

# UTILITY CONTACTS:

ELECTRIC - AMEREN  
BILL ROSENER  
HOUSE SPRINGS, MO 63051  
OFFICE: 636-931-7525

GAS - LACLEDE  
BRIAN LANGENBACHER  
4118 SHREWSBURY AVE  
SHREWSBURY, MO 63119  
OFFICE: 314-768-7767

WATER - C1 WATER  
6645 MOSS HOLLOW ROAD  
BARNHART, MO 63012  
OFFICE: 636-948-2500

SEWER - ROCK CREEK  
JASON SEGER  
4133 WEST OUTER ROAD  
ARNOLD, MO 63010  
OFFICE: 636-464-3305

TELEPHONE AT&T  
GLENN HOGENMILLER  
122 NORTH SE  
COND ST.  
FESTUS, MO 63028  
OFFICE: 636-931-7525

CABLE CHARTER  
DARYL STEFFEN  
815 CHARTER COMMONS DRIVE  
TOWN & COUNTRY, MO 63017  
OFFICE: 636-387-6663

CABLE LEVEL 3  
NAME: JERRY SORRENTINO  
1015 LOCUST STREET  
ST. LOUIS, MO 63101  
OFFICE: 877-366-8344

## GRAPHIC / SYMBOL LEGEND (USED IN PLANS)

| DESCRIPTION                                   | EXISTING  | NEW |
|-----------------------------------------------|-----------|-----|
| RIGHT-OF-WAY                                  | ---       | --- |
| PROPERTY LINE                                 | ---       | --- |
| PERMANENT DRAINAGE EASEMENT                   | ---       | PDE |
| TEMPORARY CONSTRUCTION EASEMENT               | ---       | TCE |
| UTILITY POLE (TYPE SPECIFIED)                 | ---       | --- |
| UNDERGROUND CONDUIT OR CABLE (TYPE SPECIFIED) | ---       | --- |
| T-TELEPHONE P-POWER TV-TELEVISION             | ---       | --- |
| OVERHEAD UTILITY LINE (TYPE SPECIFIED)        | ---       | --- |
| T-TELEPHONE OH-POWER W-WATER                  | ---       | --- |
| LIGHT STANDARD                                | ---       | --- |
| TRAFFIC PULL BOX                              | ---       | --- |
| GAS LINE                                      | ---       | --- |
| GAS VALVE                                     | ---       | --- |
| WATER LINE                                    | ---       | --- |
| WATER SERVICE VALVE                           | ---       | --- |
| WATER METER                                   | ---       | --- |
| FIRE HYDRANT                                  | ---       | --- |
| SANITARY SEWER                                | ---       | --- |
| STORM SEWER                                   | ---       | --- |
| SEWER MANHOLE                                 | ---       | --- |
| GRATED INLET                                  | ---       | --- |
| CURB INLET/ AREA INLET                        | ---       | --- |
| CURB INLET (MULTIPLE UNIT)                    | ---       | --- |
| IDENT. OF NEW OR MOD. SANITARY STRUCTURE      | ---       | --- |
| IDENT. OF NEW OR MOD. STORM STRUCTURE         | ---       | --- |
| PIPE WITH HEADWALLS                           | ---       | --- |
| DRAINAGE V-DITCH (SODDED)                     | ---       | --- |
| DRAINAGE FLAT BOTTOM DITCH (SODDED)           | ---       | --- |
| DRAINAGE V-DITCH (PAVED)                      | ---       | --- |
| DRAINAGE FLAT BOTTOM DITCH (PAVED)            | ---       | --- |
| CONSTRUCTION LIMITS                           | ---       | --- |
| CONCRETE PAVEMENT                             | ---       | --- |
| ASPHALTIC CONCRETE PAVEMENT                   | ---       | --- |
| PAVEMENT REMOVAL                              | ---       | --- |
| TREE OR SHRUB                                 | ---       | --- |
| HEDGE                                         | ---       | --- |
| FENCE                                         | ---       | --- |
| SIGN                                          | ---       | --- |
| BUILDING                                      | ---       | --- |
| MAILBOX (MB)                                  | ---       | --- |
| TO BE REMOVED                                 | (TBR)     |     |
| TO BE ABANDONED                               | (TBA)     |     |
| USE IN PLACE                                  | (UIP)     |     |
| TO BE REMOVED AND REPLACED                    | (TBR&R)   |     |
| TO BE REMOVED AND RELOCATED                   | (TBR&REL) |     |
| ADJUST TO GRADE                               | (ATG)     |     |
| TO BE REMOVED AND REPLACED BY OTHERS          | (TBR&RBO) |     |
| TO BE ABANDONED AND FILLED                    | (TBA&F)   |     |
| ADJUST TO GRADE BY OTHERS                     | (ATGBO)   |     |
| CUT CROSS                                     | CROSS     |     |
| FOUND CROSS                                   | OCR       |     |
| FOUND IRON PIPE                               | OIP       |     |
| FOUND IRON ROD                                | OIR       |     |
| FOUND STONE                                   | OST       |     |
| SET P.K. NAIL                                 | PK        |     |
| SET IRON PIPE                                 | SIP       |     |
| DO NOT DISTURB                                | (DND)     |     |
| MANHOLE                                       | MH        |     |
| REFERENCE POINT                               | △         |     |

### SPECIAL NOTE TO CONTRACTOR(S):

EXISTING UNDERGROUND AND ABOVE-GRADE FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED ON THESE CONTRACT DOCUMENTS BASED ON THE INFORMATION AND SURVEYS AVAILABLE AT THE TIME OF DRAWING PREPARATION. THE LOCATIONS OF THESE FEATURES MUST, THEREFORE, BE CONSIDERED APPROXIMATE, ONLY. IN ADDITION, THERE MAY BE OTHER FACILITIES, STRUCTURES, AND UTILITIES WHICH DID NOT EXIST (OR THE EXISTENCE OF WHICH WAS NOT KNOWN) AT THE TIME OF DRAWING PREPARATION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S) TO HAVE ALL EXISTING FACILITIES, STRUCTURES, AND UTILITIES LOCATED IN THE FIELD PRIOR TO ANY EXCAVATION OR CONSTRUCTION ACTIVITY, AND TO PROTECT ALL SUCH FEATURES (EXCEPT THOSE SPECIFICALLY NOTED FOR REMOVAL OR DEMOLITION) DURING CONSTRUCTION.

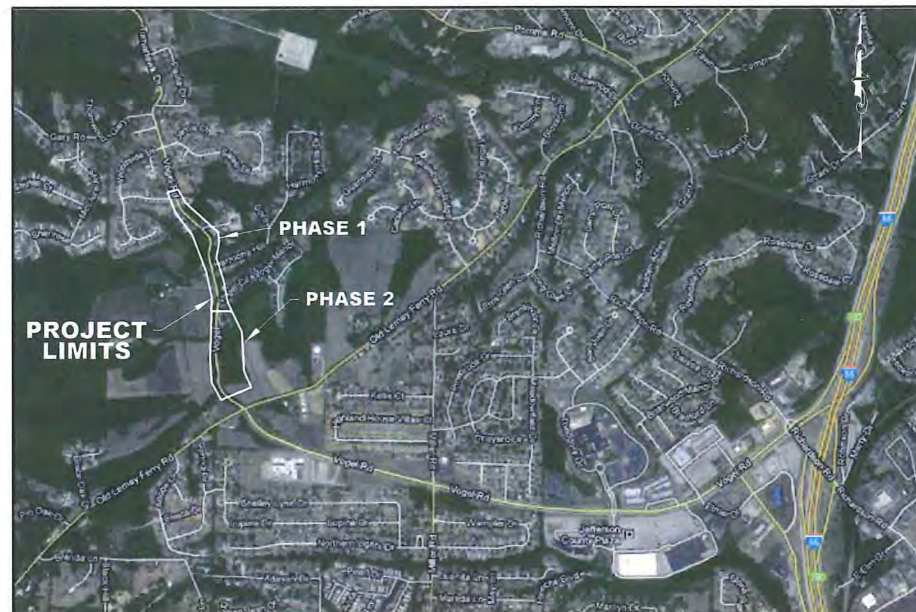
# JEFFERSON COUNTY MISSOURI

**JASON JONAS, P.E.**  
**DIRECTOR OF PUBLIC WORKS**

## VOGEL ROAD IMPROVEMENTS PHASE 1 & PHASE 2

**FEDERAL PROJECT NUMBERS:**  
**PHASE 1 STP-5403(644)**  
**PHASE 2 STP-5403(643)**

## CONSTRUCTION PLANS



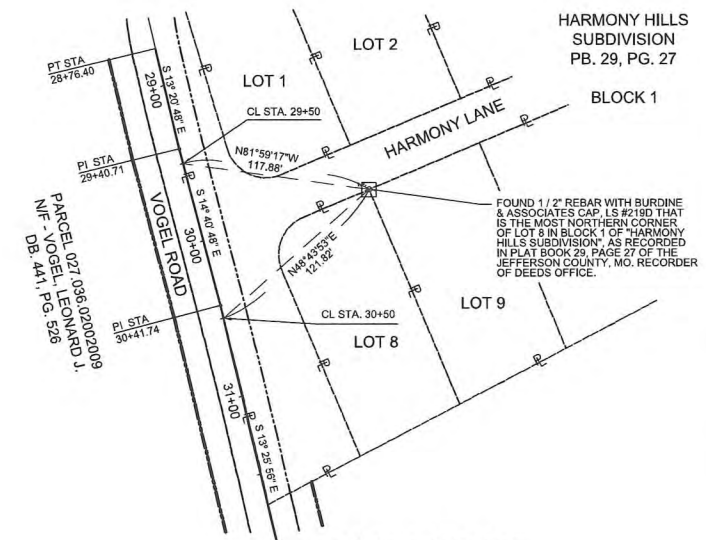
VICINITY MAP  
NOT TO SCALE

SECTION 36, TOWNSHIP 43 NORTH, RANGE 5 EAST

PREPARED JULY 9, 2014

## INDEX OF SHEETS

| DESCRIPTION                                         | SHEET    |
|-----------------------------------------------------|----------|
| COVER SHEET                                         | 1        |
| TYPICAL SECTIONS / NOTES (2)                        | 2        |
| SUMMARY OF QUANTITIES: PHASE 1                      | 2A       |
| SUMMARY OF QUANTITIES: PHASE 2                      | 2A       |
| SCHEDULE OF QUANTITIES: PHASE 1 (2)                 | 2B       |
| SCHEDULE OF QUANTITIES: PHASE 2                     | 2B       |
| PLAN AND PROFILE SHEETS (7)                         | 3 - 9    |
| GRADING & EROSION CONTROL PLAN / PROFILE SHEETS (8) | 10 - 17  |
| R/W PLAN SHEETS (6)                                 | 18 - 23  |
| REFERENCE & COORDINATE POINTS                       | 24       |
| RETAINING WALL PLAN & ELEVATIONS (2)                | 25 - 26  |
| INTERSECTION DETAILS (2)                            | 27 - 28  |
| TRAFFIC CONTROL PLAN: DETOUR ROUTE                  | 29       |
| TRAFFIC CONTROL PLAN: STAGE 1                       | 30       |
| TRAFFIC CONTROL PLAN: STAGE 2                       | 31       |
| TRAFFIC CONTROL PLAN: STAGE 3                       | 32       |
| STORM SEWER PROFILES (2)                            | 33 - 34  |
| CROSS SECTIONS (26)                                 | 1 - 26   |
| STRUCTURAL : BRIDGE PLANS (22)                      | B1 - B22 |
| STRUCTURAL : CULVERT PLANS (10)                     | C1 - C10 |



LEGAL LAND TIE

## DESIGN DESIGNATION

| FUNCTIONAL CLASSIFICATION | COLLECTOR |
|---------------------------|-----------|
| CURRENT POSTED SPEED      | 30 MPH    |
| DESIGN SPEED              | 30 MPH    |
| CURRENT ADT               | 3944      |
| FUTURE ADT (2031)         | 6000      |
| TRUCK VOLUME              | 7%        |

## LENGTH OF PROJECT: PHASE 1

|                          |                      |
|--------------------------|----------------------|
| BEGINNING STATION        | 20+41.62             |
| ENDING STATION           | 36+00.00             |
| APPARENT LENGTH          | 1558.38 FEET         |
| EQUATIONS AND EXCEPTIONS |                      |
| BRIDGE EXCEPTIONS        | 27+74.91 TO 28+21.62 |
| TOTAL CORRECTIONS        | 46.71 FEET           |
| NET LENGTH OF PROJECT    | 1511.67 FEET         |
|                          | 0.29 MILES           |

## LENGTH OF PROJECT: PHASE 2

|                          |              |
|--------------------------|--------------|
| BEGINNING STATION        | 36+00.00     |
| ENDING STATION           | 46+96.87     |
| APPARENT LENGTH          | 1096.87 FEET |
| EQUATIONS AND EXCEPTIONS |              |
| BRIDGE EXCEPTIONS        |              |
| TOTAL CORRECTIONS        | 1096.87 FEET |
| NET LENGTH OF PROJECT    | 0.21 MILES   |

DESIGN CRITERIA USED:  
AASHTO AND JEFFERSON COUNTY

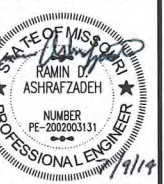
APPROVED BY:

**JEFFERSON COUNTY, MISSOURI**

JASON JONAS, P.E.  
DIRECTOR OF PUBLIC WORKS

7/11/2014  
DATE

ENGINEER'S SEAL



DATE PREPARED  
7-9-2014

ROUTE VOGEL STATE MO

DISTRICT SHEET NO. 1

COUNTY JEFFERSON

JOB NO. 1220700 / 0800

CONTRACT ID.

PROJECT NO. STP-5403(644) & STP-5403(643)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

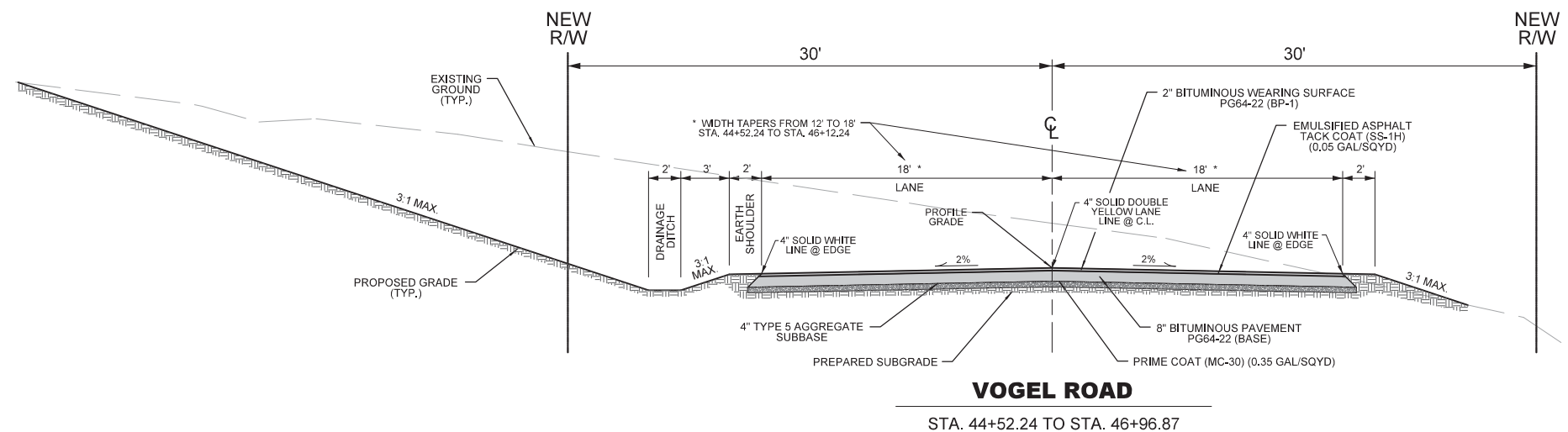
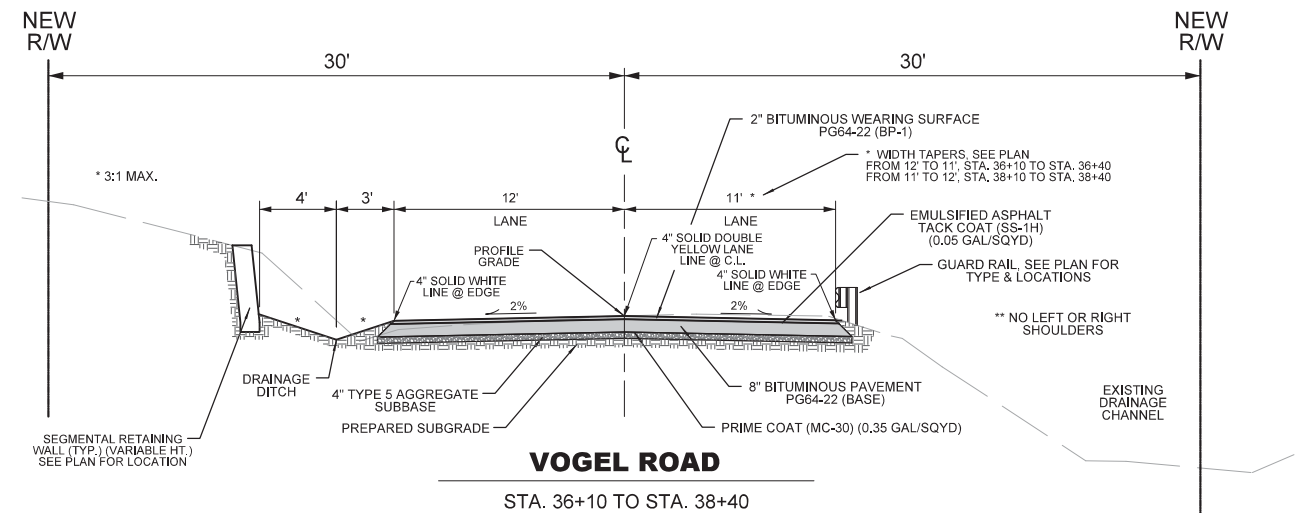
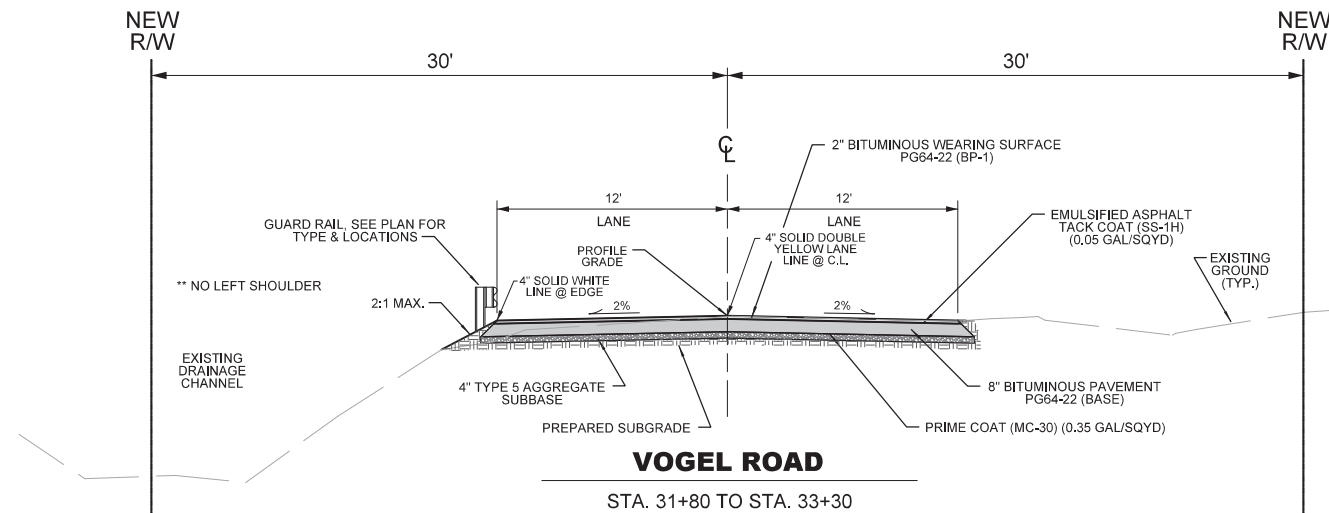
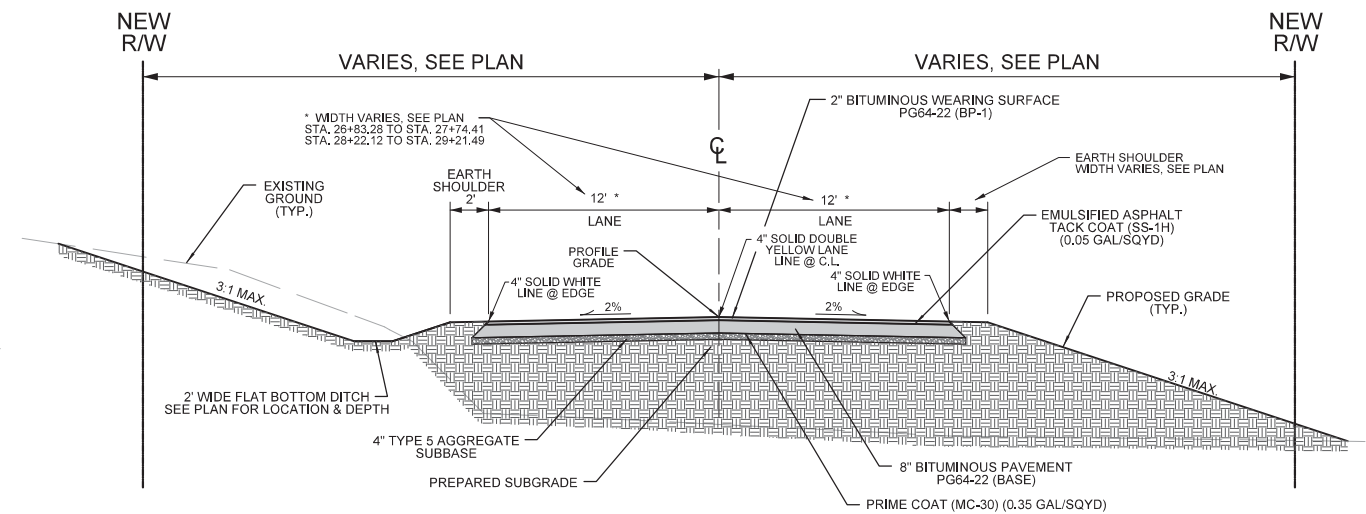
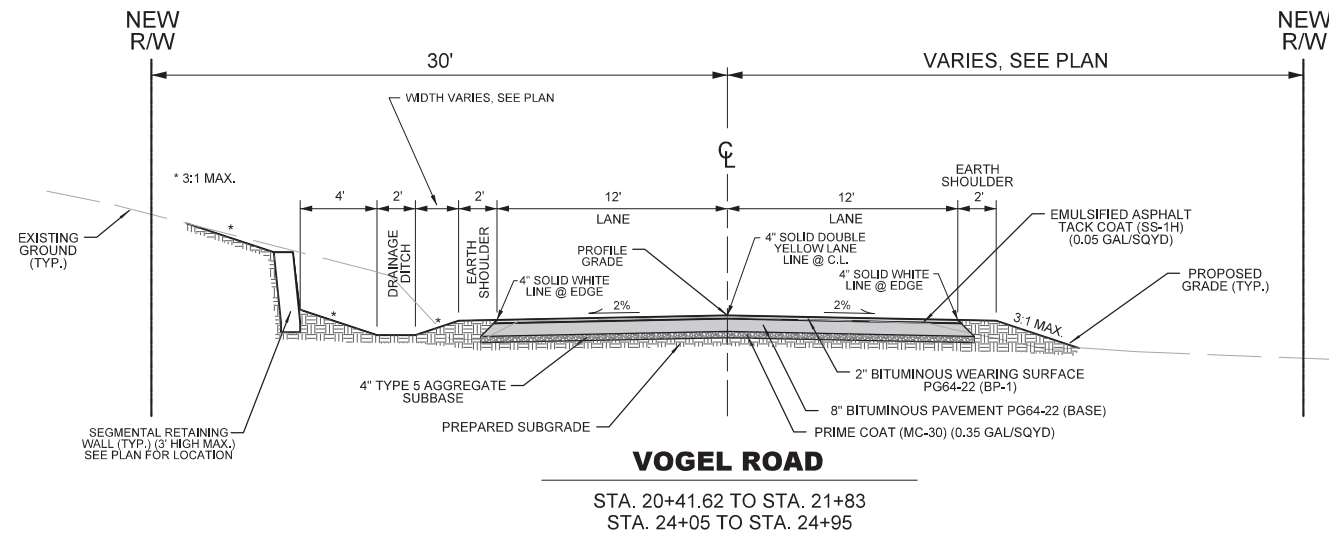


**HORNER & SHIRIN, INC.**  
ENGINEERS  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-1421 FAX: 314-531-0996  
www.horner-shirin.com  
Professional Engineer  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

COVER SHEET

**VOGEL ROAD  
IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1  
STP-5403(643) PHASE 2





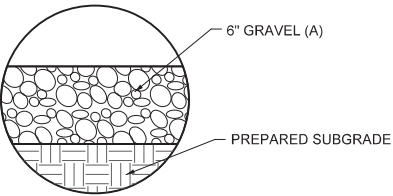
BRIDGE: STA. 27+74.91 TO STA. 28+22.12 SEE STRUCTURAL, SHEETS B1 TO B22

[illegible]

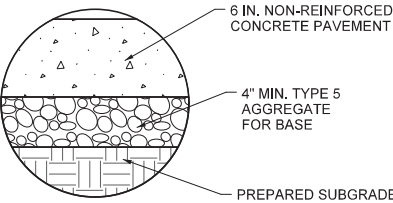
|                                              |                |
|----------------------------------------------|----------------|
| DATE PREPARED<br>7-9-2014                    |                |
| ROUTE<br>VOGEL                               | STATE<br>MO    |
| DISTRICT                                     | SHEET NO.<br>2 |
| COUNTY<br>JEFFERSON                          |                |
| JOB NO.<br>1220700 / 0800                    |                |
| CONTRACT ID.                                 |                |
| PROJECT NO.<br>STP-5403(644) & STP-5403(643) |                |
| BRIDGE NO.                                   |                |

GENERAL NOTES

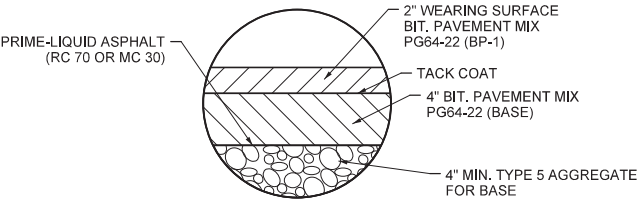
- 1) ALL ROAD CONSTRUCTION TO BE IN ACCORDANCE WITH MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, MOST RECENT EDITION.
- 2) REMOVE ALL WASTE MATERIALS, INCLUDING EXCAVATED MATERIAL, CONCRETE STORM SEWER, TRASH, DEBRIS AND DISPOSE OF IT OFF OWNERS PROPERTY.
- 3) CONTRACTOR SHALL REMOVE, STORE, & REINSTALL AT THE COMPLETION OF CONSTRUCTION ALL MAILBOXES, FENCES, AND SIGNS, AFFECTED BY CONSTRUCTION. SUBSEQUENTLY IF DAMAGE OCCURS, IT SHALL BE REPLACED BY CONTRACTOR. COUNTY SHALL PROVIDE TEMPORARY MAIL SERVICE FACILITIES FOR ALL RESIDENTS.
- 4) THE CONTRACTOR SHALL PROVIDE ADEQUATE EROSION CONTROL MEASURES IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS. EROSION CONTROL MEASURES SHALL BE ADEQUATE TO STOP ERODED MATERIAL FROM LEAVING THE SITE. EROSION CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR DURING GRADING OPERATIONS AND UNTIL SUFFICIENT VEGETATION IS ESTABLISHED TO PREVENT EROSION. TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED AFTER PERMANENT VEGETATION COVER HAS BEEN ESTABLISHED.
- 5) EXISTING UTILITY LOCATIONS SHOWN ON THESE PLANS WERE COMPILED FROM THE BEST AVAILABLE RECORDS. CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO ESTABLISH EXACT LOCATIONS, DEPTHS, AND POSSIBLE RELOCATION OF THE MAINS PRIOR TO CONSTRUCTION AND SHALL FULLY COMPLY WITH THE PROVISIONS OF THE UNDERGROUND FACILITY SAFETY AND DAMAGE PROVISIONS ACT, CHAPTER 319 RsmO. ALL UTILITIES, EITHER SHOWN OR NOT SHOWN, IN DIRECT CONFLICT WITH THIS CONSTRUCTION SHALL BE RELOCATED BY OTHERS (RESPECTIVE UTILITY COMPANY). CONTRACTOR SHALL COORDINATE THE WORK WITH EACH UTILITY COMPANY AFFECTED.
- 6) THE CONTRACTOR SHALL KEEP ALL PAVEMENTS CLEAN AND FREE OF MUD, ROCK AND DEBRIS AT ALL TIMES DURING CONSTRUCTION.
- 7) THE CONTRACTOR SHALL NOTIFY EACH AFFECTED PROPERTY OWNER A MINIMUM OF 24 HOURS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION AND/OR GRADING.
- 8) CONTRACTOR TO PROVIDE COMPACTED GRANULAR BACKFILL TO THE SUBGRADE OF THE PAVEMENT FOR ALL TRENCHES UNDER PAVEMENT. ALL OTHER TRENCHES OUTSIDE OF THE RIGHT-OF-WAY SHALL BE BACKFILLED WITH COMPACTED EARTHFILL, UNLESS OTHERWISE SHOWN IN THE PLANS.
- 9) THE CONTRACTOR SHALL PROVIDE ADEQUATE OFF-STREET PARKING FOR CONSTRUCTION EMPLOYEES. PARKING ON NON-SURFACED AREAS SHALL BE PROHIBITED IN ORDER TO ELIMINATE THE CONDITION WHEREBY MUD FROM CONSTRUCTION AND EMPLOYEE VEHICLES IS TRACKED ONTO THE PAVEMENT CAUSING HAZARDOUS ROADWAY AND DRIVEWAY CONDITIONS.
- 10) ANY DISTURBED OFF SITE PROPERTY (I.E. BUSHES, FENCES, MAILBOXES, ETC.) SHALL BE REPLACED, IN KIND, AT THE CONTRACTOR'S EXPENSE.
- 11) CONTRACTOR TO STAKE ALL RW, P.D.E. AND T.C.E. POINTS AS SHOWN ON PLANS.
- 12) NO TREES OUTSIDE THE EXISTING R/W SHALL BE REMOVED WITHOUT WRITTEN PERMISSION OF JEFFERSON COUNTY DEPARTMENT OF PUBLIC WORKS OR AS MARKED TO BE REMOVED ON THESE PLANS. COST OF REMOVAL SHALL BE INCLUDED IN CONTRACT UNIT PRICE FOR CLEARING.
- 13) CONTRACTOR TO NOTIFY AND COORDINATE WITH UTILITY COMPANIES TWO WEEKS PRIOR TO COMMENCEMENT OF PROJECT.
- 14) CONTRACTOR TO MAINTAIN ACCESS TO DRIVEWAYS FOR PROPERTY OWNERS AT ALL TIMES.
- 15) CONTRACTOR TO SALVAGE ALL SIGNS TO THE JEFFERSON COUNTY DEPARTMENT OF PUBLIC WORKS.
- 16) THE BOUNDARY AND GROUND SURVEYS, INCLUDING EXISTING UTILITIES, OUTSTANDING PHYSICAL FEATURES AND EXISTING STRUCTURE LOCATION PRIOR TO THE START OF CONSTRUCTION, WERE PREPARED BY THE FOLLOWING COMPANY AS A CONTRACTOR TO HORNER & SHIFRIN, INC.: ENGINEERING DATA SOURCE, INC., 16141 SWINGLEY RIDGE ROAD, SUITE 300, CHESTERFIELD, MO 63017 (636) 537-5585 DATED OCTOBER 2012.



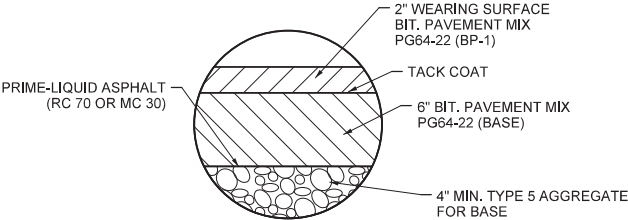
GRAVEL DRIVEWAY



CONCRETE ENTRANCE



RESIDENTIAL ASPHALT ENTRANCE

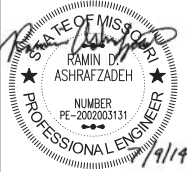


ASPHALT RESIDENTIAL STREET PAVEMENT

SPECIAL NOTE TO CONTRACTOR(S):

EXISTING UNDERGROUND AND ABOVE-GRADE FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED ON THESE CONTRACT DOCUMENTS BASED ON THE INFORMATION AND SURVEYS AVAILABLE AT THE TIME OF DRAWING PREPARATION. THE LOCATIONS OF THESE FEATURES MUST, THEREFORE, BE CONSIDERED APPROXIMATE ONLY. IN ADDITION, THERE MAY BE OTHER FACILITIES, STRUCTURES, AND UTILITIES WHICH DID NOT EXIST (OR THE EXISTENCE OF WHICH WAS NOT KNOWN) AT THE TIME OF DRAWING PREPARATION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S) TO HAVE ALL EXISTING FACILITIES, STRUCTURES, AND UTILITIES LOCATED IN THE FIELD PRIOR TO ANY EXCAVATION OR CONSTRUCTION ACTIVITY; AND TO PROTECT ALL SUCH FEATURES (EXCEPT THOSE SPECIFICALLY NOTED FOR REMOVAL OR DEMOLITION) DURING CONSTRUCTION.

ENGINEER'S SEAL



DATE PREPARED  
7-9-2014

|                |                |
|----------------|----------------|
| ROUTE<br>VOGEL | STATE<br>MO    |
| DISTRICT       | SHEET NO.<br>2 |

COUNTY  
JEFFERSON

JOB NO.  
1220700 / 0800

CONTRACT ID.

PROJECT NO.  
STP-5403(644) & STP-5403(643)

BRIDGE NO.

| DESCRIPTION | DATE |
|-------------|------|
|             |      |
|             |      |
|             |      |
|             |      |
|             |      |
|             |      |
|             |      |
|             |      |
|             |      |

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4966  
www.HornerShifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

TYPICAL SECTIONS & NOTES  
SHEET 2 OF 2  
VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1  
STP-5403(643) PHASE 2





| VOGEL ROAD IMPROVEMENTS - PHASE 2 |                                                                          |      |          |        |
|-----------------------------------|--------------------------------------------------------------------------|------|----------|--------|
| STP-5403(643)                     |                                                                          |      |          |        |
| SUMMARY OF QUANTITIES             |                                                                          |      |          |        |
| ITEM NUMBER                       | ITEM DESCRIPTION                                                         | UNIT | QUANTITY |        |
|                                   | ROADWAY ITEMS:                                                           |      |          |        |
| 2013000                           | CLEARING AND GRUBBING                                                    | AC   |          | 1.4    |
| 2022010                           | REMOVAL OF IMPROVEMENTS                                                  | LS   |          | 1      |
| 2031000                           | CLASS A EXCAVATION                                                       | CY   |          | 5304   |
| 2036000                           | COMPACTING EMBANKMENT                                                    | CY   |          | 3741   |
| 3040504                           | TYPE 5 AGGREGATE BASE (4 IN. THICK)                                      | SY   |          | 3135   |
| 3101003                           | GRAVEL (A) (6 IN. THICK)                                                 | SY   |          | 311    |
| 4011209                           | BITUMINOUS PAVEMENT MIXTURE PG64-22 (BP-1)                               | TON  |          | 339.1  |
| 4013000                           | BITUMINOUS PAVEMENT MIXTURE PG64-22 (BASE)                               | TON  |          | 1348.9 |
| 4071005                           | TACK COAT                                                                | GAL  |          | 170    |
| 4081010                           | PRIME-LIQUID ASPHALT RC 70 OR MC 30                                      | GAL  |          | 1100   |
| 6061011A                          | GUARDRAIL TYPE A, 7 FT. POST, 3 FT., - 1.5 IN. SPACING                   | LF   |          | 250    |
| 6063015                           | TYPE A CRASHWORTHY END TERMINAL (ET PLUS 25')                            | EACH |          | 1      |
| 6079902                           | REMOVAL AND RELOCATION OF MAILBOX                                        | EACH |          | 1      |
| 6096020                           | FURNISHING TYPE 2 ROCK DITCH LINER                                       | CY   |          | 252    |
| 6096040A                          | FURNISHING TYPE 4 ROCK DITCH LINER                                       | CY   |          | 116    |
| 6096042                           | PLACING TYPE 2 ROCK DITCH LINER                                          | CY   |          | 252    |
| 6096044                           | PLACING TYPE 4 ROCK DITCH LINER                                          | CY   |          | 116    |
| 6096050                           | BEDDING MATERIAL FOR ROCK DITCH LINER                                    | CY   |          | 47     |
| 6161005                           | CONSTRUCTION SIGNS                                                       | SF   |          | 291    |
| 6161031                           | TYPE III MOVEABLE BARRICADE                                              | EACH |          | 6      |
| 6181000                           | MOBILIZATION                                                             | LS   |          | 1      |
| 6261000A                          | EDGE LINE RUMBLE STRIP                                                   | LF   |          | 2246   |
| 6274000                           | CONTRACTOR FURNISHED SURVEYING AND STAKING                               | LS   |          | 1      |
| 7209904                           | MODULAR BLOCK RETAINING WALLS                                            | SF   |          | 436    |
| 7261012                           | 12 IN. PIPE GROUP A                                                      | LF   |          | 38     |
| 7261018                           | 18 IN. PIPE GROUP A                                                      | LF   |          | 186    |
| 7319902                           | AREA INLET, SINGLE, OPEN 4 SIDES                                         | EACH |          | 1      |
| 7320618A                          | 18 IN. OR ALLOWED SUBSTITUTE GROUP A FLARED END SECTION                  | EACH |          | 6      |
| 8061019                           | SILT FENCE                                                               | LF   |          | 1824   |
| 8061021                           | TYPE 1 DITCH CHECK                                                       | EACH |          | 27     |
| 8061025                           | INLET CHECK                                                              | EACH |          | 4      |
|                                   |                                                                          |      |          |        |
|                                   | PAVEMENT MARKING:                                                        |      |          |        |
| 6205130                           | TYPE 2 PREFORMED MARKING TAPE (GROOVED), LEFT/RIGHT ARROW                | EA   |          | 1      |
| 6206000B                          | 4 IN. WHITE ACRYLIC WATERBORNE PAVEMENT MARKING PAINT                    | LF   |          | 2313   |
| 6206001B                          | 4 IN. YELLOW ACRYLIC WATERBORNE PAVEMENT MARKING PAINT                   | LF   |          | 2528   |
| 6209902                           | ACRYLIC WATERBORNE PAVEMENT MARKING PAINT - STRAIGHT-RIGHT ARROW (WHITE) | EA   |          | 1      |
| 6209903                           | 12 IN. YELLOW ACRYLIC WATERBORNE PAVEMENT MARKING PAINT                  | LF   |          | 29     |
|                                   |                                                                          |      |          |        |
|                                   | LANDSCAPING/STREETSCAPING:                                               |      |          |        |
| 8052000A                          | SEEDING - WARM SEASON MIXTURES                                           | ACRE |          | 1.9    |



|                |                 |
|----------------|-----------------|
| ROUTE<br>VOGEL | STATE<br>MO     |
| DISTRICT       | SHEET NO.<br>2A |

JOB NO.  
1220700 / 0800

|                               |
|-------------------------------|
| PROJECT NO.                   |
| STP-5403(644) & STP-5403(643) |

[illegible]

**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffcomo.org](http://www.jeffcomo.org)

**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-453-4321 FAX: 314-531-6966  
[www.HornerShifrin.com](http://www.HornerShifrin.com)  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

SUMMARY OF QUANTITIES  
SHEET 2 OF 2

**VOGEL ROAD  
IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(643) PHASE 2

| CONTRACTOR FURNISHED SURVEYING AND STAKING | MOBILIZATION |
|--------------------------------------------|--------------|
| LUMP SUM = 1                               | LUMP SUM = 1 |

| ADJUST TO GRADE |         |      |                          |                             |                           |                         |                                    |
|-----------------|---------|------|--------------------------|-----------------------------|---------------------------|-------------------------|------------------------------------|
| PLAN SHEET      | STATION | SIDE | ADJUST TO GRADE CLEANOUT | ADJUST TO GRADE WATER VALVE | ADJUST TO GRADE GAS VALVE | ADJUST TO GRADE MANHOLE | REMARKS                            |
|                 |         |      | (EACH)                   | (EACH)                      | (EACH)                    | (EACH)                  |                                    |
| 3               | 20+43   | RT   |                          |                             | 1                         |                         |                                    |
| 3               | 20+75   | LT   | 1                        |                             |                           |                         | INSTALL METAL LID FLUSH WITH GRADE |
| 3               | 21+79   | LT   |                          | 3                           |                           |                         |                                    |
| 5               | 29+75   | LT   |                          |                             |                           | 1                       |                                    |
| 5               | 30+00   | LT   |                          | 1                           |                           |                         |                                    |
| 5               | 30+10   | LT   |                          | 1                           |                           |                         |                                    |
| 5               | 31+31   | RT   |                          | 1                           |                           |                         |                                    |
|                 |         |      |                          |                             |                           |                         |                                    |
|                 | TOTAL   |      | 1                        | 6                           | 1                         | 1                       |                                    |

| CLEARING AND GRUBBING |                      |          |          |       |        |         |
|-----------------------|----------------------|----------|----------|-------|--------|---------|
| PLAN SHEET            | LOCATION             | STATION  | STATION  | SIDE  | AREA   | REMARKS |
|                       |                      |          |          |       | (ACRE) |         |
| 3                     | VOGEL ROAD - PHASE 1 | 20+41.62 | 24+50.00 | LEFT  | 0.040  |         |
| 4                     | VOGEL ROAD - PHASE 1 | 24+50.00 | 29+50.00 | RIGHT | 0.364  |         |
| 5                     | VOGEL ROAD - PHASE 1 | 29+50.00 | 33+50.00 | LEFT  | 0.075  |         |
| 6                     | VOGEL ROAD - PHASE 1 | 33+50.00 | 36+00.00 | RIGHT | 0.092  |         |
|                       |                      |          |          |       |        |         |
|                       |                      |          |          | Total | 0.571  |         |
|                       |                      |          |          | USE   | 0.6    |         |
|                       |                      |          |          |       |        |         |
|                       |                      |          |          |       |        |         |

| DITCH LINER |            |         |         |       |                                                              |                                                              |                                       |         |
|-------------|------------|---------|---------|-------|--------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------|---------|
| PLAN SHEET  | LOCATION   | STATION | STATION | SIDE  | TYPE 2 ROCK DITCH LINER W./PERMANENT EROSION CONTROL BLANKET | TYPE 4 ROCK DITCH LINER W./PERMANENT EROSION CONTROL BLANKET | BEDDING MATERIAL FOR ROCK DITCH LINER | REMARKS |
|             |            |         |         |       | (CY)                                                         | (CY)                                                         | (CY)                                  |         |
| 3           | VOGEL ROAD | 20+00   | 24+50   | LT    | 98.7                                                         | 0.0                                                          | 0.0                                   |         |
| 4           | VOGEL ROAD | 24+50   | 29+50   | LT    | 28.5                                                         | 111.7                                                        | 44.7                                  |         |
| 5           | VOGEL ROAD | 29+50   | 33+50   | RT    | 11.1                                                         | 0.0                                                          | 0.0                                   |         |
|             |            |         |         |       |                                                              |                                                              |                                       |         |
|             |            |         |         | TOTAL | 138.3                                                        | 111.7                                                        | 44.7                                  |         |
|             |            |         |         | USE   | 139                                                          | 112                                                          | 45                                    |         |
|             |            |         |         |       |                                                              |                                                              |                                       |         |
|             |            |         |         |       |                                                              |                                                              |                                       |         |

| ENTRANCES  |          |      |                    |                                     |       |                          |                                       |                                  |       |                                  |       |            |       |           |       |                            |
|------------|----------|------|--------------------|-------------------------------------|-------|--------------------------|---------------------------------------|----------------------------------|-------|----------------------------------|-------|------------|-------|-----------|-------|----------------------------|
| PLAN SHEET | STATION  | SIDE | LOCATION           | TYPE 5 AGGREGATE BASE (4 IN. THICK) |       | GRAVEL (A) (6 IN. THICK) | CONCRETE PAVEMENT (6" NON-REINFORCED) | 2" BIT. PAVT. MIX PG64-22 (BP-1) |       | 4" BIT. PAVT. MIX PG64-22 (BASE) |       | PRIME COAT |       | TACK COAT |       | REMARKS                    |
|            |          |      |                    | (SF)                                | (SY)  | (SY)                     | (SY)                                  | (SY)                             | (CY)  | (SY)                             | (CY)  | (SY)       | (GAL) | (SY)      | (GAL) |                            |
| 3          | 21+90.87 | RT   | VOGEL ROAD         | 272                                 | 30.2  |                          |                                       | 30.2                             | 1.7   | 30.2                             | 3.4   | 30.2       | 10.6  | 30.2      | 1.5   | ASPHALT                    |
| 3          | 23+04.30 | RT   | VOGEL ROAD         | 695                                 | 77.2  |                          | 77.2                                  |                                  |       |                                  |       |            |       |           |       | CONCRETE                   |
| 3          | 23+30.27 | RT   | VOGEL ROAD         | 188                                 | 20.9  | 27.2                     | 20.9                                  |                                  |       |                                  |       |            |       |           |       | CONCRETE APPROACH + GRAVEL |
| 3          | 24+33.70 | RT   | VOGEL ROAD         | 582                                 | 64.7  |                          | 64.7                                  |                                  |       |                                  |       |            |       |           |       | CONCRETE                   |
| 4          | 24+67.91 | RT   | VOGEL ROAD         | 411                                 | 45.7  |                          |                                       | 45.7                             | 2.5   | 45.7                             | 5.1   |            |       |           |       | ASPHALT                    |
| 4          | 25+14.06 | LT   | WALNUT DRIVE       | 1670                                | 185.6 |                          |                                       | 185.6                            | 10.3  | 185.6                            | 20.6  | 185.6      | 65.0  | 185.6     | 9.3   | ASPHALT ROAD               |
| 4          | 27+51.55 | LT   | VOGEL ROAD         | 504                                 | 56.0  |                          |                                       | 56.0                             | 3.1   | 56.0                             | 6.2   | 56.0       | 19.6  | 56.0      | 2.8   | ASPHALT                    |
| 4          | 28+54.88 | LT   | VOGEL ROAD         | 231                                 | 25.7  | 42.6                     |                                       | 25.3                             | 1.4   | 25.3                             | 2.8   | 25.3       | 8.9   | 25.3      | 1.3   | ASPHALT APPROACH + GRAVEL  |
| 5          | 29+96.00 | LT   | HARMONY LANE       | 2504                                | 278.2 |                          | 278.2                                 |                                  |       |                                  |       |            |       |           |       | CONCRETE ROAD              |
| 5          | 30+26.95 | RT   | VOGEL ROAD         |                                     |       | 31.8                     |                                       |                                  |       |                                  |       |            |       |           |       | GRAVEL                     |
| 5          | 32+45.51 | RT   | VOGEL ROAD         |                                     |       | 42.9                     |                                       |                                  |       |                                  |       |            |       |           |       | GRAVEL                     |
| 6          | 34+10.10 | LT   | VOGEL CIRCLE       | 1483                                | 164.8 |                          |                                       | 164.8                            | 9.2   | 164.8                            | 18.3  | 164.8      | 57.7  | 164.8     | 8.2   | ASPHALT ROAD               |
|            |          |      | TOTALS             |                                     | 949.0 | 144.5                    | 441                                   | 949.0                            | 52.7  | 949.0                            | 105.4 | 461.9      |       | 461.9     |       |                            |
|            |          |      | CONVERSION FACTORS |                                     |       |                          |                                       |                                  |       |                                  |       |            |       |           |       |                            |
|            |          |      | (TON/CY)           |                                     |       |                          |                                       |                                  | 1.948 |                                  | 1.943 |            |       |           |       |                            |
|            |          |      | (GAL/SY)           |                                     |       |                          |                                       |                                  |       |                                  |       | 0.35       |       | 0.05      |       |                            |
|            |          |      | TOTAL (TONS)       |                                     |       |                          |                                       |                                  | 102.7 |                                  | 204.8 |            |       |           |       |                            |
|            |          |      | TOTAL (GAL)        |                                     |       |                          |                                       |                                  |       |                                  |       | 162        |       | 23.1      |       |                            |
|            |          |      | USE                |                                     | 949   | 145                      | 441                                   |                                  | 102.7 |                                  | 204.8 | 170        |       | 30        |       |                            |

| TEMPORARY EROSION CONTROL |         |         |      |            |                 |                  |                         |         |
|---------------------------|---------|---------|------|------------|-----------------|------------------|-------------------------|---------|
| GRADING PLAN              | STATION | STATION | SIDE | LOCATION   | SILT FENCE (LF) | INLET CHECK (EA) | TYPE 1 DITCH CHECK (EA) | REMARKS |
| 11                        | 20+00   | 24+50   | RT   | VOGEL ROAD | 399             |                  |                         |         |
| 11                        | 20+00   | 24+50   | LT   | VOGEL ROAD |                 |                  | 8                       |         |
| 12                        | 24+50   | 29+00   | RT   | VOGEL ROAD | 335             |                  | 1                       |         |
| 12                        | 24+50   | 29+50   | LT   | VOGEL ROAD | 163             | 2                | 10                      |         |
| 13                        | 29+50   | 33+50   | RT   | VOGEL ROAD |                 | 2                | 3                       |         |
| 13                        | 29+50   | 33+50   | LT   | VOGEL ROAD | 462             |                  |                         |         |
| 14                        | 33+50   | 36+00   | RT   | VOGEL ROAD | 157             |                  | 1                       |         |
| 14                        | 33+50   | 36+00   | LT   | VOGEL ROAD | 54              | 1                | 1                       |         |
|                           |         |         |      |            |                 |                  |                         |         |
|                           |         |         |      | TOTAL      | 1570            | 5                | 24                      |         |
|                           |         |         |      | USE        | 1570            | 5                | 24                      |         |

| BITUMINOUS PAVEMENT |          |          |                    |                                           |        |                                        |       |                                        |        |            |       |           |       |         |
|---------------------|----------|----------|--------------------|-------------------------------------------|--------|----------------------------------------|-------|----------------------------------------|--------|------------|-------|-----------|-------|---------|
| PLAN SHEET          | STATION  | STATION  | LOCATION           | TYPE 5<br>AGGREGATE BASE<br>(4 IN. THICK) |        | 2" BIT. PAVT.<br>MIX PG64-22<br>(BP-1) |       | 8" BIT. PAVT.<br>MIX PG64-22<br>(BASE) |        | PRIME COAT |       | TACK COAT |       | REMARKS |
|                     |          |          |                    | (SF)                                      | (SY)   | (SY)                                   | (CY)  | (SY)                                   | (CY)   | (SY)       | (GAL) | (SY)      | (GAL) |         |
| 3                   | 20+41.62 | 24+50.00 | PHASE 1            | 9801.2                                    | 1089.0 | 1089.0                                 | 60.5  | 1089.0                                 | 242.0  | 1089.0     | 381.2 | 1089.0    | 54.5  |         |
| 4                   | 24+50.00 | 29+50.00 | PHASE 1            | 11693.1                                   | 1299.2 | 1299.2                                 | 72.2  | 1299.2                                 | 288.7  | 1299.2     | 454.7 | 1299.2    | 65.0  |         |
| 5                   | 29+50.00 | 33+50.00 | PHASE 1            | 9600.0                                    | 1066.7 | 1066.7                                 | 59.3  | 1066.7                                 | 237.0  | 1066.7     | 373.3 | 1066.7    | 53.3  |         |
| 6                   | 33+50.00 | 36+00.00 | PHASE 1            | 7482.8                                    | 831.4  | 831.4                                  | 46.2  | 831.4                                  | 184.8  | 831.4      | 291.0 | 831.4     | 41.6  |         |
|                     |          |          | TOTALS             |                                           | 4286.3 |                                        | 238.2 |                                        | 952.5  | 4286.3     |       | 4286.3    |       |         |
|                     |          |          | CONVERSION FACTORS |                                           |        |                                        |       |                                        |        |            |       |           |       |         |
|                     |          |          | (TON/CY)           |                                           |        |                                        | 1.948 |                                        | 1.943  |            |       |           |       |         |
|                     |          |          | (GAL/SY)           |                                           |        |                                        |       |                                        |        | 0.35       |       | 0.05      |       |         |
|                     |          |          | TOTAL (TONS)       |                                           |        |                                        | 464.0 |                                        | 1850.7 |            |       |           |       |         |
|                     |          |          | TOTAL (GAL)        |                                           |        |                                        |       |                                        |        | 1500       |       | 214.3     |       |         |
|                     |          |          | USE                |                                           | 4287   |                                        | 464.0 |                                        | 1850.7 | 1500       |       | 220       |       |         |

| CURB       |          |          |      |              |                    |         |
|------------|----------|----------|------|--------------|--------------------|---------|
| PLAN SHEET | STATION  | STATION  | SIDE | LOCATION     | 3" ROLLED CONCRETE | REMARKS |
|            |          |          |      |              | LF                 |         |
| 4          | 29+21.16 | 29+50    | LT   | HARMONY LANE | 30.2               |         |
| 5          | 29+50    | 30+53.39 | LT   | HARMONY LANE | 113.0              |         |
|            |          |          |      | TOTAL        | 143.2              |         |
|            |          |          |      | USE          | 144                |         |

| EARTHWORK |         |         |                    |                                       |                       |                     |                                                                                                                                                                                                          |
|-----------|---------|---------|--------------------|---------------------------------------|-----------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LOCATION  | STATION | STATION | CLASS A EXCAVATION | EXCAVATION ADJUSTED FOR 15% SHRINKAGE | COMPACTING EMBANKMENT | EMBANKMENT IN PLACE | REMARKS                                                                                                                                                                                                  |
|           |         |         | (CY)               | (CY)                                  | (CY)                  | (CY)                |                                                                                                                                                                                                          |
| PHASE 1   | 20+00   | 36+00   | 2058               | 1749                                  | 1749                  | 574                 |                                                                                                                                                                                                          |
| PHASE 2   |         |         |                    |                                       | 768                   |                     | CLASS A EXCAVATION MATERIAL FROM PHASE 2 STP-5403(643)                                                                                                                                                   |
|           |         |         |                    |                                       |                       |                     |                                                                                                                                                                                                          |
|           |         | TOTAL   | 2058               | 1749                                  | 2517                  | 574                 | BORROW MATERIAL FOR EMBANKMENT IN PLACE MAY BE AVAILABLE FROM OLD LEMAY FERRY INTERSECTION PROJECT STP-5403(641). CONTRACTOR IS RESPONSIBLE TO DETERMINE IF PROJECT PHASING ALLOWS USE OF THAT MATERIAL. |

ENGINEER'S SEAL



DATE PREPARED  
6-10-2015  
ROUTE VOGEL  
DISTRICT MO  
SHEET NO. 2B  
COUNTY JEFFERSON  
JOB NO. 1220700 / 0800  
CONTRACT ID.

