SPRINKLER DESIGN DATA

PROJECT NAME: Johnsonville Elementary School — SYSTEM NO.: 1
PROJECT LOCATION: 18495 NC-27, Cameron, NC — SYS. SQ. FT.: VARIES — CEILING HGT.: VARIES
DESIGNED BY: Crossroads Fire Protection — PH#: 919-207-3855 — TOTAL BLDG. HGT.: VARIES
OCCUPANCY DESCRIPTION: School — HAZARD CLASS: Light Hazard

DESIGN SUMMARY

DESIGN METHOD:	CALC	CALC	CALC
DESIGN AREA NO.:	1	2	3
LOCATION:	CORRIDOR	CLASSROOM 8	MECH. LOFT
TYPE OF SYSTEM:	WET	WET	WET
HAZARD CLASS:	LIGHT	LIGHT	ORDINARY II
CRITERIA FROM:	NFPA 13	NFPA 13	NFPA 13
DESIGN AREA:	1246	1115	7 SPRINKLERS
SPKLR. SPACING:	18X18	20X20	130 MAX
DENSITY:	.1	.1	.2
K-FACTOR:	11.2	11.2	5.6
HOSE ALLOWANCE:	100	100	250
# DESIGN SPKLR.:	5	5	7
REQUIREMENTS @	TEST	TEST	TEST
GPM REQUIRED:	277.264	310.579	434.887
PSI REQUIRED:	60.056	54.647	65.810
NODE#	TEST	TEST	TEST
SAFETY FACTOR PSI	18.71/23.8%	23.83/30.4%	11.36/14.7%

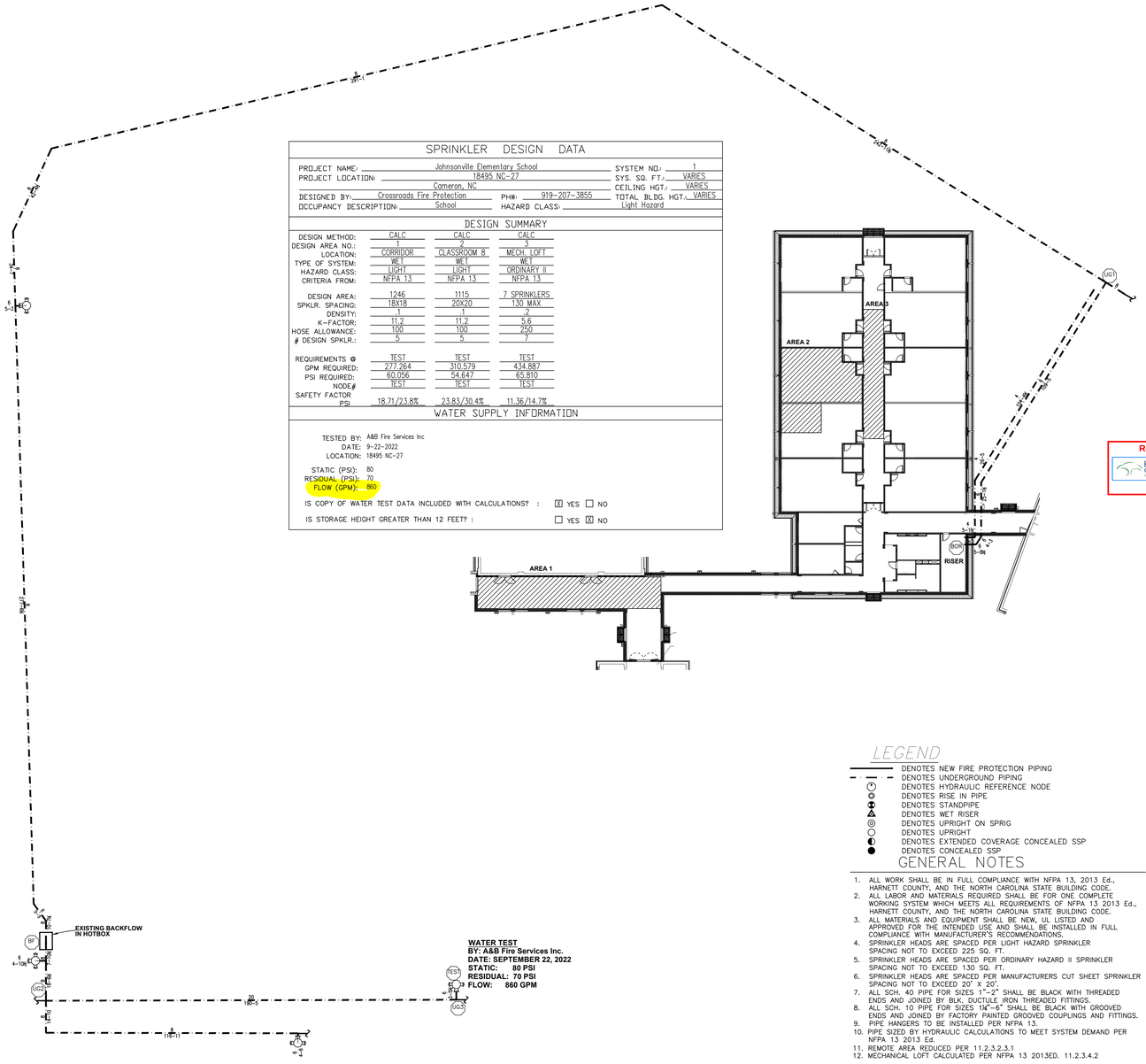
WATER SUPPLY INFORMATION

TESTED BY: A&B Fire Services Inc
DATE: 9-22-2022
LOCATION: 18495 NC-27

STATIC (PSI): 80
RESIDUAL (PSI): 70
FLOW (GPM): 860

IS COPY OF WATER TEST DATA INCLUDED WITH CALCULATIONS? : [X] YES [ ] NO

IS STORAGE HEIGHT GREATER THAN 12 FEET? : [ ] YES [X] NO



Reviewed for Fire Code Compliance
Harnett County
Leslie Jackson
05/22/2023 1:44:29 PM

LEGEND

- DENOTES NEW FIRE PROTECTION PIPING
- DENOTES UNDERGROUND PIPING
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- DENOTES RISE IN PIPE
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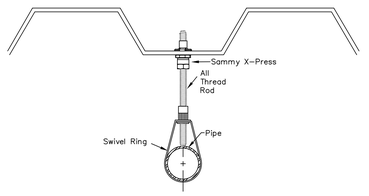
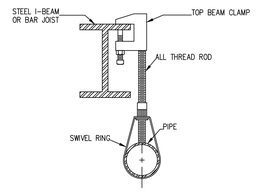


SAMMY X-PRESS HANGER DETAIL
N.T.S.



BEAM CLAMP HANGER DETAIL
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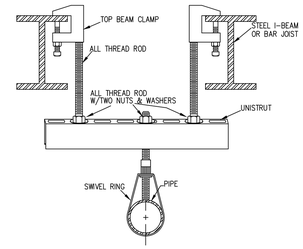

UNISTRUT HANGER DETAIL
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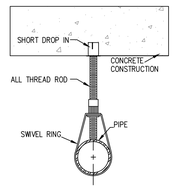
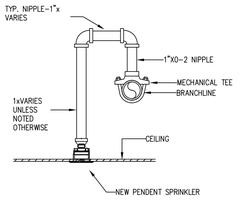


DROP-IN HANGER DETAIL
N.T.S.

HANGER INSTALLATION REQUIREMENTS

	MAXIMUM DISTANCE BETWEEN HANGERS									
NOMINAL PIPE SIZE	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"	8"
STEEL PIPE (10/ 40)	N/A	12' 0"	12' 0"	15' 0"	15' 0"	15' 0"	15' 0"	15' 0"	15' 0"	15' 0"	15' 0"	15' 0"

100 PSI STATIC PRESSURE ON SYSTEM REQURES UP-LIFT RESTRAINT WITHIN 12 INCHES HORIZONTALLY OF HEAD FOR ARM-OVERS AND END OF BRANCH LINE
THE UNSUPPORTED LENGTH BETWEEN THE END SPRINKLER AND THE LAST HANGER ON THE LINE SHALL NOT EXCEED 36" FOR 1" PIPE, 48" FOR 1¼" PIPE AND 60" FOR 1½" PIPE OR LARGER
THE CUMULATIVE HORIZONTAL LENGTH OF AN UNSUPPORTED ARMOVER TO A SPRINKLER, SPRINKLER DROP, OR SPRIG-UP SHALL NOT EXCEED 24"



RETURN BEND DETAIL
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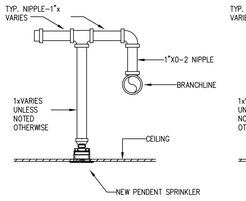

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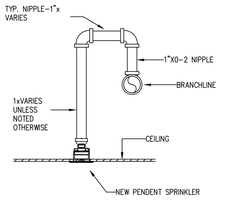

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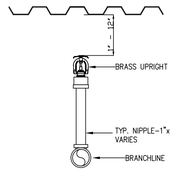
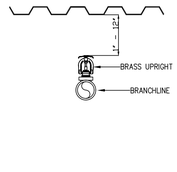
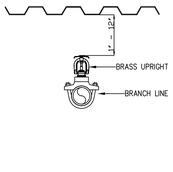


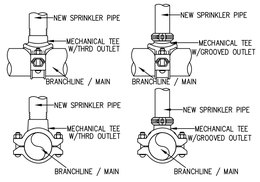
UPRIGHT ON SPRIG DETAIL
N.T.S.



