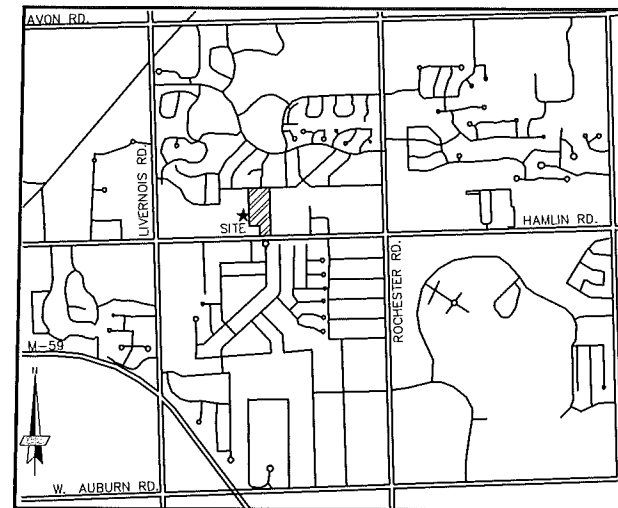


GENERAL NOTES

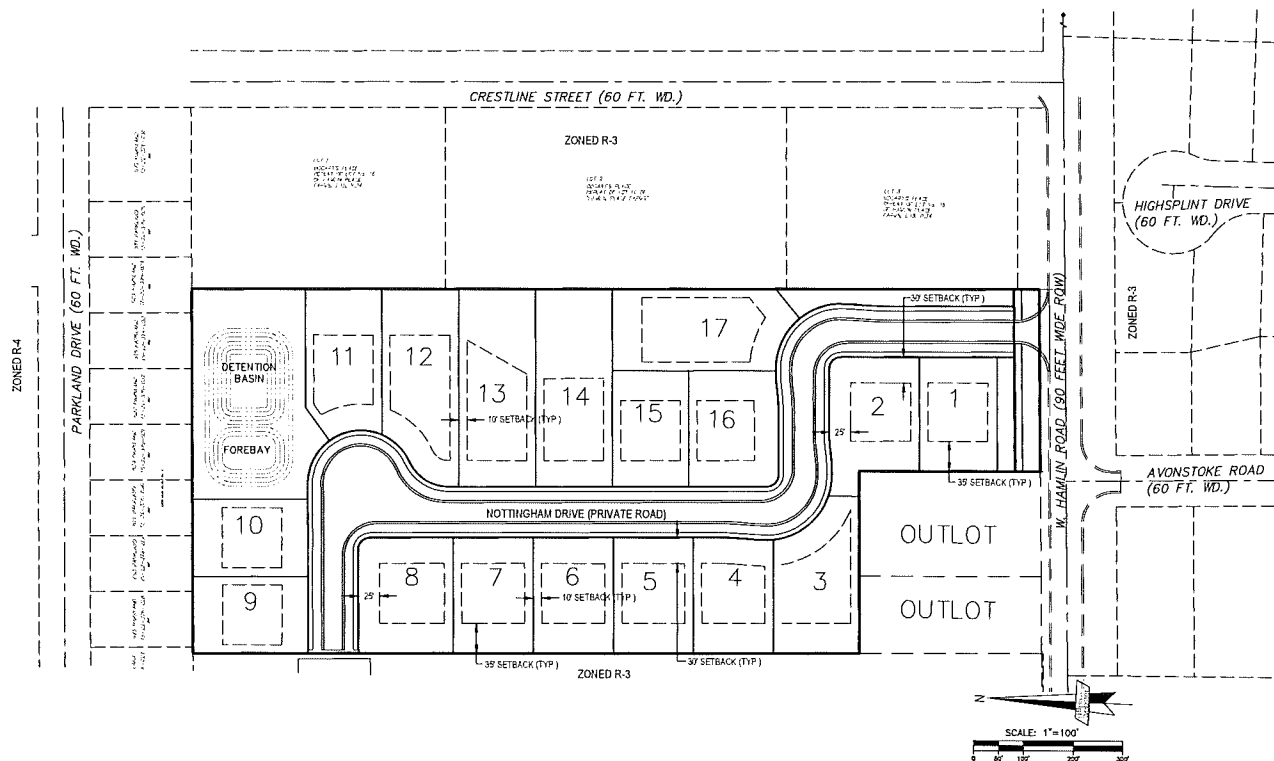
- ALL PROPOSED ROADS ARE TO BE PRIVATE. ALL ROAD PAVEMENT AND STORM DRAINAGE SHALL BE IN ACCORDANCE WITH CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF ROCHESTER HILLS, AND THE ROAD COMMISSION FOR OAKLAND COUNTY (RCCO) WHERE APPLICABLE, WITH CONCRETE CURB AND GUTTER. ALL ROADS SHALL BE 27 FT. WIDE, BACK-TO-BACK OF CURBS. THE TOTAL LENGTH OF PROPOSED ROADS (MEASURED CENTERLINE-TO-CENTERLINE) IS 1,235 LF (TYPICAL 27 FT. WIDE).
- THE STORM DRAINAGE SYSTEM WILL INCLUDE STORM SEWER PIPES AND CATCH BASINS DISCHARGING TO A NORTHERN AND SOUTHERN DETENTION BASIN. THE DESIGN OF THE STORM WATER SYSTEM WILL MEET THE CITY OF ROCHESTER HILLS STANDARDS WITH THE DETENTION SYSTEMS DESIGNED TO PROVIDE FOR 10-YEAR STORM LEVELS. BOTH DETENTION BASINS WILL OUTLET TO AN EXISTING COUNTY DRAIN THROUGH A CONTROLLED OUTLET.
- SANITARY SEWER DISPOSAL WILL BE THROUGH A PROPOSED SEWERAGE COLLECTION SYSTEM, CONNECTING TO AN EXISTING SEWER ON HAMLIN RD.
- POTABLE WATER SUPPLY SOURCE WILL BE FROM EXISTING CITY OF ROCHESTER HILLS WATER SUPPLY SYSTEM. THE PROPOSED WATER DISTRIBUTION SYSTEM SERVICING THE SITE WILL BE CONNECTED TO AN EXISTING 16" WATER MAIN THAT RUNS THROUGH PHASE 1 OF THE SITE. THE EXISTING WATER MAIN WILL REMAIN IN PLACE, AS IS.
- UNDERGROUND GAS, ELECTRIC, TELEPHONE, AND CABLE TV LINES WILL BE LOCATED IN 10 FT. WIDE EASEMENTS ALONG PROPOSED ROADWAYS AND REAR YARDS.
- OPEN SPACE AREAS ARE PRIVATE AND FOR THE ENJOYMENT OF NOTTINGHAM WOODS RESIDENTS.
- MAXIMUM 20 FT. WIDE EASEMENTS WILL BE PROVIDED FOR STORM SEWERS, SANITARY SEWERS, AND WATER MAINS. EASEMENTS WILL ALSO BE PROVIDED FOR ALL DRAINAGE SWALES AND STORM WATER DETENTION PONDS. DETAILED EASEMENT INFORMATION WILL BE INCLUDED IN THE FINAL SITE PLAN PROCESS.
- FIRE LANES TO BE PROVIDED ON INTERIOR STREETS AND PARKING TO BE ALLOWED ON ONE SIDE OF THE STREET ONLY.
- THERE ARE NO REGULATED WETLAND AREAS ON SITE.
- SIDEWALKS ARE PROPOSED ON BOTH SIDES OF THE ROADS. SIDEWALKS WILL BE DELINEATED IN THE DETAILED ENGINEERING PLAN PROCESS.
- ALL DIMENSIONS ARE TO BACK OF CURB, IF APPLICABLE.
- ALL PROPOSED WATER MAINS SHALL BE CENTERED IN A 20' EASEMENT.
- SEWER MAIN AND MANHOLE LOCATIONS ARE CONCEPTUAL FINAL LOCATIONS TO BE DETERMINED AT FINAL DESIGN.
- PRIOR TO CONSTRUCTION PERMIT APPROVAL, OWNER TO COMPLETE SOIL BORINGS TO DETERMINE WATER TABLE ELEVATION AND SOIL PERCOLATION RATES. DETENTION BASIN BOTTOM ELEVATION TO BE CONSTRUCTED BELOW THE OUTLET INVERT, ALLOWING FOR INFILTRATION BASED ON RESULTS OF SOIL ANALYSIS.
- A PRIVATE ROAD EASEMENT WILL BE RECORDED AS PART OF THE CONDOMINIUM DOCUMENTS AND WILL INCLUDE LANGUAGE ALLOWING FOR FUTURE EXTENSION OF NOTTINGHAM DRIVE TO THE WEST.
- FINAL GRADING OF LOTS TO MEET CITY OF ROCHESTER HILLS AND MICHIGAN BUILDING CODE (2009) STANDARD REQUIREMENTS.
- FINAL CONFIGURATION OF THE TREE PRESERVATION AREA MAY CHANGE BASED ON DETERMINATION OF FINAL REQUIREMENTS FOR DETENTION.

NOTTINGHAM WOODS

VANGUARD COMPANIES
PRELIMINARY SITE PLAN
ROCHESTER HILLS
OAKLAND COUNTY, MI



LOCATION MAP
(1"=2,000')



BENCHMARK DATA

(N.G.V.D. 1928) DATUM
SOURCE: GPS, NAVD 88 AND CONVERTED USING VERTCON TOOL AVAILABLE ON THE NGS WEBSITE

SITE BENCHMARK NO. 1
BENCHMARK TIE IN NORTH FACE OF A UTILITY POLE ON THE SOUTH SIDE OF HAMLIN ROAD, +/- 160 FEET WEST OF CRESTLINE STREET.
(OUT OF SCOPE OF DRAWING)
ELEVATION=846.33'

SITE BENCHMARK NO. 2
ARROW ON HYDRANT AT THE SOUTHWEST CORNER OF HAMLIN ROAD AND AVONSTOKE ROAD.
ELEVATION=854.16'

SITE BENCHMARK NO. 3
MAG NAIL WITH GW TAG #60004 IN THE SOUTH FACE OF A UTILITY POLE, +/- 70 FEET EAST OF THE NORTHWEST CORNER OF THE PROPERTY AND +/- 6 FEET NORTH OF PROPERTY LINE IN THE REAR YARD OF ADDRESS 675 PARKLAND.
ELEVATION=849.40'

ZONING INFORMATION

PROPOSED USE: R-3 ZONING, SINGLE FAMILY RESIDENTIAL
EXISTING USE: UNDEVELOPED FARMLAND/WOODLAND

EXISTING ZONING: R-3 RESIDENTIAL

TOTAL UNITS = 17

SETBACKS:
FRONT = 30'
SIDE (EACH) = 10'
SIDE (TOTAL) = 20'
SIDE (ABUTTING STREET) = 25'
REAR = 35'

	REQUIRED	PROPOSED
MAXIMUM LOT COVERAGE	30%	30%
AVG. MIN. LOT WIDTH (LOT SIZE VARIATION OPTION)	90'	92.6'
MIN. LOT WIDTH (LOT SIZE VARIATION OPTION)	81'	81'
AVG. MIN. LOT AREA (LOT SIZE VARIATION OPTION)	12,000 SF.	13,737
MIN. LOT AREA (LOT SIZE VARIATION OPTION)	10,800 SF.	12,076 SF.
MAXIMUM STORIES	2	2
MAXIMUM BUILDING HEIGHT	30'	30'
MINIMUM FLOOR AREA	1,200 SF.	2,000 SF.

