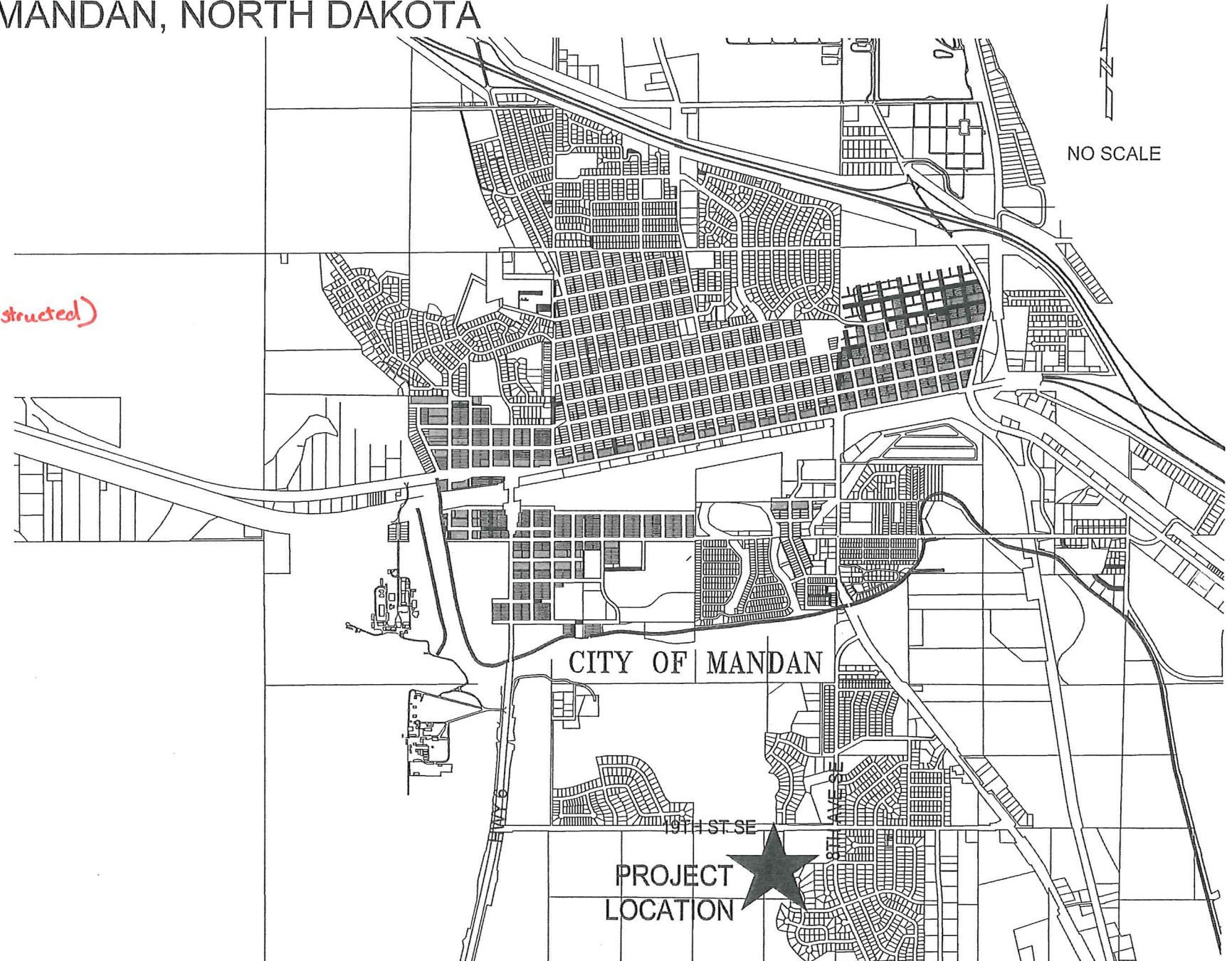


LINCOLN RIDGE 6TH ADDITION  
 WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-03  
 MANDAN, NORTH DAKOTA

ASBUILT

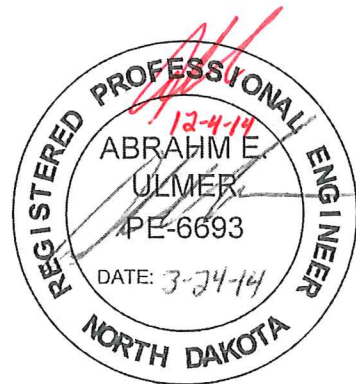
INDEX OF DRAWINGS

SHT NO	TITLE	
1	TITLE SHEET	
2	PROJECT LAYOUT	
3	LENA COURT PLAN & PROFILE	] PHASE 1
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5	WILL COURT PLAN & PROFILE	] PHASE 2 (NOT Constructed)
6	MARIO COURT PLAN & PROFILE	
7	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 LINCOLN RIDGE 6TH ADDITION WATER & SEWER IMPROVEMENTS, CITY PROJECT NO. 2014-03, 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:  
 Bowers Excavating LLC  
 160 Riverwood AVE SE  
 MANDAN, ND 58554  
 (701) 663-5619

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



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

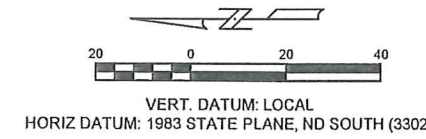
LINCOLN RIDGE 6TH ADDITION  
 MANDAN, ND

