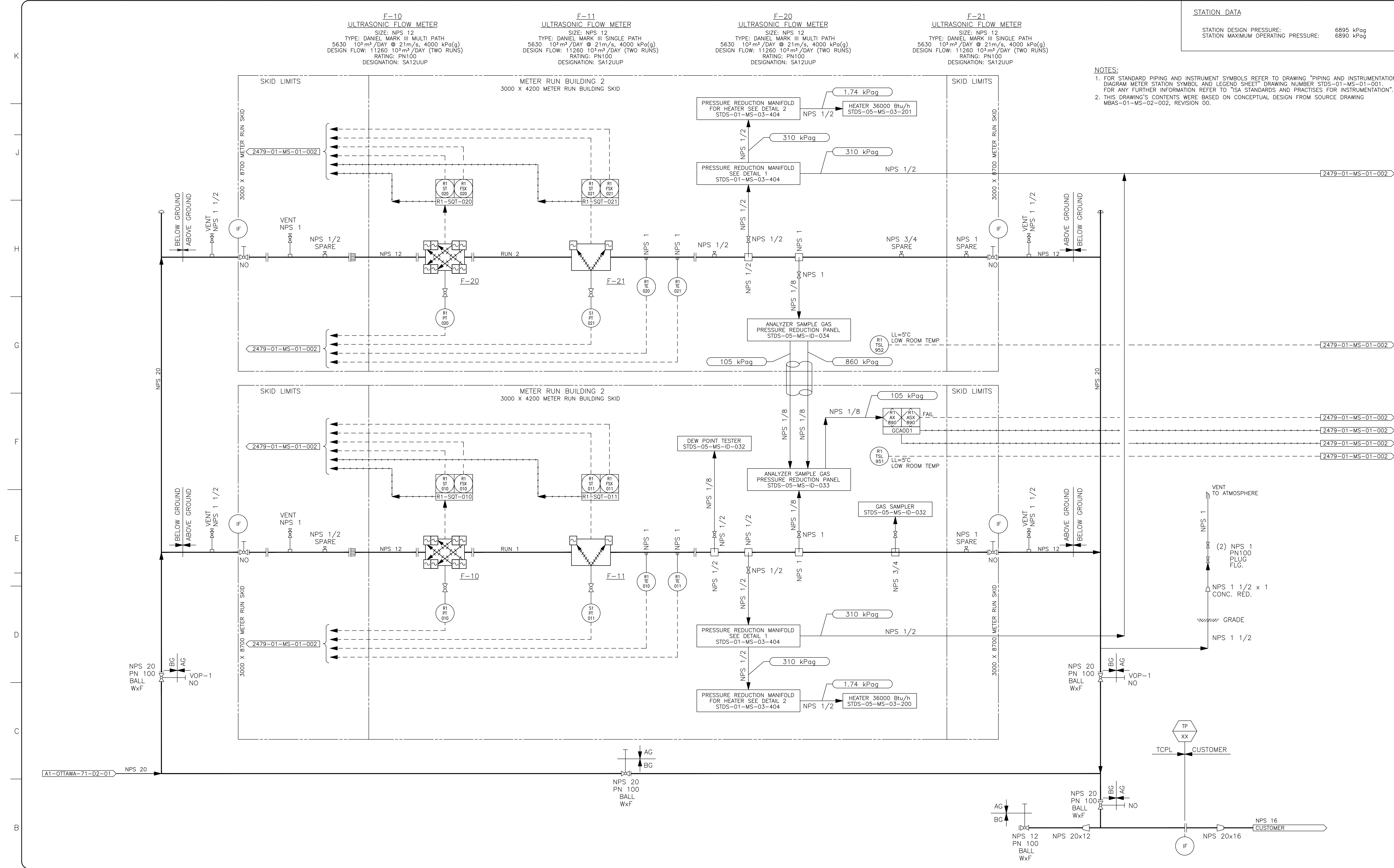


## **Preliminary Process and Instrumentation Diagram**



| STATION DATA                        |           |
|-------------------------------------|-----------|
| STATION DESIGN PRESSURE:            | 6895 kPag |
| STATION MAXIMUM OPERATING PRESSURE: | 6890 kPag |


