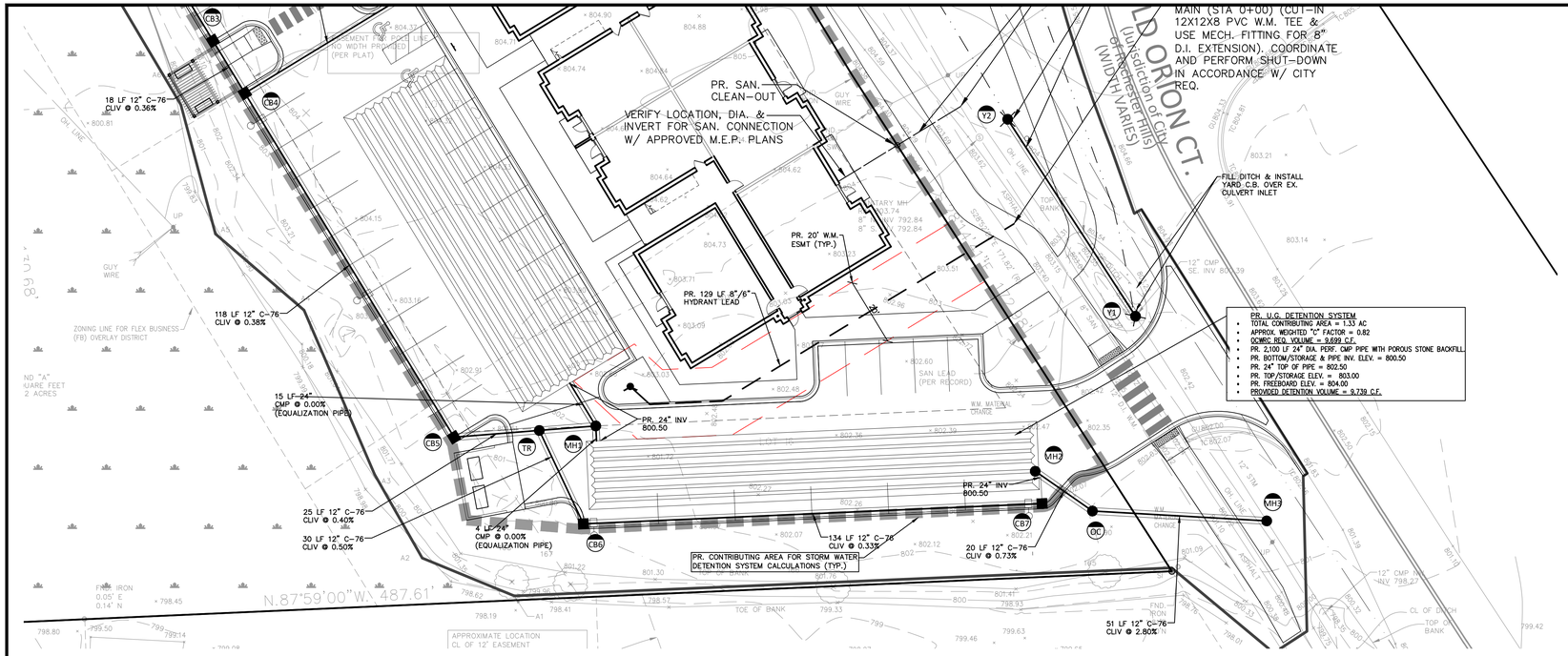
ROCHESTER HILLS MICHIGAN
JRMFD2023-0004
PSP2024-0008
Revision #3

Received
4/9/2025
City of Rochester Hills
Planning & Economic
Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

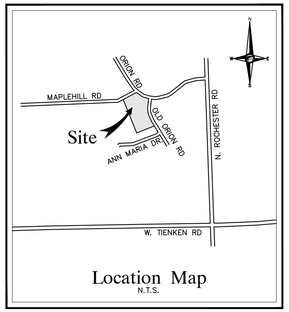
NFE JOB NO. **K176-01**
SHEET NO. **C6**

W:\5000~2000 Files\K176-01\Office\Site Plans\K176-01_UTILITY.dwg 4/4/2025 2:31 PM

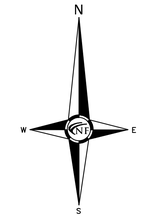


LEGEND

- MANHOLE — EXISTING SANITARY SEWER
- SAN. CLEAN OUT
- HYDRANT, GATE VALVE — EXISTING WATER MAIN
- MANHOLE, CATCH BASIN — EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- UTILITY POLE, GUY POLE, GUY WIRE — EXISTING BURIED CABLES
- OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- C.O., MANHOLE — PR. SANITARY SEWER
- HYDRANT, GATE VALVE — PR. WATER MAIN
- INLET, C.B., MANHOLE — PR. STORM SEWER
- PR. R. Y. CATCH BASIN
- SAND BACKFILL (95 % DENSITY)
- PROPOSED LIGHT POLE



Location Map
N.T.S.



Storm Drainage Structure Schedule

Structure Name	Structure Details
#CB1 PR. 2' DIA. STORM INLET	PR. RIM 806.20 PR. 12" SW. INV. 801.78
#CB2 PR. 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 806.30 PR. 12" SE. INV. 801.16 PR. 12" NE. INV. 801.58
#CB3 PR. 4' DIA. SHALLOW STORM CB W/ 2' SUMP	PR. RIM 805.00 PR. 12" NW. INV. 801.58 PR. 12" SE. INV. 801.16
#CB4 PR. 4' DIA. SHALLOW STORM CB W/ 2' SUMP	PR. RIM 804.75 PR. 12" NW. INV. 801.10 PR. 8" NE. INV. 802.00 PR. 12" SE. INV. 801.10
#CB5 PR. 4' DIA. SHALLOW STORM CB W/ 2' SUMP	PR. RIM 804.25 PR. 12" NW. INV. 800.65 PR. 12" E. INV. 800.65
#CB6 PR. 4' DIA. SHALLOW STORM CB W/ 3' SUMP	PR. RIM 803.00 PR. 12" NW. INV. 800.55 PR. 12" E. INV. 801.15
#CB7 PR. 2' DIA. STORM INLET	PR. RIM 802.58 PR. 12" W. INV. 800.70
#ES1 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" SW. INV. 804.50
#ES2 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" NE. INV. 804.25
#ES3 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" SE. INV. 804.75
#ES4 PR. 12" DIA. END SECTION W/ BAR GRATE	PR. 12" NW. INV. 804.50
#MH1 PR. 4' MANHOLE	PR. RIM 804.32 PR. 12" W. INV. 800.50 PR. 24" S. INV. 800.50 PR. 24" NW. INV. 800.50
#MH2 PR. 24" DIA. CMP RISER MH	PR. RIM 804.50 PR. 12" SE. INV. 800.50
#MH3 PR. 4' DIAMETER STORM MANHOLE AT OUTLET TO EX. CULVERT (CONSTRUCT ONLINE)	PR. RIM 802.92 PR. 12" W. INV. 798.92
#OC PR. 5' DIA. OUTLET CONTROL MANHOLE W RESTRICTED OUTLET RISER (PER DETAIL)	PR. RIM 804.35 PR. 12" NW. INV. 800.35 PR. 12" E. INV. 800.35
#TR PR. WATER QUALITY PRE-TREATMENT STRUCTURE	PR. RIM 804.55 PR. 12" W. INV. 800.55 PR. 12" SE. INV. 800.70 PR. 12" E. INV. 800.55
#Y1 PR. 4' DIA. R.Y.C.B. W/ 2' SUMP	PR. RIM 804.23 PR. 12" NW. INV. 800.39
#Y2 PR. 4' DIA R.Y.C.B. W/ 2' SUMP	PR. RIM 803.84 PR. 12" SE. INV. 800.00
#Y3 PR. 4' DIA. R.Y.C.B. W/ 2' SUMP (CONSTRUCT ONLINE VERIFY INV. ELEV. IN FIELD)	PR. RIM 808.25