EXISTING PARCEL AREA = 8.673 ACRES
RESIDENTIAL DENSITY = 1.96 DWELLINGS/ACRE

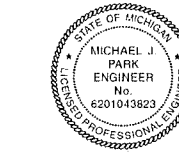


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Manager: M.P.
Engineer: L.W.
Quality Control: N.M.
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GENERAL LEGEND

	EXISTING	PROPOSED
STORM SEWER	STM	STM
SANITARY SEWER	SAH	SAH
WATER MAIN	W	W
GAS MAIN	G	G
UNDERGROUND ELECTRIC LINES	UGE	UGE
UNDERGROUND TELEPHONE LINES	UGT	UGT
UNDERGROUND CABLE TELEVISION LINES	CTV	CTV
OVERHEAD LINES	OH	OH
PUBLIC LIGHTING LINES	PLD	PLD
STEAM LINES	STEAM	STEAM
FENCE LINE	X	X
PROJECT PHASE LIMIT LINE		
CONCRETE CURB AND GUTTER (STANDARD)		
CONCRETE CURB AND GUTTER (REVERSED)		
THICKENED SLAB CURB/WALK		
STORM MANHOLE	⊕	⊕
CATCH BASIN	⊕	⊕
YARD BASIN	⊕	⊕
INLET BASIN	⊕	⊕
END SECTION))
ROOF/DOWN SPOUT	⊕	⊕
OVERFLOW/OUTLET STRUCTURE	⊕	⊕
STORM CLEAN OUT	⊕	⊕
SANITARY MANHOLE	⊕	⊕
SANITARY CLEAN OUT	⊕	⊕
SANITARY RISER	⊕	⊕
SANITARY PUMP STATION	⊕	⊕

EXISTING	PROPOSED	EXISTING	PROPOSED
GATE VALVE	⊕	GUY WIRE ANCHOR	⊕
FIRE HYDRANT	⊕	UTILITY FLAG	⊕
STOP BOX AND VALVE	⊕	SIGN POST	⊕
FDC CONNECTION	⊕	GUARD POST/BOLLARD	⊕
WATER METER	⊕	FENCE POST	⊕
POST INDICATOR VALVE	⊕	PAY PHONE	⊕
WELL HEAD	⊕	PARKING METER	⊕
IRRIGATION CONTROL BOX	⊕	RESIDENTIAL MAILBOX	⊕
LAWN IRRIGATION HEAD	⊕	U.S. MAILBOX	⊕
GAS VALVE	⊕	BLDG CORNER (FIELD LOCATED)	⊕
GAS MANHOLE	⊕	TREE	⊕
GAS RISER	⊕	WETLAND FLAG	⊕
GAS METER	⊕	SPOT ELEVATION	⊕
ELECTRIC MANHOLE	⊕	SOIL BORING	⊕
ELECTRIC RISER	⊕	ASPH.	⊕
ELECTRIC METER	⊕	CONC.	⊕
ELECTRIC TRANSFORMER	⊕	A.C.	⊕
LIGHT POLE	⊕	G.P.	⊕
TELEPHONE MANHOLE	⊕	C.L.F.	⊕
TELEPHONE RISER	⊕	D.L.	⊕
TELEPHONE CROSS BOX	⊕	F.F.	⊕
CABLE RISER	⊕	FINISHED FLOOR	⊕
TRAFFIC CONTROL BOX	⊕	O.H.	⊕
AIR CONDITIONER	⊕	FOUND IRON	⊕
PUBLIC LIGHTING MANHOLE	⊕	SET IRON	⊕
UTILITY POLE	⊕	FOUND IRON PIPE	⊕
		MEASURED RECORD	⊕
		FOUND MONUMENT	⊕
		SET NAIL	⊕

DEMOLITION LEGEND

REMOVE UTILITY STRUCTURE	⊕
REMOVE UTILITY PIPE	X X X X X X X X X X
ABANDON UTILITY PIPE	⋯ ⋯ ⋯ ⋯ ⋯ ⋯ ⋯ ⋯
CUT AND BULKHEAD UTILITY PIPE	⊕
REMOVE BUILDING	⊕
REMOVE CONCRETE PAVEMENT	⊕
REMOVE ASPHALT PAVEMENT	⊕
REMOVE SIDEWALK	⊕

PAVING AND GRADING HATCH LEGEND

COMPACTED SAND BACKFILL (CSB)	⊕
AGGREGATE MATERIAL	⊕
ASPHALT PAVEMENT	⊕
CONCRETE PAVEMENT	⊕

SHEET INDEX

- 01 COVER
- 02 EXISTING CONDITIONS
- 03 SITE PLAN
- 04 GRADING PLAN
- 05 UTILITY PLAN
- 06 UTILITY CALCULATIONS
- 07 TREE PRESERVATION PLAN
- 08 TREE TABLE 1 OF 2
- 09 TREE TABLE 2 OF 2
- 10 SOIL BORINGS
- LA-01 LANDSCAPE PLAN
- LA-02 LANDSCAPE DETAILS

COVER
FINAL SITE PLAN
NOTTINGHAM WOODS
ROCHESTER HILLS
MICHIGAN
Oakland County

Date: 01/27/2016
Scale: 1" = 100'
Sheet: 01
Project: 18701.00

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LEGAL DESCRIPTION

LOT 16 AND PART OF LOT 17 OF HAMLIN PLACE FARMS, ACCORDING TO THE PLAT THEREOF AS RECORDED IN LIBER 15 OF PLATS PAGE 34, OAKLAND COUNTY RECORDS, MORE PARTICULARLY DESCRIBED AS:

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 22, TOWN 3, NORTH, RANGE 11 EAST, AVON TOWNSHIP (NOW CITY OF ROCHESTER HILLS), OAKLAND COUNTY, MICHIGAN, SOUTH 87 DEGREES 04 MINUTES 41 SECONDS WEST, 287.51 FEET ALONG THE SOUTH LINE OF SECTION 22, THENCE NORTH 02 DEGREES 30 MINUTES 23 SECONDS WEST, 30.00 FEET TO THE SOUTHEAST CORNER OF LOT 17, SAID POINT BEING THE POINT OF BEGINNING, THENCE SOUTH 87 DEGREES 04 MINUTES 41 SECONDS WEST, 212.50 FEET ALONG THE NORTH RIGHT OF WAY LINE OF HAMLIN ROAD (VARIABLE WIDTH) TO THE SOUTHWEST CORNER OF SAID LOT 17; THENCE NORTH 02 DEGREES 32 MINUTES 05 SECONDS WEST, 211.92 FEET ALONG THE WEST LINE OF LOT 17 SAID LINE ALSO BEING THE EAST LINE OF LOT 18; THENCE SOUTH 87 DEGREES 27 MINUTES 33 SECONDS WEST, 212.62 FEET TO A POINT ON THE WEST LINE OF LOT 18; THENCE NORTH 02 DEGREES 32 MINUTES 27 SECONDS WEST, 782.16 FEET ALONG SAID WEST LINE TO A POINT ON THE SOUTH LINE OF 'AVON HILLS VILLAGE SUBDIVISION NO. 5, AS RECORDED IN LIBER 95 OF PLATS, PAGE 11, OAKLAND COUNTY RECORDS; THENCE NORTH 87 DEGREES 20 MINUTES 03 SECONDS EAST, 425.60 FEET ALONG SAID SOUTH LINE TO THE NORTHWEST CORNER OF LOT 1 OF 'BOGART'S PLACE REPLAT OF LOT 16 OF HAMLIN PLACE FARMS' AS RECORDED IN LIBER 123 OF PLATS, PAGE 3, OAKLAND COUNTY RECORDS SAID POINT ALSO BEING THE NORTH-EAST CORNER OF LOT 17; THENCE SOUTH 02 DEGREES 30 MINUTES 23 SECONDS EAST, 993.60 FEET TO THE POINT OF BEGINNING AND CONTAINING 8.673 ACRES.

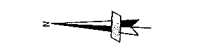
PARCEL ID NO. 15-22-376-039



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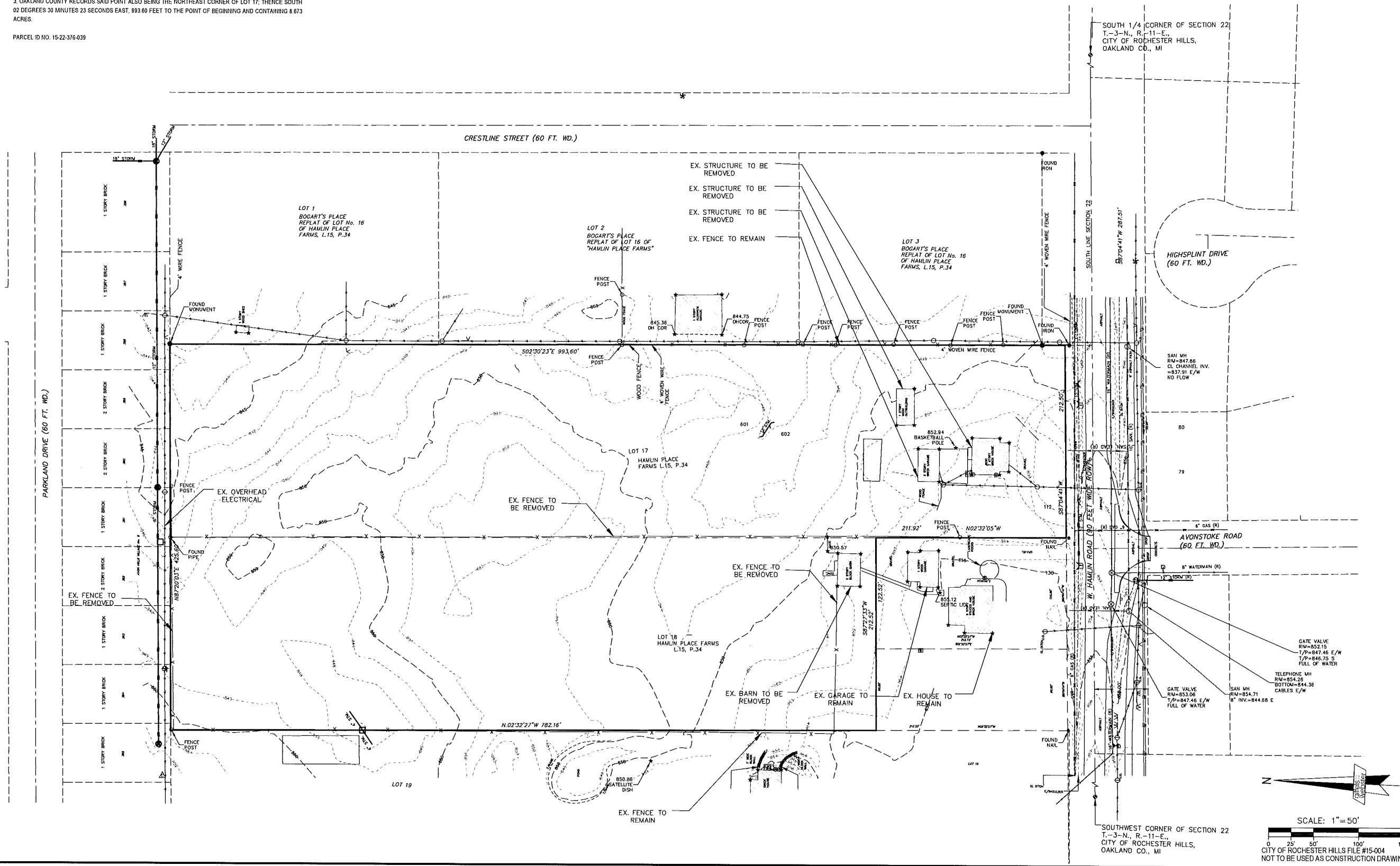
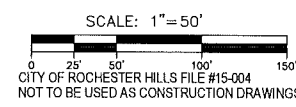


