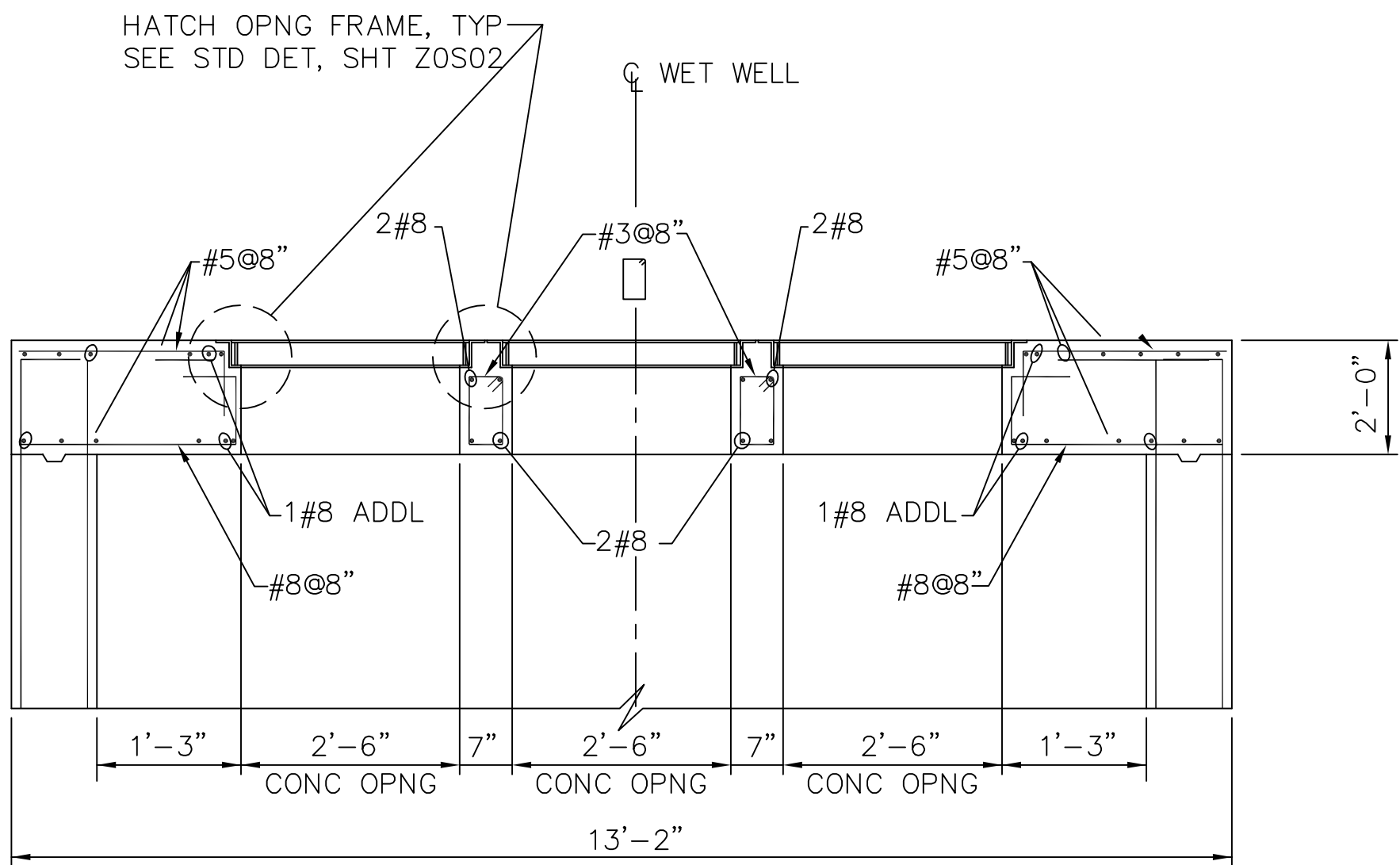
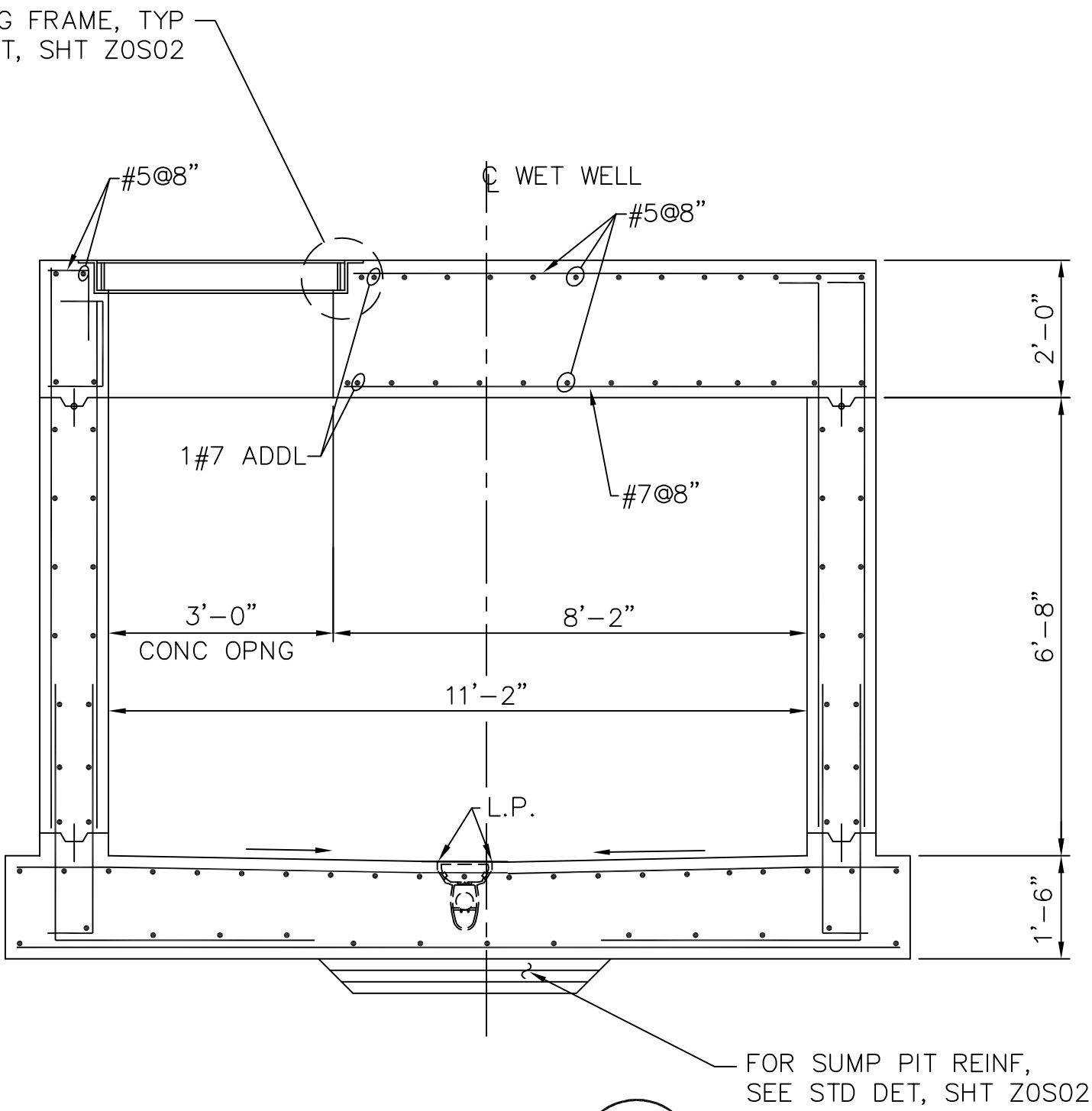
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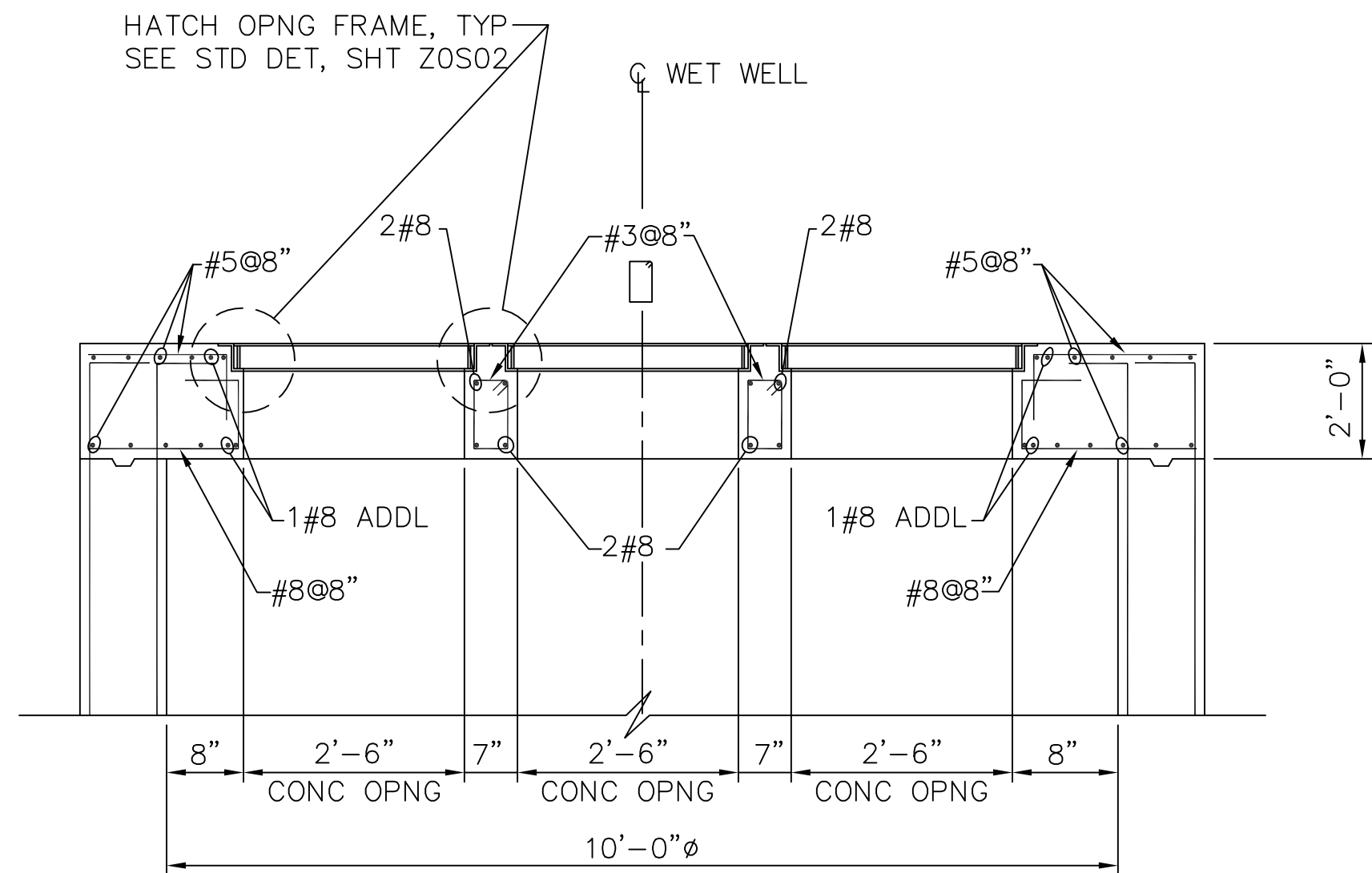
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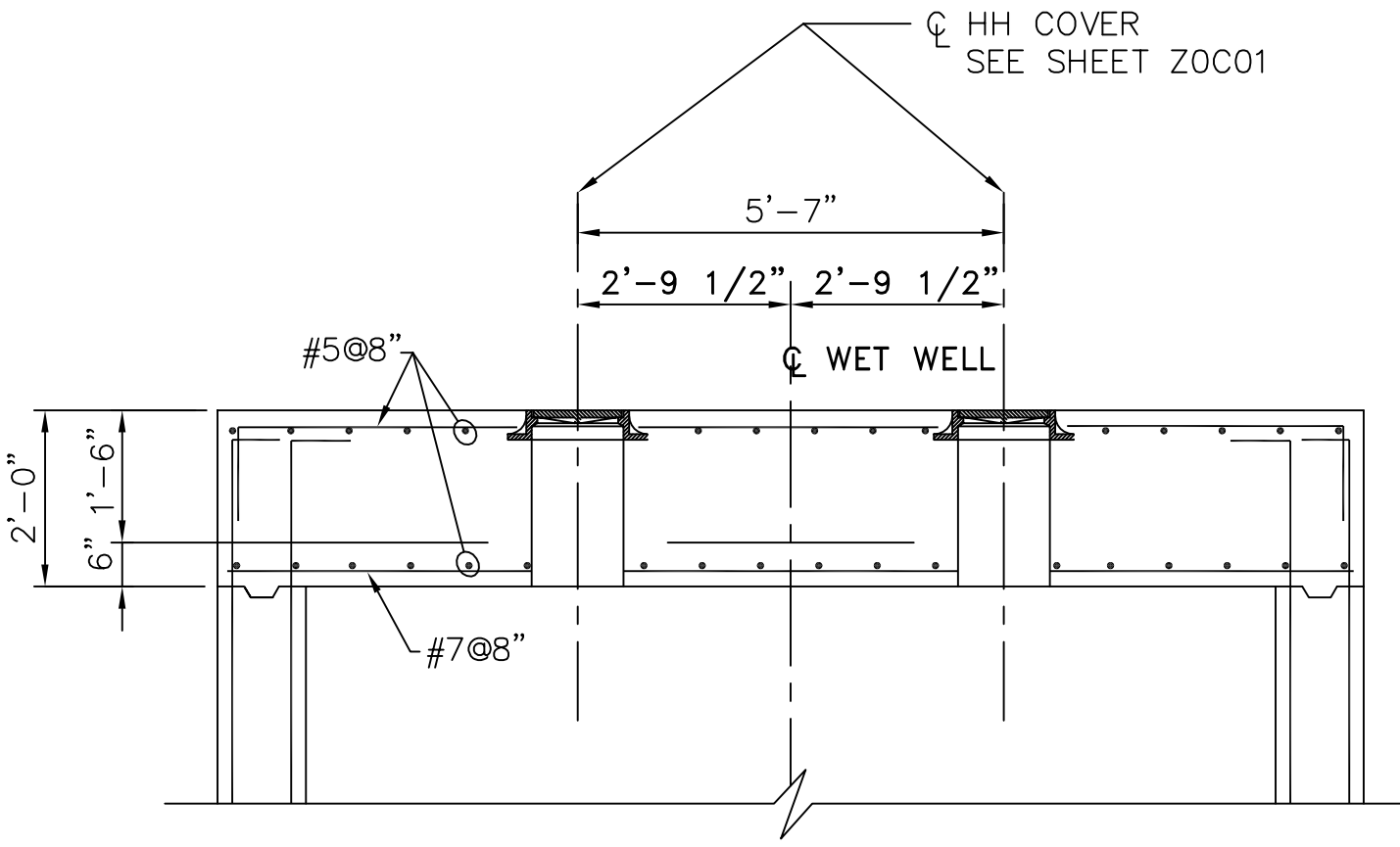
SECTION B  
D3S01