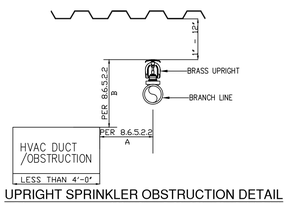
UPRIGHT SPRINKLER DETAIL
N.T.S.



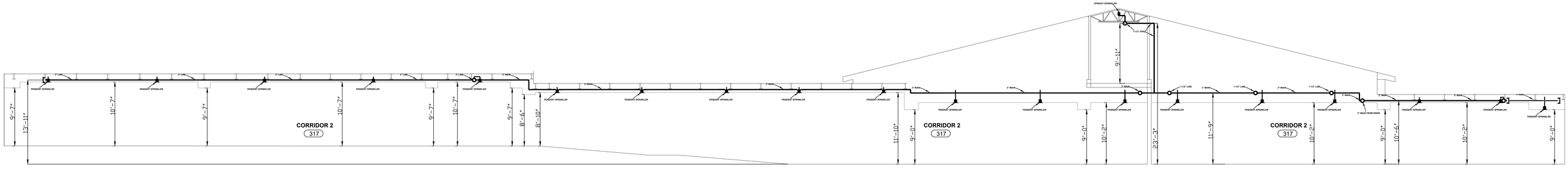
UPRIGHT ON MECH TEE DETAIL
N.T.S.



MECHANICAL TEE DETAIL
N.T.S.



UPRIGHT SPRINKLER OBSTRUCTION DETAIL
N.T.S. ORDINARY HAZARD PER NFPA13 8.6.5.2.2



ELEVATION VIEW
SCALE: N.T.S.

IMPORTANT

Building areas subject to freezing conditions, it is the owner's responsibility to provide heat throughout the wet pipe sprinkler system areas and in enclosures for dry pipe, deluge, and other types of valves controlling water supplies to sprinkler systems.

REVISIONS

DATE	DESCRIPTION	BY

SPRINKLER SYMBOLS DESCRIPTION

SYMBOL	SIZE	TEMP	STYLE	MAKE	MODEL/SIN	FINISH	ESCUTCHEON	K-FACTOR	RESPONSE	QUANTITY
◎	1/2"	200	SSU	TYCO	TY-313	BRASS	ON SPRIG	5.6K	QR	3
○	1/2"	200	SSU	TYCO	TY-313	BRASS		5.6K	QR	15
◐	3/4"	160	SSP	TYCO	TY-5522	WHITE	CONCEALED	11.2K	SR	47
●	3/4"	155	SSP	TYCO	TY-3531	WHITE	CONCEALED	5.6K	QR	65
TOTAL SPRINKLERS THIS SHEET										
TOTAL SPRINKLERS ON JOB										130

CHECKED BY:
JOHN FITCHER — NORTH CAROLINA LICENSED — NC# 16330 — SPRINKLER CONTRACTOR — FIRE PROTECTION
DOUGLAS JOHNSTON II — NORTH CAROLINA LICENSED — NC# 16330 — SPRINKLER CONTRACTOR — FIRE PROTECTION
NICET LEVEL III #117811

NC LICENSE NUMBER: 16330

Crossroads Fire Protection Inc
809 South Market Street
P.O. Box 926
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(919) 207-3855

Johnsonville Elem. School
18495 NC-27
Cameron, NC

CONTRACTOR: Engineered Construction Co.

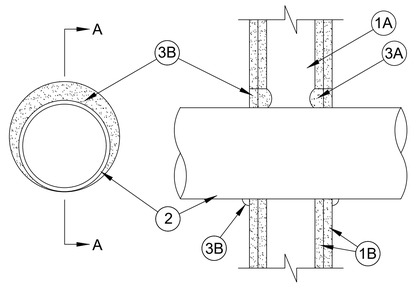
Fire Sprinkler Plan

PERMIT NO.	
CONTRACT NO.	CC-10164
APPROVAL	Harnett County
DRAWN BY	DLN
SCALE	As Noted
DATE	5-10-2023
REVISED	
PLOTTED	

FP1 OF 3

RECTORSEAL
metacaulk

System No. W-L-1106
June 07, 2004
F Rating — 2 Hr
T Rating — 0 Hr



SECTION A-A

1. Wall Assembly — The fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.

B. Gypsum Board* — Two layers of nom 5/8 in. thick gypsum board, as specified in the individual Wall and Partition Design. Max diam of opening is 11-3/4 in.

2. Through Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

A. Steel Pipe — Nom 10 in. diam (or smaller) Schedule 20 (or heavier) steel pipe. The annular space shall be min 0 in. to max 1 in.

B. Iron Pipe — Nom 10 in. diam (or smaller) cast or ductile iron pipe. The annular space shall be min 0 in. to max 1 in.
C. Conduit — Nom 4 in. diam (or smaller) steel electrical metallic tubing or steel conduit. The annular space shall be min 0 in. to max 1 in.

D. Copper Tubing — Nom 2 in. diam (or smaller) Type L (or heavier) copper tubing. The annular space shall be min 0 in. to max 1 in.

E. Copper Pipe — Nom 2 in. diam (or smaller) Regular (or heavier) copper pipe. The annular space shall be min 0 in. to max 1 in.

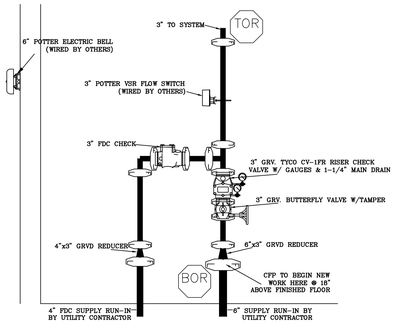
3. Firestop System — The firestop system shall consist of the following:

A. Packing Material — (Optional) — Foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. Fill, Void or Cavity Material* — Caulk — Min 1/2 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point contact location between pipe and wall, a min 1/4 in. diam bead of fill material shall be applied at the wall/pipe interface on both surfaces of wall.

RECTORSEAL — Metacaulk 1000

*Bearing the UL Classification Mark



RISER DETAIL
SCALE: N.T.S.

LEGEND

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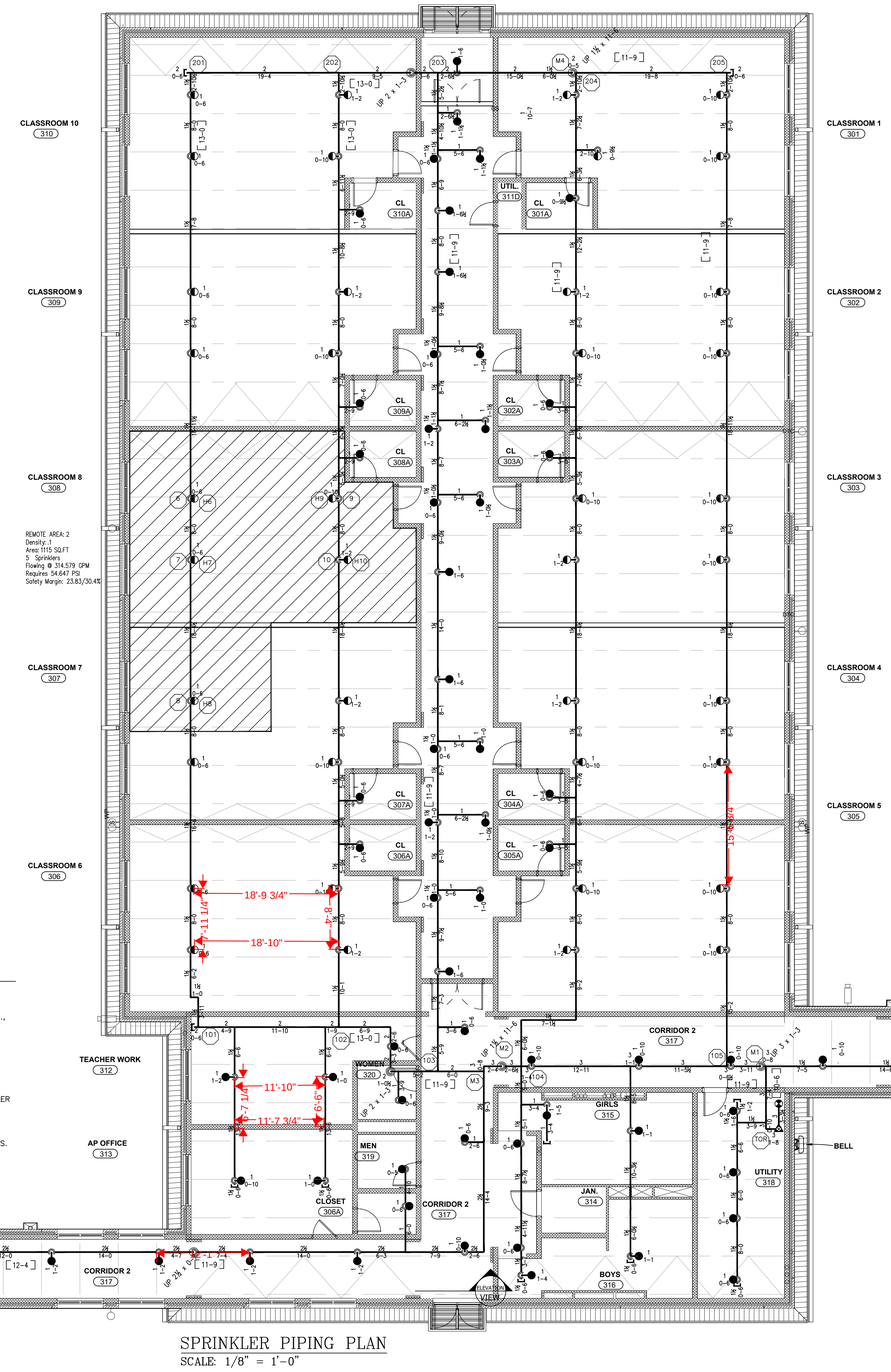
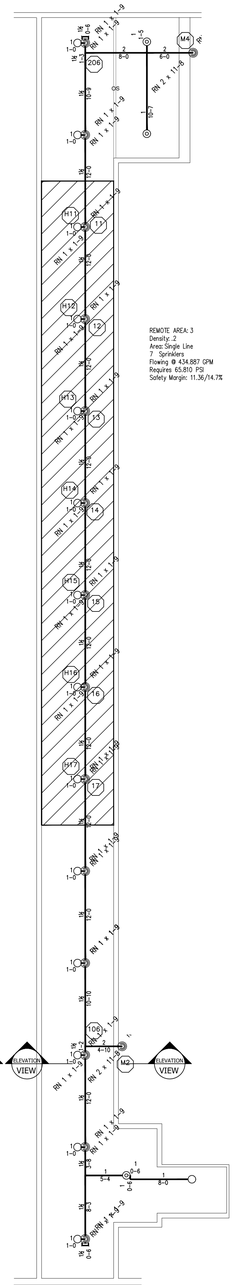


