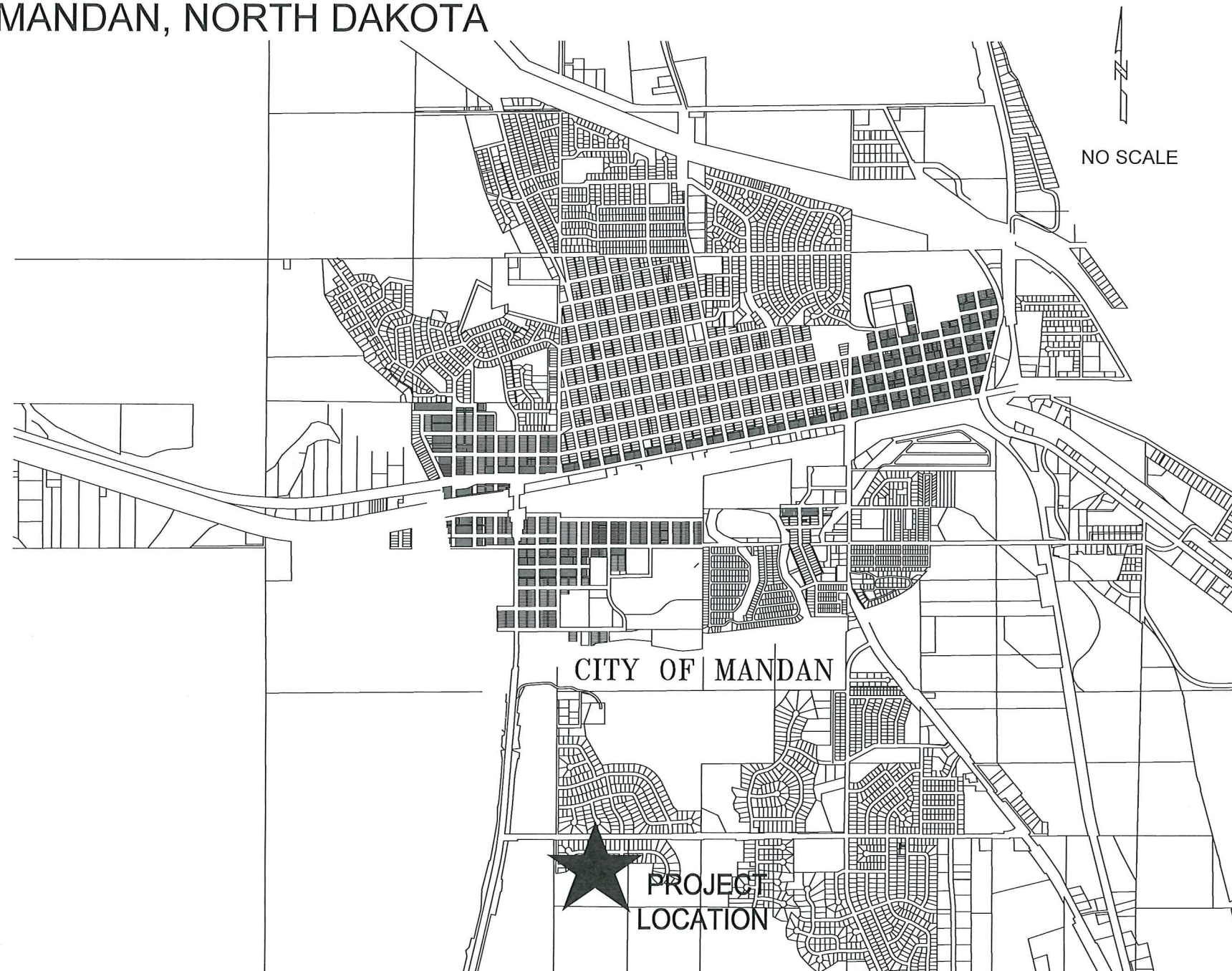


**KEIDEL'S SOUTH HEART TERRACE 3rd ADDITION  
WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA**

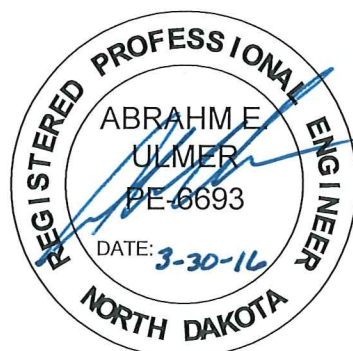
**INDEX OF DRAWINGS**

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5	20th STREET PLAN & PROFILE
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12	6th AVENUE SW PLAN & PROFILE
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15	2nd AVENUE SW PLAN & PROFILE
16	CUL-DE-SAC
17	WATER & SEWER DETAILS



*DESIGN ENGINEER'S CERTIFICATE*

I, ABRAHM E. ULMER, A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF NORTH DAKOTA, HEREBY CERTIFY THAT THE PLANS FOR KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION WATER & SEWER IMPROVEMENTS, CITY PROJECT NO. 2014-01, MANDAN, NORTH DAKOTA WERE PREPARED UNDER MY SUPERVISION AND ARE COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



ABRAHM E. ULMER, P.E.  
REGISTERED PROFESSIONAL ENGINEER  
NORTH DAKOTA REGISTRATION NO. 6693

**CONSTRUCTED BY: COFELL'S PLUMBING HEATING EXCAVATING**  
1000 INDUSTRIAL DRIVE  
BISMARCK, ND 58501  
PH: 701-258-6500



TITLE SHEET  
KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION

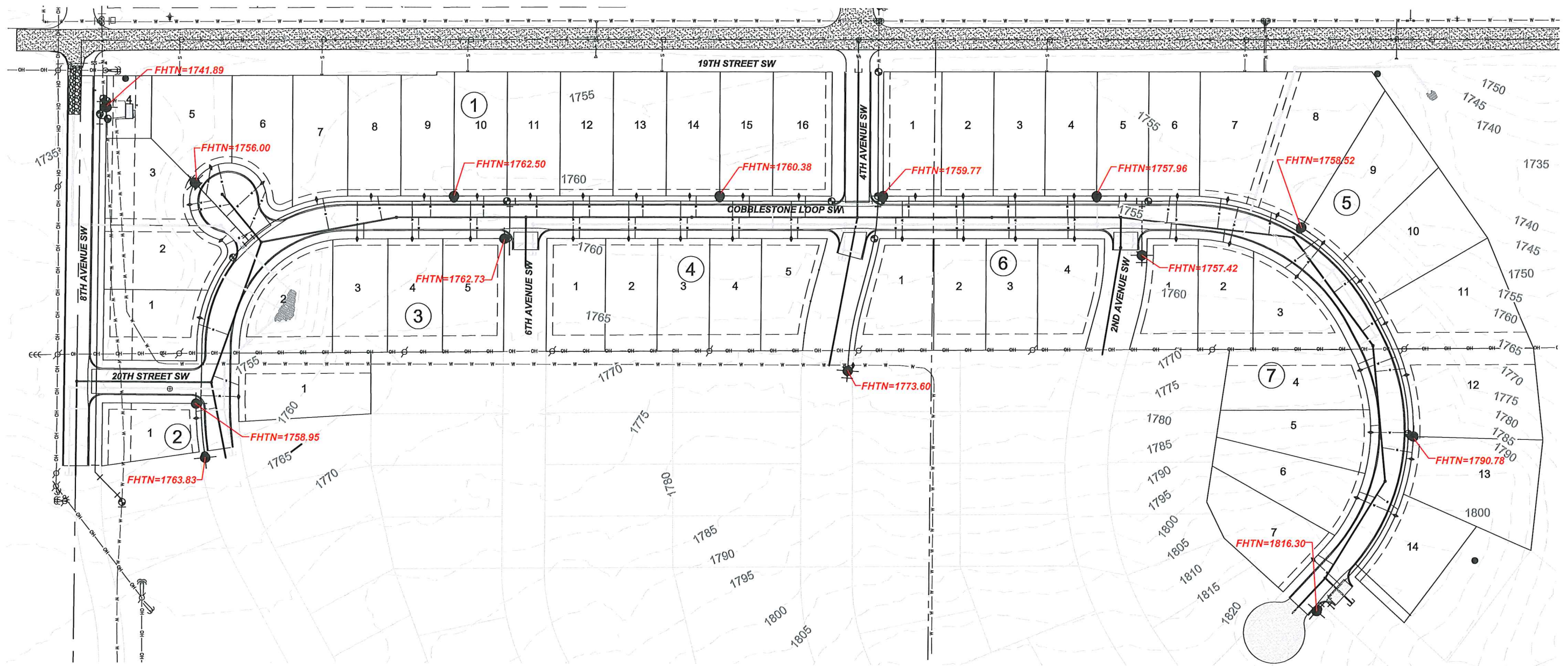
WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA  
SHEET 1 OF 17

MARCH, 2016

**PROJECT LOCATION**

AS-BUILT

**\*CAUTION\***  
UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING LOCATION PRIOR TO EXCAVATION

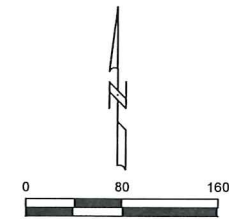
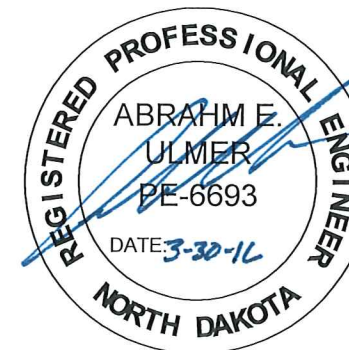


LEGEND

- |     |                              |     |                                 |
|-----|------------------------------|-----|---------------------------------|
| ○   | EXISTING MANHOLE             | --- | PROPOSED CONTOUR MAJOR          |
| ⊠   | EXISTING TELEPHONE PEDESTAL  | --- | PROPOSED CONTOUR MINOR          |
| ✱   | EXISTING STREET LIGHT        | ●   | PROPOSED FIRE HYDRANT           |
| ⊕   | EXISTING UTILITY POLE        | ○   | PROPOSED GATE VALVE             |
| ⊖   | EXISTING ANCHOR POLE         | +   | PROPOSED CURB STOP              |
| ⊠   | EXISTING ELECTRICAL BOX      | ●   | PROPOSED SANITARY SEWER MANHOLE |
| ⊙   | EXISTING TREE                | ⊠   | PROPOSED STREET SIGN            |
| ⊕   | EXISTING FIRE HYDRANT        | ✱   | PROPOSED STREET LIGHT           |
| ⊗   | EXISTING GATE VALVE          | ⊠   | PROPOSED JUNCTION BOX           |
| ⊠   | EXISTING SIGN                | --- | PROPOSED UNDERGROUND ELECTRIC   |
| --- | EXISTING SANITARY SEWERMAIN  | --- | PROPOSED CURB & GUTTER          |
| --- | EXISTING WATERMAIN           | --- | PROPOSED WATERMAIN              |
| --- | EXISTING OVERHEAD POWER LINE | --- | PROPOSED WATER SERVICE          |
| --- | EXISTING CURB & GUTTER       | --- | PROPOSED SANITARY SEWERMAIN     |
| --- | EXISTING STORM SEWER         | --- | PROPOSED SANITARY SERVICE       |
| --- | EXISTING GAS LINE            | ⊕   | PROPOSED STORM SEWER MANHOLE    |
| --- | EXISTING TELEPHONE CABLE     | ⊠   | PROPOSED 2' X 3' CATCH BASIN    |
|     |                              | ⊠   | PROPOSED 2' X 6' CATCH BASIN    |
|     |                              | ⊠   | PROPOSED FLARED END SECTION     |
|     |                              | --- | PROPOSED STORM SEWER            |

**AS-BUILT**

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VERT. DATUM: NAVD88  
HORIZ DATUM: 1983 STATE PLANE, ND SOUTH (3302)

**TOMAN ENGINEERING**  
501 1st Street NW, Mandan, ND 58554  
Phone: 701-663-6483 \* Fax: 701-663-0923

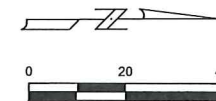
PROJECT LAYOUT  
KEIDEL'S SOUTH HEART TERRACE 3rd ADDITION

WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA  
SHEET 2 OF 17

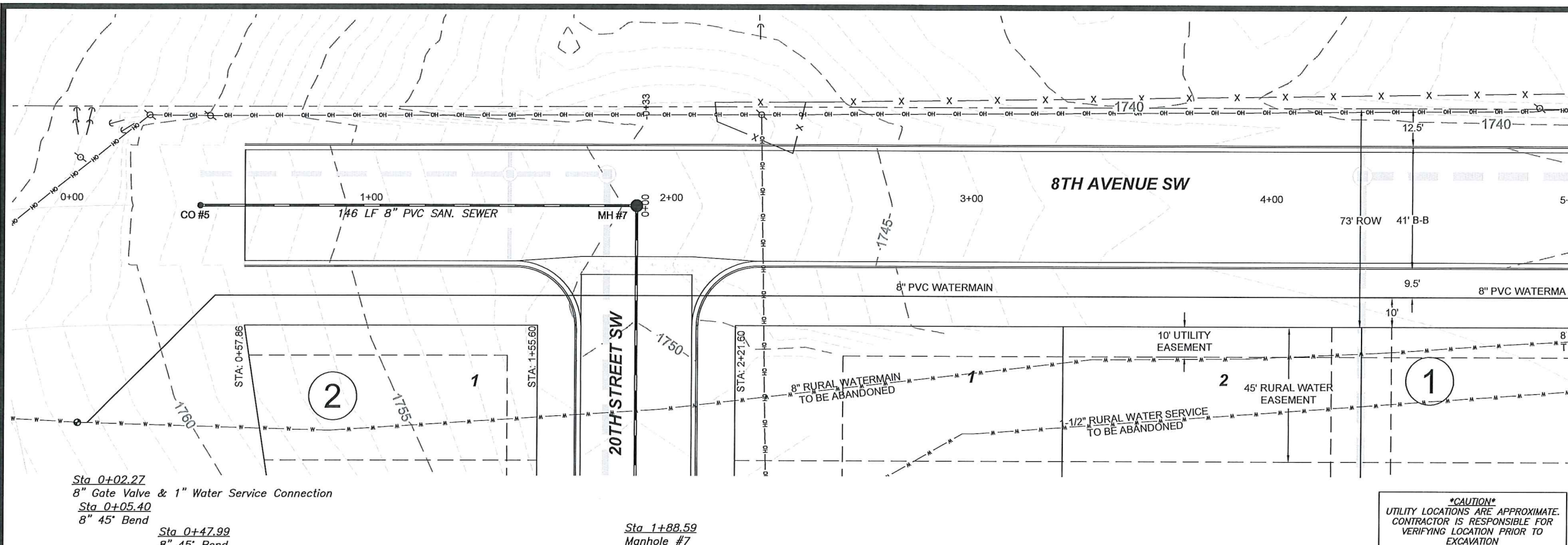
MARCH, 2016

**PROJECT LAYOUT**

BY OTHERS



VERT. DATUM: NAVD88  
HORIZ DATUM: 1983 STATE PLANE, ND SOUTH (3302)



Sta 0+02.27  
8" Gate Valve & 1" Water Service Connection  
Sta 0+05.40  
8" 45' Bend  
Sta 0+47.99  
8" 45' Bend

Sta 1+88.59  
Manhole #7

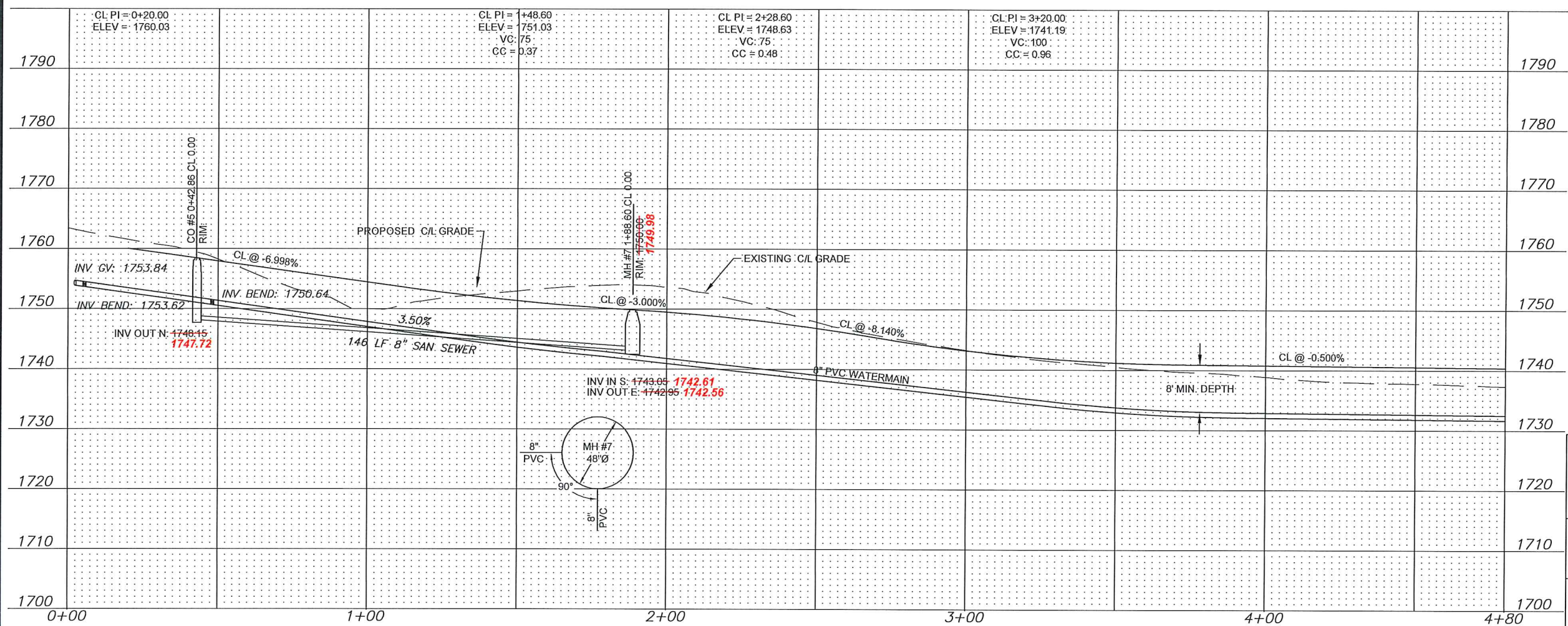
**\*CAUTION\***  
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EXCAVATION

- BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
- GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
- BACKFILL SHALL BE CLASS "A" PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM-D1557.
- A 1" WATER SERVICE CONNECTION IS TO BE USED FOR FLUSHING PURPOSES AT STA: 0+02.27.