- NOTES:
- FOR STANDARD PIPING AND INSTRUMENT SYMBOLS REFER TO DRAWING "PIPING AND INSTRUMENTATION DIAGRAM METER STATION SYMBOL AND LEGEND SHEET" DRAWING NUMBER STDS-01-MS-01-001. FOR ANY FURTHER INFORMATION REFER TO "ISA STANDARDS AND PRACTISES FOR INSTRUMENTATION".
  - THIS DRAWING'S CONTENTS WERE BASED ON CONCEPTUAL DESIGN FROM SOURCE DRAWING MBAS-01-MS-02-002, REVISION 00.

| REFERENCE DRAWINGS |       |
|--------------------|-------|
| DRAWING No         | TITLE |
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| REVISION |            |                        | DESCRIPTION |
|----------|------------|------------------------|-------------|
| REV No   | DATE       |                        |             |
| 0A       | 2017-02-10 | ISSUED FOR INFORMATION |             |
|          |            |                        |             |
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| APPROVAL     |         |                  |          |                |                 |         |
|--------------|---------|------------------|----------|----------------|-----------------|---------|
| PROJECT CODE | DRAFTER | DRAFTING CHECKER | DESIGNER | DESIGN CHECKER | PROJECT MANAGER | COMPANY |
| 689992       | SA      | KP               | JV       | KO             | MK              | CH2M    |
|              |         |                  |          |                |                 |         |
|              |         |                  |          |                |                 |         |
|              |         |                  |          |                |                 |         |
|              |         |                  |          |                |                 |         |
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|              |         |                  |          |                |                 |         |

| PROFESSIONAL ENGINEER/RPT |  | PERMIT/ ENG. APPROVAL |  |
|---------------------------|--|-----------------------|--|
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in business to deliver



