



CITY of NOVI CITY COUNCIL

Agenda Item D
March 24, 2014

SUBJECT: Approval of a request from IAC Novi, LLC, applicant for the Berkshire Pointe development, for a variance from Section 11-68(a)(1) of the Design and Construction Standards requiring water main extensions longer than 800 feet to include a secondary connection point to the water distribution network (868 feet proposed).

SUBMITTING DEPARTMENT: Department of Public Services, Engineering Division *BTL*

CITY MANAGER APPROVAL: *[Signature]*

BACKGROUND INFORMATION:

Berkshire Pointe is a proposed 86 unit single family condominium on approximately 29.15 acres located west of Wixom Road near Grand River Avenue. The applicant, IAC Novi, LLC, has submitted a final site plan and is requesting a variance from the Chapter 11 of the Novi Code of Ordinances, commonly known as the Design and Construction Standards (DCS). The applicant has provided two points of connection for the proposed water main off of the existing 16-inch water main on Wixom Road to serve the development. The applicant has also proposed a 12-inch water main stub to be provided at the northwest corner of the property adjacent to 12 Mile Road for future extension per the requirements in the DCS, but the 12-inch extension is 868 feet long and exceeds the maximum allowable water main stub length of 800 feet in the DCS.

The applicant is requesting a variance from Section 11-68(a)(1) of the Novi Code of Ordinances, requiring water main extensions longer than 800 feet to include a secondary connection point to the water distribution network. The DCS section (see attached) also states that exceptions can be made in those instances when a second connection is not available or it is not possible to provide a looped system, provided that the system is designed to accommodate a second connection when made available. Further, the DCS requires that the system be able to provide a fire flow of at least 2,000 gallons per minute in single-family detached housing.

The applicant has designed the water main to accommodate a future extension along 12 Mile Road to provide a looped system. The applicant has provided a water system model for the development which was calibrated to a hydrant test on Wixom Road. The applicant's model demonstrates that 2,140 gallons per minute would be available at 12 Mile Road. The modeled flow exceeds the DCS minimum of at least 2,000 gallons per minute for fire protection in a single family residential subdivision.

The variance request was reviewed by the City Attorney and staff from Fire Department, Community Development Department and Department of Public Services with no exceptions taken. Based upon the proposed design and the content of the applicant's

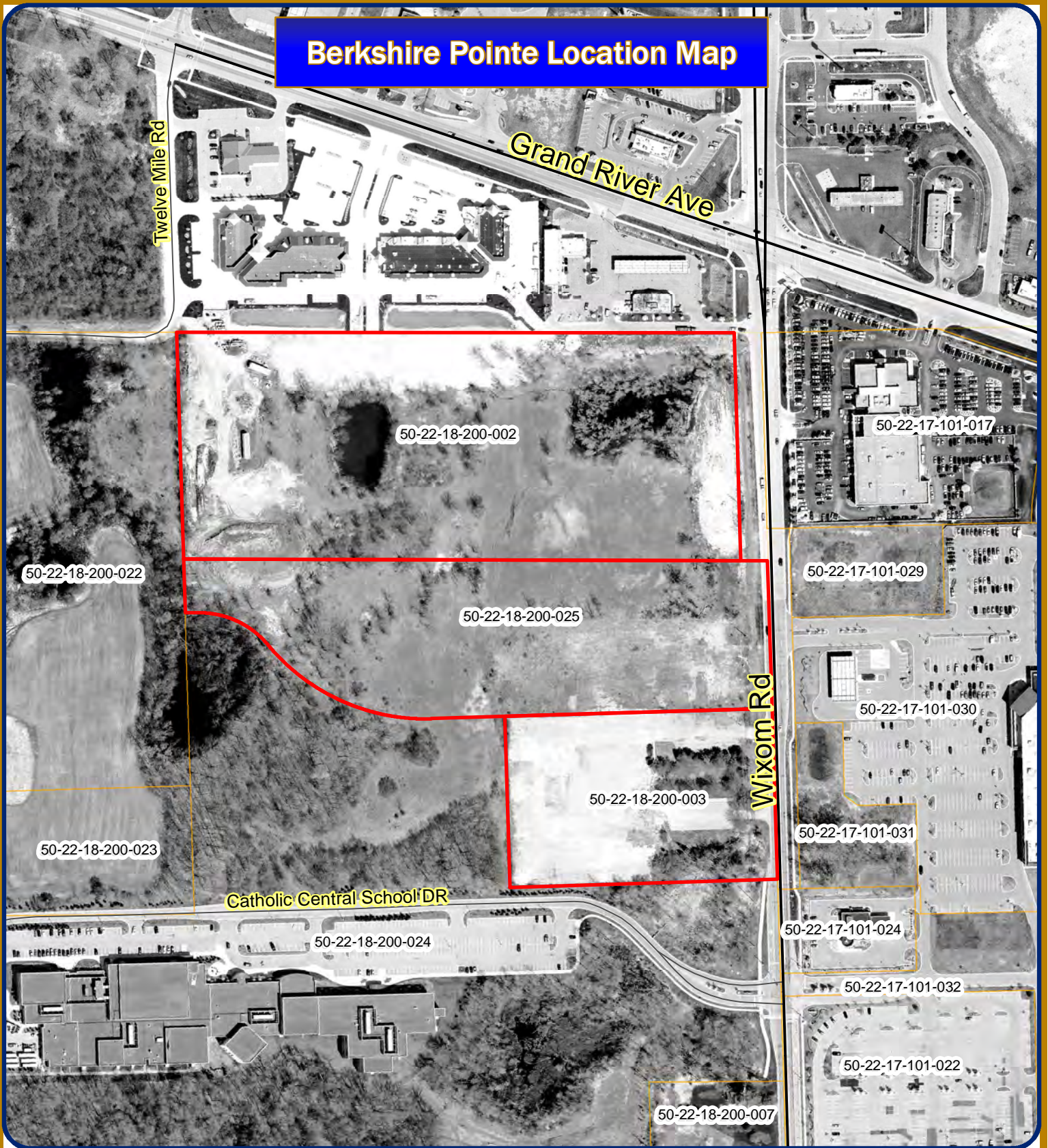
variance request, the applicant has demonstrated that in this specific case the specifications in the DCS would result in exceptional difficulty, and that the proposed design is adequate for the intended use without creating a circumstance that would be detrimental to public health and safety. For these reasons, staff recommends approval of the requested variance from Section 11-68(a)(1) of the Design and Construction Standards, because the applicant's submittal indicates comparable performance to the Ordinance standard.

