

TOWN OF MISSISSIPPI MILLS

MISSISSIPPI MILLS BUSINESS PARK

DESIGN BRIEF

SANITARY SEWERS and WATERMANS

Prepared by:

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July 2000

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**TOWN OF MISSISSIPPI MILLS
MISSISSIPPI MILLS BUSINESS PARK**

**DESIGN BRIEF
SANITARY SEWERS and WATERMAINS**

1. INTRODUCTION

The Mississippi Mills Business Park (MMBP) is located in the Town of Mississippi Mills and consists of approximately 40.5 ha (100 Ac) land area. The site is bounded by County Rd. 49 on the north, County Rd. 17 on the east, Paterson Street on the west and vacant lands to the south.

The site is partially serviced by sanitary sewers and watermains constructed in 1987-1991 under the former provincial Direct Grant Programme [MOE Project No.'s 7-0625 & 3-0530]. Sewers and watermains were sized to accommodate the entire Park; funding restrictions at the time, however, limited the construction of services to approximately 12 ha (30 Ac) of land.

The Town of Mississippi Mills wishes to develop the remaining MMBP lands and has completed the necessary Class EA for Municipal Water and Wastewater Projects in accordance with procedures set out for Schedule "B" projects.

The document entitled "**Engineering and Planning Report for the Mississippi Mills Business Park**" dated (revised) May 2000 and prepared by NoVatech Engineering Consultants Ltd. summarizes the EA process followed for the project.

2. SANITARY SEWERS [Ref. DWG's 99110-GP, P1, P2, P3, P4, SAN]

a) Existing Sewers

The MMBP lands are partially serviced by an existing 305mm sanitary sewer which begins near the easement to the water tower, runs northerly along Industrial Drive to County Road 49 and then westerly along County Road 49 to the existing sewer system on Ottawa Street.

Based on available information, the 305mm sanitary sewer was designed (and has capacity) only to service the 40.5ha (100 Ac) business park lands. The capacity of the 305mm sewer was determined through field elevation checks, examination of as-constructed records and application of typical design criteria used for similar lands. The capacity of the existing 305mm sewer is shown in Appendix A on Sanitary Sewer Design Sheet dated May 17,2000. With the exception of two minor variances, the hydraulic capacity of the existing 305mm sewer is satisfactory.

b) Proposed Sewers

Proposed sewers will be constructed on the east-west leg of Industrial Drive towards County Rd. 17 and along County Rd. 49 (Ottawa Street) from Industrial Drive towards County Rd. 17.

With the exception of the sewer extension along County Road 49 (Ottawa Street), the proposed sewer along the east-west leg of Industrial Drive will be shallower than normal due to topographic constraints. Lot services in this area will therefore require special attention by potential Developers.

Based on available geotechnical information, rock excavation will be extensive. Accordingly, sewers and watermains will be placed in common trench with 1.5m horizontal separation. To comply with MOE requirements, sewers will be PVC material, Class DR35 and will be subject to hydrostatic pressure testing at 345 kPa with no leakage.

c) Design

Design calculations and design criteria used for existing and proposed sanitary sewers is shown in Appendix A on Sanitary Sewer Design Sheet dated May 17,2000.

3. WATERMAINS [Ref. DWG's 99110-GP, P1, P2, P3, P4]

a) Existing Waterworks

The MMBP is partially serviced along existing Industrial Drive by a 250mm watermain constructed in conjunction with the 305mm sanitary sewer previously described in Section 2(a). The site is strategically located beside the Town's main groundwater pumping station and an elevated water storage tank having a capacity of 2840 cu.m.

Based on the current C of A (7-0202-91-927) and information provided by the Town, the treatment and storage facilities have been designed around the following parameters:

Design Population	-	5,100P
Average Consumption	-	500 L/cap/d
Industrial Allowance	-	12 ha @ 35,000 L/ha/d
Average Day Demand	-	2,100 L/min
Maximum Day Factor	-	1.62
Maximum Day Demand	-	3,400 L/min
Peak Hour Factor	-	3
Peak Hour Demand	-	6,300 L/min
Fire Allowance	-	158.1 L/see for 2 hrs duration

The Industrial Allowance equates to a design population of 840 P based on the average demand of 500 L/cap/d. The total equivalent population for the treatment and storage facilities is therefore 5,940 P.

The normal operating level of the storage tank is reported to be elevation 180.7m. Low water level alarm is set at elevation 171.1m.

b) Proposed Watermains

250mm watermains are proposed to be constructed on the east-west leg of Industrial Drive to County Rd. 17 and along County Rd. 49 (Ottawa Street) from Industrial Drive towards County Rd. 17.

