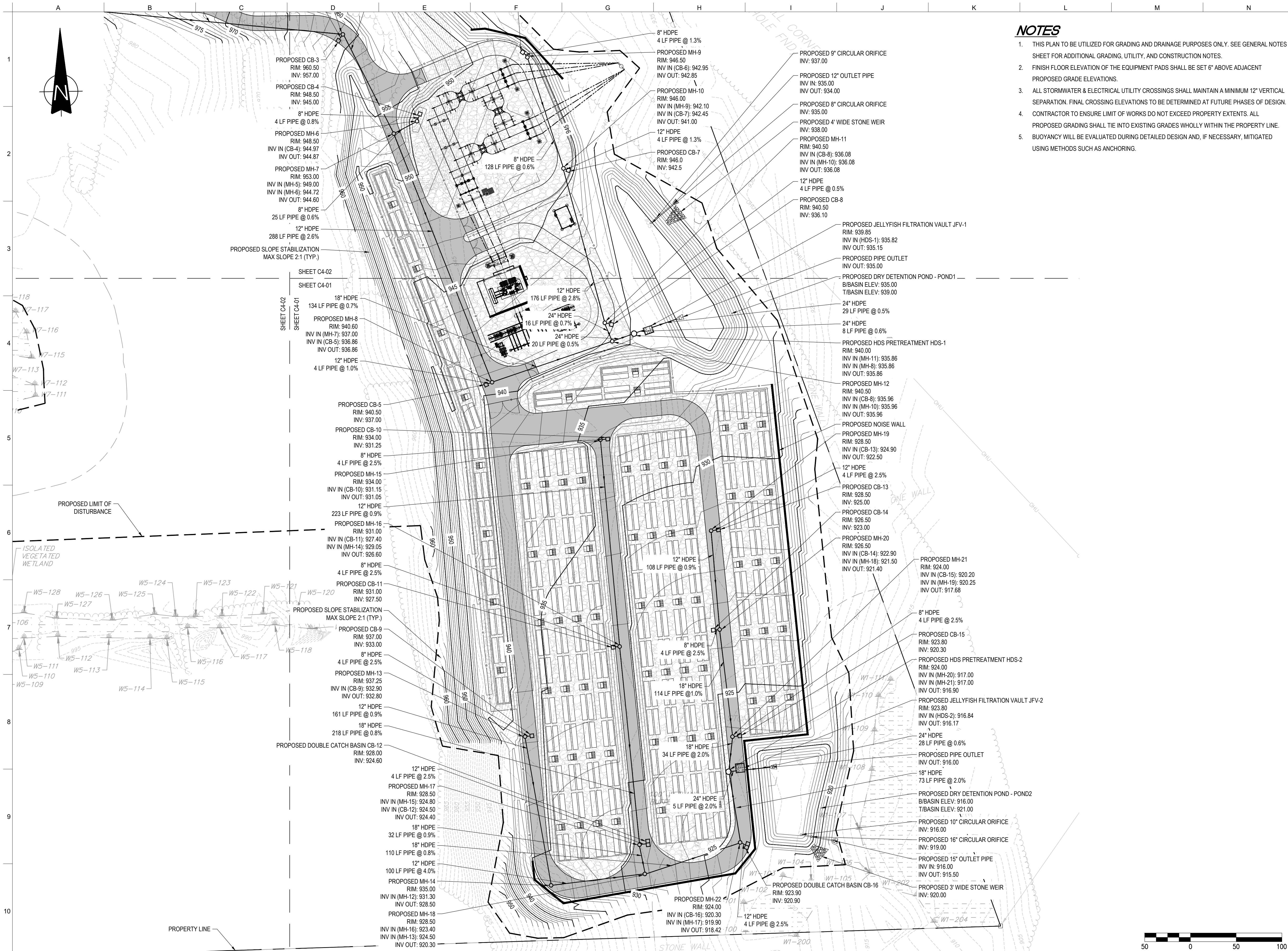




NOTES

- THIS PLAN TO BE UTILIZED FOR GRADING AND DRAINAGE PURPOSES ONLY. SEE GENERAL NOTES SHEET FOR ADDITIONAL GRADING, UTILITY, AND CONSTRUCTION NOTES.
- FINISH FLOOR ELEVATION OF THE EQUIPMENT PADS SHALL BE SET 6" ABOVE ADJACENT PROPOSED GRADE ELEVATIONS.
- ALL STORMWATER & ELECTRICAL UTILITY CROSSINGS SHALL MAINTAIN A MINIMUM 12" VERTICAL SEPARATION. FINAL CROSSING ELEVATIONS TO BE DETERMINED AT FUTURE PHASES OF DESIGN.
- CONTRACTOR TO ENSURE LIMIT OF WORKS DO NOT EXCEED PROPERTY EXTENTS. ALL PROPOSED GRADING SHALL TIE INTO EXISTING GRADES WHOLLY WITHIN THE PROPERTY LINE.
- BUOYANCY WILL BE EVALUATED DURING DETAILED DESIGN AND, IF NECESSARY, MITIGATED USING METHODS SUCH AS ANCHORING.

| Issue | Date       | Revisions                         |
|-------|------------|-----------------------------------|
| A     | 9/22/23    | DRAFT ISSUED FOR REVIEW           |
| B     | 9/28/23    | CONSTRAINT MAPPING                |
| C     | 8/21/24    | 10% DESIGN SUBMISSION             |
| D     | 9/13/24    | 30% DESIGN DRAFT                  |
| E     | 11/01/24   | ISSUED FOR ISO-NE SIS APPLICATION |
| F     | 02/28/2025 | 30% DESIGN                        |
| G     | 03/18/2025 | 30% DESIGN REVISION               |

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Client

MORAGA STORAGE LLC

Job Title

MORAGA STORAGE  
ZOVL - Oakham, MA

Seal

NOT FOR  
CONSTRUCTION

Drawing Title

CIVIL GRADING AND  
DRAINAGE SHEET

Scale

1" = 50'

File Name

C4-01.DWG

Drawing Status

30% DESIGN DRAWINGS

Job No

296229-00

Drawing No

C4-01

Issue

G



1. THIS PLAN TO BE UTILIZED FOR GRADING AND DRAINAGE PURPOSES ONLY. SEE GENERAL NOTES SHEET FOR ADDITIONAL GRADING, UTILITY, AND CONSTRUCTION NOTES.
2. FINAL FLOOR ELEVATION OF THE EQUIPMENT PADS SHALL BE SET 6" ABOVE ADJACENT PROPOSED GRADE ELEVATIONS.
3. ALL STORMWATER & ELECTRICAL UTILITY CROSSINGS SHALL MAINTAIN A MINIMUM 12" VERTICAL SEPARATION. FINAL CROSSING ELEVATIONS TO BE DETERMINED AT FUTURE PHASES OF DESIGN.
4. CONTRACTOR TO ENSURE LIMIT OF WORKS DO NOT EXCEED PROPERTY EXTENTS. ALL PROPOSED GRADING SHALL TIE INTO EXISTING GRADES WHOLLY WITHIN THE PROPERTY LINE.
5. FINAL CULVERT DESIGN, SIZING, AND MODELING WILL BE COMPLETED DURING THE DETAILED DESIGN PHASE IN ACCORDANCE WITH THE MASSACHUSETTS STREAM CROSSING STANDARDS (310 CMR 10.00) AND THE MASSACHUSETTS WETLANDS PROTECTION ACT (M.G.L. CH. 131, § 40) TO ENSURE REGULATORY COMPLIANCE AND MINIMIZE BVW IMPACTS.
6. APPROXIMATELY 385 SF OF PERMANENT WETLAND FILL AND 800 SF OF TEMPORARY WETLAND DISTURBANCE WILL OCCUR AT THE BVW CROSSING. ANY PERMANENT WETLAND FILL WILL BE REPLACED AT A 1:1 RATIO IN ACCORDANCE WITH THE MASSACHUSETTS WETLANDS PROTECTION REGULATIONS. THE LOCATION FOR THE REPLICATION AREA WILL BE DETERMINED DURING A LATER DESIGN PHASE.
7. BUOYANCY WILL BE EVALUATED DURING DETAILED DESIGN AND, IF NECESSARY, MITIGATED USING METHODS SUCH AS ANCHORING.

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ZOVL - Oakham, MA

Seal

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CONSTRUCTION

Drawing Title

# CIVIL GRADING AND DRAINAGE SHEET

Scale 1" = 50'

File Name C4-01.DWG

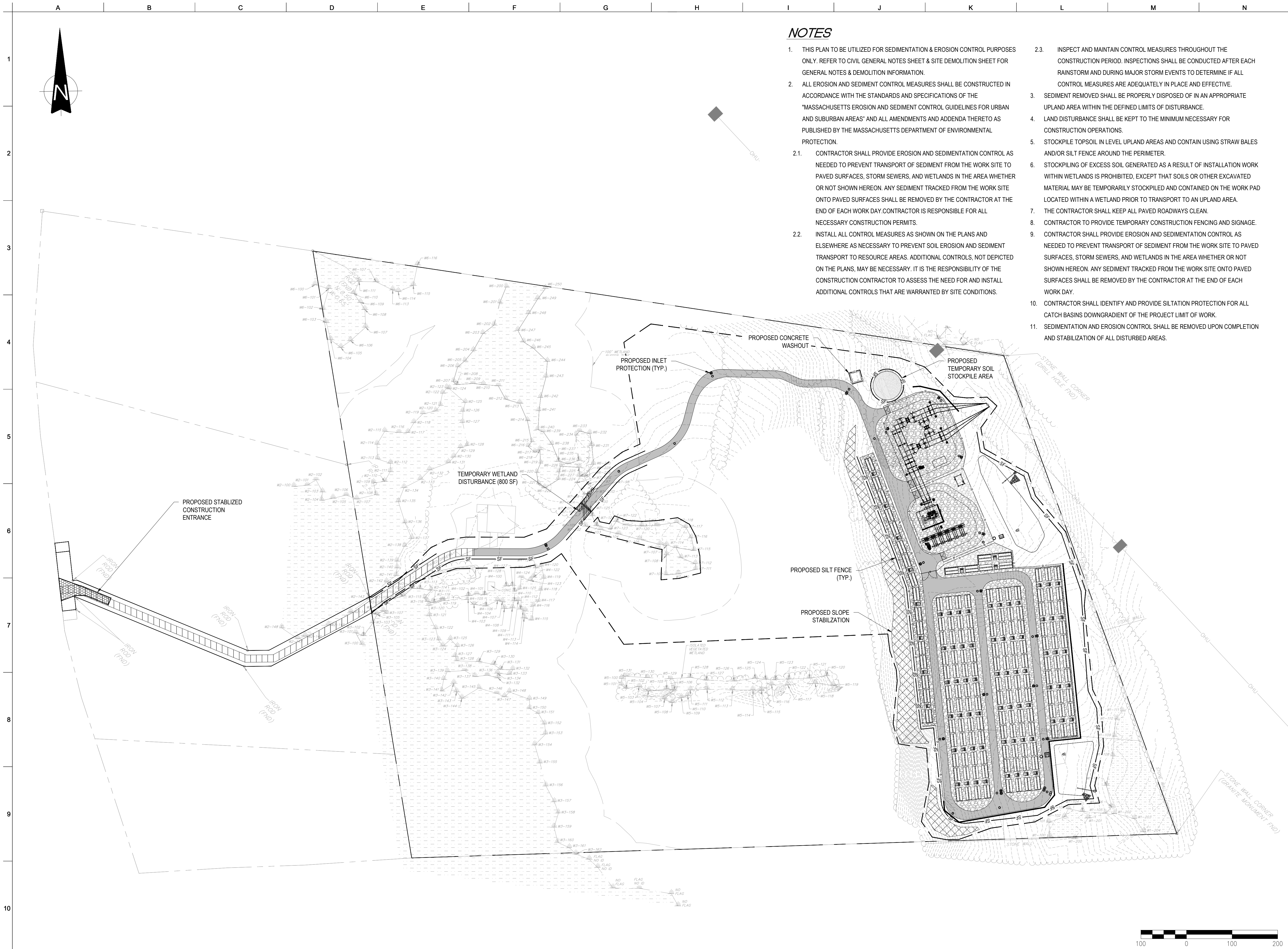
Drawing Status

Job No

Job No

## Issue

## Issue



| Issue | Date       | Revisions                         |
|-------|------------|-----------------------------------|
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| G     | 03/18/2025 | 30% DESIGN REVISION               |

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Drawing Title

SOIL EROSION AND  
SEDIMENTATION  
CONTROL SHEET

Scale

1" = 100'

File Name

C6-01.DWG

Drawing Status

30% DESIGN DRAWINGS

Job No

296229-00

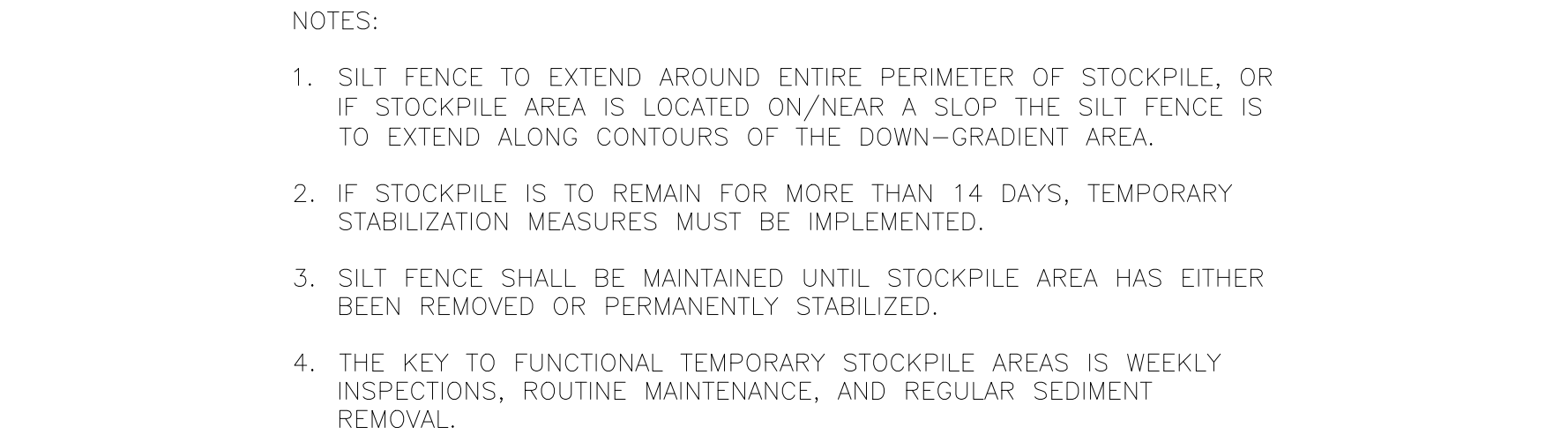
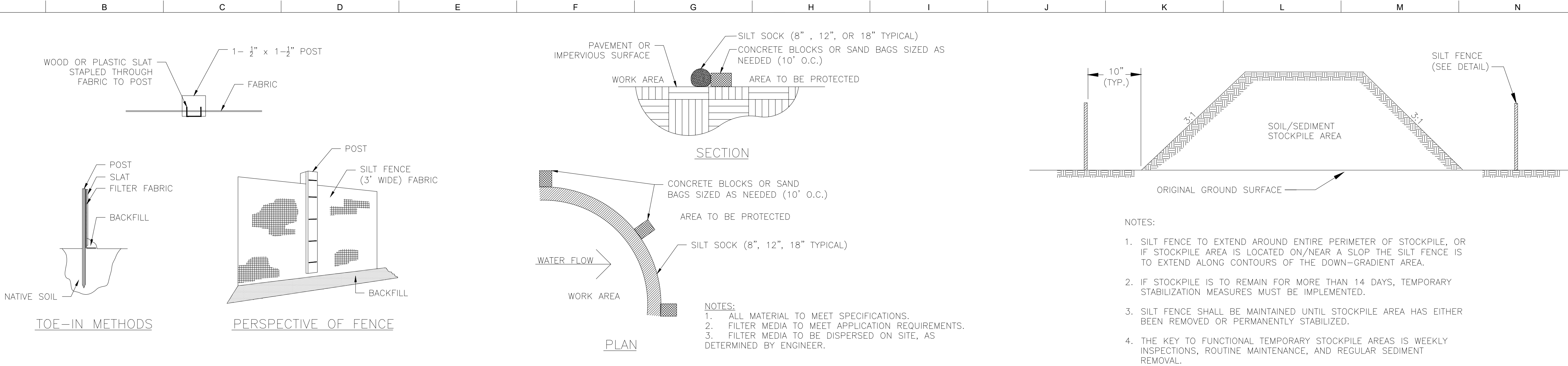
Drawing No