SECTION C  
D3S01



SECTION D  
D3S01



SECTION E  
D3S01

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
- B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
- C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
2. CONTRACTOR TO CONFIRM THE SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
3. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

STRUCTURAL  
3 PUMPS @ 250 - 500 GPM PER PUMP  
ALTERNATE LOW PROFILE CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN TRAFFIC AND SIGNAL DESIGN

STORM SEWER DESIGN STREET, BRIDGE & R.O.W.

WASTEWATER DESIGN CONSTRUCTION

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER DATE

SCALE: XX" = 1'-0" DESIGNED BY:

SUBMITTED: DRAWN BY:

DATE: NOVEMBER, 1996 SHEET NO. OF SHEETS

SURVEY BY: DWG. NO.

FIELD BOOK NO. D3S04

SEAL

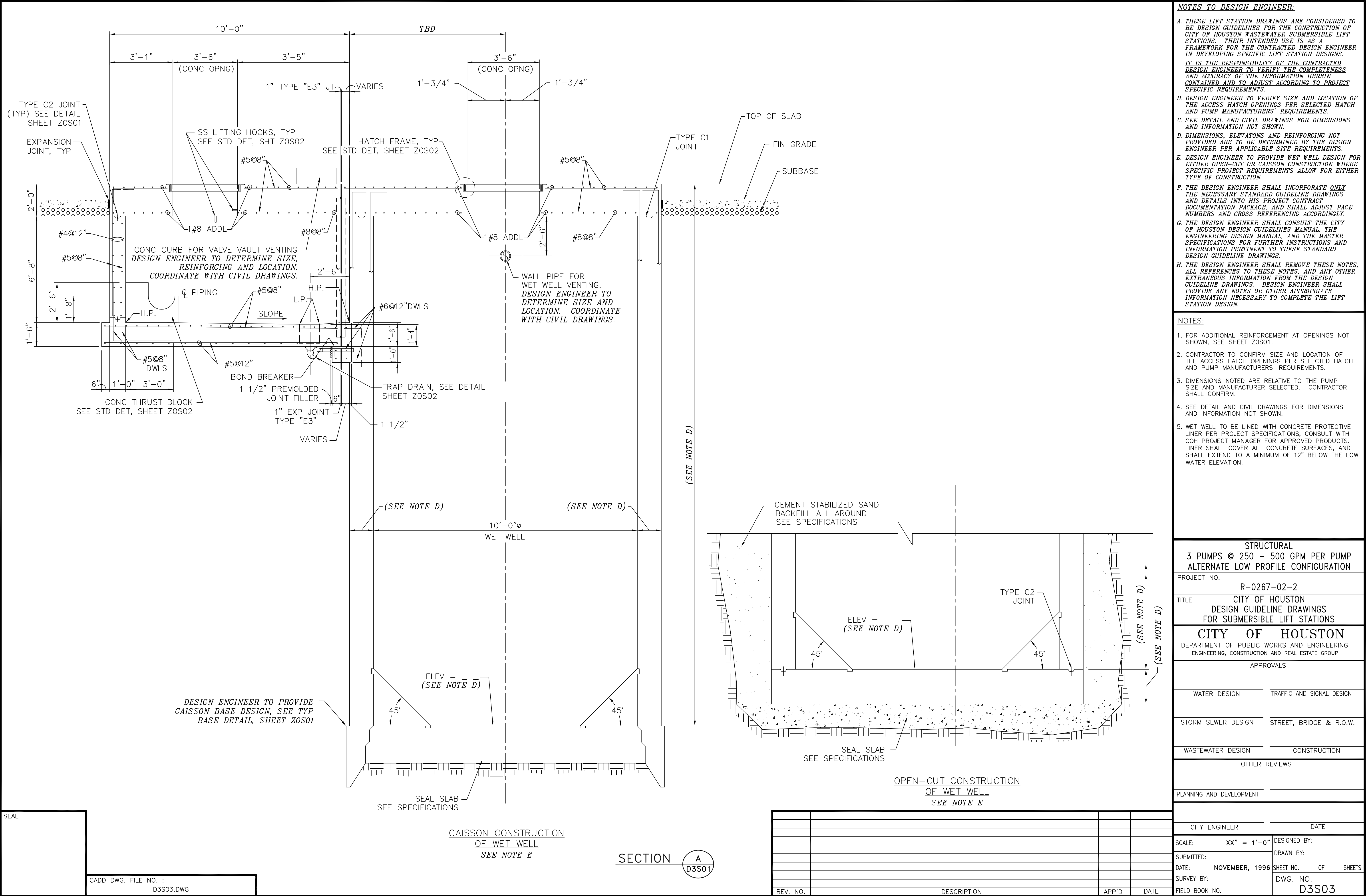
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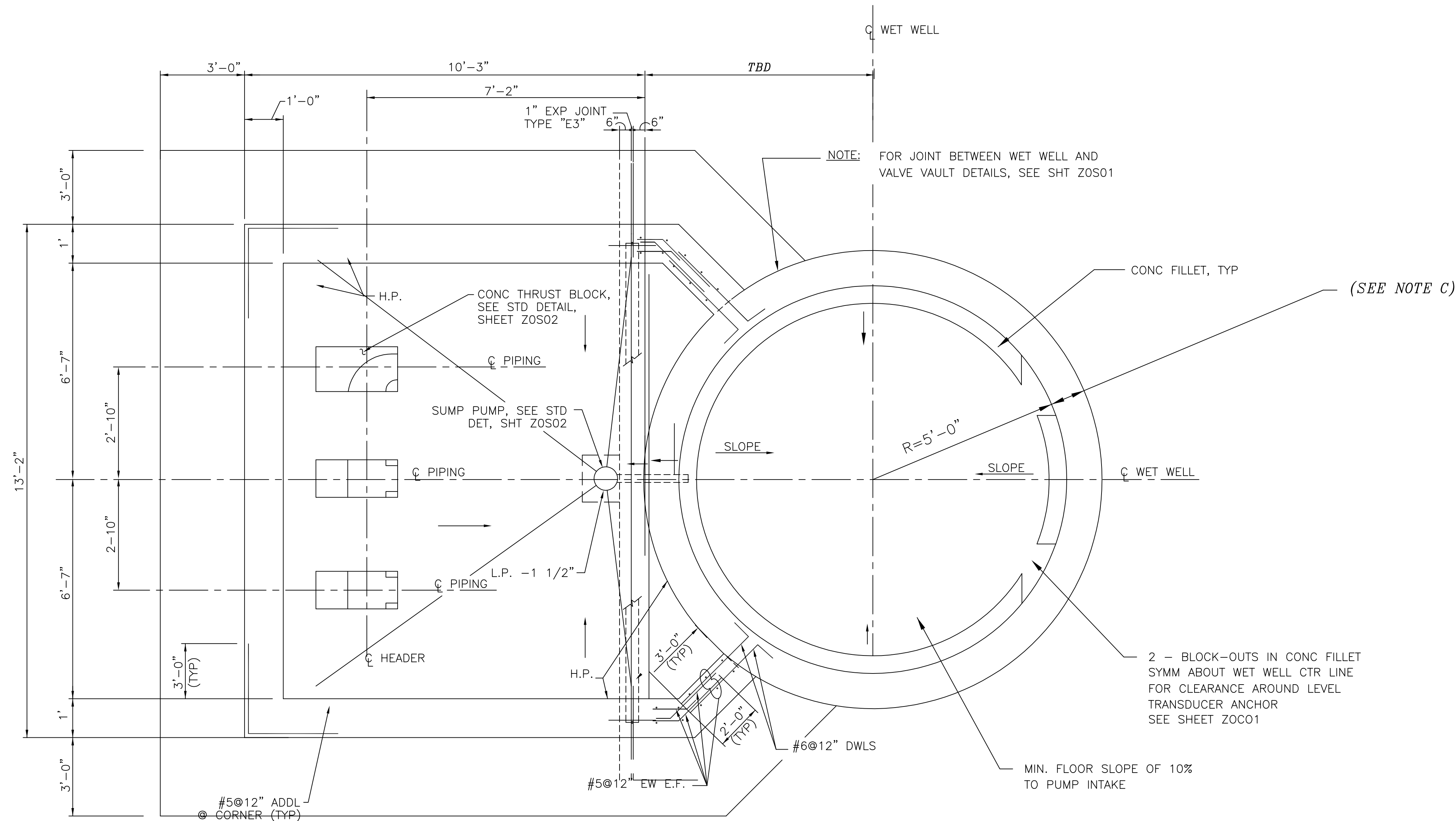
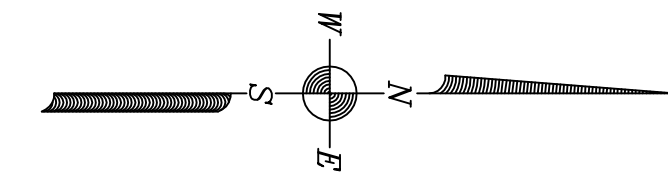
COHSTD.BDR

0 1 2 3

ORIGINAL SCALE IN INCHES  
FOR REDUCED PLANS

CONSULTANT TO UPDATE BAR SCALE TO REFLECT ACTUAL SCALE ON THE DRAWING.





NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY.

C. DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.

D. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

E. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

F. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

G. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET Z0501.
2. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
3. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
4. WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

## STRUCTURAL

3 PUMPS @ 250 - 500 GPM PER PUMP  
ALTERNATE LOW PROFILE CONFIGURATION

PROJECT NO.

R-0267-02-2

| TITLE |
|-------|
|-------|

CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

## APPROVALS

WATER DESIGN

TRAFFIC AND SIGNAL DESIGN

STORM SEWER DESIGN

STREET, BRIDGE &amp; R.O.W.

WASTEWATER DESIGN

---

CONSTRUCTION

## OTHER REVIEWS

## PLANNING AND DEVELOPMENT

CITY ENGINEER

DATE \_\_\_\_\_

SCALE: XX" = 1'-0" D

DESIGNED BY:

SUBMITTED:

DRAWN BY:

DATE: NOVEMBER, 1996 SP

6 SHEET NO. OF SHEETS

SURVEY BY:

|          |
|----------|
| DWG. NO. |
|----------|

FIELD BOOK NO.