OTTAWA SALES METER STATION

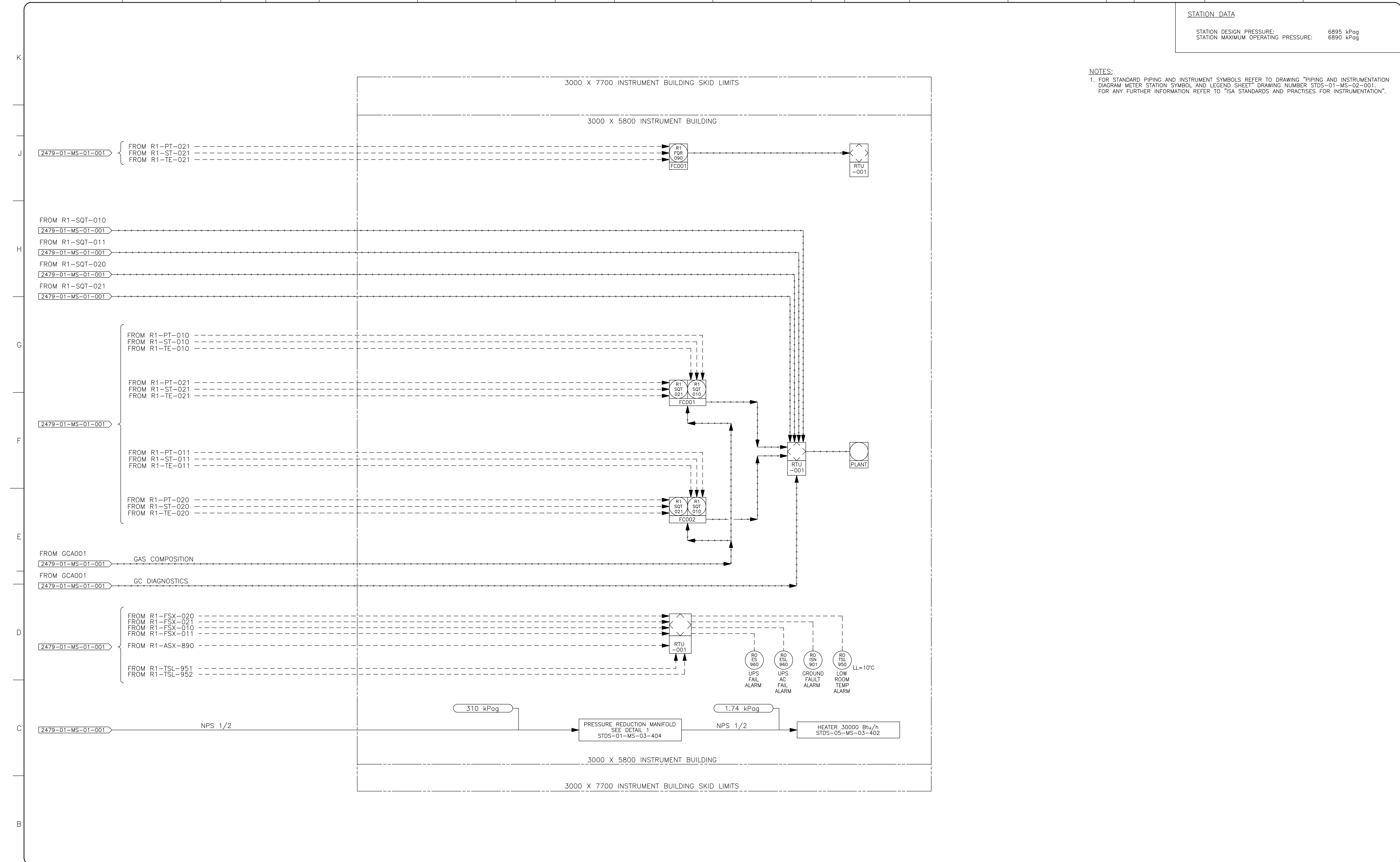
FIA # 2479CHAINAGE:DISCIPLINE # 01



PROCESS AND INSTRUMENTATION DIAGRAM

SCALE N.T.S.

DRAWING No 2479-01-MS-01-001

REV 0A



|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|---|--------------------|-------|----------|------------|-------------------|--|--------------|----------|------------------|----------|----------------|-----------------|---------|---------------------------|------|-----------------------|--------------|---|--------|--|
| A | REFERENCE DRAWINGS |       | REVISION |            |                   |  |              | APPROVAL |                  |          |                |                 |         | PROFESSIONAL ENGINEER/RPT |      | PERMIT/ ENG. APPROVAL |              | <div><div><div><div>TransCanada</div><div>In business to deliver</div></div><div></div></div></div> |        |  |
|   | DRAWING No         | TITLE | REV No   | DATE       | DESCRIPTION       |  | PROJECT CODE | DRAFTER  | DRAFTING CHECKER | DESIGNER | DESIGN CHECKER | PROJECT MANAGER | COMPANY |                           | DATE |                       |              |   |        |  |
|   | —                  |       | 0A       | 2017-02-10 | ISSUED FOR REVIEW |  | 689992       | SA       | KP               | JV       | KQ             | MK              | CH2M    |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         |                           |      |                       |              |   |        |  |
|   |                    |       |          |            |                   |  |              |          |                  |          |                |                 |         | REV. NO.                  | DATE | PERMIT NUMBER:        | SCALE N.T.S. | DRAWING No 2479-01-MS-01-002  | REV 0A |  |

