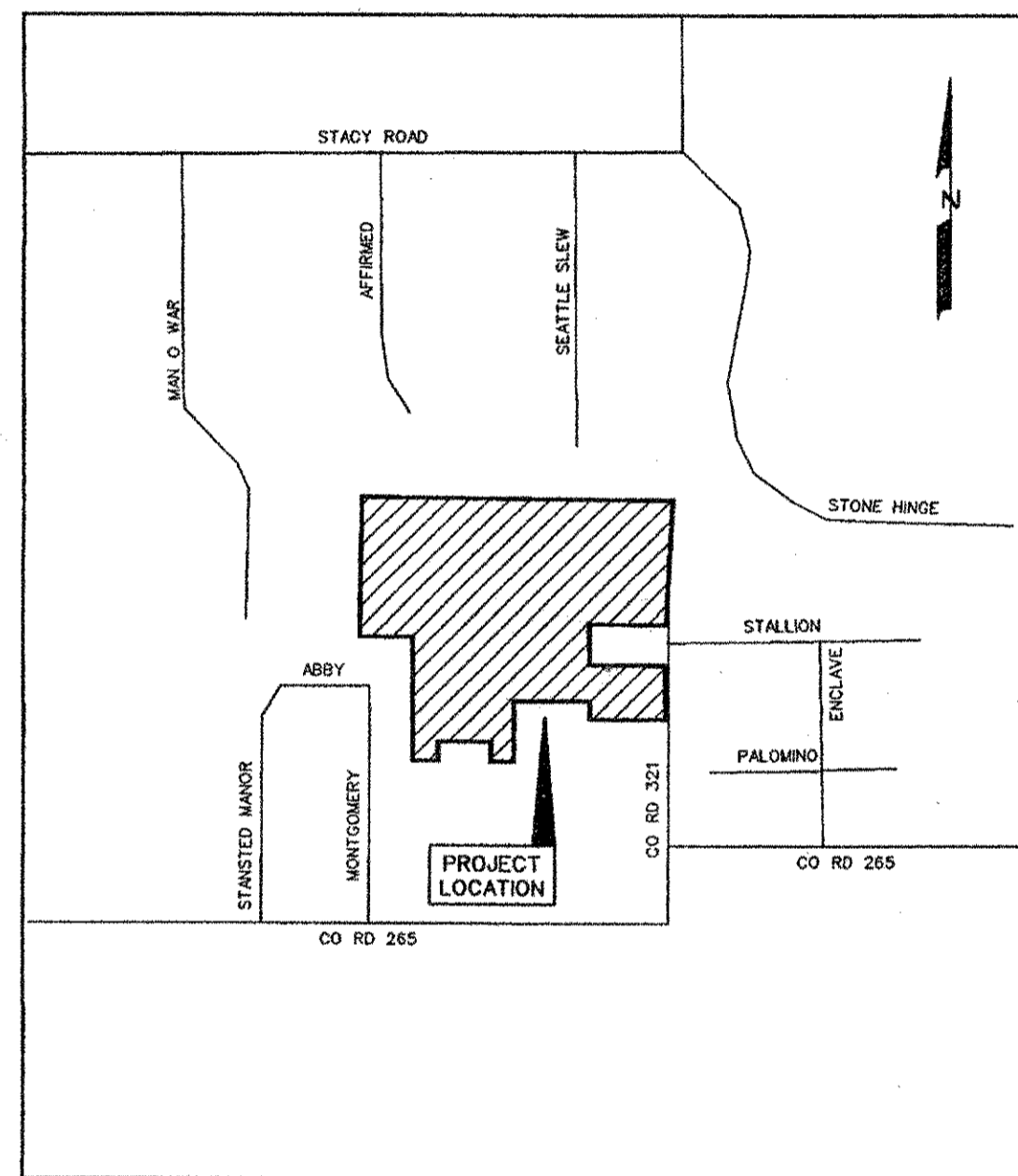


CONSTRUCTION PLANS FOR BROADMOOR ESTATES CITY OF LUCAS, TEXAS



VICINITY MAP
SCALE" 1"=1000'

INDEX

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PREPARED FOR
SCARBOROUGH FOREST RIDGE, LLC.
16380 ADDISON ROAD, ADDISON, TEXAS 75001

