CIVIL ENGINEERING PLANS
FOR
SOUTHWEST CUSTER, LLC

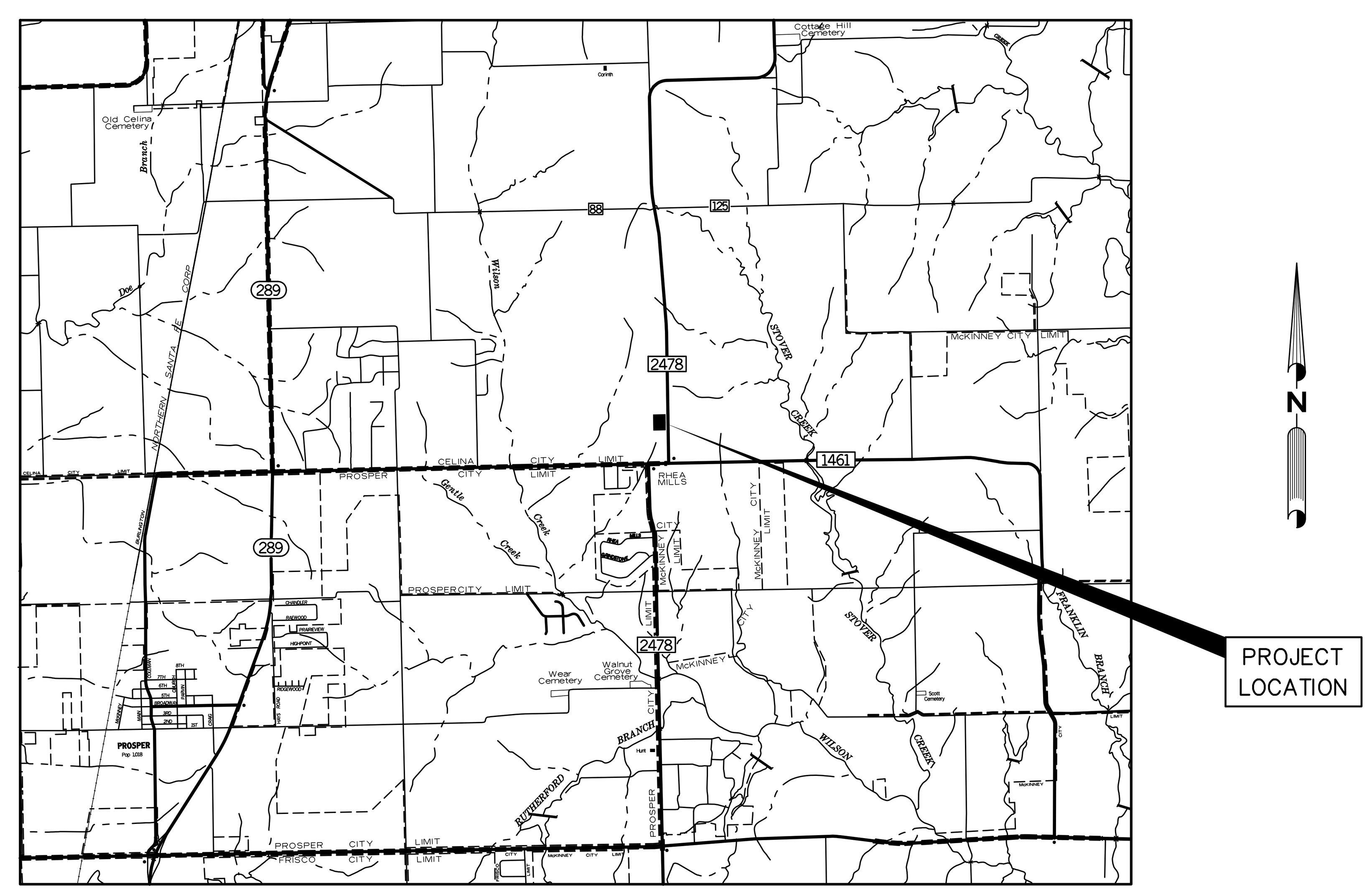
EDGEMON ADDITION
LOTS 1 & 2, BLOCK A
ETJ OF CELINA, COLLIN COUNTY, TEXAS

CITY OF CELINA
ENGINEERING DEPARTMENT
RELEASED FOR CONSTRUCTION
DATE 8/20/2014 BY ______

PRIOR TO CONSTRUCTION, THE OWNER OR THEIR REPRESENTATIVE SHALL NOTIFY THE CITY OF CELINA ENGINEERING DEPARTMENT AT 972-382-2682 x1081. CONSTRUCTION DRAWINGS STAMPED BY THE CITY OF CELINA SHALL BE ON THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION. THE CITY OF CELINA STANDARD SPECIFICATIONS FOR CONSTRUCTION SHALL TAKE PRECEDENCE OVER THESE PLANS WHENEVER IN CONFLICT THEREWITH. DISCLAIMER: ALL NECESSARY APPROVALS AND PERMITS SHALL BE ACQUIRED PRIOR TO CONSTRUCTION.

GENERAL NOTES:

1. THE ENGINEERING PLANS ARE DESIGNED TO AND SHALL BE CONSTRUCTED TO THE CITY OF CELINA, COLLIN COUNTY, THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS, AND TXDOT STANDARD DETAILS.
2. ALL EXISTING UTILITIES ARE SHOWN SCHEMATICALLY AND ARE FOR THE CONTRACTOR'S INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATION SIZE, AND MATERIAL OF ALL UTILITIES AFFECTED BY CONSTRUCTION PRIOR TO COMMENCEMENT. THE CONTRACTOR SHALL CONTACT ALL AFFECTED UTILITIES 48 HOURS PRIOR TO CONSTRUCTION.
3. ALL CONTRACTORS SHALL CONFINE THEIR ACTIVITIES TO THE WORK AREA. NO ENCROACHMENTS ONTO DEVELOPED OR UNDEVELOPED AREAS WILL BE ALLOWED. ANY DAMAGE RESULTING THERE FROM SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR.
4. ALL CONSTRUCTION AND MATERIALS TESTING SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CITY OF CELINA AND/OR COLLIN COUNTY STANDARDS AND SPECIFICATIONS.



LOCATION MAP

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SURVEYOR
NORTH TEXAS SURVEYING, LLC
1515 S. McDONALD STREET
SUITE 110
McKINNEY, TEXAS 75069
214-504-0933 (P)
214-504-0938 (F)

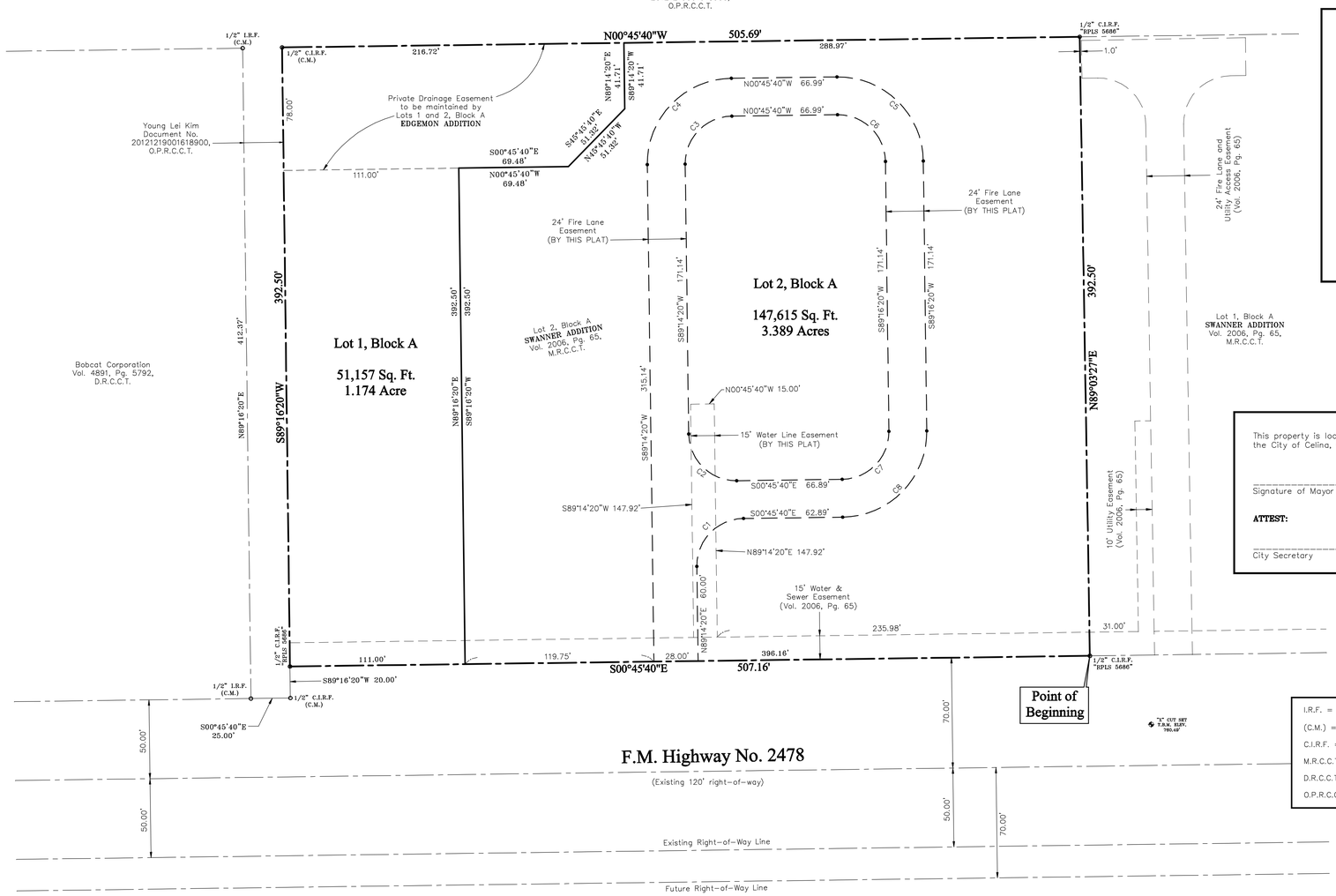
ENGINEER
CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE
SUITE 212
McKINNEY, TEXAS 75069
972-569-9193 (P)
972-569-9197 (F)
TEXAS FIRM NO. F-9356

OWNER / DEVELOPER
SOUTHWEST CUSTER, LLC
2203 AUGUSTA DRIVE
McKINNEY, TX 75070
214-882-5999 (P)
972-347-1871 (F)

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER
Trevor L. Castilla 8/14/14

FILENAME: G:\14002.00\Project\Design\Sheets\01 General\EDGE*COVER.dgn
PLOTTED: 8/14/2014

P-201405-01



Approved for preparation of final plat following construction of all public improvements (or appropriate sureties thereof) necessary for the subdivision shown on this plat.

RECOMMENDED BY:
Planning and Zoning Commission
City of Celina, Texas

_____ _____
Signature of Chairperson Date of Recommendation

APPROVED BY:
City Council
City of Celina, Texas

_____ _____
Signature of Mayor Date of Approval

ATTEST:

_____ _____
City Secretary Date

This property is located in the Extraterritorial Jurisdiction (E.T.J.) of the City of Celina, County, Texas.

_____ _____
Signature of Mayor Date of Approval

ATTEST:

_____ _____
City Secretary Date

ABBREVIATIONS

I.R.F. = Iron Rod Found
(C.M.) = Controlling Monument
C.I.R.F. = Capped Iron Rod Found
M.R.C.C.T. = Map Records, Collin County, Texas
D.R.C.C.T. = Deed Records, Collin County, Texas
O.P.R.C.C.T. = Official Public Records, Collin County, Texas

OWNER'S DEDICATION

STATE OF TEXAS §
COUNTY OF COLLIN §

WHEREAS, Southwest Custer, LLC, is the owner of a tract of land, situated in the Coleman Watson Survey, Abstract No. 945, in the Extra Territorial Jurisdiction (E.T.J.) of the City of Celina, Collin County, Texas and being all of Lot 2, Block A, of **SWANNER ADDITION**, an addition to said E.T.J. of the City of Celina, as recorded in Volume 2006, Page 65, of the Map Records, Collin County, Texas (M.R.C.C.T.), same being all of that tract of land described by deed to Matt Edgemon, as recorded under Document No. XXXX, of the Official Public Records, Collin County, Texas (O.P.R.C.C.T.), said tract being more particularly described as follows:

BEGINNING at a 1/2" iron rod with a yellow plastic cap stamped "RPLS 5686" found for the northeasterly corner of said Lot 2, same being the southeasterly corner of Lot 1, of said **SWANNER ADDITION**, said corner also being in the westerly monumented line of F.M. Highway No. 2478;

THENCE South 00°45'40" East, along said westerly monumented line of F.M. Highway No. 2478, same being the easterly line of Lot 2, a distance of 507.16' to a 1/2" iron rod with a yellow plastic cap stamped "RPLS 5686" found for the southeast corner of said Lot 2, said corner also being in the most easterly north line of a tract of land described by deed to Young Lei Kim, as recorded under Document No. 20121219001618900, O.P.R.C.C.T.;

THENCE South 89°16'20" West, along the southerly line of said Lot 2, same being the most easterly north line of said Kim tract, a distance of 392.50' to a 1/2" iron rod with a red plastic cap found for the southwest corner of said Lot 2, same being an "ell" corner of said Kim tract;

THENCE North 00°45'40" West, along a common line between said Lot 2 and Kim tract, a distance of 505.69' to a 1/2" iron rod with a yellow plastic cap stamped "RPLS 5686" found for the northwesterly corner of said Lot 2, same being the southwesterly corner of the aforementioned Lot 1;

THENCE North 89°03'27" East, along the common line between said Lots 1 and 2, a distance of 392.50' to the **POINT OF BEGINNING** and containing 198,771 square feet or 4.563 acres of land, more or less.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

That Southwest Custer, LLC, does hereby adopt this plat designating the herein above described property as **LOTS 1 AND 2, BLOCK A – EDGEMON ADDITION**, an addition to Extraterritorial Jurisdiction (E.T.J.) City of Celina, Collin County, Texas, and does hereby dedicate, in fee simple to the public use forever, the streets, rights-of-way, and other public improvements shown thereon. The streets and alleys, if any, are dedicated for street purposes. The easements and public use areas, as shown, are dedicated, for the public use forever, for the purposes indicated on this plat. No buildings, fences, trees, shrubs or other improvements or growths shall be constructed or placed upon, over or across the easements as shown, except that landscape improvements may be placed on landscape easements, if approved by the City Council of the City of Celina. In addition, utility easements may also be used for the mutual use and accommodation of all public utilities desiring to use or using the same unless the easement limits the use to particular utilities, said use by public utilities being subordinate to the public's and City of Celina's use thereof. Collin County, the City of Celina and public utility entities shall have the right to remove and keep removed all or parts of any buildings, fences, trees, shrubs or other improvements or growths which may in any way endanger or interfere with the construction, maintenance, or efficiency of their respective systems in said easements. Collin County, the City of Celina and public utility entities shall at all times have the full right ingress and egress to or from their respective easements for the purpose of constructing, reconstructing, inspecting, patrolling, maintaining, reading meters, and adding to or removing all or parts of their respective systems without the necessity at any time procuring permission from anyone.

This plat approved subject to all platting ordinances, rules, regulations and resolutions of the City of Celina, Texas.

WITNESS MY HAND at Celina, Texas, this _____ day of _____, 2014.

_____ _____
Authorized Signature of Owner Printed Name and Title

STATE OF TEXAS §
COUNTY OF COLLIN §

BEFORE ME, the undersigned, a Notary Public in and for the State of Texas, on this day personally appeared Matthew Edgemon, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that the same is his act and deed in the capacity therein stated and for the purposes therein expressed.

WITNESS MY HAND AND SEAL OF OFFICE on this, the _____ day of _____, 2014.

_____
NOTARY PUBLIC in and for the State of Texas.

SURVEYOR'S CERTIFICATION

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

That I, Michael B. Arthur, do hereby certify that I prepared this plat from an actual and accurate survey of the land and that the corner monuments shown thereon as "set" were properly placed under my personal supervision in accordance with the Subdivision Ordinance of the City of Celina.

_____
Michael B. Arthur
Registered Professional Land Surveyor
Texas Registration No. 5686

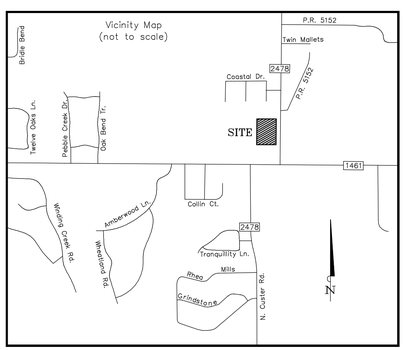
STATE OF TEXAS REGISTERED MICHAEL B. ARTHUR 5686 PROFESSIONAL LAND SURVEYOR

STATE OF TEXAS §
COUNTY OF COLLIN §

BEFORE ME, the undersigned, a Notary Public in and for the State of Texas, on this day personally appeared Michael B. Arthur, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that the same is his act and deed in the capacity therein stated and for the purposes therein expressed.

WITNESS MY HAND AND SEAL OF OFFICE on this, the _____ day of _____, 2014.

_____
NOTARY PUBLIC in and for the State of Texas.



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

Notes:

1. Selling a portion of this addition by metes and bounds is a violation of city ordinance and state law, and is subject to fines and withholding of utilities and building permits.

2. The undersigned does hereby covenant and agree that he or she or they shall construct upon the fire lane easements, as dedicated as shown hereon, a hard surface in accordance with the City of Celina's paving standards for fire lane, and that he or she or they shall maintain the same in a state of good repair at all times and keep the same free and clear of any structures, fences, trees, shrubs, or other improvements or obstruction, including but not limited to the parking of motor vehicles, trailers, boats or other impediments to the accessibility of fire apparatus. The maintenance of paving on the fire lane easements is the responsibility of the owner, and the owner shall post and maintain appropriate signs in conspicuous places along such fire lanes, stating "Fire Lane, No Parking." The local law enforcement agency(s) is hereby authorized to enforce parking regulations within the fire lanes, and to cause such fire lanes and utility easements to be maintained free and unobstructed at all times for Fire Department and emergency use.

3. This plat is hereby adopted by the Owners and approved by the City of Celina (Called "City") subject to the following conditions which shall be binding upon the Owners, their heirs, grantees, successors and assigns: The portion of Lots 1 and 2, Block A, as shown on the plat is called "Drainage Easement." the Drainage Easement within the limits of this addition, will remain accessible at all times and will be maintained in a safe and sanitary condition by the owners of the lot or lots that are traversed by or adjacent to the Drainage Easement. The City will not be responsible for the maintenance and operation of said Easement or for any damage to private property or person that results from conditions in the Easement, or for the control of erosion. No construction of any type of building, fence or any other structure within the Drainage Easement, as herein above defined shall be permitted, unless approved by the City Engineer. Provided, however, it is understood that in the event it becomes necessary for the City to erect or consider erecting any type of drainage structure in order to improve the storm drainage that may be occasioned by drainage in or adjacent to the subdivision, then in such event, the city shall have the right to enter upon the Drainage Easement at any point, or points, to investigate, survey or to erect, construct and maintain any drainage facility deemed necessary for drainage purposes. Each property owner shall keep the Drainage Easement clean and free of debris, silt, and any substance which would result in unsanitary conditions or obstruct the flow of water, and the city shall have the right of ingress and egress for the purpose of inspection and supervision of maintenance work by the property owner to alleviate any undesirable conditions which may occur. The natural drainage through the Drainage Easement is subject to storm water overflow and natural bank erosion to an extent which cannot be definitely defined. The City shall not be held liable for any damages of any nature resulting from the failure of any structure or structures, within the easement.

