Royal Botanical Gardens Hall Interior Renos
680 Plains Road W, Burlington, Ontario
ADDENDUM NO. 1
2025.03.11

The following additional instructions shall apply to and govern the tender documents.

AMENDMENT NO. 1 – ENGINEERED SPRINKLER DRAWINGS

1 Please find attached for your information only, **Engineered Sprinkler Drawings** for Royal Botanical Garden Auditorium/Hall. Sprinkler work to be done by Owner's Subtrade.

End of Addendum #1

SPECIFICATIONS

1.0 GENERAL SPECIFICATIONS

1.1. THESE DRAWINGS ARE THE PROPERTY OF THE ENGINEERS AND SHALL NOT BE ALTERED WITHOUT APPROVAL. DRAWINGS SHALL BE RETURNED UPON REQUEST.

1.2. BEFORE SUBMITTING TENDER FOR THIS WORK, EXAMINE THE SITE, LOCAL SERVICES AND LOCAL CONDITIONS, MECHANICAL DRAWINGS, LOCATION OF EXISTING EQUIPMENT AND SPACE ALLOWANCES TO ASCERTAIN THAT THE WORK CAN BE SATISFACTORILY CARRIED OUT AS SHOWN ON THESE DRAWINGS AND AS HEREIN SPECIFIED. BEFORE COMMENCING WORK, EXAMINE THE WORK AND REPORT AT ONCE, ANY DEFECT OF INTERFERENCE AFFECTING THE WORK OF THIS SECTION OR THE GUARANTEE OF SAME. NO EXTRA WILL SUBSEQUENTLY BE ALLOWED TO COVER ANY THOROUGH INSPECTION OF THE GROUNDS, EXISTING CONDITIONS, DRAWINGS AND SPECIFICATION. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE JOB AND REPORT DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

1.3. THESE DRAWINGS ARE FOR PERMIT, AND FOR PRICING, AND MUST BE ADHERED TO FOR INSTALLATION. IF CONTRACTOR WISHES TO ALTER DRAWINGS, THEN CONTRACTOR IS RESPONSIBLE FOR OBTAINING RE-APPROVALS.

1.4. CONTRACTOR TO SUPPLY AND INSTALL A COMPLETE AND FULLY OPERATIONAL AUTOMATIC SPRINKLER SYSTEM AS SHOWN ON THE DRAWINGS AND AS INDICATED IN THE SPECIFICATIONS AND CONFORMING TO N.F.P.A. REQUIREMENTS, O.B.C. REQUIREMENTS AND THE REQUIREMENTS OF THE LOCAL AUTHORITIES.

1.5. CONTRACTOR TO PROVIDE MONTHLY SUMMARY UPDATE OF AREAS OF WORK COMPETED.

1.6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL CODES, STANDARDS BY-LAWS AND AUTHORITIES HAVING JURISDICTION.

1.7. SYSTEMS TO BE INSTALLED AS PER N.F.P.A. STANDARDS, AND LOCAL AUTHORITIES

1.8. ALL WORK SHALL CONFORM TO C.S.A., E.S.A. CODES, AND LOCAL, MUNICIPAL AND PROVINCIAL LAWS AND REGULATIONS.

1.9. SPRINKLER CONTRACTOR TO CO-ORDINATE INSTALLATION WITH EXISTING SITE CONDITIONS AND ACCEPT RESPONSIBILITY FOR AND COST OF MAKING ADJUSTMENTS TO PIPING TO AVOID INTERFERENCE WITH MECHANICAL, ELECTRICAL AND OTHER BUILDING COMPONENTS.

1.10. SPRINKLER CONTRACTOR TO INCLUDE FOR OFFSETS IN SPRINKLER PIPING AND MUST SUPPLY AND INSTALL TRAPEZE HANGERS WHERE REQUIRED. HANGERS FOR MAINS TO BE INSTALLED AT PANEL POINTS OF JOISTS.

1.11. ALL MATERIALS USED IN THE INSTALLATION OF THE SPRINKLER SYSTEM SHALL BE CANADIAN MADE, UNLESS SPECIFICALLY APPROVED IN WRITING PRIOR TO INSTALLATION BY THE ARCHITECTS AND/OR ENGINEERS RESPONSIBLE FOR THE SYSTEM DESIGN.

1.12. ALL SPRINKLERS SHALL BE U.L.C. LISTED AND SHALL BE THE TYPE AND TEMPERATURE RATING SPECIFIED ON THE DRAWINGS. SPRINKLERS OF SUITABLE TEMPERATURE RATING SHALL BE INSTALLED NEAR HEATING EQUIPMENT AS SPECIFIED IN N.F.P.A. STANDARD # 13 (LATEST EDITION).

1.13. CONTRACTOR TO ALLOW IN PRICE FOR SUFFICIENT PIPE AND FITTINGS TO INSTALL PENDENT SPRINKLERS WITHIN A 5 FT. RADIUS OF THE LOCATION SHOWN ON DRAWINGS.

1.14. PROVIDE SPARE SPRINKLER HEADS AND WRENCH IN A METAL CABINET, MOUNTED ON THE WALL NEAR THE MAIN SPRINKLER VALVE HEADER. AMOUNT AS PER N.F.P.A. STANDARD # 13.

1.15. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL TEST THE SYSTEM AND SUBMIT TO THE ENGINEER COMPLETED CONTRACTORS TEST CERTIFICATES STATING THAT THE SYSTEMS HAVE BEEN INSTALLED, TESTED AND APPROVED BY THE AUTHORITIES HAVING JURISDICTION IN ACCORDANCE WITH N.F.P.A.#13, LATEST EDITION.

1.16. PENDENT SPRINKLERS INSTALLED WHERE SUSPENDED CEILING TILES OR DRYWALL OCCUR ARE TO BE EQUIPPED WITH TWO PIECE ESCUTCHEONS. (WHERE APPLICABLE)

1.17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE FIRE PROTECTION SYSTEMS AND FOR CO-ORDINATION WITH ALL SITE CONDITIONS. BEFORE COMMENCING WORK, EXAMINE THE SITE AND THE EXISTING CONDITIONS AND REPORT IMMEDIATELY TO THE ENGINEER ANY DEFECT OR INTERFERENCE AFFECTING THE COMPLETION OF THE WORK OR THE GUARANTEE OF THIS CONTRACTOR.

1.18. RECORD AS-BUILT" DRAWINGS: BE RESPONSIBLE FOR CLEARLY MARKING, AS THE JOB PROGRESSES, ALL CHANGES AND DEVIATIONS FROM THE ROUTING OF SERVICES AND THE LOCATION OF EQUIPMENT SHOWN ON THE CONTRACT DOCUMENTS ON A BOUND SET OF WHITE PRINTS. KEEP THE PRINTS AVAILABLE AT THE SITE FOR PERIODIC INSPECTION THROUGHOUT THE DURATION OF THE WORK. NOTE THAT MARKED-UP WHITE PRINTS SHALL INCORPORATE ALL REVISIONS MADE BY CHANGE ORDERS, ADDENDA, FIELD INSTRUCTION, ETC. HAND THE AS-BUILT DRAWINGS TO THE ENGINEER AT THE END OF THE PROJECT.

1.19. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE CO-OPERATIVE. PERFORM ALL WORK WHICH IS SHOWN, SPECIFIED OR REASONABLY IMPLIED ON THE DRAWINGS, BUT NOT MENTIONED IN THE SPECIFICATIONS OR VICE-VERSA, AS THOUGH FULLY COVERED BY BOTH.

1.20. WARRANT THE MECHANICAL WORK TO BE IN STRICT ACCORDANCE WITH THE CONTRACT DOCUMENTS AND FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ISSUED OF CERTIFICATE OF SUBSTANTIAL PERFORMANCE OF THE WORK. PROVIDE EXTENDED WARRANTY WHERE SPECIFIED IN ALL SUBSEQUENT SECTIONS OF THE SPECIFICATION.

1.21. MAINTAIN LIABILITY INSURANCE WHICH WILL FULLY PROTECT THE OWNER AND THE CONTRACTORS FROM ANY AND ALL CLAIMS UNDER THE WORKPLACE SAFETY & INSURANCE BOARD ACT.