Based on available geotechnical information, rock excavation will be extensive. Accordingly, as previously described in Section 2(b) sewers and watermains will be placed in common trench with 1.5m horizontal separation.

c) Design [Ref. Appendix B]

A hydraulic analysis of the water works system in the immediate area around the elevated storage tank was carried out utilizing the software programme EPANET. Figure 1 illustrates the waterworks framework and pipe diameters used in the hydraulic analysis.

Assumed Hazen-Williams coefficients "C" were as follows:

For pipe diameters 200mm and less	-	120
For pipe diameters over 200mm	-	130

Parameters reported in Section 3(a) above were used as input to analyze a number of design alternatives including the examination of fire flow allowances and future looping requirements within the Business Park.

Normal Requirements

Sufficient water supply and pressure is available to meet the normal [average, maximum day and peak hour] needs of the business park.

Fire flow allowances

The current serviced population of Mississippi Mills is estimated to be 4,500 P. For a design population of 6,000 P (per current C of A), MOE guidelines suggest a fire flow allowance of 158.1 L/s for the design of new distribution systems, water treatment and storage facilities.

The Town have indicated they wish to provide 182 L/s fire flow to the Business Park per the recommendations of the Fire Underwriters.

Both criteria were examined and are summarized below. For all cases, fire flows are assumed under normal tank operating level (elev. 180.7m) and County Road 17 NOT looped.

- Case 1A: A fire flow of 182 L/s is assumed at the end of Industrial Drive near County Road 17. Under given conditions, a residual pressure head of 13.61m would be available.
- Case 1B: A fire flow of 158.1 L/s is assumed at the end of County Road 49 near County Road 17. Under given conditions, a residual pressure head of 5.49m would be available.
- Case 1C: A fire flow of 125 L/s is assumed at the end of County Road 49 near County Road 17. Under given conditions, a residual pressure head of 15.95m would be available.

For fire protection purposes, a residual pressure head of 14.1m (138 kPa) is required. The pressure head available for Case 1B is significantly below acceptable standard. Case 1A is marginally low. Case 1C would be acceptable if a lower fire flow were permitted. At low tank water level (elev. 171.1m), the residual pressure head in all cases would drop by 9.60m.

Looping

Watermain looping is necessary to provide adequate residual pressures under fire flow conditions. Assuming a 300mm watermain along County Road 17, two cases were examined as follows:

- Case 2A: A fire flow of 158.1 L/s is assumed at County Road 49/County Road 17. At normal tank operating level, a residual pressure head of 26.50m would be available. [At low tank operating level, a residual pressure head of 16.90m would be available]
- Case 2B: A fire flow of 182 L/s is assumed at County Road 49/ County Road 17. At low tank water level, a residual pressure head of 13.86m would be available.

The pressure head available for Case 2A is acceptable. Case 2B is marginally low but is considered acceptable given the extreme conditions selected and the somewhat conservative pipe friction factors used in the hydraulic analysis.

A watermain loop along County Road 17 or internally through the business park lands, as shown on options design Drawing 99110-OP, must be given high priority in any overall business park development scheme ultimately chosen by the Town.

4. DESCRIPTION OF WORKS [Ref. DWG's 99110-GP, P1, P2, P3, P4]

a) Sanitary Sewers

Sanitary sewers and appurtenances to be constructed in the Town of Mississippi Mills as follows:

STREET	FROM	TO
Industrial Drive	Approx. 483 m south of County Rd. 49	Approx. 86 m west of County Rd. 17
County Rd. 49	Industrial Drive	Approx. 43 m west of County Rd. 17

All in accordance with the following, namely, final plans and specifications prepared by Novatech Engineering Consultants Limited, consulting engineers.

a) Watermains

Watermains, hydrants and appurtenances to be constructed in the Town of Mississippi Mills as follows:

STREET	FROM	TO
Industrial Drive	Approx. 485 m south of County Rd. 49	West limit of County Rd. 17
County Rd. 49	Industrial Drive	Approx. 40 m west of County Rd. 17

All in accordance with the following, namely, final plans and specifications prepared by Novatech Engineering Consultants Limited, consulting engineers.

