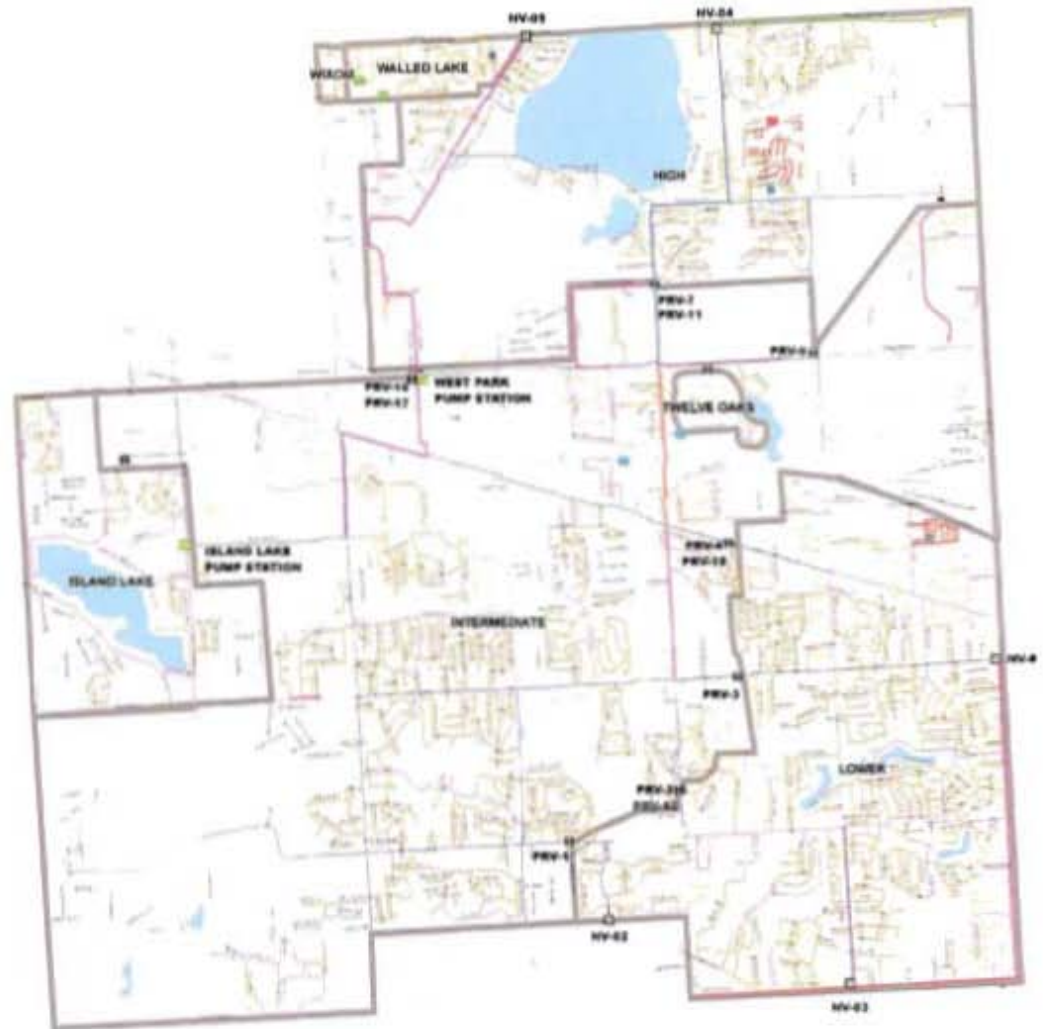


City of Novi Water System Master Plan

Christopher P. Rybak,
P.E., C.F.M
November, 2008

*City Council - Nov. 24, 2008
