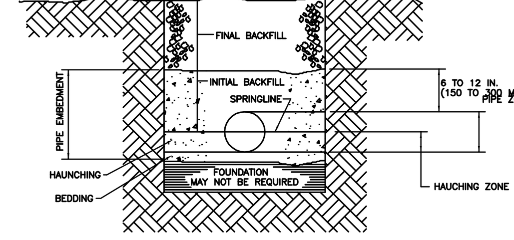
## CLASSES OF EMBEDMENT AND BACKFILL MATERIALS

| CLASS | TYPE | SOIL GROUP SYMBOL D 2487 | DESCRIPTION | PERCENTAGE PASSING SIEVE SIZES 1 1/2 IN. (40 MM) | NO. 4 (4.75 MM) | NO. 200 (0.075 MM) |
|---|---|---|---|---|---|---|
| IA | MANUFACTURED AGGREGATES OPEN–GRADED, CLEAN. | NONE | ANGULAR, CRUSHED STONE OR ROCK, CRUSHED GRAVEL, BROKEN CORAL, CRUSHED SLAG, CINDERS OR SHELLS: LARGE VOID CONTENT, CONTAIN LITTLE OR NO FINES. | 100 % | ≤10 % | <5 % |
| IB | MANUFACTURED, PROCESSED AGGREGATES; DENSE–GRADED, CLEAN | NONE | ANGULAR, CRUSHED STONE (OR OTHER CLASS IA MATERIALS) AND STONE/SAND MIXTURES WITH GRADATIONS SELECTED TO MINIMIZE MIGRATION OF ADJACENT SOILS; CONTAIN LITTLE OR NO FINES (SEE X1.8.). | 100 % | ≤50 % | <5 % |
| II | COARSE–GRAINED SOILS, CLEAN | GW | WELL–GRADED GRAVELS AND GRAVEL–SAND MIXTURES; LITTLE OR NO FINES. | 100 % | <50 % "COARSE FRACTION" | <5 % |
| | | GP | POORLY–GRADED GRAVELS AND GRAVEL–SAND MIXTURES; LITTLE OR NO FINES. | | | |
| | | SW | WELL–GRADED SANDS AND GRAVELY SANDS; LITTLE OR NO FINES. | | >50 % OF "COARSE FRACTION" | |
| | | SP | POORLY–GRADED SANDS AND GRAVEL SANDS; LITTLE OR NO FINES. | | | |
| | COARSE–GRAINED SOILS, BORDERLINE CLEAN TO W/FINES | E.G. GW–GC, SP–SM. | SANDS AND GRAVELS WHICH ARE BORDERLINE BETWEEN CLEAN AND WITH FINES. | 100 % | VARIES | 5 % TO 12 % |
| III | COARSE–GRAINED SOILS, WITH FINES | GM | SILTY GRAVELS, GRAVEL–SAND SILT MIXTURES. | 100 % | <50 % OF "COARSE FRACTION" | 12 % TO 50 % |
| | | GC | CLAYEY GRAVELS, GRAVEL–SAND–CLAY MIXTURES. | | | |
| | | SM | SILTY SANDS, SAND–SILT MIXTURES. | | >50 % OF "COARSE FRACTION" | |
| | | SC | CLAYEY SANDS, SAND–CLAY MIXTURES. | | | |