APPENDIX A

SANITARY SEWER DESIGN SHEET

PROJECT: **Mississippi Mills Business Park**
 CLIENT: **Town of Mississippi Mills**

DESIGNED BY: W.H.
 CHECKED BY:

DATE: May 17, 2000
 REVISION:

LOCATION		INDIVIDUAL			CUMULATIVE		PROPOSED SEWER				PIPE CHARACTERISTICS											
STREET	FROM MH	TO MH	TRIBUTARY AREA (ha.)	AREA (ha)	ZONE TYPE	FLOW RATE (m ³ /day)	AREA (ha)	POPULATION P	AVERAGE Q (L/s)	PEAK FACTOR M	PEAK POP FLOW Q (L/s)	PEAK EXTRAN. FLOW Q (L/s)	PEAK DESIGN FLOW Q (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Q/Q _{full}	HYDRAULIC CONDITION	
								Note 2		Note 8		Note 3										
Future North	3	3	1.2, 3.4	9.98	Light Ind	35.0	9.98	776														
Industrial Drive	4	3	5.6	2.65	Light Ind	35.0	2.65	206	1.07	4.00	4.29	0.27	4.56	90.0	203	PVC	0.28	18.1	0.96	0.25	OK	
Industrial Drive	2	1	7	1.89	Light Ind	35.0	14.52	1129	5.88	3.50	20.59	1.45	22.04	81.0	305	PVC	0.22	47.4	0.85	0.46	OK	
Industrial Drive	2	1	8	1.66	Light Ind	35.0	16.18	1268	6.55	3.50	22.94	1.52	24.56	90.0	305	PVC	0.22	47.4	0.85	0.52	OK	
Industrial Drive	1	Ex. 14	9.10	3.60	Light Ind	35.0	19.78	1538	8.01	3.50	28.04	1.88	30.02	89.5	305	PVC	0.22	47.4	0.85	0.63	OK	
Industrial Drive	Ex. 14	Ex. 13		0.00			19.78	1538	8.01	3.50	28.04	1.88	30.02	21.9	305	PVC	0.87	94.3	1.29	0.32	OK	
Industrial Drive	Ex. 13	Ex. 12a		0.00			19.78	1538	8.01	3.50	28.04	1.88	30.02	31.3	305	PVC	0.30	55.4	0.76	0.54	OK	
Industrial Drive	Ex. 12a	Ex. 12		4.25	School	8.24	24.03	1616	8.42	3.00	25.25	2.40	27.66	61.9	305	PVC	0.20	45.2	0.62	0.61	OK	
Industrial Drive	Ex. 12	Ex. 10		2.61	Light Ind	35.0	26.64	1819	9.48	3.00	28.43	2.66	31.09	100.7	305	PVC	0.35	59.8	0.82	0.52	OK	
Industrial Drive	Ex. 10	Ex. 9		1.65	Light Ind	35.0	28.49	1963	10.22	3.00	30.67	2.85	33.52	84.1	305	PVC	0.17	41.7	0.57	0.80	OK	
Industrial Drive	Ex. 9	Ex. 8a		2.78	Com	34.0	31.27	2173	11.32	3.00	33.98	3.13	37.08	48.7	305	PVC	0.30	55.4	0.76	0.67	OK	
Industrial Drive	Ex. 8a	Ex. 8		2.52	Light Ind	35.0	33.79	2369	12.34	3.00	37.02	3.38	40.40	35.6	305	PVC	0.23	48.5	0.66	0.83	OK	
Industrial Drive	Ex. 8	Ex. 7		0.00			33.79	2369	12.34	3.00	37.02	3.38	40.40	95.4	305	PVC	0.17	41.7	0.57	0.97	OK	
County Rd. 49	10	9		1.07	Com	34.0	1.07	81	0.42	5.00	2.11	0.11	2.21	75.0	203	PVC	0.88	32.0	0.99	0.07	OK	
County Rd. 49	9	8		0.75	Com	34.0	1.82	138	0.72	5.00	3.58	0.18	3.76	75.0	203	PVC	0.88	32.0	0.99	0.12	OK	
County Rd. 48	8	7		0.95	Com	34.0	2.77	179	0.93	4.00	3.73	0.24	3.97	75.0	203	PVC	0.88	32.0	0.99	-12	OK	
County Rd. 48	7	6		0.53	Com	34.0	2.90	219	1.14	4.00	4.26	0.29	4.55	55.0	203	PVC	0.80	26.4	0.82	0.18	OK	
County Rd. 49	6	5		0.00	Com	34.0	2.90	219	1.14	4.00	4.26	0.29	4.55	70.0	203	PVC	0.50	24.1	0.75	0.20	OK	
County Rd. 49	5	Ex. 7		0.00			2.90	219	1.14	4.00	4.26	0.29	4.55	80.0	203	PVC	0.50	24.1	0.75	0.20	OK	
Highway 44	Ex. 7	Ex. 6		1.01	Com	34.0	37.70	2665	13.88	3.00	41.63	3.77	45.40	115.0	305	PVC	0.30	55.4	0.76	0.82	OK	
Highway 44	Ex. 6	Ex. 5		0.45	Com	34.0	38.15	2699	14.06	3.00	42.17	3.82	45.98	108.2	305	PVC	0.31	56.3	0.77	0.82	OK	
Highway 44	Ex. 5	Ex. 4												79.8	305	PVC	0.20	45.2	0.62	1.02	< FULL >	
Highway 44	Ex. 4	Ex. 3												85.3	305	PVC	0.35	59.8	0.82	0.77	OK	
Highway 44	Ex. 3	Ex. 2												11.4	305	PVC	0.20	45.2	0.62	1.02	< FULL >	
Highway 44	Ex. 2	Ex. 1												91.1	305	PVC	0.33	58.1	0.79	0.79	OK	
Highway 44	Ex. 1	Ex. Outlet												12.0	305	PVC	0.37	61.5	0.84	0.75	OK	

