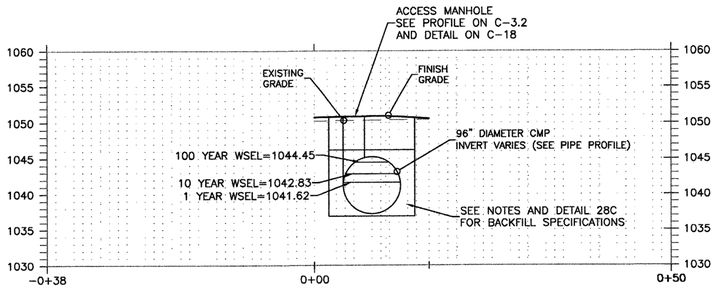


CROSS SECTION A–A

SCALE: 1"=10' HORIZ.

1" = 10' VERT.

DETENTION PIPE SPECIFICATIONS

DETENTION PIPE SHALL BE 96" DIAMETER, 14 GAUGE, ALUMINIZED CORRUGATED STEEL PIPE (CMP).

4'–FOOT MINIMUM HEIGHT OF COVER REQUIRED FOR CONSTRUCTION LOADS.

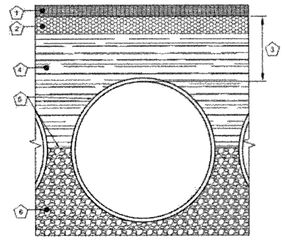
BEDDING AND BACKFILL OF PIPE SHALL FOLLOW MANUFACTURER'S DETAIL (SEE '28C – DETENTION PIPE BEDDING"),

INSTALLATION AND COMPACTION SHALL FOLLOW RECOMMENDATIONS OF SITE GEOTECHNICAL REPORT.

SEGMENTS OF PIPE SHALL BE CONNECTED USING H–12 HUGGER BANDS WITH O–RING GASKETS (SEE DETAIL).

NOTE: SITE GEOTECHNICAL INVESTIGATION INCLUDED SEVERAL BORINGS RANGING IN DEPTHS FROM 10 TO 20 FEET BELOW EXISTING GRADE. NONE OF THE BORINGS ENCOUNTERED GROUNDWATER. PIPE BUOYANCY WILL NOT AFFECT THE PROPOSED DETENTION PIPE.

UNDERGROUND DETENTION PIPE 28H



1.) RIGID OR FLEXIBLE PAVEMENT

2.) GRANULAR ROAD BASE

3.) 12" MIN. FOR DIAMETERS THROUGH 96"
18" MIN. FOR DIAMETERS FROM 102"
AND LARGER MEASURED TO TOP OF
RIGID OR BOTTOM OF FLEXIBLE
PAVEMENT.

4.) WELL-GRADED GRANULAR FILL MATERIAL FROM SPRINGLINE UP TO BE COMPACTED TO MIN. 90% STANDARD DENSITY PER AASHTO T-99.)

5.) CONTECH C40 NONWOVEN GEOTEXTILE TO PREVENT SOIL MIGRATION.

6.) RELATIVELY LOOSE GRANULAR BEDDING, ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, FROM SPRINGLINE OF PIPE TO 4"-6" BELOW BOTTOM OF PIPE. (STONE OR OTHER SUITABLE GRANULAR MATERIAL).

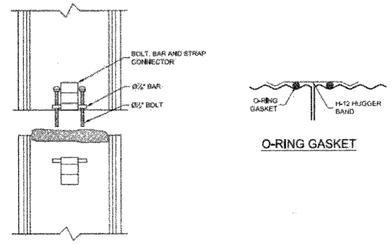
FOUNDATION/BEDDING PREPARATION

PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE 4 INCHES OF A WELL-GRADED GRANULAR MATERIAL SHALL BE PLACED AS THE BEDDING.