4. The subject property is not located within the 0.2% annual chance floodplain.

5. The surveyor has relied on the title commitment provided by the Title Company shown hereon, with regard to any easements, restrictions, or rights-of-way affecting the above described Property. No additional research regarding said easements, restrictions or rights-of-way has been performed by the surveyor.

Notes (Cont'd):

6. Bearings are based on the plat of **SWANNER ADDITION**, an addition to the E.T.J. of the City of Celina, Collin County, Texas, as recorded in Volume 2006, Page 65, of the Map Records, Collin County, Texas.

7. All easements shown herein are per the herein described plat, unless otherwise noted.

8. All lots must utilize alternative type On-Site Sewage Facilities.

9. Must maintain state-mandated setback of all On-Site Sewage Facility components from any/all easements and drainage areas, water distribution lines, sharp breaks and/or creeks/rivers/ponds, etc. (Per State regulations).

10. Tree removal and/or grading for OSSF may be required on individual lots.

11. Individual site evaluations and OSSF design plans (meeting all State and County requirements) must be submitted to and approved by Collin County for each lot prior to construction of any OSSF system.

Health Department Certification:

I hereby certify that the on-site sewage facilities described on this plat conform to the applicable OSSF laws of the State of Texas, that site evaluations have been submitted representing the site conditions in the area in which on-site sewage facilities are planned to be used.

_____
Registered Sanitarian or Designated Representative
Collin County Development Services

Owner:
Southwest Custer, LLC
2203 Augusta Drive
McKinney, Texas 75070

Engineer:
Civil Consulting Group, PLLC
Texas Firm No. F-9356
1515 Heritage Drive, Suite 212
McKinney, Texas 75069
(972) 569-9197
Contact: Trevor Castilla

Surveyor:
North Texas Surveying, LLC
Firm Registration No. 10074200
1515 South McDonald St. Suite 110
McKinney, Texas 75069
(469) 424-2074
www.northtexassurveying.com
Contact: Chad Holcomb

REPLAT
LOTS 1 AND 2, BLOCK A
EDGEMON ADDITION

Being a Replat of Lot 2, Block A
SWANNER ADDITION
Vol. 2006, Pg. 65, M.R.C.C.T.
198,771 Sq. Ft. / 4.563 Acres
an addition to the
Extraterritorial Jurisdiction of
the City of Celina, Collin County, Texas
in the
M. Mowery Survey, Abstract No. 557

Date: April 22, 2014 Scale: 1" = 40'

FILING INFORMATION

Easement Curve Data					
Curve No.	Radius	Arc Length	Delta	Chrd. Brng.	Chrd. Dist.
C1	30.00'	47.12'	90°00'00"	S45°45'40"E	42.43'
C2	30.00'	47.12'	90°00'00"	N44°14'20"E	42.43'
C3	30.00'	47.12'	90°00'00"	S45°45'40"E	42.43'
C4	54.00'	84.82'	90°00'00"	S45°45'40"E	76.37'
C5	54.00'	84.85'	90°02'00"	S44°15'20"W	76.39'
C6	30.00'	47.14'	90°02'00"	S44°15'20"W	42.44'
C7	30.00'	47.11'	89°58'00"	N45°44'40"W	42.41'
C8	54.00'	84.79'	89°58'00"	N45°44'40"W	76.35'

SURVEY DATE: 02/27/2014	SCALE: 1" = 40'	DRAWN BY: C.S.H.	CHK'D. BY: M.B.A.	JOB NO.: 2014-002B – REPLAT

GENERAL

1. All construction shall be in accordance with the latest revision of the North Central Texas Council of Governments "Standard Specifications for Public Works Construction" including the Standard Drawings therein and the City of Celina's addendum thereto. Contractor shall have at least one set of approved Engineering Plans and Specifications on-site at all times.

2. Before beginning construction, the contractor shall prepare a construction sequence schedule. The construction schedule shall be such that there is minimum interference with traffic along or adjacent to the project.

3. Construction may not begin earlier than 7:00 A.M. on weekdays nor continue after dark without permission from the City of Celina. Construction on holidays and Saturday must be approved two days in advance. A fee of $300.00 a day for working on holidays and Saturday will be accessed payable to the city before work is performed. Work may not begin before 8:00 A.M. on holidays and Saturday and work on Sunday is prohibited without special permission and payment of fees.

4. Utilities shown on the plans were taken from field surveys and information provided by the utility companies. The completeness and the accuracy of this data is not guaranteed.

   The contractor is responsible for verifying the location of all underground utilities and structures and protecting them from damage during construction.

   It will be the responsibility of each contractor to protect all existing public and private utilities throughout the construction of this project. Contractor shall contact the appropriate utility companies for line location prior to commencement of construction and shall assume full liability to those companies for any damages caused to their facilities.

DIG TESS	800-DIG-TESS
GCEC-TELECOM	903-482-7274
GCEC-ELECTRIC	903-821-3007
AT&T	972-569-3013
ATMOS ENERGY	972-881-4161
CROSSTEX ENERGY	817-570-6753
ONEOK	903-257-6594
COSERV-ELEC	940-321-7800
COSERV-GAS	940-321-7800
CITY OF CELINA	972-382-2682
TOWN OF PROSPER	972-347-9969
MARILEE SUD	972-382-3222
GRANDE	972-410-0583
SUDDEN LINK	469-853-0486

5. Work may not be backfilled or covered until the City has inspected it.

6. Material testing shall be performed by an independent testing laboratory and paid for by the Contractor. The following material tests shall be provided by the Contractor:

   a. Embankment - One soil density test shall be performed at each location for each 500 C.Y. of backfill placed.

   b. Pavement Sub grade - One gradation test (where lime stabilized) and one soil density test shall be performed for each 300 linear feet of pavement unless otherwise noted. Gradations must pass 100% through a 1 3/4" sieve and 60% through a #4 sieve.

   c. Utility Trench Backfill - One soil density test shall be performed at 300 feet intervals or as directed by the Inspector.

   d. Concrete Tests:
      (1). Compressive Strength - Four test cylinders shall be taken from a representative portion of the concrete being placed for every 150-cubic yards of concrete pavement placed, but in no case shall less than 2 sets of cylinders be taken from any one day's placement.)

      (2). Air, slump, and temperature tests shall be taken for every set of cylinders made. Concrete with a temperature above 95 33/64 F will be rejected.

      (3). Additional cylinders and/or tests may be required at the Inspector's discretion.

   The City shall select the location and depth of each soil density test unless otherwise directed.

7. All excavation on the project is unclassified.

8. Temporary erosion control shall be used to minimize the spread of silt and mud from the project on to existing streets, alleys, drainage ways and public and private property. Temporary erosion controls may include silt fences, rock check dams, stabilized construction entrances, straw bales, berms, dikes, swales, strips of undisturbed vegetation, check dams and other methods as required by the City Manager or his representative and shall conform to the Storm Water Quality Best Management Practices for Construction Activities as published by the North Central Texas Council of Governments and the City of Celina Erosion and Sediment Control Manual.

9. Finished slopes on public rights-of-way and easements shall not be steeper than 4:1. All slopes steeper than 6:1 shall be covered with erosion control matting and are hydro mulched and maintained by the contractor until grass covers all parts of the slope.

10. The contractor shall maintain two-way traffic at all times along the project.

11. Remove, salvage and replace all street and traffic control signs, which may be damaged by the construction of the project.

12. All trenching and excavation shall be performed in accordance with OSHA standards. Trench safety design will be the responsibility of the Contractor. Contractor shall submit a trench safety design approved by a professional engineer to the City for review prior to the start of any underground utility construction.

13. The contractor shall refer to TxDOT Traffic Control Plan Standards for all work within TxDOT ROW.

PAVING

1. All embankments shall be compacted to 95% Standard Proctor density.

2. All streets and alleys shall be placed on lime stabilized subgrade with a lime content of not less than 7% or as approved by city engineer.

3. The minimum 28 day compressive strength of concrete street paving shall not be less than 4000 psi and shall be air entrained. Water may not be applied to the surface of concrete paving to improve workability.

4. All curb and gutter shall be integral with the pavement.

5. Parabolic crowns are required on all street pavements except on major thoroughfares where straight sections are required.

6. Streets and alleys shall be constructed with provisions for sidewalk ramps at all intersections.

DRAINAGE

1. Storm sewer pipe shall be reinforced concrete, Class III unless otherwise noted.

2. All structural concrete shall be Class "C" (3600 psi compressive strength at 28 days), air entrained.

3. The contractor shall install plugs in storm sewer lines or otherwise prevent mud from entering the storm sewer system during construction.

WATER AND SANITARY SEWER

1. Water mains shall be AWWA C-900 or 905 PVC Class 200 unless otherwise noted. Minimum cover for waterlines is 48" below top of curb, 60" where no curbed street is present or as required to clear existing utilities, whichever is greater. Class B+ embedment unless otherwise noted.

2. All utility trench backfill shall be performed in 12" loose lifts and mechanically compacted with approved vibratory methods.

3. Marking tape shall be installed one foot above and over PVC water lines.

4. Fittings for PVC water lines shall be ductile iron and be encased in a polyethylene sheath.

5. All Mechanical Joints will be restrained. (Mega-Lug etc.)

6. Valves, including tapping valves shall be resilient seat gate valves, unless noted otherwise.

7. All direct burial valves shall be provided with cast iron valve boxes with PVC stacks. Valve stacks shall be vertical and concentric with the valve stem. Stainless steel valve extensions are required on all valves where the operating nut is greater than 4 feet below finished grade.

8. Fire hydrants shall be Waterous or equal as directed or approved by the City of Celina on a case by case basis and field painted silver with bonnet and caps color-coded to pipe size.

   a. Six inch line- silver body with RED bonnet and caps.
   b. Eight inch line- silver body with BLUE bonnet and caps.
   c. Ten inch line- silver body with GREEN bonnet and caps.
   d. Twelve inch and larger- silver body with YELLOW bonnet and caps.

9. All exposed bolting on any buried equipment or material shall be stainless steel. Included are:

   a. Bonnet and stuffing box bolts on valves.
   b. Shoe bolts on fire hydrants.
   c. Flange bolts.
   d. "Cor-ten" mechanical joint "T" bolts are acceptable for direct burial service.

10. Depending on meter size; meter boxes shall be DFW37C-12-1SAF, DFW38C-14-1SAF, DFW65C-14-1SAF, or approved equal, and shall incorporate the Celina logo in the lid.

11. One sample station shall be provided to the city for every 250 connections.

12. Sanitary sewer mains shall be DR 35 PVC. Embedment shall be Class H unless otherwise noted.

    a. The contractor shall install and maintain watertight plugs in all connections to the City's sanitary sewer system until the City accepts the project.

    b. All sanitary sewer lines and manholes shall be leak tested before the project is accepted. Deflection testing of PVC sewer lines is required. Deflection shall be tested with a mandrel for 5% deflection.

    c. All sewer lines shall be video inspected with a copy of the video and station report submitted to the Inspector.

    d. Mandrel, Air Test, and Video inspection shall not be performed until all utilities are complete, in place, and backfilled.

Specifications are not meant to exclude any other manufacturer. Any specification may be replaced with an approved equal upon approval by the City of Celina.

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

Trevor L. Castilla 8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

GENERAL NOTES

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-1
APPROVED- CCG	CHECKED- TLC	SCALE- N/A	

P-201405-01

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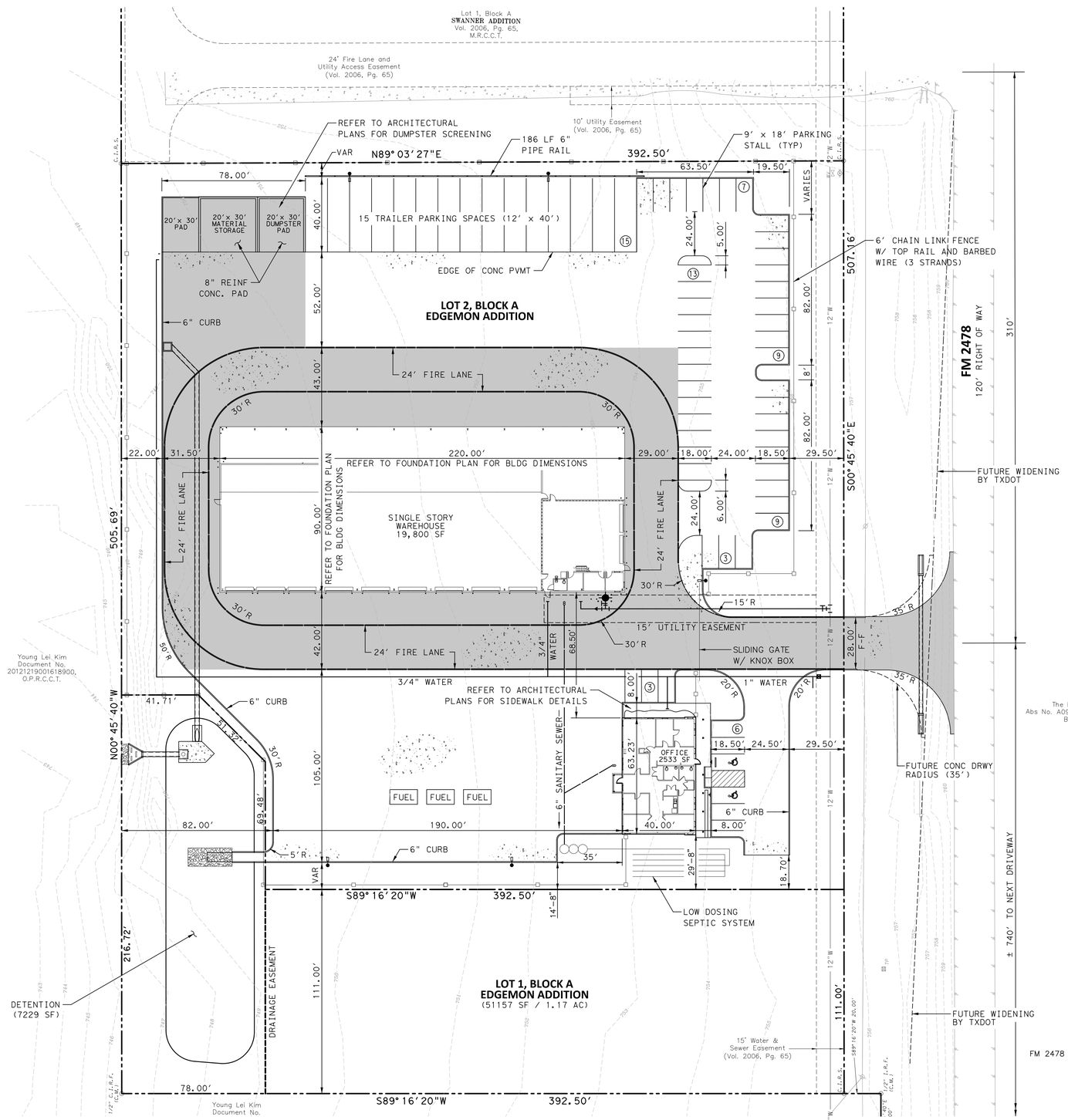
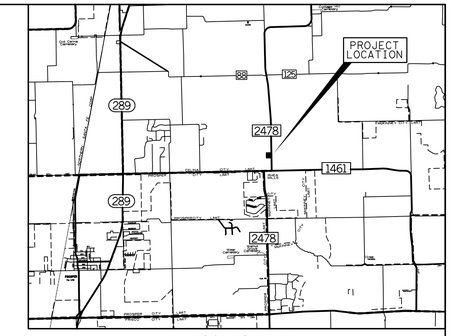
PLOTTED: 8/14/2014



LEGEND

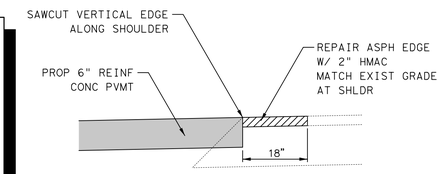
- 5" REINF. CONCRETE PAVEMENT (4000 PSI)(#3 @ 18" O.C.E.W.)
- 6" REINF. CONCRETE PAVEMENT (4000 PSI)(#3 @ 18" O.C.E.W.)
- EXIST. ASPHALTIC PAVEMENT
- PROPOSED LIGHT POLE
- WATER METER



LOCATION MAP

NOTES

1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
2. ALL DRIVEWAYS SHALL BE BUILT IN ACCORDANCE TO THE CITY OF CELINA DETAILS.
3. NO LANDSCAPING SUCH AS TREES, HEDGES, ABOVE AND UNDERGROUND STRUCTURES SHALL BE LOCATED WITHIN EXISTING OR PROPOSED UTILITY EASEMENTS AND RIGHT OF WAY.
4. REFER TO ARCHITECTURAL PLANS FOR BUILDING DIMENSIONS.
5. FIRE LANES SHALL BE A MINIMUM OF 6" CONCRETE REINFORCED WITH #3 BARS @ 18" O.C.E.W. COMPRESSIVE STRENGTH SHALL BE A MINIMUM OF 4000 PSI.
6. FIRE LANES SHALL BE MARKED BY PAINTED LINES OF RED TRAFFIC PAINT 6" WIDE TO SHOW THE EXACT BOUNDARY LINES OF THE FIRE LANE. THE LINES SHALL BE MARKED BY PAINTED 4-INCH HIGH LETTERING, USING A 1-INCH WIDE STROKE OF WHITE TRAFFIC PAINT ON THE CONTRASTING RED BACKGROUND STATING: "NO PARKING – FIRE LANE" OR "FIRE LANE NO PARKING". THIS MARKING IS TO BE PLACED AT 25-FOOT INTERVALS ALONG EACH BOUNDARY LINE. WHERE A CURB IS AVAILABLE, THE STRIPING SHALL BE ON THE VERTICAL FACE OF THE CURB.
7. ALL PARKING STALLS ARE 9' X 18' UNLESS NOTED OTHERWISE.
8. CURB RADII ARE 3' UNLESS NOTED OTHERWISE.
9. DUMPSTER AND STORAGE PADS SHALL BE A MINIMUM OF 8" CONCRETE REINFORCED WITH #3 BARS @ 18" O.C.E.W. COMPRESSIVE STRENGTH SHALL BE A MINIMUM OF 4000 PSI.
10. ALL STANDARD PARKING STALLS SHALL BE WHITE TRAFFIC PAINT (4") IN ACCORDANCE TO THE TxMUTCD AND TEXAS ACCESSIBILITY STANDARDS.
11. THE UPPER 6" OF THE SUBGRADE UNDER THE PROPOSED PAVEMENT SHALL CONSIST OF COMPACTED SOILS WITH PI OF LESS THAN 15% OR COMPACTED/STABILIZED BY ADDING 6% (BY DRY WEIGHT) OF HYDRATED LIME. ALTERNATIVELY, THE THICKNESS OF THE HEAVY DUTY PAVEMENT CAN BE INCREASED BY 2" IN-LIEU OF STABILIZING THE UPPER 6" OF SOILS UNDER THE PAVEMENT.



