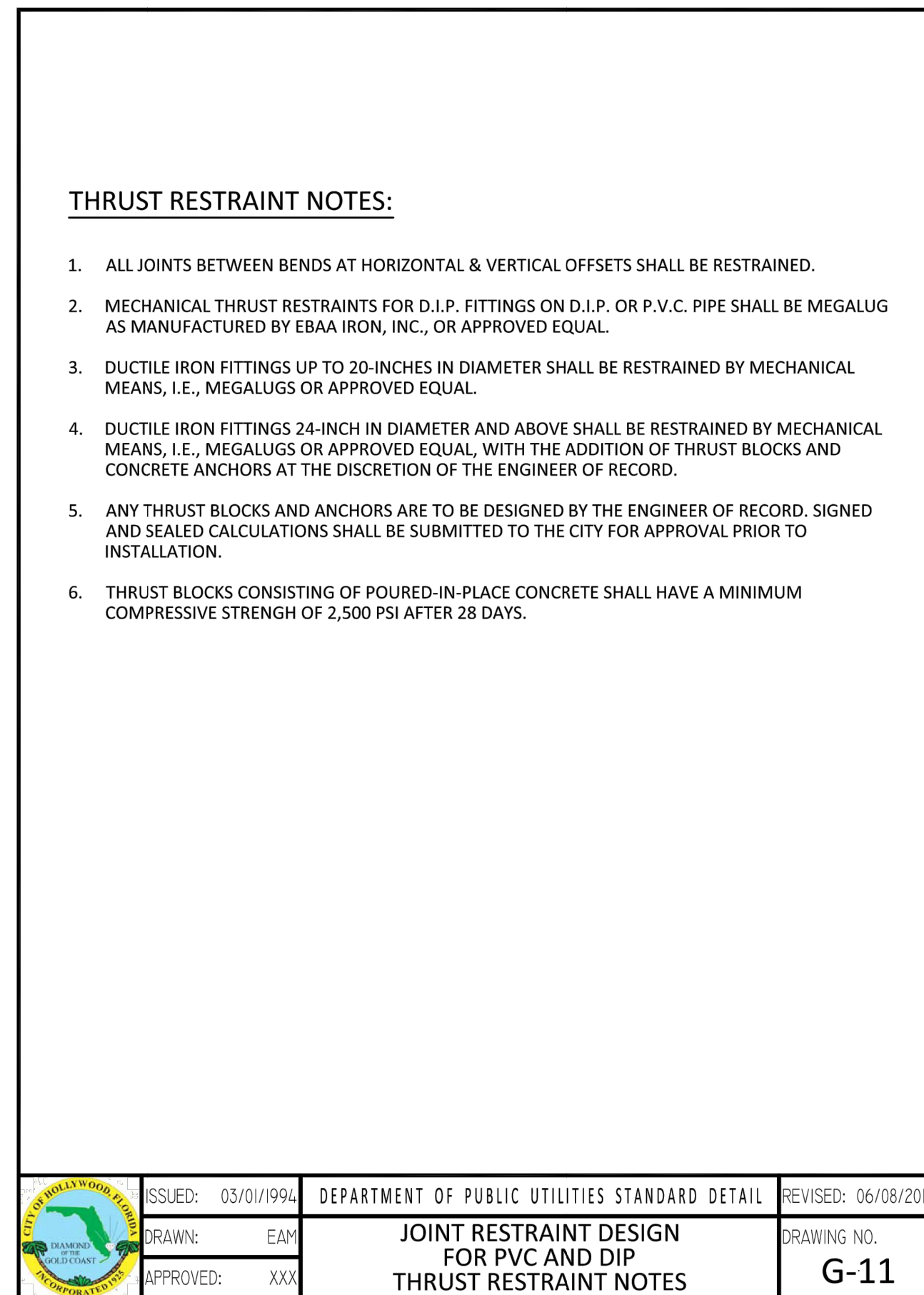
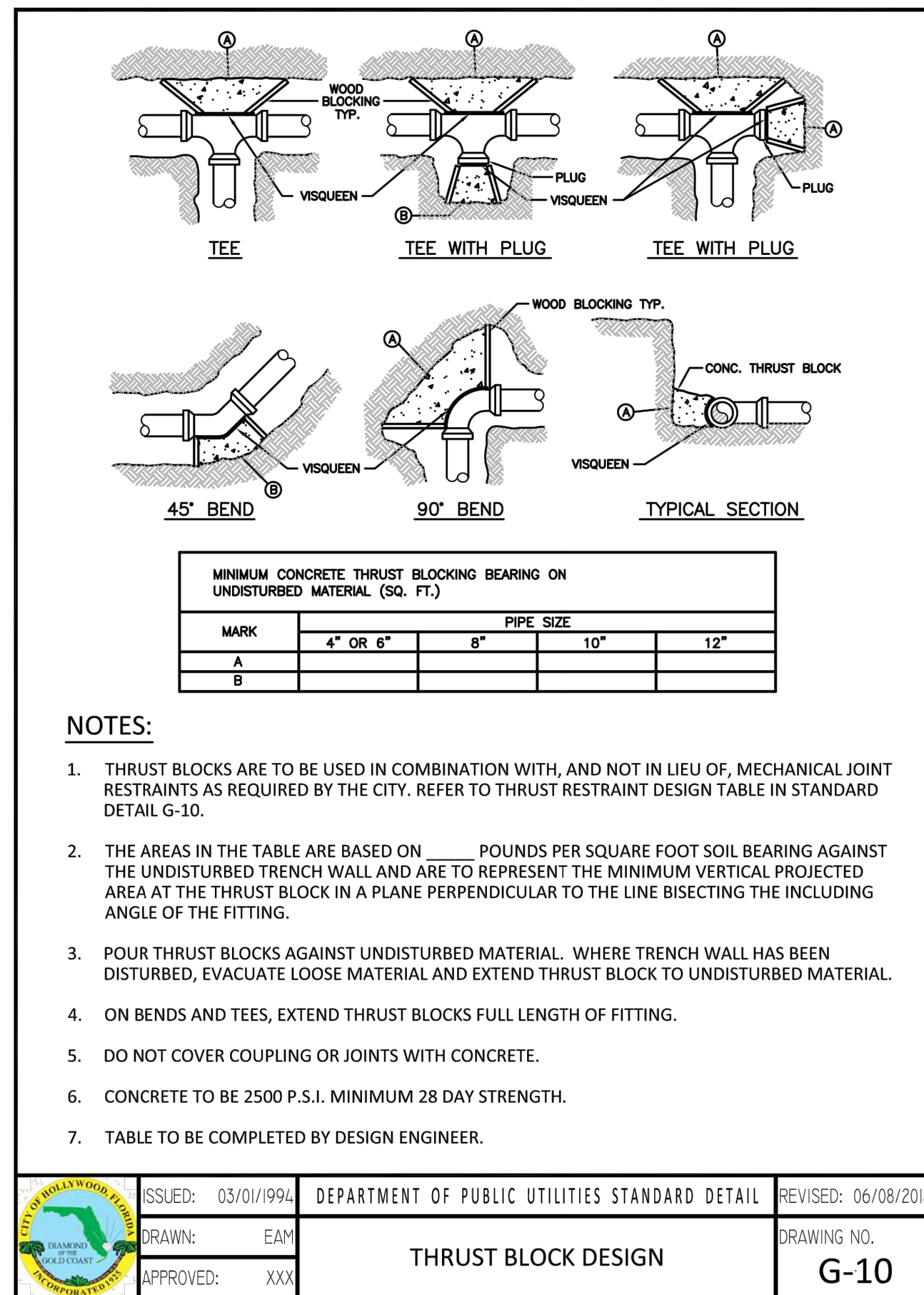
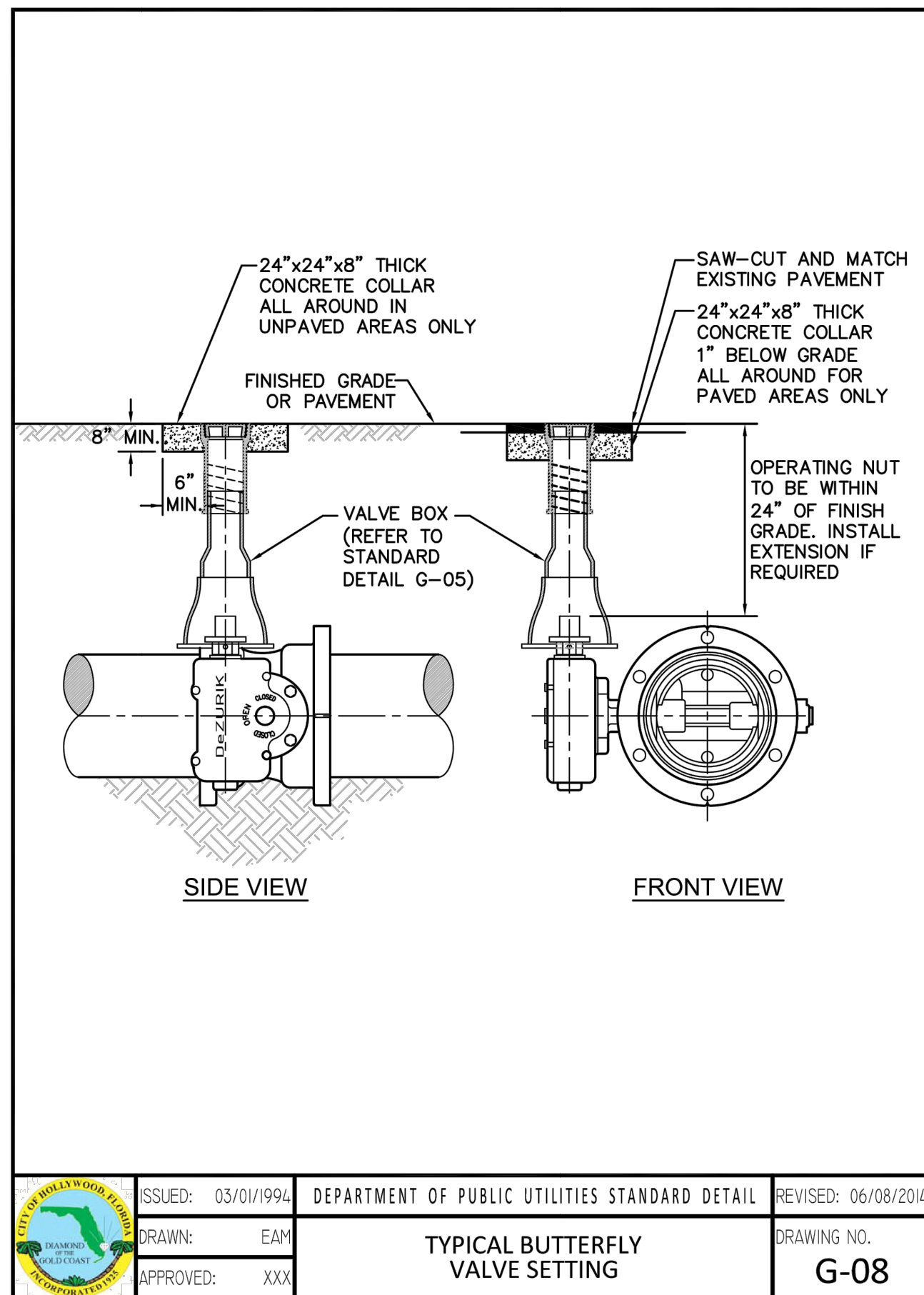
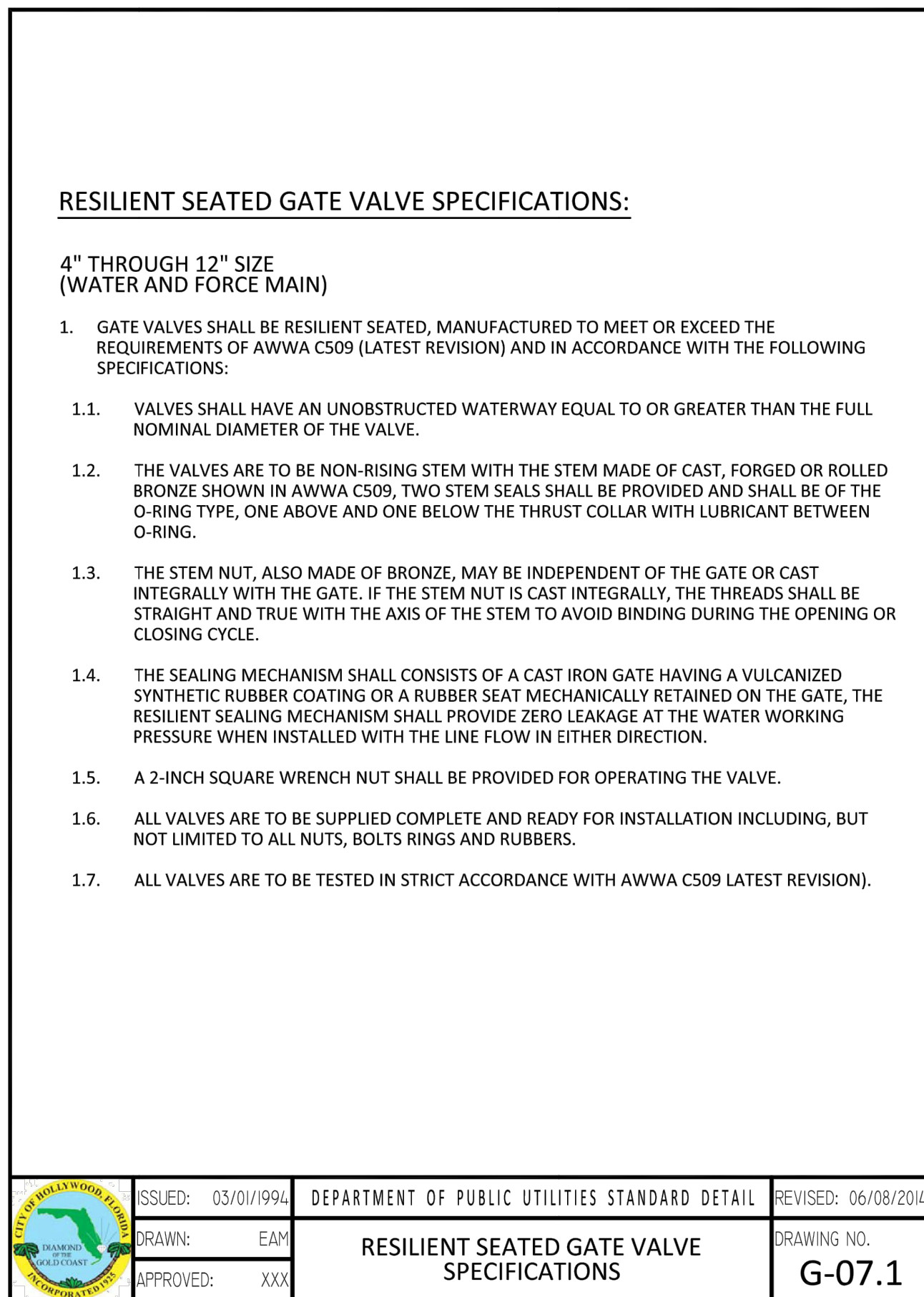