Presentation #3*

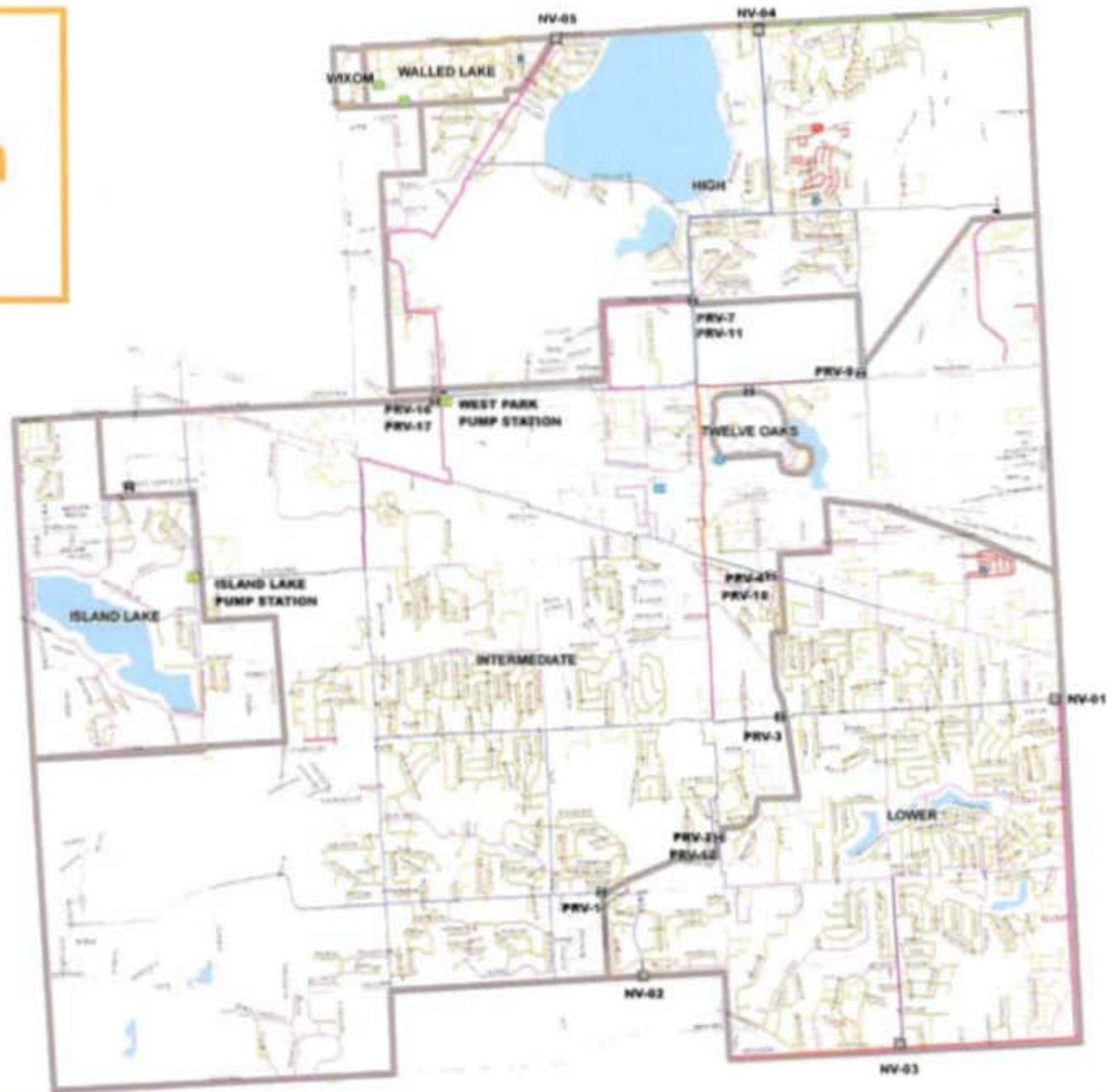


One Team. Infinite Solutions.



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Existing Distribution System