SPRINKLER PIPING PLAN
SCALE: 1/8" = 1'-0"



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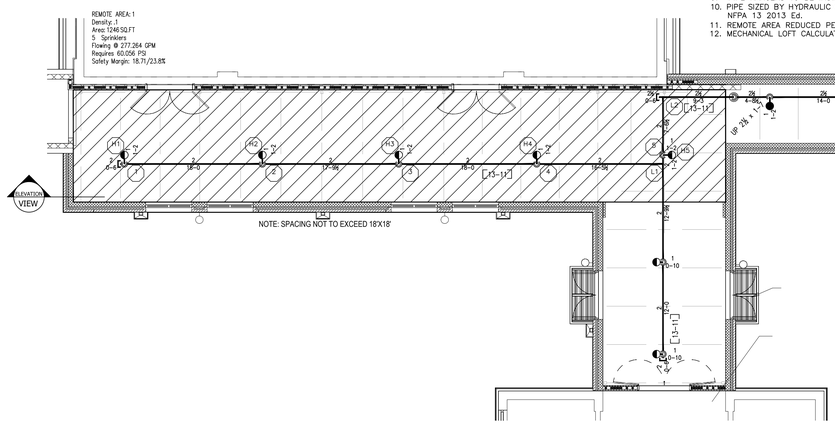

N W E S
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PERMIT NO.	
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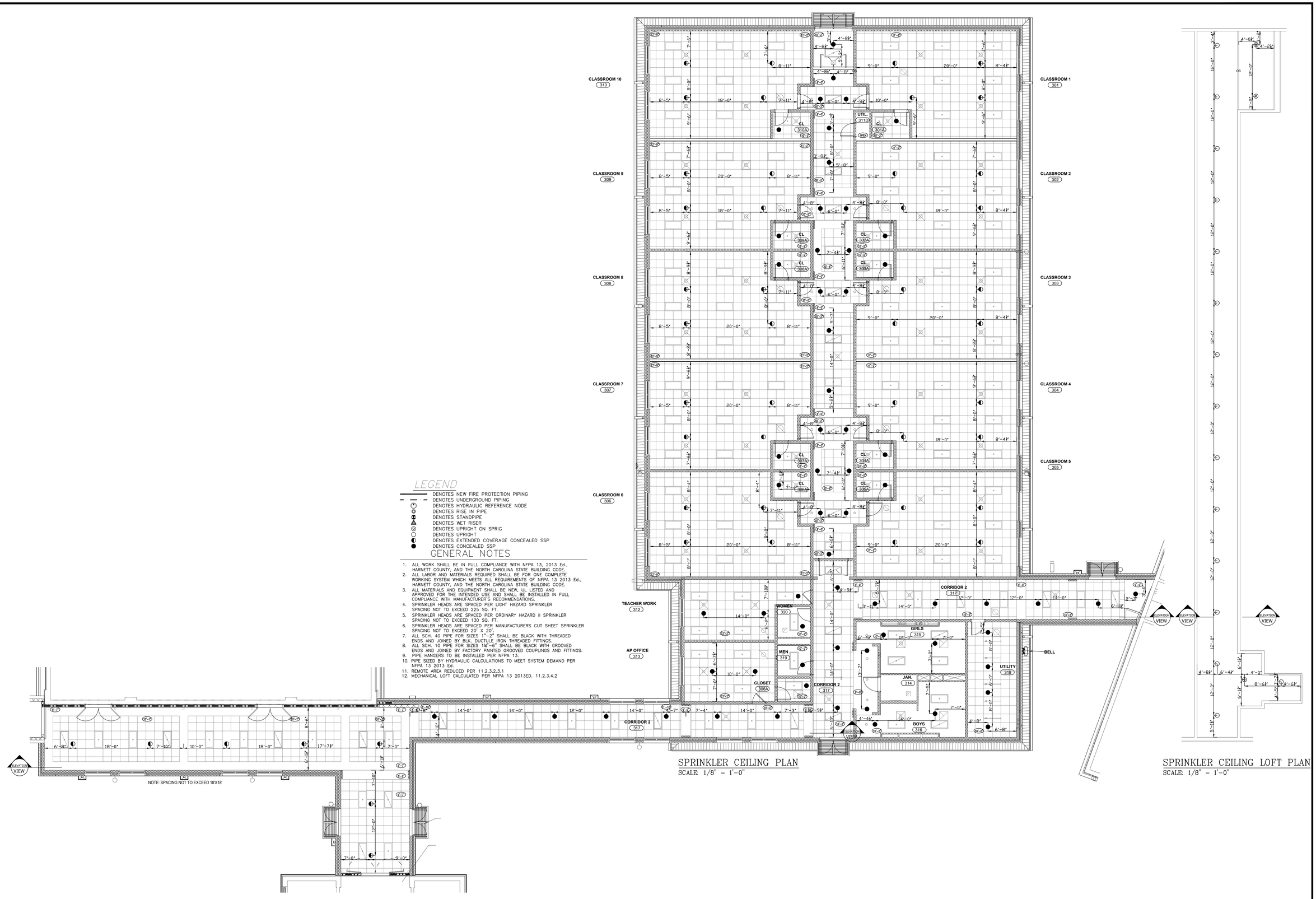
APPROVAL	Harnett County
DRAWN BY	DLN
SCALE	As Noted
DATE	5-10-2023
REVISED	
PLOTTED	FP2 OF 3



SPRINKLER CEILING PLAN
SCALE: 1/8" = 1'-0"

SPRINKLER CEILING LOFT PLAN
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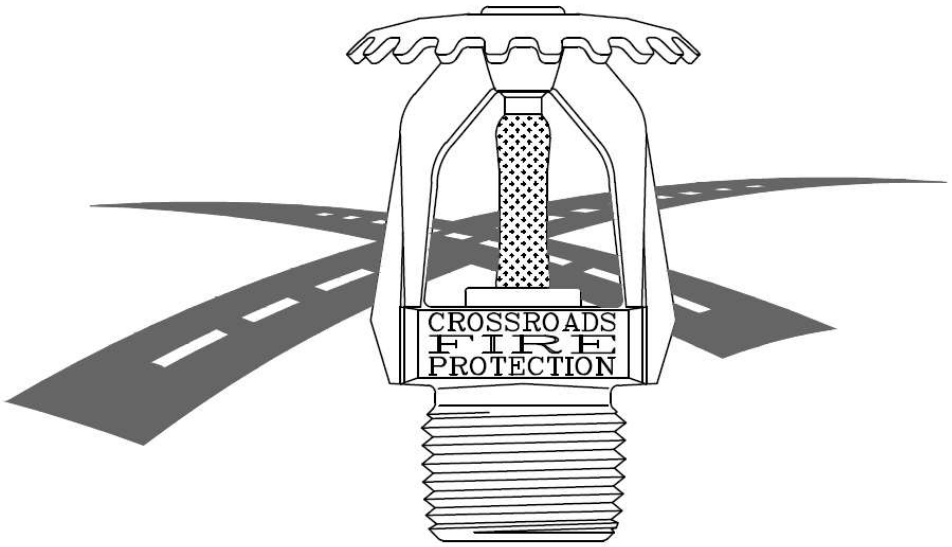
REVISED	
PLOTTED	FP3 OF 3



Crossroads Fire Protection
809 South Market Street
P.O. Box 926
Benson, NC 27504
919-207-3855

Job Name	:	Johnsonville Elementary School
Drawing	:	FP2
Location	:	18495 NC-27
Remote Area	:	1
Contract	:	CC-10164
Data File	:	Johnsonville Area 1.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME Johnsonville Elementary School
Location 18495 NC-27
Drawing # FP2
Contract # CC-10164
Date 5-10-2023