TRENCH CROSS SECTION SHOWING TERMINOLOGY

## TABLE 1

RECOMMENDATIONS FOR INSTALLATION AND USE OF SOILS AND AGGREGATES FOR FOUNDATION, EMBEDMENT AND BACKFILL

| | SOIL CLASS: CLASS IA | CLASS IB | CLASS II | CLASS III |
|---|---|---|---|---|
| GENERAL RECOMMENDATIONS AND RESTRICTIONS | DO NOTE USE WHERE CONDITIONS MAY CAUSE MIGRATION OF FINES FROM ADJACENT SOIL AND LOSS OF PIPE SUPPORT. SUITABLE FOR USE AS A DRAINAGE BLANKET AND UNDERDRAIN IN ROCK CUTS WHERE ADJACENT MATERIAL IS SUITABLY GRADED | PROCESS MATERIAL AS REQUIRED TO OBTAIN GRADATION WHICH WILL MINIMIZE MIGRATION OF ADJACENT MATERIALS SUITABLE FOR USE AS DRAINAGE BLANKET AND UNDERDRAIN. | WHERE HYDRAULIC GRADIENT EXISTS CHECK GRADATION TO MINIMIZE MIGRATION. "CLEAN" GROUPS SUITABLE FOR USE AS DRAINAGE BLANKET AND UNDERDRAIN. | DO NOT USE WHERE WATER CONDITIONS IN TRENCH MAY CAUSE INSTABILITY |
| FOUNDATION | SUITABLE AS FOUNDATION AND FOR REPLACING OVER–EXCAVATED AND UNSTABLE TRENCH BOTTOM AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS. | SUITABLE AS FOUNDATION AND FOR REPLACING OVER–EXCAVATED AND UNSTABLE TRENCH BOTTOM. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS. | SUITABLE AS FOUNDATION AND FOR REPLACING OVER–EXCAVATED AND UNSTABLE TRENCH BOTTOM AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS. | SUITABLE AS FOUNDATION AND FOR REPLACING OVER–EXCAVATED TRENCH BOTTOM AS RESTRICTED ABOVE. DO NOT USE IN THICKNESSES GREATER THAN 12 IN. TOTAL. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS |
| BEDDING | SUITABLE AS RESTRICTED ABOVE. INSTALL IN 6–IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND. MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS). | INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS LEVEL FINAL GRADE BY HAND. MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS). | SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS). | SUITABLE ONLY IN DRY TRENCH CONDITIONS. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND. MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS). |
| HAUNCHING | SUITABLE AS RESTRICTED ABOVE. INSTALL IN 6–IN. MAXIMUM LAYERS. WORK IN AROUND PIPE BY HAND TO PROVIDE UNIFORM SUPPORT | INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS WORK IN AROUND PIPE BY HAND TO PROVIDE UNIFORM SUPPORT. | SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND. MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS). | SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6–IN. MAXIMUM LAYERS. WORK AROUND PIPE BY HAND. TO PROVIDE UNIFORM SUPPORT |
| INITIAL BACKFILL | SUITABLE AS RESTRICTED ABOVE. INSTALL TO A MINIMUM OF 6 IN. ABOVE PIPE CROWN. | INSTALL AND COMPACT TO A MINIMUM OF 6 IN. ABOVE PIPE CROWN | SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT TO A MINIMUM OF 6 IN. ABOVE PIPE CROWN. | SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT TO A MINIMUM OF 6 IN. ABOVE PIPE CROWN. |
| EMBEDMENT COMPACTION [B] | PLACE AND WORK BY HAND TO INSURE ALL EXCAVATED VOIDS AND HAUNCH AREAS ARE FILLED. FOR HIGH DENSITIES USE VIBRATORY COMPACTORS. | MINIMUM DENSITY 85 % STD. PROCTOR[C] USE HAND TAMPERS OR VIBRATORY COMPACTORS. | MINIMUM DENSITY 85 % STD. PROCTOR[C] USE HAND TAMPERS OR VIBRATORY COMPACTORS. | MINIMUM DENSITY 90 % STD. PROCTOR[C] USE HAND TAMPERS OR VIBRATORY COMPACTORS. MAINTAIN MOISTURE CONTENT NEAR OPTIMUM TO MINIMIZE COMPACTIVE EFFORT. |
| FINAL BACKFILL | COMPACT AS REQUIRED BY THE ENGINEER. | COMPACT AS REQUIRED BY THE ENGINEER. | COMPACT AS REQUIRED BY THE ENGINEER. | COMPACT AS REQUIRED BY THE ENGINEER. |

[B] WHEN USING MECHANICAL COMPACTORS AVOID CONTACT WITH PIPE. WHEN COMPACTING OVER PIPE CROWN MAINTAIN A MINIMUM OF 6 IN. COVER WHEN USING SMALL MECHANICAL COMPACTORES. WHEN USING LARGER COMPACTORS MAINTAIN MINIMUM CLEARANCES AS REQUIRED BY THE ENGINEER.
THE MINIMUM DENSITIES GIVEN IN THE TABLE ARE INTEDED AS THE COMPATION REQUIREMENTS FOR OBTAINING SATISFACTORY EMBEDMENT STIFFNESS IN MOST INSTALLATION CONDITIONS.