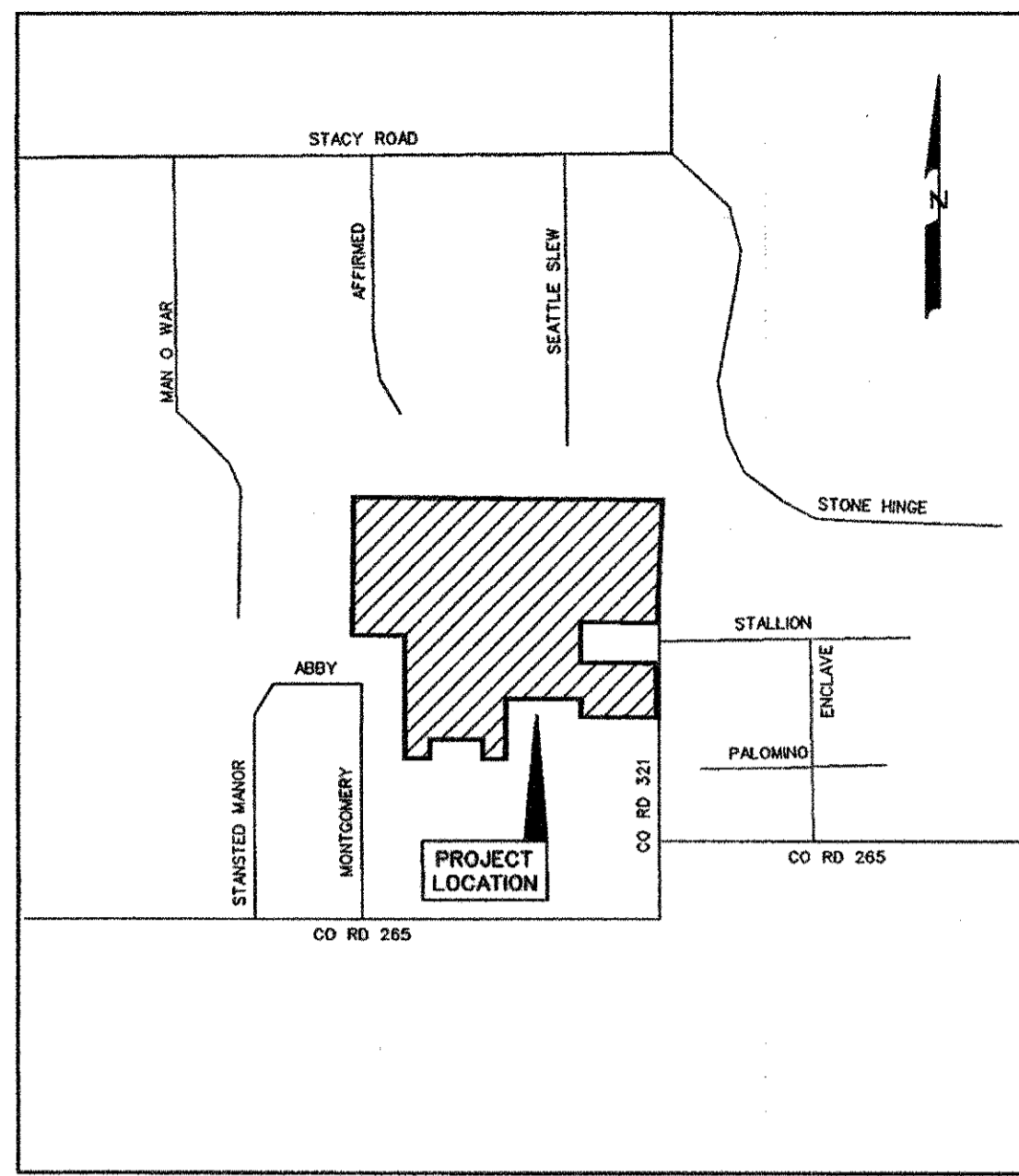
CORWIN ENGINEERING, INC. — CONSULTING ENGINEERS
200 W. BELMONT, SUITE E ALLEN, TEXAS 75013

AS-BUILT JUNE 2013
INFORMATION PROVIDED
BY CONTRACTORS
(NOT FIELD VERIFIED)



The seal appearing on
this document was
authorized by
Brandon Davidson
P.E. 87682, on
June 28, 2013

1	PER CITY COMMENTS	DS	9-4-12
NO.	REVISIONS	BY	DATE



LOCATION MAP
SCALE 1"=1000'

CURVE TABLE

CURVE NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	BEARING
1.	36°51'50"	75.00'	48.25'	25.00'	47.43'	N70°56'05"W
2.	36°51'52"	150.00'	96.51'	49.99'	94.85'	N70°56'06"W
3.	163°44'23"	60.00'	142.89'	---	98.99'	S45°37'58"W
4.	50°09'46"	60.00'	324.46'	---	50.87'	S78°45'48"W
5.	49°14'55"	60.00'	325.12'	---	50.00'	S89°45'59"E
6.	150°00'00"	50.00'	183.26'	---	96.59'	S44°45'59"E
7.	92°06'29"	38.00'	61.09'	39.42'	54.72'	S44°10'46"W
8.	25°31'24"	38.00'	16.93'	8.61'	16.79'	N77°32'12"W
9.	24°39'58"	38.00'	16.36'	8.31'	16.23'	N77°06'29"W

LINE TABLE

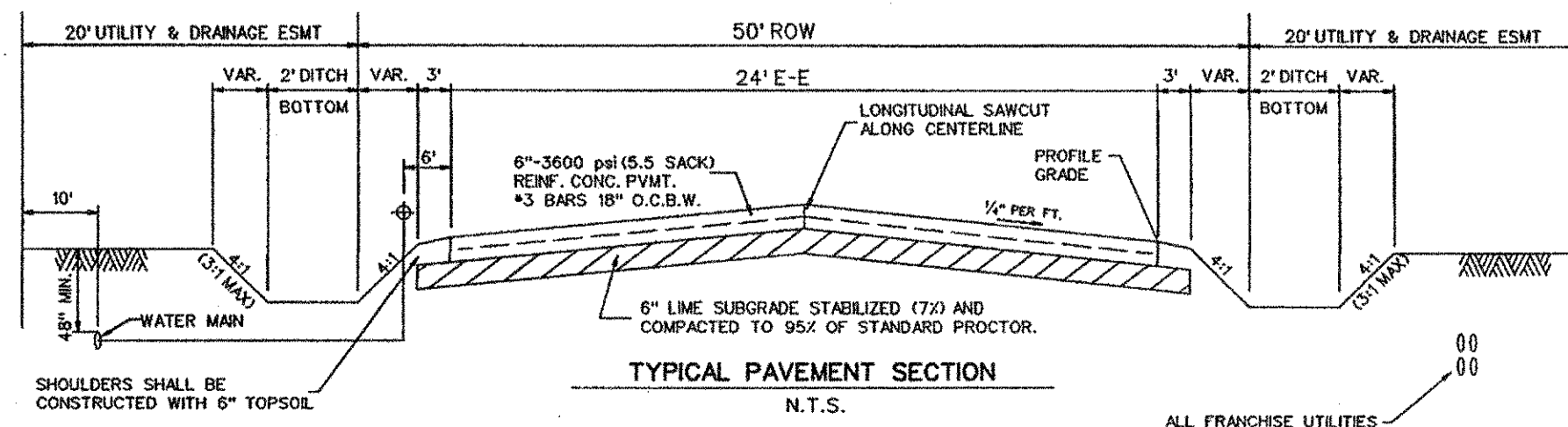
LINE NO.	BEARING	DISTANCE
1.	S 44°22'02" E	21.21'
2.	N 89°22'02" W	10.00'
3.	N 51°46'37" E	18.50'