DESIGN

Remote area # 1
Remote area location Corridor 317
Occupancy classification Light
Density .1 - Gpm/SqFt
Area of application 1246 - SqFt
Coverage/sprinkler 18X18 - SqFt
Type of sprinkler calculated EC 11.2 Conc. PD
 # Sprinklers calculated 5
In-rack demand N/A - GPM
Hose streams 100 - GPM
Total water required (including hose streams) 277.264 - GPM @ 60.0562 - Psi
Type of system Wet
Volume of system (dry or pre-action) N/A - Gal

WATER SUPPLY INFORMATION

Test date 9-22-2022
Location 18495 NC-27
Source of info Contract Documents

CONTRACTOR INFO Crossroads Fire Protection
Address 809 South Market Street / P.O. Box 926 / Benson, NC 27504
Phone # 919-207-3855
Name of designer DLN
Authority having jurisdiction Harnett County
NOTES:

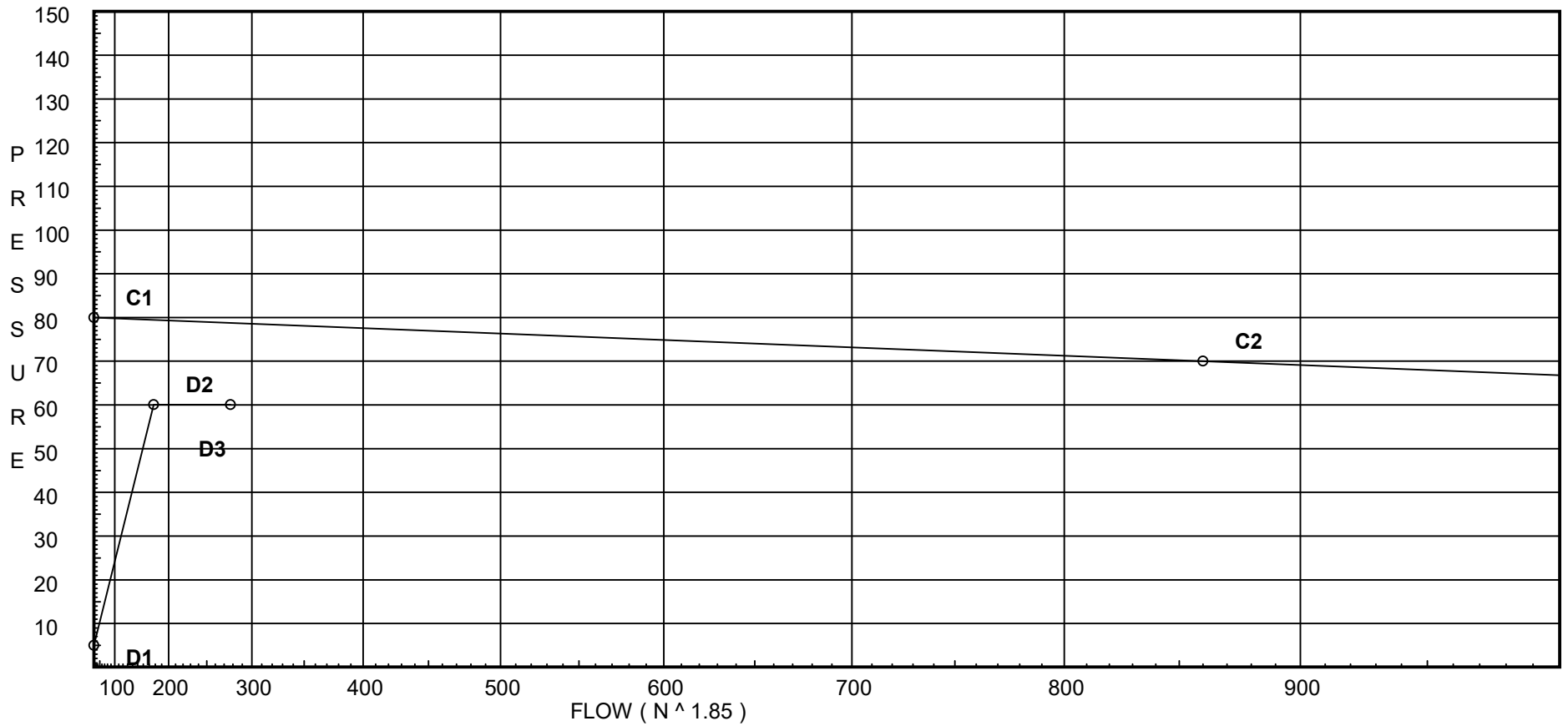
text1(35) - invisible

Water Supply Curve

Crossroads Fire Protection
Johnsonville Elementary School

City Water Supply:
- C1 - Static Pressure : 80
- C2 - Residual Pressure: 70
- C2 - Residual Flow : 860

Demand:
- D1 - Elevation : 5.015
- D2 - System Flow : 177.264
- D2 - System Pressure : 60.056
- Hose (Demand) : 100
- D3 - System Demand : 277.264
- Safety Margin : 18.712



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zim	Wilkins 375ADA	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

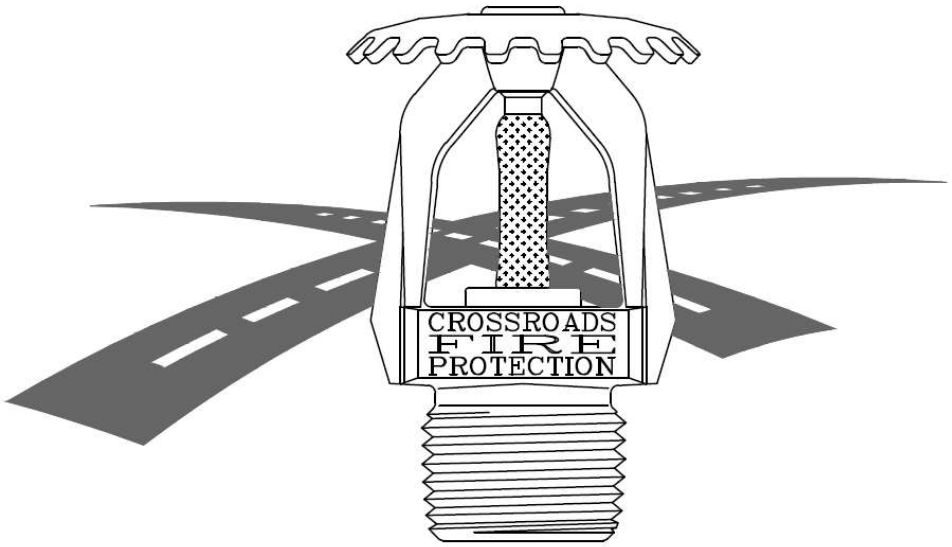
Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
H1	13.58	11.2	8.7	na	33.04	0.1	1	8.7
H2	13.58	11.2	8.83	na	33.28	0.1	1	8.7
H3	13.58	11.2	9.29	na	34.15	0.1	1	8.7
H4	13.58	11.2	10.31	na	35.96	0.1	1	8.7
H5	13.58	11.2	13.3	na	40.84	0.1	1	8.7
1	13.917		12.01	na				
2	13.917		12.19	na				
3	13.917		12.82	na				
4	13.917		14.21	na				
L1	13.917		18.11	na				
5	13.917		18.27	na				
L2	13.917		22.64	na				
M3	11.75		38.3	na				
M2	11.75		38.66	na				
104	11.75		38.78	na				
105	11.75		39.56	na				
M1	10.5		41.44	na				
TOR	10.5		42.01	na				
BOR	1.5		47.48	na				
UG1	-3.0		49.57	na				
BF	-3.0		49.84	na				
UG2	-3.0		62.15	na				
UG3	-3.0		62.15	na				
TEST	2.0		60.06	na	100.0			

The maximum velocity is 15.56 and it occurs in the pipe between nodes 5 and L2

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
*HEADS										
H1	13.580	11.20	33.04	1	2E	4.0	1.500	120	8.700	
to					T	5.0	9.000		-0.146	
1	13.917		33.04	1.049			10.500	0.3293	3.458	Vel = 12.27
			0.0							
1			33.04						12.012	K Factor = 9.53
H2	13.580	11.20	33.28	1	2E	4.0	1.500	120	8.830	
to					T	5.0	9.000		-0.146	
2	13.917		33.28	1.049			10.500	0.3338	3.505	Vel = 12.35
			0.0							
2			33.28						12.189	K Factor = 9.53
H3	13.580	11.20	34.15	1	2E	4.0	1.500	120	9.294	
to					T	5.0	9.000		-0.146	
3	13.917		34.15	1.049			10.500	0.3501	3.676	Vel = 12.68
			0.0							
3			34.15						12.824	K Factor = 9.54
H4	13.580	11.20	35.96	1	2E	4.0	1.500	120	10.310	
to					T	5.0	9.000		-0.146	
4	13.917		35.96	1.049			10.500	0.3853	4.046	Vel = 13.35
			0.0							
4			35.96						14.210	K Factor = 9.54
H5	13.580	11.20	40.84	1	2E	4.0	1.500	120	13.297	
to					T	5.0	9.000		-0.146	
5	13.917		40.84	1.049			10.500	0.4875	5.119	Vel = 15.16
			0.0							
5			40.84						18.270	K Factor = 9.55
*LINES										
1	13.917		33.04	2			18.000	120	12.012	
to									0.0	
2	13.917		33.04	2.157			18.000	0.0098	0.177	Vel = 2.90
2	13.917		33.28	2			17.792	120	12.189	
to									0.0	
3	13.917		66.32	2.157			17.792	0.0357	0.635	Vel = 5.82
3	13.917		34.14	2			18.000	120	12.824	
to									0.0	
4	13.917		100.46	2.157			18.000	0.0770	1.386	Vel = 8.82
4	13.917		35.96	2	T	12.307	16.458	120	14.210	
to							12.307		0.0	
L1	13.917		136.42	2.157			28.765	0.1356	3.901	Vel = 11.98
L1	13.917		0.0	2			1.167	120	18.111	
to									0.0	
5	13.917		136.42	2.157			1.167	0.1362	0.159	Vel = 11.98
5	13.917		40.84	2	T	12.307	7.542	120	18.270	
to							12.307		0.0	
L2	13.917		177.26	2.157			19.849	0.2202	4.370	Vel = 15.56
			0.0							
L2			177.26						22.640	K Factor = 37.25