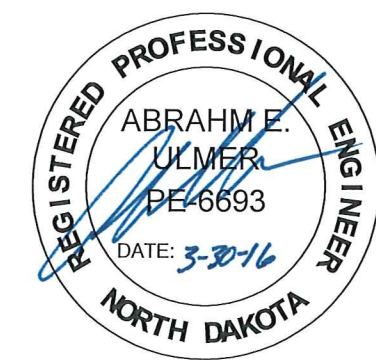
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	56 LF
801-4.60	Bedding Material	14 Ton
801-4.62	8" Cleanout	1 EA

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	130 Ton
901-4.11	8" Watermain	492 LF
901-4.52	8" Gate Valve & Box	1 EA
1209-4.41	1" Water Service Connection	1 EA



**AS-BUILT**

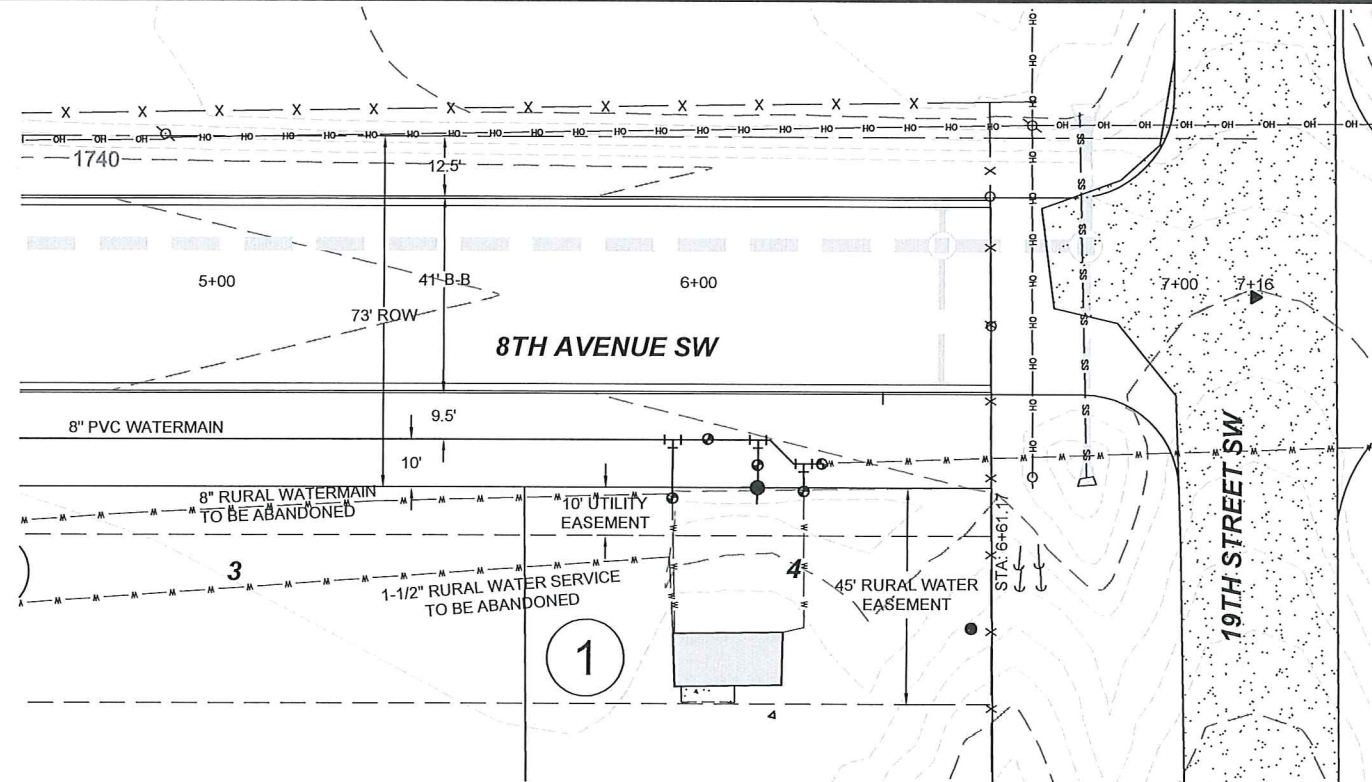


**TOMAN ENGINEERING**  
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**8TH AVENUE SW**  
KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
STA 0+00 - 4+80  
WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA  
SHEET 3 OF 17

MARCH, 2016

**PLAN & PROFILE**



VERT. DATUM: NAVD88  
 HORIZ DATUM: 1983 STATE PLANE, ND SOUTH (3302)

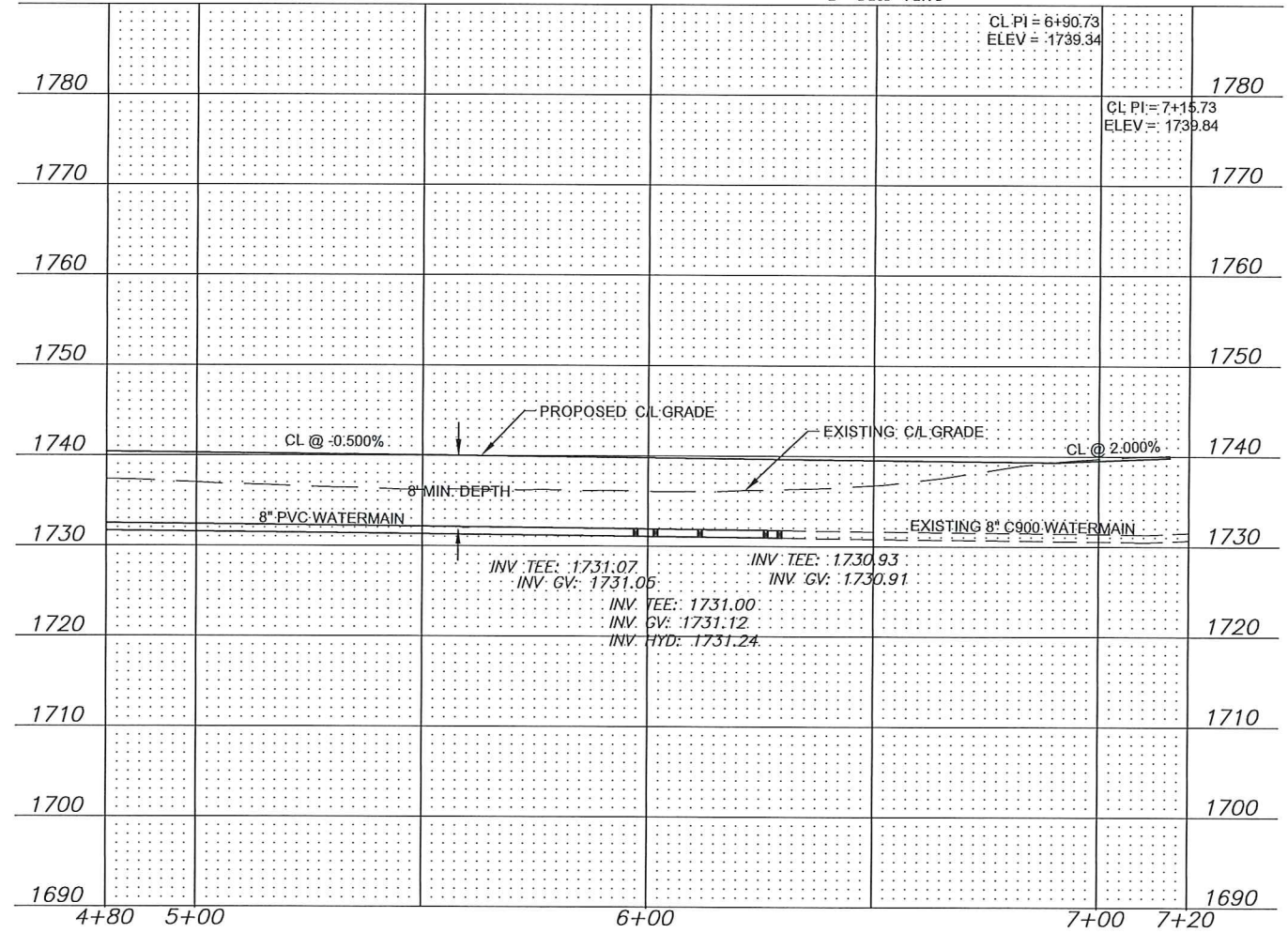
- BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
- GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
- AT STATION 5+97 AND 6+26 CONTRACTOR SHALL REMOVE EXISTING 90° BEND & REPLACE WITH 8"x8" TEE. MISSOURI WEST WATER (RURAL) SHALL BE GIVEN 2 WEEKS NOTICE TO ORGANIZE WATERMAIN SHUT OFF AND CONNECTION (INCIDENTAL).
- BACKFILL SHALL BE CLASS 'A' PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM D-1557.

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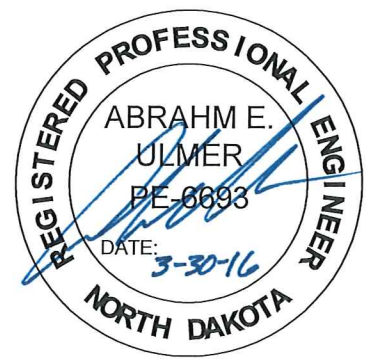
Sta 5+97.29 40' Rt	Sta 6+11.72 40' Rt	Sta 6+26.38 40' Rt
8"x8" Tee	8"x6" Tee	8"x8" Tee
11 LF 8" WM	10 LF 6" WM	3 LF 8" WM
8" Gate Valve	6" Gate Valve	8" Gate Valve
Sta 6+01.57 40' Rt	6" Hydrant	Sta 6+29.38 40' Rt
8" Gate Valve		8" Gate Valve

APPROXIMATE QUANTITIES

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	38 Ton
901-4.10	6" Watermain	10 LF
901-4.11	8" Watermain	133 LF
901-4.50	8" Gate Valve & Box	4 Ea
901-4.51	6" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	1 Ea



**AS-BUILT**

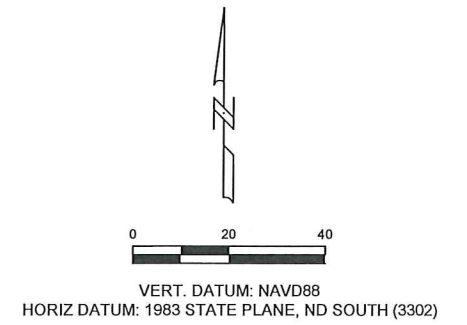
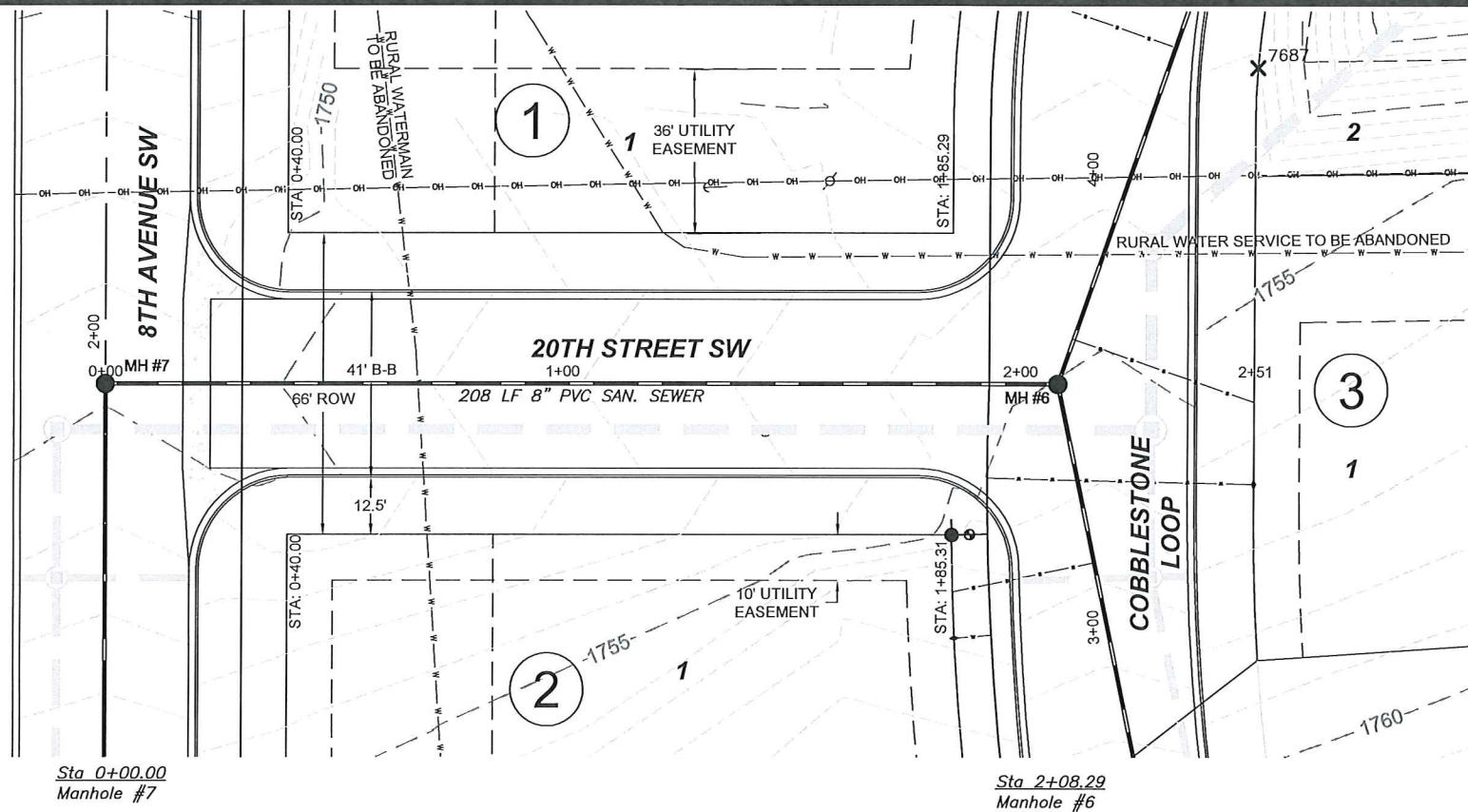


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**8TH AVENUE SW**  
 KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 4+80 - 5+99

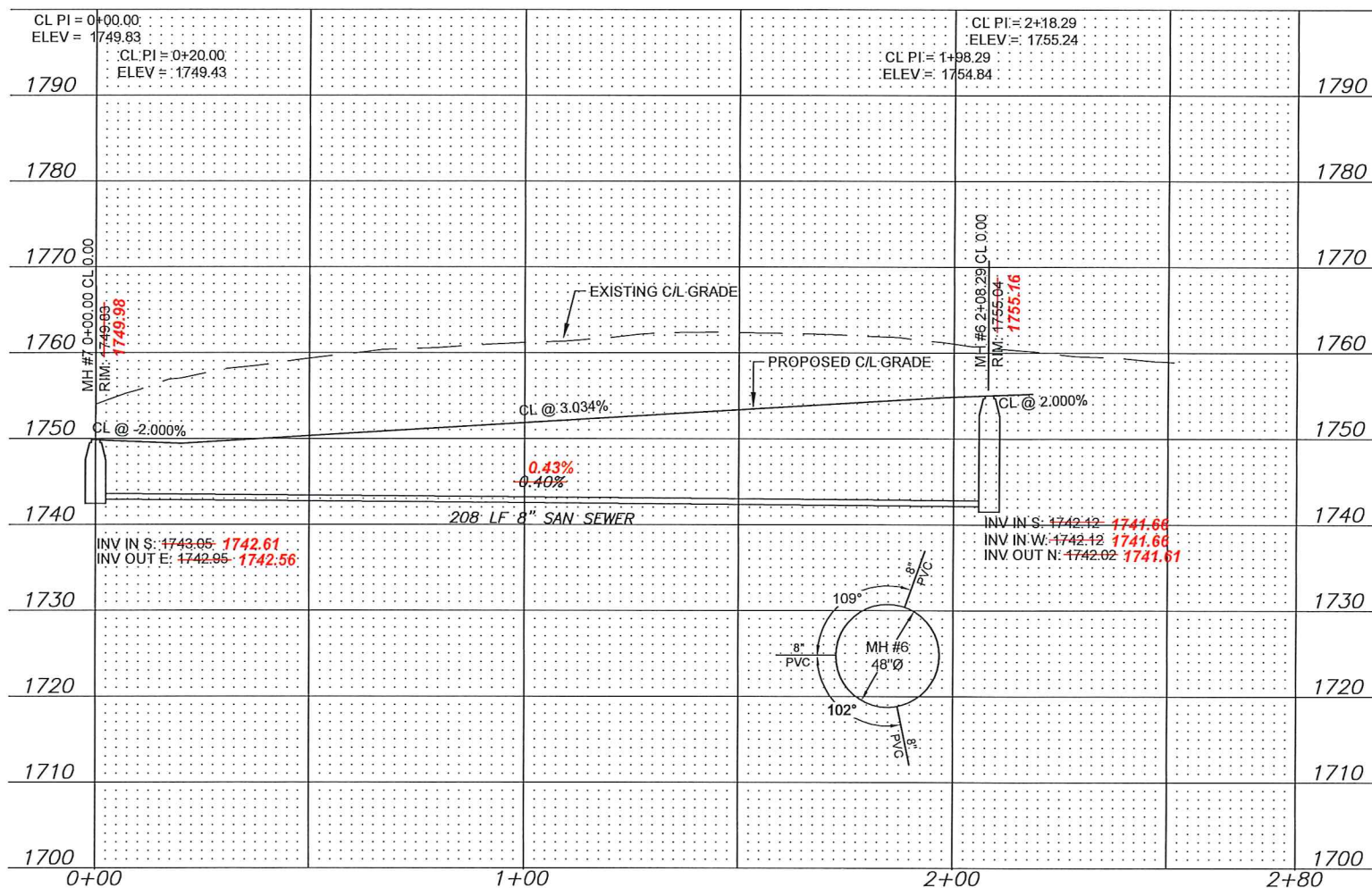
WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 4 OF 17 MARCH, 2016

**PLAN & PROFILE**



1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
2. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
3. RURAL WATER SERVICE TO BE ABANDONED IN THIS AREA.
4. BACKFILL SHALL BE CLASS "A" PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM D-1557.