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-03

SHEET 1 OF 7

MARCH, 2014

**TITLE SHEET**

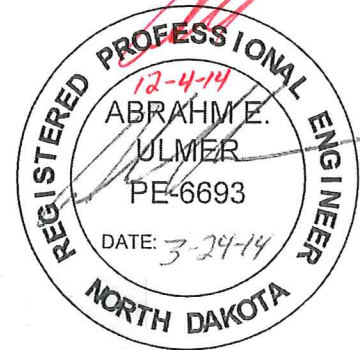
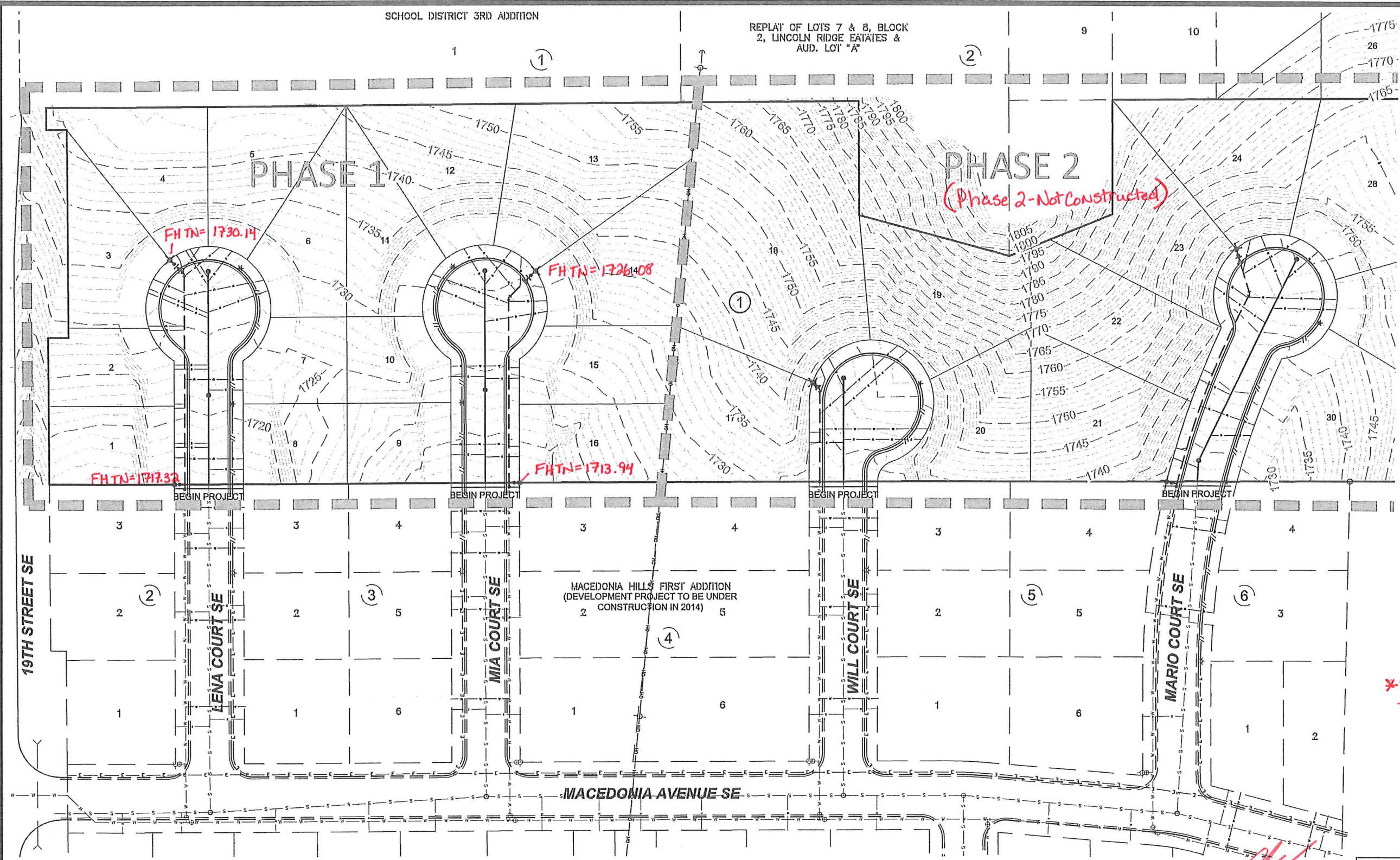


LEGEND

- EXISTING MANHOLE
- EXISTING TELEPHONE PEDESTAL
- ☆ EXISTING STREET LIGHT
- ⌋ EXISTING UTILITY POLE
- ⌋ EXISTING ANCHOR POLE
- EXISTING ELECTRICAL BOX
- EXISTING TREE
- EXISTING FIRE HYDRANT
- ⊗ EXISTING GATE VALVE
- ⊠ EXISTING SIGN
- — — EXISTING SANITARY SEWERMAIN
- — — EXISTING WATERMAIN
- — — EXISTING OVERHEAD POWER LINE
- ≡ ≡ ≡ EXISTING CURB & GUTTER
- — — EXISTING STORM SEWER
- — — EXISTING GAS LINE
- — — EXISTING TELEPHONE CABLE
- - - - - PROPOSED CONTOUR MAJOR
- - - - - PROPOSED CONTOUR MINOR
- ⊙ PROPOSED FIRE HYDRANT
- PROPOSED GATE VALVE
- ⊙ PROPOSED CURB STOP
- PROPOSED SANITARY SEWER MANHOLE
- ⌋ PROPOSED STREET SIGN
- ☆ PROPOSED STREET LIGHT
- ≡ ≡ ≡ PROPOSED CURB & GUTTER
- — — PROPOSED WATERMAIN
- — — PROPOSED WATER SERVICE
- — — PROPOSED SANITARY SEWERMAIN
- — — PROPOSED SANITARY SERVICE
- PHASE AREAS

\*Elevations Shown were taken using GPS Survey Equipment

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LINCOLN RIDGE 6TH ADDITION  
 MANDAN, ND

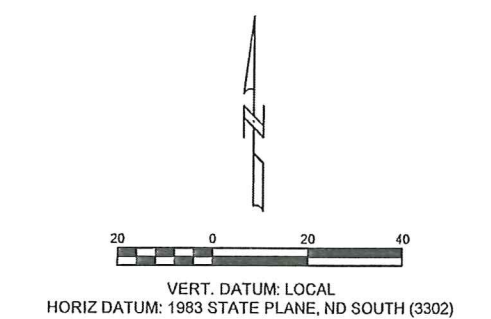
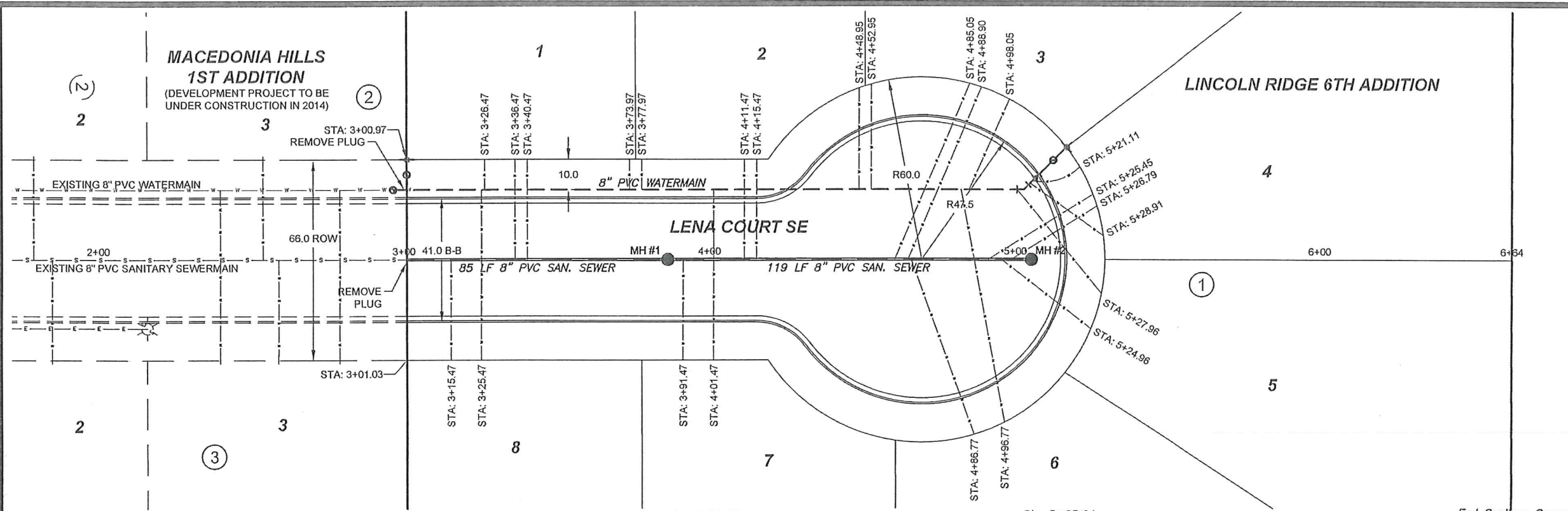
WATER & SEWER IMPROVEMENTS  
 CITY PROJECT NO. 2014-03