BACKFILL

THE BACKFILL SHALL BE AN A1, A2 OR A3 GRANULAR FILL PER AASHTO M-145 OR A WELL-GRADED GRANULAR FILL AS APPROVED BY THE ENGINEER (SEE INSTALLATION GUIDELINES). THE MATERIAL SHALL BE PLACED IN HIGH LOOSE LIFTS AND COMPACTED TO 90% AASHTO T99 STANDARD PROCTOR DENSITY. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16') DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

1/3 BACKFILL DETAIL
SCALE: N.T.S.



O-RING GASKET

CONNECTION DETAIL
SINGLE BOLT, BAR AND STRAP

GENERAL NOTES

1. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
12" THRU 48", 1-PIECE
54" THRU 96", 2-PIECE
102" THRU 144", 3-PIECES
2. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS.
3. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2 5/8" x 1/2". DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES

2/3 H-12 HUGGER BAND DETAIL
SCALE: N.T.S.

DETENTION PIPE BEDDING 28C

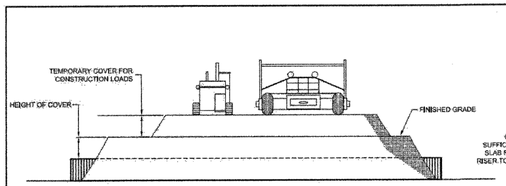
MARK	DATE	REVISION DESCRIPTION	BY

CONTECH CONSTRUCTION PRODUCTS INC.
www.contech-cpi.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7093 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH PROPOSAL DRAWING

UNDERGROUND DETENTION SYSTEM - 000-001
CMP STANDARD DETAILS
SITE DESIGNATION: CMP

PROJECT NO.# 000 | ADS NO.# 001 | DATE 11/18/09
DESIGNED ATM | DRAWN ATM
CHECKED XXX | APPROVED XXX
SHEET NO.# 3 OF 4



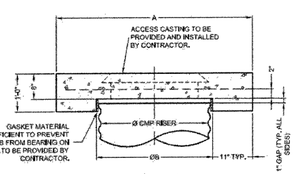
CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

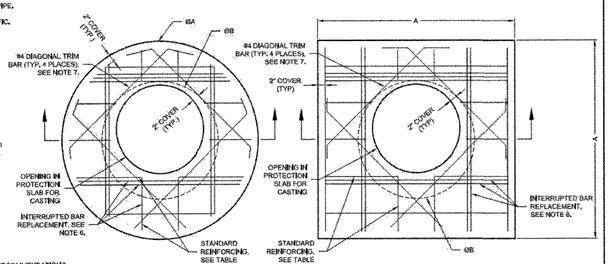
3/4 CONSTRUCTION LOADING DIAGRAM
SCALE: N.T.S.



SECTION VIEW

REINFORCING TABLE				
Ø CMP RISER	A	Ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	Ø 6' 4"x4"	28"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,760
30"	Ø 6'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	Ø 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	Ø 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	Ø 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW

SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS. EXTEND BARS A MINIMUM OF 12" BEYOND OPENING. BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

4/4 MANHOLE CAP DETAIL
SCALE: N.T.S.

SPECIFICATION FOR CORRUGATED STEEL PIPE-ALUMINIZED TYPE 2 STEEL

SCOPE:

THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED STEEL PIPE (CSP) DETAILED IN THE PROJECT PLANS.

MATERIAL

THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M274 OR ASTM A929.

PIPE

THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M36 OR ASTM A760. THE PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

HANDLING AND ASSEMBLY

SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS OF THE NATIONAL CORRUGATED STEEL PIPE ASSOCIATION (NCSPA).