ASPHALT EDGE CONNECTION DETAIL

SITE PLAN DATA

	OFFICE	WAREHOUSE
FLOOR AREA	2,533 SF	19,800 SF
PARKING RATIO:	300:1	5000:1
REQUIRED PARKING:	9	4
ON-SITE PARKING PROVIDED:	9	41
ON-SITE HC PARKING PROVIDED:	2	
TRAILER PARKING:	15	15
TOTAL AVAILABLE PARKING:	50	50
TOTAL IMPERVIOUS AREA:	2.56 AC	

FM 2478 POSTED SPEED = 60 MPH

OWNER / DEVELOPER
SOUTHWEST CUSTER, LLC
2203 AUGUSTA DRIVE
MCKINNEY, TX 75070
214-882-5999 (P)
972-347-1871 (F)

N

0' 30' 60'

SCALE IN FEET

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

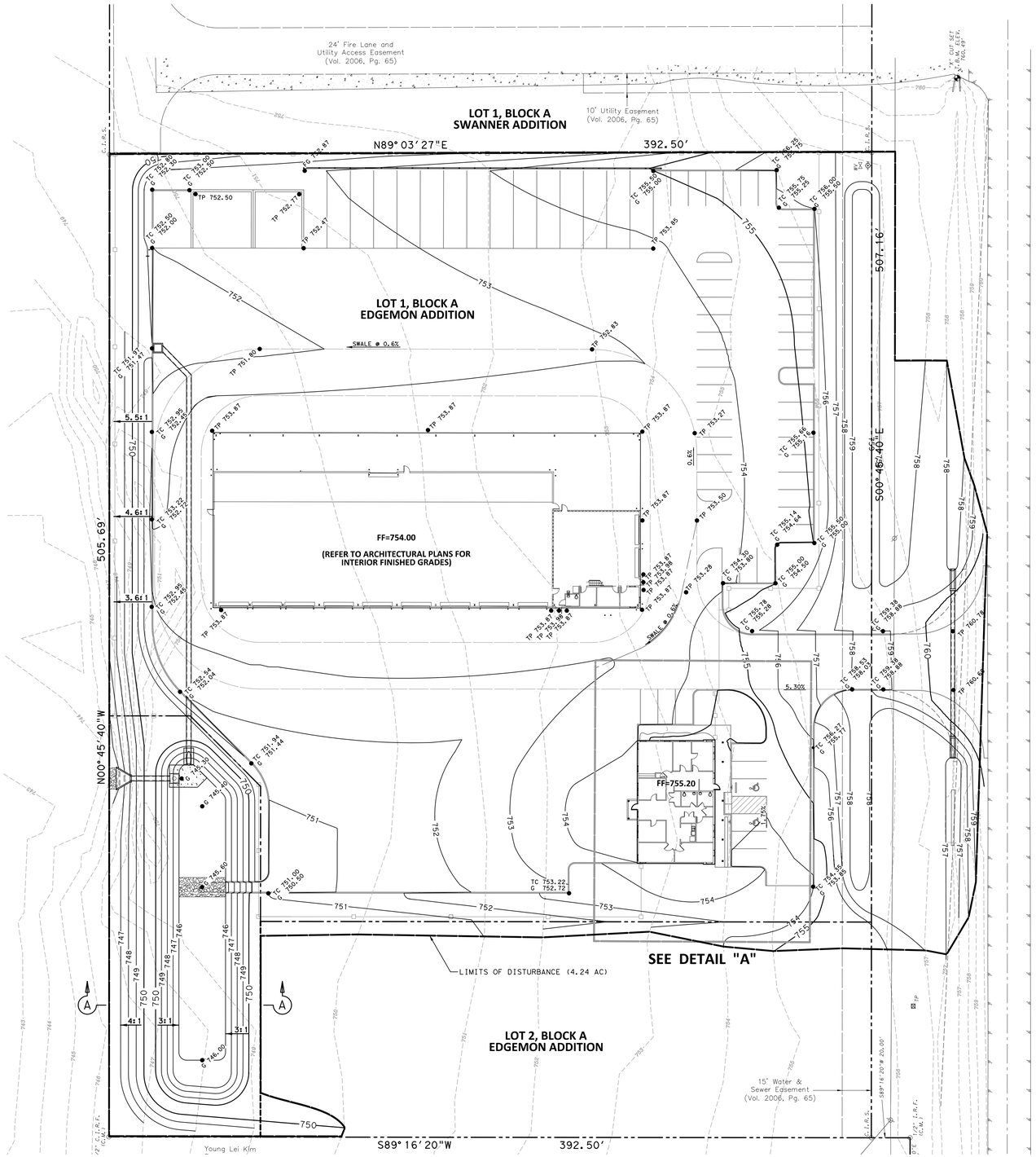
SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

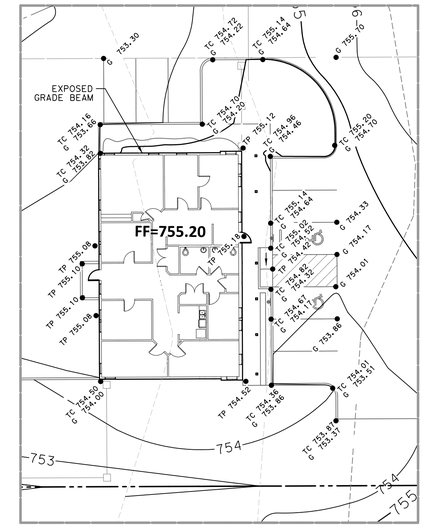
SITE PLAN & DIMENSION CONTROL

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-2
APPROVED- CCG	CHECKED- TLC	SCALE-	

P-201405-01

FILENAME: G:\14002.00\Project\Design\Sheets\01 General\EDGE*SITEPLAN.dgn
PLOTTED: 8/14/2014

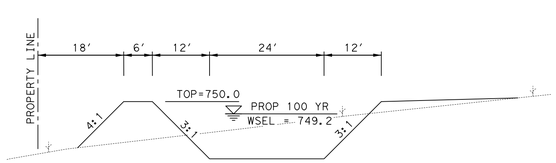




DETAIL "A"

GRADING NOTES

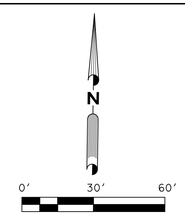
1. THE CONTRACTOR SHALL REVIEW AND ADHERE TO THE GEOTECHNICAL REPORT PREPARED BY SAM ENGINEERING & TESTING, LP DATED MARCH 21, 2014.
2. ANY LOOSE/SOFT FILL, SOFT SOIL AND SOILS CONTAINING ORGANIC MATERIALS FOUND AT THE EXPOSED SURFACE SHALL BE OVER-EXCAVATED AND REMOVED FROM THE SITE.
3. THE RESULTING EXCAVATIONS FROM ALL MENTIONED ACTIVITIES SHOULD BE BACKFILLED WITH SUITABLE FILL MATERIAL.
4. ALL EXPOSED SUBGRADE IN ALL BUILDING AND PAVEMENT AREAS SHALL BE PROOFROLLED TO DETECT UNSUITABLE SOIL CONDITIONS. PROOFROLLING SHALL BE DONE AFTER A PERIOD OF DRY WEATHER TO AVOID DEGRADING AN OTHERWISE ACCEPTABLE SUBGRADE. PROOFROLLING SHOULD BE PERFORMED WITH A HEAVILY LOADED DUMP TRUCK OR SIMILAR APPROVED CONSTRUCTION EQUIPMENT. PROOFROLLING SHALL INCLUDE TWO PASSES PERPENDICULAR TO THE FIRST TWO PASSES.
5. IN AREAS WHERE UNDERCUTTING IS REQUIRED, THE TOP 8" OF THE SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY WITH MC BEING BETWEEN -2 TO +4% OF THE OPTIMUM MC AS DETERMINED BY THE STANDARD PROCTOR TEST (ASTM D-698A).
6. FILL MATERIAL SHALL CONSIST OF NATURALLY OCCURING EARTH MATERIALS WITH A PI BETWEEN 10-20% AND LL OF NO GREATER THAN 40%. IT SHALL BE FREE FROM ORGANIC MATERIAL AND CLAY BALLS WITH A MAXIMUM PARTICLE SIZE DIAMETER OF 1.5".
7. PRIOR TO PLACING ANY FILL MATERIAL, THE TOP 8" OF SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 95% OF THE MDD WITH MC OF -2 TO +4% OF THE OMC AS DETERMINED BY THE STANDARD PROCTOR TEST (ASTM D-698A).
8. ALL COMPACTED FILL SHALL BE CONSTRUCTED BY SPREADING ACCEPTABLE SOIL IN LOOSE LAYERS NOT MORE THAN 10" THICK AND BE COMPACTED TO AT LEAST 95% OF THE MDD AS DETERMINED BY ASTM D-698A. THE MC OF THE FILL SOILS SHALL BE MAINTAINED WITHIN -3 TO +3% OF THE OMC AS DETERMINED BY ASTM D-698A.
9. THE UPPER 6" OF THE SUBGRADE UNDER THE PROPOSED PAVEMENT SHALL CONSIST OF COMPACTED SOILS WITH PI OF LESS THAN 15% OR COMPACTED/STABILIZED BY ADDING 6% (BY DRY WEIGHT) OF HYDRATED LIME. ALTERNATIVELY, THE THICKNESS OF THE HEAVY DUTY PAVEMENT CAN BE INCREASED BY 2" IN-LIEU OF STABILIZING THE UPPER 6" OF SOILS UNDER THE PAVEMENT.
10. ALL GARAGE DOORS SHALL HAVE A 1.5" LIP AT FINISHED FLOOR.



SECTION A-A

LEGEND

---755---	EXIST. CONTOUR
——755——	PROP. CONTOUR



STATE OF TEXAS
TREVOR L. CASTILLO
85405
LICENSED
PROFESSIONAL ENGINEER

8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

GRADING PLAN

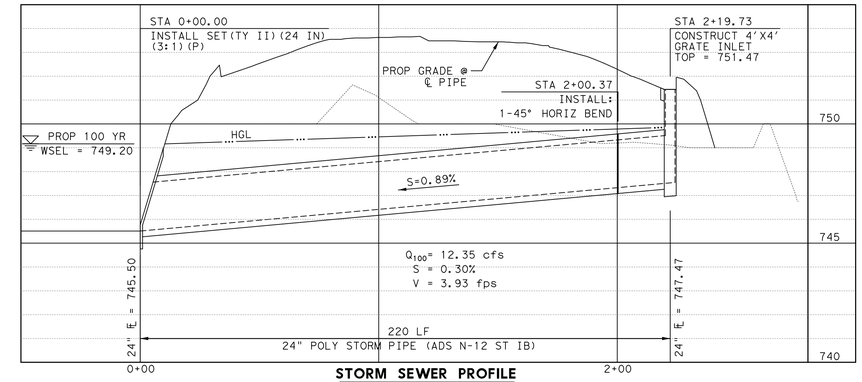
DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-3
APPROVED- CCG	CHECKED- TLC	SCALE-	

FILENAME: G:\14002.00\Project\Design\Sheets\01 General\EDGE*GRADING.dgn
PLOTTED: 8/14/2014

P-201405-01

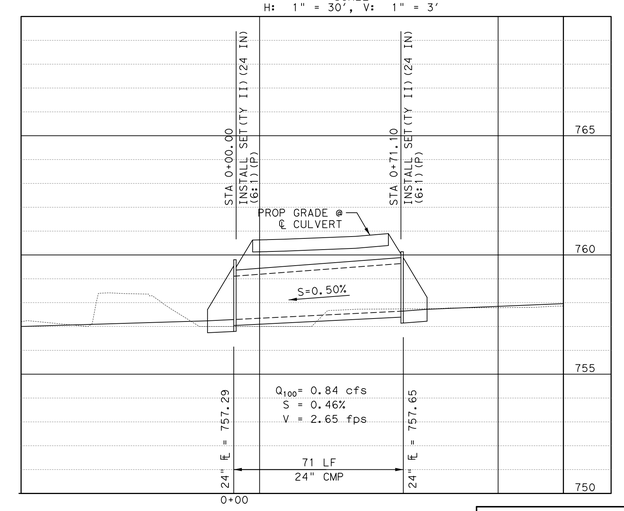
STYLE "FG" PRECAST INLET - HYDRAULIC CALCULATIONS													
DRAINAGE AREA ID	100 YR RUNOFF (Q_{100}) (cfs)	GRATE WIDTH (W) (ft)	GRATE LENGTH (L) (ft)	ALLOWABLE HEAD (h) (ft)	SHORT SPAN STEEL AREA (A) (in^2/ft)	LONG SPAN STEEL AREA (B) (in^2/ft)	GRATE INLET OPEN AREA (ft^2)	WEIR COEFFICIENT (C_w)	INLET CAPACITY (WEIR) (cfs)	ACTUAL HEAD (WEIR) (ft)	ORIFICE COEFFICIENT (C_o)	INLET CAPACITY (ORIFICE) (cfs)	ACTUAL HEAD (ORIFICE) (ft)
A	12.35	4	4	0.5	0.34	0.34	15.981	3.00	16.97	0.40	0.67	60.76	0.01

100 YEAR RUNOFF CALCULATIONS					
DRAINAGE AREA ID	Weighted Runoff Coeff. c	Time of Concentration T_c (min.)	Intensity I (in/hr)	Area (Ac.)	Runoff (cfs)
A	0.90	10	8.74	1.57	12.35
B	0.90	10	8.74	1.62	12.74
C	0.90	10	8.74	0.79	6.21
D	0.40	10	8.74	0.24	0.84



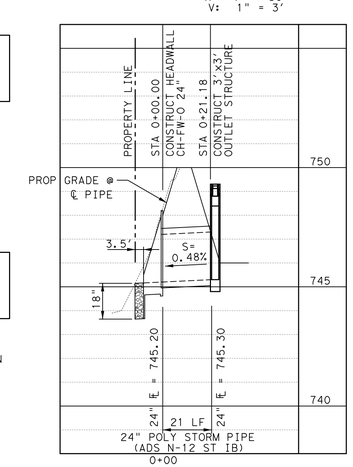
STORM SEWER PROFILE

SCALE
H: 1" = 30', V: 1" = 3'



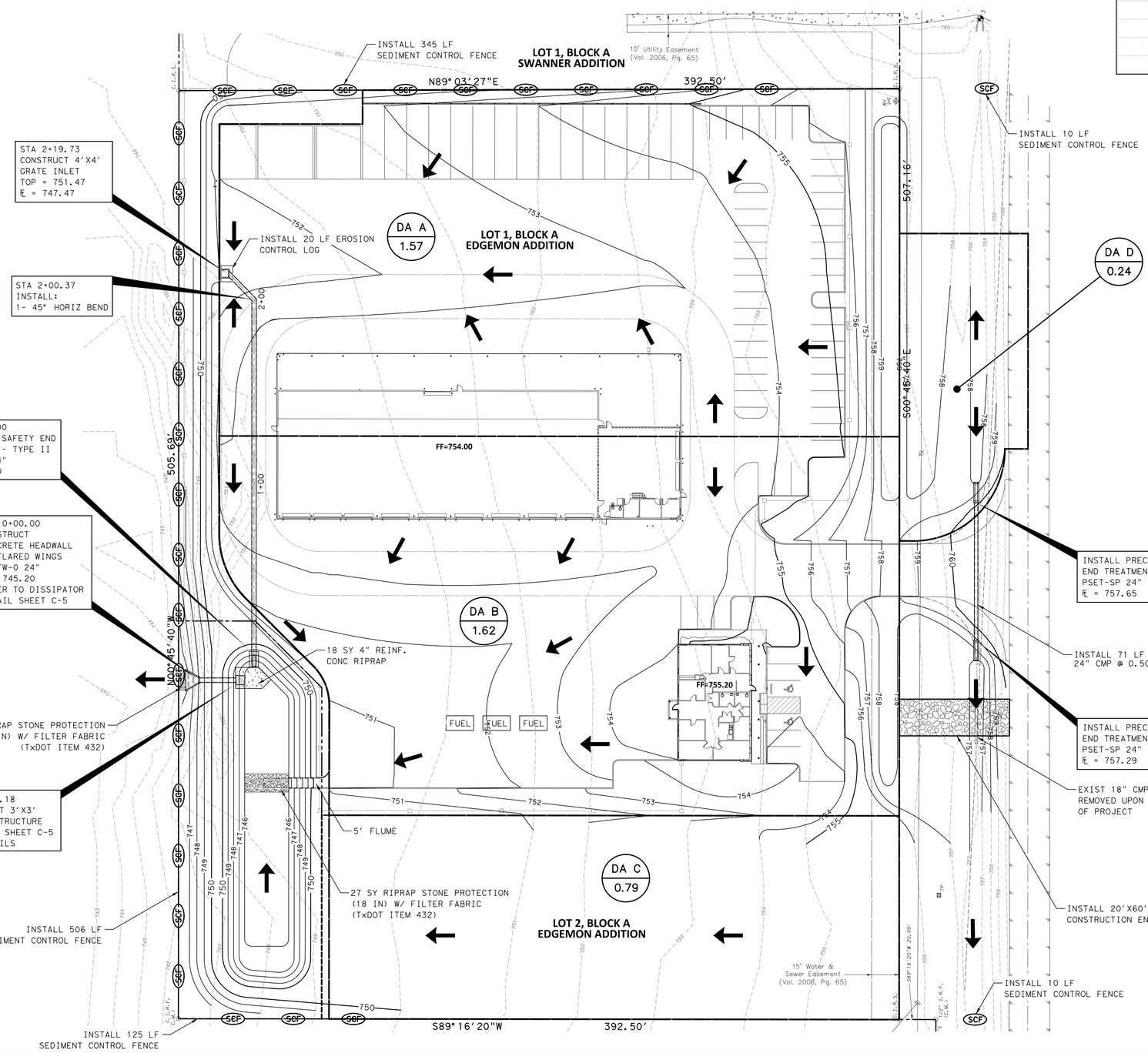
CULVERT PROFILE

SCALE
H: 1" = 30'
V: 1" = 3'



OUTFALL PROFILE

SCALE
H: 1" = 30'
V: 1" = 3'



LEGEND

DA C / 0.75	DRAINAGE AREA ID / ACREAGE
	DRAINAGE BOUNDARY
755	EXIST. CONTOUR
755	PROP. CONTOUR
SCF	SEDIMENT CONTROL FENCE

N

0' 30' 60'

SCALE IN FEET

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

Trevor L. Castilla 8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

DRAINAGE & EROSION CONTROL PLAN

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-4
APPROVED- CCG	CHECKED- TLC	SCALE-	

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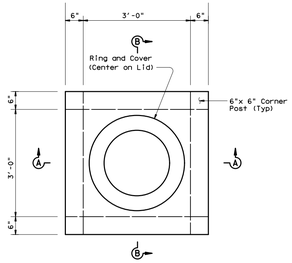
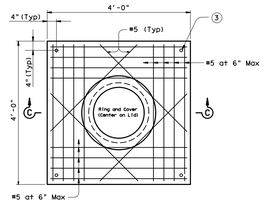
PLOTTED: 8/14/2014

P-201405-01

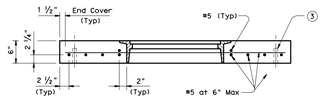


OUTLET STRUCTURE PLAN

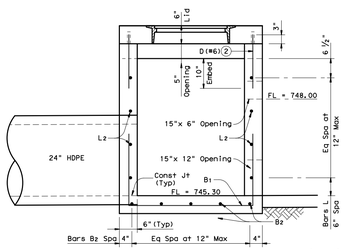
OUTLET STRUCTURE DETAILS



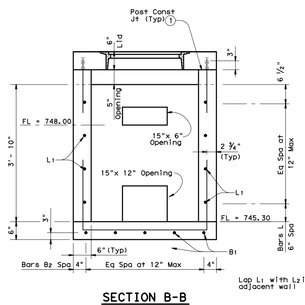
TYPICAL LID PLAN



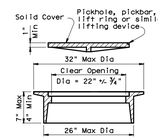
SECTION C-C



SECTION A-A



SECTION B-B



RING AND COVER DETAILS

Approximate Weight = 245 lb

GENERAL NOTES:

When approved, precast inlets with equivalent structural capacity may be furnished. Sealed engineering calculations and drawings shall be submitted for approval prior to construction.