SHEET 2 OF 7 MARCH, 2014

ASBUILT

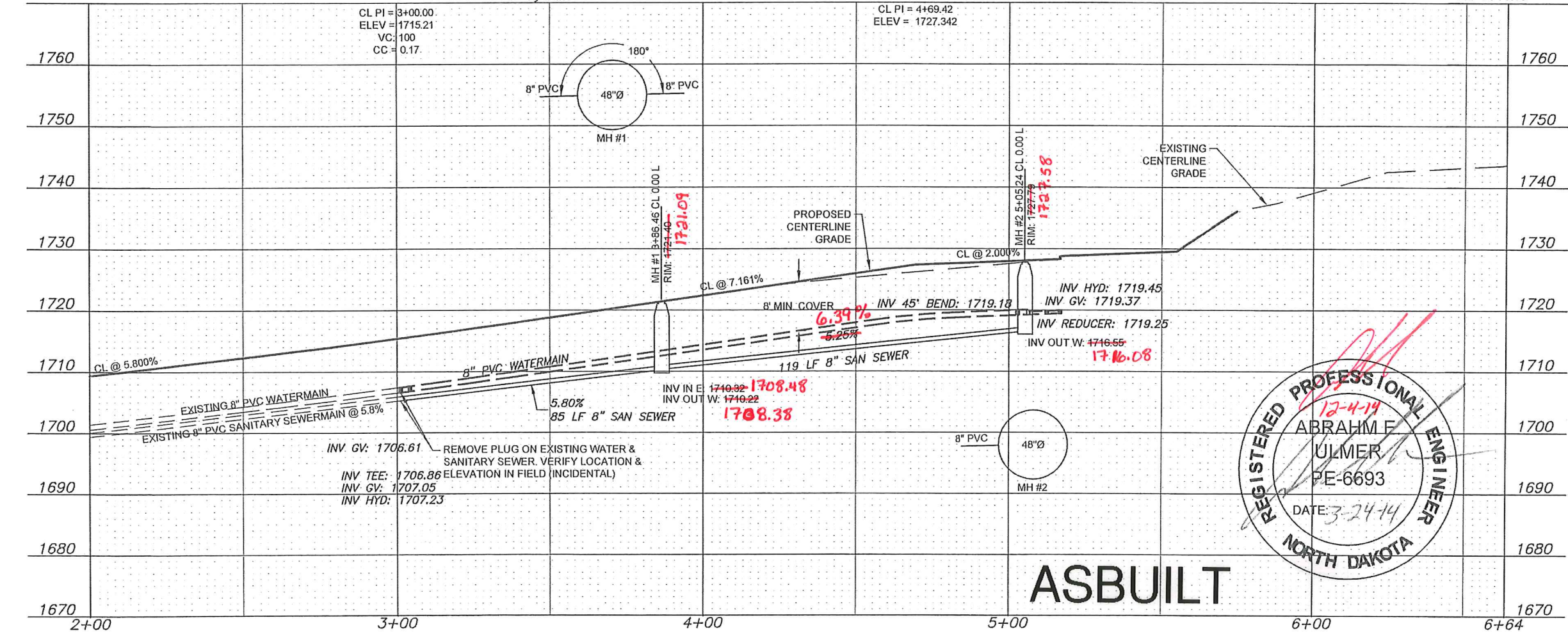
PROJECT LAYOUT

H:\Projects\1000\1263\02 1263 Project Layout.dwg, 3/24/2014 2:22:31 PM, Andra, 1-2



1. GRADING OF SITE WILL BE COMPLETED BY OTHERS PRIOR TO CONSTRUCTION.
  2. BACKFILL SHALL BE CLASS 'A' PER CITY OF MANDAN SPECIFICATIONS. MOISTURE REQUIREMENTS SHALL BE NO MORE THAN 3% ABOVE OR 2% BELOW OPTIMUM MOISTURE AS DETERMINED BY ASTM D-1557.
- \* Elevations shown were taken using GPS Survey Equipment*

<u>Begin Sanitary Sewermain Quantities</u> Sta 3+01.03	<u>Sta 3+00.97</u> 8"x6" Tee 10 LF 6" WM 6" Gate Valve 6" Hydrant	<u>Sta 3+86.46</u> Manhole #1	<u>Sta 5+02.74</u> 8" 45° Bend	<u>Sta 5+16.69</u> 8"x6" Reducer 15 LF WM 6" Gate Valve 6" Fire Hydrant	<u>End Sanitary Sewermain Quantities</u> Sta 5+05.24
<u>Begin Watermain Quantities</u> Sta 2+96.54	<u>Sta 2+96.54</u> 8" Gate Valve				<u>End Watermain Quantities</u> Sta 5+16.69



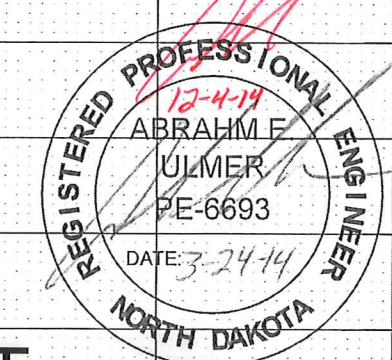
### APPROXIMATE QUANTITIES

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	205 LF
801-4.50	8"x4" Wye Branch	12 Ea
801-4.60	Bedding Material	92 Ton
1205-4.1	Manhole	2 Ea
1209-4.1	4" Sanitary Sewer Pipe	494 LF
1209-4.6	4" - 45° Bend	12 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	115 Ton
901-4.10	6" Watermain	25 LF
901-4.11	8" Watermain	211 LF
901-4.51	6" Gate Valve & Box	2 Ea
901-4.52	8" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	2 Ea
1209-4.12	1" Water Service Pipe	413 LF
1209-4.41	1" Water Service Connection	12 Ea
1209-4.51	1" Curb Stop & 1-1/4" Box	12 Ea

**\*CAUTION\***  
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**ASBUILT**

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

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LENA COURT SE  
LINCOLN RIDGE 6TH ADDITION  
MANDAN, ND

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WATER & SEWER IMPROVEMENTS  
CITY PROJECT NO. 2014-03  
PHASE 1  
SHEET 3 OF 7