1.22. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE LAYOUT OF WORK AND FOR ANY DAMAGE CAUSED TO THE PROPERTY OF THE OWNER OR OTHER TRADES THROUGH THE IMPROPER LOCATION OF MATERIALS, EQUIPMENT, OR CARRYING OUT OF THE WORK.

1.23. PROVIDE PIPE HANGERS OR SUPPORTS ON ALL PIPING. HANGER RODS MUST BE VERTICAL WITHOUT BENDS OR OFFSETS AND WORKMANSHIP MUST BE SUCH THAT FINISHED PIPING IS TRUE, BOTH WITH MANUFACTURER'S LINE AND GRADE. METAL STRAPS, WIRES, PERFORATED BANDS, CHAIN OR SOLID RING HANGERS USED AS PIPE HANGERS OR SUPPORTS WILL NOT BE ACCEPTABLE.

1.24. WHERE NEW PIPES PASS THROUGH EXISTING CONCRETE SLABS AND CONCRETE OR MASONRY WALLS, CORE DRILL OR SAW CUT AN OPENING. SIZE OPENINGS TO LEAVE 13 mm (1/2") CLEARANCES AROUND PIPES. PACK AND SEAL THE VOID BETWEEN THE OPENING AND THE PIPES FOR THE LENGTH OF THE OPENING WITH DOW CORNING SERIES 2000. "FIRESTOP" SEALANT U.L.C. APPROVED MATERIAL PACKED AND SECURED IN SUCH A MANNER THAT THE PACKING IN VERTICAL HOLES AND OPENINGS WILL NOT FALL OUT.

1.25. WHERE DISSIMILAR METALS ARE IN CLOSE PROXIMITY TO EACH OTHER, THEY SHALL BE SEPARATED BY MEANS OF WATERPROOF GASKETS OR OF APPROVED MATERIALS. SCREWS, BOLTS, RIVETS AND OTHER FASTENING DEVICES SHALL BE MADE OF THE SAME MATERIALS OR OF MATERIALS HAVING THE SAME CHARACTERISTICS AS THE METALS WHICH THEY FASTEN, IN ORDER TO PREVENT ELECTROLYTIC ACTION. PROVIDE HEAVY BRASS ADAPTORS FOR CONNECTIONS BETWEEN STEEL AND COPPER PIPES.

1.26. NO INSTALLATION SHALL BE CONCEALED OR RENDERED INACCESSIBLE BY DRYWALL, BOARDING OR OTHER BUILDING CONSTRUCTION, UNTIL IT HAS BEEN INSPECTED BY THE ENGINEER AND LOCAL AUTHORITIES HAVING JURISDICTION AND FOUND TO CONFORM TO CONTRACT DOCUMENT AND REGULATIONS. WHEN REQUESTING AN INSPECTION, THE CONTRACTOR SHALL PROVIDE A MINIMUM OF THREE (3) WORKING DAYS NOTICE IN ADVANCE.

1.27. DIMENSIONS AND/OR MEASUREMENTS INDICATED ON THE DRAWINGS ARE TO BE VERIFIED AT SITE AND ANY MAJOR DISCREPANCIES TO BE REPORTED PRIOR TO FABRICATION AND INSTALLATION. (IF APPLICABLE)

1.28. EXACT LOCATION AND ELEVATION OF MAINS TO BE DETERMINED BY CONTRACTOR TO SUIT SITE CONDITIONS.

1.29. CONTRACTOR TO CO-ORDINATE LOCATION OF SPRINKLERS WITH RESPECT TO SURFACE MOUNTED LIGHT FIXTURES AND MAINTAIN MINIMUM CLEARANCE AS REQUIRED BY NFPA 13 TO AVOID ANY OBSTRUCTION TO SPRAY PATTERN OF SPRINKLERS.

1.30. MINIMUM WALL THICKNESS OF SPRINKLER PIPING TO BE EQUIVALENT TO SCHEDULE 10S.

1.31. CONTRACTOR TO INCLUDE FOR AN ADDITIONAL 3 SPRINKLERS FOR BELOW OBSTRUCTIONS ETC.

1.32. SINCE THE BUILDING IS EXISTING, CONTRACTOR IS TO VISIT SITE AND BECOME FAMILIAR WITH EXISTING SITE CONDITIONS RELATIVE TO THE PROJECT AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO QUOTING OR FABRICATION

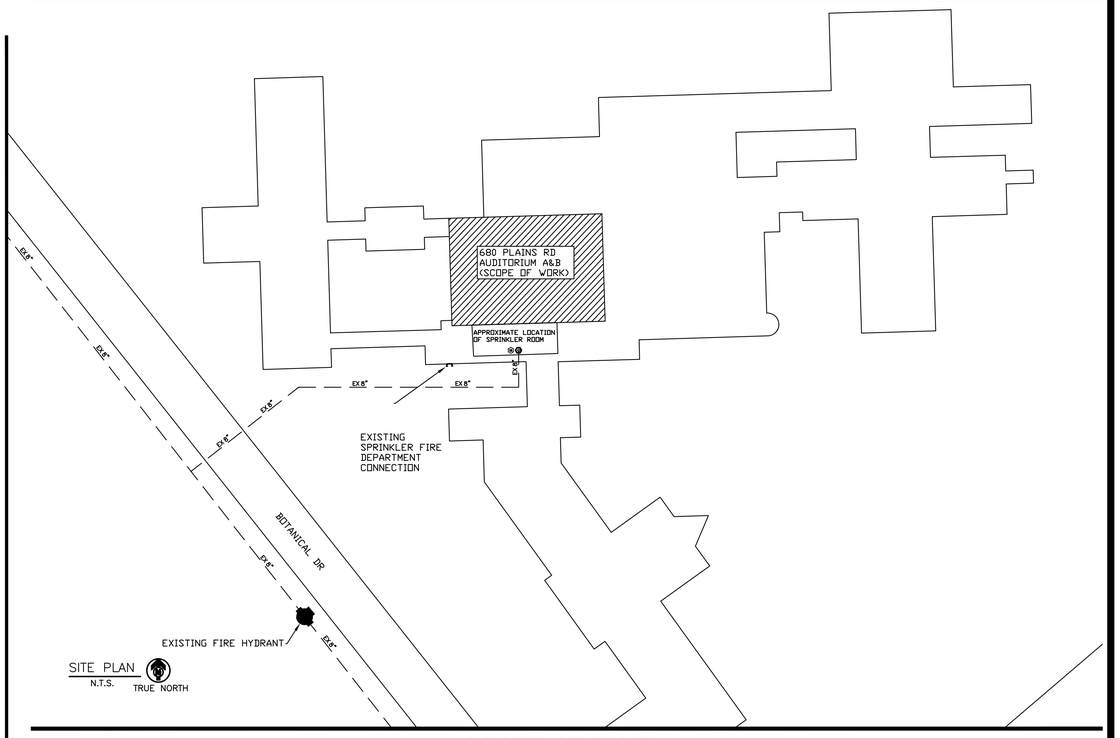
1.33. A COPY OF N.F.P.A STANDARD #25 IS TO BE PROVIDED AND LEFT IN A VISIBLE LOCATION IN THE SPRINKLER ROOM.

1.34. PROVIDE SHOP DRAWINGS FOR THE FOLLOWING: (WHERE APPLICABLE)
A) - SPRINKLERS
B) - DOUBLE CHECK VALVE ASSEMBLY / BACKFLOW DEVICE
C) - RISER CHECK/ALARM VALVE AND TRIM/DRY PIPE VALVE
D) - SUPERVISORY DEVICES
E) - HANGERS

1.35 ALL SPRINKLER EQUIPMENT SHALL BE OF ONE MANUFACTURER FROM THE FOLLOWING:
- VICTAULIC
- VIKING
- TYCO
- RELIABLE
- OR APPROVED EQUAL. ALL SHALL BE U.L.C. LISTED FOR THEIR SPECIFIC APPLICATION.

1.36 CONTRACTOR MAY USE 1 INCH DIA. FLEXIBLE DROPS WITH A MAXIMUM LENGTH OF 4 FEET WITH A MAXIMUM OF 8, 90 DEGREE BENDS. FLEXIBLE PIPING IF USED IS TO BE STAINLESS STEEL WITH BRAIDED CONNECTION, SINGLE PIECE WELDED CONSTRUCTION WITH NO O-RINGS OR GASKETS, ULC LISTED AND FM APPROVED.