C6-01

Issue

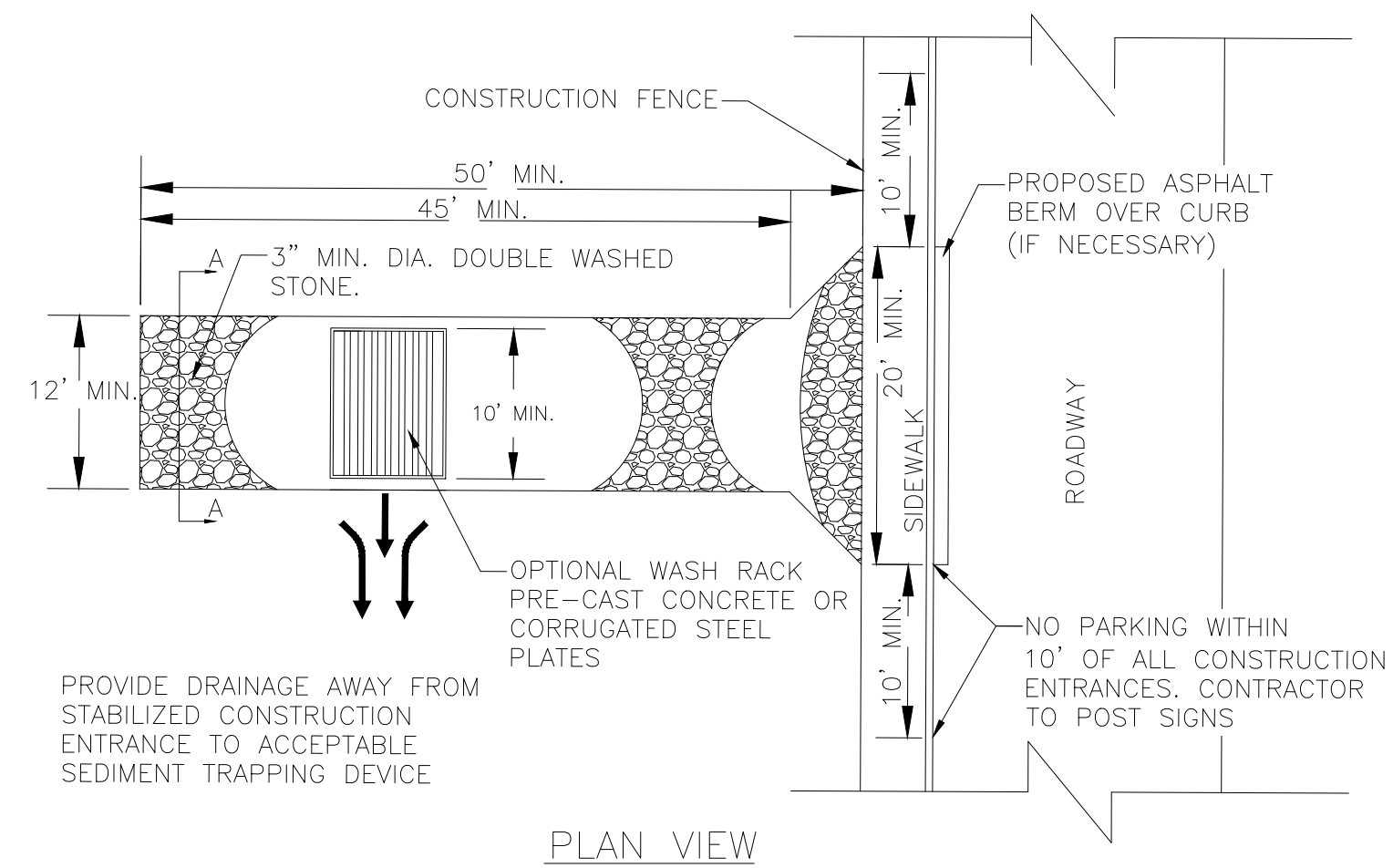
G

|           |            |       |
|-----------|------------|-------|
| Job No    | Drawing No | Issue |
| 296229-00 | C8-01      | G     |



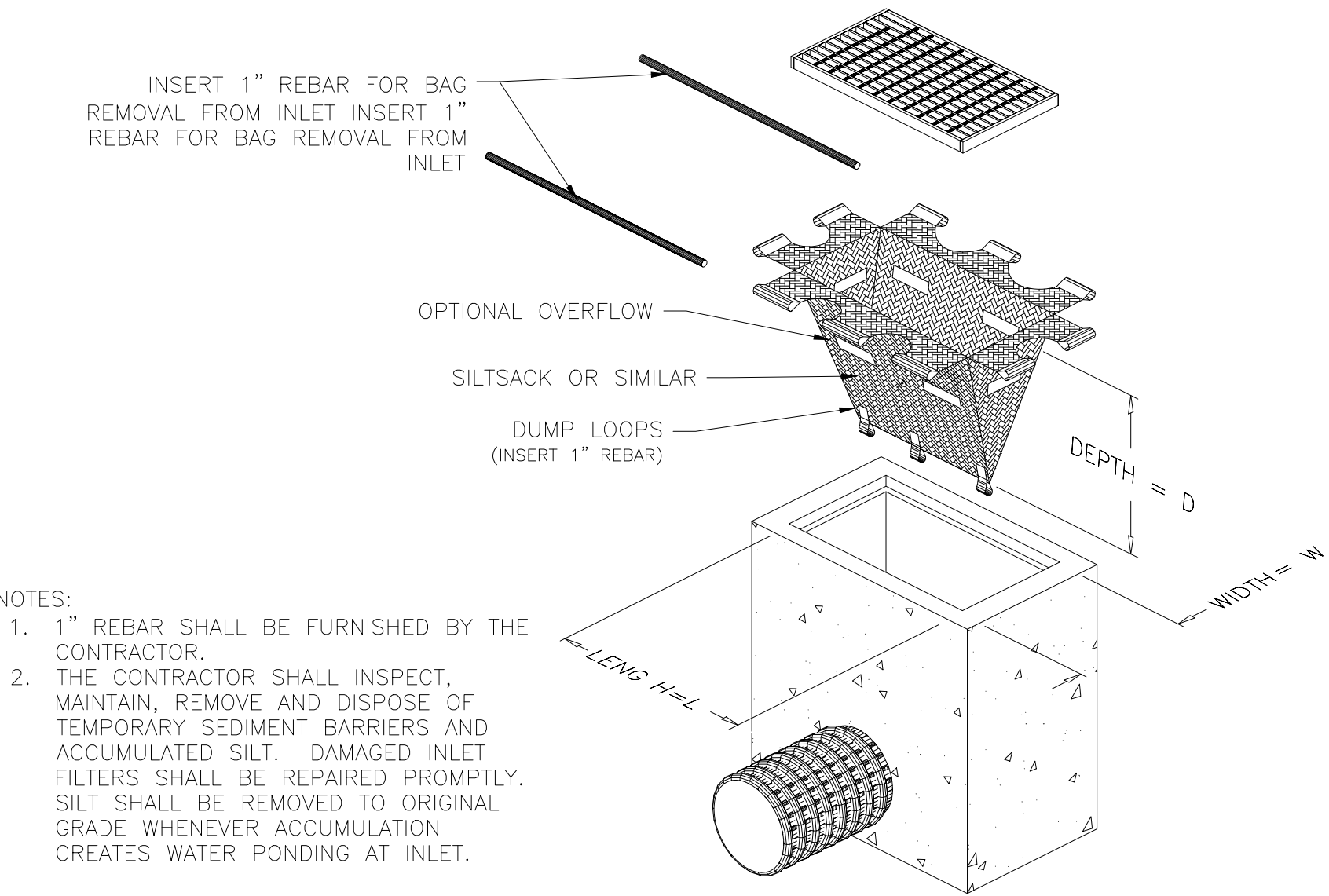
## 1 SILTATION FENCE DETAIL

N.T.S.



## 4 CONSTRUCTION ENTRANCE

N.T.S.

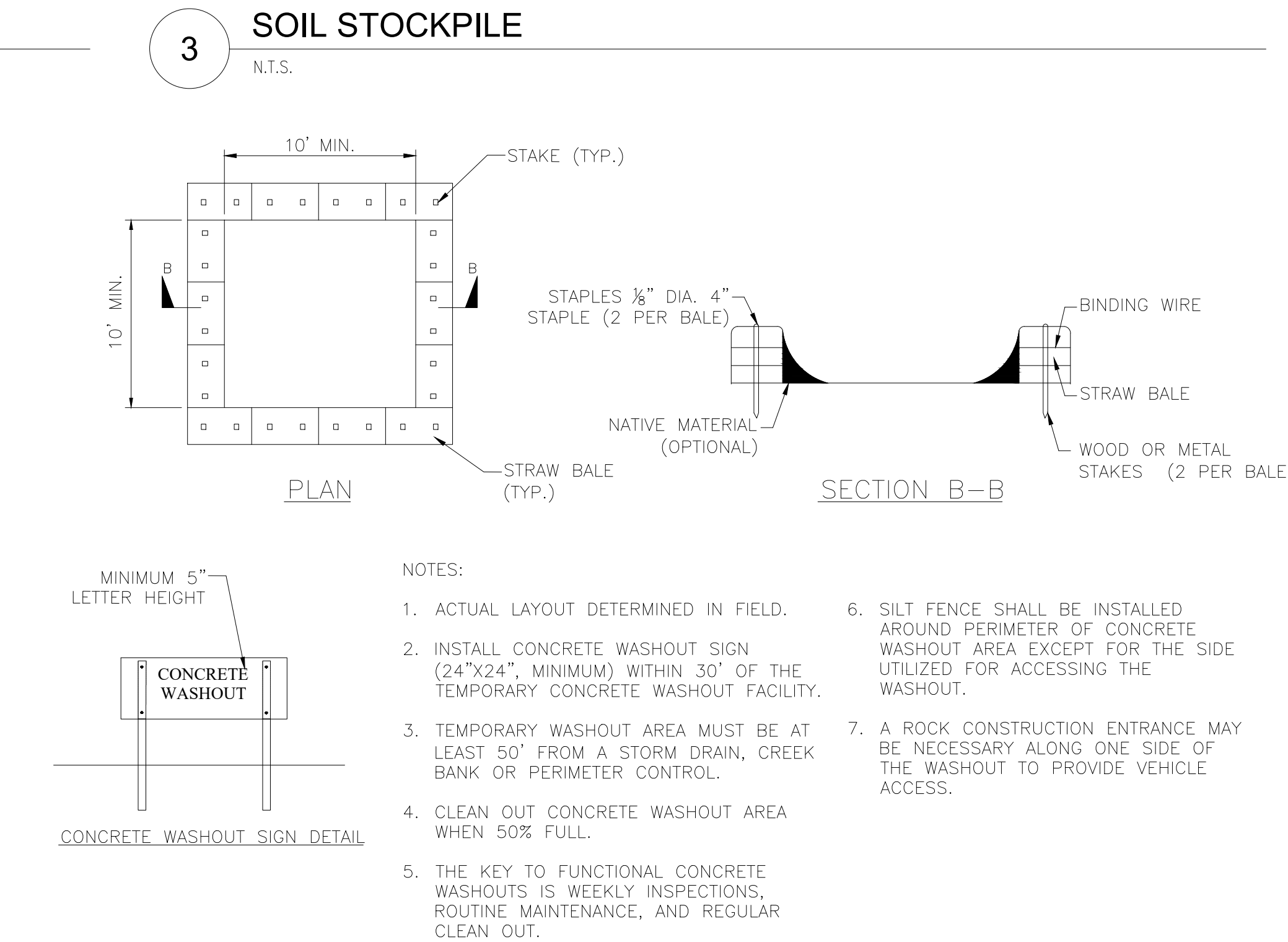
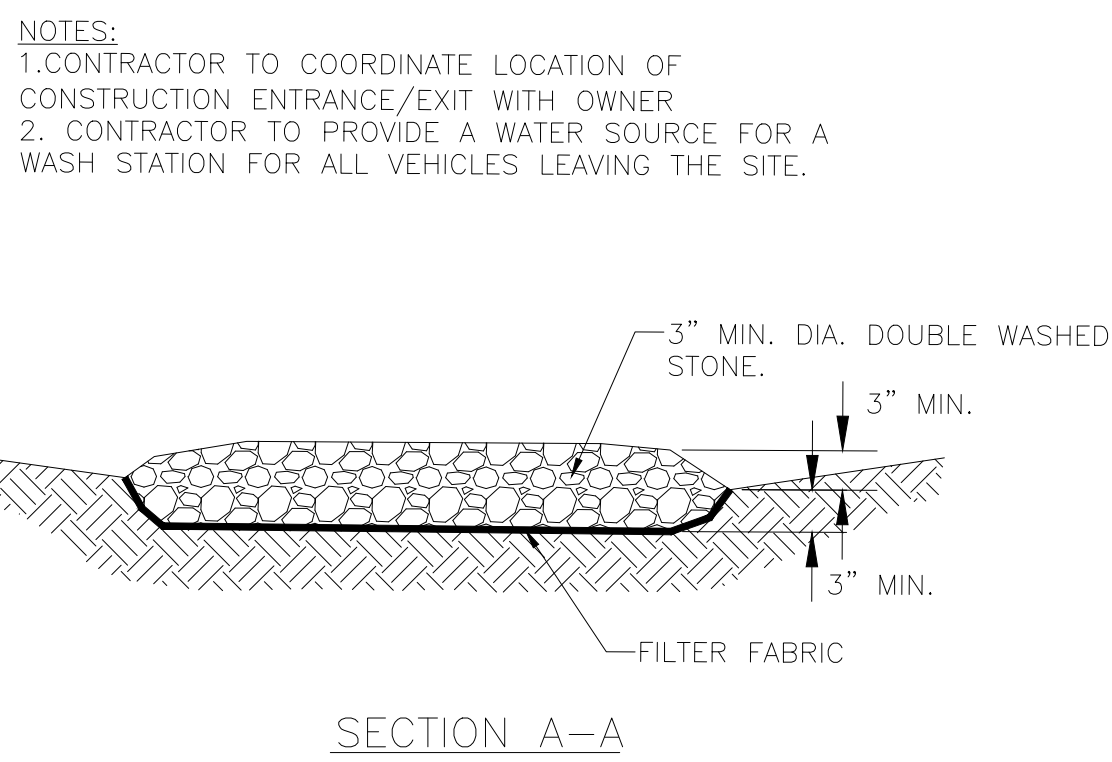


## 6 INLET PROTECTION FOR CATCH BASIN

N.T.S.

## 2 SILT SOCK ON PAVEMENT DETAIL

N.T.S.



## 5 CONCRETE WASHOUT

N.T.S.

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CONSTRUCTION

Drawing Title

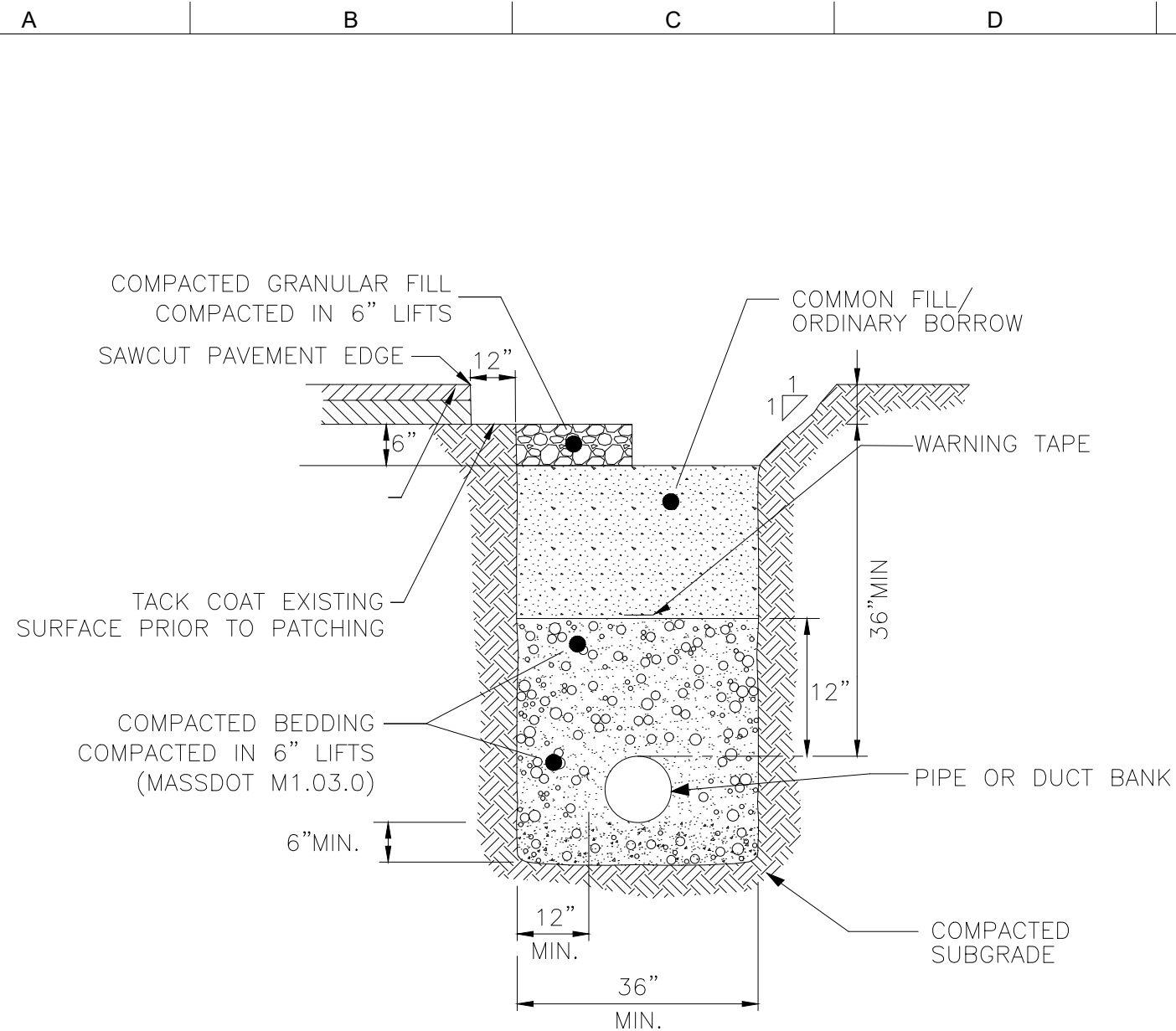
CIVIL DETAIL  
SHEET 2

Scale  
NTS

File Name  
C8-01.DWG

Drawing Status  
30% DESIGN DRAWINGS

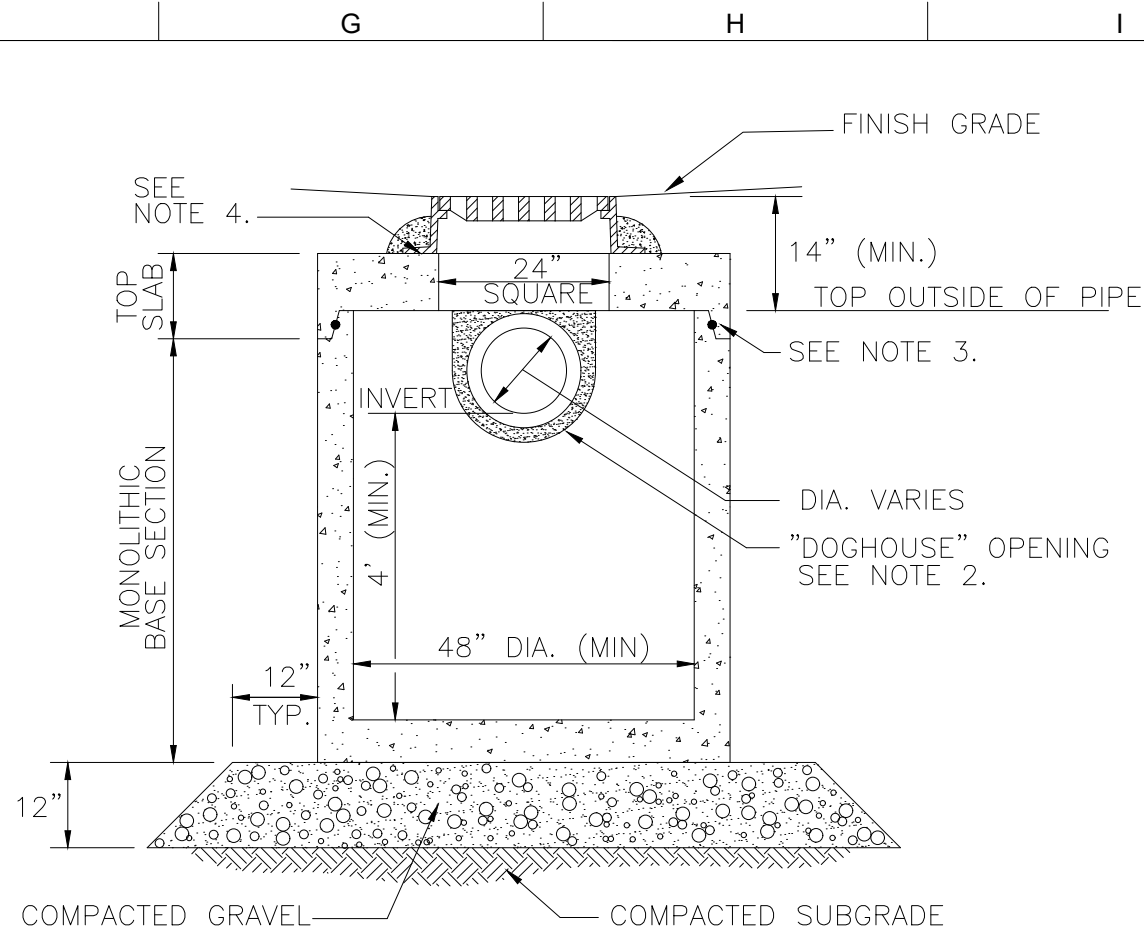
| Job No    | Drawing No | Issue |
|-----------|------------|-------|
| 296229-00 | C8-02      | G     |



