

NOTE TO APPLICANTS:

As a courtesy to our applicants, EMWD is providing this sample Water hydraulic analysis to assist you in producing reports with a consistent scope of work and formatting.

This sample report may not reflect the latest Design Criteria, therefore, applicants should not utilize the content of this sample in their report development: Please ensure you are utilizing the latest edition of our Design Guidelines, available on our web site (under New Development Process).

HYDRAULIC ANALYSIS REPORT

For

Tentative Tract #

Located at the North West corner of XXX st. and YYY ave. in the
city of ZZZ

Prepared For:
Eastern Municipal Water District

Prepared By:
XYZ Consulting

Date:
March XX, 2007

Sample Study for Water

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To: Eastern Municipal Water District – New Business Development Department

From:

Date:

Subject:

A.) OBJECTIVE

We are asked to prepare and provide calculations for a hydraulic modeling study for a Plan of Service supporting the Tract No. We need to show adequate calculations of a proposed water system to service our development that is within Eastern Municipal Water District (EMWD) jurisdiction. This will be from a part of the Plan of Service. The project consists of 72 dwelling units. Domestic water will be supplied to Tract from the Districts 1627 Pressure Zone.

It is the intention of this Hydraulic study to provide Eastern Municipal Water District with the following information:

1. Proposed domestic water distributions system for our project.
2. Supporting calculations of the proposed systems in a Plan of Service.

B.) ANALYSIS CRITERIA

Medium Density Residential	180 GPD per Person Average Daily Flow
High Density Residential	120 GPD per Person Average Daily Flow
Commercial	2,000 GPD per Acre
Industrial	2,000 GPD per Acre
Institutional	3,000 GPD per Acre
Medium Density Residential	3.5 persons per D.U.
High Density Residential	2.5 persons per D.U.

Recommended Velocity is 7 fps

Maximum Velocity is 10 fps

Maximum Velocity during Fire Flow is 15 fps

C.) HYDRAULIC ANALYSIS

This Hydraulic analysis is based on EMWD water design criteria and Max Day Demand plus the required 1000gpm fire flow for the project. Static pressures for this project will average between 67 psi to 69 psi. Attachment C illustrates the static pressures on the proposed project. Analysis of the in-tract water distribution system was performed using H₂OMap Water computer modeling program. The distribution systems for Tract and existing pipelines were analyzed.

All of the proposed in-tract 8-inch pipes were analyzed per Eastern Municipal Water District design criteria. They were analyzed based on two points of connection; the project proposes to have a loop system. The hydraulic analysis included several scenarios done on various points through out the in-tract of the project, which consisted of max day demand plus fire flows. All scenarios were analyzed at the reservoir tanks levels established in the District criteria and per the fire flow results provided by Eastern Municipal Water District. Attachment B shows the model schematic and Attachment C shows all of the output data sheets from the various scenarios.

The hydraulic analysis concluded that for a 1000 gpm fire flow demand anywhere in-tract with two points of connection, the 8-inch pipelines are sized properly and satisfy service pressure criteria and velocity criteria of Eastern Municipal Water District. To satisfy the loop system we are proposing to connect to the 36-inch transmission pipeline in