SITE PLAN



SCOPE OF WORK

SCOPE OF WORK:

1. FIRE PROTECTION WORK CONSISTS OF MODIFYING EXISTING SPRINKLER SYSTEM THROUGHOUT THE RENOVATED GROUND FLOOR AUDITORIUM IN ACCORDANCE WITH DRAWINGS:

   FP-01 – SITE PLAN, SPECIFICATIONS, DETAILS AND SPRINKLER HEADER DIAGRAM
   FP-02 – PROPOSED SPRINKLER DESIGN LAYOUT – AUDITORIUM HIGH AND LOW CEILING

DESIGN DATA:

1. ALL WORK AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE (2024), AUTHORITY HAVING JURISDICTION REQUIREMENTS, WITH NFPA 13 (2019)
2. HYDRAULIC REQUIREMENTS ARE IN COMPLIANCE WITH NFPA 13 AND SPRINKLER HEAD SPECIFICATIONS.

   CALCULATION #1 – WET SYSTEM – GROUND FLOOR – LIGHT HAZARD – SPRK SYS DESIGNED FOR DISCHARGE RATE OF 0.1 GPM/SQ. FT OVER AN AREA OF 1500 SQ. FT

   CALCULATION #2 – WET SYSTEM – GROUND FLOOR – LIGHT HAZARD – SPRK SYS DESIGNED FOR DISCHARGE RATE OF 0.1 GPM/SQ. FT WITH A MAX OF 7 HEADS IN DESIGN AREA (19.3.3.4.2)

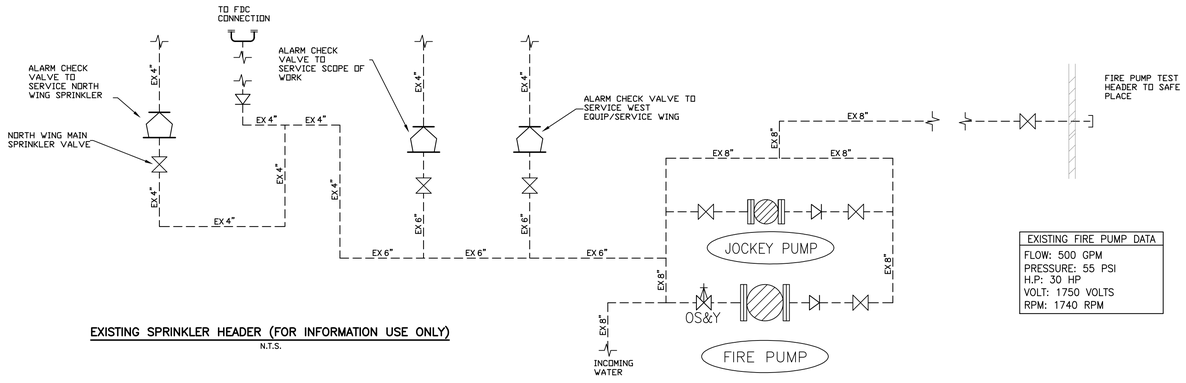
DESIGN CRITERIA:

AUDITORIUM DESIGNED AS WET TYPE SPRINKLER SYSTEM – LIGHT HAZARD – SPRINKLER SYSTEM IS DESIGNED TO DISCHARGE AT A DENSITY OF 0.10 GPM/SQ.FT OVER AN AREA OF 1500 SQ.FT PLUS 100 GPM FOR HOSES PER NFPA 13 (2019 ED, FIG 19.3.3.1.1, 19.3.3.2.5)

FIRE PUMP TEST INFORMATION:

FIRE PUMP TEST LOCATION: 680 PLAINS RD W, BURLINGTON ON
DATE: DECEMBER 11TH 2023
STATIC: 105 PSI
RESIDUAL: 88 PSI FLOW: 500 GPM

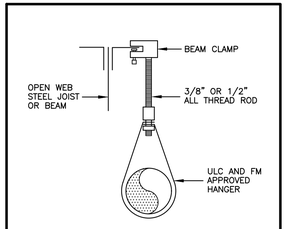
EXISTING SPRINKLER HEADER DETAILS



EXISTING FIRE PUMP DATA
FLOW: 500 GPM
PRESSURE: 55 PSI
H.P: 30 HP
VOLT: 1750 VOLTS
RPM: 1740 RPM

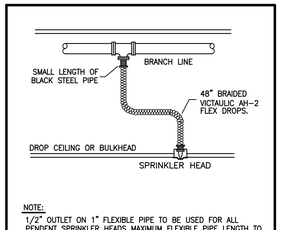
EXISTING SPRINKLER HEADER (FOR INFORMATION USE ONLY)
N.T.S.

NFPA 13 DETAILS



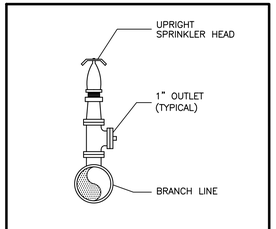
AS PER N.F.P.A.13

HANGER DETAIL
N.T.S.



NOTE:
1/2" OUTLET ON 1" FLEXIBLE PIPE TO BE USED FOR ALL PENDENT SPRINKLER HEADS MAXIMUM FLEXIBLE PIPE LENGTH TO BE 4'-0". MINIMUM BEND RADIUS TO BE 2", MAXIMUM 8 BENDS.

SPRINKLER HEAD C/W FLEXIBLE PIPING INSTALLATION
N.T.S.



UPRIGHT SPRINKLER & 1" OUTLET DETAIL
N.T.S.

SUBMITTALS

NO	DATE	DESCRIPTION	DWN	CH'D
1	FEB 28/2025	ISSUED FOR CLIENT REVIEW AND COORDINATION	TM	JC
2	MAR 10/2025	ISSUED FOR PERMIT	TM	JC

NORRIS FIRE CONSULTING

Norris Fire Consulting Inc
Smoke Control | Sprinkler | Fire Alarm | Code |
1840 Clements Road, Suite 202, Pickering, ON L1W 3Y2
Tel: (905) 669-5154; www.norrisfireconsulting.com
Learn + Grow + Inspire + Execute

Professional Engineers Ontario
Limited Engineering Licensee
Name: M B J Norris
Number: 100229827
Limitations: Specifying and reviewing of fire protection and fire alarm systems as per OBC, OFC and NFPA (13, 14, 17A, 20, 22, 24, 30, 70, 101, 2001 & 5000)
Association of Professional Engineers of Ontario
MAR. 10/25

AUDITORIUM A&B
680 PLAINS RD. W
BURLINGTON, ONTARIO

DRAWING TITLE
SITE PLAN, SPECIFICATIONS, DETAILS AND SPRINKLER HEADER DIAGRAM

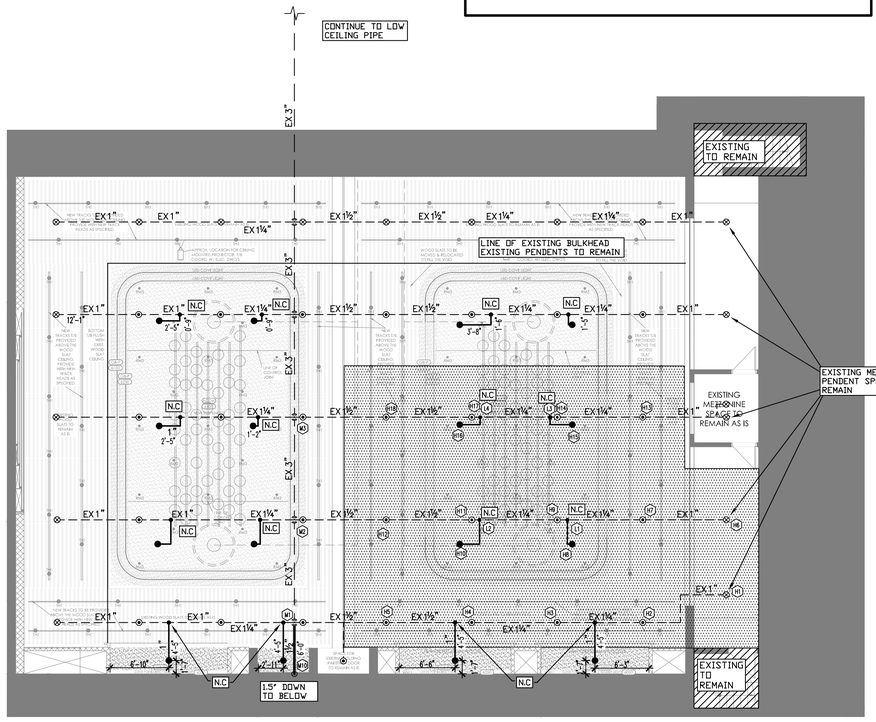
JOB. NO. 24-0453
SCALE: 1 : 100
DRAWN BY: TM
CHECKED BY: JC
SHEET FP-01