RECOMMENDED ACTION: Approval of a request from IAC Novi, LLC, applicant for the Berkshire Pointe development, for a variance from Section 11-68(a)(1) of the Design and Construction Standards requiring water main extensions longer than 800 feet to include a secondary connection point to the water distribution network (868 feet proposed).

	1	2	Y	N
Mayor Gatt				
Mayor Pro Tem Staudt				
Council Member Casey				
Council Member Fischer				

	1	2	Y	N
Council Member Markham				
Council Member Mutch				
Council Member Wrobel				

Berkshire Pointe Location Map

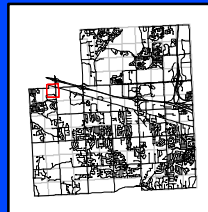


Map Author: A. Wayne
 Date: March 14, 2014
 Project:
 Version #:

Amended By:
 Date:
 Department:

MAP INTERPRETATION NOTICE

Map information depicted is not intended to replace or substitute for any official or primary source. This map was intended to meet National Map Accuracy Standards and use the most recent, accurate sources available to the people of the City of Novi. Boundary measurements and area calculations are approximate and should not be construed as survey measurements performed by a licensed Michigan Surveyor as defined in Michigan Public Act 332 of 1970 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.



Map Legend

 Subject Property



City of Novi
 Engineering Division
 Department of Public Services
 26300 Lee BeGole Drive
 Novi, MI 48375
cityofnovi.org



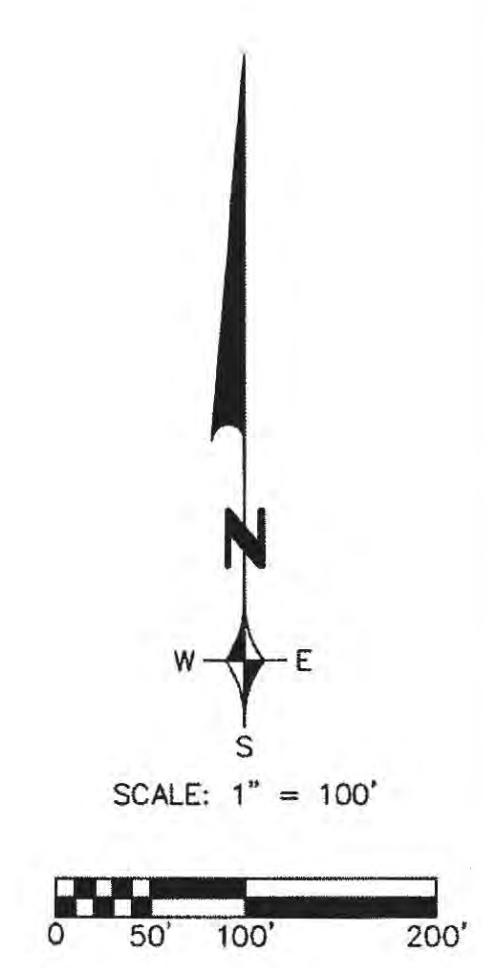
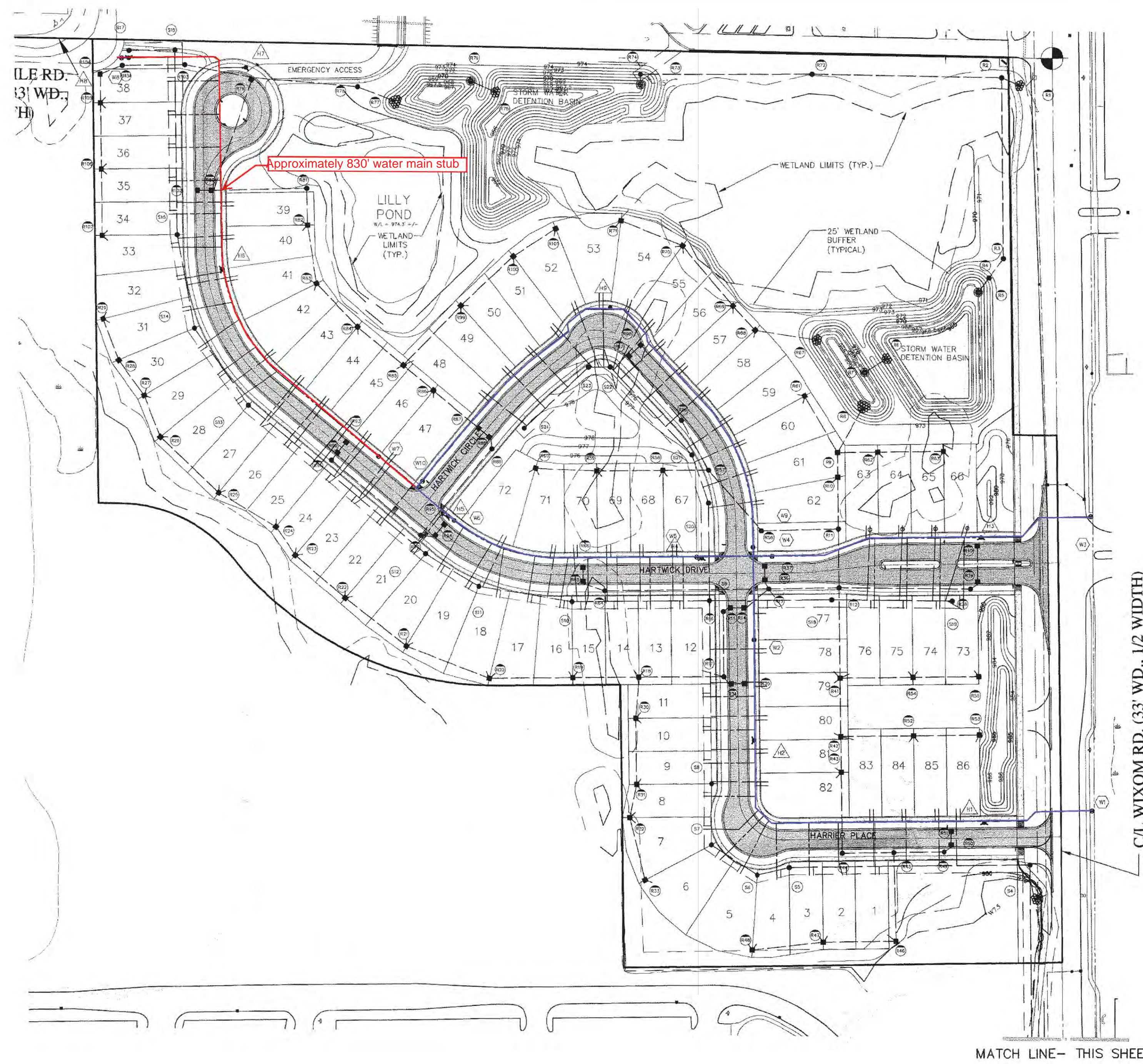
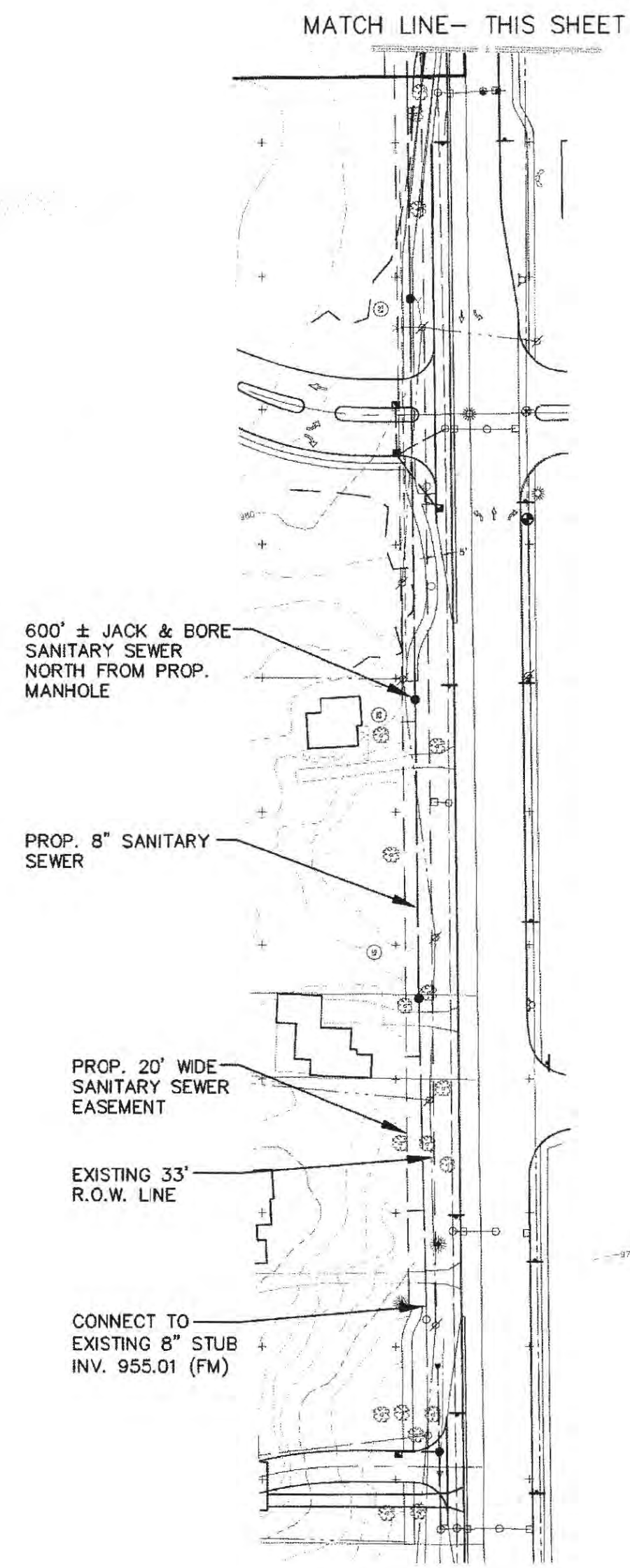
1 inch = 294 feet