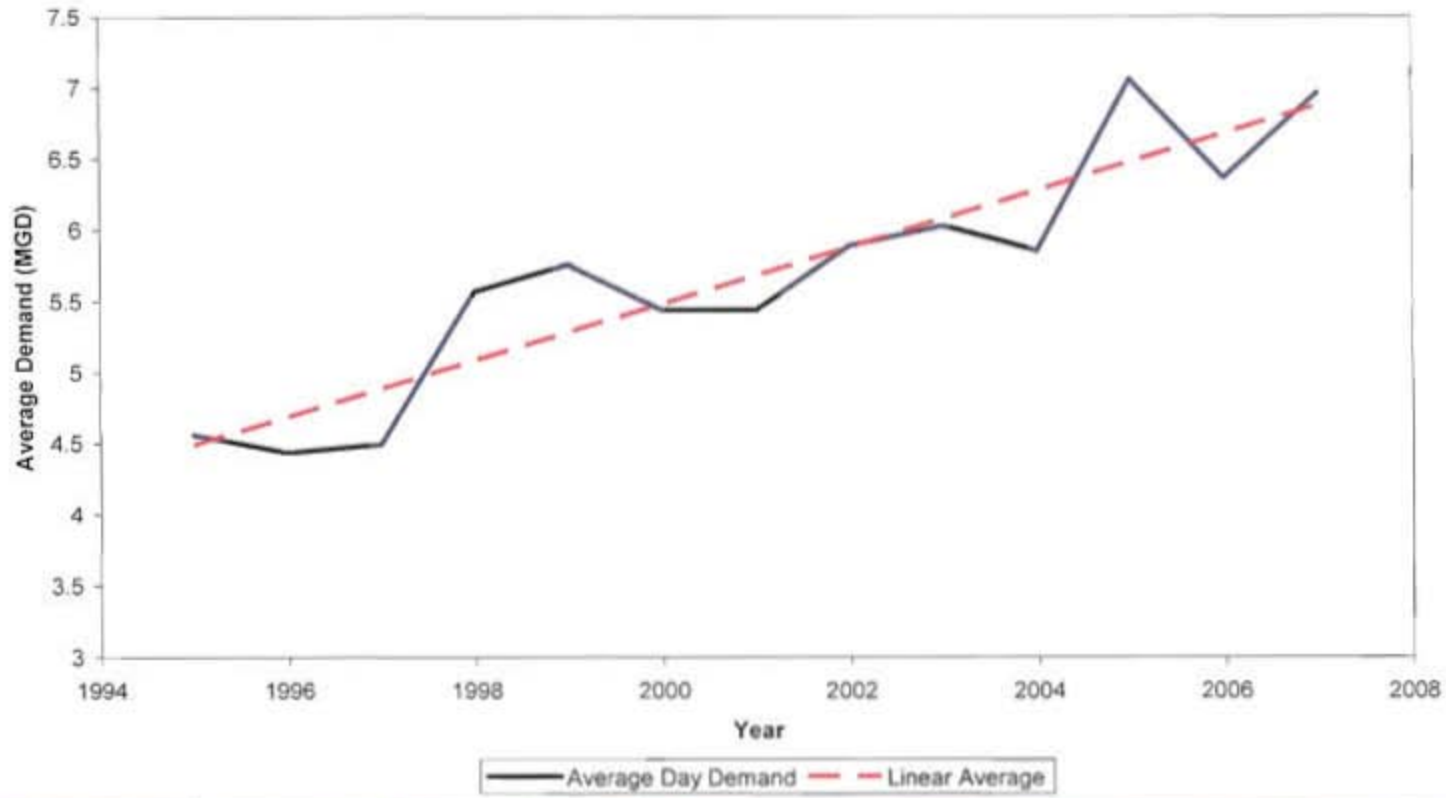
Legend	
Water Mains	Water Features
4" or Less	Master Meter
6"	PRV
8"	Booster Station
10"	Control Valve
12"	Private Well
15"	Private Well and Storage Tank
20"	Private Well House
24"	Private Water Tank
30"	Water Pressure Districts
36"	
42"	