DATE	ISSUE
03/05/2015	PRELIM. SITE PLAN SUBMITTAL
07/06/2015	REVISED PER CITY REVIEW
08/04/2015	REVISED PER CITY REVIEW
10/23/2015	REVISED PER PC REVIEW
12/02/2015	RELOCATE LOT 17
06/09/2016	FINAL SITE PLAN SUBMITTAL
07/28/2016	FINAL SITE PLAN SUBMITTAL
08/24/2016	FINAL SITE PLAN SUBMITTAL

Developed For:
VANGUARD COMPANIES
101 S. MAIN STREET
ROCHESTER, MI 48037
p (248) 650-6206
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EXISTING CONDITIONS
**FINAL SITE PLAN
NOTTINGHAM WOODS**
ROCHESTER HILLS
MICHIGAN
Oakland County

Date:	7/6/15
Scale:	1" = 50'
Sheet:	02
Project:	16701.00

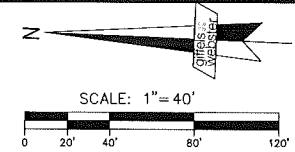


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FIRE DEPARTMENT NOTES:

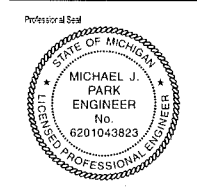
- CONSTRUCTION SITE SHALL BE SAFEGUARDED IN ACCORDANCE WITH IFC 2006, CHAPTER 14.
- OPEN BURNING IS NOT PERMITTED INCLUDING THE BURNING OF TRASH, DEBRIS, OR LAND CLEARING MATERIALS. OPEN BURNING FOR WARMING OF SAND AND/OR WATER FOR THE PREPARATION OF MORTAR SHALL BE WITHIN THE CITY OF ROCHESTER HILLS BURN PERMIT GUIDELINES. FIRE PRESERVATION ORDINANCE CHAPTER 58, SEC 307.6.2 & 307.6.2.3
- BUILDING CONSTRUCTION TYPE IS V-8.
- PROPOSED INDIVIDUAL BUILDING SIZES WILL RANGE FROM 2,000 SF TO 3,600 SF OF LIVING SPACE.



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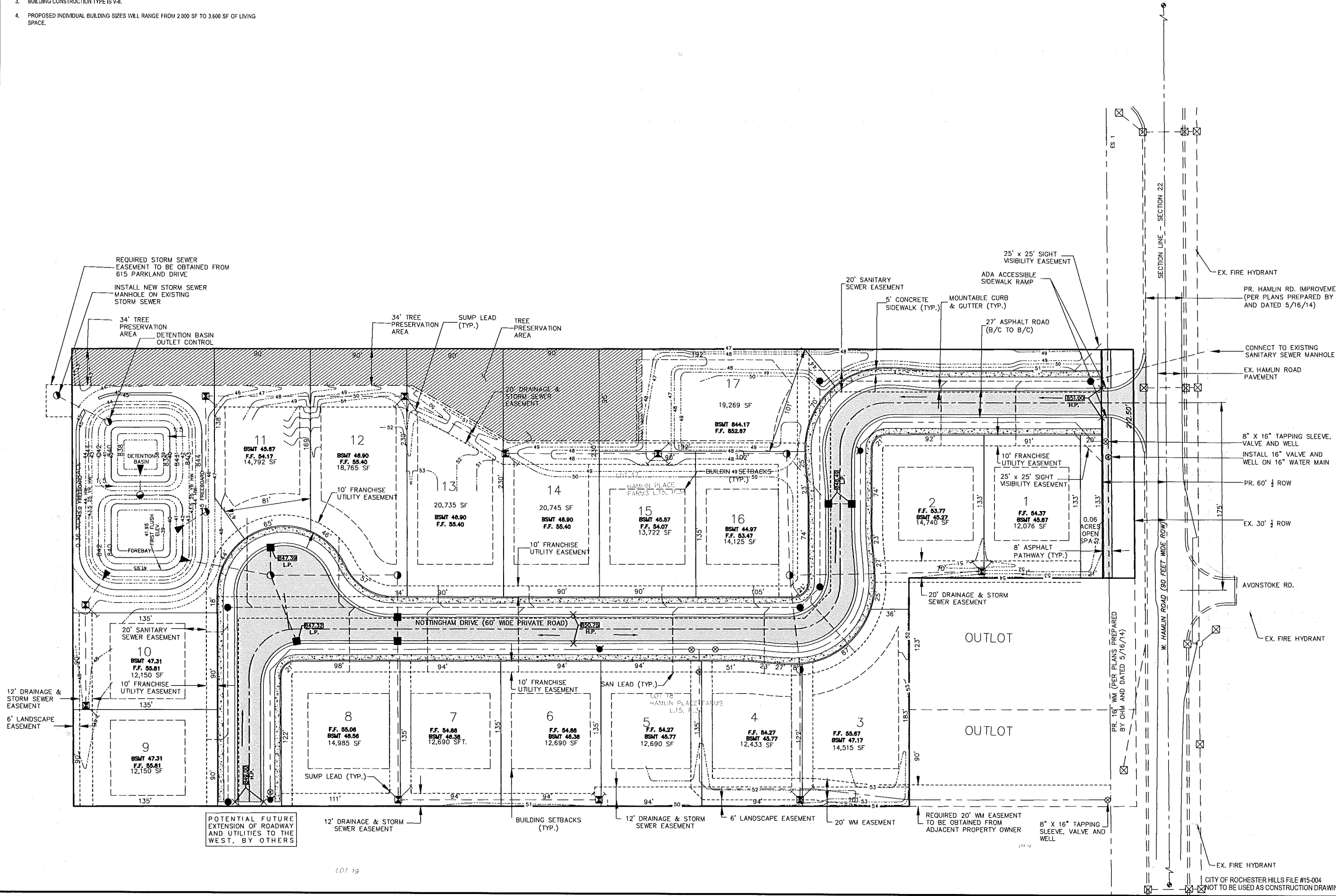


DATE	ISSUE
03/05/2015	PRELIM SITE PLAN SUBMITTAL
07/02/2015	REVISED PER CITY REVIEW
08/04/2015	REVISED PER CITY REVIEW
10/23/2015	REVISED PER PREVIEW
12/02/2015	RELOCATE LOT 17
06/09/2016	FINAL SITE PLAN SUBMITTAL
08/26/2016	FINAL SITE PLAN SUBMITTAL
09/04/2016	FINAL SITE PLAN SUBMITTAL

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SITE PLAN
 FINAL SITE PLAN
 NOTTINGHAM WOODS
 ROCHESTER HILLS
 MICHIGAN
 Oakland County

Date: 01/27/2016
 Scale: 1" = 40'
 Sheet: 03
 Project: 18701.00



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Section:	

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DATE:	ISSUE:
05 09 2016	FINAL SITE PLAN SUBMITTAL
07 26 2016	FINAL SITE PLAN SUBMITTAL
08 04 2016	FINAL SITE PLAN SUBMITTAL

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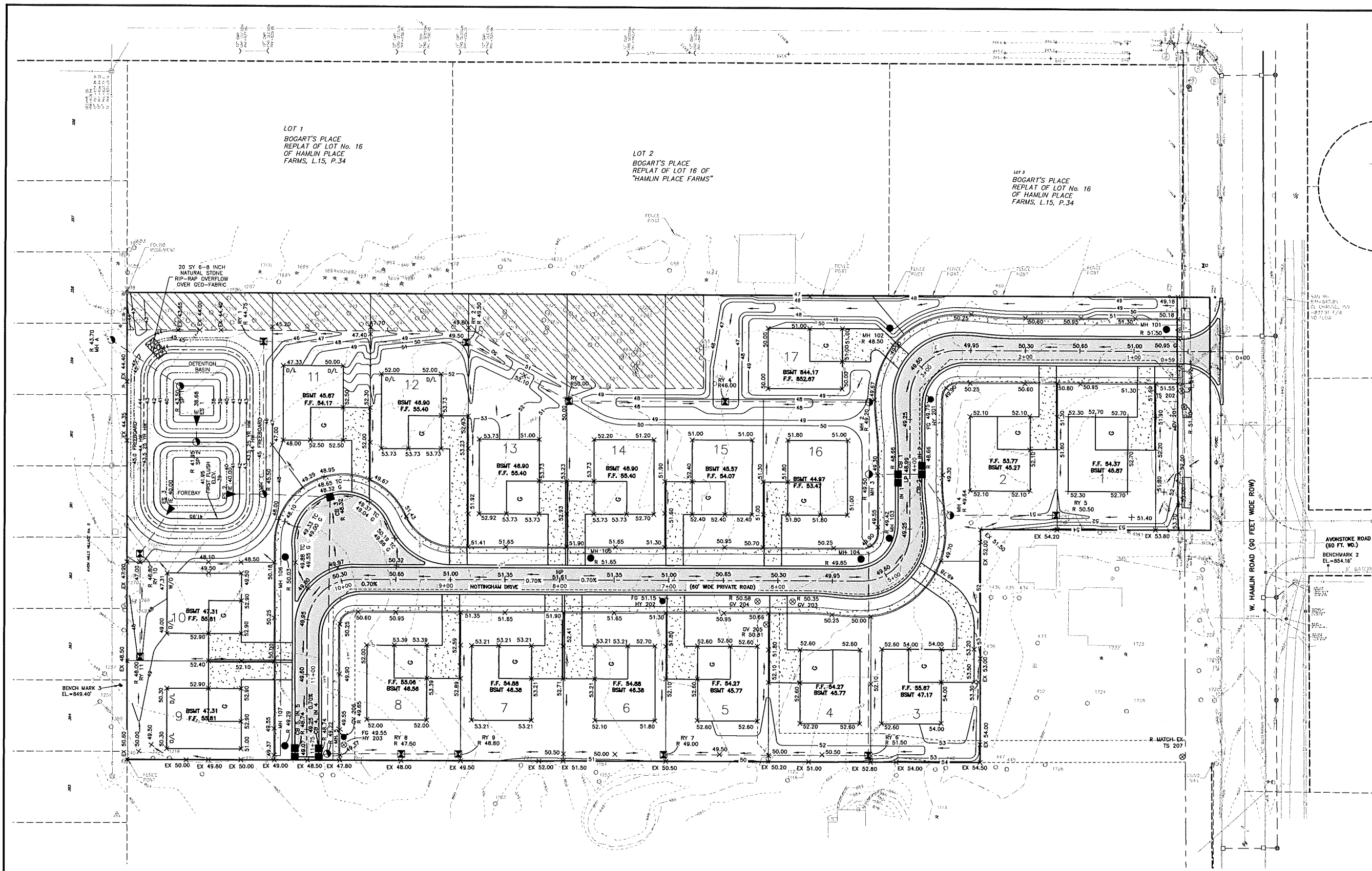
GRADING PLAN