Sec. 11-68. Design considerations.

(a) *General requirements.*

- (1) Generally, the distribution system in all developments requiring more than eight hundred (800) feet of water main shall have a minimum of two (2) connections to a source of supply and shall be a looped system. Exceptions will be made in those instances when a second connection is not available, or it is not otherwise possible to provide a looped system, provided the system is designed to accommodate a second connection when made available. The ability to serve at least two thousand (2,000) gallons per minute in single-family detached residential; three thousand (3,000) gallons per minute in apartment, cluster residential and similar complexes, institutional and school areas; and at least four thousand (4,000) gallons per minute in office, industrial and shopping centers is essential. Water mains are required to be extended along all road frontages abutting the proposed development at the direction of the city in accordance with the City of Novi Master Plan current edition for water main construction.

LOT	LENGTH	SLOPE	RISER	INV. @ END OF LEAD	STA. FROM D.S. MANHOLE
1	11	1%	13.8'	973.95	2+06
2	11	1%	13.8'	974.32	2+51
3	11	1%	14.2'	974.82	2+96
4	11	1%	13.9'	974.90	0+12
5	11	1%	13.2'	974.55	0+26
6	11	1%	13.0'	974.47	0+61
7	11	1%	12.8'	974.33	0+26
8	11	1%	12.1'	974.00	0+71
9	11	1%	11.9'	974.00	0+33
10	11	1%	10.8'	973.06	0+78
11	11	1%	10.0'	972.45	1+23
12	11	1%	7.1'	970.31	0+41
13	11	1%	6.9'	970.32	0+86
14	11	1%	5.7'	969.30	1+31
15	11	1%	4.6'	968.38	1+76
16	11	1%	5.8'	969.67	0+10
17	11	1%	6.1'	970.15	0+55
18	11	1%	5.9'	970.12	0+99
19	11	1%	5.9'	970.29	0+11
20	11	1%	5.6'	970.16	0+55
21	11	1%	5.1'	969.83	0+12
22	11	1%	5.0'	970.00	0+78
23	11	1%	4.6'	969.78	1+23
24	11	1%	4.0'	969.32	1+68
25	11	1%	4.0'	969.42	1+92
26	11	1%	4.5'	970.11	2+37
27	11	1%	4.9'	970.72	2+81
28	11	1%	5.2'	971.18	0+10
29	11	1%	5.3'	971.46	0+54
30	11	1%	5.1'	971.44	0+98
31	11	1%	5.0'	971.55	0+30
32	11	1%	4.6'	971.36	0+74
33	11	1%	4.4'	971.30	1+19
34	11	1%	4.2'	971.27	0+33
35	11	1%	3.0'	970.25	0+78
36	11	1%	2.1'	969.54	1+23
37	11	1%	1.4'	969.02	1+68
38	11	1%	1.0'	968.79	2+13
39	78	1%	2.5'	970.29	0+44
40	74	1%	3.5'	971.08	1+24
41	72	1%	4.3'	971.57	0+60
42	70	1%	4.7'	971.46	0+38
43	77	1%	4.5'	970.95	2+81
44	77	1%	3.8'	970.04	2+32
45	77	1%	3.3'	969.37	1+87
46	77	1%	4.1'	970.07	1+63
47	77	1%	4.3'	970.08	1+18
48	79	1%	2.4'	969.27	1+16
49	80	1%	2.2'	968.81	0+81
50	78	1%	2.3'	968.45	0+39
51	80	1%	2.2'	967.93	0+25
52	96	1%	1.7'	967.41	0+15
53	100	1%	1.5'	967.23	0+09
54	99	1%	1.6'	967.18	1+59
55	87	1%	1.8'	967.06	1+57
56	79	1%	1.8'	967.09	1+41
57	79	1%	2.5'	967.62	0+98
58	79	1%	3.2'	968.14	0+53
59	76	1%	3.6'	968.35	0+12
60	75	1%	3.6'	968.16	0+59
61	77	1%	5.8'	970.23	0+23
62	76	1%	7.4'	971.61	1+26
63	101	1%	2.3'	971.28	0+48
64	102	1%	2.0'	971.44	0+93
65	103	1%	1.4'	971.30	1+38
66	108	1.60%	0.0'	970.78	1+56
67	78	1%	5.0'	968.91	0+50
68	78	1%	4.8'	968.93	0+95
69	78	1%	4.0'	968.27	1+40
70	82	1%	3.6'	968.10	1+81
71	70	1%	4.2'	968.72	0+34
72	77	1%	4.7'	969.80	1+24
73	22	1%	2.2'	971.50	1+59
74	11	1%	2.6'	971.63	1+43
75	11	1%	3.0'	971.58	0+98
76	11	1%	3.5'	971.63	0+53
77	11	5%	5.0'	972.47	0+80
78	78	5%	6.0'	972.48	1+82
79	78	1%	9.4'	972.57	1+37
80	78	1%	9.9'	972.69	0+92
81	78	1%	12.6'	975.42	0+47
82	78	1%	12.6'	975.38	0+05
83	78	5%	9.9'	974.08	2+14
84	78	5%	9.7'	973.70	1+69
85	78	5%	9.5'	973.32	1+24
86	78	5%	9.5'	973.22	1+00
27047 WIXOM ROAD	11	1%	18.5'	974.05	0+78
27053 WIXOM ROAD	11	1%	18.0'	974.00	1+88
27171 WIXOM ROAD	11	1%	16.5'	973.51	1+98