Existing Demands



Stantec

City of Novi Water System Master Plan
Historical System Demands



Peaking Factors



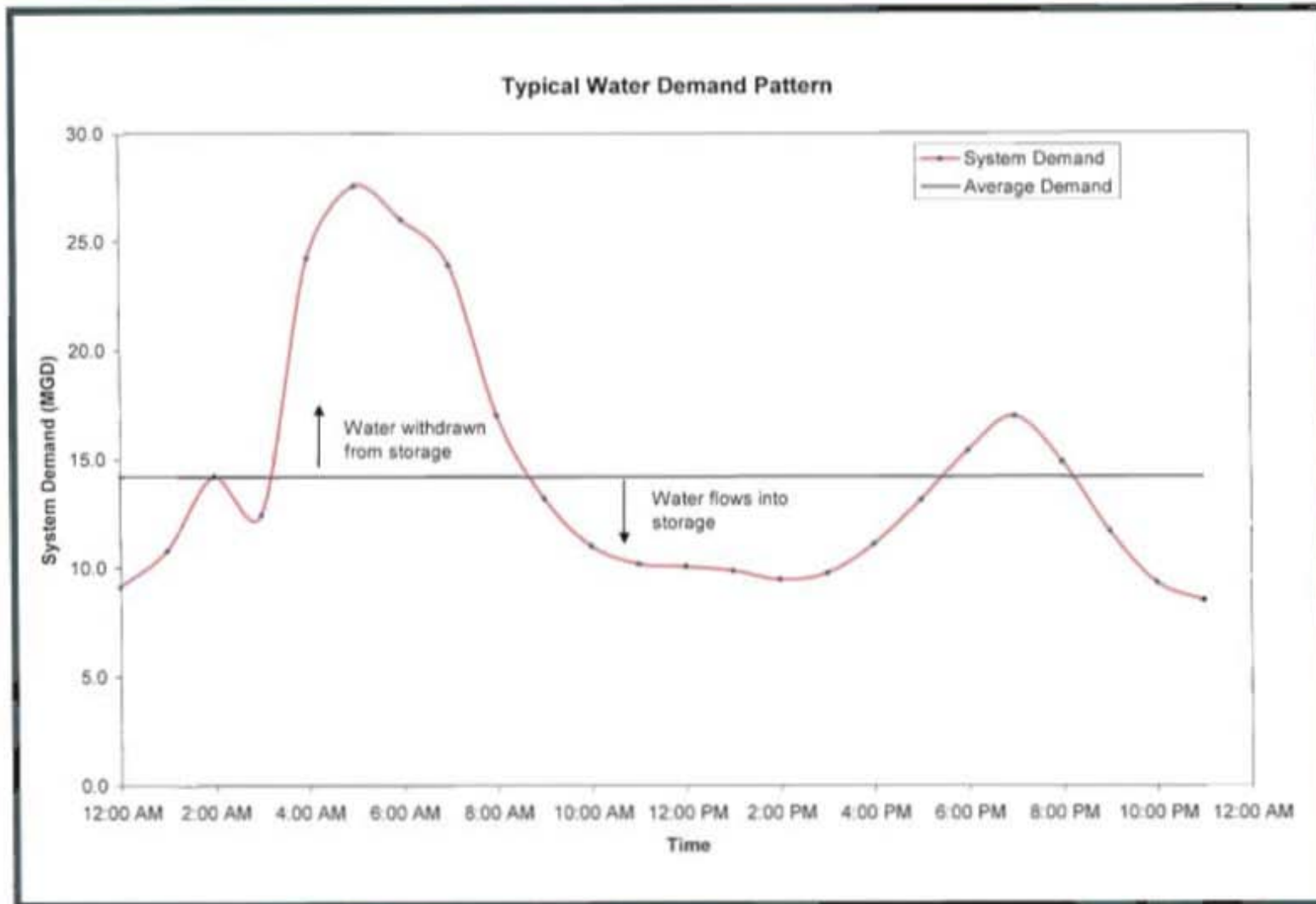
City of Novi, Michigan 2008 Water Master Plan Flow Summary

	Average Day (MGD)	Max Day (MGD)	Peak Hour (MGD)	Max Pressure (PSI)	Min Pressure (PSI)*	Average Pressure (PSI)	Max Day Multiplier	Peak Hour Multiplier
2004	5.80	13.04	20.54	124.79	39.77	78.14	2.25	3.54
2005	7.04	14.47	25.76	120.59	50.14	78.07	2.06	3.66
2006	6.36	16.08	27.59	116.49	42.10	73.92	2.53	4.34
2007	6.80	17.24	32.48	110.18	41.80	76.39	2.53	4.78