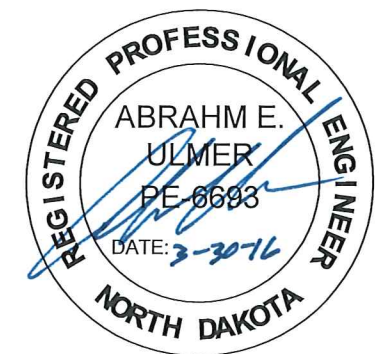
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 EXCAVATION



AS-BUILT

**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	208 LF
801-4.60	Bedding Material	33 Ton
1205-4.1	Manhole	1 Ea



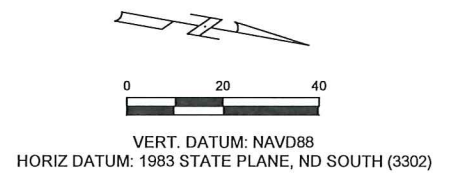
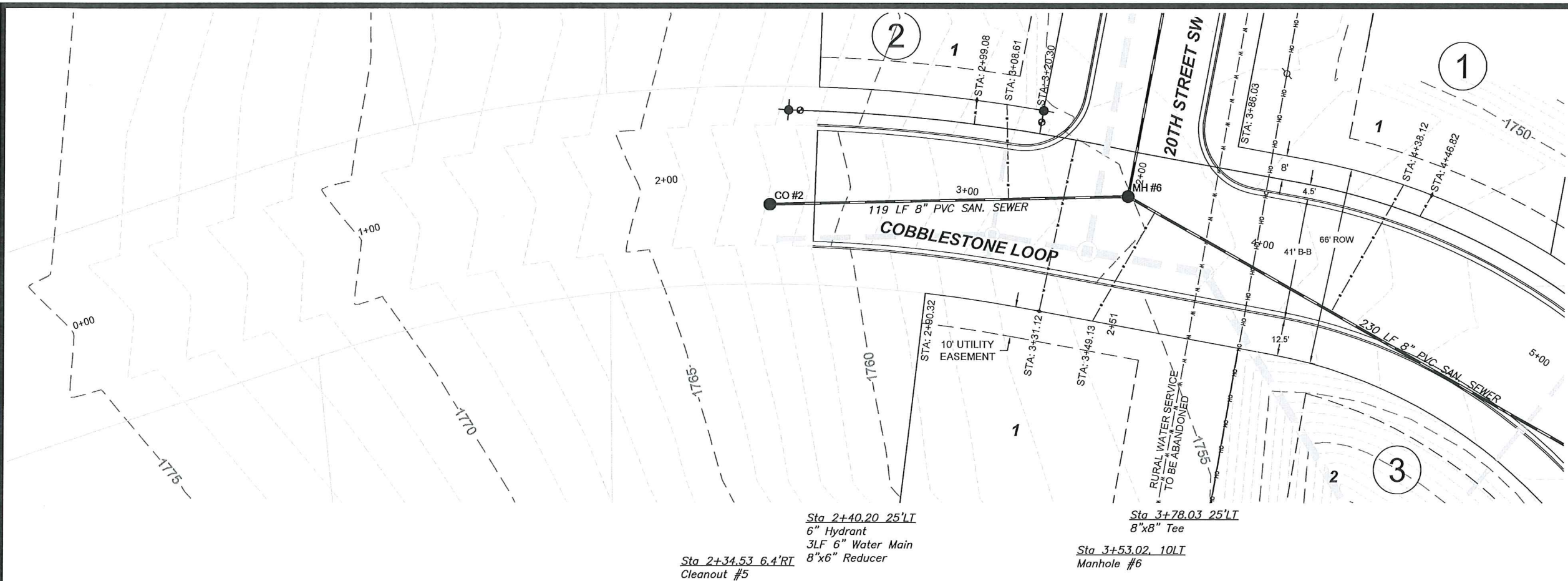
**TOMAN ENGINEERING**  
 501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

**20TH STREET SW**  
 KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 0+00 - 2+08.29

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 5 OF 17

MARCH, 2016

PLAN & PROFILE



1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
2. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
3. EXISTING RURAL WATER SERVICE TO BE ABANDONED IN THIS AREA.
4. BACKFILL SHALL BE CLASS 'A' PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM D-1557.

**APPROXIMATE QUANTITIES**

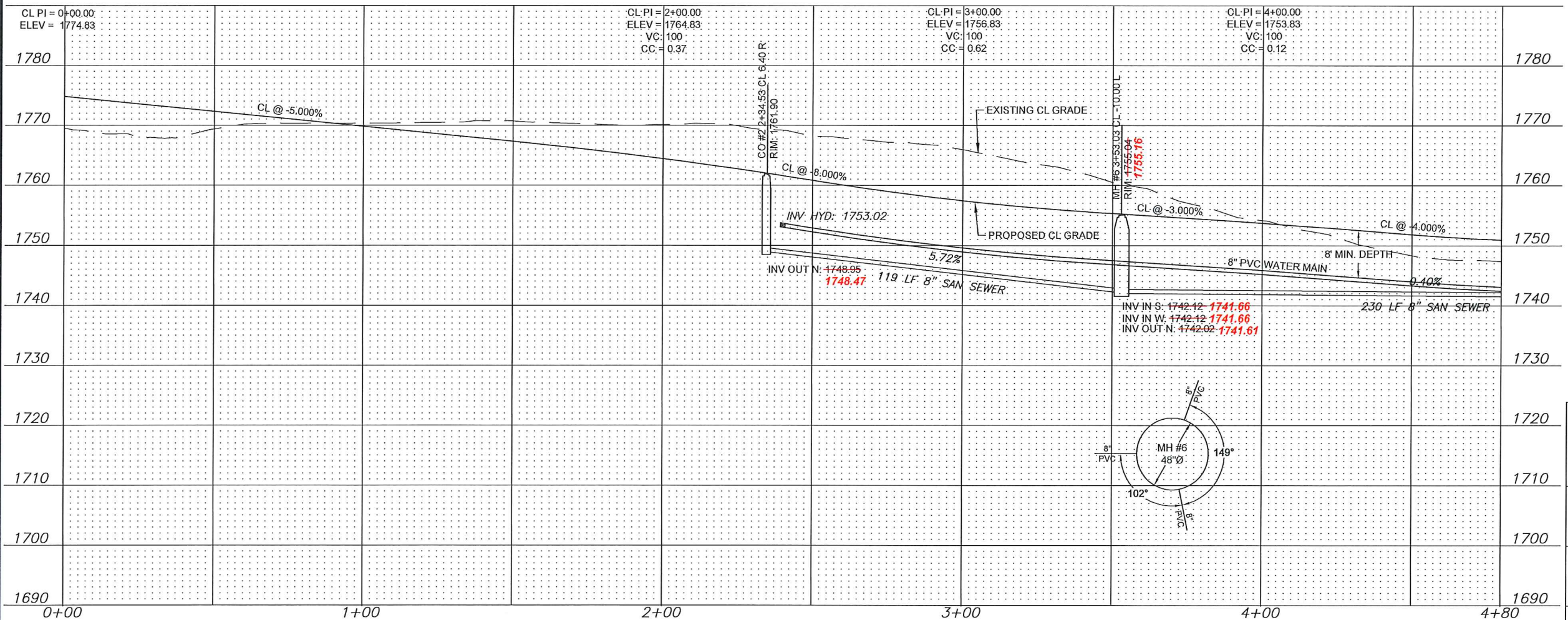
Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	339 LF
801-4.50	8"x4" Wye Branch	3 Ea
801-4.60	Bedding Material	75 Ton
1205-4.1	Manhole	1 Ea
1209-4.1	4" Sanitary Service Pipe	123 LF
1209-4.6	4" - 45° Bend	3 Ea
Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	142 Ton
901-4.10	6" Watermain	3 LF
901-4.11	8" Watermain	452 LF
901-4.70	6" Hydrant	1 Ea
1209-4.12	1" Water Service Pipe	66 LF
1209-4.41	1" Water Service Connection	3 Ea
1209-4.51	1" Curb Stop & 1 1/4" Box	3 Ea

Sta 2+40.20 25'LT  
6" Hydrant  
3LF 6" Water Main  
8"x6" Reducer  
Cleanout #5

Sta 2+34.53 6.4'RT

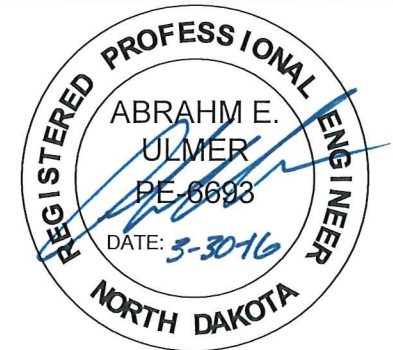
Sta 3+78.03 25'LT  
8"x8" Tee  
Manhole #6

Sta 3+53.02 10LT  
Manhole #6



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**AS-BUILT**



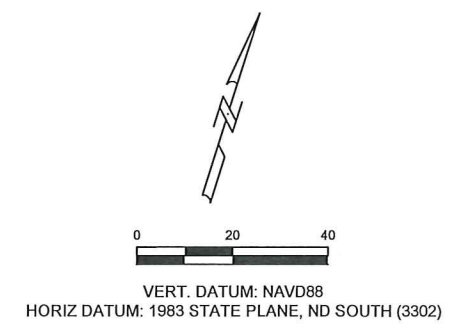
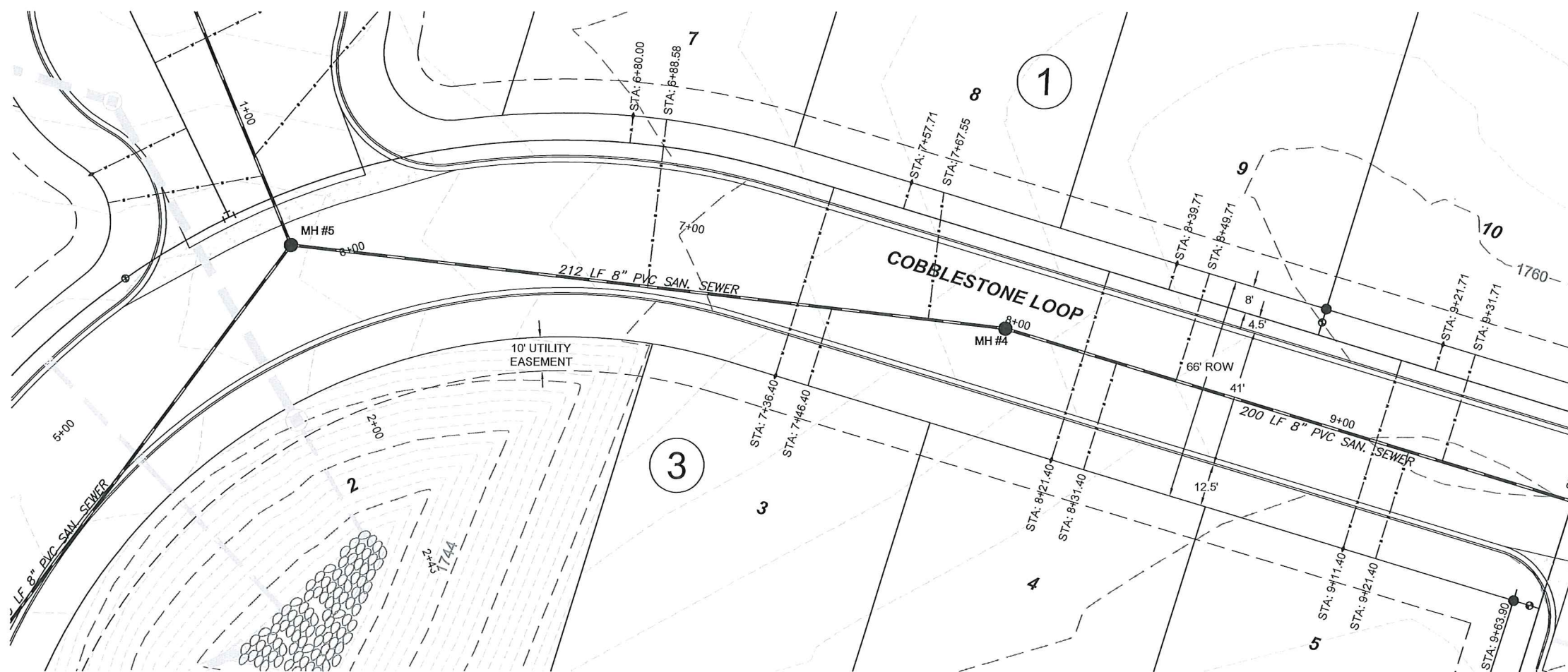
**TOMAN ENGINEERING**  
501 1st Street NW, Mandan, ND 58554  
Phone: 701-663-6483 \* Fax: 701-663-0923

**COBBLESTONE LOOP**  
KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
STA 0+00 - 4+80

WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA  
SHEET 6 OF 17

MARCH, 2016

**PLAN & PROFILE**



1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
2. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
3. ADDITIONAL DEPTH OF WATERMAIN FROM STA 8+50 TO STA 9+67 SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
4. BACKFILL SHALL BE CLASS 'A' PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM-D-1557.

**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	475 LF
801-4.50	8"x4" Wye Branch	8 Ea
801-4.60	Bedding Material	120 Ton
1205-4.1	Manhole	2 Ea
1209-4.1	4" Sanitary Service Pipe	269 LF
1209-4.6	4" - 45° Bend	8 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	172 Ton
901-4.10	6" Watermain	8 LF
901-4.11	8" Watermain	480 LF
901-4.51	6" Gate Valve & Box	1 Ea
901-4.52	8" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	1 Ea
1209-4.12	1" Water Service Pipe	264 LF
1209-4.41	1" Water Service Connection	8 Ea
1209-4.51	1" Curb Stop & 1 1/4" Box	8 Ea

Sta 5+40.26, 25'LI  
8" Gate Valve

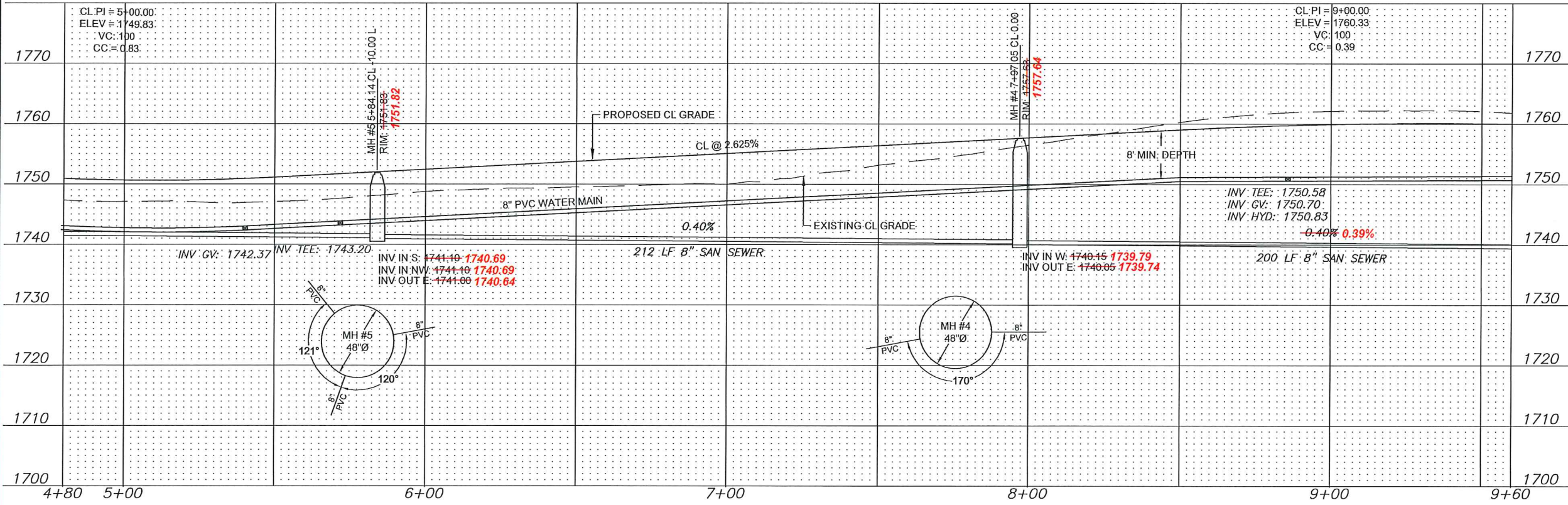
Sta 5+71.90, 25'LI  
8"x8" Tee

Sta 5+84.14, 10'LF  
Manhole #5

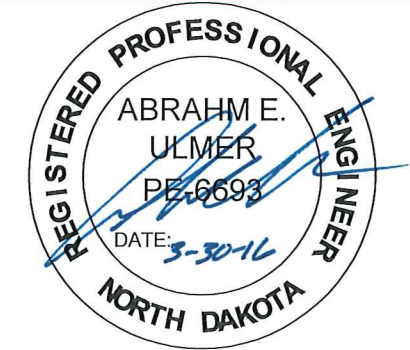
Sta 7+97.05  
Manhole #4

Sta 8+85.71, 33'LI  
8"x6" Tee  
8 LF 6" WM  
6" Gate Valve  
6" Hydrant

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**AS-BUILT**

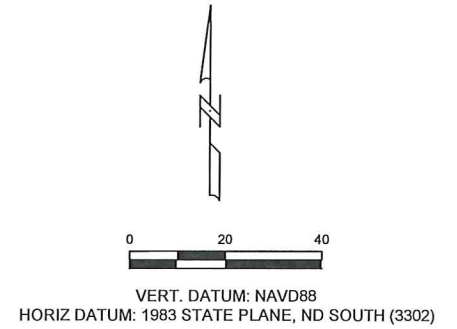
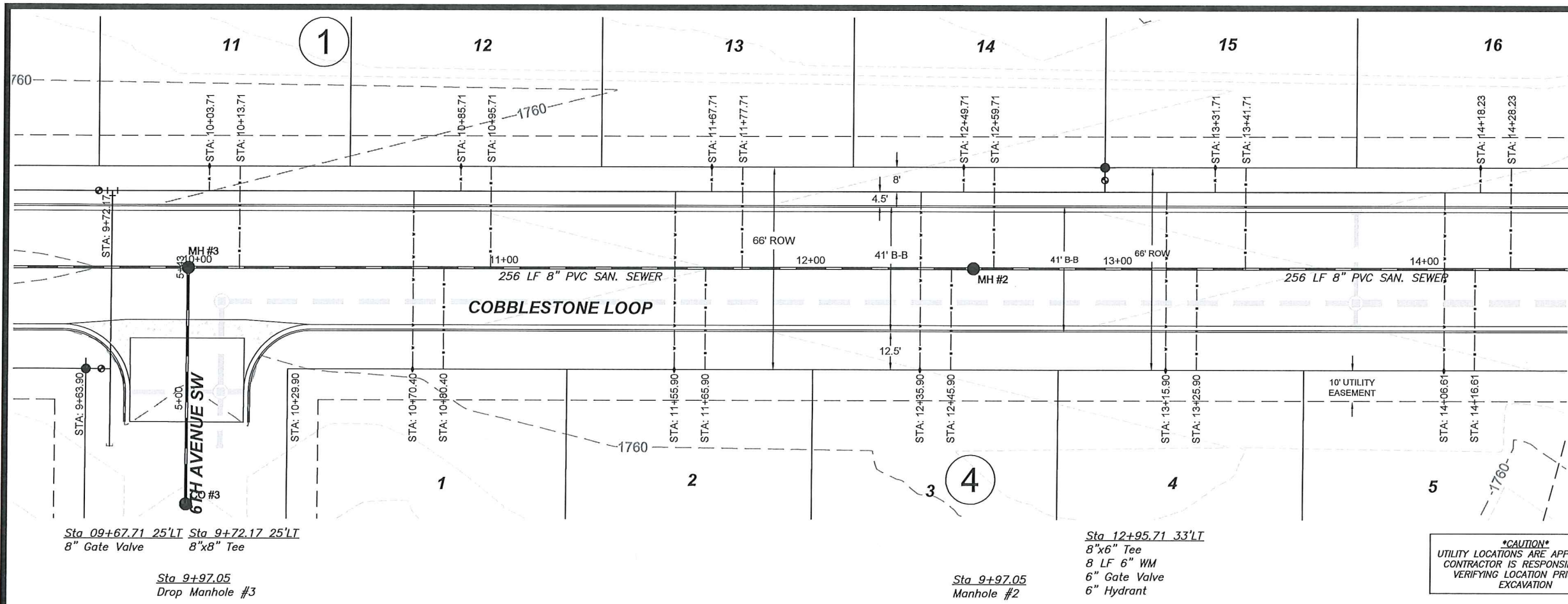