GENERAL NOTES:

1. MATERIALS: UNLESS OTHERWISE SPECIFIED ON THE PLANS OR HEREIN, CORRUGATED POLYETHYLENE PIPE SHALL CONFORM TO AASHTO M–294, LATEST EDITION, STANDARD SPECIFICATION FOR CORRUGATED POLYETHYLENE PIPE.
2. RESINS: CORRUGATED POLYETHYLENE PIPE SHALL BE MANUFACTURED FROM HIGH DENSITY POLYETHYLENE VIRGIN COMPOUNDS, AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM D–3350 FOR THE CELL CLASSIFICATION 335420C.
3. COUPLING BANDS: EXCEPT AS OTHERWISE REQUIRED HEREIN, COUPLING BANDS AND OTHER HARDWARE FOR CORRUGATED POLYETHYLENE PIPE SHALL DEMONSTRATE THAT THEY MEET THE SOIL TIGHTNESS REQUIREMENTS OF AASHTO SECTION 26.4.2.4 "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES."

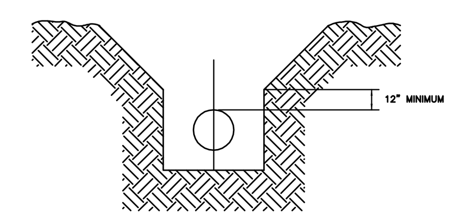
   COUPLING BANDS SHALL LAP EQUALLY ON EACH OF THE PIPES BEING CONNECTED TO FORM A TIGHTLY CLOSED JOINT AFTER INSTALLATION.

   THE CORRUGATIONS IN THE BAND SHALL INDEX THE CORRUGATIONS IN THE PIPE ENDS TO ENGAGE THE FIRST OR SECOND CORRUGATION FROM THE END OF EACH PIPE.

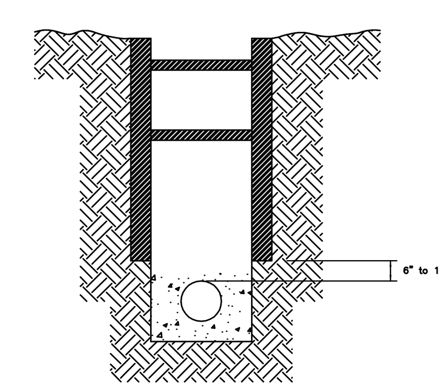
   WHEN INFILTRATION OF EXFILTRATION IS A CONCERN, THE COUPLING MAY BE REQUIRED TO HAVE GASKETS. THE GASKET MATERIAL SHALL BE CLOSED–CELL EXPANDED RUBBER OR NEOPRENE.
4. DESIGNATION OF TYPE: THE PIPE MAY BE ONE OR BOTH OF THE FOLLOWING TYPE

   TYPE S: THIS PIPE WILL HAVE A FULL CIRCULAR CROSS–SECTION, WITH AN OUTER CORRUGATED PIPE WALL AND A SMOOTH INNER LINER.

   TYPE D: THIS PIPE SHALL CONSIST OF AN ESSENTIALLY SMOOTH WATERWAY BRACED CIRCUMFERENTIALLY WITH CIRCULAR RIBS WHICH ARE FORMED SIMULTANEOUSLY WITH A SMOOTH OUTER WALL.
5. INSTALLATION: CORRUGATED POLYETHYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH TABLE 1 AND ASTM D–2321, LATEST EDITION, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS."