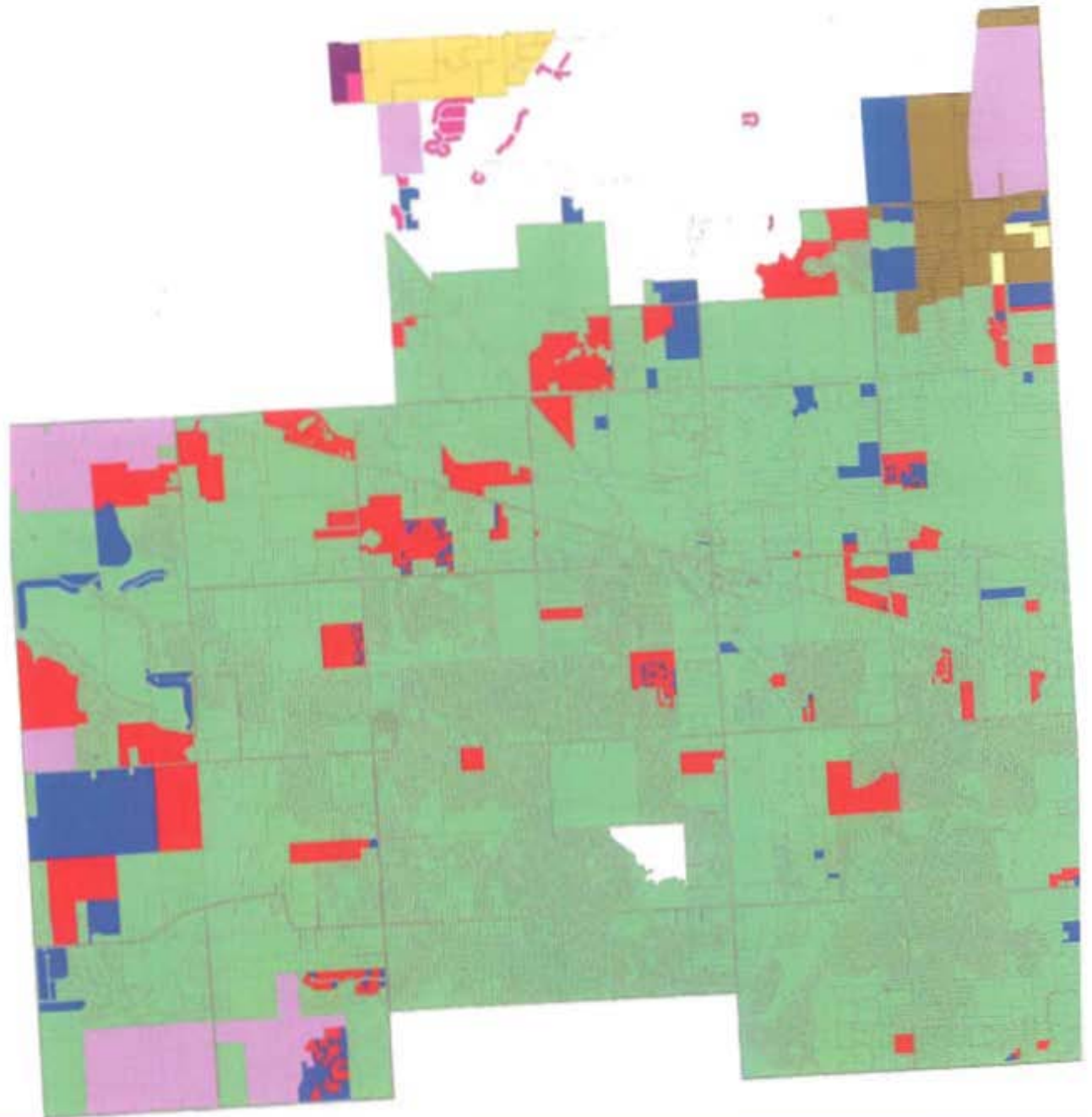
*Min pressure excludes cases where pressure in the line is 0.0 PSI and where no pressure was recorded.

Buildout	7.93	20.09	37.86				2.53	4.78
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Demand Patterns



Projected Demand Areas



Legend

- Other_Future_Growth
- Revised_Future_Growth_Parcel
- Future_Novi_Parcels (CMOM)
- Future_Commerce_Parcels (CMOM)
- Future_Walled_Lake_Parcels (CMOM)
- Future_Wixom_Water_Utility_Transfer
- Future_Walled_Lake_Water_Utility_Transfer
- Novi_Parcels
- Commerce_Parcels
- Walled_Lake_Parcels