STATION DATA

STATION DESIGN PRESSURE: 6895 kPag  
STATION MAXIMUM OPERATING PRESSURE: 6890 kPag

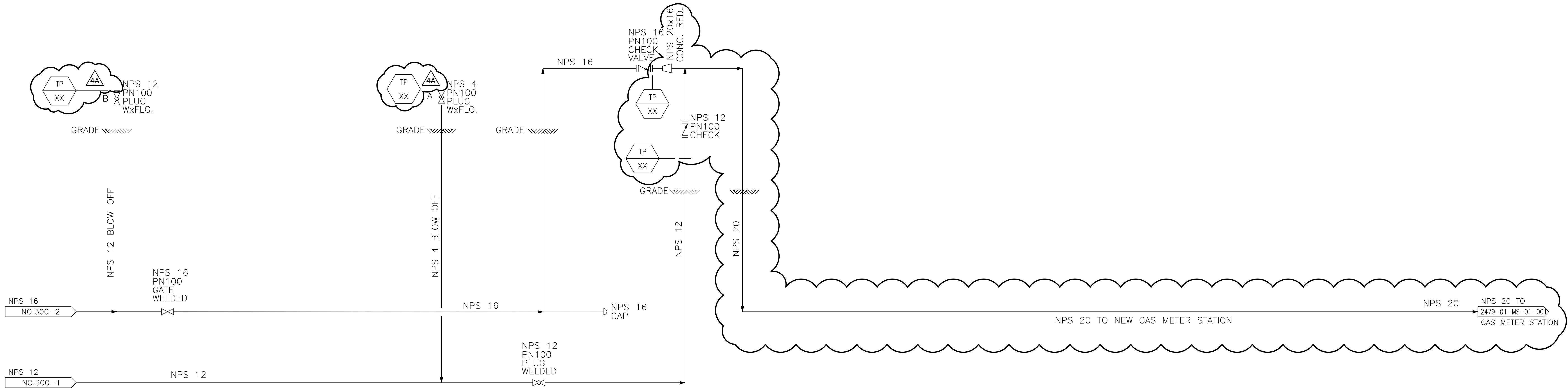
DESIGN CONDITIONS:

DESIGN PRESSURE: 6895 kPa  
HYDRO TEST PRESSURE: 12,410 kPa TO 13,031 kPa  
DESIGN CODE: CSA Z662  
LOCATION FACTOR: 0.625  
DESIGN TEMPERATURE: M45°C TO 120°C (NOTE 1)

NOTES:

1. DESIGN CONDITIONS FOR ORIGINAL PIPING INSTALLED PRIOR TO REV. 4.

4A




|     |          |  |            |            |              |              |                |                 |                  |          |
|-----|----------|--|------------|------------|--------------|--------------|----------------|-----------------|------------------|----------|
| 4A  | 17.02.11 | ISSUED FOR INFORMATION   | CP         | JV         |              |              |                |                 |                  |          |
| 3   | 09.10.01 | AS-BUILT - ADDED CHECK<br>ULTRASONIC METER ON RUN #1<br>PROJECT #2059821 | AM         | STARCO     |              |              |                |                 |                  |          |
| 2   | 99.06.01 | AS-BUILT UNDER C.O. T97874   | RH         | WK         | BV           |              |                |                 |                  | 99.06.01 |
| 1   | 97.11.28 | ISSUED FOR ADDENDUM 1  | RH         | BK         | DF           |              |                |                 |                  |          |
| 0   | 97.11.06 | ISSUED FOR CONSTRUCTION<br>UNDER CO. T97874                              | JB         | RA         | DF           |              |                |                 |                  |          |
| A   | 97.09.10 | ISSUED FOR BID<br>UNDER CO. T97874                                       | NB         | LW         |              |              |                |                 |                  |          |
| No. | DATE     | REVISION   | REV.<br>BY | CHK.<br>BY | DES.<br>ENG. | SUP.<br>ENG. | BID<br>DRAWING | CONSTR<br>ISSUE | ASBUILT<br>DATES |          |