PROJECT NO. STP-5403(644) & STP-5403(643)  
BRIDGE NO.

| DATE | DESCRIPTION |  |  |  |  |  |
|------|-------------|--|--|--|--|--|
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |
|      |             |  |  |  |  |  |

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffcomo.org

HORNER & SHIRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4966  
www.HornerShirin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

SCHEDULE OF QUANTITIES  
PHASE 1 - SHEET 1 OF 2  
VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1





|              |                                            |
|--------------|--------------------------------------------|
| MOBILIZATION | CONTRACTOR FURNISHED SURVEYING AND STAKING |
| LUMPSUM = 1  | LUMPSUM = 1                                |

| BITUMINOUS PAVEMENT |          |          |                    |                                     |        |                                  |       |                                  |        |            |       |           |       |         |
|---------------------|----------|----------|--------------------|-------------------------------------|--------|----------------------------------|-------|----------------------------------|--------|------------|-------|-----------|-------|---------|
| PLAN SHEET          | STATION  | STATION  | LOCATION           | TYPE 5 AGGREGATE BASE (4 IN. THICK) |        | 2" BIT. PAVT. MIX BP-1 (PG64-22) |       | 8" BIT. PAVT. MIX BP-1 (PG64-22) |        | PRIME COAT |       | TACK COAT |       | REMARKS |
|                     |          |          |                    | (SF)                                | (SY)   | (SY)                             | (CY)  | (SY)                             | (CY)   | (SY)       | (GAL) | (SY)      | (GAL) |         |
| 6                   | 36+00    | 38+50.00 | VOGEL ROAD PHASE 2 | 5793.8                              | 643.8  | 643.8                            | 35.8  | 643.8                            | 143.1  | 643.8      | 225.3 | 643.8     | 32.2  |         |
| 7                   | 38+50.00 | 43+50.00 | VOGEL ROAD PHASE 2 | 12000.0                             | 1333.3 | 1333.3                           | 74.1  | 1333.3                           | 296.3  | 1333.3     | 466.7 | 1333.3    | 66.7  |         |
| 8                   | 43+50.00 | 46+96.87 | VOGEL ROAD PHASE 2 | 10225.7                             | 1136.2 | 1136.2                           | 63.1  | 1136.2                           | 252.5  | 1136.2     | 397.7 | 1136.2    | 56.8  |         |
|                     |          |          | TOTALS             |                                     | 3113.3 |                                  | 173.0 |                                  | 691.9  |            |       |           |       |         |
|                     |          |          | CONVERSION FACTORS |                                     |        |                                  |       |                                  |        |            |       |           |       |         |
|                     |          |          | (TON/CY)           |                                     |        | 1.948                            |       | 1.943                            |        |            |       |           |       |         |
|                     |          |          | (GAL/SY)           |                                     |        |                                  |       |                                  |        | 0.35       |       | 0.05      |       |         |
|                     |          |          | TOTAL (TONS)       |                                     |        | 337.0                            |       | 1344.4                           |        |            |       |           |       |         |
|                     |          |          | TOTAL (GAL)        |                                     |        |                                  |       |                                  |        | 1089.7     |       | 155.7     |       |         |
|                     |          |          | USE                |                                     | 3114   |                                  | 337.0 |                                  | 1344.4 |            | 1090  |           | 160   |         |

| DITCH LINER |            |         |          |       |                                                                    |                                                                    |                                          |         |
|-------------|------------|---------|----------|-------|--------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------|---------|
| PLAN SHEET  | LOCATION   | STATION | STATION  | SIDE  | TYPE 2 ROCK DITCH LINER<br>W./PERMANENT<br>EROSION CONTROL BLANKET | TYPE 4 ROCK DITCH LINER<br>W./PERMANENT<br>EROSION CONTROL BLANKET | BEDDING MATERIAL<br>FOR ROCK DITCH LINER | REMARKS |
|             |            |         |          |       | (CY)                                                               | (CY)                                                               | (CY)                                     |         |
|             |            |         |          |       |                                                                    |                                                                    |                                          |         |
| 6           | VOGEL ROAD | 36+00   | 38+50    | LT    | 41.0                                                               | 0.0                                                                | 0.0                                      |         |
| 7           | VOGEL ROAD | 38+50   | 43+50    | LT    | 151.6                                                              | 23.4                                                               | 9.4                                      |         |
| 7           | VOGEL ROAD | 38+50   | 43+50    | RT    | 0.0                                                                | 86.2                                                               | 34.5                                     |         |
| 8           | VOGEL ROAD | 43+50   | 46+96.87 | LT    | 58.7                                                               | 5.6                                                                | 2.3                                      |         |
| 8           | VOGEL ROAD | 43+50   | 46+96.87 | RT    | 0.0                                                                | 62.4                                                               | 25.0                                     |         |
|             |            |         |          | TOTAL | 251.3                                                              | 115.2                                                              | 46.2                                     |         |
|             |            |         |          | USE   | 252                                                                | 116                                                                | 47                                       |         |
|             |            |         |          |       |                                                                    |                                                                    |                                          |         |

| ENTRANCES  |          |                          |                                           |      |                             |                                        |       |                                        |       |            |       |           |       |                   |
|------------|----------|--------------------------|-------------------------------------------|------|-----------------------------|----------------------------------------|-------|----------------------------------------|-------|------------|-------|-----------|-------|-------------------|
| PLAN SHEET | STATION  | LOCATION                 | TYPE 5<br>AGGREGATE BASE<br>(4 IN. THICK) |      | GRAVEL (A)<br>(6 IN. THICK) | 2" BIT. PAVT.<br>MIX BP-1<br>(PG64-22) |       | 4" BIT. PAVT.<br>MIX BASE<br>(PG64-22) |       | PRIME COAT |       | TACK COAT |       | REMARKS           |
|            |          |                          | (SF)                                      | (SY) | (SY)                        | (SY)                                   | (CY)  | (SY)                                   | (CY)  | (SY)       | (GAL) | (SY)      | (GAL) |                   |
| 6          | 36+24.82 | PARCEL 9 DRIVEWAY        | 185.0                                     | 20.6 |                             | 20.6                                   | 1.1   | 20.6                                   | 2.3   | 20.6       | 7.2   | 20.6      | 1.0   | ASPHALT<br>GRAVEL |
| 8          | 44+72.65 | PARCEL 10 FIELD ENTRANCE |                                           |      | 311.1                       |                                        |       |                                        |       |            |       |           |       |                   |
|            |          |                          |                                           |      |                             |                                        |       |                                        |       |            |       |           |       |                   |
|            |          | TOTALS                   |                                           | 20.6 | 311.1                       |                                        | 1.1   |                                        | 2.3   |            |       |           |       |                   |
|            |          | CONVERSION FACTORS       |                                           |      |                             |                                        |       |                                        |       |            |       |           |       |                   |
|            |          | (TON/CY)                 |                                           |      |                             |                                        | 1.948 |                                        | 1.943 |            |       |           |       |                   |
|            |          | (GAL/SY)                 |                                           |      |                             |                                        |       |                                        |       | 0.35       |       |           | 0.05  |                   |
|            |          | TOTAL (TONS)             |                                           |      |                             |                                        | 2.1   |                                        | 4.5   |            |       |           |       |                   |
|            |          | TOTAL (GAL)              |                                           |      |                             |                                        |       |                                        |       | 7.2        |       |           | 1.0   |                   |
|            |          | USE                      |                                           | 21   | 311                         |                                        | 2.1   |                                        | 4.5   |            | 10    |           | 10    |                   |
|            |          |                          |                                           |      |                             |                                        |       |                                        |       |            |       |           |       |                   |

| GUARDRAIL  |                      |         |         |       |                                       |                                            |         |
|------------|----------------------|---------|---------|-------|---------------------------------------|--------------------------------------------|---------|
| PLAN SHEET | LOCATION             | STATION | STATION | SIDE  | TYPE A<br>CRASHWORTHY<br>END TERMINAL | TYPE A<br>7 FT. POSTS<br>3FT 1.5IN SPACING | REMARKS |
|            |                      |         |         |       | (EA)                                  | (LF)                                       |         |
| 6          | VOGEL ROAD - PHASE 2 | 36+00   | 38+50   | RT    | 1                                     | 250.00                                     |         |
|            |                      |         |         | TOTAL | 1                                     | 250                                        |         |
|            |                      |         |         | USE   | 1                                     | 250                                        |         |

| MAILBOXES (TO BE REMOVED AND RELOCATED) |            |          |       |         |         |
|-----------------------------------------|------------|----------|-------|---------|---------|
| PLAN SHEET                              | LOCATION   | STATION  | SIDE  | MAILBOX | REMARKS |
|                                         |            |          |       | (EACH)  |         |
| 6                                       | VOGEL ROAD | 36+66.00 | LEFT  | 1       |         |
|                                         |            |          | TOTAL | 1       |         |
|                                         |            |          | USE   | 1       |         |
|                                         |            |          |       |         |         |

| TRAFFIC CONTROL DEVICES     |      |          |
|-----------------------------|------|----------|
| DESCRIPTION                 | UNIT | QUANTITY |
| CONSTRUCTION SIGNS          | SF   | 291      |
| TYPE III MOVABLE BARRICADES | EACH | 6        |

[illegible]

| DRAINAGE STRUCTURES |        |      |                  |              |                                |                      |                      |                        |         |
|---------------------|--------|------|------------------|--------------|--------------------------------|----------------------|----------------------|------------------------|---------|
| STATION             | OFFSET | SIDE | STRUCTURE NUMBER | TO STRUCTURE | AREA INLET SINGLE OPEN 4 SIDES | 12" RCP PIPE GROUP A | 18" RCP PIPE GROUP A | 18" FLARED END SECTION | REMARKS |
|                     |        |      |                  |              | (EACH)                         | (LF)                 | (LF)                 | (EACH)                 |         |
| 36+39.60            | 18.6   | RT   | EP 7.1           | AI 7.2       | 1                              | 38                   |                      |                        |         |
| 40+21.81            | 26.5   | RT   | FE 8.1           | FE 8.2       |                                |                      | 48                   | 2                      |         |
| 42+60.65            | 32.0   | RT   | FE 9.1           | FE 9.2       |                                |                      | 59                   | 2                      |         |
| 43+20.35            | 44.2   | RT   | FE 10.1          | FE 10.2      |                                |                      | 79                   | 2                      |         |
|                     |        |      |                  |              |                                |                      |                      |                        |         |
|                     |        |      |                  |              | 1                              | 38                   | 186                  | 6                      |         |

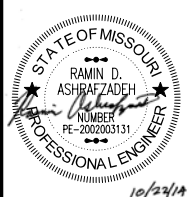
| CLEARING AND GRUBBING |                      |          |          |       |        |         |
|-----------------------|----------------------|----------|----------|-------|--------|---------|
| PLAN SHEET            | LOCATION             | STATION  | STATION  | SIDE  | AREA   | REMARKS |
|                       |                      |          |          |       | (ACRE) |         |
| 6                     | VOGEL ROAD - PHASE 2 | 36+00.00 | 38+50.00 | LEFT  | 0.09   |         |
| 7                     | VOGEL ROAD - PHASE 2 | 38+50.00 | 43+50.00 | BOTH  | 0.84   |         |
| 8                     | VOGEL ROAD - PHASE 2 | 43+50.00 | 46+96.87 | BOTH  | 0.40   |         |
|                       |                      |          |          | TOTAL | 1.33   |         |
|                       |                      |          |          | USE   | 1.4    |         |

| EARTHWORK |         |          |                       |                                             |                          |                                                       |
|-----------|---------|----------|-----------------------|---------------------------------------------|--------------------------|-------------------------------------------------------|
| LOCATION  | STATION | STATION  | CLASS A<br>EXCAVATION | EXCAVATION<br>ADJUSTED FOR<br>15% SHRINKAGE | COMPACTING<br>EMBANKMENT | REMARKS                                               |
|           |         |          | (CY)                  | (CY)                                        | (CY)                     |                                                       |
| PHASE 2   | 36+00   | 46+96.87 | 5304                  | 4509                                        | 3741                     | 768 CY to be used as Compacting Embankment in Phase 1 |
|           |         | TOTAL    | 5304                  | 4509                                        | 3741                     |                                                       |
|           |         |          |                       |                                             |                          |                                                       |

| TEMPORARY EROSION CONTROL |         |          |      |                          |                    |                                         |                               |         |
|---------------------------|---------|----------|------|--------------------------|--------------------|-----------------------------------------|-------------------------------|---------|
| GRADING PLAN              | STATION | STATION  | SIDE | LOCATION                 | SILT FENCE<br>(LF) | INLET PROTECTION<br>INLET CHECK<br>(EA) | TYPE 1<br>DITCH CHECK<br>(EA) | REMARKS |
| 14                        | 36+00   | 38+50    | RT   | VOGEL ROAD               | 253                |                                         |                               |         |
| 14                        | 36+00   | 38+50    | LT   | VOGEL ROAD               |                    | 1                                       | 5                             |         |
| 15                        | 38+50   | 43+50    | RT   | VOGEL ROAD               | 727                |                                         |                               |         |
| 15                        | 38+50   | 43+50    | LT   | VOGEL ROAD               |                    | 3                                       | 17                            |         |
| 16                        | 43+50   | 46+96.87 | RT   | VOGEL ROAD               | 378                |                                         |                               |         |
| 16                        | 43+50   | 46+96.87 | LT   | VOGEL ROAD               |                    |                                         | 5                             |         |
| 17                        | 10+00   | 12+41.69 | RT   | PARCEL 10 FIELD ENTRANCE | 255                |                                         |                               |         |
| 17                        | 10+00   | 12+41.69 | LT   | PARCEL 10 FIELD ENTRANCE | 211                |                                         |                               |         |
|                           |         |          |      |                          |                    |                                         |                               |         |
|                           |         |          |      | TOTAL                    | 1824               | 4                                       | 27                            |         |
|                           |         |          |      | USE                      | 1824               | 4                                       | 27                            |         |

| SEEDING - WARM SEASON MIXTURES |            |         |          |       |        |         |
|--------------------------------|------------|---------|----------|-------|--------|---------|
| PLAN SHEET                     | LOCATION   | STATION | STATION  | SIDE  | AREA   | REMARKS |
|                                |            |         |          |       | (ACRE) |         |
| 6                              | VOGEL ROAD | 36+00   | 38+50    | LT    | 0.10   |         |
| 6                              | VOGEL ROAD | 36+00   | 38+50    | RT    | 0.01   |         |
| 7                              | VOGEL ROAD | 38+50   | 43+50    | LT    | 0.40   |         |
| 7                              | VOGEL ROAD | 38+50   | 43+50    | RT    | 0.55   |         |
| 8                              | VOGEL ROAD | 43+50   | 46+96.87 | LT    | 0.28   |         |
| 8                              | VOGEL ROAD | 43+50   | 46+96.87 | RT    | 0.50   |         |
|                                |            |         |          | TOTAL | 1.84   |         |
|                                |            |         |          | USE   | 1.90   |         |

| MODULAR BLOCK RETAINING WALLS |          |         |         |       |      |         |
|-------------------------------|----------|---------|---------|-------|------|---------|
| PLAN SHEET                    | LOCATION | STATION | STATION | SIDE  | AREA | REMARKS |
|                               |          |         |         |       | (SF) |         |
| 12                            | WALL E   | 36+62   | 37+90   | LEFT  | 436  |         |
|                               |          |         |         | TOTAL | 436  |         |
|                               |          |         |         | USE   | 436  |         |
|                               |          |         |         |       |      |         |

ENGINEER'S SEAL

10/22/14

DATE PREPARED

6-10-2015

|       |       |
|-------|-------|
| ROUTE | STATE |
| VOGEL | MO    |

|          |                 |
|----------|-----------------|
| DISTRICT | SHEET NO.<br>2B |
|----------|-----------------|

COUNTY

JEFFERSON

JOB NO.

1220700 / 0800

CONTRACT ID.

PROJECT NO.

STP-5403(644) & STP-5403(643)

BRIDGE NO.

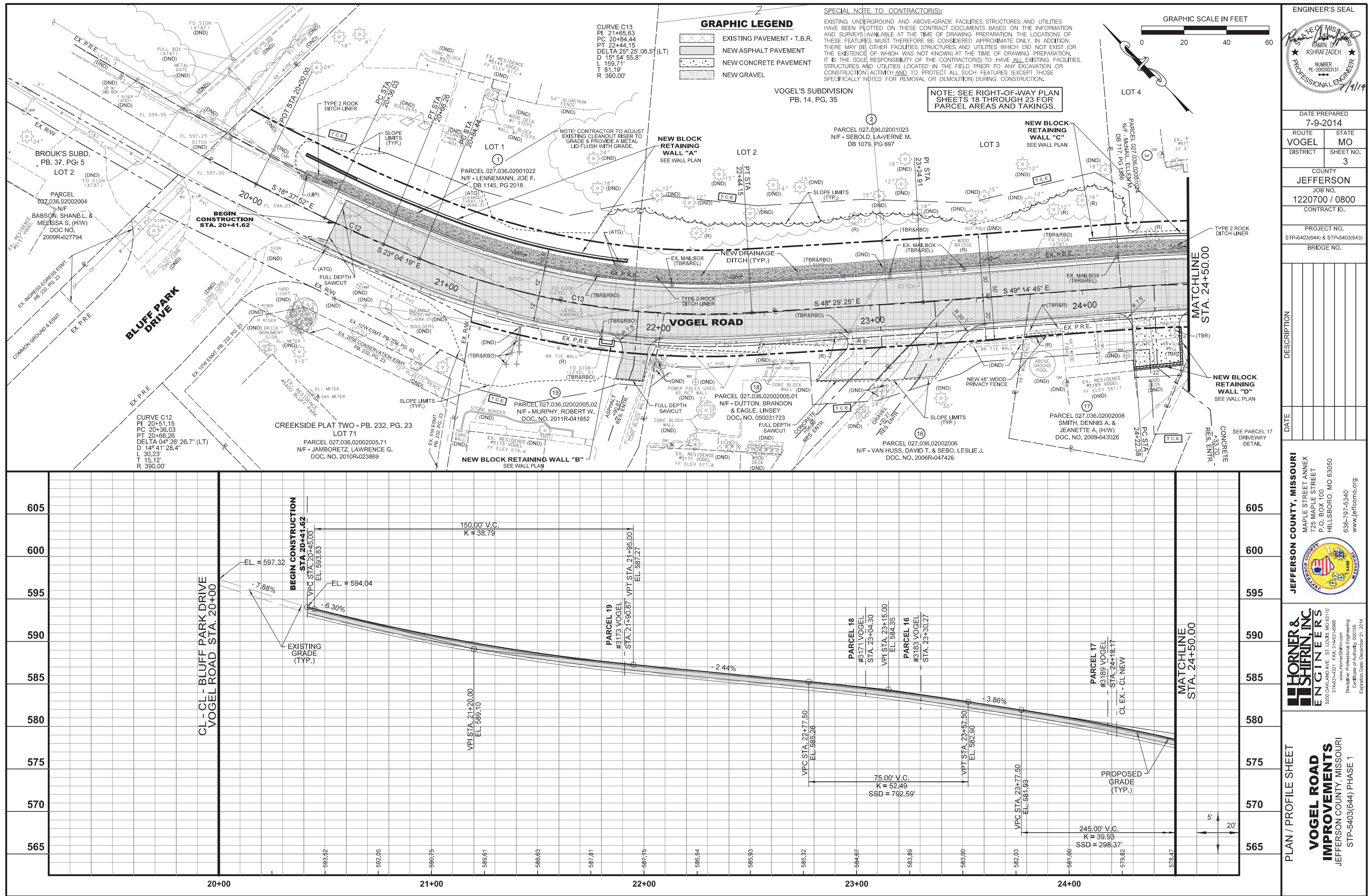
[illegible]

**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffco.org](http://www.jeffco.org)

**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-551-4321 FAX: 314-531-6986  
[www.HornerShifrin.com](http://www.HornerShifrin.com)  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

**SCHEDULE OF QUANTITIES**  
**PHASE 2 - SHEET 1 OF 1**

**VOGEL ROAD**  
**IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(643) PHASE 2

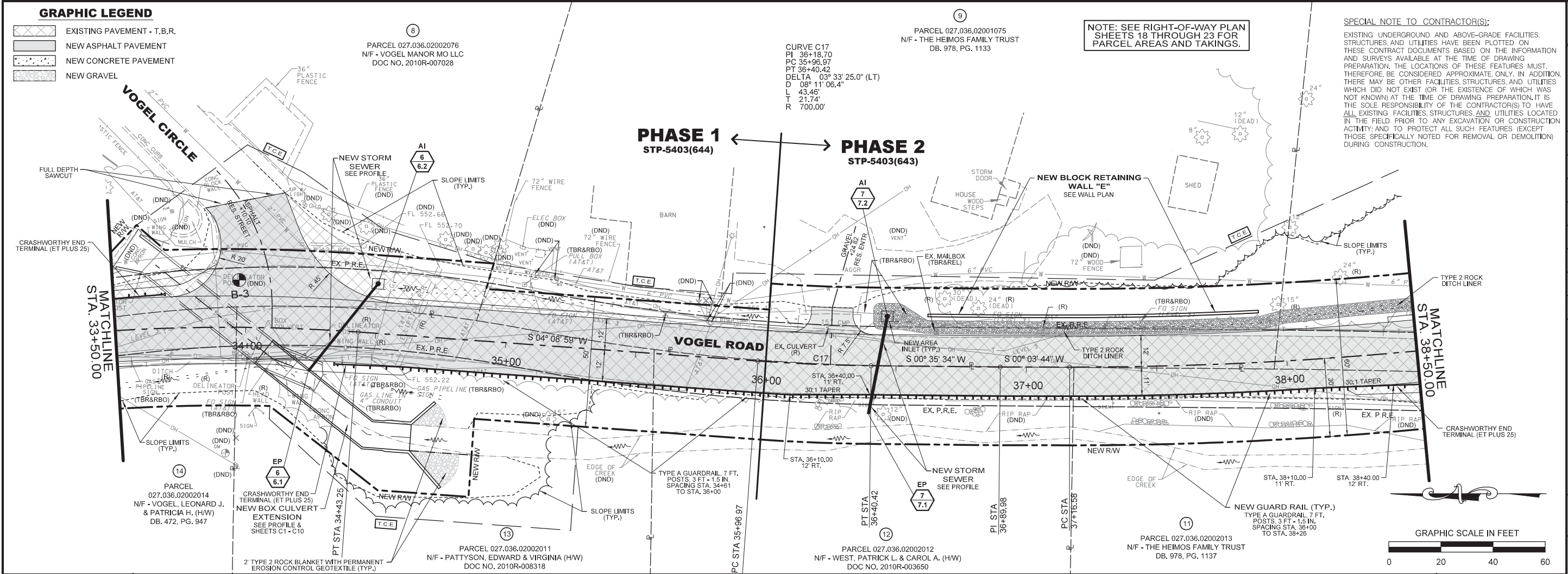




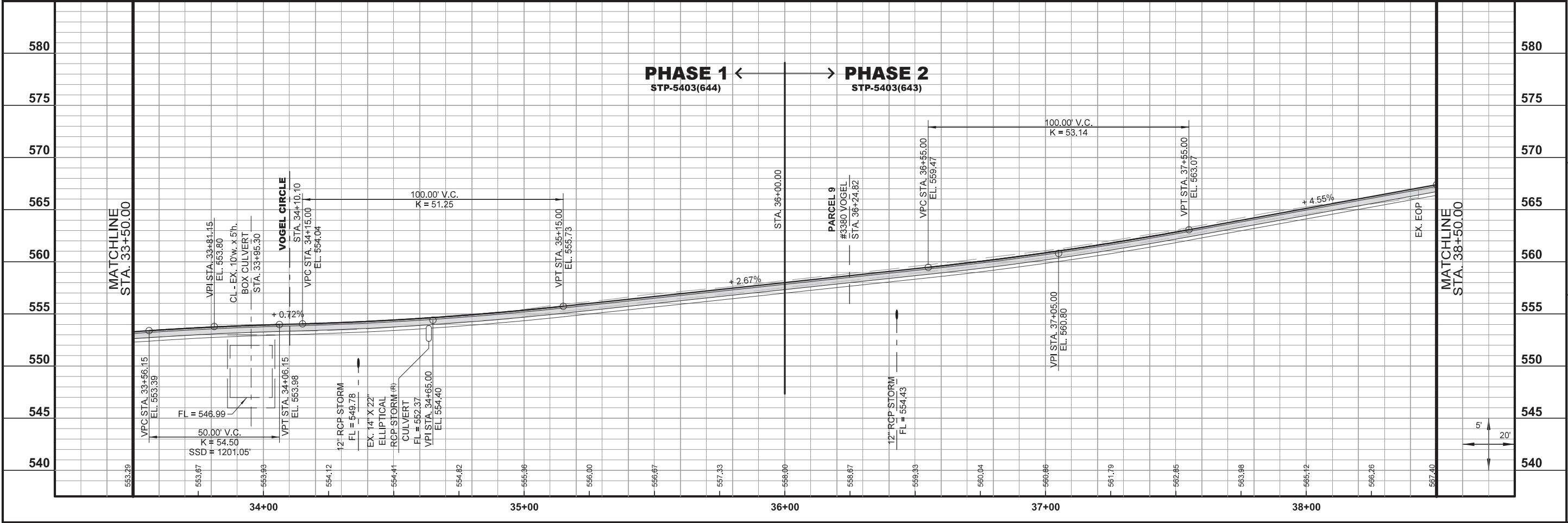




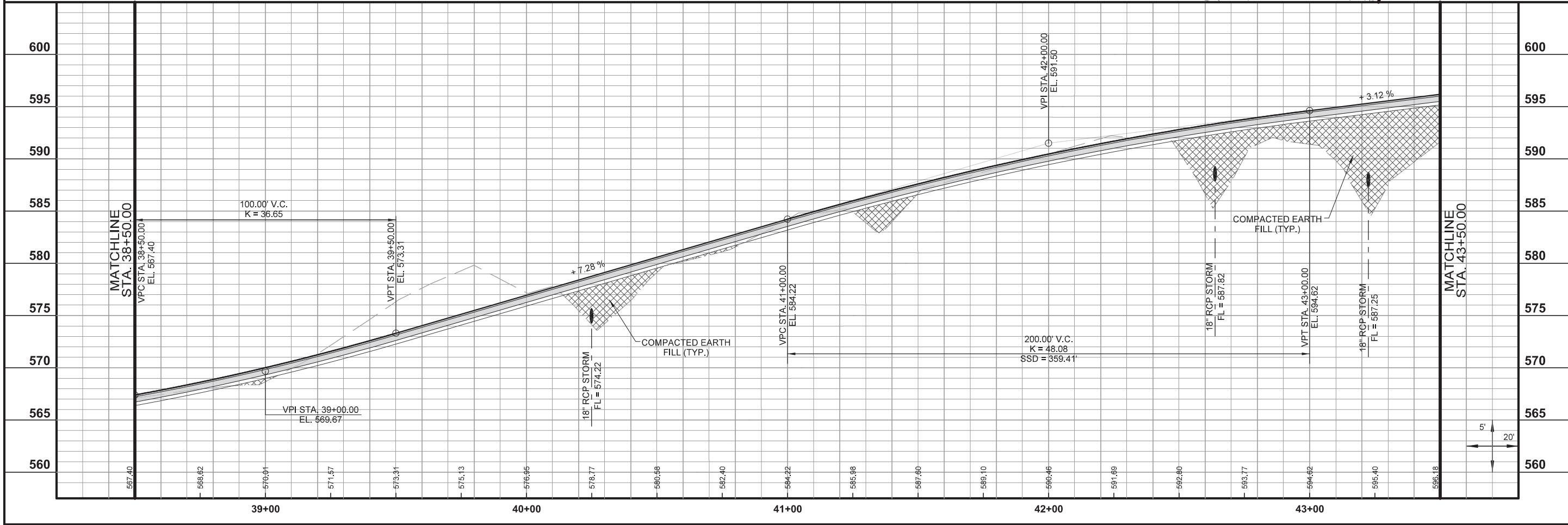
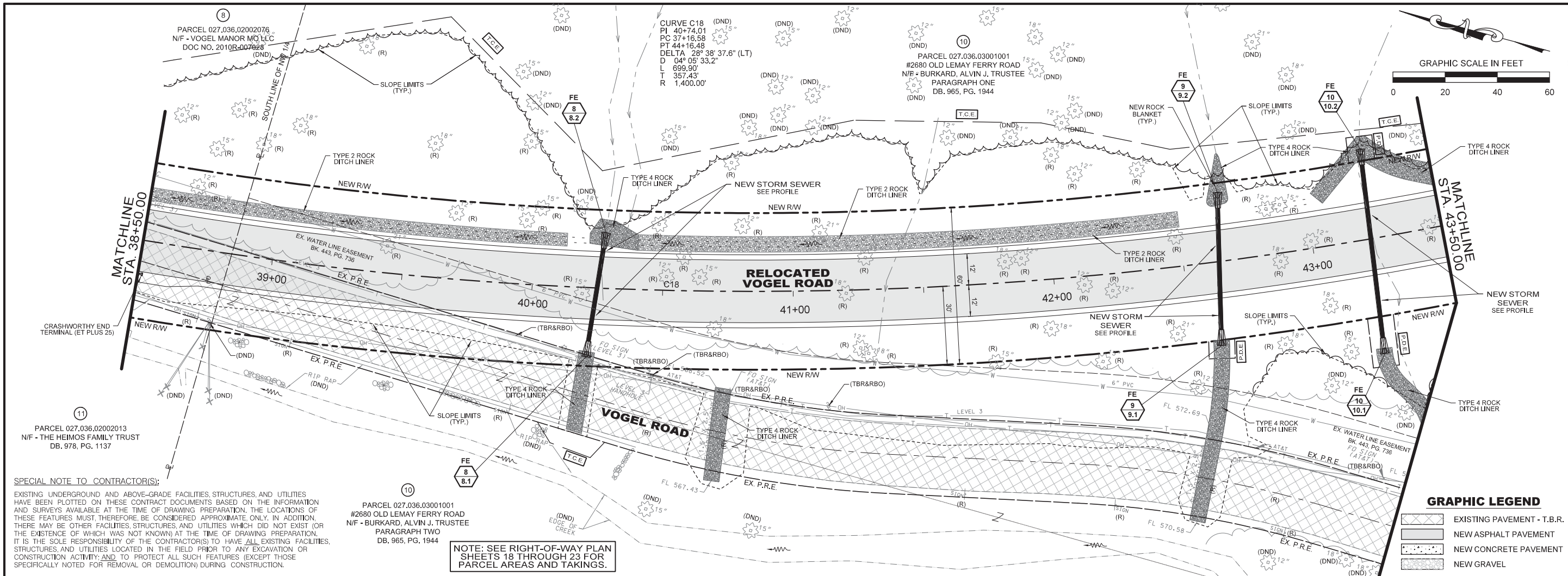




| ENGINEER'S SEAL |                               |
|-----------------|-------------------------------|
|                 |                               |
| DATE PREPARED   | 7-9-2014                      |
| ROUTE           | STATE                         |
| VOGEL           | MO                            |
| DISTRICT        | SHEET NO.                     |
|                 | 6                             |
| COUNTY          | JEFFERSON                     |
| JOB NO.         | 1220700 / 0800                |
| CONTRACT ID.    |                               |
| PROJECT NO.     | STP-5403(644) & STP-5403(643) |
| BRIDGE NO.      |                               |
| DESCRIPTION     |                               |
| DATE            |                               |







ENGINEER'S SEAL

STATE OF MISSOURI

RAMIN D. ASHRAFI-ZADEH

PROFESSIONAL ENGINEER

10/22/14

DATE PREPARED  
10-22-2014

ROUTE  
VOGEL

DISTRICT  
7

STATE  
MO

SHEET NO.  
7

COUNTY  
JEFFERSON

JOB NO.  
1220700 / 0800

CONTRACT ID.

PROJECT NO.  
STP-5403(644) & STP-5403(643)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

HORNER & SHIRIN, INC.

ENGINEERS

5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4966  
www.HornerShirin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

PLAN / PROFILE SHEET

VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(643) PHASE 2

REV.









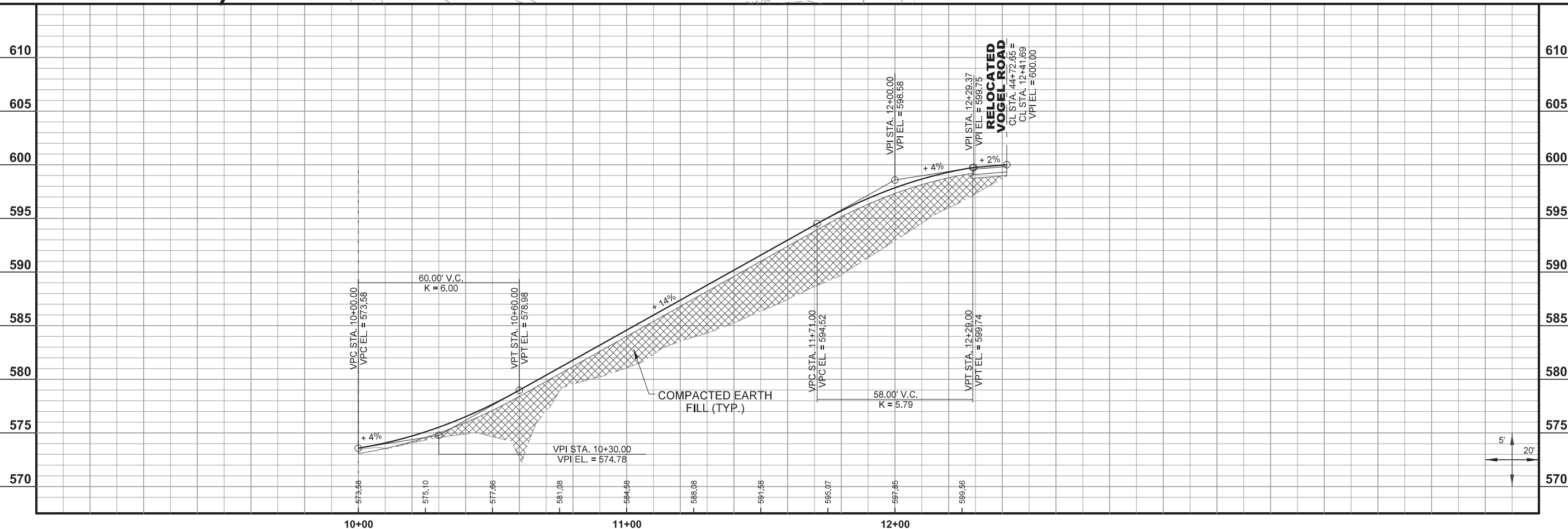
|                                                                                   |                           |
|-----------------------------------------------------------------------------------|---------------------------|
|  | EXISTING PAVEMENT - T,B,R |
|  | NEW ASPHALT PAVEMENT      |
|  | NEW CONCRETE PAVEMENT     |
|  | NEW GRAVEL                |



SEE STP-5403(641)  
PLANS FOR  
CONTINUATION

SPECIAL NOTE TO CONTRACTOR(S):

EXISTING UNDERGROUND AND ABOVE-GRADE FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED ON THESE CONTRACT DOCUMENTS BASED ON THE INFORMATION AND SURVEYS AVAILABLE AT THE TIME OF DRAWING PREPARATION. THE LOCATIONS OF THESE FEATURES MUST, THEREFORE, BE CONSIDERED APPROXIMATE ONLY. IN ADDITION, THERE MAY BE OTHER FACILITIES, UTILITIES, OR STRUCTURES ON THE SITE (OR THE EXISTENCE OF WHICH WAS NOT KNOWN) AT THE TIME OF DRAWING PREPARATION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S) TO HAVE ALL EXISTING FACILITIES, STRUCTURES, AND UTILITIES LOCATED IN THE FIELD PRIOR TO ANY EXCAVATION OR CONSTRUCTION OF THE PROPOSED PROJECT. PROTECT ALL EXISTING FACILITIES SPECIFICALLY NOTED FOR REMOVAL OR DEMOLITION DURING CONSTRUCTION.



STATE OF MISSOURI  
 RAMIN D. ASHRAFZADEH  
 NUMBER  
 PE-2002003131  
 PROFESSIONAL ENGINEER  
 10/24/2010

DATE PREPARED

10-22-2014

|                |             |
|----------------|-------------|
| ROUTE<br>VOGEL | STATE<br>MO |
| DISTRICT       | SHEET NO    |

|                |   |
|----------------|---|
|                | 9 |
| COUNTY         |   |
| JEFFERSON      |   |
| JOB NO.        |   |
| 1220700 / 0800 |   |
| CONTRACT ID.   |   |

|                               |
|-------------------------------|
| PROJECT NO.                   |
| STP-5403(644) & STP-5403(644) |
| BRIDGE NO.                    |

[illegible]

**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffcomo.org](http://www.jeffcomo.org)

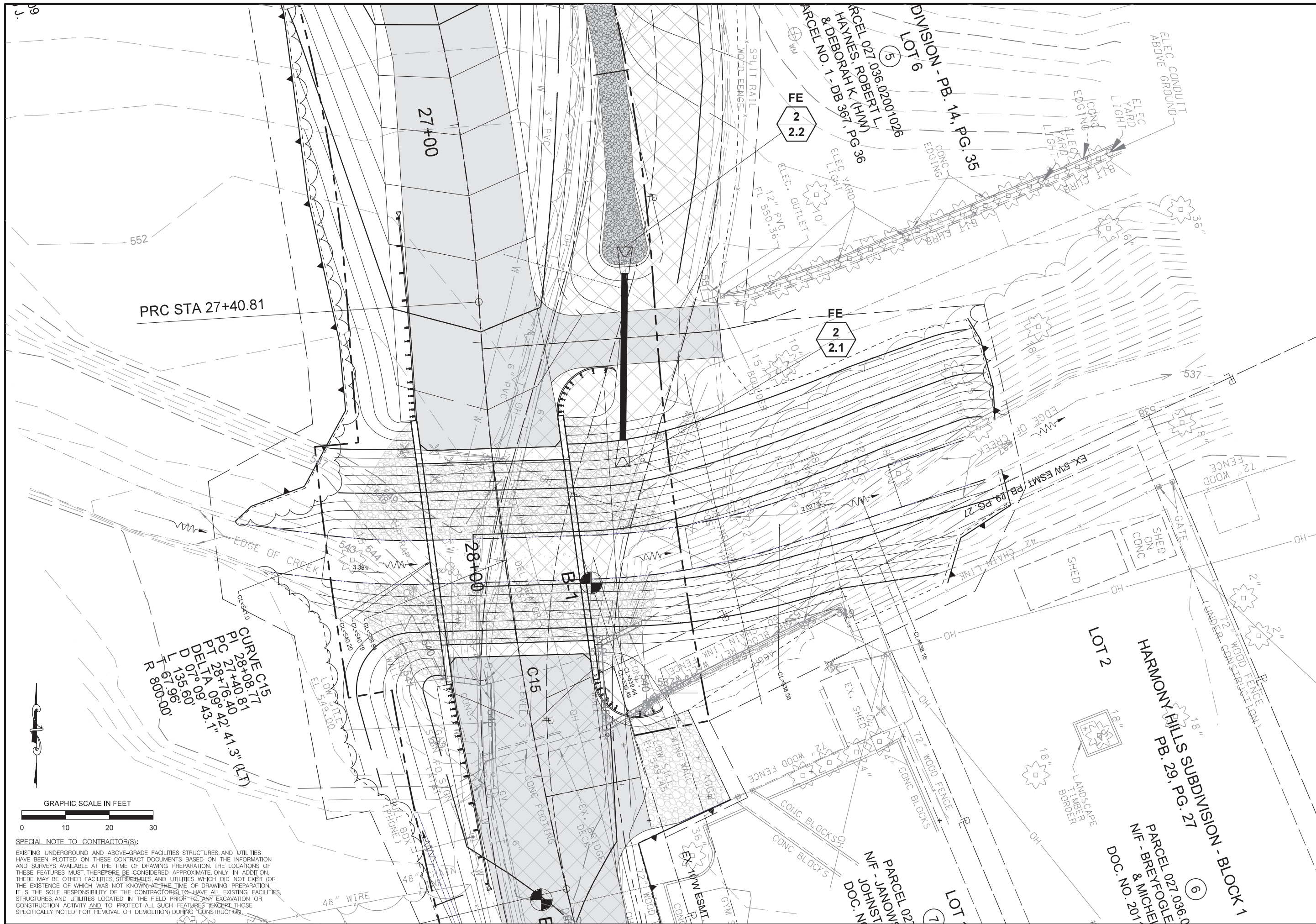
**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-6866  
[www.HornerShifrin.com](http://www.HornerShifrin.com)  
Discipline: Professional Engineering  
Certificate of Authority: 000159

PLAN / PROFILE SHEET

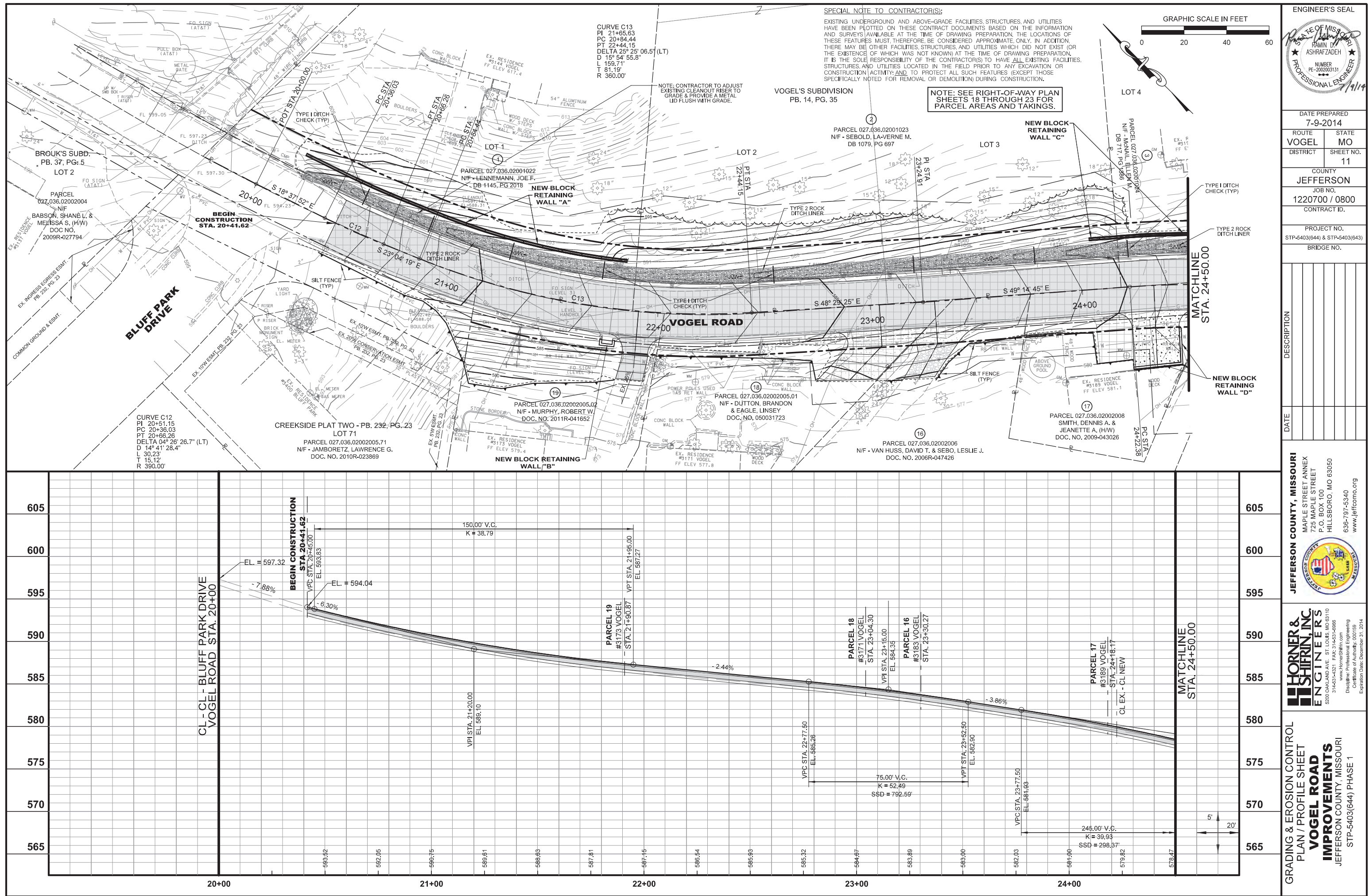
**VOGEL ROAD  
IMPROVEMENTS**

JEFFERSON COUNTY, MISSOURI  
STP-5403(643) PHASE 2





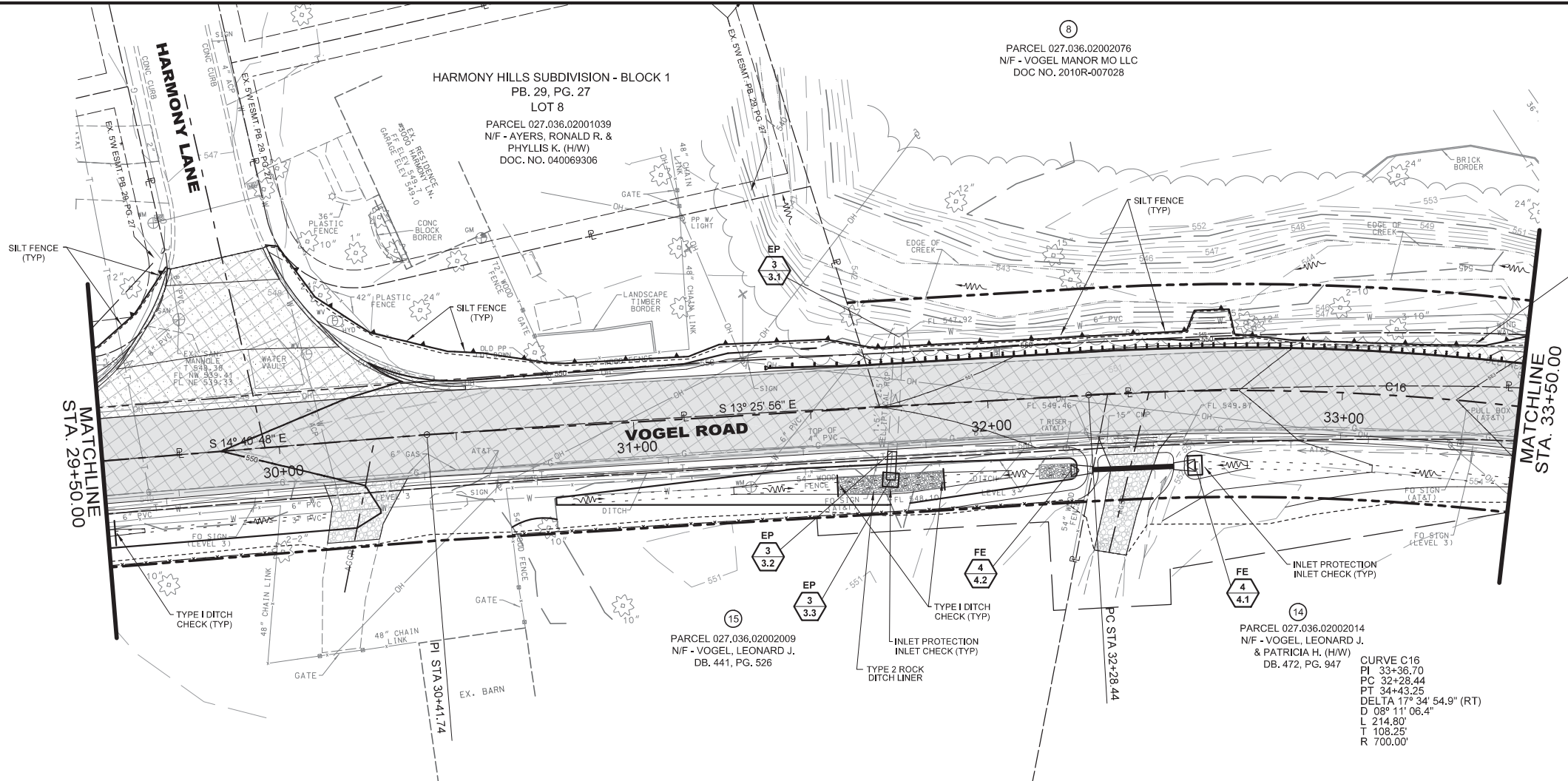






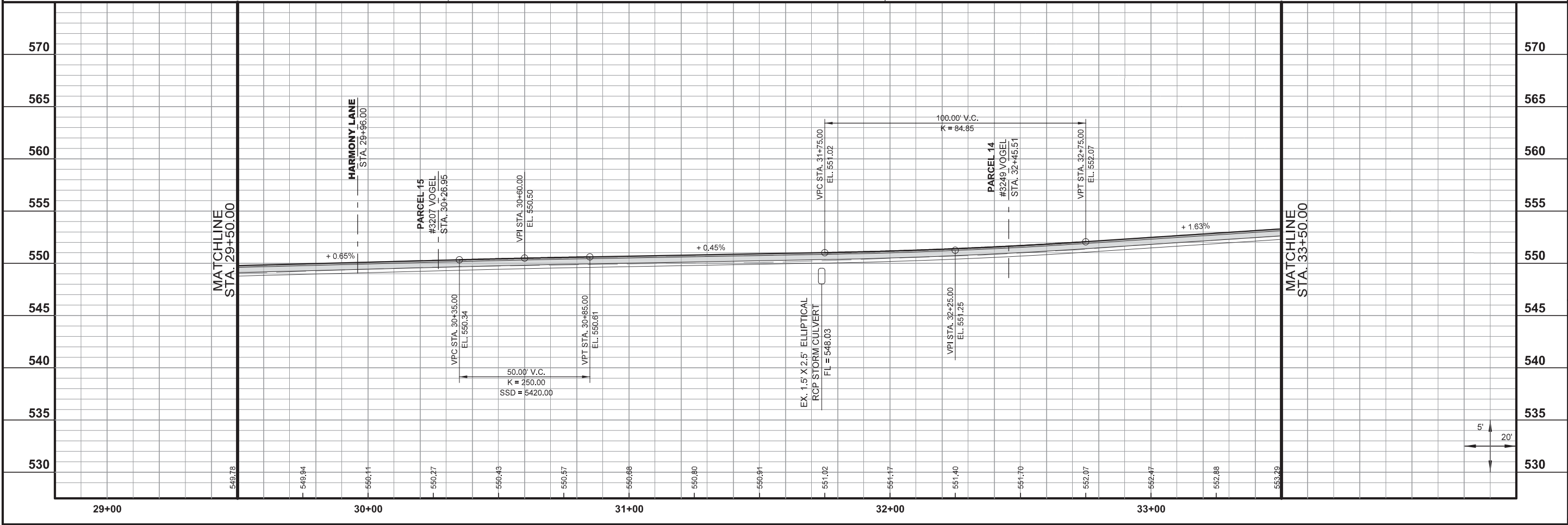






NOTE: SEE RIGHT-OF-WAY PLAN SHEETS 18 THROUGH 23 FOR PARCEL AREAS AND TAKINGS.

**SPECIAL NOTE TO CONTRACTOR(S):**  
EXISTING UNDERGROUND AND ABOVE-GRADE FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED ON THESE CONTRACT DOCUMENTS BASED ON THE INFORMATION AND SURVEYS AVAILABLE AT THE TIME OF DRAWING PREPARATION. THE LOCATIONS OF THESE FEATURES MUST, THEREFORE, BE CONSIDERED APPROXIMATE, ONLY. IN ADDITION, THERE MAY BE OTHER FACILITIES, STRUCTURES, AND UTILITIES WHICH DID NOT EXIST (OR THE EXISTENCE OF WHICH WAS NOT KNOWN) AT THE TIME OF DRAWING PREPARATION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S) TO HAVE ALL EXISTING FACILITIES, STRUCTURES, AND UTILITIES LOCATED IN THE FIELD PRIOR TO ANY EXCAVATION OR CONSTRUCTION ACTIVITY; AND TO PROTECT ALL SUCH FEATURES (EXCEPT THOSE SPECIFICALLY NOTED FOR REMOVAL OR DEMOLITION) DURING CONSTRUCTION.



ENGINEER'S SEAL

STATE OF MISSOURI

ASHRAF ZADEH

PROFESSIONAL ENGINEER

NUMBER PE-200203131

9/14

DATE PREPARED

7-9-2014

ROUTE

VOGEL

DISTRICT

STATE

MO

SHEET NO.

13

COUNTY

JEFFERSON

JOB NO.

1220700 / 0800

CONTRACT ID.

PROJECT NO.

STP-5403(644) & STP-5403(643)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX

725 MAPLE STREET

P.O. BOX 100

HILLSBORO, MO 63050

636-797-5340

www.jeffcom.org

HORNER & SHIRIN, INC.

ENGINEERS

5200 OAKLAND AVE. ST. LOUIS, MO 63110

314-531-4321 FAX: 314-531-4966

www.HornerShirin.com

Discipline: Professional Engineering

Certificate of Authority: 000159

Expiration Date: December 31, 2014

GRADING & EROSION CONTROL

PLAN / PROFILE SHEET

VOGEL ROAD

IMPROVEMENTS

JEFFERSON COUNTY, MISSOURI

STP-5403(644) PHASE 1

REV.