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**COBBLESTONE LOOP**  
KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
STA 4+80 - 9+60

WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA  
SHEET 7 OF 17 MARCH, 2016

**PLAN & PROFILE**



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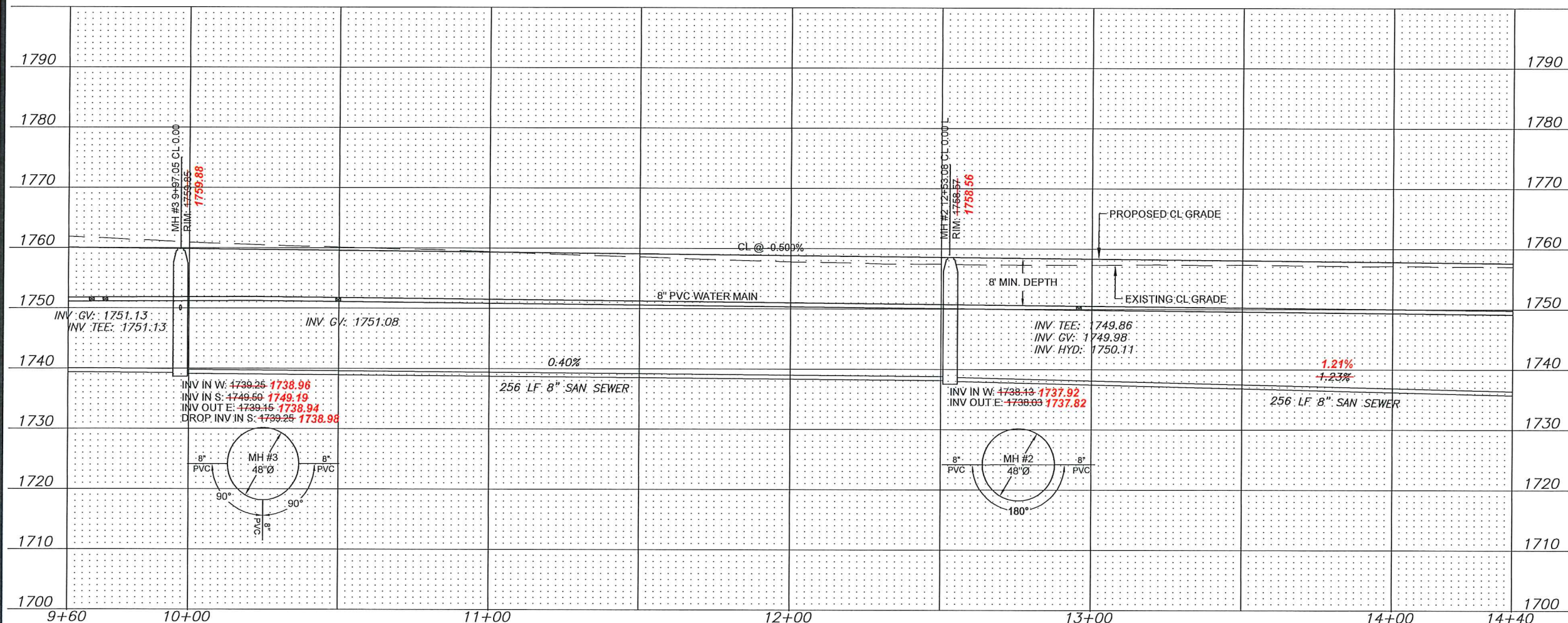
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	480 LF
801-4.50	8"x4" Wye Branch	11 Ea
801-4.60	Bedding Material	134 Ton
1205-4.1	Manhole	2 Ea
1209-4.1	4" Sanitary Service Pipe	363 LF
1209-4.6	4" - 45° Bend	11 Ea

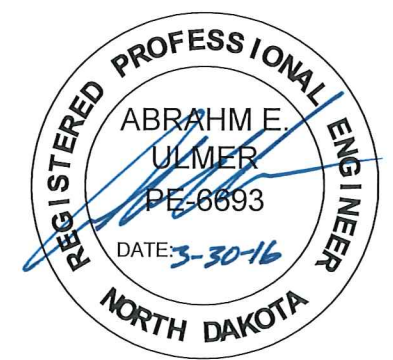
  

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	177 Ton
901-4.10	6" Watermain	8 LF
901-4.11	8" Watermain	480 LF
901-4.51	6" Gate Valve & Box	1 Ea
901-4.52	8" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	1 Ea
1209-4.12	1" Water Service Pipe	338 LF
1209-4.41	1" Water Service Connection	11 Ea
1209-4.51	1" Curb Stop & 1 1/4" Box	11 Ea

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AS-BUILT



TOMAN ENGINEERING

501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

COBBLESTONE LOOP

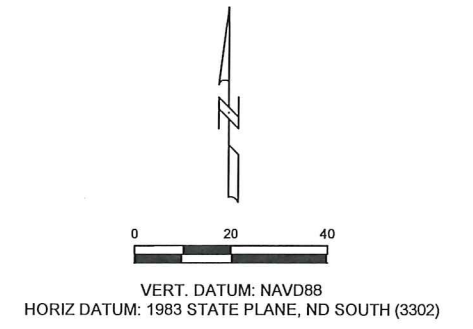
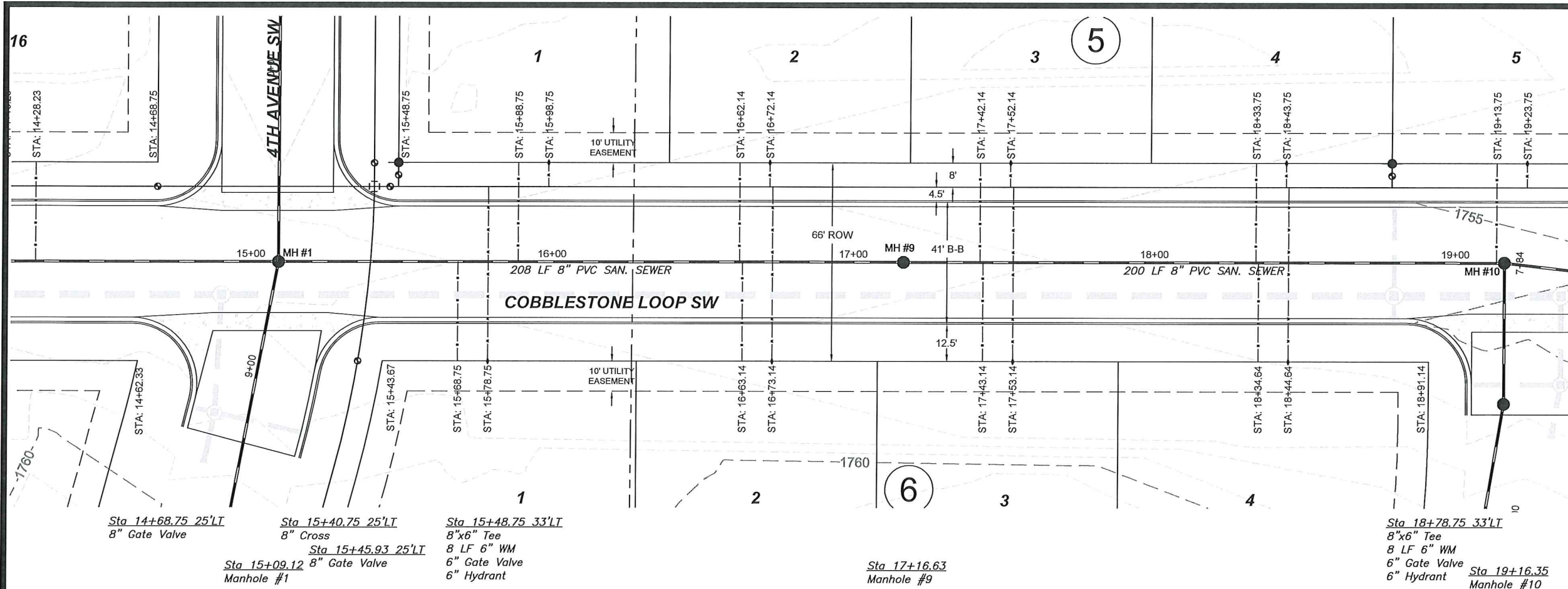
KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 9+60 - 14+40

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 8 OF 17

MARCH, 2016

PLAN & PROFILE





1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
2. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
3. BACKFILL SHALL BE CLASS 'A' PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM-1557.

**APPROXIMATE QUANTITIES**

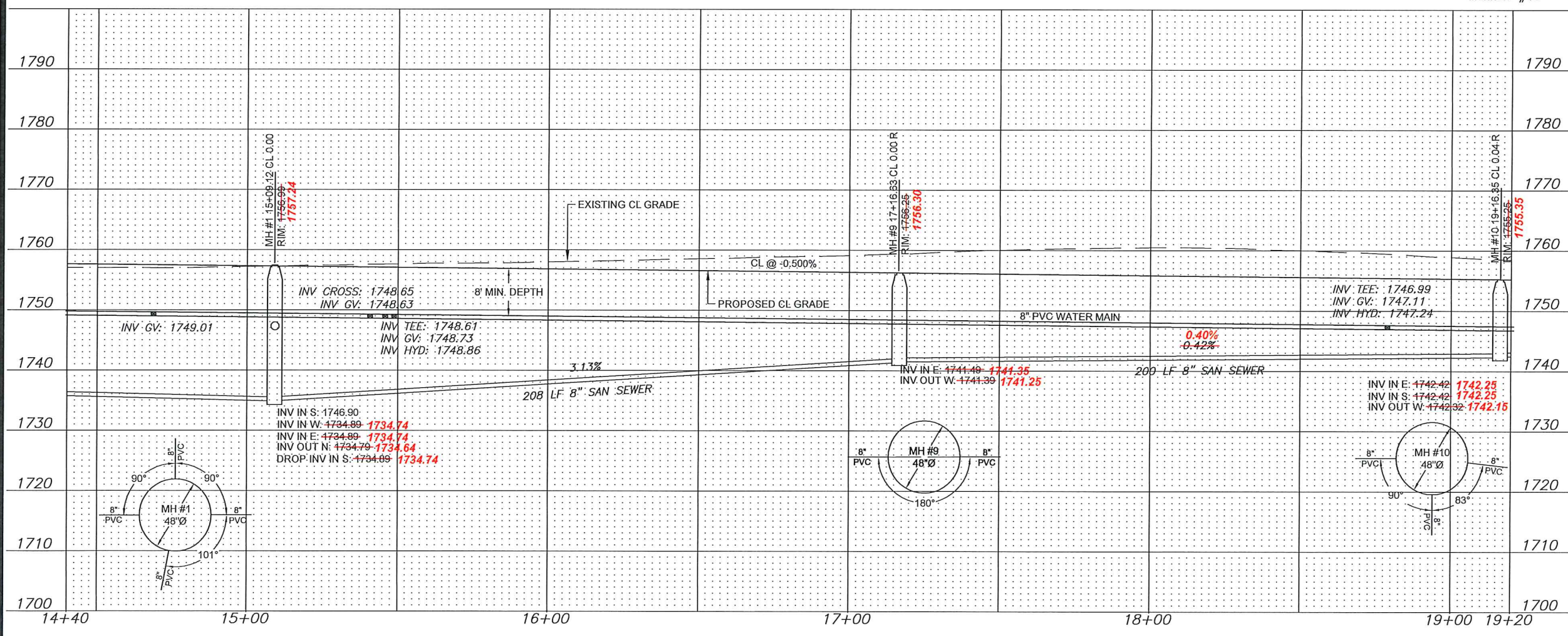
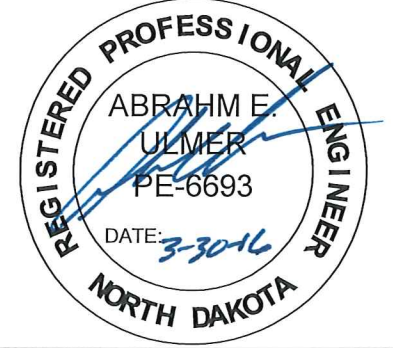
Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	480 LF
801-4.50	8"x4" Wye Branch	9 Ea
801-4.60	Bedding Material	125 Ton
1205-4.1	Manhole	3 Ea
1209-4.1	4" Sanitary Service Pipe	297 LF
1209-4.6	4" - 45° Bend	9 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	170 Ton
901-4.10	6" Watermain	16 LF
901-4.11	8" Watermain	480 LF
901-4.51	6" Gate Valve & Box	1 Ea
901-4.52	8" Gate Valve & Box	2 Ea
901-4.70	6" Hydrant	2 Ea
1209-4.12	1" Water Service Pipe	264 LF
1209-4.41	1" Water Service Connection	8 Ea
1209-4.51	1" Curb Stop & 1 1/4" Box	8 Ea

**\*CAUTION\***  
UTILITY LOCATIONS ARE APPROXIMATE.  
CONTRACTOR IS RESPONSIBLE FOR  
VERIFYING LOCATION PRIOR TO  
EXCAVATION

**AS-BUILT**



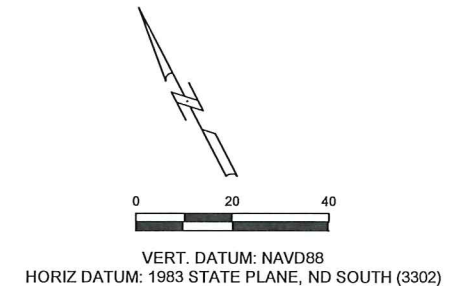
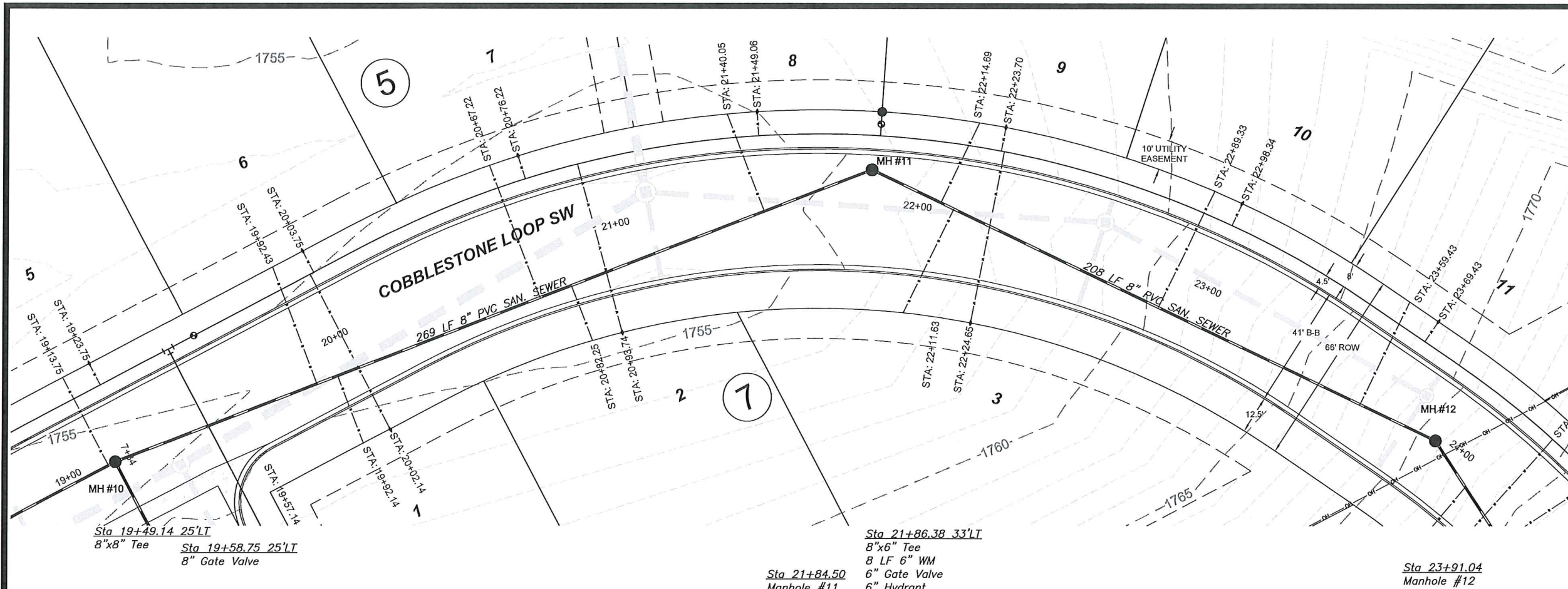
**TOMAN ENGINEERING**  
501 1st Street NW, Mandan, ND 58554  
Phone: 701-663-6483 \* Fax: 701-663-0923