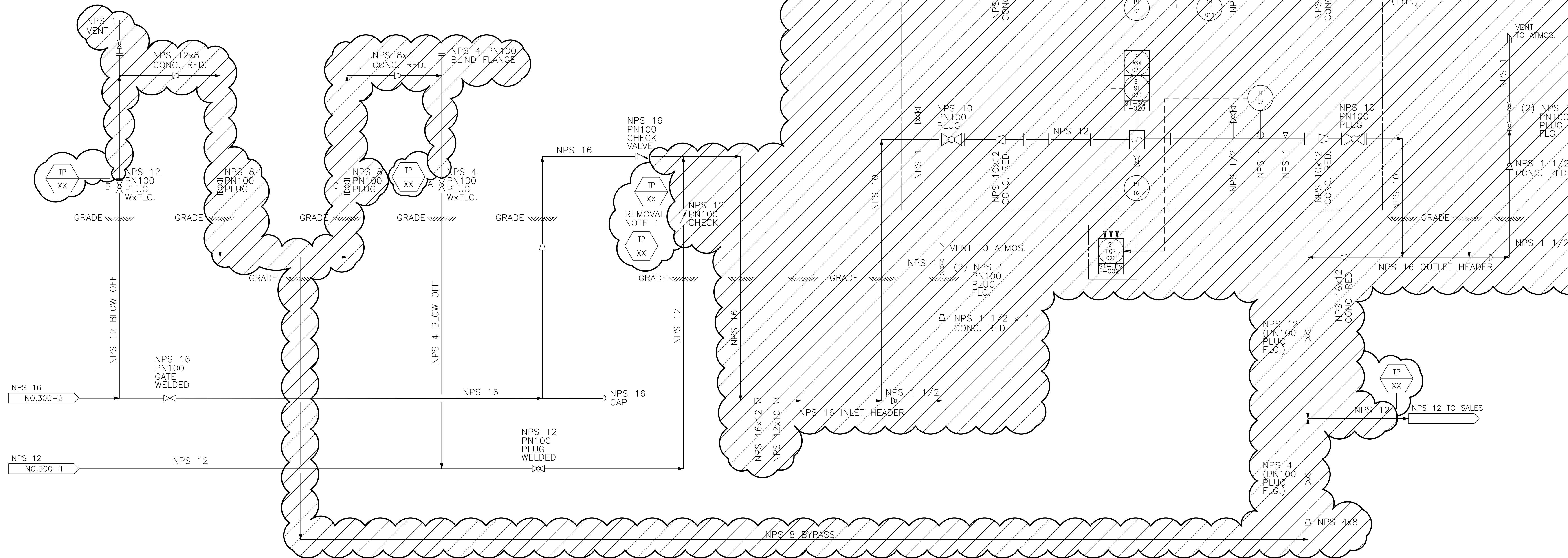


|   |     |      |          |                                |  |               |  |  |  |
|---|-----|------|----------|--------------------------------|--|---------------|--|--|--|
| DRAWING TITLE   |     |      |          |                                |  |               |  |  |  |
| METER INSTALLATION<br>OTTAWA SALES METER STATION<br>PROCESS AND INSTRUMENTATION DIAGRAM |     |      |          |                                |  |               |  |  |  |
| REGIONAL MUNICIPALITY OF OTTAWA-CARLETON ONTARIO  |     |      |          |                                |  |               |  |  |  |
| LOCATION: OTTAWA METER STATION  |     |      |          |                                |  |               |  |  |  |
| DRAFTER   | NFB | DATE | 97-09-03 | CONTRACTOR FILE/DRAWING NUMBER |  |               |  |  |  |
| CHECKER   | LW  | DATE | 97-10-06 | TCPL PROJECT NUMBER            |  | DWG SCALE NTS |  |  |  |
| COORDINATOR   |     | DATE |          | TCPL DRAWING NUMBER            |  |               |  |  |  |
| DESIGN ENG  |     | DATE |          | A1-OTTAWA-71-D2-01             |  | 4A            |  |  |  |
| PROJ MGR  |     | DATE |          |                                |  |               |  |  |  |
| ENG SUPV  |     | DATE |          |                                |  |               |  |  |  |