NOTES:

1. USE METALLIC TRACING/WARNING TAPE OVER ALL DUCTBANKS.
2. INSTALL PIPE IN CENTER OF TRENCH.

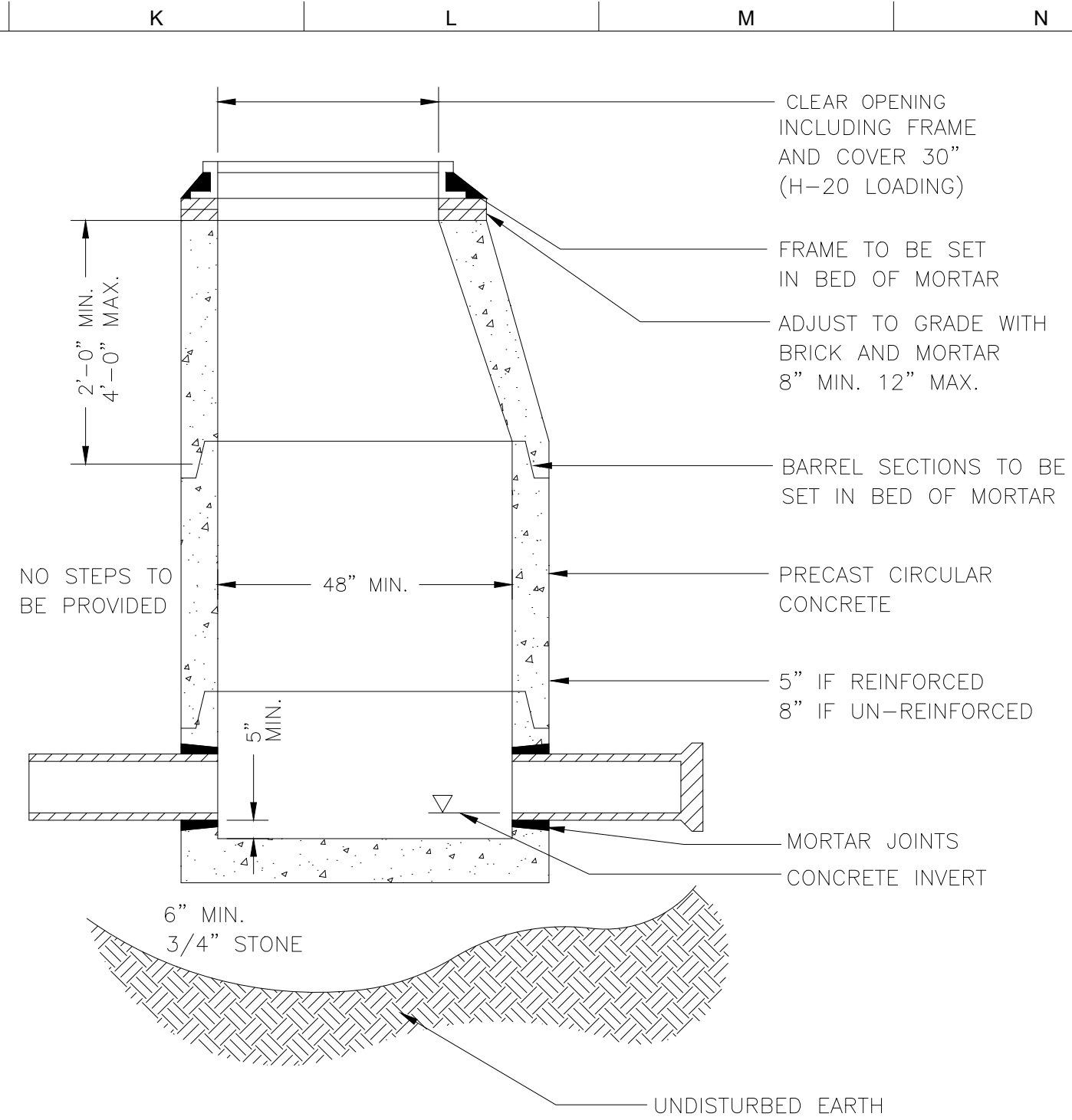
1 UTILITY TRENCH  
N.T.S.



NOTES:

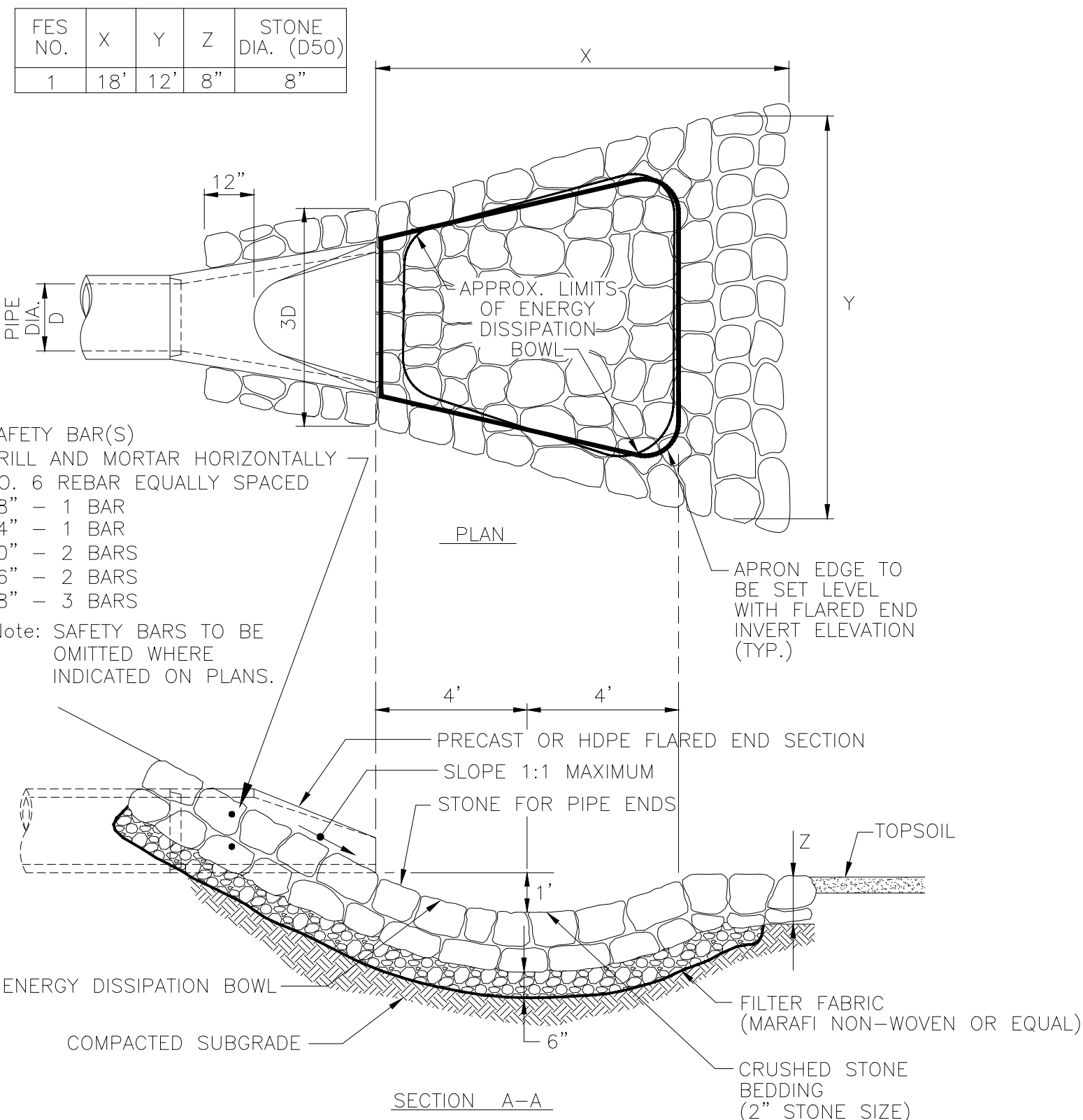
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE DOGHOUSE OPENING FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. TOP SLAB SHALL NOT REST DIRECTLY ON PIPE. GROUT ALL PIPE CONNECTIONS (NON-SHRINK GROUT).
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAME AND GRATE (4"DEPTH) SHALL BE SET IN FULL MORTAR BED.
5. ADJUST TO FINISH GRADE WITH CLAY BRICK AND MORTAR AS REQUIRED.

2 TYPICAL CATCH BASIN  
N.T.S.

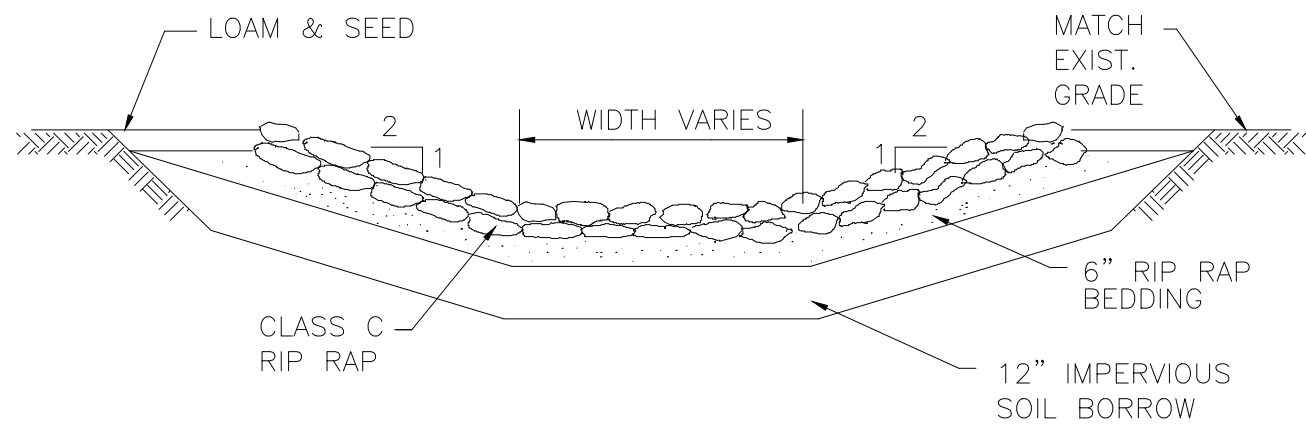


STRUCTURE TO BE DESIGNED FOR H-20 LOADING

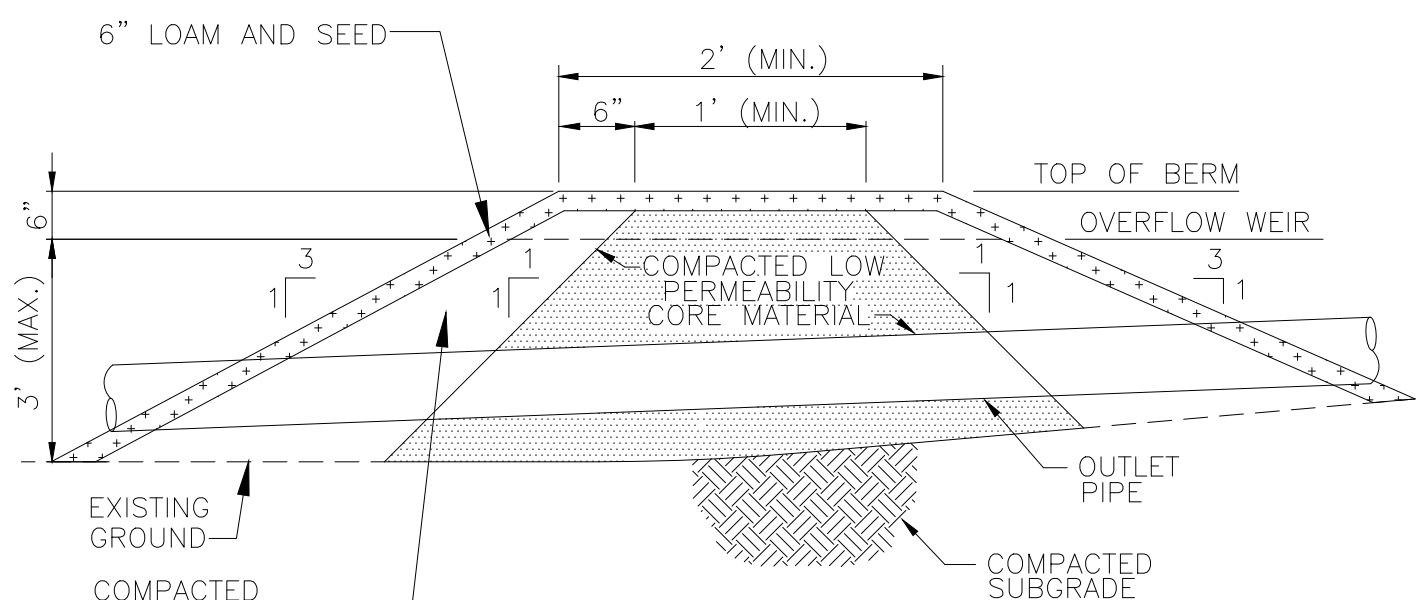
3 DRAIN MANHOLE DETAIL (H-20 LOADING)  
N.T.S.



4 FLARED END SCOUR PROTECTION  
N.T.S.



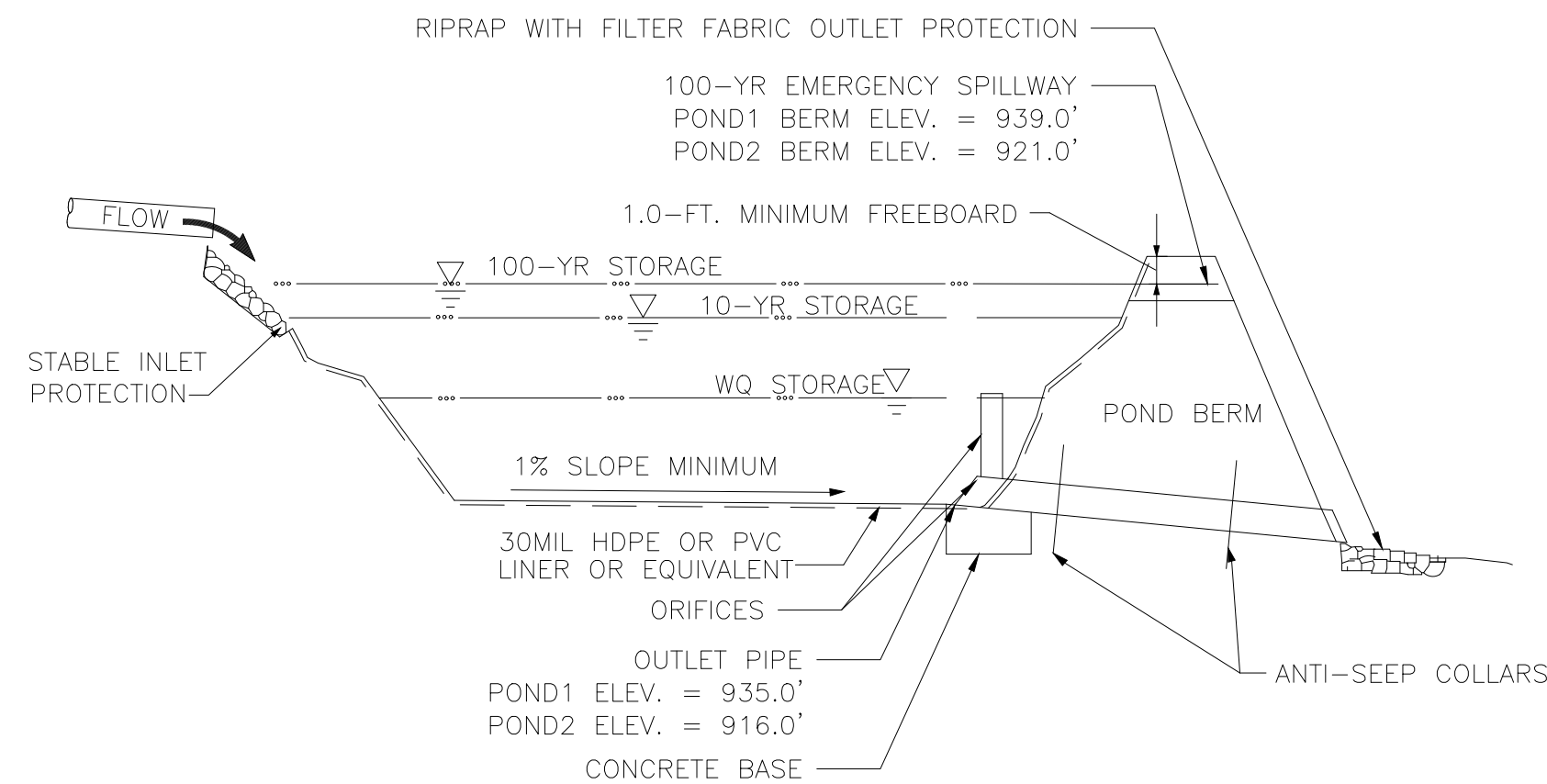
5 DETENTION BASIN EMERGENCY SPILLWAY  
N.T.S.