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

Registered Sanitarian/Designed Representative
Collin County Development Services

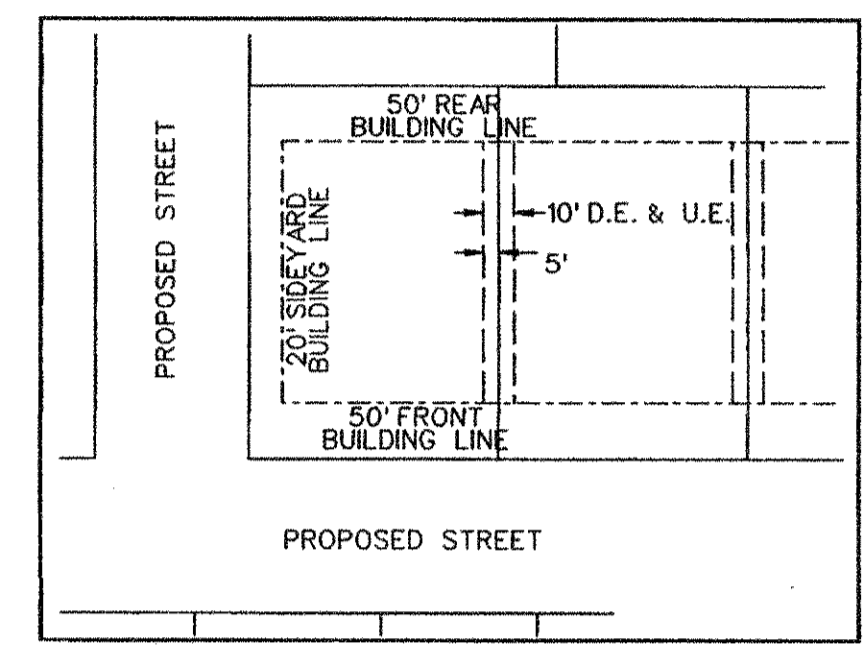
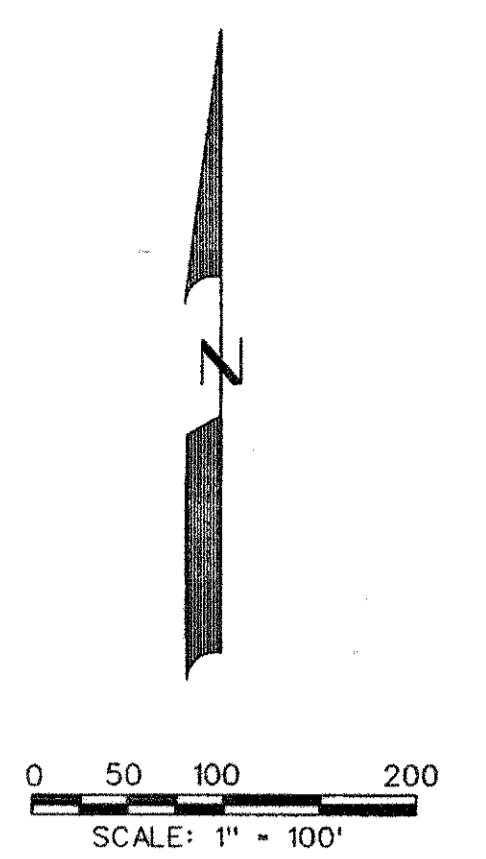
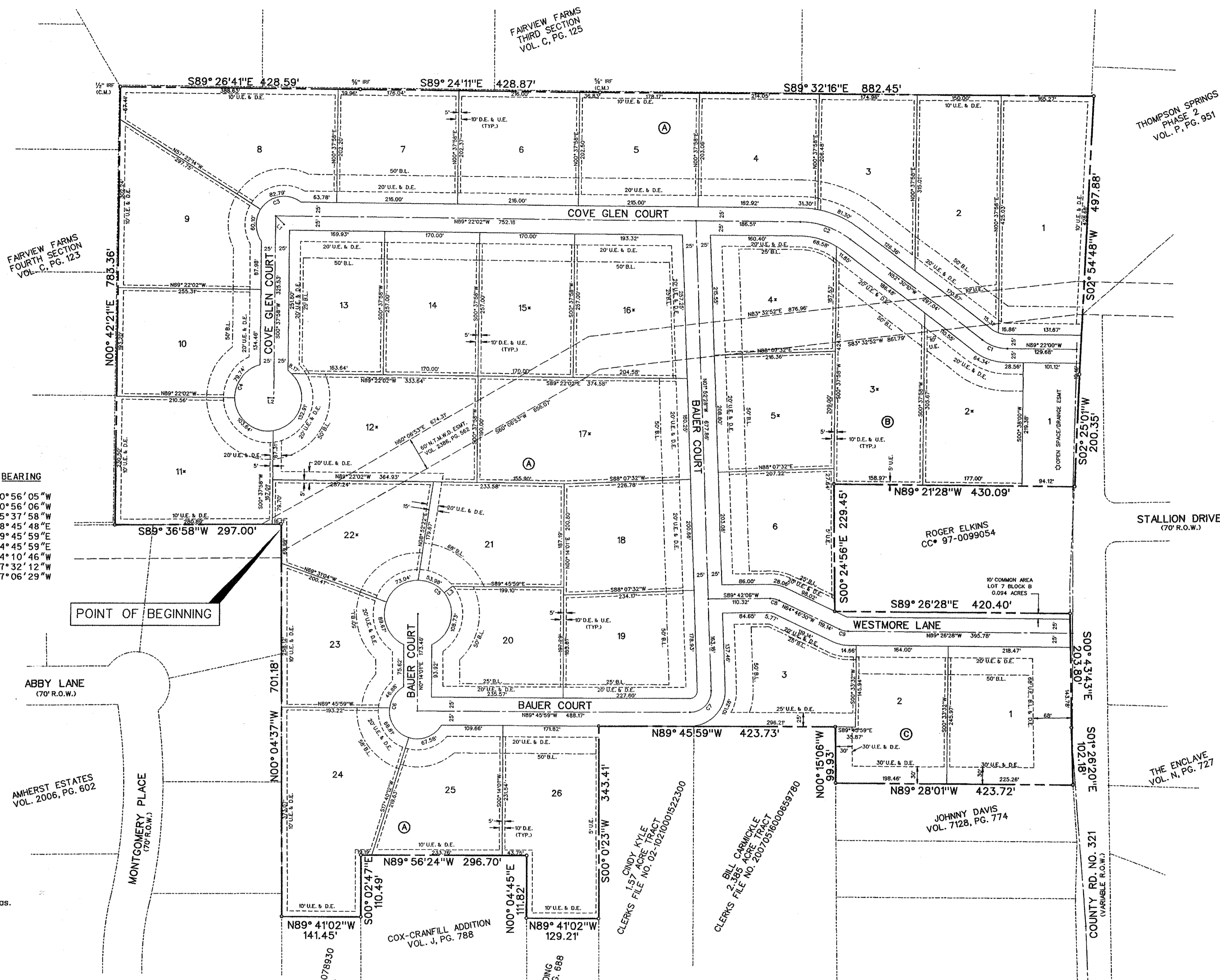
NOTES