**FINAL SITE PLAN
NOTTINGHAM WOODS**

ROCHESTER HILLS
MICHIGAN

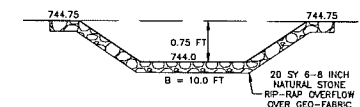
Oakland County

Date:	7/6/15
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QUANTITIES THIS SHEET

20 SY 6-8 INCH NATURAL STONE RIP-RAP OVERFLOW OVER GEO-FABRIC



100-YEAR OVERFLOW SPILLWAY WEIR DETAIL

(NOT TO SCALE)



DATE	ISSUE
05/09/2016	FINAL SITE PLAN SUBMITTAL
07/26/2016	FINAL SITE PLAN SUBMITTAL
08/04/2016	FINAL SITE PLAN SUBMITTAL

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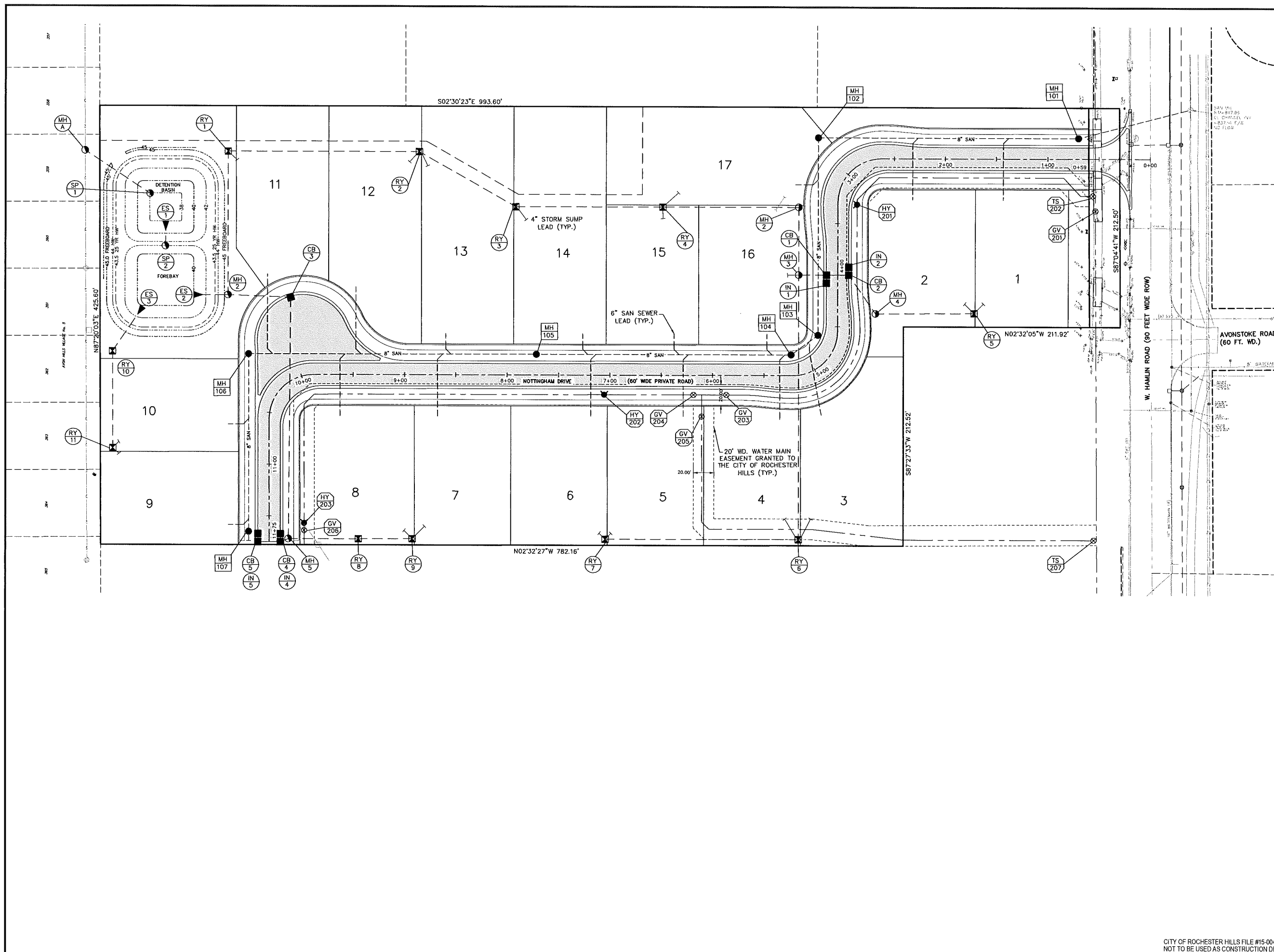
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**OVERALL
GENERAL UTILITY
PLAN
FINAL SITE PLAN
NOTTINGHAM WOODS**

ROCHESTER HILLS
MICHIGAN

Oakland County

Date: 7/6/15
Scale: 1"=40'
Sheet: 05
Project: 18701.00



DETENTION BASIN CALCULATIONS

Weighted "C" Calculation - On Site

	Area (acres)	C	Area x C
Building Roofs	1.45	0.95	1.38
Pavement	1.17	0.95	1.11
Pond	0.14	1.00	0.14
Lawn/Open Areas	5.11	0.25	1.28
Total	7.87		3.91

$C = \frac{\text{Area} \times C}{\text{Area}} = \frac{3.91}{7.87} = 0.50$

*Based on Soil Type Sandy Loam with slopes <6%

Weighted "C" Calculation - Off Site

	Area (acres)	C	Area x C
Building Roofs	0.00	0.95	0.00
Pavement	0.00	0.95	0.00
Pond	0.00	1.00	0.00
Lawn/Open Areas	4.26	0.25	1.07
Total	4.26		1.07

$C = \frac{\text{Area} \times C}{\text{Area}} = \frac{1.07}{4.26} = 0.25$

*Based on Soil Type Sandy Loam with slopes <6%

Weighted "C" Calculation - Overall

	Area (acres)	C	Area x C
Building Roofs	1.45	0.95	1.38
Pavement	1.17	0.95	1.11
Pond	0.14	1.00	0.14
Lawn/Open Areas	9.37	0.25	2.34
Total	12.13		4.97

$C = \frac{\text{Area} \times C}{\text{Area}} = \frac{4.97}{12.13} = 0.41$

*Based on Soil Type Sandy Loam with slopes <6%

Existing Condition Flow at Ex. Rear Yard C.B.

Intensity, I =	3.89	Inches/Hour	@ 20 Minute time of concentration
Area, A _s =	5.32	Acres	
Q _s =	C x I x A _s		
=	0.25 x 3.89 x 5.32		
=	5.17	CFS	

Allowable Outflow Calculation

Based on Acreage: Property Area = 12.13 acres

Q _s =	0.20	cfs/acre	
=	0.20 x 12.13		
=	2.43	cfs	

CHOOSE ALLOWABLE FLOW

EXISTING CONDITION Q_s = 5.17 CFS < Q_a = 2.43 CFS ALLOWABLE DESIGN, THEREFORE ALLOWABLE DESIGN CONTROLS

Q_a = Q_s = 2.43 CFS

Required Pretreatment Storage Volume

The forebay will detain the first flush volume, or first half inch of rain in a 24-hour storm.

V _{PF} =	1.815	x	A	x	C
=	1.815	x	12.13	x	0.41
=	9,023	cubic feet			

25 YEAR STORM EVENT Required Storage Volume

Q ₀ =	Q _a	=	2.43
=	A x C	=	12.13 acres x 0.41
=	0.49	cfs per acre impervious	
T ₂₅ =	-25	+	$\sqrt{\frac{8,062.5}{Q_0}}$
=	-25	+	$\sqrt{\frac{8,062.5}{0.49}}$
=	103.54	minutes	
V ₂₅ =	12,900	x	T ₂₅
=	12,900	x	25
=	322,500	cubic feet	
V ₂₅ =	12,900	x	T ₂₅
=	12,900	x	103.54
=	1,335,876	cubic feet	
V ₂₅ =	103.54	+	25
=	128.04	minutes	
V ₂₅ =	12,900	x	T ₂₅
=	12,900	x	128.04
=	1,651,716	cubic feet	
V ₂₅ =	103.54	+	25
=	128.04	minutes	
V ₂₅ =	12,900	x	T ₂₅
=	12,900	x	128.04
=	1,651,716	cubic feet	

Storage Volume Provided

	Forebay				Detention Pond			
	Elevation	Area (ft ²)	Incremental Volume (ft ³)	Cumulative Volume (ft ³)	Elevation	Area (ft ²)	Incremental Volume (ft ³)	Cumulative Volume (ft ³)
Freeboard	845				845	18323		
High Water	844				844	16855	17,482	0
Top of Forebay Storage	842	5315	4,600	10,055	843	13907	15,209	36,860
	841	3920	3,302	5,455	842	5399	9,280	21,651
	840	2720	2,153	2,153	841	4905	5,150	12,371
Bottom of Detention Pond / Forebay	839	1632			840	2779	3,792	7,221
					839	1669	2,201	3,429
					838	836	1,229	1,229
Forebay Volume Provided =			10,055	cubic feet	Total Volume Provided =		46,915	cubic feet
Forebay Volume Required =			9,023	cubic feet	Total Volume Required =		41,612	cubic feet

WATER FIRE FLOW CALCULATIONS

Design Criteria

Required Fire Flow	1,500 GPM with a residual pressure of 20 psi
Maximum Day Flow	17 REUs x 1,000 gallons/day/REU = 17,000 gallons/day = 12 gpm
Peaking Factor	Aug Max Day Demand * 2 = 12 gpm * 2 = 24 gpm
Hazen & Williams	C = 120

(1,500 GPM fire suppression + 24 gallon/minute maximum day demand)

Estimate Residual Pressure at Fire Hydrant with 1,524 GPM Demand (1,500 GPM Fire Suppression + 24 GPM Maximum Day Demand)

Residual Flow, Q _r (GPM)	Static Pressure @ Test Hydrant P _s (psi)	Calculated Residual Pressure @ 1,524 gpm P _{r1524} (psi)	Residual Pressure at Test Hydrant P _t (psi)
1962	57	1,524 = Q _r x ((P _s - P _{r1524}) / (P _s - P _t)) ^{0.54} P _{r1524} = 49 psi	44

Residual Pressure at the Furthest Point of Proposed WM (1,524 GPM Demand)

H _t	L (ft.)	C	Q (gpm)	D (in.)
H _t = 0.002083 L (100/C) ⁸⁵ x (Q ^{1.857/d^{4.8655})}	1,100	120	1,524	8
H _t = 50.3 ft = 21.8 psi				
P = P _{r1524} - H _t = 49 - 22.4 = 26.6 psi				

NOTES:

- SOIL BORINGS TO DETERMINE SOIL PERCOLATION RATES, ARE PROVIDED ON SHEET 10. IF INSUFFICIENT PERCOLATION RATES ARE INDICATED, THEN DRY WELLS WILL BE REQUIRED FOR PERMITTING AS AN ALTERNATIVE MEANS TO OBTAIN A SUFFICIENT RATE OF INFILTRATION.