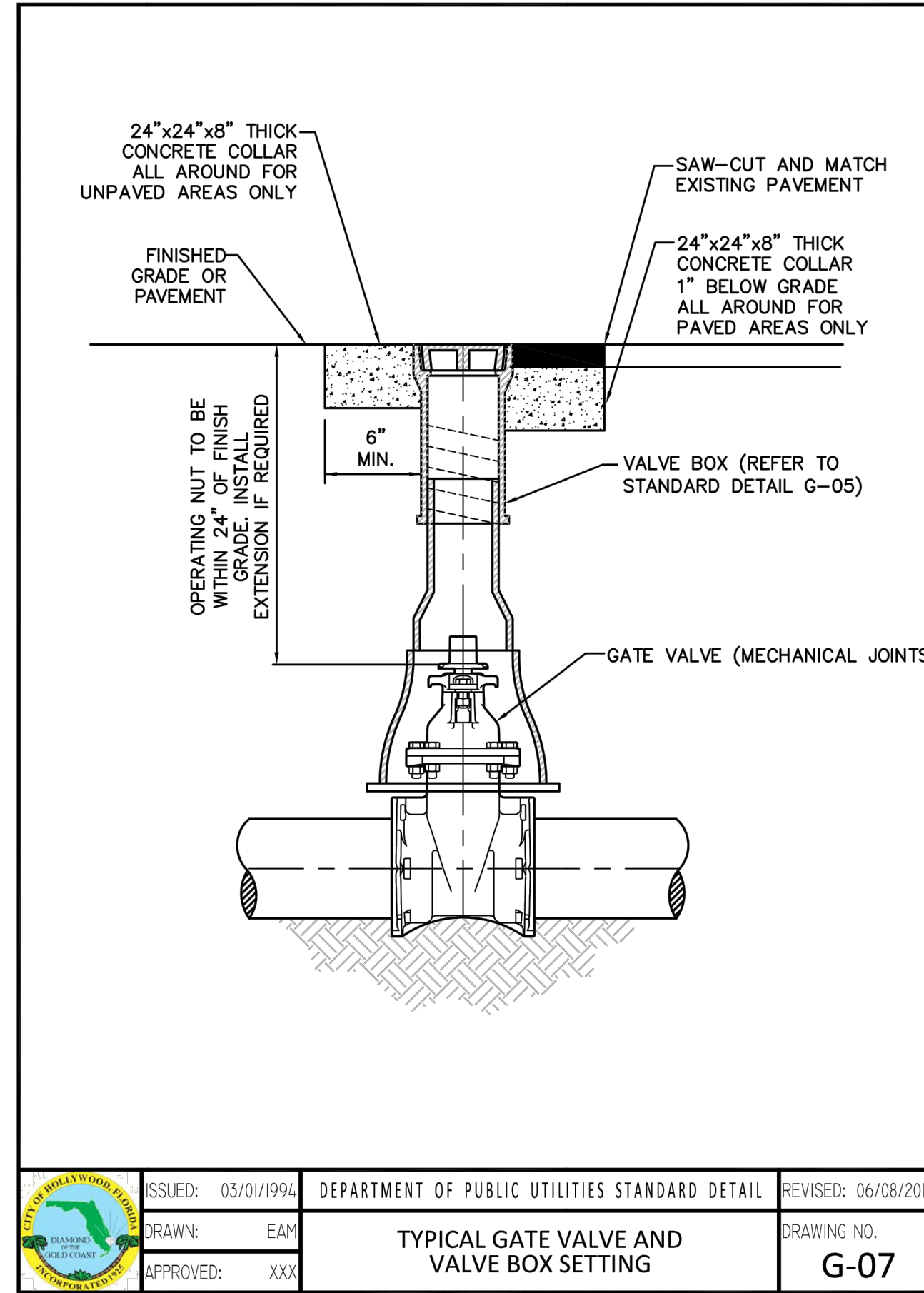
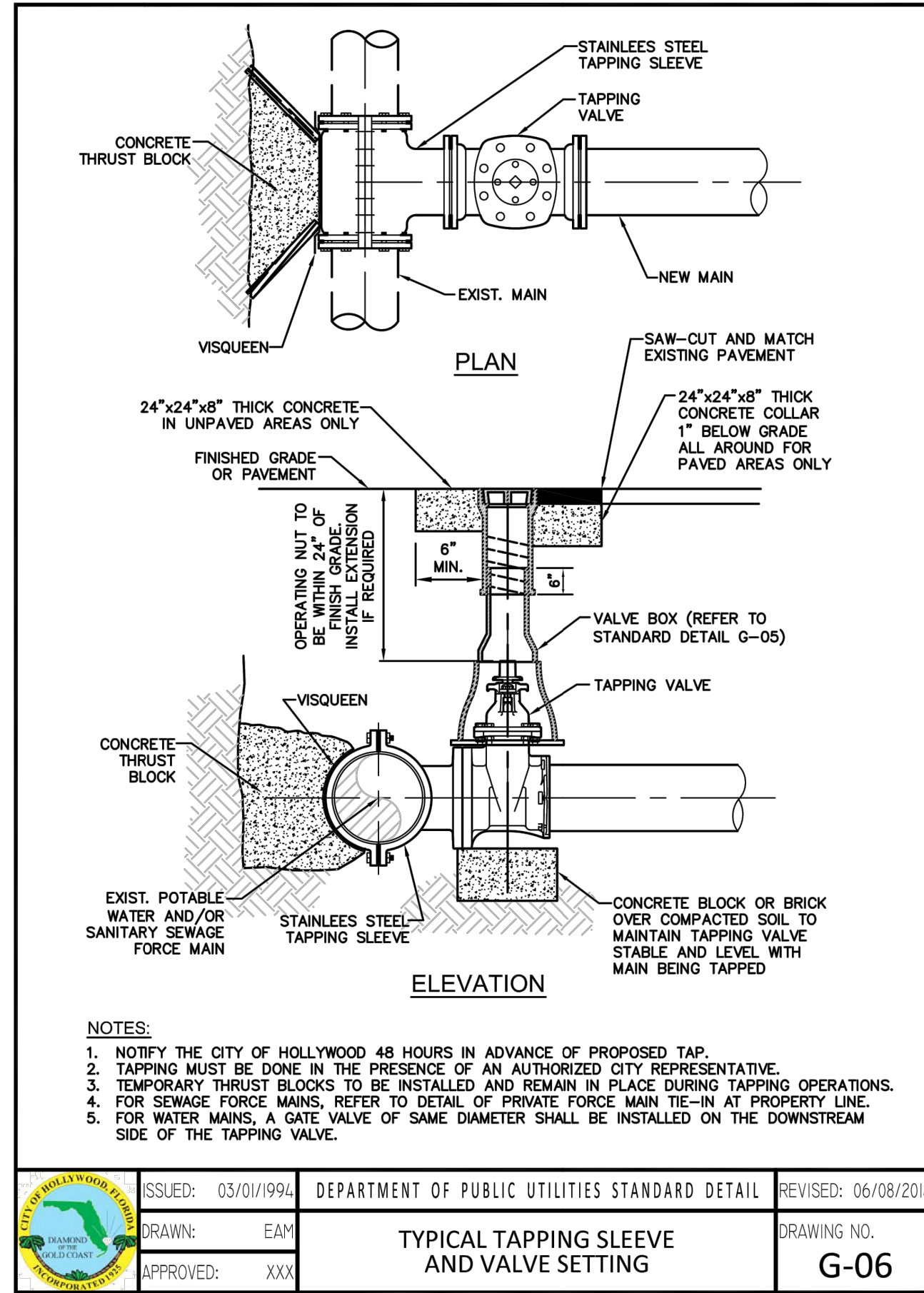
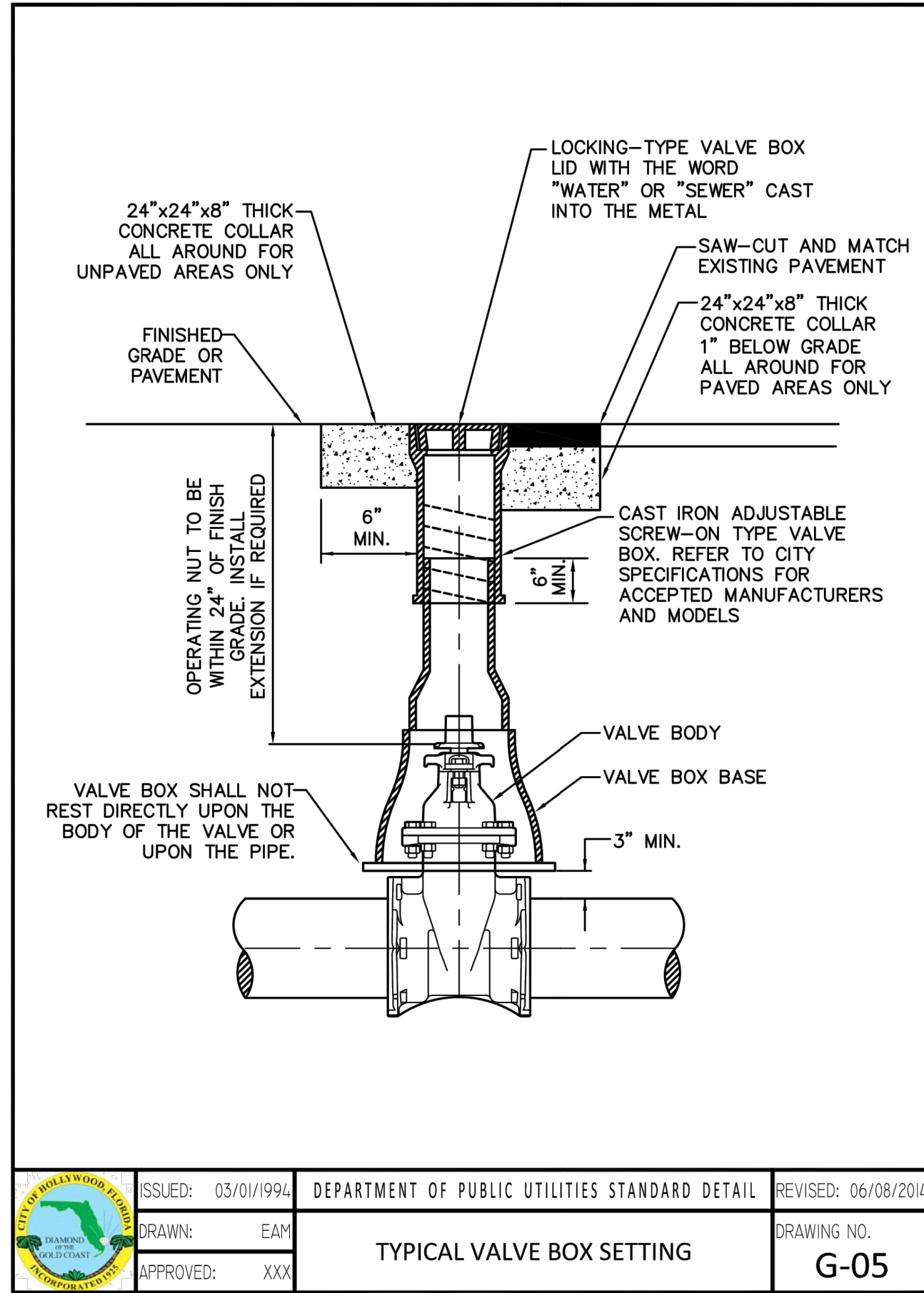
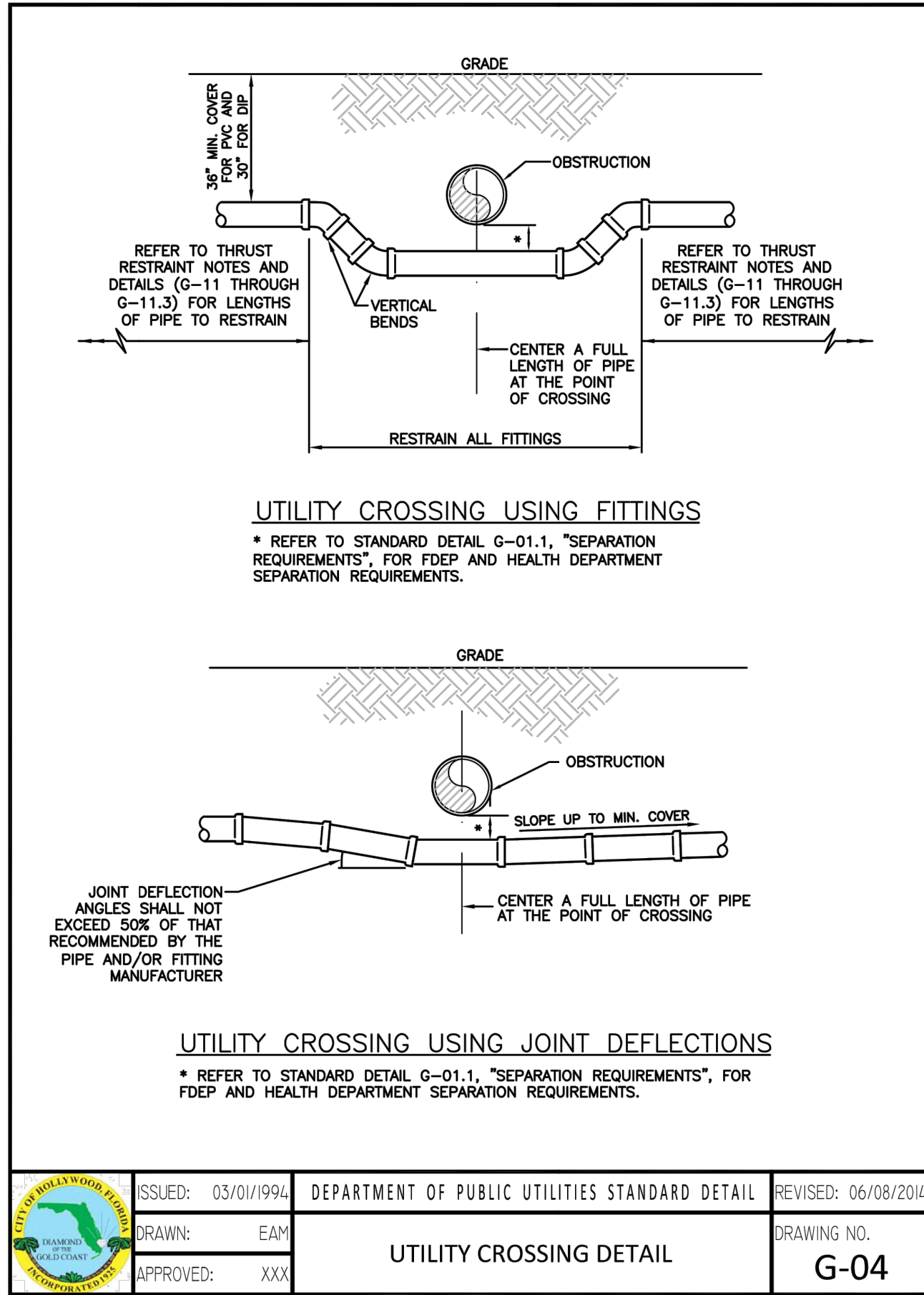