GENERAL INSTALLATION NOTE:

1. CONTRACTOR TO COORDINATE THE LOCATION OF PENDENT HEADS WITH ELECTRICAL & MECHANICAL SERVICES TO AVOID INTERFERENCE WITH OR OBSTRUCTIONS CREATED BY LIGHTS AND/OR DUCWORK (WHERE APPLICABLE).
2. CONTRACTOR TO CONFIRM EXISTING STRUCTURE AND PIPE ROUTING ON SITE PRIOR TO INSTALLATION
3. SPRINKLER CONTRACTOR TO INCLUDE FOR OFFSETS IN THE SPRINKLER PIPING AND SUPPLY AND INSTALLATION OF HANGERS. HANGERS SHALL BE PER NFPA 13.
4. ALL SPRINKLER HEADS IN DRYWALL CEILING TO BE OF CONCEALED HEAD TYPE SPRINKLERS

LEGEND:

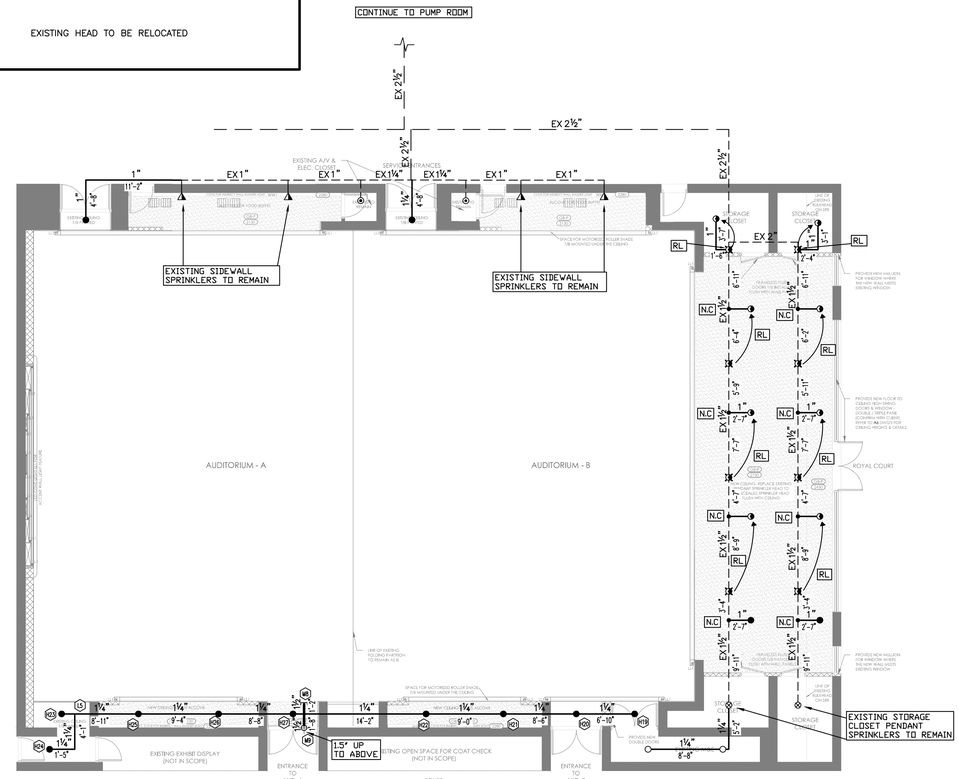
- EX. — EXISTING BRANCH LINE TO REMAIN
- EX. — EXISTING MAIN TO REMAIN
- NEW BRANCH LINE TO BE INSTALLED
- N.C — NEW CONNECTION
- R.L — EXISTING HEAD TO BE RELOCATED



AUDITORIUM HIGH CEILING

SCALE 1:100

Hydraulic Calculation Data
Design Area Number: 1 Design Area Location: GROUND FLOOR HIGH CEILING Hazard/Occupancy: LIGHT HAZARD Design Density: 0.10 GPM / SQ FT Design Area: 1571 SQ FT Number of Sprinklers in Design Area: 18
System Demand: 513.60 GPM System Pressure: 67.04 PSI Hose Allowance (Included): 100 GPM



AUDITORIUM LOW CEILING

SCALE 1:100

Hydraulic Calculation Data
Design Area Number: 2 Design Area Location: GROUND FLOOR LOW CEILING Hazard/Occupancy: LIGHT HAZARD Design Density: 0.10 GPM / SQ FT Design Area: UP TO 7 HEADS PER LINE (19.3.3.4.2) Number of Sprinklers in Design Area: 9 (2 LINES)
System Demand: 269.73 GPM System Pressure: 40.77 PSI Hose Allowance (Included): 100 GPM

Table 10.2.7.1.2 Positioning of Sprinklers to Avoid Obstructions to Discharge (SSU/SSP)

Distance from Sprinkler to Side of Obstruction (A)	Maximum Allowable Distance of Deflector above Bottom of Obstruction (B) [in.(mm)]
Less than 1 ft	0
1 ft to less than 1 ft 6 in.	2 1/2 (65)
1 ft 6 in. to less than 2 ft	3 1/2 (90)
2 ft to less than 2 ft 6 in.	5 1/2 (140)
2 ft 6 in. to less than 3 ft	7 1/2 (190)
3 ft to less than 3 ft 6 in.	9 1/2 (240)
3 ft 6 in. to less than 4 ft	12 (300)
4 ft to less than 4 ft 6 in.	14 (350)
4 ft 6 in. to less than 5 ft	16 1/2 (420)
5 ft to less than 5 ft 6 in.	18 (450)
5 ft 6in. to less than 6 ft	20 (510)
6 ft to less than 6 ft 6 in.	24 (600)
6 ft 6 in. to less than 7 ft	30 (750)
7 ft to less than 7 ft 6 in	35 (875)

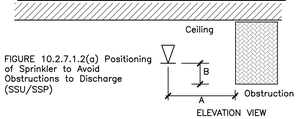


FIGURE 10.2.7.1.2(a) Positioning of Sprinkler to Avoid Obstructions to Discharge (SSU/SSP)

ELEVATION VIEW

SPRINKLER OUTLET SIZES
K2.8 TO 5.6: ½"
K8.0 TO 16.8: ¾"
K22.4 TO 34: 1"
DRY PEND & SW 1"
ESFR DRY PEND 1 ½"

SUBMITTALS

NO	DATE	DESCRIPTION	DWN	CH'D
1	FEB 28/2025	ISSUED FOR CLIENT REVIEW AND COORDINATION	TM	JC
2	MAR 10/2025	ISSUED FOR PERMIT	TM	JC

HEAD COUNT

S/R=STANDARD RESPONSE Q/R=QUICK RESPONSE
○ C/W GUARD

◑	EXISTING PENDENT TO BE RELOCATED	–
⊗	EXISTING STANDARD COVERAGE PENDENT (K=5.6) S/R TO REMAIN	–
◭	EXISTING STANDARD COVERAGE SIDEWALL (K=5.6) S/R TO REMAIN	–
⊛	EXISTING STANDARD COVERAGE UPRIGHT (K=5.6) S/R TO REMAIN	–
○	175°F STANDARD COVERAGE UPRIGHT (K=5.6) S/R	2
●	175°F STANDARD COVERAGE PENDENT (K=5.6) S/R	30