Lid will be precast.

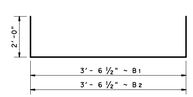
In areas of conflict between reinforcing steel, blockouts, pipes, anchor bolts or other reinforcing steel, the reinforcement shall be bent or adjusted to clear as directed by the Engineer.

Structural Steel for grates shall conform to the requirements of ASTM Designation A-36 or AISI Designation M1010-M1020.

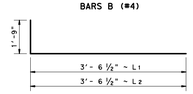
All reinforcing steel shall be Grade 60 unless otherwise noted.

All concrete shall be Class "A" (f'c = 3,000 psi).

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

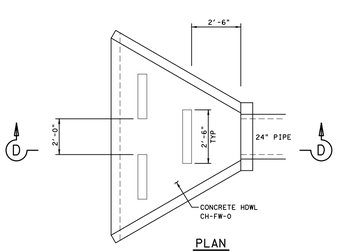


BARS B (#4)

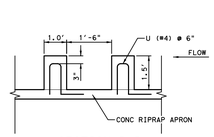


BARS L (#4)

1. Place layer of grout between lid and corner posts to provide stable seating of lid.
2. Center Dowels D in corner posts. (Typ)
3. Form holes in lid for Dowels D using 1" Dia x 4" PVC Pipe (SCH 40) (Typ)



PLAN



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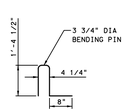

BAR U (#4)

ENERGY DISSIPATER DETAIL

10 YEAR DESIGN FREQUENCY
MODIFIED RATIONAL METHOD DETENTION POND DESIGN

CONDITION	Weighted Runoff Coeff. c	Rainfall Intensity, I = b/(tc+a)^d: Time of Concentration T_c	Intensity I (in/hr)	Area (Ac.)	Runoff (cfs)
Existing Condition	0.40	15	5.46	4.56	9.96
Proposed Condition	0.90	10	6.36	4.56	26.10

Time Step	Td Duration (min)	c	Intensity I (in/hr)	Area (Ac.)	Q peak (cfs)	Volume (ft³) Inflow T*Q*60	Outflow 0.5(T*+Ta)*Q*60	Req. Storage Inflow-Outflow	Volume (ac-ft)
1	10	0.71	6.36	4.56	20.59	12354.68	5975.42	6379.26	0.15
2	15	0.71	5.46	4.56	17.68	15909.57	7469.28	8440.29	0.19
3	20	0.71	4.85	4.56	15.70	18842.83	8963.14	9879.70	0.23
4	25	0.71	4.40	4.56	14.25	21368.16	10456.99	10911.17	0.25
5	30	0.71	4.10	4.56	13.27	23893.49	11950.85	11942.64	0.27
6	35	0.71	3.85	4.56	12.46	26176.00	13444.70	12731.29	0.29
7	40	0.71	3.55	4.56	11.49	27584.35	14938.56	12645.79	0.29
8	45	0.71	3.30	4.56	10.68	28847.02	16432.42	12414.60	0.29
9	50	0.71	3.10	4.56	10.04	30109.68	17926.27	12183.41	0.28
10	55	0.71	2.90	4.56	9.39	30983.83	19420.13	11563.70	0.27
11	60	0.71	2.69	4.56	8.71	31352.92	20913.98	10438.93	0.24
12	65	0.71	2.60	4.56	8.42	32829.26	22407.84	10421.42	0.24
13	70	0.71	2.50	4.56	8.09	33994.80	23901.70	10093.10	0.23
14	75	0.71	2.40	4.56	7.77	34966.08	25395.55	9570.53	0.22
15	80	0.71	2.29	4.56	7.41	35587.70	26889.41	8698.29	0.20
16	85	0.71	2.22	4.56	7.19	36656.11	28383.26	8272.84	0.19
17	90	0.71	2.15	4.56	6.96	37588.54	29877.12	7711.42	0.18

100 YEAR DESIGN FREQUENCY
MODIFIED RATIONAL METHOD DETENTION POND DESIGN

CONDITION	Weighted Runoff Coeff. c	Rainfall Intensity, I = b/(tc+a)^d: Time of Concentration T_c	Intensity I (in/hr)	Area (Ac.)	Runoff (cfs)	
Existing Condition	0.40	15	7.52	4.56	13.72	ALLOWABLE RELEASE RATE
Proposed Condition	0.90	10	8.74	4.56	35.87	

Time Step	Td Duration (min)	c	Intensity I (in/hr)	Area (Ac.)	Q peak (cfs)	Volume (ft³) Inflow T*Q*60	Outflow 0.5(T*+Ta)*Q*60	Req. Storage Inflow-Outflow	Volume (ac-ft)
1	10	0.71	8.74	4.56	28.30	16977.97	8229.89	8748.09	0.20
2	15	0.71	7.52	4.56	24.35	21912.08	10287.36	11624.72	0.27
3	20	0.71	6.80	4.56	22.02	26418.82	12344.83	14073.98	0.32
4	25	0.71	6.20	4.56	20.07	30109.68	14402.30	15707.38	0.36
5	30	0.71	5.75	4.56	18.62	33509.16	16459.78	17049.38	0.39
6	35	0.71	5.50	4.56	17.81	37394.28	18517.25	18877.03	0.43
7	40	0.71	5.10	4.56	16.51	39628.22	20574.72	19053.50	0.44
8	45	0.71	4.70	4.56	15.22	41085.14	22632.19	18452.95	0.42
9	50	0.71	4.45	4.56	14.41	43221.96	24689.66	18532.30	0.43
10	55	0.71	4.20	4.56	13.60	44873.14	26747.14	18126.00	0.42
11	60	0.71	3.91	4.56	12.66	45572.46	28804.61	16767.85	0.38
12	65	0.71	3.80	4.56	12.30	47981.23	30862.08	17119.15	0.39
13	70	0.71	3.65	4.56	11.82	49632.41	32919.55	16712.86	0.38
14	75	0.71	3.50	4.56	11.33	50992.20	34977.02	16015.18	0.37
15	80	0.71	3.35	4.56	10.85	52060.61	37034.50	15026.11	0.34
16	85	0.71	3.25	4.56	10.52	53663.22	39091.97	14571.25	0.33
17	90	0.71	3.15	4.56	10.20	55071.58	41149.44	13922.14	0.32

DETENTION POND OUTLET CALCULATIONS

Weir Equation	$Q = cbh^{3/2}$	Orifice Equation	$Q = cA(2gh)^{1/2}$
Q	Runoff (cfs)	Q	Runoff (cfs)
c	Coefficient	c	Coefficient
b	Weir base width	A	Opening Area (ft²)
h	Water height above weir	g	32.2 ft/s²
		h	Water depth above centroid of opening

BASE OPENING

Opening base width (ft) = 1.250
Opening height (ft) = 1.000
Area (sf) = 1.25
Base Elevation = 745.30
Weir Coefficient = 3.00
Orifice Coefficient = 0.60

SECONDARY OPENING

Opening base width (ft) = 1.250
Opening height (ft) = 0.500
Area (sf) = 0.63
Base Elevation = 748.00
Weir Coefficient = 3.00
Orifice Coefficient = 0.60

DETENTION POND WSEL (ft)	BASE OPENING WEIR FLOW HEIGHT (ft)	BASE OPENING WEIR FLOW RUNOFF (cfs)	BASE OPENING ORIFICE FLOW HEIGHT (ft)	BASE OPENING ORIFICE FLOW RUNOFF (cfs)	SECONDARY OPENING WEIR FLOW HEIGHT (ft)	SECONDARY OPENING WEIR FLOW RUNOFF (cfs)	SECONDARY OPENING ORIFICE FLOW HEIGHT (ft)	SECONDARY OPENING ORIFICE FLOW RUNOFF (cfs)	COMBINED RUNOFF (cfs)	
745.30	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.0	
745.45	0.15	0.2	0.00	0.0	0.00	0.0	0.00	0.0	0.2	
745.60	0.30	0.6	0.00	0.0	0.00	0.0	0.00	0.0	0.6	
745.75	0.45	1.1	0.00	0.0	0.00	0.0	0.00	0.0	1.1	
745.90	0.60	1.7	0.00	0.0	0.00	0.0	0.00	0.0	1.7	
746.05	0.75	2.4	0.00	0.0	0.00	0.0	0.00	0.0	2.4	
746.20	0.90	3.2	0.00	0.0	0.00	0.0	0.00	0.0	3.2	
746.35	1.05	4.0	0.55	4.5	0.00	0.0	0.00	0.0	4.0	
746.50	1.20	4.9	0.70	5.0	0.00	0.0	0.00	0.0	4.9	
746.65	1.35	5.9	0.85	5.5	0.00	0.0	0.00	0.0	5.5	
746.80	0.00	0.0	1.00	6.0	0.00	0.0	0.00	0.0	6.0	
746.95	0.00	0.0	1.15	6.5	0.00	0.0	0.00	0.0	6.5	
747.10	0.00	0.0	1.30	6.9	0.00	0.0	0.00	0.0	6.9	
747.25	0.00	0.0	1.45	7.2	0.00	0.0	0.00	0.0	7.2	
747.40	0.00	0.0	1.60	7.6	0.00	0.0	0.00	0.0	7.6	
747.55	0.00	0.0	1.75	8.0	0.00	0.0	0.00	0.0	8.0	
747.70	0.00	0.0	1.90	8.3	0.00	0.0	0.00	0.0	8.3	
747.85	0.00	0.0	2.05	8.6	0.00	0.0	0.00	0.0	8.6	
748.00	0.00	0.0	2.20	8.9	0.00	0.0	0.00	0.0	8.9	
748.15	0.00	0.0	2.35	9.2	0.15	0.2	0.00	0.0	9.4	
748.30	0.00	0.0	2.50	9.5	0.30	0.6	0.00	0.0	10.1	10 year detention = 748.25
748.45	0.00	0.0	2.65	9.8	0.45	1.1	0.00	0.0	10.9	
748.60	0.00	0.0	2.80	10.1	0.60	1.7	0.35	1.8	11.8	
748.75	0.00	0.0	2.95	10.3	0.00	0.0	0.50	2.1	12.5	
748.90	0.00	0.0	3.10	10.6	0.00	0.0	0.65	2.4	13.0	
749.05	0.00	0.0	3.25	10.9	0.00	0.0	0.80	2.7	13.5	
749.20	0.00	0.0	3.40	11.1	0.00	0.0	0.95	2.9	14.0	100 year detention = 749.20

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

DETENTION POND CALCULATIONS

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-5
APPROVED- CCG	CHECKED- TLC	SCALE-	

P-201405-01

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PLOTTED: 8/14/2014

Lot 1, Block A
SWANNER ADDITION
Vol. 2006, Pg. 65,
M.R.C.C.T.

24' Fire Lane and
Utility Access Easement
(Vol. 2006, Pg. 65)

10' Utility Easement
(Vol. 2006, Pg. 65)

OVERHEAD LIGHTING
PER OWNERS SPECIFICATIONS

OVERHEAD LIGHTING
PER OWNERS SPECIFICATIONS

N89° 03' 27"E 392.50'

INDUSTRIAL TYPE QUADPLEX GFCI RECEPTACLE W/ WEATHERPROOF COVER. COVER SHALL PROVIDE WEATHERPROOFING WITH POWER CHORDS PLUGGED IN. MOUNT RECEPTACLE 6" ABOVE FINISHED GRADE ON C-CHANNEL STEEL POST.

INSTALL 3/4" FROST PROOF YARD HYDRANT W/ 2'X2'X4" CONC APRON

LOT 2, BLOCK A
EDGEMON ADDITION

INSTALL:
1 - 8" x 6" TEE
5 LF 6" WATER LINE
1 - FH ASSEM & VALVE
1 - 8" x 6" REDUCER

INSTALL:
122 LF 8" WATER LINE
AWWA C900 PVC CL200

CONNECT TO EXIST. 12" WATER
INSTALL:
1 - 12" x 8" TAPPING SLEEVE AND VALVE (HD-CAST IRON)

FF = 754.00

INSTALL:
11 LF 6" WATER LINE
AWWA C900 PVC CL200
REFER TO SPRINKLER PLAN FOR CONTINUATION

OVERHEAD LIGHTING
PER OWNERS SPECIFICATIONS

INSTALL:
1 - 2 WAY CLEANOUT
6" ℄ = 750.00

INSTALL:
41 LF 3/4" WATER SERVICE (DOM)

Young Lei Kim
Document No.
20121219001618900,
O.P.R.C.C.T.

INSTALL:
448 LF 3/4" WATER SERVICE (DOM)

INSTALL:
1 - 2 WAY CLEANOUT
4" ℄ = 751.20

31.50'

FF = 755.20

130 LF
6" SAN SWR
@ 0.50%

4" SAN SWR
LATERAL

FUEL FUEL FUEL

INSTALL:
6"X 60° WYE

CONNECT TO EXIST. 12" WATER
INSTALL:
1 - 2" WATER SERVICE AND METER (DOM.)

INSTALL:
1 - 1" WATER SERVICE (IRRIG)
REFER TO LANDSCAPE PLAN FOR CONTINUATION

INSTALL:
145 LF 1" WATER SERVICE (DOM)

S89° 16' 20"W 392.50'

5-50' LATERALS
(LOW DOSE SEPTIC SYSTEM)

OVERHEAD LIGHTING
PER OWNERS SPECIFICATIONS

2-500 GAL SEPTIC TANK
1-500 GAL PUMP TANK

OVERHEAD LIGHTING
PER OWNERS SPECIFICATIONS

LOT 1, BLOCK A
EDGEMON ADDITION

15' Water &
Sewer Easement
(Vol. 2006, Pg. 65)

Young Lei Kim

S89° 16' 20"W 392.50'

N00° 45' 40"W 505.69'

S00° 45' 40"E 507.16'

FM 2478
120' RIGHT OF WAY

N

0' 30' 60'
SCALE IN FEET

STATE OF TEXAS
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85405
LICENSED
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SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

UTILITY PLAN

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-6
APPROVED- CCG	CHECKED- TLC	SCALE-	

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PLOTTED: 8/14/2014

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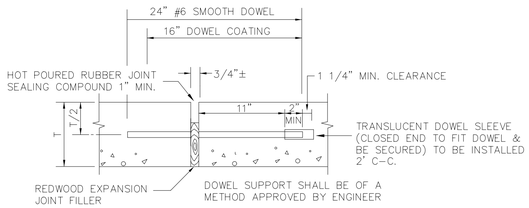
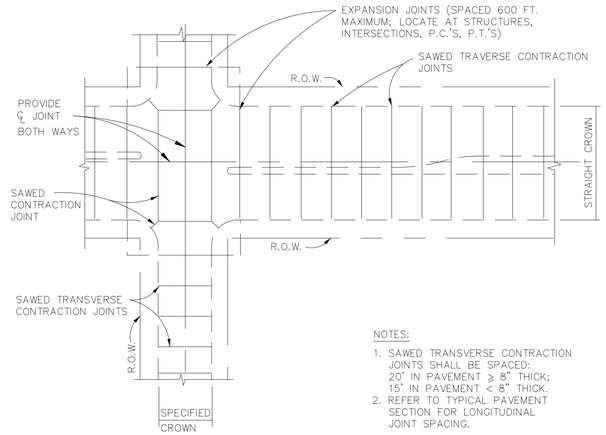


EXPANSION JOINT

(SPACED 600 FT. MAXIMUM; LOCATE AT STRUCTURES AND AT INTERSECTION P.C.'S & P.T.'S)
N.T.S.

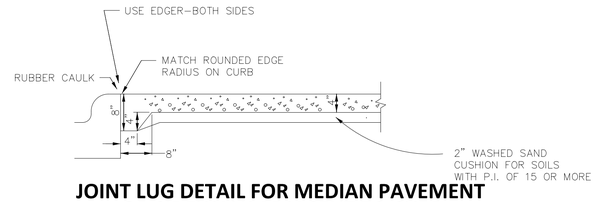


NOTES:

1. SAWED TRANSVERSE CONTRACTION JOINTS SHALL BE SPACED:
   20' IN PAVEMENT ≥ 8" THICK;
   15' IN PAVEMENT < 8" THICK.
2. REFER TO TYPICAL PAVEMENT SECTION FOR LONGITUDINAL JOINT SPACING.

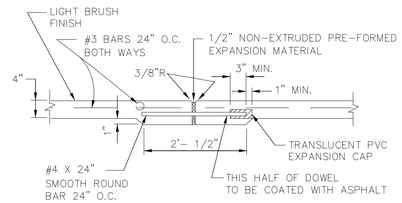
SPACING DIAGRAM FOR TRANSVERSE JOINTS

N.T.S.



JOINT LUG DETAIL FOR MEDIAN PAVEMENT OR SIDEWALK ADJACENT TO CURB

N.T.S.

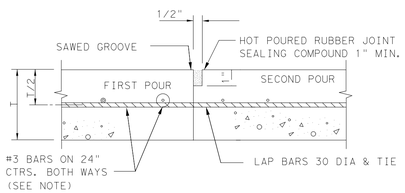


SIDEWALK EXPANSION JOINT DETAIL

N.T.S.

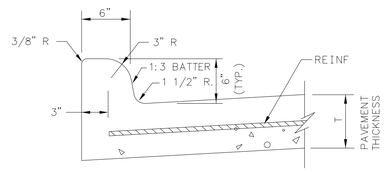
NOTE:

1. REFER TO STANDARD SPECIFICATION ITEM 8.3. FOR ALTERNATE REINFORCEMENT.
2. CROSS SLOPE OF SIDEWALK SHALL BE ± 1/4" PER FT. MAX.
3. OTHER THAN 6'-0" SIDEWALK WIDTH MAY BE SPECIFIED BY OWNER.
4. SIDEWALK SHALL BE CLASS "A" CONCRETE UNLESS OTHERWISE SPECIFIED BY OWNER.
5. ALL HONEYCOMB IN BACK OF CURB TO BE TROWEL-PLASTERED BEFORE POURING SIDEWALK.
6. LUG MAY BE FORMED BY SHAPING SUBGRADE TO APPROXIMATE DIMENSIONS SHOWN.