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 DRAWN BY SHB  
 CHECKED BY GDW

GREGORY D. WILFONG  
 No. 63166  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

**Kimley»Horn**  
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 445 24TH STREET, SUITE 200, VERO BEACH, FL 32960  
 PHONE: 772-794-4100  
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UTILITY DETAILS  
 OAKWOOD SOUTH RETAIL SHOPPING CENTER  
 CITY OF HOLLYWOOD

SHEET NUMBER C-405

| NO. | REVISIONS | DATE | BY |
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### HORIZONTAL BENDS

| PIPE DIA. (INCHES) | BEND (ANGLE) | RESTRAINED LENGTH (RL) (FT) |      |
|--------------------|--------------|-----------------------------|------|
|                    |              | PVC                         | *DIP |
| 24                 | 11 1/2       | -                           | -    |
|                    | 22 1/2       | -                           | -    |
|                    | 45           | -                           | -    |
|                    | 90           | -                           | -    |
| 16                 | 11 1/2       | -                           | -    |
|                    | 22 1/2       | -                           | -    |
|                    | 45           | -                           | -    |
|                    | 90           | -                           | -    |
| 12                 | 11 1/2       | -                           | -    |
|                    | 22 1/2       | -                           | -    |
|                    | 45           | -                           | -    |
|                    | 90           | -                           | -    |
| 8                  | 11 1/2       | -                           | -    |
|                    | 22 1/2       | -                           | -    |
|                    | 45           | -                           | -    |
|                    | 90           | -                           | -    |
| 6                  | 11 1/2       | -                           | -    |
|                    | 22 1/2       | -                           | -    |
|                    | 45           | -                           | -    |
|                    | 90           | -                           | -    |
| 4                  | 11 1/2       | -                           | -    |
|                    | 22 1/2       | -                           | -    |
|                    | 45           | -                           | -    |
|                    | 90           | -                           | -    |

### TEES AND TAPPING SLEEVES

| RUN DIA. (INCHES) | BRANCH DIA. (INCHES) | MINIMUM RESTRAINED LENGTH ALONG RUN (FT) |      | RUN DIA. (INCHES) | BRANCH DIA. (INCHES) | MINIMUM RESTRAINED LENGTH ALONG BRANCH (FT) |      |
|-------------------|----------------------|--|------|-------------------|----------------------|---|------|
|                   |                      | PVC                                      | *DIP |                   |                      | PVC   | *DIP |
| 24                | 24                   | -  | -    | 12                | 8                    | -   | -    |
|                   | 16                   | -  | -    |                   | 6                    | -   | -    |
|                   | 12                   | -  | -    |                   | 4                    | -   | -    |
|                   | 8                    | -  | -    |                   | 4                    | -   | -    |
| 16                | 16                   | -  | -    | 8                 | 6                    | -   | -    |
|                   | 12                   | -  | -    |                   | 4                    | -   | -    |
|                   | 8                    | -  | -    |                   | 4                    | -   | -    |
|                   | 6                    | -  | -    |                   | 4                    | -   | -    |