TRENCH EXCAVATION PER OSHA REQUIREMENTS




TRENCH CROSS SECTION SHOWING TRENCH BOX DETAIL

### RECOMMENDED TRENCH WIDTH

| DIAMETER | O.D. | TRENCH WIDTH |
|---|---|---|
| 12" | 14.45" | 31" |
| 15" | 17.65" | 34" |
| 18" | 21.10" | 39" |
| 24" | 28.30" | 48" |
| 30" | 36.10" | 66" |
| 36" | 42.25" | 78" |
| 42" | 47.00" | 83" |
| 48" | 53.00" | 89" |

The trench width must be wide enough to accomodate compaction equipment.

### MULTIPLE INSTALLATION OF POLYETHYLENE PIPES

| DIAMETER OF PIPE IN. | (MM) | CLEAR DISTANCES BETWEEN PIPES FT. | (M) |
|---|---|---|---|
| 18 | (450) | 1' 2" | (0.36) |
| 24 | (600) | 1' 5" | (0.44) |
| 30 | (750) | 1' 8" | (0.52) |
| 36 | (900) | 1' 11" | (0.60) |
| 42 | (1050) | 2' 2" | (0.68) |
| 48 | (1200) | 2' 5" | (0.76) |

### HIGH DENSITY CORRUGATED POLYETHYLENE PIPE HEIGHT OF COVER H–20 AND E–80 LIVE LOADS

| NOMINAL DIAMETER IN. | (MM) | MINIMUM COVER IN. & (MM) H–20 | E–80 | MAXIMUM COVER FT. | (M) |
|---|---|---|---|---|---|
| 12 | (300) | 12 (300) | 24 (600) | 58 | (18) |
| 15 | (375) | 12 (300) | 24 (600) | 59 | (18) |
| 18 | (450) | 12 (300) | 24 (600) | 62 | (19) |
| 24 | (600) | 12 (300) | 24 (600) | 61 | (19) |
| 30 | (750) | 12 (300) | 24 (600) | 61 | (19) |
| 36 | (900) | 12 (300) | 24 (600) | 61 | (19) |
| 42 | (1050) | 12 (300) | 24 (600) | 61 | (19) |
| 48 | (1200) | 12 (300) | 24 (600) | 61 | (19) |

STRUCTURAL DESIGN CALCULATIONS BASED UPON LOAD FACTOR DESIGN METHODOLOGY PER AASHTO.

| REQ'D | MAT'L | SHT | PART NO. | ITEM | DESCRIPTION |
|---|---|---|---|---|---|

ADS Advanced Drainage Systems Inc.

AASHTO INSTALLATION DETAILS

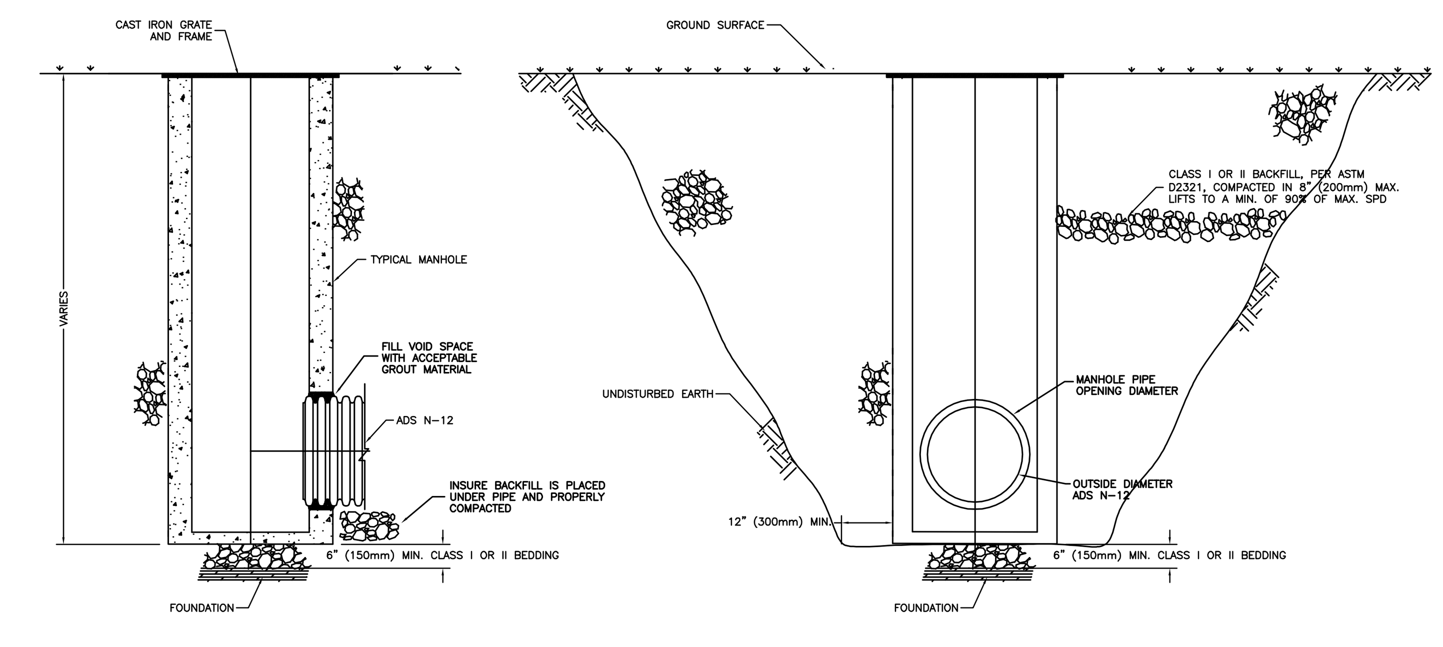
TOLERANCES: DECIMAL 0.00 ± .02; FT ' INCH " ± 1/16; DECIMAL 0.000 ± .005; FRACTIONAL ± 1/32; DECIMAL 0.0000 ± .0005; ANGULAR ± 1/2°