NOTES:

1. PIPES PENETRATING THE LOW PERMEABILITY CORE SHALL BE BEDDED IN THE LOW PERMEABILITY CORE MATERIAL
2. THE BERM SECTION IS SUBJECT TO CHANGE AND WILL BE BASED ON THE RESULTS OF FURTHER GEOTECHNICAL INVESTIGATIONS.

6 DRY POND BERM SECTION  
N.T.S.



7 STORMWATER SYSTEM SECTION  
N.T.S.

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Seal

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CONSTRUCTION

Drawing Title

CIVIL DETAIL  
SHEET 3

Scale

NTS

File Name

C8-01.DWG

Drawing Status

30% DESIGN DRAWINGS

Job No

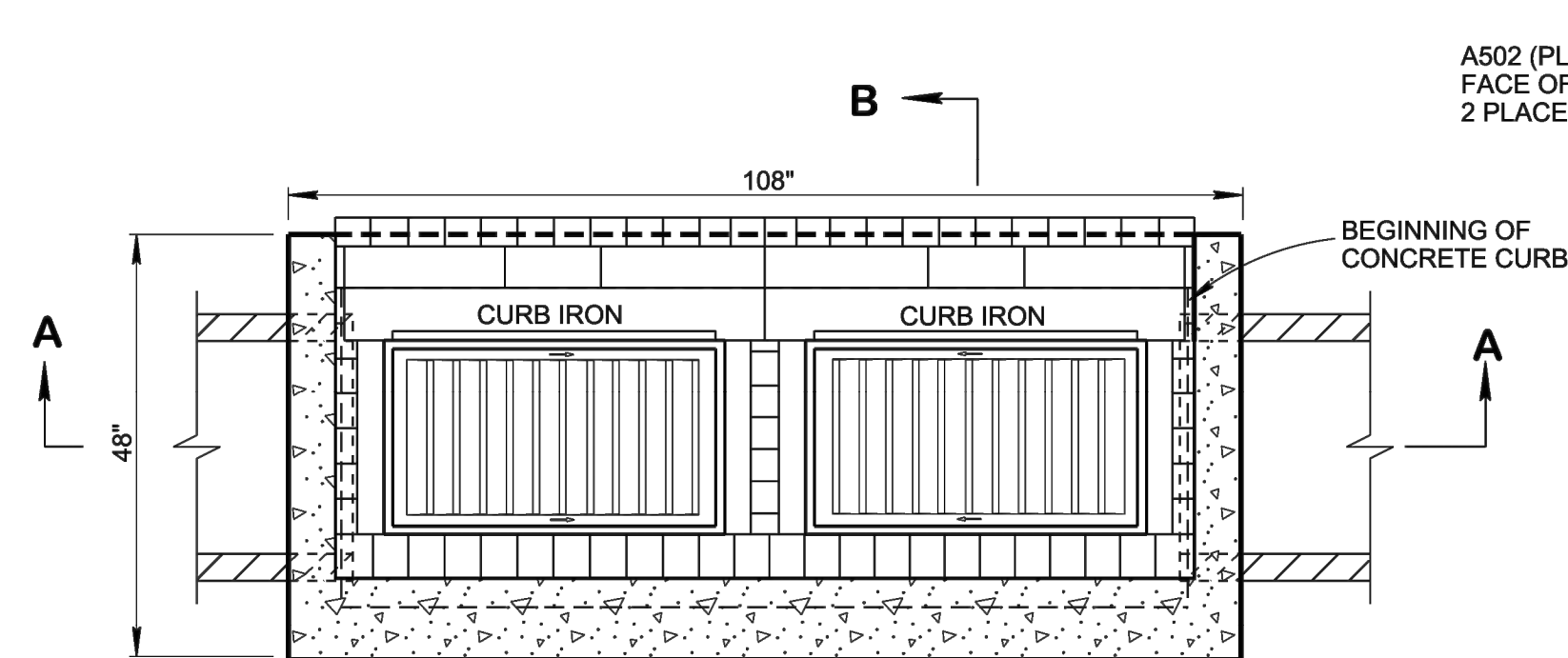
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Drawing No

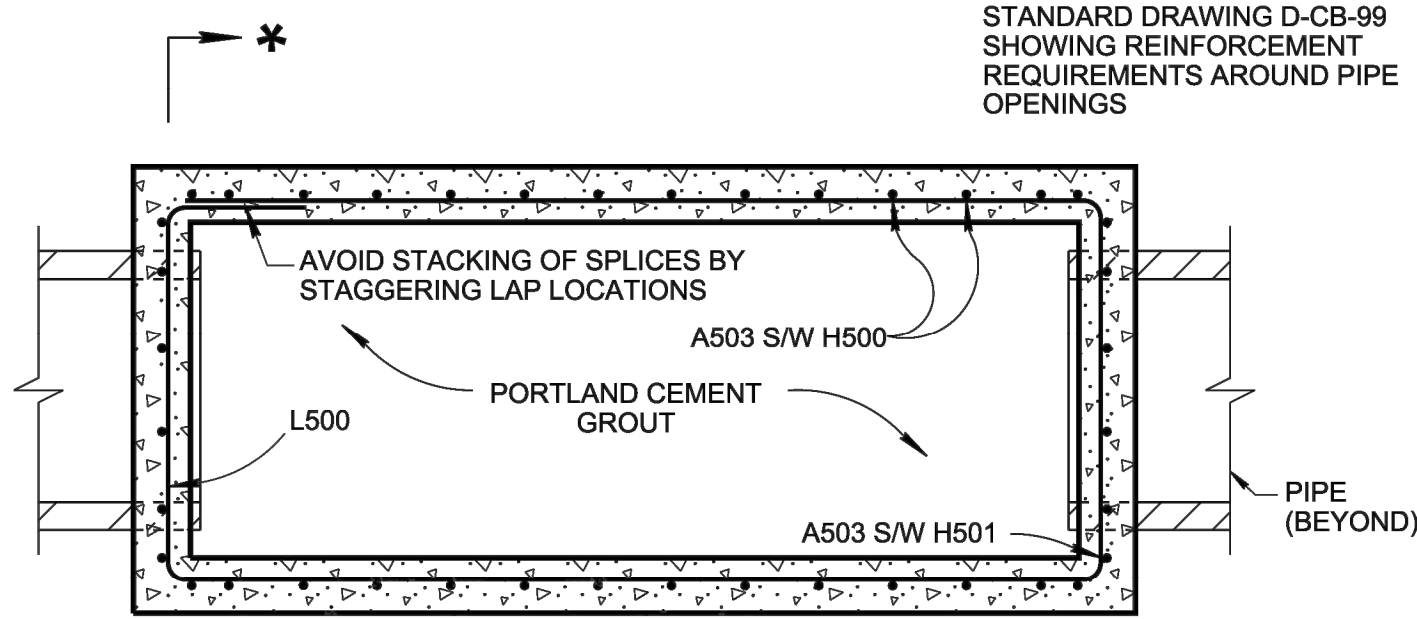
C8-03

Issue

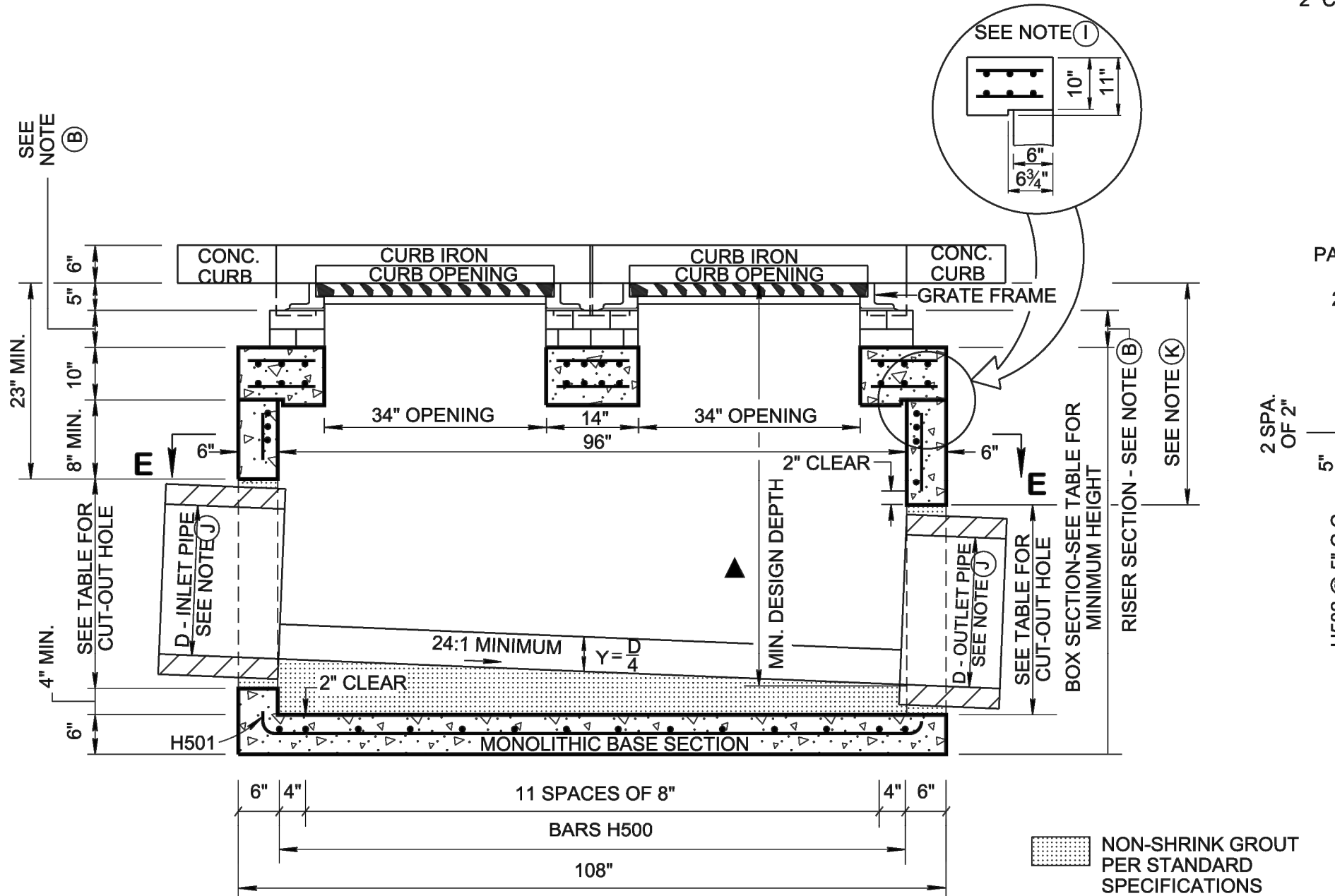
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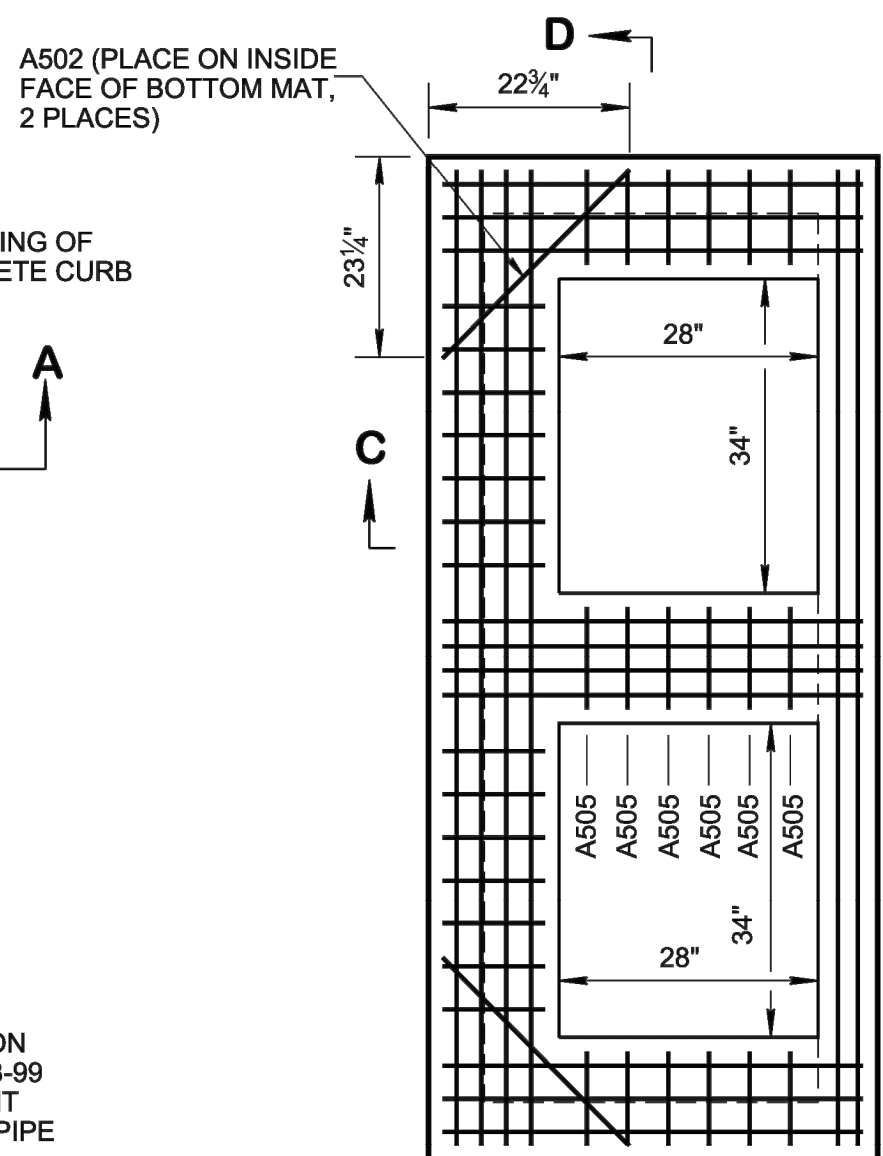
PLAN VIEW