NORRIS FIRE CONSULTING

Norris Fire Consulting Inc
Smoke Control | Sprinkler | Fire Alarm | Code |
1840 Clements Road, Suite 202, Pickering, ON L1W 3Y2
Tel: (905) 669-5154; www.norrisfireconsulting.com
Learn + Grow + Inspire + Execute

PROJECT NORTH

Professional Engineers Ontario
Limited Engineering Licensee
Name: M B J Norris
Number: 100229827
Limitations: Specifying and reviewing of fire protection and fire alarm systems as per OBC, OFC and NFPA (13, 14, 17A, 20, 22, 24, 30, 70, 101, 2001 & 5000)
Association of Professional Engineers of Ontario
MAR. 10/25

AUDITORIUM A&B

680 PLAINS RD. W
BURLINGTON, ONTARIO

DRAWING TITLE

PROPOSED SPRINKLER DESIGN LAYOUT - AUDITORIUM HIGH AND LOW CEILING

JOB. NO. 24-0453

SCALE: 1 : 100

DRAWN BY: TM | CHECKED BY: JC

SHEET FP-02

NORRIS FIRE CONSULTING

Smoke Control | Sprinkler | Fire Alarm | Codes

SPRINKLER SYSTEM HYDRAULICS
FOR
680 PLAINS RD.

Professional Engineers
Ontario

Limited Engineering Licensee

Name: M B J Norris Mar. 10, 2025
Number: 100229827
Limitations: Specifying and reviewing of fire protection and fire alarm systems as per OBC, OFC and NFPA (13, 14, 17A, 20, 22, 24, 30, 70, 101, 2001 & 5000)

Association of Professional Engineers of Ontario

680 PLAINS RD,
BURLINGTON, ON
Date: MARCH 10TH, 2025

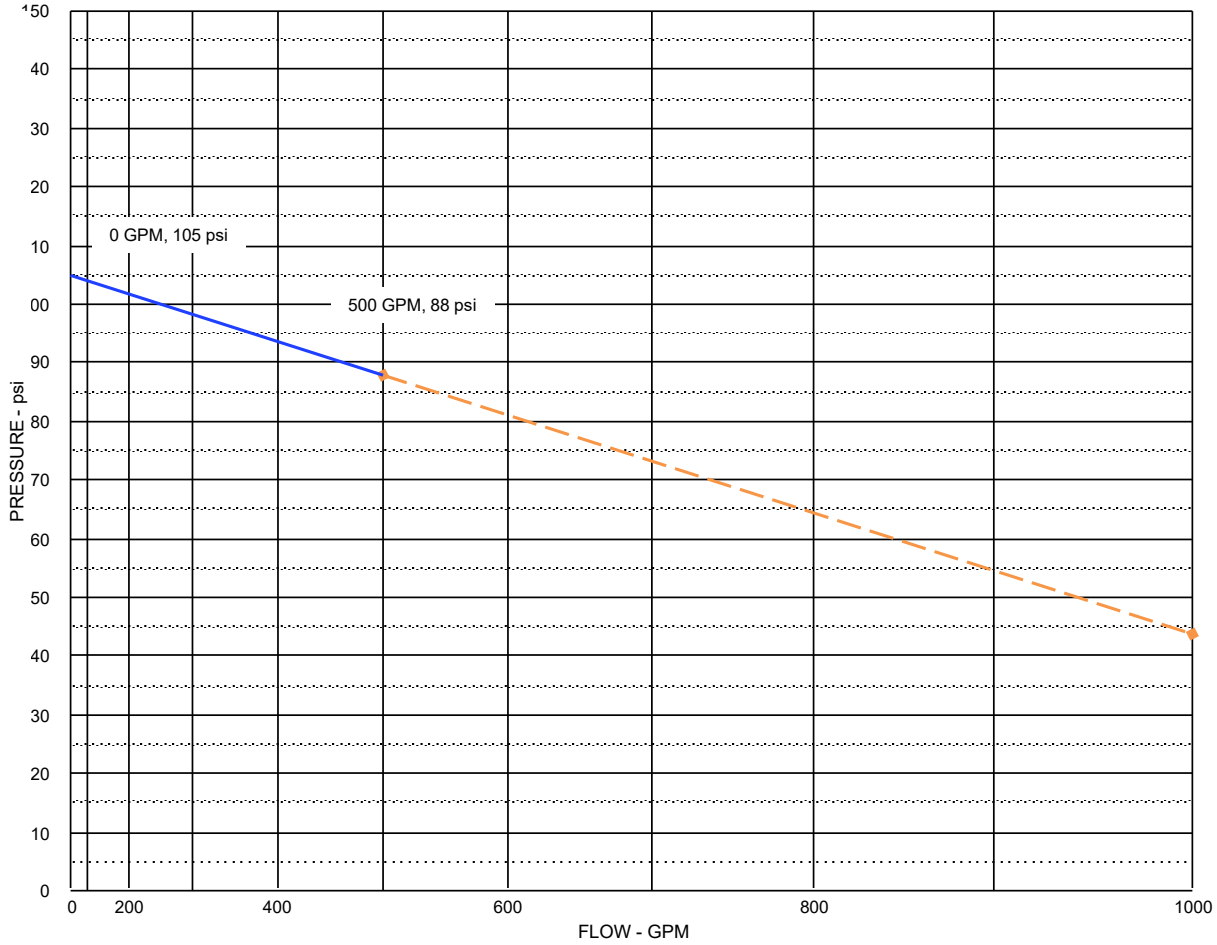
NORRIS FIRE CONSULTING INC

Project No. 24-0453

1840 Clements Rd., Ste. 202, Pickering, ON L1W 3Y2 • (905) 669-5154 • contact@norrisfc.com • www.norrisfireconsulting.com

TABLE OF CONTENTS

Available Water Supply Graph



680 Plains Rd.
Burlington, ON

Test By
J.D. Collins Fire Protection Company

Test Date
December 11, 2023

Results

Pressure (PSI)	Flow (GPM)
105 PSI	0 GPM
88 PSI	500 GPM

NORRIS FIRE

NORRIS FIRE
CONSULTING

Norris Fire Consulting INC.
1840 Clements Road
Suite 200
Pickering, On, L1W 3Y2
905-669-5154

Job Name	:	24-0453 680 Plains Rd
Drawing	:	FP-02
Location	:	Burlington, On
Remote Area	:	1
Contract	:	24-0453
Data File	:	24-0453 680 Plains Rd - Calc.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME 24-0453 680 Plains Rd
Location Burlington, On
Drawing # FP-02
Contract # 24-0453
Date 3/10/2025

DESIGN

Remote area # 1
Remote area location Auditorium High Ceiling
Occupancy classification LH
Density 0.1 - Gpm/SqFt
Area of application 1571 - SqFt
Coverage/sprinkler 150 - SqFt
Type of sprinkler calculated K5.6 Upright & Pendent S/R
 # Sprinklers calculated 18
In-rack demand - GPM
Hose streams 100 - GPM
Total water required (including hose streams) 381.733 - GPM @ 43.5382 - Psi
Type of system Wet
Volume of system (dry or pre-action) - Gal