- Bearing are referenced to a 43.704 acre tract, as recorded in Clerks File No. 20081010001209780, in the Deed Records of Collin County, Texas.
- All lot lines are radial or perpendicular to the street unless otherwise noted by bearing.
- 1/2" iron rods with "CORWIN ENGR. INC." caps set at all boundary corners, block corners, points of curvature, points of tangency, and angle points in public right-of-way unless otherwise noted.
- "Notice: 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."
- B.L. - Building Line
U.E. - Utility Easement
D.E. - Drainage Easement
W.E. - Water Easement
OSSF - On-Site Sewage Facilities
- All lots must utilize alternative type On-Site Sewage Facilities.
- Must maintain state-mandated setback of all On-Site Sewage Facility components from any/all easements and drainage areas.
- Final grading, per the grading plan, will be required prior to installation/operation of On-Site Sewage Facilities.
- Individual site evaluations and OSSF design plans must be submitted to and approved by Collin County for each lot prior to construction of any OSSF system.
- Wrought iron fences are permitted in drainage easements.
- No Floodplain exists on site.
- The HOA (Homeowners Assoc.) to maintain common areas, drainage ditches and drainage ditches adjacent to the road with concrete lined bottoms, ditches will be maintained to allow for positive drainage at all times.



TYPICAL PAVEMENT SECTION
N.T.S.

NOTE: CONTRACTOR TO PROVIDE LIQUID ASPHALT SEALER FOR CONCRETE JOINTS



TYPICAL LOT DETAIL

LOT AREA SUMMARY TABLE					
BLOCK A		BLOCK A		BLOCK B	
LOT #	AREA (S.F.)	LOT #	AREA (S.F.)	LOT #	AREA (S.F.)
1	67083	14	43690	C-1	21340
2	55707	15	43690	2	43811
3	4184	16	5130	3	58075
4	43560	17	70834	4	46153
5	43589	18	46248	5	44221
6	43726	19	44630	6	44488
7	43696	20	43614	BLOCK C	
8	61649	21	46492	LOT #	AREA (S.F.)
9	56403	22	48813	1	54470
10	47384	23	45033	2	43682
11	60822	24	67010	3	43583
12	65181	25	44685		
13	43654	26	54325		

LOT AREAS ROUNDED TO THE NEAREST SQUARE FOOT
C-1 INDICATES OPEN SPACE

SITE DATA SUMMARY TABLE

GROSS ACRES:	44.800
R.O.W. DEDICATION:	5.071
NET ACRES:	39.729
TOTAL LOTS:	34
NET DENSITY:	0.86

FINAL PLAT
OF
BROADMOOR ESTATES
LOTS 1-26, BLOCK A
LOTS 1-6, BLOCK B
LOTS 1-3, BLOCK C

OUT OF THE
JOHN W. KERBY SURVEY, ABSTRACT NO. 506
IN THE
CITY OF LUCAS
COLLIN COUNTY, TEXAS
ZONING DISTRICT - R1
OWNER/APPLICANT
SCARBOROUGH FOREST RIDGE, LLC.
16380 ADDISON ROAD
ADDISON, TEXAS 75001
972-380-5900
PREPARED BY
CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013
972-396-1200

* - Lots 1,2,11,12,15-17 & 22, Block A & Lots 2-5 Block B are affected by the following note:

The NTMWD easement restricts construction of permanent structures such as foundations, walls, pools and permanent storage buildings. Fences and landscaping are permitted within or crossing the easement. Items such as driveways and sprinkler systems that encroach on the NTMWD easements are allowed. However, the NTMWD assumes no responsibility for damages resulting from the need to repair or maintain the NTMWD pipelines. Further, any cost for repair for damage to the pipelines resulting from construction by the developer, contractor or owner will be the responsibility of the developer, contractor or owner.
Where the Utility Easements (U.E.) cross the existing NTMWD easement, no appearances associated with the utilities are permitted within the NTMWD easement.

FEMA RM 133 as referenced on FEMA Panel No. 48085C0455 G for Collin County, Texas and Incorporated Areas dated Jan. 19, 1996. Elev. -590.08'. Square cut on east headwall of west end of bridge at White Rock Creek & FM 1376.

LEGAL DESCRIPTION

WHEREAS, SCARBOROUGH FOREST RIDGE, LLC., is the owner of a tract of land situated in the John W. Kerby Survey, Abstract No. 506 in the City of Lucas, Collin County, Texas, being out of a 10.046 acre tract, as described in Clerks File No. 20121002001250530, a 12.383 acre tract, as described in Clerks File No. 20122003001255570, a 1.391 acre tract, as described in Clerks File No. 20121003001256070 a 18.0400 acre tract, as described in Clerks File No. 20121002001250600, a 1.997 acre tract, as described in Clerks File No. 20121002001250590, and a 1.0 acre tract, as described in Clerks File No. 20070912001273990, in the Deed Records of Collin County, Texas and being more particularly described as follows:

BEGINNING, at a 1/2 inch iron rod set at the northeast corner of Amherst Estates, an addition to the City of Lucas, as described in Volume 2006, Page 602, in the Plat Records of Collin County, Texas;