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
*MAINS										
L2	13.917		177.26	2.5	5E	41.186	136.000	120	22.640	
to							41.186		0.939	
M3	11.750		177.26	2.635			177.186	0.0831	14.717	Vel = 10.43
M3	11.750		0.0	3	E	9.408	3.000	120	38.296	
to							9.408		0.0	
M2	11.750		177.26	3.26			12.408	0.0294	0.365	Vel = 6.81
M2	11.750		0.0	3			3.875	120	38.661	
to									0.0	
104	11.750		177.26	3.26			3.875	0.0294	0.114	Vel = 6.81
104	11.750		0.0	3			26.792	120	38.775	
to									0.0	
105	11.750		177.26	3.26			26.792	0.0295	0.790	Vel = 6.81
105	11.750		0.0	3	2E	18.815	6.375	120	39.565	
to					T	20.159	38.974		0.541	
M1	10.500		177.26	3.26			45.349	0.0295	1.336	Vel = 6.81
M1	10.500		0.0	3	E	9.408	9.833	120	41.442	
to							9.408		0.0	
TOR	10.500		177.26	3.26			19.241	0.0295	0.567	Vel = 6.81
TOR	10.500		0.0	3	E	9.408	9.000	120	42.009	
to					S	21.503	44.351		3.898	
BOR	1.500		177.26	3.26	B	13.44	53.351	0.0294	1.571	Vel = 6.81
			0.0							
BOR			177.26						47.478	K Factor = 25.73
*UNDERGROUND										
BOR	1.500		177.26	6			146.500	140	47.478	
to									1.949	
UG1	-3		177.26	6.16			146.500	0.0010	0.147	Vel = 1.91
UG1	-3		0.0	8	2E	56.936	909.000	140	49.574	
to					T	55.354	189.786		0.0	
BF	-3		177.26	8.27	G	6.326	1098.786	0.0002	0.261	Vel = 1.06
					5F	71.17				
BF	-3		0.0	8	T	55.354	26.417	140	49.835	
to					2E	56.936	118.616		12.280	* * Fixed Loss = 12.28
UG2	-3		177.26	8.27	G	6.326	145.033	0.0002	0.035	Vel = 1.06
					Zim	0.0				
UG2	-3		0.0	20	2G	45.186	190.417	140	62.150	
to							45.186		0.0	
UG3	-3		177.26	20.57			235.603	0	0.001	Vel = 0.17
UG3	-3		0.0	6	T	43.037	3.500	140	62.151	
to					E	20.084	67.425		-2.166	
TEST	2		177.26	6.16	G	4.304	70.925	0.0010	0.071	Vel = 1.91
			100.00							Qa = 100.00
TEST			277.26						60.056	K Factor = 35.78



Crossroads Fire Protection
809 South Market Street
P.O. Box 926
Benson, NC 27504
919-207-3855

Job Name	:	Johnsonville Elementary School
Drawing	:	FP2
Location	:	18495 NC-27
Remote Area	:	2
Contract	:	CC-10164
Data File	:	Johnsonville Area 2.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME Johnsonville Elementary School
Location 18495 NC-27
Drawing # FP2
Contract # CC-10164
Date 5-10-2023

DESIGN

Remote area # 2
Remote area location Classroom 8
Occupancy classification Light
Density .1 - Gpm/SqFt
Area of application 1115 - SqFt
Coverage/sprinkler 20x20 - SqFt
Type of sprinkler calculated EC 11.2 Conc. PD
 # Sprinklers calculated 5
In-rack demand N/A - GPM
Hose streams 100 - GPM
Total water required (including hose streams) 310.579 - GPM @ 54.6469 - Psi
Type of system Wet Grid
Volume of system (dry or pre-action) N/A - Gal

WATER SUPPLY INFORMATION

Test date 9-22-2022
Location 18495 NC-27
Source of info Contract Documents

CONTRACTOR INFO Crossroads Fire Protection
Address 809 South Market Street / P.O. Box 926 / Benson, NC 27504
Phone # 919-207-3855
Name of designer DLN
Authority having jurisdiction Harnett County
NOTES:

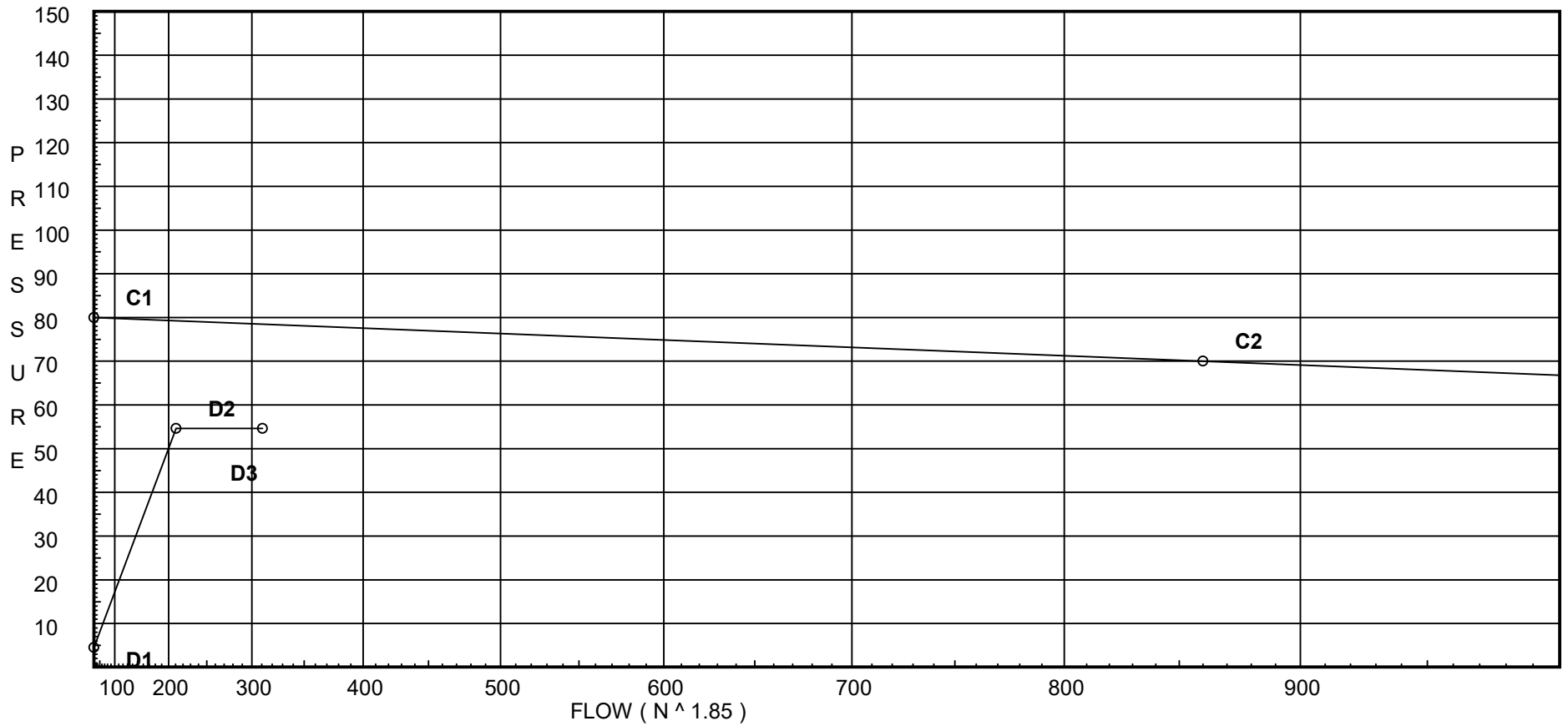
text1(35) - invisible

Water Supply Curve

Crossroads Fire Protection
Johnsonville Elementary School

City Water Supply:
- C1 - Static Pressure : 80
- C2 - Residual Pressure: 70
- C2 - Residual Flow : 860

Demand:
- D1 - Elevation : 4.493
- D2 - System Flow : 210.579
- D2 - System Pressure : 54.647
- Hose (Demand) : 100
- D3 - System Demand : 310.579
- Safety Margin : 23.834