- UTILITY LEGEND**
- EXISTING**
- MANHOLE
 - CATCH BASIN
 - ⊕ INLET
 - ⊖ CLEANOUT
 - ⊙ END SECTION
 - ⊕ ROOF DRAIN
 - ⊕ GATE VALVE
 - ⊕ HYDRANT
 - ⊕ WATER SHUT-OFF
 - ⊕ UTILITY POLE
 - ⊕ GUY ANCHOR
 - ⊕ LIGHT POLE
 - ⊕ SIGN
 - ⊕ TREE
 - TREE LINE
 - SANITARY SEWER
 - STORM SEWER
 - WATER MAIN
 - GAS MAIN
 - ELECTRIC CABLE
- PROPOSED**
- MANHOLE
 - CATCH BASIN
 - ⊕ INLET
 - ⊖ CLEANOUT
 - ⊙ END SECTION
 - ⊕ ROOF DRAIN
 - ⊕ GATE VALVE
 - ⊕ HYDRANT
 - ⊕ WATER SHUT-OFF
 - ⊕ TREE REMOVAL
 - SANITARY SEWER
 - STORM SEWER
 - WATER MAIN
 - ⊕ DITCH

SANITARY SEWER DESIGN:

NUMBER OF PROPOSED UNITS = 86 UNITS (ON-SITE) + 3 (OFF-SITE) = 89 UNITS
 NUMBER OF POSSIBLE FUTURE UNITS FROM 40 ACRE PARCEL TO WEST:
 (R-4 ZONING, 3.3 UNITS/AC. DENSITY) 3.3 UNITS/ACRE x 40 ACRES = 132 UNITS
 TOTAL NUMBER OF UNITS = 221 UNITS
 REU (HOMES) = 1.0 REU/UNIT x 221 = 221 REU
 REU (POOL) = 3.0 REU/1000 SF x 1800 SF = 5.4 REU
 TOTAL REU = 226.4 REU
 NUMBER OF PEOPLE = 3.5 PEOPLE/REU x 226.4 REU = 792.4 PEOPLE
 AVG. DAILY FLOW = 100 GPCPD x 792.4 PEOPLE / (7.5 x 24 x 3600) = 0.122 CFS
 PEAKING FACTOR = (18 + √792.4/1000) / (4 + √792.4/1000) = 3.9 USE 4.0
 PEAK DAILY FLOW = 100 GPCPD x 4.0 x 792.4 / (7.5 x 24 x 3600) = 0.488 CFS
 AN 8" DIAMETER SEWER AT 0.40% (MIN.) HAS A CAPACITY OF 0.76 CFS.

NOTE:
 THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AS DISCLOSED BY AVAILABLE UTILITY COMPANY RECORDS AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE COMPANY. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF A CONFLICT IS APPARENT.

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP SUBMITTAL	11/4/13							
ENG SUBMITTAL	1/14/14							

ZEIMET WOZNAK & ASSOCIATES
 Civil Engineers & Land Surveyors
 53800 GRAND RIVER AVE., SUITE 100
 NEW HUDSON, MICHIGAN 48165
 P: (248) 437-5009 F: (248) 437-5222 www.zeimetwozniak.com

MISS DIG SYSTEM, INC.
 THREE FULL WORKING DAYS BEFORE YOU DIG. CALL THE MISS DIG SYSTEM 1-800-482-7171

PROJECT SPONSOR:
 IAC NOVI, LLC ATTN: GARY SHAPIRO
 4111 ANDOVER ROAD, SUITE 150-W
 BLOOMFIELD HILLS, MI 48302 (248) 626-6114

OVERALL UTILITY PLAN
BERKSHIRE POINT
 NOVI, MICHIGAN, SECTION 18

DATE: 11/4/13 SCALE: HOR: 1" = 100' VER: 1" = N/A
 DESIGNED BY: SRB JOB NO. 13165
 DRAWN BY: SRB SHEET CE-12

STATE OF MICHIGAN
 SHAWN R. BLAZCZAK
 LICENSED PROFESSIONAL ENGINEER
 No. 10573

Z:\Projects\3013165\DWG\13165_FINAL_SITE_PLAN.dwg, Utility, 1/14/2014 1:25:20 PM, sbarszczyk



JOHNSON ROSATI SCHULTZ JOPPICH PC

34405 W. Twelve Mile Road, Suite 200 ~ Farmington Hills, Michigan 48331-5627
Phone: 248.489.4100 | Fax: 248.489.1726

Elizabeth Kudla Saarela
esaarela@jrsjlaw.com

www.johnsonrosati.com

February 10, 2014

Adam Wayne, Engineering
City of Novi
45175 Ten Mile Road
Novi, Michigan 48375

Re: Berkshire Pointe – Water Main Stub
Variance from Design and Construction Standards

Dear Mr. Wayne:

Our office has reviewed the proposed request for a variance from the City's Design and Construction Standards which would permit the property owner to construct an approximately 830' water main stub for the development. In order to complete the construction, the applicant requires a waiver from Section 11-68 (a)(1) of the City of Novi Code, which states in relevant part:

Sec. 11-68. Design considerations.