D3S02

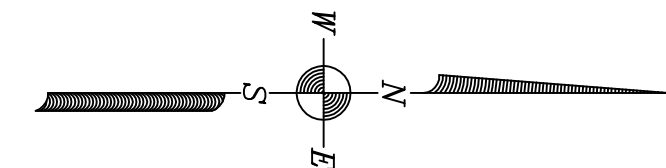
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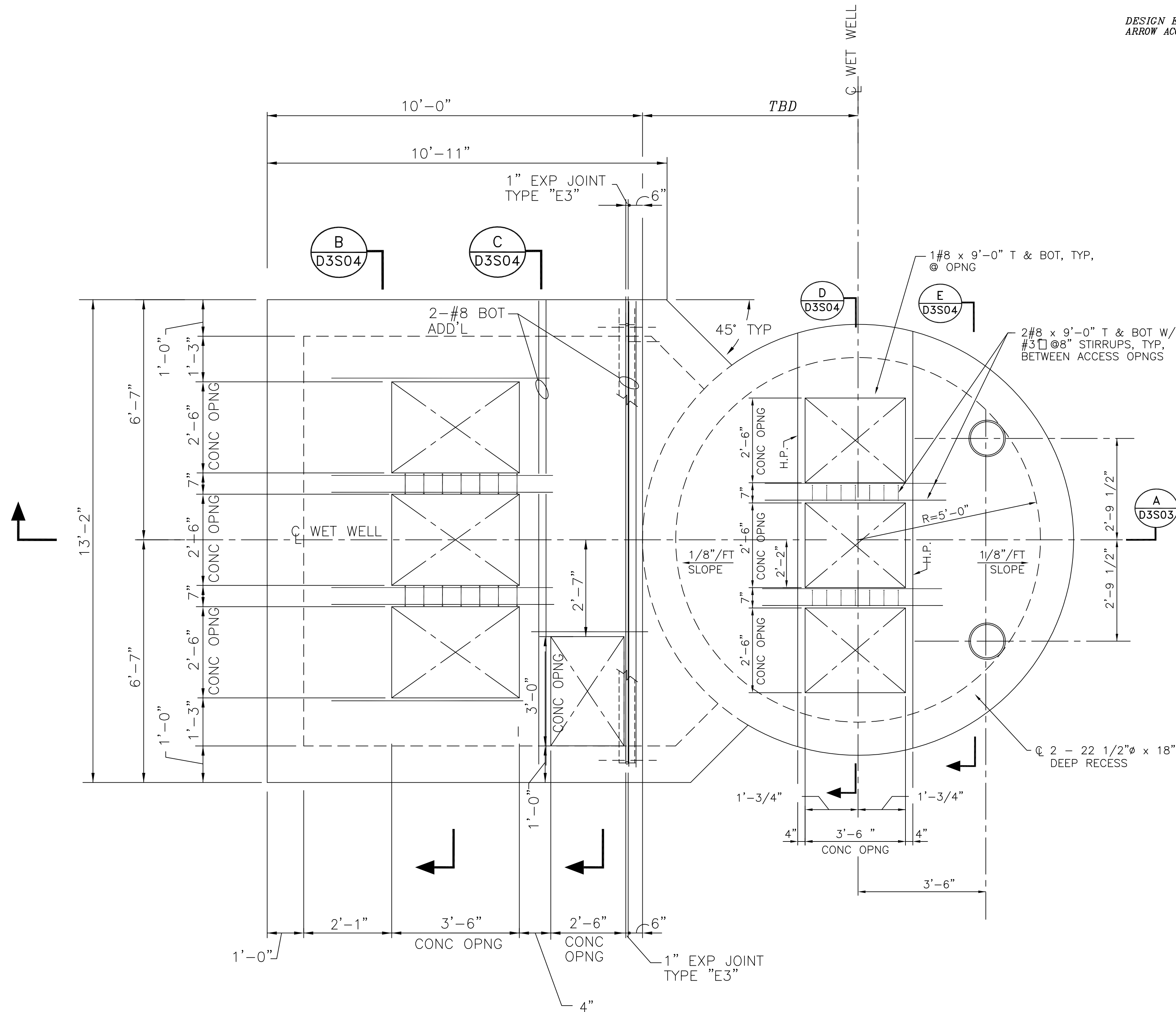
COHSTD.BDR

0 1 2 3 ORIGINAL SCALE IN INCHES  
FOR REDUCED PLANS

CONSULTANT TO UPDATE BAR SCALE TO REFLECT ACTUAL SCALE ON THE DRAWING.



DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN



PLAN VIEW @ GRADE

- NOTES TO DESIGN ENGINEER:**
- THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
  - DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
  - DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.
  - SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - WHEN GRATING FOR VALVE VAULT HATCH COVERING IS USED, THE DESIGN ENGINEER SHALL REPLACE THE SUMP PUMP DETAIL WITH THE TRAP DRAIN DETAIL (SHEET ZS02) AND REVISE DRAWINGS ACCORDINGLY. SEE SHEET ZC07 FOR ADDITIONAL INFORMATION.
  - THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
  - THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
  - THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.
  - THE DESIGN ENGINEER SHALL ENSURE GUARDRAIL AND CATWALK MEET THE REQUIREMENTS FOR "AREAS NOT OPEN TO PUBLIC" AS PROVIDED BY THE U.S. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) AND LATEST COH CODE ENFORCEMENT APPROVED VERSION OF THE INTERNATIONAL BUILDING CODE (IBC).
  - THE DESIGN ENGINEER SHALL PROVIDE GUARDRAILS FOR ANY WALKING SURFACES WITH A POTENTIAL FALL DISTANCE EQUAL TO OR GREATER THAN 30 INCHES.

- NOTES:**
- FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
  - CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
  - DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
  - SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

| STRUCTURAL                                                                                                       |                                                                               |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 3 PUMPS @ 250 - 500 GPM PER PUMP<br>ALTERNATE LOW PROFILE CONFIGURATION                                          |                                                                               |
| PROJECT NO.                                                                                                      | R-0267-02-2                                                                   |
| TITLE                                                                                                            | CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                                                                               |
| APPROVALS                                                                                                        |                                                                               |
| WATER DESIGN                                                                                                     | TRAFFIC AND SIGNAL DESIGN                                                     |
| STORM SEWER DESIGN                                                                                               | STREET, BRIDGE & R.O.W.                                                       |
| WASTEWATER DESIGN                                                                                                | CONSTRUCTION                                                                  |
| OTHER REVIEWS                                                                                                    |                                                                               |
| PLANNING AND DEVELOPMENT                                                                                         |                                                                               |
| CITY ENGINEER                                                                                                    | DATE                                                                          |
| SCALE: XX" = 1'-0"                                                                                               | DESIGNED BY:                                                                  |
| SUBMITTED:                                                                                                       | DRAWN BY:                                                                     |
| DATE: NOVEMBER, 1996                                                                                             | SHEET NO. OF SHEETS                                                           |
| SURVEY BY:                                                                                                       | DWG. NO.                                                                      |
| FIELD BOOK NO.                                                                                                   | D3S01                                                                         |

SEAL

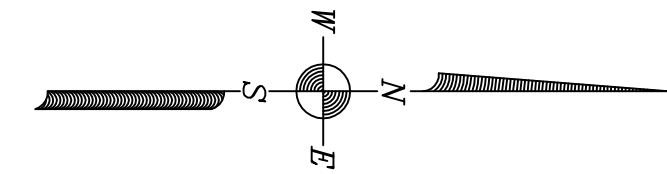
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D3S01.DWG

COHSTD.BDR

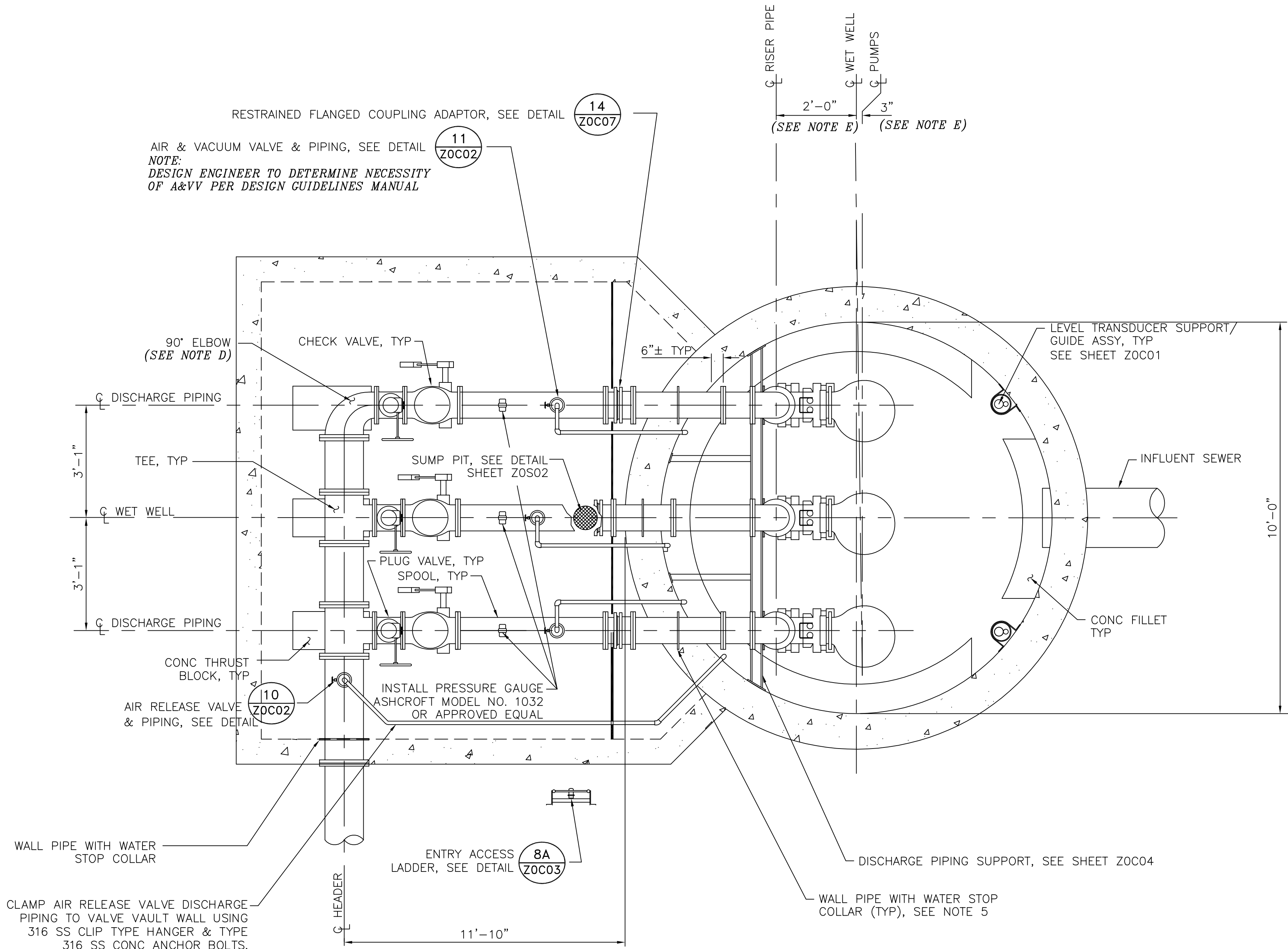
0 1 2 3

ORIGINAL SCALE IN INCHES  
FOR REDUCED PLANS

CONSULTANT TO UPDATE BAR SCALE TO REFLECT ACTUAL SCALE ON THE DRAWING.



DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN



SECTION **B**  
D3C02

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
- B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 250 – 2000 GPM PER PUMP).
- C. LIFT STATION DESIGN IS BASED UPON 6”–10” NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
- D. REPLACE THE 90° ELBOW WITH A FLANGED TEE FOR CONNECTION TO SURGE RELIEF VALVE, IF REQUIRED. SEE DETAILS, SHEET ZOC06.
- E. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY.
- F. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- G. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- H. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- I. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
- INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
- INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
- SLEEVED OR CORED DISCHARGE PIPE OPENINGS SEALED WITH LINK-SEAL (OR APPROVED EQUAL) MAY BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.

|                                                                                                                  |                                                                               |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| BASE SECTION<br>3 PUMPS @ 250 – 500 GPM PER PUMP<br>ALTERNATE LOW PROFILE CONFIGURATION                          |                                                                               |
| PROJECT NO.                                                                                                      | R-0267-02-2                                                                   |
| TITLE                                                                                                            | CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                                                                               |
| APPROVALS                                                                                                        |                                                                               |
| WATER DESIGN                                                                                                     | TRAFFIC AND SIGNAL DESIGN                                                     |
| STORM SEWER DESIGN                                                                                               | STREET, BRIDGE & R.O.W.                                                       |
| WASTEWATER DESIGN                                                                                                | CONSTRUCTION                                                                  |
| OTHER REVIEWS                                                                                                    |                                                                               |
| PLANNING AND DEVELOPMENT                                                                                         |                                                                               |
| CITY ENGINEER                                                                                                    | DATE                                                                          |
| SCALE: XX" = 1'-0"                                                                                               | DESIGNED BY:                                                                  |
| SUBMITTED:                                                                                                       | DRAWN BY:                                                                     |
| DATE: DECEMBER, 1996                                                                                             | SHEET NO. OF SHEETS                                                           |
| SURVEY BY:                                                                                                       | DWG. NO.                                                                      |
| FIELD BOOK NO.                                                                                                   | D3C03                                                                         |