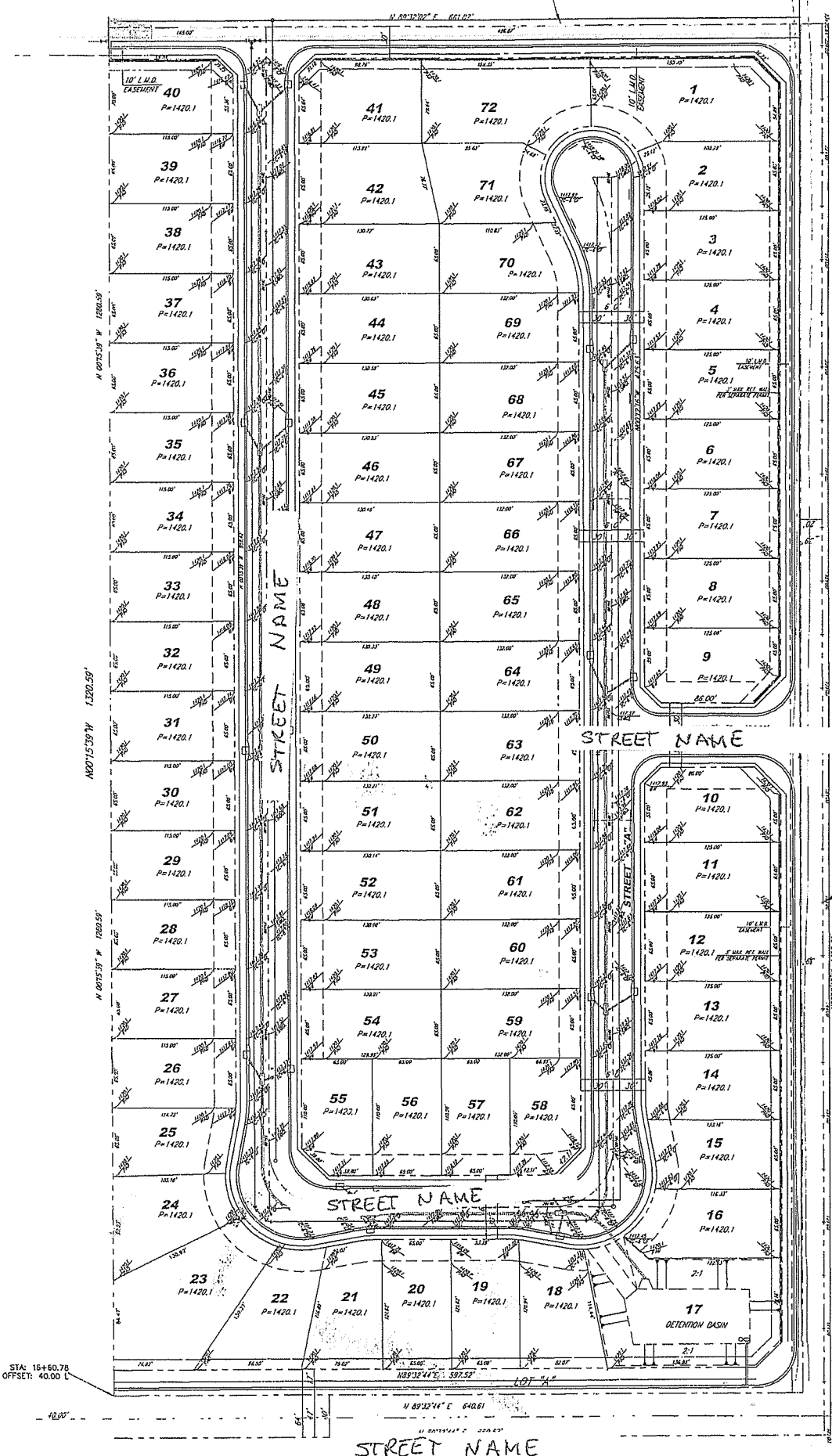
However, if this becomes a concern to the district, we analyzed this project with an extension of a 12-inch water pipeline in to street "D" which will meet all of the Water Design pressure criteria. The 12-inch or 36-inch water pipelines as second points of connection are adequate to meet our projects demands plus fire flow.

Recommendations:

It is recommended that the proposed domestic water distribution system be constructed according to Attachment B with 8-inch pipelines in-tract.

Attachment A

Vicinity Map



STA: 16+50.78
 OFFSET: 40.00 L

STREET NAME

STREET NAME

42.00'

N 89°32'44" E 640.61'

N 89°32'44" E 597.52'

LOT #

N 89°32'44" E 640.61'

N 89°32'44" E 640.61'

N 89°32'44" E 640.61'

N 89°32'44" E 640.61'