PROVIDED DETENTION VOLUME CALCULATIONS

Circular Underground Detention System

PIPE STORAGE VOLUME	
Total Linear Feet of Proposed U.G. Detention Pipe	2,189 *ft*
Proposed Pipe Diameter	24 *in*
Proposed Pipe Cross-Sectional Area	3.14 *sft*
Total Storage Provided in Pipe	***6,877 cft***
STONE TRENCH STORAGE VOLUME	
Proposed Porous Stone Trench Width	3.00 *ft*
Proposed Porous Stone Trench Height (Above Pipe Invert)	2.50 *ft*
Cross-Sectional Area of Trench	7.50 *sft*
Subtract Pipe Cross-Sectional Area	-3.14 *sft*
Net Cross-Sectional Porous Stone Trench Area	4.36 *sft*
Minimum Stone Trench Backfill Porosity (%)	30 *%*
Effective Storage Provided in Trench Backfill Cross-Section	1.31 *sft*
Total Storage Provided in Porous Stone Trench	***2,862 cft***
TOTAL U.G. DETENTION VOLUME PROVIDED	**9,739 *cft***

MULTI-STAGE DETENTION OUTLET CALCULATIONS

Extended Detention & 100-Year - Circular Orifice

Contributing Acreage "A":	1.33 *ac*
Weighted Runoff Coefficient "C":	0.82
100-Year Storm Allowable Outlet Rate "Q100p":	1.330 *cfs*
Extended Detention Volume Discharge Rate "Qed":	0.044 *cfs*
Top of Detention Storage "Ztop":	803.00
Bottom of Detention Storage "Zbot":	800.50
Elevation of Outlet Control "Zout":	800.35
EXTENDED DETENTION OUTLET CALCULATIONS	
Extended Detention Volume "Ved":	7,522 *cft*
Extended Detention Elevation "Zed":	802.50
Calculate Average Head "Hed":	
Hed = 0.5*(Zed-Zout)	1.075 *ft*
Calculate Required Orifice Area "Aed":	
Aed = Qed / (0.62*(2*g*Hed)^0.5)	0.008 *sft*
Provided Number of Holes	1 *Hole*
Required Diameter of Holes	1.125 *in*
Provided Orifice Area "Aed-act ":	0.007 *sft*
Calculate Actual Average Release Rate "Qed-act":	
Qed-act = 0.62*Aed-act*((2*g*Hed)^0.5)	0.036 *cfs*
Calculate Actual Holding Time "Ted":	
Ted = (Ved/Qed-act)/3600	58.67 *hr*
**** Use (1) 1.125" Hole @ 800.35 ****	
100-YEAR FLOOD VOLUME OUTLET CALCULATIONS	
Calculate Head on Extended Detention Holes "Hout":	
Hout = Ztop - Zout	2.650 *ft*
Calculate Flow through Extended Detention Holes "Q100p-ed":	
Q100p-ed = (0.62*Aed-act(2*32.2*Hout)^0.5)	0.056 *cfs*
Calculate Adjusted Required Outlet Release Rate "Q100p-adj":	
Q100p-adj = Q100p - Q100p-ed	1.274 *cfs*
Calculate Head on 100-year Holes "H100p":	
H100p = Ztop - Zed	0.50 *ft*
Calculate Required Orifice Area "A100p":	
A100p = (Q100p-adj / (0.62*(2*g*H100p)^0.5))	0.362 *sft*
Provided Number of Holes	13 *Holes*
Required Diameter of Holes	2.25 *in*
Provided Orifice Area "A100p-act":	0.359 *sft*
Calculate Actual Peak Release Rate "Q100p-act":	
Q100p-act = (0.62*A100p-act)*(2*g*H100p)^0.5)	1.263 *cfs*
Calculate Total Release Rate "Q100p-tot":	
Q100p-tot = Q100p-ed + Q100p-act	1.319 *cfs*
**** Use (13) 2.25" Holes @ 802.50 ****	

WEIGHTED RUNOFF COEFFICIENT CALCULATIONS

Surface Type			C (Average) = Area 1 * C1 + Area 2 * C2 + Area 3 * C3 / Area 1 + Area 2 + Area 3
	Pervious	0.30	
	Impervious	0.95	
	Pond	1.00	

Drainage Area	*Total Area*	*Pervious*	*Impervious*	*Pond*	*C (Average)*
Development Area	58,070 Sq.Ft.	11,471 Sq.Ft.	46,599 Sq.Ft.	0 Sq.Ft.	0.82
	1.33 Ac.	0.26 Ac.	1.07 Ac.	0.00 Ac.	
Overall	58,070.00 Sq.Ft.	11,471.00 Sq.Ft.	46,599.00 Sq.Ft.	0.00 Sq.Ft.	0.82
	1.330 Ac.	0.263 Ac.	1.070 Ac.	0.000 Ac.	

REQUIRED DETENTION VOLUME CALCULATIONS

100 Year Post-Development Detention Volume

Name of Project:	**Name**
Location of Project:	**Location**
NFE Project No.:	**K176-01**
Site Acreage "A":	2.41 *ac*
Development Acreage "A":	1.33 *ac*
Weighted Runoff Coefficient "C":	0.82
Time of Concentration "Tc":	12.05 *min*
1. Calculate Required Water Quality Volume (Vwq) (1" Rainfall Event)	
Vwq = 3630(C)(A)	3,959 *cft*
2. Calculate Required Forebay Volume (Vf) (0.15" Rainfall Event)	
Vf = 545(C)(A)	594 *cft*
3. Calculate Required Channel Protection Volume (Vcp-r) (1.3" Rainfall Event)	
Vcp-r = 4719(C)(A)	5,147 *cft* *
4. Calculate Required Extended Detention Volume (Ved) (1.9" Rainfall Event)	
Ved = 6897(C)(A)	7,522 *cft*
5. Calculate Extended Detention Outlet Rate (Qed) (48 hour discharge)	
Qed = Ved / [(48 hr)(60 min)(60 sec)] = Ved/172800	0.04 *cfs*
6. Calculate 100-year Rainfall Intensity (I100)	
I100 = 83.3/(Tc+9.17)^0.81))	7.01 *in/hr*
7. Calculate 100-year Storm Inlet Rate (Q100-in)	
Q100-in = (C)(I100)(A)	7.65 *cfs*
8. Determine the Variable Release Rate (Qvrr)	
Qvrr =	1.00 *cfs/ac*
Restricted Outlet rate per local municipality	N/A *cfs/ac*
9. Calculate Allowable 100-year Storm Outlet Rate (Q100P)	
Q100p = (Qvrr)(A)	1.33 *cfs*
10. Calculate Storage Curve Factor (R)	
R = 0.206-(0.15)(LN(Q100P/Q100-in))	0.468
11. Calculate Required 100-year Storm Volume In (V100R)	
V100R = 18,985(C)(A)	20,705 *cft*
12. Calculate 100-year Storm Detention Storage Volume (V100D)	
V100D = (V100R)(R)	9,699 *cft*
Vcp(credit)	0 *cft*
TOTAL DETENTION VOLUME REQUIRED:	**9,699 *cft***

**Infiltration note: Per G2 report, avg measured rate for 2 test pits = ((0.3 + 0.2)/2) =0.25 in/hr. Apply safety factor of 2 → 0.25/2 = 0.125 in/hr → soils not suitable*

SUBMIT G2 REPORT WITH CONSTRUCTION PLAN SUBMITTAL FOR LIP

BACKFILL & BEDDING DETAIL FOR UNDERGROUND DETENTION PIPE SYSTEM

NOTE: UNDERGROUND DETENTION PIPES SHALL CONFORM TO AASHTO M36 (ASTM 760) ALUMINUM COATED SHEET CONFORMING TO AASHTO M274

NOTE: USE OF THE CONTINUOUS WELDED SEAM PROCESS IN THE FABRICATION OF THE UNDERGROUND DETENTION PIPES IS PROHIBITED

PROVIDE CONTECH C-60 NONWOVEN GEOTEXTILE FABRIC AROUND ALL JOINTS.