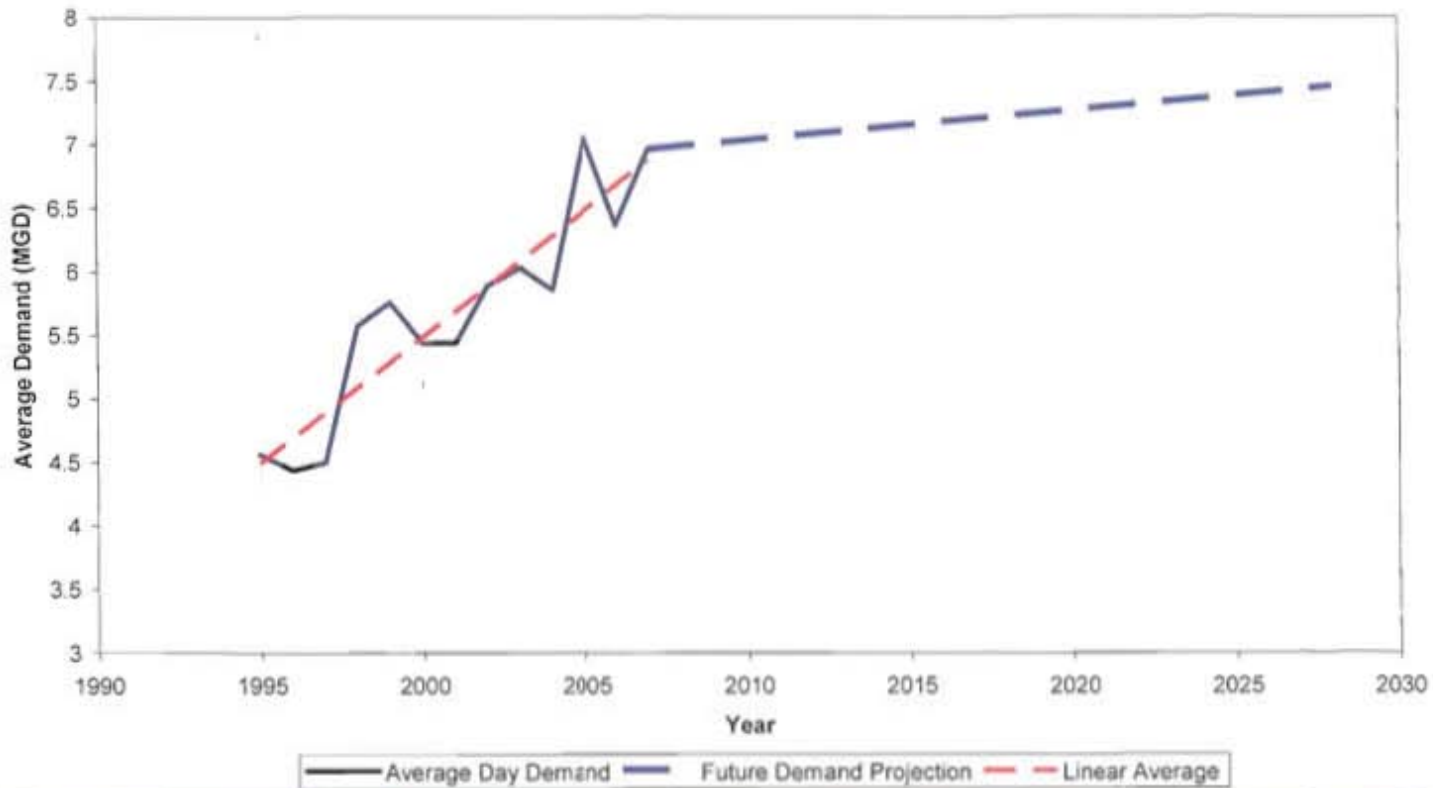
Revised Future Growth Parcels Based on Removing 2005 CMOM Growth Parcels that Are Being Billed in 2006 and Have Significant Build-Out in the 2006 Aerial Photo Growth Parcels from 2005 CMOM Report included in Growth Analysis to provide correlation to 2005 CMOM Study.