Total Area = 38.15

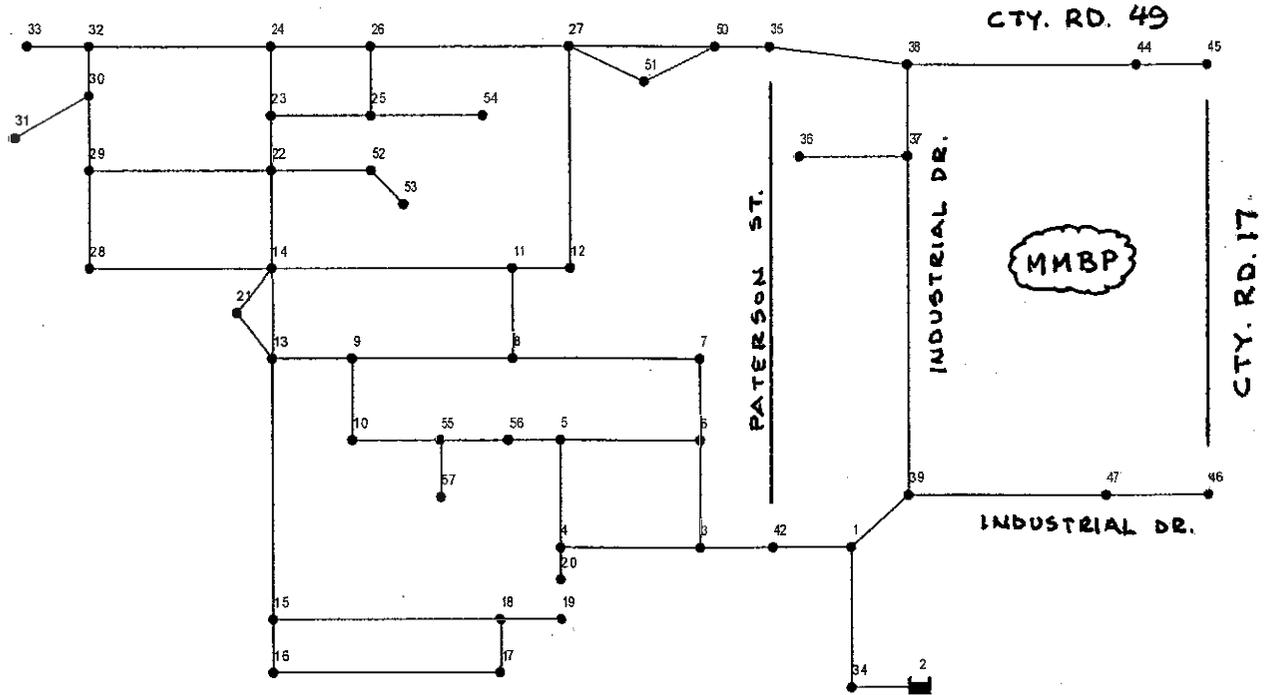
- Notes:**
- $Q(d) = Q(p) + Q(i)$; where $Q(d)$ = Design Flow (L/sec)
 $Q(p)$ = Population Flow (L/sec)
 $Q(i)$ = Extraneous Flow (L/sec)
 - Equivalent Population based on:
 450 L/cap/day
 0.10 L/sectha
 - Extraneous Flow Allowance:
 = 5.0 for area < 2.0 ha
 = 4.0 for area 2.0 ha - 10.0 ha
 = 3.5 for area 10.1 ha - 20.0 ha
 = 3.0 for area 20.1 ha - 60 ha
 = 2.5 for area 60.1 ha - 200 ha
 = 2.0 for area > 200 ha
 - Heavy Industrial Flow: = 55,000 L/day
 Light Industrial Flow: = 35,000 L/day
 Commercial Flow: = 34,000 L/day
 School Flow: = 70 L/student/day
 - Peak Factor - Ind/Com/Inst Areas:
 = 5.0 for area < 2.0 ha
 = 4.0 for area 2.0 ha - 10.0 ha
 = 3.5 for area 10.1 ha - 20.0 ha
 = 3.0 for area 20.1 ha - 60 ha
 = 2.5 for area 60.1 ha - 200 ha
 = 2.0 for area > 200 ha