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**JOINT RESTRAINT DESIGN FOR PVC AND DIP HORIZONTAL BENDS AND TEES**  
 DRAWING NO. **G-11.1**

### VERTICAL OFFSETS

| PIPE DIA. (INCHES) | BEND (ANGLE) | LOWSIDE DEPTH (FT) | PVC                                     |   | *DIP |   |
|--------------------|--------------|--------------------|---|---|------|---|
|                    |              |                    | RESTRAINED LENGTHS (RL1 (FT), RL2 (FT)) | RESTRAINED LENGTHS (RL1 (FT), RL2 (FT)) |      |   |
| 24                 | 45           | 4                  | -                                       | -                                       | -    | - |
|                    | 5            | -                  | -                                       | -                                       | -    | - |
|                    | 6            | -                  | -                                       | -                                       | -    | - |
|                    | 7            | -                  | -                                       | -                                       | -    | - |
| 16                 | 45           | 4                  | -                                       | -                                       | -    | - |
|                    | 5            | -                  | -                                       | -                                       | -    | - |
|                    | 6            | -                  | -                                       | -                                       | -    | - |
|                    | 7            | -                  | -                                       | -                                       | -    | - |
| 12                 | 45           | 4                  | -                                       | -                                       | -    | - |
|                    | 5            | -                  | -                                       | -                                       | -    | - |
|                    | 6            | -                  | -                                       | -                                       | -    | - |
|                    | 7            | -                  | -                                       | -                                       | -    | - |
| 8                  | 45           | 4                  | -                                       | -                                       | -    | - |
|                    | 5            | -                  | -                                       | -                                       | -    | - |
|                    | 6            | -                  | -                                       | -                                       | -    | - |
|                    | 7            | -                  | -                                       | -                                       | -    | - |
| 6                  | 45           | 4                  | -                                       | -                                       | -    | - |
|                    | 5            | -                  | -                                       | -                                       | -    | - |
|                    | 6            | -                  | -                                       | -                                       | -    | - |
|                    | 7            | -                  | -                                       | -                                       | -    | - |
| 4                  | 45           | 4                  | -                                       | -                                       | -    | - |
|                    | 5            | -                  | -                                       | -                                       | -    | - |
|                    | 6            | -                  | -                                       | -                                       | -    | - |
|                    | 7            | -                  | -                                       | -                                       | -    | - |

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 APPROVED: XXX  
**JOINT RESTRAINT DESIGN FOR PVC AND DIP VERTICAL OFFSETS**  
 DRAWING NO. **G-11.2**

### REDUCERS

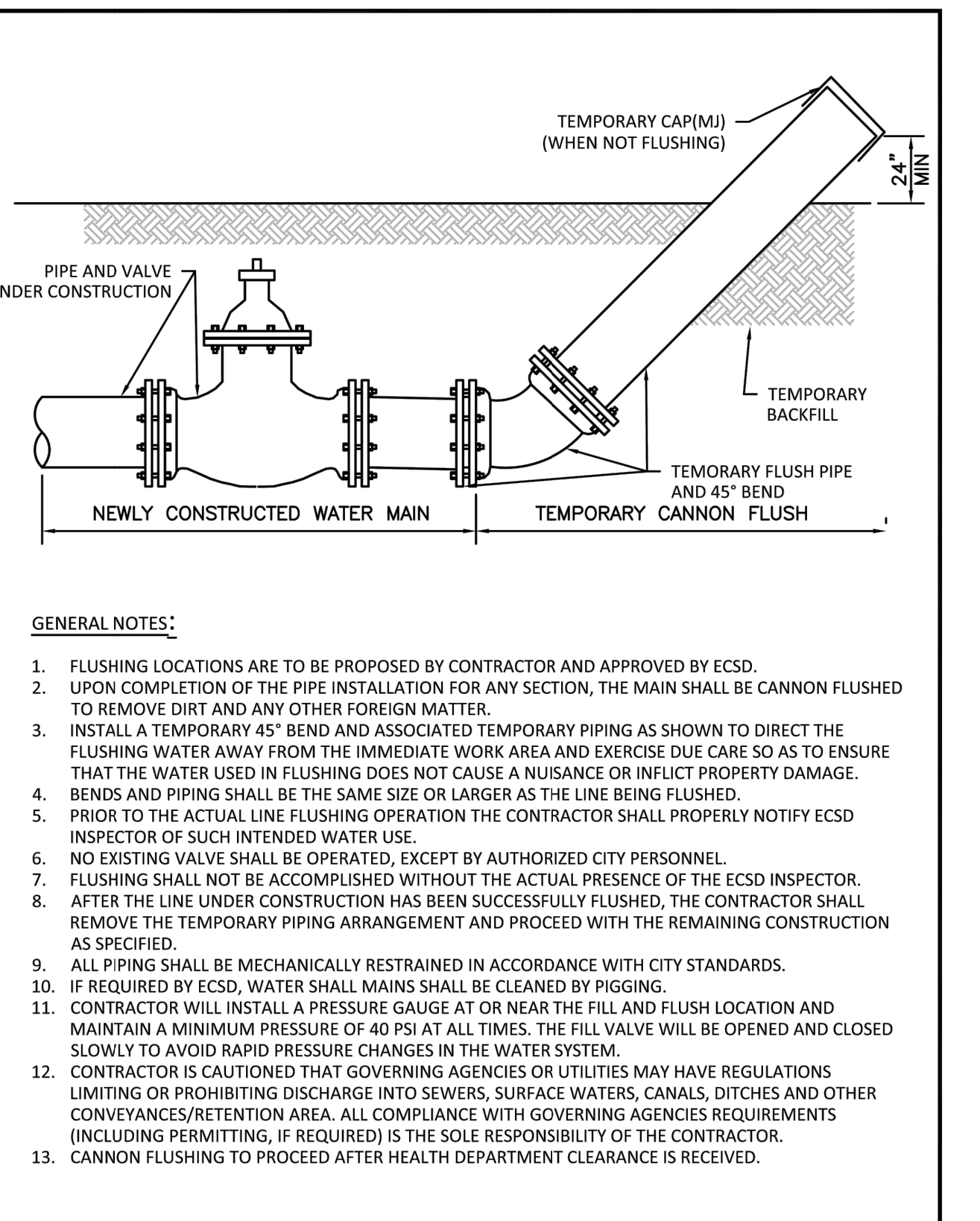
| LARGE SIDE | SMALL SIDE | MINIMUM LENGTH TO RESTRAIN ON LARGE SIDE (FT) |      | LARGE SIDE | SMALL SIDE | MINIMUM LENGTH TO RESTRAIN ON LARGE SIDE (FT) |      |
|------------|------------|---|------|------------|------------|---|------|
|            |            | PVC   | *DIP |            |            | PVC   | *DIP |
| 24"        | 16"        | -   | -    | 12"        | 8"         | -   | -    |
|            | 12"        | -   | -    |            | 6"         | -   | -    |
|            | 8"         | -   | -    |            | 4"         | -   | -    |
|            | 6"         | -   | -    |            | 6"         | -   | -    |
| 16"        | 12"        | -   | -    | 8"         | 4"         | -   | -    |
|            | 8"         | -   | -    |            | 2"         | -   | -    |
|            | 6"         | -   | -    |            | 4"         | -   | -    |
|            | 4"         | -   | -    |            | 2"         | -   | -    |

### DEAD ENDS

| PIPE DIA. (INCHES) | MIN. RESTRAINED LENGTH (FT) |      |
|--------------------|-----------------------------|------|
|                    | PVC                         | *DIP |
| 24"                | -                           | -    |
| 16"                | -                           | -    |
| 12"                | -                           | -    |
| 8"                 | -                           | -    |
| 6"                 | -                           | -    |
| 4"                 | -                           | -    |

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 APPROVED: XXX  
**JOINT RESTRAINT DESIGN FOR PVC AND DIP REDUCERS AND DEAD ENDS**  
 DRAWING NO. **G-11.3**

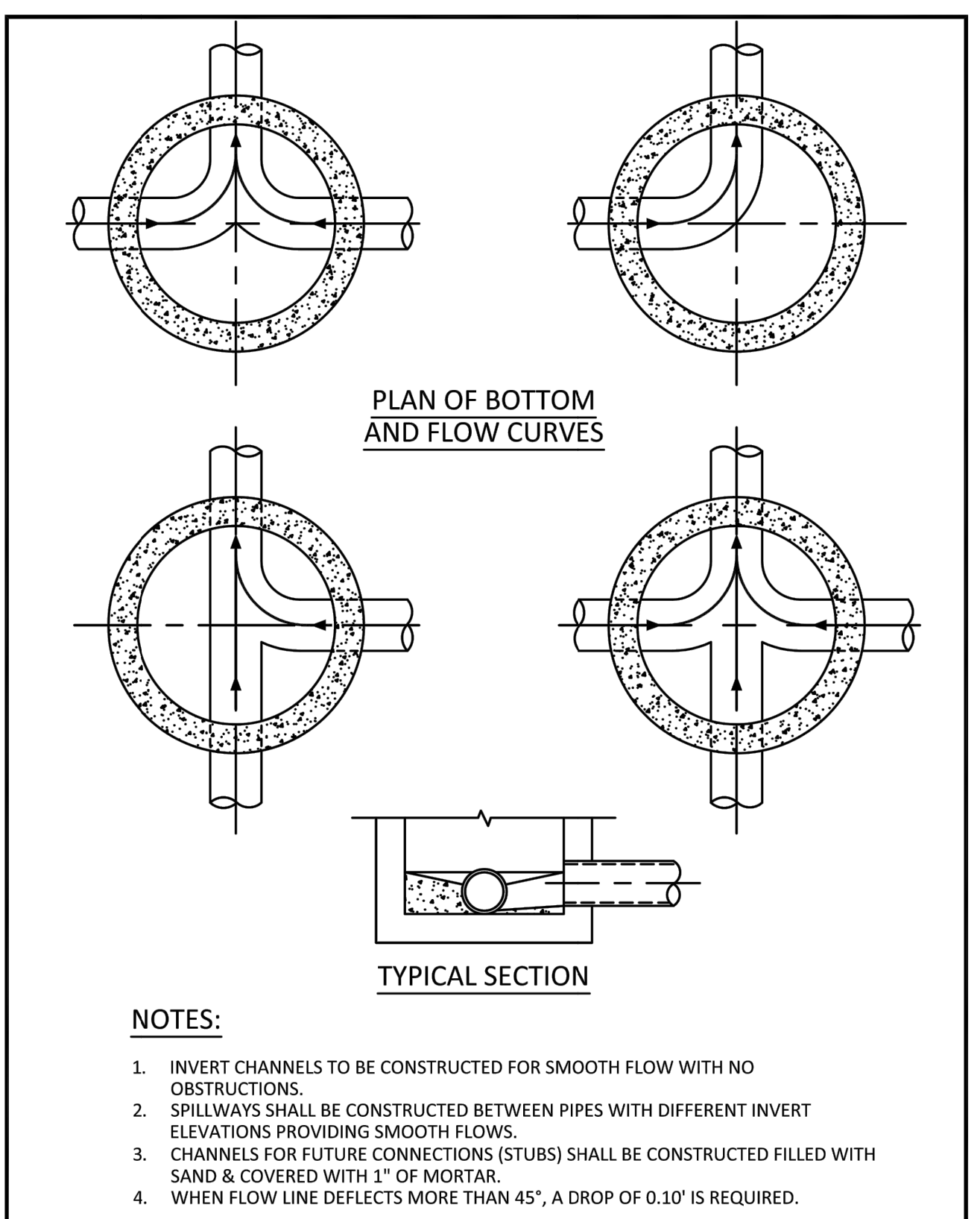


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 DRAWN: EAM  
 APPROVED: XXX  
**CANNON FLUSHING**  
 DRAWING NO. **G-13**