(a) General requirements.

(1) Generally, the distribution system in all developments requiring more than eight hundred (800) feet of water main shall have a minimum of two (2) connections to a source of supply and shall be a looped system. Exceptions will be made in those instances when a second connection is not available, or it is not otherwise possible to provide a looped system, provided the system is designed to accommodate a second connection when made available. The ability to serve at least two thousand (2,000) gallons per minute in single-family detached residential; three thousand (3,000) gallons per minute in apartment, cluster residential and similar complexes, institutional and school areas; and at least four thousand (4,000) gallons per minute in office, industrial and shopping centers is essential. Water mains are required to be extended along all road frontages abutting the proposed development at the direction of the city in accordance with the City of Novi Master Plan current edition for water main construction

February 10, 2014

Page 2

The applicant indicates that others will connect to the stub at intersection of 12 Mile in the future.

Section 11-10 of the Ordinance Code permits the City Council to grant a variance from the Design and Construction Standards when a property owner shows all of the following:

- (b) A variance may be granted when all of the following conditions are satisfied:
- (1) A literal application of the substantive requirement would result in exceptional, practical difficulty to the applicant;
 - (2) The alternative proposed by the applicant shall be adequate for the intended use and shall not substantially deviate from the performance that would be obtained by strict enforcement of the standards; and
 - (3) The granting of the variance will not be detrimental to the public health, safety or welfare, nor injurious to adjoining or neighboring property.

In the event that City Council finds that the standards for a variance or waiver have been met, our office sees no legal impediment to granting the variance, subject to the condition that the Engineering Division has also reviewed and approved the proposed plan.

If you have any questions regarding the above, please call me.

Very truly yours,

JOHNSON, ROSATI, SCHULTZ & JOPPICH, P.C.

Elizabeth Kudla Saarela

EKS

Enclosures

- C: Maryanne Cornelius, Clerk (w/Enclosures)
Charles Boulard, Community Development Director (w/Enclosures)
Matt Wiktorowski, Field Operations (w/Enclosures)
Brian Coburn, Engineering Manager (w/Enclosures)
David Beschke, Landscape Architect (w/Enclosures)
Jeff Johnson, Fire Department (w/Enclosures)
Thomas R. Schultz, Esquire (w/Enclosures)



Request for Variance Design and Construction Standards

Applicant Information

Name: IAC Novi, LLC

Address: 4111 Andover Rd.
150 - West

Phone No: 248-626-6102

Engineer Information

Name: Zeimet Wozniak & Associates

Address: 55800 Grand River
Suite 100

Phone No: 248-437-5099

Applicant Status (please check one):

- Property Owner Developer Developer / Owner Representative
 Other _____

Project Name Berkshire Pointe

Project Address/Location Section 18, West side of Wixom Road, South of Grand River

Variance Request Allow a water main stub in excess of 800'

Justification (attach additional pages if necessary)

A stub at the 12 Mile Rd. right-of-way will be provided for future connection by others.

INTERNAL USE

Date Submitted: _____

Code Section from which variance is sought: _____

Submittal Checklist: One (1) copy of plan on 8.5 x 11 size paper
 \$100 Filing Fee (No fee for driveway width variance requests)

Request Status: APPROVED DENIED

Authorized By: _____

Authorization Date: _____

Z EIMET W OZNIAK & ASSOCIATES

Civil Engineers & Land Surveyors

55800 Grand River Avenue, Suite 100
New Hudson, Michigan 48165-9318
248.437.5099 · 248.437.5222 fax
www.zeimetwozniak.com

March 5, 2014

Mr. Adam Wayne, PE
City of Novi
Engineering Department
45175 W. Ten Mile Road
Novi, MI 48375

Re: Berkshire Pointe
Fire Flow Analysis

Dear Mr. Wayne,

We have performed a fire flow analysis of the proposed water system for this project using WaterCAD V.8i, a computer modeling software program by Bentley Systems.

Our analysis is based on hydrant flow data of the existing 16" water main along the east side of Wixom Road performed by Michigan Fire Sprinkler on February 19, 2014 (see attached "Hydrant Flow Test Report"). A flow of 2,726.2 gpm at 20 psi was calculated at the flow hydrant with a static pressure of 50 psi and residual pressure of 45 psi at the read hydrant.

The analysis was performed using the following demands on the proposed system:

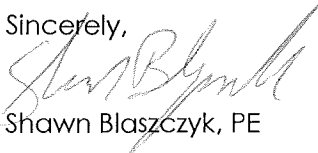
- Maximum Daily Flow = $(86 \text{ units} \times 3.2 \text{ people/unit} \times 100 \text{ gpcpd} \times 2.5) / (24 \times 60) = 47.8 \text{ gpm}$
- Required Fire Flow = 2,000 gpm at 20 psi

A reservoir and pump were used to feed each the existing 16" water main using the flows and pressures from the hydrant flow test to model the water source. The pump was placed between the two proposed connections to simulate flow in the 16" water main from both directions. The pump was sized based on the flows and pressures listed on the Hydrant Flow Test Report (see attached "Pump Definition Detailed Report" and graph). The proposed system was modeled using the pipe sizes and lengths, material, and junctions (see attached Pipe Table and Junction Table). A fire flow analysis was modeled using the maximum daily flow plus the fire flow demands.

The fire flow model results shows that at the proposed 12" stub near 12 Mile Road, a flow of 2140 gpm at 20 psi can be provided (see attached "Fire Flow Report"). This exceeds the City's minimum requirements.

If you have any further questions or comments, please contact us.