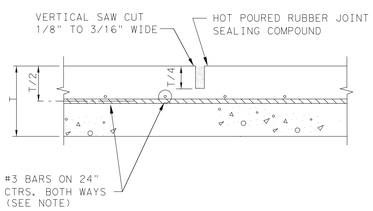
CONSTRUCTION JOINT

N.T.S.



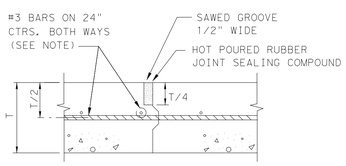
INTEGRAL CURB & GUTTER

N.T.S.



SAWED CONTRACTION JOINT

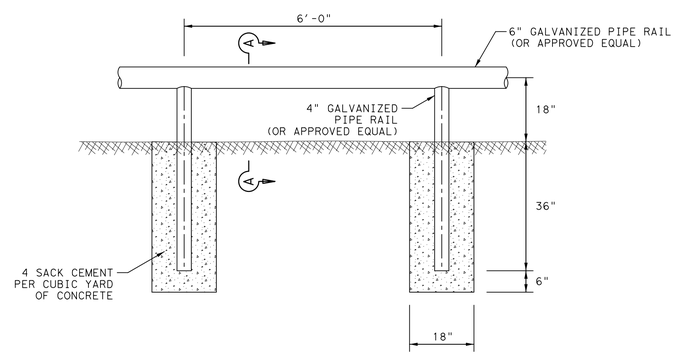
N.T.S.



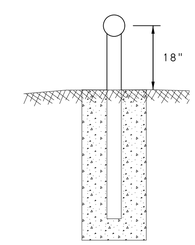
KEYWAY JOINT

(FOR PAVEMENT THICKNESS > 6")
N.T.S.

NOTE:
ALTERNATE REINFORCEMENT
#4 BARS ON 30" CTRS. BOTH WAYS.



PIPE RAIL DETAIL



SECTION A-A

STATE OF TEXAS
TREVOR L. CASTILLO
85405
LICENSED
PROFESSIONAL ENGINEER

8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

MISCELLANEOUS DETAILS

PAVING DETAILS

SHEET 1 OF 4

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-7
APPROVED- CCG	CHECKED- TLC	SCALE-	

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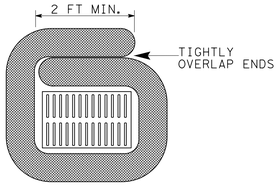


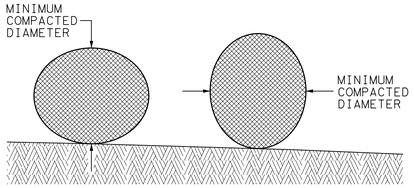
DROP INLET
USE 12" DIAMETER LOG

INLET PROTECTION

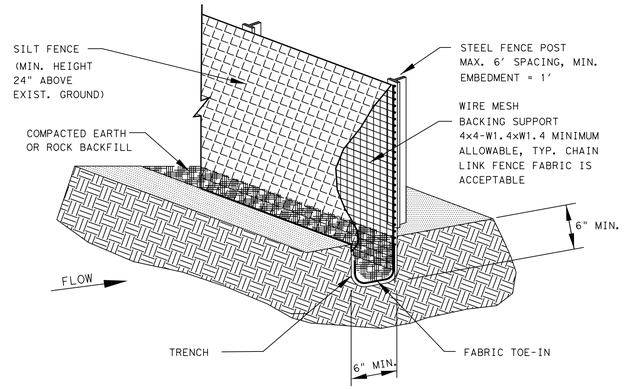
MATERIAL REQUIREMENTS

FILL:
USE 100% SHREDDED MULCH OR OTHER NON-COMPOST BIODEGRADEABLE MATERIAL AS FILL FOR LOGS. NO COMPOST OR FINES. DO NOT USE MATERIAL WHICH PROHIBITS WATER INFILTRATION.

LOG MESH:
USE MESH WITH 1#4" OPENINGS OR LARGER. MESH MUST ALLOW WATER INFILTRATION BUT ALSO HOLD FILL MATERIAL IN PLACE.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS



SILT FENCE

SILT FENCE GENERAL NOTES:

1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF ONE FOOT.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (e.g. PAVEMENT), WEIGHT FABRIC FLAP WITH ROCK ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.

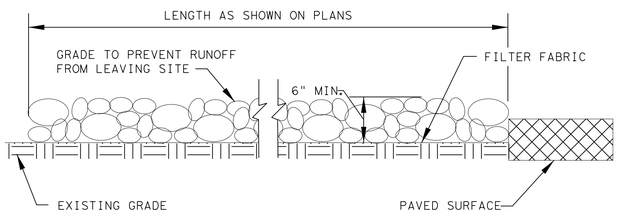
3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS ATTACHED TO THE STEEL FENCE POST. THERE SHALL BE A 3 FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.

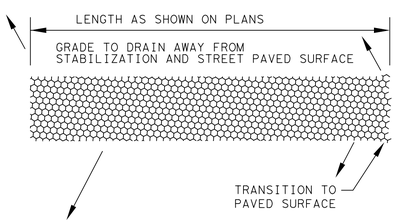
5. INSPECTION SHALL BE MADE EVERY TWO WEEKS AND AFTER EACH 1/2" RAINFALL. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF HALF THE HEIGHT OF THE FENCE. THE SILT SHALL BE DISPOSED OF AT AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.



PROFILE VIEW
N.T.S.



DRAINAGE MUST FLOW AWAY FROM ENTRANCE

PLAN VIEW
N.T.S.

STABILIZED CONSTRUCTION ENTRANCE GENERAL NOTES:

1. STONE SHALL BE 3 TO 5 INCH DIAMETER CRUSHED ROCK OR ACCEPTABLE CRUSHED PORTLAND CEMENT CONCRETE.

2. LENGTH SHALL BE SHOWN ON PLANS, WITH A MINIMUM LENGTH OF 30 FEET FOR LOTS WHICH ARE LESS THAN 150 FEET FROM EDGE OF PAVEMENT. THE MINIMUM DEPTH IN ALL OTHER CASES SHALL BE 50 FEET.

3. THE THICKNESS SHALL NOT BE LESS THAN 6 INCHES.

4. THE WIDTH SHALL BE NO LESS THAN THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.

5. WHEN NECESSARY, VEHICLES SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WITH DRAINAGE FLOWING AWAY FROM BOTH THE STREET AND THE STABILIZED ENTRANCE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED SURFACES. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PAVED SURFACES MUST BE REMOVED IMMEDIATELY.

7. THE ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

STABILIZED CONSTRUCTION ENTRANCE

STATE OF TEXAS
TREVOR L. CASTILLO
85405
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8/14/14

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SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

MISCELLANEOUS DETAILS
EROSION CONTROL DETAILS

SHEET 2 OF 4

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-8
APPROVED- CCG	CHECKED- TLC	SCALE-	

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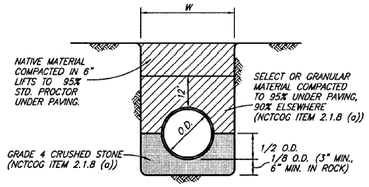
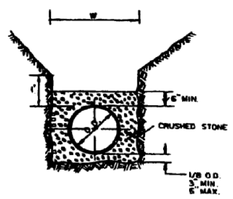


CLASS B+ EMBEDMENT

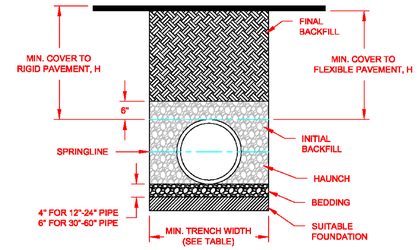
STD PVC WATER OR D.I.P.



CLASS H EMBEDMENT

P.V.C. PIPE ONLY

STD. P.V.C. SEWER INSTALLATION
STD. P.V.C., R.C.C.P & DUCTILE WATER INSTALLATION.



RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4"	21*
6"	23*
8"	26*
10"	28*
12"	30*
15"	34*
18"	39*
24"	48*
30"	56*
36"	64*
42"	72*
48"	80*
54"	88*
60"	96*

NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-900mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

MINIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

	SURFACE LIVE LOADING CONDITION	
PIPE DIAM.	H-25	HEAVY CONSTRUCTION (75T AXLE LOAD) *
12" - 48"	12"	48"
54" - 60"	24"	60"

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER

MINIMUM RECOMMENDED COVER BASED ON RAILWAY LOADING CONDITIONS

PIPE DIAM.	COOPER E-80**
UP TO 24"	24"
30"-36"	36"
42"-60"	48"

** COVER IS MEASURED FROM TOP OF PIPE TO BOTTOM OF RAILWAY TIE.
*** E-80 COVER REQUIREMENTS, ARE ONLY APPLICABLE TO ASTM F 2306 PIPE.

REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
2	ADDED E-80 INFORMATION	TJR	06/20/07	

© 2007 ADS, INC.

ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS DETAIL BASED ON INFORMATION PROVIDED TO ADS. THIS DRAWING IS INTENDED TO DEPICT THE COMPONENTS AS REQUESTED. ADS HAS NOT PERFORMED ANY ENGINEERING OR DESIGN SERVICES FOR THIS PROJECT, NOR HAS ADS INDEPENDENTLY VERIFIED THE INFORMATION SUPPLIED. THE INSTALLATION DETAILS PROVIDED HEREIN ARE GENERAL RECOMMENDATIONS AND ARE NOT SPECIFIC FOR THIS PROJECT. THE DESIGN ENGINEER SHALL REVIEW THESE DETAILS PRIOR TO CONSTRUCTION. IT IS THE DESIGN ENGINEERS RESPONSIBILITY TO ENSURE THE DETAILS PROVIDED HEREIN MEETS OR EXCEEDS THE APPLICABLE NATIONAL, STATE, OR LOCAL REQUIREMENTS AND TO ENSURE THAT THE DETAILS PROVIDED HEREIN ARE ACCEPTABLE FOR THIS PROJECT.

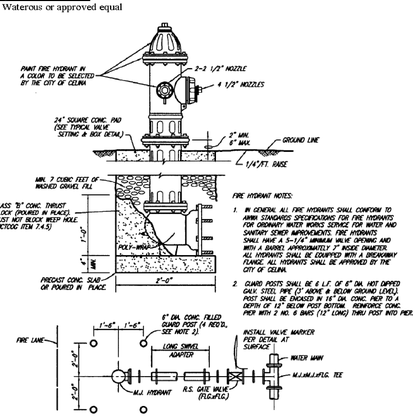
TYPICAL TRENCH DETAIL

DRAWING NUMBER: STD-101

ADS ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OHIO 43026

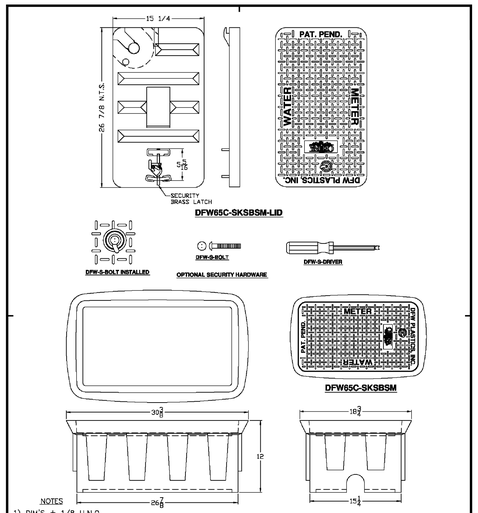
DRAWN BY:	CKG
DATE:	10/15/06
REV. BY:	
SCALE:	NTS
SHEET:	1 OF 1

Fire Hydrant Installation
Note: Waterous or approved equal



TYPICAL FIRE HYDRANT INSTALLATION

NO SCALE



NOTES
1) DIM'S ± 1/8 U.N.O.
2) SNAP LOCK POCKET WILL RECEIVE I-TRON ERT. SNAP LOCK SLOT IS 1.80" ± .015" TO ALLOW FOR A FINGER FORCE INSTALL. POCKET HEIGHT IS 15/16 FOR MIN 1/8" AIR GAP.

DFW PLASTICS, INC.
1001 JARVIS RD.
FORT WORTH, TX. 76179
(817) 439-2600
(817) 439-3700 (f)
www.dfwplasticsinc.com

CITY OF CELINA

DFW65C-SKSBSM

FILE NAME: CITY OF CELINA DFW65C-12-SKSBSM.DWG
UPDATED: 01/28/08
DRAWN BY: J.C.A.
PLOT SCALE: 1:10

STATE OF TEXAS
TREVOR L. CASTILLE
85405
LICENSED PROFESSIONAL ENGINEER
8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

MISCELLANEOUS DETAILS

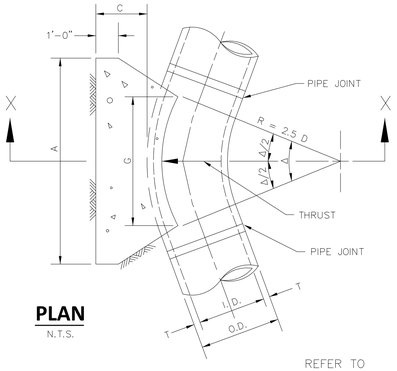
UTILITY DETAILS

SHEET 3 OF 4

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-9
APPROVED- CCG	CHECKED- TLC	SCALE-	

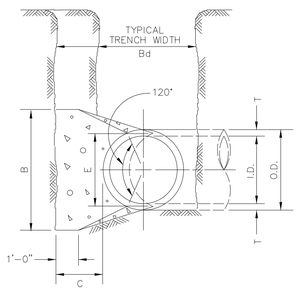
P-201405-01

FILENAME: G:\14002.00\Project\Design\Sheets\01 General\EDGE*DETAILS03.dgn
PLOTTED: 8/14/2014



PLAN
N.T.S.

REFER TO
STD. DWG. No. 4040
FOR GENERAL NOTES.



SECTION X-X
N.T.S.

HORIZONTAL THRUST BLOCK AT PIPE BEND

I.D. (IN.)	T (IN.)	Δ = 11.25° (FT.)	Δ ≥ 22.50° (FT.)	E (FT.)
4,6,8	0.4	1.5	1.5	0.9
10,12	0.5	1.5	1.5	1.2
16,18	0.6	1.5	1.5	1.6
20	0.7	1.5	1.5	1.8
24	0.9	1.5	1.5	2.1
30	2.9	1.5	1.9	2.6
36	4.5	1.5	2.3	3.3
42	5.0	1.8	2.6	3.8
48	5.5	2.0	3.0	4.3
54	6.0	2.3	3.4	4.8
60	6.5	2.5	3.8	5.3
66	6.8	2.8	4.1	5.7
72	7.5	3.0	4.5	6.3
78	7.5	3.3	4.9	6.7
84	8.0	3.5	5.3	7.2
90	8.5	3.8	5.6	7.7
96	9.0	4.0	6.0	8.2

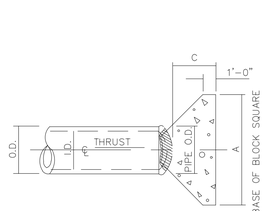
I.D. (IN.)	Δ = 11.25°								I.D. (IN.)	Δ= 22.50°							
			EARTH			ROCK						EARTH			ROCK		
	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)		G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.0	0.4
24	1.1	8.9	3.0	3.5	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.5	0.5
30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8
36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3
42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1
48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.5	6.0	2.8
54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	1.4	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1
60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	1.8	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3
66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2
72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.3	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1
78	3.6	70.2	8.0	9.0	8.1	4.0	9.0	3.9	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7
84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8
90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7
96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8

TABLES OF DIMENSIONS AND QUANTITIES

I.D. (IN.)	Δ = 30°								I.D. (IN.)	Δ = 45°							
			EARTH			ROCK						EARTH			ROCK		
	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)		G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1
10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3
16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6
20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7
24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1
30	3.6	27.5	6.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6
36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.6
42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2
48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3
54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9
60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0
66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2
72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7
78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9
84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6
90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.6
96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5

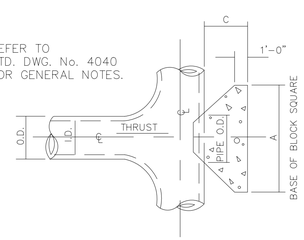
I.D. (IN.)	Δ = 67.50°								I.D. (IN.)	Δ = 90°							
			EARTH			ROCK						EARTH			ROCK		
	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)		G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2
10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12	4.0	16.0	6.5	2.5	1.0	3.5	2.5	0.5
16,18	4.7	28.3	7.5	4.0	1.9	5.5	3.0	0.9	16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0
20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5
24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1
30	7.8	58.9	12.0	5.0	4.8	7.5	4.0	2.2	30	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3
36	9.4	84.9	14.5	6.0	8.2	9.5	4.5	3.8	36	11.9	108.0	18.0	6.0	11.4	12.0	4.5	5.3
42	10.9	115.5	17.0	7.0	12.8	11.0	5.5	6.3	42	13.9	147.0	21.0	7.0	17.8	14.0	5.5	8.7
48	12.5	150.9	19.0	8.0	18.4	13.0	6.0	9.2	48	15.9	192.0	24.0	8.0	26.2	16.0	6.0	12.4
54	14.0	191.0	21.5	9.0	26.0	15.0	6.5	12.9	54	17.9	243.0	27.0	9.0	36.9	18.0	7.0	18.1
60	15.6	235.8	24.0	10.0	35.6	16.0	7.5	17.6	60	19.9	299.8	30.0	10.0	50.3	20.0	7.5	24.0
66	17.1	285.3	26.0	11.0	46.0	18.0	8.0	23.0	66	21.8	362.8	33.0	11.0	66.2	22.0	8.5	32.5
72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72	23.8	431.8	36.0	12.0	85.6	24.0	9.0	41.0
78	20.2	398.5	31.0	13.0	75.7	21.0	9.5	37.4	78	25.7	506.7	39.0	13.0	108.2	26.0	10.0	53.2
84	21.8	462.1	33.5	14.0	94.7	22.0	10.5	46.5	84	27.7	587.7	42.0	14.0	134.4	28.0	10.5	64.8
90	23.3	530.5	35.5	15.0	114.4	24.5	11.0	58.2	90	29.0	674.6	45.0	15.0	164.9	30.0	11.5	81.2
96	24.9	603.6	38.0	16.0	138.9	25.5	12.0	70.0	96	31.6	767.5	48.0	16.0	199.0	32.0	12.0	95.1

TABLES OF DIMENSIONS AND QUANTITIES



PLAN OF PLUG THRUST BLOCK
N.T.S.

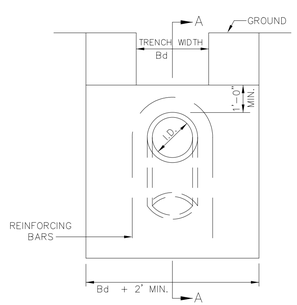
REFER TO
STD. DWG. No. 4040
FOR GENERAL NOTES.