THENCE, South 89° 36' 58" West, along the north line of said Amherst Estates, for a distance of 297.00 feet, to a 1/2 inch iron rod set at the south east corner of Fairview Farms Fourth Section, an addition to Collin County, Texas, as described in Volume C, Page 123, in said Plat Records;

THENCE, North 00° 42' 21" East, departing the north line of said Amherst Estates and along the east line of said Fairview Farms Fourth Section, for a distance of 783.36 feet, to a 1/2 inch iron rod found at the southwest corner of Fairview Farms Third Section, an addition to Collin County, Texas, as described in Volume C, Page 125, in said Plat Records;

THENCE, South 89° 26' 41" East, departing the east line of said Fairview Farms Fourth Section and along the south line of said Fairview Farms Third Section, for a distance of 428.59 feet, to a 5/8 inch iron found;

THENCE, South 89° 24' 11" East, continuing along said south line, for a distance of 428.87 feet, to a 5/8 inch iron rod found;

THENCE, South 89° 32' 16" East, continuing along said south line, for a distance of 882.45 feet, to a 1/2 inch iron rod set being the southeast corner of said Fairview Farms Third Section, also being in the west line of Thompson Springs Phase 2, an addition the Town of Fairview, as described in Volume P, Page 951, in said Plat Records;

THENCE, South 02° 54' 48" West, along the west line of said Thompson Springs Phase 2, at 205.89 feet, passing the southwest corner of said Thompson Springs Phase 2 also being the northwest corner of The Enclave, an addition to the City of Lucas, as described in Volume N, Page 727, in said Plat Records, and continuing for a total distance of 497.88 feet, to a 1/2 inch iron rod set;

THENCE, South 02° 25' 01" West, along the west line of said The Enclave, for a distance of 200.35 feet, to a 1/2 inch iron rod set at the northeast corner of said 2.0 acre tract;

THENCE, North 89° 21' 28" West, departing the west line of said The Enclave and with the north line of said 2.0 acre tract, for a distance of 430.09 feet, to a 1/2 inch iron rod set at the northwest corner of said 2.0 acre tract;

THENCE, South 00° 24' 56" East, along the west line of said 2.0 acre tract, for a distance of 229.45 feet, to a 1/2 inch iron rod set at the southwest corner of said 2.0 acre tract;

THENCE, South 89° 26' 28" East, along the south line of said 2.0 acre tract, for a distance of 420.40 feet, to a 1/2 inch iron rod set in the west line of said The Enclave;

THENCE, South 00° 43' 43" East, along the west line of said The Enclave, for a distance of 203.80 feet, to a 1/2 inch iron rod set at the northeast corner of said 1.0 acre tract;

THENCE, South 01° 26' 02" East, continuing along said west line and along the east line of said 1.0 acre tract, for a distance of 102.18 feet, to a 1/2 inch iron set at the southeast corner of said 1.0 acre tract;

THENCE, North 89° 28' 01" West, departing said west line and along the south line of said 1.0 acre tract, for a distance of 423.72 feet, to a 1/2 inch iron rod set at the southwest corner of said 1.0 acre tract;

THENCE, North 00° 15' 06" West, along the west line of said 1.0 acre tract, for a distance of 99.93 feet, to a 1/2 inch iron rod set at the northeast corner of a 2.385 acre tract, as described in Clerks File No. 20070516000659780 and being in the south line of said 18.0400 acre tract;

THENCE, North 89° 45' 59" West, departing said west line and along said south line, for a distance of 423.73 feet, to a 1/2 inch iron rod set at the northwest corner of a 1.57 acre tract, as described in Clerks File No. 02-10210001522300, in said Deed Records also being the southwest corner of said 18.0400 acre tract;

THENCE, South 00° 00' 23" West, along the west line of said 1.57 acre tract, for a distance of 343.41 feet, to a 1/2 inch iron rod set;

THENCE, North 89° 41' 02" West, departing said west line, for a distance of 129.21 feet, to a 1/2 inch iron rod set;

THENCE, North 00° 04' 45" East, for a distance of 111.82 feet, to a 1/2 inch iron rod set;

THENCE, North 89° 56' 24" West, for a distance of 296.70 feet, to a 1/2 inch iron rod set;

THENCE, South 00° 02' 47" East, for a distance of 110.49 feet, to a 1/2 inch iron rod set;

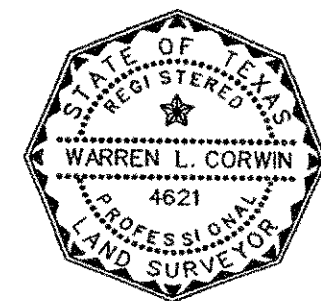
THENCE, North 89° 41' 02" West, for a distance of 141.45 feet, to a 1/2 inch iron rod set in the east line of said Amherst Estates;

THENCE, North 00° 04' 37" West, along the east line of said Amherst Estates, for a distance of 701.18 feet, to the POINT OF BEGINNING and containing 44.800 acres of land.

SURVEYOR'S CERTIFICATE

KNOW ALL MEN BY THESE PRESENTS that I, WARREN L. CORWIN, do hereby certify that I prepared this Plat and the field notes from an actual and accurate survey of the land, that the corner monuments shown thereon were properly placed under my personal supervision in accordance with the subdivision Regulations of the City of Lucas, Texas.

WARREN L. CORWIN
R.P.L.S. No. 4621



THE 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 WARREN L. CORWIN, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed same for the purpose and consideration therein expressed.

Given under my hand and seal of office, this _____ day of _____, 2013.

NOTARY PUBLIC, STATE OF TEXAS

DEDICATION

NOW THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

THAT, SCARBOROUGH FOREST RIDGE, LLC. 2011 is the owner of the above-described project and does hereby adopt this plat designating the herein described property as BROADMOOR ESTATES, LOTS 1-26 BLOCK A, LOTS 1-6 BLOCK B, LOTS 1-3 BLOCK C, an addition to the City of Lucas, Collin County, Texas, and does hereby dedicate to the public use forever the right-of-way, streets, easements, and alleys platted hereon.

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

EXECUTED this the _____ day of _____, 2013.