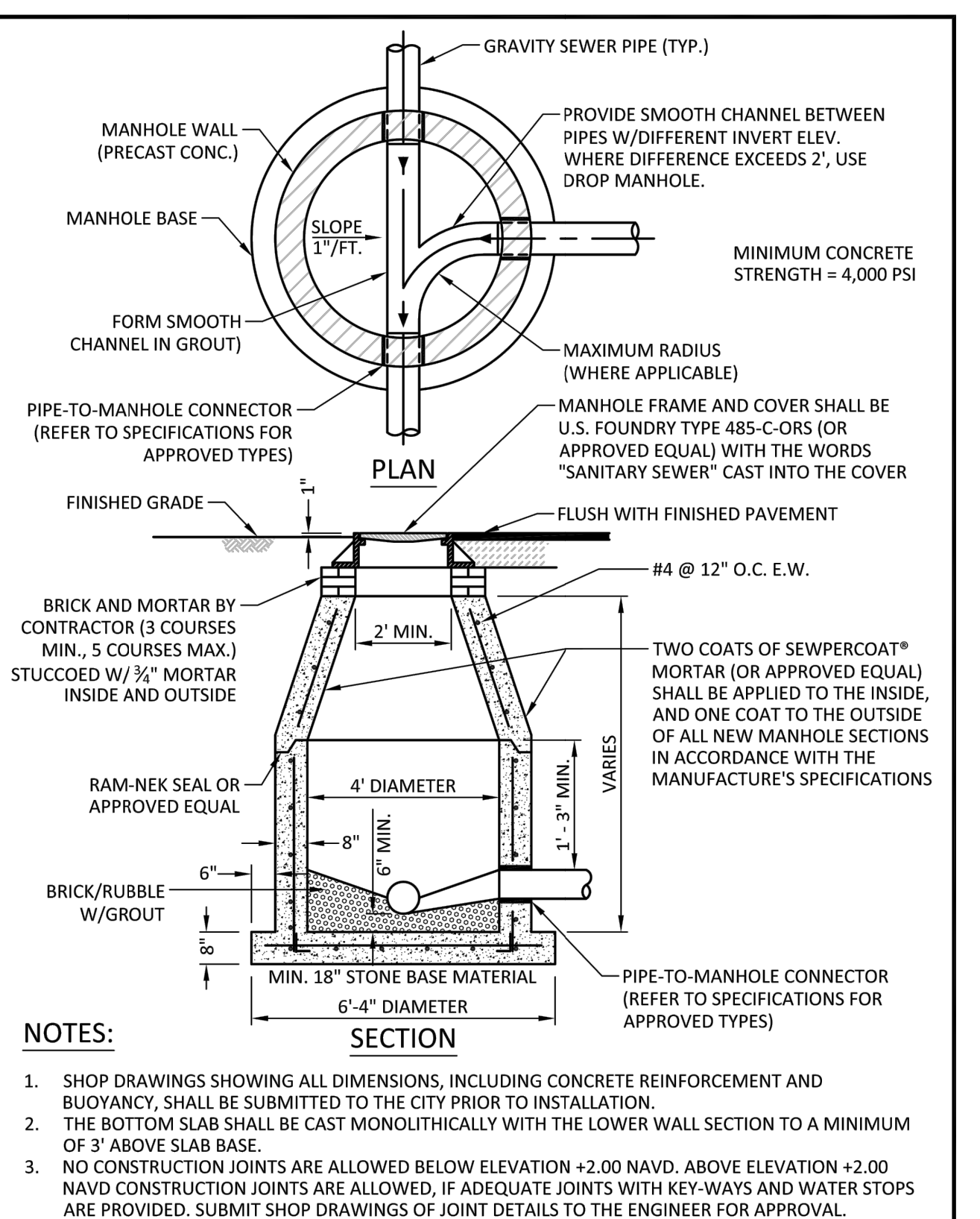
### SEWER NOTES:

- THE MINIMUM DEPTH OF COVER OVER D.I.P. SANITARY SEWER GRAVITY OR FORCE MAINS IS 30". THE MINIMUM DEPTH OF COVER OVER PVC SANITARY SEWER OR FORCE MAINS IS 36".
- ALL CONNECTIONS TO EXISTING MAINS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- LEAKAGE TESTS AND ALIGNMENT (LAMPING) TESTS SHALL BE PERFORMED ON ALL NEW SEWER LINES UP TO THE CONNECTION POINT WITH THE EXISTING SEWER SYSTEM. THESE TESTS SHALL BE REQUESTED AND PAID FOR BY THE CONTRACTOR.
- LAMPING TESTS SHALL BE PERFORMED ON GRAVITY SEWERS FROM MANHOLE TO MANHOLE UP TO AND INCLUDING THE POINT OF CONNECTION TO THE EXISTING SEWER SYSTEM.
- LEAKAGE TESTS SHALL BE PERFORMED ON ALL SEGMENTS OF A GRAVITY SEWER SYSTEM, INCLUDING SERVICE LATERALS AND MANHOLES, FOR A CONTINUOUS PERIOD OF NO LESS THAN 2 HOURS. AT THE END OF THE TEST, THE TOTAL MEASURED LEAKAGE SHALL NOT EXCEED 100 GALLONS PER INCH OF PIPE DIAMETER PER MILE PER DAY FOR ANY SECTION OF THE SYSTEM, WITH ZERO ALLOWABLE LEAKAGE FOR LATERALS AND MANHOLES. AN EXFILTRATION OR INFILTRATION TEST SHALL BE PERFORMED WITH A MINIMUM POSITIVE HEAD OF 2 FEET ON THE SECTION BEING TESTED.
- FORCE MAINS SHALL BE PRESSURE-TESTED IN ACCORDANCE WITH RULE 62-555.330 (FAC). THE PRESSURE TEST SHALL CONSIST OF HOLDING A TEST PRESSURE OF 150 PSI ON THE PIPELINE FOR A CONTINUOUS PERIOD OF 2 HOURS. THE MAXIMUM ALLOWABLE LEAKAGE SHALL BE DETERMINED BY THE FOLLOWING FORMULA:
 
$$L = 5 \times D \times \sqrt{P}$$
 WHERE:  
 L = ALLOWABLE LEAKAGE FOR SYSTEM IN GALLONS PER HOUR  
 D = PIPE DIAMETER IN INCHES  
 S = LENGTH OF LINES IN LINEAL FEET  
 P = AVERAGE TEST PRESSURE IN PSI
- CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING CONFLICTS WITH FORCE MAINS PLACED AT MINIMUM COVER. IN CASE OF CONFLICT, FORCE MAIN SHALL BE LOWERED TO PASS UNDER CONFLICTS WITH 12" MINIMUM SEPARATION FROM WATER MAINS AND 6" MINIMUM SEPARATION FROM OTHER UTILITIES. NO ADDITIONAL PAYMENT SHALL BE DUE TO CONTRACTOR FOR LOWERING THE MAIN OR THE ADDITIONAL FITTINGS USED THEREON.
- WHenever it is necessary, in the interest of safety, to brace the sides of a trench, the contractor shall furnish, put in place and maintain such sheeting or bracing as may be necessary to support the sides of the excavation to ensure personnel safety, and to prevent movement which can in any way damage the work or endanger adjacent structures. The contractor shall be solely responsible for the sequence, methods and means of construction, and for the implementation of all OSHA and other safety requirements.

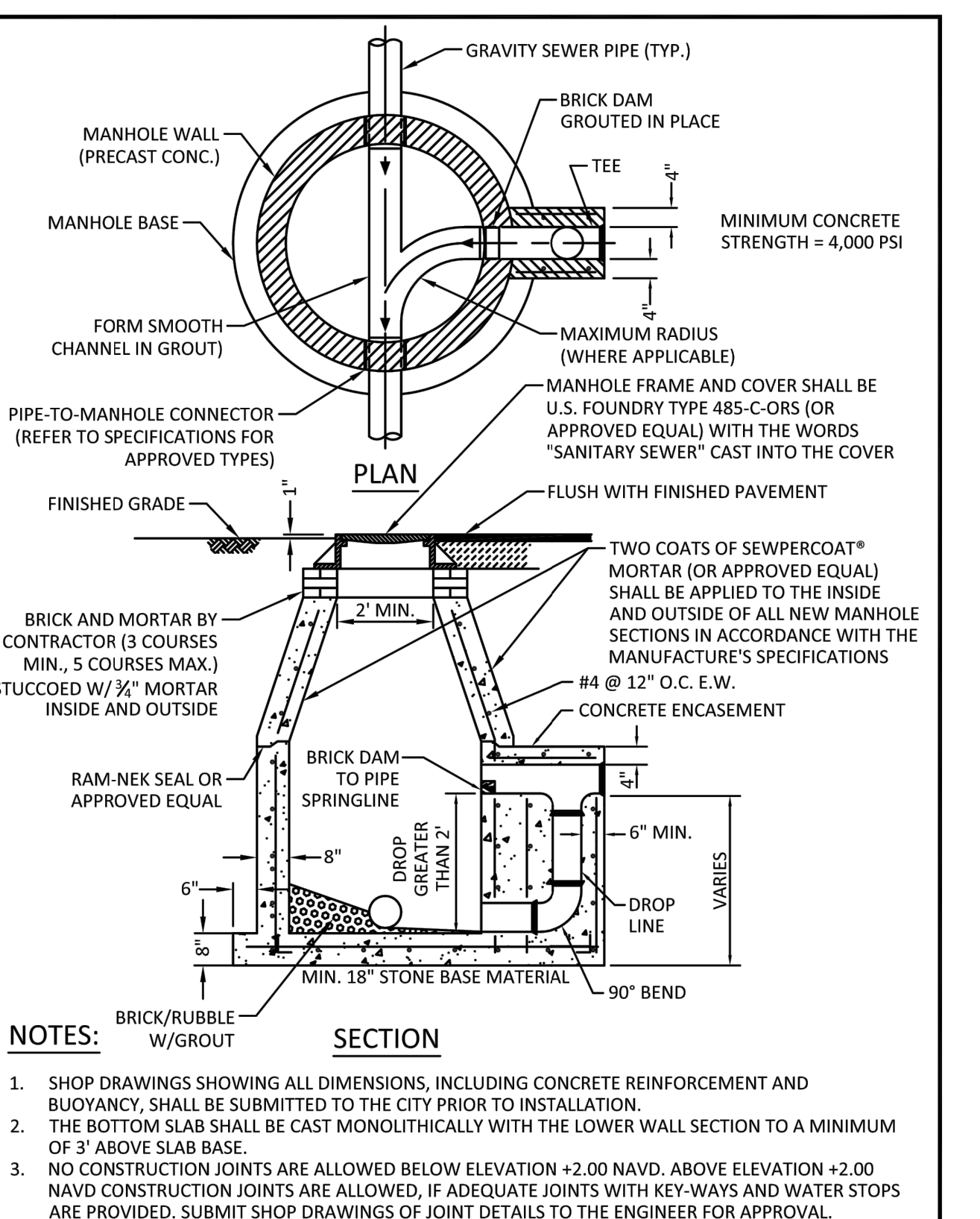
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**SANITARY SEWER MAIN CONSTRUCTION NOTES**  
 DRAWING NO. **S-01**