PRIOR TO INSTALLATION OF THE UNDERGROUND DETENTION SYSTEM, ALL PIPE AND HARDWARE SHALL BE IN SOUND CONDITION, WITHOUT DAMAGE TO METAL COATING AND/OR SHAPE. BEFORE BACKFILLING TRENCH PER APPROVAL FROM THE CITY ENGINEER.

PLAN VIEW
CMP 24" 90° BEND SECTION
N.T.S.

SECTION A-A

SECTION DETAIL

PR. STRUCTURE OUTLET CONTROL DETAIL
N.T.S.

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL
NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼ of Section 3
T. 3N., R. 11E.
City of Rochester Hills, Oakland County, Michigan

SHEET
Stormwater Management Plan

Know what's below Call before you dig.

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: J. Lawrey
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: 1" = 20'

20 10 0 10 20 30

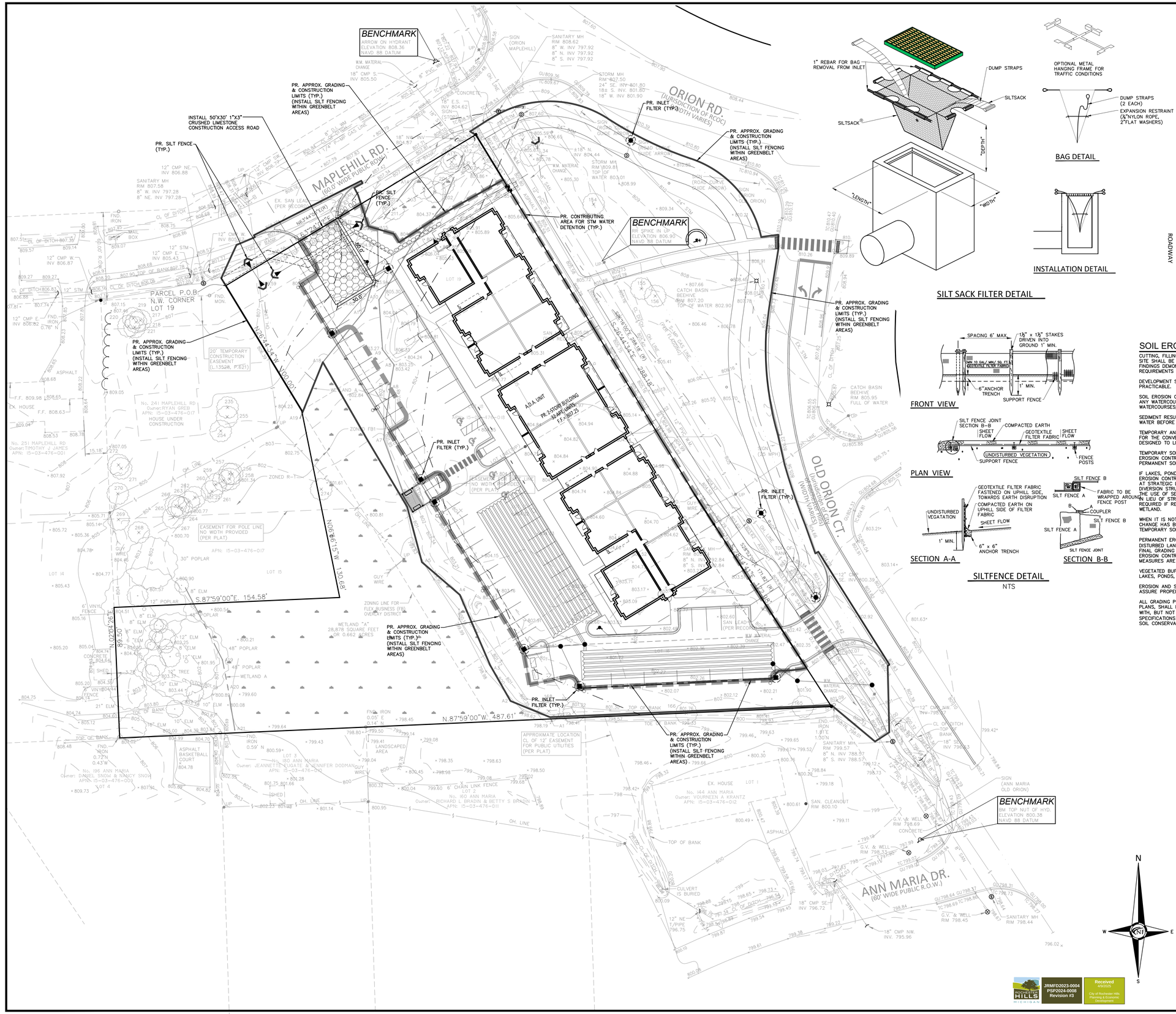
NFE JOB NO. K176-01
SHEET NO. C7

JRMFD2023-0004
PSP2024-0008
Revision #3

Received 4/9/2025
City of Rochester Hills Planning & Economic Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

W:\2000-2999 Files\K000-FILES\K176-01\Office\Site Plans\K176-01_UTILITY.dwg 4/4/2025 2:40 PM



SILT SACK FILTER DETAIL

BAG DETAIL

INSTALLATION DETAIL

FRONT VIEW

PLAN VIEW

SECTION A-A

SECTION B-B

SILTFENCE DETAIL
NTS

SOIL EROSION CONTROL

CUTTING, FILLING AND GRADING SHALL BE MINIMIZED AND THE NATURAL TOPOGRAPHY OF THE SITE SHALL BE PRESERVED TO THE MAXIMUM POSSIBLE EXTENT, EXCEPT WHERE SPECIFIC FINDINGS DEMONSTRATE THAT MAJOR ALTERATIONS WILL STILL MEET THE PURPOSES AND REQUIREMENTS OF THIS ORDINANCE.

DEVELOPMENT SHALL BE STAGED TO KEEP THE EXPOSED AREAS OF SOIL AS SMALL AS PRACTICABLE.

SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED BETWEEN THE DISTURBED AREA AND ANY WATERCOURSES, INCLUDING RIVERS, STREAMS, CREEKS, LAKES, PONDS AND OTHER WATERCOURSES; WETLANDS; OR ROADWAYS ON OR NEAR THE SITE.

SEDIMENT RESULTING FROM ACCELERATED SOIL EROSION SHALL BE REMOVES FROM RUNOFF WATER BEFORE THAT WATER LEAVES THE SITE.

TEMPORARY AND PERMANENT SOIL EROSION CONTROL MEASURES DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF WATER AROUND, THROUGH, OR AWAY FROM THE SITE SHALL BE DESIGNED TO LIMIT THE WATER FLOW TO A NON-EROSIVE VELOCITY.

TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE REMOVED AFTER PERMANENT SOIL EROSION CONTROL MEASURES HAVE BEEN IMPLEMENTED. ALL SITES SHALL BE STABILIZED WITH PERMANENT SOIL EROSION CONTROL MEASURES.

IF LAKES, PONDS, CREEKS, STREAMS, OR WETLANDS ARE LOCATED ON OR NEAR THE SITE, EROSION CONTROL MEASURES WHICH DIVERT RUNOFF AND TRAP SEDIMENT MUST BE PROVIDED AT STRATEGIC LOCATIONS. STRAW BALE BERMS MAY BE USED AS TEMPORARY STORMWATER DIVERSION STRUCTURES, BUT WILL NOT BE CONSIDERED SUFFICIENT FOR TRAPPING SEDIMENT. THE USE OF SEDIMENT BASINS, FILTER FABRIC, VEGETATED BUFFER STRIPS, AND ROCK FILTERS IN LIEU OF STRAW BALE BERMS SHALL BE STRONGLY ENCOURAGED. OTHER MEASURES MAY BE REQUIRED IF REASONABLY DETERMINED TO BE NECESSARY TO PROTECT A WATERCOURSE OR WETLAND.

WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH CHANGE HAS BEEN COMPLETED OR WHEN SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED.

PERMANENT EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 15 (FIFTEEN) CALENDAR DAYS AFTER FINAL GRADING OR THE FINAL EARTH CHANGE HAS BEEN COMPLETED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED.

VEGETATED BUFFER STRIPS SHALL BE CREATED OR RETAINED ALONG THE EDGES OF ALL LAKES, PONDS, CREEKS, STREAMS, OTHER WATERCOURSES, OR WETLANDS.

EROSION AND SEDIMENTATION CONTROL MEASURES SHALL RECEIVE REGULAR MAINTENANCE TO ASSURE PROPER FUNCTIONING.

ALL GRADING PLANS AND SPECIFICATIONS, INCLUDING EXTENSIONS OF PREVIOUSLY APPROVED PLANS, SHALL INCLUDE PROVISIONS FOR EROSION AND SEDIMENT CONTROL IN ACCORDANCE WITH, BUT NOT LIMITED TO, THE STANDARDS CONTAINED IN THE "STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", PUBLISHED BY THE OAKLAND SOIL CONSERVATION DISTRICT.

NOTES

REFER TO THE WRC SOIL EROSION AND SEDIMENTATION CONTROL DETAIL SHEET FOR ALL ADDITIONAL NOTES & DETAILS (TYP)

A DISTANCE OF 2.59 MILES TO THE NEAREST BODY OF WATER (STONY CREEK LAKE).

THE TOTAL AREA OF EARTH DISRUPTION IS 2.57 ACRES.

THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY THE CONTRACTOR

A SOIL EROSION PERMIT IS REQUIRED FROM OAKLAND COUNTY.

SOIL DATA

THIS SITE CONSISTS OF 15B (SPINKS LOAMY SAND, 0 TO 6 PERCENT SLOPES) & 17A (WASEPI SANDY LOAM, 0 TO 3 PRCENT SLOPES)

BASED ON DATA PROVIDED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE.

ON-SITE CONTACT

THE SITE CONTACT PERSON RESPONSIBLE FOR MAINTENANCE OF SOIL EROSION CONTROL MEASURES SHALL BE: T.B.D.

ESTIMATED QUANTITIES

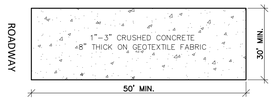
SOIL EROSION

DESCRIPTION	QUANTITY	UNITS
SILT FABRIC FENCING	1,550	L.F.
INLET FILTER	10	EA.
SILT SACK OR EQUAL	10	EA.
1"X3" CONSTRCUTION ACCESS (MUD MAT)	70	SYD.

LEGEND

- INDICATES LIMITS OF SILT FABRIC FENCE
- INDICATES LIMITS OF DRAINAGE DISTRICT AREA
- INDICATES LIMITS OF SOIL DISRUPTION
- INDICATES LOW POINT INLET FILTER OR PROPOSED DRAINAGE STRUCTURE
- INDICATES SILT SACK OR EQUAL ON EXISTING, DRAINAGE STRUCTURE
- AREA A 0.00 ACRE — INDICATES DRAINAGE DISTRICT AREA

Location Map
N.T.S.



TEMPORARY CRUSHED CONCRETE CONSTRUCTION ACCESS ROAD

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL

NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼ of Section 3 T. 3N., R. 11E. City of Rochester Hills, Oakland County, Michigan

SHEET
Soil Erosion and Sedimentation Control Plan

811 Know what's below Call before you dig.

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: J. Lawrey
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: 1" = 30'

30 15 0 15 30 45

NFE JOB NO. K176-01
SHEET NO. C8

Rochester Hills MICHIGAN
JRMFD2023-0004
PSP2024-0008
Revision #3
Received 4/4/2025
City of Rochester Hills Planning & Economic Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

W:\2020-2000 Files\KKDD-FILES\K176-01\Office\Site Prona\K176-01_SE.dwg 4/4/2025 2:32 PM

GENERAL NOTES:

1. THE IMPROVEMENTS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE CITY OF ROCHESTER HILLS STANDARD DETAILS, SPECIFICATIONS, AND CODE OF ORDINANCE, THE CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION (ENGLISH), OAKLAND COUNTY, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, AND THE 1994 MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, EXCEPT WHERE OTHERWISE INDICATED ON THESE PLANS OR IN THE PROPOSAL, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.
2. THE LOCATION OF ALL UTILITIES SHOWN ON THESE PLANS IS TAKEN FROM THE BEST AVAILABLE DATA. NOWAK AND FRAUS WILL NOT BE RESPONSIBLE FOR ANY OMISSION OR VARIATIONS FROM THE LOCATIONS SHOWN OR IN THE CASE OF UNFORESEEN EVENTS. AS A CONDITION OF THIS CONTRACT, NOTICE SHALL BE GIVEN TO MISS DIG FOR ANY UNDERGROUND WORK TO BE PERFORMED IN ACCORDANCE WITH THIS CONTRACT. THE CONTRACTOR SHALL NOTIFY MISS DIG AT 1-800-482-7171 A MINIMUM OF THREE WORKING DAYS PRIOR TO ANY EXCAVATION OR GRADING. THE CONTRACTOR SHALL VERIFY THE LOCATION & DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION
3. PUBLIC RIGHT OF WAYS SHALL NOT BE CLOSED WITHOUT THE WRITTEN APPROVAL OF THE CITY OR STATE. PERMITS MUST BE OBTAINED FROM THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MDOT AND MDEQ PRIOR TO THE COMMENCEMENT OF WORK. PROPER TEMPORARY SIGNING AND BARRICADING MUST BE ERECTED AND MAINTAINED TO INSURE SAFE TRAFFIC CONDITIONS ADJACENT TO WORK WITHIN PUBLIC RIGHTS OF WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING PERMITS, FILING ADVANCE NOTICE(S) AND MEETING ALL OTHER APPLICABLE PERMIT REQUIREMENTS.
4. DUST CONTROL SHALL BE PROVIDED BY THE CONTRACTOR AT SUCH TIMES AS THE CITY/COUNTY/STATE INSPECTORS SHALL DIRECT. WATER AND/OR CHLORIDE USED AS A DUST CONTROL PALLIATIVE WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED TO BE INCLUDED IN THE WORK OF THE ENTIRE PROJECT.
5. THE CONTRACTOR SHALL VERIFY WITH THE CITY OR APPROPRIATE OWNER(S)/OWNER'S REPRESENTATIVE, ALL SALVAGED OR REMOVED MATERIAL, DEBRIS OR ITEMS ORIGINATING FROM PRIVATE PROPERTY OR PUBLIC RIGHT OF WAYS, NOT TO BE REUSED AS PART OF THIS PROJECT AND NOT TO BE CLAIMED BY THE APPROPRIATE OWNER(S). SAID ITEMS SHALL INCLUDE BUT ARE NOT LIMITED TO DRAINAGE STRUCTURE COVERS, SIGNS, SIGN POLES, DIRT, ETC., SHALL BECOME THE PROPERTY OF THE CONTRACTOR, SHALL BE IMMEDIATELY HAULED OFFSITE AND LEGALLY DISPOSED OF AND SHALL NOT BE STORED WITHIN MUNICIPAL RIGHT OF WAYS.
6. IN CONJUNCTION WITH THE PROPOSED SITE WORK, THE UTILITY COMPANIES AND/OR PUBLIC AGENCIES MAY BE RELOCATING OR REPLACING FACILITIES WHICH MAY OR MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR WILL BE REQUIRED TO COORDINATE HIS OPERATION WITH THESE AND/OR OTHER UTILITIES, IF NECESSARY, TO NOT INCUR FURTHER COSTS TO THE OWNER.
7. THE CONTRACTOR AND/OR SUBCONTRACTOR IS REQUIRED TO COOPERATE AND COORDINATE THEIR WORK WITH ALL WORK, IF ANY, BEING PERFORMED BY OTHERS.
8. SAWCUTTING IS REQUIRED FOR THE REMOVAL OF PAVEMENT, SIDEWALK, CURB AND GUTTER, DRIVE APPROACHES, ETC. THE FIELD ENGINEER SHALL DETERMINE AND MARK IN THE FIELD THE APPROPRIATE REMOVAL OR SAWCUT LIMITS PRIOR TO CONSTRUCTION.
9. IT IS THE INTENT THAT ALL GOVERNMENT CORNERS BE PRESERVED AND THAT, WHERE NECESSARY, MONUMENT BOXES BE SURVEYED AND WITNESSED, WHETHER SHOWN OR NOT, PRIOR TO REMOVAL OF SAID MONUMENTS. APPROPRIATELY RESET ALL MONUMENT CORNERS AND RESPECTIVE BOXES IN CONJUNCTION WITH CONSTRUCTION OPERATIONS.
10. IN THE SPIRIT OF PROVIDING QUALITY PROJECT ASSURANCE, ALL RECOMMENDATIONS AND SUGGESTIONS POSED BY OTHER PROFESSIONAL DESIGN AND TESTING FIRMS INVOLVED WITH THIS PROJECT AND NOT TO BE FOUND IN THESE PLANS SHALL BE CONSIDERED AND DECIDED UPON BY THE OWNER AND CONTRACTOR.
11. ADJUSTING EXISTING STORM DRAIN, SANITARY SEWER AND GATE VALVE STRUCTURE COVERS AS INDICATED IN THE PLANS SHALL INCLUDE REMOVING AND RELAYING THE EXISTING BRICK COURSES, BRICK AND IF NEEDED, PRECAST SECTIONS TO OBTAIN THE DESIRED PROPOSED RIM ELEVATIONS. SET ALL RIM ELEVATIONS TO THE PROPOSED FINISHED GRADES AS INDICATED IN THE PLANS.