**COBBLESTONE LOOP**  
KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
STA 14+40 - 19+20

WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA  
SHEET 9 OF 17

**PLAN & PROFILE**

MARCH, 2016



- BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
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**APPROXIMATE QUANTITIES**

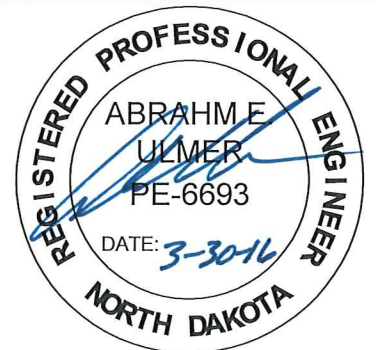
Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	480 LF
801-4.50	8"x4" Wye Branch	9 Ea
801-4.60	Bedding Material	135 Ton
1205-4.1	Manhole	3 Ea
1209-4.1	4" Sanitary Service Pipe	335 LF
1209-4.6	4" - 45° Bend	9 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	168 Ton
901-4.10	6" Watermain	8 LF
901-4.11	8" Watermain	480 LF
901-4.51	6" Gate Valve & Box	1 Ea
901-4.52	8" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	1 Ea
1209-4.12	1" Water Service Pipe	230 LF
1209-4.41	1" Water Service Connection	10 Ea
1209-4.51	1" Curb Stop & 1 1/4" Box	10 Ea

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EXCAVATION

**AS-BUILT**

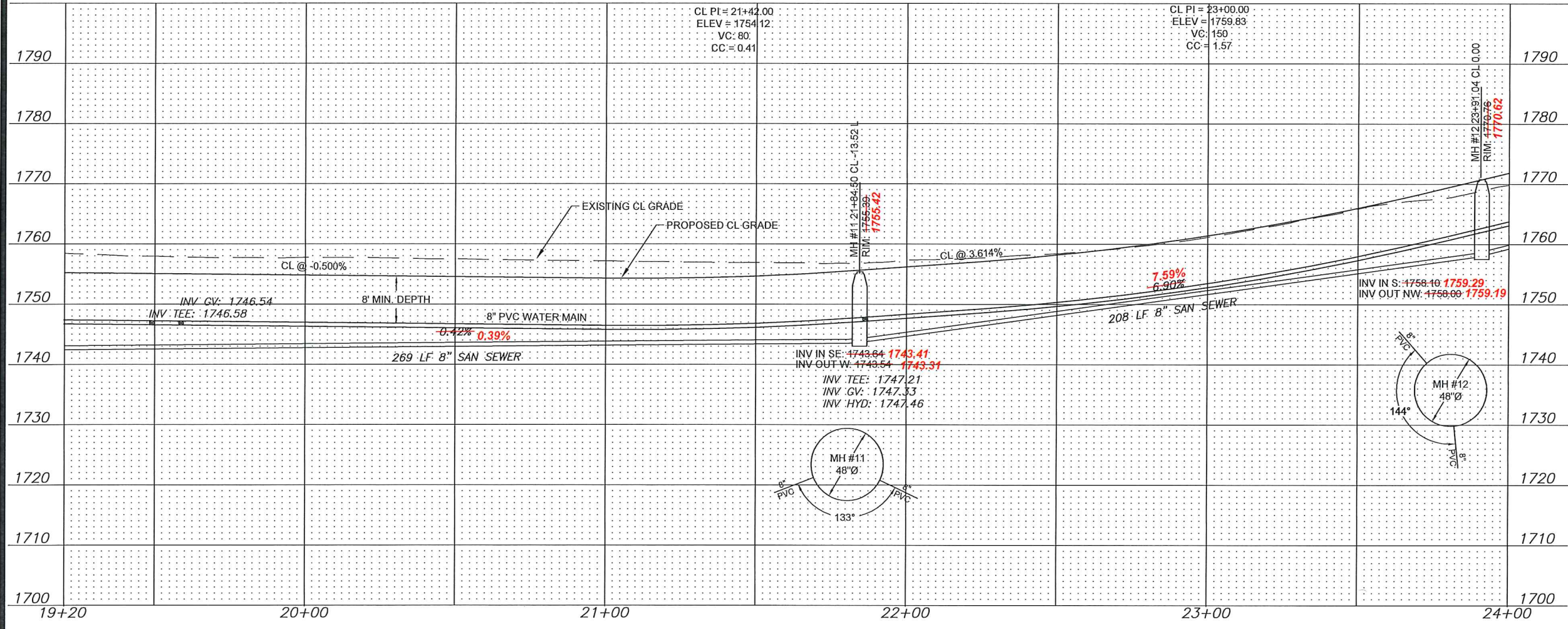


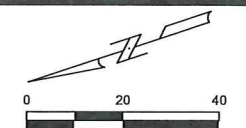
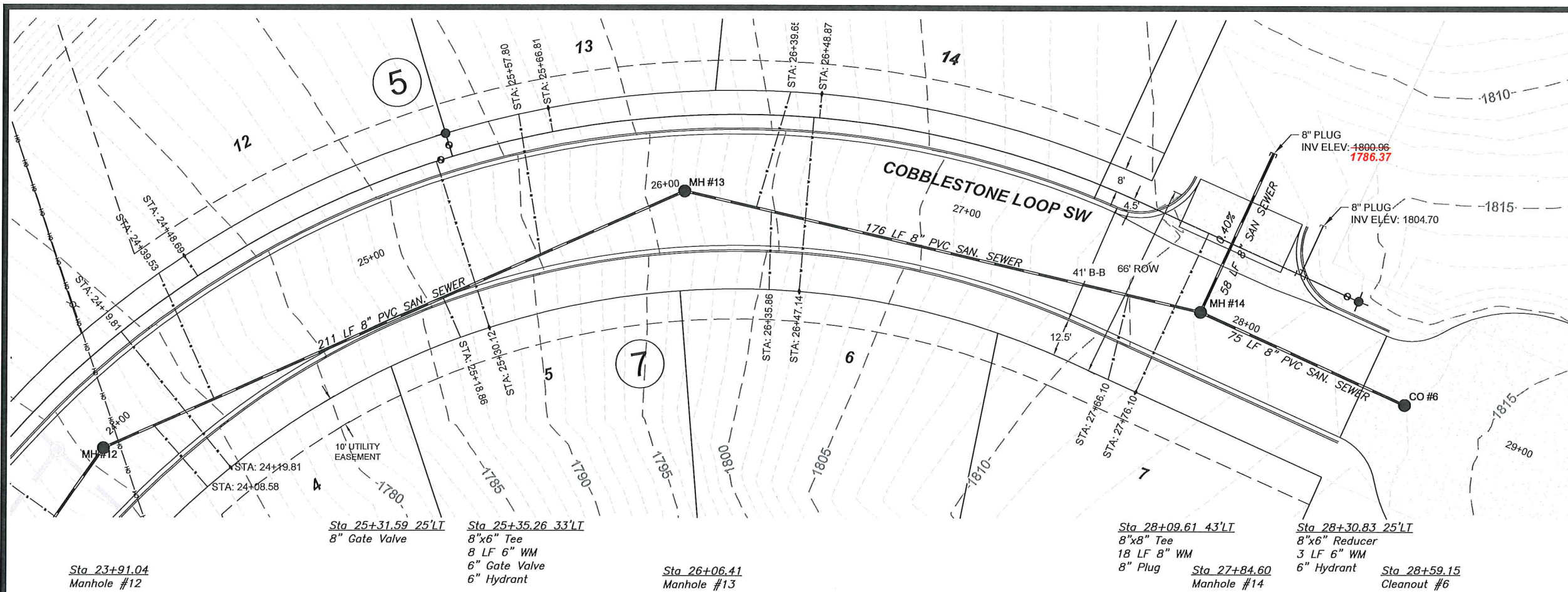
**COBBLESTONE LOOP**  
KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
STA 19+20 - 24+00

WATER & SEWER IMPROVEMENT  
CITY PROJECT NO. 2014-01  
MANDAN, NORTH DAKOTA  
SHEET 10 OF 17

MARCH, 2016

**PLAN & PROFILE**





VERT. DATUM: NAVD88  
 HORIZ DATUM: 1983 STATE PLANE, ND SOUTH (3302)

1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
2. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
3. BACKFILL SHALL BE CLASS 'A' PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM-D-1557.

**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	520 LF
801-4.50	8"x4" Wye Branch	7 Ea
801-4.60	Bedding Material	125 Ton
801-4.62	8" Cleanout	1 Ea
1205-4.1	Manhole	2 Ea
1209-4.1	4" Sanitary Service Pipe	230 LF
1209-4.6	4" - 45° Bend	7 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	165 Ton
901-4.10	6" Watermain	11 LF
901-4.11	8" Watermain	445 LF
901-4.51	6" Gate Valve & Box	2 Ea
901-4.70	6" Hydrant	7 Ea
1209-4.12	1" Water Service Pipe	258 LF
1209-4.41	1" Water Service Connection	7 Ea
1209-4.51	1" Curb Stop & 1 1/4" Box	7 Ea

Sta 23+91.04  
Manhole #12

Sta 25+31.59 25' LT  
8" Gate Valve

Sta 25+35.26 33' LT  
8"x6" Tee  
8 LF 6" WM  
6" Gate Valve  
6" Hydrant

Sta 26+06.41  
Manhole #13

Sta 28+09.61 43' LT  
8"x8" Tee  
18 LF 8" WM  
8" Plug

Sta 27+84.60  
Manhole #14

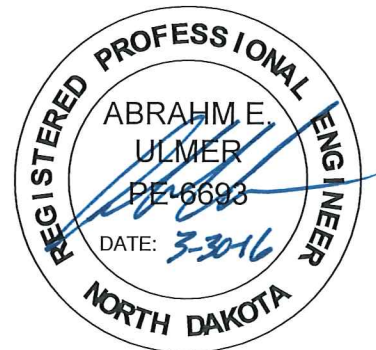
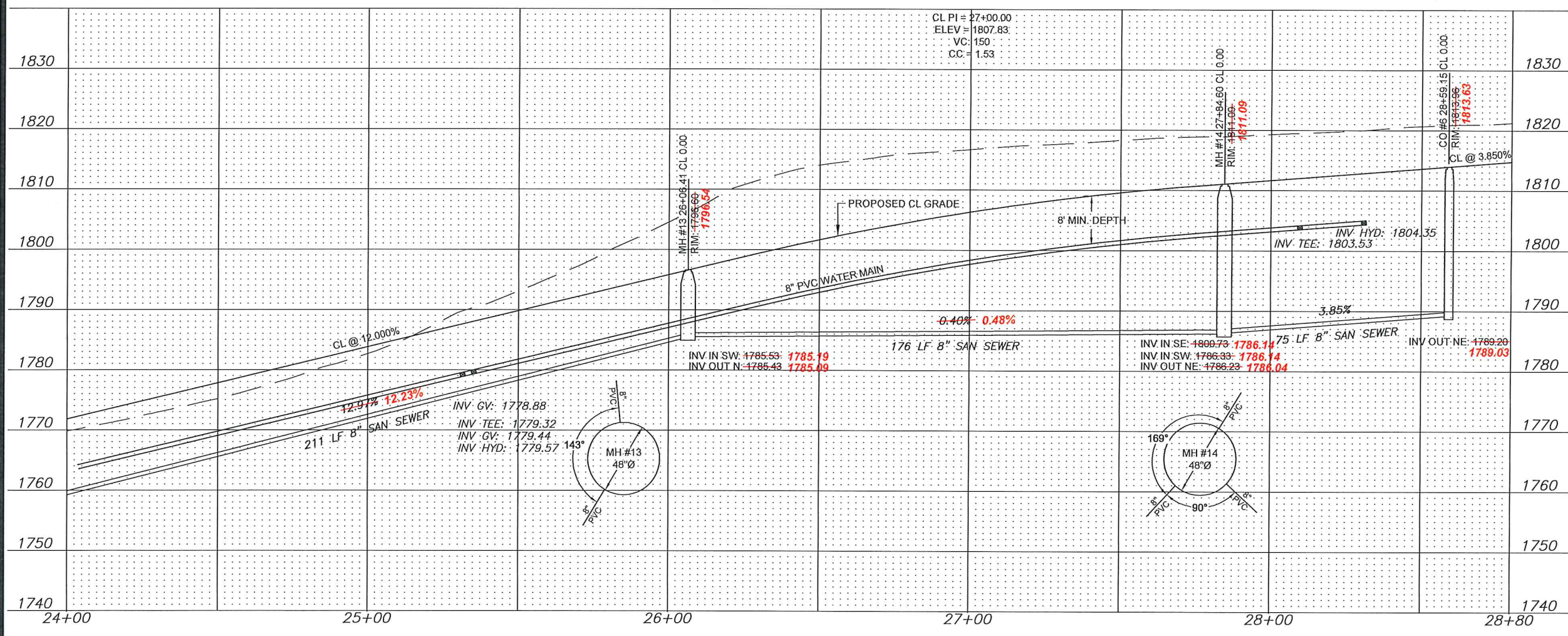
Sta 28+30.83 25' LT  
8"x6" Reducer  
3 LF 6" WM  
6" Hydrant

Sta 28+59.15  
Cleanout #6

CL PI = 27+00.00  
ELEV = 1807.83  
VC = 150  
CC = 1.53

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 EXCAVATION

**AS-BUILT**



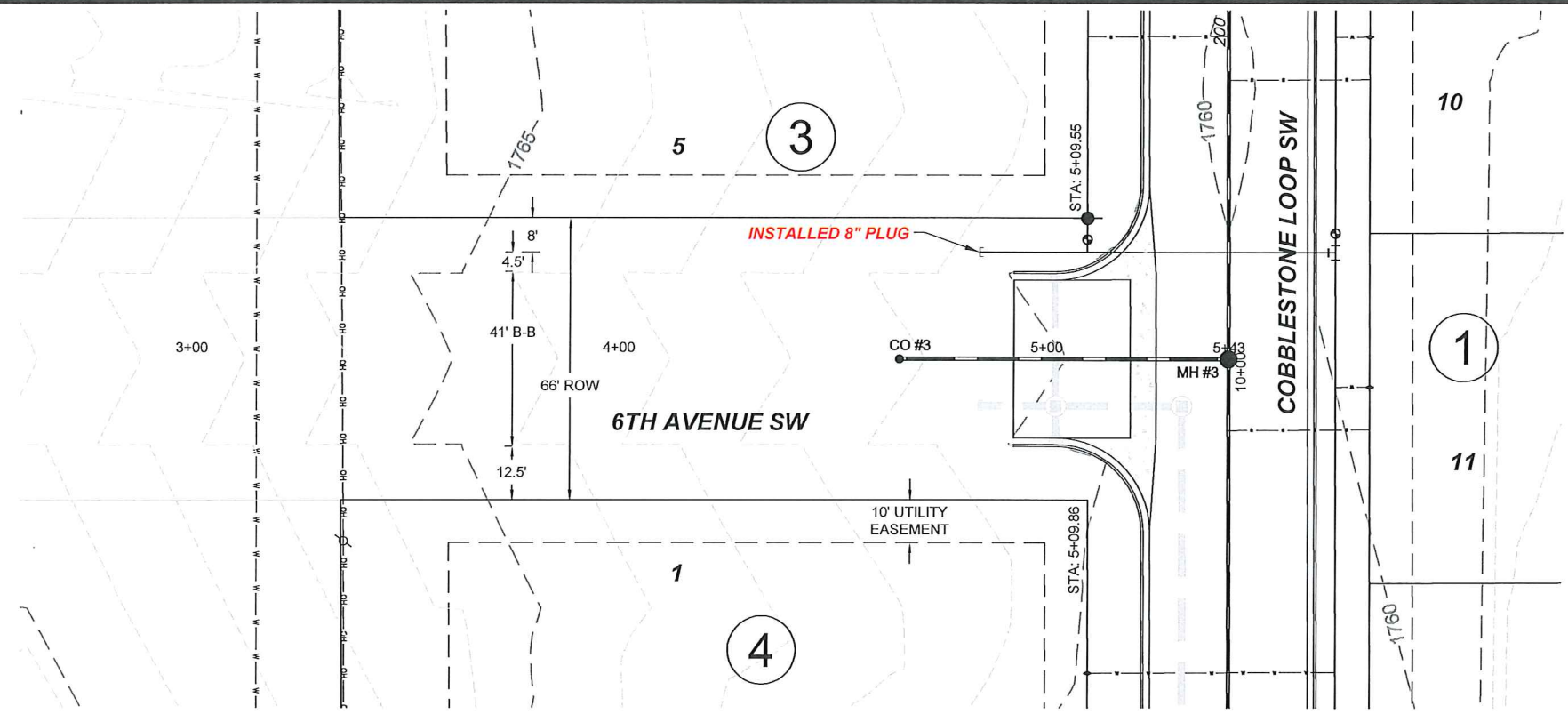
**TOMAN ENGINEERING**  
 501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

**COBBLESTONE LOOP**  
 KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 24+00 - 28+80

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 11 OF 17

MARCH, 2016

**PLAN & PROFILE**



VERT. DATUM: NAVD88  
 HORIZ DATUM: 1983 STATE PLANE, ND SOUTH (3302)

1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
2. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
3. BACKFILL SHALL BE CLASS "A" PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM D-1557.