APPENDIX B

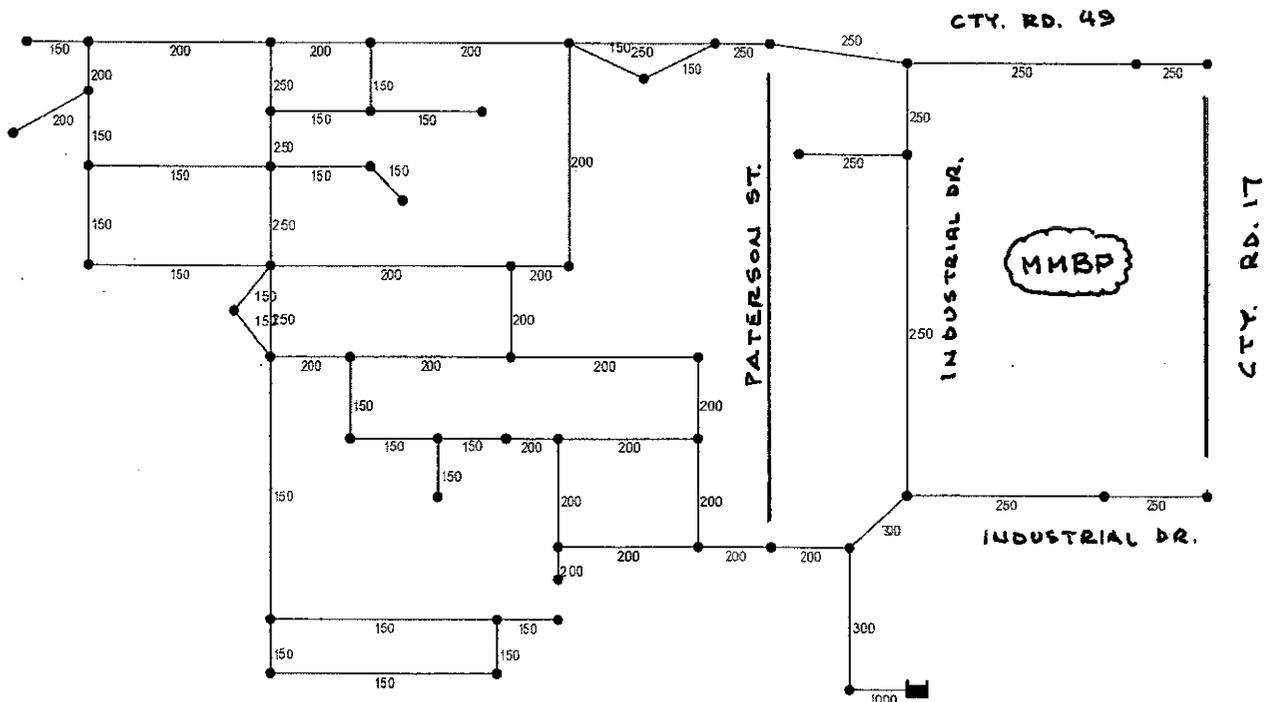
MISSISSIPPI MILLS BUSINESS PARK

FIGURE 1.