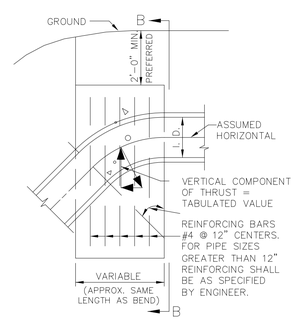
PLAN OF TEE THRUST BLOCK
N.T.S.

I.D. (IN.)	THRUST (TONS)	C (FT.)	EARTH		ROCK	
			A (FT.)	VOL. (C.Y.)	A (FT.)	VOL. (C.Y.)
4,6,8	5.1	1.5	2.5	0.3	2.0	0.2
10,12	11.3	1.5	3.5	0.6	2.5	0.3
16,18	25.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	45.2	2.5	7.0	3.1	5.0	1.7
30	53.0	3.0	7.5	4.1	5.5	2.4
36	76.3	4.0	9.0	7.3	6.5	4.2
42	104.0	4.5	10.5	11.0	7.5	6.2
48	136.0	5.0	12.0	15.6	8.5	8.7
54	172.0	5.5	13.5	21.4	9.5	11.9
60	212.0	6.0	15.0	28.4	10.5	15.7
66	257.0	6.5	16.5	36.8	11.5	20.5
72	305.0	7.5	17.5	47.2	12.5	27.2
78	358.0	8.0	19.0	58.9	13.5	33.7
84	416.0	8.5	20.5	72.3	14.5	41.2
90	477.0	9.0	22.0	87.7	15.5	49.7
96	543.0	9.5	23.5	104.8	16.5	61.0

HORIZONTAL THRUST BLOCK AT TEES AND PLUGS



ELEVATION "B-B"
N.T.S.



SECTION "A-A"
N.T.S.

Δ →	11.25°		22.50°		30°		45°		67.50°		90°		← Δ
I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	I.D. (IN.)
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96

VERTICAL THRUST BLOCK AT PIPE BEND

GENERAL NOTES FOR ALL THRUST BLOCKS

1. CONCRETE FOR BLOCKING SHALL BE CLASS "B".
2. ALL CALCULATIONS ARE BASED ON INTERNAL PRESSURE OF 200 PSI FOR DUCTILE IRON, P.V.C., AND 150 PSI FOR CONCRETE PIPE.
3. VOLUMES OF THRUST BLOCKS ARE NET VOLUMES OF CONCRETE TO BE FURNISHED. THE CORRESPONDING WEIGHT OF THE CONCRETE (CLASS "B") IS EQUAL TO OR GREATER THAN THE VERTICAL COMPONENT OF THE THRUST ON THE VERTICAL BEND.
4. WALL THICKNESS (T) ASSUMED HERE FOR ESTIMATING PURPOSES ONLY.
5. POUR CONCRETE FOR BLOCK AGAINST UNDISTURBED EARTH.
6. DIMENSIONS MAY BE VARIED AS REQUIRED BY FIELD CONDITIONS WHERE AND AS DIRECTED BY THE ENGINEER. THE VOLUME OF CONCRETE BLOCKING SHALL NOT BE LESS THAN SHOWN HERE.
7. THE SOIL BEARING PRESSURES ARE BASED ON 1000 LBS./S.F. IN SOIL AND 2000 LBS./S.F. IN ROCK.
8. USE POLYETHYLENE WRAP OR EQUAL BETWEEN CONCRETE AND BEND, TEE, OR PLUG TO PREVENT THE CONCRETE FROM STICKING TO IT.
9. CONCRETE SHALL NOT EXTEND BEYOND JOINTS.

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER
8/14/14

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1515 HERITAGE DRIVE, STE. 212
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SOUTHWEST CUSTER, LLC
LOTS 1 & 2, BLOCK A
EDGEMON ADDITION
ETJ OF CELINA, COLLIN COUNTY, TEXAS

MISCELLANEOUS DETAILS
THRUST BLOCK DETAILS

SHEET 4 OF 4

DESIGNED- TLC	DRAWN- JRK	DATE- 8/14/2014	C-10
APPROVED- CCG	CHECKED- TLC	SCALE-	

P-201405-01

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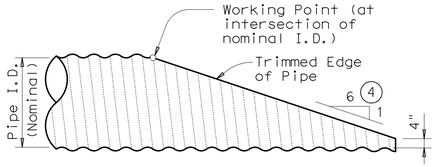
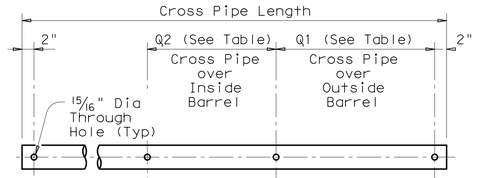


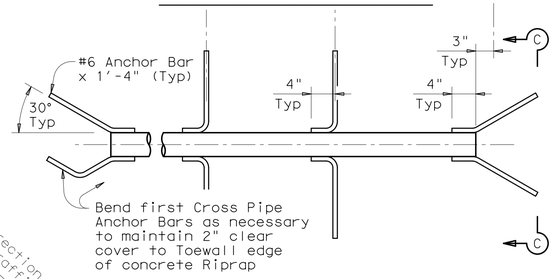
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

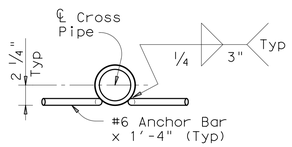
(Showing Corrugated Metal Pipe Culvert.)
(Details at Concrete Pipe Culvert are similar.)



PIPE W/ BOLTED ANCHOR

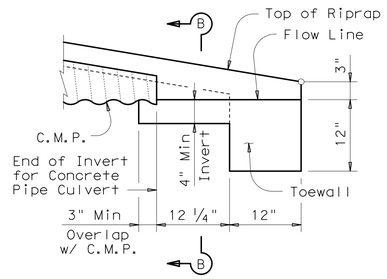


PIPE W/ ANCHOR BARS



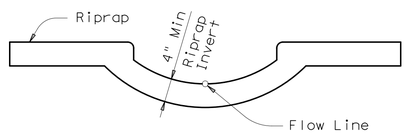
SECTION C-C

CROSS PIPE DETAILS



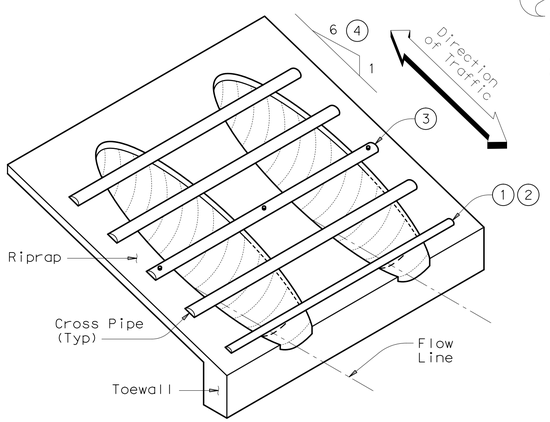
DETAIL "A"

(Showing Invert with Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Cross Pipes not shown for clarity.)

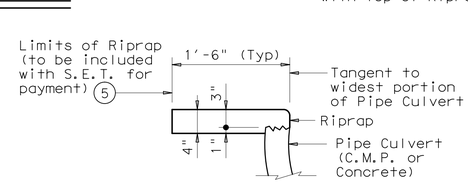


SECTION B-B

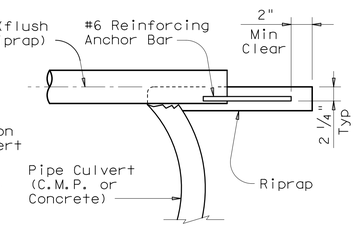
(Cross Pipes not shown for clarity.)



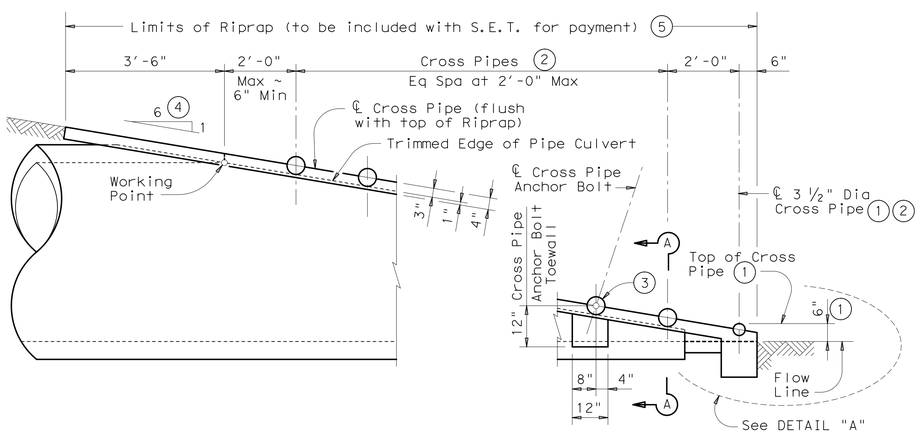
ISOMETRIC VIEW OF TYPICAL INSTALLATION



SHOWING TYPICAL PIPE CULVERT & RIPRAP

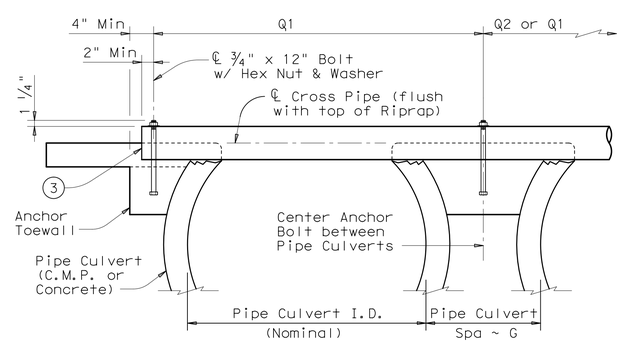


SHOWING CROSS PIPE WITH ANCHOR BAR



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES (2)							
Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	9"	N/A	2'- 1"	1'- 9"	3 or more Pipe Culverts	3" Std (3.500" O.D.)
15"	0.7	11"	N/A	2'- 5"	2'- 2"		
18"	0.8	1'- 2"	N/A	2'-10"	2'- 8"		
21"	0.9	1'- 4"	N/A	3'- 2"	3'- 1"		
24"	0.9	1'- 7"	N/A	3'- 6"	3'- 7"		
27"	1.0	1'- 8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'- 2"	4'- 4"	2 or more Pipe Culverts	
33"	1.2	1'-11"	4'- 2"	4'- 5"	4'- 8"	All Pipe Culverts	
36"	1.3	2'- 1"	4'- 5"	4'- 9"	5'- 1"	All Pipe Culverts	4" Std (4.500" O.D.)
42"	1.5	2'- 4"	4'-11"	5'- 5"	5'-10"		
48"	1.7	2'- 7"	5'- 5"	6'- 0"	6'- 7"	All Pipe Culverts	5" Std (5.563" O.D.)
54"	2.0	3'- 0"	5'-11"	6'- 9"	7'- 6"		
60"	2.2	3'- 3"	6'- 5"	7'- 4"	8'- 3"		
66"	2.4	3'- 3"	6'-11"	7'-10"	8'- 9"		
72"	2.7	3'- 4"	7'- 5"	8'- 5"	9'- 4"		

1. The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.
2. Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).
3. The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.
4. Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.
5. Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
6. Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO. D-1

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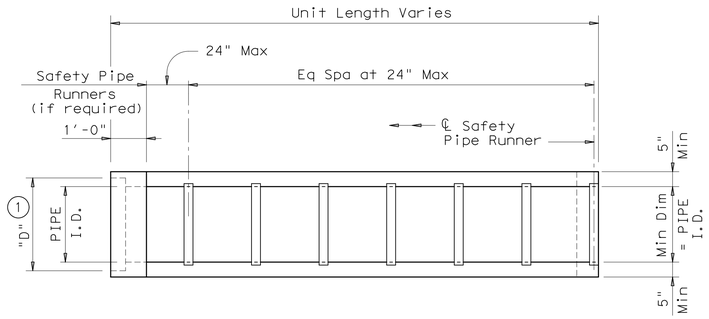
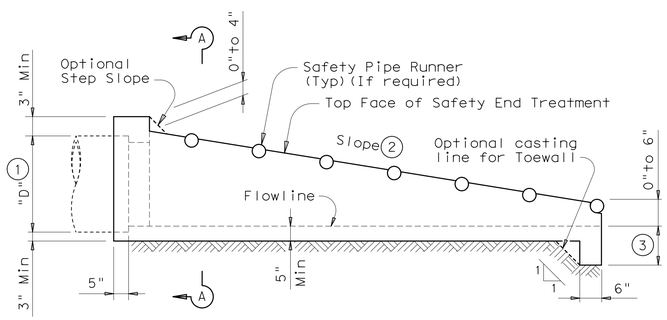
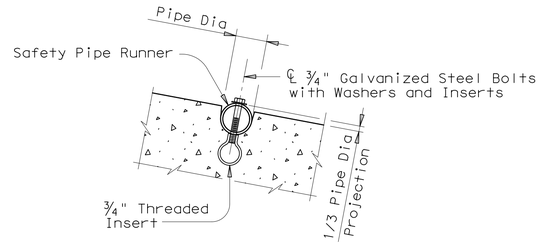


PLAN

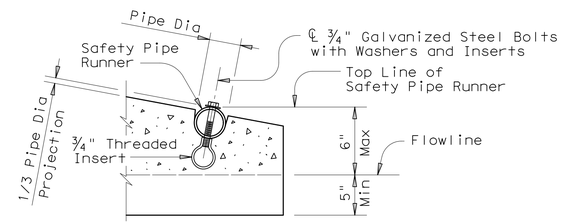


LONGITUDINAL ELEVATION

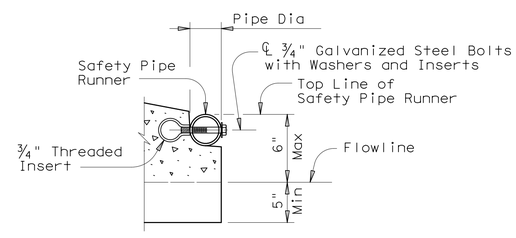


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

PIPE I.D.	PIPE WALL "B" THICKNESS	(1) "D"	MAXIMUM SLOPE	MINIMUM LENGTH OF UNIT	PIPE RUNNERS REQUIRED		REQUIRED PIPE RUNNER SIZES		
					SINGLE PIPE	MULTIPLE PIPE	NOMINAL DIA.	O.D.	I.D.
12"	2"	17"	6:1	4'-9"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	20 ½"	6:1	6'-5"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	24"	6:1	8'-0"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
24"	3"	31"	6:1	11'-3"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	38 ½"	6:1	14'-8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	45 ½"	6:1	17'-11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	52 ½"	6:1	21'-2"	Yes	Yes	4" STD	4.500"	4.026"

(1) Dimension "D" is based on ASTM C-76, Class III, Wall "B" thickness. If any other wall thickness is used, dimension "D" must be adjusted accordingly.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) The top 4" of void between Precast End Treatments shall be filled with concrete Riprap and shall be considered subsidiary to Safety End Treatment.

(5) Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.

(6) Cement stabilized bedding and backfill shall be in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill shall be considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill shall be as directed by Engineer.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture of this product shall conform to requirements of Item "Safety End Treatment" except as noted below :

A. Minimum reinforcing shall be #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6 x 6 - W12 x W12 or 5 x 5 - W10 x W10 welded wire fabric.

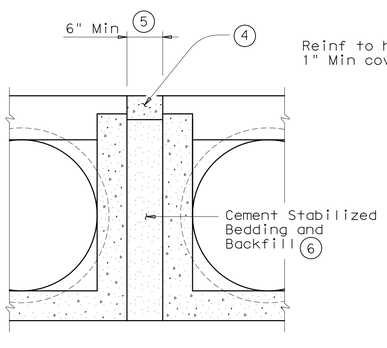
B. Concrete for precast (steel formed) sections shall be Class "C" with a minimum compressive strength of 3600 psi.

At the option and expense of the Contractor the next larger size of Safety End Treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

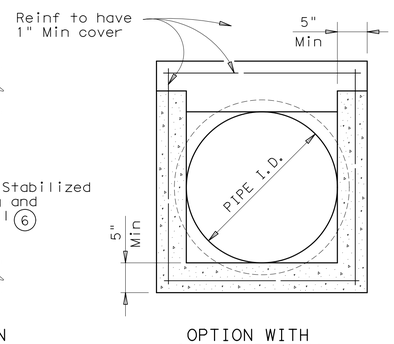
Pipe Runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Pipe Runners shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

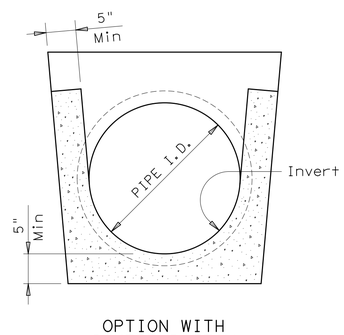
All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



MULTIPLE PIPE INSTALLATION

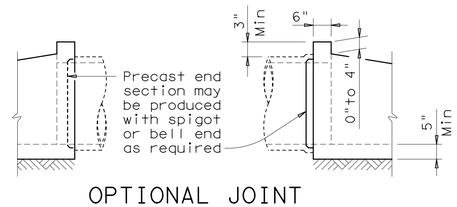


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT

(Showing joint between RCP and Precast Safety End Treatment)

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

PSET-SP

FILE: psetspse.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
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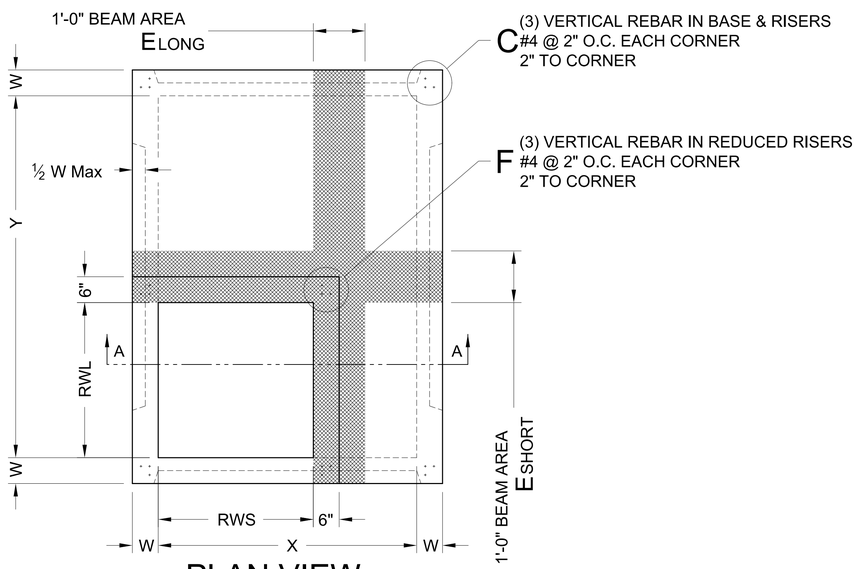
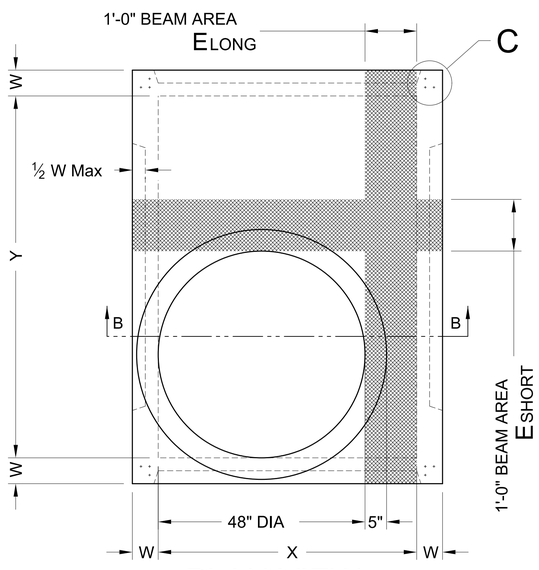