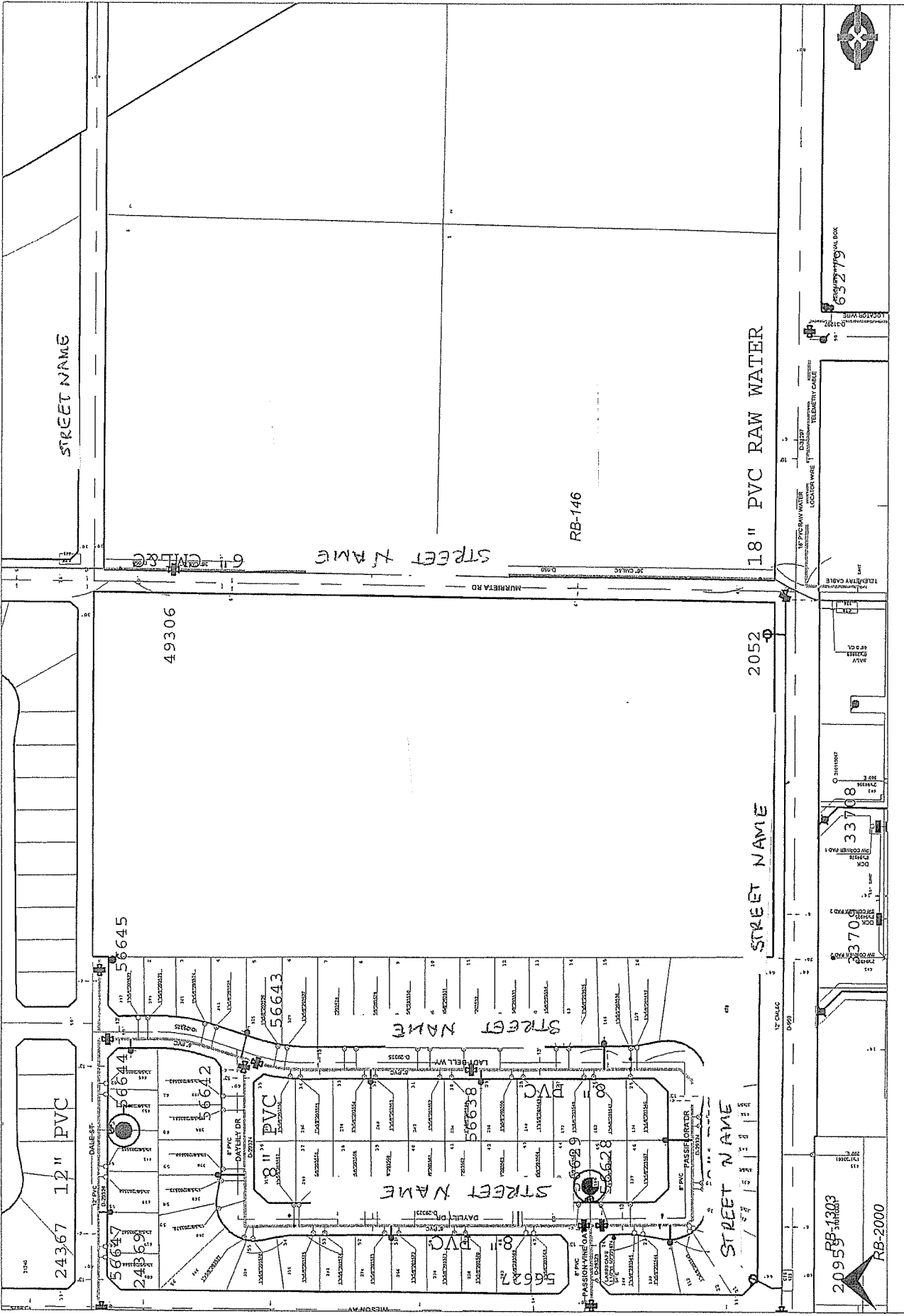
N 89°32'44" E 640.61'

N 89°32'44" E 640.61'

N 89°32'44" E 640.61'

N 89°32'44" E 640.61'

N 89°32'44" E 640.61'