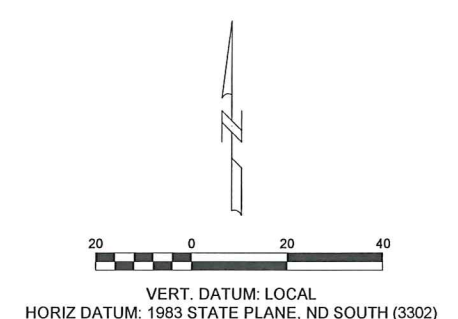
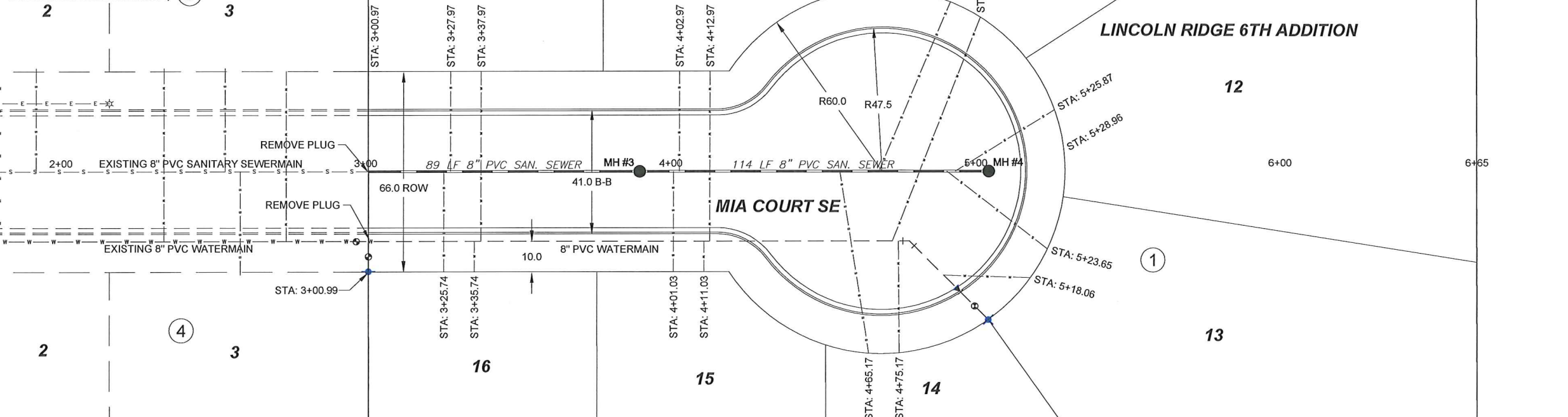
MARCH, 2013

PLAN & PROFILE

**MACEDONIA HILLS**

**1ST ADDITION**

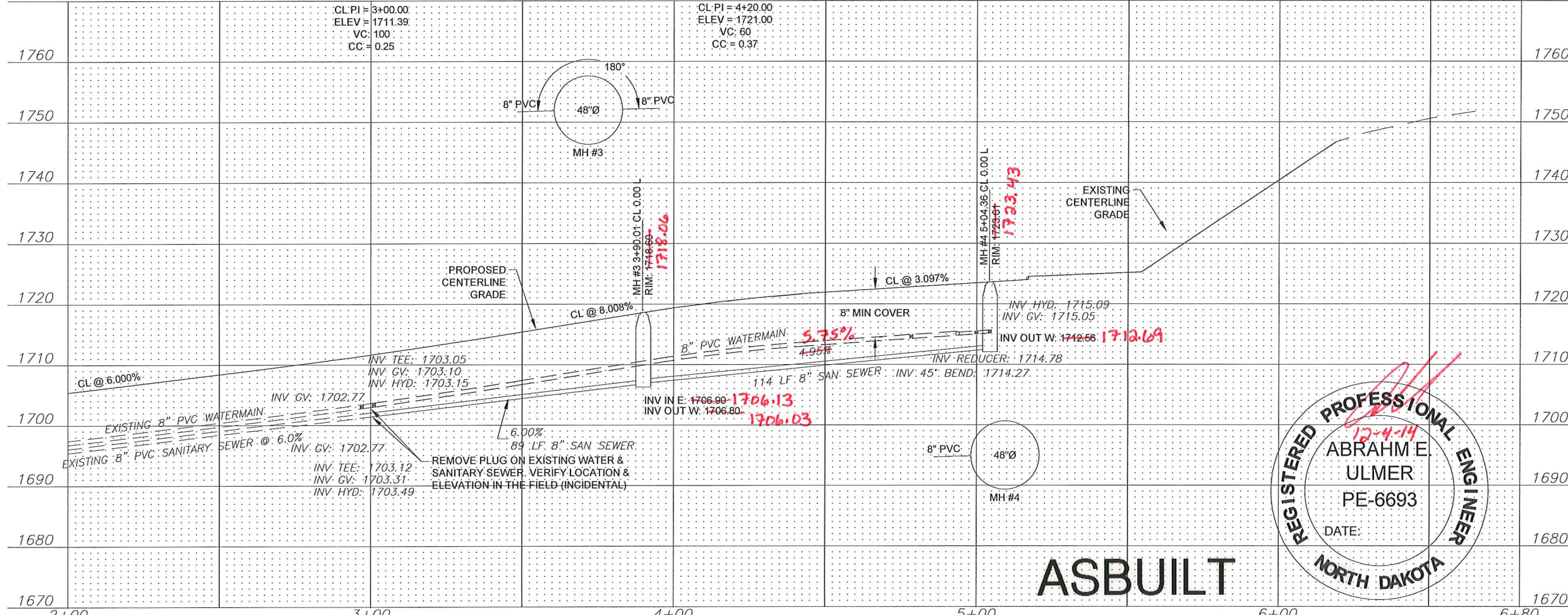
(DEVELOPMENT PROJECT TO BE UNDER CONSTRUCTION IN 2014)



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

*\*Elevations shown were taken using GPS Survey Equipment*

*Begin Sanitary Sewermain Quantities Sta 3+00.00*  
*Begin Watermain Quantities Sta 2+97.03*  
*End Sanitary Sewermain Quantities Sta 5+04.36*  
*End Watermain Quantities Sta 5+04.28*



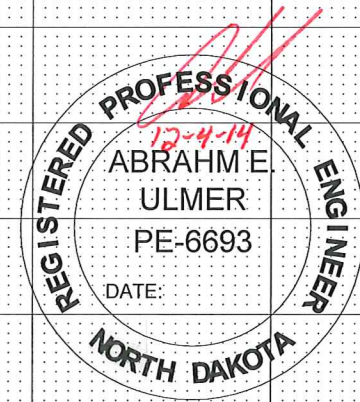
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	203 LF
801-4.50	8"x4" Wye Branch	8 Ea
801-4.60	Bedding Material	85 Ton
1205-4.1	Manhole	2 Ea
1209-4.1	4" Sanitary Sewer Pipe	335 LF
1209-4.6	4" - 45° Bend	8 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	105 Ton
901-4.10	6" Watermain	25 LF
901-4.11	8" Watermain	203 LF
901-4.51	6" Gate Valve & Box	2 Ea
901-4.52	8" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	2 Ea
1209-4.12	1" Water Service Pipe	334 LF
1209-4.41	1" Water Service Connection	8 Ea
1209-4.51	1" Curb Stop & 1-1/4" Box	8 Ea

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 Phone: 701-663-6483 \* Fax: 701-663-0923