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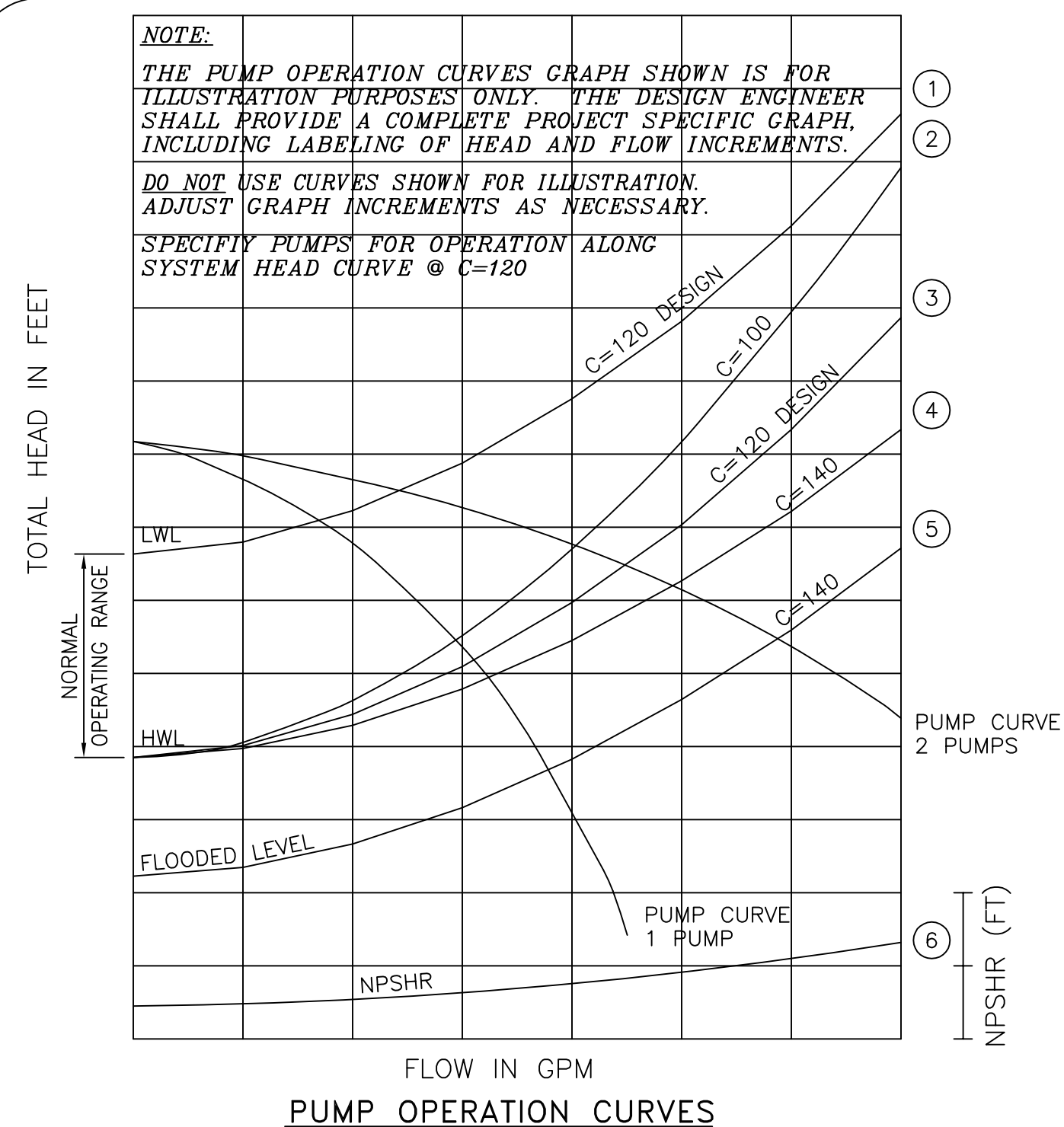
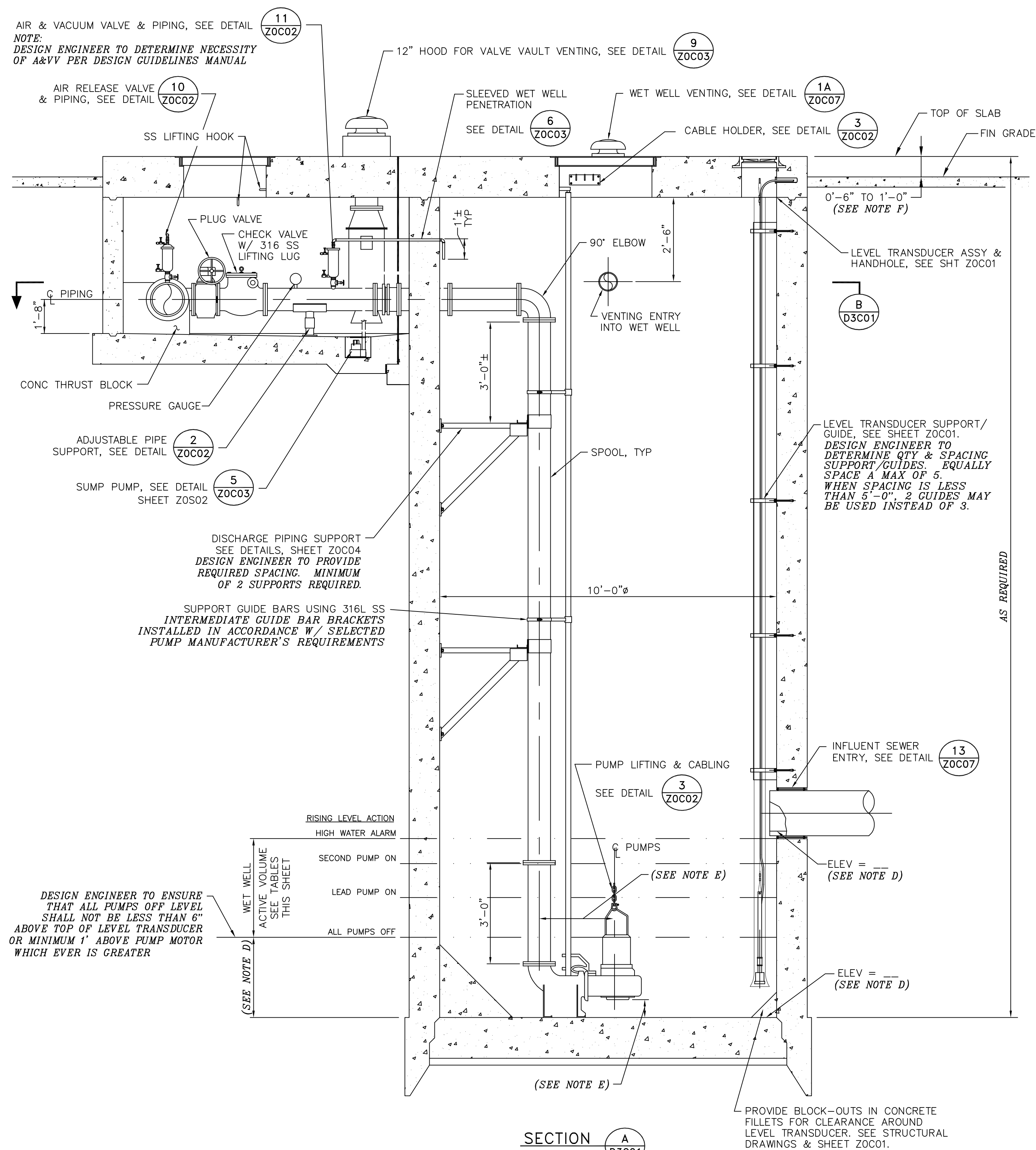
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0 1 2 3

ORIGINAL SCALE IN INCHES  
FOR REDUCED PLANS

CONSULTANT TO UPDATE BAR SCALE TO REFLECT ACTUAL SCALE ON THE DRAWING.



- PUMP CURVE NOTES:**
1. LOW NORMAL OPERATING LEVEL C=120 – DESIGN.
  2. HIGH NORMAL OPERATING LEVEL C=100 – INFORMATION ONLY (TCEQ)
  3. HIGH NORMAL OPERATING LEVEL C=120 – DESIGN
  4. HIGH NORMAL OPERATING LEVEL C=140 – INFORMATION ONLY
  5. EMERGENCY FLOODED OPERATING LEVEL C=140 – MAXIMUM DISCHARGE
  6. NET POSITIVE SUCTION HEAD REQUIRED (NPSHR) BASED ON NORMAL OPERATING WATER LEVELS
  7. PUMP CURVES ARE MODIFIED FOR STATION LOSS.

| PUMP CHARACTERISTICS                                | PUMP NO. 1 | PUMP NO. 2 | PUMP NO. 3 |
|-----------------------------------------------------|------------|------------|------------|
| MOTOR DATA<br>NOMINAL SIZE (HP)<br>MAX SPEED (RPM)  |            |            |            |
| SOLIDS PASSAGE<br>MIN SPHERE (IN)                   |            |            |            |
| CAPACITY (GPM)<br>DESIGN<br>RUNOUT                  |            |            |            |
| DISCHARGE HEAD (FT)<br>DESIGN<br>RUNOUT<br>SHUT OFF |            |            |            |
| EFFICIENCY (%)<br>DESIGN                            |            |            |            |
| NPSHR (FT)<br>DESIGN<br>RUNOUT                      |            |            |            |
| PUMP CYCLE TIME                                     |            |            |            |

| STATION OPERATION TABLES |                             |                                                        |
|--------------------------|-----------------------------|--------------------------------------------------------|
|                          |                             |                                                        |
| RISING LEVEL CYCLE       |                             |                                                        |
| WATER LEVEL ELEVATION    | ACTION                      | PUMP(S) IN OPERATION                                   |
|                          | PUMPS OFF LEVEL — NO ACTION | ALL PUMPS ARE OFF                                      |
|                          | LEAD PUMP TURNS ON          | LEAD PUMP ON                                           |
|                          | SECOND PUMP TURNS ON        | LEAD & SECOND PUMPS ON                                 |
|                          | HIGH WATER ALARM ON         | HIGH WATER ALARM SOUND                                 |
| FALLING LEVEL CYCLE      |                             |                                                        |
| WATER LEVEL              | ACTION                      | PUMP(S) IN OPERATION                                   |
|                          | HIGH WATER LEVEL ALARM OFF  | LEAD & SECOND PUMPS ON                                 |
|                          | LEAD PUMP TURNS OFF         | SECOND PUMP ON                                         |
|                          | SECOND PUMP TURNS OFF       | ALL PUMPS STOPPED — STANDBY PUMP SWITCHES TO LEAD PUMP |

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.  
IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
- B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 250 - 500 GPM PER PUMP).
- C. LIFT STATION DESIGN IS BASED UPON 6"-10" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
- D. ELEVATIONS AND INFORMATION OMITTED ARE DETERMINED BY DESIGN ENGINEER FOR SPECIFIC SITE REQUIREMENTS.
- E. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY, DESIGN ENGINEER SHALL PROVIDE RAISED PUMP BASE IF REQUIRED.
- F. WHERE FLOOD PLAIN CONDITIONS REQUIRE THE TOP SLAB TO BE GREATER THAN 1'-0" ABOVE FINISHED GRADE, DESIGN ENGINEER SHALL PROVIDE CONCRETE STAIRS.
- G. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- H. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
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NOTES:

1. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
2. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
3. PUMP ANCHOR BOLTS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLTS AND PATTERN INCLUDING CALCULATIONS, DURING SHOP DRAWING SUBMISSION.
4. CONTRACTOR TO PROVIDE ADHESIVE ANCHORS IN LIEU OF WEDGE ANCHORS FOR ALL SUBMERGED CONDITIONS, AND SUBMIT DESIGN OF ANCHOR BOLTS DURING SHOP DRAWING SUBMISSION.
5. ALL PIPING IN THE WET WELL SHALL BE FLANGED. NO FLANGED COUPLING ADAPTORS, OR VICTAULIC STYLE COUPLINGS SHALL BE PERMITTED INSIDE THE WET WELL.

## ELEVATION SECTION

3 PUMPS @ 250 - 500 GPM PER PUMP  
ALTERNATE LOW PROFILE CONFIGURATION

PROJECT NO.