SECTION E-E



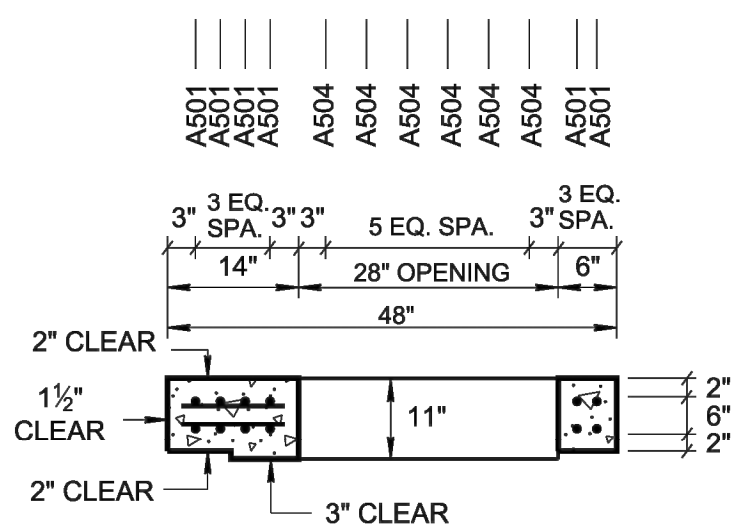
SECTION A-A



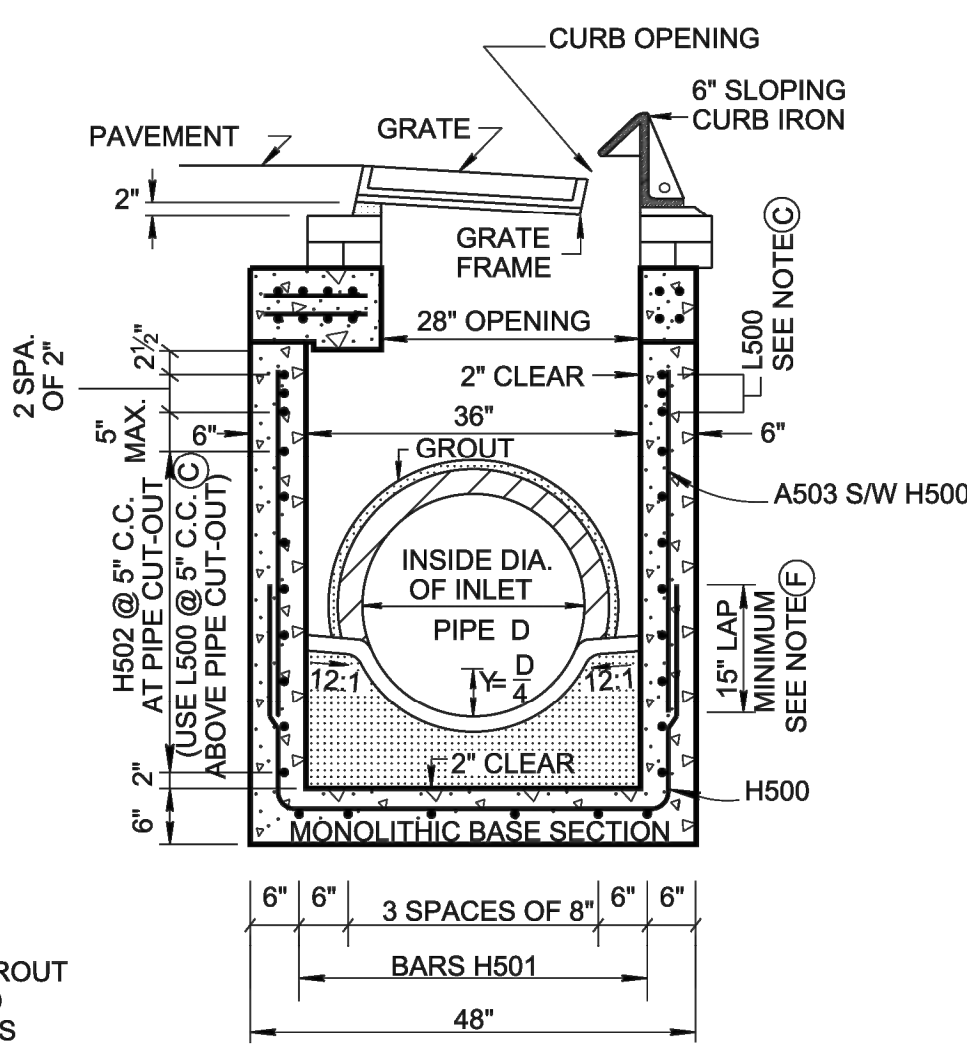
SECTION \*-\*

ELEV. VIEW IS PROVIDED ON STANDARD DRAWING D-CB-99 SHOWING REINFORCEMENT REQUIREMENTS AROUND PIPE OPENINGS

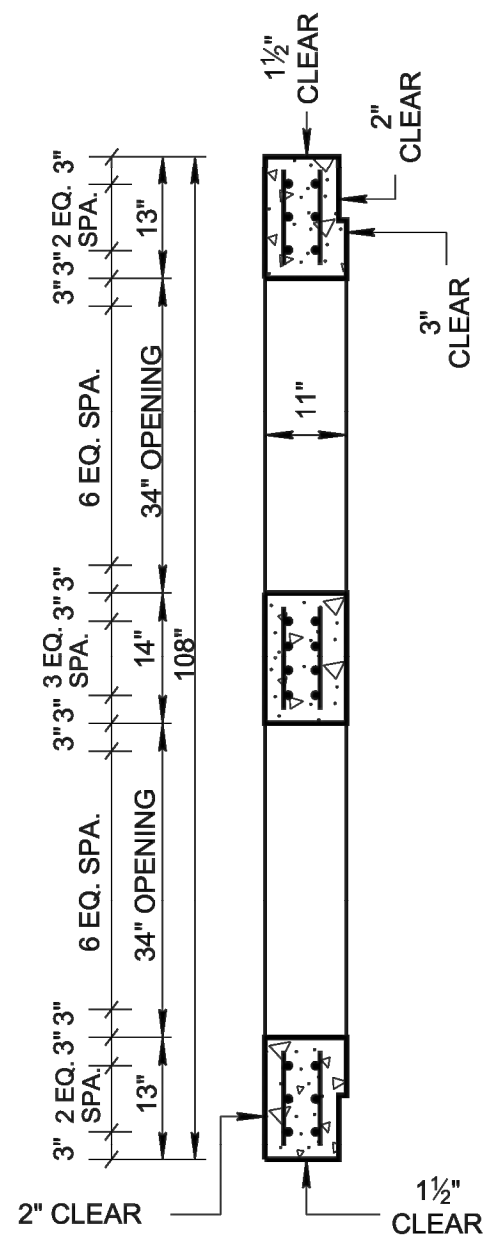
LID REINFORCING



SECTION C-C



SECTION B-B



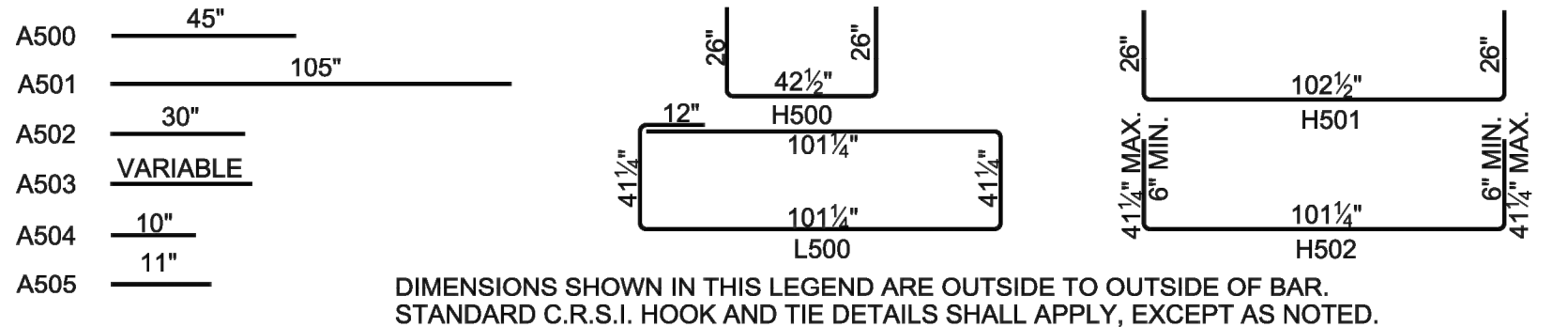
SECTION D-D

| CATCH BASIN MAXIMUM DEPTH NOTE              |  |
|---------------------------------------------|--|
| MAXIMUM DEPTH FOR THIS STRUCTURE IS 10.00'. |  |

| CATCH BASIN DIMENSIONS                        |                                    |                                             |                                               |  | FOR DESIGN USE ONLY<br>CATCH BASIN<br>MINIMUM<br>DESIGN DEPTH<br>(FEET) |
|-----------------------------------------------|------------------------------------|---------------------------------------------|-----------------------------------------------|--|-------------------------------------------------------------------------|
| INSIDE<br>DIAMETER<br>(D) OF PIPE<br>(INCHES) | PIPE WALL<br>THICKNESS<br>(INCHES) | DIAMETER<br>OF CUT-OUT<br>HOLES<br>(INCHES) | BOX SECTION<br>MINIMUM<br>HEIGHTS<br>(INCHES) |  |                                                                         |
| 18                                            | 2½                                 | 25                                          | 53                                            |  | 4.06                                                                    |
| 24                                            | 3                                  | 32                                          | 60                                            |  | 4.61                                                                    |
| ④ 30                                          | 3½                                 | 39                                          | 67                                            |  | 5.15                                                                    |
| ④ 36                                          | 4                                  | 46                                          | 74                                            |  | 5.69                                                                    |
| ④ 42                                          | 4½                                 | 53                                          | 81                                            |  | 6.23                                                                    |
| ④ 48                                          | 5                                  | 60                                          | 88                                            |  | 6.77                                                                    |
| ④ 54                                          | 5½                                 | 67                                          | 95                                            |  | 7.31                                                                    |
| ④ 60                                          | 6                                  | 74                                          | 102                                           |  | 7.86                                                                    |

- CUT-OUT HOLES BASED ON REINFORCED CONCRETE PIPE WITH WALL TYPE "B".
- ALL FLEXIBLE PIPE MATERIALS REQUIRE GASKET. SEE STANDARD DRAWING D-PB-2.
- CUT-OUT HOLES FOR PRECAST STRUCTURES TO BE FORMED IN ORDER TO OBTAIN A SMOOTH EDGED HOLE. SCORED OR ETCHED HOLES WITH REINFORCING STEEL LEFT UN CUT WILL NOT BE PERMITTED.
- TO BE USED IN 96 INCH INTERIOR WALLS ONLY.

REINFORCING STEEL LEGEND



GENERAL NOTES

- DRAWING TO BE USED FOR ALL PRECAST NO. 26 CONCRETE CATCH BASINS THAT ARE BETWEEN MINIMUM DEPTH AND TEN FEET. SEE STANDARD DRAWING D-CB-26S FOR DETAILS OF CAST-IN-PLACE NO. 26 CONCRETE CATCH BASINS AND PRECAST NO. 26 CONCRETE CATCH BASINS THAT ARE GREATER TEN FEET IN DEPTH. SEE STANDARD DRAWING D-CB-99 FOR ADDITIONAL CONSTRUCTION NOTES & DETAILS.
- THIS DIMENSION MAY VARY FROM A MINIMUM OF 0 INCHES TO A MAXIMUM OF 24 INCHES AS LONG AS 23 INCHES IS SATISFIED. THE CONTRACTOR HAS THE OPTION OF USING BRICK OR STANDARD PRECAST CONCRETE RISER FRAMES. THE USE OF BRICK SHALL BE LIMITED TO 6 INCHES. IF THIS DIMENSION EXCEEDS 6 INCHES, PRECAST CONCRETE RISER FRAMES SHALL BE USED AS SHOWN ON STANDARD DRAWING D-RF-1.
- THIS DRAWING DEPICTS THE MINIMUM HORIZONTAL REINFORCING AT THE TOP OF CATCH BASIN WALLS. SEE ADDITIONAL DETAILS ON STANDARD DRAWING D-CB-99 FOR TALLER SECTIONS AND STEEL PLACEMENT ABOVE PIPE OPENINGS.
- ALL PRECAST ELEMENTS SHALL MEET ASTM C913 (CURRENT EDITION) UNLESS SUPERSEDED BY THIS DRAWING.  
  
CONCRETE:  $f'_c = 4,000$  POUNDS PER SQUARE INCH AT 28 DAYS  
REINFORCING STEEL: ASTM A615,  $F_y = 60,000$  POUNDS PER SQUARE INCH  
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.
- PRECAST CATCH BASIN UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED CATCH BASIN UNITS AT THEIR OWN EXPENSE.
- THE FABRICATOR MAY ELIMINATE THE A503 BARS BY LENGTHENING THE VERTICAL LEG OF THE H500/H501 BARS SO THAT 1½ INCHES OF CLEAR COVER IS PROVIDED AT THE TOP OF THE STRUCTURE.
- APPROPRIATE SIZING AND LOCATION OF LIFTING DEVICES SHALL BE THE RESPONSIBILITY OF THE FABRICATOR.
- THE CONTRACTOR IS TO PATCH ALL LIFTING DEVICE HOLES WITH GROUT AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.
- ALTERNATIVE JOINT DETAILS MAY BE ACCEPTABLE. SEE STANDARD DRAWING D-CB-99 FOR ADDITIONAL DETAILS.
- SEE ROADWAY PLANS DRAINAGE TABULATION FOR PIPE INLET AND OUTLET ELEVATIONS. IF NEEDED, INVERT ELEVATIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER IN ORDER TO ACCOMMODATE INLET AND OUTLET PIPES.
- FOR CASES WHERE THE OUTLET PIPE DIAMETER IS LARGER THAN THE INLET PIPE DIAMETER, A MINIMUM 23 INCH DEPTH SHALL BE MAINTAINED ABOVE THE OUTLET PIPE.
- SEE STANDARD DRAWING D-CBB-12B FOR DETAILS REGARDING CAST IRON GRATES, FRAMES AND CURB INLETS.
- PAY DEPTH MEASUREMENT MADE FROM TOP OF GRATE TO OUTLET FLOW ELEVATION. PAYMENT INCLUDES RISER SECTION AND GRATE. PAYMENT FOR CATCH BASIN WILL BE MADE UNDER ITEM NUMBERS.

611-26.02, CATCH BASINS, TYPE 26, > 4'-8" DEPTH, EACH,

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Drawing Title

CIVIL DETAIL  
SHEET 4

Scale

NTS

File Name

C8-01.DWG

Drawing Status

30% DESIGN DRAWINGS

Job No

296229-00

Drawing No

C8-04

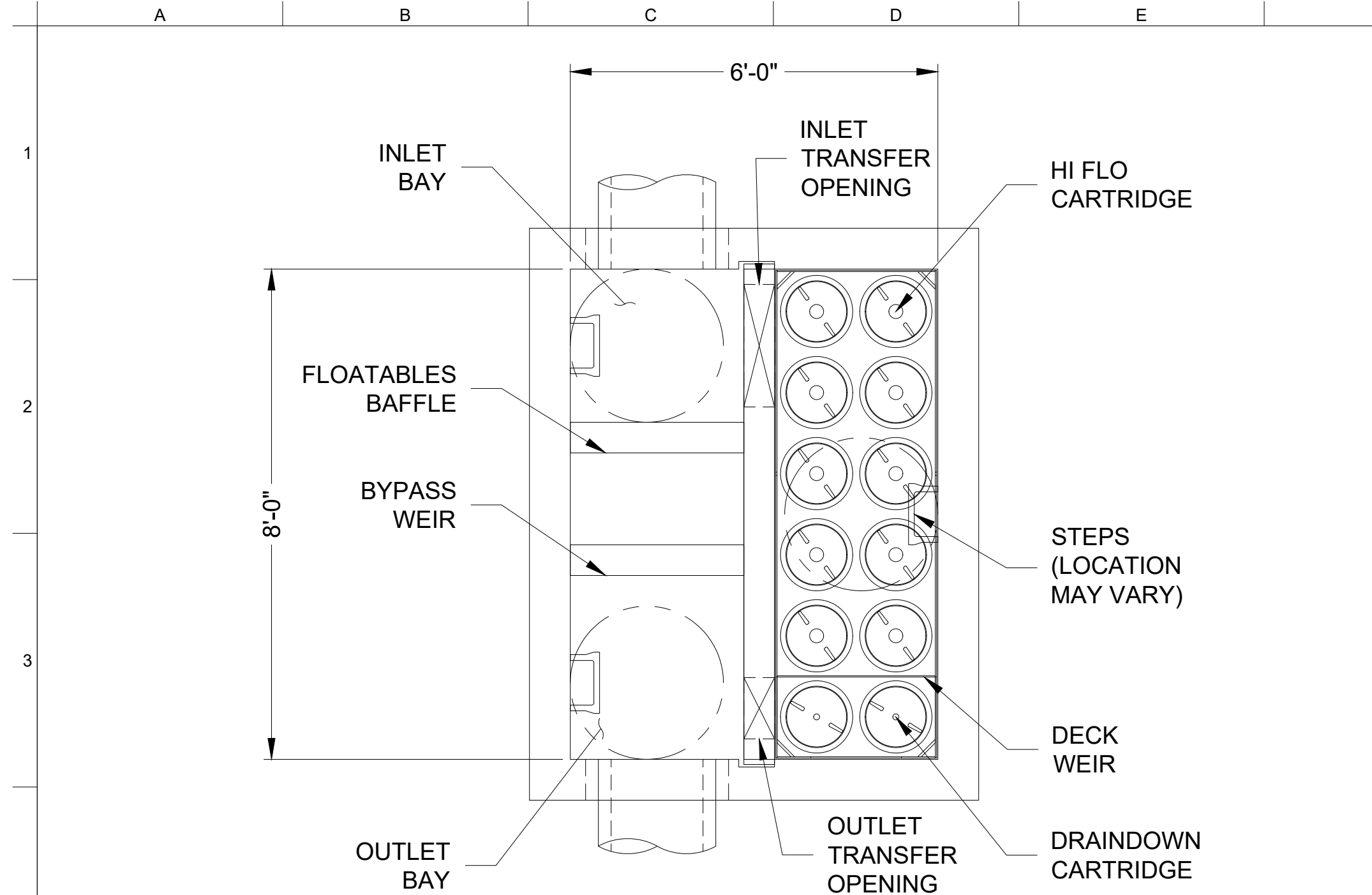
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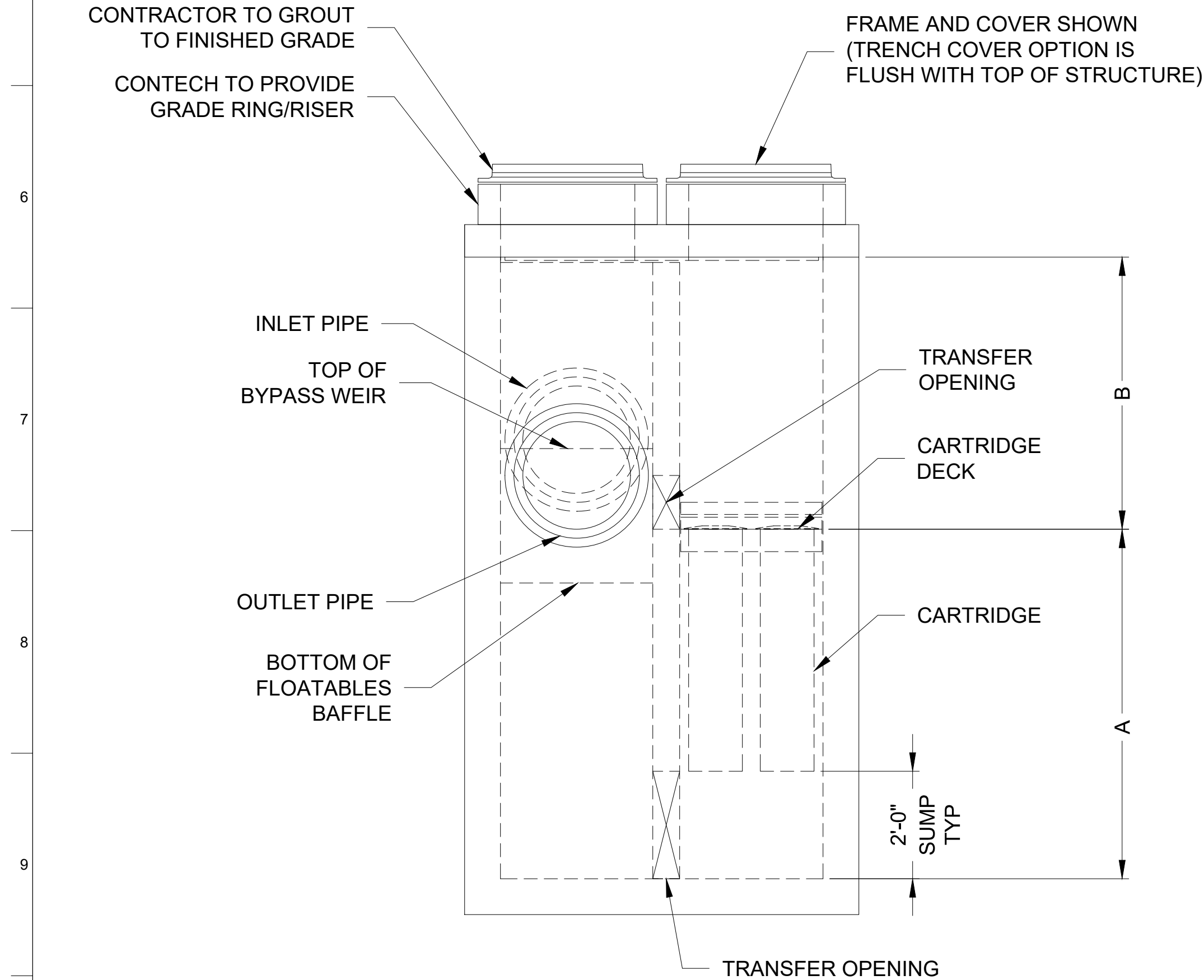
1

DOUBLE CATCH BASIN

N.T.S.