REVISIONS: NO. 1, 2, 3, 4, 5 — DATE — BY

DRAWN BY CAD. DEPT. — SCALE — MATERIAL
CHK'D D.Y. — DATE 5–5–94 — DRAWING NO. STD–104
DESIGNED BY A.D.S. — SHT. SIZE E

# GROUTED MANHOLE CONNECTION

FOR NON–WATERTIGHT APPLICATIONS ONLY




SIDE VIEW

TRENCH CROSS–SECTION

FILL VOID SPACE BETWEEN ADS PIPE AND MANHOLE OPENING WITH A NON–SHRINK GROUT MATERIAL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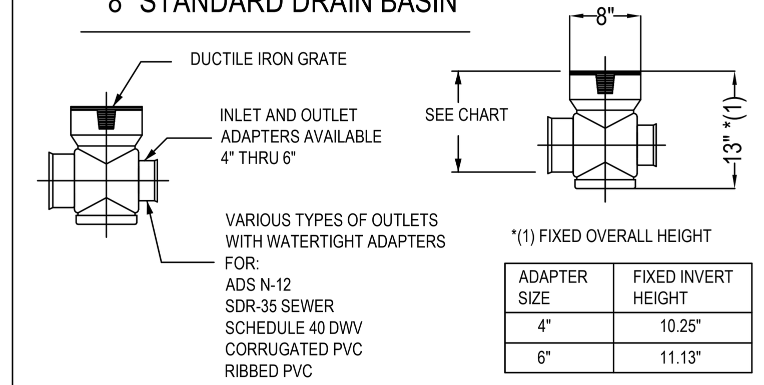
ADS ADVANCED DRAINAGE SYSTEMS, INC.