NODES

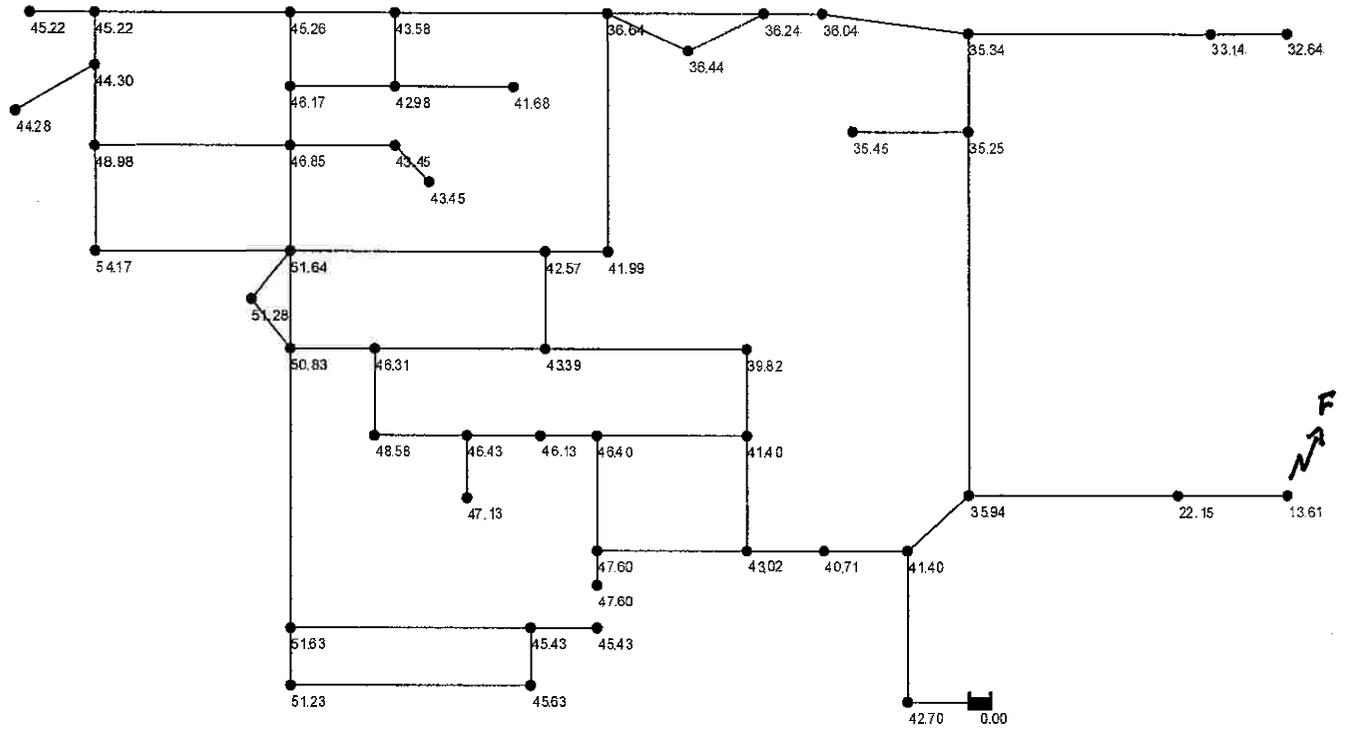


PIPE DIAMETERS



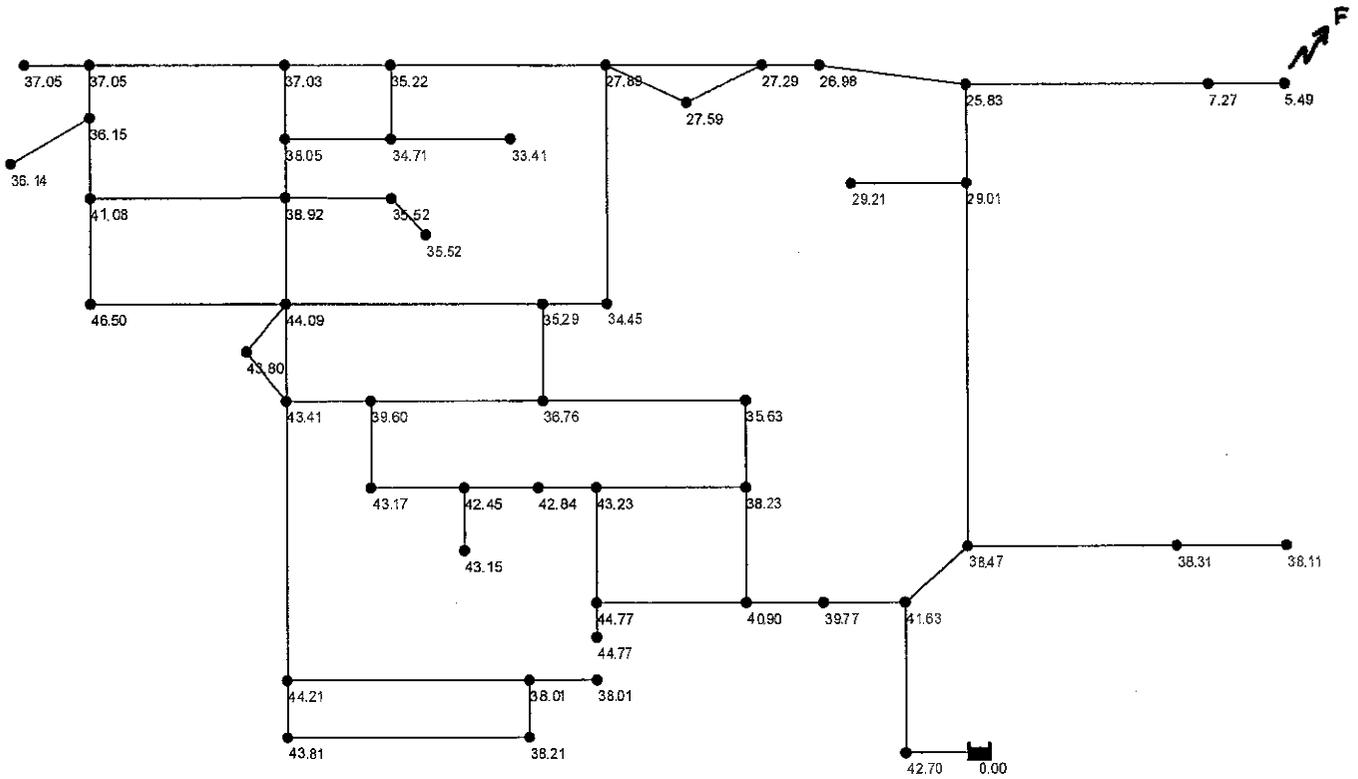
182 L/s FIRE @ INDUSTRIAL/CTY RD 17 (Cty Rd 17 NOT Looped, Tank Normal)