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zim	Wilkins 375ADA	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
H6	12.375	11.2	12.88	na	40.2	0.1	1	12.8
H7	12.375	11.2	12.8	na	40.07	0.1	1	12.8
H8	12.375	11.2	13.46	na	41.1	0.1	1	12.8
H9	11.542	11.2	15.93	na	44.7	0.1	1	12.8
H10	11.542	11.2	15.8	na	44.51	0.1	1	12.8
201	13.0		24.06	na				
6	13.0		17.4	na				
7	13.0		17.29	na				
8	13.0		18.19	na				
202	13.0		24.64	na				
9	13.0		21.81	na				
10	13.0		21.81	na				
203	11.75		27.24	na				
204	11.75		28.2	na				
205	11.75		28.37	na				
206	23.25		23.48	na				
M4	11.75		28.19	na				
101	13.0		24.64	na				
102	13.0		25.19	na				
103	11.75		29.13	na				
M3	11.75		31.32	na				
106	23.25		26.52	na				
M2	11.75		31.52	na				
104	11.75		31.9	na				
105	11.75		32.71	na				
M1	10.5		35.09	na				
TOR	10.5		35.87	na				
BOR	1.5		41.93	na				
UG1	-3.0		44.08	na				
BF	-3.0		44.44	na				
UG2	-3.0		56.71	na				
UG3	-3.0		56.71	na				
TEST	2.0		54.65	na	100.0			

The maximum velocity is 16.59 and it occurs in the pipe between nodes H9 and 9

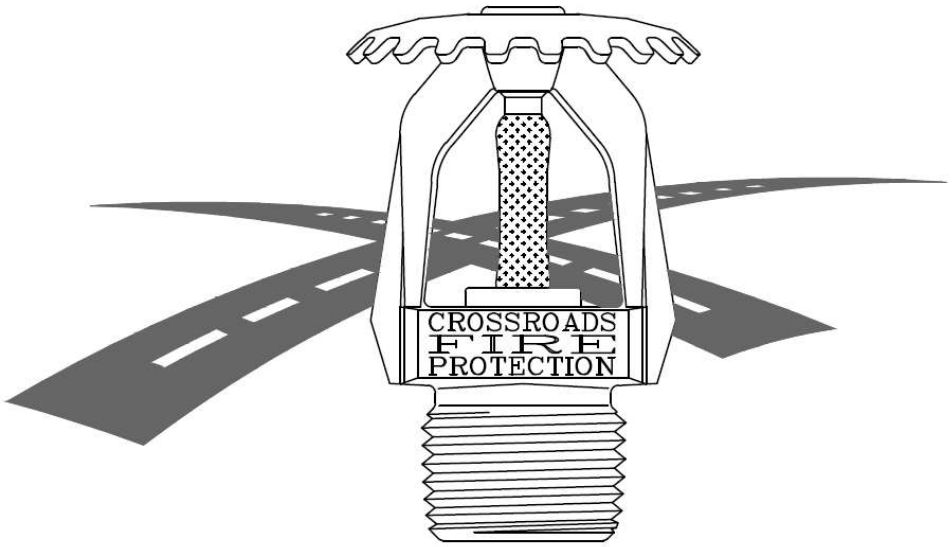
Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
*HEADS										
H6	12.375	11.20	40.20	1	2E	4.0	1.125	120	12.881	
to					T	5.0	9.000		-0.271	
6	13		40.2	1.049			10.125	0.4735	4.794	Vel = 14.92
			0.0							
6			40.20						17.404	K Factor = 9.64
H7	12.375	11.20	40.07	1	2E	4.0	1.125	120	12.800	
to					T	5.0	9.000		-0.271	
7	13		40.07	1.049			10.125	0.4707	4.766	Vel = 14.88
			0.0							
7			40.07						17.295	K Factor = 9.64
H8	12.375	11.20	41.10	1	2E	4.0	1.125	120	13.463	
to					T	5.0	9.000		-0.271	
8	13		41.1	1.049			10.125	0.4932	4.994	Vel = 15.26
			0.0							
8			41.10						18.186	K Factor = 9.64
H9	11.542	11.20	44.70	1	2E	4.0	2.292	120	15.932	
to					T	5.0	9.000		-0.631	
9	13		44.7	1.049			11.292	0.5762	6.506	Vel = 16.59
			0.0							
9			44.70						21.807	K Factor = 9.57
H10	11.542	11.20	44.51	1	2E	4.0	2.625	120	15.795	
to					T	5.0	9.000		-0.631	
10	13		44.51	1.049			11.625	0.5717	6.646	Vel = 16.52
			0.0							
10			44.51						21.810	K Factor = 9.53
*LINES										
201	13		-60.67	1.5	T	9.9	55.500	120	24.055	
to							9.900		0.0	
6	13		-60.67	1.682			65.400	-0.1017	-6.651	Vel = 8.76
6	13		40.20	1.5			8.000	120	17.404	
to									0.0	
7	13		-20.47	1.682			8.000	-0.0136	-0.109	Vel = 2.96
7	13		40.07	1.5	T	9.9	60.958	120	17.295	
to							9.900		0.0	
8	13		19.6	1.682			70.858	0.0126	0.891	Vel = 2.83
8	13		41.10	1.5	2E	9.9	43.583	120	18.186	
to					T	9.9	19.800		0.0	
101	13		60.7	1.682			63.383	0.1018	6.452	Vel = 8.76
			0.0							
101			60.70						24.638	K Factor = 12.23
202	13		-41.80	1.5			55.500	120	24.641	
to									0.0	
9	13		-41.8	1.682			55.500	-0.0511	-2.834	Vel = 6.04
9	13		44.70	1.5			8.000	120	21.807	
to									0.0	
10	13		2.9	1.682			8.000	0.0004	0.003	Vel = 0.42

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
10	13		44.52	1.5	T	9.9	42.583	120	21.810	
to							9.900		0.0	
102	13		47.42	1.682			52.483	0.0645	3.384	Vel = 6.85
			0.0							
102			47.42						25.194	K Factor = 9.45
203	11.750		19.58	1.5	2T	19.799	130.250	120	27.243	
to							19.799		0.0	
103	11.750		19.58	1.682			150.049	0.0126	1.884	Vel = 2.83
			0.0							
103			19.58						29.127	K Factor = 3.63
204	11.750		26.66	1.5	2E	9.9	136.708	120	28.203	
to					2T	19.799	29.699		0.0	
104	11.750		26.66	1.682			166.407	0.0222	3.699	Vel = 3.85
			0.0							
104			26.66						31.902	K Factor = 4.72
205	11.750		30.81	1.5	2T	19.799	129.583	120	28.373	
to							19.799		0.0	
105	11.750		30.81	1.682			149.382	0.0290	4.339	Vel = 4.45
			0.0							
105			30.81						32.712	K Factor = 5.39
206	23.250		25.41	1.5	2T	19.799	129.542	120	23.480	
to							19.799		0.0	
106	23.250		25.41	1.682			149.341	0.0203	3.036	Vel = 3.67
			0.0							
106			25.41						26.516	K Factor = 4.93
*MAINS										
201	13		60.67	2			19.333	120	24.055	
to									0.0	
202	13		60.67	2.157			19.333	0.0303	0.586	Vel = 5.33
202	13		41.80	2	2E	12.307	13.500	120	24.641	
to							12.307		0.541	
203	11.750		102.47	2.157			25.807	0.0799	2.061	Vel = 9.00
203	11.750		-19.59	2			17.583	120	27.243	
to									0.0	
M4	11.750		82.88	2.157			17.583	0.0540	0.949	Vel = 7.28
M4	11.750		-25.40	2			0.417	120	28.192	
to									0.0	
204	11.750		57.48	2.157			0.417	0.0264	0.011	Vel = 5.05
204	11.750		-26.67	2			19.667	120	28.203	
to									0.0	
205	11.750		30.81	2.157			19.667	0.0086	0.170	Vel = 2.71
			0.0							
205			30.81						28.373	K Factor = 5.78
206	23.250		-25.41	2	E	6.153	26.000	120	23.480	
to					T	12.307	18.460		4.981	
M4	11.750		-25.41	2.157			44.460	-0.0061	-0.269	Vel = 2.23
			0.0							

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
M4			-25.41						28.192	K Factor = -4.79
101	13		60.70	2			18.333	120	24.638	
to									0.0	
102	13		60.7	2.157			18.333	0.0303	0.556	Vel = 5.33
102	13		47.41	2	3E	18.46	20.000	120	25.194	
to							18.460		0.541	
103	11.750		108.11	2.157			38.460	0.0882	3.392	Vel = 9.49
103	11.750		19.58	2	T	12.307	6.000	120	29.127	
to							12.307		0.0	
M3	11.750		127.69	2.157			18.307	0.1200	2.197	Vel = 11.21
M3	11.750		0.0	3	E	9.408	3.000	120	31.324	
to							9.408		0.0	
M2	11.750		127.69	3.26			12.408	0.0161	0.200	Vel = 4.91
			0.0							
M2			127.69						31.524	K Factor = 22.74
106	23.250		25.41	3	E	9.408	3.000	120	26.516	
to					T	20.159	29.567		4.981	
M2	11.750		25.41	3.26			32.567	0.0008	0.027	Vel = 0.98
M2	11.750		127.69	3			16.833	120	31.524	
to									0.0	
104	11.750		153.1	3.26			16.833	0.0225	0.378	Vel = 5.88
104	11.750		26.67	3			26.792	120	31.902	
to									0.0	
105	11.750		179.77	3.26			26.792	0.0302	0.810	Vel = 6.91
105	11.750		30.81	3	2E	18.815	6.375	120	32.712	
to					T	20.159	38.974		0.541	
M1	10.500		210.58	3.26			45.349	0.0405	1.837	Vel = 8.09
M1	10.500		0.0	3	E	9.408	9.833	120	35.090	
to							9.408		0.0	
TOR	10.500		210.58	3.26			19.241	0.0405	0.780	Vel = 8.09
TOR	10.500		0.0	3	E	9.408	9.000	120	35.870	
to					S	21.503	44.351		3.898	
BOR	1.500		210.58	3.26	B	13.44	53.351	0.0405	2.161	Vel = 8.09
			0.0							
BOR			210.58						41.929	K Factor = 32.52
*UNDERGROUND										
BOR	1.500		210.58	6			146.500	140	41.929	
to									1.949	
UG1	-3		210.58	6.16			146.500	0.0014	0.201	Vel = 2.27
UG1	-3		0.0	8	2E	56.936	909.000	140	44.079	
to					T	55.354	189.786		0.0	
BF	-3		210.58	8.27	G	6.326	1098.786	0.0003	0.360	Vel = 1.26
					5F	71.17				
BF	-3		0.0	8	T	55.354	26.417	140	44.439	
to					2E	56.936	118.616		12.228	* * Fixed Loss = 12.228
UG2	-3		210.58	8.27	G	6.326	145.033	0.0003	0.047	Vel = 1.26
					Zim	0.0				
UG2	-3		0.0	20	2G	45.186	190.417	140	56.714	
to							45.186		0.0	
UG3	-3		210.58	20.57			235.603	0	0.001	Vel = 0.20