SANITARY SEWER CALCULATIONS

SITE SANITARY SEWER DEMAND

Number of Lots = 17

Population = Number of Lots x 3.5

= 17 lots x 3.5 people per lot

= 60 people

Average Flow = Population x Per Capita Capacity
Gallons per Cubic Foot x Seconds per Day

= 60 people x 100 gpcpd
7.48 gal/cft x 86,400 sec/day

= 0.01 CFS or 4.13 GPM

Peaking Factor = 4.00

Peak Flow = Average Flow x Peaking Factor

= 0.01 people x 4.00

= 0.04 CFS or 16.53 GPM

EXISTING PIPE CAPACITY

Min. Pipe Slope = 0.40 %

Pipe Diameter = 8 Inch

N = 0.013

Pipe Capacity (Hazen Williams) = 0.76 CFS

ULTIMATE SANITARY SEWER DEMAND (EXTENSION OF SEWER OFF-SITE TO WEST)

Number of Lots = 21

Population = Number of Lots x 3.5

= 21 lots x 3.5 people per lot

= 74 people

Average Flow = Population x Per Capita Capacity
Gallons per Cubic Foot x Seconds per Day

= 74 people x 100 gpcpd
7.48 gal/cft x 86,400 sec/day

= 0.01 CFS or 5.10 GPM

Peaking Factor = 4.00

Peak Flow = Average Flow x Peaking Factor

= 0.01 people x 4.00

= 0.05 CFS or 20.42 GPM

EXISTING PIPE CAPACITY

Min. Pipe Slope = 0.40 %

Pipe Diameter = 8 Inch

N = 0.013

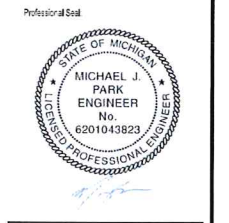
Pipe Capacity (Hazen Williams) = 0.76 CFS



Engineers
Surveyors
Planners
Landscape Architects
Environmental Specialists

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Manager: M.P.
Engineer: L.W.
Quality Control: N.M.
Section:



DATE	ISSUE
03/05/2015	PRELIM SITE PLAN SUBMITTAL
07/06/2015	REVISED PER CITY REVIEW
08/04/2015	REVISED PER CITY REVIEW
10/23/2015	REVISED PER PC REVIEW
12/02/2015	RELOCATE LOT 17
06/09/2016	FINAL SITE PLAN SUBMITTAL
07/26/2016	FINAL SITE PLAN SUBMITTAL
08/04/2016	FINAL SITE PLAN SUBMITTAL

Developed For:

VANGUARD COMPANIES

101 S. MAIN STREET
ROCHESTER, MI 48037

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UTILITY CALCULATIONS
FINAL SITE PLAN
NOTTINGHAM WOODS

ROCHESTER HILLS
MICHIGAN

Oakland County

Date: 7/6/15
Scale: 1" = 100'
Sheet: 06
Project: 18701.00

TREE IMPACT CALCULATIONS:
NOTTINGHAM WOODS

TOTAL NUMBER OF TREES SURVEYED:	745
TOTAL NUMBER OF REGULATED TREES:	452
TOTAL NUMBER OF REGULATED TREES PRESERVED:	77
TOTAL NUMBER OF REGULATED TREES REMOVED:	375
TOTAL NUMBER OF UNREGULATED:	179
TOTAL NUMBER OF TREES OFFSITE:	90

MAP LEGEND

- REGULATED TREES - TO BE PRESERVED
- REGULATED TREES - TO BE REMOVED
- UNREGULATED TREES
- ✕ DEAD TREES - TO BE REMOVED
- OFFSITE TREES

NOTES

- THIS PROJECT WILL REQUIRE TREE REPLACEMENT CREDITS FOR THE REMOVAL OF REGULATED TREES. THE REPLACEMENT CREDITS WILL BE ACCOUNTED FOR BY THE INSTALLATION OF NEW TREES (PER THE LANDSCAPE PLAN), WITH THE REMAINDER TO BE PAID INTO THE CITY TREE FUND AT \$200 PER TREE.
- ALL TREES ARE PRESUMED TO BE IN GOOD CONDITION UNLESS OTHERWISE NOTED.



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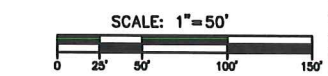


DATE	ISSUE
03/05/2015	PRELIM SITE PLAN SUBMITTAL
07/06/2015	REVISED PER CITY REVIEW
08/04/2015	REVISED PER CITY REVIEW
10/23/2015	REVISED PER PC REVIEW
12/02/2015	RELOCATE LOT 17
03/09/2016	FINAL SITE PLAN SUBMITTAL
07/25/2016	FINAL SITE PLAN SUBMITTAL
08/04/2016	FINAL SITE PLAN SUBMITTAL

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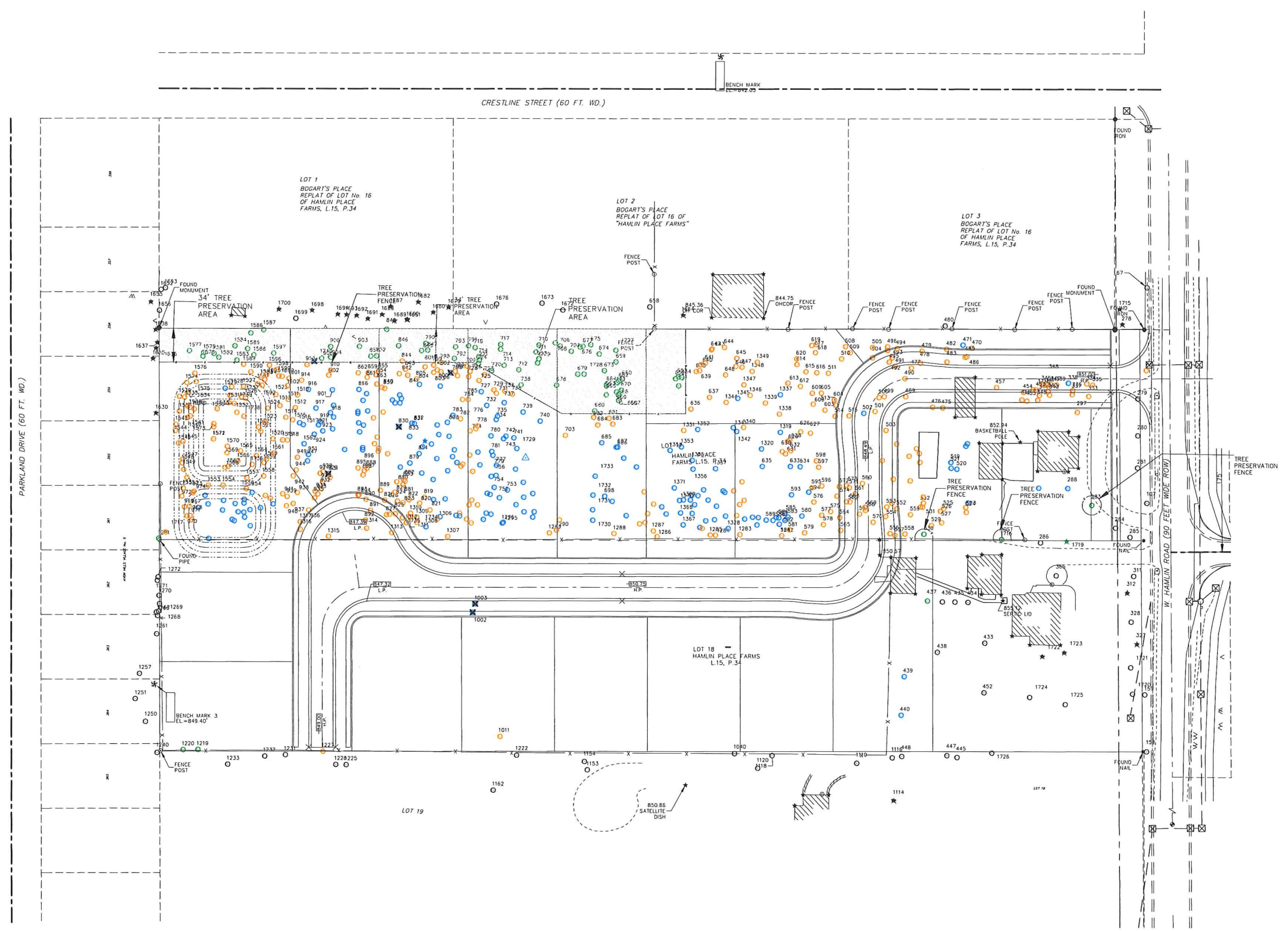
TREE PRESERVATION PLAN
FINAL SITE PLAN
NOTTINGHAM WOODS
ROCHESTER HILLS
MICHIGAN
Oakland County

Date:	7/6/15
Scale:	1" = 50'
Sheet:	07
Project:	18701.00



CITY OF ROCHESTER HILLS FILE #15-004
NOT TO BE USED AS CONSTRUCTION DRAWINGS

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Quality Control:	N.M.
Section:	

Professional Seal



NOTES

1. EXTERIOR FEATURES/STYLES WILL INCLUDE AT LEAST 65% BRICK COVERAGE WITH A TRADITIONAL AND/OR FRENCH COUNTRY STYLE THEME
2. MASONRY MATERIALS WILL INCLUDE BRICK, CULTURED STONE, CUT LIMESTONE
3. THE COLORS REPRESENTED IN THE ARTISTIC RENDERINGS CORRECTLY REFLECT GENERAL COLOR THEME OF THE DEVELOPMENT
4. SINGLE FAMILY RESIDENTIAL DEVELOPMENT DESIGNED AND INTENDED TO MEET THE STANDARDS SET FORTH IN THE ORDINANCE. FURTHER, IT WILL SUBSTANTIALLY AND MATERIALLY MATCH MANY OF THE NEWER DEVELOPMENTS IN ROCHESTER HILLS - I.E. VISTAS OF ROCHESTER, LEGACY, ETC.