Projected Demands



Stantec

City of Novi Water System Master Plan
Historical and Projected System Demands



Existing System Conditions

Attributes

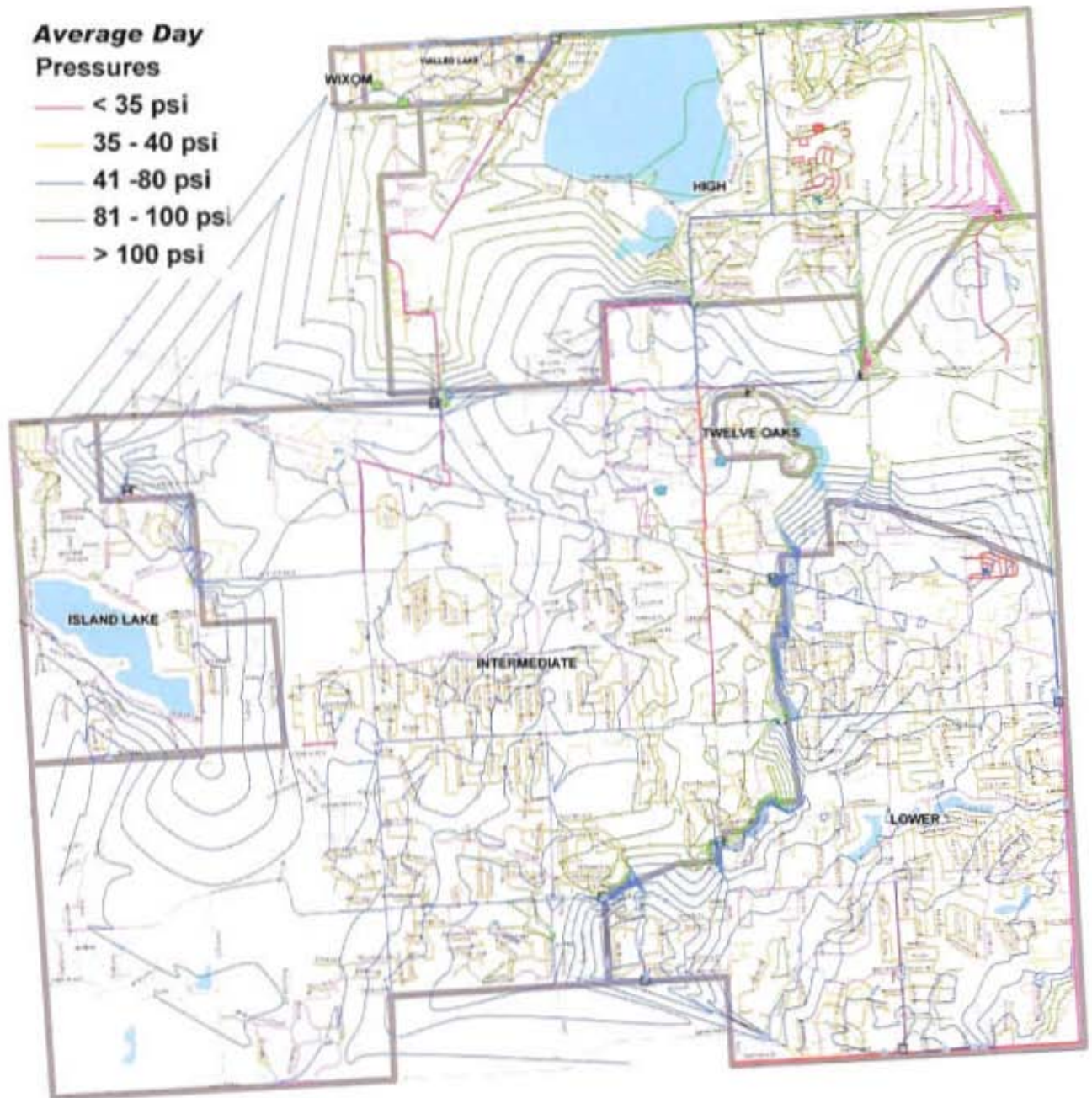
- Well developed trunk system and looping.
- Above average adequate supply pressures from DWSD.
- Capability to provide adequate pressures.
- Fire flow availability generally exceeds requirements.

Deficiencies

- Localized high pressure.
- Short term below average supply pressures from DWSD.
- Localized high pressure due to pump station operations.
- Inefficient PRV operations.
- Localized fire flow availability.
- Pump station operations.
- No community storage.