Final Calculations : Hazen-Williams

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
UG3	-3		0.0	6	T	43.037	3.500	140	56.715	
to					E	20.084	67.425		-2.166	
TEST	2		210.58	6.16	G	4.304	70.925	0.0014	0.098	Vel = 2.27
			100.00							Qa = 100.00
TEST			310.58						54.647	K Factor = 42.01



Crossroads Fire Protection
809 South Market Street
P.O. Box 926
Benson, NC 27504
919-207-3855

Job Name	:	Johnsonville Elementary School
Drawing	:	FP2
Location	:	18495 NC-27
Remote Area	:	3
Contract	:	CC-10164
Data File	:	Johnsonville Area 3.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME Johnsonville Elementary School
Location 18495 NC-27
Drawing # FP2
Contract # CC-10164
Date 5-10-2023

DESIGN

Remote area # 3
Remote area location Mechanical Loft
Occupancy classification Ordinary II
Density .2 - Gpm/SqFt
Area of application 7 Sprinklers - SqFt
Coverage/sprinkler 130 Max - SqFt
Type of sprinkler calculated 5.6K Upright
 # Sprinklers calculated 7
In-rack demand N/A - GPM
Hose streams 250 - GPM
Total water required (including hose streams) 434.887 - GPM @ 65.8101 - Psi
Type of system Wet Grid
Volume of system (dry or pre-action) N/A - Gal

WATER SUPPLY INFORMATION

Test date 9-22-2022
Location 18495 NC-27
Source of info Contract Documents

CONTRACTOR INFO Crossroads Fire Protection
Address 809 South Market Street / P.O. Box 926 / Benson, NC 27504
Phone # 919-207-3855
Name of designer DLN
Authority having jurisdiction Harnett County
NOTES: Single Line Calculation
Per 11.2.3.4.2

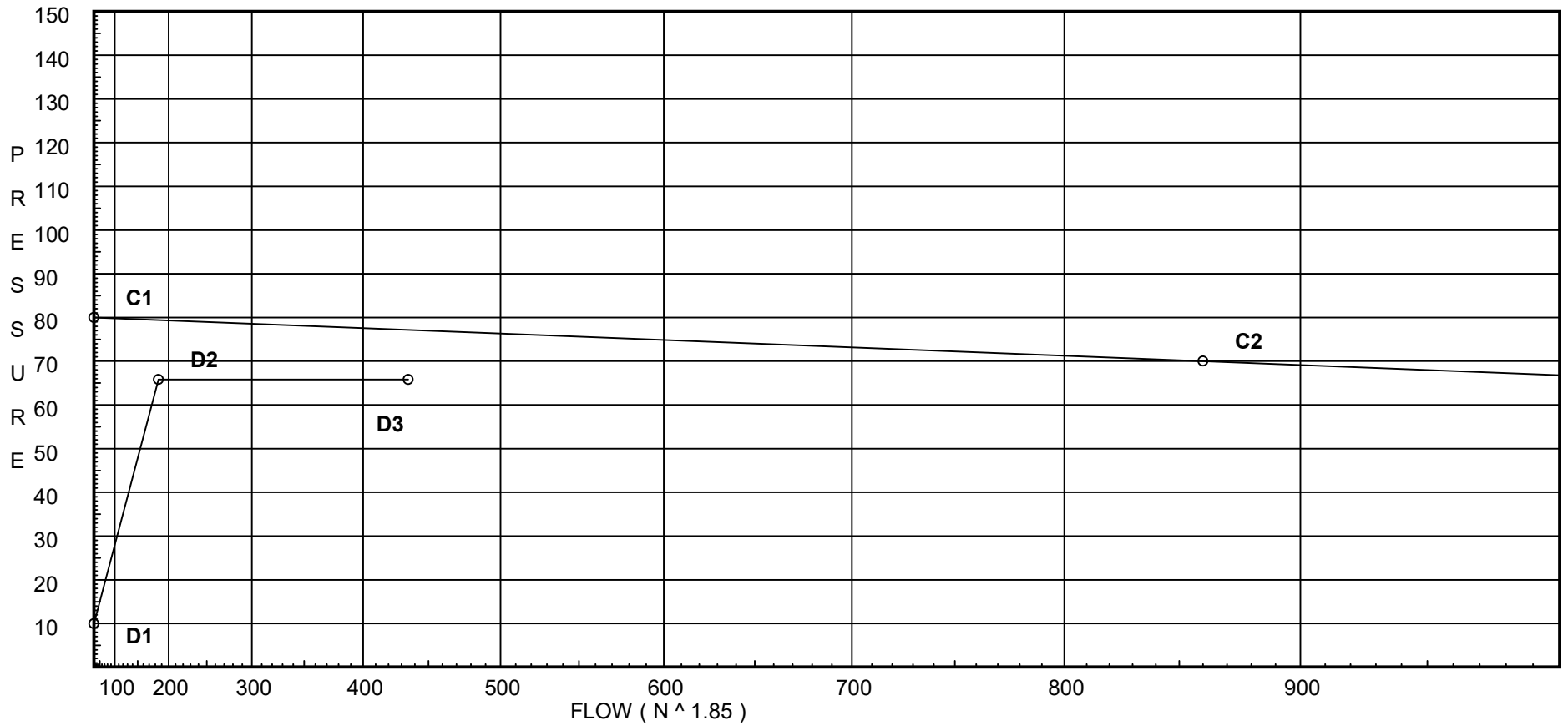
text1(35) - invisible

Water Supply Curve

Crossroads Fire Protection
Johnsonville Elementary School

City Water Supply:
- C1 - Static Pressure : 80
- C2 - Residual Pressure: 70
- C2 - Residual Flow : 860

Demand:
- D1 - Elevation : 9.961
- D2 - System Flow : 184.887
- D2 - System Pressure : 65.810
- Hose (Demand) : 250
- D3 - System Demand : 434.887
- Safety Margin : 11.357



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zim	Wilkins 375ADA	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
H11	25.0	5.6	23.37	na	27.07	0.2	130	7.0
H12	25.0	5.6	22.11	na	26.33	0.2	130	7.0
H13	25.0	5.6	21.62	na	26.04	0.2	130	7.0
H14	25.0	5.6	21.56	na	26.0	0.2	130	7.0
H15	25.0	5.6	21.62	na	26.04	0.2	130	7.0
H16	25.0	5.6	22.11	na	26.33	0.2	130	7.0
H17	25.0	5.6	23.38	na	27.08	0.2	130	7.0
206	23.25		34.02	na				
11	23.25		26.8	na				
12	23.25		25.41	na				
13	23.25		24.87	na				
14	23.25		24.8	na				
15	23.25		24.87	na				
16	23.25		25.41	na				
17	23.25		26.82	na				
201	13.0		41.91	na				
6	13.0		42.19	na				
7	13.0		42.23	na				
8	13.0		42.54	na				
202	13.0		41.89	na				
9	13.0		41.97	na				
10	13.0		42.17	na				
203	11.75		42.23	na				
204	11.75		41.92	na				
205	11.75		42.03	na				
M4	11.75		41.91	na				
101	13.0		42.82	na				
102	13.0		42.84	na				
103	11.75		43.68	na				
M3	11.75		44.01	na				
106	23.25		36.75	na				
M2	11.75		44.04	na				
104	11.75		44.36	na				
105	11.75		45.01	na				
M1	10.5		46.99	na				
TOR	10.5		47.61	na				
BOR	1.5		53.2	na				
UG1	-3.0		55.31	na				
BF	-3.0		55.59	na				
UG2	-3.0		67.9	na				
UG3	-3.0		67.9	na				
TEST	2.0		65.81	na	250.0			