INSTALLATION

SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A798 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

POND ACCESS MANHOLE 23F

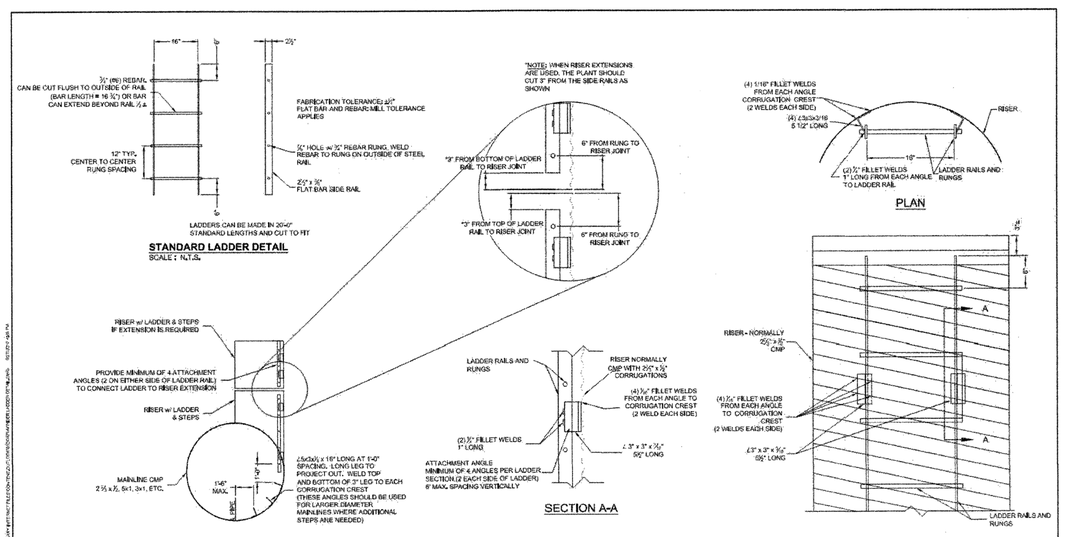
MARK	DATE	REVISION DESCRIPTION	BY

CONTECH CONSTRUCTION PRODUCTS INC.
www.contech-cpi.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7093 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH PROPOSAL DRAWING

UNDERGROUND DETENTION SYSTEM - 000-001
CMP STANDARD DETAILS
SITE DESIGNATION: CMP

PROJECT NO.# 000 | ADS NO.# 001 | DATE 11/18/09
DESIGNED ATM | DRAWN ATM
CHECKED XXX | APPROVED XXX
SHEET NO.# 4 OF 4



STANDARD LADDER DETAIL
SCALE : N.T.S.

1/F2 RISER LADDER DETAIL
SCALE: N.T.S.

NOTE:
THIS DRAWING IS INTENDED TO APPLY TO LADDERS INSTALLED IN RISERS HAVING A DIAMETER OF 90" OR LARGER, DUE TO SPACE CONSTRAINTS AND LIMITED ACCESSIBILITY, THE PRACTICALITY AND SUITABILITY OF UTILIZING RISERS SMALLER THAN 90" DIAMETER AND/OR INCORPORATING LADDERS IN THESE SMALLER DIAMETER RISERS SHOULD BE ADDRESSED BY THE OWNER AND PROJECT ENGINEER.

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7093 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH FABRICATION DRAWING

STANDARD CMP
RISER LADDER DETAIL

PROJECT NO.# 000 | ADS NO.# | DATE 08/27/12
DESIGNED MW | DRAWN TPF
CHECKED XXX | APPROVED XXX
SHEET NO.# F1 OF 1

POND ACCESS MANHOLE (LADDER) 23F

SHEET NO. C-18

COMMONWEALTH OF VIRGINIA
JOHN M. NOLAND
Lic. No. 019570
PROFESSIONAL ENGINEER

JAN 11 2016

REV-4	12-07-15		
REA	GD	CB	CB
PRN	PM	DES	DRW
DATE			

DETAIL SHEET
WALMART SUPERCENTER #3243
4530 CHALLENGER AVENUE
ROANOKE VIRGINIA

GreenbergFarrow
1430 W. PEACHTREE ST. NW SUITE 200
ATLANTA, GA. 30309
PHONE (404) 347-3900
FAX (404) 347-3970
DWG NAME: ROANOKE VA
JOB NO.: 201305410

MURPHY OIL USA, INC.
200 PEACH STREET
P.O. BOX 7000
EL DORADO, AR 71730-7000
MURPHY USA