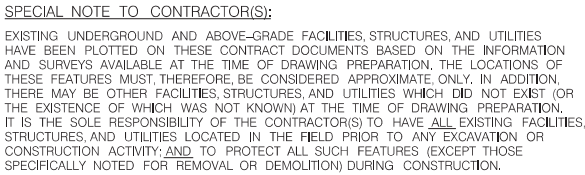












SEE STP-5403(641)  
PLANS FOR  
CONTINUATION

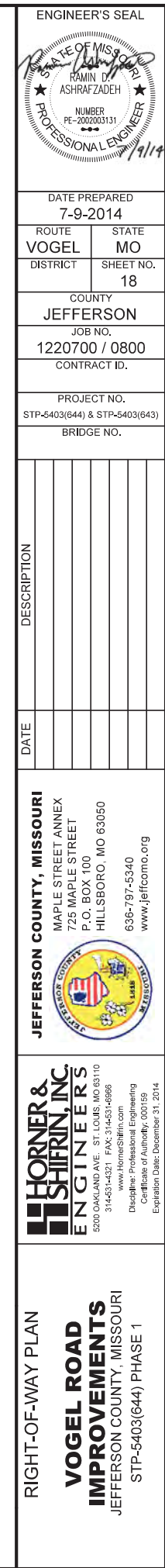
[illegible]

**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
5200 OAKLAND AVE. ST. LOUIS MO 63110  
314-531-4321 FAX: 314-531-6966  
www.HornerShifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

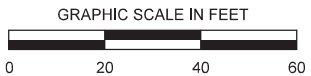
GRADING & EROSION CONTROL  
PLAN / PROFILE SHEET

**VOGEL ROAD  
IMPROVEMENTS**

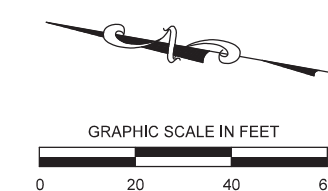
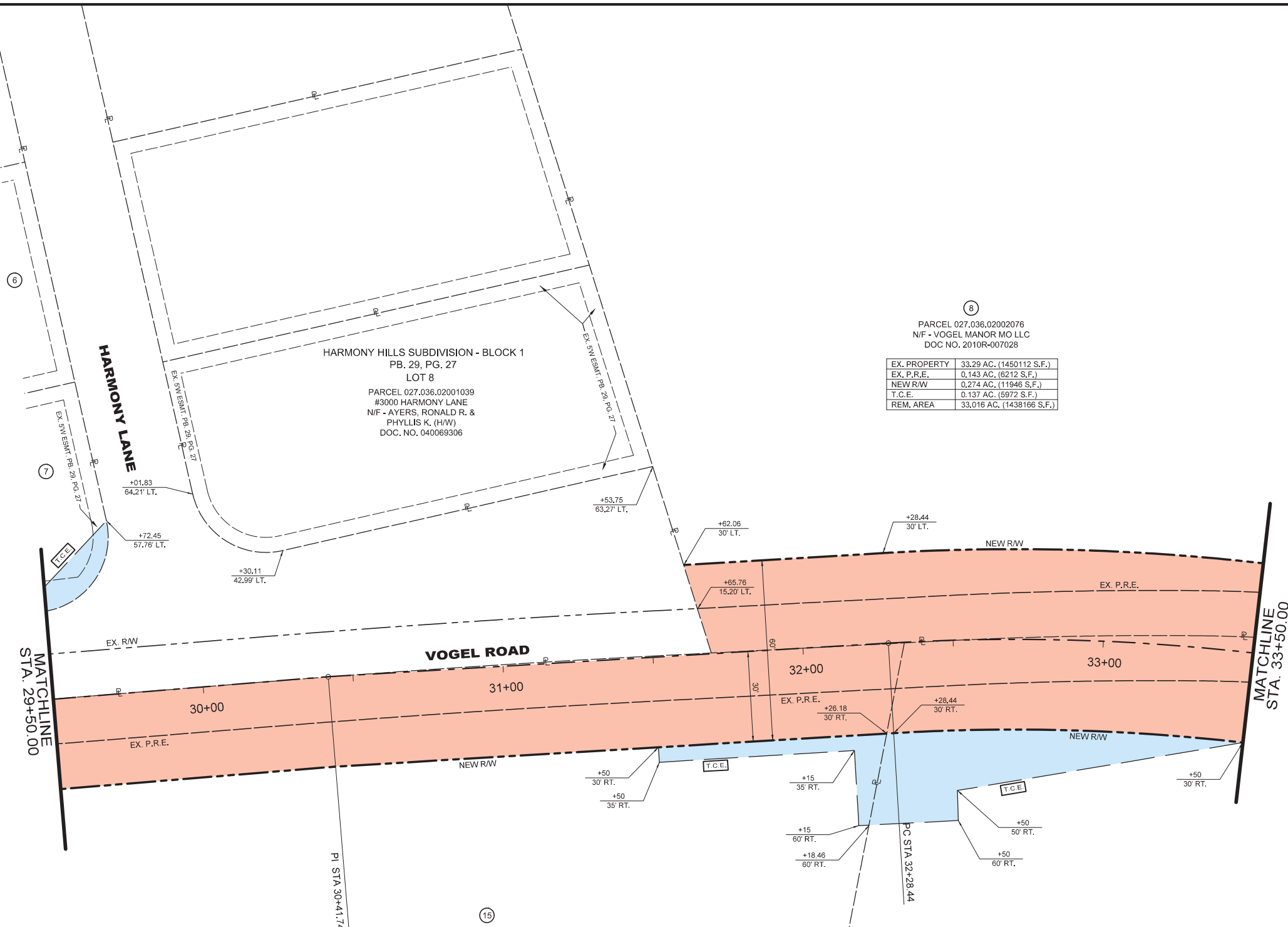
JEFFERSON COUNTY, MISSOURI  
STP-5403(643) PHASE 2







CURVE C15  
PI 28+08.77  
PC 27+40.81  
PT 28+76.40  
DELTA 09° 42' 41.3" (LT)  
D 07° 09' 43.1"  
L 135.60'  
T 67.96'  
R 800.00'



8

PARCEL 027.036.02002076  
N/F - VOGEL MANOR MO LLC  
DOC NO. 2010R-007028

|              |                           |
|--------------|---------------------------|
| EX. PROPERTY | 33.29 AC. (1450112 S.F.)  |
| EX. P.R.E.   | 0.143 AC. (6212 S.F.)     |
| NEW R/W      | 0.274 AC. (11946 S.F.)    |
| T.C.E.       | 0.137 AC. (5972 S.F.)     |
| REM. AREA    | 33.016 AC. (1438166 S.F.) |

15

PARCEL 027.036.02002009  
#3207 VOGEL ROAD  
N/F - VOGEL, LEONARD J.  
DB. 441, PG. 526

14

PARCEL 027.036.02002014  
#3249 VOGEL ROAD  
N/F - VOGEL, LEONARD J. & PATRICIA H. (H/W)  
DB. 472, PG. 947

|              |                         |
|--------------|-------------------------|
| EX. PROPERTY | 5.58 AC. (243064 S.F.)  |
| EX. P.R.E.   | 0.056 AC. (2457 S.F.)   |
| NEW R/W      | 0.124 AC. (5389 S.F.)   |
| T.C.E.       | 0.043 AC. (1854 S.F.)   |
| REM. AREA    | 5.456 AC. (237675 S.F.) |

ENGINEER'S SEAL

STATE OF MISSOURI  
ASHRAF ZADEH  
NUMBER  
PE-200203131  
PROFESSIONAL ENGINEER  
9/14

DATE PREPARED

7-9-2014

ROUTE

STATE

VOGEL

MO

DISTRICT

SHEET NO.

20

COUNTY

JEFFERSON

JOB NO.

1220700 / 0800

CONTRACT ID.

PROJECT NO.

STP-5403(644) & STP-5403(643)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

HORNER & SHIRIN, INC.  
ENGINEERS

5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4966  
www.HornerShirin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

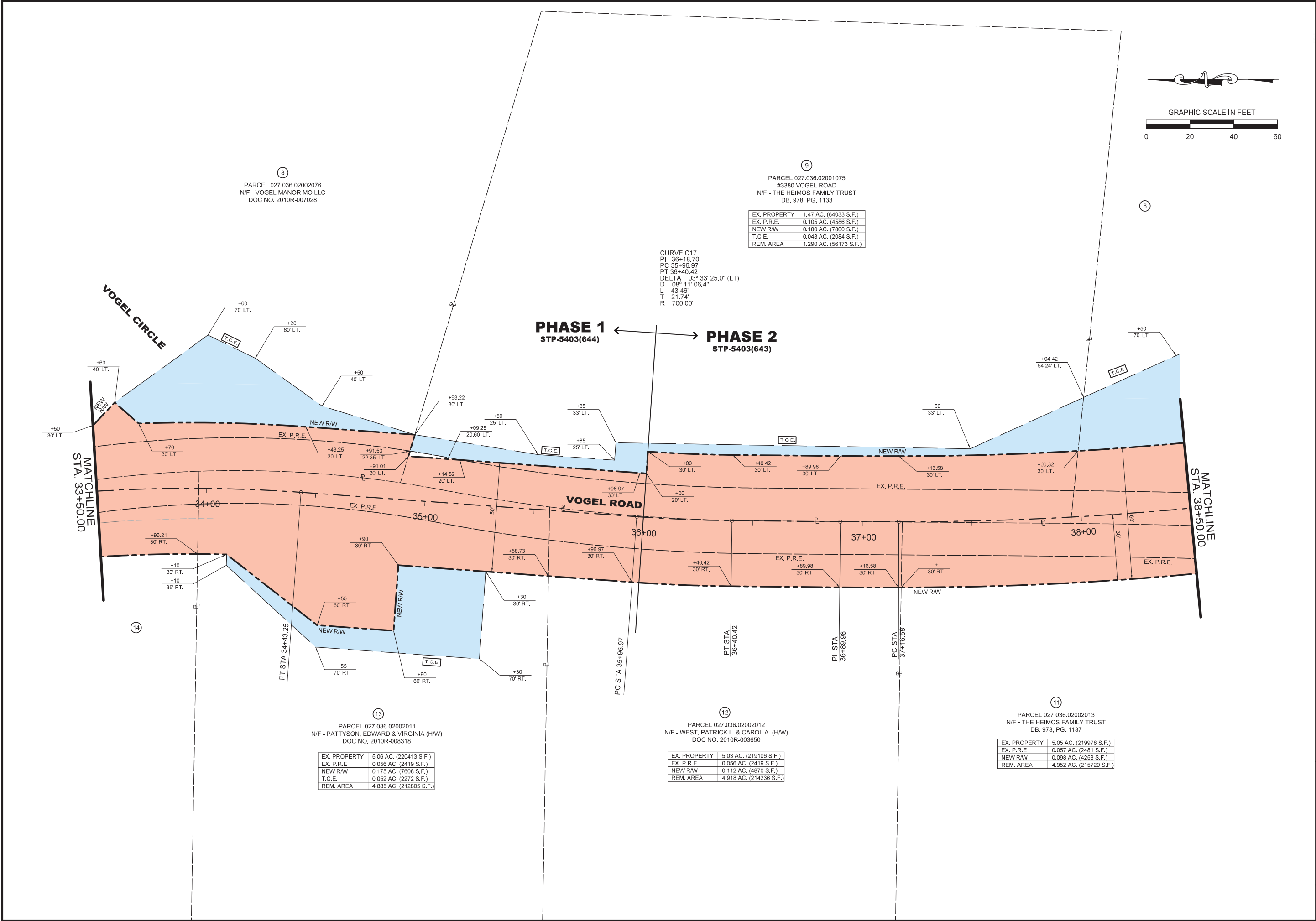
RIGHT-OF-WAY PLAN

VOGEL ROAD  
IMPROVEMENTS

JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1

REV.





ENGINEER'S SEAL

DATE PREPARED  
7-9-2014

ROUTE  
VOGEL

DISTRICT

STATE  
MO

SHEET NO.  
21

COUNTY  
JEFFERSON

JOB NO.  
1220700 / 0800

CONTRACT ID.

PROJECT NO.  
STP-5403(644) & STP-5403(643)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

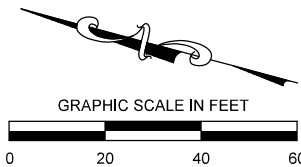
HORNER & SHIRIN, INC.

ENGINEERS

5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4966  
www.HornerShirin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

RIGHT-OF-WAY PLAN

VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1  
STP-5403(643) PHASE 2



|              |                           |
|--------------|---------------------------|
| EX. PROPERTY | 58.33 AC. (2540854 S.F.)  |
| EX. P.R.E.   | 0.606 AC. (26392 S.F.)    |
| NEW R/W      | 1.119 AC. (48749 S.F.)    |
| T.C.E.       | 1.179 AC. (51357 S.F.)    |
| P.D.E.       | 0.008 AC. (357 S.F.)      |
| REM. AREA    | 57.211 AC. (2492105 S.F.) |

STATE OF MISSOURI  
 RAMIN D. ASHRAFZADEH  
 NUMBER  
 PE-2002003131  
 PROFESSIONAL ENGINEER  
 10/24/14

DATE PREPARED  
7-9-2014

|                |             |
|----------------|-------------|
| ROUTE<br>VOGEL | STATE<br>MO |
|----------------|-------------|

|          |                 |
|----------|-----------------|
| DISTRICT | SHEET NO.<br>22 |
|----------|-----------------|

COUNTY  
JEFFERSON

JOB NO.  
1220700 / 0800

|              |
|--------------|
| CONTRACT ID. |
|--------------|

|                               |
|-------------------------------|
| PROJECT NO.                   |
| STP-5403(644) & STP-5403(643) |

BRIDGE NO.

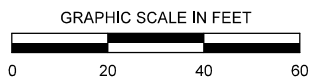
[illegible]

**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffco.mo.org](http://www.jeffco.mo.org)

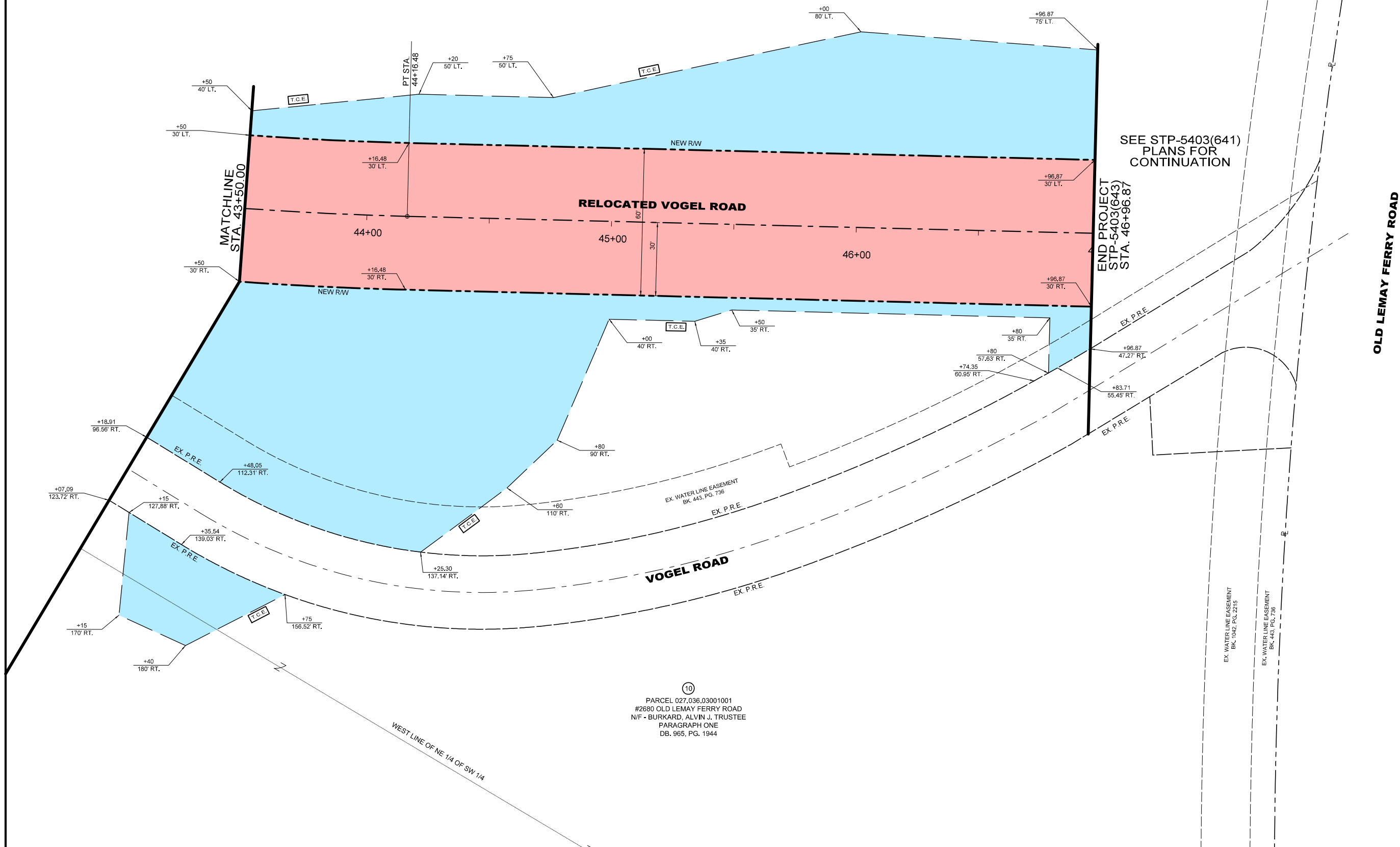
**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-6966  
www.HornerShifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

**RIGHT-OF-WAY PLAN**  
**VOGEL ROAD**  
**IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(643) PHASE 2





10  
 PARCEL 027.036.03001001  
 #2680 OLD LEMAY FERRY ROAD  
 N/F - BURKARD, ALVIN J. TRUSTEE  
 PARAGRAPH ONE  
 DB. 965, PG. 1944



DATE PREPARED  
7-9-2014

|          |          |
|----------|----------|
| ROUTE    | STATE    |
| VOGEL    | MO       |
| DISTRICT | SHEET NO |
|          | 23       |

COUNTY  
JEFFERSON

JOB NO.  
220700 / 080

CONTRACT ID

|                             |
|-----------------------------|
| PROJECT NO.                 |
| STP-5403(644) & STP-5403(64 |
| BRIDGE NO.                  |

BRIDGE NO.

[illegible]

**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffco.com.org](http://www.jeffco.com.org)

**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**

5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-6966  
[www.HornerShifrin.com](http://www.HornerShifrin.com)

Discipline: Professional Engineering  
Certificate of Authority: 000159

**RIGHT-OF-WAY PLAN**

**VOGEL ROAD**

**IMPROVEMENTS**

JEFFERSON COUNTY, MISSOURI

STP-5403(643) PHASE 2

REV.







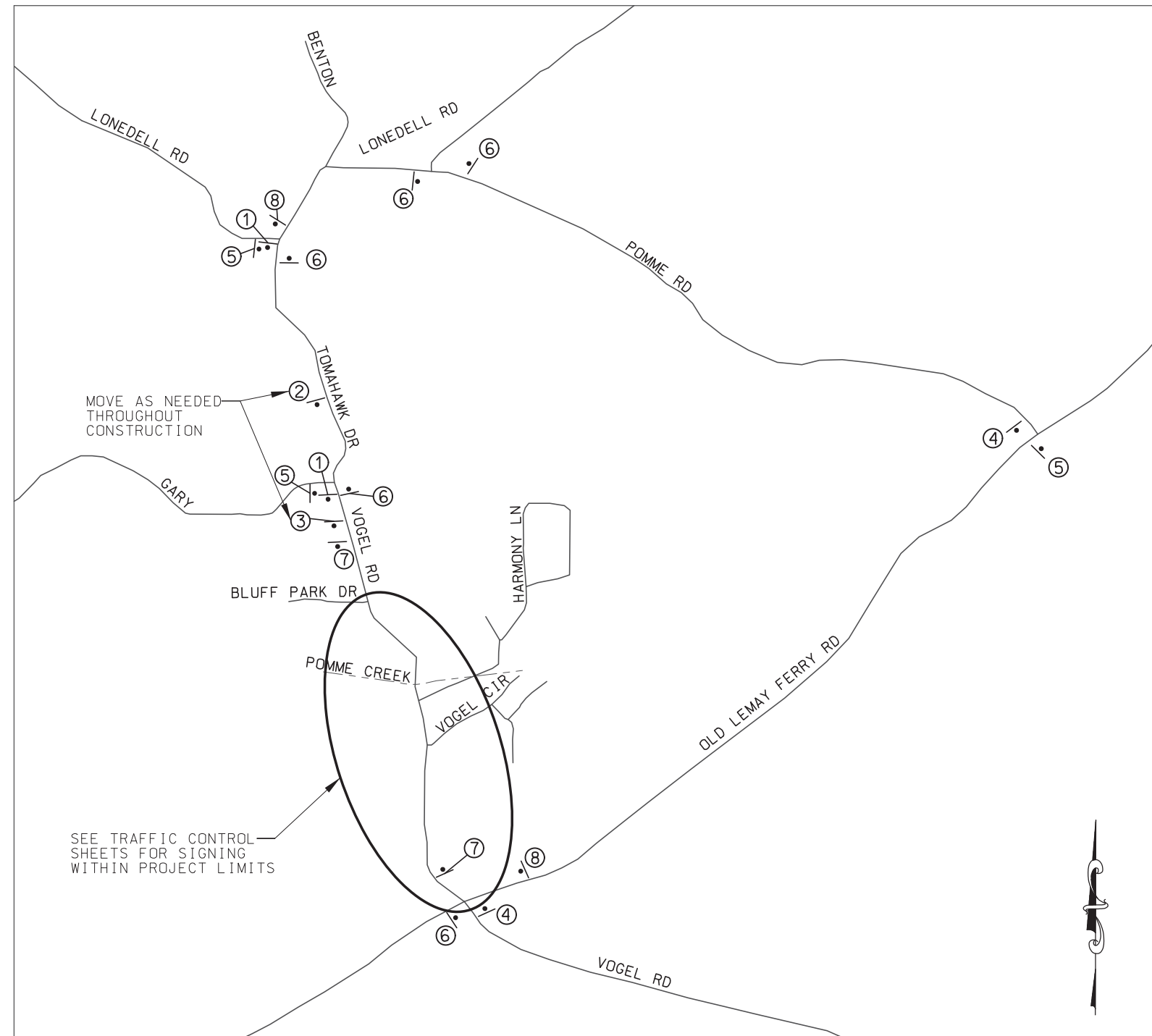








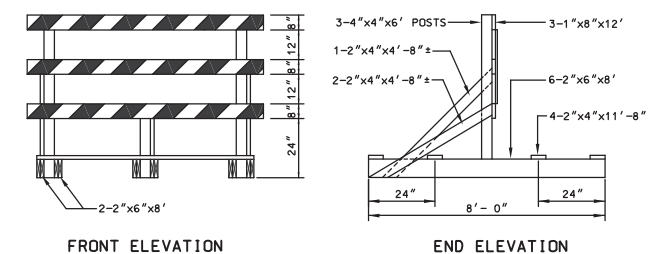
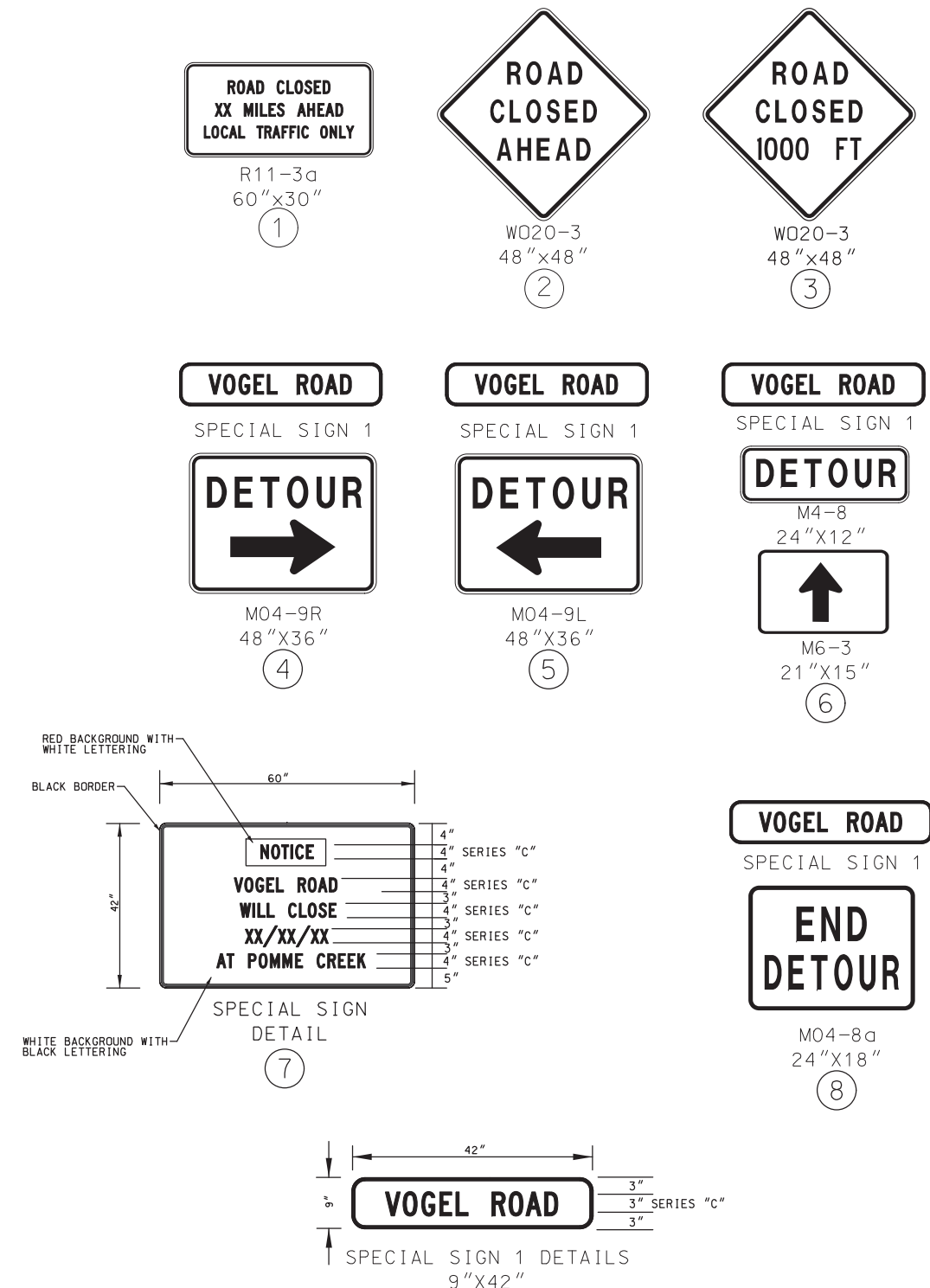




## VOGEL ROAD DETOUR ROUTE

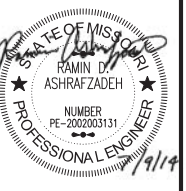
NOTES:

- 1) SIGN LOCATIONS TO BE APPROVED BY ENGINEER.
- 2) DISTANCE MAY BE ADJUSTED ACCORDING TO FIELD CONDITIONS WITH PERMISSION OF THE ENGINEER.
- 3) NO DIRECT PAYMENT WILL BE MADE FOR RELOCATION OF TCP SIGNS AND DEVICES.
- 4) ANY EXISTING SIGNS THAT CONFLICT WITH TEMPORARY TRAFFIC CONTROL SHALL BE COVERED OR REMOVED.
- 5) CONTRACTOR TO MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES.
- 6) ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 7) ALL TRAFFIC CONTROL ITEMS NOT INCLUDED IN THE PAY ITEM ARE TO BE CONSIDERED INCIDENTAL.



STRIPES ARE 6" WIDE ALTERNATING REFLECTORIZED ORANGE AND REFLECTORIZED WHITE OR SILVER. ALL REFLECTORIZED SURFACES SHALL BE TYPE 1 SHEETING. NO DIRECT PAYMENT WILL BE MADE FOR RELOCATION OF BARRICADES. STRIPES SHALL SLOPE DOWNWARD TOWARD THE SIDE TRAFFIC IS TO PASS.

NOTE: TWO WARNING LIGHTS (TYPE C) SHALL BE PLACED ON EACH MOVEABLE BARRICADE UNIT. THE LIGHTS SHALL BE MAINTAINED THROUGHOUT THE LENGTH OF THE PROJECT AT NO ADDITIONAL COST. THE COST OF THE LIGHTS PAID UNDER "WARNING LIGHT TYPE C". THE COST OF ROAD CLOSED SIGNS SHALL BE INCLUDED IN THE TYPE III MOVEABLE BARRICADE UNIT.



DATE PREPARED  
7-9-2014

|                |                 |
|----------------|-----------------|
| ROUTE<br>VOGEL | STATE<br>MO     |
| DISTRICT       | SHEET NO.<br>29 |

COUNTY  
JEFFERSON

|              |                |
|--------------|----------------|
| JOB NO.      | 1220700 / 0800 |
| CONTRACT ID. |                |

|                               |
|-------------------------------|
| PROJECT NO.                   |
| STP-5403(644) & STP-5403(643) |
| BRIDGE NO.                    |

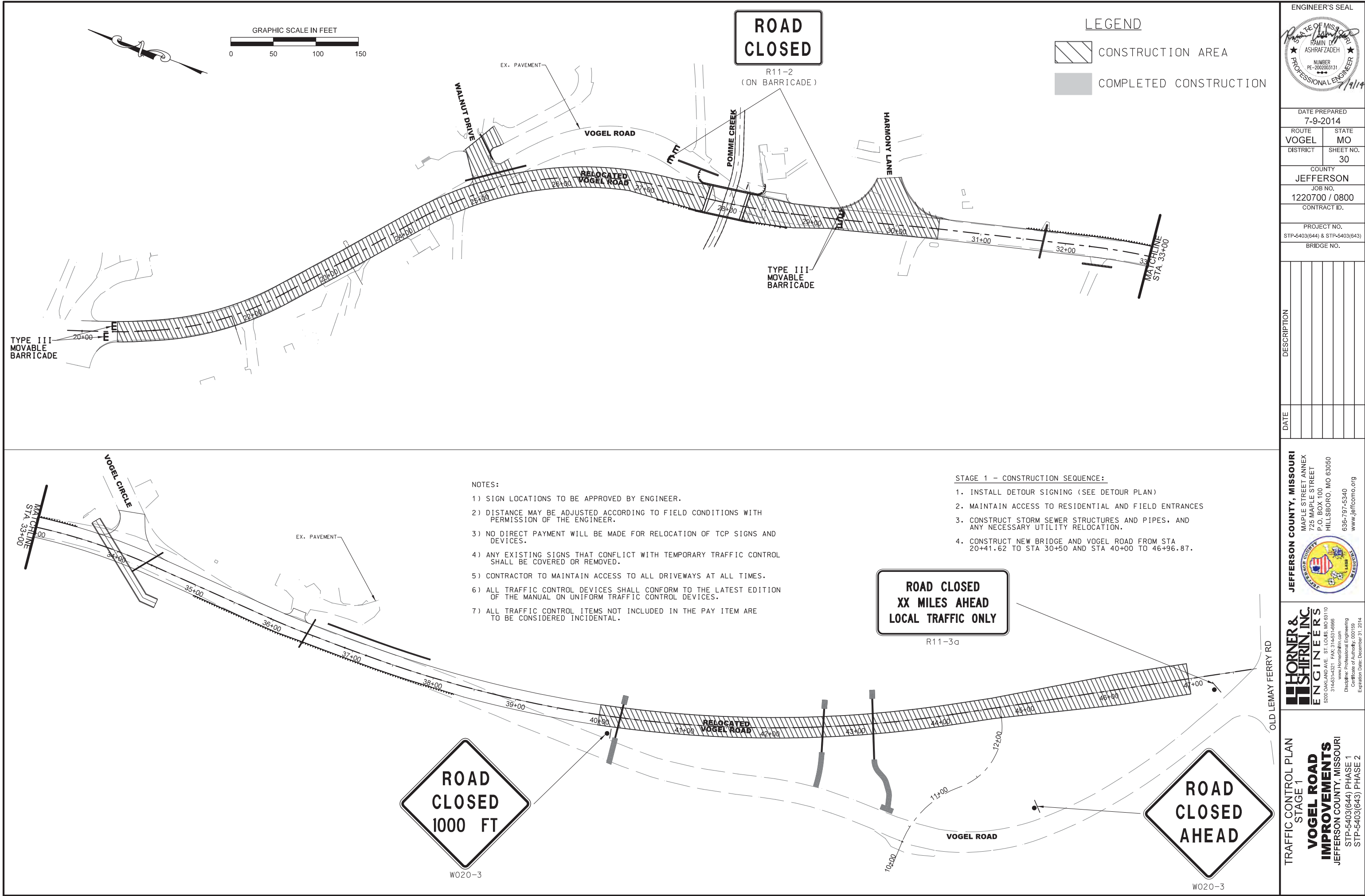
[illegible]

**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffcomo.org](http://www.jeffcomo.org)



**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
35200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-5966  
[www.HornerShifrin.com](http://www.HornerShifrin.com)  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

TRAFFIC CONTROL PLAN  
DETOUR ROUTE  
**VOGEL ROAD**  
**IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1  
STP-5403(643) PHASE 2

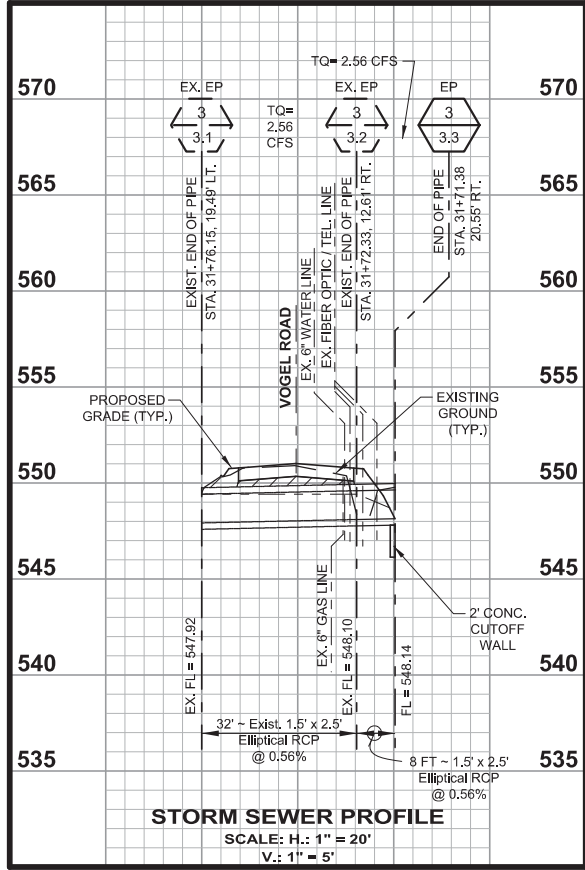
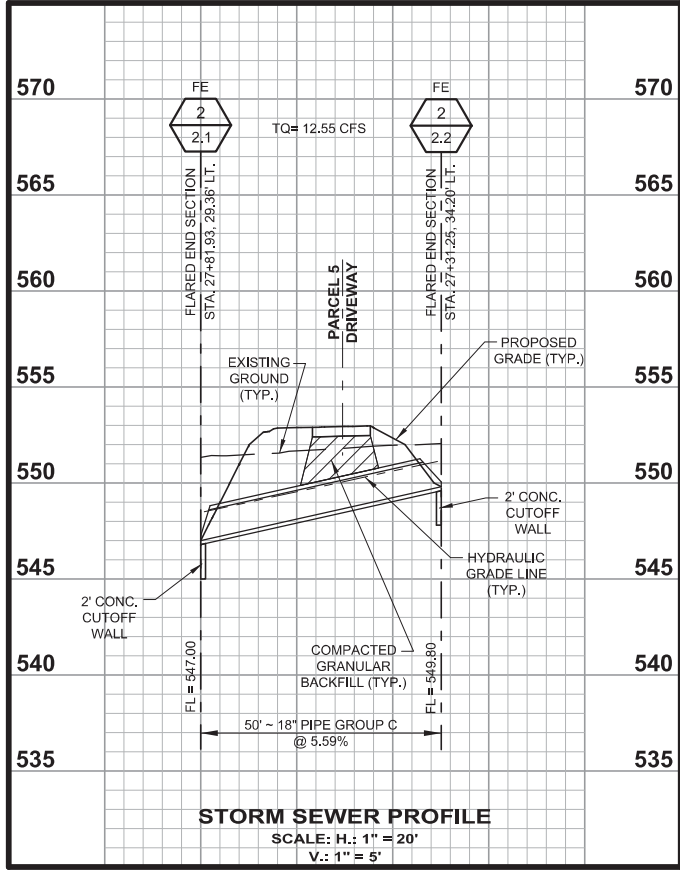
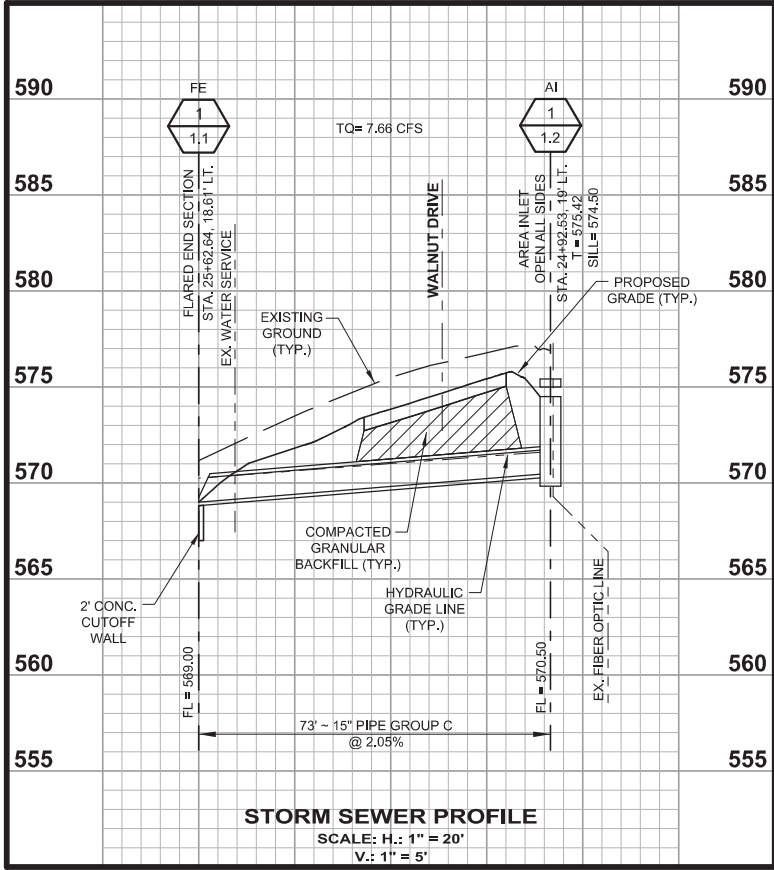












SPECIAL NOTE TO CONTRACTOR(S):

EXISTING UNDERGROUND AND ABOVE-GRADE FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED ON THESE CONTRACT DOCUMENTS BASED ON THE INFORMATION AND SURVEYS AVAILABLE AT THE TIME OF DRAWING PREPARATION. THE LOCATIONS OF THESE FEATURES MUST, THEREFORE, BE CONSIDERED APPROXIMATE, ONLY. IN ADDITION, THERE MAY BE OTHER FACILITIES, STRUCTURES, AND UTILITIES WHICH DID NOT EXIST (OR THE EXISTENCE OF WHICH WAS NOT KNOWN) AT THE TIME OF DRAWING PREPARATION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S) TO HAVE ALL EXISTING FACILITIES, STRUCTURES AND UTILITIES LOCATED IN THE FIELD PRIOR TO ANY EXCAVATION OR CONSTRUCTION ACTIVITY AND TO PROTECT ALL SUCH FEATURES (EXCEPT THOSE SPECIFICALLY NOTED FOR REMOVAL OR DEMOLITION) DURING CONSTRUCTION.

ENGINEER'S SEAL



DATE PREPARED  
7-9-2014

ROUTE  
VOGEL

STATE  
MO

DISTRICT  
33

SHEET NO.

COUNTY  
JEFFERSON

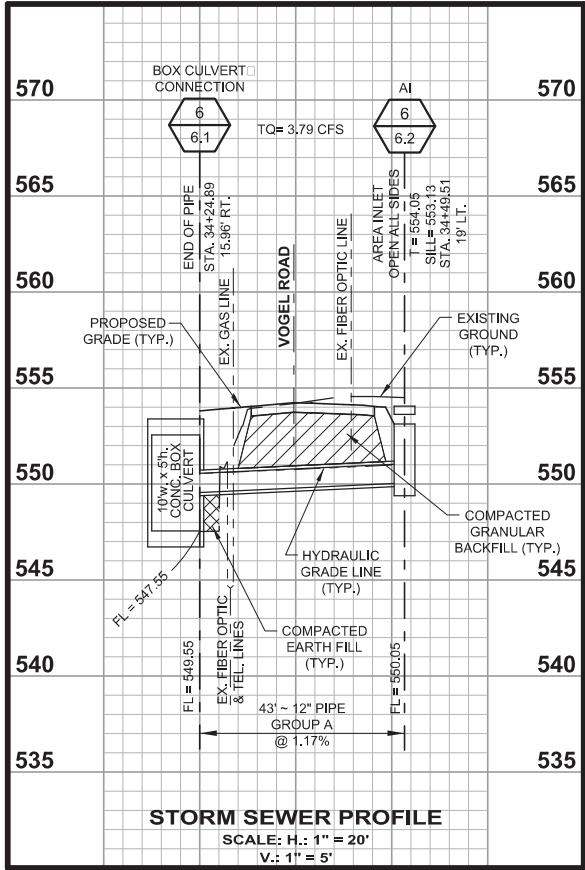
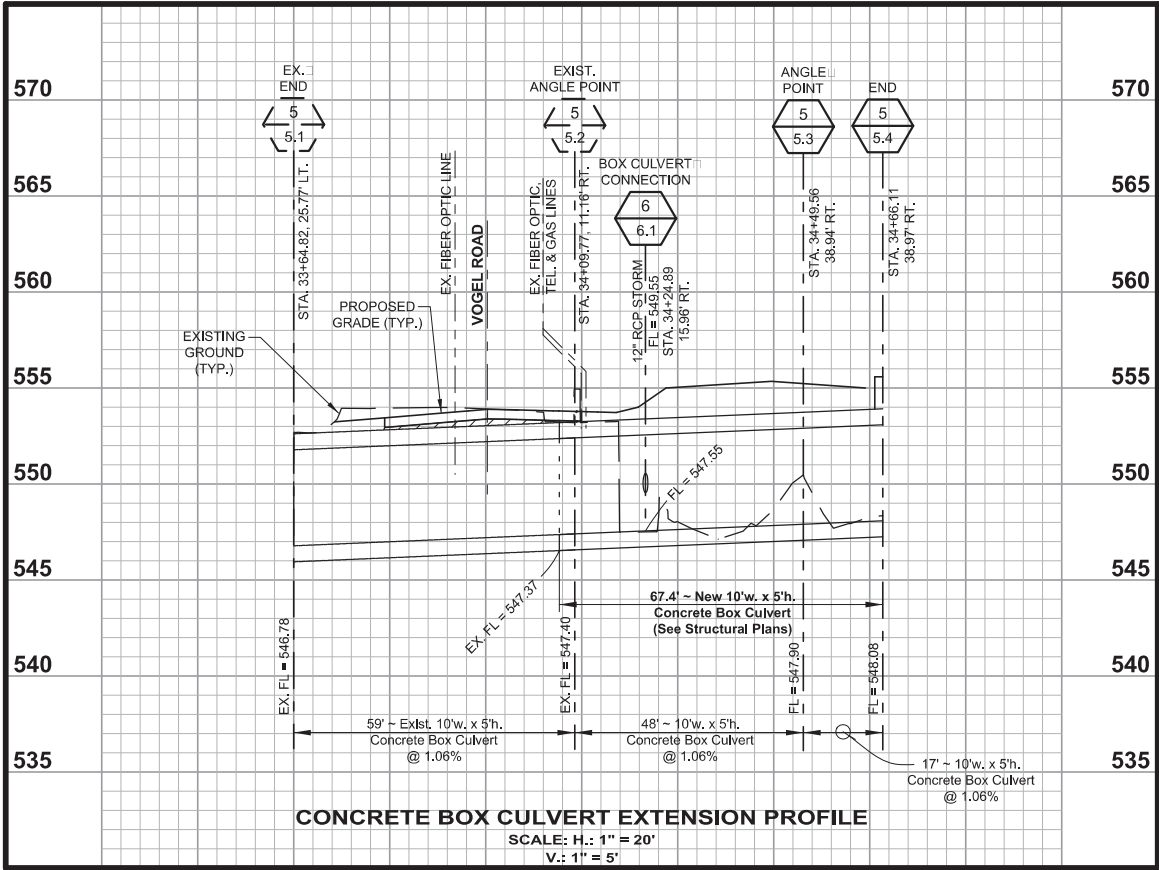
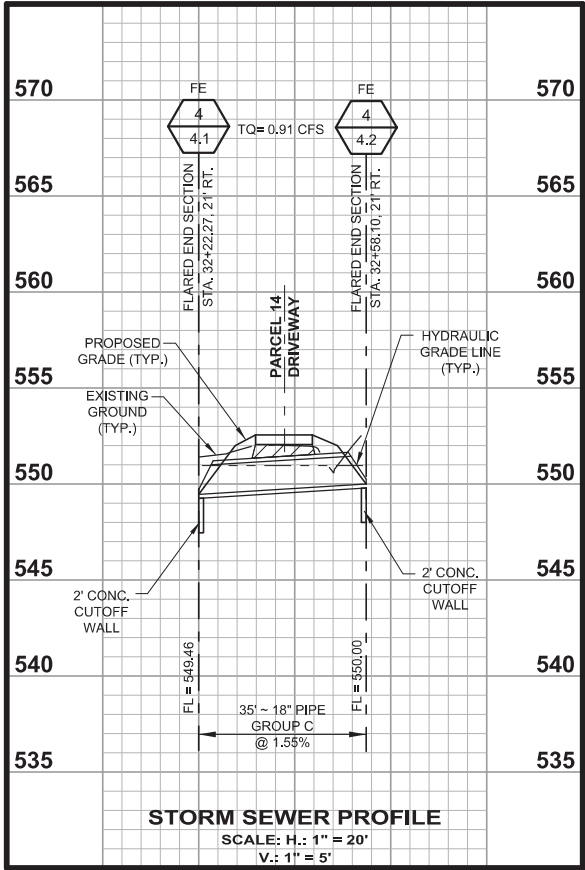
JOB NO.  
1220700 / 0800

CONTRACT ID.