GENERAL PAVING NOTES:

1. PROPOSED ASPHALT PAVEMENT LIFT THICKNESSES SHOWN ARE MINIMUM, AND SHALL BE CONFIRMED WITH ON-SITE GEOTECHNICAL ENGINEER. REQUIRED ASPHALT PAVEMENT LIFT THICKNESS PLACEMENT MAY INCREASE FROM MINIMUM THICKNESS SHOWN BASED ON FIELD CONDITIONS.
2. PAVEMENT SHALL BE OF THE TYPE, THICKNESS AND CROSS SECTION AS INDICATED ON THE PLANS AND AS FOLLOWS:

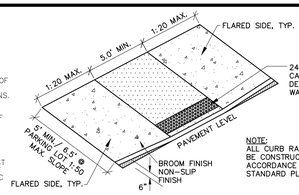
   CONCRETE:
   CONCRETE PAVEMENT SHALL MEET P1 MODIFIED MATERIAL SPECIFICATIONS. PORTLAND CEMENT TYPE IA (AIR-ENTRAINED) WITH A MINIMUM CEMENT CONTENT OF SIX SACKS PER CUBIC YARD, MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,500 PSI AND A SLUMP OF 1 1/2 TO 3 INCHES. CONCRETE WALKS & CURB AND GUTTER SHALL MEET M.D.O.T. P1 MATERIAL SPECIFICATIONS.
   7-SACK HIGH-EARLY **NOT ALLOWED UNLESS APPROVED BY OWNER**.

   ALL CONCRETE PAVEMENT AND FLATWORK MIXES USED ON THIS PROJECT SHALL COMPLY WITH A MINIMUM GROUND GRANULATED BLAST-FURNACE SLAG (GGBFS) SUBSTITUTION OF THIRTY-FIVE (35) PERCENT SUBJECT TO SEASONAL LIMITATIONS PER THE MICHIGAN DEPARTMENT OF TRANSPORTATION (M.D.O.T.) STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2012 EDITION.

   ASPHALT: **ALL BITUMINOUS MIXES SHALL BE DESIGNED FOR 3 PERCENT AIR VOIDS.**
   LEVELING COURSE - M.D.O.T. 3E03;
   SURFACE COURSE - M.D.O.T. 4E03;
   ASPHALT BOND COAT SHALL MEET SS-1H AND/OR AN APPROVED EQUIVALENT APPLIED UNIFORMLY OVER THE SURFACE AT A RATE OF 0.10 GALLONS/SQ. YARD.
   ASPHALT BINDER - PG 64-22 (ALL BIT. MIXES)
   COMPACT ALL ASPHALT COURSES TO A DENSITY OF 94% TO 97% OF THE MAXIMUM DENSITY AS DETERMINED BY THE RICE METHOD.
3. AGGREGATE BASE COURSE SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT, UNLESS OTHERWISE INDICATED. SAND SUB-BASE SHALL MEET M.D.O.T. CLASS II SPECIFICATIONS, AND SHALL BE COMPACTED TO 95% MAX. DENSITY.
4. NO RAP ALLOWED IN TOP COURSES. RAP IN LEVELING & BASE COURSES SHALL BE LIMITED TO 30%, AND OTHERWISE SHALL MEET M.D.O.T. STANDARDS.
5. ALL CONCRETE PAVEMENT, DRIVEWAYS, CURB & GUTTER, ETC., SHALL BE SPRAY CURED WITH WHITE MEMBRANE CURING COMPOUND IMMEDIATELY FOLLOWING FINISHING OPERATION. DO NOT ALLOW TRAFFIC UNTIL PCC REACHES 75 PERCENT DESIGN FLEXURAL STRENGTH.
6. ALL CONCRETE PAVEMENT JOINTS SHALL BE FILLED WITH HOT POURED RUBBERIZED ASPHALT JOINT SEALING COMPOUND IMMEDIATELY AFTER SAWCUT OPERATION. FEDERAL SPECIFICATION SS-S164.
7. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CONTRACT.
8. ALL TOP OF CURB ELEVATIONS, AS SHOWN ON THE PLANS, ARE CALCULATED FOR A 6" CONCRETE CURB UNLESS OTHERWISE NOTED.
9. ALL SIDEWALK RAMPS, CONFORMING TO PUBLIC ACT NO. 8, 1973 AND ICC/ANSI A117.1-1998, SECTION 406, SHALL BE INSTALLED AS INDICATED ON THE PLANS.
10. FOR ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL PAY FOR AND SECURE ALL NECESSARY PERMITS AND LIKEWISE ARRANGE FOR ALL INSPECTION.
11. EXISTING TOPSOIL, VEGETATION AND ORGANIC MATERIALS SHALL BE STRIPPED AND REMOVED FROM PROPOSED PAVEMENT AREA PRIOR TO PLACEMENT OF BASE MATERIALS, INCLUDING COMPLETE REMOVAL OF TREE ROOTS.
12. EXPANSION & CONTRACTION JOINTS SHALL BE PLACED IN ACCORDANCE WITH INDUSTRY QUALITY STANDARDS.
13. ALL PAVEMENT SUBGRADE AREAS SHALL BE PROOF-ROLLED (MAX. DEFLECTION 1/4") UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF BASE MATERIALS AND PAVING MATERIALS.
14. FILL AREAS SHALL BE MACHINE COMPACTED IN UNIFORM LIFTS NOT EXCEEDING 9 INCHES THICK TO 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT.
15. ALL STRUCTURES (MANHOLES, GATEWELLS, HYDRANTS, ETC.) WITHIN THE PROJECT LIMITS SHALL BE ADJUSTED TO THE FINISH GRADE.
16. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE ALL FOUNDATION ELEVATIONS WITH THE ARCHITECTURAL PLANS TO ENSURE PROPER CONSTRUCTION OF ALL WALKS, PAVEMENTS, CURBS, WALLS, ETC. TO ACHIEVE PROPOSED FINISHED GRADES.
17. THE CONTRACTOR SHALL REQUEST WRITTEN CLARIFICATION FROM THE ENGINEER WELL IN ADVANCE OF CONSTRUCTION, SHOULD THERE BE ANY QUESTIONS.
18. UNDER NO CIRCUMSTANCES SHOULD A SIDEWALK, WALKPATH, OR OTHER PAVED ROUTE BE CONSTRUCTED BENEATH AN ANGLED UTILITY POLE GUY ANCHOR CABLE. THE CONTRACTOR MUST COORDINATE RELOCATION OF GUY ANCHORS WITH THE UTILITY COMPANY OWNER PRIOR TO CONSTRUCTION.
19. EXISTING ASPHALT TO BE OVERLAID MUST BE PREPARED ACCORDING TO THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEERING REPORTS AND FIELD TESTING ENGINEER PRIOR TO PAVING OVERLAYS AND WEDGE COURSES, INCLUDING CLEANING, SWEEPING, MILLING, CRACK FILLING, GRINDING, ETC.
20. CONSTRUCTION TRAFFIC SHALL BE MINIMIZED ON EXPOSED SUBGRADES, AGGREGATE BASE COURSES, AND NEW PAVEMENTS. CONSULT WITH THE ON-SITE SOILS ENGINEER FOR REMEDIES CONCERNS TRAFFIC LOADING AND PREPARATIONS TO MINIMIZE DAMAGE TO THE PREPARED SURFACE AND SUBSURFACE.
21. ON-SITE FILL CAN BE USED IF THE SPECIFIED COMPACTION REQUIREMENTS CAN BE ACHIEVED AND IS FREE OF FROZEN SOIL, ORGANICS OR OTHER DELETERIOUS MATERIALS. CONSULT WITH THE ON-SITE SOILS ENGINEER PRIOR TO USE OF MATERIALS AS DICTATED BY SITE CONDITIONS.
22. REPAIR DISTRESSED PAVEMENT LEVELING AREAS PER THE RECOMMENDATIONS OF THE ON-SITE SOILS ENGINEER, PRIOR TO PLACING TOP COURSE.