The maximum velocity is 13.36 and it occurs in the pipe between nodes 17 and 106

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
*HEADS										
H11	25	5.60	27.07	1	2E	4.0	2.750	120	23.369	
to					T	5.0	9.000		0.758	
11	23.250		27.07	1.049			11.750	0.2278	2.677	Vel = 10.05
			0.0							
11			27.07						26.804	K Factor = 5.23
H12	25	5.60	26.33	1	2E	4.0	2.750	120	22.105	
to					T	5.0	9.000		0.758	
12	23.250		26.33	1.049			11.750	0.2164	2.543	Vel = 9.77
			0.0							
12			26.33						25.406	K Factor = 5.22
H13	25	5.60	26.04	1	2E	4.0	2.750	120	21.619	
to					T	5.0	9.000		0.758	
13	23.250		26.04	1.049			11.750	0.2120	2.491	Vel = 9.67
			0.0							
13			26.04						24.868	K Factor = 5.22
H14	25	5.60	26.00	1	2E	4.0	2.750	120	21.556	
to					T	5.0	9.000		0.758	
14	23.250		26.0	1.049			11.750	0.2114	2.484	Vel = 9.65
			0.0							
14			26.00						24.798	K Factor = 5.22
H15	25	5.60	26.04	1	2E	4.0	2.750	120	21.621	
to					T	5.0	9.000		0.758	
15	23.250		26.04	1.049			11.750	0.2120	2.491	Vel = 9.67
			0.0							
15			26.04						24.870	K Factor = 5.22
H16	25	5.60	26.33	1	2E	4.0	2.750	120	22.110	
to					T	5.0	9.000		0.758	
16	23.250		26.33	1.049			11.750	0.2165	2.544	Vel = 9.77
			0.0							
16			26.33						25.412	K Factor = 5.22
H17	25	5.60	27.08	1	2E	4.0	2.750	120	23.380	
to					T	5.0	9.000		0.758	
17	23.250		27.08	1.049			11.750	0.2279	2.678	Vel = 10.05
			0.0							
17			27.08						26.816	K Factor = 5.23
*LINES										
206	23.250		-92.36	1.5	T	9.9	22.708	120	34.021	
to							9.900		0.0	
11	23.250		-92.36	1.682			32.608	-0.2213	-7.217	Vel = 13.34
11	23.250		27.07	1.5			12.000	120	26.804	
to									0.0	
12	23.250		-65.29	1.682			12.000	-0.1165	-1.398	Vel = 9.43
12	23.250		26.33	1.5			12.000	120	25.406	
to									0.0	
13	23.250		-38.96	1.682			12.000	-0.0448	-0.538	Vel = 5.63
13	23.250		26.04	1.5			12.000	120	24.868	
to									0.0	
14	23.250		-12.92	1.682			12.000	-0.0058	-0.070	Vel = 1.87

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
14	23.250		26.00	1.5			12.000	120	24.798	
to									0.0	
15	23.250		13.08	1.682			12.000	0.0060	0.072	Vel = 1.89
15	23.250		26.04	1.5			12.000	120	24.870	
to									0.0	
16	23.250		39.12	1.682			12.000	0.0452	0.542	Vel = 5.65
16	23.250		26.33	1.5			12.000	120	25.412	
to									0.0	
17	23.250		65.45	1.682			12.000	0.1170	1.404	Vel = 9.45
17	23.250		27.08	1.5	T	9.9	34.833	120	26.816	
to							9.900		0.0	
106	23.250		92.53	1.682			44.733	0.2221	9.934	Vel = 13.36
			0.0							
106			92.53						36.750	K Factor = 15.26
201	13		11.02	1.5	T	9.9	55.500	120	41.911	
to							9.900		0.0	
6	13		11.02	1.682			65.400	0.0043	0.283	Vel = 1.59
6	13		0.0	1.5			8.000	120	42.194	
to									0.0	
7	13		11.02	1.682			8.000	0.0044	0.035	Vel = 1.59
7	13		0.0	1.5	T	9.9	60.958	120	42.229	
to							9.900		0.0	
8	13		11.02	1.682			70.858	0.0043	0.307	Vel = 1.59
8	13		0.0	1.5	T	9.9	55.500	120	42.536	
to							9.900		0.0	
101	13		11.02	1.682			65.400	0.0043	0.283	Vel = 1.59
			0.0							
101			11.02						42.819	K Factor = 1.68
202	13		17.92	1.5			8.000	120	41.886	
to									0.0	
9	13		17.92	1.682			8.000	0.0106	0.085	Vel = 2.59
9	13		0.0	1.5			18.375	120	41.971	
to									0.0	
10	13		17.92	1.682			18.375	0.0107	0.196	Vel = 2.59
10	13		0.0	1.5	2E	9.9	43.583	120	42.167	
to					T	9.9	19.800		0.0	
102	13		17.92	1.682			63.383	0.0107	0.676	Vel = 2.59
			0.0							
102			17.92						42.843	K Factor = 2.74
203	11.750		17.01	1.5	2T	19.799	130.250	120	42.229	
to							19.799		0.0	
103	11.750		17.01	1.682			150.049	0.0097	1.451	Vel = 2.46
			0.0							
103			17.01						43.680	K Factor = 2.57
204	11.750		21.29	1.5	2E	9.9	136.708	120	41.918	
to					2T	19.799	29.699		0.0	
104	11.750		21.29	1.682			166.407	0.0147	2.438	Vel = 3.07

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
			0.0							
104			21.29						44.356	K Factor = 3.20
205	11.750		25.12	1.5	2T	19.799	129.583	120	42.034	
to							19.799		0.0	
105	11.750		25.12	1.682			149.382	0.0199	2.974	Vel = 3.63
			0.0							
105			25.12						45.008	K Factor = 3.74
*MAINS										
201	13		-11.02	2			19.333	120	41.911	
to									0.0	
202	13		-11.02	2.157			19.333	-0.0013	-0.025	Vel = 0.97
202	13		-17.92	2	2E	12.307	13.500	120	41.886	
to							12.307		0.541	
203	11.750		-28.94	2.157			25.807	-0.0077	-0.198	Vel = 2.54
203	11.750		-17.01	2			17.583	120	42.229	
to									0.0	
M4	11.750		-45.95	2.157			17.583	-0.0181	-0.319	Vel = 4.03
M4	11.750		92.36	2			0.417	120	41.910	
to									0.0	
204	11.750		46.41	2.157			0.417	0.0192	0.008	Vel = 4.07
204	11.750		-21.29	2			19.667	120	41.918	
to									0.0	
205	11.750		25.12	2.157			19.667	0.0059	0.116	Vel = 2.21
			0.0							
205			25.12						42.034	K Factor = 3.87
206	23.250		92.36	2	E	6.153	25.666	120	34.021	
to					T	12.307	18.460		4.981	
M4	11.750		92.36	2.157			44.126	0.0659	2.908	Vel = 8.11
			0.0							
M4			92.36						41.910	K Factor = 14.27
101	13		11.02	2			18.333	120	42.819	
to									0.0	
102	13		11.02	2.157			18.333	0.0013	0.024	Vel = 0.97
102	13		17.92	2	3E	18.46	20.000	120	42.843	
to							18.460		0.541	
103	11.750		28.94	2.157			38.460	0.0077	0.296	Vel = 2.54
103	11.750		17.01	2	T	12.307	6.000	120	43.680	
to							12.307		0.0	
M3	11.750		45.95	2.157			18.307	0.0181	0.332	Vel = 4.03
M3	11.750		0.0	3	E	9.408	3.000	120	44.012	
to							9.408		0.0	
M2	11.750		45.95	3.26			12.408	0.0024	0.030	Vel = 1.77
			0.0							
M2			45.95						44.042	K Factor = 6.92
106	23.250		92.53	2	E	6.153	16.499	120	36.750	
to					T	12.307	18.460		4.981	
M2	11.750		92.53	2.157			34.959	0.0661	2.311	Vel = 8.12

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	******* Notes ******
M2	11.750		45.95	3			16.833	120	44.042	
to									0.0	
104	11.750		138.48	3.26			16.833	0.0187	0.314	Vel = 5.32
104	11.750		21.29	3			26.792	120	44.356	
to									0.0	
105	11.750		159.77	3.26			26.792	0.0243	0.652	Vel = 6.14
105	11.750		25.12	3	2E	18.815	6.375	120	45.008	
to					T	20.159	38.974		0.541	
M1	10.500		184.89	3.26			45.349	0.0318	1.444	Vel = 7.11
M1	10.500		0.0	3	E	9.408	9.833	120	46.993	
to							9.408		0.0	
TOR	10.500		184.89	3.26			19.241	0.0319	0.613	Vel = 7.11
TOR	10.500		0.0	3	E	9.408	9.000	120	47.606	
to					S	21.503	44.351		3.898	
BOR	1.500		184.89	3.26	B	13.44	53.351	0.0318	1.699	Vel = 7.11
			0.0							
BOR			184.89						53.203	K Factor = 25.35
*UNDERGROUND										
BOR	1.500		184.89	6			146.500	140	53.203	
to									1.949	
UG1	-3		184.89	6.16			146.500	0.0011	0.158	Vel = 1.99
UG1	-3		0.0	8	2E	56.936	909.000	140	55.310	
to					T	55.354	189.786		0.0	
BF	-3		184.89	8.27	G	6.326	1098.786	0.0003	0.282	Vel = 1.10
					5F	71.17				
BF	-3		0.0	8	T	55.354	26.417	140	55.592	
to					2E	56.936	118.616		12.268	* * Fixed Loss = 12.268
UG2	-3		184.89	8.27	G	6.326	145.033	0.0003	0.038	Vel = 1.10
					Zim	0.0				
UG2	-3		0.0	20	2G	45.186	190.417	140	67.898	
to							45.186		0.0	
UG3	-3		184.89	20.57			235.603	0	0.001	Vel = 0.18
UG3	-3		0.0	6	T	43.037	3.500	140	67.899	
to					E	20.084	67.425		-2.166	
TEST	2		184.89	6.16	G	4.304	70.925	0.0011	0.077	Vel = 1.99
			250.00							Qa = 250.00
TEST			434.89						65.810	K Factor = 53.61