WATER SUPPLY INFORMATION

Test date 12/11/2023
Location 680 Plains Rd.
Source of info Fire Pump Test

CONTRACTOR INFO Norris Fire Consulting INC.
Address 1840 Clements Road / Suite 200 / Pickering, On, L1W 3Y2
Phone # 905-669-5154
Name of designer
Authority having jurisdiction
NOTES:

text1(35) - invisible

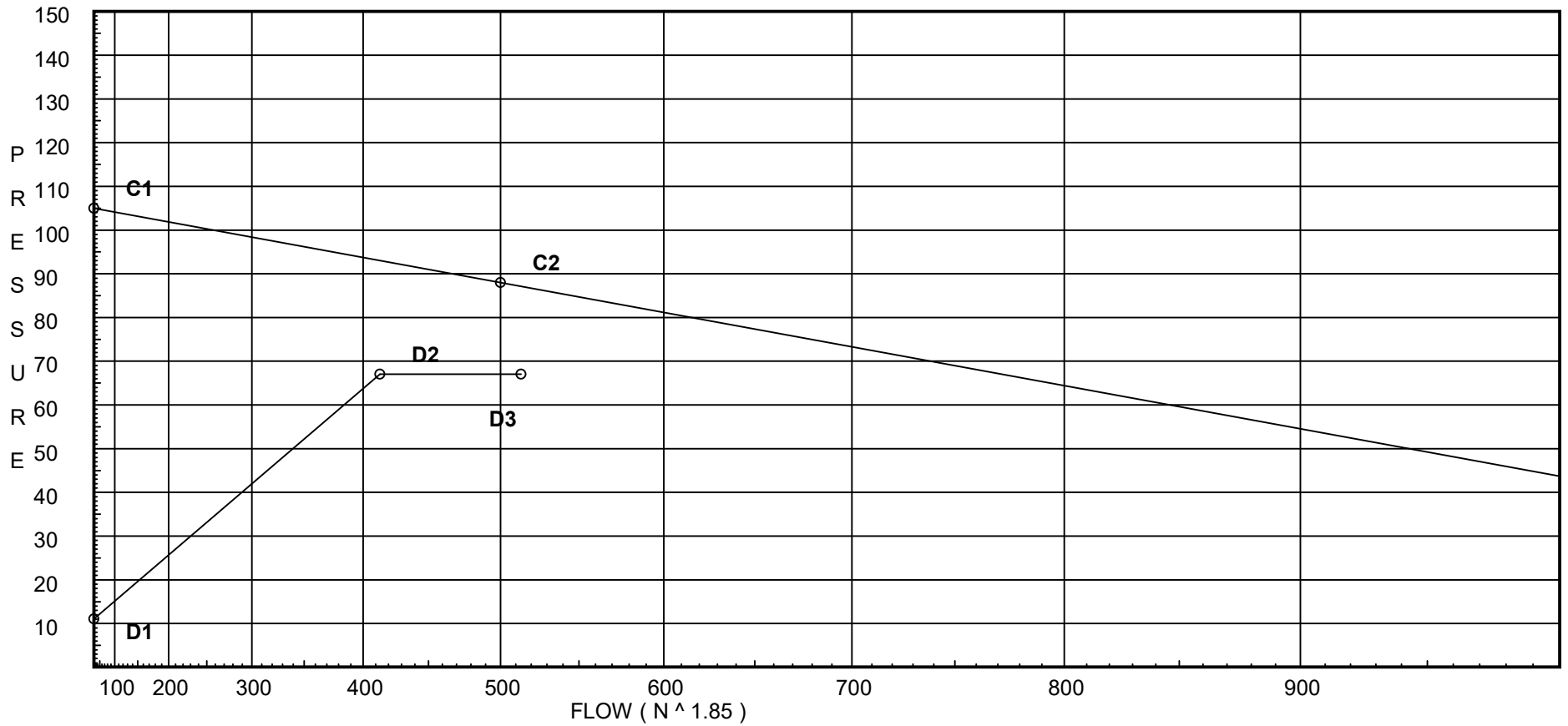
Water Supply Curve

Norris Fire Consulting INC.
24-0453 680 Plains Rd

Date 3/10/2025

City Water Supply:
- C1 - Static Pressure : 105
- C2 - Residual Pressure: 88
- C2 - Residual Flow : 500

Demand:
- D1 - Elevation : 11.044
- D2 - System Flow : 413.422
- D2 - System Pressure : 67.023
- Hose (Demand) : 100
- D3 - System Demand : 513.422
- Safety Margin : 20.124



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
Avc	Alarm Vic 751	0	0	0	0	3	9	8	17	0	21	0	22	50	0	0	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
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

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.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
FPO	105.0	88	500.0	87.146	513.42	67.023

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
SH	20.0	5.6	10.8	18.4	0.1	184
SH1	25.5		11.98			
SL	20.0	5.6	7.0	14.82	0.1	75
SL1	25.5		7.01			
H1	25.5	5.6	14.84	21.58	0.1	75
H2	25.5	5.6	17.55	23.46	0.1	83.8
H3	25.5	5.6	19.08	24.46	0.1	66.65
H4	25.5	5.6	22.49	26.56	0.1	66.65
H5	25.5	5.6	24.86	27.92	0.1	83.74
H6	25.5	5.6	10.63	18.26	0.1	154.98
H7	25.5	5.6	12.18	19.54	0.1	112.2
H8	25.5	5.32	11.98	18.4	K=K @ SH1	
L1	25.5		13.15			
H9	25.5	5.6	13.42	20.52	0.1	112.2
H10	25.5	5.32	16.26	21.43	K=K @ SH1	
L2	25.5		17.16			
H11	25.5	5.6	17.75	23.6	0.1	154.98
H12	25.5	5.6	22.31	26.45	0.1	106.25
H13	25.5	5.6	16.07	22.45	0.1	112.2
H14	25.5	5.6	16.49	22.74	0.1	154.98
H15	25.5	5.32	15.84	21.15	K=K @ SH1	
L3	25.5		16.62			
H16	25.5	5.32	18.32	22.75	K=K @ SH1	
L4	25.5		19.18			
H17	25.5	5.6	19.72	24.87	0.1	154.98
H18	25.5	5.6	23.74	27.29	0.1	106.25
M1	25.5		33.67			
M2	25.5		33.92			
M3	25.5		34.97			
M4	10.0		52.32			
M5	10.0		57.82			
M6	10.0		58.99			
M7	10.0		60.24			
TOR	10.0		61.57			
BOR	0.0		66.43			
FPO	0.0		67.02	100.0		

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 ******
SH	20	5.60	18.40	1			32.000	120	10.796	
to									-2.382	
SH1	25.500		18.4	1.049			32.000	0.1115	3.569	Vel = 6.83
			0.0							
SH1			18.40						11.983	K Factor = 5.32
SL	20	5.60	14.82	1			32.000	120	7.000	
to									-2.382	
SL1	25.500		14.82	1.049			32.000	0.0747	2.390	Vel = 5.50
			0.0							
SL1			14.82						7.008	K Factor = 5.60
H1	25.500	5.60	21.58	1	2E	4.0	14.060	120	14.845	
to							4.000		0.0	
H2	25.500		21.58	1.049			18.060	0.1497	2.704	Vel = 8.01
H2	25.500	5.60	23.46	1.25			9.960	120	17.549	
to									0.0	
H3	25.500		45.04	1.38			9.960	0.1536	1.530	Vel = 9.66
H3	25.500	5.60	24.46	1.25			9.960	120	19.079	
to									0.0	
H4	25.500		69.5	1.38			9.960	0.3429	3.415	Vel = 14.91
H4	25.500	5.60	26.56	1.5			8.030	120	22.494	
to									0.0	
H5	25.500		96.06	1.61			8.030	0.2945	2.365	Vel = 15.14
H5	25.500	5.60	27.92	1.5	T	8.0	10.670	120	24.859	
to							8.000		0.0	
M1	25.500		123.98	1.61			18.670	0.4721	8.815	Vel = 19.54
			0.0							
M1			123.98						33.674	K Factor = 21.37
H6	25.500	5.60	18.26	1			14.060	120	10.634	
to									0.0	
H7	25.500		18.26	1.049			14.060	0.1100	1.546	Vel = 6.78
H7	25.500	5.60	19.55	1.25			8.750	120	12.180	
to									0.0	
L1	25.500		37.81	1.38			8.750	0.1112	0.973	Vel = 8.11
			0.0							
L1			37.81						13.153	K Factor = 10.43
H8	25.500	5.32	18.40	1	E	2.0	3.490	120	11.983	K = K @ SH1
to					T	5.0	7.000		0.0	
L1	25.500		18.4	1.049			10.490	0.1115	1.170	Vel = 6.83
L1	25.500		37.81	1.25			1.167	120	13.153	
to									0.0	
H9	25.500		56.21	1.38			1.167	0.2314	0.270	Vel = 12.06
H9	25.500	5.60	20.51	1.25			9.083	120	13.423	
to									0.0	
L2	25.500		76.72	1.38			9.083	0.4116	3.739	Vel = 16.46
			0.0							
L2			76.72						17.162	K Factor = 18.52
H10	25.500	5.32	21.43	1	E	2.0	4.120	120	16.257	K = K @ SH1
to							2.000		0.0	
L2	25.500		21.43	1.049			6.120	0.1479	0.905	Vel = 7.96