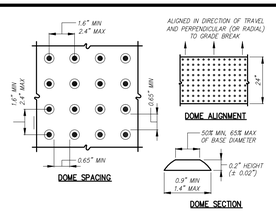
STORM DRAIN, SANITARY SEWER, AND WATER MAIN NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF ROCHESTER HILLS AND OAKLAND COUNTY, AS APPLICABLE. THE CITY OF ROCHESTER HILLS NOTES, DETAILS AND SPECIFICATIONS SHALL BE INCORPORATED AS PART OF THESE PLANS.
2. ALL PIPE TRENCHES UNDER OR WITHIN A FIVE (5) FOOT INFLUENCE OF EXISTING OR PROPOSED BUILDING AND PAVEMENTS SHALL BE BACK FILLED WITH ENGINEERED FILL CONSISTING OF MDOT CLASS II SAND AND BE MACHINE COMPACTED IN 8" TO 9" LIFTS TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY UTILIZING ASTM 1557-T180 MODIFIED PROCTOR OR AS RECOMMENDED BY THE SOILS ENGINEER. PAVEMENTS SHALL INCLUDE PARKING LOTS, DRIVE APPROACHES, CURB & GUTTER AND ADJACENT WALKS.
3. ALL STORM DRAIN AND SEWER PIPE SHALL BE INSTALLED ON CLASS "B" BEDDING OR BETTER. ALL STORM, SANITARY, AND WATER MAIN PIPE TRENCHES SHALL BE AS AS SHOWN ON STANDARD DETAIL SHEETS.
4. STORM DRAIN AND SEWER SHALL BE OF THE TYPE, SIZE AND CLASS DESIGNATION AS INDICATED ON THE PLANS AND LIKEWISE BE INSTALLED AT THE PROPOSED LINE AND GRADE.
5. ALL STORM DRAIN PIPE SHALL BE REINFORCED CONCRETE PIPE CONFORMING TO ASTM SPECIFICATION C-76 CL IV, UNLESS OTHERWISE INDICATED.
6. AND WATER MAIN PIPE SHALL BE AS SHOWN AND IN ACCORDANCE WITH THE MUNICIPALITY STANDARDS.
7. ALL MANHOLE, CATCH BASIN, AND GATE WELL COVERS/CASTINGS SHALL BE AS INDICATED IN THE PLANS IN ACCORDANCE WITH MUNICIPALITY STANDARDS.
8. THE CONTRACTOR SHALL NOTIFY MISS DIG (1-800-482-7171) A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.
9. EXACT GRADES AND INVERTS OF PROPOSED STORM DRAIN AND SEWER ARE TO BE CHECKED WITH THE FIELD ENGINEER PRIOR AND DURING INSTALLATION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE DESIGN ENGINEER OF ANY PLAN INCONSISTENCY AND/OR UTILITY CONFLICTS.
10. ALL STORM DRAIN PIPE JOINTS SHALL BE "PREMIUM JOINT" MODIFIED GROOVED TONGUE (MGT) WITH SYNTHETIC RUBBER GASKETS CONFORMING TO ASTM SPECIFICATION C-443 AND C-361 UNLESS OTHERWISE INDICATED ON THE PLANS.
11. FACILITY MANUFACTURED PRECAST TEE SECTIONS SHALL BE FOR ROOF DRAINS AND/OR SUMP PUMP LEADS AND LATERALS WHERE INDICATED ON THE PLANS. BLIND TAP CONNECTIONS INTO STORM SEWER WILL NOT BE PERMITTED BY BREAKING PIPEWALL.
12. THE UNDERGROUND SITE CONTRACTOR SHALL INSTALL ALL STORM DRAIN AND SEWER BUILDING LEADS (IF REQUIRED) TO WITHIN FIVE (5) FEET OF PROPOSED BUILDING.
13. UTILIZE FLOWABLE FILL IN AREAS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
14. ASSURE PROPER COMPACTION AROUND ALL STORM DRAIN, SEWER, AND WATER MAIN PIPE, INCLUDING CROSSINGS WITH OTHER UTILITIES.
15. ALL STORM DRAIN PIPE SIDEWALL TAPS SHALL BE DONE VERTICALLY CENTER TO CENTER OF PIPES, AND HORIZONTALLY IN THE MIDDLE OF A PIPE SECTION (TYPICAL CONCRETE PIPE SECTION IS 8' LONG). MAKE TAPS IN THE PRESENCE OF THE MUNICIPALITY'S INSPECTOR.
16. INSTALL CONCRETE THRUST BLOCKS AT ALL BENDS AND HYDRANT TEES PER OAKLAND COUNTY STANDARD DETAILS.

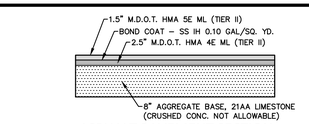


NOTE:
ALL CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH M.D.O.T. STANDARD PLAN R-28.

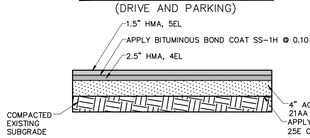
BARRIER FREE RAMP DETAIL
N.T.S.



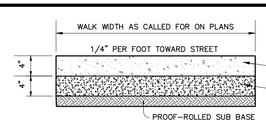
DETECTABLE WARNING DETAIL
N.T.S.