EASTERN MUNICIPAL WATER DISTRICT
 MAPS & RECORDS

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 plot_menu_field 2

Time of plot: 20/08/2007 18:53:35 Scale : 1:2905.19

63279

33708

370

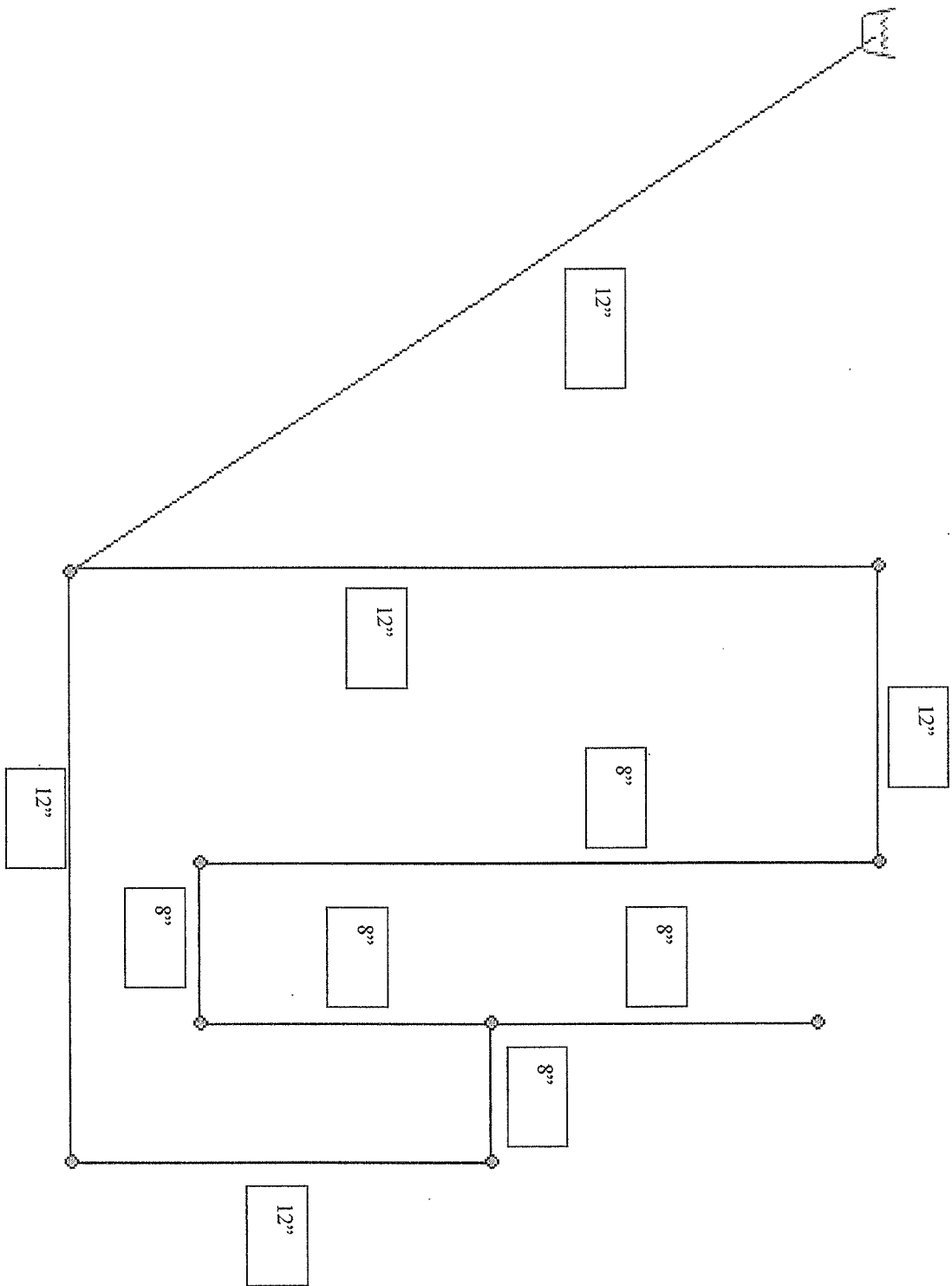
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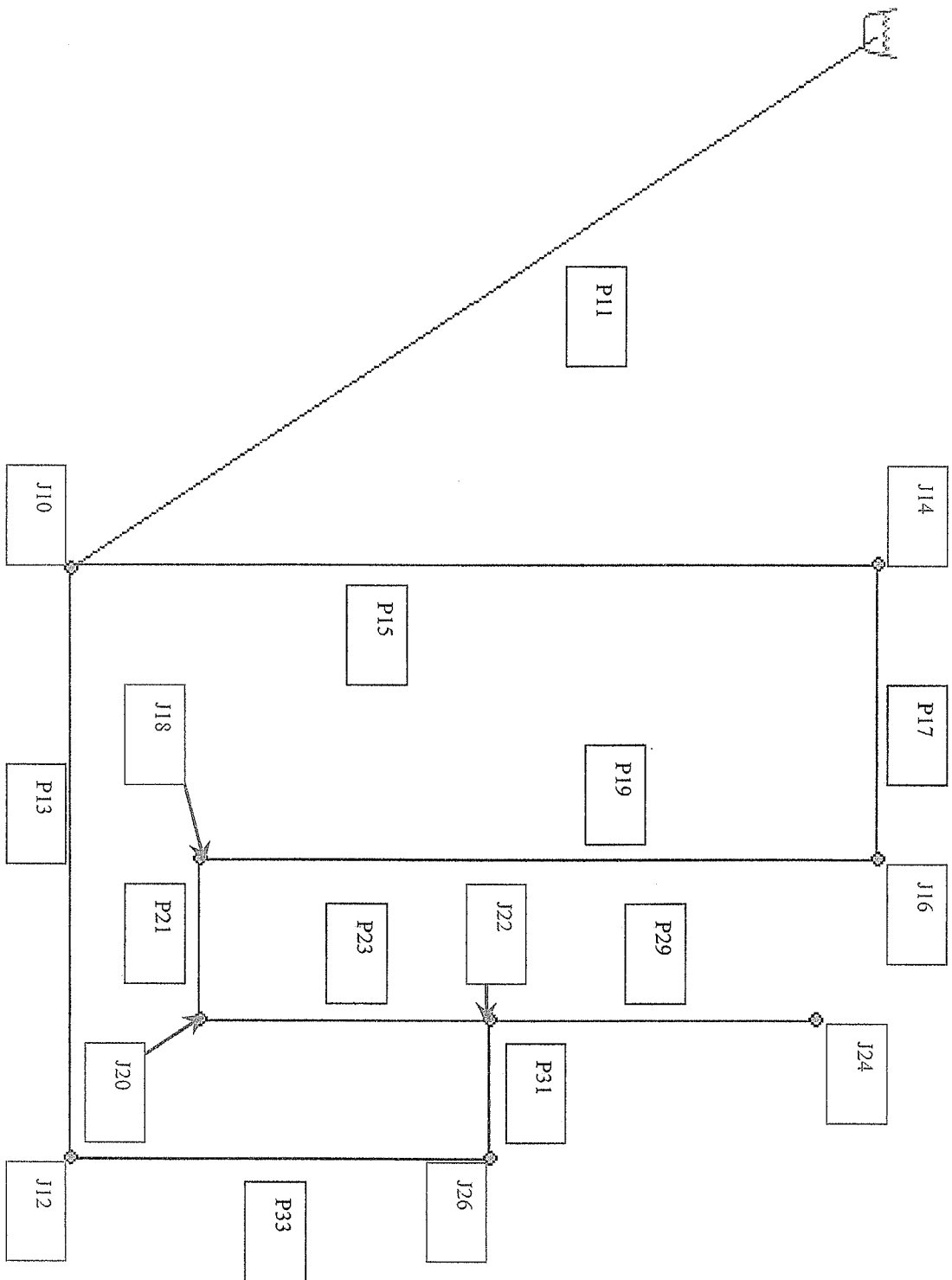
RB-2000