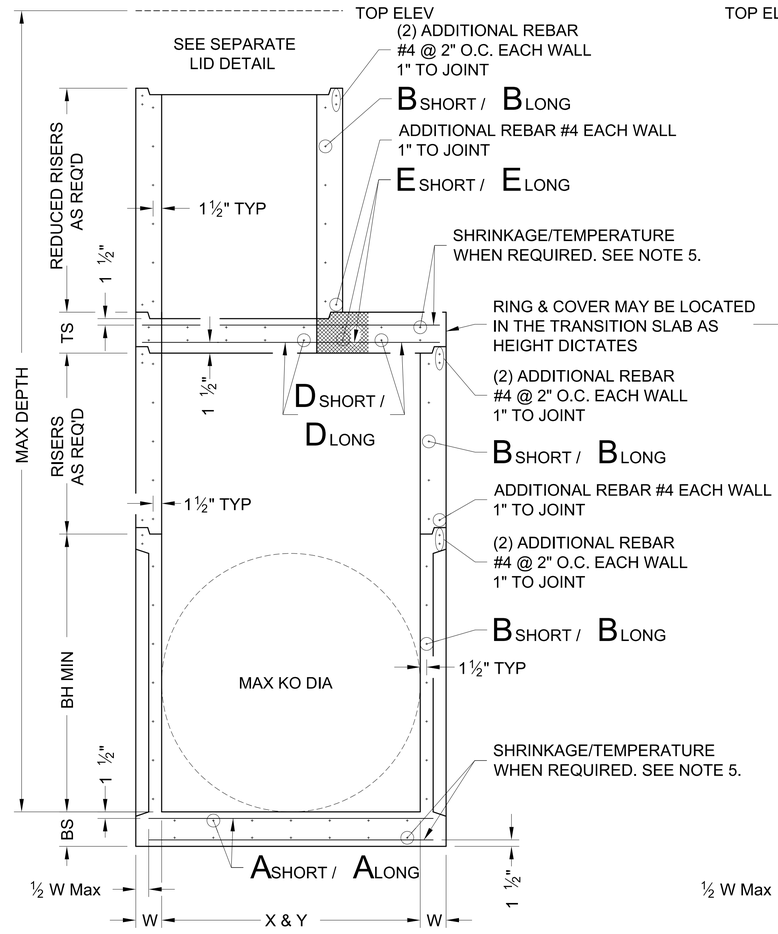
PLAN VIEW

SQUARE REDUCED RISER OPTION



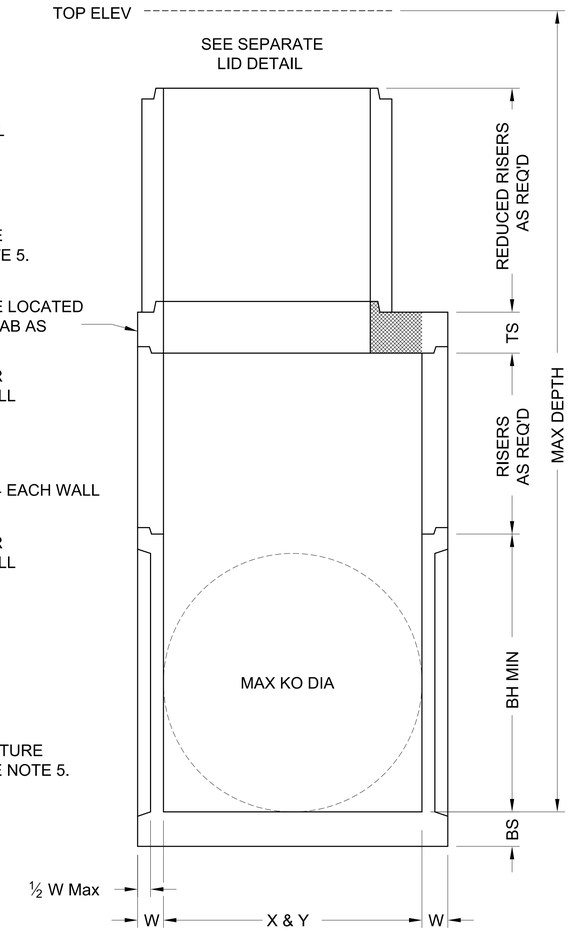
PLAN VIEW

ROUND REDUCED RISER OPTION



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
5. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel.
6. No substitution is allowed for vertical and horizontal #4 bars in corners.
7. Manufacture base and risers to nearest 3" increment.
8. Inverts (benching) to be provided by Contractor.
9. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
10. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
11. Do not grout rubber gasket joints without Manufacturer's recommendation.
12. Provide lifting devices in conformance with Manufacturer's recommendations.
13. See Standard Inlet and Manhole Program Guide for information not shown.
14. Payment for precast base is subsidiary to the specified inlet or manhole, per Item 465, "Manholes and Inlets."

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

PRECAST BASE

TYPE PB

FILE: prestd01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	DIST	COUNTY		SHEET NO.
				D-3

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FILE:

	To 15 Feet Top of Base Slab															To 25 Feet Top of Base Slab																
	Base Slab				Base Unit or Riser Walls				Below Grade Slab				Transition Slab*			Base Slab				Base Unit or Riser Walls				Below Grade Slab				Transition Slab**				
Size	Short Span	Long Span	Steel Depth	Thickness	Short Span	Long Span	Steel Depth	Thickness	Short Span	Long Span	Steel Depth	Thickness	Riser Size	Short Beam	Long Beam	Short Span	Long Span	Steel Depth	Thickness	Short Span	Long Span	Steel Depth	Thickness	Short Span	Long Span	Steel Depth	Thickness	Riser Size	Short Beam	Long Beam	Min Height	Max KO DIA***
XxY	Ashort	Along	As & Al	BS	Bshort	Blong	Bs & Bl	W	Dshort	Dlong	Ds & Dl	TS	RWS x RWL or ID	Eshort	Elong	Ashort	Along	As & Al	BS	Bshort	Blong	Bs & Bl	W	Dshort	Dlong	Ds & Dl	TS	RWS x RWL or ID	Eshort	Elong	BH MIN	KO DIA
Feet	in^2/ft	in^2/ft	Inches	Inches	in^2/ft	in^2/ft	Inches	Inches	in^2/ft	in^2/ft	Inches	Inches	Feet**	in^2/ft	in^2/ft	in^2/ft	in^2/ft	Inches	Inches	in^2/ft	in^2/ft	Inches	Inches	in^2/ft	in^2/ft	Inches	Inches	Feet**	in^2/ft	in^2/ft	Feet	Inches
3x3	0.20	0.20	4.25	6	0.19	0.19	4.25	6	0.37	0.37	7	9	N/A	N/A	N/A	0.29	0.29	4.25	6	0.24	0.24	4.25	6	0.37	0.37	7	9	N/A	N/A	N/A	2.5	36
4x4	0.29	0.29	4.25	6	0.24	0.24	4.25	6	0.41	0.41	7	9	N/A	N/A	N/A	0.47	0.47	4.25	6	0.38	0.38	4.25	6	0.41	0.41	7	9	N/A	N/A	N/A	4.5	48
3x5	0.29	0.18	4.25	6	0.19	0.35	4.25	6	0.48	0.48	7	9	N/A	N/A	N/A	0.39	0.18	4.25	6	0.23	0.59	4.25	6	0.48	0.48	7	9	N/A	N/A	N/A	2.5	36/60
3x5	0.29	0.18	4.25	6	0.19	0.35	4.25	6	N/A	N/A	7	9	3x3	0.30	0.34	0.39	0.18	4.25	6	0.23	0.59	4.25	6	N/A	N/A	7	9	3x3	0.4	0.4	2.5	36/60
4x5	0.36	0.18	4.25	6	0.22	0.34	4.25	6	0.42	0.42	7	9	N/A	N/A	N/A	0.53	0.26	4.25	6	0.39	0.59	4.25	6	0.42	0.42	7	9	N/A	N/A	N/A	4.5	48/60
4x5	0.36	0.18	4.25	6	0.22	0.34	4.25	6	N/A	N/A	7	9	3x3	0.30	0.30	0.53	0.26	4.25	6	0.39	0.59	4.25	6	N/A	N/A	7	9	3x3	0.46	0.37	4.5	48/60
4x5	0.36	0.18	4.25	6	0.22	0.34	4.25	6	N/A	N/A	7	9	4x4	0.30	0.30	0.53	0.26	4.25	6	0.39	0.59	4.25	6	N/A	N/A	7	9	4x4	0.39	0.39	4.5	48/60
4x5	0.36	0.18	4.25	6	0.22	0.34	4.25	6	N/A	N/A	7	9	48"	0.39	0.39	0.53	0.26	4.25	6	0.39	0.59	4.25	6	N/A	N/A	7	9	48"	0.47	0.47	4.5	48/60
4x5	0.36	0.18	4.25	6	0.22	0.34	4.25	6	N/A	N/A	7	9	3x5	0.33	0.40	0.53	0.26	4.25	6	0.39	0.59	4.25	6	N/A	N/A	7	9	3x5	0.48	0.48	4.5	48/60
5x5	0.36	0.36	4.25	6	0.34	0.34	4.25	6	0.43	0.43	7	9	N/A	N/A	N/A	0.62	0.62	4.25	6	0.59	0.59	4.25	6	0.43	0.43	7	9	N/A	N/A	N/A	5.5	60
5x5	0.36	0.36	4.25	6	0.34	0.34	4.25	6	N/A	N/A	7	9	3x3	0.34	0.34	0.62	0.62	4.25	6	0.59	0.59	4.25	6	N/A	N/A	7	9	3x3	0.53	0.53	5.5	60
5x5	0.36	0.36	4.25	6	0.34	0.34	4.25	6	N/A	N/A	7	9	4x4	0.36	0.36	0.62	0.62	4.25	6	0.59	0.59	4.25	6	N/A	N/A	7	9	4x4	0.64	0.64	5.5	60
5x5	0.36	0.36	4.25	6	0.34	0.34	4.25	6	N/A	N/A	7	9	48"	0.36	0.36	0.62	0.62	4.25	6	0.59	0.59	4.25	6	N/A	N/A	7	9	48"	0.64	0.64	5.5	60
5x5	0.36	0.36	4.25	6	0.34	0.34	4.25	6	N/A	N/A	7	9	3x5	0.34	0.40	0.62	0.62	4.25	6	0.59	0.59	4.25	6	N/A	N/A	7	9	3x5	0.53	0.53	5.5	60
5x6	0.27	0.27	6.25	8	0.34	0.45	4.25	6	0.48	0.48	7	9	N/A	N/A	N/A	0.47	0.45	6.25	8	0.38	0.54	6.25	8	0.48	0.48	7	9	N/A	N/A	N/A	5.5	60/72
5x6	0.27	0.27	6.25	8	0.34	0.45	4.25	6	N/A	N/A	7	9	3x3	0.34	0.34	0.47	0.45	6.25	8	0.38	0.54	6.25	8	N/A	N/A	7	9	3x3	0.61	0.5	5.5	60/72
5x6	0.27	0.27	6.25	8	0.34	0.45	4.25	6	N/A	N/A	7	9	4x4	0.36	0.45	0.47	0.45	6.25	8	0.38	0.54	6.25	8	N/A	N/A	7	9	4x4	0.74	0.57	5.5	60/72
5x6	0.27	0.27	6.25	8	0.34	0.45	4.25	6	N/A	N/A	7	9	48"	0.36	0.45	0.47	0.45	6.25	8	0.38	0.54	6.25	8	N/A	N/A	7	9	48"	0.74	0.57	5.5	60/72
5x6	0.27	0.27	6.25	8	0.34	0.45	4.25	6	N/A	N/A	7	9	3x5	0.45	0.45	0.47	0.45	6.25	8	0.38	0.54	6.25	8	N/A	N/A	7	9	3x5	0.61	0.61	5.5	60/72
6x6	0.27	0.27	6.25	8	0.45	0.45	4.25	6	0.56	0.56	7	9	N/A	N/A	N/A	0.52	0.52	6.25	8	0.54	0.54	6.25	8	0.56	0.56	7	9	N/A	N/A	N/A	6.5	72
6x6	0.27	0.27	6.25	8	0.45	0.45	4.25	6	N/A	N/A	7	9	3x3	0.41	0.41	0.52	0.52	6.25	8	0.54	0.54	6.25	8	N/A	N/A	7	9	3x3	0.74	0.74	6.5	72
6x6	0.27	0.27	6.25	8	0.45	0.45	4.25	6	N/A	N/A	7	9	4x4	0.45	0.45	0.52	0.52	6.25	8	0.54	0.54	6.25	8	N/A	N/A	7	9	4x4	0.87	0.87	6.5	72
6x6	0.27	0.27	6.25	8	0.45	0.45	4.25	6	N/A	N/A	7	9	48"	0.45	0.45	0.52	0.52	6.25	8	0.54	0.54	6.25	8	N/A	N/A	7	9	48"	0.87	0.87	6.5	72
6x6	0.27	0.27	6.25	8	0.45	0.45	4.25	6	N/A	N/A	7	9	3x5	0.45	0.45	0.52	0.52	6.25	8	0.54	0.54	6.25	8	N/A	N/A	7	9	3x5	0.87	0.87	6.5	72
8x8	0.52	0.52	6.25	8	0.51	0.51	6.25	8	0.45	0.45	10	12	N/A	N/A	N/A	0.87	0.87	6.25	8	0.70	0.70	8.25	10	0.45	0.45	10	12	N/A	N/A	N/A	8.5	72
8x8	0.52	0.52	6.25	8	0.51	0.51	6.25	8	N/A	N/A	10	12	3x3	0.61	0.61	0.91	0.91	6.25	8	0.70	0.70	8.25	10	N/A	N/A	10	12	3x3	0.85	0.85	8.5	72
8x8	0.52	0.52	6.25	8	0.51	0.51	6.25	8	N/A	N/A	10	12	4x4	0.70	0.70	0.87	0.87	6.25	8	0.70	0.70	8.25	10	N/A	N/A	10	12	4x4	1.01	1.01	8.5	72
8x8	0.52	0.52	6.25	8	0.51	0.51	6.25	8	N/A	N/A	10	12	48"	0.70	0.70	0.87	0.87	6.25	8	0.70	0.70	8.25	10	N/A	N/A	10	12	48"	1.01	1.01	8.5	72
8x8	0.52	0.52	6.25	8	0.51	0.51	6.25	8	N/A	N/A	10	12	3x5	0.70	0.85	0.87	0.87	6.25	8	0.70	0.70	8.25	10	N/A	N/A	10	12	3x5	1.01	1.01	8.5	72

Note: all temperature and shrinkage steel area = 0.11 in^2/ft E.W.

Maximum spacing of reinforcement is 8"

* Note: detailed reinforcement is in addition to normal below grade slab requirements.

** Unless otherwise indicated.

*** Thin wall panels (KO) are optional. Holes may be cast or cored to no more than Maximum KO DIA at manufacturer's option. Where no penetration is required it is acceptable to provide a wall with no sectional reduction. Refer to manual for information.

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DATE:
FILE:

HL93 LOADING SHEET 2 OF 2

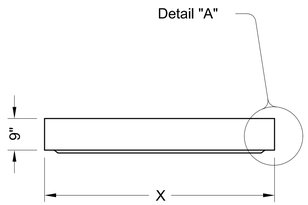
Texas Department of Transportation — Bridge Division Standard

PRECAST BASE

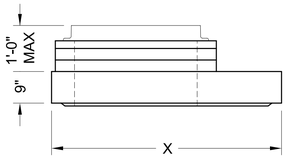
TYPE PB

FILE: prestd01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				D-4

P-201405-01



ELEVATION VIEW



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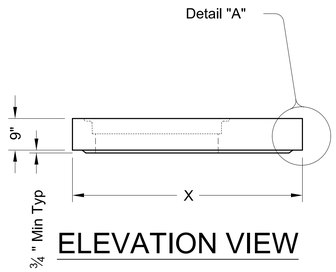

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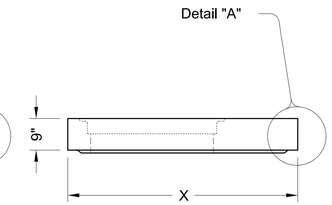

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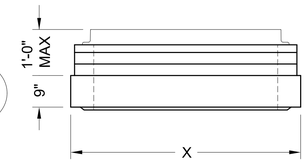

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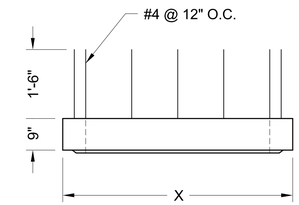

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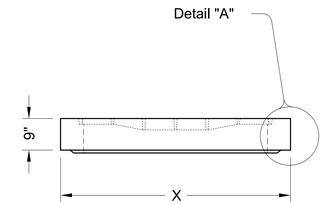
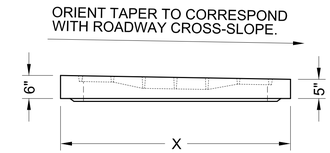
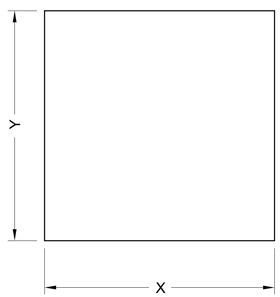


STYLE 'FG'

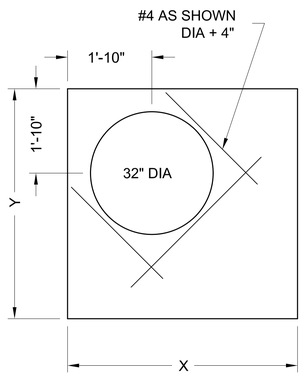


STYLE 'SFG'
ELEVATION VIEW



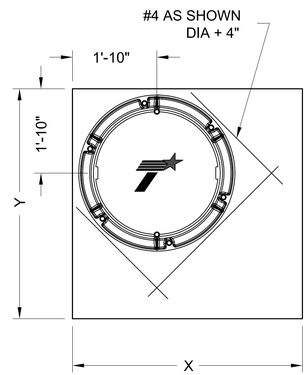
PLAN VIEW
NO OPENINGS

STYLE 'SL'



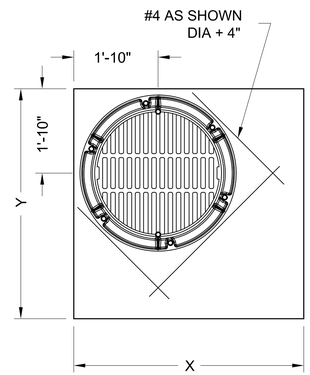
PLAN VIEW
SHIP LOOSE RING & COVER

STYLE 'RH'



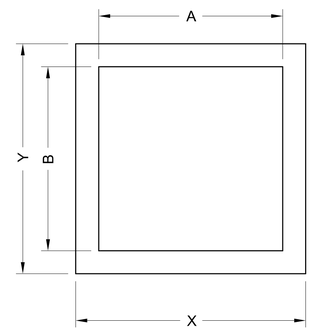
PLAN VIEW
32" DIA CAST-IN RING & COVER

STYLE 'RC'



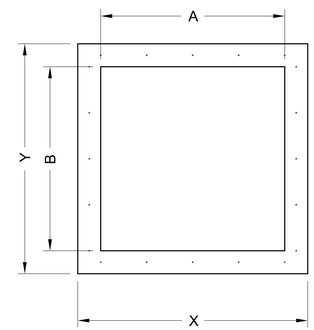
PLAN VIEW
32" DIA CAST-IN RING & GRATE

STYLE 'RG'



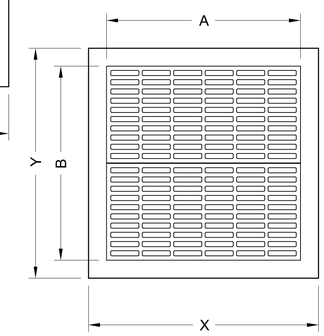
PLAN VIEW
SHIP LOOSE FRAME & GRATE

STYLE 'SH'



PLAN VIEW
EXPOSED REBAR

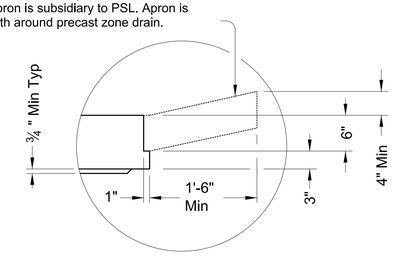
STYLE 'S1'



PLAN VIEW
CAST-IN FRAME & GRATE

STYLES 'FG' & 'SFG'

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"
(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Precast solid lids are intended for direct traffic and may be placed in roadway.
3. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner.
4. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
5. Provide Grade 60 reinforcing steel or equivalent area of WWR.
6. Provide clear cover of ¾" to reinforcing from bottom of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
7. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. See standard PB for more information.
8. No substitution is allowed for diagonal #4 bars around openings.
9. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
10. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
11. Do not grout rubber gasket joints without Manufacturer's recommendation.
12. Provide lifting devices in conformance with Manufacturer's recommendations.
13. See approved industry Cast Iron Product Standards for details of castings.
14. See Standard Inlet and Manhole Program Guide for information not shown.
15. Payment for inlet is per Item 465, "Manholes and Inlets" by type, size, and opening (when applicable).