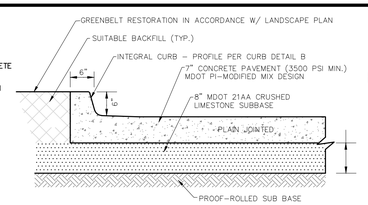
ASPHALT PAVEMENT SECTION
(DRIVE AND PARKING)



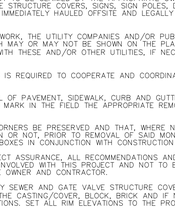
ASPHALT PAVEMENT SECTION
(PATHWAY)
NTS



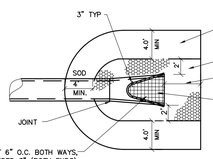
CONCRETE SIDEWALK SECTION
N.T.S.



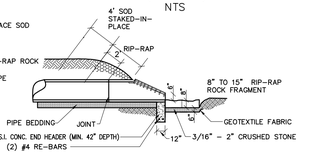
FOR PARKING LOT
7" CONCRETE PAVEMENT SECTION
N.T.S.



BARRIER FREE PARKING SIGN DETAIL
N.T.S.
Provide (1) for each accessible parking space



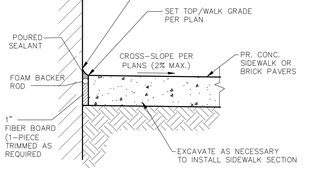
PLAN VIEW



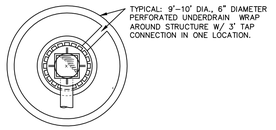
PROFILE VIEW

#6 RE-BAR AT 6" O.C. BOTH WAYS, WELDED, EXTENDED 3" (BOTH ENDS) BEYOND OPENINGS AND BEND TO FIT SIDES (TYP.)
SIZE OF PIPE AND END SECTION VARIES.

END SECTION AND BAR SCREEN DETAIL
N.T.S.

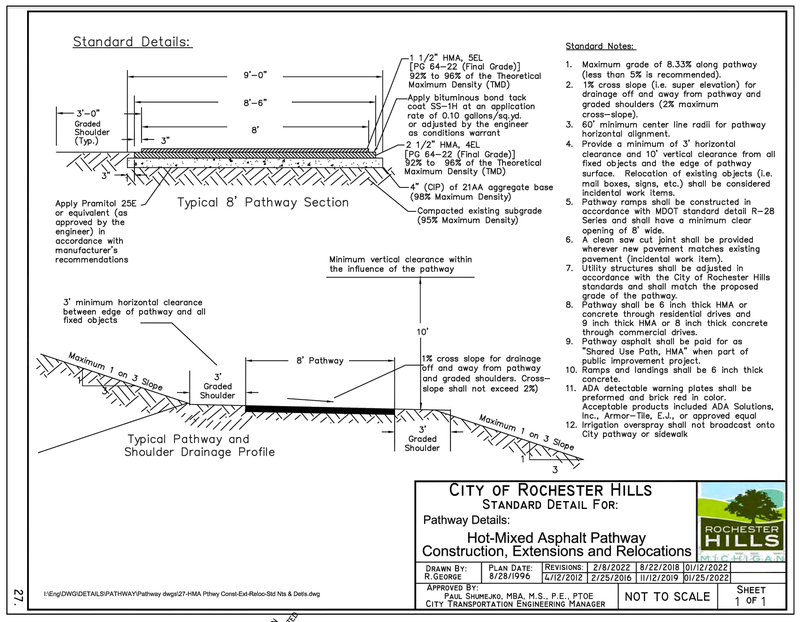


EXPANSION JOINT DETAIL AT BUILDING
N.T.S.

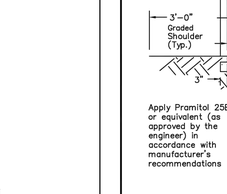


NOTE:
TYPICAL: 6" PERFORATED UNDERDRAIN, SET INVERT 2.5 FT. (MINIMUM) BELOW RIM ELEVATION.
BASE QUANTITY EQUALS 30-40 L.F. PER STRUCTURE.

UNDERDRAIN DETAIL
N.T.S.



SPECIAL SHALLOW CATCH BASIN DETAIL
N.T.S.



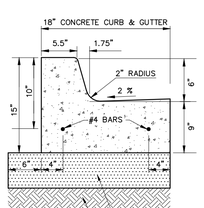
GENERAL NOTES:
1. RETAINING WALL SHALL BE OF GRAVITY-TYPE CONSTRUCTION.
2. STONE WALL SHALL BE TIGHT AND CONSISTENT AS POSSIBLE.
3. EACH COURSE TO BE BATTERED 3-6" TYPICAL.
4. SOIL SEPARATOR FILTER FABRIC SHALL BE PLACED BEHIND WALL.
5. WALL SHALL NOT HAVE TWO CONSECUTIVE COURSES WITH VERTICAL JOINTS IN DIRECT ALIGNMENT.

BOULDER RETAINING WALL
NTS

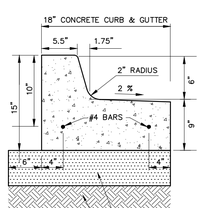
MDOT DRIVEWAY OPENING DETAIL 'M'
N.T.S.

SECTION A-A

8" CONCRETE PAVEMENT SECTION
N.T.S.



CONCRETE CURB DETAIL 'A'
N.T.S.



CONCRETE CURB DETAIL 'B'
N.T.S.

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL
NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼ of Section 3
T. 3N., R. 11E.
City of Rochester Hills, Oakland County, Michigan

SHEET
Notes and Details (1 of 3)

Know what's below Call before you dig.

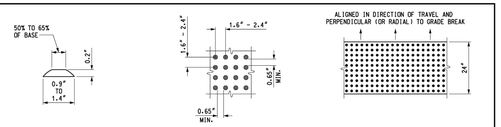
DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: J. Lawrey
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: N.T.S.

NFE JOB NO. K176-01
SHEET NO. C9

JRMFD2023-0004 PSP2024-0008 Revision #3
Received 4/9/2025 City of Rochester Hills Planning & Economic Development
CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

W:\2020-2000 Files\V2020-FILES\V178-01\Office\Site Plans\V178-01_NOTES.dwg 1/4/2025 2:43 PM



DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

CURB RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, WHERE CONDITIONS PERMIT. IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5' MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND LANDINGS TO NOT LESS THAN 4' x 4'.

CURB RAMPS WITH A RUNNING SLOPE ≤5% DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 2% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN ½". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS: IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

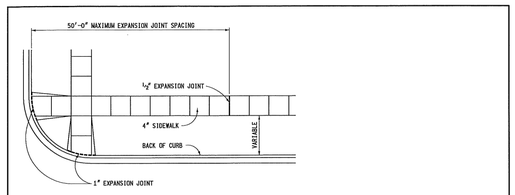
FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE CURB RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

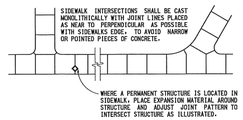
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

CURB RAMP AND DETECTABLE WARNING DETAILS

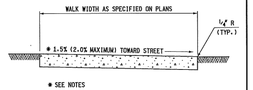
F.H.W.A. APPROVAL	PLAN DATE		SHEET
	5-8-2020	R-28-J	7 OF 7



LOCATION OF JOINTS IN CONCRETE SIDEWALK



TYPICAL SIDEWALK JOINT LAYOUTS



4" CONCRETE SIDEWALK

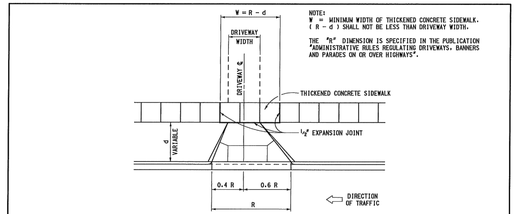
MDOT Michigan Department of Transportation
PREPARED BY DESIGN DIVISION
DRAWN BY: R.L.T.
CHECKED BY: K.T.C.