\*CAUTION\*  
 UTILITY LOCATIONS ARE APPROXIMATE.  
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 EXCAVATION

**APPROXIMATE QUANTITIES**

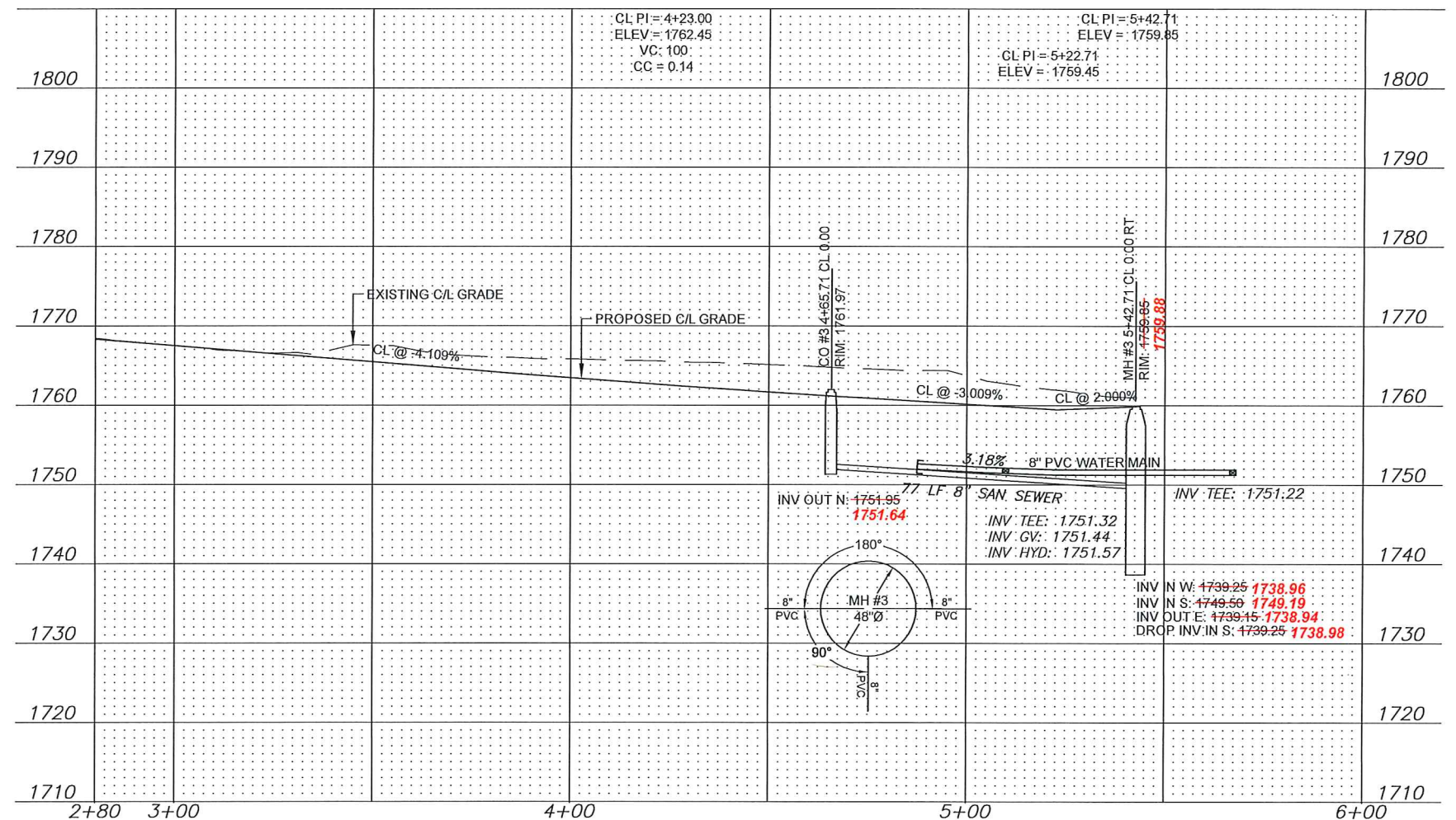
Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	233 LF
801-4.60	Bedding Material	40 Ton
801-4.62	8" Cleanout	1 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	80 Ton
901-4.10	6" Watermain	11 LF
901-4.11	8" Watermain	239 LF
901-4.51	6" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	2 Ea

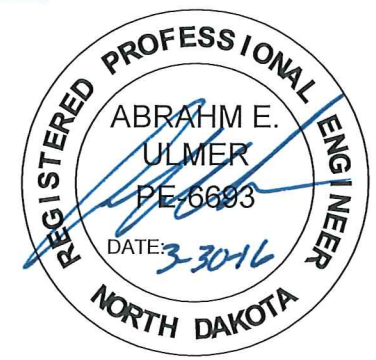
Sta 5+09.55 33'LT  
 8"x6" Tee  
 8 LF 6" WM  
 6" Gate Valve  
 6" Hydrant

Sta 4+65.71  
 Cleanout #3

Sta 5+42.71  
 Manhole #13



AS-BUILT



TOMAN ENGINEERING

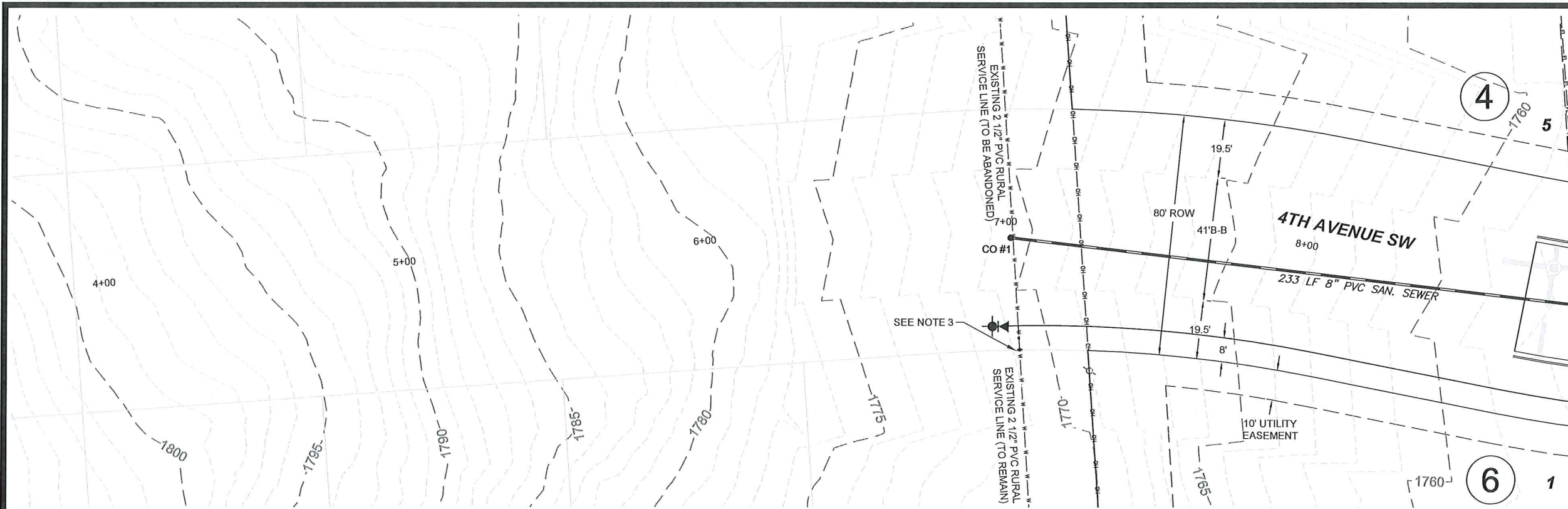
501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

6TH AVENUE SW

KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 2+80 - 5+43

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 12 OF 17 MARCH, 2016

PLAN & PROFILE



VERT. DATUM: NAVD88  
 HORIZ DATUM: 1983 STATE PLANE, ND SOUTH (3302)

- BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
- GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
- CONTRACTOR IS TO CONNECT TO EXISTING 2 1/2" CLASS 160 PVC & INSTALL CURB STOP. MISSOURI WEST WATER (RURAL) SHALL BE GIVEN 2 WEEKS NOTICE TO ORGANIZE WATER SERVICE SHUT OFF AND RECONNECTION.
- 4TH AVENUE WATERMAIN SHALL BE PRESSURE TESTED AND TESTED FOR BACTERIA PRIOR TO RURAL WATER SERVICE RECONNECTION.
- BACKFILL SHALL BE CLASS "A" PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM-D-1557.

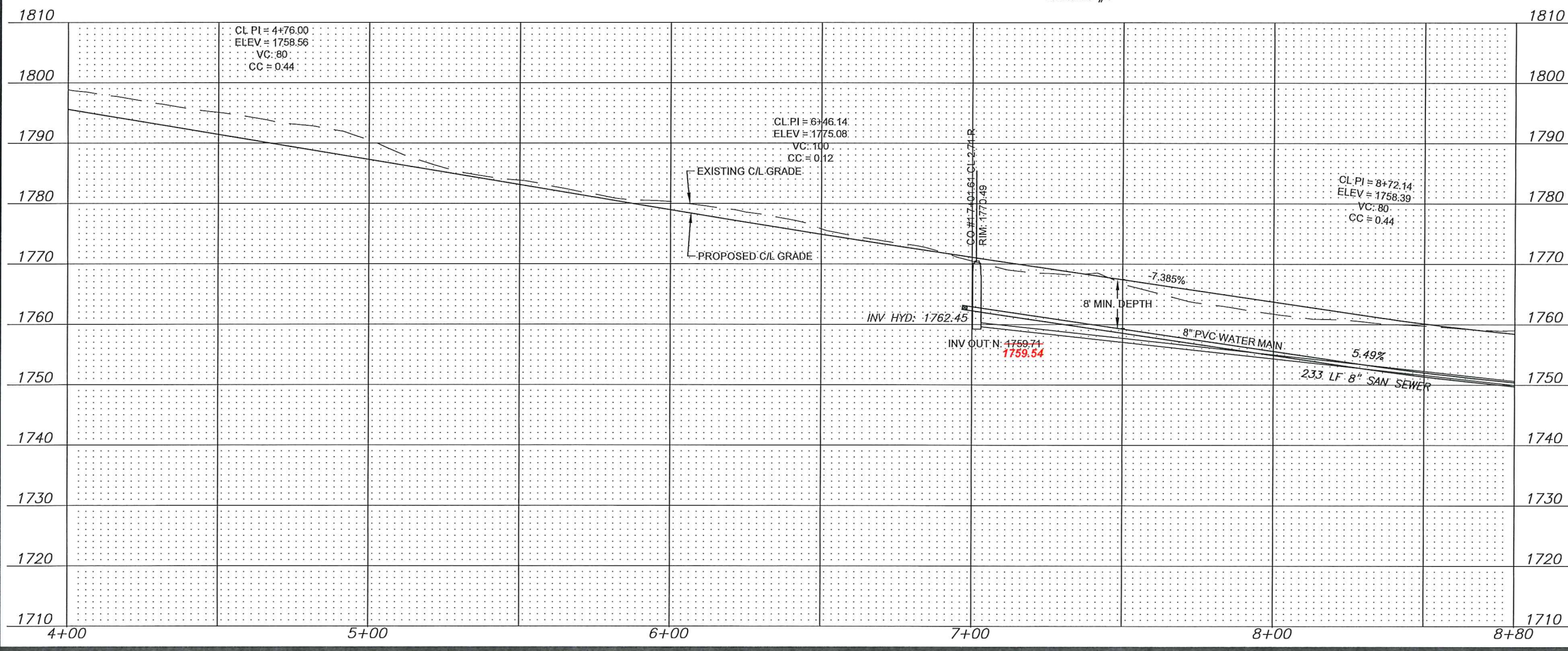
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	233 LF
801-4.60	Bedding Material	40 Ton
801-4.62	8" Cleanout	1 Ea
1209-4.18	2 1/2" Water Service Pipe	233 LF
1209-4.45	2 1/2" Water Service Connection	40 Ton
1209-4.56	2 1/2" Curb Stop & Box	1 Ea

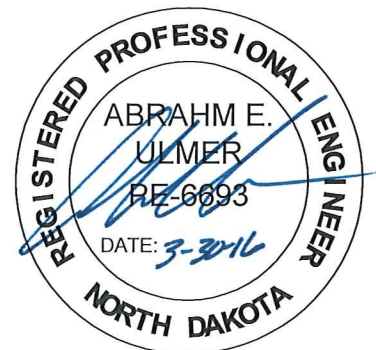
Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	80 Ton
901-4.10	6" Watermain	11 LF
901-4.11	8" Watermain	239 LF
901-4.51	6" Gate Valve & Box	1 Ea
901-4.52	8" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	2 Ea

Sta 6+97.70 32'RT  
 6" Hydrant  
 3 LF 6" Water Main  
 8"x6" Reducer  
 Sta 7+01.61 2.71'RT  
 Cleanout #1



\*CAUTION\*  
 UTILITY LOCATIONS ARE APPROXIMATE.  
 CONTRACTOR IS RESPONSIBLE FOR  
 VERIFYING LOCATION PRIOR TO  
 EXCAVATION

**AS-BUILT**

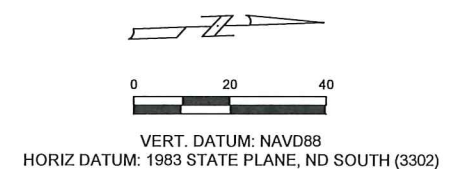
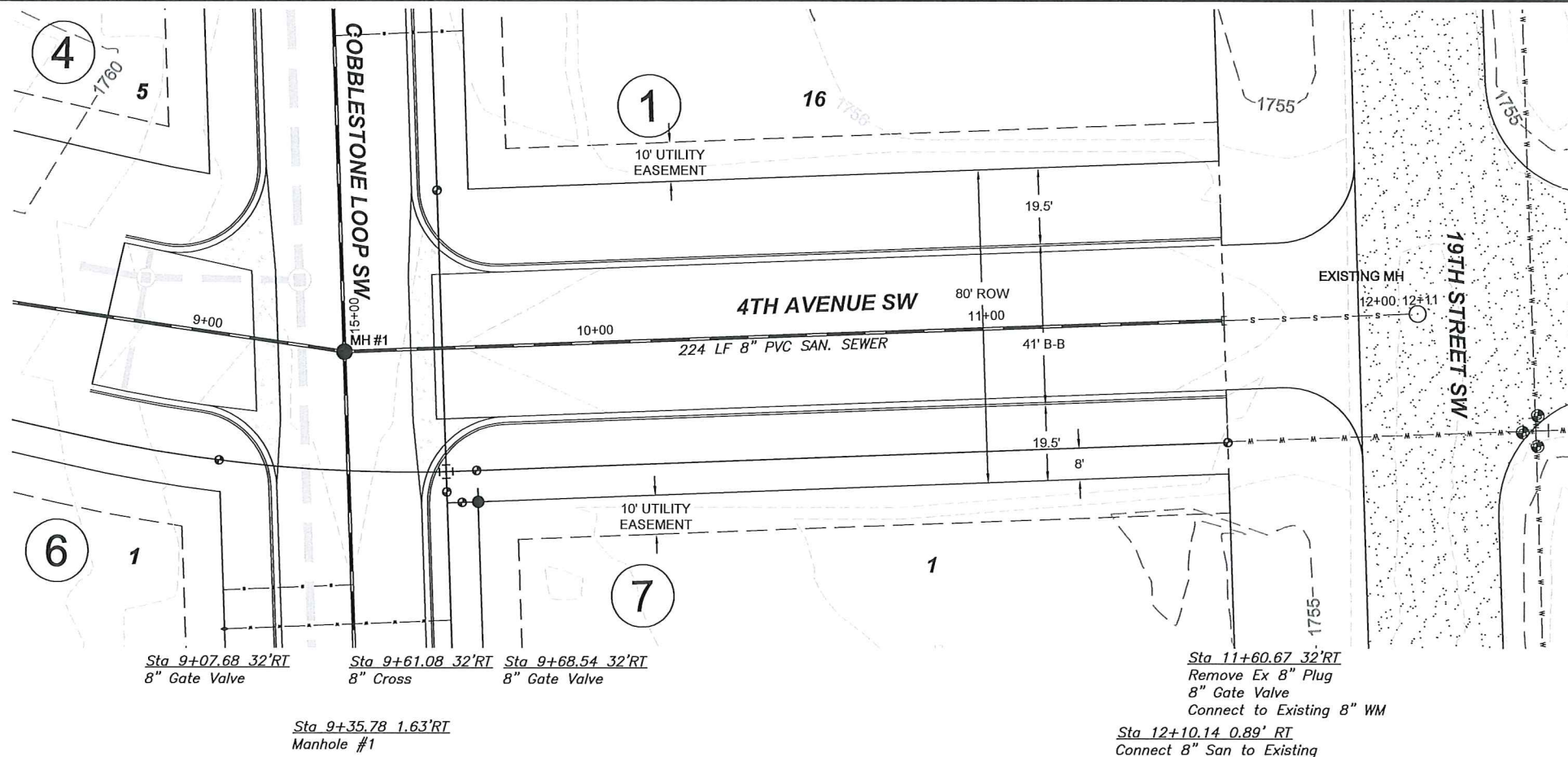