MIA COURT SE  
 LINCOLN RIDGE 6TH ADDITION  
 MANDAN, ND

WATER & SEWER IMPROVEMENTS  
 CITY PROJECT NO. 2014-03  
 PHASE 1  
 SHEET 4 OF 7  
 MARCH, 2014

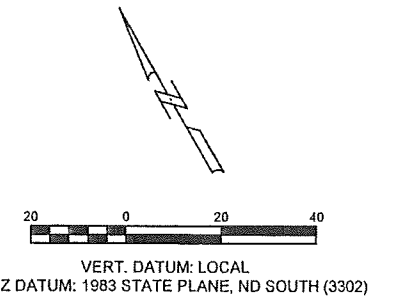
**ASBUILT**

**PLAN & PROFILE**

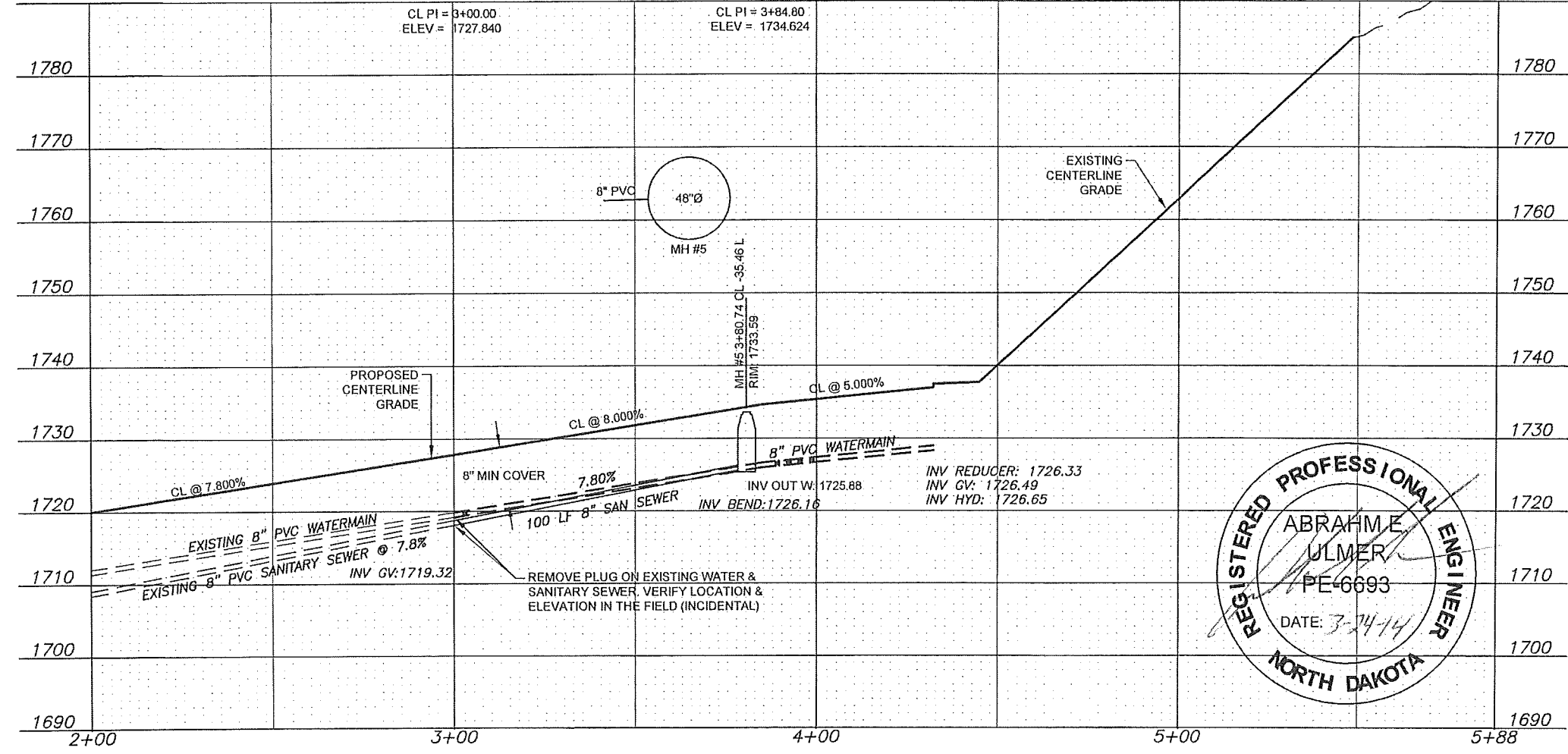
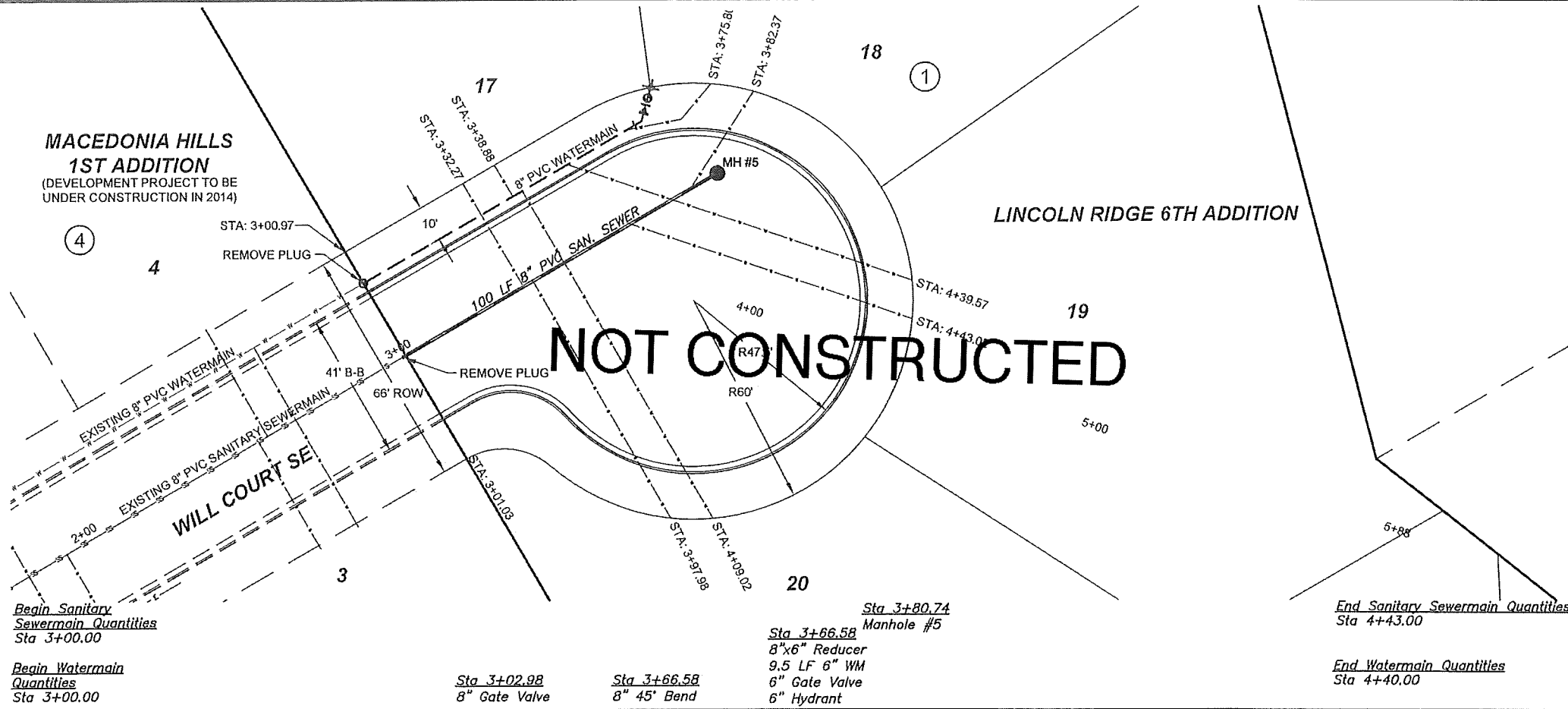
**MACEDONIA HILLS  
1ST ADDITION**  
(DEVELOPMENT PROJECT TO BE  
UNDER CONSTRUCTION IN 2014)