Sincerely,



Shawn Blaszczyk, PE

Pc: Gary Shapiro
Stephen Carson
Z:/13165 Fire Flow Letter

Hydrant Flow Test Report

Test Date 2/19/2014

Test Time 10:20 am

Location

Wixom Road (south of Grand River)
Novi, MI
for Berkshire Pointe

Tested by

City of Novi (Jim Cheyne)
Michigan Fire Sprinkler (Mike
Newsome)
Zeimet Wozniak Assoc (Andy
Wozniak)

Notes

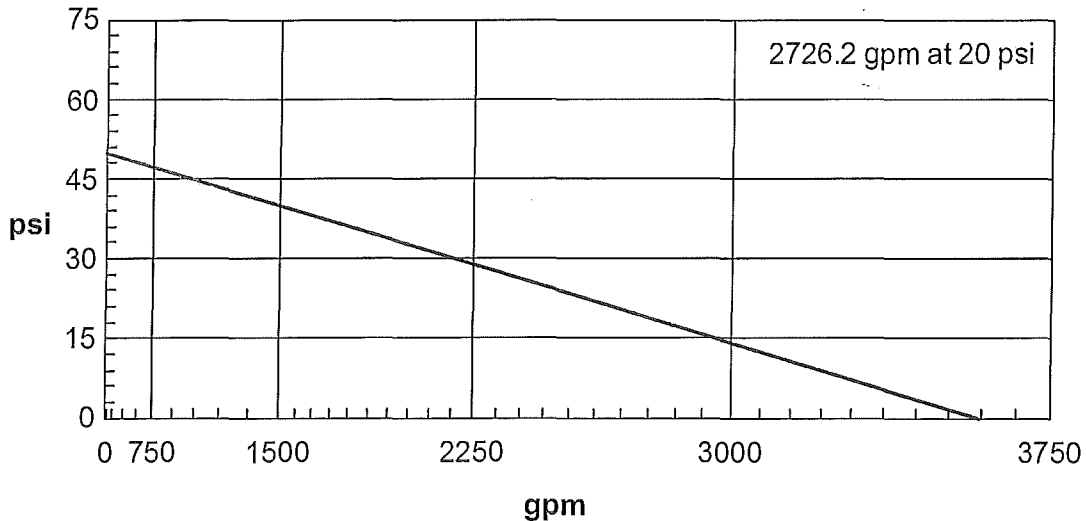
Read Hydrant

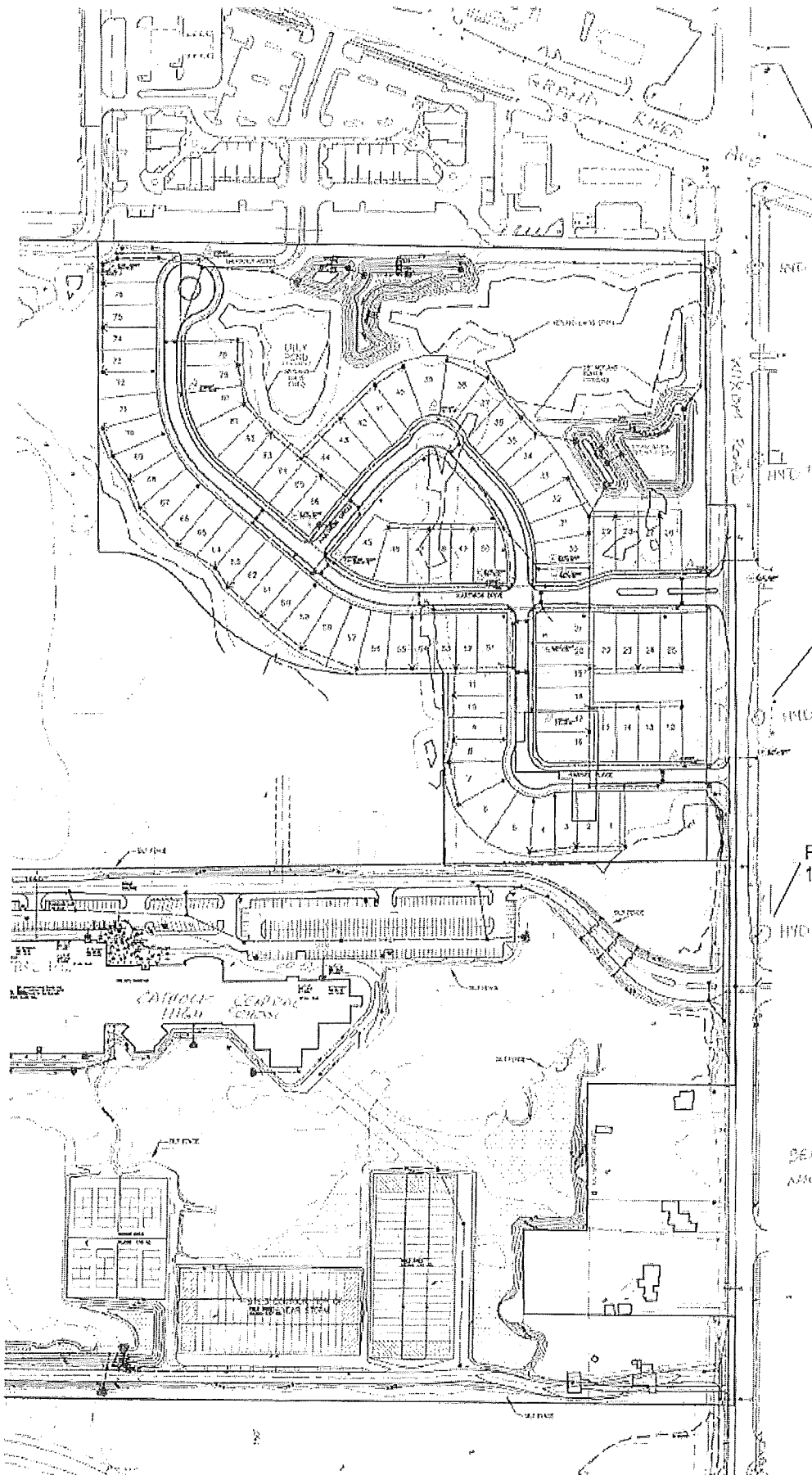
50 psi static pressure
45 psi residual pressure
2 ft hydrant elevation

Flow Hydrant(s)