PROJECT NO.  
STP-5403(644) & STP-5403(643)

BRIDGE NO.

| DATE | DESCRIPTION |
|------|-------------|
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |



JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050

636-797-5340  
www.jeffcommo.org

**HORNER & SHIRIN, INC.**  
ENGINEERS

5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4966  
www.HornerShirin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

STORM SEWER PROFILES  
SHEET 1 OF 2

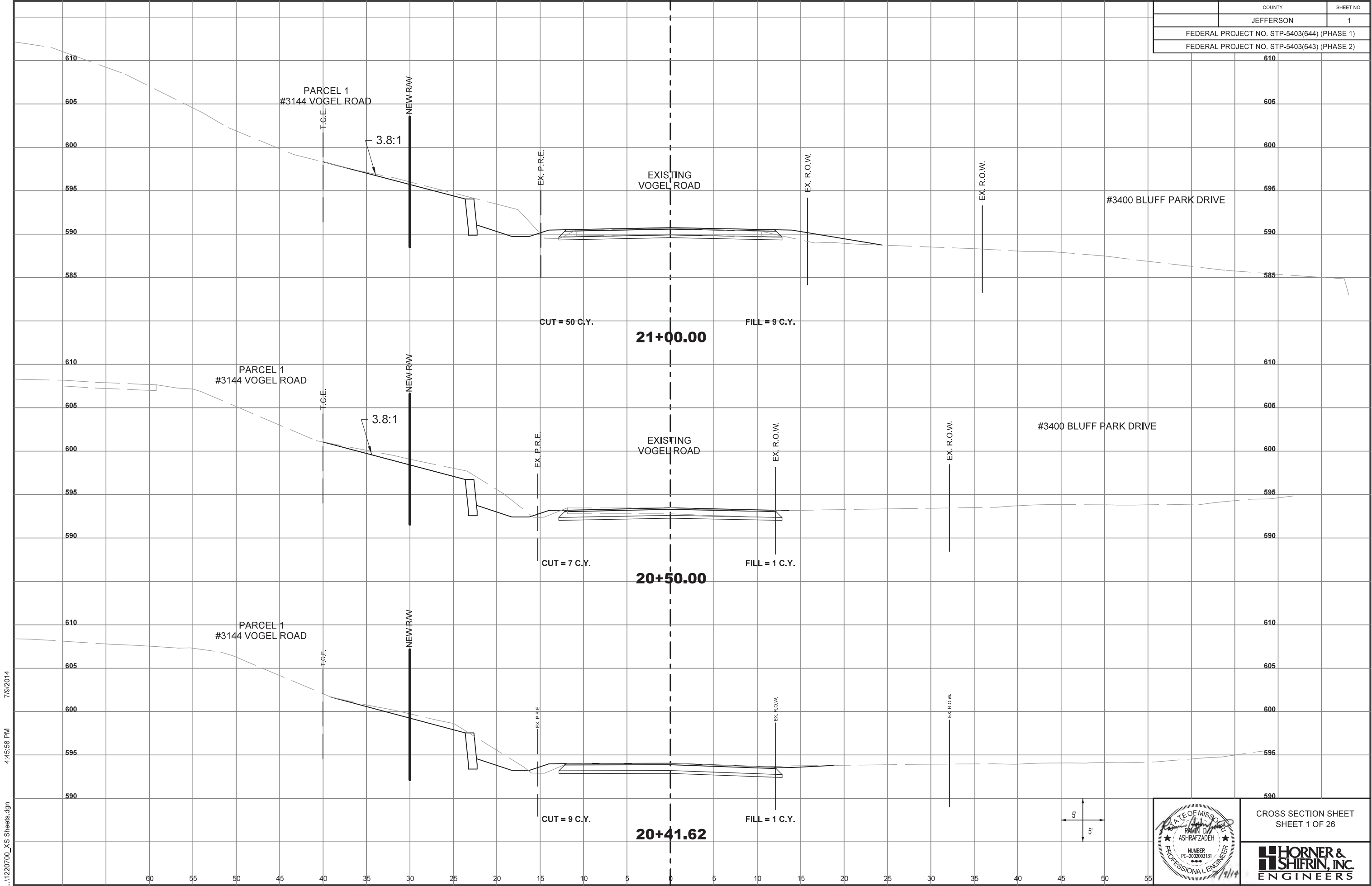
**VOGEL ROAD**  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI

STP-5403(644) PHASE 1





| COUNTY                                      | SHEET NO. |
|---------------------------------------------|-----------|
| JEFFERSON                                   | 1         |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |



7/9/2014

4:45:58 PM

...11220700\_XS Sheets.dgn



CROSS SECTION SHEET  
SHEET 1 OF 26

**HORNER &  
SHIFRIN, INC.**  
ENGINEERS

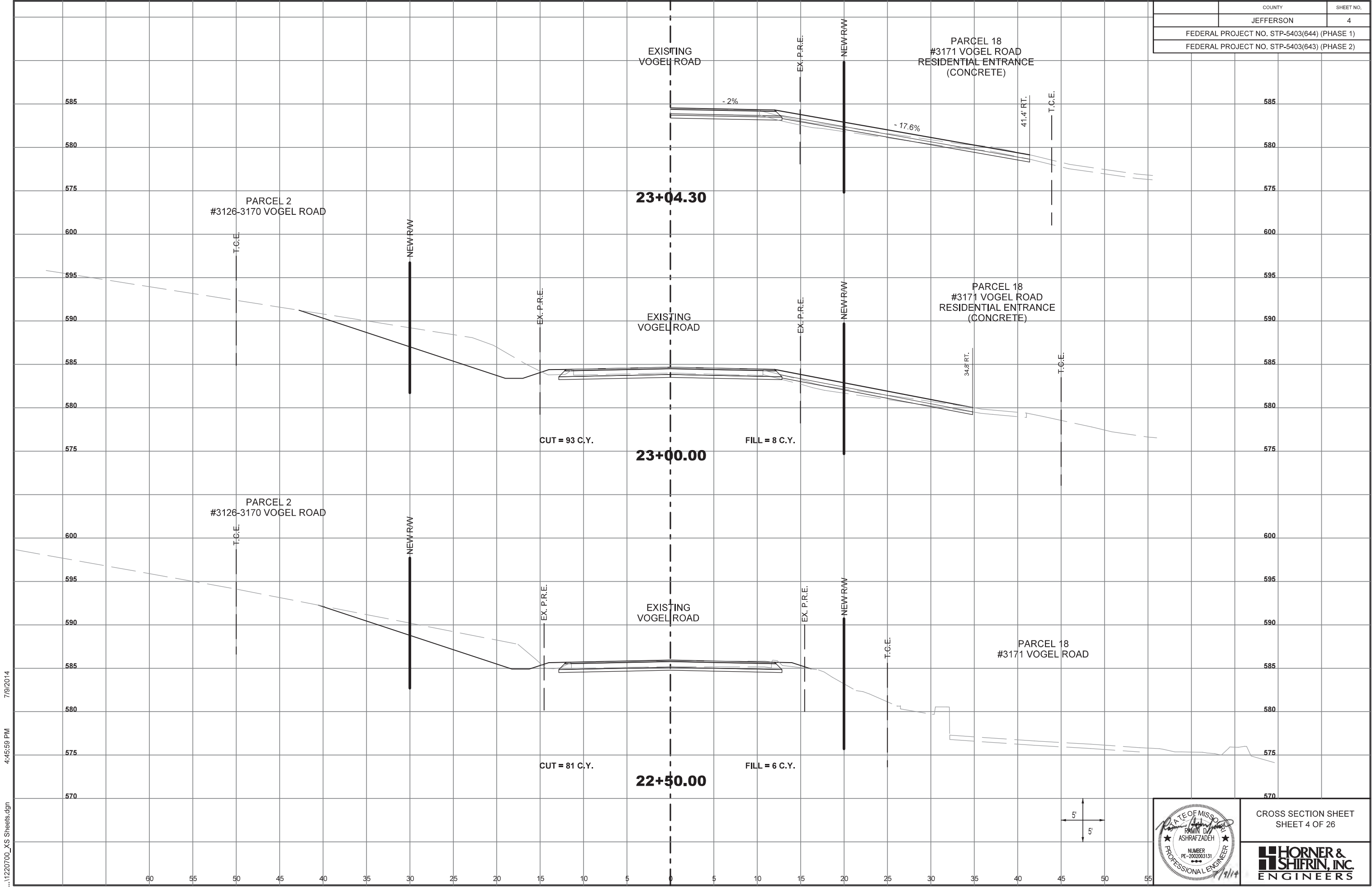






7/9/2014 4:45:59 PM ...\\1220700\_XS Sheets.dgn

|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 4         |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |

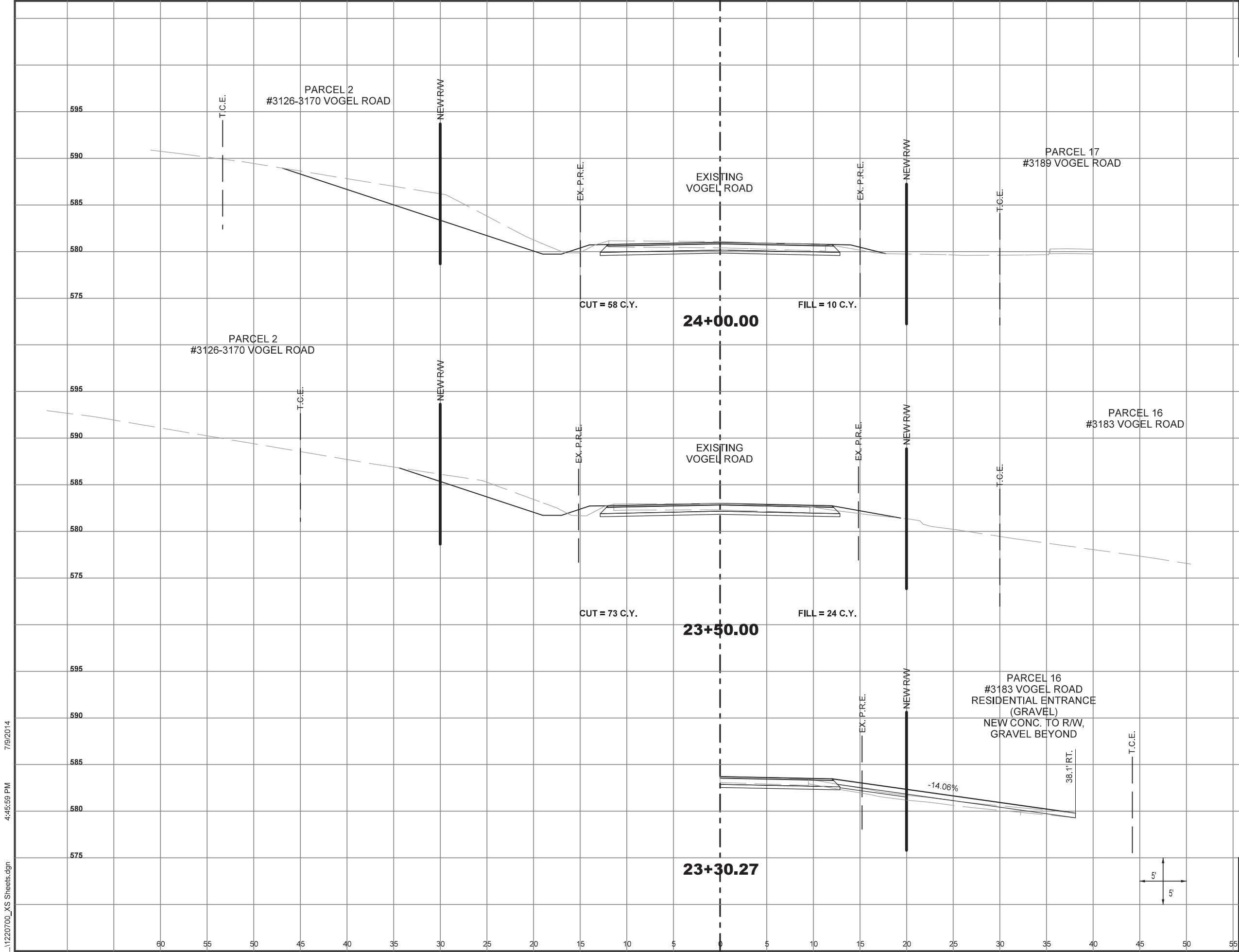


CROSS SECTION SHEET  
SHEET 4 OF 26





|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 5         |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



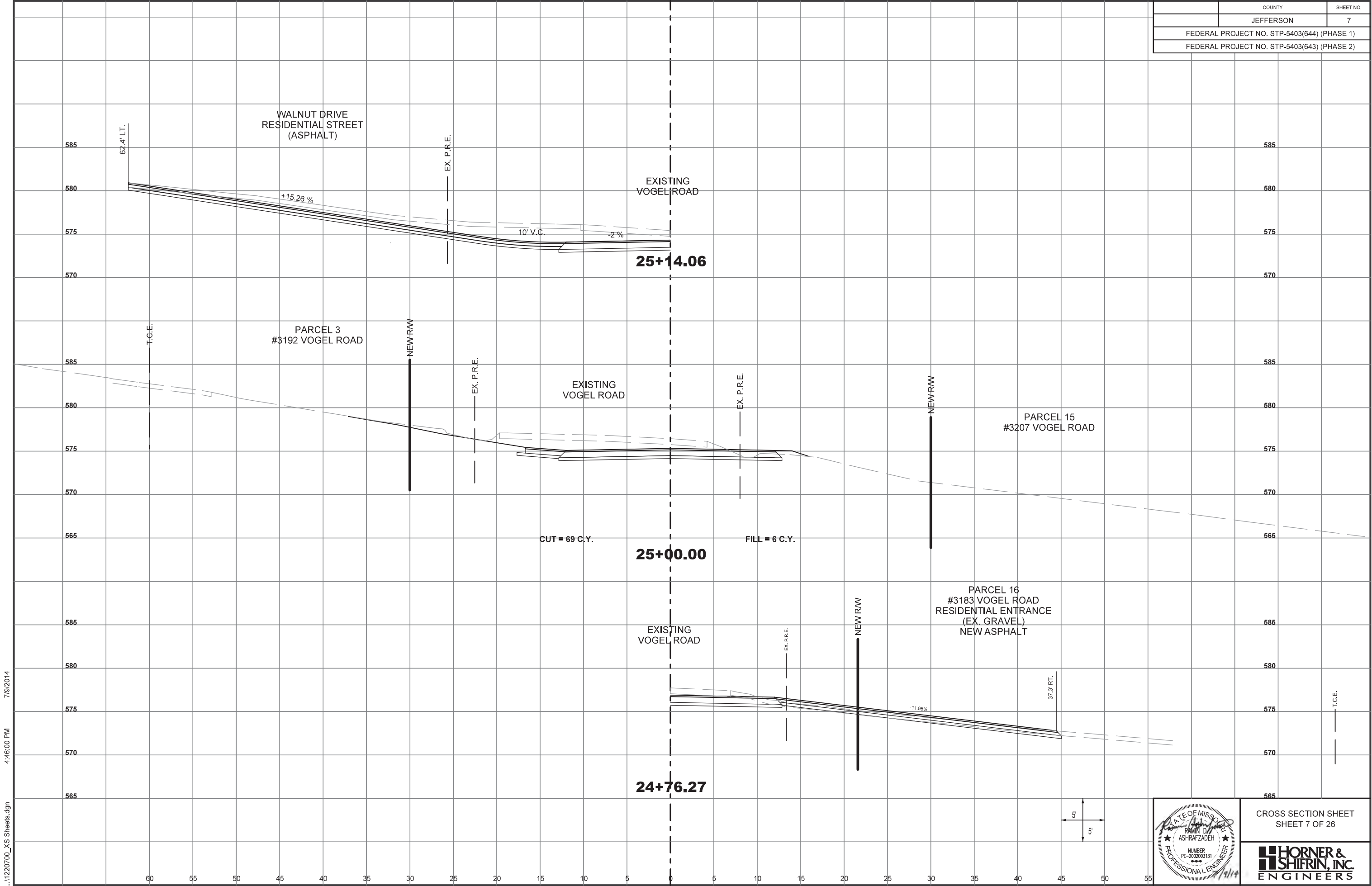
CROSS SECTION SHEET  
SHEET 5 OF 26







|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 7         |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



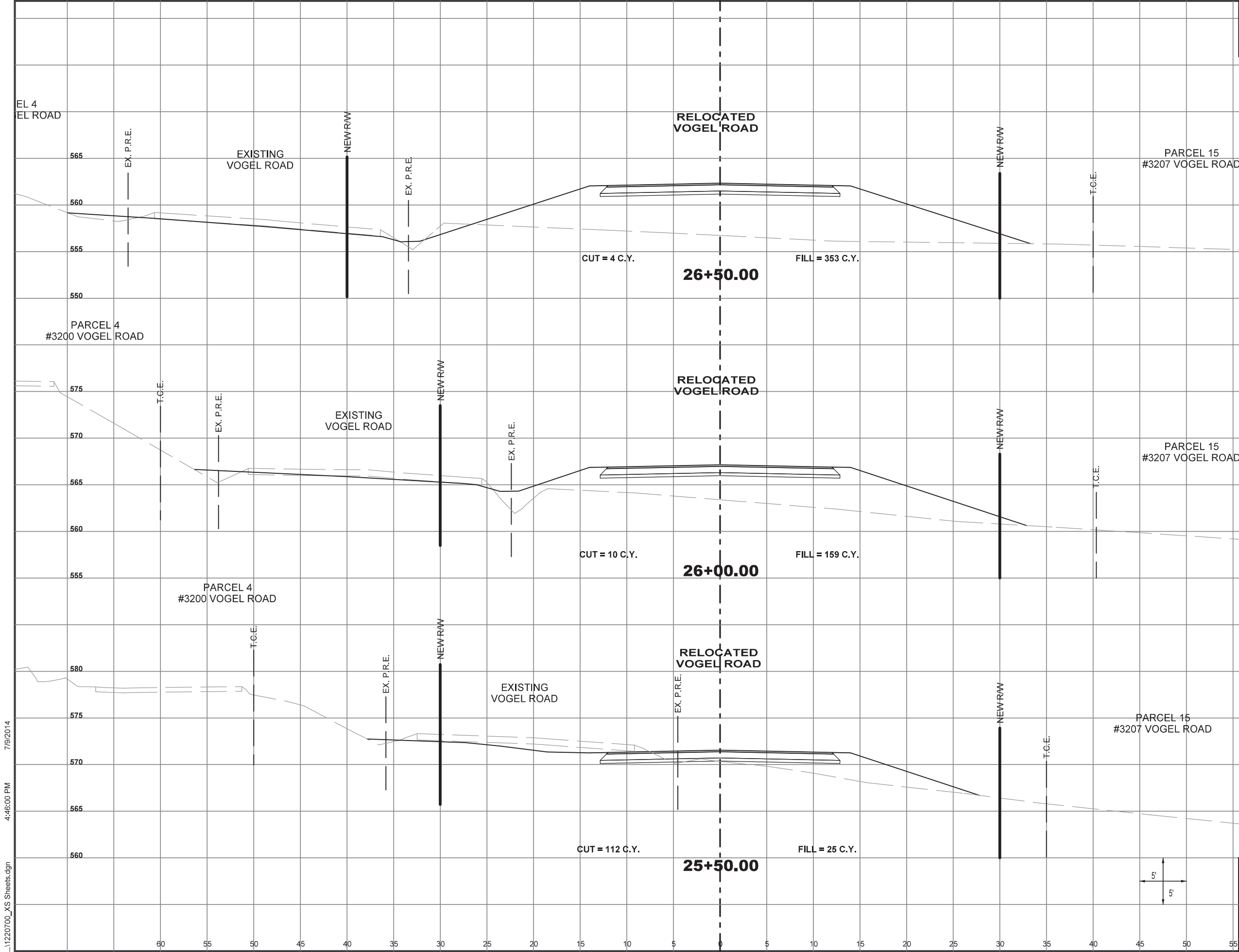
7/9/2014 4:46:00 PM ...\\1220700\_XS Sheets.dgn



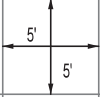
CROSS SECTION SHEET  
SHEET 7 OF 26



|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 8         |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



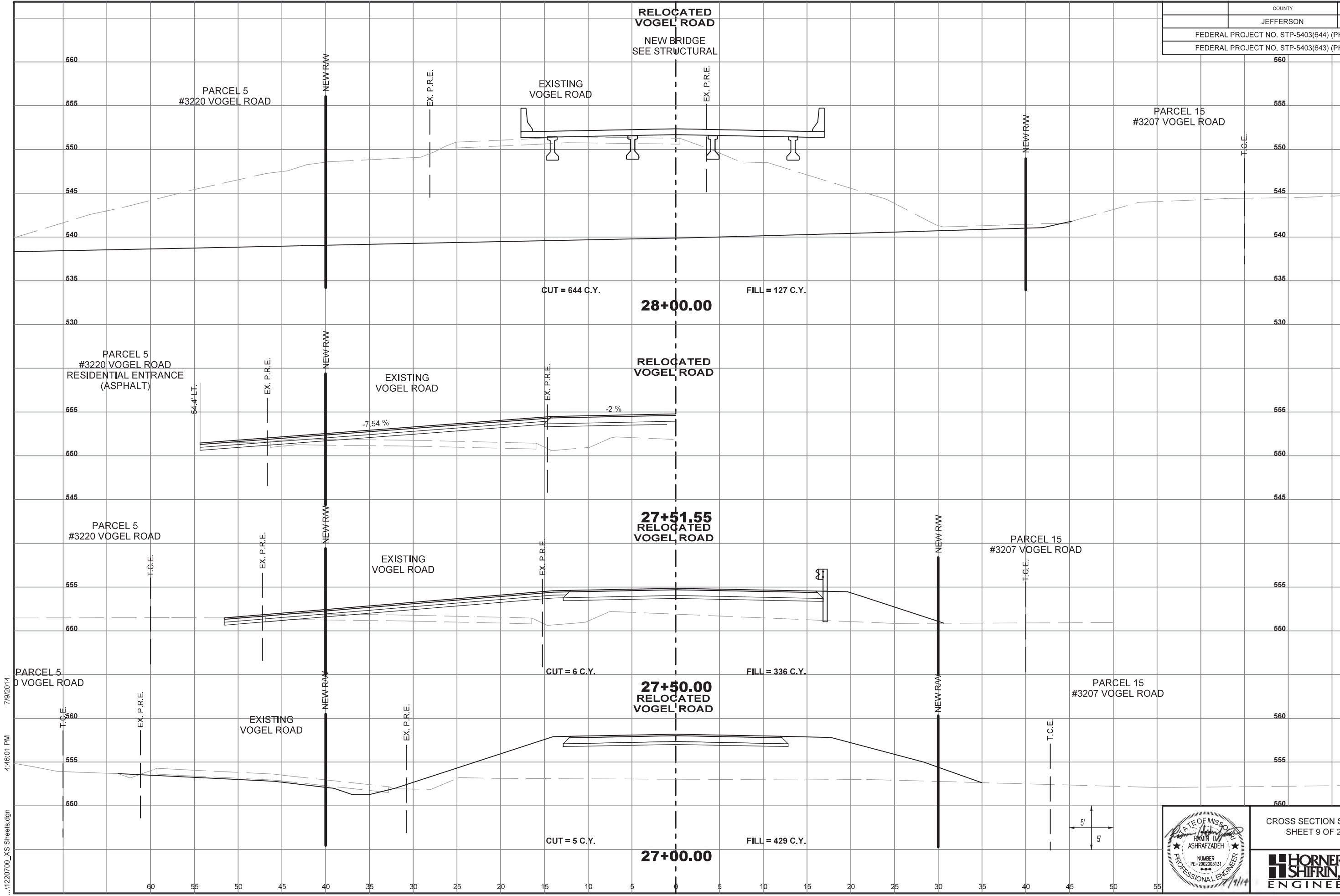
7/9/2014 4:46:00 PM ...\\1220700\_XS Sheets.dgn



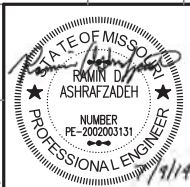
CROSS SECTION SHEET  
SHEET 8 OF 26

**HORNER &  
SHIFRIN, INC.**  
ENGINEERS





|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 9         |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |

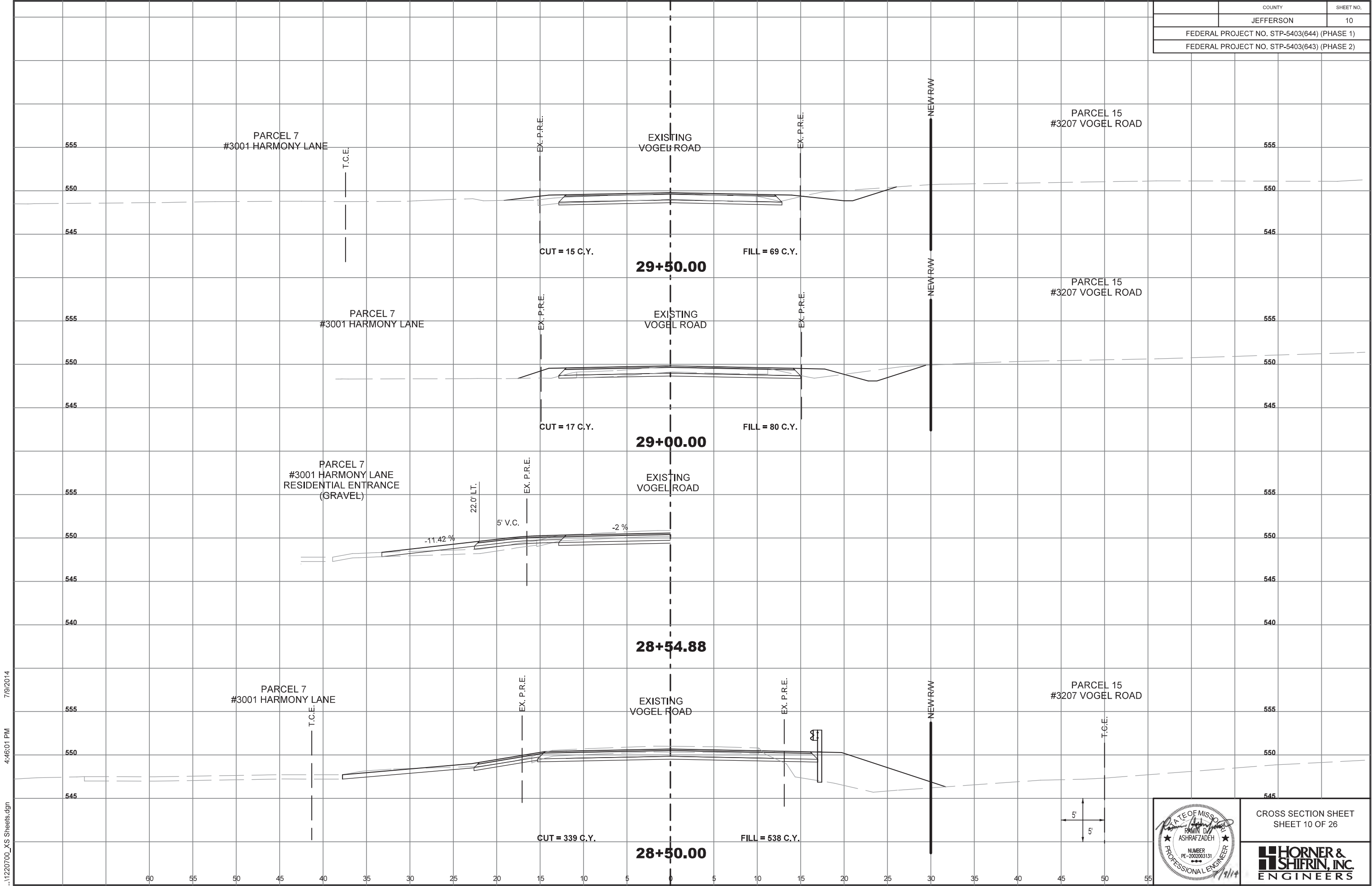


CROSS SECTION SHEET  
SHEET 9 OF 26



7/9/2014 4:46:01 PM ...\\1220700\_XS Sheets.dgn

|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 10        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



7/9/2014 4:46:01 PM ...\\1220700\_XS Sheets.dgn

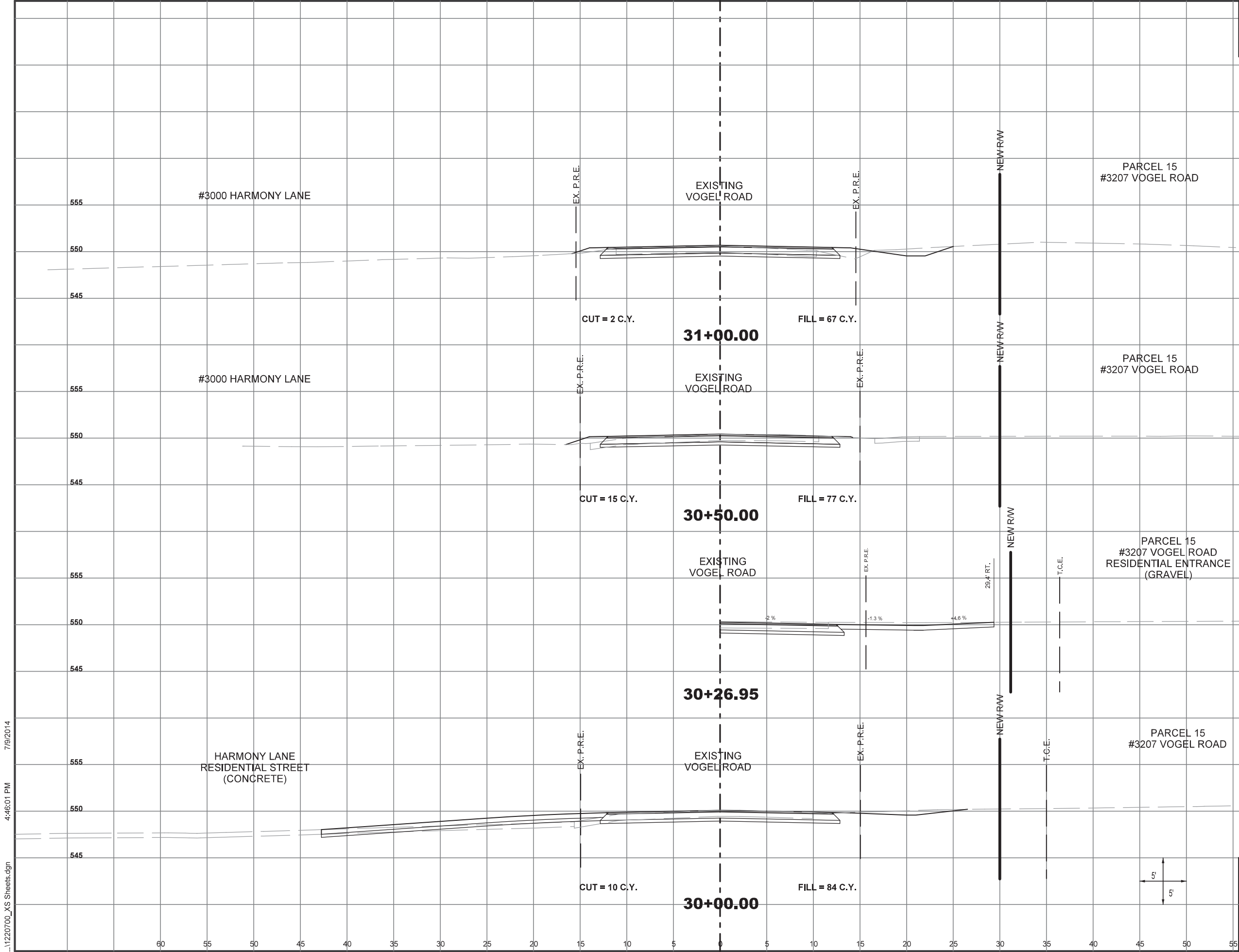


CROSS SECTION SHEET  
SHEET 10 OF 26





|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 11        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



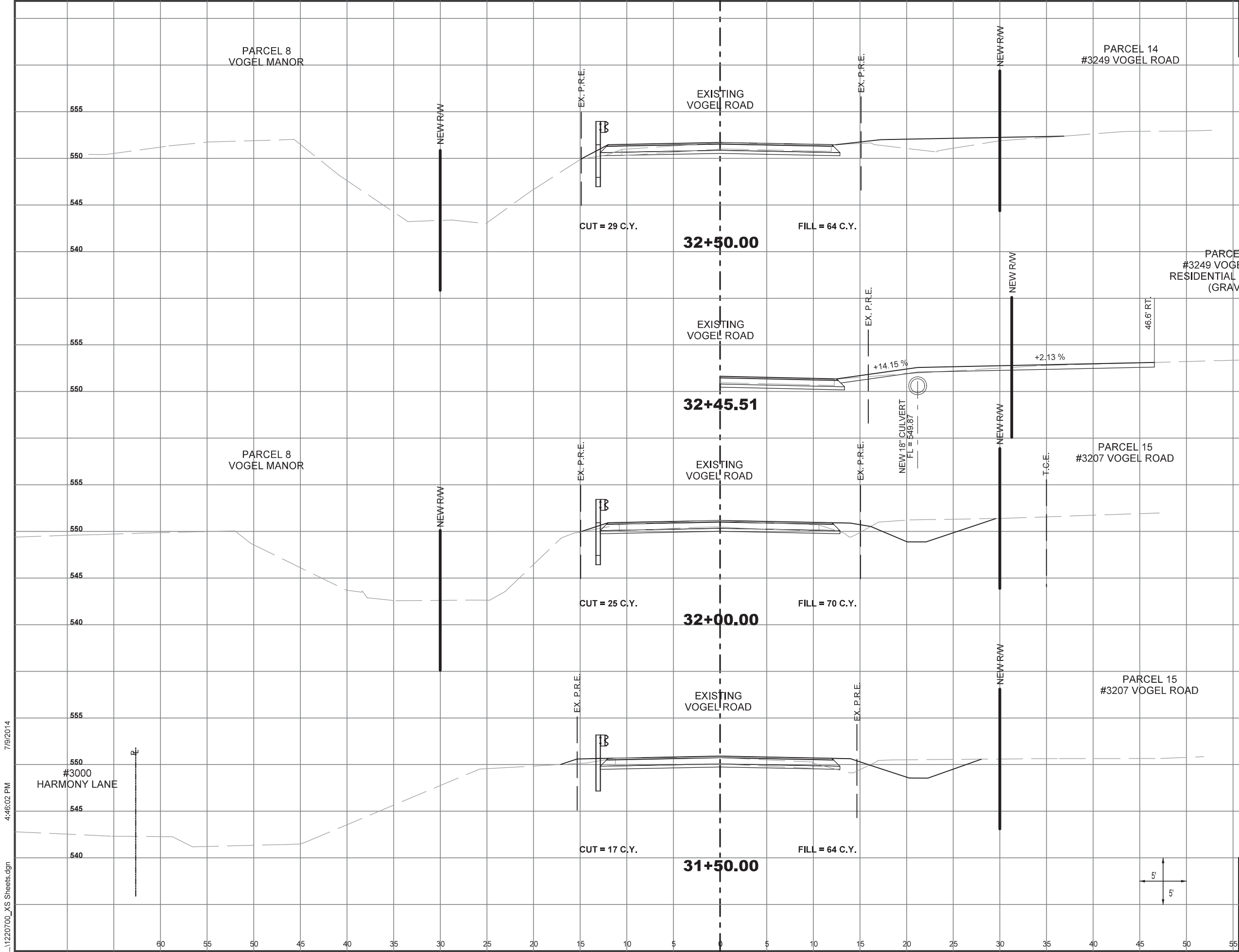
7/9/2014 4:46:01 PM ...\\1220700\_XS Sheets.dgn



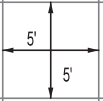
CROSS SECTION SHEET  
SHEET 11 OF 26



|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 12        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



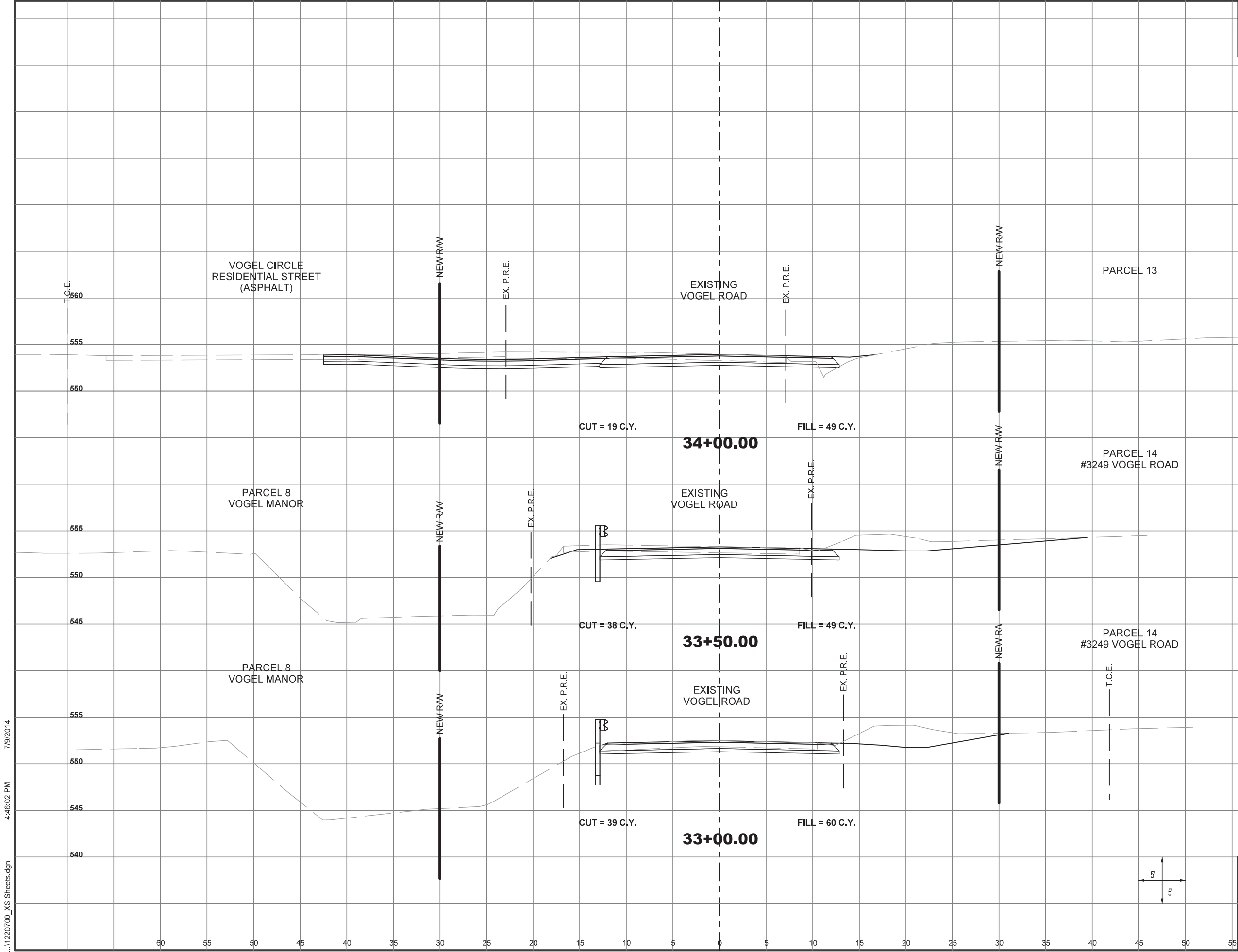
7/9/2014 4:46:02 PM ...\\1220700\_XS Sheets.dgn



CROSS SECTION SHEET  
SHEET 12 OF 26



|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 13        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |

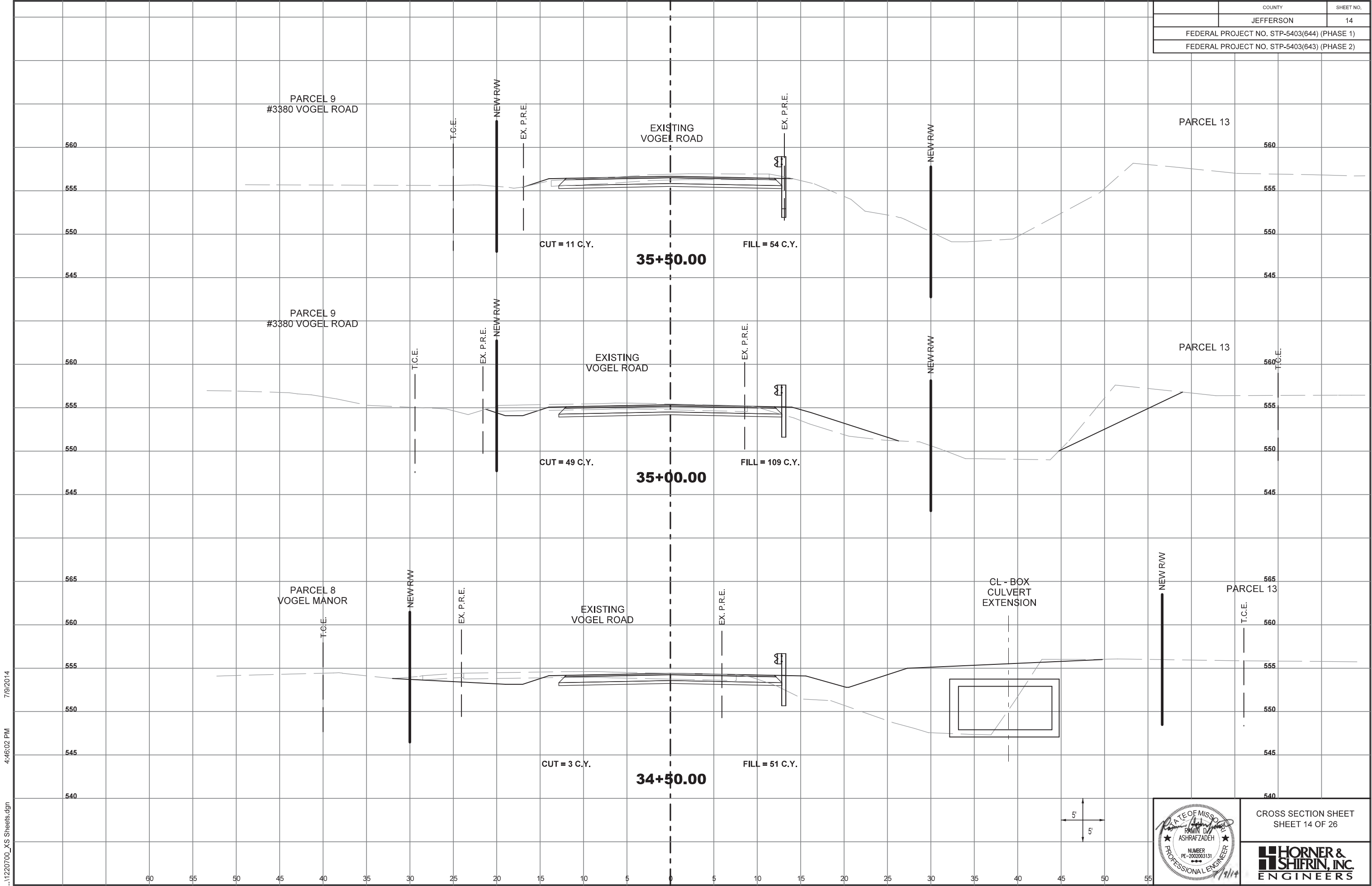


CROSS SECTION SHEET  
SHEET 13 OF 26



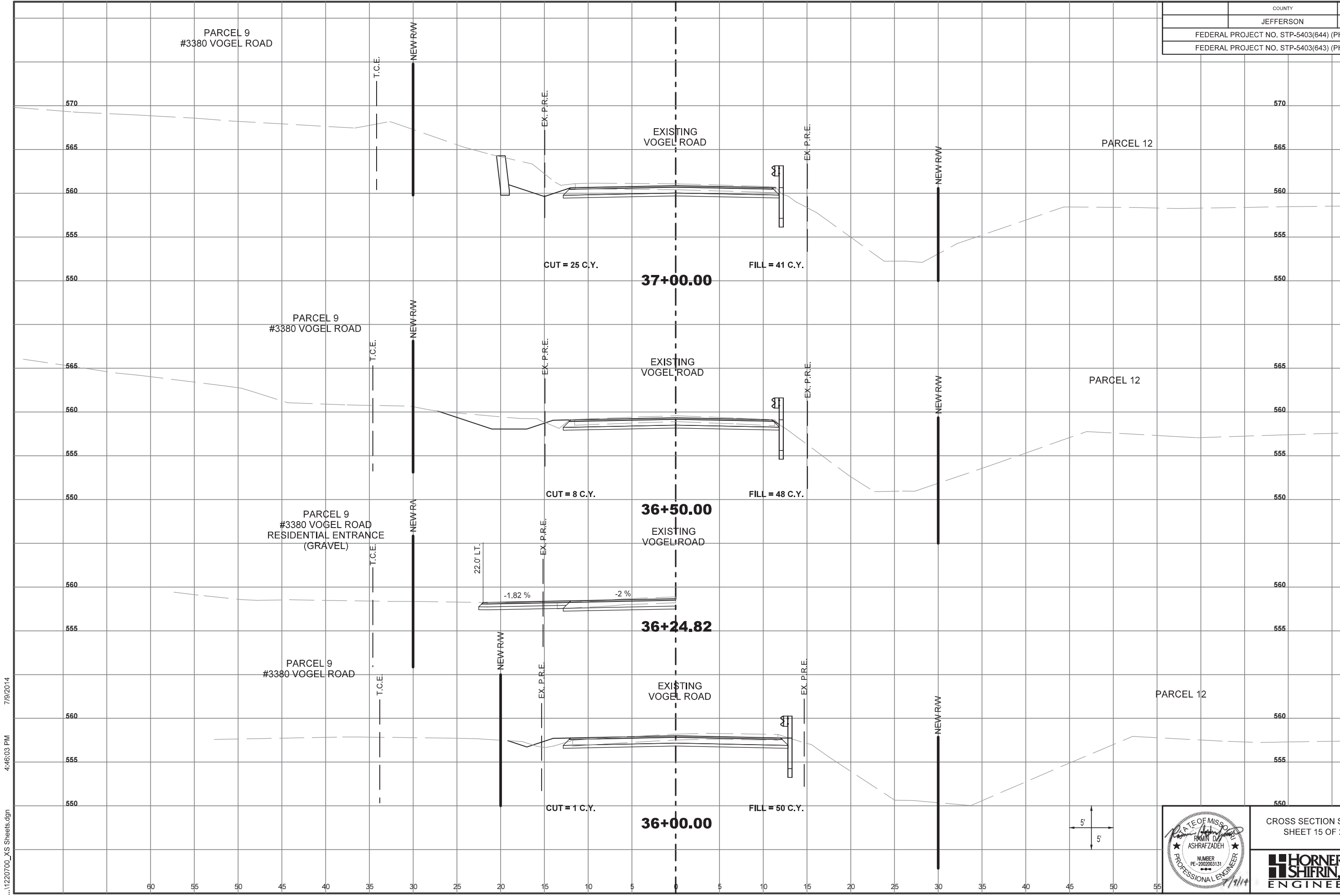


|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 14        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



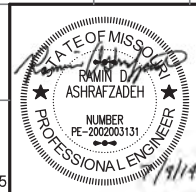
CROSS SECTION SHEET  
SHEET 14 OF 26





|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 15        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |

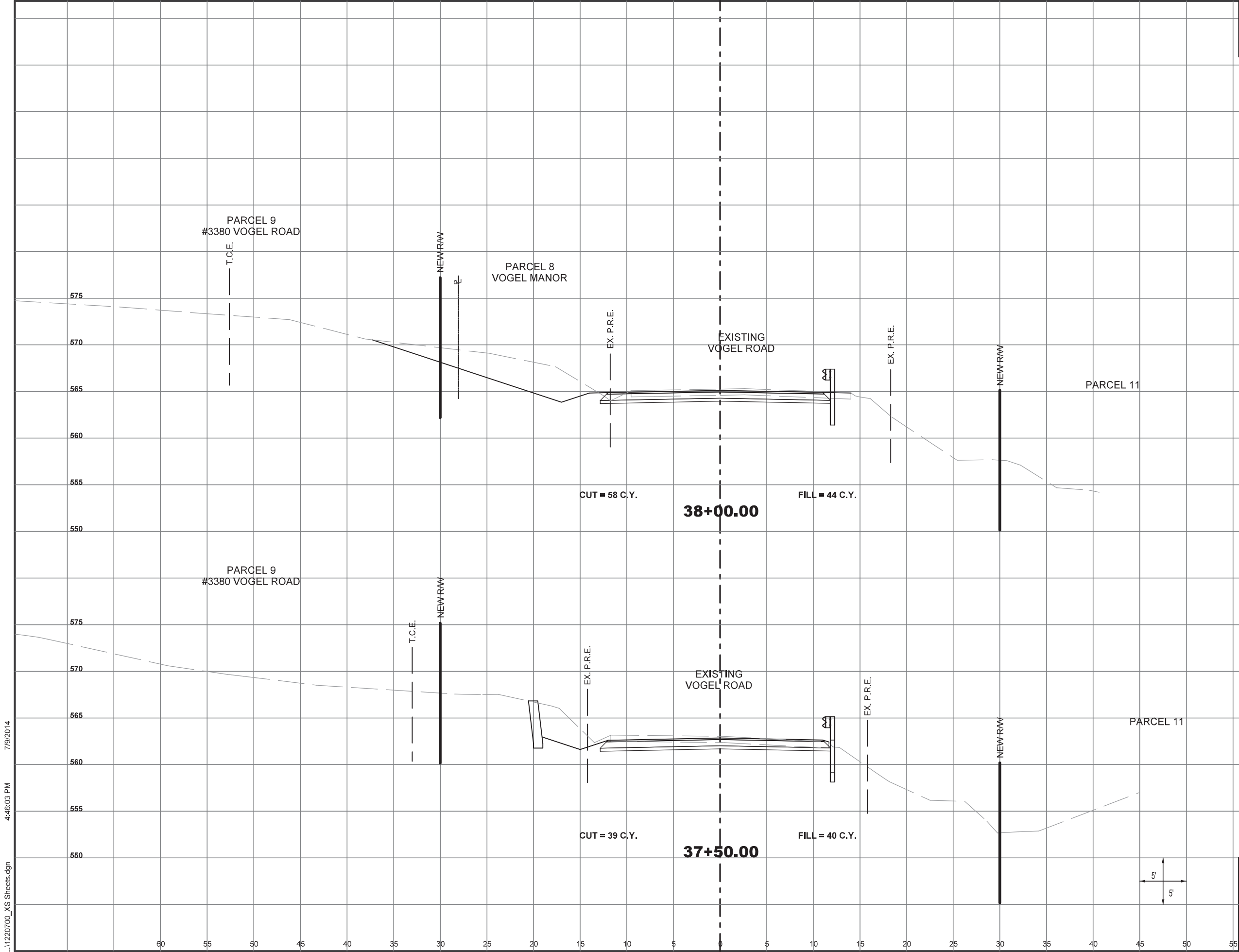
7/9/2014  
4:46:03 PM  
...11220700\_XS Sheets.dgn



CROSS SECTION SHEET  
SHEET 15 OF 26



|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 16        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |

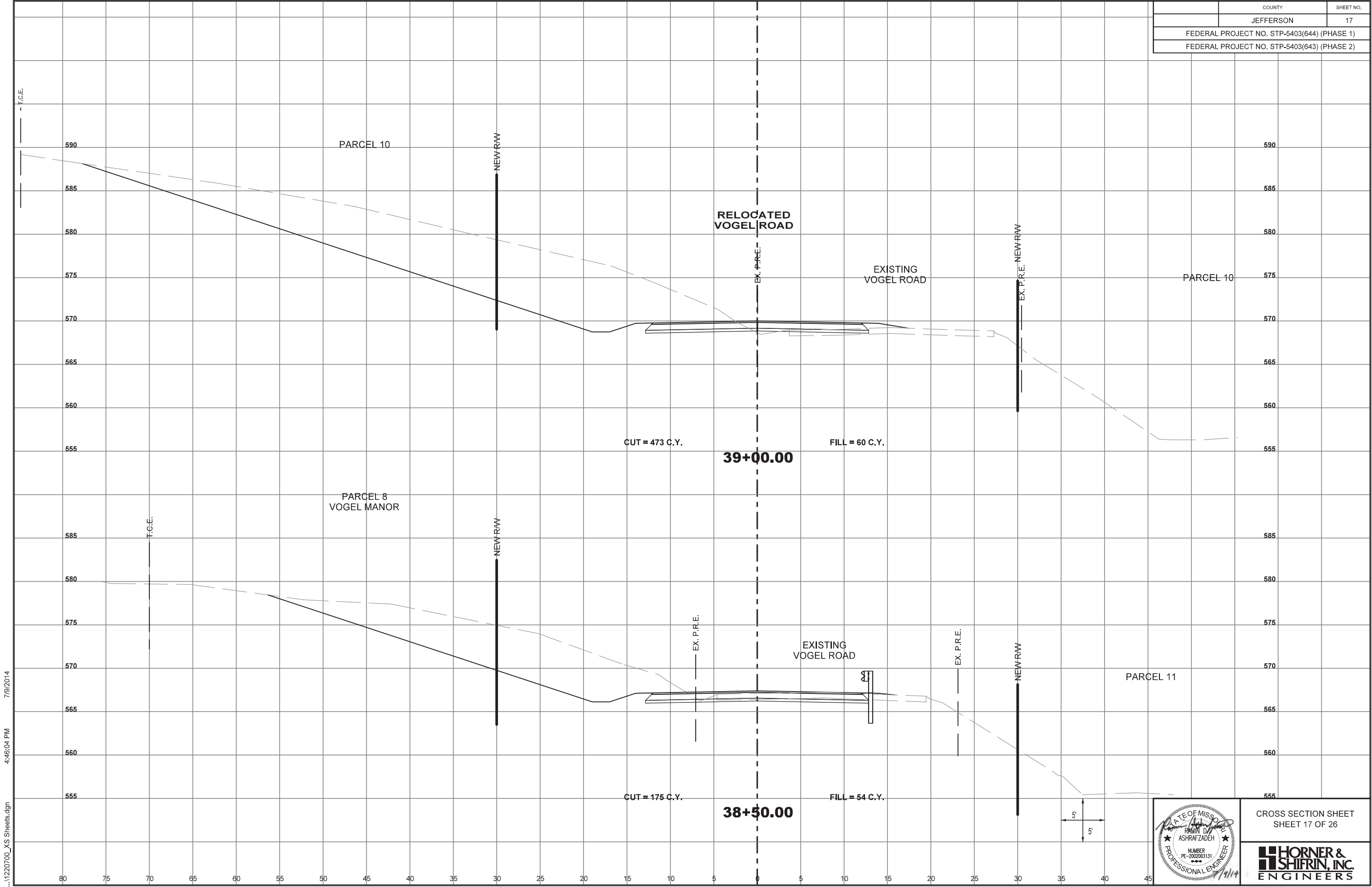


CROSS SECTION SHEET  
SHEET 16 OF 26





|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 17        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



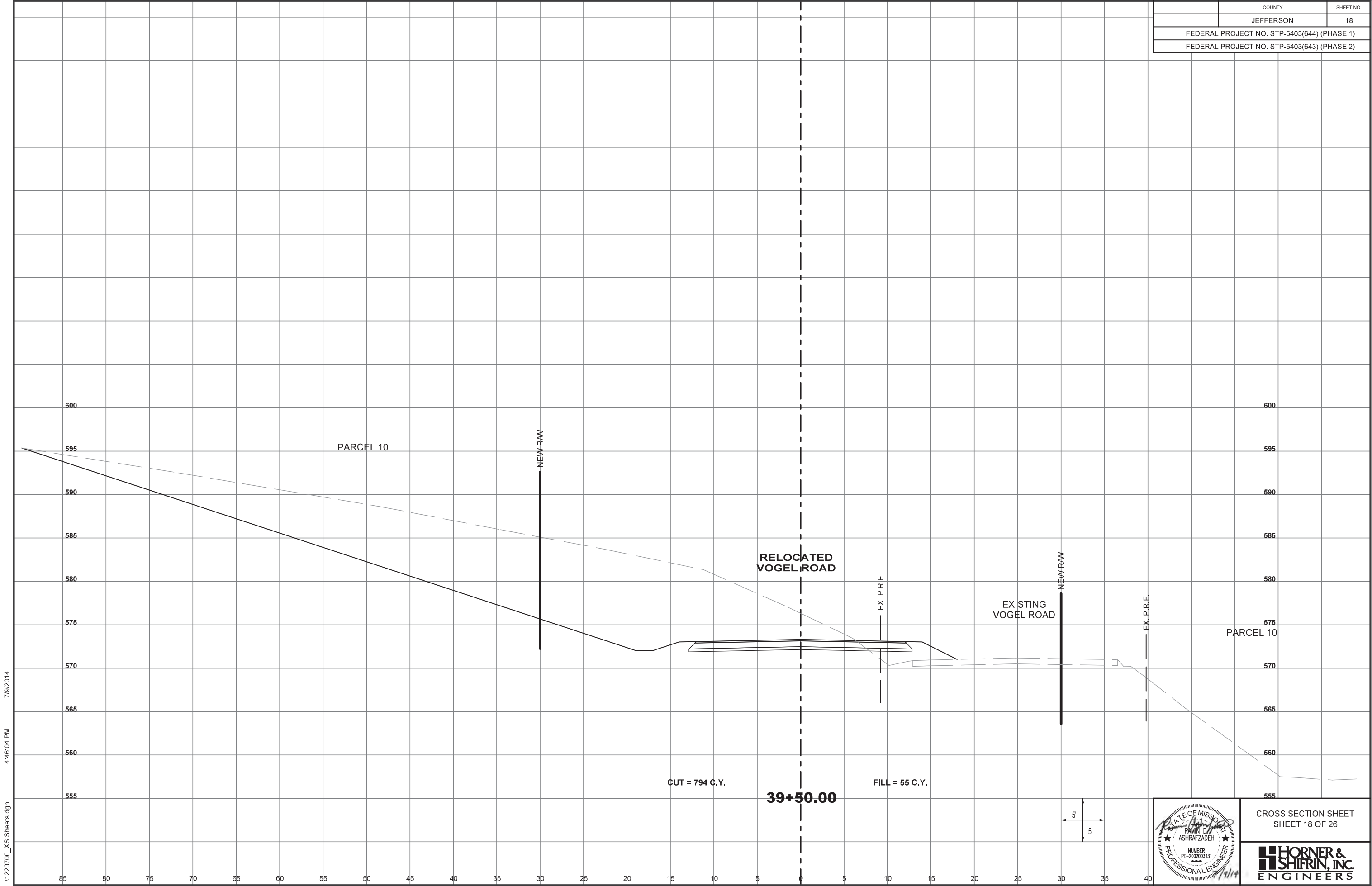
7/9/2014 4:46:04 PM ...\\1220700\_XS Sheets.dgn



CROSS SECTION SHEET  
SHEET 17 OF 26



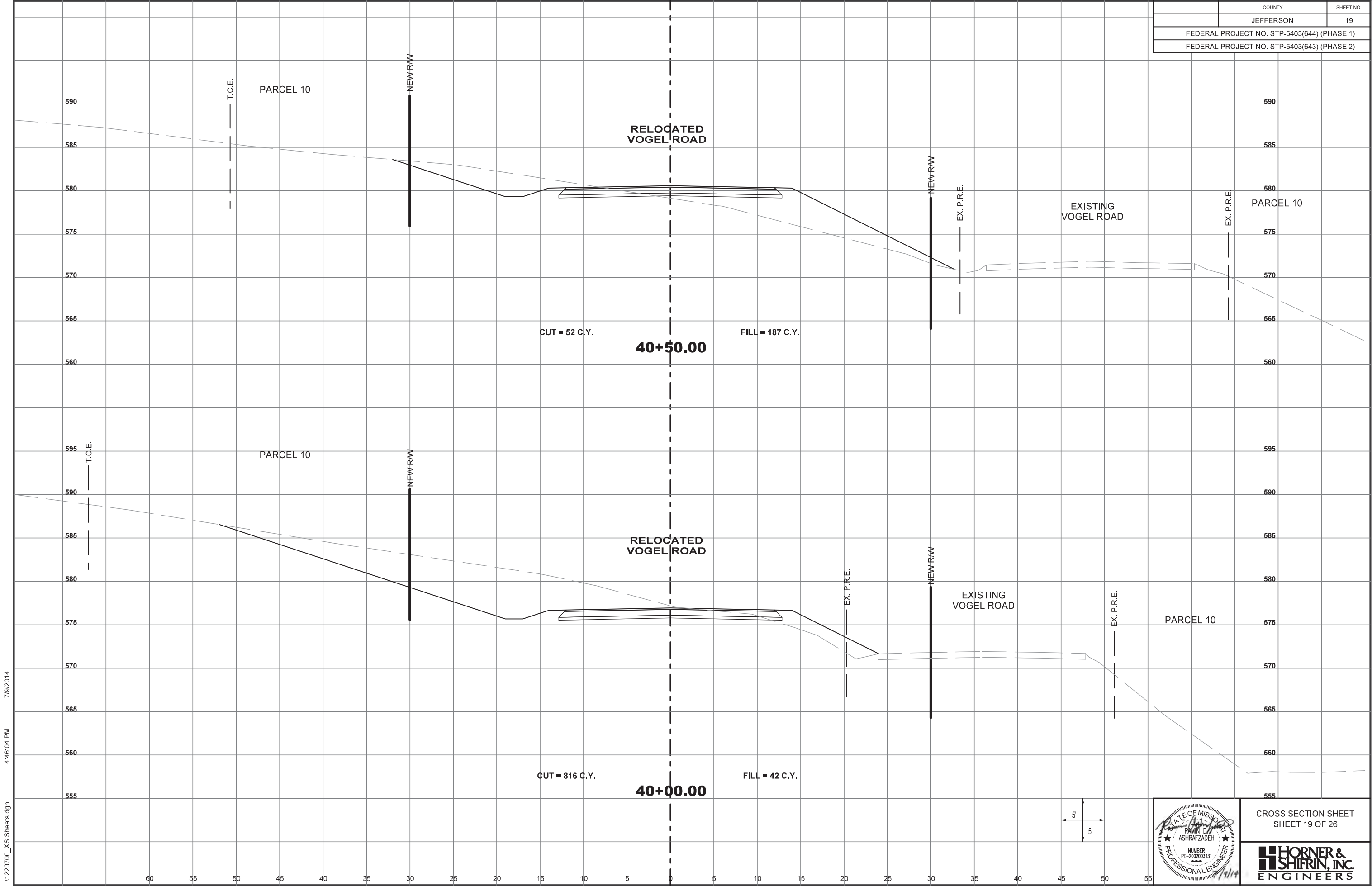
|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 18        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