Attachment B

Model Schematic





Attachment C

Model Output Data

**TRACT
HYDRAULIC MODEL DATA
SCENARIO- MAXIMUM DAY DEMANDS**

JUNCTION DATA			
ID	Demand (gpm)	Elevation (ft)	Pressure (psi)
J10	0.00	1418.00	68.35
J12	0.00	1418.01	68.34
J14	0.00	1419.00	67.92
J16	6.30	1419.00	67.92
J18	6.30	1419.00	67.91
J20	6.30	1419.00	67.91
J22	6.30	1419.00	67.91
J24	6.30	1419.00	67.91
J26	6.30	1418.50	68.13

PIPE DATA				
ID	Length (ft)	Diameter (in)	Velocity (ft/s)	Headloss (ft)
P11	200.00	12.00	0.09	0.00
P13	1400.00	12.00	0.05	0.01
P15	1300.00	12.00	0.04	0.00
P17	900.00	12.00	0.04	0.00
P19	1100.00	8.00	0.05	0.01
P21	300.00	8.00	0.01	0.00
P23	500.00	8.00	0.03	0.00
P29	400.00	8.00	0.04	0.00
P31	200.00	8.00	0.11	0.01
P33	600.00	12.00	0.05	0.00

Roughness = 120 (milli-ft)