Outlet	Elev	Size	C	Pitot Pressure	Flow
#1	2	2.5	.9	38	1035 gpm

Flow Graph





Test Hydrant
50 psi static
45 psi residual

HYD # 3

Flow Hydrant
1035 gpm

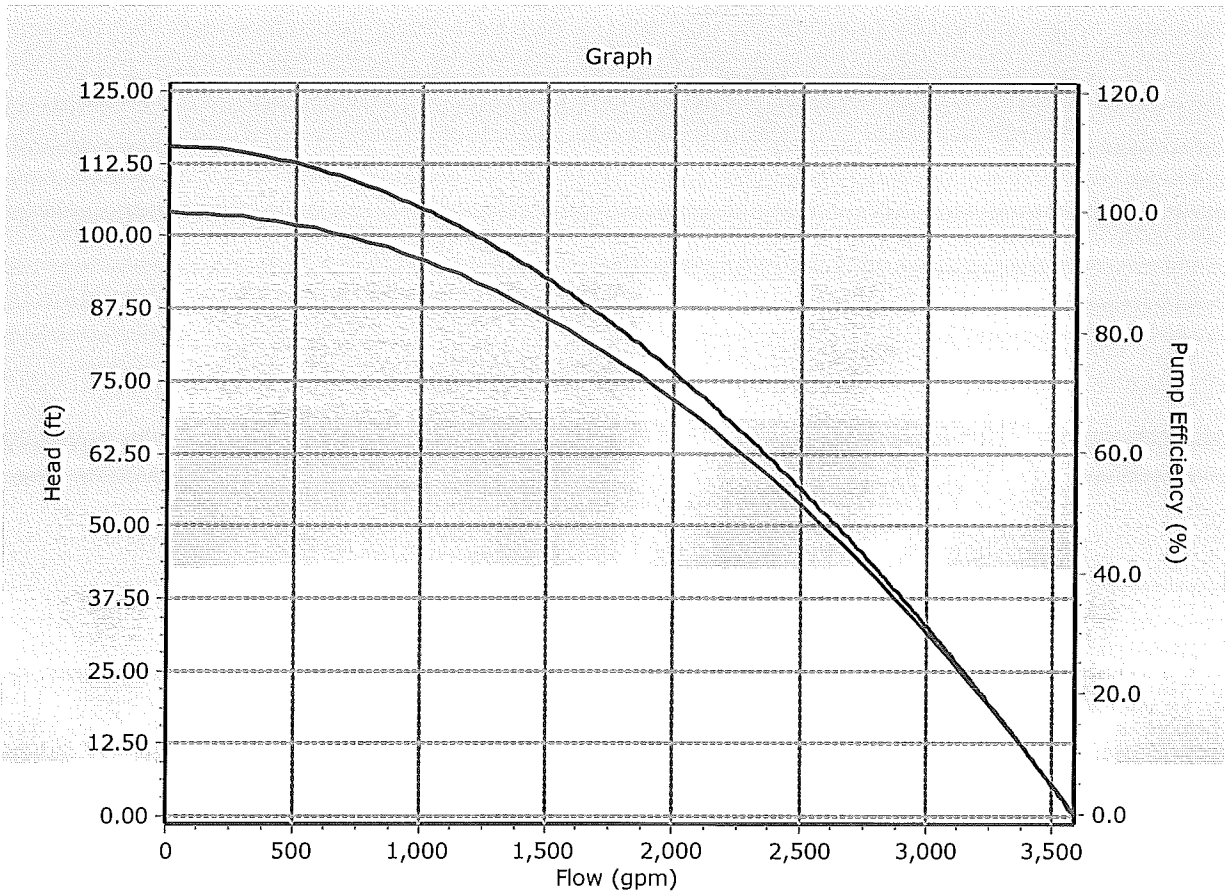
HYD # 4

SEWERAGE TOWER
AND VALVE

Pump Definition Detailed Report: Pump Definition - 1

Element Details			
ID	53	Notes	
Label	Pump Definition - 1		
Pump Definition Type			
Pump Definition Type	Standard (3 Point)	Design Head	103.95 ft
Shutoff Flow	0 gpm	Maximum Operating Flow	2,726 gpm
Shutoff Head	115.50 ft	Maximum Operating Head	46.20 ft
Design Flow	1,035 gpm		
Pump Efficiency Type			
Pump Efficiency Type	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0 gpm		
Transient (Physical)			
Inertia (Pump and Motor)	0.000 lb·ft ²	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True

Pump Definition Detailed Report: Pump Definition - 1



Scenario: Automated Fire Flow
 Current Time Step: 0.000Hr
 FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/R)	Has User Defined Length?	Length (User Defined) (ft)
37	P-4	425	J-1	J-3	12.0	Ductile Iron	120.0	False	0.000	114	0.32	0.000	True	424
39	P-5	453	J-3	J-4	12.0	Ductile Iron	120.0	False	0.000	76	0.21	0.000	True	488
43	P-7	771	J-4	J-5	12.0	Ductile Iron	120.0	False	0.000	48	0.14	0.000	True	682
44	P-8	97	J-5	H-1	12.0	Ductile Iron	120.0	False	0.000	0	0.00	0.000	True	150
46	P-9	47	J-5	H-2	8.0	Ductile Iron	120.0	False	0.000	0	0.00	0.000	True	37
47	P-10	722	J-4	J-3	8.0	Ductile Iron	120.0	False	0.000	-20	0.13	0.000	True	788
49	P-11	818	J-3	J-6	8.0	Ductile Iron	120.0	False	0.000	-30	0.19	0.000	True	818
73	P-16	236	J-1	J-7	16.0	Ductile Iron	120.0	False	0.000	-161	0.26	0.000	True	200
74	P-17	235	J-7	J-6	16.0	Ductile Iron	120.0	False	0.000	78	0.12	0.000	True	198
76	P-18	6	J-7	PMP-3	16.0	Ductile Iron	120.0	False	0.000	-239	0.38	0.001	True	0
78	P-19	6	PMP-3	R-3	16.0	Ductile Iron	120.0	False	0.000	-239	0.38	0.000	True	0

Z:\Projects 3D\13165\WATER CAD\13165 berkshirefire flow2.wtg

Scenario: Automated Fire Flow
Current Time Step: 0.000Hr
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	J-1	971.00	<None>	<Collection: 1 item>	48	1,087.23	50
36	J-3	972.00	<None>	<Collection: 1 item>	48	1,087.21	50
38	J-4	972.00	<None>	<Collection: 1 item>	48	1,087.19	50
42	J-5	971.00	<None>	<Collection: 1 item>	48	1,087.19	50
48	J-6	975.00	<None>	<Collection: 1 item>	48	1,087.23	49
72	J-7	973.01	<None>	<Collection: 0 items>	0	1,087.23	49

Z:\Projects 3D\13165\WATER CAD\13165 berkshire fire flow2.wtg

Scenario: Automated Fire Flow
 Current Time Step: 0.000Hr
 Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Pressure (System Lower Limit) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Is Fire Flow Run Balanced?
H-1	<None>	21	True	2,000	2,140	2,000	2,140	20	20	20	20	J-5	(N/A)	20	J-5	True
H-2	<None>	3	True	2,000	2,102	2,000	2,102	20	20	20	21	J-5	(N/A)	21	J-5	True
J-1	<None>	5	True	2,000	2,433	2,048	2,480	20	21	20	20	J-6	(N/A)	20	J-6	True
J-3	<None>	3	True	2,000	2,387	2,048	2,434	20	20	20	20	J-4	(N/A)	20	J-4	True
J-4	<None>	3	True	2,000	2,291	2,048	2,339	20	20	20	20	J-5	(N/A)	20	J-5	True
J-5	<None>	3	True	2,000	2,140	2,048	2,188	20	20	20	20	H-2	(N/A)	20	H-2	True
J-6	<None>	3	True	2,000	2,418	2,048	2,466	20	20	20	21	J-7	(N/A)	21	J-7	True
J-7	<None>	5	True	2,000	2,433	2,000	2,433	20	21	20	20	J-6	(N/A)	20	J-6	True