CASE 1A



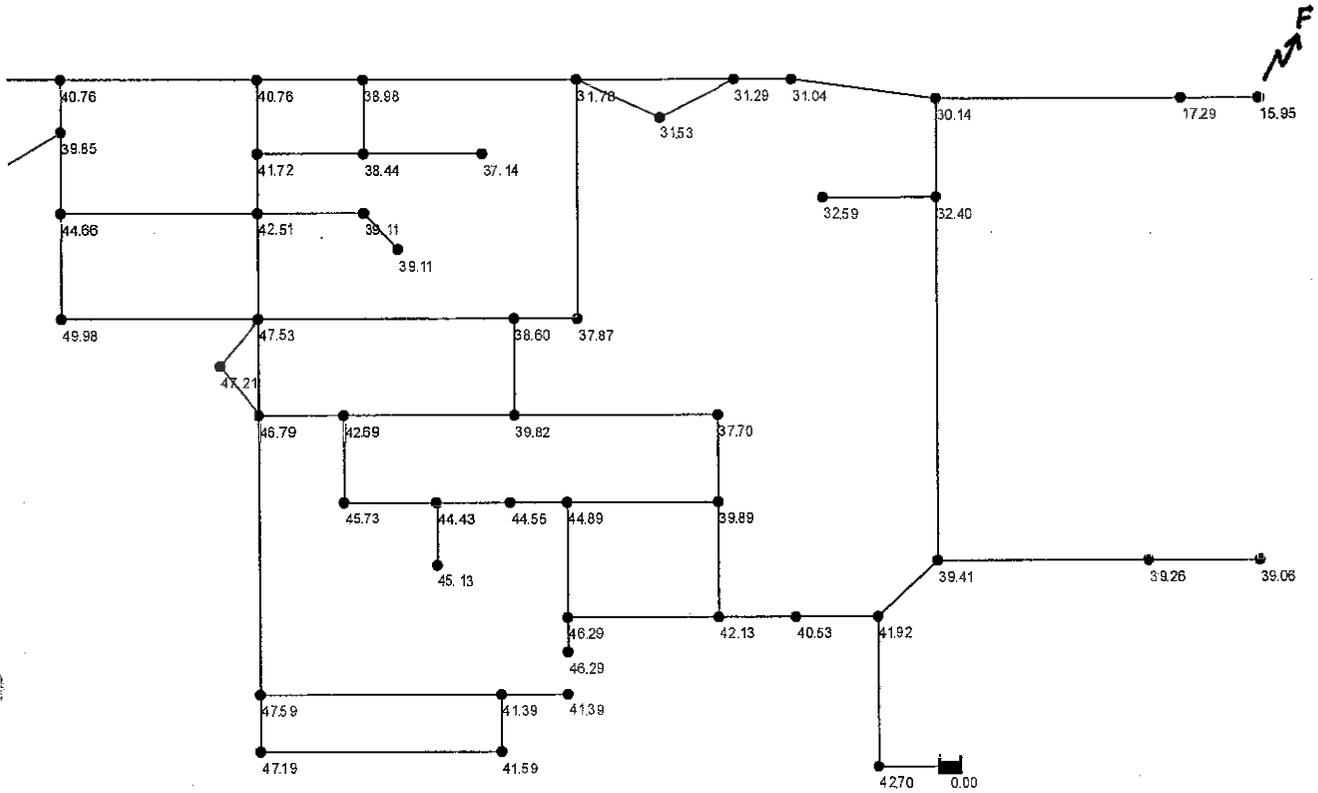
158.1 L/s FIRE @ CTY RDS 49/17 (Cty Rd 17 NOT Looped, Tank Normal)