**TRACT
HYDRAULIC MODEL DATA
SCENARIO- MAXIMUM DAY DEMANDS + FIRE FLOW AT J-24**

JUNCTION DATA			
ID	Demand (gpm)	Elevation (ft)	Pressure (psi)
J10	0.00	1418.00	67.05
J12	0.00	1418.01	62.71
J14	0.00	1419.00	65.80
J16	6.30	1419.00	65.24
J18	6.30	1419.00	58.78
J20	6.30	1419.00	57.08
J22	6.30	1419.00	54.38
J24	1006.30	1419.00	30.21
J26	6.30	1418.50	60.64

PIPE DATA				
ID	Length (ft)	Diameter (in)	Velocity (ft/s)	Headloss (ft)
P11	200.00	12.00	2.93	3.00
P13	1400.00	12.00	2.02	10.01
P15	1300.00	12.00	0.91	1.88
P17	900.00	12.00	0.91	1.30
P19	1100.00	8.00	2.00	14.92
P21	300.00	8.00	1.96	3.91
P23	500.00	8.00	1.92	6.25
P29	400.00	8.00	6.42	55.78
P31	200.00	8.00	4.54	13.95
P33	600.00	12.00	2.02	4.29

**TRACT
HYDRAULIC MODEL DATA
SCENARIO- MAXIMUM DAY DEMANDS + FIRE FLOW AT J-22**

JUNCTION DATA			
ID	Demand (gpm)	Elevation (ft)	Pressure (psi)
J10	0.00	1418.00	67.05
J12	0.00	1418.01	62.71
J14	0.00	1419.00	65.80
J16	6.30	1419.00	65.24
J18	6.30	1419.00	58.78
J20	6.30	1419.00	57.08
J22	1006.30	1419.00	54.38
J24	6.30	1419.00	54.38
J26	6.30	1418.50	60.64

PIPE DATA				
ID	Length (ft)	Diameter (in)	Velocity (ft/s)	Headloss (ft)
P11	200.00	12.00	2.93	3.00
P13	1400.00	12.00	2.02	10.01
P15	1300.00	12.00	0.91	1.88
P17	900.00	12.00	0.91	1.30
P19	1100.00	8.00	2.00	14.92
P21	300.00	8.00	1.96	3.91
P23	500.00	8.00	1.92	6.25
P29	400.00	8.00	0.04	0.00
P31	200.00	8.00	4.54	13.95
P33	600.00	12.00	2.02	4.29

**TRACT
HYDRAULIC MODEL DATA
SCENARIO- MAXIMUM DAY DEMANDS + FIRE FLOW AT J-26**

JUNCTION DATA			
ID	Demand (gpm)	Elevation (ft)	Pressure (psi)
J10	0.00	1418.00	67.05
J12	0.00	1418.01	61.75
J14	0.00	1419.00	66.14
J16	6.30	1419.00	65.81
J18	6.30	1419.00	62.08
J20	6.30	1419.00	61.11
J22	6.30	1419.00	59.59
J24	6.30	1419.00	59.59
J26	1006.30	1418.50	59.26

PIPE DATA				
ID	Length (ft)	Diameter (in)	Velocity (ft/s)	Headloss (ft)
P11	200.00	12.00	2.93	3.00
P13	1400.00	12.00	2.23	12.24
P15	1300.00	12.00	0.69	1.10
P17	900.00	12.00	0.69	0.76
P19	1100.00	8.00	1.52	8.62
P21	300.00	8.00	1.48	2.23
P23	500.00	8.00	1.44	3.51
P29	400.00	8.00	0.04	0.00
P31	200.00	8.00	1.36	1.25
P33	600.00	12.00	2.23	5.24

**TRACT
HYDRAULIC MODEL DATA
SCENARIO- MAXIMUM DAY DEMANDS + FIRE FLOW AT J-16**

JUNCTION DATA			
ID	Demand (gpm)	Elevation (ft)	Pressure (psi)
J10	0.00	1418.00	67.05
J12	0.00	1418.01	66.47
J14	0.00	1419.00	61.87
J16	1006.30	1419.00	58.58
J18	6.30	1419.00	62.16
J20	6.30	1419.00	63.19
J22	6.30	1419.00	65.00
J24	6.30	1419.00	65.00
J26	6.30	1418.50	66.02