CROSS SECTION SHEET  
SHEET 18 OF 26

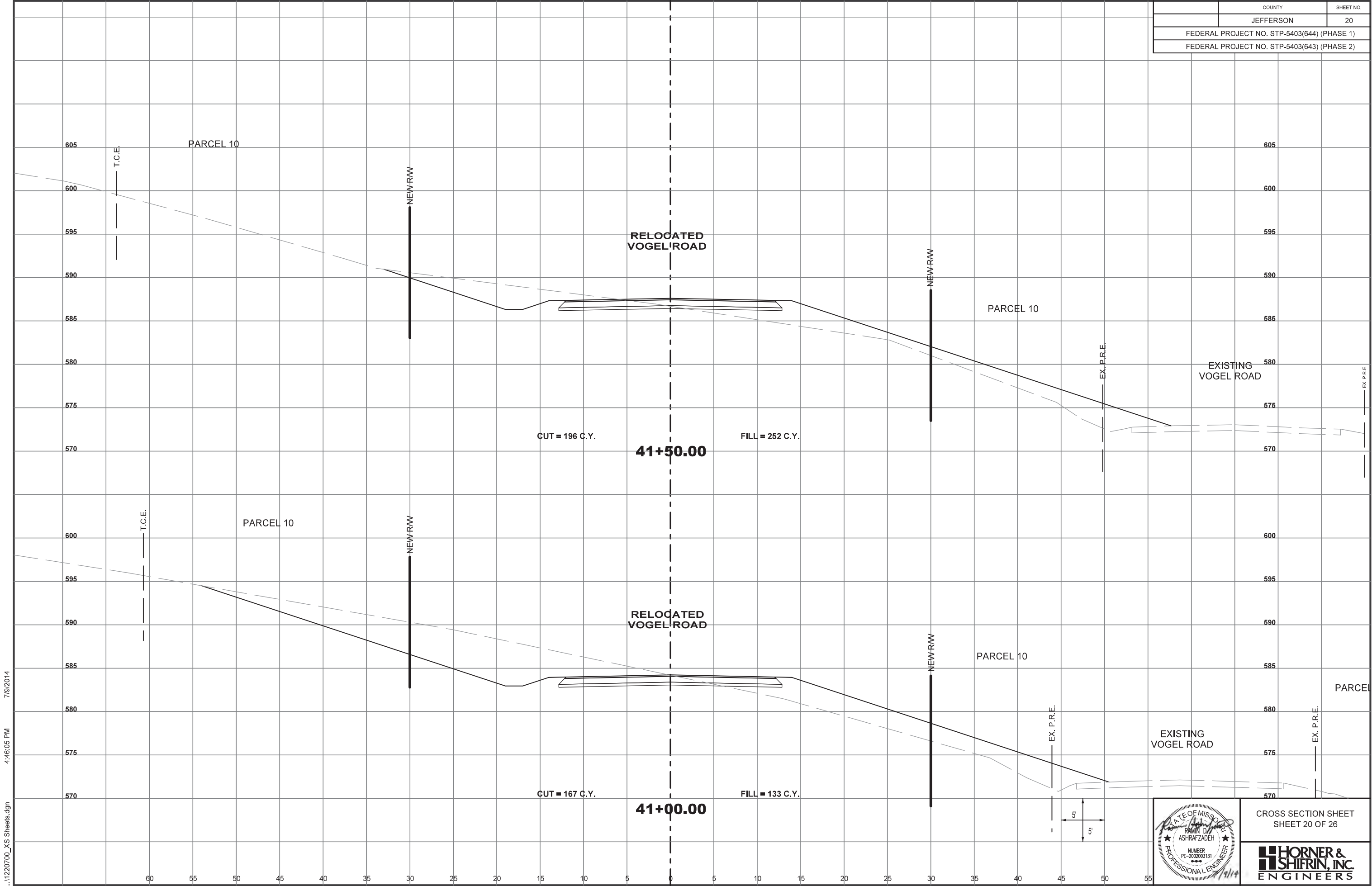


|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 19        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |





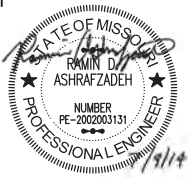
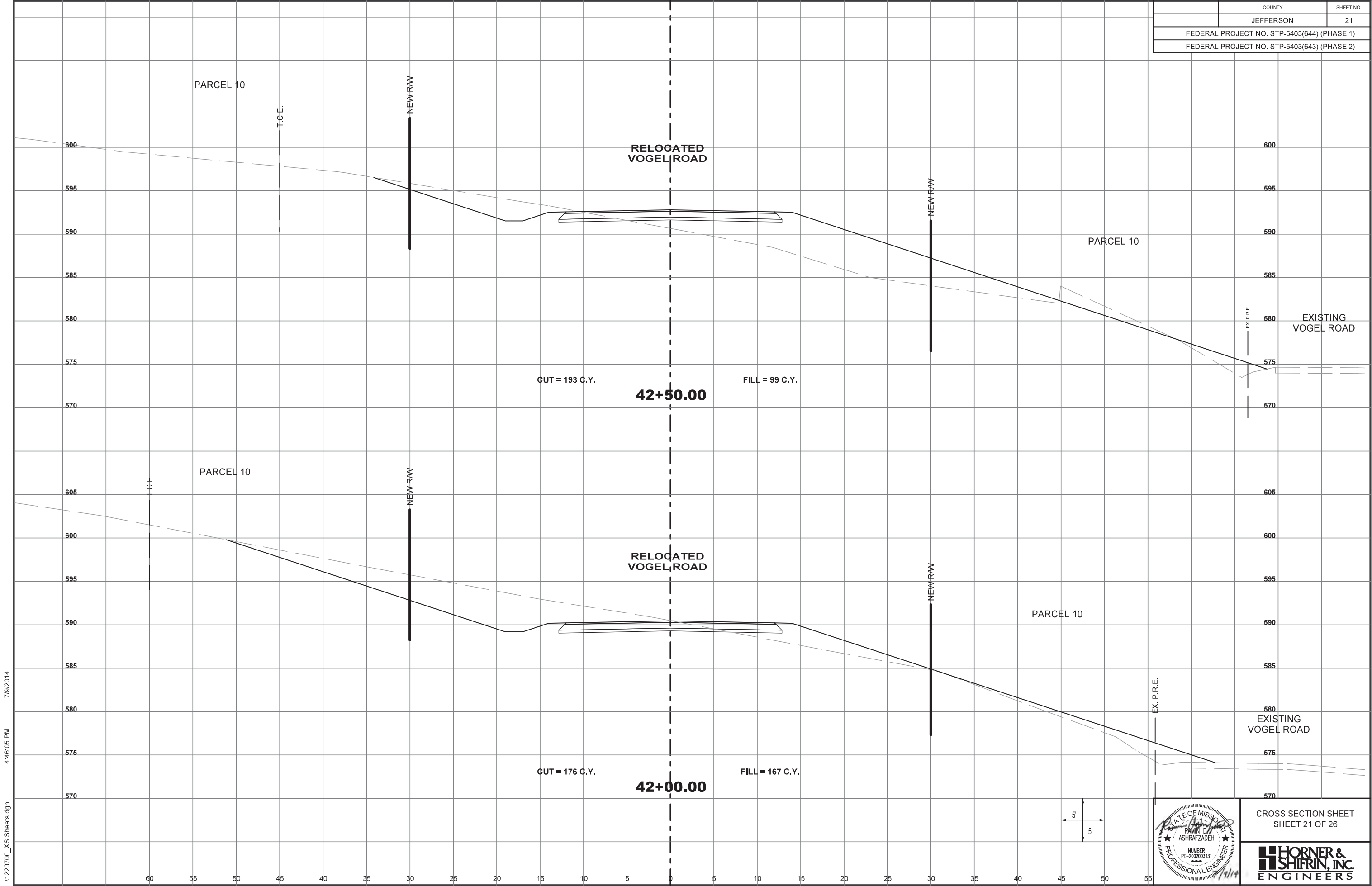
|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 20        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



CROSS SECTION SHEET  
SHEET 20 OF 26



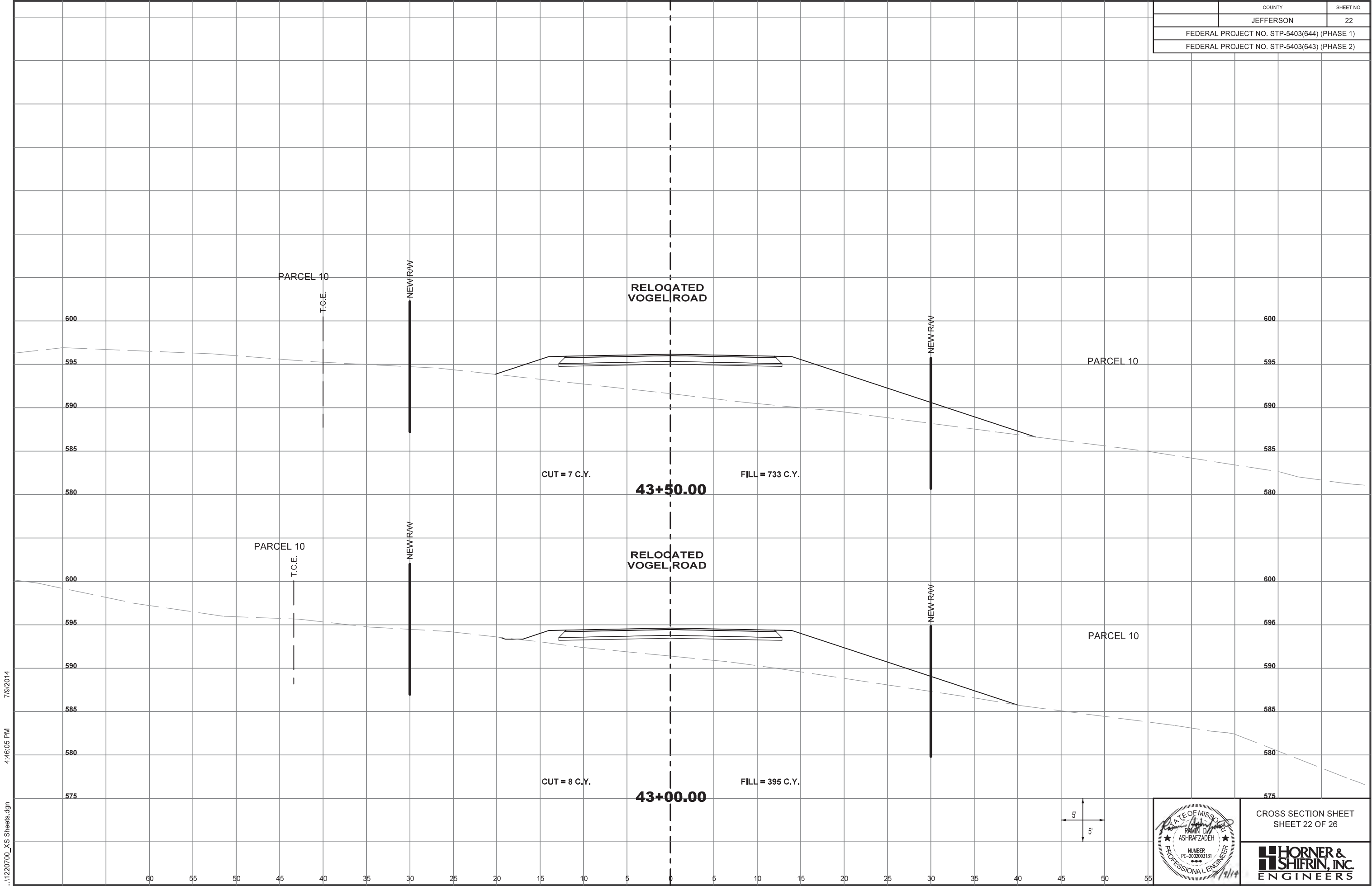
|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 21        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



CROSS SECTION SHEET  
SHEET 21 OF 26



|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 22        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |

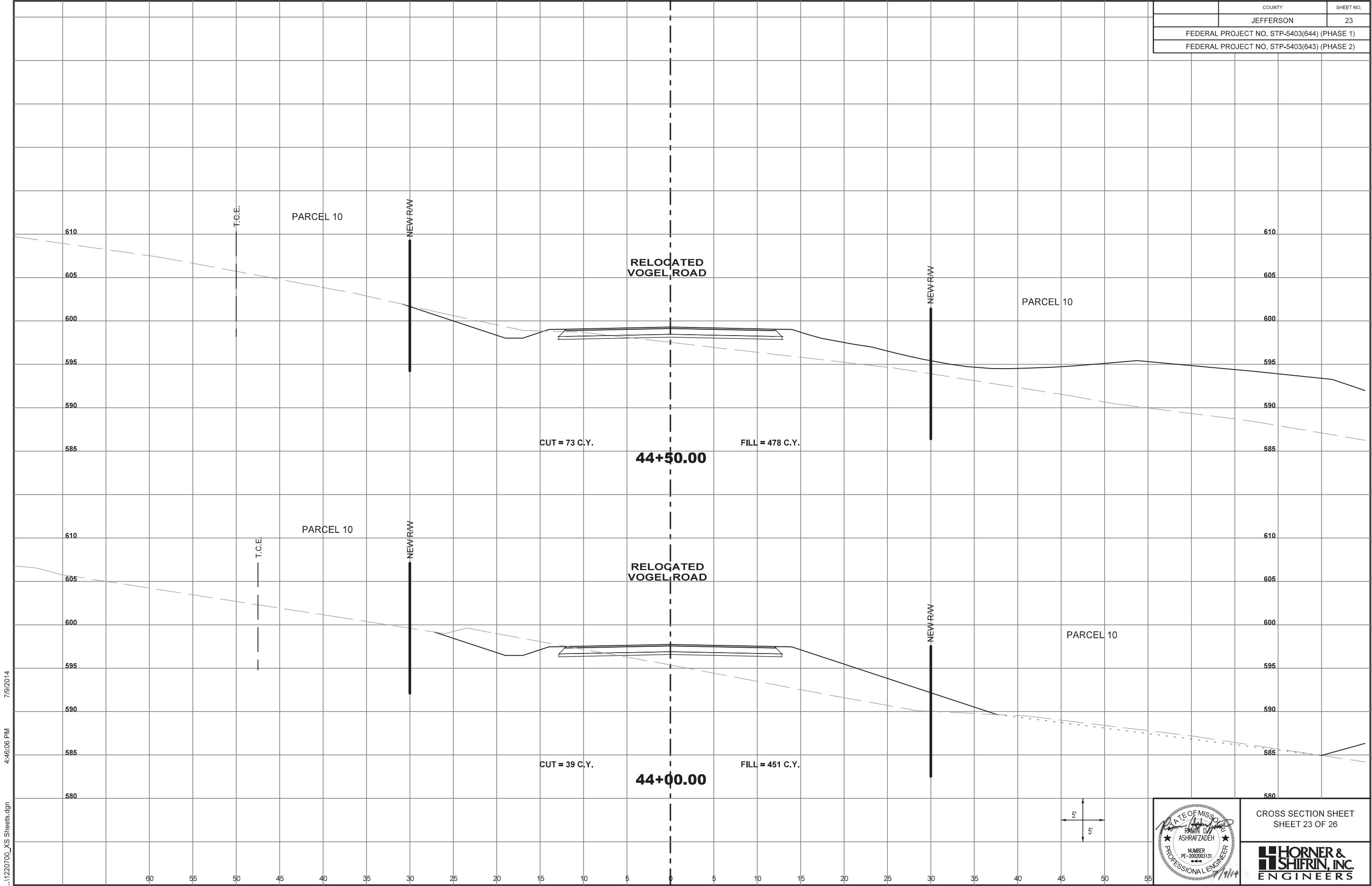


CROSS SECTION SHEET  
SHEET 22 OF 26





|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 23        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |



7/9/2014

4:46:06 PM

...11220700\_XS Sheets.dgn



CROSS SECTION SHEET  
SHEET 23 OF 26

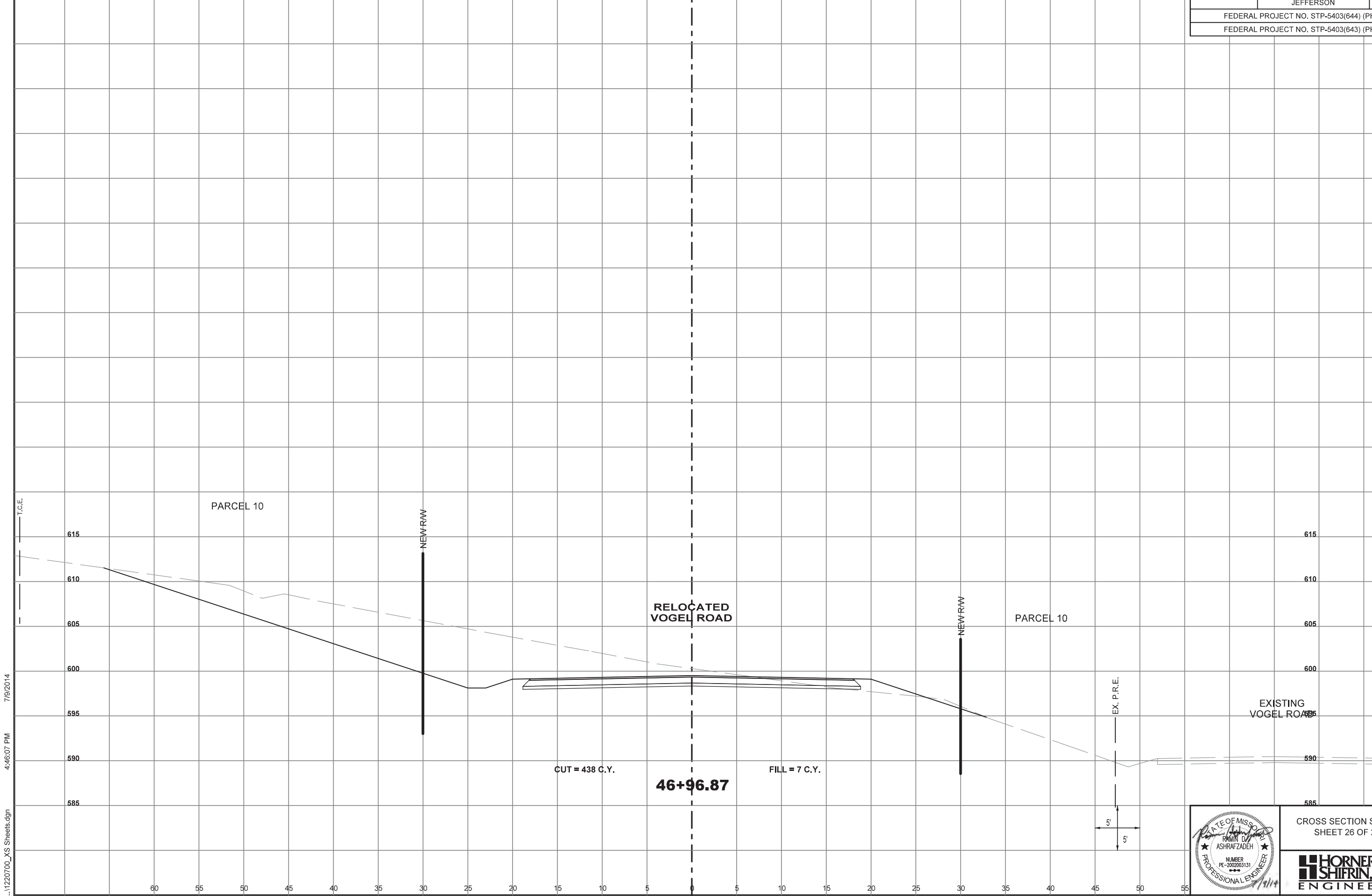
**HORNER &  
SHIFRIN, INC.**  
ENGINEERS







|                                             |           |           |
|---------------------------------------------|-----------|-----------|
|                                             | COUNTY    | SHEET NO. |
|                                             | JEFFERSON | 26        |
| FEDERAL PROJECT NO. STP-5403(644) (PHASE 1) |           |           |
| FEDERAL PROJECT NO. STP-5403(643) (PHASE 2) |           |           |

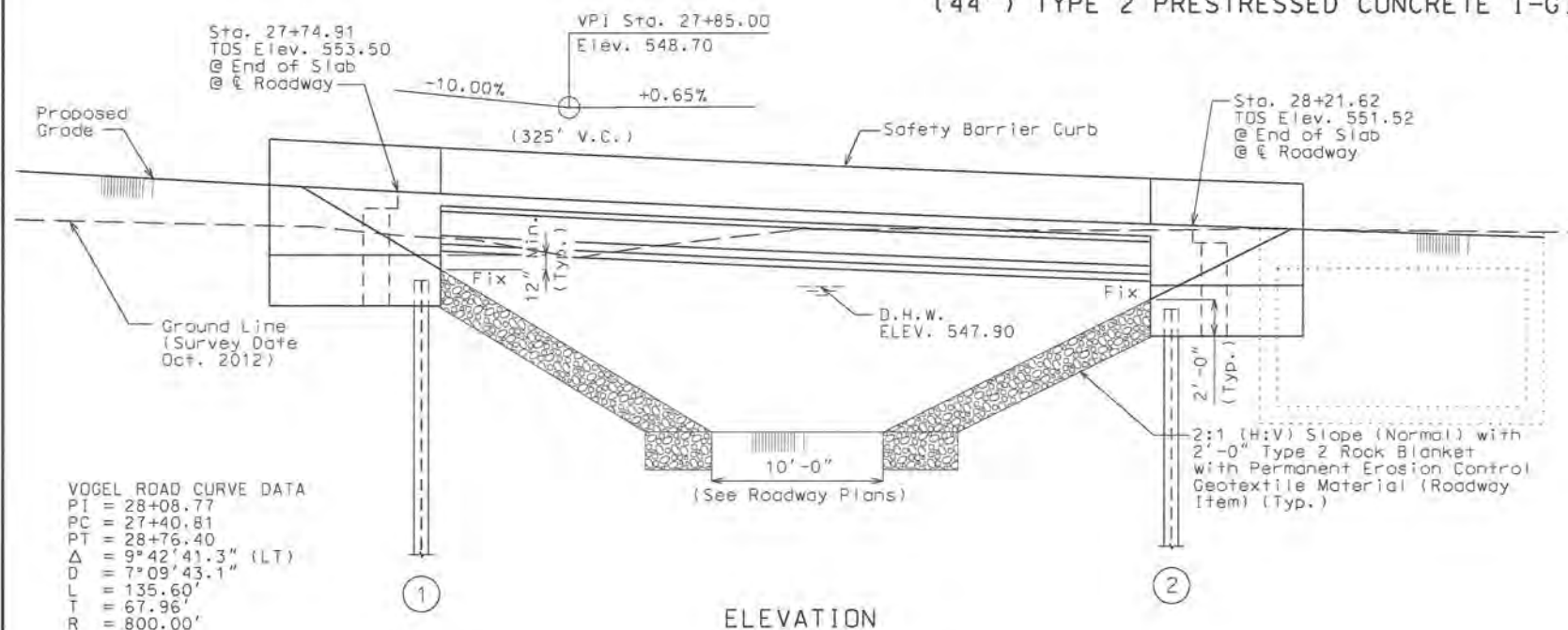


CROSS SECTION SHEET  
SHEET 26 OF 26

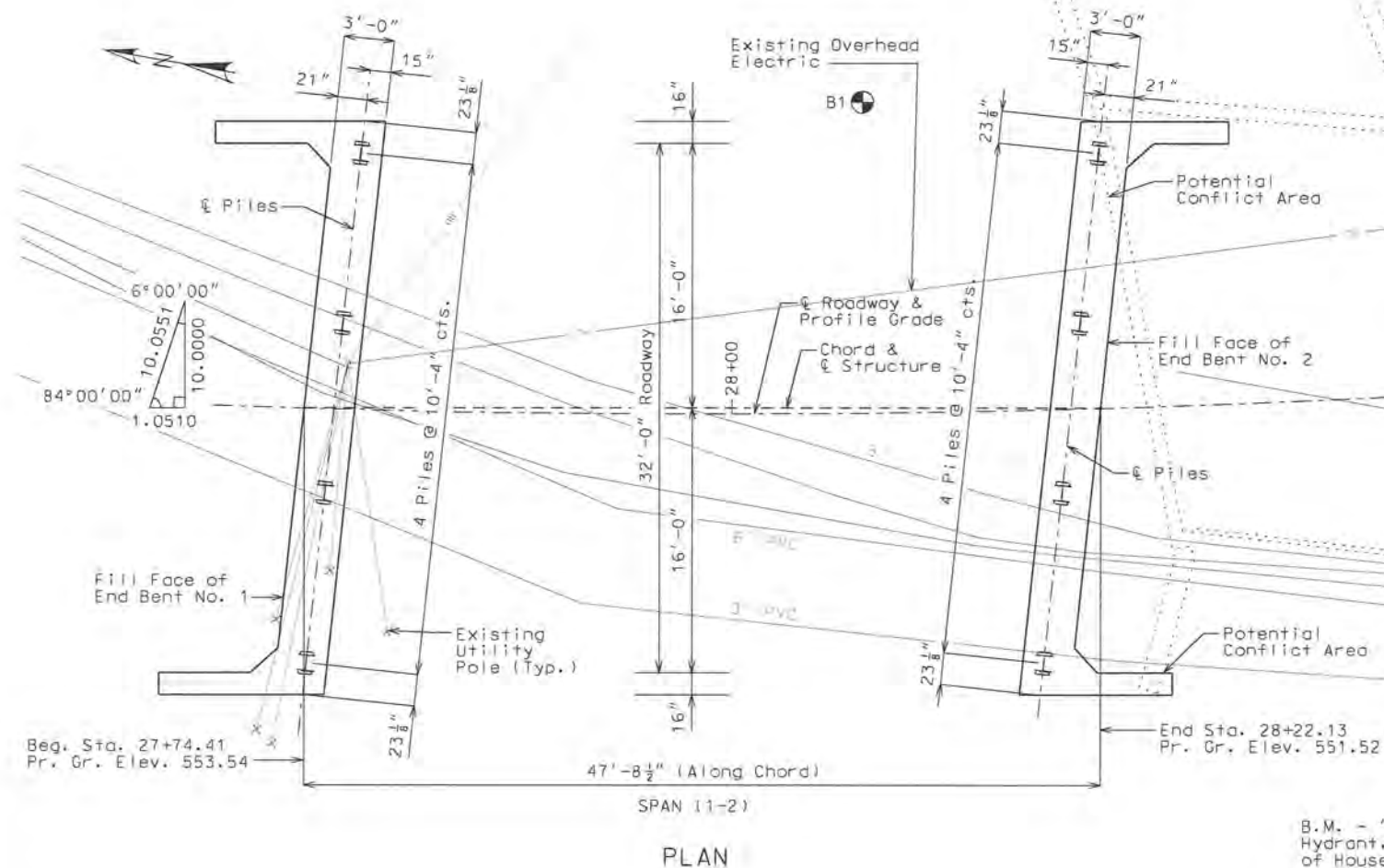


# JEFFERSON COUNTY (44') TYPE 2 PRESTRESSED CONCRETE I-GIRDER SPAN

SEC 36 TWP 43N RGE 5E



VOGEL ROAD CURVE DATA  
PI = 28+08.77  
PC = 27+40.81  
PT = 28+76.40  
Δ = 9°42'41.3" (LT)  
D = 7°09'43.1"  
L = 135.60'  
T = 67.96'  
R = 800.00'



Notes:

Bents are parallel to a line skewed 6°00'00" L.A. to a line perpendicular to the chord.

All stationing is along the & Roadway.

All dimensions are horizontal.

Note: The location of existing substructure elements are approximate. Remove existing substructure according to Sec 216 including any portion found to be in conflict with proposed construction as determined in the field.

"B" Indicates location of borings.

Notice and Disclaimer Regarding Boring Log Data

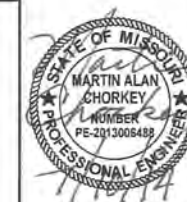
The locations of all subsurface borings for this structure are shown on the bridge plan sheets for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the County for the design of the project, are shown on Sheets No. B21 and B22. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the County or elsewhere.

The County does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the County.

Designed: MAC  
Detailed: CAB  
Checked: CBW

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1 of 22



DATE PREPARED  
7/9/2014

ROUTE  
MO

DISTRICT  
SHEET NO.

B1

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

| Estimated Quantities                           |             |         |           |       |
|------------------------------------------------|-------------|---------|-----------|-------|
| Item                                           |             | Substr. | Superstr. | Total |
| Class 1 Excavation                             | cu. yard    | 70      |           | 70    |
| Removal of Bridges                             | lump sum    |         |           | 1     |
| Structural Steel Piles (12 In.)                | linear foot | 176     |           | 176   |
| Pile Point Reinforcement                       | each        | 8       |           | 8     |
| Class B Concrete (Substructure)                | cu. yard    | 29.0    |           | 29.0  |
| Slab on Concrete I-Girder                      | sq. yard    |         | 180       | 180   |
| * Safety Barrier Curb                          | linear foot |         | 122       | 122   |
| Permeable Concrete Fill                        | cu. yard    | 66.1    |           | 66.1  |
| Type 2 (32 in.), Prestressed Concrete I-Girder | linear foot |         | 180       | 180   |
| Conduit System on Structure                    | lump sum    |         | 1         | 1     |
| Vertical Drain at End Bents                    | each        | 2       |           | 2     |
| Laminated Neoprene Bearing Pad (Tapered)       | each        |         | 8         | 8     |

All concrete above the construction joint in the end bents is included in the Estimated Quantities for Slab on Concrete I-Girder.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Concrete I-Girder.

Cost of channel shear connectors C4 x 5.4 (ASTM A709 Grade 36) in place will be considered completely covered by the contract unit price for Structural Steel Piles (12 in.).

\* Safety barrier curb shall be cast-in-place option or slip-form option.

| Estimated Quantities for Slab on Concrete I-Girder |          |       |
|----------------------------------------------------|----------|-------|
| Item                                               |          | Total |
| Class B-2 Concrete                                 | cu. yard | 63.4  |
| Reinforcing Steel                                  | pound    | 6170  |
| Reinforcing Steel (Epoxy Coated)                   | pound    | 9,430 |

The table of Estimated Quantities for Slab on Concrete I-Girder represents the quantities used by the County in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for prestressed panels, conventional forms, all concrete and coated and uncoated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

The Estimated Quantities for Slab on Concrete I-Girder are based on skewed precast prestressed end panels.

Class B-2 Concrete quantity is based on minimum top flange thickness (and the girder steps shown on Sheet No. B10) and minimum joint material thickness.

The prestressed panel quantities are not included in the table of Estimated Quantities for Slab on Concrete I-Girder.

| FOUNDATION DATA   |                                              |                        |                        |  |
|-------------------|----------------------------------------------|------------------------|------------------------|--|
| TYPE              | DESIGN DATA                                  | BENT NO. 1             | BENT NO. 2             |  |
| Load Bearing Pile | Pile Type and Size                           | HP 12x53               | HP 12x53               |  |
|                   | Number                                       | 4                      | 4                      |  |
|                   | Approximate Length per Each                  | 23                     | 21                     |  |
|                   | Pile Driving Verification Method             | Modified Gates Formula | Modified Gates Formula |  |
|                   | Minimum Nominal Axial Compressive Resistance | kip                    | 440                    |  |
|                   | Hammer Energy Required                       | ft-lb                  | 14,100                 |  |

Driven Pile:

Minimum Nominal Axial Compressive Resistance = Maximum Factored Loads/Resistance Factor

Manufactured pile point reinforcement shall be used on all piles at End Bent No. 1 and End Bent No. 2.

#### GENERAL NOTES:

Design Specifications:  
2012 AASHTO LRFD Bridge Design Specifications (6th Ed.)  
and 2013 Interim Revisions

#### Design Loading:

HL-93  
35#/Sq. Ft. Future Wearing Surface  
Earth 120 #/CU. Ft., Equivalent Fluid Pressure 45#/CU. Ft.

Superstructure: Simply-supported, non-composite for dead load (composite for live load)

#### Design Unit Stresses:

Class B Concrete (Substructure)  $f'_c = 3,000$  psi

Class B-2 Concrete (Superstructure, except Prestressed Girders and Panels and Safety Barrier Curb)  $f'_c = 4,000$  psi

Class B-1 Concrete (Safety Barrier Curb)  $f'_c = 4,000$  psi

Reinforcing Steel (Grade 60)  $f_y = 60,000$  psi

Steel Pile (ASTM A709 Grade 50)  $f_b = 9,000$  psi  $f_y = 50,000$  psi

For precast prestressed panel stresses, see Sheet No. B11.

For prestressed girder stresses, see Sheet No. B10.

#### Neoprene Pads:

Bearings shall be 60 durometer neoprene pads.

Laminated Neoprene Bearing Pads (Tapered) shall be in accordance with Sec 716.

#### Joint Filler:

All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

#### Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

All reinforcing steel shall be tied 100%. Mechanical Tying devices shall not be used.

(E) Denotes epoxy coated reinforcing steel.

#### Miscellaneous:

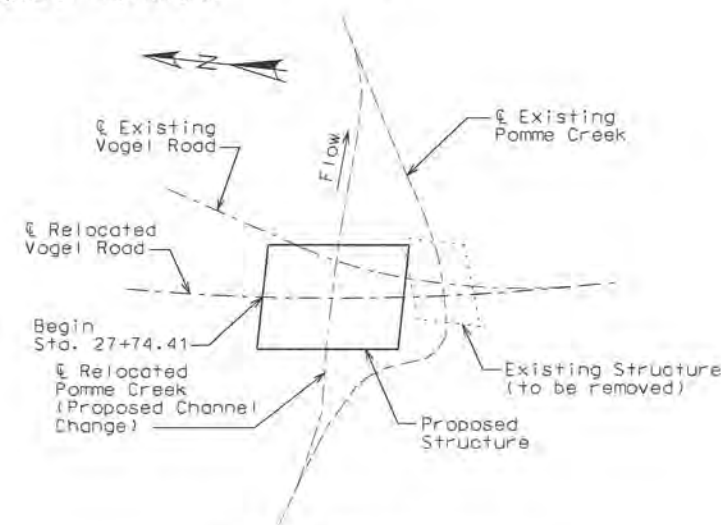
The road shall be closed to traffic during construction. See Roadway Plans.

The bridge deck shall be sealed with a Class 2 Penetrating Concrete Sealer. See Job Special Provisions.

#### Construction Specifications:

The 2011 Edition and Supplemental revisions of the Missouri Department of Transportation's "Missouri Standard Specifications for Highway Construction" and the Job Special Provisions shall govern.

| HYDROLOGIC DATA                              |  |
|----------------------------------------------|--|
| Drainage Area = 0.84 (sq. mi.)               |  |
| Backwater/Base Flood Data (100 year)         |  |
| High Water Elev. = 548.25                    |  |
| Design Discharge = 1423 (cfs)                |  |
| Estimated Backwater = 0.0 (ft)               |  |
| Average Velocity thru Opening = 7.9 (ft/sec) |  |
| Freeboard                                    |  |
| Design Frequency = 50 (year)                 |  |
| Design Discharge = 1191 (cfs)                |  |
| Freeboard = 0.0 (ft)                         |  |
| Design High Water (DHW) Elev. = 547.90       |  |

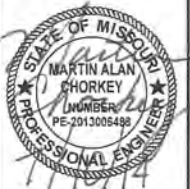


LOCATION SKETCH

Designed: MAC  
Detailed: CAB  
Checked: CBW

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 2 of 22



DATE PREPARED  
7/9/2014

ROUTE STATE  
DISTRICT SHEET NO.  
B2

COUNTY  
JEFFERSON  
JOB NO.  
1220700  
CONTRACT ID.

PROJECT NO.  
STP-5403(644)  
BRIDGE NO.

DESCRIPTION

DATE

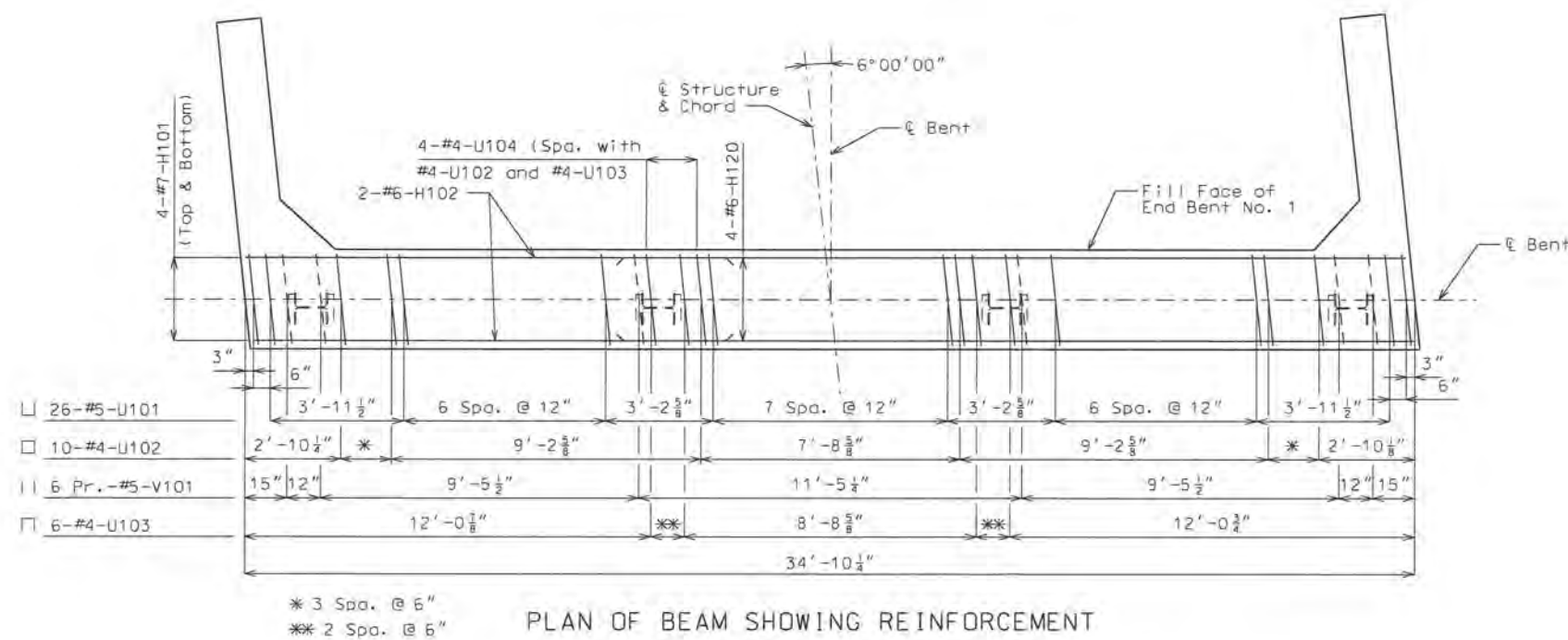
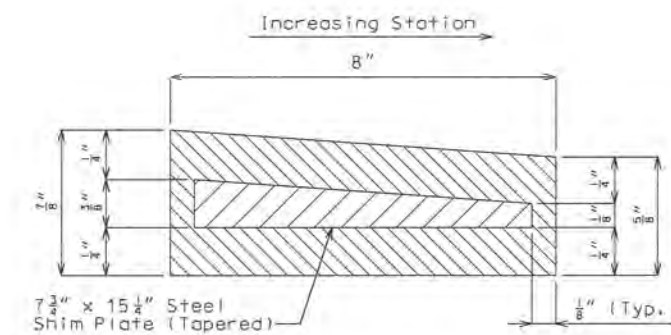
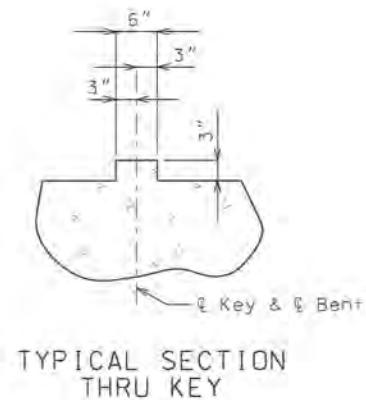
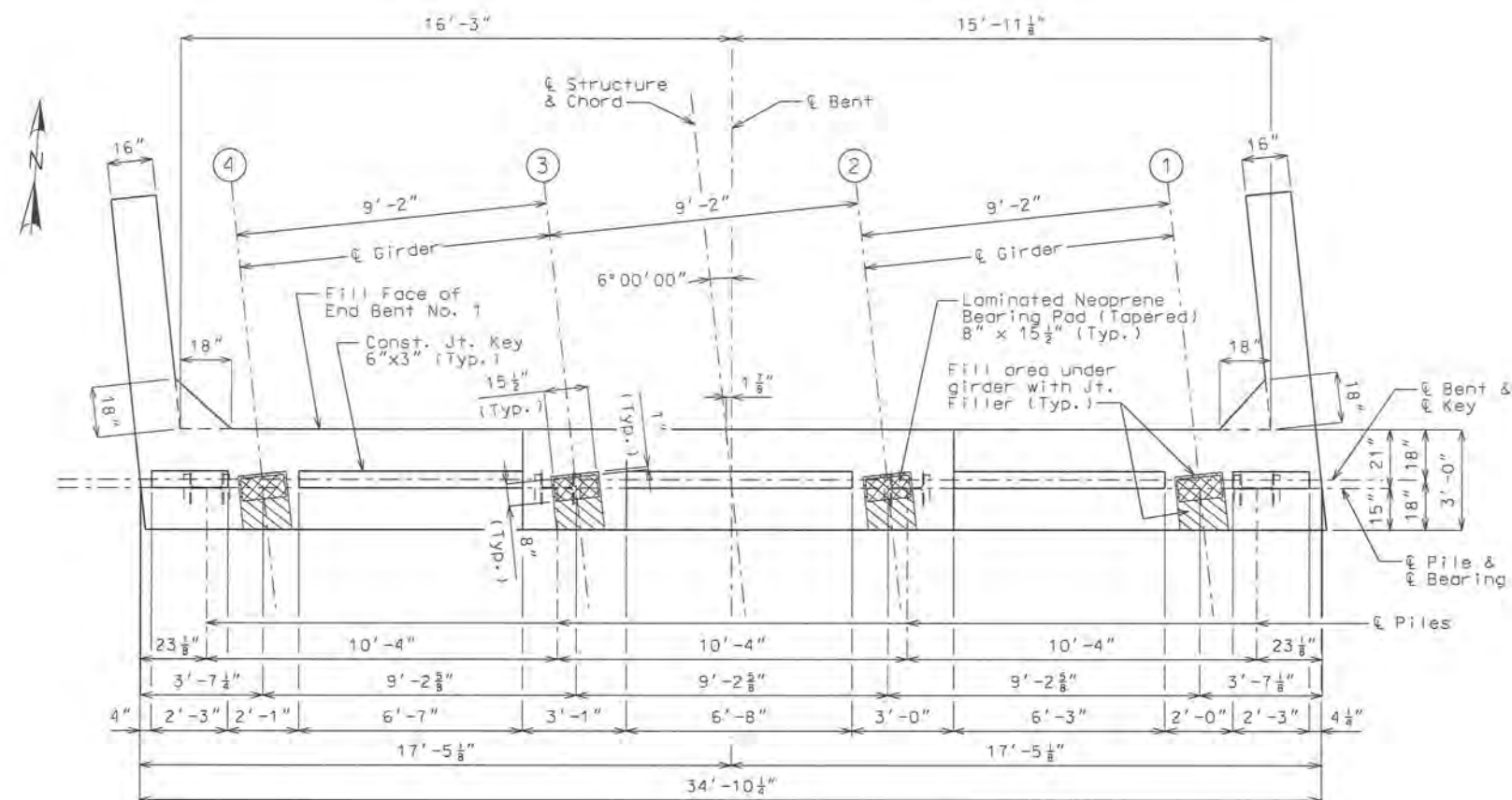
JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
836-797-5340  
www.jeffco.org

HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-1966  
www.HornerShifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

GENERAL NOTES

VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1





Notes:

Work this sheet with Sheets No. B4 and B5.

The U-bars and Pr. V-bars in End Bent shall be placed parallel to C Structure.

END BENT NO. 1

Designed: MAC  
Detailed: CAB  
Checked: CBW

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 22



DATE PREPARED  
7/9/2014

| ROUTE | STATE |
|-------|-------|
|-------|-------|

|  |    |
|--|----|
|  | MO |
|--|----|

SHEET NO.  
B3

|        |    |
|--------|----|
|        | BS |
| COUNTY |    |

JEFFERSON

JOB NO.

1220700

CONTRACT ID.

PROJECT NO. \_\_\_\_\_

TP-5403(644)

1

1

JEFFERSON COUNTY, MISSOURI  
 MAPLE STREET ANNEX  
 725 MAPLE STREET



P.O. BOX 100  
HILLSBORO, MO 63050

636-797-5340  
www.jeffcomo.org

---



**FLORINER &  
SHIFRIN, INC.**

**ENGINEERS**  
5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-6960  
[www.HornerSmithInc.com](http://www.HornerSmithInc.com)

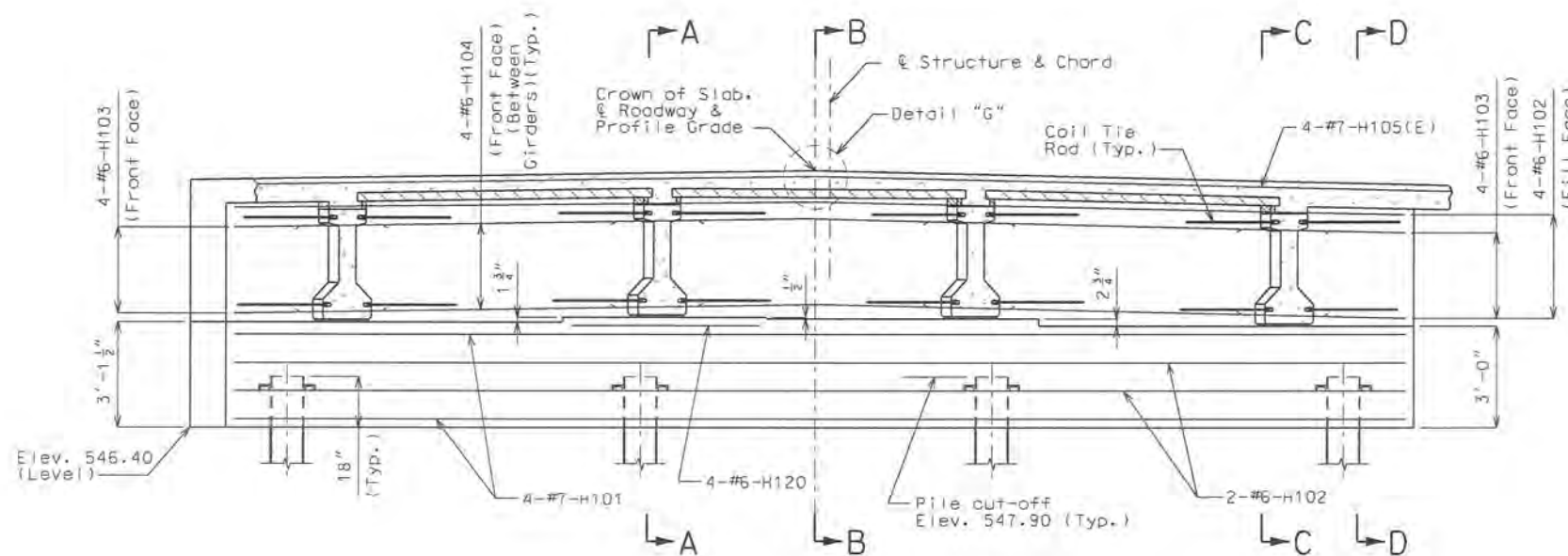
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2018

© 2006 The Authors  
Journal compilation © 2006 Blackwell Publishing Ltd

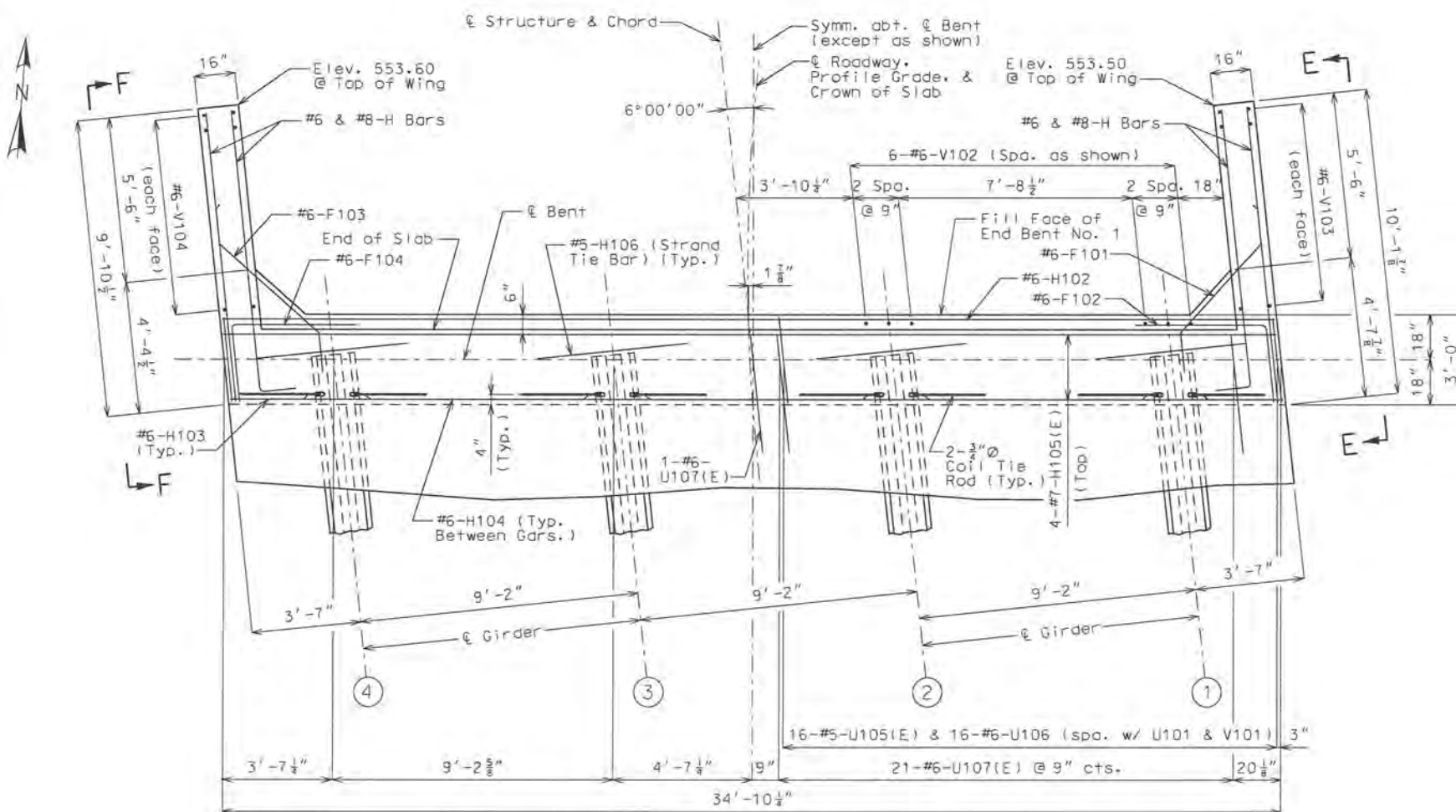
## VOGEL ROAD IMPROVEMENTS

STP-5403(644) PHASE 1

---



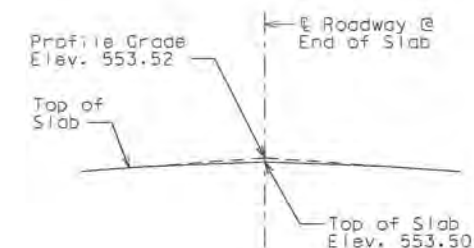
SECTION NEAR END BENT



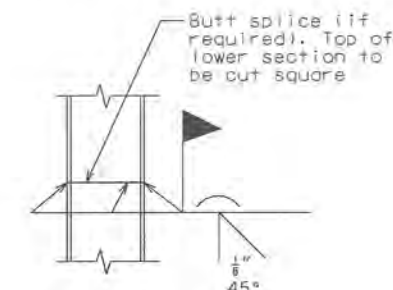
PART PLAN

END BENT NO. 1

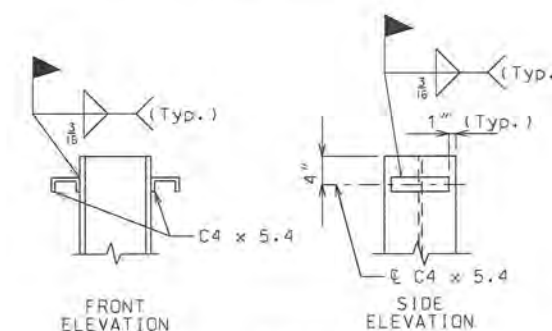
Note: This drawing is not to scale. Follow dimensions.



DETAIL "G"



STEEL PILE SPLICE



DETAILS OF PILE ANCHORS

Notes:

Work this sheet with Sheets No. B3 and B5.

For details of Vertical Drain at End Bents, see Sheet No. B6.

The #6-F101 and #6-F103 shall be bent in the field to clear girders.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

Strands at end of girder shall be field bent or, if necessary, cut in field to maintain 1 1/2" minimum clearance to fill face of end bent.

For location of Coil Tie Rods and #5-H106 (Strand Tie Bar), see Sheet No. B10.

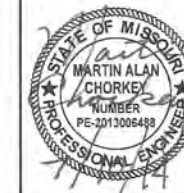
Reinforcing steel shall be shifted to clear piles. U-Bars shall clear piles by at least 1 1/2".

| Substructure Quantity Table for End Bent No. 1 |             |          |
|------------------------------------------------|-------------|----------|
| Item                                           |             | Quantity |
| Class 1 Excavation                             | cu. yard    | 35       |
| Structural Steel Piles (12 in.)                | linear foot | 92       |
| Pile Point Reinforcement                       | each        | 4        |
| Class B Concrete                               | cu. yard    | 14.5     |

Note: These quantities are included in the estimated quantities table on Sheet No. B2.