DATE	ISSUE:
03 05 2015	PRELIM. SITE PLAN SUBMITTAL
07 06 2015	REVISED PER CITY REVIEW
08 04 2015	REVISED PER CITY REVIEW
10 23 2015	REVISED PER PC REVIEW
12 02 2015	RELOCATE LOT 17
06 09 2016	FINAL SITE PLAN SUBMITTAL
07 26 2016	FINAL SITE PLAN SUBMITTAL
08 04 2016	FINAL SITE PLAN SUBMITTAL

Developed For:

VANGUARD COMPANIES

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**ARCHITECTURAL
DRAWINGS
FINAL SITE PLAN
NOTTINGHAM WOODS**

ROCHESTER HILLS
MICHIGAN

Oakland County

Date:	7/6/15
Scale:	N/A
Sheet:	A-01
Project:	18701.00

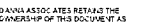


D'Anna Associates
Architecture | Engineering

1055 SOUTH BLVD. E. SUITE 200
ROCHESTER, HILLS, NY 48307

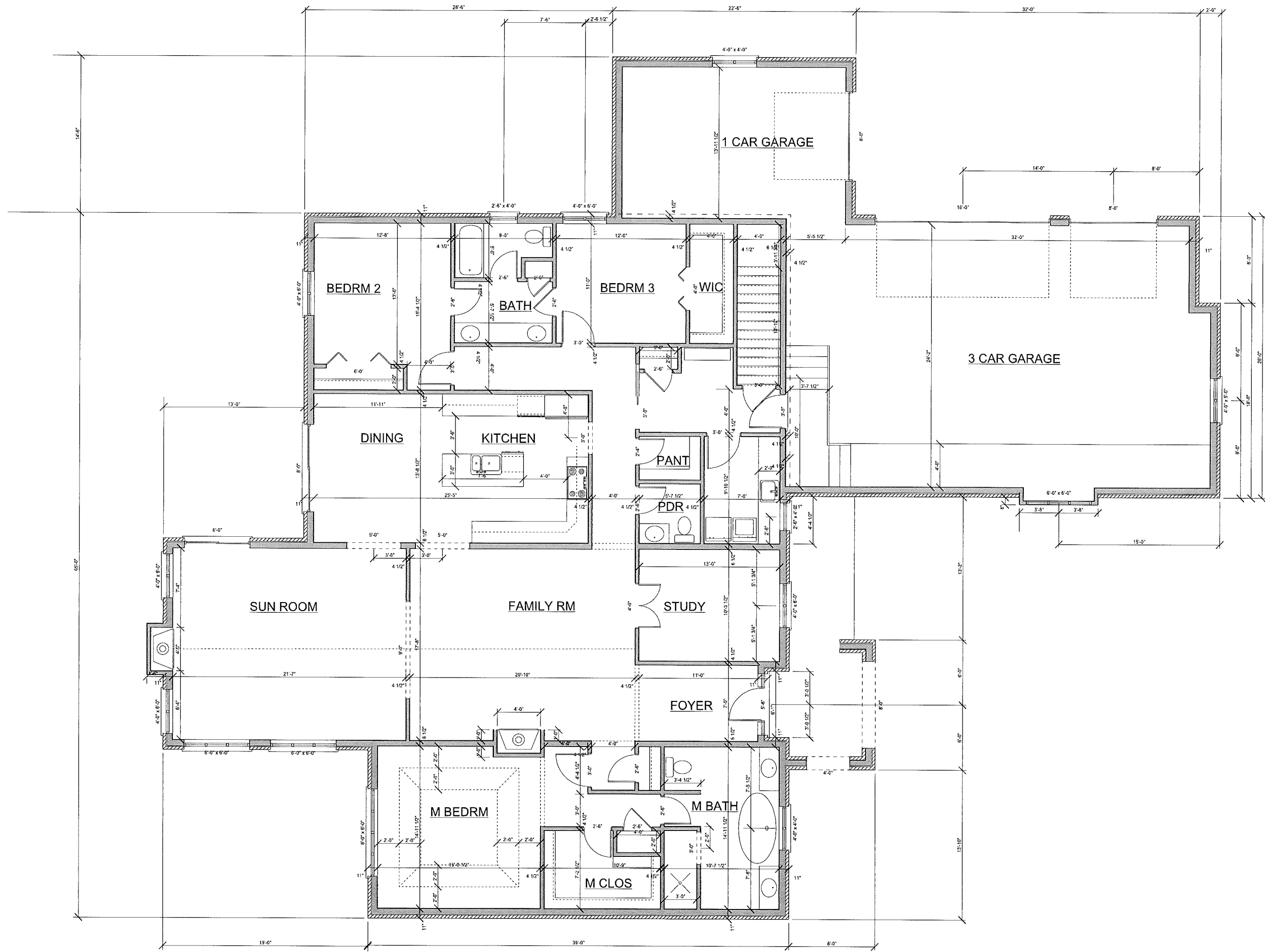
P 248-852-7702 F 248-852-7707

dannaassoc.com



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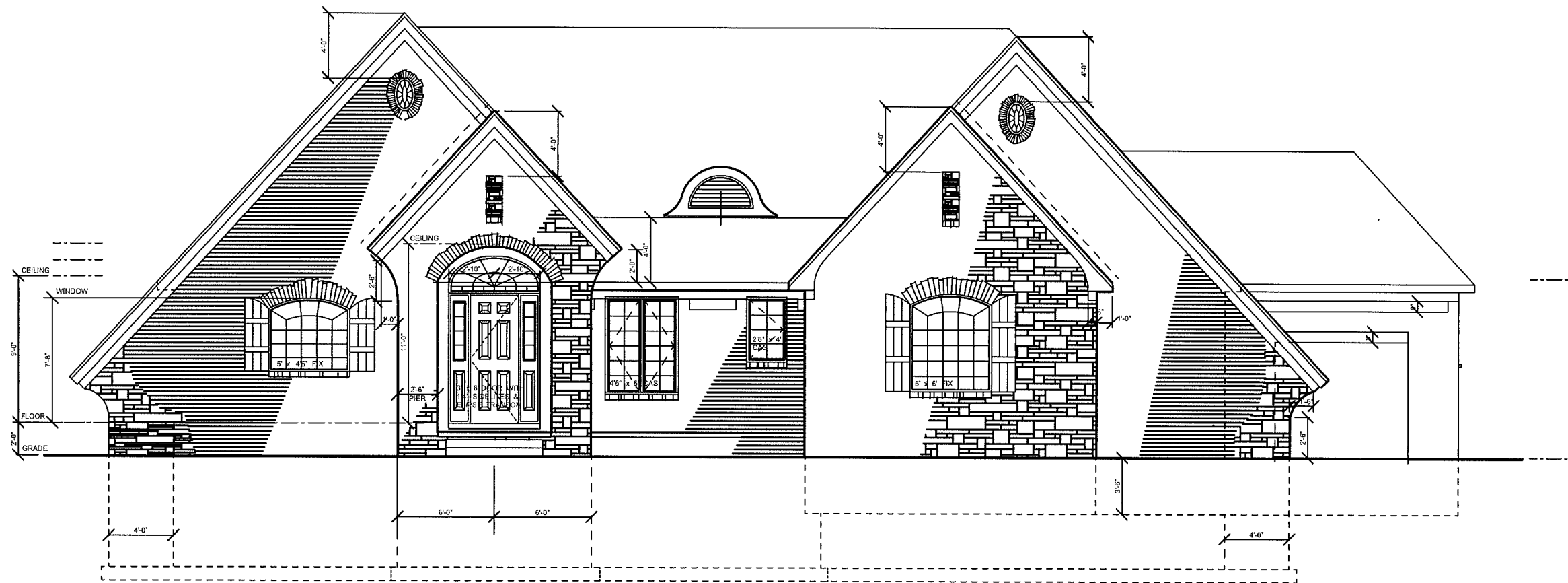


- ISSUANCE:
- SCHEMATIC
 - BIDDING
 - MUNI SUBMITTAL
 - CONSTRUCTION
 - OTHER:

DRAWINGS SHALL NOT BE
USED FOR CONSTRUCTION
UNLESS INDICATED

NO.	DESC.	DATE

ISSUE DATE 1-22-15
DB F.P.
CB V.M.
SHEET
A2
PROJECT NO. 15011



FRONT ELEVATION
 1/4" = 1'-0"

GREENBELT PLANT LIST:

REQ.ED 6 DECIDUOUS TREE; 4 ORNAMENTAL TREES = 6 DECIDUOUS TREES; 4 ORNAMENTAL TREES PROPOSED

PERENNIALS:	NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
	28	OBSSIAN CORAL BELLS	HEUCHERA 'OBSSIAN'	1 GAL. POT	FOU
	15	FOUNTAIN GRASS	FENISTELUM ALPECUROIDES	1 GAL. POT	FOU

SHRUBS:	NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
	24	BIRCHLEAF SPREA	SPRAEA PRUNIFOLIA	24" SPD.	SPY
	9	SKYROCKET JUNPER	JAMPERUS SCOPA DORN 'SKYROCKET'	6-8" HT.	SKY
	15	GROW-LOW SUMAC	RHUS ARNICA 'GRO-LOW'	24" SPD.	SUM

TREES:	NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
	5	LONDON PLANE TREE	PLATANUS X ACERIFOLIA	3" CAL. BAB	LP
	3	SHAGBARK HICKORY	CARYA OVATA	3" CAL. BAB	SH
	4	KOREAN LILAC TREE	SIRINDA MUYEN 'PALBIN' (TREE FORM)	3" CAL. BAB	LI
	9	WHITE FIR	ABIES CONCOLOR	6" TALL BAB	WF
	42	WHITE SPRUCE	PICEA GLAUCA	6-7" TALL BAB	WS
	6	PYRAMIDAL ENGLISH OAK	QUERCUS ROBUR 'FASTIGIATA'	3" CAL. BAB	EO

DETENTION PLANT LIST:

REQ.ED 11 TREES; 8 EVERGREEN TREES; 30 SHRUBS = 1522/35 = 4.34 = 11 DECIDUOUS TREES; 8 EVERGREEN TREES; 30 SHRUBS PROPOSED

PERENNIALS:	NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
	54	GREAT BLUE LOBELIA	LOBELIA SIPHUTICA	1 GAL. POT	GBL

SHRUBS:	NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
	15	SUMMER WINE NINEBARK	PHYSCARPUS OPULIFOLIUS	30" TALL	NIN
	15	DAPPLED WILLOW	SALIX INT. 'HAKURO NISHIKI'	24" TALL	WL

DECIDUOUS TREES:	NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
	5	BLACK GUM	NYSSA SYLVATICA	3" CAL. BAB	BG
	3	SOURWOOD	DYODENDRUM ARBOREUM	3" CAL. BAB	SW
	8	COLORADO SPRUCE	PICEA PUMENS	6-7" TALL BAB	CS