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**MANHOLE FLOW PATTERNS**  
 DRAWING NO. **S-02**



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**STANDARD PRECAST MANHOLE**  
 DRAWING NO. **S-03**



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**DROP MANHOLE**  
 DRAWING NO. **S-04**

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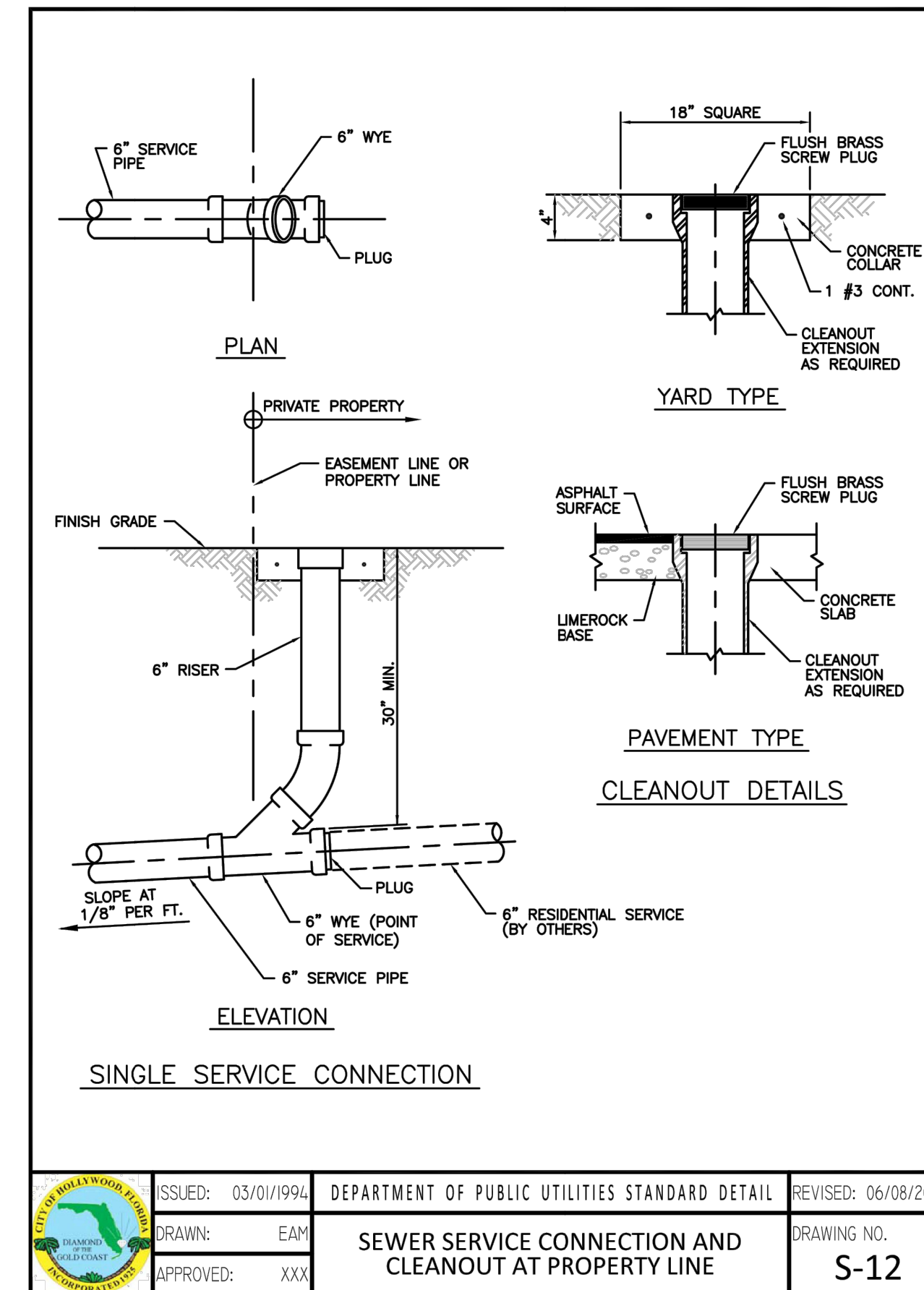