R-0267-02-2

|       |                 |
|-------|-----------------|
| TITLE | CITY OF HOUSTON |
|-------|-----------------|

CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

## CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

## APPROVALS

|                    |                           |
|--------------------|---------------------------|
| WATER DESIGN       | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |

## OTHER REVIEWS

|                          |  |
|--------------------------|--|
| PLANNING AND DEVELOPMENT |  |
|--------------------------|--|

PLANNING AND DEVELOPMENT

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## References

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CITY ENGINEER DATE

SCALE:  $1/4" = 1'-0"$  DESIGNED BY:

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| SURVEY BY:     | DWG. NO. |
| FIELD BOOK NO. | D3C02    |

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| FIELD BOOK NO. | DSC02 |
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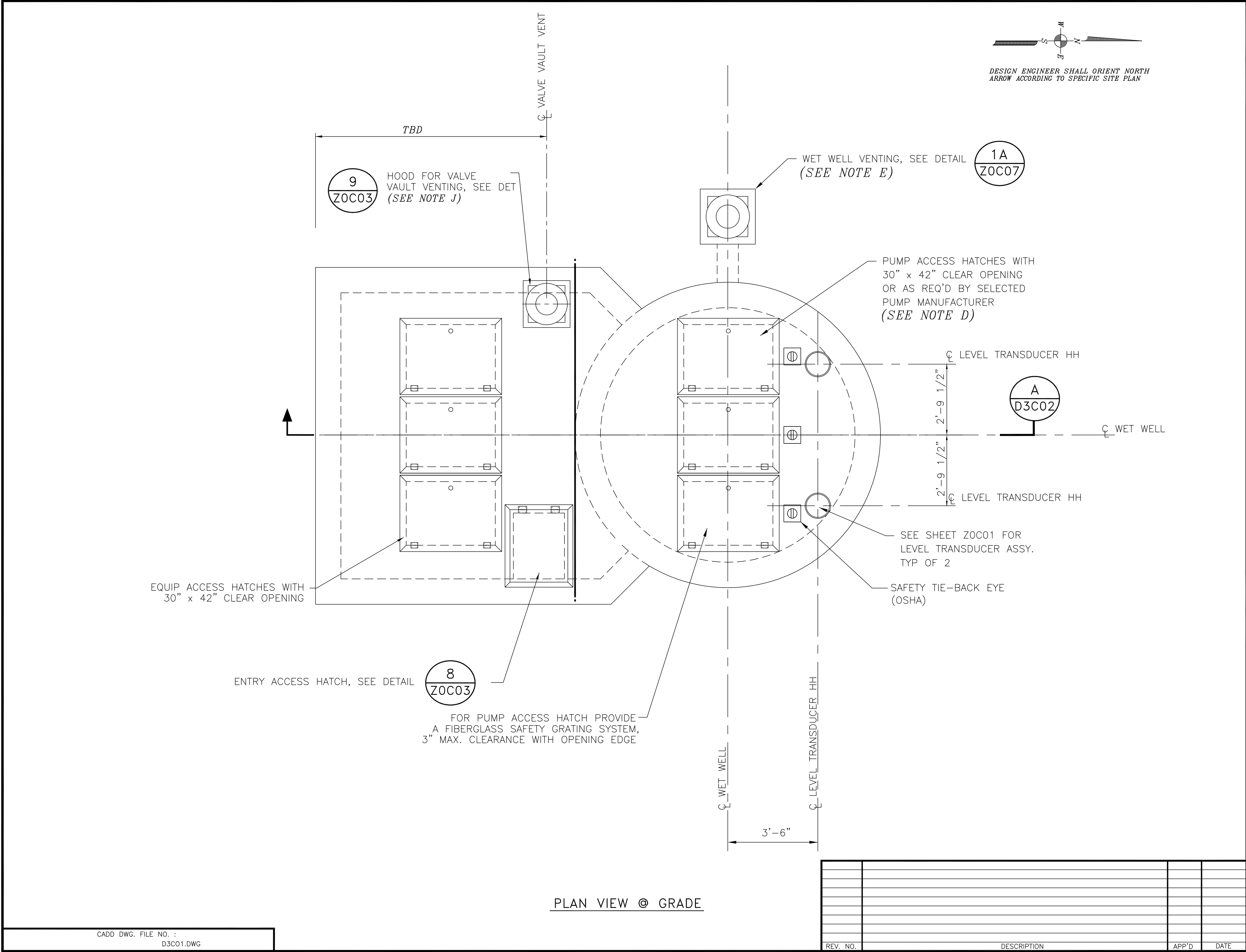
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ORIGINAL SCALE IN INCHES  
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CONSULTANT TO UPDATE BAR SCALE TO REFLECT ACTUAL SCALE ON THE DRAWING.

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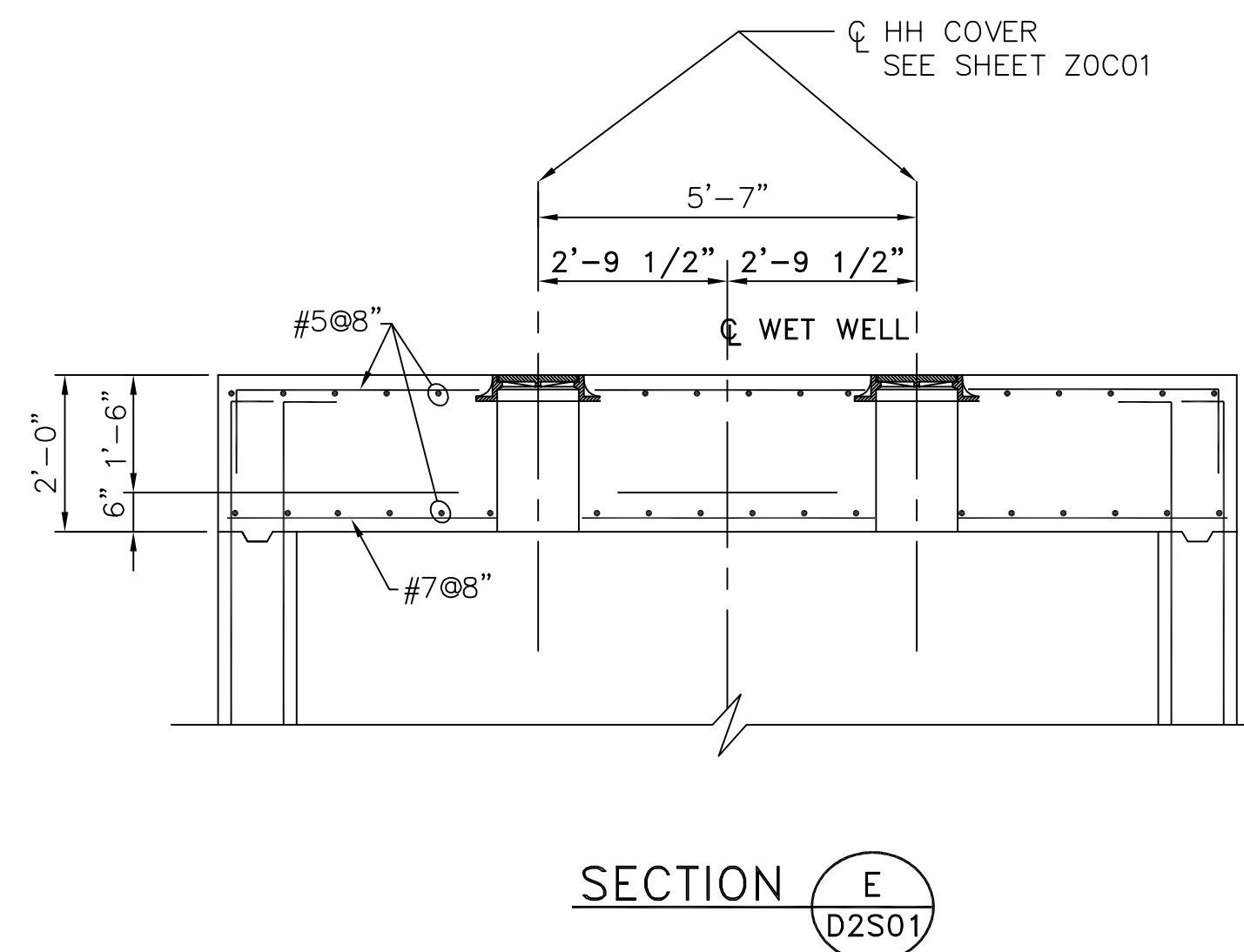
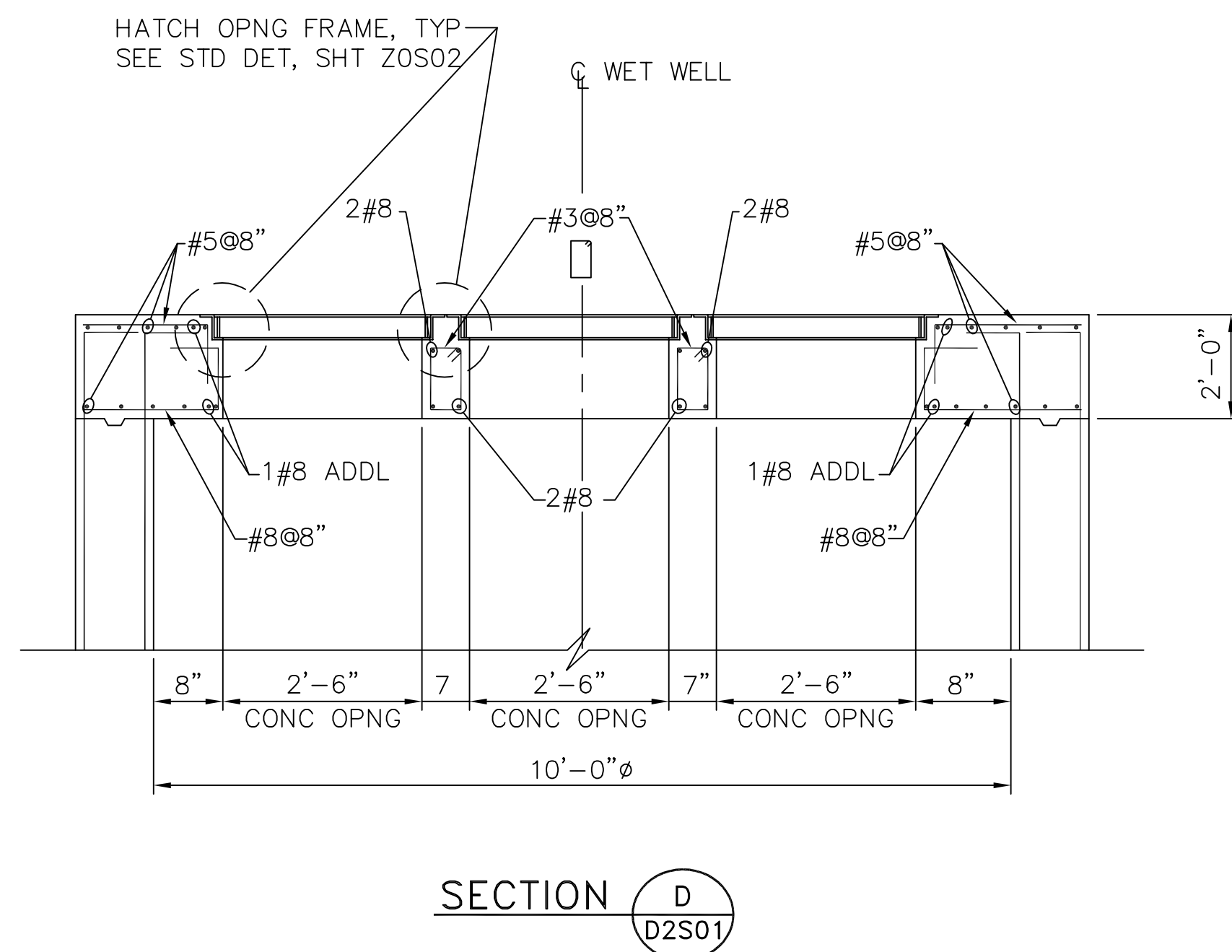
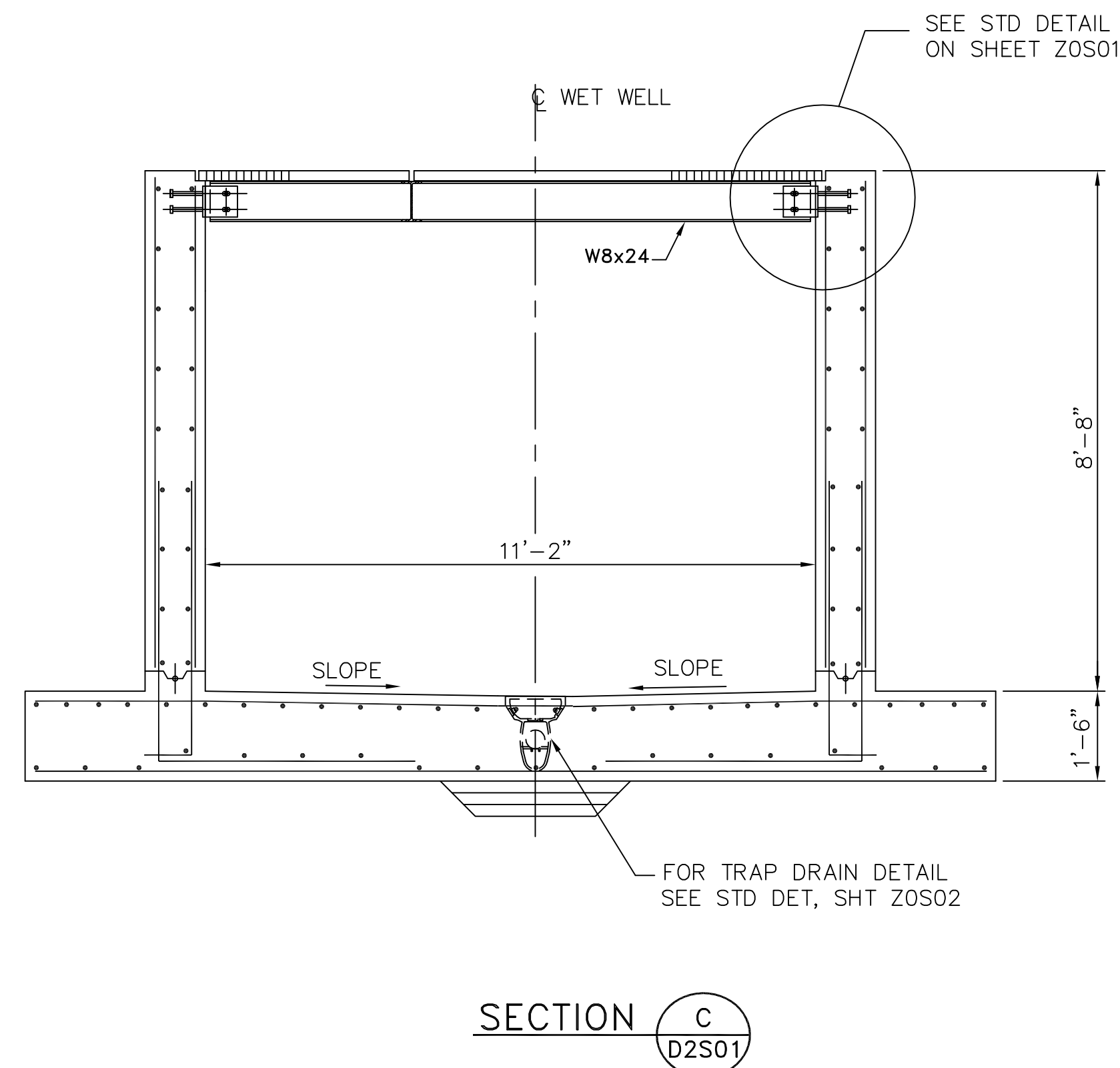
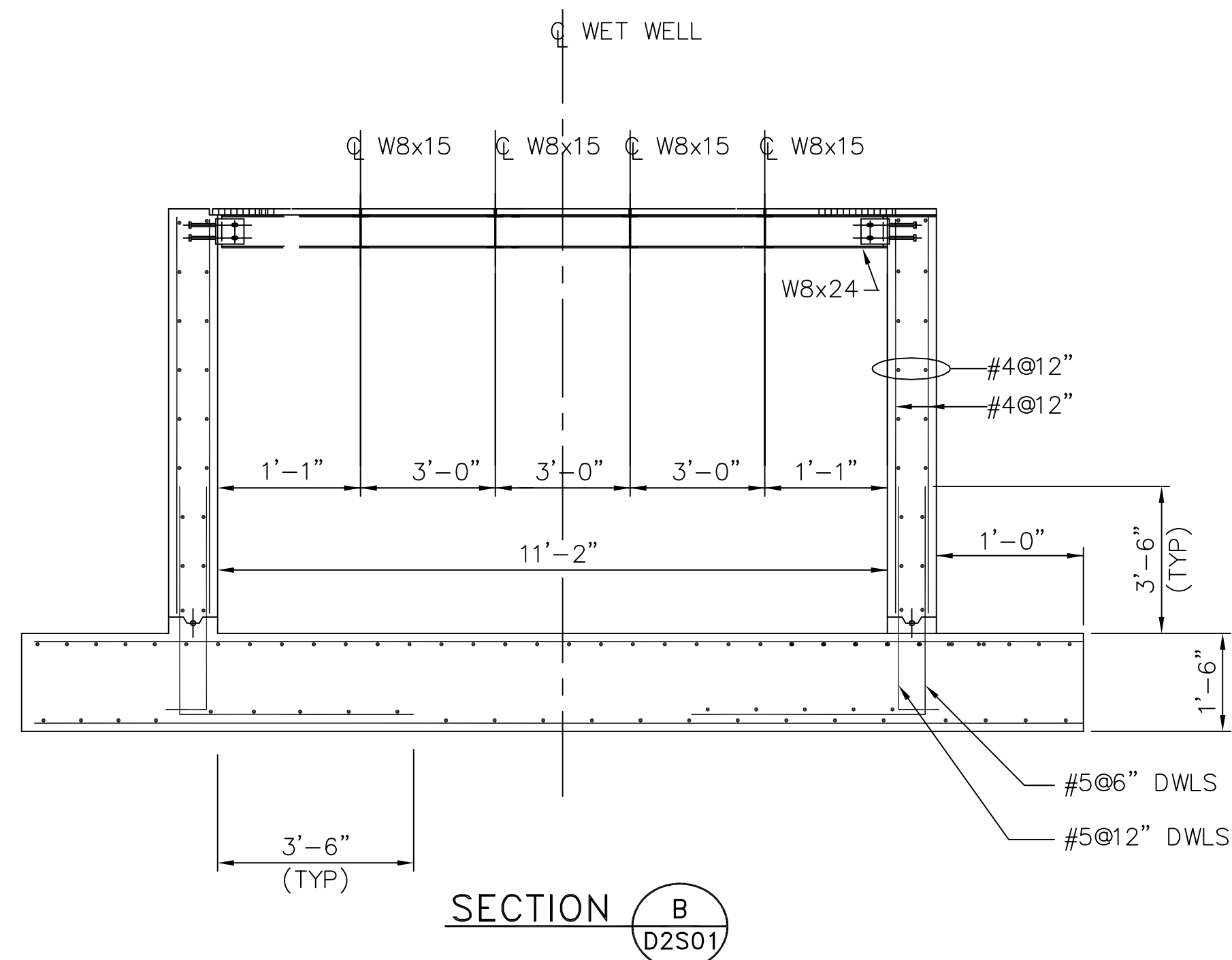
(SEE NOTE D)