DRAWN BY K.M.J. 3–2–99 — APPROVED BY P.X.C. 3–2–99 — DRAWING # STD–201

REVISIONS: BY — DATE

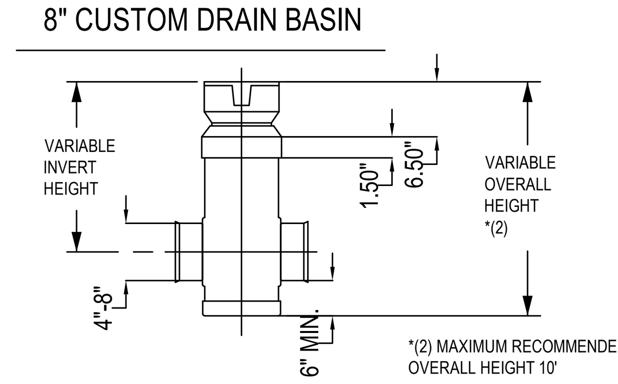
## 8" STANDARD DRAIN BASIN




*(1) FIXED OVERALL HEIGHT

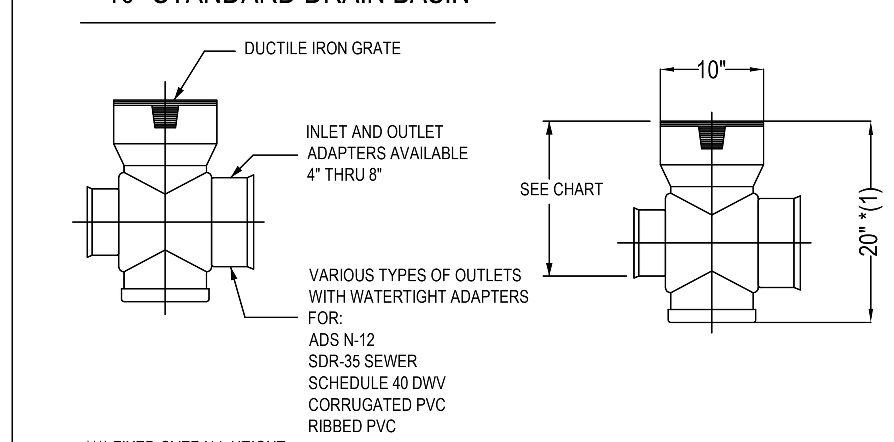
| ADAPTER SIZE | FIXED INVERT HEIGHT |
|---|---|
| 4" | 10.25" |
| 6" | 11.13" |

## 8" CUSTOM DRAIN BASIN




*(2) MAXIMUM RECOMMENDED OVERALL HEIGHT 10'

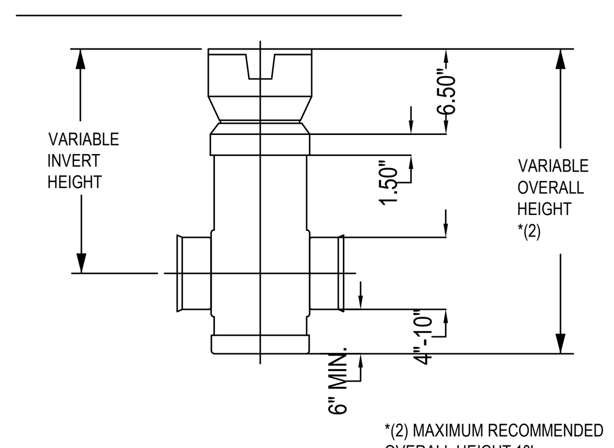
## 10" STANDARD DRAIN BASIN




*(1) FIXED OVERALL HEIGHT

| ADAPTER SIZE | FIXED INVERT HEIGHT |
|---|---|
| 4" | 13.75" |
| 6" | 14.62" |
| 8" | 15.62" |

## 10" CUSTOM DRAIN BASIN




*(2) MAXIMUM RECOMMENDED OVERALL HEIGHT 10'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DRAWN BY AWA — DATE 11AUG00 — MATERIAL
APPD BY CJA — DATE 11AUG00 — PROJECT NO./NAME DRAIN BASIN
DWG SIZE A — SCALE 1:120 — SHEET 1 OF 1


Nyloplast
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com


TITLE 8" & 10" DESIGN DETAILS
DWG NO. 7001-110-045 — REV B

Storm Sewer Extension to Serve

# Yard Drain Details

1811 N. Burns, Wichita, Kansas


kemiller engineering
516 S. Market,
Wichita, KS 67202
316/264–0242


| PROJECT NUMBER 660503 | | | SHEET 5 OF 7 |
|---|---|---|---|
| KEM NO. 04158 | FILE ADS Details | DATE 1/05 | |
| DESIGN pb | DRAWN pb | REVISED 3/2/05 | |