Z:\Projects 3D\13165\WATER CAD\13165 berkshirefire flow2.wtg

Z:\Proj\3D\13165\DWG\13165 water model PLAN.dwg, water model, 3/4/2014 8:51:06 AM, blaszczyk

2140 GPM @ 20 PSI
(H-1)

C/L 12 MILE RD.
(EXIST. 33' WD.,
1/2 WIDTH)

2188 GPM @ 20 PSI
(J-5)

2339 GPM @ 20 PSI
(J-4)

2434 GPM @ 20 PSI
(J-3)

2480 GPM @ 20 PSI
(J-1)

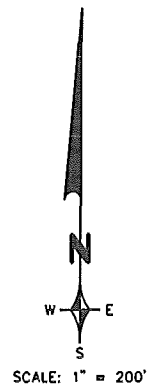
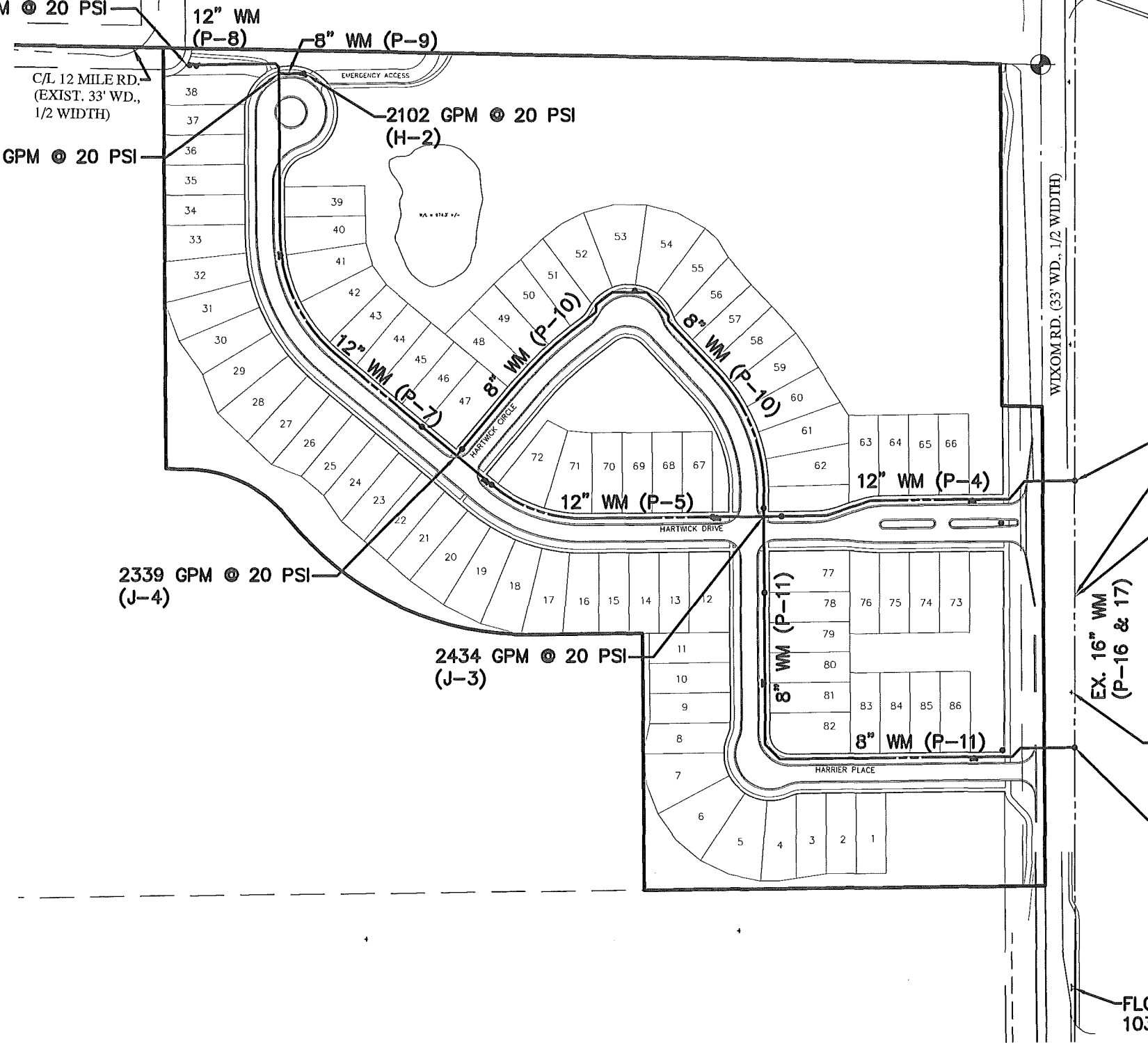
2433 GPM @ 20 PSI
(J-7)

RESERVOIR AND PUMP TO
SIMULATE FLOW IN EX. 16" WM.
PUMP-3 (3 POINT CURVE)
0 GPM @ 115.50' (50 PSI)
1035 GPM @ 87.78' (38 PSI)
2726 GPM @ 46.20' (20 PSI)

READ HYDRANT
STATIC PRESSURE 50 PSI
RESIDUAL PRESSURE 45 PSI


2466 GPM @ 20 PSI
(J-6)

FLOW HYDRANT
1035 GPM



- DESIGN NOTES:**
- RESIDUAL PRESSURE BASED ON READING ON EXISTING HYDRANT WHILE FLOWING AT HYDRANT SHOWN.
 - PUMP AND RESERVOIR DATA DERIVED FROM HYDRANT FLOW TEST REPORT BY MICHIGAN FIRE SPRINKLER DATED 2-19-2014.
 - PUMP AND RESERVOIR ADDED TO EXISTING 16" WATERMAIN BETWEEN CONNECTIONS TO SIMULATE FLOW IN BOTH DIRECTIONS.

REVISIONS		
ITEM	DATE	BY
REV. PUMP	3-4-14	SRB


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 BERKSHIRE POINTE**
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 IAC NOVI LLC
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 BLOOMFIELD HILLS, MI 48302

DATE	2-27-14	SCALE	HOR: 1" = 200'
DESIGNED BY	SRB	FIELD BOOK NO.	
DRAWN BY	SRB	JOB NO.	13165
		SHEET NO.	1/1

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