**TOMAN ENGINEERING**  
 501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

**4TH AVENUE SW**  
 KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 3+11 - 4+80

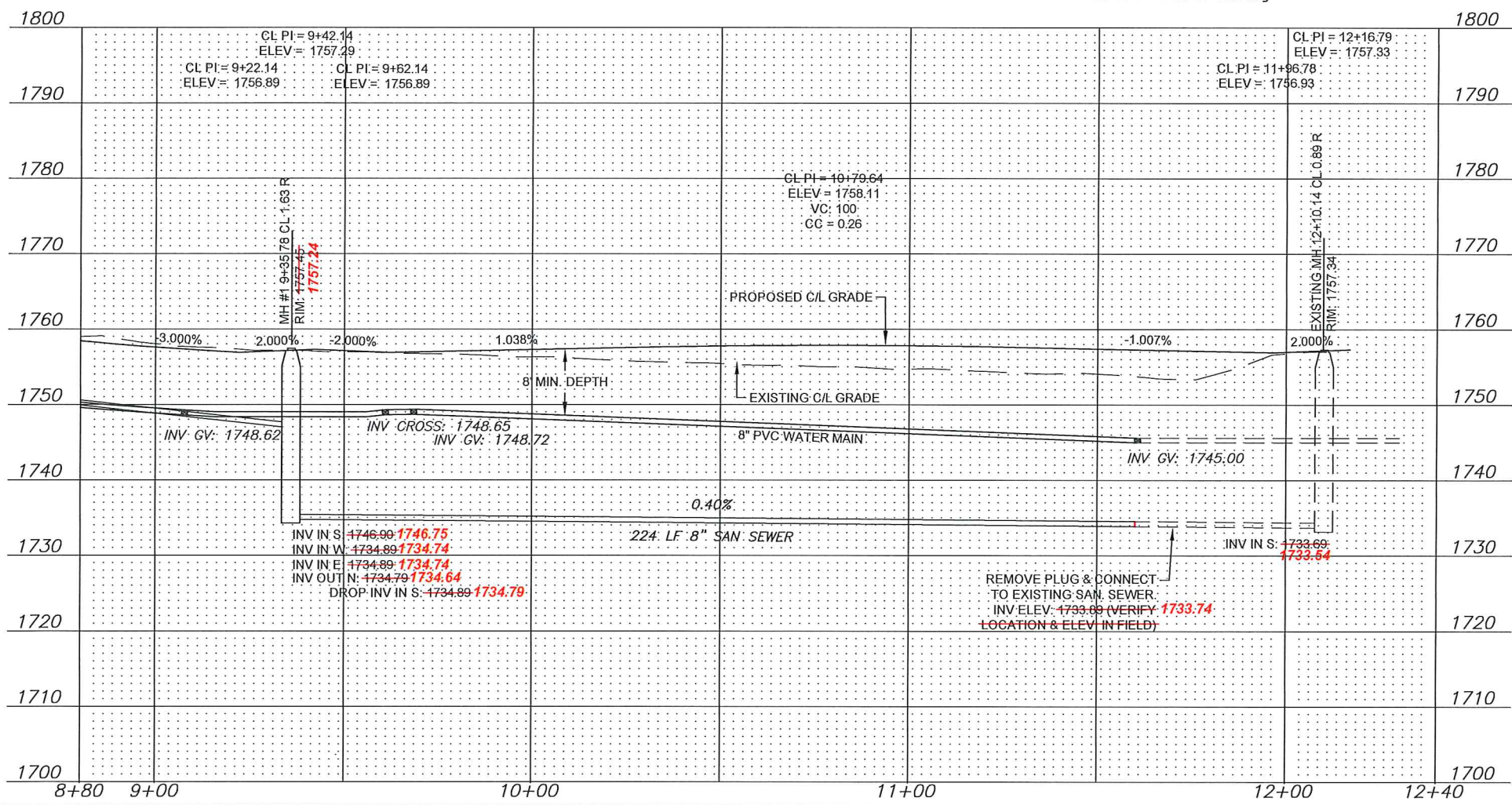
WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 13 OF 17 MARCH, 2016

**PLAN & PROFILE**



1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
2. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
3. VERIFY LOCATION AND ELEVATION OF EXISTING SANITARY SEWER.
4. ADDITIONAL DEPTH OF WATERMAIN FROM STA 5+71 TO STA 9+70 SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
5. PROPOSE GATE VALVE @ STA 7+70 SHALL HAVE A BOX EXTENSION AND VALVE STEM EXTENSION AS NEEDED (INCIDENTAL).
6. BACKFILL SHALL BE CLASS 'A' PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 2% ABOVE OR 3% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM D-1557.

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 EXCAVATION



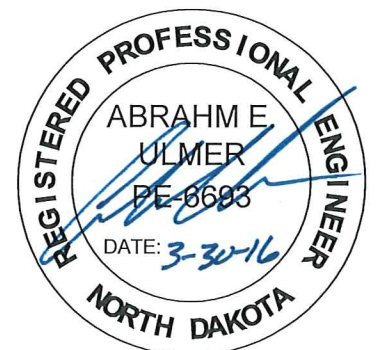
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	290 LF
801-4.60	Bedding Material	50 Ton
1205-4.1	Manhole	1 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	85 Ton
901-4.11	8" Watermain	291 LF
901-4.52	8" Gate Valve & Box	1 Ea

**AS-BUILT**

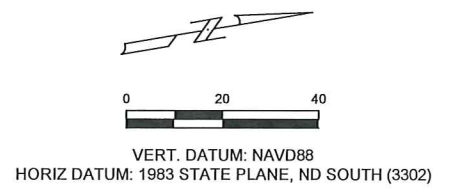
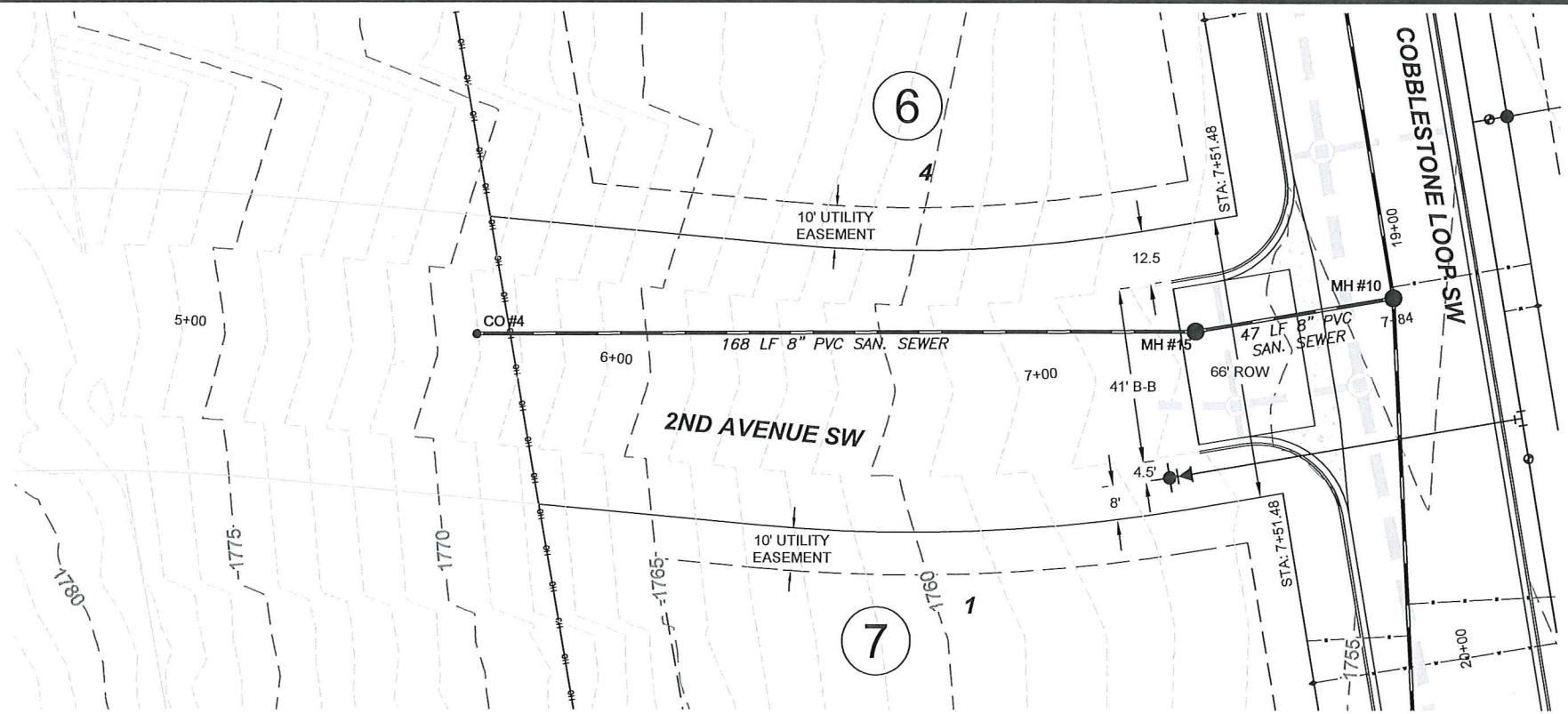


**TE** TOMAN ENGINEERING  
 501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

4TH AVENUE SW  
 KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 4+80 - 7+70.64

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 14 OF 17 MARCH, 2016

**PLAN & PROFILE**



1. BACKFILL SHALL BE CLASS "A" AS PER CITY OF MANDAN SPECIFICATIONS.
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 VERIFYING LOCATION PRIOR TO  
 EXCAVATION

Sta 5+72.08 25'RT  
 6" Hydrant  
 3 LF 6" WM  
 8"x6" Reducer  
 Sta 5+67.08, 5.39'LT  
 Cleanout #4

Sta 7+37.52  
 Manhole #15

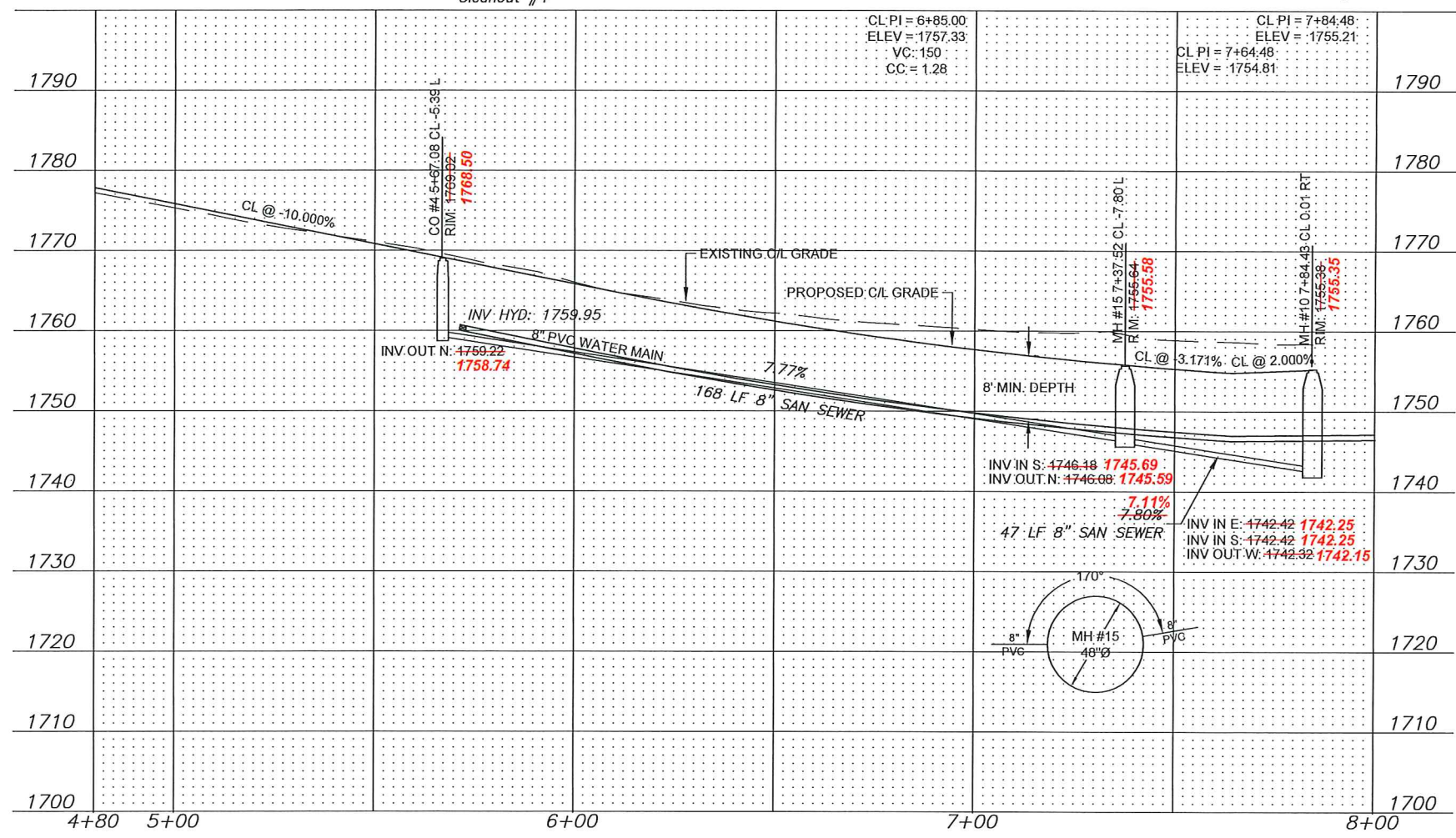
Sta 7+84.43  
 Manhole #10

**APPROXIMATE QUANTITIES**

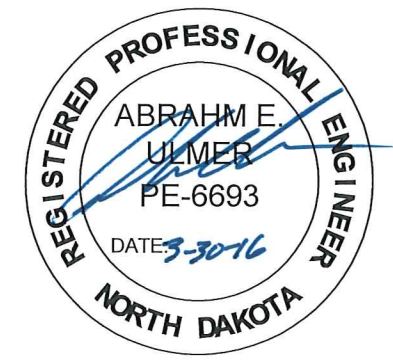
Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	215 LF
801-4.60	Bedding Material	35 Ton
801-4.67	Cleanout	1 Ea
1205-4.1	Manhole	1 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	75 Ton
901-4.10	6" Watermain	3 LF
901-4.11	8" Watermain	242 LF
901-4.70	6" Hydrant	1 Ea



AS-BUILT

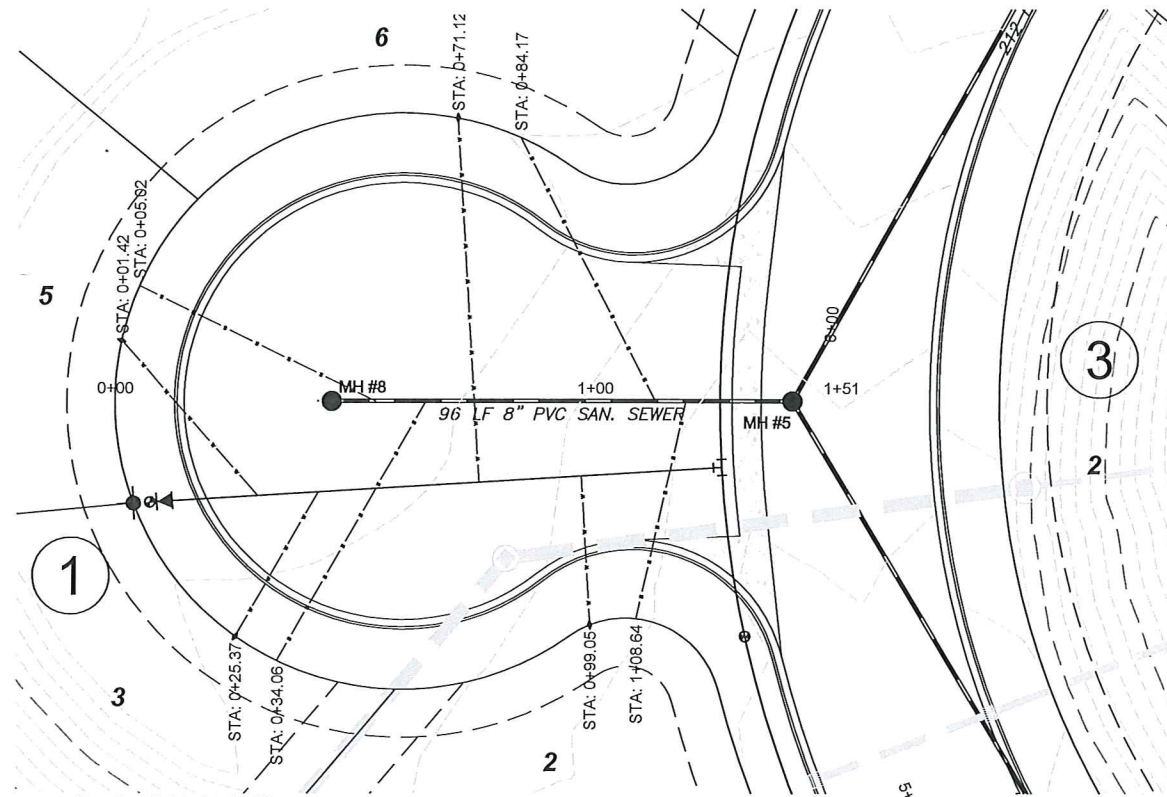


**TOMAN ENGINEERING**  
 501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

**2ND AVENUE SW**  
 KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 4+80 - 7+70.64

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 15 OF 17 MARCH, 2016

PLAN & PROFILE

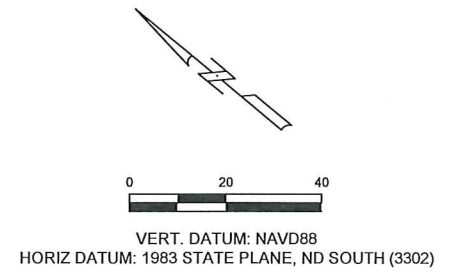
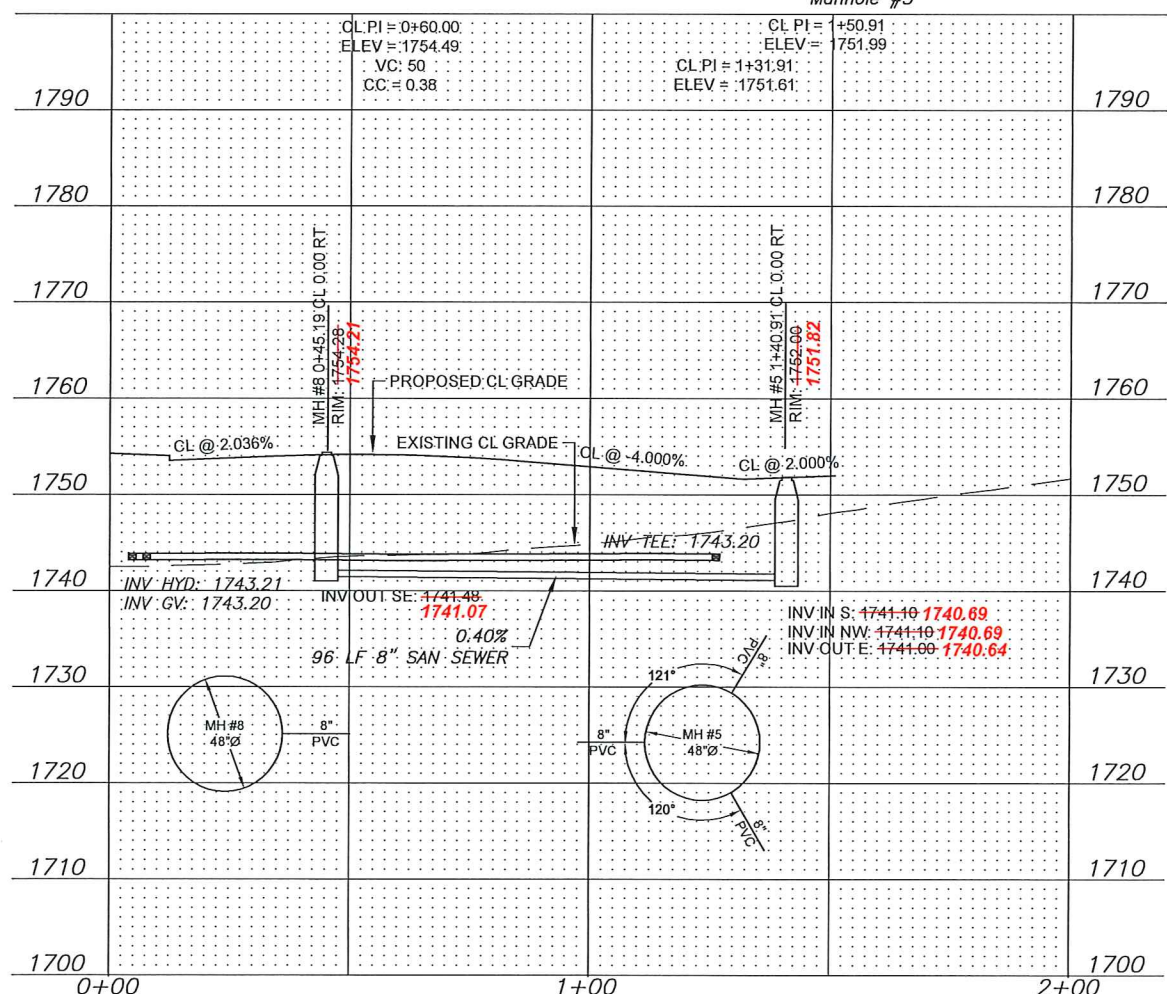