Designed: MAC  
Detailed: CAB  
Checked: CBW

Sheet No. 4 of 22



DATE PREPARED:  
7/9/2014

ROUTE STATE  
MO

DISTRICT SHEET NO.  
B4

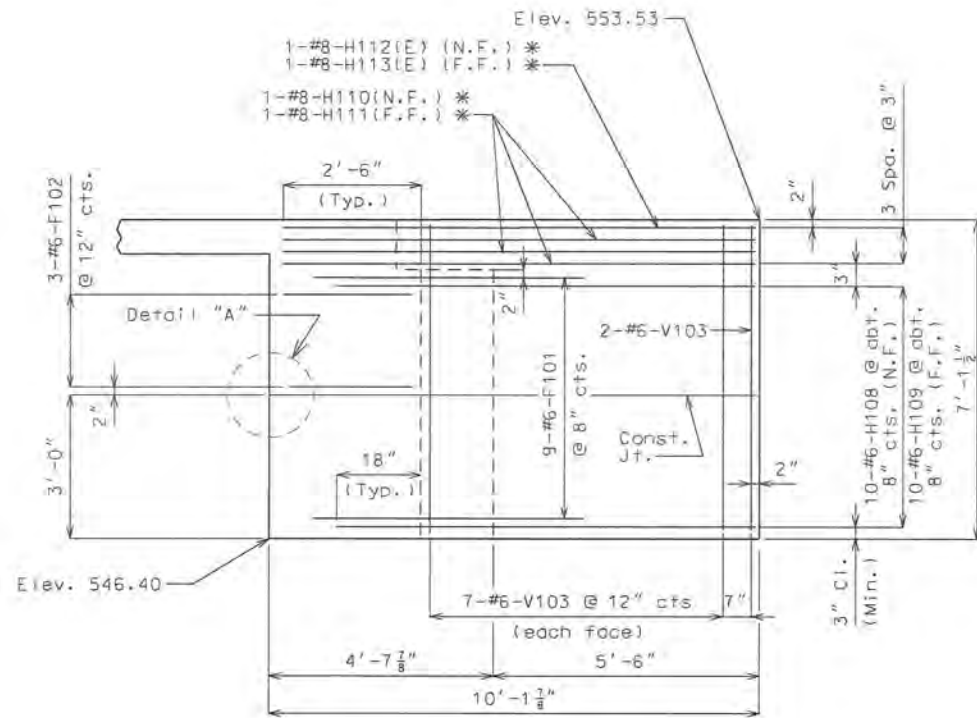
COUNTY  
JEFFERSON

JOB NO.  
1220700

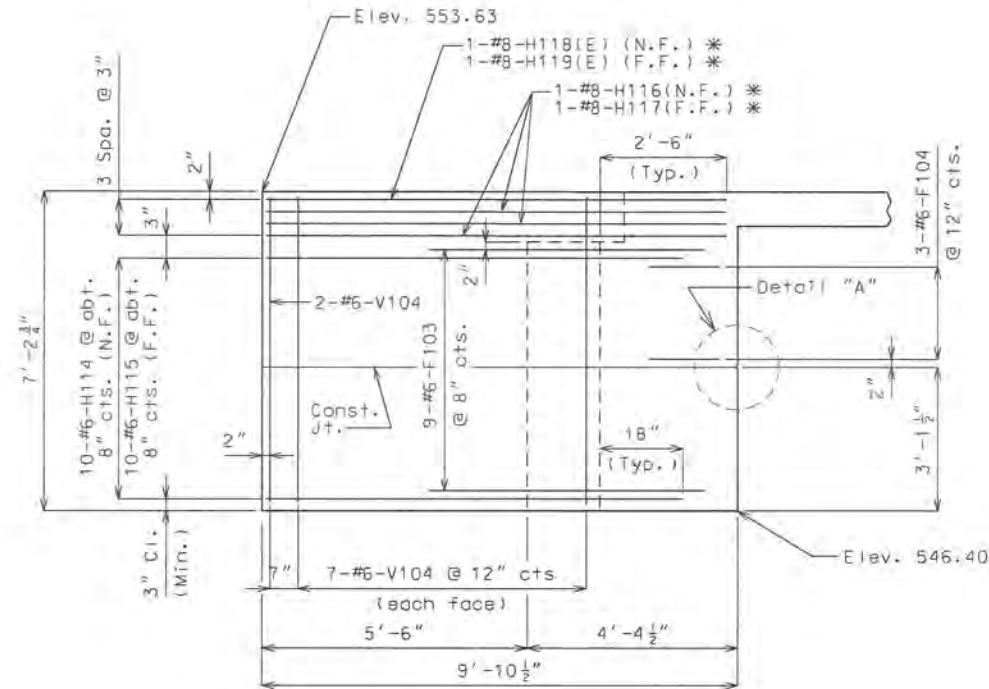
CONTRACT ID

PROJECT NO.  
STP-5403(644)

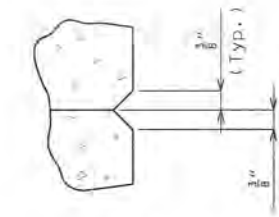
BRIDGE NO.



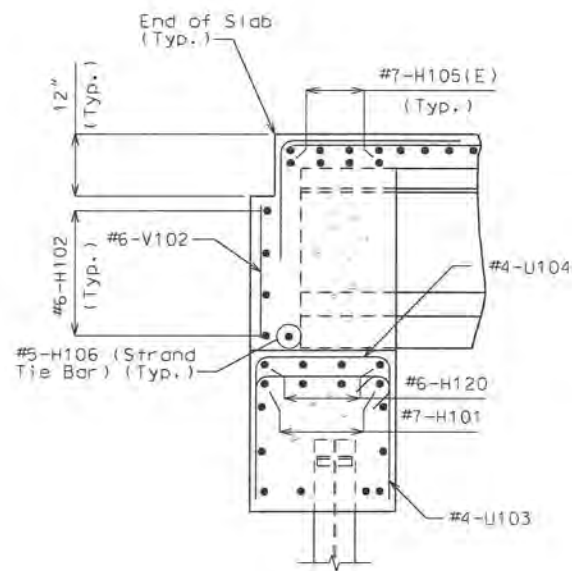
ELEVATION E-E



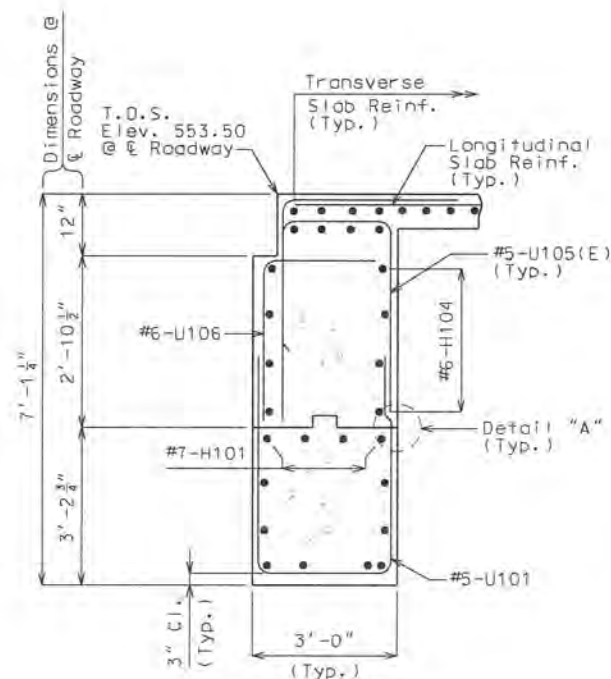
ELEVATION F-F



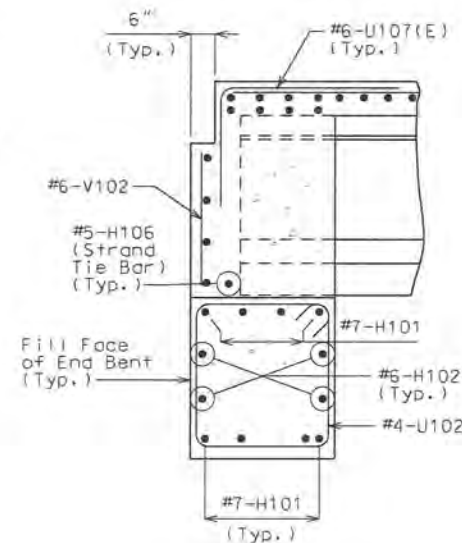
DETAIL "A"



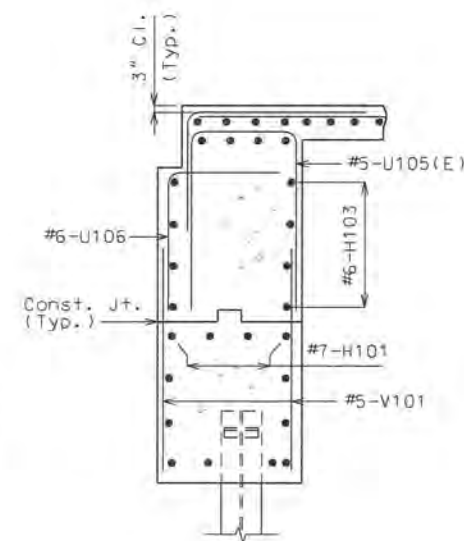
SECTION A-A



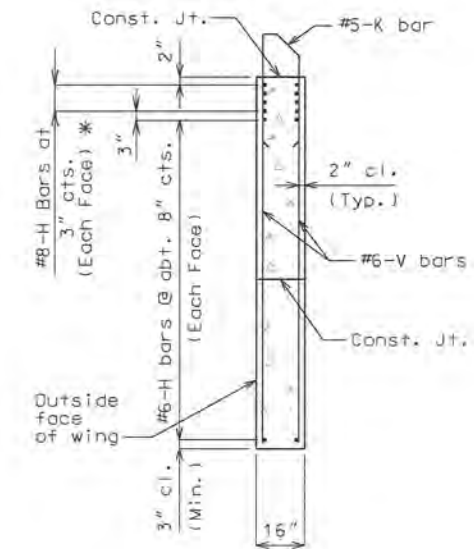
SECTION B-B



SECTION C-C



SECTION D-D



TYPICAL SECTION THRU WING

\* Placed with grade

Notes:

Work this sheet with Sheets No. B3 and B4.

For reinforcement of Safety Barrier Curb, see Sheets No. B14, B15, and B16.

END BENT NO. 1

Designed: MAC  
Detailed: CAB  
Checked: CBW

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 5 of 22



DATE PREPARED  
7/9/2014  
ROUTE  
STATE  
MO  
DISTRICT  
SHEET NO.  
B5  
COUNTY  
JEFFERSON  
JOB NO.  
1220700  
CONTRACT ID.  
PROJECT NO.  
STP-5403(644)  
BRIDGE NO.

DESCRIPTION

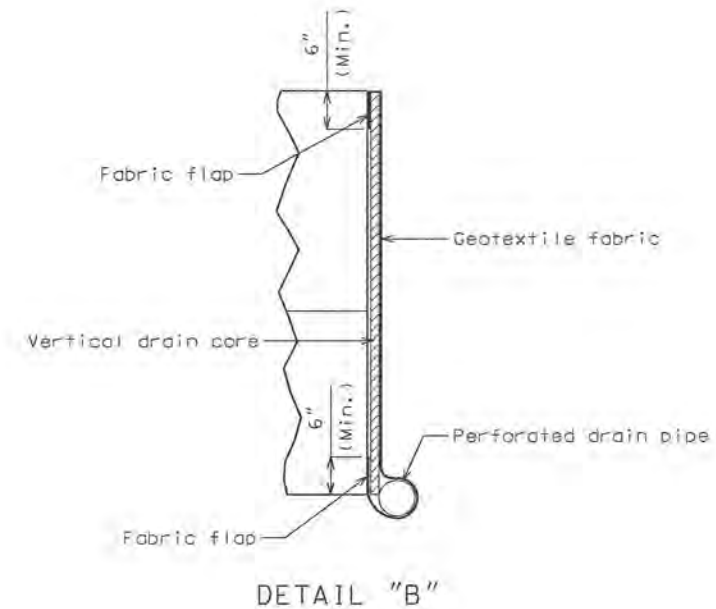
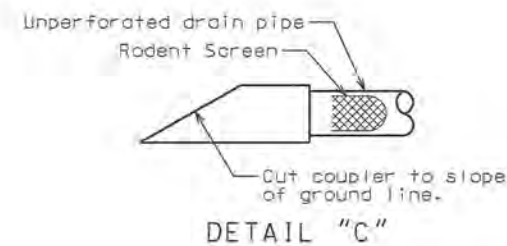
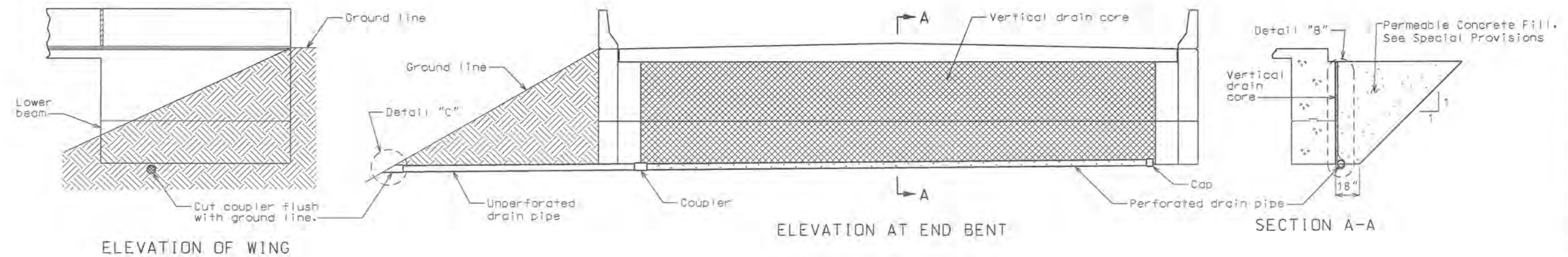
DATE

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

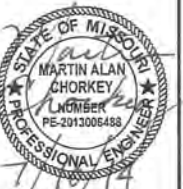
HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-521-4321 FAX: 314-521-9965  
www.horner-shifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

DETAILS OF END BENT NO. 1  
VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1





Note:  
 Drain pipe may be either 6" diameter corrugated metallic-coated steel pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.  
 Place drain pipe at fill face of end bent and slope to lowest grade of ground line, also missing the lower beam of end bent by 1 1/2". (See elevation at end bent.)  
 Perforated pipe shall be placed at fill face side at the bottom of end bent and plain pipe shall be used where the vertical drain ends to the exit at ground line.



DATE PREPARED  
7/9/2014  
 ROUTE STATE  
MO  
 DISTRICT SHEET NO.  
B6  
 COUNTY  
JEFFERSON  
 JOB NO.  
1220700  
 CONTRACT ID.  
 PROJECT NO.  
STP-5403(644)  
 BRIDGE NO.

| DATE | DESCRIPTION |
|------|-------------|
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |
|      |             |

JEFFERSON COUNTY, MISSOURI  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
 www.jeffco.org

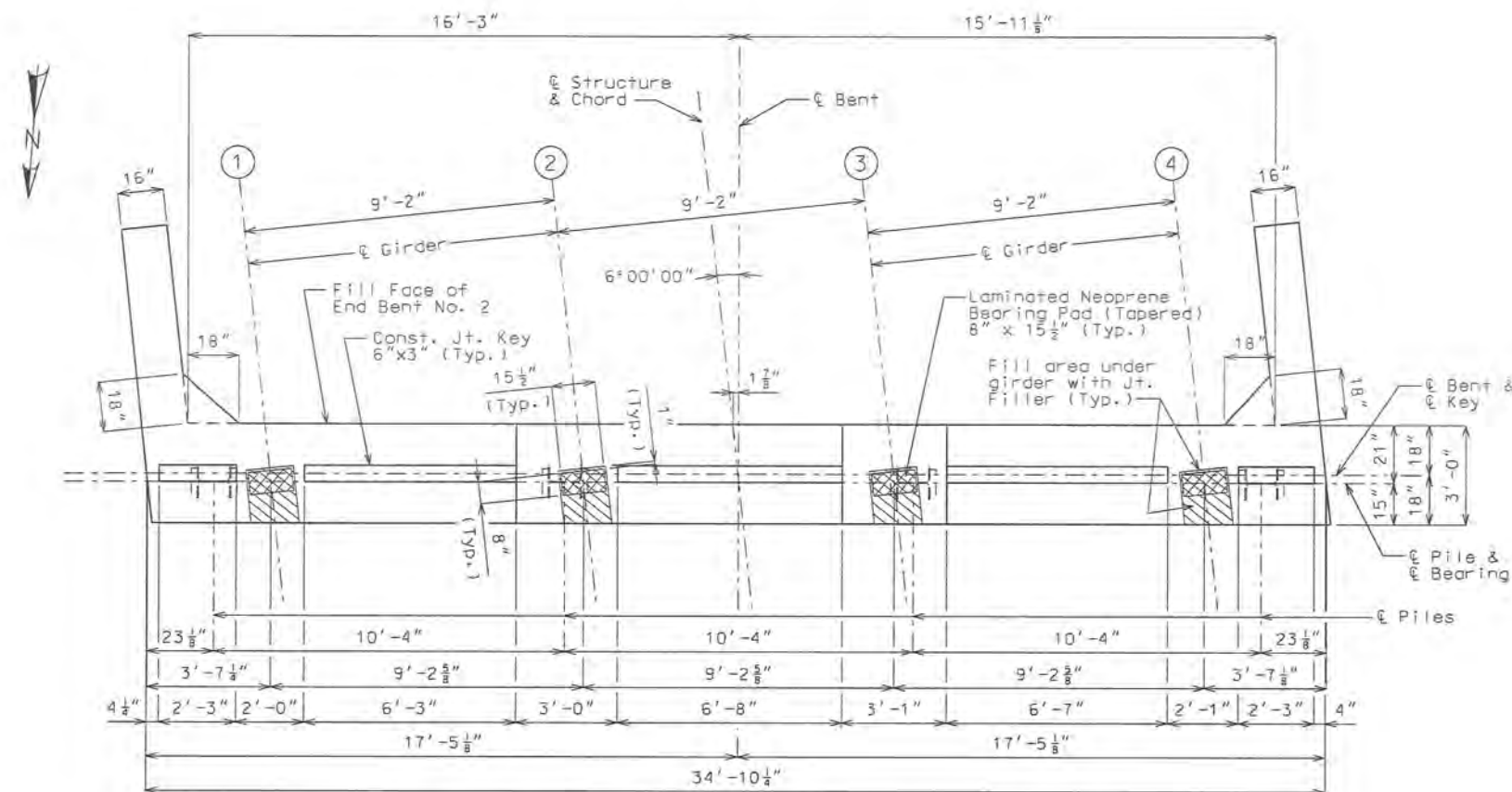
**HORNER & SHIFRIN, INC.**  
 ENGINEERS  
 5200 DAKLAND AVE. ST. LOUIS, MO 63110  
 314-531-4321 FAX: 314-531-5866  
 www.horner-shifrin.com  
 Discipline: Professional Engineering  
 Certificate of Authority: 000199  
 Expiration Date: December 31, 2014

VERTICAL DRAIN AT END BENTS  
**VOGEL ROAD IMPROVEMENTS**  
 JEFFERSON COUNTY, MISSOURI  
 STP-5403(644) PHASE 1

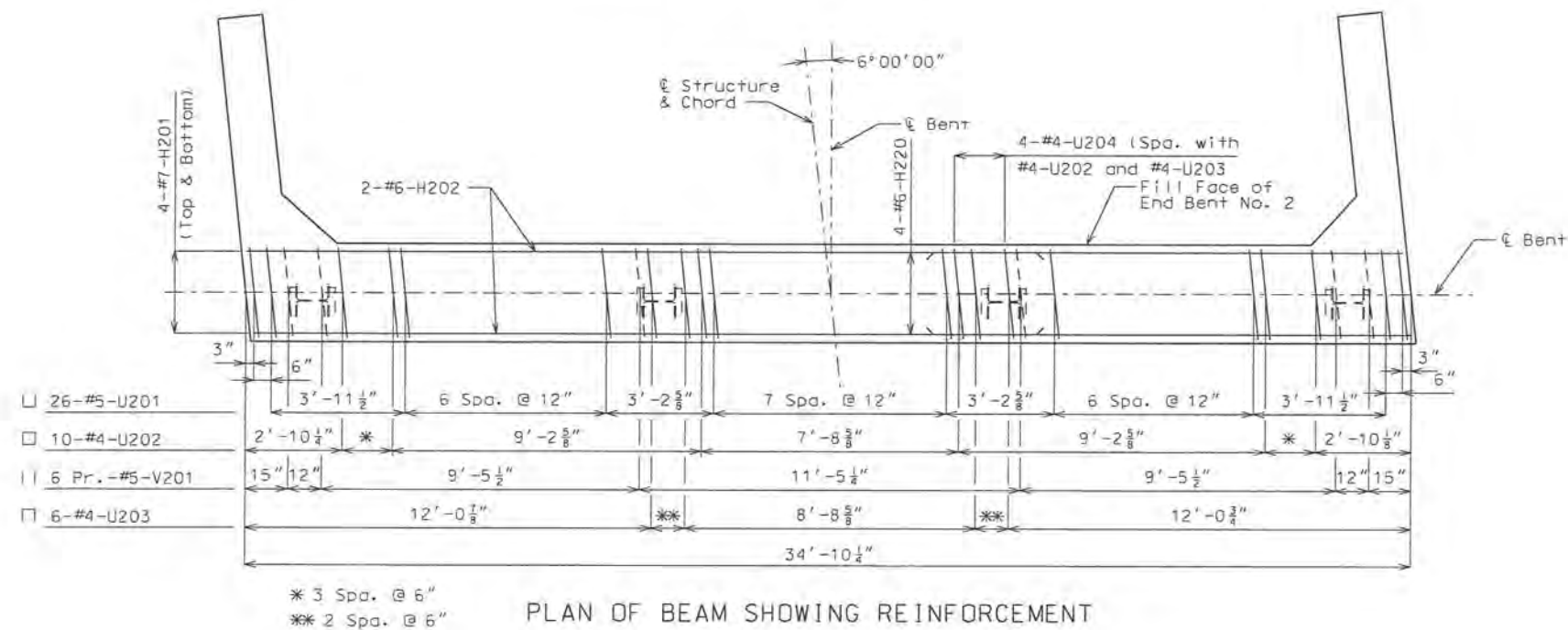
Designed: MAC  
 Detailed: CAB/CBW  
 Checked: CBW

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 22

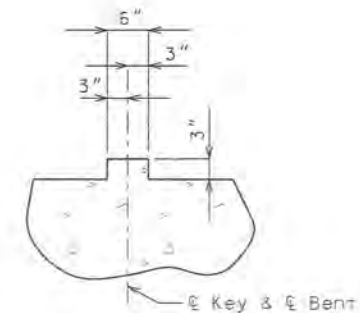


PLAN OF BEAM SHOWING DIMENSIONS

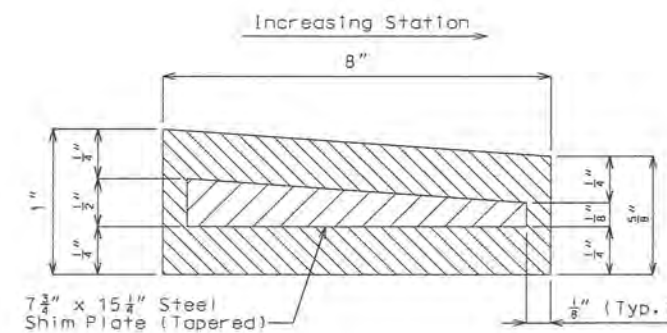


PLAN OF BEAM SHOWING REINFORCEMENT

## END BENT NO. 2



TYPICAL SECTION THRU KEY



TYPICAL SECTION THRU 8" x 15 1/2" LAMINATED NEOPRENE BEARING PAD (TAPERED) (4 required)

### Notes:

Work this sheet with Sheets No. B8 and B9.

The U-bars and Pr. V-bars in End Bent shall be placed parallel to Structure.



DATE PREPARED  
7/9/2014

ROUTE STATE  
MO  
DISTRICT SHEET NO.  
B7

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

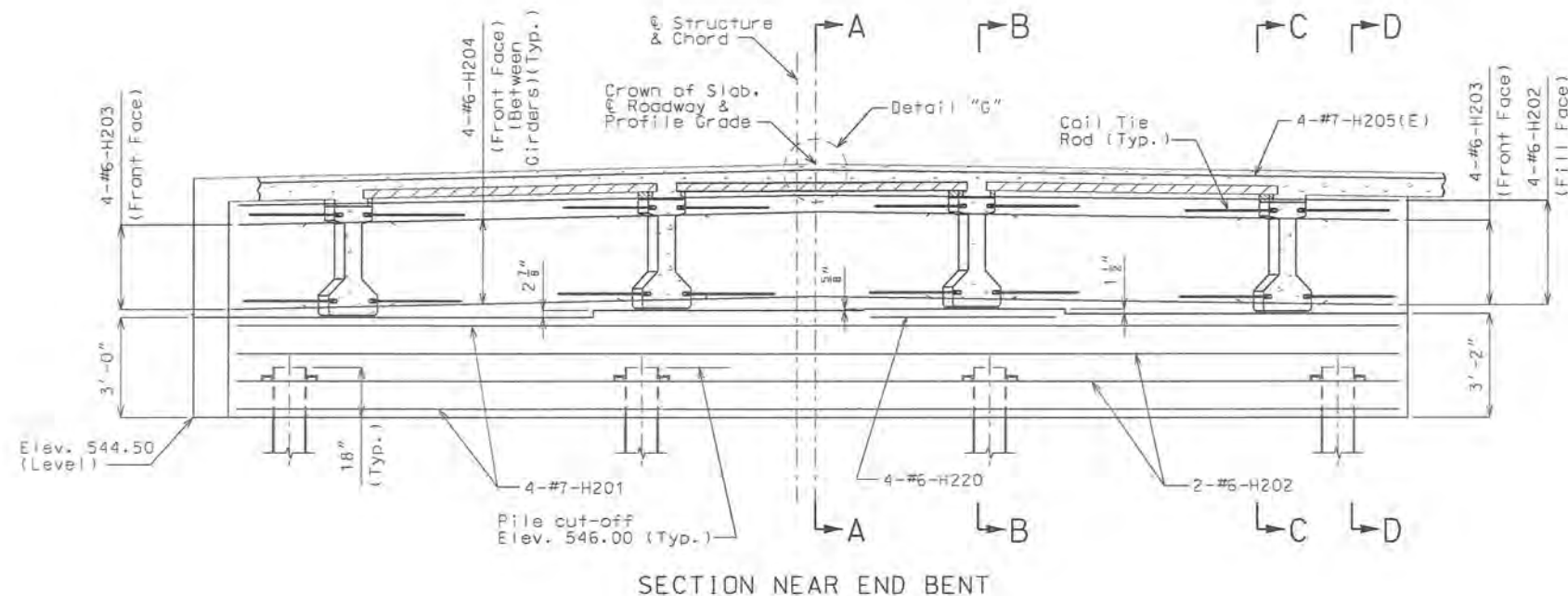
DESCRIPTION

DATE

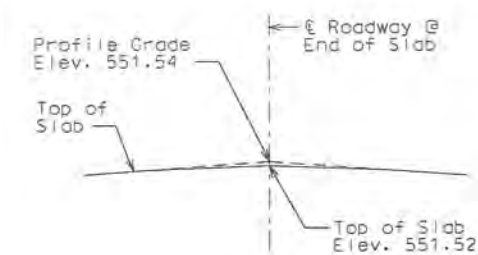
JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeflcom.org

HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE. ST. LOUIS, MO 63119  
314-521-4321 FAX: 314-521-6965  
www.HornerShifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

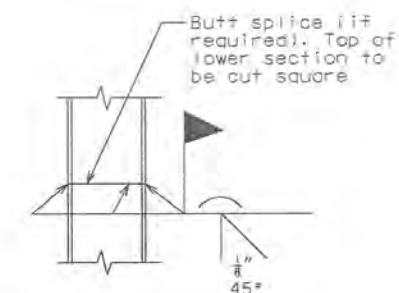
DETAILS OF END BENT NO. 2  
VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1



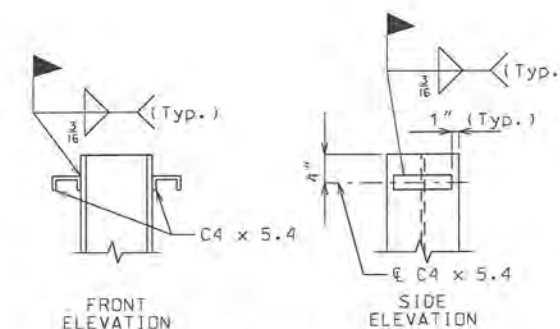
SECTION NEAR END BENT



DETAIL "G"



STEEL PILE SPLICE



DETAILS OF PILE ANCHORS

#### Notes:

Work this sheet with Sheets No. B7 and B9.

For details of Vertical Drain at End Bents, see Sheet No. B6.

The #6-F201 and #6-F203 shall be bent in the field to clear girders.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

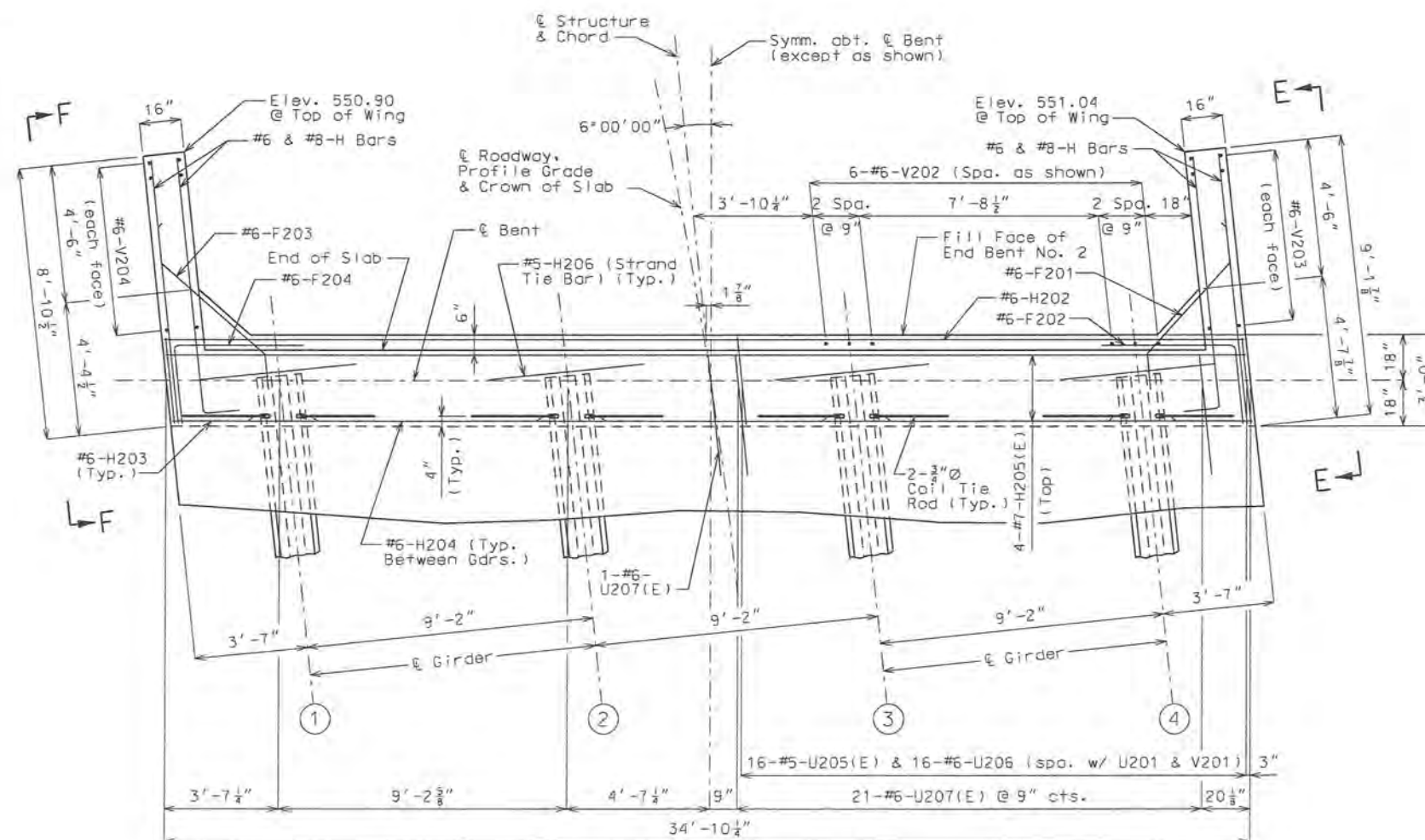
Strands at end of girder shall be field bent or, if necessary, cut in field to maintain 1 1/2" minimum clearance to fill face of end bent.

For location of Coil Tie Rods and #5-H206 (Strand Tie Bar), see Sheet No. B10.

Reinforcing steel shall be shifted to clear piles. U-Bars shall clear piles by at least 1 1/2".

| Substructure Quantity Table for End Bent No. 2 |             |          |
|------------------------------------------------|-------------|----------|
| Item                                           |             | Quantity |
| Class 1 Excavation                             | cu. yard    | 35       |
| Structural Steel Piles (12 in.)                | linear foot | 84       |
| Pile Point Reinforcement                       | each        | 4        |
| Class B Concrete                               | cu. yard    | 14.5     |

Note: These quantities are included in the estimated quantities table on Sheet No. B2.



PART PLAN

END BENT NO. 2

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 8 of 22

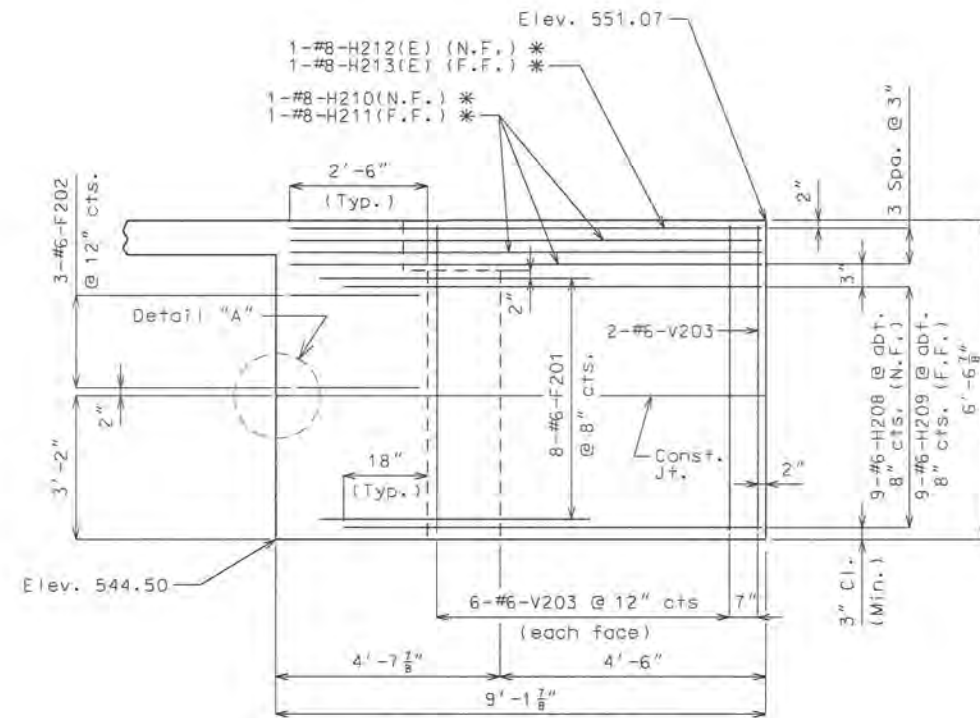
Designed: MAC  
Detailed: CAB  
Checked: CBW

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
836-797-5340  
www.jefcom.org

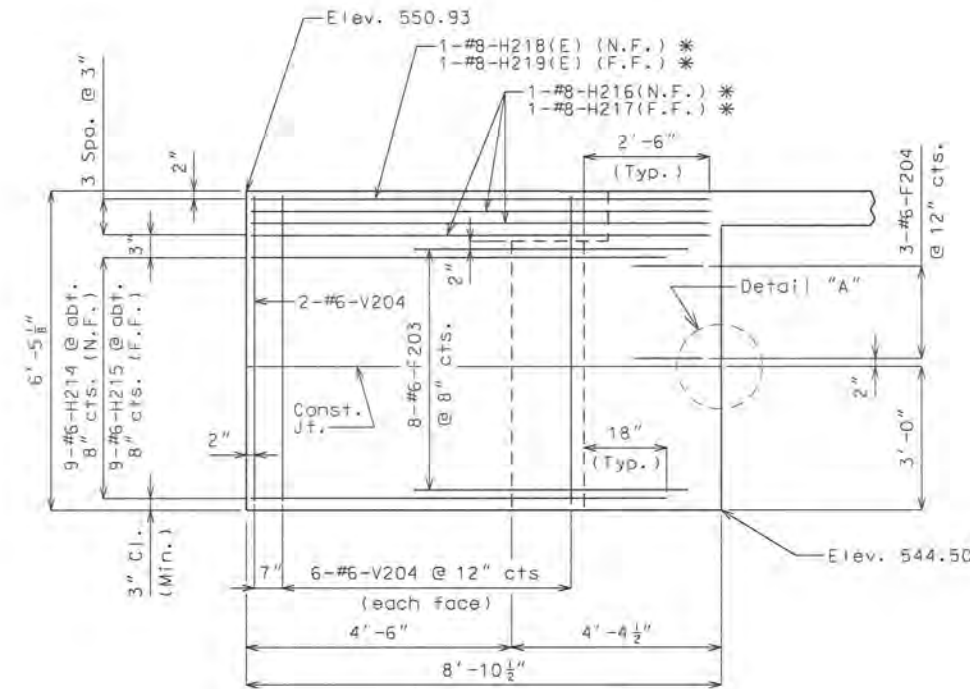
HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-5966  
www.horner-shifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000109  
Expiration Date: December 31, 2014

DETAILS OF END BENT NO. 2  
**VOGEL ROAD IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1

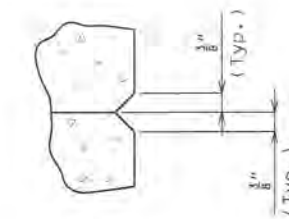




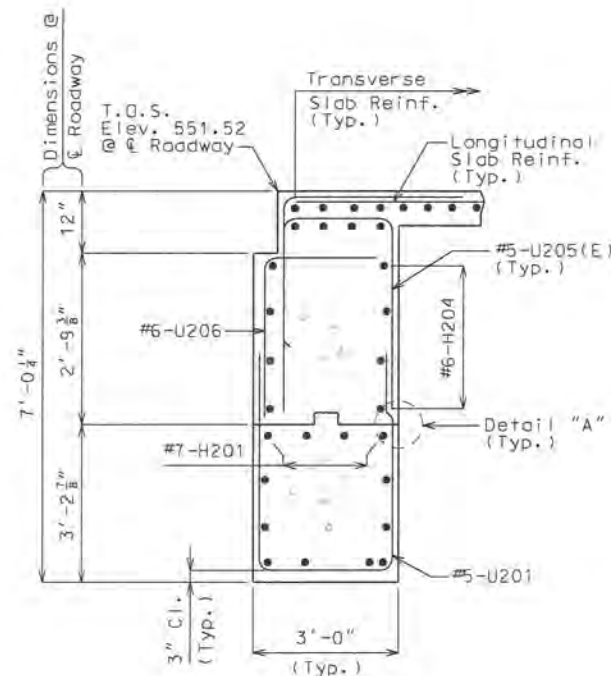
ELEVATION E-E



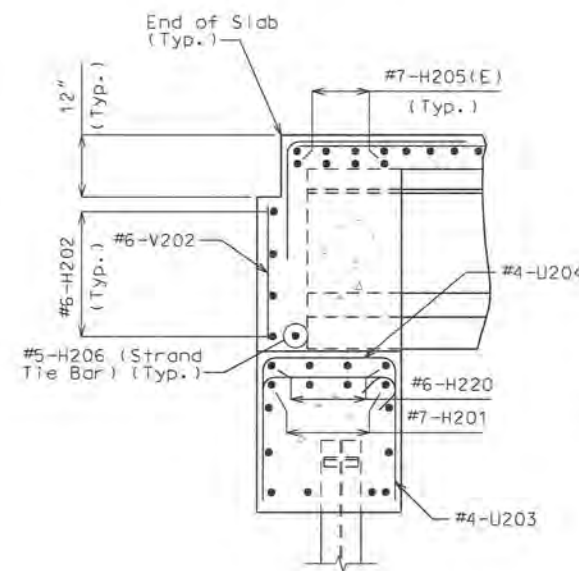
ELEVATION F-F



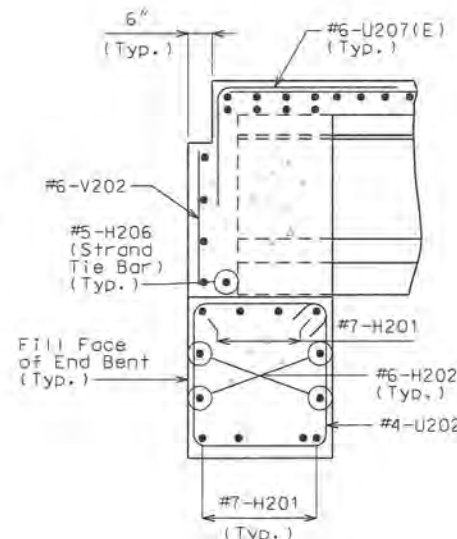
DETAIL "A"



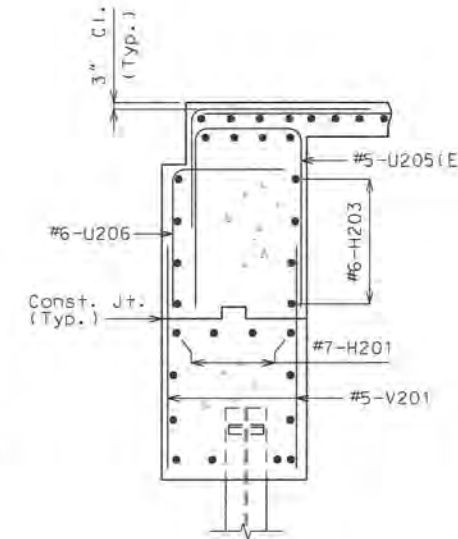
SECTION A-A



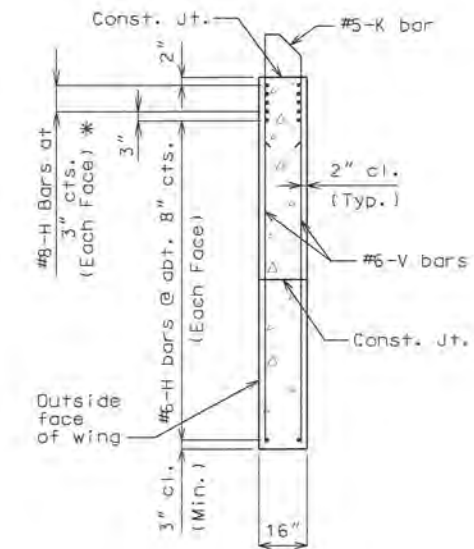
SECTION B-B



SECTION C-C



SECTION D-D



TYPICAL SECTION THRU WING

\* Placed with grade

Notes:

Work this sheet with Sheets No. B7 and B8.

For reinforcement of Safety Barrier Curb, see Sheets No. B14, B15 and B16.

END BENT NO. 2

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 9 of 22

Designed: MAC  
Detailed: CAB  
Checked: CBW



DATE PREPARED  
7/10/2014  
ROUTE  
STATE  
MO  
DISTRICT  
SHEET NO.  
B9  
COUNTY  
JEFFERSON  
JOB NO.  
1220700  
CONTRACT ID.  
PROJECT NO.  
STP-5403(644)  
BRIDGE NO.

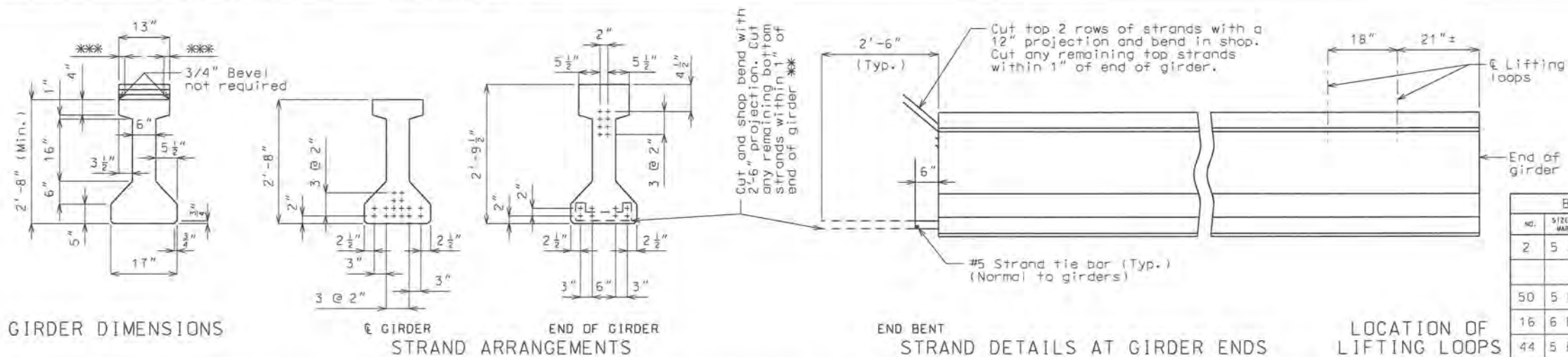
DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

HORNER & SHIRIN, INC.  
ENGINEERS  
5300 OAKLAND AVE., ST. LOUIS, MO 63110  
314-831-4321 FAX: 314-831-4966  
www.horner-shirin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

DETAILS OF END BENT NO. 2  
VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1



GIRDER DIMENSIONS

STRAND ARRANGEMENTS

END BENT  
STRAND DETAILS AT GIRDER ENDSLOCATION OF  
LIFTING LOOPS

Concrete for prestressed girders shall be Class A-1 with  $f'_c = 7,000$  psi and  $f'_ci = 5,000$  psi.

1+ indicates prestressing strand.

Use 16 strands with an initial prestress force of 496 kips.

Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 1/2" diameter in accordance with AASHTO M 203, Grade 270. Pretensioned members shall be in accordance with Sec 1029.

At the contractor's option the location for bent-up strands may be varied from that shown. The total number of bent-up strands shall not be changed. One strand tie bar is required for each layer of bent-up strands except at end bents which require one bar on the bottom layer of strands only. No additional payment will be made if additional strand tie bars are required.

At contractor's option a 1 1/2" to 1 3/4" smooth finish strip is permitted to facilitate placement of preformed fiber expansion joint material or expanded or extruded polystyrene bedding material for the prestressed panels.

| BILL OF REINFORCING STEEL - EACH GIRDER |             |               |       |                 |
|-----------------------------------------|-------------|---------------|-------|-----------------|
| NO.                                     | SIZE & MARK | ACTUAL LENGTH | SHAPE | BENDING DIAGRAM |
| 2                                       | 5 A1        | 44'-10"       | 20    |                 |
| 50                                      | 5 B1        | 4'-1"         | 11    |                 |
| 16                                      | 6 B2        | 3'-6"         | 11    |                 |
| 44                                      | 5 B3        | 4'-2"         | 11    |                 |
| 55                                      | 4 C1        | 13"           | 10    |                 |
| 110                                     | 4 D1        | 2'-4"         | 9     | SHAPE 20        |

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

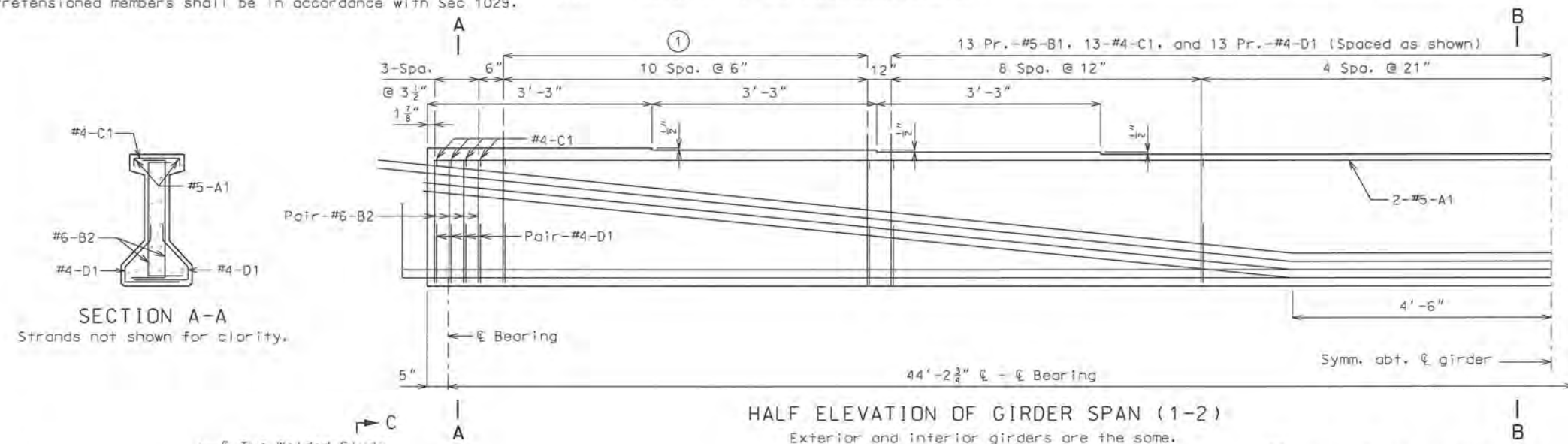
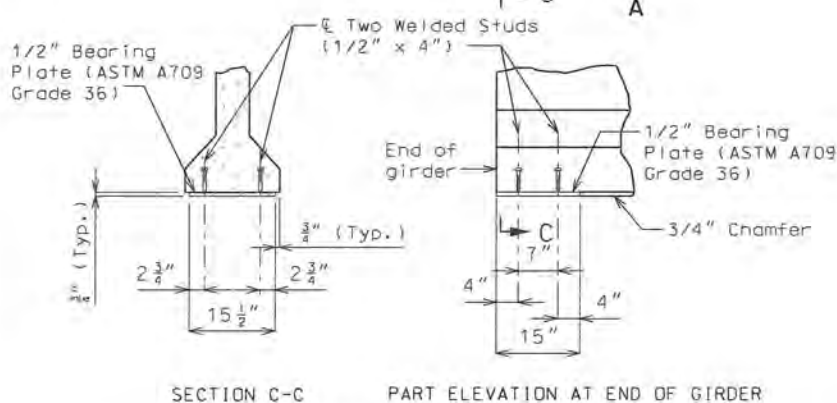
Actual lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1".

All reinforcement shall be Grade 60.

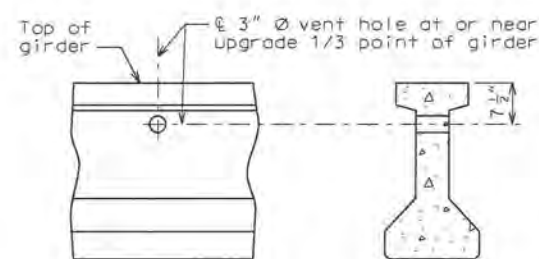
The two D1 bars may be furnished as one bar at the fabricator's option.

All B1 and B3 bars shall be epoxy coated.

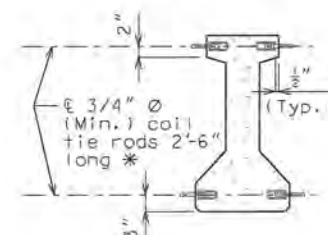
HALF ELEVATION OF GIRDER SPAN (1-2)  
Exterior and interior girders are the same.

BEARING PLATE DETAILS

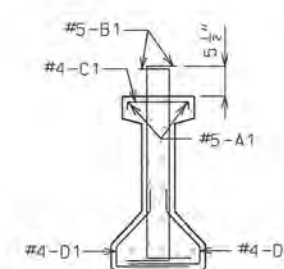
Galvanize the 1/2" bearing plate (ASTM A709 Grade 36) in accordance with ASTM A123. Cost of furnishing, galvanizing, and installing the 1/2" bearing plate (ASTM A709 Grade 36) and welded studs in the prestressed girder will be considered completely covered by the contract unit price for Prestressed Concrete I-Girder.

PART ELEVATION OF GIRDER  
PART SECTION NEAR VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2" minimum.



DETAILS OF COIL TIES

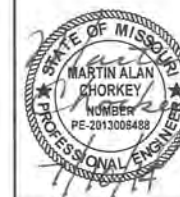
SECTION B-B  
Strands not shown for clarity.

Cost of 3/4" Ø coil tie rods placed in diaphragms will be considered completely covered by the contract unit price for Prestressed Concrete I-Girder.

Coil ties shall be held in place in the forms by slotted wire-setting-studs projecting through forms. Studs are to be left in place or replaced with temporary plugs until girders are erected, then replaced by coil tie rods.

For location of coil ties, see Sheets No. B4 and B8.

For Girder Camber Diagram, see Sheet No. B12.



DATE PREPARED  
7/9/2014

ROUTE STATE  
DISTRICT SHEET NO  
B10

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID

PROJECT NO.  
STP-5403(644)

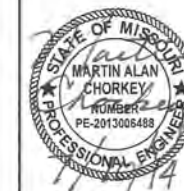
BRIDGE NO.