OWNER:

Scarborough Forest Ridge Development, L.P., a Texas limited liability company

By: Scarborough Forest Ridge LLC, a Texas limited liability company, its authorized agent

By: _____
Jack Tate, Manager

THE STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned, a Notary Public for the State of Texas, on this day personally appeared JACK TATE, 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 and considerations therein expressed.

WITNESS MY HAND AND SEAL OF OFFICE, this the _____ day of _____, 2013.

NOTARY PUBLIC, STATE OF TEXAS

"Recommended For Approval

Chairman
Planning and Zoning Commission
City of Lucas, Texas

Date

"Approved For Construction:

Public Works Director
City of Lucas, Texas

Date

Director of Community Development
City of Lucas, Texas

Date

ATTEST

Signature

Date

Print Name & Title

FINAL PLAT
OF
BROADMOOR ESTATES
LOTS 1-26, BLOCK A
LOTS 1-6, BLOCK B
LOTS 1-3, BLOCK C
OUT OF THE
JOHN W. KERBY SURVEY, ABSTRACT NO. 506
IN THE
CITY OF LUCAS
COLLIN COUNTY, TEXAS
ZONING DISTRICT - R1
OWNER/APPLICANT
SCARBOROUGH FOREST RIDGE, LLC.
16380 ADDISON ROAD
ADDISON, TEXAS 75001
972-380-5900
PREPARED BY
CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013
972-396-1200
JUNE 2013



LEGEND

- PROP. STORM SEWER
- PROP. CURB INLETS
- PROP. CONC. HEADWALL
- EXIST. STORM SEWER
- DRAINAGE AREA DIVIDE
- FLOW ARROW
- ① DRAINAGE AREA NO.

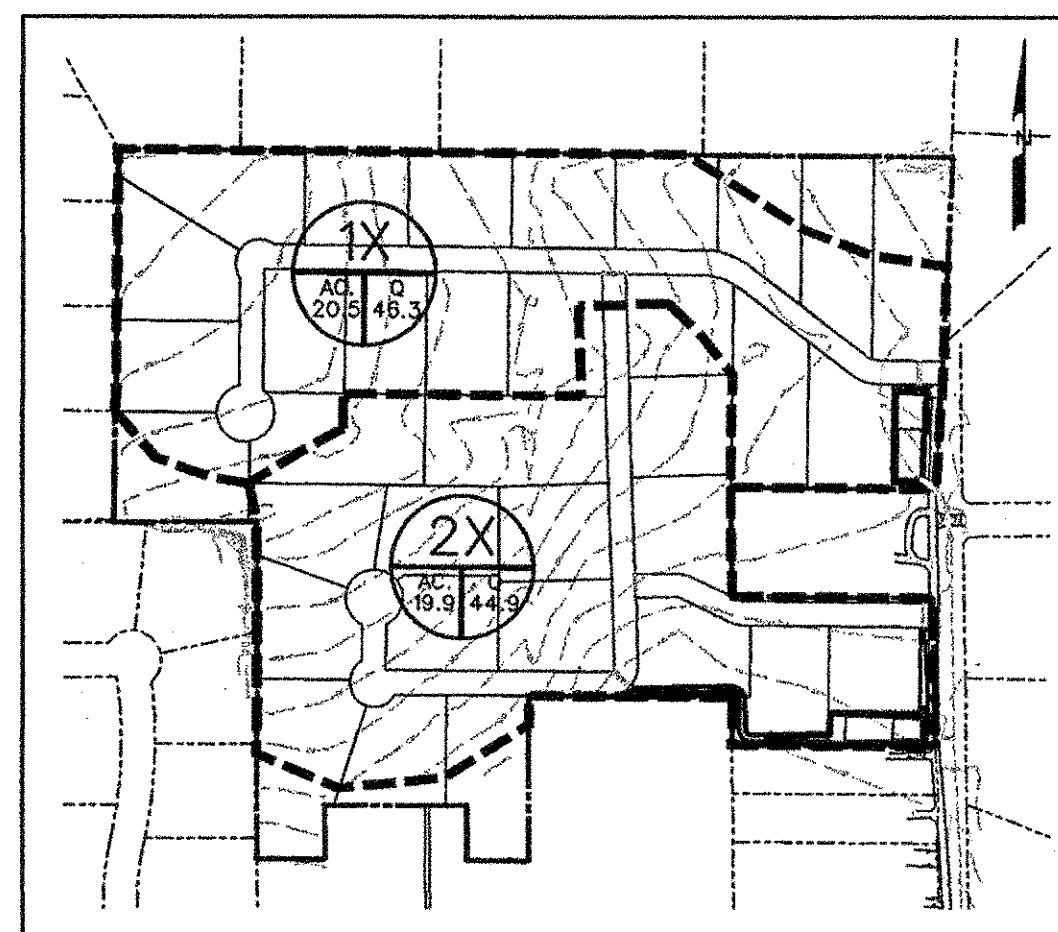
SCALE: 1" = 100'

RUNOFF COMPUTATIONS

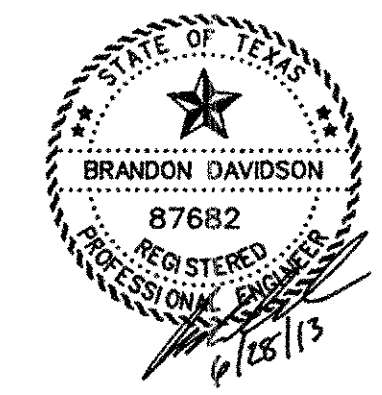
Area #	Area (sf)	Area (acres)	Pre-Development Runoff Coefficient	Post-Development Runoff Coefficient	CA	Tc (min)	Q(100) (in/hr)	Pre-Development Q(100) (cfs)	Post-Development Q(100) (cfs)
1	502723	11.54	0.30	0.40	4.62	15	7.52	26.0	34.7
2	225220	5.17	0.30	0.40	2.07	15	7.52	11.7	15.6
3	162138	3.72	0.30	0.40	1.49	15	7.52	8.4	11.2
4	132856	3.05	0.30	0.40	1.22	15	7.52	6.9	9.2
5	194752	4.47	0.30	0.40	1.79	15	7.52	10.1	13.4
6	138037	3.17	0.30	0.40	1.27	15	7.52	7.1	9.5
7	291512	6.69	0.30	0.40	2.68	15	7.52	15.1	20.1
8	138331	3.18	0.30	0.40	1.27	15	7.52	7.2	9.6
9	29649	0.68	0.30	0.40	0.27	15	7.52	1.5	2.0
10	34681	0.80	0.30	0.40	0.32	15	7.52	1.8	2.4
1X	894234	20.53	0.30		6.16	15	7.52	46.3	
2X	866356	19.89	0.30		5.97	15	7.52	44.9	