**LINCOLN RIDGE 6TH ADDITION**

**NOT CONSTRUCTED**



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



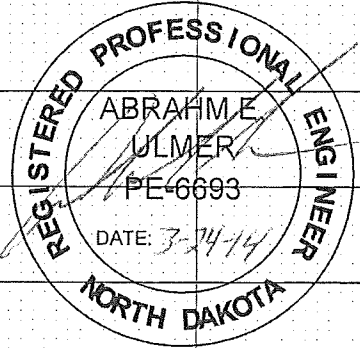
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	100 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 Sewer Pipe	223 LF
1209-4.6	4" - 45° Bend	4 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	55 Ton
901-4.10	6" Watermain	8 LF
901-4.11	8" Watermain	90 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	243 LF
1209-4.41	1" Water Service Connection	4 Ea
1209-4.51	1" Curb Stop & 1-1/4" Box	4 Ea

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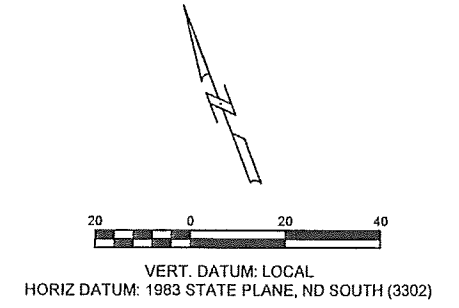
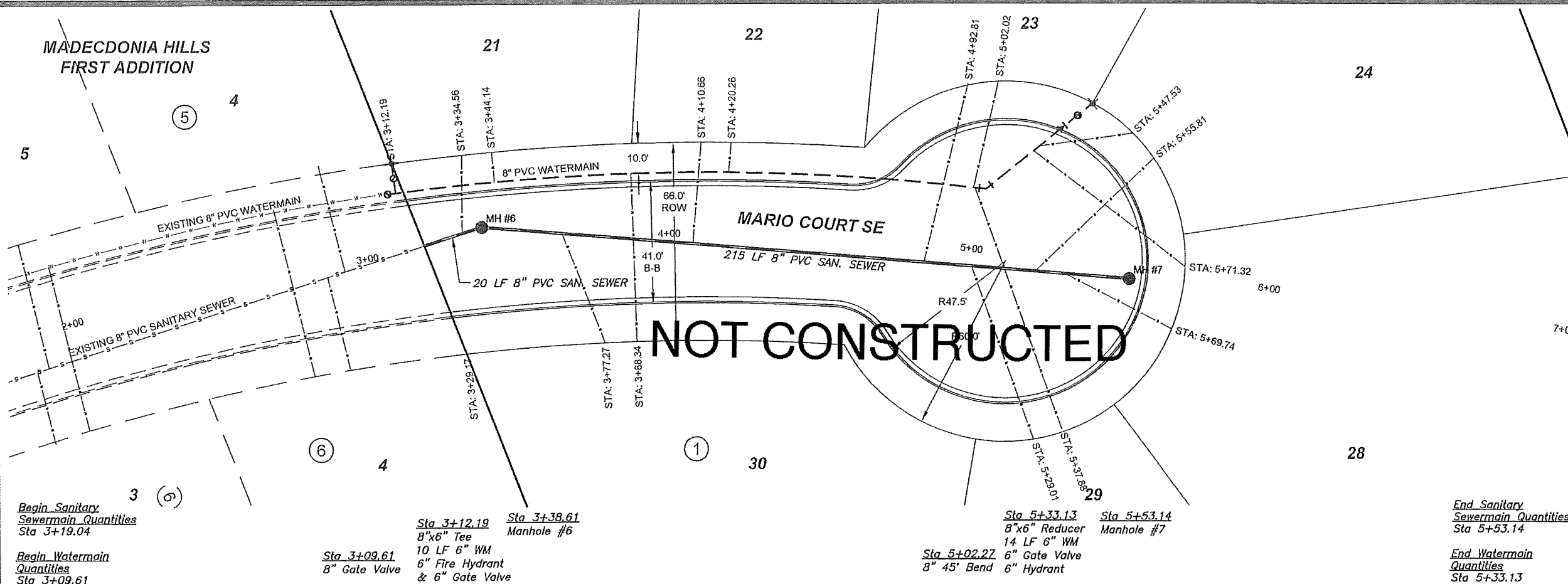
**WILL COURT SE**  
LINCOLN RIDGE 6TH ADDITION  
MANDAN, NORTH DAKOTA

WATER & SEWER IMPROVEMENTS  
CITY PROJECT NO. 2014-03  
PHASE 2  
SHEET 5 OF 7  
MARCH, 2013

**PLAN & PROFILE**

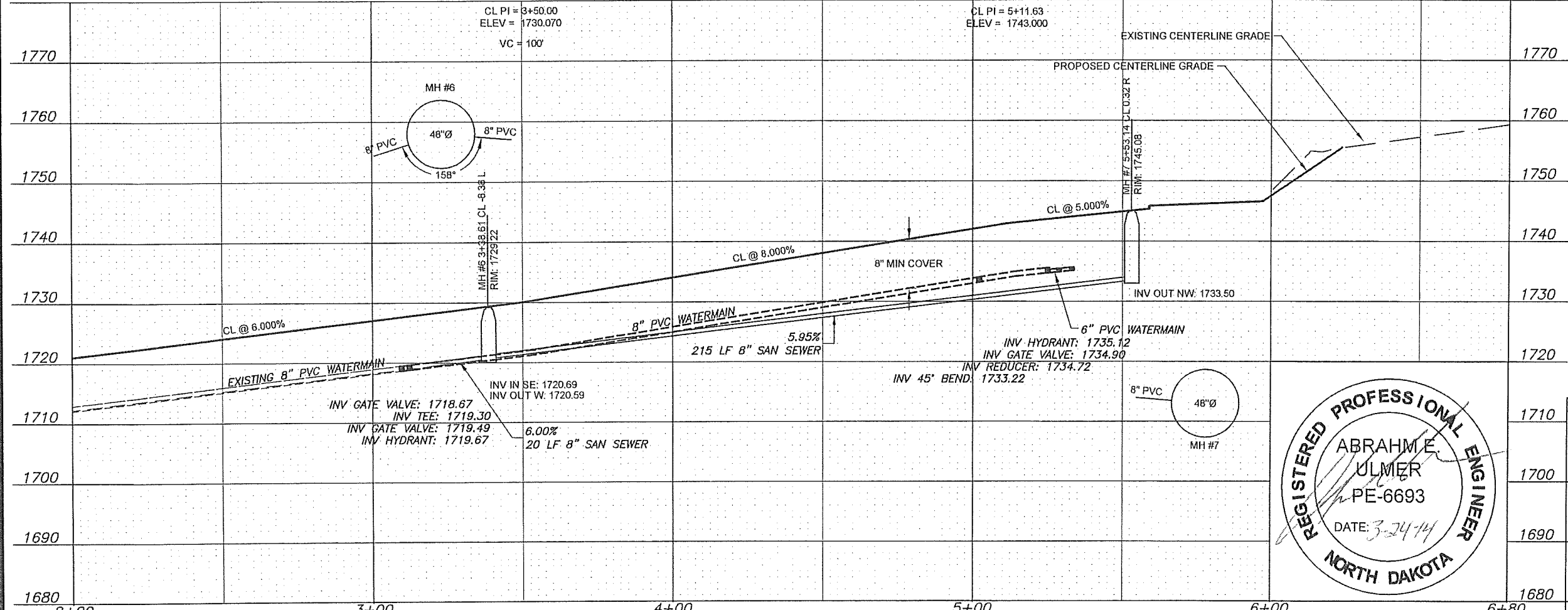
H:\Projects\1000\1263\05 Will Court.dwg, 3/24/2014 2:24:18 PM, Andra, 1:2