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 ******
L2	25.500		76.72	1.25			0.910	120	17.162	
to									0.0	
H11	25.500		98.15	1.38			0.910	0.6495	0.591	Vel = 21.05
H11	25.500	5.60	23.60	1.5			9.970	120	17.753	
to									0.0	
H12	25.500		121.75	1.61			9.970	0.4566	4.552	Vel = 19.19
H12	25.500	5.60	26.45	1.5	T	8.0	9.680	120	22.305	
to							8.000		0.0	
M2	25.500		148.2	1.61			17.680	0.6568	11.613	Vel = 23.36
			0.0							
M2			148.20						33.918	K Factor = 25.45
H13	25.500	5.60	22.45	1.25			9.960	120	16.071	
to									0.0	
H14	25.500		22.45	1.38			9.960	0.0424	0.422	Vel = 4.82
H14	25.500	5.60	22.74	1.25			0.820	120	16.493	
to									0.0	
L3	25.500		45.19	1.38			0.820	0.1549	0.127	Vel = 9.69
			0.0							
L3			45.19						16.620	K Factor = 11.08
H15	25.500	5.32	21.15	1	E	2.0	3.420	120	15.837	K = K @ SH1
to							2.000		0.0	
L3	25.500		21.15	1.049			5.420	0.1445	0.783	Vel = 7.85
L3	25.500		45.20	1.25			8.150	120	16.620	
to									0.0	
L4	25.500		66.35	1.38			8.150	0.3146	2.564	Vel = 14.23
			0.0							
L4			66.35						19.184	K Factor = 15.15
H16	25.500	5.32	22.75	1	E	2.0	3.240	120	18.319	K = K @ SH1
to							2.000		0.0	
L4	25.500		22.75	1.049			5.240	0.1651	0.865	Vel = 8.45
L4	25.500		66.35	1.25			0.980	120	19.184	
to									0.0	
H17	25.500		89.1	1.38			0.980	0.5429	0.532	Vel = 19.11
H17	25.500	5.60	24.86	1.5			9.970	120	19.716	
to									0.0	
H18	25.500		113.96	1.61			9.970	0.4040	4.028	Vel = 17.96
H18	25.500	5.60	27.29	1.5	T	8.0	10.670	120	23.744	
to							8.000		0.0	
M3	25.500		141.25	1.61			18.670	0.6010	11.221	Vel = 22.26
			0.0							
M3			141.25						34.965	K Factor = 23.89
M1	25.500		123.98	3			11.960	120	33.674	
to									0.0	
M2	25.500		123.98	3.068			11.960	0.0204	0.244	Vel = 5.38
M2	25.500		148.19	3			11.960	120	33.918	
to									0.0	
M3	25.500		272.17	3.068			11.960	0.0875	1.047	Vel = 11.81

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 ******
M3	25.500		141.25	3	E	7.0	49.110	120	34.965	
to							7.000		6.713	
M4	10		413.42	3.068			56.110	0.1897	10.642	Vel = 17.94
M4	10		0.0	3	2E	14.0	15.000	120	52.320	
to							14.000		0.0	
M5	10		413.42	3.068			29.000	0.1897	5.501	Vel = 17.94
M5	10		0.0	3			6.140	120	57.821	
to									0.0	
M6	10		413.42	3.068			6.140	0.1896	1.164	Vel = 17.94
M6	10		0.0	4	T	20.0	4.890	120	58.985	
to							20.000		0.0	
M7	10		413.42	4.026			24.890	0.0505	1.257	Vel = 10.42
M7	10		0.0	4			26.350	120	60.242	
to									0.0	
TOR	10		413.42	4.026			26.350	0.0505	1.331	Vel = 10.42
			0.0							
TOR			413.42						61.573	K Factor = 52.69
TOR	10		413.42	6	E	14.0	10.000	120	61.573	
to					T	30.0	66.000		4.331	
BOR	0		413.42	6.065	Avc	22.0	76.000	0.0069	0.521	Vel = 4.59
BOR	0		0.0	6	T	30.0	15.000	120	66.425	
to					3E	42.0	72.000		0.0	
FPO	0		413.42	6.065			87.000	0.0069	0.598	Vel = 4.59
			100.00							Qa = 100.00
FPO			513.42						67.023	K Factor = 62.71

NORRIS FIRE
CONSULTING

Norris Fire Consulting INC.
1840 Clements Road
Suite 200
Pickering, On, L1W 3Y2
905-669-5154

Job Name	:	24-0453 680 Plains Rd
Drawing	:	FP-02
Location	:	Burlington, On
Remote Area	:	2
Contract	:	24-0453
Data File	:	24-0453 680 Plains Rd - Calc New Main.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME 24-0453 680 Plains Rd
Location Burlington, On
Drawing # FP-02
Contract # 24-0453
Date 3/10/2025

DESIGN

Remote area # 2
Remote area location Auditorium Low Ceiling
Occupancy classification LH
Density 0.1 - Gpm/SqFt
Area of application 1571 - SqFt
Coverage/sprinkler 150 - SqFt
Type of sprinkler calculated K5.6 Upright & Pendent S/R
 # Sprinklers calculated 9
In-rack demand - GPM
Hose streams 100 - GPM
Total water required (including hose streams) 381.733 - GPM @ 43.5382 - Psi
Type of system Wet
Volume of system (dry or pre-action) - Gal

WATER SUPPLY INFORMATION

Test date 12/11/2023
Location 680 Plains Rd.
Source of info Fire Pump Test

CONTRACTOR INFO Norris Fire Consulting INC.
Address 1840 Clements Road / Suite 200 / Pickering, On, L1W 3Y2
Phone # 905-669-5154
Name of designer
Authority having jurisdiction
NOTES:

text1(35) - invisible

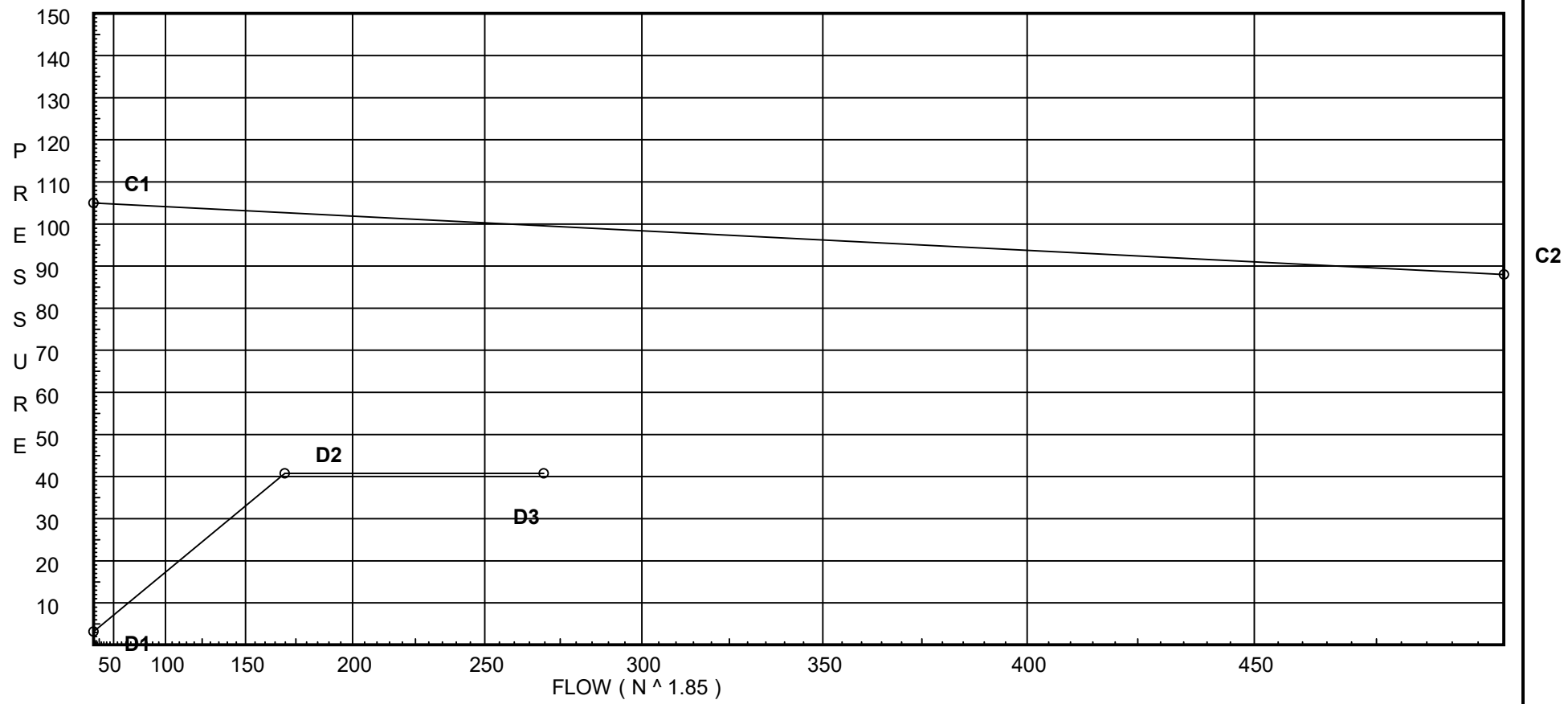
Water Supply Curve

Norris Fire Consulting INC.
24-0453 680 Plains Rd

Date 3/10/2025

City Water Supply:
- C1 - Static Pressure : 105
- C2 - Residual Pressure: 88
- C2 - Residual Flow : 500

Demand:
- D1 - Elevation : 3.176
- D2 - System Flow : 169.734
- D2 - System Pressure : 40.768
- Hose (Demand) : 100
- D3 - System Demand : 269.734
- Safety Margin : 58.805



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
Avc	Alarm Vic 751	0	0	0	0	3	9	8	17	0	21	0	22	50	0	0	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
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

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.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
FPO	105.0	88	500.0	99.573	269.73	40.768

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
SH	20.0	5.6	10.8	18.4	0.1	184
SH1	25.5		11.98			
SL	20.0	5.6	7.0	14.82	0.1	75
SL1	25.5		7.01			
H19	7.333	5.6	8.45	16.28	0.1	75
H20	7.333	5.6	8.61	16.43	0.1	83.8
H21	7.333	5.6	9.33	17.11	0.1	66.65
H22	7.333	5.6	11.0	18.57	0.1	66.65
H23	7.333	5.6	7.25	15.08	0.1	66.65
H24	7.333	5.6	7.0	14.82	0.1	66.65
L5	7.333	5.6	7.28	15.11	0.1	66.65
H25	7.333	5.6	8.42	16.25	0.1	66.65
H26	7.333	5.6	10.96	18.54	0.1	66.65
H27	7.333	5.6	14.8	21.54	0.1	66.65
M8	7.333		15.71			
M9	7.33		17.12			
M10	25.5		19.74			
M1	25.5		24.8			
M2	25.5		25.24			
M3	25.5		25.68			
M4	10.0		34.44			
M5	10.0		35.5			
M6	10.0		35.72			
M7	10.0		35.96			
TOR	10.0		36.22			
BOR	0.0		40.65			
FPO	0.0		40.77	100.0		

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 ******
SH	20	5.60	18.40	1			32.000	120	10.796	
to									-2.382	
SH1	25.500		18.4	1.049			32.000	0.1115	3.569	Vel = 6.83
			0.0							
SH1			18.40						11.983	K Factor = 5.32
SL	20	5.60	14.82	1			32.000	120	7.000	
to									-2.382	
SL1	25.500		14.82	1.049			32.000	0.0747	2.390	Vel = 5.50
			0.0							
SL1			14.82						7.008	K Factor = 5.60
H19	7.333	5.60	16.28	1.25			6.833	120	8.450	
to									0.0	
H20	7.333		16.28	1.38			6.833	0.0234	0.160	Vel = 3.49
H20	7.333	5.60	16.43	1.25			8.500	120	8.610	
to									0.0	
H21	7.333		32.71	1.38			8.500	0.0849	0.722	Vel = 7.02
H21	7.333	5.60	17.11	1.25			9.000	120	9.332	
to									0.0	
H22	7.333		49.82	1.38			9.000	0.1852	1.667	Vel = 10.69
H22	7.333	5.60	18.57	1.25			14.167	120	10.999	
to									0.0	
M8	7.333		68.39	1.38			14.167	0.3328	4.715	Vel = 14.67
			0.0							
M8			68.39						15.714	K Factor = 17.25
H23	7.333	5.60	15.08	1.25			1.500	120	7.254	
to									0.0	
L5	7.333		15.08	1.38			1.500	0.0207	0.031	Vel = 3.23
			0.0							
L5			15.08						7.285	K Factor = 5.59
H24	7.333	5.60	14.82	1.25	E	3.0	5.500	120	7.000	
to					T	6.0	9.000		0.0	
L5	7.333		14.82	1.38			14.500	0.0197	0.285	Vel = 3.18
L5	7.333	5.60	30.19	1.25			7.417	120	7.285	
to									0.0	
H25	7.333		45.01	1.38			7.417	0.1534	1.138	Vel = 9.65
H25	7.333	5.60	16.26	1.25			9.333	120	8.423	
to									0.0	
H26	7.333		61.27	1.38			9.333	0.2716	2.535	Vel = 13.14
H26	7.333	5.60	18.53	1.25			8.667	120	10.958	
to									0.0	
H27	7.333		79.8	1.38			8.667	0.4427	3.837	Vel = 17.12
H27	7.333	5.60	21.54	1.25			1.333	120	14.795	
to									0.0	
M8	7.333		101.34	1.38			1.333	0.6894	0.919	Vel = 21.74
			0.0							
M8			101.34						15.714	K Factor = 25.56
M8	7.333		169.73	1.5			1.667	120	15.714	
to									0.001	
M9	7.330		169.73	1.61			1.667	0.8440	1.407	Vel = 26.75

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 ******
M9	7.330		0.0	1.5			12.417	120	17.122	
to									-7.869	
M10	25.500		169.73	1.61			12.417	0.8442	10.483	Vel = 26.75
M10	25.500		0.0	1.5			6.000	120	19.736	
to									0.0	
M1	25.500		169.73	1.61			6.000	0.8443	5.066	Vel = 26.75
M1	25.500		0.0	3			11.960	120	24.802	
to									0.0	
M2	25.500		169.73	3.068			11.960	0.0365	0.437	Vel = 7.37
M2	25.500		0.0	3			11.960	120	25.239	
to									0.0	
M3	25.500		169.73	3.068			11.960	0.0365	0.437	Vel = 7.37
M3	25.500		0.0	3	E	7.0	49.110	120	25.676	
to							7.000		6.713	
M4	10		169.73	3.068			56.110	0.0365	2.050	Vel = 7.37
M4	10		0.0	3	2E	14.0	15.000	120	34.439	
to							14.000		0.0	
M5	10		169.73	3.068			29.000	0.0365	1.059	Vel = 7.37
M5	10		0.0	3			6.140	120	35.498	
to									0.0	
M6	10		169.73	3.068			6.140	0.0366	0.225	Vel = 7.37
M6	10		0.0	4	T	20.0	4.890	120	35.723	
to							20.000		0.0	
M7	10		169.73	4.026			24.890	0.0097	0.242	Vel = 4.28
M7	10		0.0	4			26.350	120	35.965	
to									0.0	
TOR	10		169.73	4.026			26.350	0.0097	0.256	Vel = 4.28
			0.0							
TOR			169.73						36.221	K Factor = 28.20
TOR	10		169.73	6	E	14.0	10.000	120	36.221	
to					T	30.0	66.000		4.331	
BOR	0		169.73	6.065	Avc	22.0	76.000	0.0013	0.101	Vel = 1.88
BOR	0		0.0	6	T	30.0	15.000	120	40.653	
to					3E	42.0	72.000		0.0	
FPO	0		169.73	6.065			87.000	0.0013	0.115	Vel = 1.88
			100.00							Qa = 100.00
FPO			269.73						40.768	K Factor = 42.24