CASE 1B



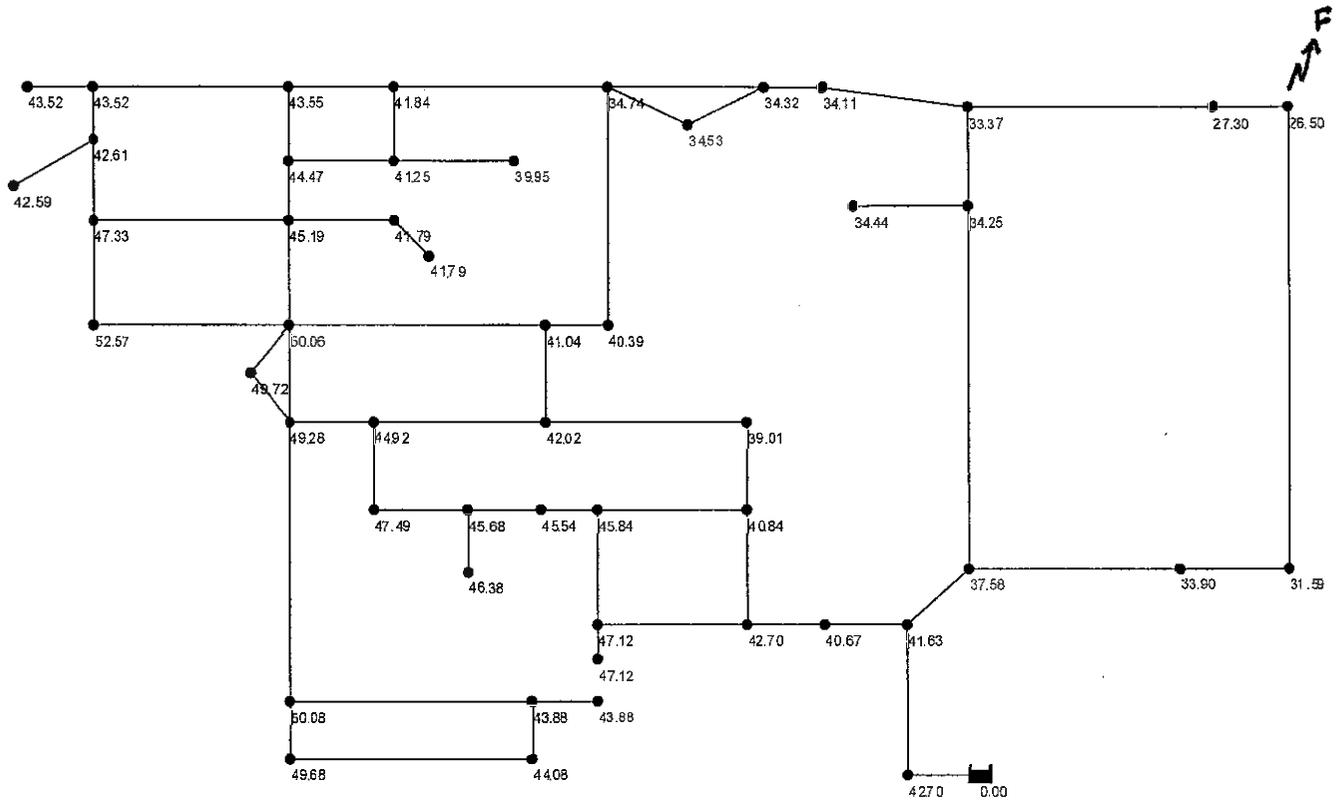
125 L/s FIRE@ CTY RDS 49/17 (Cty Rd 17 NOT Looped, Tank Normal)

CASE 1C



158.1 L/s FIRE@ CTY RDS 49/17 (Cty Rd 17 Looped, Tank Normal)

CASE 2A



182L/S FIRE@ CTY RDS49/17 (Cty Rd 17 Looped, Tank Low)

CASE 2B