MADEC DONIA HILLS  
FIRST ADDITION



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

<b>Begin Sanitary Sewermain Quantities</b> Sta 3+19.04	<b>Sta 3+12.19</b> 8"x6" Tee	<b>Sta 3+38.61</b> Manhole #6	<b>Sta 5+33.13</b> 8"x6" Reducer	<b>Sta 5+53.14</b> Manhole #7	<b>End Sanitary Sewermain Quantities</b> Sta 5+53.14
<b>Begin Watermain Quantities</b> Sta 3+09.61	<b>Sta 3+09.61</b> 8" Gate Valve	<b>Sta 3+38.61</b> 10 LF 6" WM 6" Fire Hydrant & 6" Gate Valve	<b>Sta 5+02.27</b> 6" Gate Valve	<b>Sta 5+33.13</b> 6" Hydrant	<b>End Watermain Quantities</b> Sta 5+33.13



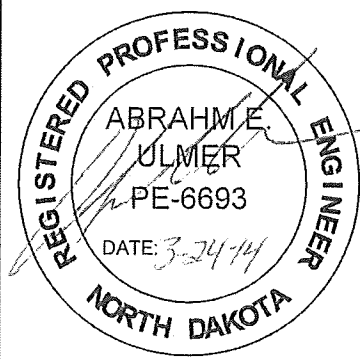
**APPROXIMATE QUANTITIES**

Spec No.	Sanitary Sewermain Items	Quantity
801-4.2	8" Sanitary Sewermain	235 LF
801-4.50	8"x4" Wye Branch	7 Ea
801-4.60	Bedding Material	90 Ton
1205-4.1	Manhole	2 Ea
1209-4.1	4" Sanitary Sewer Pipe	318 LF
1209-4.6	4" - 45° Bend	7 Ea

Spec No.	Watermain Items	Quantity
801-4.60	Bedding Material	110 Ton
901-4.10	6" Watermain	24 LF
901-4.11	8" Watermain	230 LF
901-4.51	6" Gate Valve & Box	2 Ea
901-4.52	8" Gate Valve & Box	1 Ea
901-4.70	6" Hydrant	2 Ea
1209-4.12	1" Water Service Pipe	294 LF
1209-4.41	1" Water Service Connection	7 Ea
1209-4.51	1" Curb Stop & 1-1/4" Box	7 Ea

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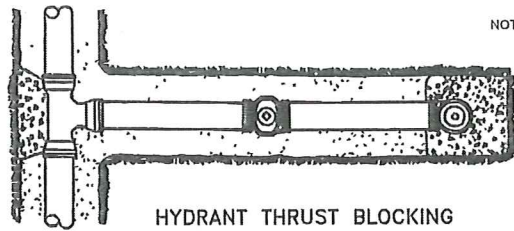
**TOMAN ENGINEERING**  
501 1st Street NW, Mandan, ND 58554  
Phone: 701-663-6483 \* Fax: 701-663-0923

**MARIO COURT SE**  
LINCOLN RIDGE 6TH ADDITION  
MANDAN, ND

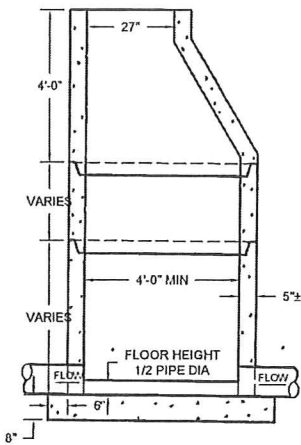
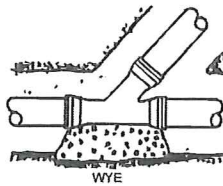
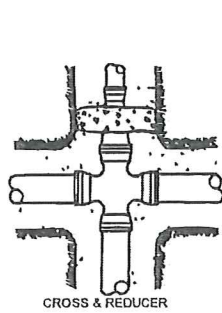
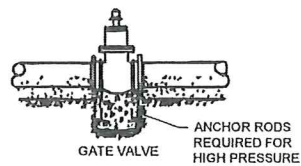
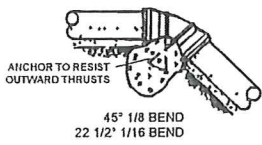
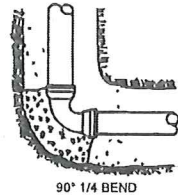
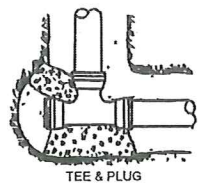
WATER & SEWER IMPROVEMENTS  
DISTRICT NO. 2014-03  
PHASE 2  
SHEET 6 OF 7

MARCH, 2014

**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



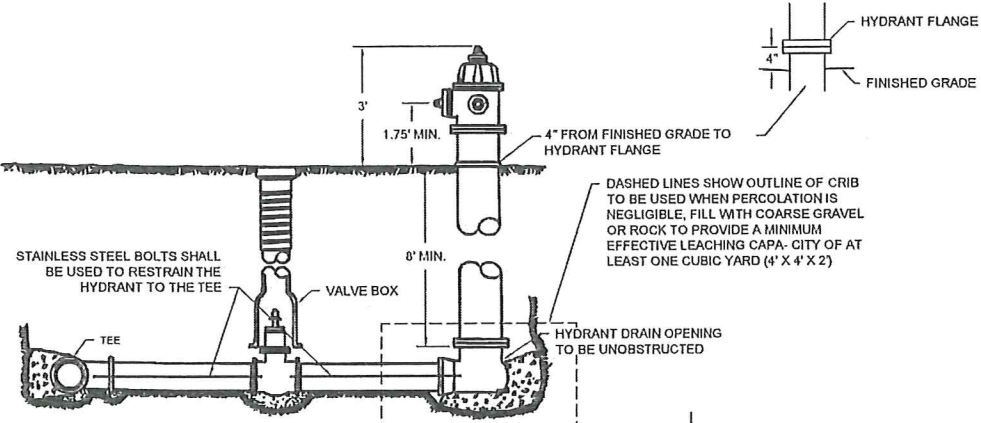
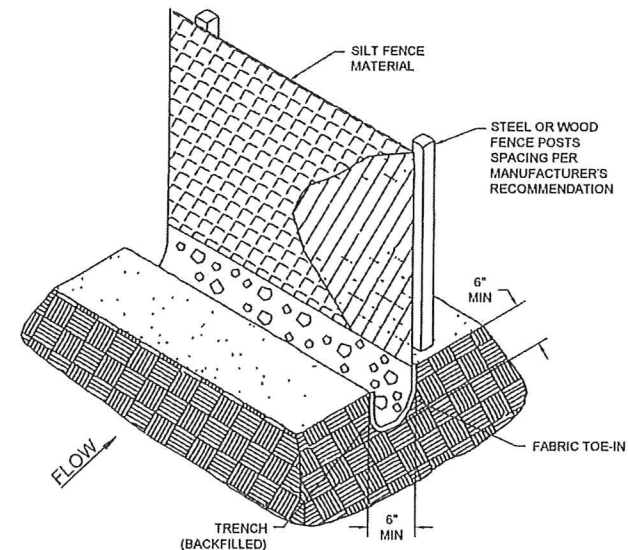
MANHOLES ARE TO BE MANUFACTURED IN ACCORDANCE WITH ASTM SPECIFICATION C-478-73

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.