Average Day Pressures

- < 35 psi
- 35 - 40 psi
- 41 - 80 psi
- 81 - 100 psi
- > 100 psi



Future System Conditions

Attributes

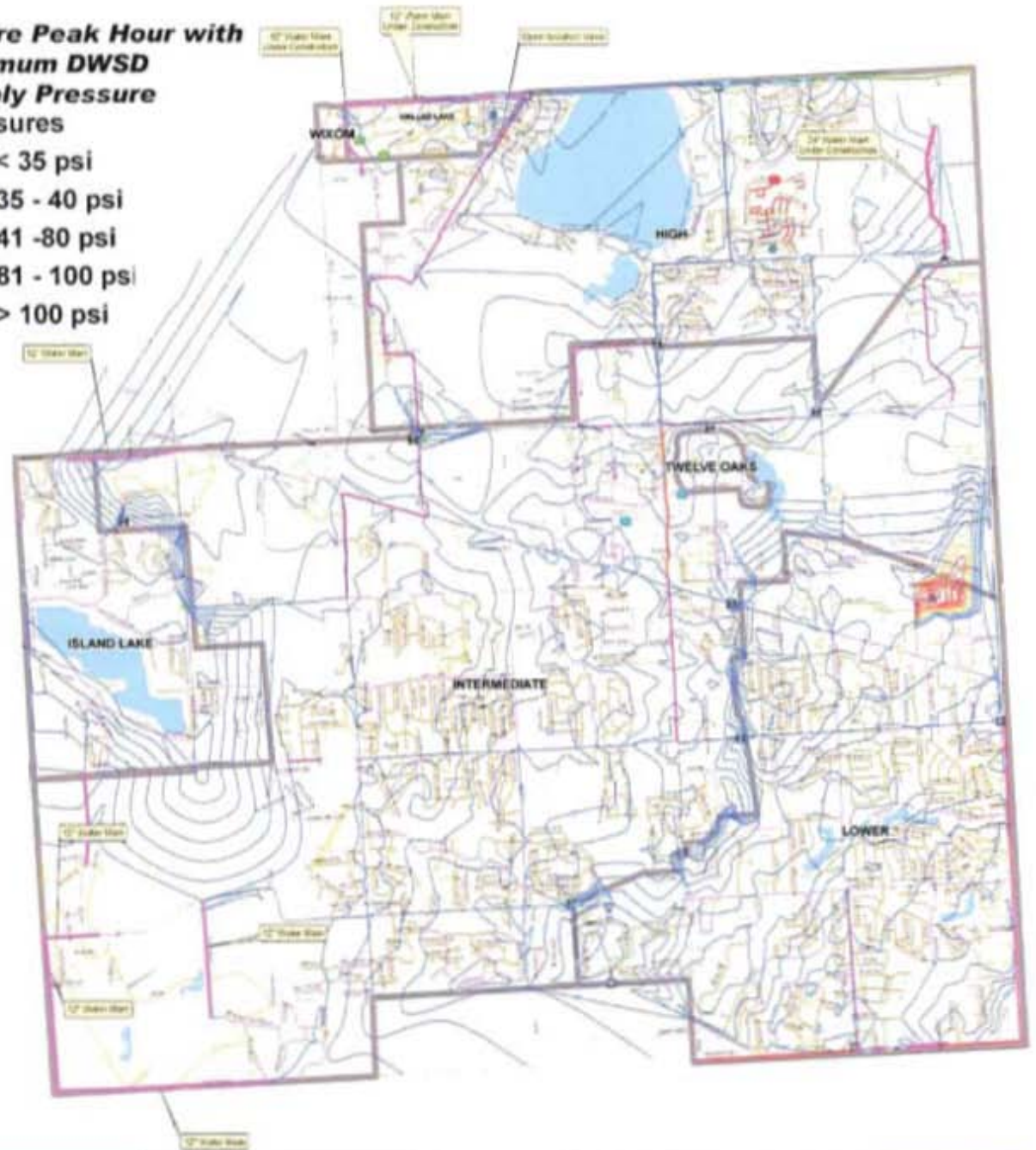
- Same as existing conditions.

Deficiencies

- Short term below average supply pressures from DWSD.
- Localized low pressure in the southwest due to pump station operations.
- Island Lake pressure district limits on the north and south boundaries.
- No community storage.

Future Peak Hour with Minimum DWSD Supply Pressures

- < 35 psi
- 35 - 40 psi
- 41 - 80 psi
- 81 - 100 psi
- > 100 psi



Recommendations

Legend

Tier	Water Features	Future Pressure District study area
<ul style="list-style-type: none"> Tier 1 (Red) Tier 2 (Yellow) Tier 3 (Green) 	<ul style="list-style-type: none"> Manhole Water Main Valve Structure Water Pressure District 	<ul style="list-style-type: none"> Future Pressure District study area

Final Locations to be determined based on recommendations of proposed Island Lake Pressure District study.

Tier 1

- Perform Island Lake Pump Station review. CIP# 091-04
- Develop a study of the Island Lake Pressure District. CIP# 091-04
- Survey and review pressure relief valve settings by hydraulic grade line. CIP# 091-07
- Establish hydraulic grade line of 1,090 feet at the High/Intermediate Pressure District.
- Establish hydraulic grade line of 1,025 feet at the Intermediate/Low Pressure District.
- Develop a Financial/Feesibility study to supply storage for peak hour demand purposes. CIP# 091-30
- Install SCADA control system. CIP# 091-05

General

- Perform a risk assessment of the City and Detroit Water Sewer District water system reliability to define the City of Novi's policy on redundant supply to maintain distribution system integrity due to a north side failure from Detroit Water Sewer District.
- Continue to review opportunities to complete Birch water main loops and eliminate dead end mains to improve system reliability and water quality.
- Replace any existing 8-inch public water main with 8-inch water main when