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|        |                    |
| NUMBER | TITLE              |
|        | REFERENCE DRAWINGS |

Small Meter Storage Upgrade

| ULTRASONIC METERS |   |   |
|-------------------|---|---|
| QTY               | DESCRIPTION   | TAGGED INSTRUMENTS  |
| 1                 | INSTRUMENT NPS 12<br>MULTI-PATH AS PER DATA SHEET   |  |
| 1                 | DANIEL 3410 NPS 12<br>SINGLE PATH AS PER DATA SHEET |   |
| 1                 | INSTRUMENT NPS 12<br>MULTI-PATH AS PER DATA SHEET   |   |



**DESIGN CONDITIONS:**

|                      |                          |
|----------------------|--------------------------|
| DESIGN PRESSURE:     | 6895 kPa                 |
| HYDRO TEST PRESSURE: | 12,410 kPa TO 13,031 kPa |
| DESIGN CODE:         | CSA Z662                 |
| LOCATION FACTOR:     | 0.625                    |
| DESIGN TEMPERATURE:  | M45°C TO 120°C           |

|     |          |  |              |            |              |             |                |                 |                  |          |
|-----|----------|--|--------------|------------|--------------|-------------|----------------|-----------------|------------------|----------|
| 4AR | 17.02.11 | ISSUED FOR INFORMATION   | CP           | JV         |              |             |                |                 |                  |          |
| 3   | 09.10.01 | AS—BUILT — ADDED CHECK<br>ULTRASONIC METER ON RUN #1<br>PROJECT #2059821 | AM<br>STARCO |            |              |             |                |                 |                  |          |
| 2   | 99.06.01 | AS—BUILT UNDER C.O. T97874   | RH           | WK         | BF           |             |                |                 |                  | 99.06.01 |
| 1   | 97.11.28 | ISSUED FOR ADDENDUM 1  | RH           | BK         | DF           |             |                |                 |                  |          |
| 0   | 97.11.06 | ISSUED FOR CONSTRUCTION<br>UNDER CO. T97874                              |              | JB         | RA           | DF          |                |                 |                  |          |
| A   | 97.09.10 | ISSUED FOR BID<br>UNDER CO. T97874                                       |              | NB         | LW           |             |                |                 |                  |          |
| No. | DATE     | REVISION   | REV.<br>BY   | CHK.<br>BY | DES.<br>ENG. | SUP.<br>ENG | BID<br>DRAWING | CONSTR<br>ISSUE | ASBUILT<br>DATES |          |



DRAWING TITLE

METER INSTALLATION  
OTTAWA SALES METER STATION  
PROCESS AND INSTRUMENTATION DIAGRAM

|  |         |
|--|---------|
| REGIONAL MUNICIPALITY OF OTTAWA-CARLETON | ONTARIO |
|--|---------|

|                                |     |           |            |
|--------------------------------|-----|-----------|------------|
| LOCATION: OTTAWA METER STATION |     |           |            |
| DRAFTER                        | NFB | DATE      | 97-09-03   |
| CHECKER                        | LW  | DATE      | 97-10-06   |
| COORDINATOR                    |     | DATE      |            |
| DESIGN ENG                     |     | DATE      |            |
| PROJ MGR                       |     | DATE      |            |
| ENG SUPV                       |     | DATE      |            |
| CONTRACTOR FILE/DRAWING NUMBER |     |           |            |
| TCPL PROJECT NUMBER            |     | DWG SCALE | NTS        |
| TCPL DRAWING NUMBER            |     |           |            |
| A1-OTTAWA-71-D2-01             |     |           | 4AR<br>REV |

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| NUMBER | TITLE              |
|        | REFERENCE DRAWINGS |