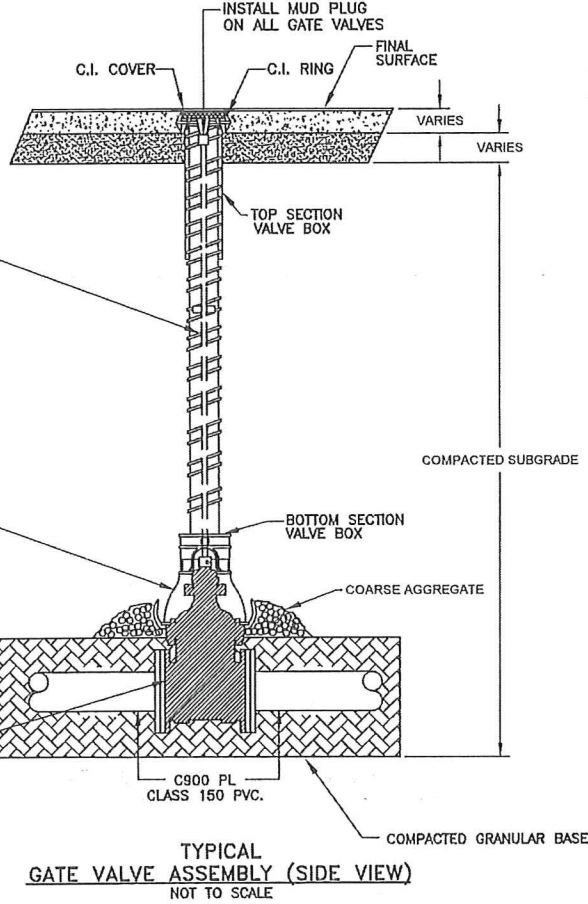
LAYOUT OF FIRE HYDRANT & VALVE

THRUST BLOCK DETAILS

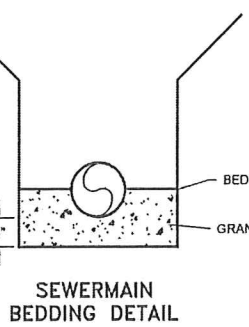
TYPICAL MANHOLE NON-INTEGRAL

SILT FENCE

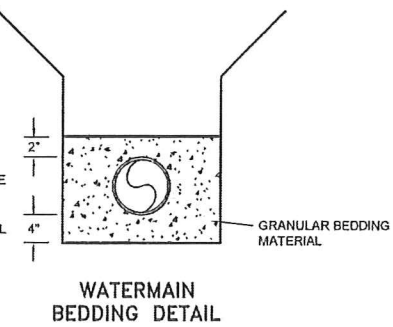
SERVICE LINE CORPORATION COCK DIRECT TAP POSITION



TYPICAL GATE VALVE ASSEMBLY (SIDE VIEW) NOT TO SCALE

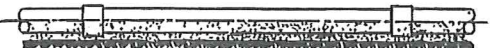


SEWERMAIN BEDDING DETAIL

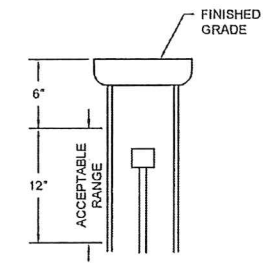


WATERMAIN BEDDING DETAIL

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



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



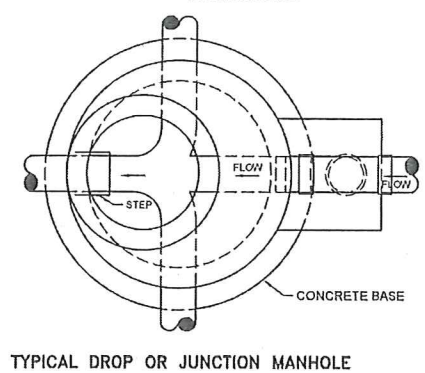
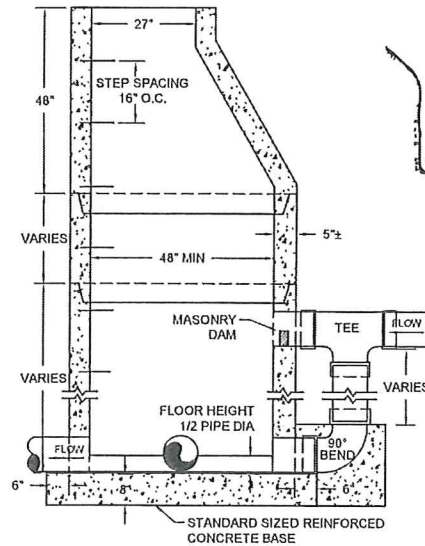
NOTE: VALVE STEM MUST BE IN RANGE OF 6" - 18" BELOW FINISHED GRADE.

VALVE STEM DETAIL

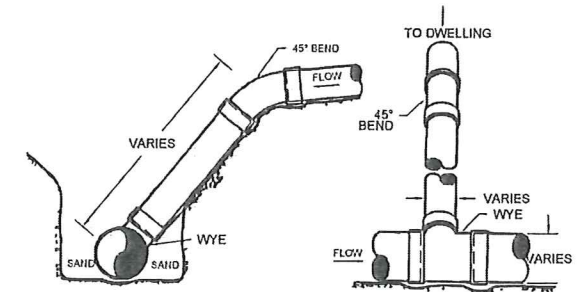
MAXIMUM SIZE OF OUTLET RECOMMENDED WITH SERVICE CLAMPS (INCHES)

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"

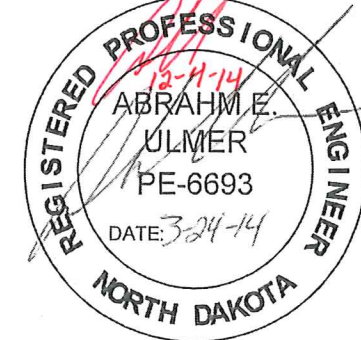
SADDLES FOR PVC WATERMAIN



TYPICAL DROP OR JUNCTION MANHOLE



WYE AND RISER DETAILS



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

**ASBUILT**

LINCOLN RIDGE 6TH ADDITION  
 MANDAN, NORTH DAKOTA

WATER & SEWER IMPROVEMENT  
 CITY PROJECT NO. 2014-03

SHEET 7 OF 7 MARCH, 2014

**WATER & SEWER DETAILS**