- NOTES TO DESIGN ENGINEER:**
- THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
  - THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANADARD (RANGE: 250 – 500 GPM PER PUMP).
  - LIFT STATION DESIGN IS BASED UPON 6"-10" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF PROJECT SPECIFIC CONDITIONS REQUIRE.
  - DESIGN ENGINEER TO VERIFY THE SIZE AND LOCATION OF THE WET WELL HATCHES ACCORDING TO THE SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
  - THE ACTUAL LOCATION OF THE WET WELL VENTING MAY VARY ACCORDING TO SITE REQUIREMENTS. WHERE POSSIBLE, LOCATE ON THE NORTHWEST SIDE OF THE WET WELL.
  - SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
  - THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
  - THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.
  - THE DESIGN ENGINEER TO DETERMINE SIZE OF HOOD FOR VALVE VAULT VENTING PER VAULT VOLUME.

- NOTES:**
- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

|                                                                                                                              |  |                     |  |
|------------------------------------------------------------------------------------------------------------------------------|--|---------------------|--|
| PLAN VIEW @ GRADE<br>3 PUMPS @ 250 – 500 GPM PER PUMP<br>ALTERNATE LOW PROFILE CONFIGURATION                                 |  |                     |  |
| PROJECT NO. R-000267-000X-X                                                                                                  |  |                     |  |
| TITLE<br>CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS                                       |  |                     |  |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING AND CONSTRUCTION                                |  |                     |  |
| DESIGN ENGINEER TO INCLUDE COH<br>STANDARD TITLE BLOCK ON ALL<br>DRAWINGS, SEE STANDARD TITLE<br>BLOCK DETAIL ON SHEET ZOC0X |  |                     |  |
| SCALE: XX" = 1'-0"                                                                                                           |  | DESIGNED BY:        |  |
| SUBMITTED:                                                                                                                   |  | DRAWN BY:           |  |
| DATE: NOVEMBER, 1996                                                                                                         |  | SHEET NO. OF SHEETS |  |
| SURVEY BY:                                                                                                                   |  | DWG. NO. D3C01      |  |
| FIELD BOOK NO.                                                                                                               |  |                     |  |



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

IT IS THE RESPONSIBILITY OF THE CONTRACTED  
DESIGN ENGINEER TO VERIFY THE COMPLETENESS  
AND ACCURACY OF THE INFORMATION HEREIN  
CONTAINED AND TO ADJUST ACCORDING TO PROJECT  
SPECIFIC REQUIREMENTS.

**B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.**

C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
2. CONTRACTOR TO CONFIRM THE SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
3. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

STRUCTURAL  
3 PUMPS @ 250 - 500 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-000267-000X-X

|       |                                                                               |
|-------|-------------------------------------------------------------------------------|
| TITLE | CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS |
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**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
DRAWINGS, SEE STANDARD TITLE  
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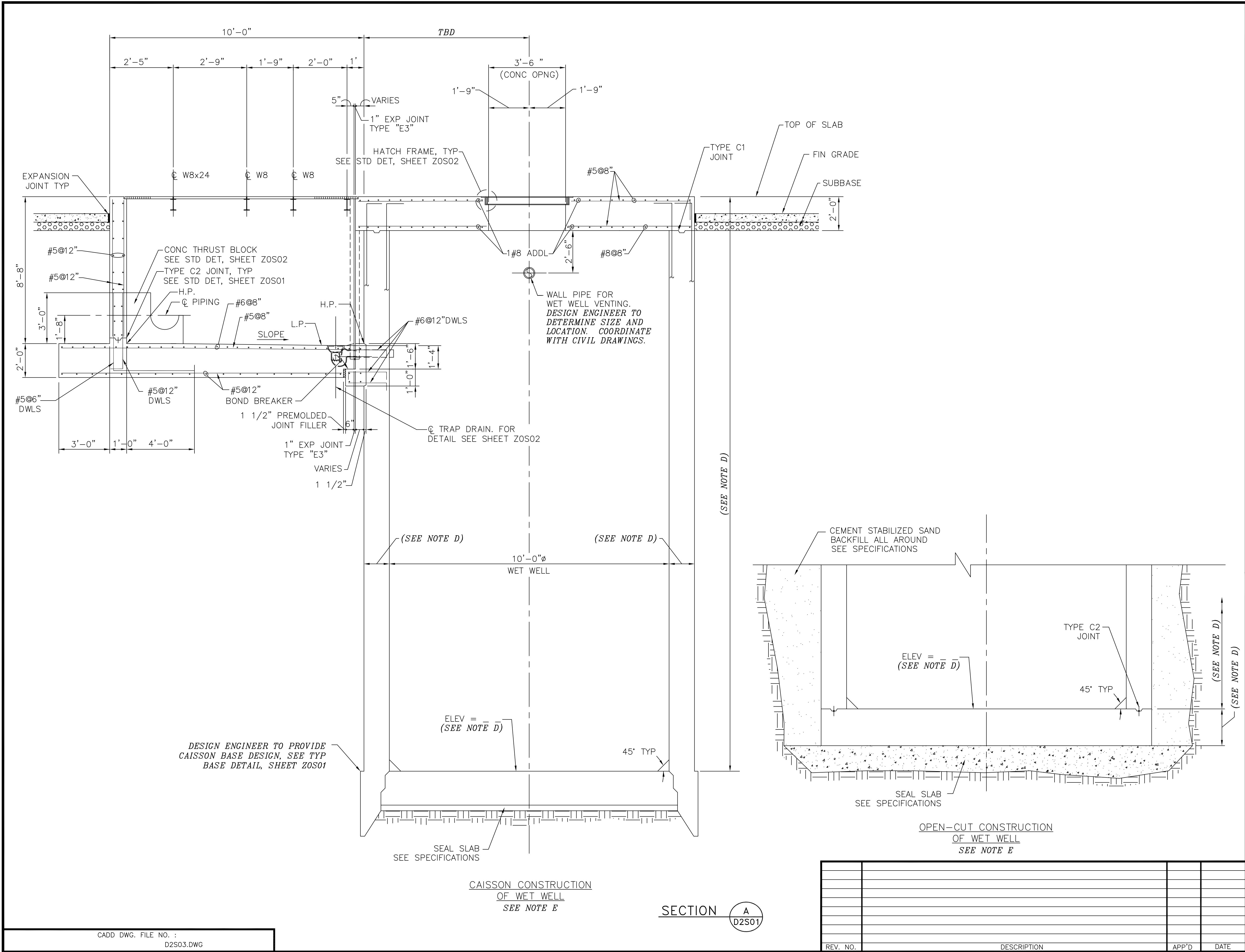
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ORIGINAL SCALE IN INCHES  
FOR REDUCED PLANS

CONSULTANT TO UPDATE BAR SCALE TO REFLECT ACTUAL SCALE ON THE DRAWING.



**NOTES TO DESIGN ENGINEER:**

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

D. DIMENSIONS, ELEVATIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.

E. DESIGN ENGINEER TO PROVIDE WET WELL DESIGN FOR EITHER OPEN-CUT OR CAISSON CONSTRUCTION.

F. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

G. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

H. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

**NOTES:**

1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET Z0S01.

2. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

3. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.

4. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

5. WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

**STRUCTURAL**  
3 PUMPS @ 250 - 500 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-000267-000X-X

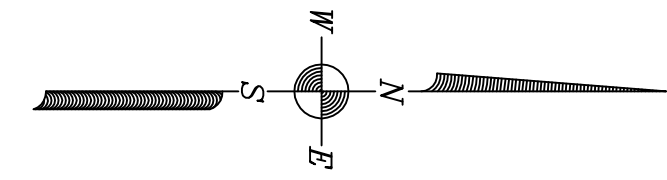
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DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING AND CONSTRUCTION

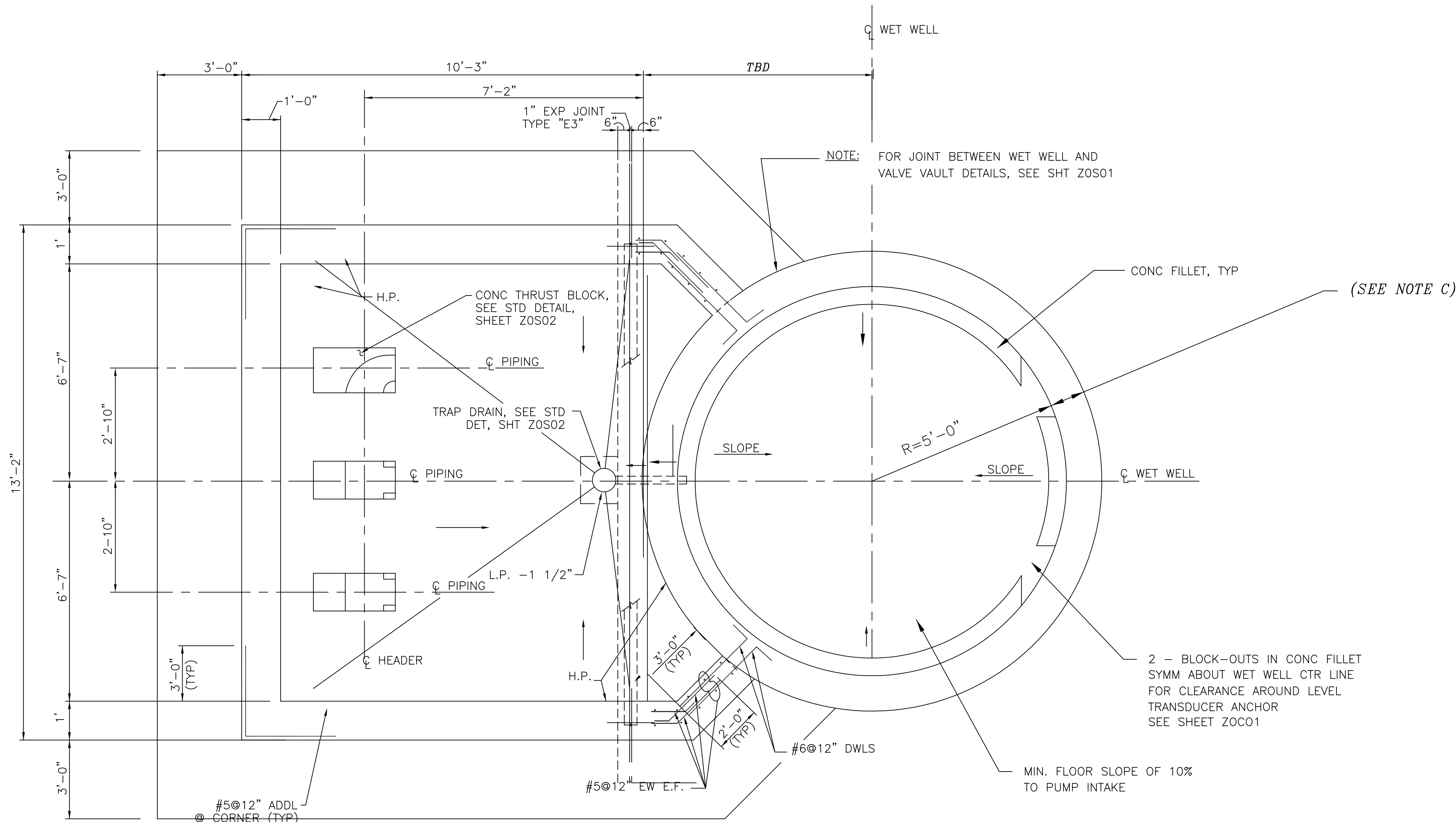
DESIGN ENGINEER TO INCLUDE COH STANDARD TITLE BLOCK ON ALL DRAWINGS, SEE STANDARD TITLE BLOCK DETAIL ON SHEET ZOC0X

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| SCALE: XX" = 1'-0"   | DESIGNED BY:        |
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| SURVEY BY:           | DWG. NO.            |
| FIELD BOOK NO.       | D2S03               |

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DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN



PLAN VIEW @ VAULT FLOOR

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
- B. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY.
- C. DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE PROJECT SPECIFIC REQUIREMENTS.
- D. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- E. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- F. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- G. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

- FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
- SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

STRUCTURAL  
3 PUMPS @ 250 - 500 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-000267-000X-X

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
DRAWINGS, SEE STANDARD TITLE  
BLOCK DETAIL ON SHEET ZOC0X

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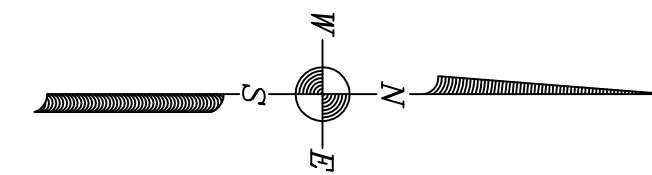
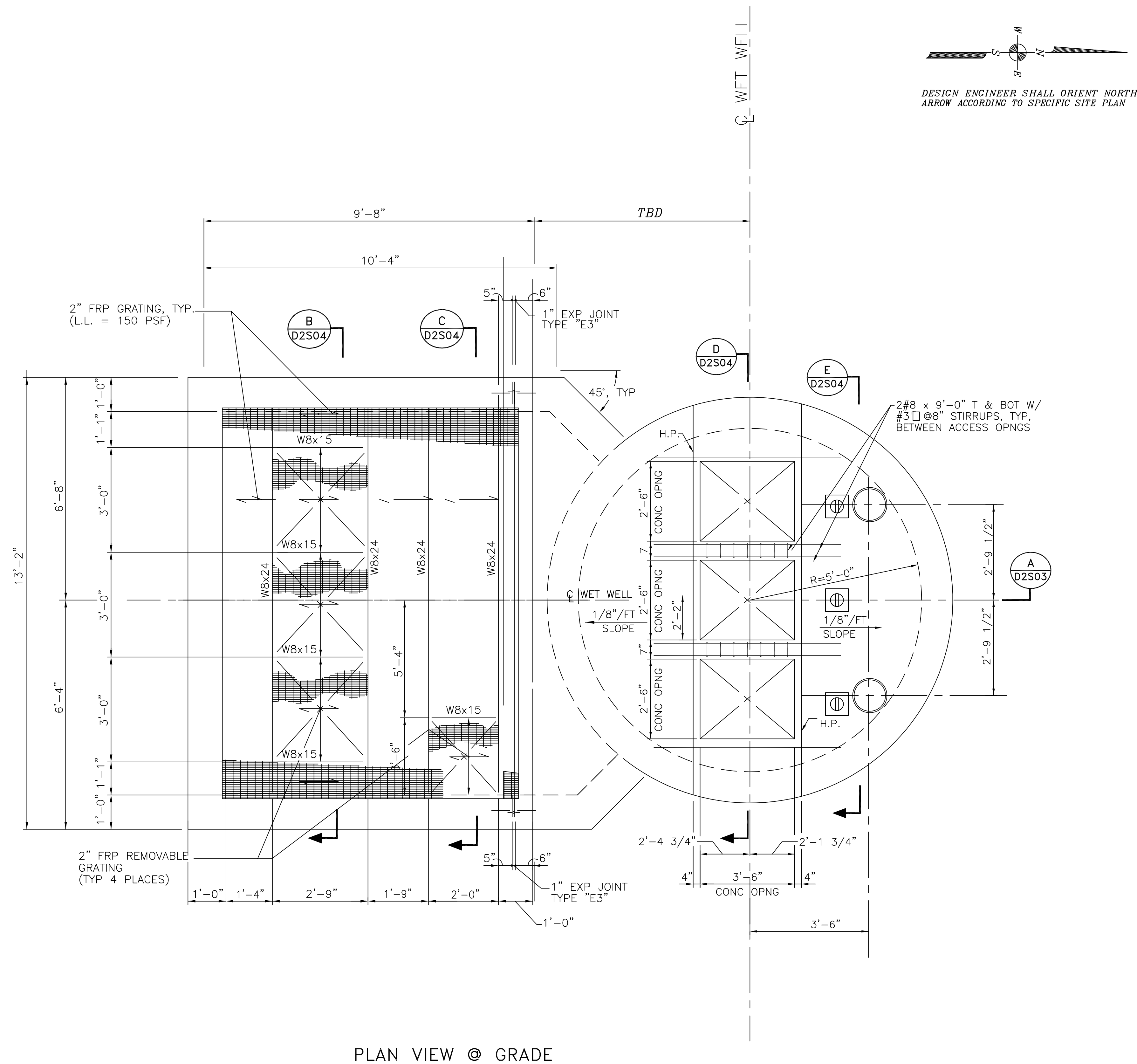
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ORIGINAL SCALE IN INCHES  
FOR REDUCED PLANS

CONSULTANT TO UPDATE BAR SCALE TO REFLECT ACTUAL SCALE ON THE DRAWING.



**NOTES TO DESIGN ENGINEER:**

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

IT IS THE RESPONSIBILITY OF THE CONTRACTED  
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AND ACCURACY OF THE INFORMATION HEREIN  
CONTAINED AND TO ADJUST ACCORDING TO PROJECT  
SPECIFIC REQUIREMENTS.

**B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.**

C. DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE PROJECT SPECIFIC REQUIREMENTS.

D. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

E. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

**F THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.**

THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

H. THE DESIGN ENGINEER SHALL ENSURE GUARDRAIL AND CATWALK MEET THE REQUIREMENTS FOR "AREAS NOT OPEN TO PUBLIC" AS PROVIDED BY THE U.S. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) AND LATEST COH CODE ENFORCEMENT APPROVED VERSION OF THE INTERNATIONAL BUILDING CODE (IBC).

1. THE DESIGN ENGINEER SHALL PROVIDE GUARDRAILS FOR ANY WALKING SURFACES WITH A POTENTIAL FALL DISTANCE EQUAL TO OR GREATER THAN 30 INCHES.

NOTES:

1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET Z0501.
2. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
3. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
4. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
5. WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

## STRUCTURAL

3 PUMPS @ 250 - 500 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-000267-000X-X

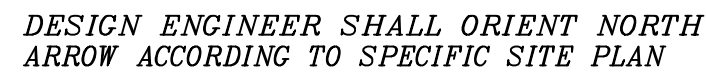
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| TITLE | CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS |
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**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
DRAWINGS, SEE STANDARD TITLE  
BLOCK DETAIL ON SHEET ZOC0X

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| DATE: NOVEMBER, 1996 | SHEET NO. OF SHEETS |
| SURVEY BY:           | DWG. NO.            |
| FIELD BOOK NO.       | D2S01               |



1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SEAL AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
3. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
4. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
5. SLEEVED OR CORED DISCHARGE PIPE OPENINGS SEALE WITH LINK-SEAL (OR APPROVED EQUAL) MAY BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
DRAWINGS, SEE STANDARD TITLE  
BLOCK DETAIL ON SHEET ZOC0X

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| DATE: DECEMBER, 1996 | SHEET NO. OF SHEET |
| SURVEY BY:           | DWG. NO.           |
| FIELD BOOK NO.       | D2C03              |

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1. LOW NORMAL OPERATING LEVEL C=120 - DESIGN.
2. HIGH NORMAL OPERATING LEVEL C=100 - INFORMATION ONLY (TCEQ)
3. HIGH NORMAL OPERATING LEVEL C=120 - DESIGN
4. HIGH NORMAL OPERATING LEVEL C=140 - INFORMATION ONLY
5. EMERGENCY FLOODED OPERATING LEVEL C=140 - MAXIMUM DISCHARGE
6. NET POSITIVE SUCTION HEAD REQUIRED (NPSHR) BASED ON NORMAL OPERATING WATER LEVELS
7. PUMP CURVES ARE MODIFIED FOR STATION LOSSES.

| PUMP CHARACTERISTICS                                | PUMP NO. 1 | PUMP NO. 2 | PUMP NO. 3 |
|-----------------------------------------------------|------------|------------|------------|
| MOTOR DATA<br>NOMINAL SIZE (HP)<br>MAX SPEED (RPM)  |            |            |            |
| SOLIDS PASSAGE<br>MIN SPHERE (IN)                   |            |            |            |
| CAPACITY (GPM)<br>DESIGN<br>RUNOUT                  |            |            |            |
| DISCHARGE HEAD (FT)<br>DESIGN<br>RUNOUT<br>SHUT OFF |            |            |            |
| EFFICIENCY (%)<br>DESIGN                            |            |            |            |
| NPSHR (FT)<br>DESIGN<br>RUNOUT                      |            |            |            |
| PUMP CYCLE TIME                                     |            |            |            |

| RISING LEVEL CYCLE    |                             |                                                        |
|-----------------------|-----------------------------|--------------------------------------------------------|
| WATER LEVEL ELEVATION | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | PUMPS OFF LEVEL – NO ACTION | ALL PUMPS ARE OFF                                      |
|                       | LEAD PUMP TURNS ON          | LEAD PUMP ON                                           |
|                       | SECOND PUMP TURNS ON        | LEAD & SECOND PUMPS ON                                 |
|                       | HIGH WATER ALARM ON         | HIGH WATER ALARM SOUND                                 |
| FALLING LEVEL CYCLE   |                             |                                                        |
| WATER LEVEL           | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | HIGH WATER LEVEL ALARM OFF  | LEAD & SECOND PUMPS ON                                 |
|                       | LEAD PUMP TURNS OFF         | SECOND PUMP ON                                         |
|                       | SECOND PUMP TURNS OFF       | ALL PUMPS STOPPED – STANDBY PUMP SWITCHES TO LEAD PUMP |

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| REV. NO. | DESCRIPTION | APP'D | DATE |

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

IT IS THE RESPONSIBILITY OF THE CONTRACTED  
DESIGN ENGINEER TO VERIFY THE COMPLETENESS  
AND ACCURACY OF THE INFORMATION HEREIN  
CONTAINED AND TO ADJUST ACCORDING TO PROJECT  
SPECIFIC REQUIREMENTS.