Size	X x Y	A x B	Short Span Steel Area	Long Span Steel Area
3'x3'	4'x4'	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
* 3'x3'	4'x4'	3'x3'	0.32 in²/ft	0.32 in²/ft
4'x4'	5'x5'	3'x3' or 32" Dia	0.34 in²/ft	0.34 in²/ft
* 4'x4'	5'x5'	4'x4'	0.32 in²/ft	0.32 in²/ft
4'x4'	5'x5'	4'x4'	0.34 in²/ft	0.34 in²/ft
3'x5'	4'x6'	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
3'x5'	4'x6'	3'x5'	0.48 in²/ft	0.48 in²/ft
* 3'x5'	4'x6'	3'x5'	0.32 in²/ft	0.32 in²/ft
4'x5'	5'x6'	3'x3' or 32" Dia	0.38 in²/ft	0.38 in²/ft
4'x5'	5'x6'	3'x4'	0.57 in²/ft	0.57 in²/ft
4'x5'	5'x6'	3'x5'	0.66 in²/ft	0.71 in²/ft
5'x5'	6'x6'	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
5'x5'	6'x6'	3'x4'	0.43 in²/ft	0.43 in²/ft
5'x5'	6'x6'	3'x5'	0.63 in²/ft	0.68 in²/ft
5'x6'	6'x7'	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
5'x6'	6'x7'	3'x4'	0.60 in²/ft	0.56 in²/ft
5'x6'	6'x7'	3'x5'	0.37 in²/ft	0.32 in²/ft
6'x6'	7'x7'	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
6'x6'	7'x7'	3'x4'	0.56 in²/ft	0.56 in²/ft
6'x6'	7'x7'	3'x5'	0.56 in²/ft	0.56 in²/ft
8'x8'	9'x9'	3'x3' or 32" Dia	0.36 in²/ft	0.36 in²/ft
8'x8'	9'x9'	3'x4'	0.36 in²/ft	0.36 in²/ft
8'x8'	9'x9'	3'x5'	0.36 in²/ft	0.36 in²/ft

* These sizes and designs are applicable to style 'SFG' only.

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

PRECAST SOLID LID

TYPE PSL

FILE: prestd05.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST		COUNTY	SHEET NO. D-5

P-201405-01

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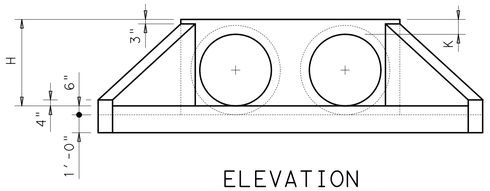
FILE:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

SLOPE	DIA OF PIPE, D	Values for one Pipe: W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be added for each addt'l Pipe: X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4'- 7 1/2"	2'- 6"	2'-10"	3'- 3 1/4"	84	0.6	1'- 9"	20	0.2
	15"	5'- 5 3/4"	2'- 9 1/2"	3'- 4"	3'-10 1/4"	99	0.7	2'- 2"	24	0.3
	18"	6'- 4 1/4"	3'- 1"	3'-10"	4'- 5"	120	0.9	2'- 8"	32	0.3
	21"	7'- 2 3/4"	3'- 4 1/2"	4'- 4"	5'- 0"	137	1.1	3'- 1"	43	0.4
	24"	8'- 2 1/2"	3'- 9 1/2"	4'-10"	5'- 7"	158	1.3	3'- 7"	50	0.5
	27"	9'- 1"	4'- 1"	5'- 4"	6'- 2"	173	1.5	3'-11"	56	0.6
	30"	9'-11 1/2"	4'- 4 1/2"	5'-10"	6'- 8 3/4"	197	1.7	4'- 4"	65	0.8
	33"	10'-10"	4'- 8"	6'- 4"	7'- 3 3/4"	216	2.0	4'- 8"	71	0.9
	36"	11'- 8 1/4"	4'-11 1/2"	6'-10"	7'-10 3/4"	241	2.2	5'- 1"	81	1.0
	42"	13'- 5 1/4"	5'- 6 1/2"	7'-10"	9'- 0 1/2"	290	2.8	5'-10"	97	1.3
	48"	15'- 9"	6'- 1 1/2"	9'- 4"	10'- 9 1/4"	350	3.8	6'- 7"	117	1.7
	54"	17'- 5 3/4"	6'- 8 1/2"	10'- 4"	11'-11 1/4"	415	4.5	7'- 6"	151	2.1
	60"	19'- 2 3/4"	7'- 3 1/2"	11'- 4"	13'- 1"	469	5.3	8'- 3"	174	2.5
	66"	20'-11 1/2"	7'-10 1/2"	12'- 4"	14'- 3"	530	6.2	8'- 9"	194	2.9
	72"	22'- 8 1/2"	8'- 5 1/2"	13'- 4"	15'- 4 3/4"	587	7.1	9'- 4"	213	3.3
3:1	12"	6'- 3"	2'- 6"	4'- 3"	4'-11"	114	0.8	1'- 9"	22	0.2
	15"	7'- 5"	2'- 9 1/2"	5'- 0"	5'- 9 1/4"	133	1.1	2'- 2"	28	0.3
	18"	8'- 6 3/4"	3'- 1"	5'- 9"	6'- 7 3/4"	166	1.3	2'- 8"	37	0.5
	21"	9'- 8 3/4"	3'- 4 1/2"	6'- 6"	7'- 6"	189	1.6	3'- 1"	48	0.6
	24"	11'- 0"	3'- 9 1/2"	7'- 3"	8'- 4 1/2"	221	2.0	3'- 7"	58	0.7
	27"	12'- 2"	4'- 1"	8'- 0"	9'- 2 3/4"	245	2.3	3'-11"	67	0.8
	30"	13'- 4"	4'- 4 1/2"	8'- 9"	10'- 1 1/4"	287	2.7	4'- 4"	77	1.0
	33"	14'- 5 3/4"	4'- 8"	9'- 6"	10'-11 3/4"	310	3.1	4'- 8"	84	1.2
	36"	15'- 7 3/4"	4'-11 1/2"	10'- 3"	11'-10"	343	3.5	5'- 1"	96	1.4
	42"	17'-11 1/2"	5'- 6 1/2"	11'- 9"	13'- 6 3/4"	424	4.5	5'-10"	119	1.7
	48"	21'- 1 3/4"	6'- 1 1/2"	14'- 0"	16'- 2"	527	6.1	6'- 7"	146	2.3
	54"	23'- 5 1/2"	6'- 8 1/2"	15'- 6"	17'-10 3/4"	618	7.3	7'- 6"	186	2.9
	60"	25'- 9 1/4"	7'- 3 1/2"	17'- 0"	19'- 7 1/2"	707	8.7	8'- 3"	219	3.4
	66"	28'- 1"	7'-10 1/2"	18'- 6"	21'- 4 1/4"	797	10.1	8'- 9"	242	3.9
	72"	30'- 4 3/4"	8'- 5 1/2"	20'- 0"	23'- 1 1/4"	910	11.7	9'- 4"	272	4.4
4:1	12"	7'-10 3/4"	2'- 6"	5'- 8"	6'- 6 1/2"	144	1.1	1'- 9"	24	0.3
	15"	9'- 4"	2'- 9 1/2"	6'- 8"	7'- 8 1/2"	177	1.5	2'- 2"	32	0.4
	18"	10'- 9 1/2"	3'- 1"	7'- 8"	8'-10 1/4"	217	1.9	2'- 8"	42	0.5
	21"	12'- 2 3/4"	3'- 4 1/2"	8'- 8"	10'- 0"	254	2.3	3'- 1"	57	0.7
	24"	13'- 9 1/2"	3'- 9 1/2"	9'- 8"	11'- 2"	295	2.8	3'- 7"	67	0.9
	27"	15'- 3"	4'- 1"	10'- 8"	12'- 3 3/4"	328	3.3	3'-11"	77	1.0
	30"	16'- 8 1/4"	4'- 4 1/2"	11'- 8"	13'- 5 3/4"	379	3.8	4'- 4"	89	1.3
	33"	18'- 1 3/4"	4'- 8"	12'- 8"	14'- 7 1/2"	417	4.5	4'- 8"	101	1.4
	36"	19'- 7"	4'-11 1/2"	13'- 8"	15'- 9 1/4"	464	5.1	5'-1"	115	1.7
	42"	22'- 5 3/4"	5'- 6 1/2"	15'- 8"	18'- 1"	575	6.5	5'-10"	141	2.1
	48"	26'- 6 1/4"	6'- 1 1/2"	18'- 8"	21'- 6 3/4"	720	8.9	6'- 7"	175	2.8
	54"	29'- 5"	6'- 8 1/2"	20'- 8"	23'-10 1/4"	863	10.7	7'- 6"	226	3.6
	60"	32'- 3 3/4"	7'- 3 1/2"	22'- 8"	26'- 2"	984	12.7	8'- 3"	264	4.3
	66"	35'- 2 1/2"	7'-10 1/2"	24'- 8"	28'- 5 3/4"	1126	14.9	8'- 9"	300	4.9
	72"	38'- 1 1/4"	8'- 5 1/2"	26'- 8"	30'- 9 1/2"	1283	17.3	9'- 4"	334	5.6
6:1	12"	11'- 2"	2'- 6"	8'- 6"	9'- 9 3/4"	220	1.9	1'- 9"	28	0.4
	15"	13'- 2 1/4"	2'- 9 1/2"	10'- 0"	11'- 6 1/2"	264	2.5	2'- 2"	37	0.5
	18"	15'- 2 1/2"	3'- 1"	11'- 6"	13'- 3 1/4"	326	3.2	2'- 8"	50	0.7
	21"	17'- 2 3/4"	3'- 4 1/2"	13'- 0"	15'- 0 1/4"	381	3.9	3'- 1"	69	0.9
	24"	19'- 4 1/2"	3'- 9 1/2"	14'- 6"	16'- 9"	447	4.8	3'- 7"	80	1.2
	27"	21'- 4 3/4"	4'- 1"	16'- 0"	18'- 5 3/4"	506	5.7	3'-11"	96	1.4
	30"	23'- 5 1/4"	4'- 4 1/2"	17'- 6"	20'- 2 1/2"	587	6.7	4'- 4"	110	1.7
	33"	25'- 5 1/2"	4'- 8"	19'- 0"	21'-11 1/4"	667	7.8	4'- 8"	127	2.0
	36"	27'- 5 3/4"	4'-11 1/2"	20'- 6"	23'- 8"	727	9.0	5'- 1"	144	2.3
	42"	31'- 6 1/4"	5'- 6 1/2"	23'- 6"	27'- 1 1/2"	914	11.5	5'-10"	179	3.0
	48"	37'- 3 1/2"	6'- 1 1/2"	28'- 0"	32'- 4"	1181	15.9	6'- 7"	231	4.0
	54"	41'- 4 1/4"	6'- 8 1/2"	31'- 0"	35'- 9 1/2"	1412	19.2	7'- 6"	300	5.0
	60"	45'- 4 3/4"	7'- 3 1/2"	34'- 0"	39'- 3"	1619	22.9	8'- 3"	353	6.0



ELEVATION

Showing dimensions

1. Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
2. For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
3. Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.
4. Quantities shown are for one structure end only (one headwall).
5. Min Length = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$

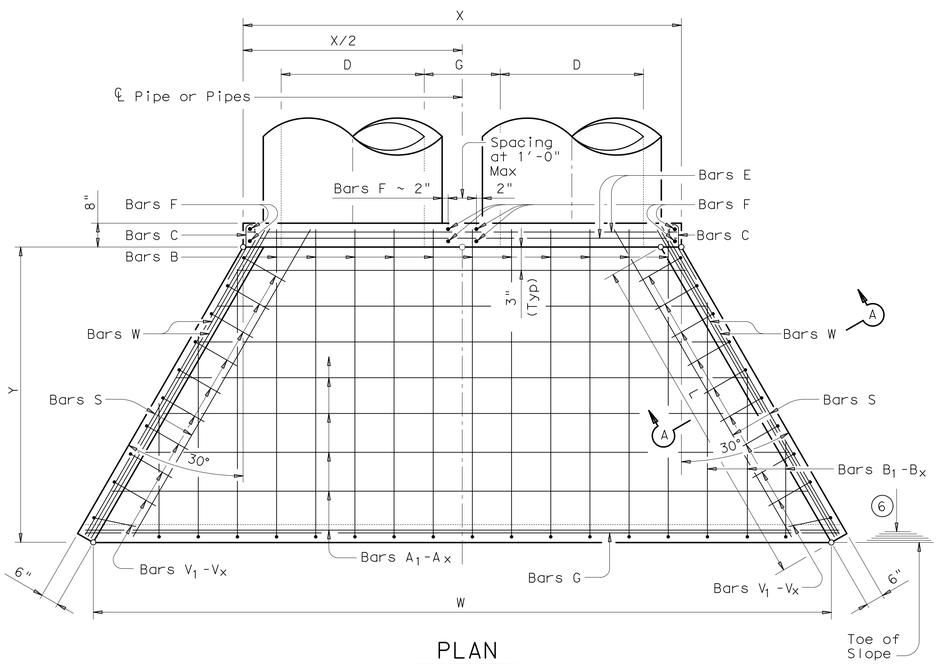
   Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$
6. Lengths of wings based on SL:1 Slope along this line.

TABLE OF REINFORCING STEEL (4)

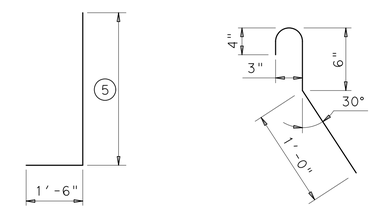
Bar	Size	Spa	No.
A	# 4	1'-0"	~
B	# 3	1'-6"	~
C	# 4	1'-0"	~
D	# 3	1'-0"	~
E	# 5	~	4
F	# 5	~	~
G	# 3	~	2
S	# 4	~	6
V	# 4	1'-0"	~
W	# 5	~	4

TABLE OF CONSTANT DIMENSIONS

DIA OF PIPE, D	G	K	H
12"	9"	1'- 0"	2'- 0"
15"	11"	1'- 0"	2'- 3"
18"	1'- 2"	1'- 0"	2'- 6"
21"	1'- 4"	1'- 0"	2'- 9"
24"	1'- 7"	1'- 0"	3'- 0"
27"	1'- 8"	1'- 0"	3'- 3"
30"	1'-10"	1'- 0"	3'- 6"
33"	1'-11"	1'- 0"	3'- 9"
36"	2'- 1"	1'- 0"	4'- 0"
42"	2'- 4"	1'- 0"	4'- 6"
48"	2'- 7"	1'- 3"	5'- 3"
54"	3'- 0"	1'- 3"	5'- 9"
60"	3'- 3"	1'- 3"	6'- 3"
66"	3'- 3"	1'- 3"	6'- 9"
72"	3'- 4"	1'- 3"	7'- 3"

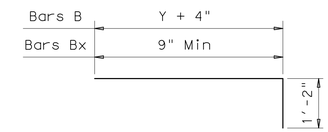


PLAN



BARS V

BARS C
(2'-0" long)



BARS B & B1-Bx

GENERAL NOTES:

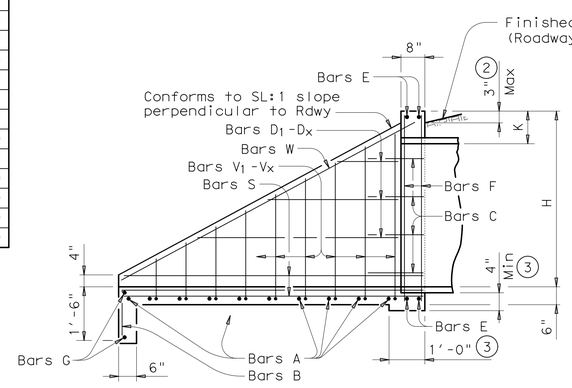
Designed according to AASHTO LRFD Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

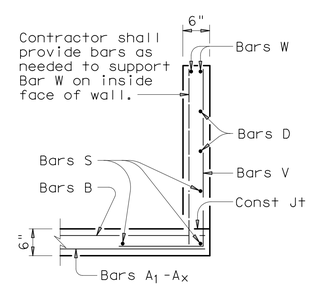
All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.



TYPICAL WING ELEVATION



SECTION A-A

Texas Department of Transportation — Bridge Division Standard

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

FILE: chfw00se.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				D-6

P-201405-01

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