PIPE DATA				
ID	Length (ft)	Diameter (in)	Velocity (ft/s)	Headloss (ft)
P11	200.00	12.00	2.93	3.00
P13	1400.00	12.00	0.73	1.32
P15	1300.00	12.00	2.19	10.96
P17	900.00	12.00	2.19	7.59
P19	1100.00	8.00	1.49	8.27
P21	300.00	8.00	1.53	2.38
P23	500.00	8.00	1.57	4.17
P29	400.00	8.00	0.04	0.00
P31	200.00	8.00	1.65	1.84
P33	600.00	12.00	0.73	0.57

**TRACT
HYDRAULIC MODEL DATA
SCENARIO- MAXIMUM DAY DEMANDS + FIRE FLOW AT J-18**

JUNCTION DATA			
ID	Demand (gpm)	Elevation (ft)	Pressure (psi)
J10	0.00	1418.00	67.05
J12	0.00	1418.01	64.64
J14	0.00	1419.00	64.62
J16	6.30	1419.00	63.23
J18	1006.30	1419.00	47.14
J20	6.30	1419.00	51.82
J22	6.30	1419.00	59.82
J24	6.30	1419.00	59.82
J26	6.30	1418.50	63.39

PIPE DATA				
ID	Length (ft)	Diameter (in)	Velocity (ft/s)	Headloss (ft)
P11	200.00	12.00	2.93	3.00
P13	1400.00	12.00	1.50	5.56
P15	1300.00	12.00	1.42	4.62
P17	900.00	12.00	1.42	3.20
P19	1100.00	8.00	3.16	37.14
P21	300.00	8.00	3.26	10.81
P23	500.00	8.00	3.30	18.46
P29	400.00	8.00	0.04	0.00
P31	200.00	8.00	3.38	7.75
P33	600.00	12.00	1.50	2.38

**TRACT
HYDRAULIC MODEL DATA
SCENARIO- MAXIMUM DAY DEMANDS + FIRE FLOW AT J-20**

JUNCTION DATA			
ID	Demand (gpm)	Elevation (ft)	Pressure (psi)
J10	0.00	1418.00	67.05
J12	0.00	1418.01	64.07
J14	0.00	1419.00	65.07
J16	6.30	1419.00	63.99
J18	6.30	1419.00	51.55
J20	1006.30	1419.00	48.25
J22	6.30	1419.00	58.20
J24	6.30	1419.00	58.20
J26	6.30	1418.50	62.58

PIPE DATA				
ID	Length (ft)	Diameter (in)	Velocity (ft/s)	Headloss (ft)
P11	200.00	12.00	2.93	3.00
P13	1400.00	12.00	1.67	6.88
P15	1300.00	12.00	1.25	3.58
P17	900.00	12.00	1.25	2.48
P19	1100.00	8.00	2.78	28.72
P21	300.00	8.00	2.74	7.61
P23	500.00	8.00	3.69	22.97
P29	400.00	8.00	0.04	0.00
P31	200.00	8.00	3.77	9.59
P33	600.00	12.00	1.67	2.95