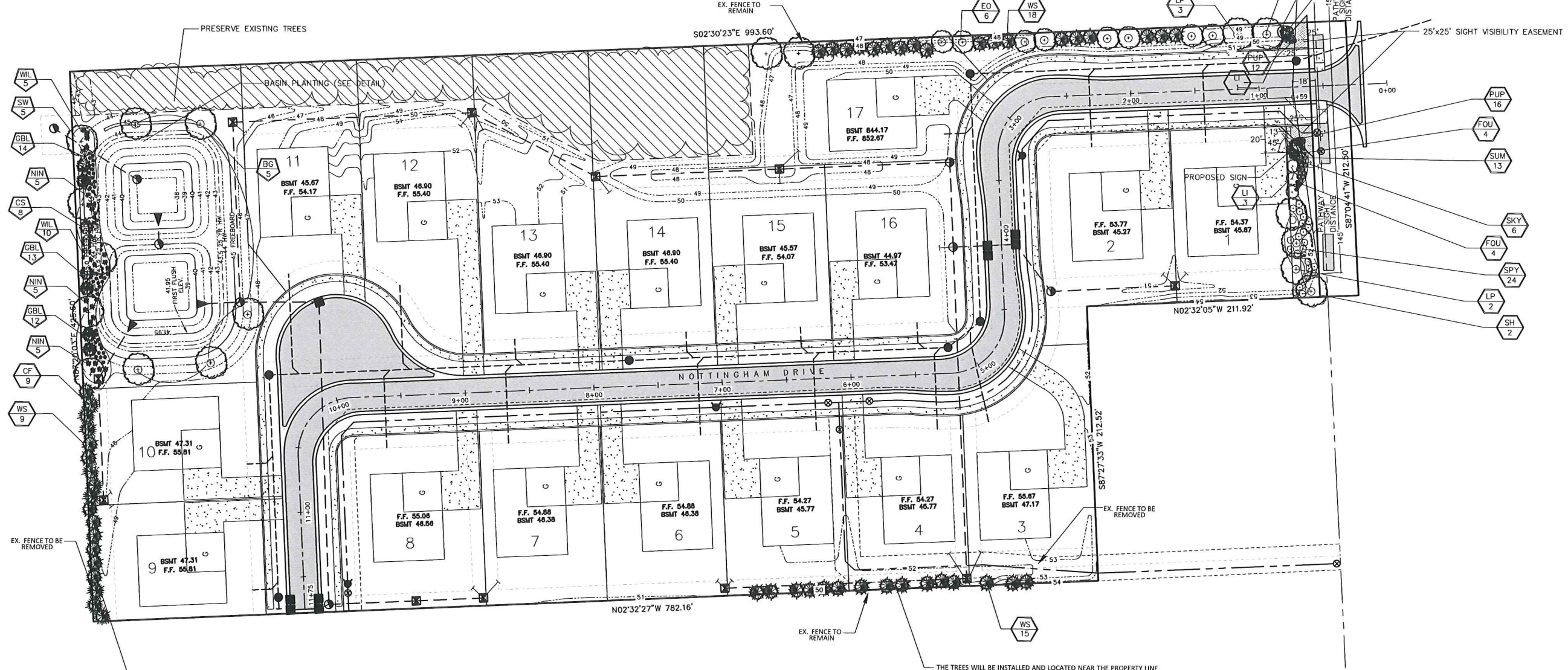
NOTES

- PRIOR APPROVAL IS REQUIRED TO PLANT ANY TREE OR SHRUB ON THE PUBLIC RIGHT-OF-WAY.
- ALL TREES AND SHRUBS MUST BE PLANTED AT LEAST 10' FROM THE EDGE OF THE PUBLIC ROAD. (TREES MUST BE PLANTED AT LEAST 15' AWAY FROM CURB OR ROAD EDGE WHERE THE SPEED LIMIT IS MORE THAN 35 MPH) SHADE TREES AND SHRUBS MUST BE PLANTED AT LEAST 5' FROM THE EDGE OF THE PUBLIC WALKWAY. EVERGREEN AND ORNAMENTAL TREES MUST BE PLANTED AT LEAST 10' FROM THE PUBLIC WALKWAY.
- NO TREES OR SHRUBS MAY BE PLANTED WITHIN THE TRIANGULAR AREA FORMED AT THE INTERSECTION OF ANY STREET RIGHT-OF-WAY LINES AT A DISTANCE ALONG EACH LINE OF 25' FROM THEIR POINT OF INTERSECTION. NO TREES OR SHRUBS MAY BE PLANTED IN THE TRIANGULAR AREA FORMED AT THE INTERSECTION OF ANY DRIVEWAY WITH A PUBLIC WALKWAY AT A DISTANCE ALONG EACH LINE OF 15' FROM THEIR POINT OF INTERSECTION.
- ALL TREES AND SHRUBS MAY BE PLANTED AT LEAST 10' FROM ANY FIRE HYDRANT. SHADE AND EVERGREEN TREES MUST BE PLANTED AT LEAST 15' FROM THE NEAREST OVERHEAD WIRE. TREES MUST BE PLANTED A MINIMUM OF 5' FROM AN UNDERGROUND UTILITY, UNLESS THE CITY'S LANDSCAPE ARCHITECT REQUIRES A GREATER DISTANCE.
- PRIOR TO THE RELEASE OF THE PERFORMANCE BOND, THE CITY OF ROCHESTER HILLS FORESTRY DIVISION NEEDS TO INSPECT ALL TREES, EXISTING OR PLANTED, TO IDENTIFY ANY THAT POSE A HAZARD TO THE SAFE USE OF PUBLIC RIGHT-OF-WAY. FORESTRY MAY REQUIRE THE DEVELOPER TO REMOVE, AND POSSIBLY REPLACE, ANY SUCH TREES. THESE REQUIREMENTS ARE INCORPORATED INTO THE PLA.
- ALL PLANTING AREAS TO BE IRRIGATED
- PARCEL BOUNDARY IS THE LIMITS OF GRADING
- PRIOR TO THE RELEASE OF THE PERFORMANCE BOND, THE CITY OF ROCHESTER HILLS MUST INSPECT ALL LANDSCAPING PLANTINGS AND THE OPERATION OF THE IRRIGATION SYSTEM.
- IRRIGATION WILL ONLY OCCUR BETWEEN THE HOURS OF 12AM AND 5AM.
- ALL SIGNS MUST MEET THE REQUIREMENTS OF SECTION 138-12.306 AND CHAPTER 134 OF THE CITY OF ORDINANCES AND BE APPROVED UNDER SEPARATE PERMITS ISSUED BY THE BUILDING DEPARTMENT.
- THE PROPOSED STREET TREES ARE TO BE PLANTED IN THE ROW AFTER CONSTRUCTION OF THE PROJECT IS COMPLETED. APPLICANT SHALL PAY \$200 PER LOT TO ACCOUNT FOR PLANTINGS.

LANDSCAPING COST SUMMARY
NOTTINGHAM WOODS
Rochester Hills Michigan

G/W Project # 18701
Sept. 15, 2016

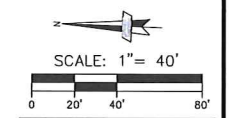
ITEM	QUANT	UNIT PRICE	TOTAL
Stone Sign	1	\$10,000.00	\$10,000.00
Red Maple	4	\$350.00	\$1,400.00
Sweetgum	4	\$400.00	\$1,600.00
Tulip Tree	4	\$350.00	\$1,400.00
Chirapin	4	\$400.00	\$1,600.00
Shagbark Hickory	4	\$400.00	\$1,600.00
London Plane Tree	5	\$350.00	\$1,750.00
Korean Lilac Tree	4	\$400.00	\$1,600.00
Black Gum	5	\$400.00	\$2,000.00
Pyramidal English Oak	6	\$400.00	\$2,400.00
White Fir	11	\$400.00	\$4,400.00
Sourwood	6	\$350.00	\$2,100.00
White Spruce	42	\$350.00	\$14,700.00
Colorado Spruce	8	\$400.00	\$3,200.00
Bndal Wreath Spiraea	24	\$35.00	\$840.00
Skyrocket Juniper	6	\$70.00	\$420.00
Grow-Low Sumac	15	\$35.00	\$525.00
Summer Wine Ninebark	15	\$45.00	\$675.00
Dappled Willow	15	\$45.00	\$675.00
Obsidian Coral Bells	28	\$15.00	\$420.00
Fountain Grass	15	\$15.00	\$225.00
Great Blue Lobelia	54	\$15.00	\$810.00
Much by the Yard installed	25	\$50.00	\$1,250.00
Planting Soil by the Yard installed	25	\$70.00	\$1,750.00
Irrigation System installed	1	\$15,000.00	\$15,000.00
# of Lb's Native Seed Pond Mix	20	\$100.00	\$2,000.00
# of Yards of Sod installed	4,100	\$2.50	\$10,250.00
Sub-Total			\$84,500.00
10% Contingency	0	\$0.00	\$0.00
GRAND TOTAL			\$84,500.00



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Quality Control:	N.M.
Section:	



DATE	ISSUE
03/05/2015	PRELIM SITE PLAN SUBMITTAL
07/05/2015	REVISED PER CITY REVIEW
08/04/2015	REVISED PER CITY REVIEW
10/23/2015	REVISED PER PC REVIEW
12/02/2015	RELOCATE LOT 17
01/20/2016	REVISED PER NEIGHBORHOOD MEETING
05/09/2016	FINAL SITE PLAN SUBMITTAL
07/26/2016	FINAL SITE PLAN SUBMITTAL
08/04/2016	FINAL SITE PLAN SUBMITTAL

Developed For
VANGUARD COMPANIES
101 S. MAIN STREET
ROCHESTER, MI 48037
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LANDSCAPE PLAN
FINAL SITE PLAN
NOTTINGHAM WOODS
ROCHESTER HILLS
MICHIGAN
Oakland County

Date:	01/27/2016
Scale:	1" = 40'
Sheet:	LA-01
Project:	18701.00

PLANT NOTES:

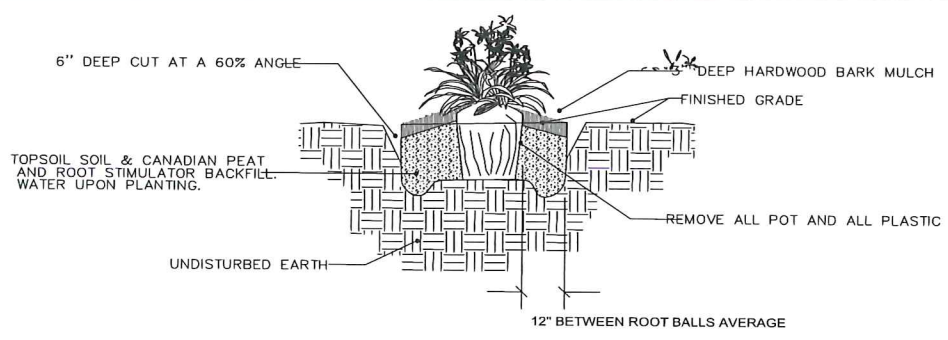
- A. The Planning Department may approve an alternative form of irrigation for a particular site, or may waive this requirement upon determining that underground irrigation is not necessary for the type of proposed plant materials.
- B. All automatic irrigation systems shall be designed to minimize water usage, and shall be shut off during water emergencies, periods of protracted rainfall, or water rationing periods.
- C. The irrigation requirement may be waived by the reviewing authority if the project incorporates landscaping that will contribute points towards LEED certification or an equivalent rating system.
- D. The applicant may be required to post a Performance Bond prior to the issuance of a temporary or final Certificate of Occupancy to ensure the completion of landscaping (including irrigation). If the landscaping is not 100% complete when any certificate of occupancy is requested, the City will inspect the landscaping and determine the percentage of completion and a performance bond must be submitted to the City by the Developer in the sum equal to the unfinished portion of the landscape work. The City will have the authority to determine the percentage of completion and the bond amount required. If the landscaping is 100% complete and approved no Performance Bond will be required.
- E. Maintenance Bond. A Maintenance Bond in the sum of 25% of estimated cost of landscaping (including irrigation) must be posted prior to the issuance of any Certificate of Occupancy (including temporary). The Maintenance Bond is held for a period of 2 years, at the end of which time the City shall inspect the landscaping. Once, inspection issues are addressed the unused balance of the Maintenance Bond will be released.