DEPARTMENT DIRECTOR
Kirk T. Steudle
APPROVED BY: Director, Bureau of Field Services
APPROVED BY: Director, Bureau of Highway Development

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

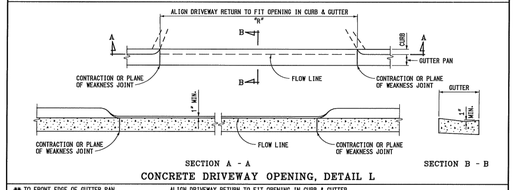
9-30-2014 F.H.W.A. APPROVAL	7-1-2014 PLAN DATE	R-29-I	SHEET 1 OF 4



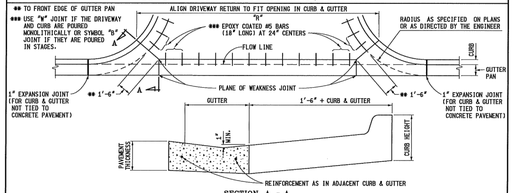
NOTE:
W = MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK.
(R - d) SHALL NOT BE LESS THAN DRIVEWAY WIDTH.

THE "R" DIMENSION IS SPECIFIED IN THE PUBLICATION "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS AND PARADES ON OR OVER HIGHWAYS".

CONCRETE DRIVEWAY OPENING LAYOUT



CONCRETE DRIVEWAY OPENING, DETAIL L



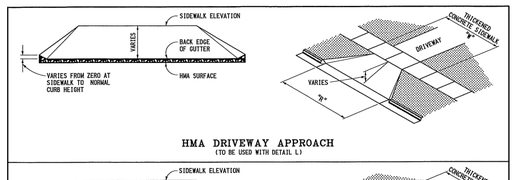
CONCRETE DRIVEWAY OPENING, DETAIL M

NOTE:
FOR ROADWAYS WITH CONCRETE PAVEMENTS, LONGITUDINAL LANE TIES WILL BE CONTINUOUS THROUGH THE DRIVEWAY OPENING AND THE SPACING OF THE #5 BARS IN CONCRETE DRIVEWAYS SHALL BE ADJUSTED TO AVOID CONFLICT WITH THE LONGITUDINAL LANE TIES.

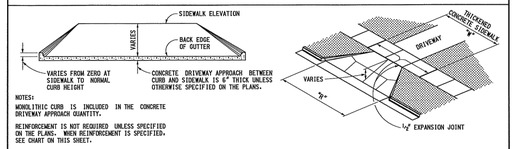
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

9-30-2014 F.H.W.A. APPROVAL	7-1-2014 PLAN DATE	R-29-I	SHEET 2 OF 4



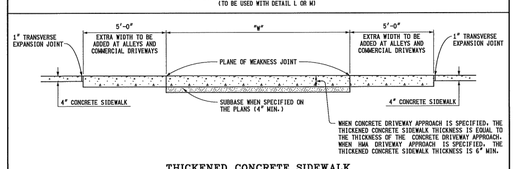
HMA DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L)



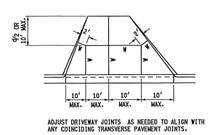
NOTES:
MONOLITHIC CURB IS INCLUDED IN THE CONCRETE DRIVEWAY APPROACH QUANTITY.

REINFORCEMENT IS NOT REQUIRED UNLESS SPECIFIED ON THE PLANS. WHEN REINFORCEMENT IS SPECIFIED, SEE CHART ON THIS SHEET.

CONCRETE DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L OR M)



THICKENED CONCRETE SIDEWALK



ADJUST DRIVEWAY JOINTS AS NEEDED TO ALIGN WITH ANY COINCIDING TRANSVERSE PAVEMENT JOINTS.

JOINT LAYOUT IS AS INDICATED OR AS DIRECTED BY THE ENGINEER.

INTERMEDIATE DRIVEWAY JOINT DETAILS

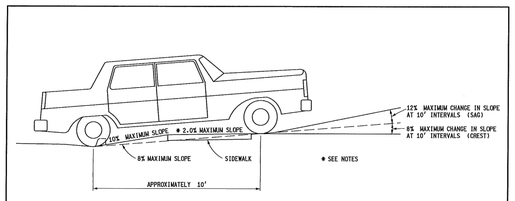
REINFORCEMENT FOR CONCRETE DRIVEWAYS

CONCRETE DRIVEWAY THICKNESS	WIRE SIZE (6" x 6" MESH)	AVERAGE WEIGHT (LBS/100 SFT)
LESS THAN 8"	W1.4	21
	W2.9	42
8" OR GREATER	USE WIRE FABRIC REINFORCEMENT SPECIFIED ON STANDARD PLAN R-57-SERIES	

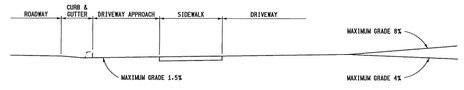
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

9-30-2014 F.H.W.A. APPROVAL	7-1-2014 PLAN DATE	R-29-I	SHEET 3 OF 4



LOW VOLUME COMMERCIAL OR RESIDENTIAL DRIVEWAY SLOPES



COMMERCIAL DRIVEWAY PROFILE FOR MAJOR TRAFFIC GENERATORS

NOTES:

FOR DRIVEWAY DESIGN REFER ALSO TO "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS, AND PARADES ON OR OVER HIGHWAYS" AND GEOMETRIC DESIGN G-680-SERIES, COMMERCIAL DRIVEWAYS.

FOR CURB AND GUTTER DETAILS, SEE STANDARD PLAN R-30-SERIES.

TRANSVERSE SIDEWALK SLOPES ARE TYPICALLY 1.5% (2.0% MAXIMUM). IN ORDER TO MEET SITE CONDITIONS, IF THE TRANSVERSE SLOPE IS REQUIRED TO BE LESS THAN 1.5%, LONGITUDINAL DRAINAGE MUST BE PROVIDED.

WHEN SETTING GRADES FOR COMMERCIAL DRIVES, THE TYPES OF VEHICLES USING THE DRIVE SHOULD BE CONSIDERED.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

9-30-2014 F.H.W.A. APPROVAL	7-1-2014 PLAN DATE	R-29-I	SHEET 4 OF 4

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL
NOT FOR CONSTRUCTION
STATE OF MICHIGAN
PAUL TULIKANGAS
ENGINEER NO. 057929
LICENSED PROFESSIONAL ENGINEER

PROJECT
Old Orion Court Development

CLIENT
Mark Bismack
5319 23 Mile Road
Shelby Township, MI 48306

Care of:
Krieger Klatt Architects
Contact: Mr. Jeff Klatt, AIA
Phone: (248) 414-9270
Email: Jeff@kriegerklatt.com

PROJECT LOCATION
Part of the SE ¼ of Section 3
T. 3N., R. 11E.
City of Rochester Hills, Oakland County, Michigan

SHEET
Notes and Details (2 of 3)

Know what's below Call before you dig.

DATE	ISSUED/REVISED
04-24-24	SPA
07-15-24	SPA REV 1
11-14-24	OWNER REVIEW
01-13-25	SPA REV 2
04-04-25	SPA REV 3

DRAWN BY: J. Lawrey
DESIGNED BY: P. Tulikangas
APPROVED BY: B. Buchholz
DATE: January 9, 2024
SCALE: N.T.S.

JRMFD2023-0004
PSP2024-0008
Revision #3
Received 4/9/2025
City of Rochester Hills Planning & Economic Development

CITY OF ROCHESTER HILLS
CITY FILE #19-042.2 , SEC. 03

NFE JOB NO. K176-01
SHEET NO. C10