References

EMWD COMPUTER MODEL FLOW TEST

Grid
Number: 36B

Requested by: _____ Date: August 17, 2007

Address: _____

Phone: _____ Fax: _____

Project: APN 311-210-009 WO/CO: _____

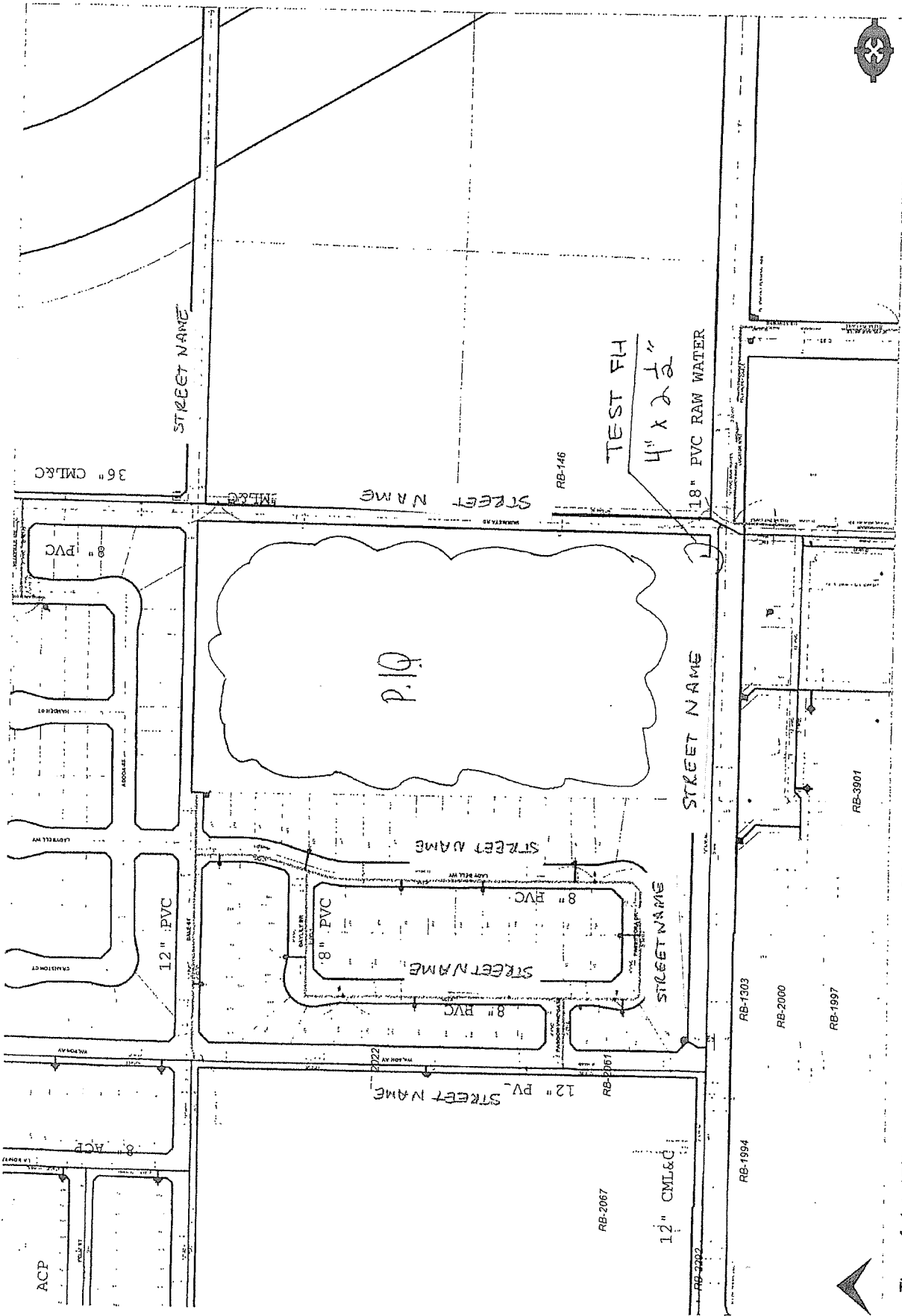
Test Location: _____

Observation: Same as Test Location

MODEL		RESULTS
Test Location	Elevation (feet)	1418.01
	Static Pressure (psi)	68.35
	Residual Pressure (psi)	67.29
	Fire Flow Needed (gpm)	1000
Observation Location	Elevation (feet)	Same as test location
	Static Pressure (psi)	"
	Residual Pressure (psi)	"
Demand Condition: Maximum Day		
Tank(s) Name/Level: Citrus Tank (1627 HWL) @ 20'		
Pump(s) Operating/Name: n/a		
Regulator Setting(s)/Name: n/a		
Comments: _____		

The above results were determined from a computer simulation of the District's water system and/or from hydraulic calculations. These results are not a guarantee the District's system will supply water to the project at any specific flows or pressures. In addition, the capacity of the on-site fire system, meters, service lines, backflow assemblies and other appurtenances were not considered.

Completed By: Michael Paris



Time of plot: 17/08/2007 15:16:57
 Scale : 1:3873.39

DISCLAIMER
 LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY.
 ACTUAL LOCATIONS SHALL BE VERIFIED PRIOR TO CONSTRUCTION.
 EASTERN MUNICIPAL WATER DISTRICT ASSUMES NO LIABILITY FOR ANY
 DAMAGE AND/OR EXPENSE RESULTING FROM INADEQUATE VERIFICATION.

EASTERN MUNICIPAL WATER DISTRICT

plot_menu_field 1
 plot_menu_field 2





WATER SYSTEM PLANNING & DESIGN

PRINCIPLE

GUIDELINES

CRITERIA

Updated February 2006

Revised July 2, 2007