**PLAN VIEW**  
(TOP SLAB NOT SHOWN FOR CLARITY)



**ELEVATION VIEW**

## JELLYFISH DESIGN NOTES

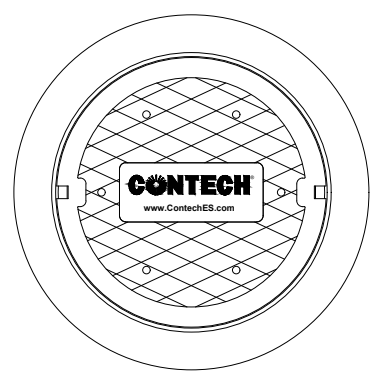
JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD

### CARTRIDGE SELECTION

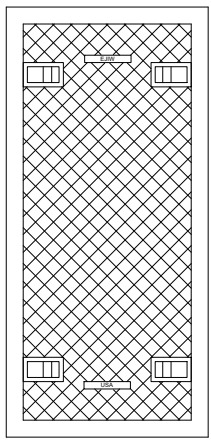
| CARTRIDGE LENGTH                              | 54"           | 40"           | 27"           | 15"           |
|-----------------------------------------------|---------------|---------------|---------------|---------------|
| OUTLET INVERT TO STRUCTURE INVERT (A)         | 6'-6"         | 5'-4"         | 4'-3"         | 3'-3"         |
| FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART) | 0.178 / 0.089 | 0.133 / 0.067 | 0.089 / 0.045 | 0.049 / 0.025 |
| MAX. TREATMENT (CFS)                          | 2.94          | 2.21          | 1.47          | 0.81          |
| DECK TO INSIDE TOP (MIN) (B)                  | 5.00          | 4.00          | 4.00          | 4.00          |

### SITE SPECIFIC DATA REQUIREMENTS

| STRUCTURE ID                       | JFV-1 |
|------------------------------------|-------|
| WATER QUALITY FLOW RATE (cfs)      | 1.13  |
| PEAK FLOW RATE (cfs)               | 11.40 |
| RETURN PERIOD OF PEAK FLOW (yrs)   | 100   |
| # OF CARTRIDGES REQUIRED (HF / DD) | 6/ 2  |
| CARTRIDGE LENGTH                   | 54"   |



**FRAME AND COVER**  
(DIAMETER VARIES)  
N.T.S.



**24" TRENCH COVER**  
(LENGTH VARIES)  
N.T.S.

### GENERAL NOTES:

- PRODUCT SHALL BE CONTECH JFPD0806-6-2 OR APPROVED SIMILAR
- JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
- STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 10', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
- STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
- OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
- THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
- NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

### INSTALLATION NOTES:

- SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD DURING SUBSEQUENT DETAILED DESIGN.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
- CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
- CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

| Issue | Date       | Revisions                         |
|-------|------------|-----------------------------------|
| A     | 9/22/23    | DRAFT ISSUED FOR REVIEW           |
| B     | 9/28/23    | CONSTRAINT MAPPING                |
| C     | 8/21/24    | 10% DESIGN SUBMISSION             |
| D     | 9/13/24    | 30% DESIGN DRAFT                  |
| E     | 11/01/24   | ISSUED FOR ISO-NE SIS APPLICATION |
| F     | 02/28/2025 | 30% DESIGN                        |
| G     | 03/18/2025 | 30% DESIGN REVISION               |

# ARUP

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Client

MORAGA STORAGE LLC

Job Title

**MORAGA STORAGE**  
ZOVL - Oakham, MA

Seal

**NOT FOR  
CONSTRUCTION**

Drawing Title

**CIVIL DETAIL  
SHEET 5**

Scale

NTS

File Name

C8-01.DWG

Drawing Status

30% DESIGN DRAWINGS

Job No

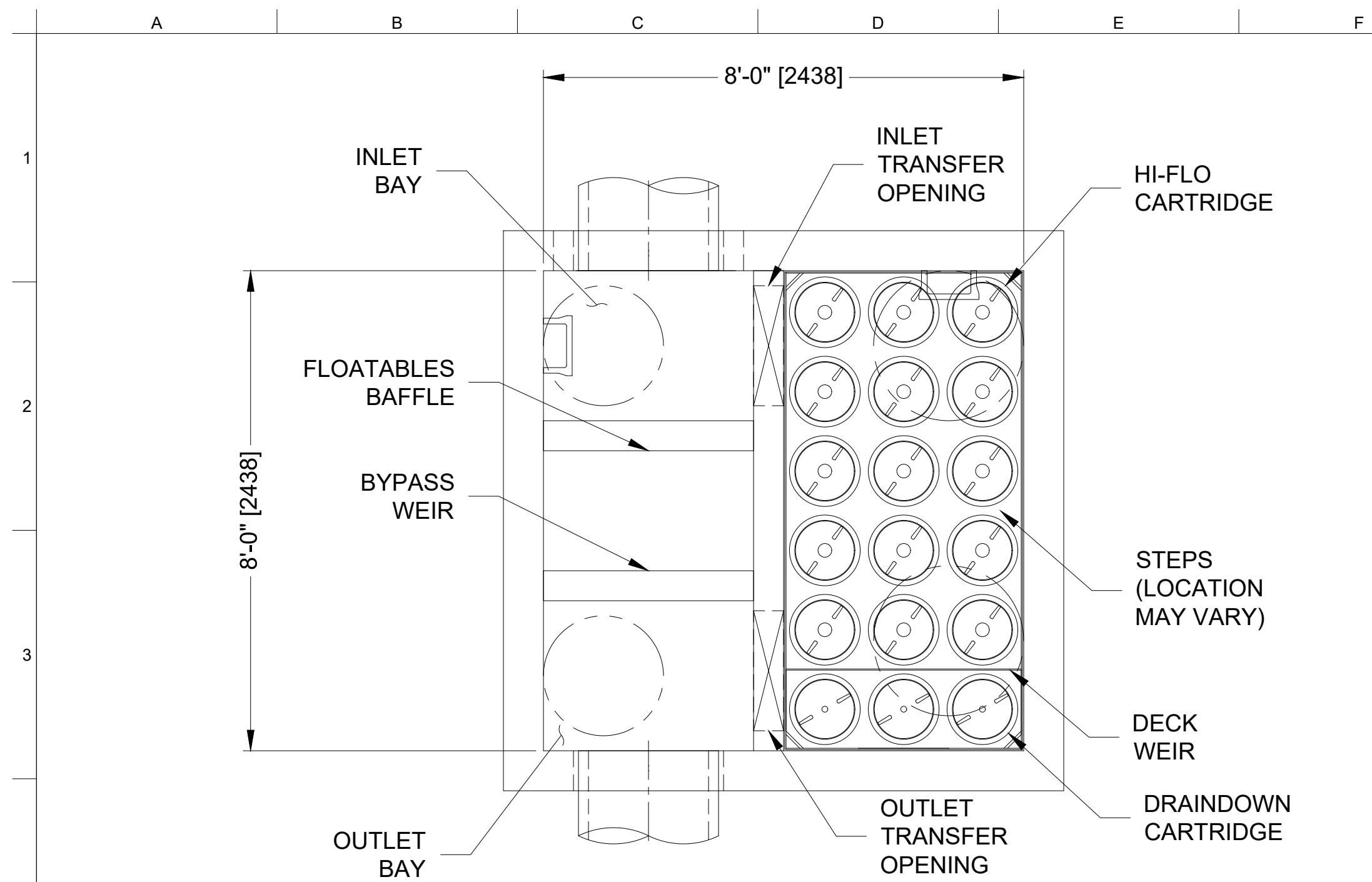
296229-00

Drawing No

C8-05

Issue

G



## CDS2015-5-C DESIGN NOTES

CDS2015-5-C RATED TREATMENT CAPACITY IS 1.4 CFS, OR PER LOCAL REGULATIONS.

THE STANDARD CDS2015-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

| CONFIGURATION | DESCRIPTION |
|---------------|-------------|
| 1             | ...         |
| 2             | ...         |
| 3             | ...         |
| 4             | ...         |
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| 90            | ...         |
| 91            | ...         |
| 92            | ...         |
| 93            | ...         |
| 94            | ...         |
| 95            | ...         |
| 96            | ...         |
| 97            | ...         |
| 98            | ...         |
| 99            | ...         |
| 100           | ...         |

|                                   |
|-----------------------------------|
| GRATED INLET ONLY (NO INLET PIPE) |
|-----------------------------------|

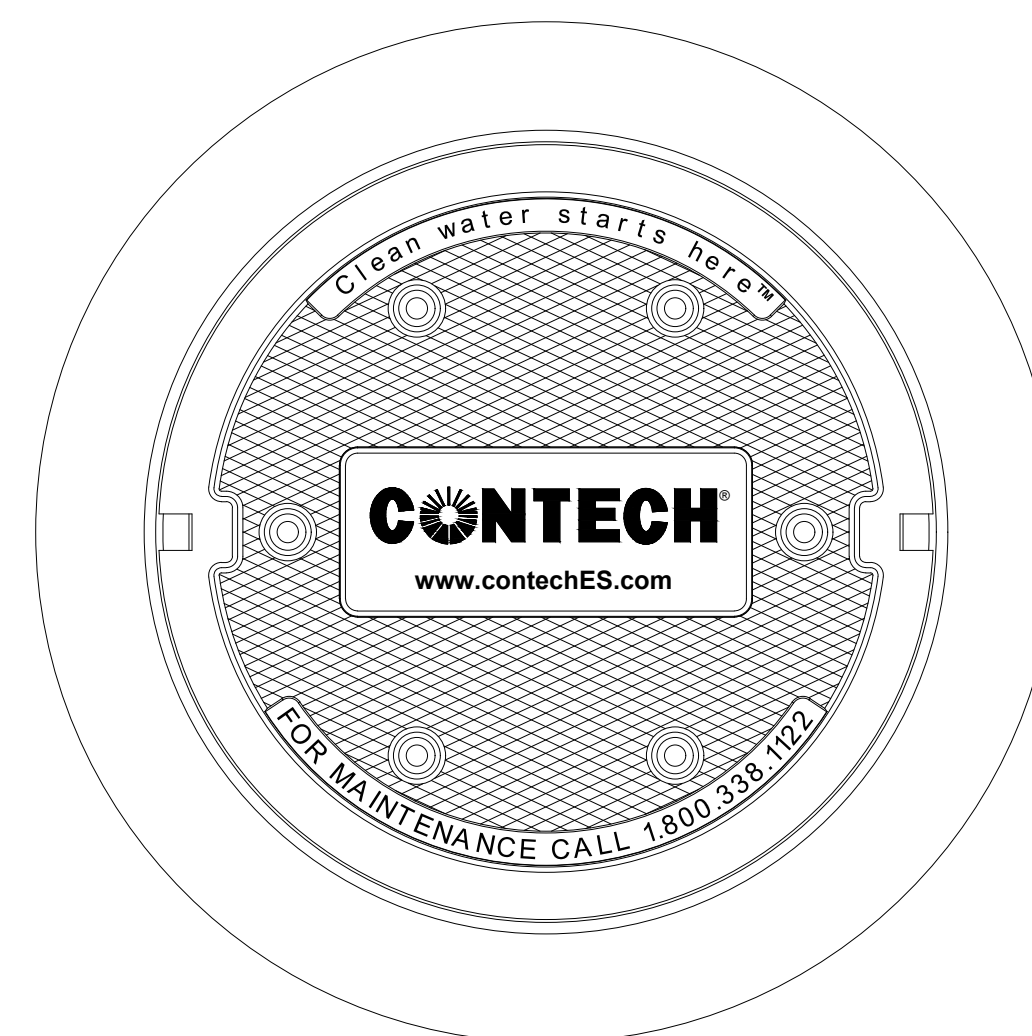
|                                       |
|---------------------------------------|
| GRATED INLET WITH INLET PIPE OR PIPES |
|---------------------------------------|

CURB INLET ONLY (NO INLET PIPE)

CURB INLET WITH INLET PIPE OR PIPES

## SITE SPECIFIC DATA REQUIREMENTS

|                                  |       |
|----------------------------------|-------|
| STRUCTURE ID                     | HDS-1 |
| WATER QUALITY FLOW RATE (cfs)    | 1.13  |
| PEAK FLOW RATE (cfs)             | 11.40 |
| RETURN PERIOD OF PEAK FLOW (yrs) | 100   |



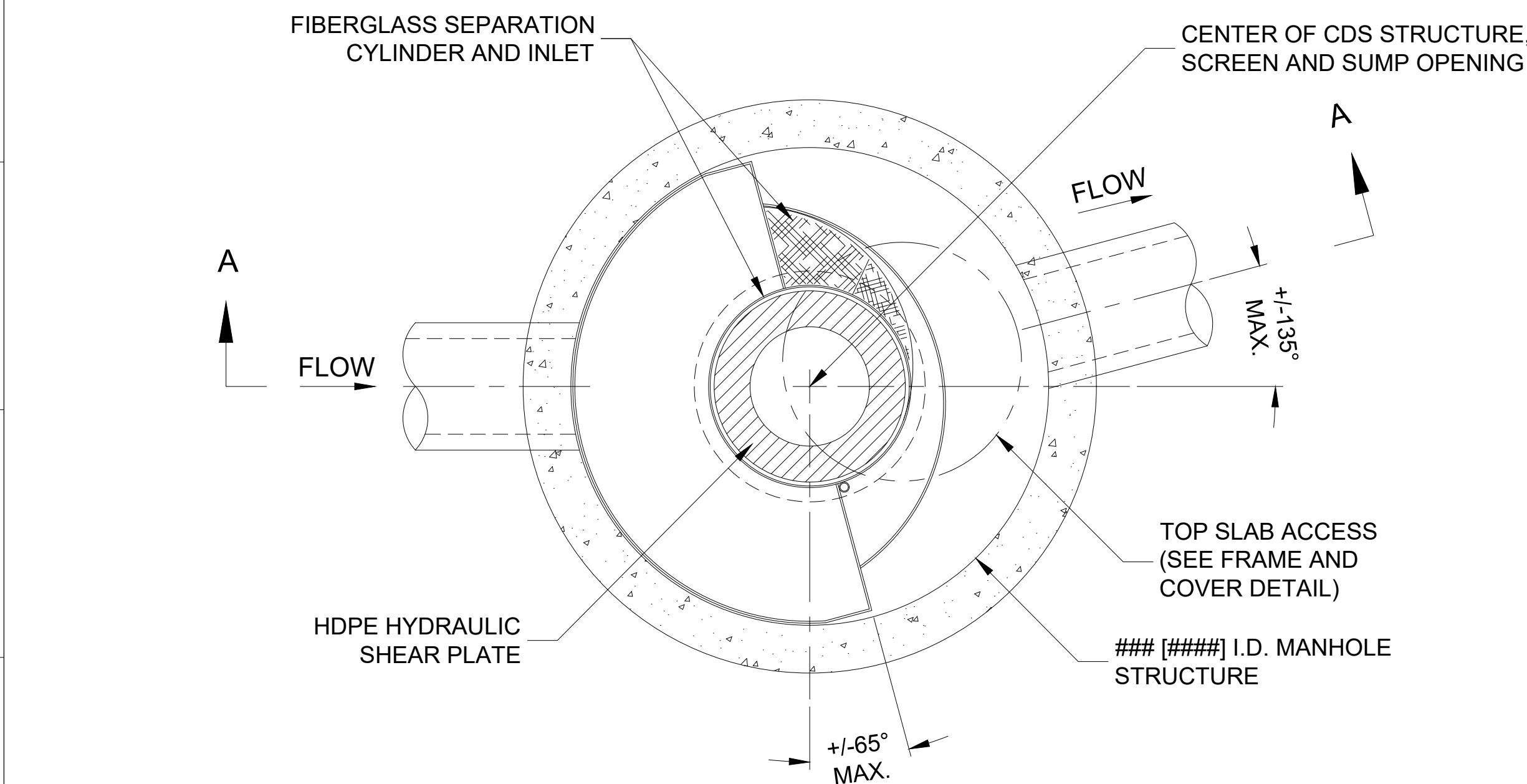
**FRAME AND COVER**  
(DIAMETER VARIES)  
N.T.S.

GENERAL NOTES:

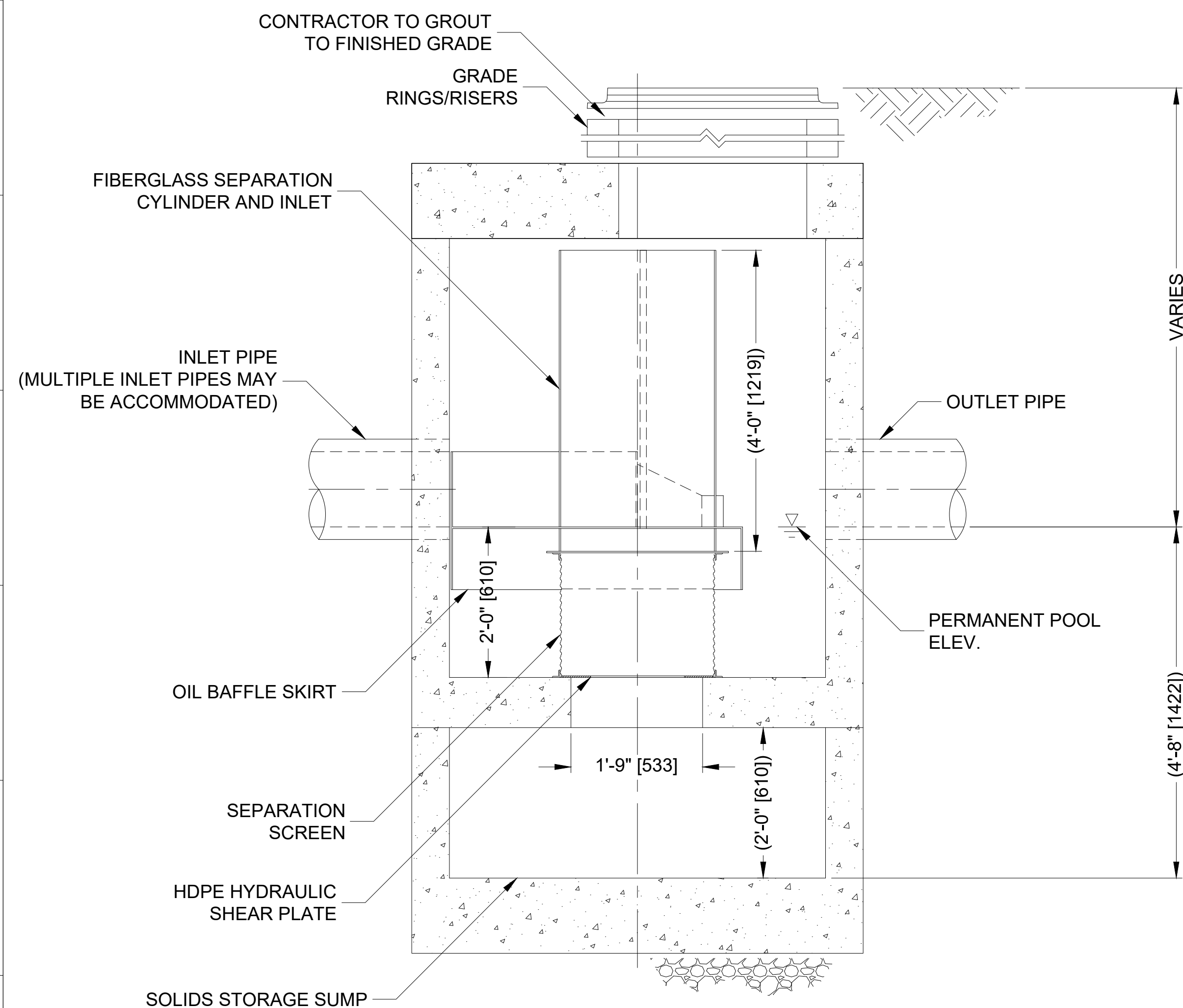
1. PRODUCT SHALL BE CONTECH CDS2015-5-C OR APPROVED SIMILAR
2. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
3. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
4. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
5. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND ASSHTO LOAD FACTOR DESIGN MENTION.