DATE PREPARED  
7/9/2014

ROUTE STATE  
MO

DISTRICT SHEET NO.  
B13

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

DESCRIPTION

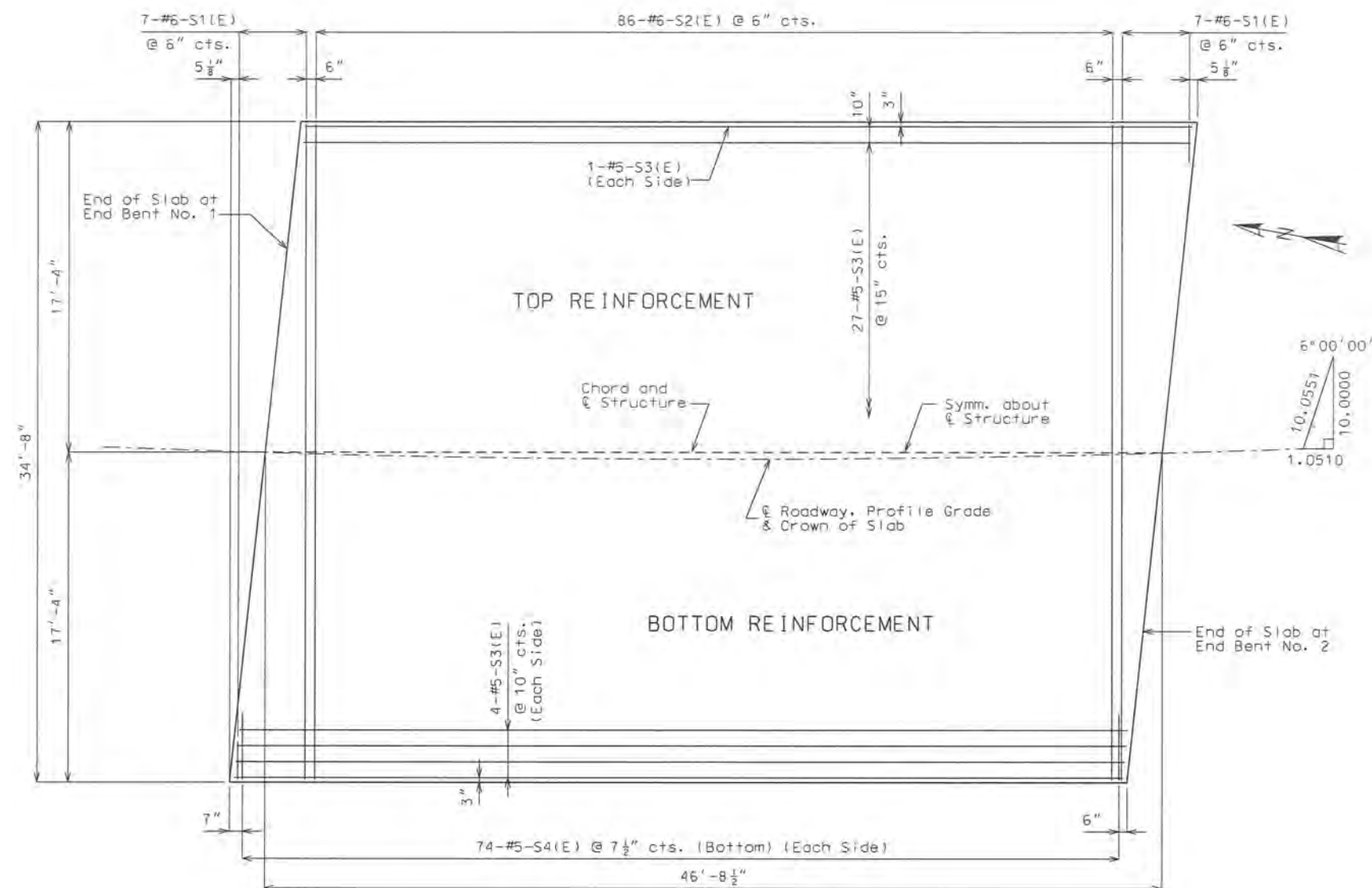
DATE

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
836-797-5340  
www.jeffco.org

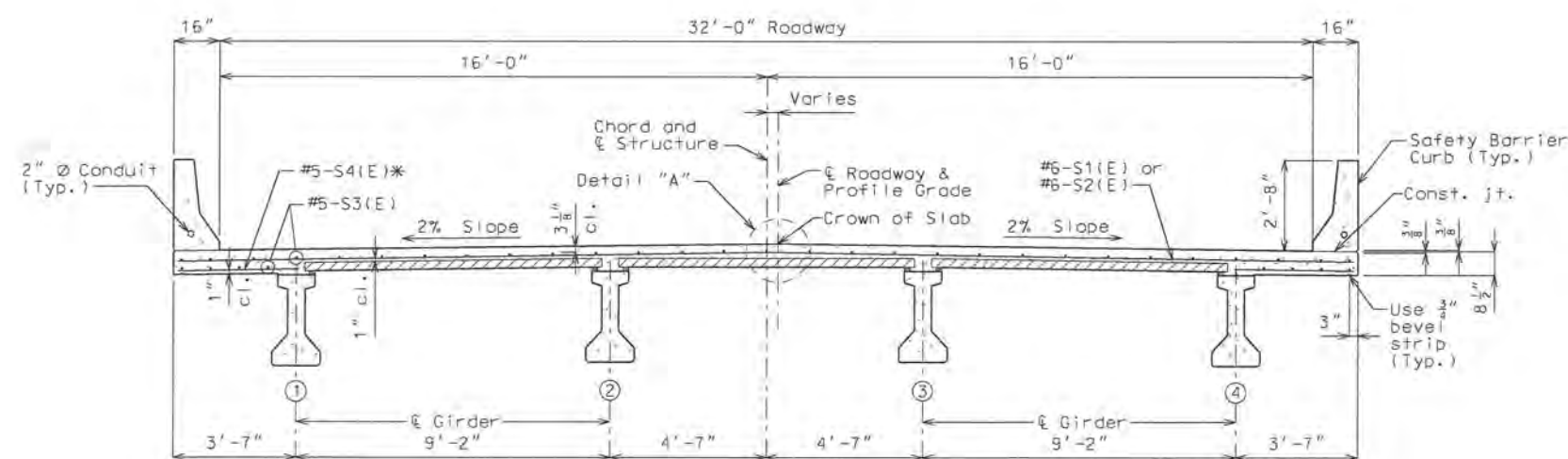
HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4996  
www.horner-shifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000109  
Expiration Date: December 31, 2014

SLAB DETAILS

VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1



PLAN OF SLAB SHOWING REINFORCEMENT



TYPICAL SECTION THRU SLAB

\* Alternate bar shape available, see Barrier Curb sheets.

Notes:

The contractor shall furnish an approved retarder to retard the set of the concrete to 2.5 hours and shall pour and satisfactorily finish the slab pours at a rate of not less than 25 cubic yards per hour.

The concrete diaphragm at the end bents shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

Longitudinal slab dimensions are measured horizontal.

For details of Precast Prestressed Panels, see Sheet No. B11.

For Theoretical Bottom of Slab Elevations, Theoretical Slab Haunching Diagram, and Girder Camber Diagram, see Sheet No. B12.

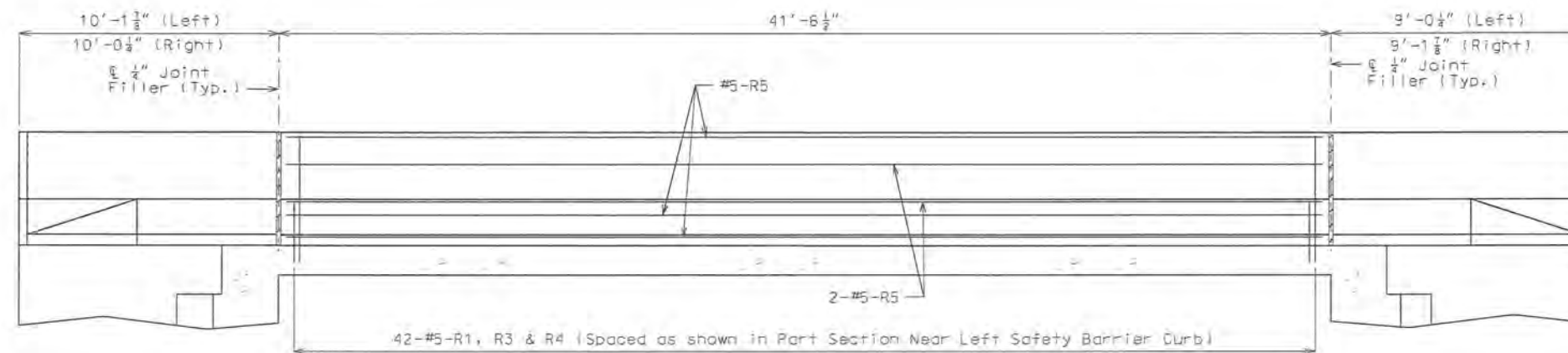
For details and reinforcement of the barrier curb not shown, see Sheets No. B14 thru B16.

For details of conduit system, see Sheet No. B19.

Designed: MAC  
Detailed: CAB  
Checked: CBW

Note: This drawing is not to scale. Follow dimensions.

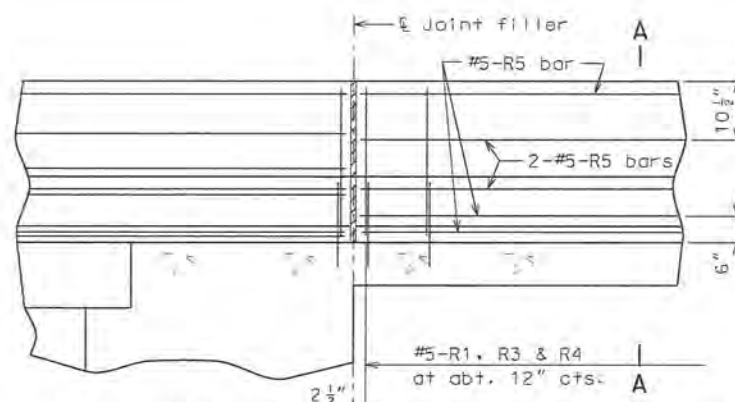
Sheet No.13 of 22



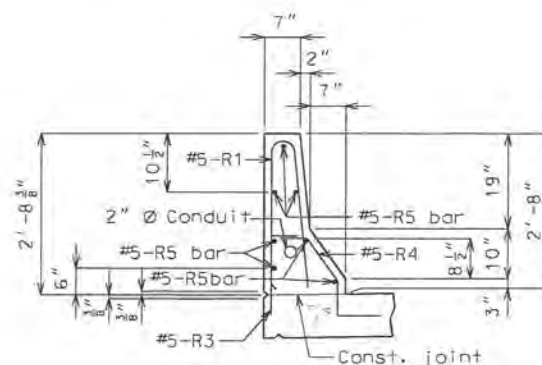
SPAN (1-2)

## SECTION NEAR LEFT SAFETY BARRIER CURB

(Right Barrier Curb similar as shown.)  
Note: Longitudinal dimensions are horizontal  
along outside face of curb.



PART SECTION NEAR LEFT SAFETY BARRIER CURB  
(CAST-IN-PLACE CONVENTIONAL FORMING OPTION)

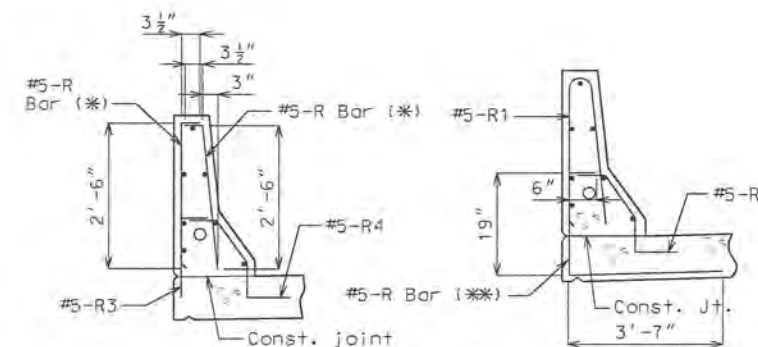


PART SECTION A-A

Notes:

Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

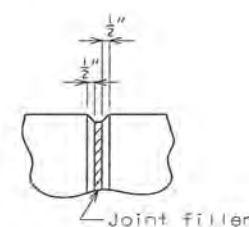
The cross-sectional area above the slab = 2.28 sq. ft.



R-BAR PERMISSIBLE ALTERNATE SHAPE

(\*) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)

(\*\*\*) The R3 bar and #5 bottom transverse slab bar in cantilever (P/S panels only) combination may be furnished as one bar as shown, at the contractor's option.



FILLED JOINT  
DETAIL

Notes:

Top of safety barrier curb shall be built parallel to grade with barrier curb joints (except at end bents) normal to grade.

All exposed edges of safety barrier curb shall have either a  $\frac{1}{2}$ " radius or a  $\frac{1}{8}$ " bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from end of wing to end of wing.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".

For details of Conduit System on Structure, see Sheet No. B19.



DATE PREPARED  
7/9/2014

|       |       |
|-------|-------|
| ROUTE | STATE |
|       | MO    |

|          |                  |
|----------|------------------|
|          | MO               |
| DISTRICT | SHEET NO.<br>B14 |

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

[illegible]

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
705 MAPLE STREET

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050

536-797-5340  
www.jeffcomo.org



**HORN &  
SHIFRIN, INC.**

**ENGINEERS**  
5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4331 FAX: 314-531-6966  
[www.HornerShilly.com](http://www.HornerShilly.com)  
Discipline: Professional Engineering  
Certificate of Authority: 000156  
Expiration Date: December 31, 2014

CAST-IN-PLACE BARRIER CURB

**VOGEL ROAD  
IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1



SECTION A-A

SECTION B-B

SECTION C-C

PART ELEVATION G-G

PART PLAN

1" Chamfer \_\_\_\_\_  
Transition 1" chamfer  
to 0" chamfer at Type  
A Curb height for curb  
gutter lines to match)

ELEVATION

ELEVATION

PLAN PLAN

Notes:

Use a minimum lap of 2'-0" between K9 and K10 or K13 bars.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".

SECTION D-D

SECTION E-E

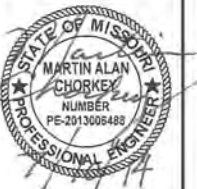
SECTION F-F

The top two K9, K10 or K13 bars shall be kept with position close to those shown in Sections A-A thru F-F

(K3 or K4 thru K8 bars not shown for clarity)

K1-K2 BAR PERMISSIBLE  
ALTERNATE SHAPE (\*\*\*)

(\*\*\*): The K1 and K2 bar combination may be furnished as one bar as shown, at the contractor's option.



DATE PREPARED  
7/9/2014

|          |                  |
|----------|------------------|
| ROUTE    | STATE<br>MO      |
| DISTRICT | SHEET NO.<br>B15 |

|              |           |
|--------------|-----------|
| COUNTY       | JEFFERSON |
| JOB NO.      | 1220700   |
| CONTRACT ID. |           |

|             |               |
|-------------|---------------|
| PROJECT NO. | STP-5403(644) |
| BRIDGE NO.  |               |

[illegible]

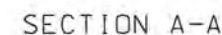
**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffco.mo.org](http://www.jeffco.mo.org)

**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
52500 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-6965  
[www.horner-shifrin.com](http://www.horner-shifrin.com)  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

**VOGEL ROAD  
IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1



Measurement of Safety Barrier Curb is to the nearest linear foot for each structure, measured along the outside top of slab from end of wing to end of wing.

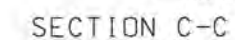
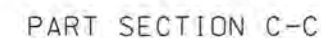


Cost of silicone joint sealant and backer rod, complete in place, will be considered completely covered by the contract unit price for Safety Barrier Curb.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".



(\*\*) The R3 bar and #5 bottom transverse slab bar in cantilever (P/S panels only) combination may be furnished as one bar at the contractor's option.



OPTIONAL SLIP-FORM BRIDGE  
SAFETY BARRIER CURB

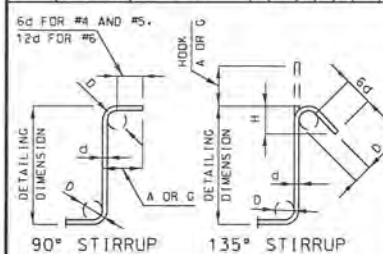
**VOGEL ROAD  
IMPROVEMENTS**

JEFFERSON COUNTY, MISSOURI

STP-5403(644) PHASE 1

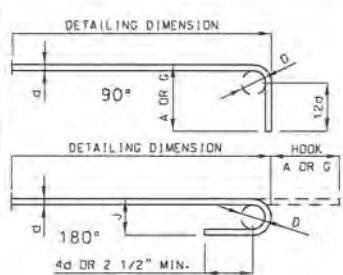


| BILL OF REINFORCING STEEL |        |          |                |           |           |             |             |            |          |            |        |     |       |     |       |     |        |     |        |       |        |                |               |        |     |     |     |     |
|---------------------------|--------|----------|----------------|-----------|-----------|-------------|-------------|------------|----------|------------|--------|-----|-------|-----|-------|-----|--------|-----|--------|-------|--------|----------------|---------------|--------|-----|-----|-----|-----|
| NO.                       | REQ'D. | MARK NO. | LOCATION       | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |        |     |       |     |       |     |        |     |        |       |        | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |     |     |     |     |
|                           |        |          |                |           |           |             |             |            |          | B          |        | C   |       | D   |       | E   |        | F   |        | H     |        |                |               |        | K   |     |     |     |
|                           |        |          |                |           |           |             |             |            |          | FT.        | IN.    | FT. | IN.   | FT. | IN.   | FT. | IN.    | FT. | IN.    | FT.   | IN.    |                |               |        | FT. | IN. | FT. | IN. |
|                           |        |          | SUPERSTR       |           |           |             |             |            |          |            |        |     |       |     |       |     |        |     |        |       |        |                |               |        |     |     |     |     |
|                           |        |          | END BENT NO. 1 |           |           |             |             |            |          |            |        |     |       |     |       |     |        |     |        |       |        |                |               |        |     |     |     |     |
| 9                         | 6      | F101     | BEAM & DIAPH   |           | 23        |             |             |            |          | 1          | 2.000  | 4   | 0.625 | 1   | 2.000 | 0   | 10.375 | 0   | 9.375  | 0     | 10.375 | 0              | 9.375         | 6      | 5   | 6   | 4   | 86  |
| 3                         | 6      | F102     | DIAPH          |           | 14        |             |             |            |          |            |        | 5   | 2.750 | 2   | 9.125 |     |        |     | 2      | 9.000 | 0      | 3.500          | 8             | 0      | 7   | 10  | 35  |     |
| 9                         | 6      | F103     | BEAM & DIAPH   |           | 23        |             |             |            |          | 1          | 2.000  | 4   | 6.000 | 1   | 2.000 | 0   | 9.375  | 0   | 10.375 | 0     | 9.375  | 0              | 10.375        | 6      | 10  | 6   | 9   | 91  |
| 3                         | 6      | F104     | DIAPH          |           | 21        |             |             |            |          | 2          | 9.125  | 5   | 2.750 |     |       |     |        |     | 2      | 9.000 | 0      | 3.500          | 8             | 0      | 7   | 10  | 35  |     |
|                           |        |          |                |           |           |             |             |            |          |            |        |     |       |     |       |     |        |     |        |       |        |                |               |        |     |     |     |     |
| 8                         | 7      | H101     | BEAM           |           | 20        |             |             |            |          | 34         | 7.000  |     |       |     |       |     |        |     |        |       |        |                | 34            | 7      | 34  | 7   | 566 |     |
| 8                         | 6      | H102     | BEAM & DIAPH   |           | 20        |             |             |            |          | 34         | 7.000  |     |       |     |       |     |        |     |        |       |        |                | 34            | 7      | 34  | 7   | 416 |     |
| 8                         | 6      | H103     | DIAPH          |           | 20        |             |             |            |          | 2          | 7.500  |     |       |     |       |     |        |     |        |       |        |                | 2             | 8      | 2   | 8   | 32  |     |
| 12                        | 6      | H104     | DIAPH          |           | 20        |             |             |            |          | 7          | 6.000  |     |       |     |       |     |        |     |        |       |        |                | 7             | 6      | 7   | 6   | 135 |     |
| 4                         | 7      | H105     | DIAPH          | E         | 20        |             |             |            |          | 34         | 7.000  |     |       |     |       |     |        |     |        |       |        |                | 34            | 7      | 34  | 7   | 283 |     |
| 4                         | 5      | H106     | STRAND TIE     |           | 20        |             |             |            |          | 3          | 11.000 |     |       |     |       |     |        |     |        |       |        |                | 3             | 11     | 3   | 11  | 16  |     |
| 10                        | 6      | H108     | WING           |           | 20        |             |             |            |          | 8          | 6.000  |     |       |     |       |     |        |     |        |       |        |                | 8             | 6      | 8   | 6   | 128 |     |
| 10                        | 6      | H109     | WING           |           | 19        |             |             |            |          | 8          | 6.000  | 1   | 0.000 |     |       |     |        |     |        |       |        |                | 9             | 6      | 9   | 4   | 140 |     |
| 1                         | 8      | H110     | WING           |           | 20        |             |             |            |          | 9          | 6.000  |     |       |     |       |     |        |     |        |       |        |                | 9             | 6      | 9   | 6   | 25  |     |
| 1                         | 8      | H111     | WING           |           | 19        |             |             |            |          | 9          | 6.000  | 1   | 5.000 |     |       |     |        |     |        |       |        |                | 10            | 11     | 10  | 9   | 29  |     |
| 1                         | 8      | H112     | WING           | E         | 20        |             |             |            |          | 9          | 6.000  |     |       |     |       |     |        |     |        |       |        |                | 9             | 6      | 9   | 6   | 25  |     |
| 1                         | 8      | H113     | WING           | E         | 19        |             |             |            |          | 9          | 6.000  | 1   | 5.000 |     |       |     |        |     |        |       |        |                | 10            | 11     | 10  | 9   | 29  |     |
| 10                        | 6      | H114     | WING           |           | 20        |             |             |            |          | 8          | 3.000  |     |       |     |       |     |        |     |        |       |        |                | 8             | 3      | 8   | 3   | 124 |     |
| 1                         |        |          |                |           |           |             |             |            |          |            |        |     |       |     |       |     |        |     |        |       |        |                |               |        |     |     |     |     |



| STIRRUP HOOK DIMENSIONS |            |                |                |                |              |
|-------------------------|------------|----------------|----------------|----------------|--------------|
| GRADES 40 - 50 - 60 KSI |            |                |                |                |              |
| BAR<br>SIZE             | D<br>(IN.) | 90° HOOK       |                | 135° HOOK      |              |
|                         |            | HOKK<br>A OR G | HOKK<br>A OR G | HOKK<br>A OR G | APPROX.<br>H |
| #4                      | 2"         | 4 1/2"         | 4 1/2"         | 3"             |              |
| #5                      | 2 1/2"     | 6"             | 5 1/2"         | 3 3/4"         |              |
| #6                      | 4 1/2"     | 12"            | 8"             | 4 1/2"         |              |

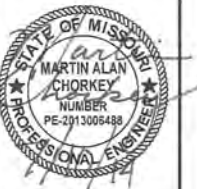
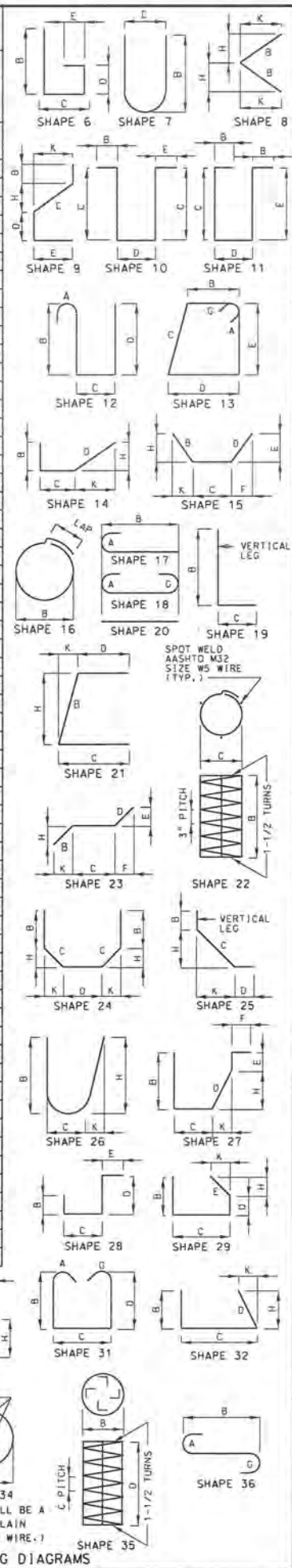
NOTE: UNLESS OTHERWISE NOTED DIAMETER  
"D" IS THE SAME FOR ALL BENDS AND HOOKS  
ON A BAR.



| END HOOK DIMENSIONS |            |            |         |           |
|---------------------|------------|------------|---------|-----------|
| BAR<br>SIZE         | D<br>(IN.) | ALL GRADES |         |           |
|                     |            | 180° HOOKS |         | 90° HOOKS |
|                     |            | A OR G     | A       | G         |
| #3                  | 2 1/4"     | 5"         | 3"      | A OR G    |
| #4                  | 3"         | 6"         | 4"      | B"        |
| #5                  | 3 3/4"     | 7"         | 5"      | 10"       |
| #6                  | 4 1/2"     | 8"         | 6"      | 12"       |
| #7                  | 5 1/4"     | 10"        | 7"      | 14"       |
| #8                  | 6"         | 11"        | 8"      | 16"       |
| #9                  | 9 1/2"     | 15"        | 11 3/4" | 19"       |
| #10                 | 10 3/4"    | 17"        | 13 1/4" | 22"       |
| #11                 | 12"        | 19"        | 14 3/4" | 2' 0"     |
| #14                 | 18 1/4"    | 2' 3"      | 21 3/4" | 2' 7"     |

**NOTE:**  
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME  
PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.  
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.  
E = EPOXY COATED REINFORCEMENT.  
S = STIRRUP.  
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.  
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE  
AND THE FOLLOWING LINE.  
NO. EA. = NUMBER OF BARS OF EACH LENGTH.  
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND  
ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)  
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.  
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.  
90 ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO  
BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE  
SPICES OR SPACERS.  
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

| BILL OF REINFORCING STEEL |        |          |          |           |           |             |             |            |          |            |        |        |       |       |       |     |       |     |     |     |     |                |               |        |     |     |
|---------------------------|--------|----------|----------|-----------|-----------|-------------|-------------|------------|----------|------------|--------|--------|-------|-------|-------|-----|-------|-----|-----|-----|-----|----------------|---------------|--------|-----|-----|
| NO.                       | REQ'D. | MARK NO. | LOCATION | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |        |        |       |       |       |     |       |     |     |     |     | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |     |     |
|                           |        |          |          |           |           |             |             |            |          | B          |        | C      |       | D     |       | E   |       | F   |     | H   |     |                |               |        | K   |     |
|                           |        |          |          |           |           |             |             |            |          | FT.        | IN.    | FT.    | IN.   | FT.   | IN.   | FT. | IN.   | FT. | IN. | FT. | IN. |                |               |        | FT. | IN. |
|                           |        | 8 H213   | WING     | E         | 19        |             |             |            |          | 8          | 6.000  | 1      | 5.000 |       |       |     |       |     | 9   | 11  | 9   | 9              | 26            |        |     |     |
|                           |        | 6 H214   | WING     |           | 20        |             |             |            |          | 7          | 3.000  |        |       |       |       |     |       |     | 7   | 3   | 7   | 3              | 98            |        |     |     |
|                           |        | 6 H215   | WING     |           | 19        |             |             |            |          | 7          | 3.000  | 1      | 0.000 |       |       |     |       |     | 8   | 3   | 8   | 1              | 109           |        |     |     |
|                           |        | 8 H216   | WING     |           | 20        |             |             |            |          | 8          | 3.000  |        |       |       |       |     |       |     | 8   | 3   | 8   | 3              | 22            |        |     |     |
|                           |        | 8 H217   | WING     |           | 19        |             |             |            |          | 8          | 5.000  | 1      | 5.000 |       |       |     |       |     | 9   | 8   | 9   | 6              | 25            |        |     |     |
|                           |        | 8 H218   | WING     | E         | 20        |             |             |            |          | 8          | 3.000  |        |       |       |       |     |       |     | 8   | 3   | 8   | 3              | 22            |        |     |     |
|                           |        | 8 H219   | WING     | E         | 19        |             |             |            |          | 8          | 3.000  | 1      | 5.000 |       |       |     |       |     | 9   | 8   | 9   | 6              | 25            |        |     |     |
|                           |        | 6 H220   | BEAM     |           | 20        |             |             |            |          | 2          | 10.000 |        |       |       |       |     |       |     | 2   | 10  | 2   | 10             | 17            |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |        |        |       |       |       |     |       |     |     |     |     |                |               |        |     |     |
|                           |        | 5 U201   | BEAM     |           | 10        | S           |             |            |          |            | 4      | 11.000 | 2     | 9.000 |       |     |       |     | 12  | 7   | 12  | 4              | 334           |        |     |     |
|                           |        | 4 U202   | BEAM     |           | 13        | S           |             |            |          | 2          | 9.000  | 2      | 7.500 | 2     | 9.000 | 2   | 7.500 |     | 11  | 6   | 11  | 3              | 75            |        |     |     |
|                           |        | 6 U203   | BEAM     |           | 10        | S           |             |            |          | 2          | 7.500  | 2      | 9.000 |       |       |     |       |     | 8   | 0   | 7   | 10             | 31            |        |     |     |
|                           |        | 4 U204   | BEAM     |           | 10        | S           |             |            |          |            | 0      | 9.500  | 2     | 9.000 |       |     |       |     | 4   | 4   | 4   | 2              | 11            |        |     |     |
|                           |        | 5 U205   | DIAPH    | E         | 10        | S           |             |            |          |            | 3      | 1.750  | 2     | 3.000 |       |     |       |     | 8   | 7   | 8   | 4              | 278           |        |     |     |
|                           |        | 6 U206   | DIAPH    |           | 19        | S           |             |            |          | 2          | 5.000  | 2      | 9.000 |       |       |     |       |     | 5   | 2   | 5   | 0              | 240           |        |     |     |
|                           |        | 6 U207   | DIAPH    | E         | 19        | S           |             |            |          | 3          | 0.000  | 4      | 5.500 |       |       |     |       |     | 7   | 6   | 7   | 4              | 474           |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |        |        |       |       |       |     |       |     |     |     |     |                |               |        |     |     |
|                           |        | 5 V201   | BEAM     |           | 20        |             |             |            |          | 4          | 11.000 |        |       |       |       |     |       |     | 4   | 11  | 4   | 11             | 62            |        |     |     |
|                           |        | 6 V202   | DIAPH    |           | 20        |             |             |            |          | 2          | 5.000  |        |       |       |       |     |       |     | 2   | 5   | 2   | 5              | 44            |        |     |     |
|                           |        | 6 V203   | WING     |           | 20        |             |             |            |          | 6          | 2.000  |        |       |       |       |     |       |     | 6   | 2   | 6   | 2              | 130           |        |     |     |
|                           |        | 6 V204   | WING     |           | 20        |             |             |            |          | 6          | 1.000  |        |       |       |       |     |       |     | 6   | 1   | 6   | 1              | 128           |        |     |     |
|                           |        |          | SLAB     |           |           |             |             |            |          |            |        |        |       |       |       |     |       |     |     |     |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |        |        |       |       |       |     |       |     |     |     |     |                |               |        |     |     |
|                           |        | 6 S1     | SLAB     | E</       |           |             |             |            |          |            |        |        |       |       |       |     |       |     |     |     |     |                |               |        |     |     |



DATE PREPARED  
7/9/2014

|          |          |
|----------|----------|
| ROUTE    | STATE    |
|          | MO       |
| DISTRICT | SHEET NO |
|          | B17      |

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

|             |               |
|-------------|---------------|
| PROJECT NO. | STP-5403(644) |
| BRIDGE NO.  |               |

| DESCRIPTION | DATE | AMOUNT | REMARKS |
|-------------|------|--------|---------|
| ...         | ...  | ...    | ...     |

DATE \_\_\_\_\_

**JEFFERSON COUNTY, MISSOURI**  
 MAPLE STREET ANNEX  
 725 MAPLE STREET  
 P.O. BOX 100  
 HILLSBORO, MO 63050  
 636-797-5340  
[www.jeffco.org](http://www.jeffco.org)

**HORNER &  
SHIFRIN, INC.**  
**ENGINEERS**  
5200 OAKLAND AVE. ST. LOUIS, MO 63119  
314-531-4321 FAX: 314-531-4860  
[www.horner-shifrin.com](http://www.horner-shifrin.com)  
Discipline: Professional Engineering  
Certificate of Authority: 000159

**VOGEL ROAD  
IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1

Designed: MAC  
Detailed: CBW  
Checked: MAB

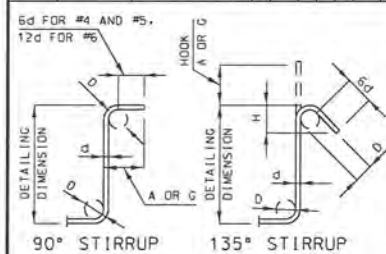
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 17 of 22

### BENDING DIAGRAMS

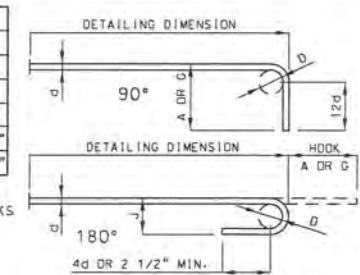


| BILL OF REINFORCING STEEL |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               |        |
|---------------------------|--------|----------|---------------------|-----------|-----------|-------------|-------------|------------|----------|------------|-----|-----|-----|-----|-----|-----|----------------|---------------|--------|
| NO.                       | REQ'D. | MARK NO. | LOCATION            | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |     |     |     |     |     |     |                |               |        |
|                           |        |          |                     |           |           |             |             |            |          | B          | C   | D   | E   | F   | H   | K   | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |
|                           |        |          |                     |           |           |             |             |            |          | FT.        | IN. | FT. | IN. | FT. | IN. | FT. | IN.            | FT.           | IN.    |
|                           |        |          | TOTALS              |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               |        |
| 4                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 234    |
| 4                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 158    |
| 5                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 824    |
| 5                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 5902   |
| 6                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 3775   |
| 6                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 5751   |
| 7                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 1132   |
| 7                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 566    |
| 8                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 203    |
| 8                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 203    |
|                           |        |          | TOTAL               |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 6168   |
|                           |        |          | TOTAL               |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 12580  |
|                           |        |          | SLAB ON GIRDER      |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               |        |
| 4                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 234    |
| 5                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 824    |
| 5                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 2910   |
| 6                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 3775   |
| 6                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 5751   |
| 7                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 1132   |
| 7                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 566    |
| 8                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 203    |
| 8                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 203    |
|                           |        |          | TOTAL               |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 6168   |
|                           |        |          | TOTAL               |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 9430   |
|                           |        |          | SAFETY BARRIER CURB |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               |        |
| 4                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 158    |
| 5                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 2858   |
|                           |        |          | TOTAL               |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 3016   |
|                           |        |          | SLIP FORM OPTION    |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               |        |
| 5                         |        |          |                     |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 134    |
|                           |        |          | TOTAL               |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               | 134    |



| STIRRUP HOOK DIMENSIONS |         |                 |                  |           |
|-------------------------|---------|-----------------|------------------|-----------|
| GRADES 40 - 50 - 60 KSI |         |                 |                  |           |
| BAR SIZE                | D (IN.) | 90° HOOK A OR G | 135° HOOK A OR G | APPROX. H |
| #4                      | 2"      | 4 1/2"          | 4 1/2"           | 3"        |
| #5                      | 2 1/2"  | 6"              | 5 1/2"           | 3 3/4"    |
| #6                      | 4 1/2"  | 12"             | 8"               | 4 1/2"    |

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



| END HOOK DIMENSIONS |         |                  |                 |           |
|---------------------|---------|------------------|-----------------|-----------|
| ALL GRADES          |         |                  |                 |           |
| BAR SIZE            | D (IN.) | 180° HOOK A OR G | 90° HOOK A OR G | APPROX. H |
| #3                  | 2 1/4"  | 5"               | 3"              | 6"        |
| #4                  | 3"      | 6"               | 4"              | 8"        |
| #5                  | 3 3/4"  | 7"               | 5"              | 10"       |
| #6                  | 4 1/2"  | 8"               | 6"              | 12"       |
| #7                  | 5 1/4"  | 10"              | 7"              | 14"       |
| #8                  | 6"      | 11"              | 8"              | 16"       |
| #9                  | 9 1/2"  | 15"              | 11 3/4"         | 19"       |
| #10                 | 10 3/4" | 17"              | 13 1/4"         | 22"       |
| #11                 | 12"     | 19"              | 14 3/4"         | 24"       |
| #14                 | 18 1/4" | 27"              | 21 3/4"         | 27"       |

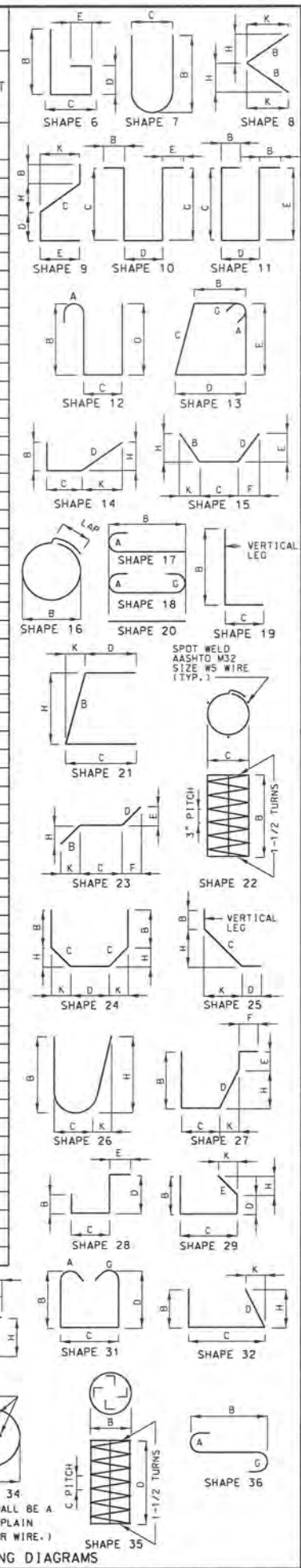
NOTE: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET. E = EPOXY COATED REINFORCEMENT. S = STIRRUP. X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES. V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE. NO. EA. = NUMBER OF BARS OF EACH LENGTH. NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH). ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH. PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS. FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS. REINFORCING STEEL (GRADE 60) F<sub>y</sub> = 60,000 PSI.

Designed: MAC  
Detailed: CBW  
Checked: MAB

Note: This drawing is not to scale. Follow dimensions.

Sheet No.18 of 22

| BILL OF REINFORCING STEEL |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |                |               |        |
|---------------------------|--------|----------|----------|-----------|-----------|-------------|-------------|------------|----------|------------|-----|-----|-----|-----|-----|-----|----------------|---------------|--------|
| NO.                       | REQ'D. | MARK NO. | LOCATION | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          | B          | C   | D   | E   | F   | H   | K   | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |
|                           |        |          |          |           |           |             |             |            |          | FT.        | IN. | FT. | IN. | FT. | IN. | FT. | IN.            | FT.           | IN.    |



DATE PREPARED  
7/9/2014

ROUTE  
MO

DISTRICT  
SHEET NO.  
B18

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050

636-797-5340  
www.jeffcom.org

HORNER & SHIFRIN, INC.  
ENGINEERS

5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-0966  
www.horner-shifrin.com

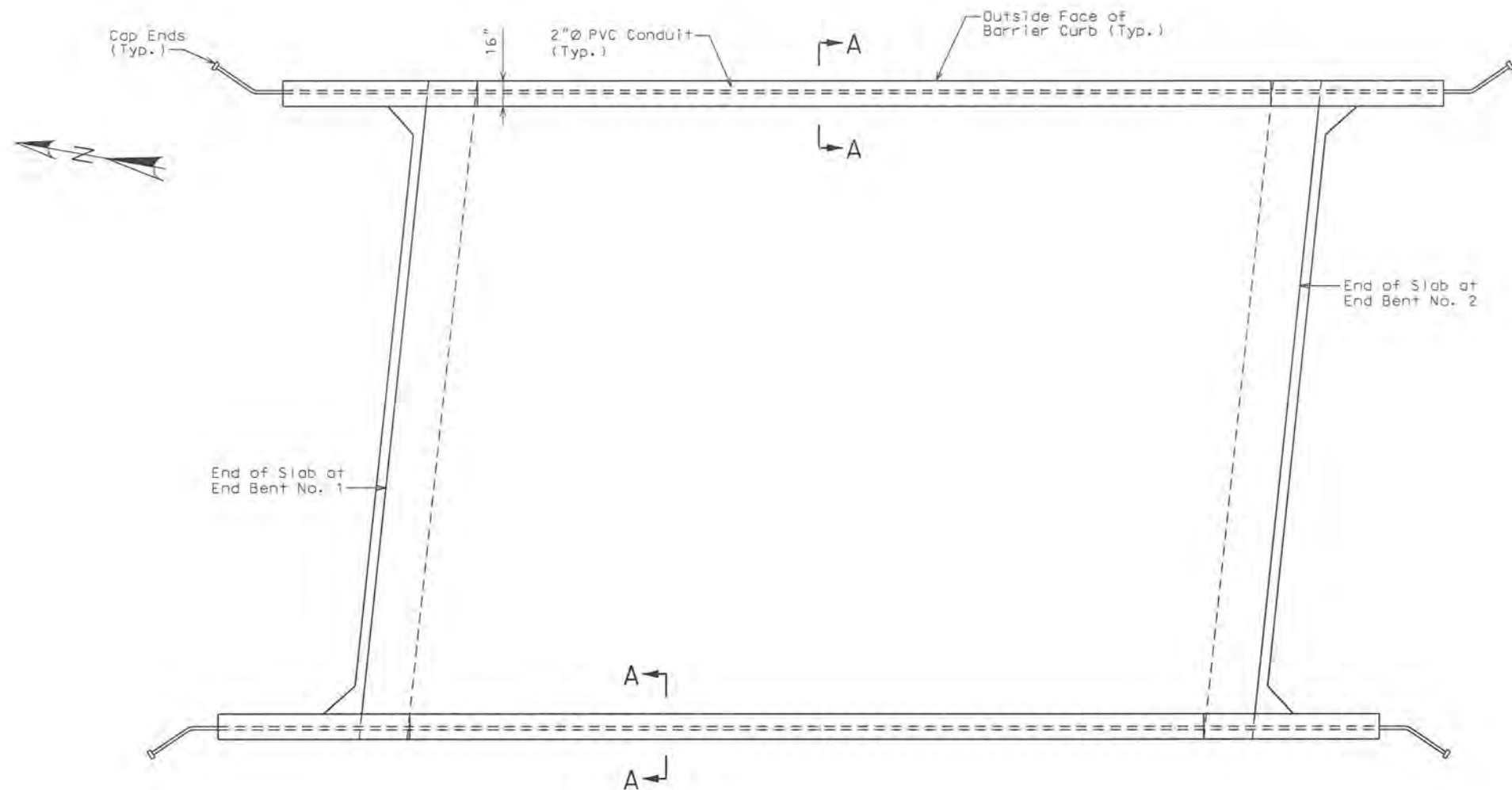
Discipline: Professional Engineering  
Certificate of Authority: 003159  
Expiration Date: December 31, 2014

BILL OF REINFORCING STEEL

VOGEL ROAD IMPROVEMENTS

JEFFERSON COUNTY, MISSOURI

STP-5403(644) PHASE 1



PLAN

**Notes:**

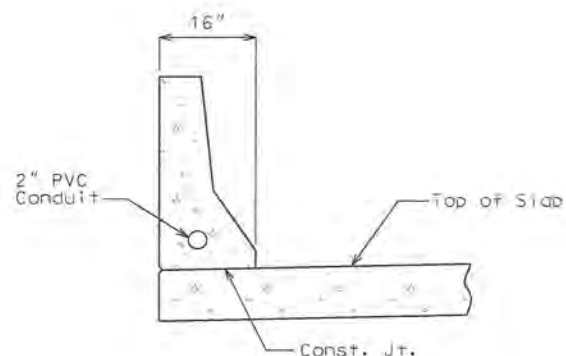
All conduits shall be rigid non-metallic schedule 40 heavy wall polyvinyl chloride (PVC) with 3" minimum cover in concrete. Each section of conduit shall bear the Underwriters Laboratories (UL) label.

Shift reinforcing steel in field where necessary to clear conduit.

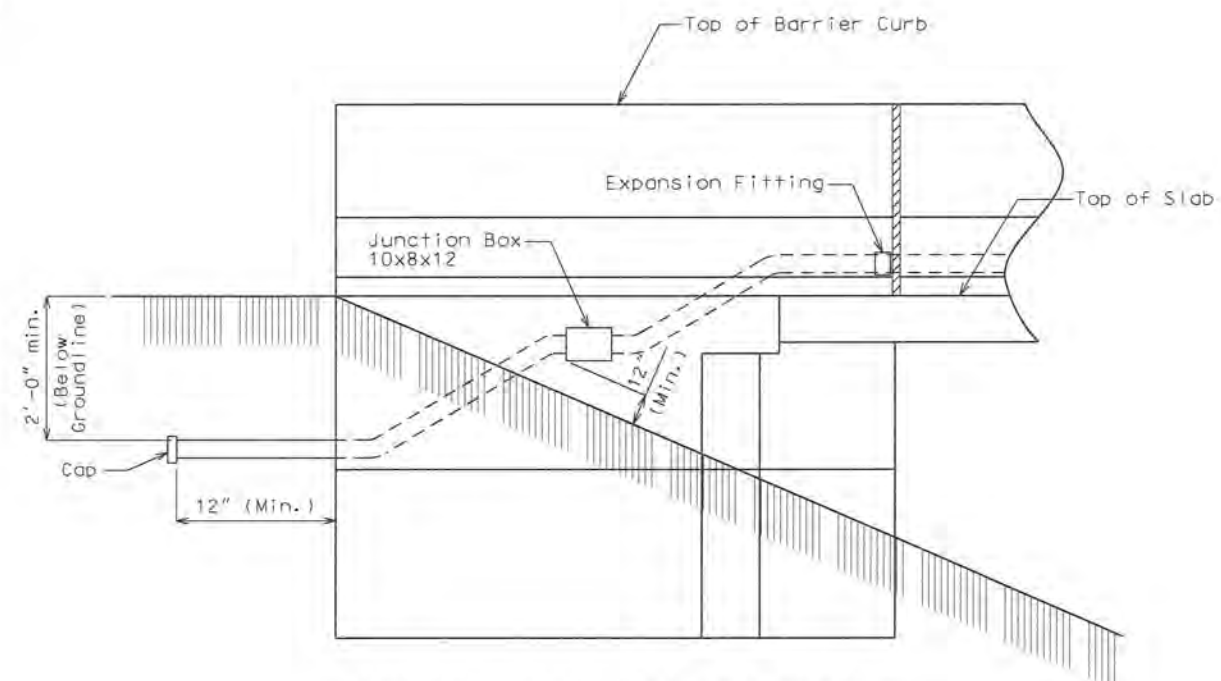
Expansion fittings shall be placed and set in accordance with the manufacturer's requirements and based on air temperature at the time of setting given an estimated total expansion movement of 1" at filled joints using a maximum temperature range of 120° F and a maximum temperature of 110° F.

Drainage shall be provided at low points and other critical locations of all conduits in accordance with Sec. 707. All conduits shall be sloped to drain where possible.

Payment for furnishing and installing Conduit System, complete-in-place, will be considered completely covered by the contract lump sum price for Conduit System on Structure.



SECTION A-A

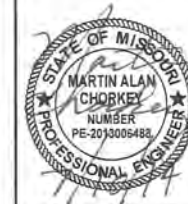


TYPICAL DETAIL AT END BENTS

Designed: MAB  
Detailed: CBW  
Checked: MAB

Note: This drawing is not to scale. Follow dimensions.

Sheet No.19 of 22



DATE PREPARED  
7/10/2014

ROUTE  
MO

DISTRICT  
SHEET NO.  
B19

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.





| LOG OF BORING NO. B-1                                                                                                                              |         |          |             |                                                                                                                                              |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------|-------------------------------|------------------|---------------|
| Project Description: <b>Vogel Road Improvements<br/>Arnold, Missouri</b>                                                                           |         |          |             |                                                                                                                                              |            | Geotechnical Engineering<br>5850 Arsenal Street<br>St. Louis, Missouri 63139<br>(314) 644-3134 (314) 644-3135 FAX |                                                               |                                  | TSI<br>INCORPORATED           |                  |               |
| Depth, feet                                                                                                                                        | Samples | Sample # | Graphic Log | Surface El.:<br>Location: <b>See Site and Boring<br/>Location Plan</b>                                                                       | Recovery % | ROD                                                                                                               | Penetration<br>Blows Per 6 inches<br>Hand Penetrometer<br>TSF | Undrained<br>Shear Strength, TSF | Unit Dry Weight,<br>lb/cu ft. | Water Content, % | Plastic Limit |
| MATERIAL DESCRIPTION                                                                                                                               |         |          |             |                                                                                                                                              |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             | Asphaltic concrete (12.0")                                                                                                                   |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         | SS-1     |             | Crushed limestone, with gravel and<br>silt (FILL)                                                                                            | 33         |                                                                                                                   | 8<br>9<br>6                                                   |                                  |                               | 5                |               |
|                                                                                                                                                    |         | SS-2     |             | Gray, Limestone pieces, with<br>lean clay                                                                                                    | 67         |                                                                                                                   | 11<br>10<br>9                                                 |                                  |                               | 9                |               |
| 5                                                                                                                                                  |         | SS-3     |             |                                                                                                                                              | 67         |                                                                                                                   | 8<br>15<br>20                                                 |                                  |                               | 13               |               |
|                                                                                                                                                    |         | SS-4     |             | (24% passing No. 200 sieve)                                                                                                                  | 78         |                                                                                                                   | 10<br>10<br>11                                                |                                  |                               | 8                |               |
| 10                                                                                                                                                 |         |          |             |                                                                                                                                              |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         | SS-5     |             | Brown, fat CLAY (CH), with<br>limestone pieces                                                                                               |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             |                                                                                                                                              |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| 15                                                                                                                                                 |         |          |             |                                                                                                                                              | 89         |                                                                                                                   | 10<br>8<br>13                                                 | 3.25                             |                               | 23               |               |
|                                                                                                                                                    |         | SS-6     |             | Gray, Limestone pieces, with fat<br>clay                                                                                                     | 44         |                                                                                                                   | 7<br>7<br>50/6"                                               |                                  |                               | 18               |               |
| 20                                                                                                                                                 |         |          |             |                                                                                                                                              |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         | RUN1     |             | Gray, weathered LIMESTONE                                                                                                                    | 100        | 67                                                                                                                |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             | LIMESTONE, gray, moderately<br>hard, slightly weathered, medium<br>crystalline, medium bedded<br>- 2.0" gray, soft shale seam at<br>21.1 ft. |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         | RUN2     |             | - shaley, hard, very finely<br>crystalline from 21.75 to 25.0 ft.                                                                            | 100        | 90                                                                                                                |                                                               |                                  |                               |                  |               |
| 25                                                                                                                                                 |         |          |             |                                                                                                                                              |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| Completion Depth: 30.00<br>Date Boring Started: 11/28/12<br>Date Boring Completed: 11/28/12<br>Engineer/Geologist: JAO<br>Project No.: 20121098.01 |         |          |             | Remarks: Boring drilled with CME 550 using HSA and auto SPT.<br>Groundwater not encountered during drilling.<br>Auger refusal at 20.0 ft.    |            |                                                                                                                   |                                                               |                                  |                               |                  |               |

The stratification lines represent approximate strata boundaries.  
In situations, the transition may be gradual.

Continued Next Page

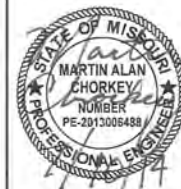
| LOG OF BORING NO. B-1                                                                                                                              |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------|-------------------------------|------------------|---------------|
| Project Description: <b>Vogel Road Improvements<br/>Arnold, Missouri</b>                                                                           |         |          |             |                                                                                                                                           |            | Geotechnical Engineering<br>5850 Arsenal Street<br>St. Louis, Missouri 63139<br>(314) 644-3134 (314) 644-3135 FAX |                                                               |                                  | TSI<br>INCORPORATED           |                  |               |
| Depth, feet                                                                                                                                        | Samples | Sample # | Graphic Log | Surface El.:<br>Location: <b>See Site and Boring<br/>Location Plan</b>                                                                    | Recovery % | ROD                                                                                                               | Penetration<br>Blows Per 6 inches<br>Hand Penetrometer<br>TSF | Undrained<br>Shear Strength, TSF | Unit Dry Weight,<br>lb/cu ft. | Water Content, % | Plastic Limit |
| MATERIAL DESCRIPTION                                                                                                                               |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             | LIMESTONE, gray, hard, slightly<br>weathered, medium to coarse<br>crystalline, medium bedded                                              | 93         | 67                                                                                                                |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| 30                                                                                                                                                 |         |          |             | Boring terminated at 30.0 ft.                                                                                                             |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| 35                                                                                                                                                 |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| 40                                                                                                                                                 |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| 45                                                                                                                                                 |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
|                                                                                                                                                    |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| 50                                                                                                                                                 |         |          |             |                                                                                                                                           |            |                                                                                                                   |                                                               |                                  |                               |                  |               |
| Completion Depth: 30.00<br>Date Boring Started: 11/28/12<br>Date Boring Completed: 11/28/12<br>Engineer/Geologist: JAO<br>Project No.: 20121098.01 |         |          |             | Remarks: Boring drilled with CME 550 using HSA and auto SPT.<br>Groundwater not encountered during drilling.<br>Auger refusal at 20.0 ft. |            |                                                                                                                   |                                                               |                                  |                               |                  |               |

The stratification lines represent approximate strata boundaries.  
In situations, the transition may be gradual.

Note: For locations of borings, see Sheet No. B1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 21 of 22



DATE PREPARED  
7/9/2014  
ROUTE STATE  
MO  
DISTRICT SHEET NO.  
B21  
COUNTY  
JEFFERSON  
JOB NO.  
1220700  
CONTRACT ID.  
PROJECT NO.  
STP-5403(644)  
BRIDGE NO.