Maintenance

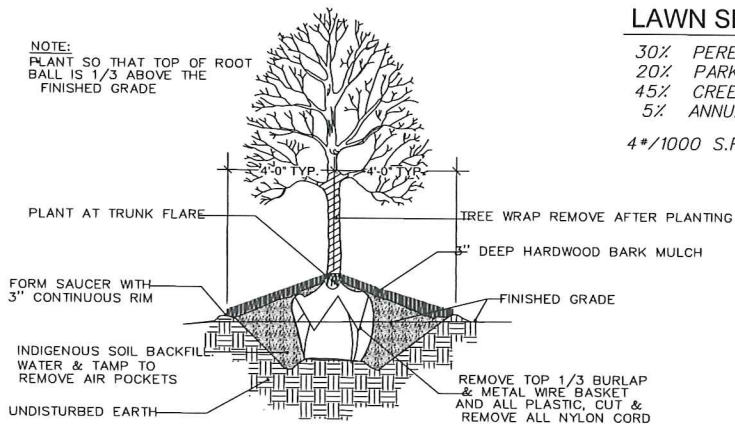
- The owner of the property shall be responsible for all maintenance of site landscaping, as follows:
- A. Landscaping shall be kept in a neat, orderly and healthy growing condition, free from debris and refuse.
 - B. Pruning shall be minimal at the time of installation, only to remove dead or diseased branches. Subsequent pruning shall assure proper maturation of plants to achieve their approved purpose.
 - C. All dead, damaged, or diseased plant material shall be removed immediately and replaced within six (6) months after it dies or in the next planting season, whichever occurs first. For purposes of this Section, the planting season for deciduous plants shall be between March 1 and June 1 and from October 1 until the prepared soil becomes frozen. The planting season for evergreen plants shall be between March 1 and June 1. Plant material installed to replace dead or diseased material shall be as close as practical to the size of the material it is intended to replace. The City may notify property owners of the need to replace dead, damaged, or diseased material.
 - D. The approved landscape plan shall be considered a permanent record and integral part of the Site Plan Approval. Unless otherwise approved in accordance with the aforementioned procedures, any revisions to or removal of plant materials, or non-compliance with the maintenance requirements of this Section 138-2.109 will place the parcel in non-conformity with the approved landscape plan and be a violation of this Ordinance.
 - E. If protected trees are damaged, a fine shall be issued on an inch-by-inch basis at a monetary rate as defined by the Forestry Department.

Installation:

All landscaping shall be installed in a manner consistent with the standards of the American Association of Nurserymen, the approved site plan, and the following:



PERENNIAL PLANTING DETAIL
NO SCALE



DECIDUOUS TREE PLANTING DETAIL
NO SCALE

LAWN SEED MIX:

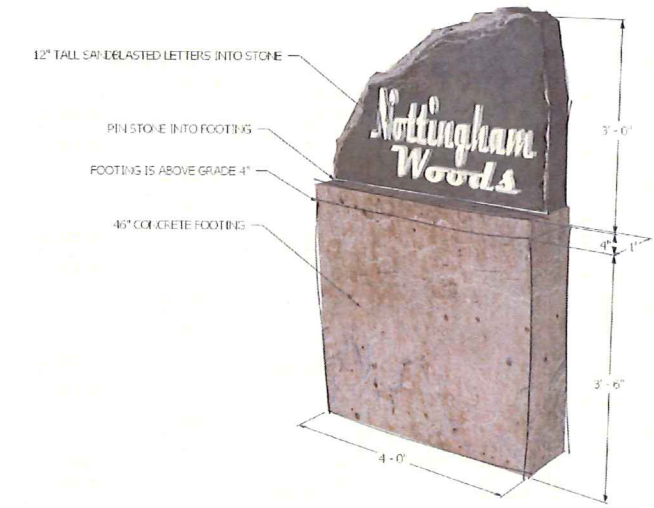
- 30% PERENNIAL RYGRASS
 - 20% PARK KENTUCKY BLUEGRASS
 - 45% CREEPING RED FESCUE
 - 5% ANNUAL RYEGRASS
- 4*/1000 S.F. SEEDING RATE

Bio Retention Native Seed Mix:

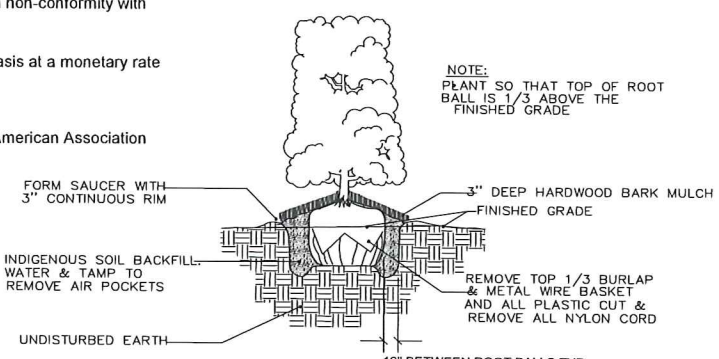
10 pounds

Common Name	Scientific Name	Color	Bloom Time	Oz.
Mexican Aster	Cosmos Bipinnatus	White, Purple	June-August	140
Annual Rye	Lolium perenne	-	-	100

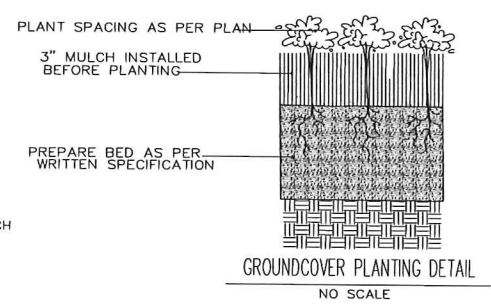
Common Name	Scientific Name	Oz.
Little Bluestem Grass	Schizachyrium scoparium	80



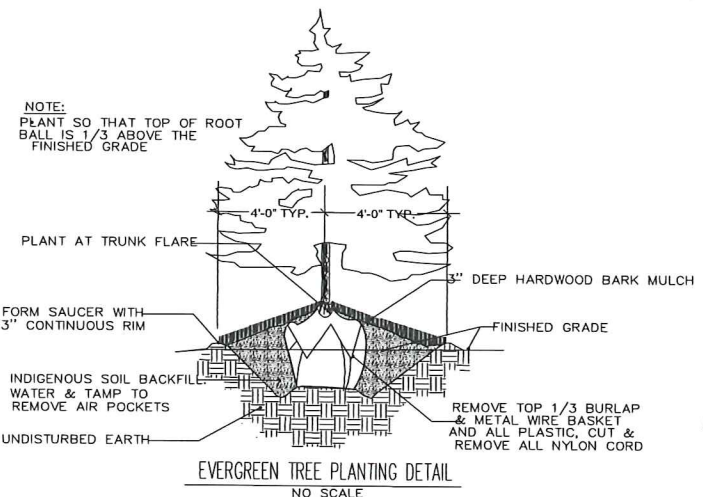
SIGN DETAIL
NO SCALE



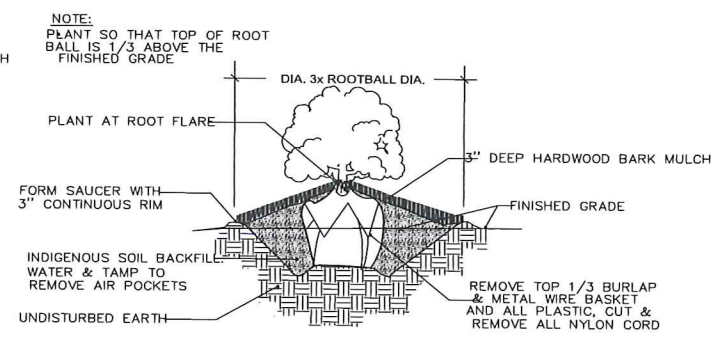
SHRUB HEDGE PLANTING DETAIL
NO SCALE



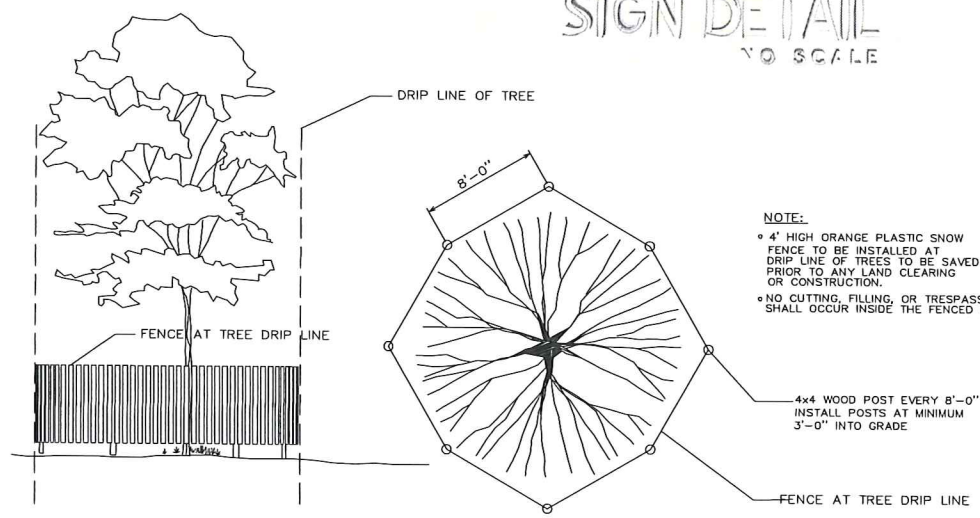
GROUNDCOVER PLANTING DETAIL
NO SCALE



EVERGREEN TREE PLANTING DETAIL
NO SCALE



SHRUB PLANTING DETAIL
NO SCALE



EXISTING TREE PROTECTION DETAIL
NO SCALE

Executive:	P.M.
Manager:	M.P.
Engineer:	L.W.
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Section:	



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Developed For:

VANGUARD COMPANIES
 101 S. MAIN STREET
 ROCHESTER, MI 48037

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LANDSCAPE DETAILS
 FINAL SITE PLAN
 NOTTINGHAM WOODS

ROCHESTER HILLS
 MICHIGAN

Oakland County

Date:	7/6/15
Scale:	N/A
Sheet:	LA-02
Project:	18701.00