INSTALLATION NOTES:

1. SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD DURING SUBSEQUENT DETAILED DESIGN.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS STRUCTURE.
3. CONTRACTOR TO INSTALL JOIN SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPES. MATCH INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.



**PLAN VIEW B-B**  
N.T.S.



**ELEVATION A-A**  
N.T.S.

1

HYDRODYNAMIC SEPARATOR (HDS-1) - CONTECH CDS2015-5 (OR APPROVED SIMILAR)

N.T.S.

| Issue | Date       | Revisions                         |
|-------|------------|-----------------------------------|
| A     | 9/22/23    | DRAFT ISSUED FOR REVIEW           |
| B     | 9/28/23    | CONSTRAINT MAPPING                |
| C     | 8/21/24    | 10% DESIGN SUBMISSION             |
| D     | 9/13/24    | 30% DESIGN DRAFT                  |
| E     | 11/01/24   | ISSUED FOR ISO-NE SIS APPLICATION |
| F     | 02/28/2025 | 30% DESIGN                        |
| G     | 03/18/2025 | 30% DESIGN REVISION               |

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Client

MORAGA STORAGE LLC

Job Title

MORAGA STORAGE  
ZOVL - Oakham, MA

Seal

NOT FOR  
CONSTRUCTION

Drawing Title

CIVIL DETAIL  
SHEET 7

Scale NTS

NTS

File Name C8-01.DWG

C8-01.DWG

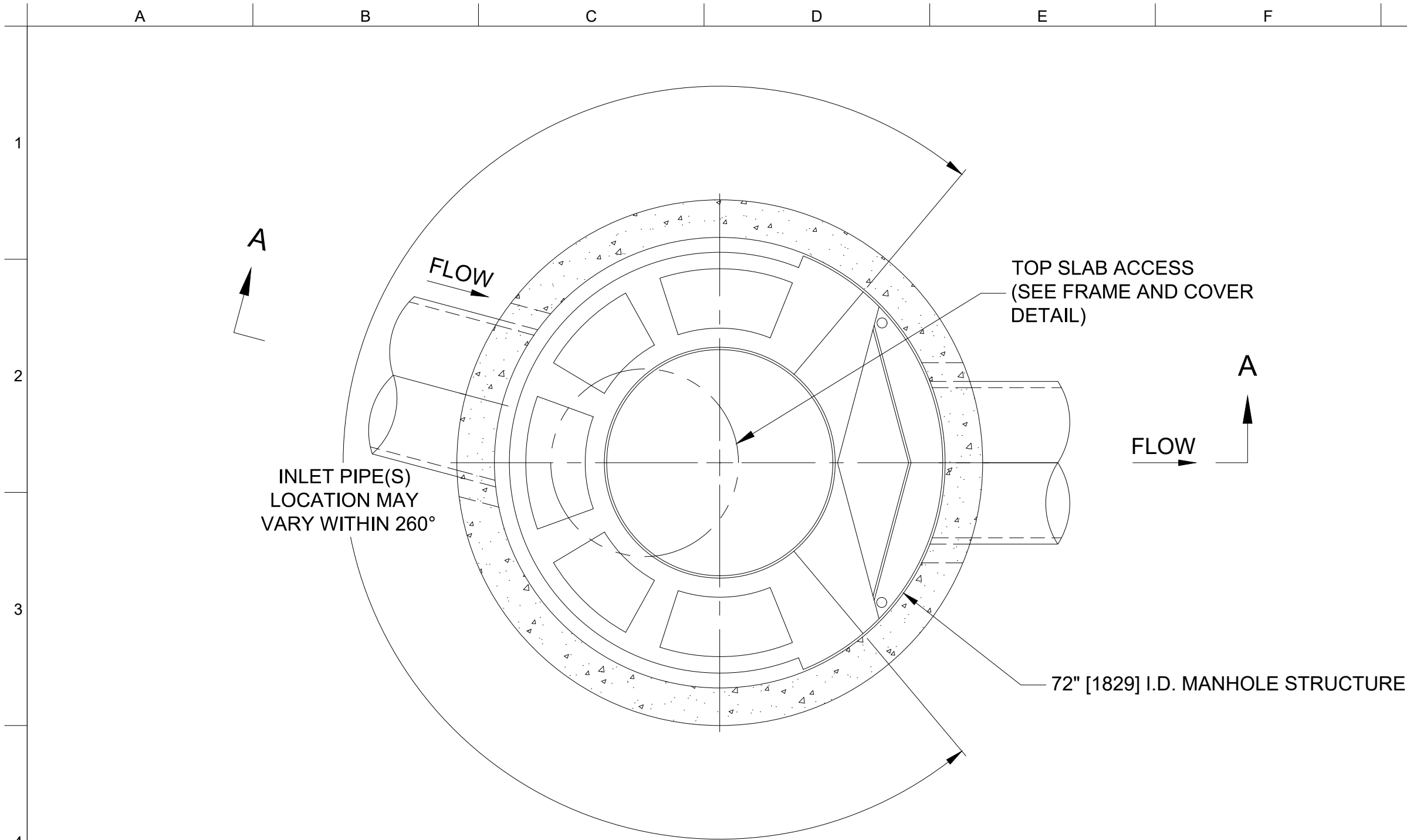
Drawing Status

### % DESIGN DRAWINGS

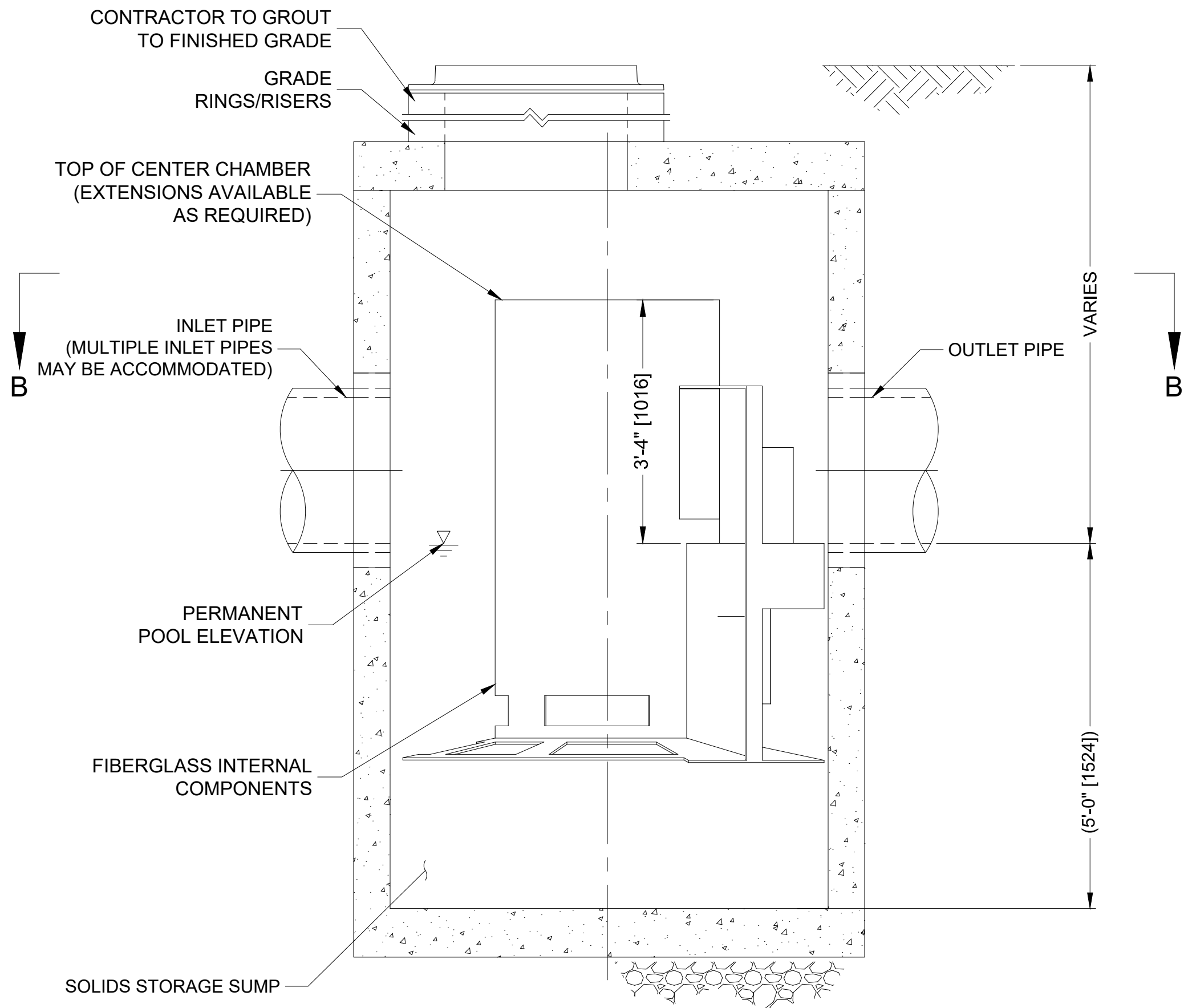
Job No  
296229-00

|            |       |
|------------|-------|
| Drawing No | C8-07 |
|------------|-------|

|       |   |
|-------|---|
| Issue | G |
|-------|---|



PLAN VIEW B-B  
NOT TO SCALE



ELEVATION A-A  
NOT TO SCALE

1 HYDRODYNAMIC SEPARATOR (HDS-2) - CONTECH CS-6 (OR APPROVED SIMILAR)  
N.T.S.

## CASCADE SEPARATOR DESIGN NOTES

CS-6 RATED TREATMENT CAPACITY IS 5.6 CFS, OR PER LOCAL REGULATIONS.

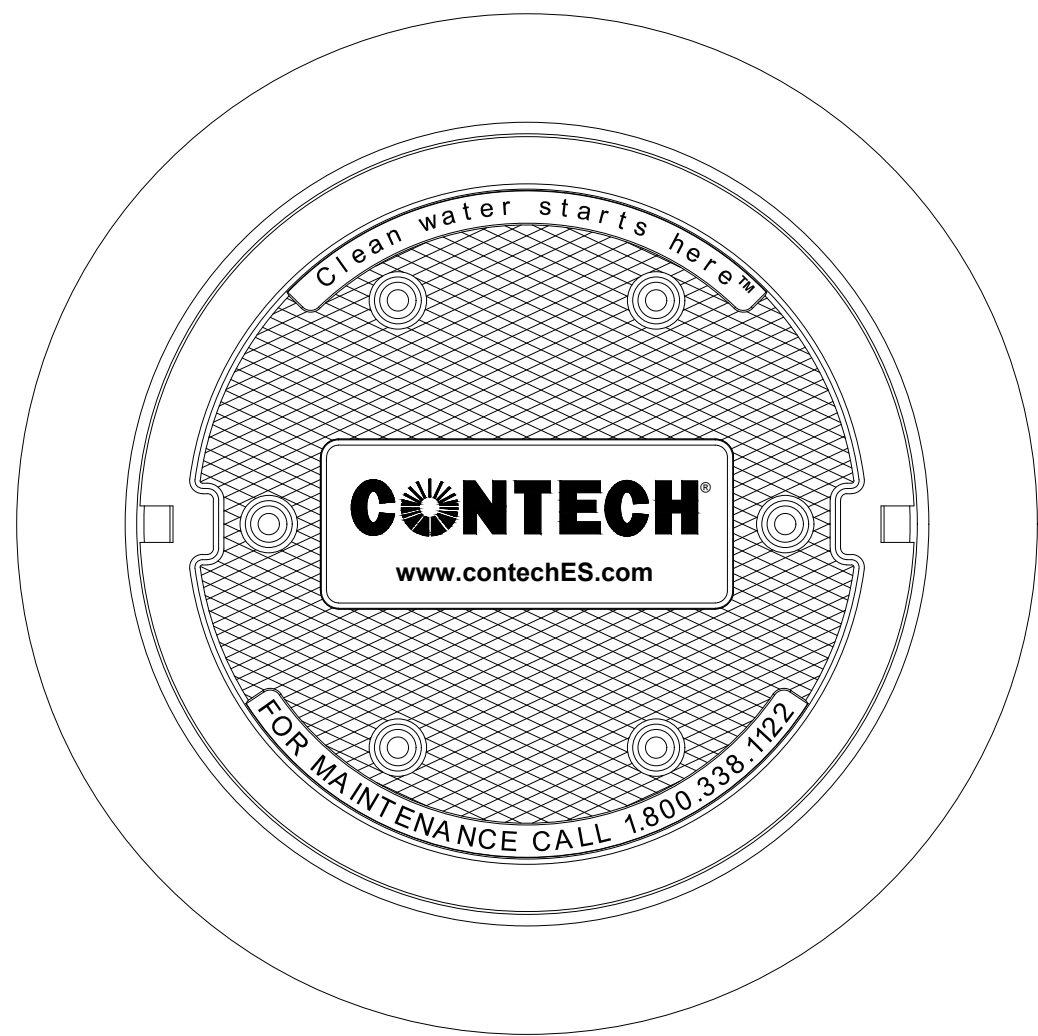
THE STANDARD CS-6 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

### CONFIGURATION DESCRIPTION

- GRATED INLET ONLY (NO INLET PIPE)
- GRATED INLET WITH INLET PIPE OR PIPES
- CURB INLET ONLY (NO INLET PIPE)
- CURB INLET WITH INLET PIPE OR PIPES

## SITE SPECIFIC DATA REQUIREMENTS

|                                  |       |
|----------------------------------|-------|
| STRUCTURE ID                     | HDS-2 |
| WATER QUALITY FLOW RATE (cfs)    | 2.32  |
| PEAK FLOW RATE (cfs)             | 23.03 |
| RETURN PERIOD OF PEAK FLOW (yrs) | 100   |



FRAME AND COVER  
(DIAMETER VARIES)  
N.T.S.

### GENERAL NOTES:

- PRODUCT SHALL BE CONTECH CS-6 OR APPROVED SIMILAR
- CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
- STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
- IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND ASSHTO LOAD FACTOR DESIGN MENTION.