DESCRIPTION

DATE

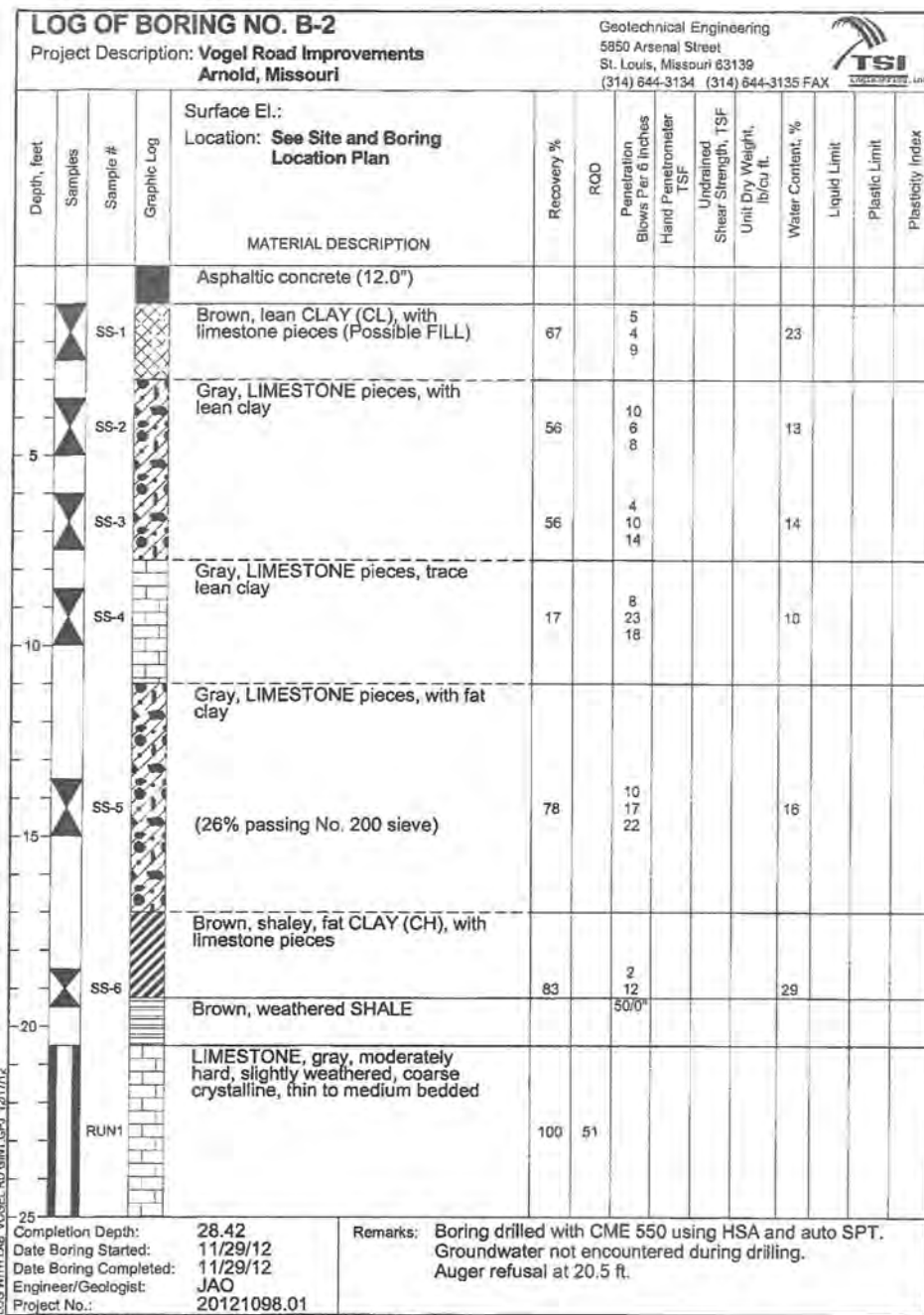
JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

HORNER &  
SHIRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE., ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4560  
www.HornerShirin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000159  
Expiration Date: December 31, 2014

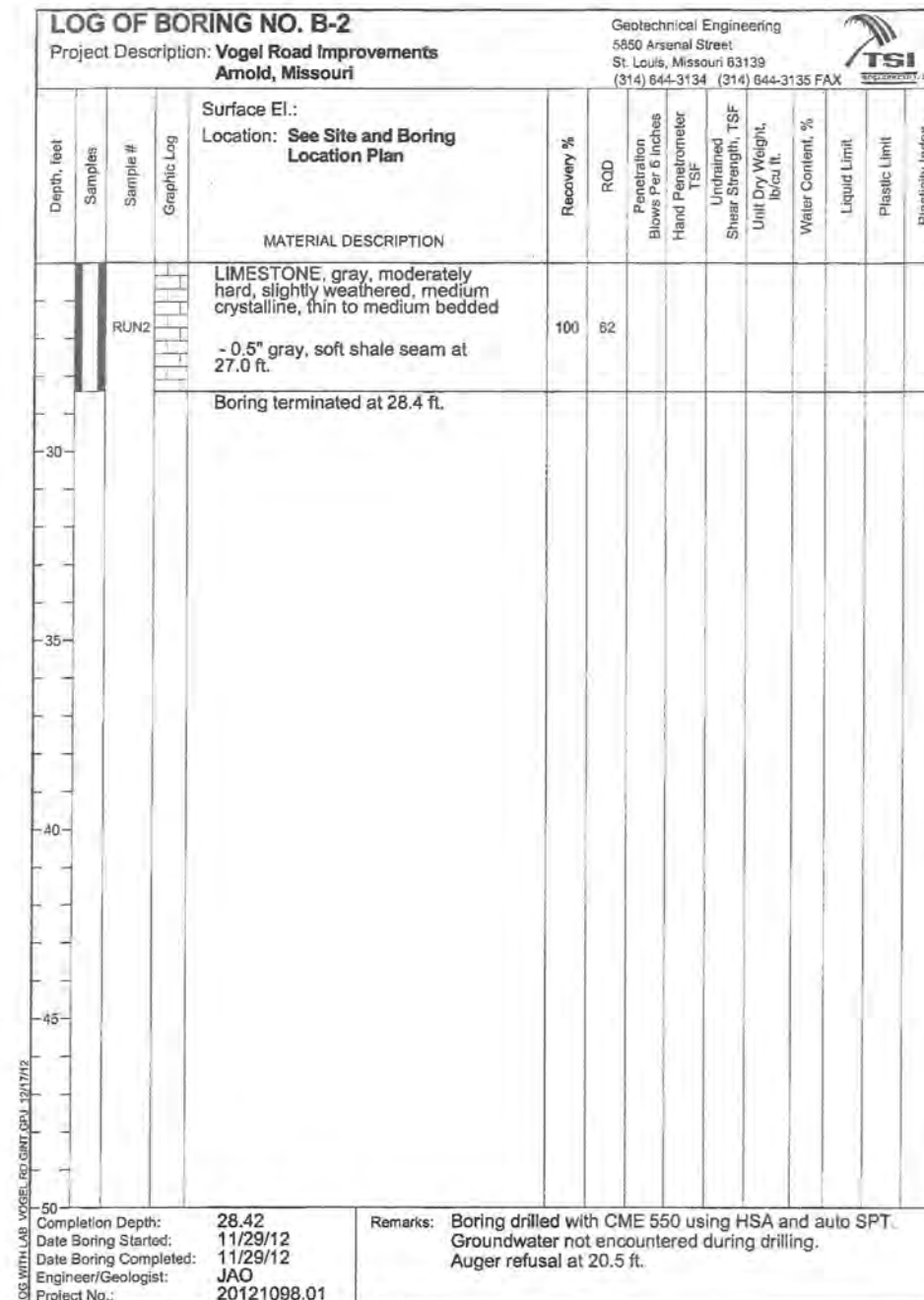
BORING DATA  
VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1

Designed: MAC  
Detailed: CAB  
Checked: CBW

Bridge Boring Data.dgn 7/14/2014 1:14:21 PM



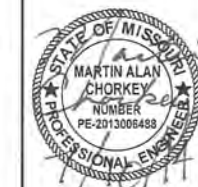
Continued Next Page



Note: For locations of borings, see Sheet No. B1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No.22 of 22



DATE PREPARED  
7/9/2014

ROUTE STATE  
MO

DISTRICT SHEET NO.  
B22

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050

636-797-5340  
www.jeffco.org

HORNER &  
SHIRIN, INC.  
ENGINEERS

5209 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX: 314-531-4966  
www.HornerShirin.com

Discipline: Professional Engineering  
Certificate of Authority: 000109  
Expiration Date: December 31, 2014

BORING DATA

VOGEL ROAD  
IMPROVEMENTS

JEFFERSON COUNTY, MISSOURI

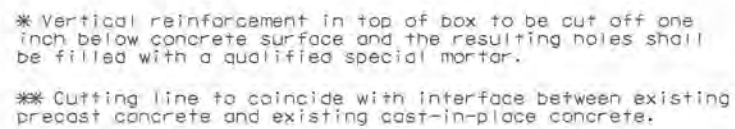
STP-5403(644) PHASE 1

Designed: MAC  
Detailed: CAB  
Checked: CBW









A continuous V-groove at least 1" in depth shall be cut on the face of the concrete as a guide for the line of break and to prevent spalling.



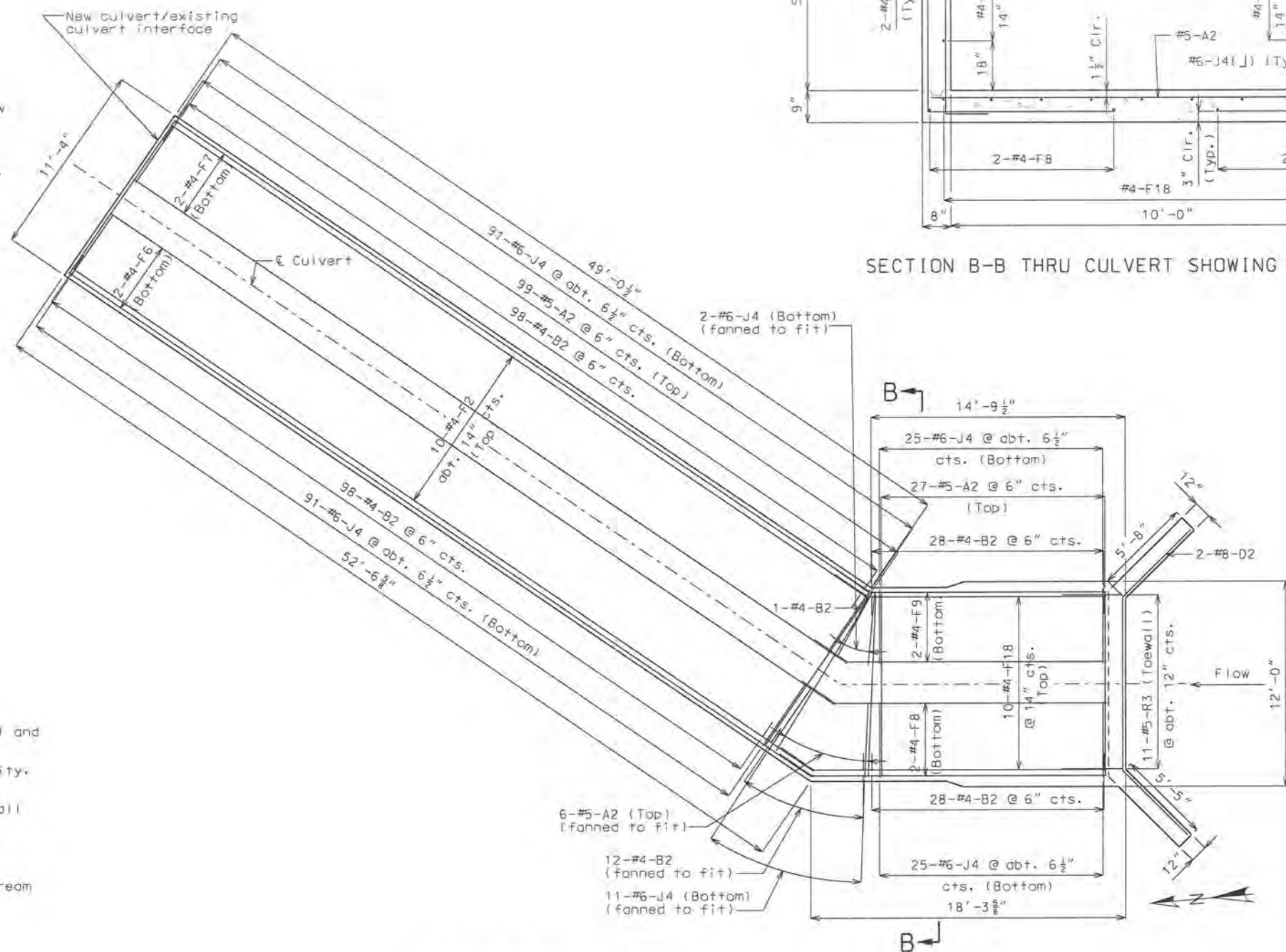


NOTES:

Expansion bolts shall consist of self drilling expansion shields and  $\frac{3}{4}$ " diameter hooked bolts. Hooked bolts shall extend a minimum of 9" into new concrete.

Minimum certified proof load is 4 kips.

See Special Provisions for additional information.

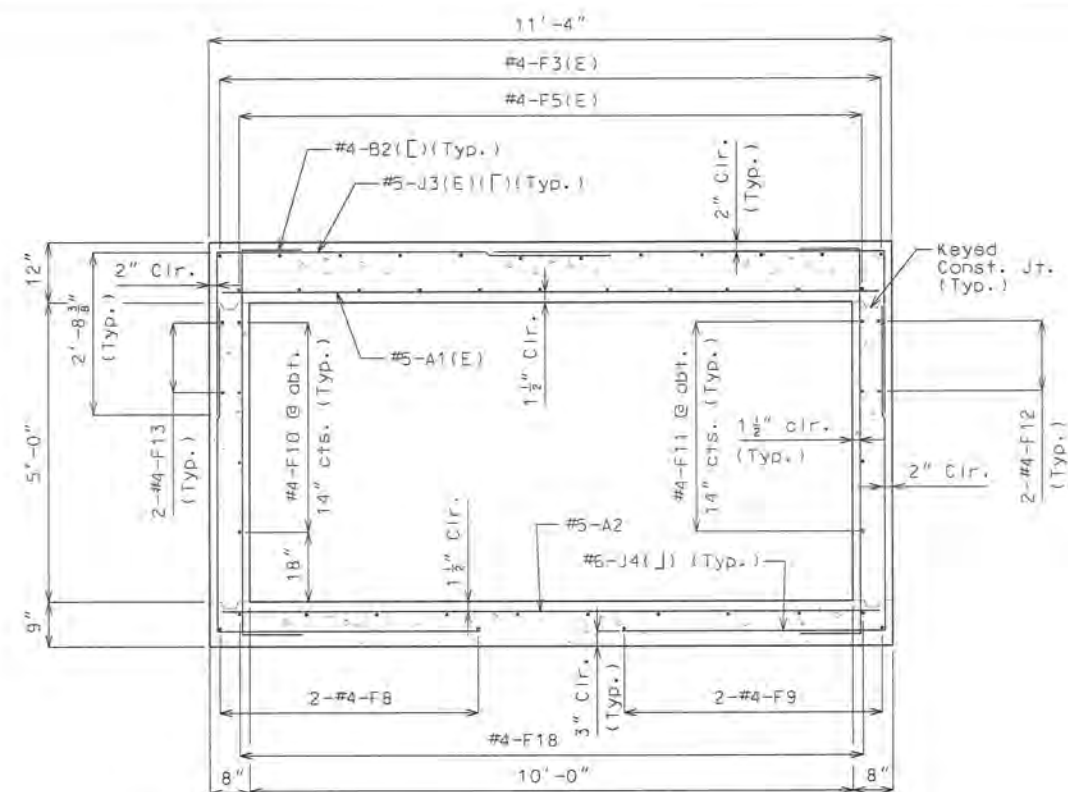


PLAN OF BOTTOM SLAB  
(H bars in Toe wall not shown for clarity)

Designed: MAC  
Detailed: CBW  
Checked: MAB

Note: This drawing is not to scale. Follow dimensions.

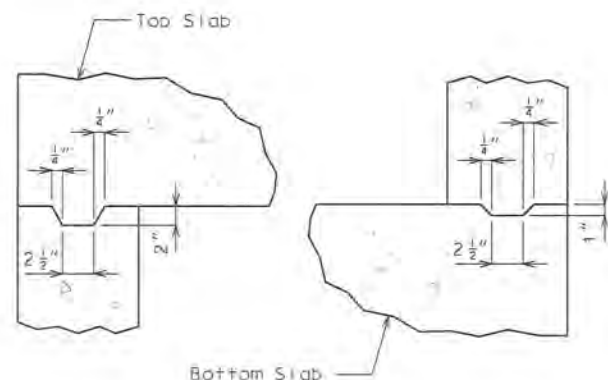
Sheet No. 4 of 10



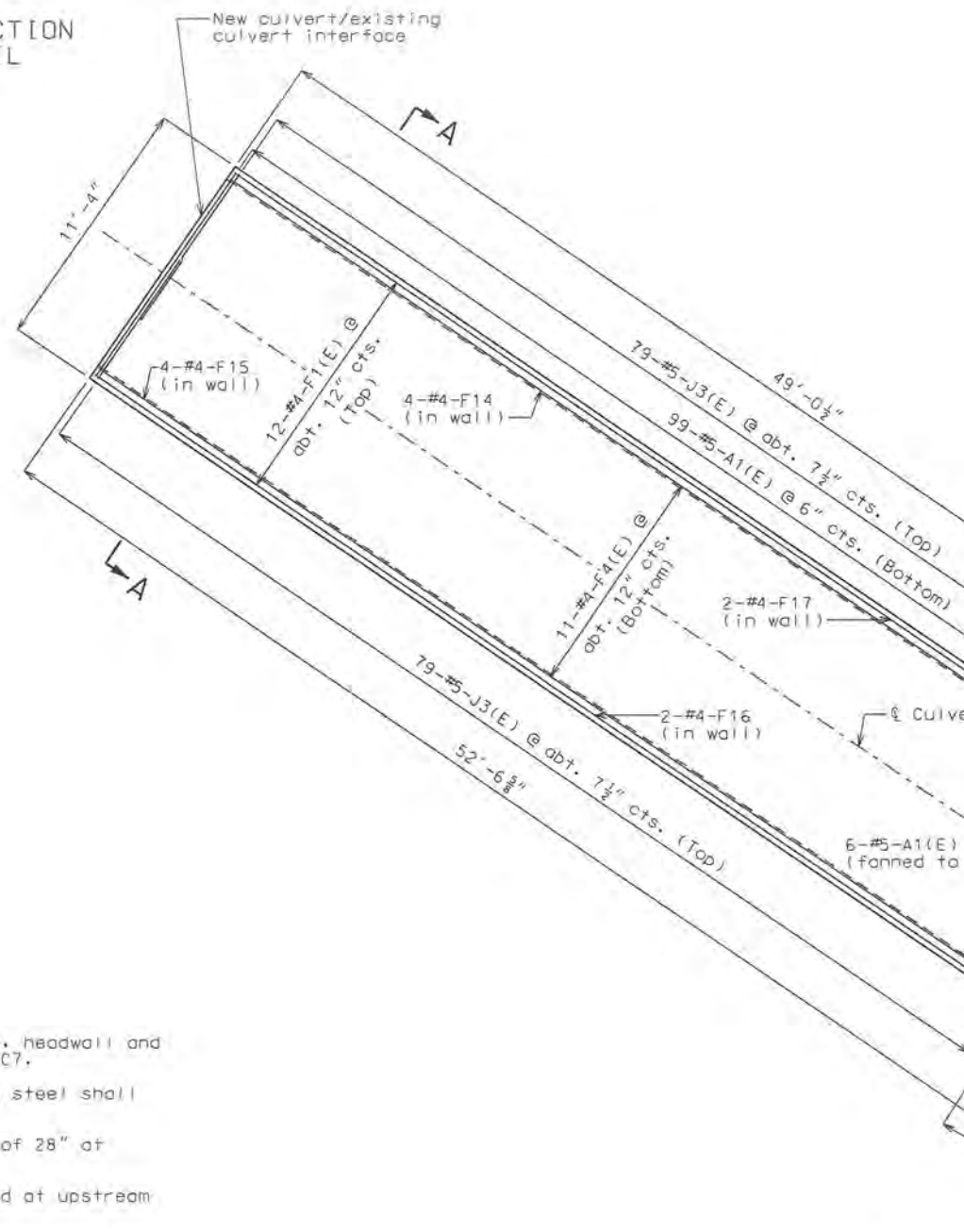
SECTION B-B THRU CULVERT SHOWING REINFORCEMENT

[illegible]



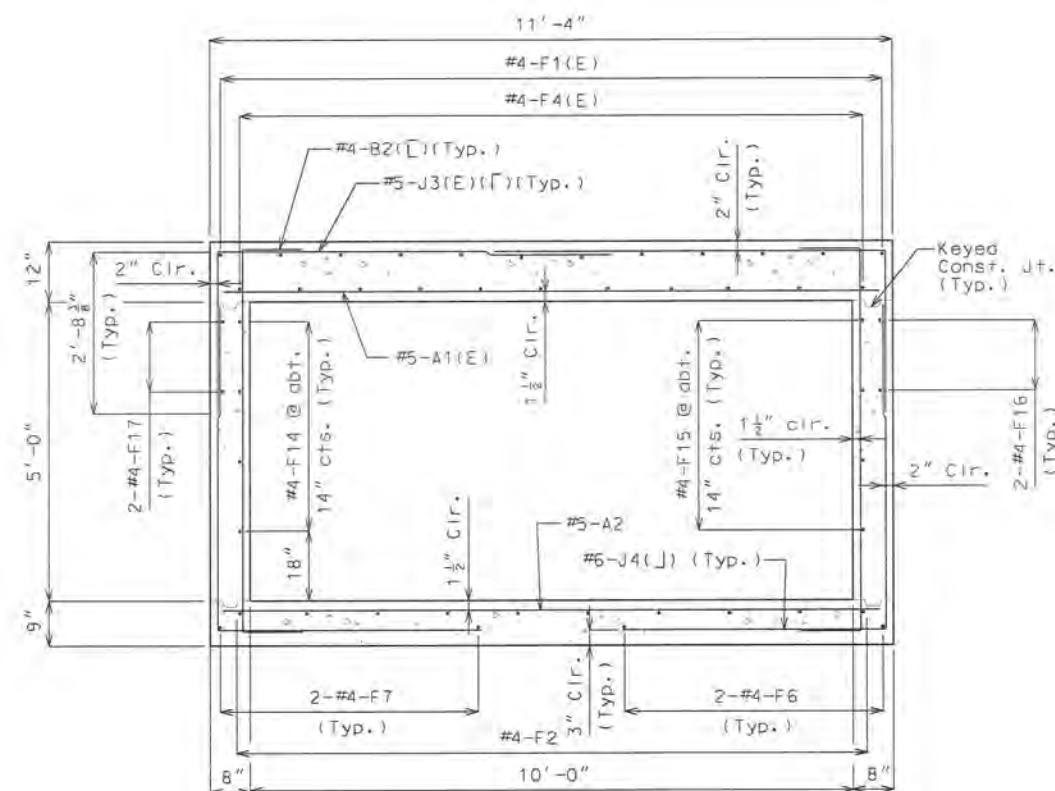


KEYED CONSTRUCTION JOINT DETAIL



PLAN OF TOP SLAB

(B & H bars in walls, wingwall and headwall not shown for clarity)



SECTION A-A THRU CULVERT SHOWING REINFORCEMENT

Notes:

For sections thru culvert, wings, headwall and toewall, see Sheets No. C4 thru C7.

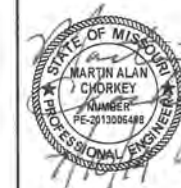
Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Lap longitudinal bars a minimum of 28" at splices.

Beveled headwall shall be located at upstream end.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 5 of 10



DATE PREPARED  
7/10/2014

ROUTE STATE  
MO

DISTRICT SHEET NO.  
C5

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

DESCRIPTION

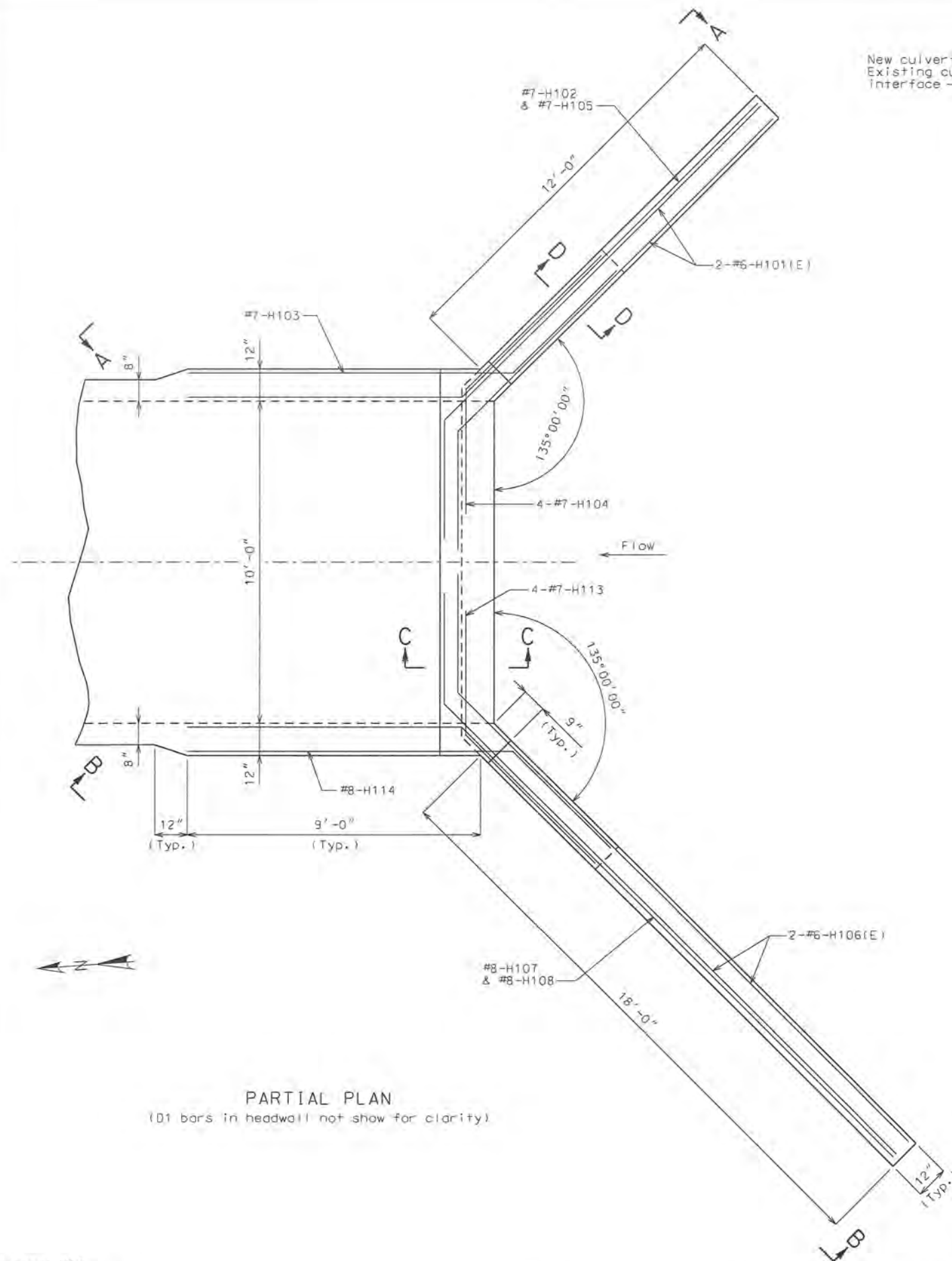
DATE

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.mo.org

HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4211 FAX 314-531-2865  
www.horner-shifrin.com  
Professional Engineering  
Certificate of Authority: 030196  
Expiration Date: December 31, 2014

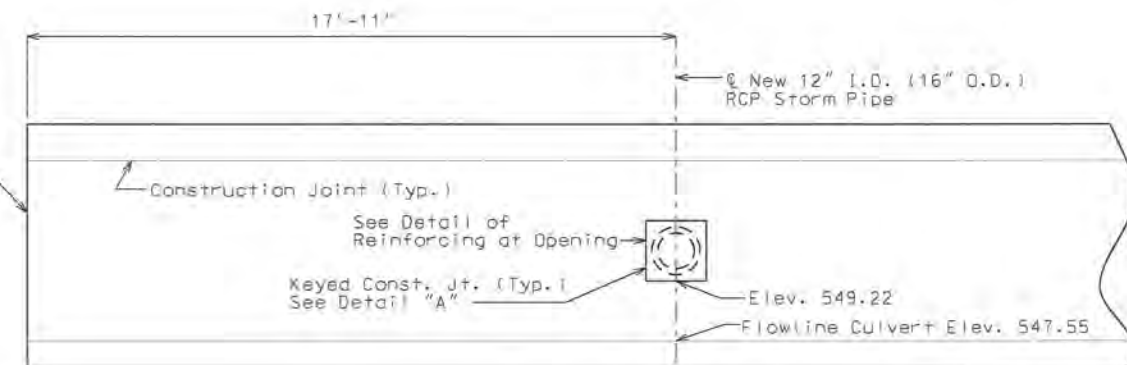
BOX CULVERT DETAILS

**VOGEL ROAD IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1

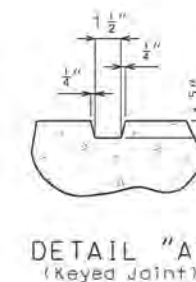
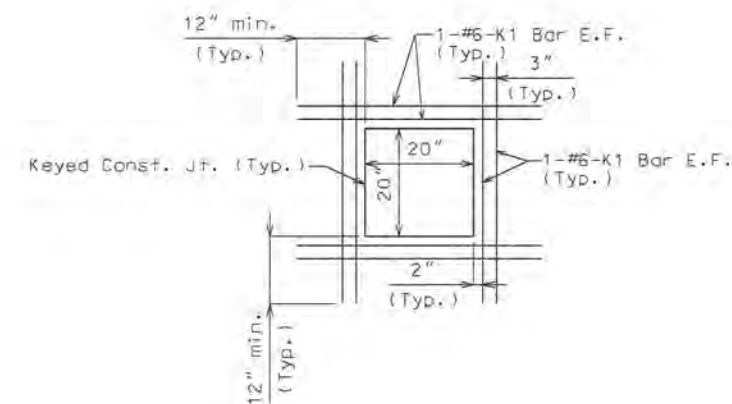


PARTIAL PLAN  
(D1 bars in headwall not shown for clarity)

New culvert/  
Existing culvert  
Interface



DEVELOPED ELEVATION OF NE EXTERIOR WALL  
Note: See Sheet Nos. C4 thru C5 for Box Culvert Reinforcing.



DETAIL OF REINFORCING  
AT OPENING

Notes:

For sections thru culvert, wings, headwall and toewall, see Sheets No. C4 thru C7.

Minimum clearance to reinforcing steel shall be 1 1/2".

Beveled headwall shall be located at upstream end.

Cut F bars as required at opening, and shift J3 and J4 bars to clear opening.

Place 1" minimum joint filler around reinforced concrete pipe.

Designed: MAC  
Detailed: CAB/CBW  
Checked: MAB

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 10



DATE PREPARED  
7/10/2014

ROUTE  
STATE  
MO

DISTRICT  
SHEET NO.  
C6

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID.

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI  
MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050  
636-797-5340  
www.jeffco.org

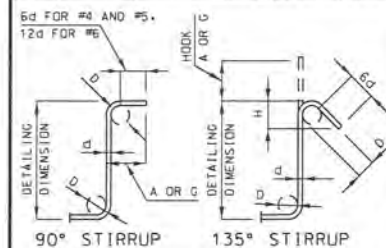
HORNER & SHIFRIN, INC.  
ENGINEERS  
5200 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX 314-531-8966  
www.horner-shifrin.com  
Discipline: Professional Engineering  
Certificate of Authority: 000153  
Expiration Date: December 31, 2015

BOX CULVERT DETAILS  
& PARTIAL PLAN AT WINGWALLS  
**VOGEL ROAD IMPROVEMENTS**  
JEFFERSON COUNTY, MISSOURI  
STP-5403(644) PHASE 1



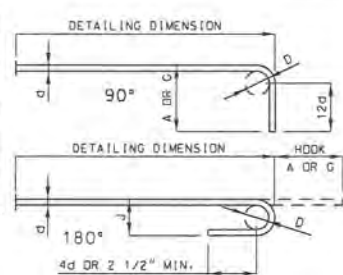


| BILL OF REINFORCING STEEL |        |          |      |               |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
|---------------------------|--------|----------|------|---------------|-----------|-----------|-------------|-------------|------------|----------|------------|-----|--------|-------|--------|-------|-------|-----|-------|-----|--------|-----|----------------|---------------|--------|-----|-----|------|-----|-----|
| NO.                       | REQ'D. | MARK NO. | MARK | LOCATION      | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |     |        |       |        |       |       |     |       |     |        |     | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |     |     |      |     |     |
|                           |        |          |      |               |           |           |             |             |            |          | B          |     | C      |       | D      |       | E     |     | F     |     | H      |     |                |               |        | K   |     |      |     |     |
|                           |        |          |      |               |           |           |             |             |            |          | FT.        | IN. | FT.    | IN.   | FT.    | IN.   | FT.   | IN. | FT.   | IN. | FT.    | IN. |                |               |        | FT. | IN. | FT.  | IN. | FT. |
|                           |        |          |      | SLABS & WALLS |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 132                       | 5      | A1       |      | TOP SLAB      | E         | 20        |             |             |            |          |            | 11  | 1.000  |       |        |       |       |     |       |     |        |     |                | 11            | 1      | 11  | 1   | 1526 |     |     |
| 132                       | 5      | A2       |      | BOTTOM SLAB   |           | 20        |             |             |            |          |            | 11  | 1.000  |       |        |       |       |     |       |     |        |     |                | 11            | 1      | 11  | 1   | 1526 |     |     |
| 265                       | 4      | B2       |      | EXT. WALLS    |           | 10        |             |             |            |          |            |     | 1      | 0.000 | 6      | 4.000 |       |     |       |     |        |     |                | 8             | 4      | 8   | 2   | 1446 |     |     |
| 12                        | 4      | F1       |      | TOP SLAB      | E         | 20        |             |             |            | V        | 1          | 48  | 11.500 |       |        |       |       |     |       |     |        |     |                | 49            | 0      | 49  | 0   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            | 52  | 3.375  |       |        |       |       |     |       |     |        |     |                | 52            | 3      | 52  | 3   | 406  |     |     |
|                           |        |          |      | 3.625 INCH    |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 10                        | 4      | F2       |      | BOTTOM SLAB   |           | 20        |             |             |            | V        | 1          | 49  | 1.000  |       |        |       |       |     |       |     |        |     |                | 49            | 1      | 49  | 1   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            | 52  | 1.000  |       |        |       |       |     |       |     |        |     |                | 52            | 1      | 52  | 1   | 338  |     |     |
|                           |        |          |      | 4.000 INCH    |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 12                        | 4      | F3       |      | TOP SLAB      | E         | 15        |             |             |            | V        | 1          |     |        | 14    | 9.000  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 17            | 1      | 17  | 1   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            |     |        | 18    | 2.250  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 20            | 6      | 20  | 6   | 151  |     |     |
|                           |        |          |      | 3.750 INCH    |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 11                        | 4      | F4       |      | TOP SLAB      | E         | 20        |             |             |            | V        | 1          | 49  | 1.000  |       |        |       |       |     |       |     |        |     |                | 49            | 1      | 49  | 1   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            | 52  | 2.500  |       |        |       |       |     |       |     |        |     |                | 52            | 3      | 52  | 3   | 372  |     |     |
|                           |        |          |      | 3.750 INCH    |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 11                        | 4      | F5       |      | TOP SLAB      | E         | 15        |             |             |            | V        | 1          |     |        | 14    | 9.375  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 17            | 1      | 17  | 1   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            |     |        | 17    | 11.625 | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 20            | 4      | 20  | 4   | 137  |     |     |
|                           |        |          |      | 3.875 INCH    |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 2                         | 4      | F6       |      | BOTTOM SLAB   |           | 20        |             |             |            | V        | 1          | 51  | 0.250  |       |        |       |       |     |       |     |        |     |                | 51            | 0      | 51  | 0   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            | 52  | 4.125  |       |        |       |       |     |       |     |        |     |                | 52            | 4      | 52  | 4   | 69   |     |     |
|                           |        |          |      | 15.875 INCH   |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 2                         | 4      | F7       |      | BOTTOM SLAB   |           | 20        |             |             |            | V        | 1          | 48  | 11.625 |       |        |       |       |     |       |     |        |     |                | 49            | 0      | 49  | 0   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            | 50  | 3.500  |       |        |       |       |     |       |     |        |     |                | 50            | 4      | 50  | 4   | 66   |     |     |
|                           |        |          |      | 15.875 INCH   |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 2                         | 4      | F8       |      | BOTTOM SLAB   |           | 15        |             |             |            | V        | 1          |     |        | 17    | 1.250  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 19            | 5      | 19  | 5   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            |     |        | 15    | 9.375  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 18            | 1      | 18  | 1   | 25   |     |     |
|                           |        |          |      | 15.875 INCH   |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 2                         | 4      | F9       |      | BOTTOM SLAB   |           | 15        |             |             |            | V        | 1          |     |        | 15    | 0.875  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 17            | 5      | 17  | 5   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            |     |        | 13    | 9.000  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 16            | 1      | 16  | 1   | 22   |     |     |
|                           |        |          |      | 15.875 INCH   |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 4                         | 4      | F10      |      | WALL          |           | 15        |             |             |            |          |            |     |        | 17    | 11.625 | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 20            | 4      | 20  | 4   | 54   |     |     |
| 4                         | 4      | F11      |      | WALL          |           | 15        |             |             |            |          |            |     |        | 14    | 9.375  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 17            | 1      | 17  | 1   | 46   |     |     |
| 2                         | 4      | F12      |      | WALL          |           | 15        |             |             |            |          |            |     |        | 14    | 9.000  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 17            | 1      | 17  | 1   | 23   |     |     |
| 2                         | 4      | F13      |      | WALL          |           | 15        |             |             |            |          |            |     |        | 18    | 2.250  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 20            | 6      | 20  | 6   | 27   |     |     |
| 4                         | 4      | F14      |      | WALL          |           | 20        |             |             |            |          |            | 49  | 1.000  |       |        |       |       |     |       |     |        |     |                | 49            | 1      | 49  | 1   | 131  |     |     |
| 4                         | 4      | F15      |      | WALL          |           | 20        |             |             |            |          |            | 52  | 2.500  |       |        |       |       |     |       |     |        |     |                | 52            | 3      | 52  | 3   | 140  |     |     |
| 2                         | 4      | F16      |      | WALL          |           | 20        |             |             |            |          |            | 52  | 3.375  |       |        |       |       |     |       |     |        |     |                | 52            | 3      | 52  | 3   | 70   |     |     |
| 2                         | 4      | F17      |      | WALL          |           | 20        |             |             |            |          |            | 48  | 11.500 |       |        |       |       |     |       |     |        |     |                | 49            | 0      | 49  | 0   | 65   |     |     |
| 10                        | 4      | F18      |      | BOTTOM SLAB   |           | 15        |             |             |            | V        | 1          |     |        | 13    | 10.000 | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 16            | 2      | 16  | 2   |      |     |     |
|                           |        |          |      | INCREMENT =   |           |           |             |             |            |          |            |     |        | 17    | 0.000  | 2     | 4.000 | 1   | 3.875 | 1   | 11.125 |     |                | 19            | 4      | 19  | 4   | 119  |     |     |
|                           |        |          |      | 4.250 INCH    |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 212                       | 5      | J3       |      | TOP CORNER    | E         | 19        |             |             |            |          |            | 2   | 8.375  | 6     | 4.750  |       |       |     |       |     |        |     |                | 9             | 1      | 9   | 0   | 1990 |     |     |
| 245                       | 6      | J4       |      | BOTTOM CORNER |           | 19        |             |             |            |          |            | 5   | 5.000  | 4     | 4.500  |       |       |     |       |     |        |     |                | 9             | 10     | 9   | 8   | 3557 |     |     |
| 16                        | 6      | K1       |      | WALL          |           | 20        |             |             |            |          |            | 3   | 8.000  |       |        |       |       |     |       |     |        |     |                | 3             | 8      | 3   | 8   | 88   |     |     |
|                           |        |          |      | HEADWALL      |           |           |             |             |            |          |            |     |        |       |        |       |       |     |       |     |        |     |                |               |        |     |     |      |     |     |
| 6                         | 8      | D1       |      | UPSTREAM      |           | 20        |             |             |            |          |            | 11  | 9.000  |       |        |       |       |     |       |     |        |     |                | 11            | 9      | 11  | 9   | 188  |     |     |
| 13                        | 5      | R1       |      | UPSTREAM      |           | 27        | S           |             |            |          |            | 1   | 5.000  | 0     | 10.000 | 0     | 7.125 | 2   | 3.000 |     |        | 0   | 5.000          | 0             | 5.000  | 5   | 1   | 4    | 11  | 67  |
| 13                        | 5      | R2       |      | UPSTREAM      |           | 10        | S           |             |            |          |            |     |        | 0     | 10.500 | 1     | 3.000 |     |       |     |        |     |                | 3             | 0      | 2   | 9   | 37   |     |     |



| STIRRUP HOOK DIMENSIONS |         |                 |                  |           |
|-------------------------|---------|-----------------|------------------|-----------|
| GRADES 40 - 50 - 60 KSI |         |                 |                  |           |
| BAR SIZE                | D (IN.) | 90° HOOK A OR G | 135° HOOK A OR G | APPROX. H |
| #4                      | 2"      | 4 1/2"          | 4 1/2"           | 3"        |
| #5                      | 2 1/2"  | 6"              | 5 1/2"           | 3 3/4"    |
| #6                      | 4 1/2"  | 12"             | 8"               | 4 1/2"    |

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



| END HOOK DIMENSIONS |         |                   |                  |       |
|---------------------|---------|-------------------|------------------|-------|
| ALL GRADES          |         |                   |                  |       |
| BAR SIZE            | D (IN.) | 180° HOOKS A OR G | 90° HOOKS A OR G |       |
| #3                  | 2 1/4"  | 5"                | 3"               | 6"    |
| #4                  | 3"      | 6"                | 4"               | 8"    |
| #5                  | 3 3/4"  | 7"                | 5"               | 10"   |
| #6                  | 4 1/2"  | 8"                | 6"               | 12"   |
| #7                  | 5 1/4"  | 10"               | 7"               | 14"   |
| #8                  | 6"      | 11"               | 8"               | 16"   |
| #9                  | 9 1/2"  | 15"               | 11 3/4"          | 19"   |
| #10                 | 10 3/4" | 17"               | 13 1/4"          | 22"   |
| #11                 | 12"     | 19"               | 14 3/4"          | 24"   |
| #14                 | 18 1/4" | 27-3"             | 21 3/4"          | 27-7" |

NOTE:  
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.  
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.  
S = STIRRUP.  
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.  
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.  
NO. EA. = NUMBER OF BARS OF EACH LENGTH.  
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)  
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.  
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.  
FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.  
REINFORCING STEEL (GRADE 60) F<sub>y</sub> = 60,000 PSI.

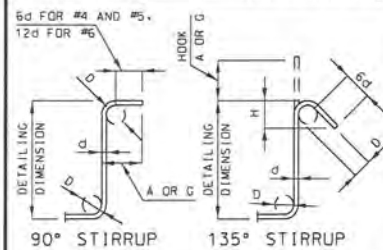
Designed: MAC  
Detailed: CBW  
Checked: MAB

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 8 of 10

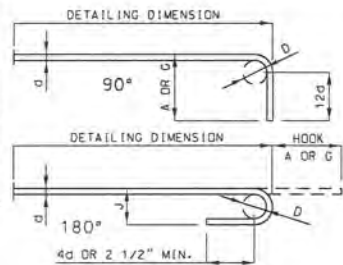
| BILL OF REINFORCING STEEL |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |     |     |     |     |     |     |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------|--------|----------|----------|-----------|-----------|-------------|-------------|------------|----------|------------|-----|-----|-----|-----|-----|-----|-----|----------------|---------------|--------|-----|-----|-----|-----|-----|-----|-----|-----|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| NO.                       | REQ'D. | MARK NO. | LOCATION | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |     |     |     |     |     |     |     | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |     |     |     |     |     |     |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                           |        |          |          |           |           |             |             |            |          | B          |     | C   |     | D   |     | E   |     |                |               |        | F   |     | H   |     | K   |     |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                           |        |          |          |           |           |             |             |            |          | FT.        | IN. | FT. | IN. | FT. | IN. | FT. | IN. |                |               |        | FT. | IN. | FT. | IN. | FT. | IN. | FT. | IN. | LBS. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                           |        |          | TOEWALL  |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |     |     |     |     |     |     |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| BILL OF REINFORCING STEEL |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|---------------------------|--------|----------|----------|-----------|-----------|-------------|-------------|------------|----------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|----------------|---------------|--------|-----|-----|
| NO.                       | REQ'D. | MARK NO. | LOCATION | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |     |     |     |     |     |     |     |     |     |       |     | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |     |     |
|                           |        |          |          |           |           |             |             |            |          | B          |     | C   |     | D   |     | E   |     | F   |     | H     |     |                |               |        | K   |     |
|                           |        |          |          |           |           |             |             |            |          | FT.        | IN. | FT. | IN. | FT. | IN. | FT. | IN. | FT. | IN. | FT.   | IN. |                |               |        | FT. | IN. |
|                           |        |          | TOTALS   |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        | 4        |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 2641  |     |                |               |        |     |     |
|                           |        | 4        |          | E         |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 1066  |     |                |               |        |     |     |
|                           |        | 5        |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 1750  |     |                |               |        |     |     |
|                           |        | 5        |          | E         |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 3516  |     |                |               |        |     |     |
|                           |        | 6        |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 4357  |     |                |               |        |     |     |
|                           |        | 6        |          | E         |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 246   |     |                |               |        |     |     |
|                           |        | 7        |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 770   |     |                |               |        |     |     |
|                           |        | 8        |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 1359  |     |                |               |        |     |     |
|                           |        |          | TOTAL    |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 10877 |     |                |               |        |     |     |
|                           |        |          | TOTAL    | E         |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     | 4828  |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |     |     |       |     |                |               |        |     |     |



| STIRRUP HOOK DIMENSIONS |         |          |           |           |
|-------------------------|---------|----------|-----------|-----------|
| GRADES 40 - 50 - 60 KSI |         |          |           |           |
| BAR SIZE                | D (IN.) | 90° HOOK | 135° HOOK | APPROX. H |
| #4                      | 2"      | 4 1/2"   | 4 1/2"    | 3"        |
| #5                      | 2 1/2"  | 6"       | 5 1/2"    | 3 3/4"    |
| #6                      | 4 1/2"  | 12"      | 8"        | 4 1/2"    |

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



| END HOOK DIMENSIONS |         |            |           |       |
|---------------------|---------|------------|-----------|-------|
| ALL GRADES          |         |            |           |       |
| BAR SIZE            | D (IN.) | 180° HOOKS | 90° HOOKS |       |
| #3                  | 2 1/4"  | 5"         | 3"        | 6"    |
| #4                  | 3"      | 6"         | 4"        | 8"    |
| #5                  | 3 3/4"  | 7"         | 5"        | 10"   |
| #6                  | 4 1/2"  | 8"         | 6"        | 12"   |
| #7                  | 5 1/4"  | 10"        | 7"        | 14"   |
| #8                  | 6"      | 11"        | 8"        | 16"   |
| #9                  | 9 1/2"  | 15"        | 11 3/4"   | 19"   |
| #10                 | 10 3/4" | 17"        | 13 1/4"   | 22"   |
| #11                 | 12"     | 19"        | 14 3/4"   | 2'-0" |
| #14                 | 18 1/4" | 2'-3"      | 21 3/4"   | 2'-7" |

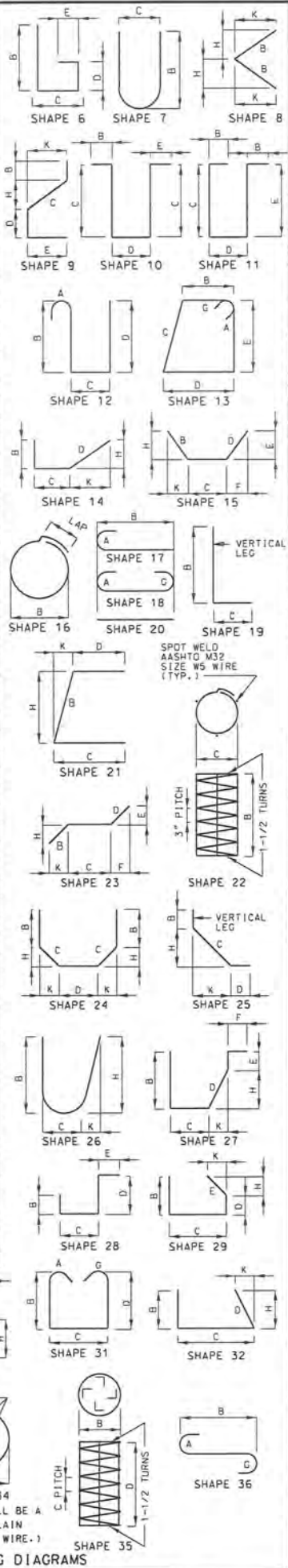
NOTE:  
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.  
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.  
E = EPOXY COATED REINFORCEMENT.  
S = STIRRUP.  
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.  
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.  
ND, EA. = NUMBER OF BARS OF EACH LENGTH.  
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)  
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.  
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.  
FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.  
REINFORCING STEEL (GRADE 60) F<sub>y</sub> = 60,000 PSI.

Designed: MAC  
Detailed: CBW  
Checked: MAB

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 9 of 10

| BILL OF REINFORCING STEEL |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|---------------------------|--------|----------|----------|-----------|-----------|-------------|-------------|------------|----------|------------|-----|-----|-----|-----|-----|-----|-----|----------------|---------------|--------|
| NO.                       | REQ'D. | MARK NO. | LOCATION | EPOXY (E) | SHAPE NO. | STIRRUP (S) | SUBSTR. (X) | VARIES (V) | NO. EACH | DIMENSIONS |     |     |     |     |     |     |     | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |
|                           |        |          |          |           |           |             |             |            |          | B          | C   | D   | E   | F   | H   | K   |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          | FT.        | IN. | FT. | IN. | FT. | IN. | FT. | IN. | FT.            | IN.           | FT.    |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |
|                           |        |          |          |           |           |             |             |            |          |            |     |     |     |     |     |     |     |                |               |        |



BENDING DIAGRAMS

DATE PREPARED  
7/10/2014

ROUTE  
STATE  
MO

DISTRICT  
SHEET NO.  
C9

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

DESCRIPTION

DATE

JEFFERSON COUNTY, MISSOURI

MAPLE STREET ANNEX  
725 MAPLE STREET  
P.O. BOX 100  
HILLSBORO, MO 63050

636-797-5340  
www.jeffco.org

HORNER & SHIFRIN, INC.  
ENGINEERS

5208 OAKLAND AVE. ST. LOUIS, MO 63110  
314-531-4321 FAX 314-531-6965  
www.horner-shifrin.com

Discipline: Professional Engineering  
Certificate of Authority: 000158  
Expiration Date: December 31, 2014

BILL OF REINFORCING STEEL

VOGEL ROAD  
IMPROVEMENTS  
JEFFERSON COUNTY, MISSOURI

STP-5403(644) PHASE 1



| LOG OF BORING NO. B-3                                                                                                                              |         |          |             |                                                                                     |                                                                                                                                           |     |                                                               |                                                                   |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------|-------------------------------------------------------------------|------------------|
| Project Description: <b>Vogel Road Improvements<br/>Arnold, Missouri</b>                                                                           |         |          |             |                                                                                     | Geotechnical Engineering<br>5850 Arsenal Street<br>St. Louis, Missouri 63139<br>(314) 644-3134 (314) 644-3135 FAX                         |     |                                                               |                                                                   |                  |
| Depth, feet                                                                                                                                        | Samples | Sample # | Graphic Log | MATERIAL DESCRIPTION                                                                | Recovery %                                                                                                                                | ROD | Penetration<br>Blows Per 6 inches<br>Hand Penetrometer<br>TSF | Undrained<br>Shear Strength, TSF<br>Unit Dry Weight,<br>lb/cu ft. | Water Content, % |
|                                                                                                                                                    |         |          |             | Surface El.: <b>554.2</b><br>Location: <b>See Site and Boring<br/>Location Plan</b> |                                                                                                                                           |     |                                                               |                                                                   |                  |
|                                                                                                                                                    |         |          |             | Asphaltic concrete (14.0")                                                          |                                                                                                                                           |     |                                                               |                                                                   |                  |
|                                                                                                                                                    |         | SS-1     |             | Brown, SILT (ML), with asphalt<br>pieces and crushed limestone<br>(FILL)            | 56                                                                                                                                        |     | 27<br>25<br>20                                                |                                                                   | 6                |
|                                                                                                                                                    |         | SS-2     |             |                                                                                     | 0                                                                                                                                         |     | 15<br>15<br>20                                                |                                                                   |                  |
|                                                                                                                                                    |         | SS-3     |             | Gray, LIMESTONE pieces, with fat<br>clay                                            | 78                                                                                                                                        |     | 4<br>10<br>13                                                 |                                                                   | 16               |
|                                                                                                                                                    |         | SS-4     |             |                                                                                     | 56                                                                                                                                        |     | 5<br>10<br>16                                                 |                                                                   | 17               |
|                                                                                                                                                    |         | SS-5     |             | Gray, lean CLAY (CL), with gravel<br>and limestone pieces                           | 100                                                                                                                                       |     | 3<br>3<br>3                                                   | 1.25                                                              | 23 40 19 21      |
|                                                                                                                                                    |         | SS-6     |             | Gray, weathered LIMESTONE<br>Boring terminated at 18.2 ft.                          | 0                                                                                                                                         |     | 50/2"                                                         |                                                                   |                  |
| Completion Depth: 18.17<br>Date Boring Started: 11/28/12<br>Date Boring Completed: 11/28/12<br>Engineer/Geologist: JAO<br>Project No.: 20121098.01 |         |          |             |                                                                                     | Remarks: Boring drilled with CME 550 using HSA and auto SPT.<br>Groundwater not encountered during drilling.<br>Auger refusal at 18.0 ft. |     |                                                               |                                                                   |                  |

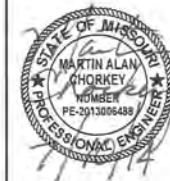
LOG WITH LAB VOGEL RD GINT GPJ 12/18/12

The stratification lines represent approximate strata boundaries.  
In situations, the transition may be gradual.

Note: For location of boring, see Sheet No. 01.

Note: This drawing is not to scale. Follow dimensions.

Sheet No.10 of 10



DATE PREPARED  
7/10/2014

ROUTE STATE  
MO

DISTRICT SHEET NO.  
C10

COUNTY  
JEFFERSON

JOB NO.  
1220700

CONTRACT ID

PROJECT NO.  
STP-5403(644)

BRIDGE NO.

Designed: MAC  
Detailed: CBW  
Checked: MAB