Sta 0+03.90 21.27RT  
 6" Hydrant  
 6 LF 6" WM  
 6" Gate Valve  
 8"x6" Reducer

Sta 0+45.19  
 Manhole #8

Sta 1+26.33 13.76RT  
 Connect 8" WM to Tee

Sta 1+40.91  
 Manhole #5



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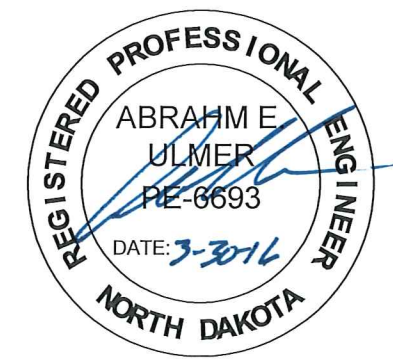
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	96 LF
801-4.50	8"x4" Wye Branch	4 Ea
801-4.60	Bedding Material	50 Ton
1205-4.1	Manhole	1 Ea
1209-4.1	4" Sanitary Service Pipe	225 LF
1209-4.6	4" - 45° Bend	4 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	46 Ton
901-4.10	6" Watermain	6 LF
901-4.11	8" Watermain	117 LF
901-4.51	6" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	1 Ea
1209-4.12	1" Water Service Pipe	90 LF
1209-4.41	1" Water Service Connection	4 Ea
1209-4.51	1" Curb Stop & 1 1/4" Box	4 Ea

**AS-BUILT**



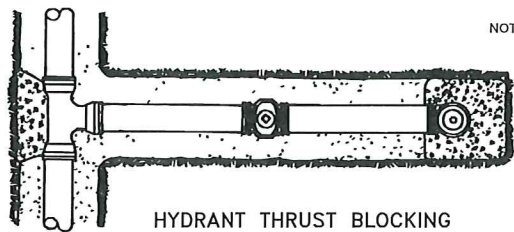
**TOMAN ENGINEERING**  
 501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

CUL-DE-SAC  
 KEIDEL'S SOUTH HEART TERRACE 3RD ADDITION  
 STA 0+00 - 1+40.91

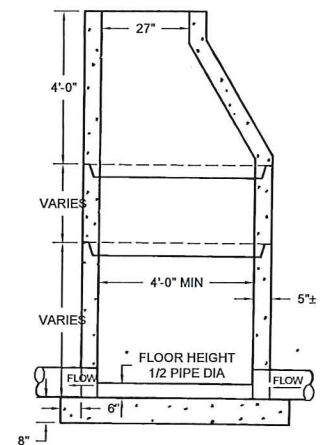
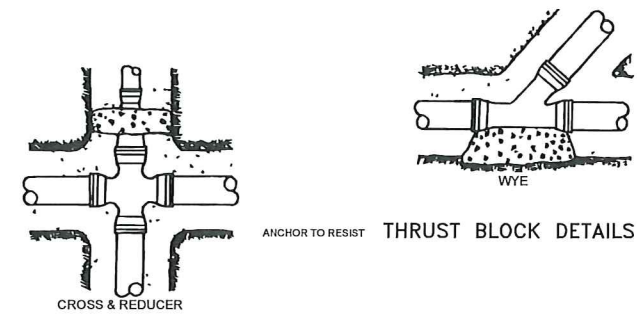
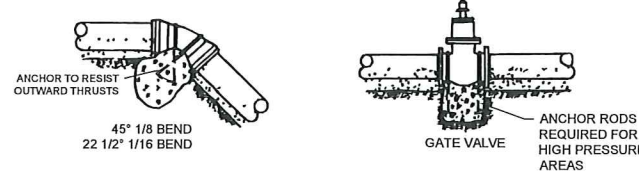
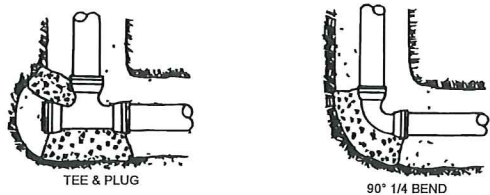
WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 16 OF 17 MARCH, 2016

**PLAN & PROFILE**





- NOTES:
- (1) PIPE DEFLECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION
  - (2) BEDDING REQUIREMENTS SHALL BE AS INDICATED HEREON UNLESS MODIFIED IN THE SPECIFICATION
  - (3) CONCRETE FOR THRUST BLOCKS SHALL HAVE MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,000 P.S.I. AND MAX. SLUMP OF 3 INCHES AT TIME OF PLACEMENT



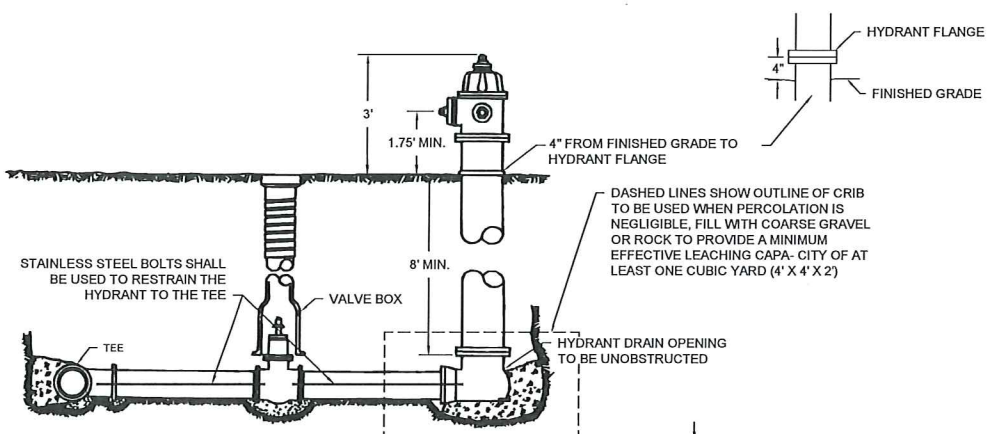
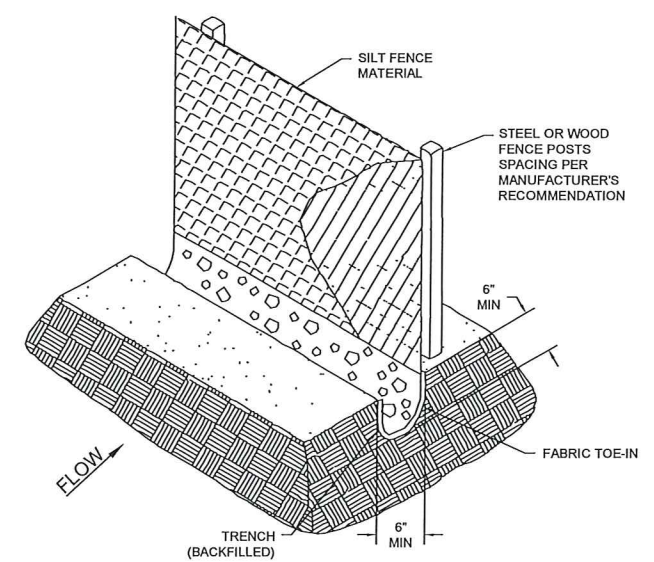
MANHOLES ARE TO BE MANUFACTURED IN ACCORDANCE WITH ASTM SPECIFICATION C-478-73

ALL MANHOLES ARE TO HAVE ECCENTRIC CONES

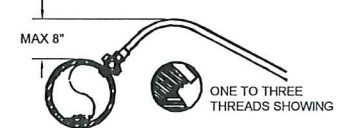
ALL MANHOLE SECTION JOINTS TO BE SEALED WITH KENT SEALER

MANHOLE FLOORS SHALL SLOPE 1/2" PER FOOT

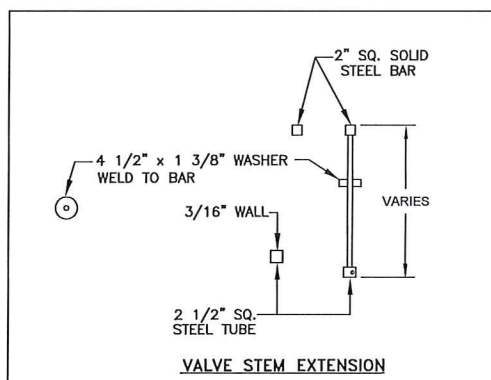
- NOTES:
1. SILT FENCE FABRIC SHALL BE ONE OF THE FOLLOWING
    - A. BURLAP: AASHTO M182
    - B. POLYPROPYLENE FABRIC: ASTM D4397
    - C. NYLON NETTING REINFORCED FABRIC
    - D. PREMANUFACTURED SILT FENCE MEETING EQUAL PROPERTIES OF ABOVE
  2. SILT FENCE FABRIC SHALL HAVE A MINIMUM BURSTING STRENGTH 150 PSI
  3. SILT FENCE FABRIC SHALL HAVE EDGES TREATED TO PREVENT UNRAVELING.
  4. MINIMUM HEIGHT OF THE SILT FENCE TO BE 2'-6" WITH A MINIMUM OF 6" CLEARANCE BETWEEN THE TOP OF THE SILT FENCE AND THE TOP OF THE POSTS.
  5. INSTALL THE POSTS ON SLIGHT ANGLE TOWARDS THE ANTICIPATED RUNOFF SURFACE.



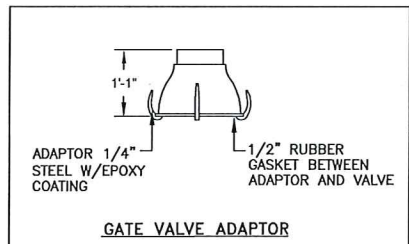
LAYOUT OF FIRE HYDRANT & VALVE



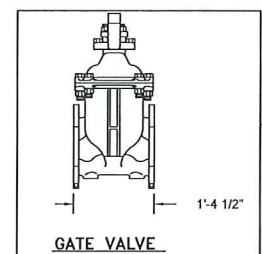
SERVICE LINE CORPORATION COCK DIRECT TAP POSITION



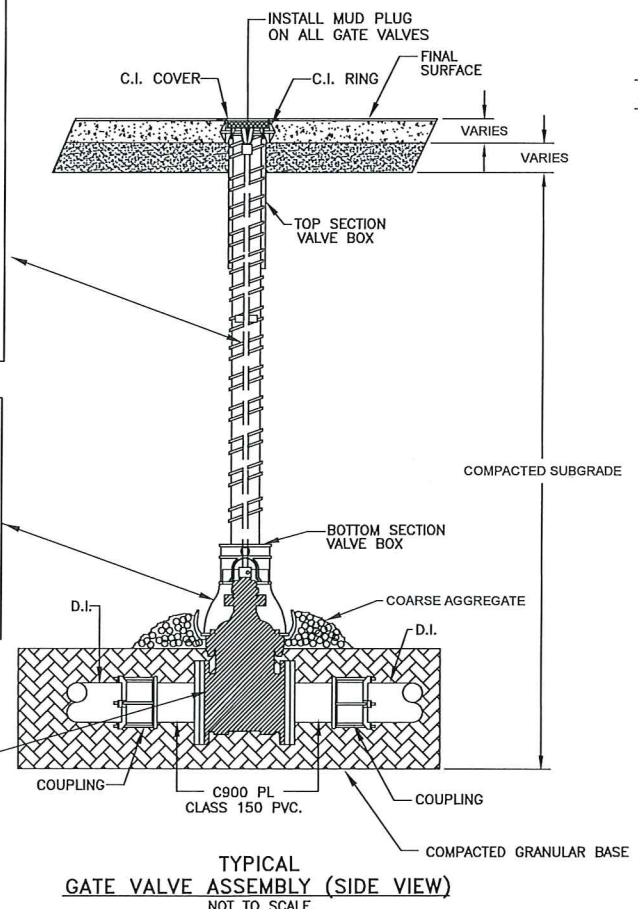
VALVE STEM EXTENSION



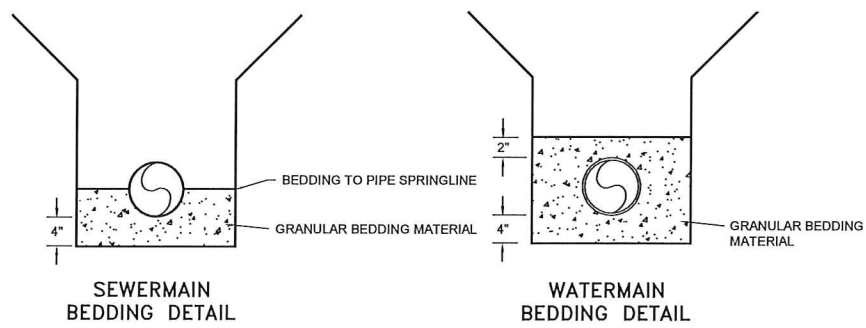
GATE VALVE ADAPTOR



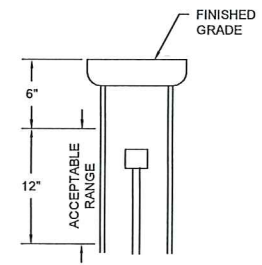
GATE VALVE



TYPICAL GATE VALVE ASSEMBLY (SIDE VIEW) NOT TO SCALE



SAND CUSHION BEDDING—SUPPORT ENTIRE LENGTH OF PIPE SPECIAL COMPACTION REQUIRED TO PIPE SPRING LINE

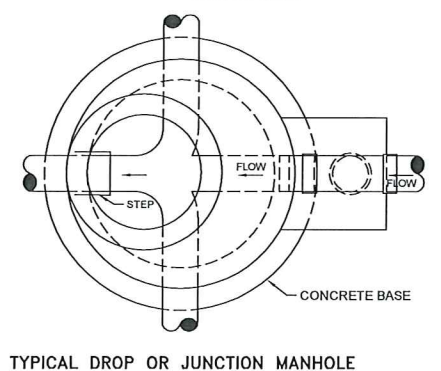
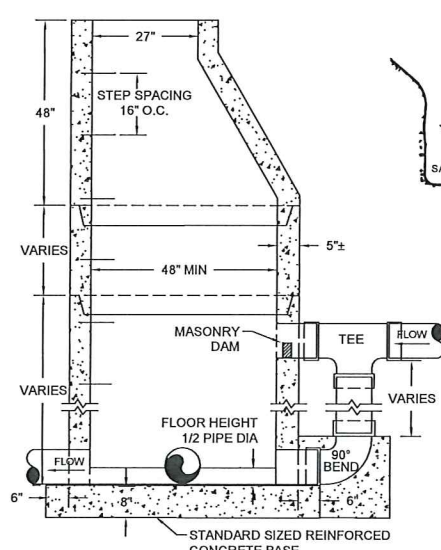


VALVE STEM DETAIL

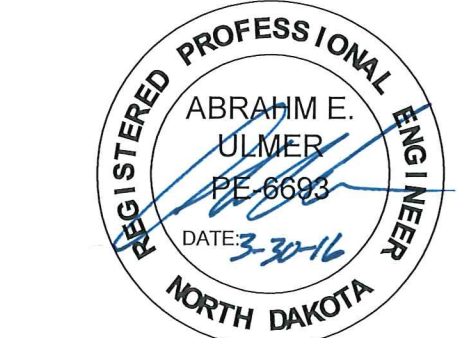
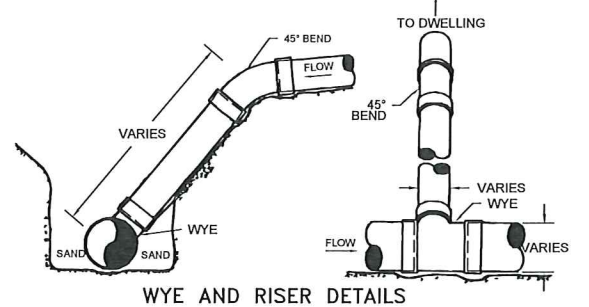
MAXIMUM SIZE OF OUTLET RECOMMENDED WITH SERVICE CLAMPS (INCHES)

NOMINAL PIPE SIZE	(CLASSES 100-150-200) DOUBLE STRAP
4"	1"
6"	1 1/2"
8"	2"
10"	2"
12"	2"
14"	2"
16"	2"

SADDLES FOR PVC WATERMAIN



TYPICAL DROP OR JUNCTION MANHOLE



**TOMAN ENGINEERING**  
 501 1st Street NW, Mandan, ND 58554  
 Phone: 701-663-6483 \* Fax: 701-663-0923

DETAIL SHEET  
 KEIDEL'S SOUTH HEART TERRACE 3rd ADDITION

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-01  
 MANDAN, NORTH DAKOTA  
 SHEET 17 OF 17

MARCH, 2016

**WATER & SEWER DETAILS**

**AS-BUILT**