### INSTALLATION NOTES:

- SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD DURING SUBSEQUENT DETAILED DESIGN.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CS STRUCTURE.
- CONTRACTOR TO INSTALL JOIN SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPES. MATCH INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- CONTRACTOR TO TAKE APPROPRIATE MEASURERS TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM.

| Issue | Date       | Revisions                         |
|-------|------------|-----------------------------------|
| A     | 9/22/23    | DRAFT ISSUED FOR REVIEW           |
| B     | 9/28/23    | CONSTRAINT MAPPING                |
| C     | 8/21/24    | 10% DESIGN SUBMISSION             |
| D     | 9/13/24    | 30% DESIGN DRAFT                  |
| E     | 11/01/24   | ISSUED FOR ISO-NE SIS APPLICATION |
| F     | 02/28/2025 | 30% DESIGN                        |
| G     | 03/18/2025 | 30% DESIGN REVISION               |

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Client

MORAGA STORAGE LLC

Job Title

MORAGA STORAGE  
ZOVL - Oakham, MA

Seal

NOT FOR  
CONSTRUCTION

Drawing Title

CIVIL DETAIL  
SHEET 8

Scale

NTS

File Name

C8-01.DWG

Drawing Status

30% DESIGN DRAWINGS

Job No

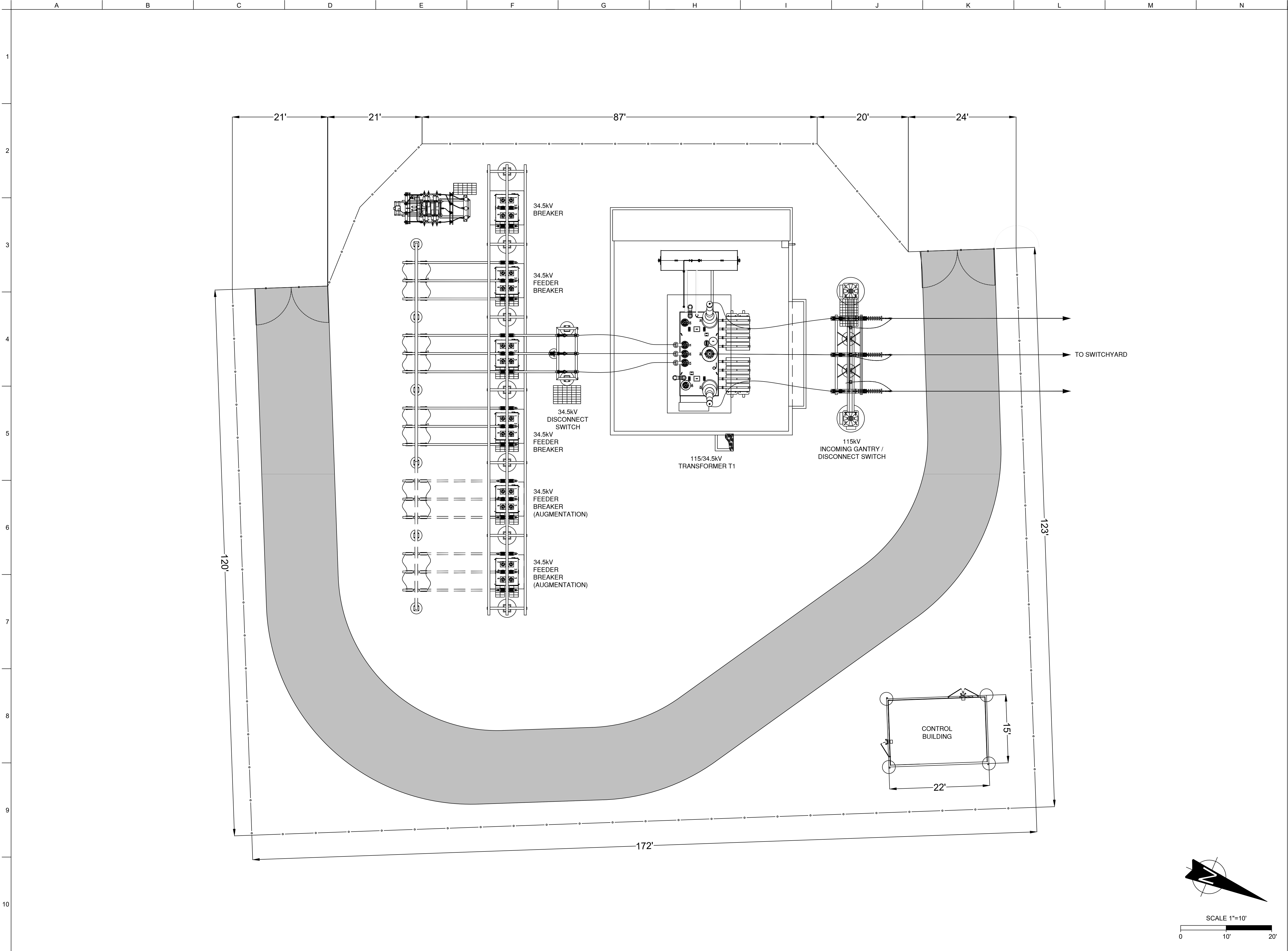
296229-00

Drawing No

C8-08

Issue

G



| Revisions |          |                       |
|-----------|----------|-----------------------|
| Rev #     | Date     | Description           |
| A         | 02/19/25 | ISSUED FOR DISCUSSION |
| B         | 02/27/25 | ISSUED FOR DISCUSSION |
|           |          |                       |
|           |          |                       |

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Job Title

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Oakham, MA

FOR REVIEW

NOT FOR  
CONSTRUCTION

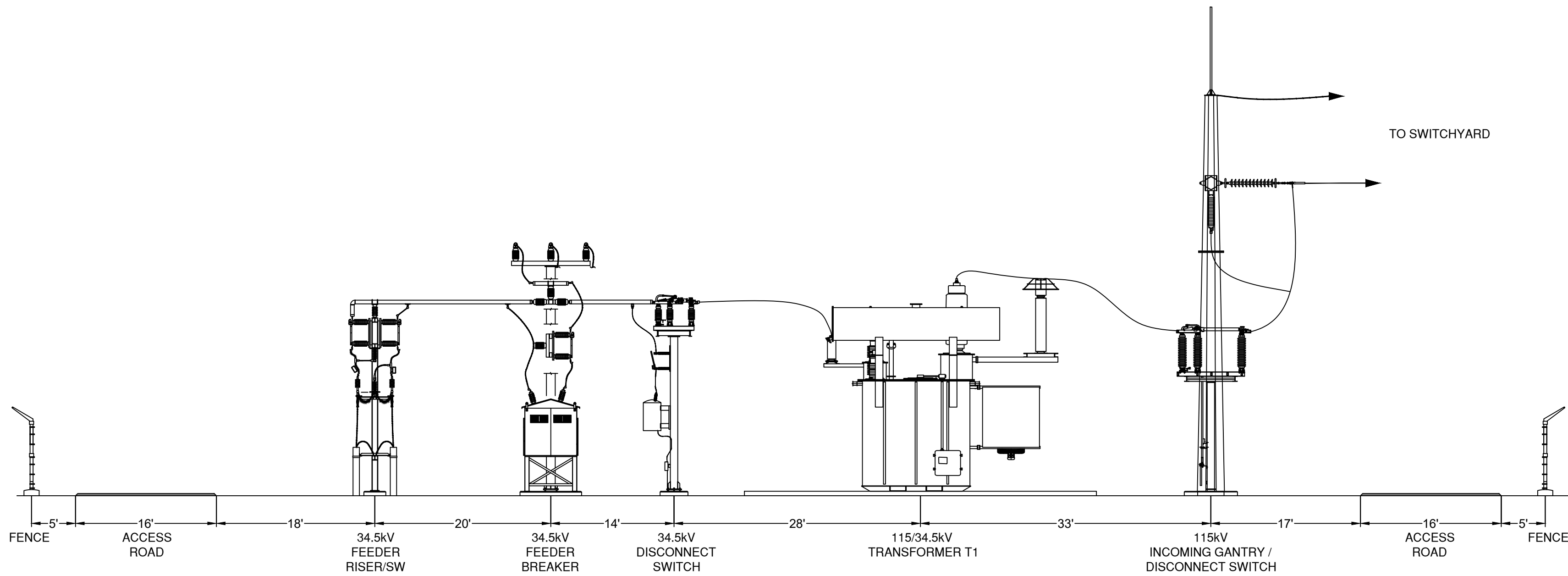
Drawing Title

MORAGA STORAGE  
SUBSTATION GENERAL  
ARRANGEMENT

Scale 1" = 10'

Job No  
296299

Drawing No  
E500



SCALE 1"=10'

010'20'

| Revisions |          |                       |
|-----------|----------|-----------------------|
| Rev #     | Date     | Description           |
| A         | 02/19/25 | ISSUED FOR DISCUSSION |
| B         | 02/27/25 | ISSUED FOR DISCUSSION |
|           |          |                       |
|           |          |                       |

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Job Title

MORAGA STORAGE  
Oakham, MA

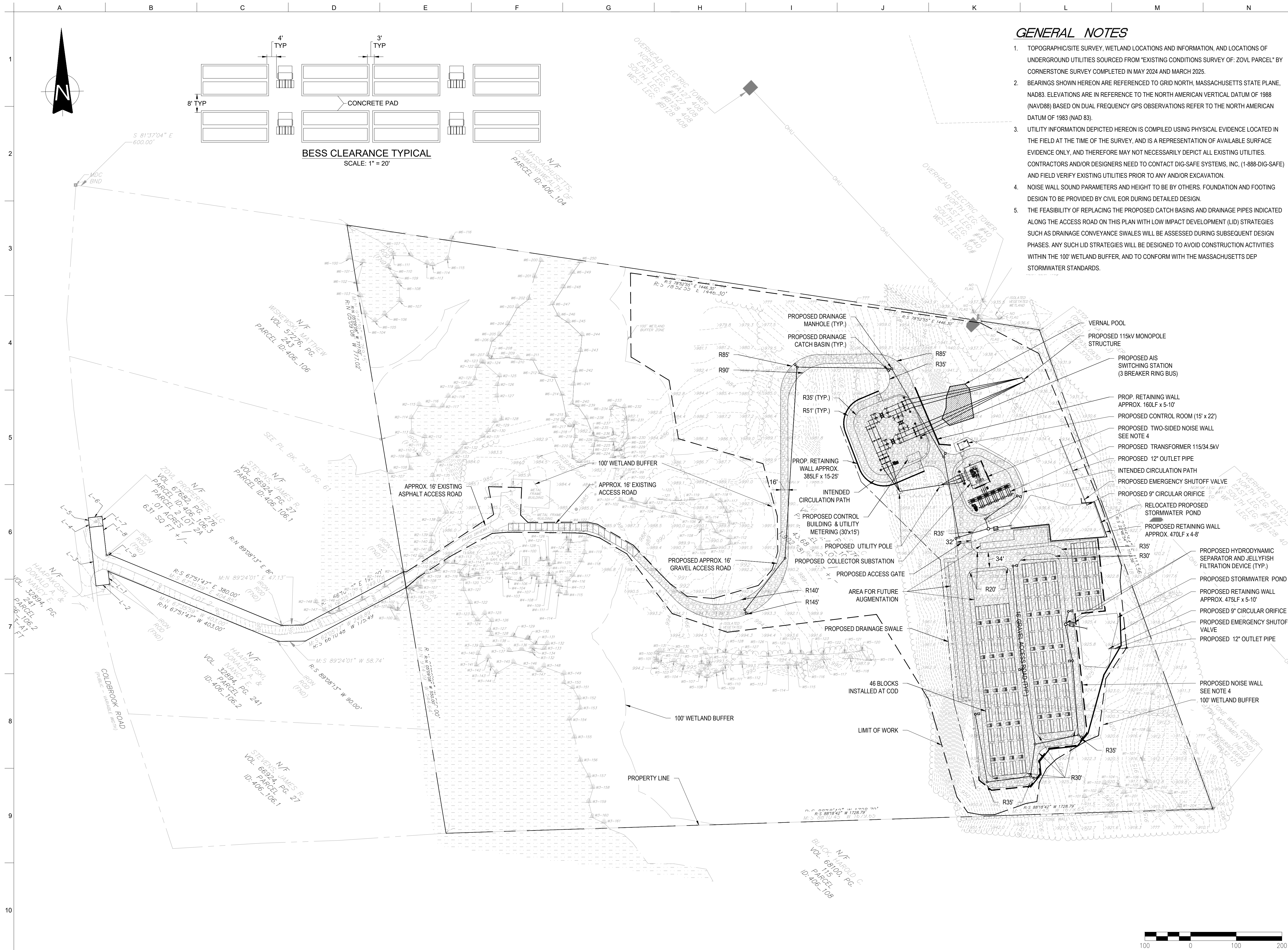
FOR REVIEW

NOT FOR  
CONSTRUCTION

Drawing Title

MORAGA STORAGE  
SUBSTATION  
SECTION VIEW

| Scale  |            | 1" = 10' |
|--------|------------|----------|
| Job No | Drawing No |          |
| 296299 | E501       |          |



### GENERAL NOTES

- TOPOGRAPHIC/SITE SURVEY, WETLAND LOCATIONS AND INFORMATION, AND LOCATIONS OF UNDERGROUND UTILITIES SOURCED FROM "EXISTING CONDITIONS SURVEY OF: ZOVLF PARCEL" BY CORNERSTONE SURVEY COMPLETED IN MAY 2024 AND MARCH 2025.
- BEARINGS SHOWN HEREON ARE REFERENCED TO GRID NORTH, MASSACHUSETTS STATE PLANE, NAD83. ELEVATIONS ARE IN REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) BASED ON DUAL FREQUENCY GPS OBSERVATIONS REFER TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83).
- UTILITY INFORMATION DEPICTED HEREON IS COMPILED USING PHYSICAL EVIDENCE LOCATED IN THE FIELD AT THE TIME OF THE SURVEY, AND IS A REPRESENTATION OF AVAILABLE SURFACE EVIDENCE ONLY, AND THEREFORE MAY NOT NECESSARILY DEPICT ALL EXISTING UTILITIES. CONTRACTORS AND/OR DESIGNERS NEED TO CONTACT DIG-SAFE SYSTEMS, INC. (1-888-DIG-SAFE) AND FIELD VERIFY EXISTING UTILITIES PRIOR TO ANY AND/OR EXCAVATION.
- NOISE WALL SOUND PARAMETERS AND HEIGHT TO BE BY OTHERS. FOUNDATION AND FOOTING DESIGN TO BE PROVIDED BY CIVIL EOR DURING DETAILED DESIGN.
- THE FEASIBILITY OF REPLACING THE PROPOSED CATCH BASINS AND DRAINAGE PIPES INDICATED ALONG THE ACCESS ROAD ON THIS PLAN WITH LOW IMPACT DEVELOPMENT (LID) STRATEGIES SUCH AS DRAINAGE CONVEYANCE SWALES WILL BE ASSESSED DURING SUBSEQUENT DESIGN PHASES. ANY SUCH LID STRATEGIES WILL BE DESIGNED TO AVOID CONSTRUCTION ACTIVITIES WITHIN THE 100' WETLAND BUFFER, AND TO CONFORM WITH THE MASSACHUSETTS DEP STORMWATER STANDARDS.

| Issue | Date       | Revisions                         |
|-------|------------|-----------------------------------|
| A     | 9/22/23    | DRAFT ISSUED FOR REVIEW           |
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| E     | 11/01/24   | ISSUED FOR ISO-NE SIS APPLICATION |
| F     | 02/28/2025 | 30% DESIGN                        |
| G     | 03/18/2025 | 30% DESIGN REVISION               |
| H     | 11/14/2025 | SITE PLAN ALTERNATIVE             |
| I     | 12/16/2025 | SITE PLAN ALTERNATIVE             |

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Job Title

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ZOVLF - Oakham, MA

Seal

NOT FOR  
CONSTRUCTION

Drawing Title

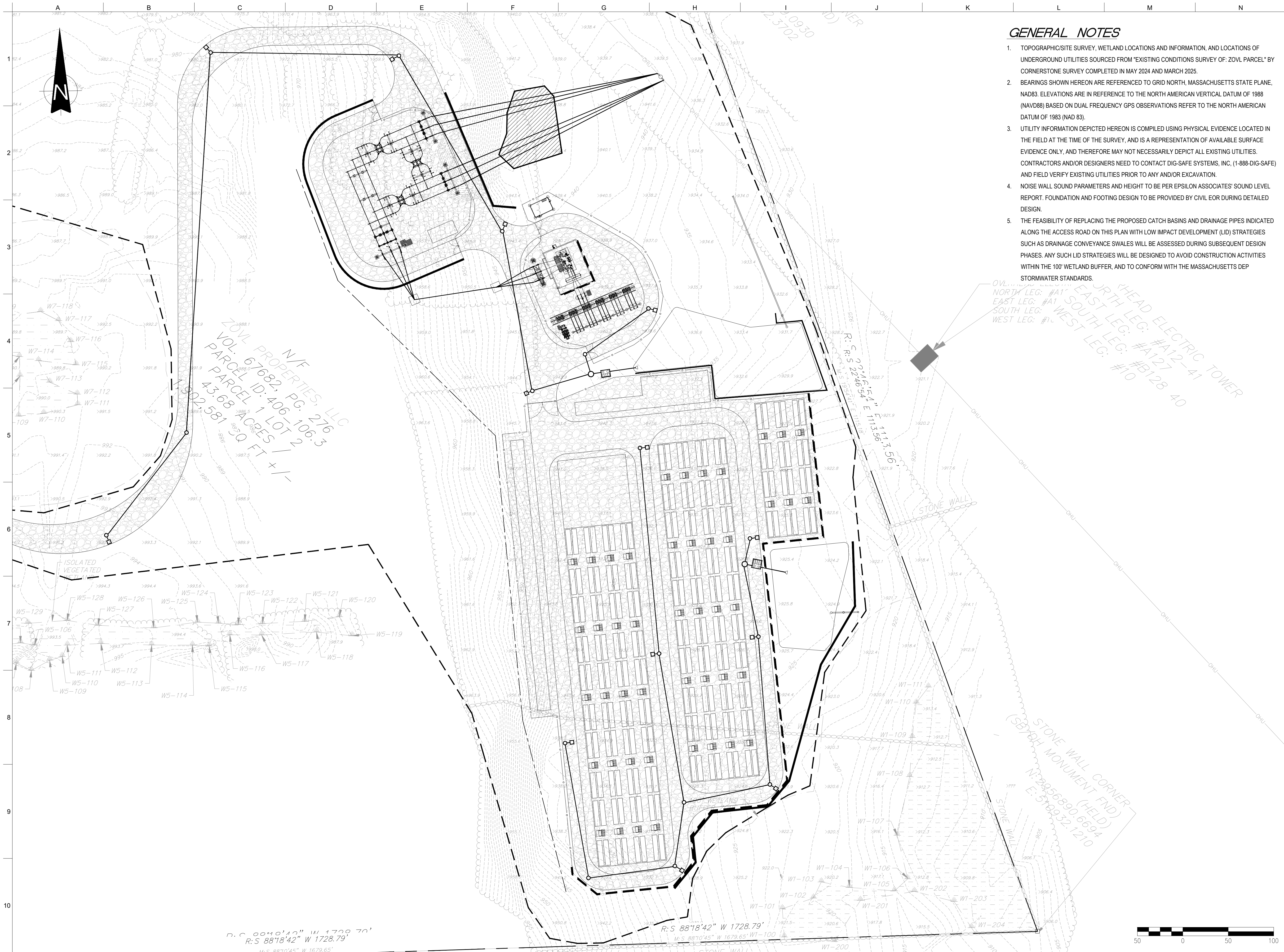
CIVIL SITE PLAN

Scale  
1" = 100'

File Name  
C2-01 - VERNAL POOL ALTERNATE.V3.DWG

Drawing Status  
30% DESIGN DRAWINGS

| Job No    | Drawing No | Issue |
|-----------|------------|-------|
| 296229-00 | C2-01      | I     |



| Issue | Date       | Revisions                         |
|-------|------------|-----------------------------------|
| A     | 9/22/23    | DRAFT ISSUED FOR REVIEW           |
| B     | 9/28/23    | CONSTRAINT MAPPING                |
| C     | 8/21/24    | 10% DESIGN SUBMISSION             |
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| F     | 02/28/2025 | 30% DESIGN                        |
| G     | 03/18/2025 | 30% DESIGN REVISION               |
| H     | 11/14/2025 | SITE PLAN ALTERNATIVE             |
| I     | 12/16/2025 | SITE PLAN ALTERNATIVE             |

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Job Title

MORAGA STORAGE  
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Seal

NOT FOR  
CONSTRUCTION

Drawing Title

CIVIL SITE PLAN

Scale

1" = 50'

File Name

C2-01 - VERNAL POOL ALTERNATE.V3.DWG

Drawing Status

30% DESIGN DRAWINGS

Job No

296229-00

Drawing No

C2-02

Issue

I