B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANADARD (RANGE: 250 - 500 GPM PER PUMP).

C. LIFT STATION DESIGN IS BASED UPON 6"-10" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF PROJECT SPECIFIC CONDITIONS REQUIRE.

D. ELEVATIONS AND INFORMATION OMITTED ARE DETERMINED BY DESIGN ENGINEER FOR PROJECT SPECIFIC REQUIREMENTS.

*E. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY. DESIGN ENGINEER SHALL PROVIDE RAISED PUMP BASE IF REQUIRED.*

F. WHERE FLOOD PLAIN CONDITIONS REQUIRE THE TOP SLAB TO BE GREATER THAN 1'-0" ABOVE FINISHED GRADE, DESIGN ENGINEER SHALL PROVIDE CONCRETE STAIRS.

H. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

1. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

J. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

1. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
2. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
3. PUMP ANCHOR BOLTS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLTS AND PATTERN INCLUDING CALCULATIONS, DURING SHOP DRAWING SUBMISSION.
4. CONTRACTOR TO PROVIDE ADHESIVE ANCHORS IN LIEU OF WEDGE ANCHORS FOR ALL SUBMERGED CONDITIONS AND SUBMIT DESIGN OF ANCHOR BOLTS DURING SHOP DRAWING SUBMISSION.
5. ALL PIPING IN THE WET WELL SHALL BE FLANGED. NO FLANGED COUPLING ADAPTORS, OR VICTAULIC STYLE COUPLINGS SHALL BE PERMITTED INSIDE THE WET WELL.

3 PUMPS @ 250 – 500 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO.

R-000267-000X-X

|       |                                                                               |
|-------|-------------------------------------------------------------------------------|
| TITLE | CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS |
|-------|-------------------------------------------------------------------------------|

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
DRAWINGS, SEE STANDARD TITLE  
BLOCK DETAIL ON SHEET ZOC0X

SCALE: XX" = 1'-0"

DESIGNED BY:

SUBMITTED:

DRAWN BY:

DATE:

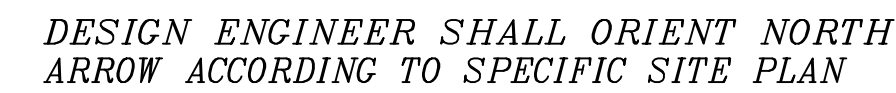
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SURVEY BY:

DWG. NO.

FIELD BOOK NO

D2C02



1. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

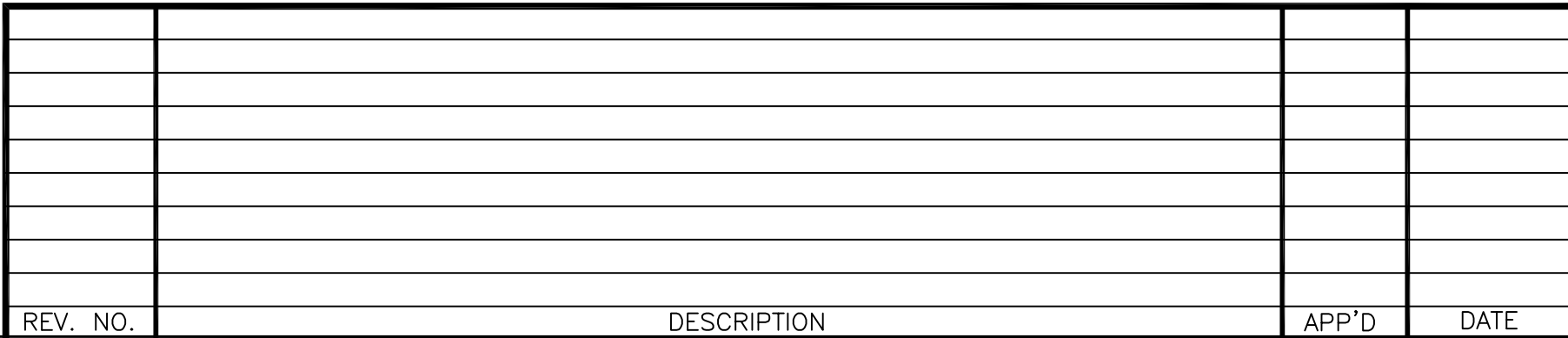
2. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
DRAWINGS, SEE STANDARD TITLE  
BLOCK DETAIL ON SHEET ZOC0X



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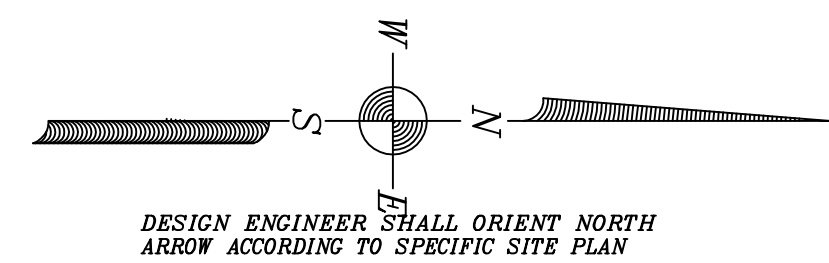
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| SURVEY BY:           | DWG. NO.            |
| FIELD BOOK NO.       | D2C01               |



1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZO501.
2. CONTRACTOR TO CONFIRM THE SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS ACCORDING TO THE SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
3. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
4. WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
DRAWINGS, SEE STANDARD TITLE  
BLOCK DETAIL ON SHEET ZOC0X

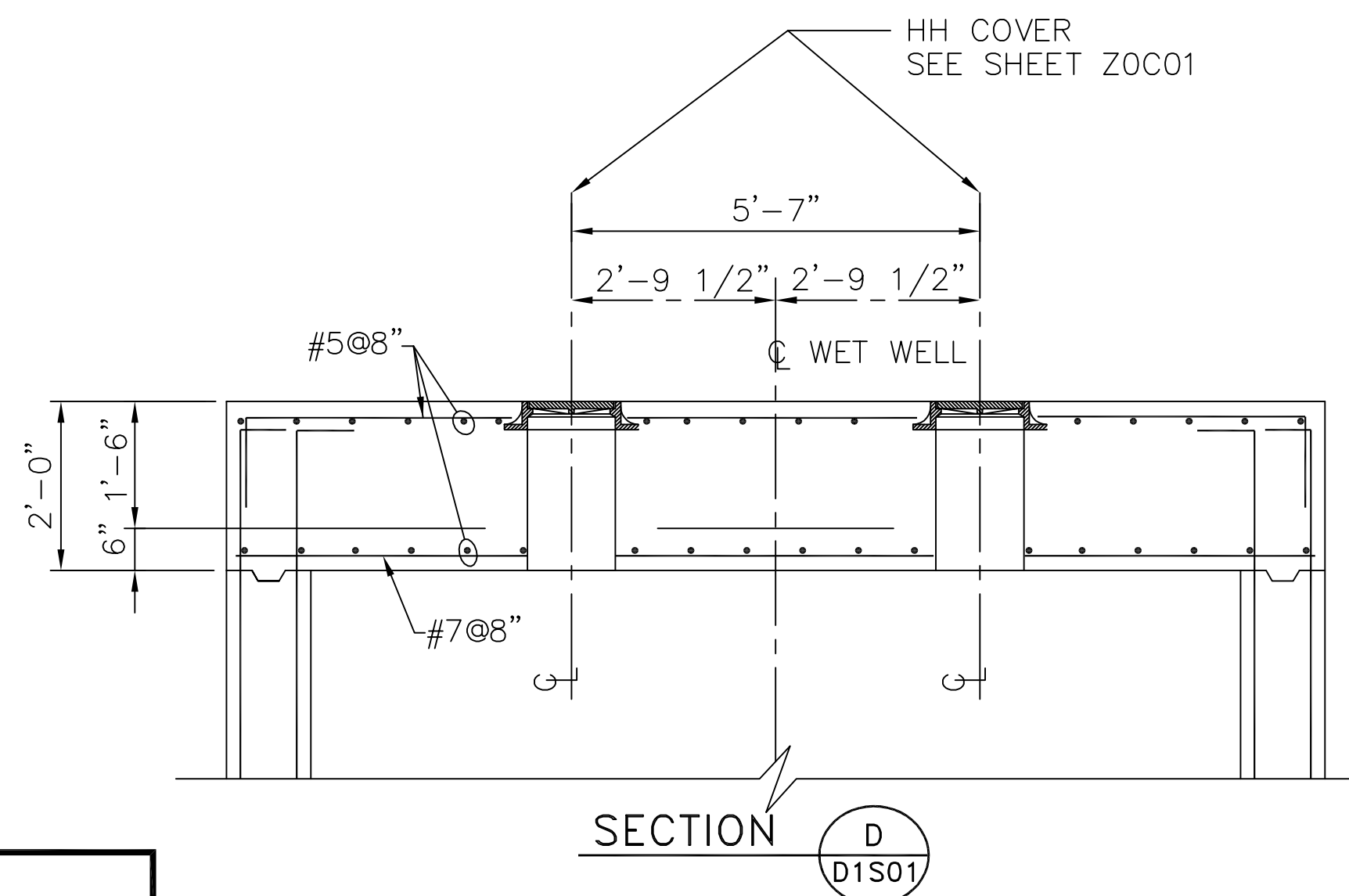
D1S02



**I. THE DESIGN ENGINEER SHALL PROVIDE GUARDRAILS FOR ANY WALKING SURFACES WITH A POTENTIAL FALL DISTANCE EQUAL TO OR GREATER THAN 30 INCHES.**

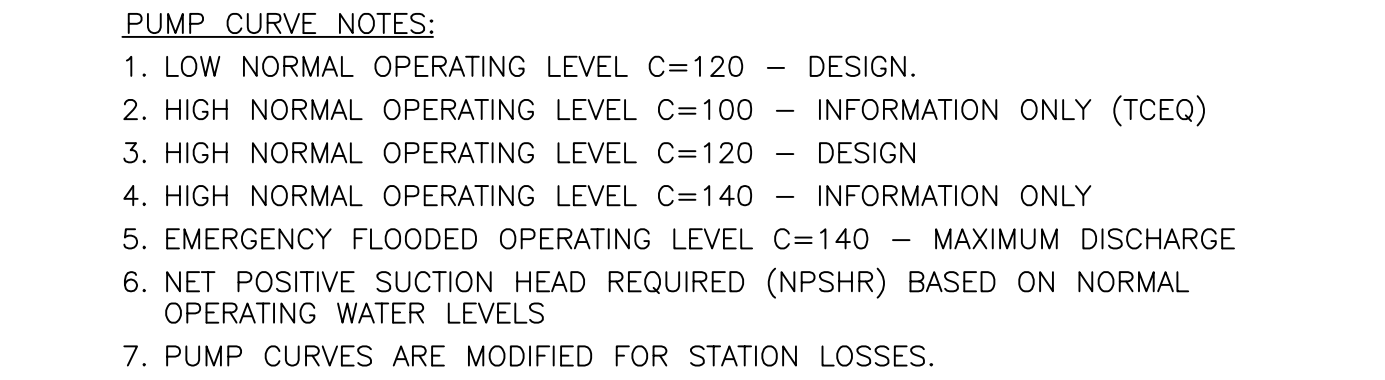
4. WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
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| SURVEY BY:           | DWG. NO.            |
| FIELD BOOK NO.       | D1S01               |



## STATION OPERATION TABLES

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- NOTES:**
1. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
  2. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  3. PUMP ANCHOR BOLTS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLTS AND PATTERN, INCLUDING CALCULATIONS, DURING SHOP DRAWING SUBMISSION.
  4. CONTRACTOR TO PROVIDE ADHESIVE ANCHORS IN LIEU OF WEDGE ANCHORS FOR ALL SUBMERGED CONDITIONS. AND SUBMIT DESIGN OF ANCHOR BOLTS DURING SHOP DRAWING SUBMISSION.
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DESIGN ENGINEER TO INCLUDE COH  
STANDARD TITLE BLOCK ON ALL  
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