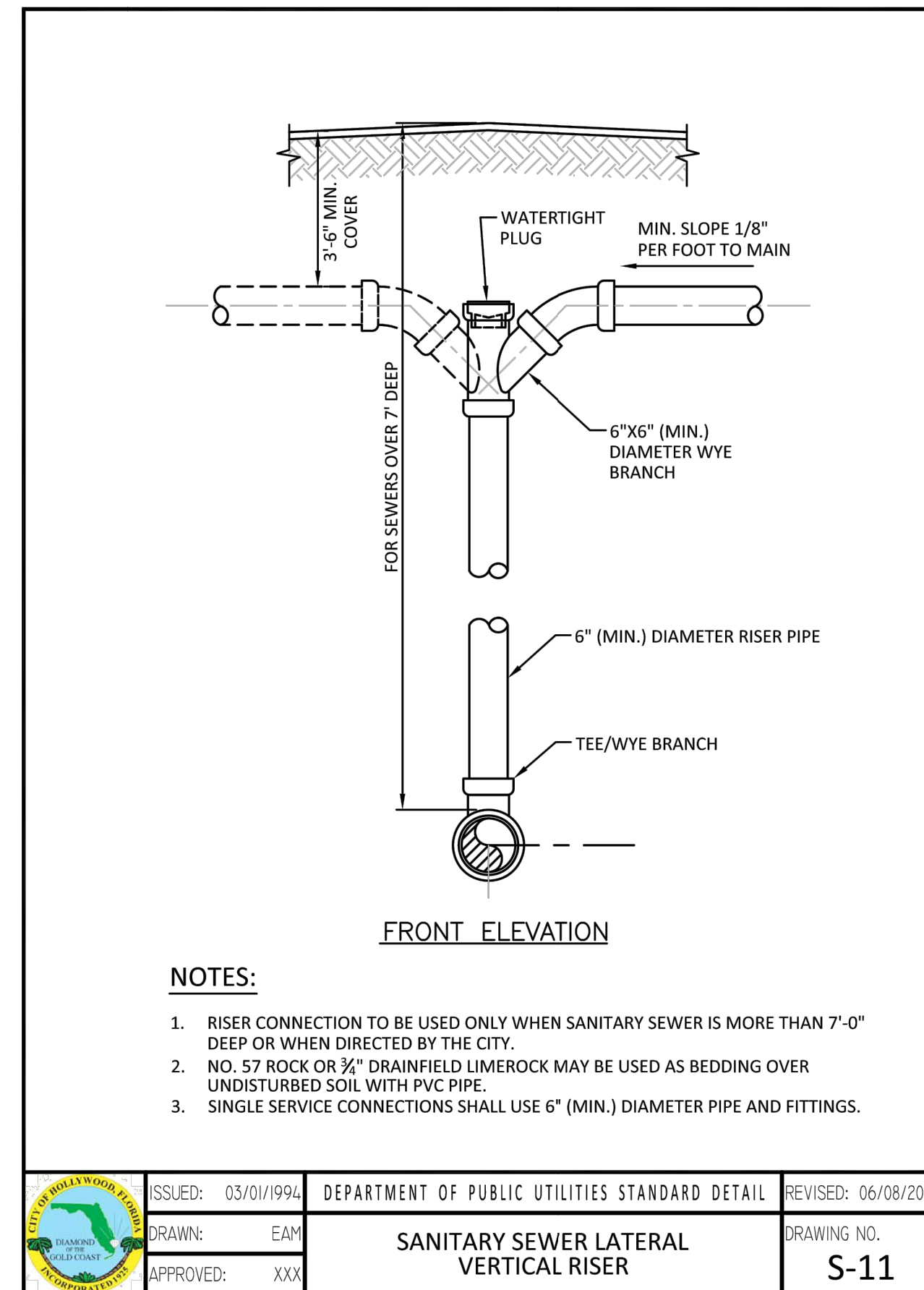
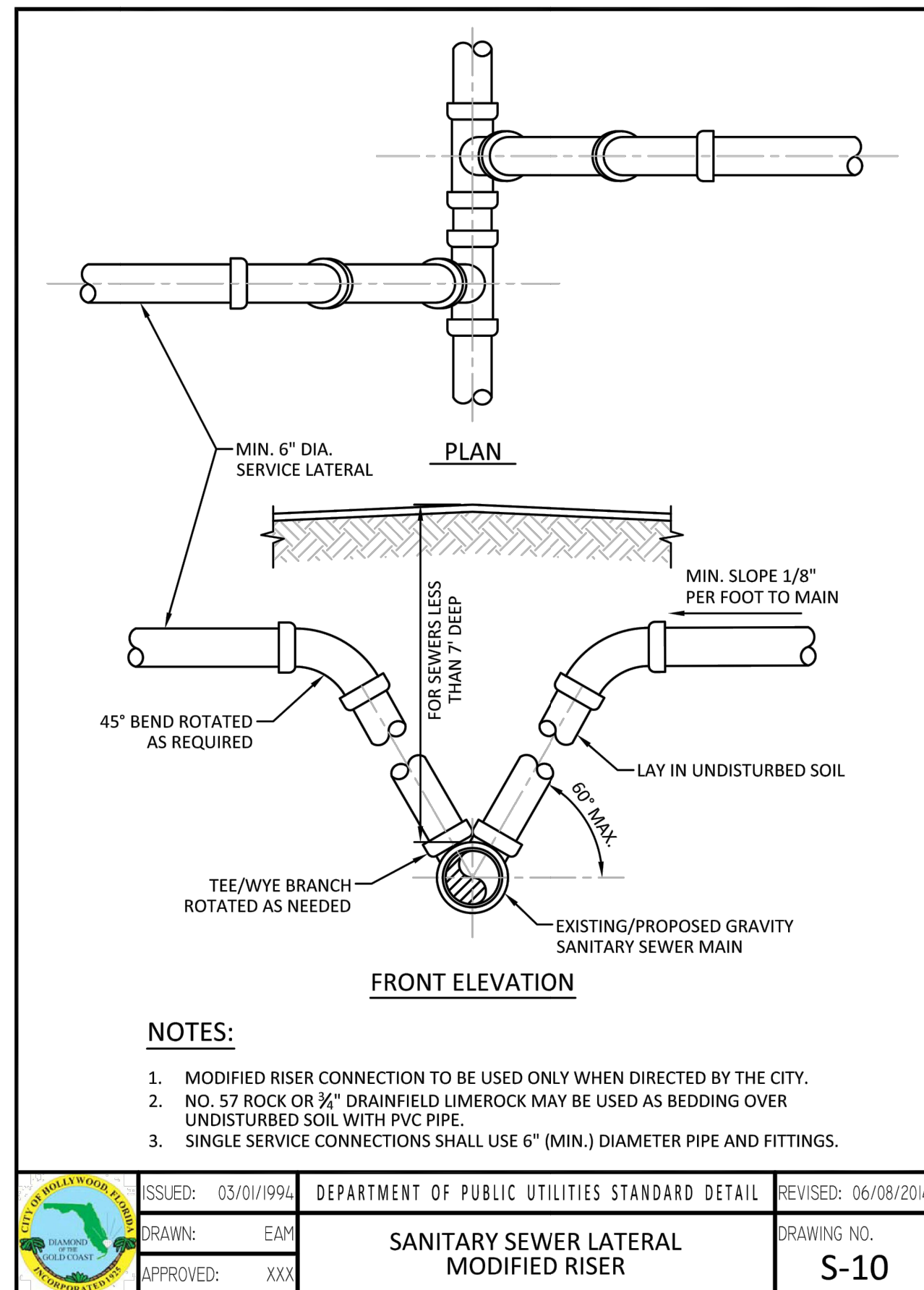
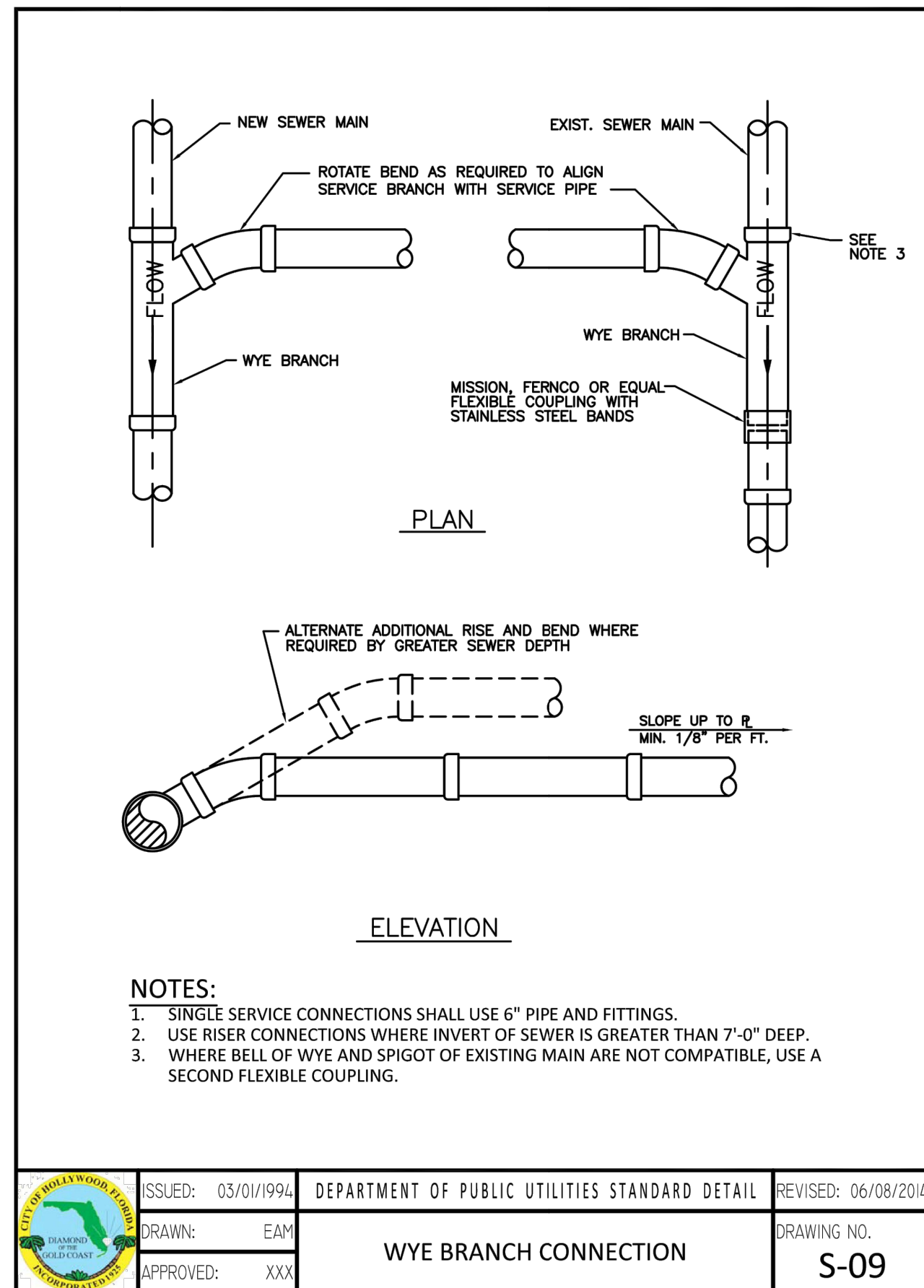
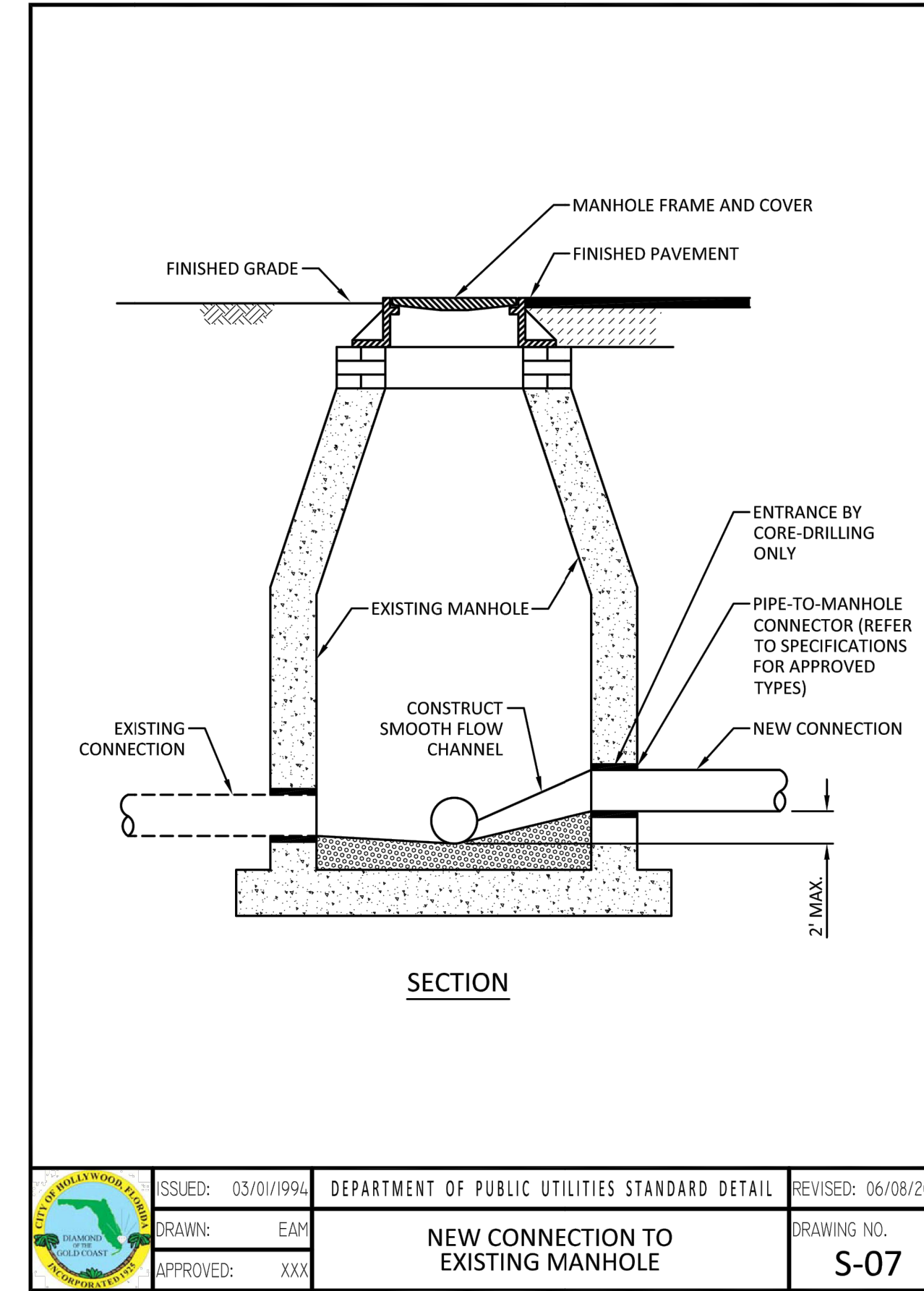
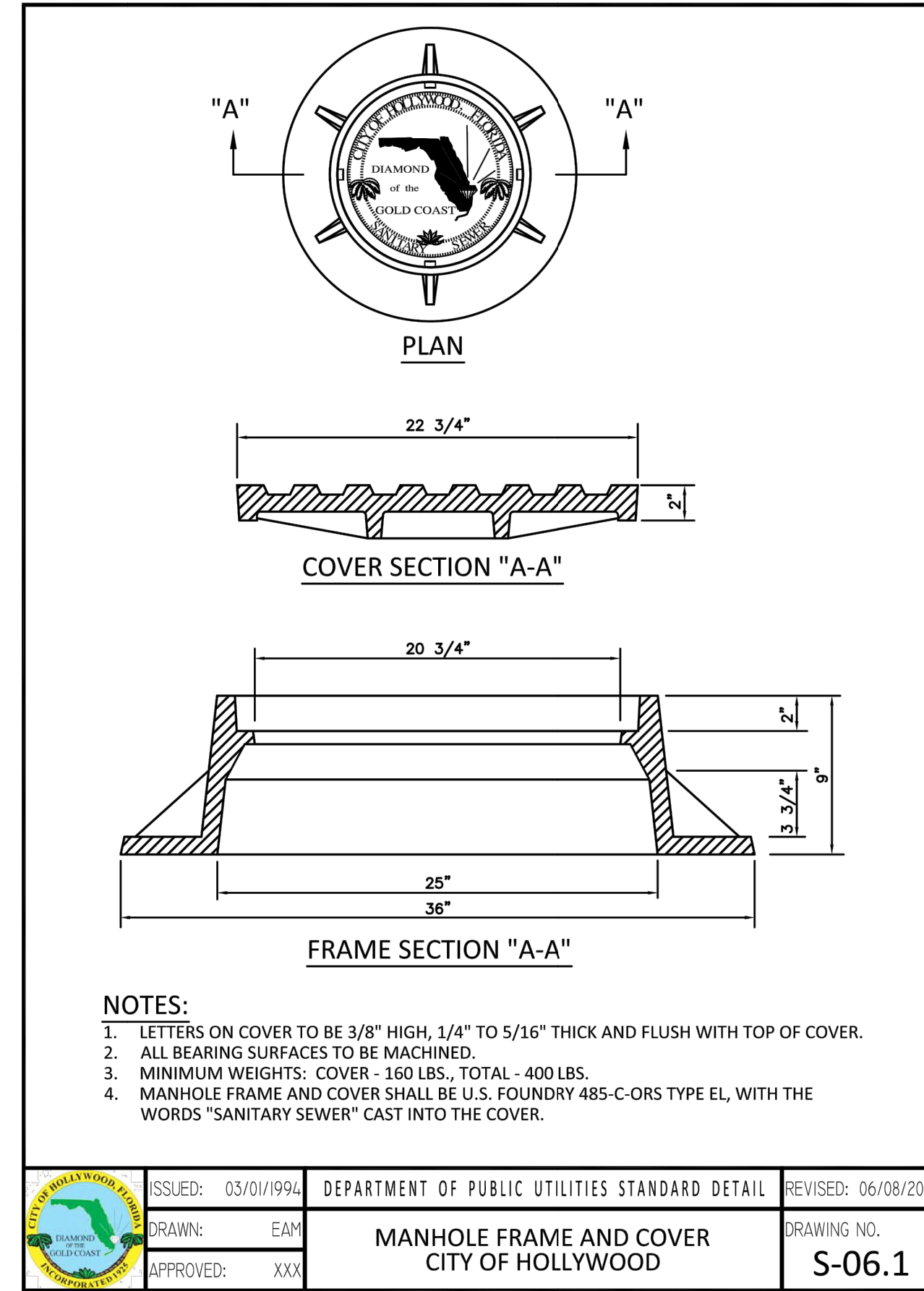
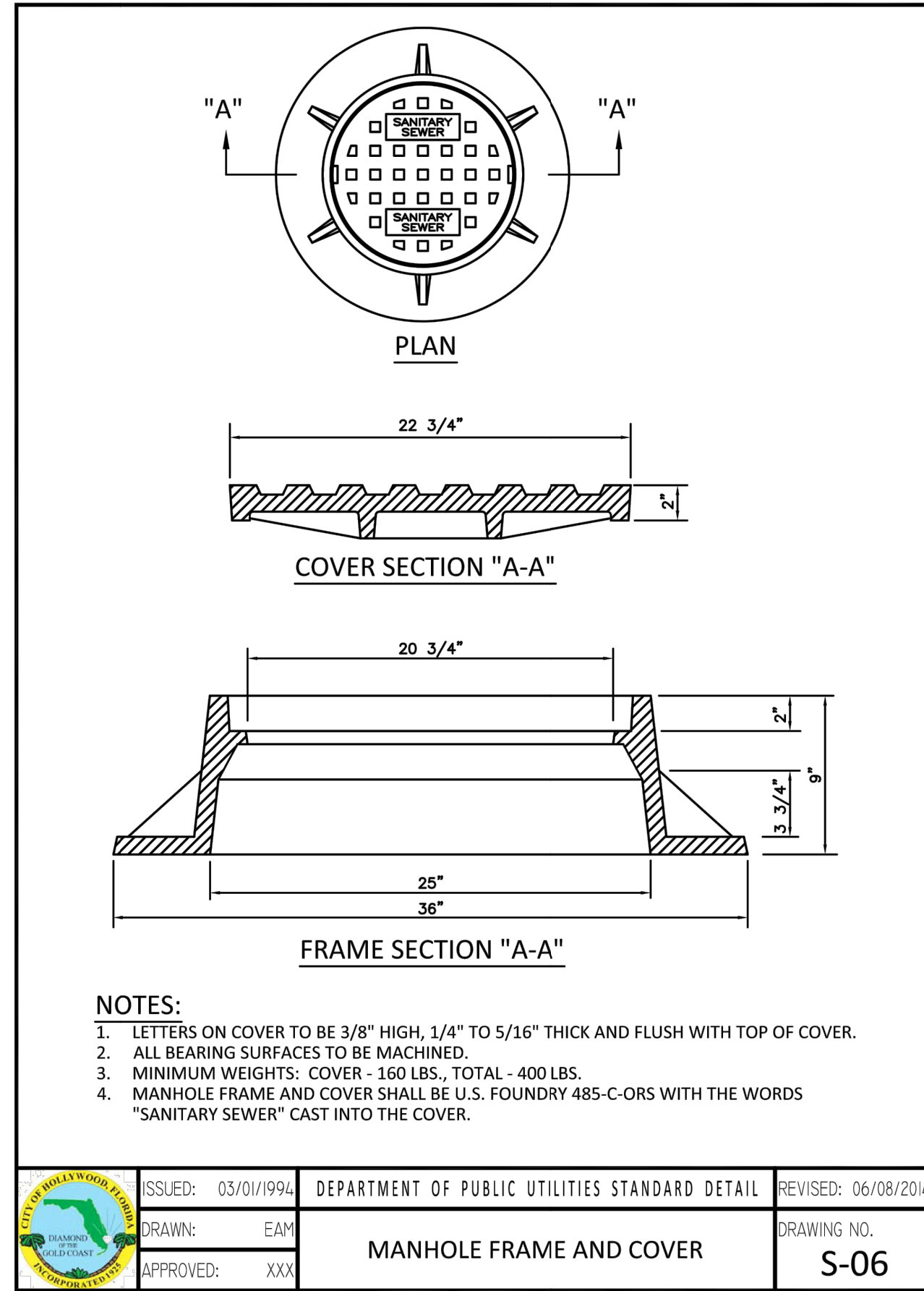
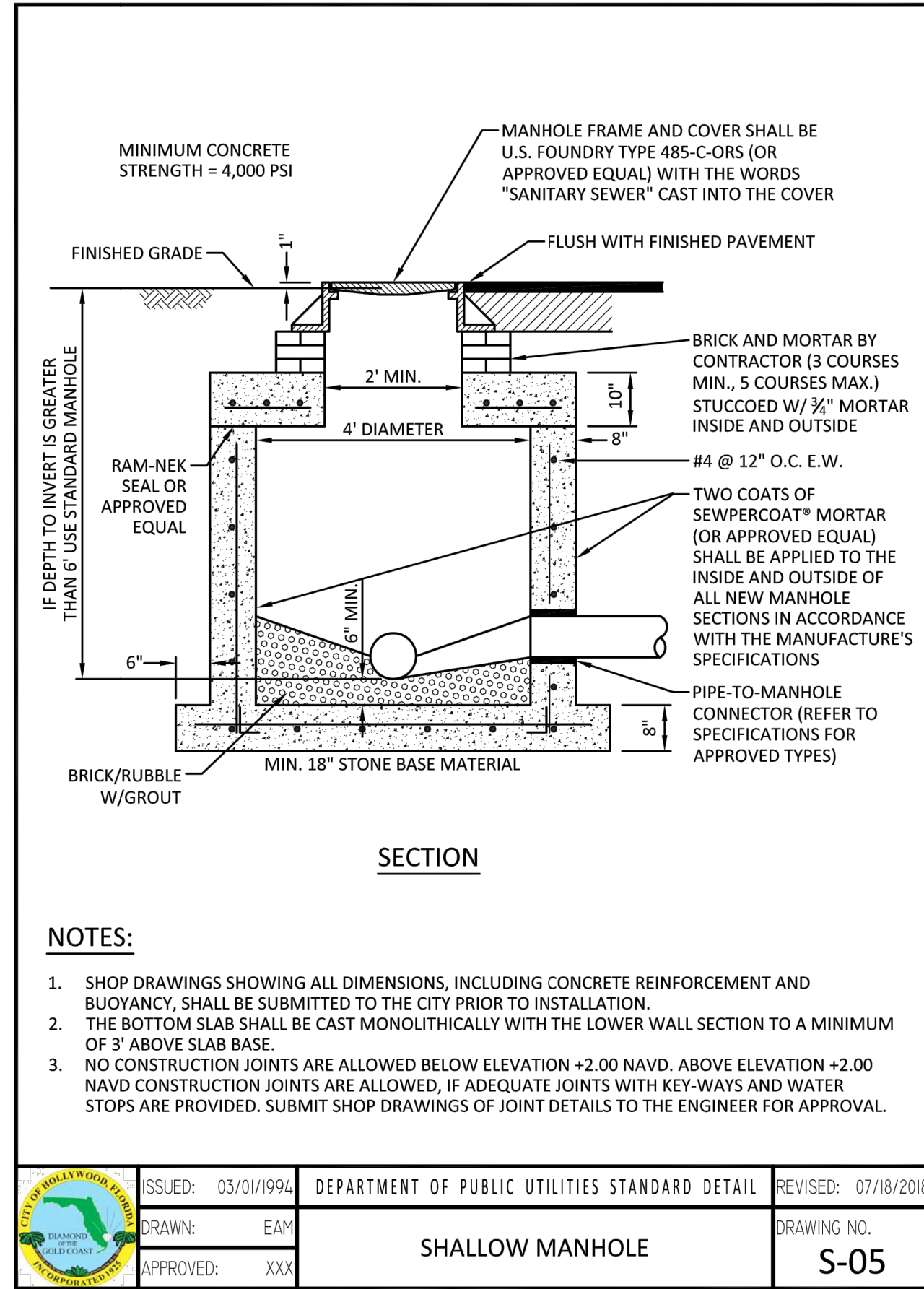
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 No. 63166  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

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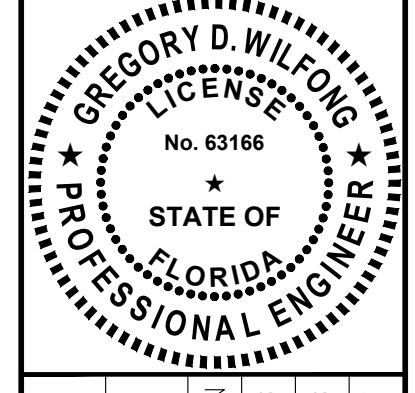
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**UTILITY DETAILS**

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CITY OF HOLLYWOOD

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