DRIVEWAY CULVERT SIZE REQUIREMENTS

Block	Lot	Pipe Size (in)	No. of Barrels
A	1	21	3
A	2	21	3
A	3	21	3
A	4	21	3
A	5	21	3
A	6	18	3
A	7	18	2
A	8	18	2
A	9	18	1
A	10	18	1
A	11	18	1
A	12	18	1
A	13	18	1
A	14	21	1
A	15	21	1
A	16	18	2
A	17	18	1
A	18	21	1
A	19	18	2
A	20	21	1
A	21	18	1
A	22	18	1
A	23	18	1
A	24	21	1
A	25	18	2
A	26	18	2
B	2	18	3
B	3	18	3
B	4	18	1
B	5	18	1
B	6	18	1
C	2	18	1
C	3	21	1



Note:
Contractor to contact NTMWD Line Locates at 972-442-5405, 48 hours prior to work in NTMWD Easement.



The seal appearing on this document was authorized by Brandon Davidson P.E. 87682, on June 28, 2013

AS-BUILT JUNE 2013
INFORMATION PROVIDED BY CONTRACTORS (NOT FIELD VERIFIED)

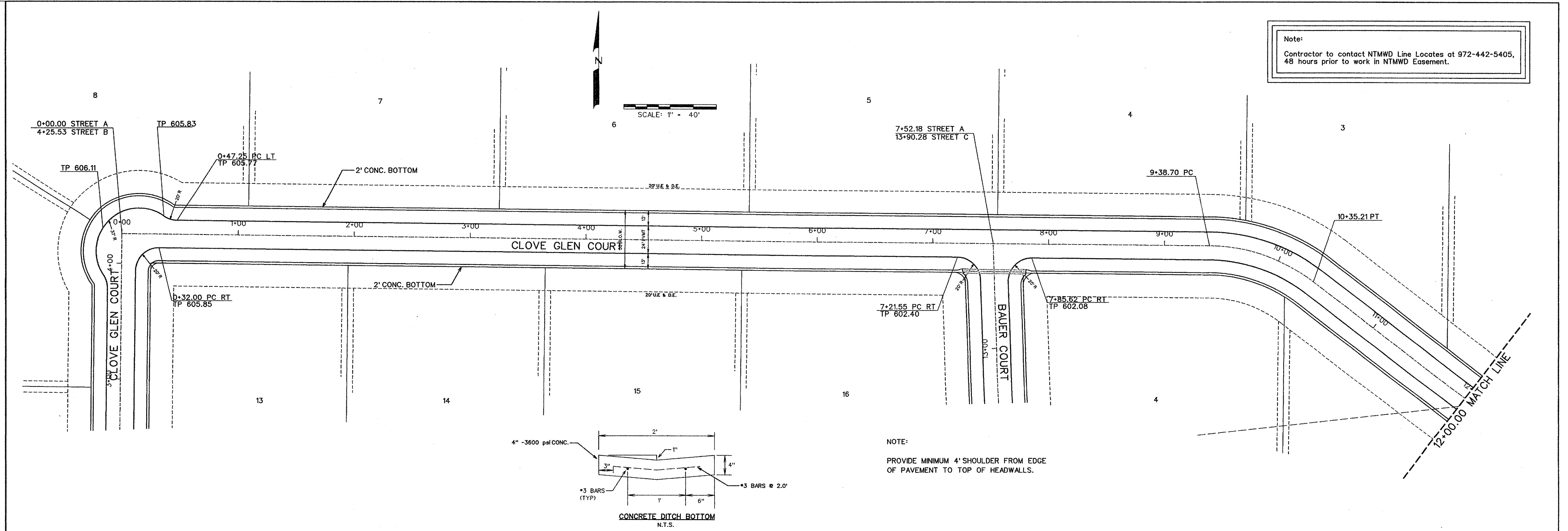
CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972) 396-1200
TBPE FIRM #5951

DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
LUCAS, TEXAS

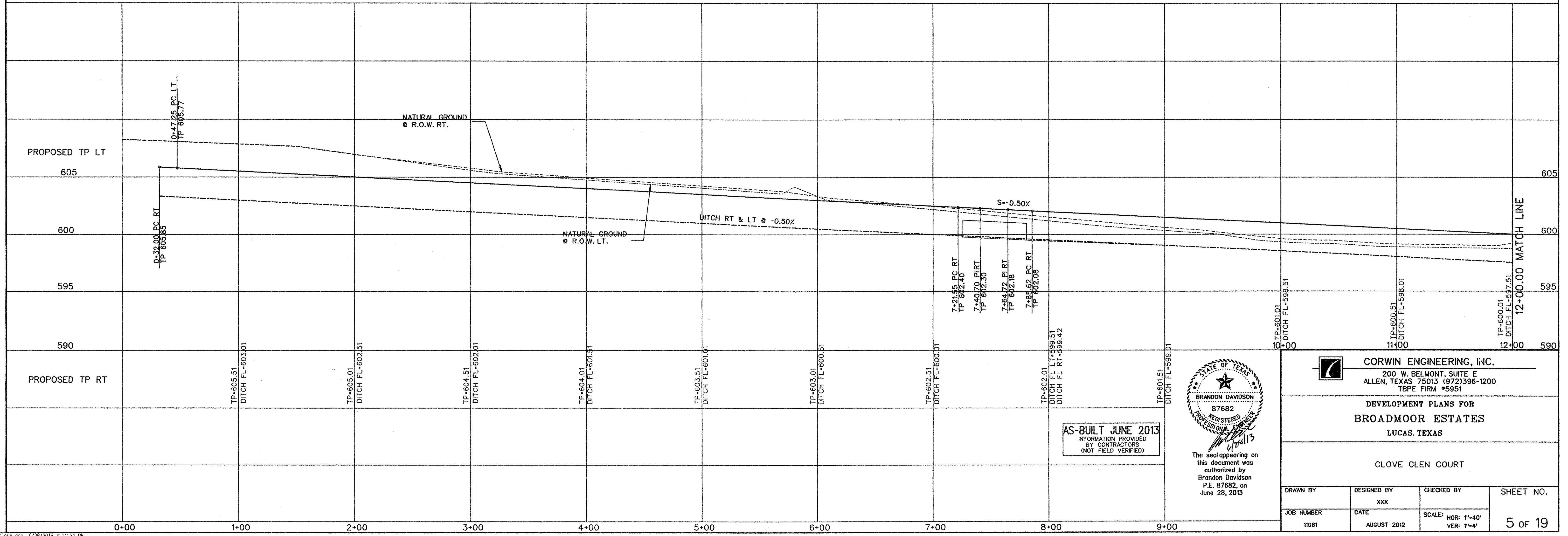
DRAINAGE AREA MAP

DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	XXX	XXX	
JOB NUMBER	DATE	SCALE:	
11061	AUGUST 2012	1"=100'	4 OF 19

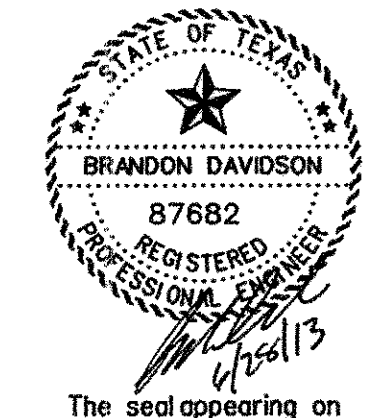
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NOTE:
PROVIDE MINIMUM 4' SHOULDER FROM EDGE
OF PAVEMENT TO TOP OF HEADWALLS.



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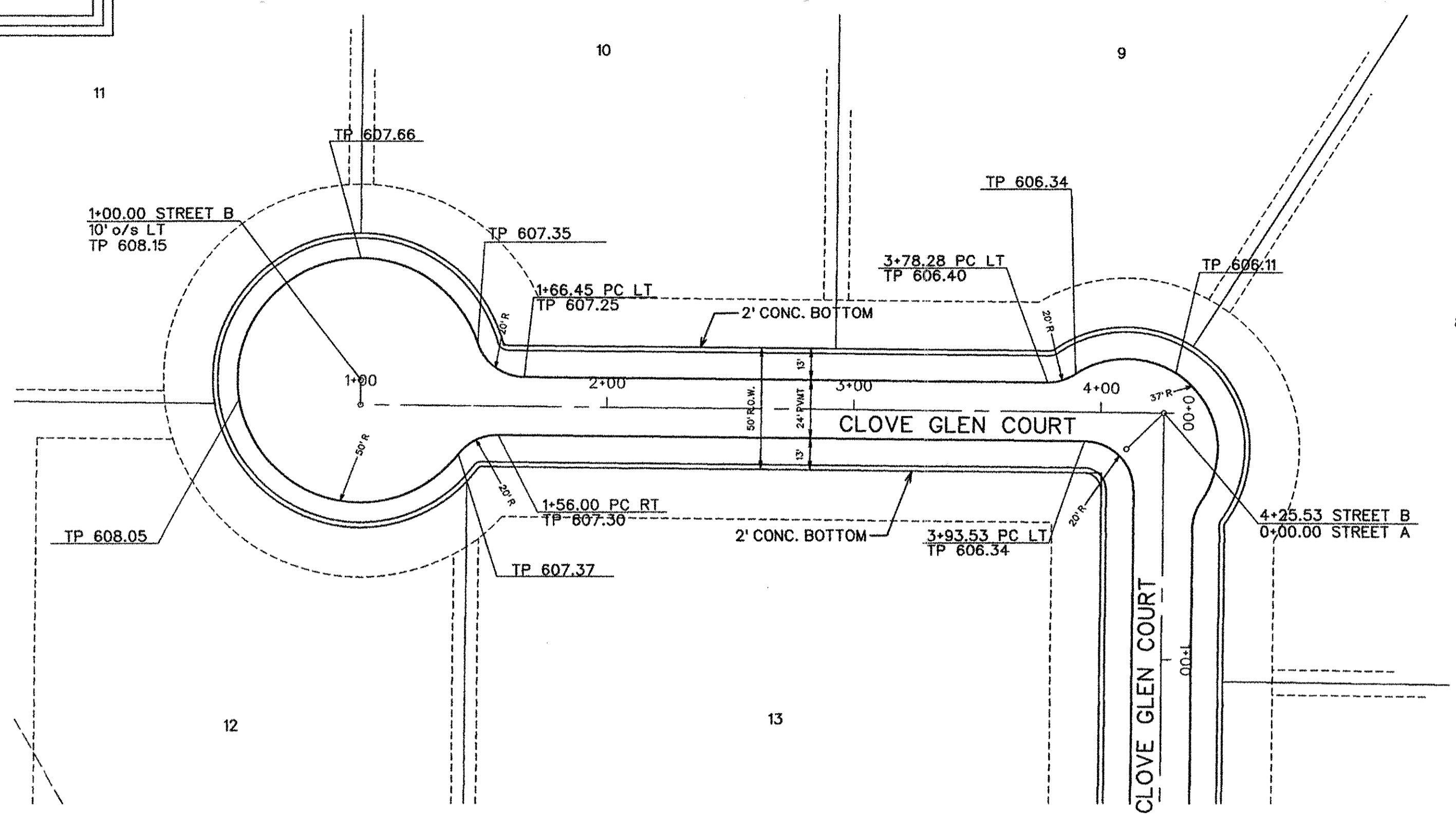
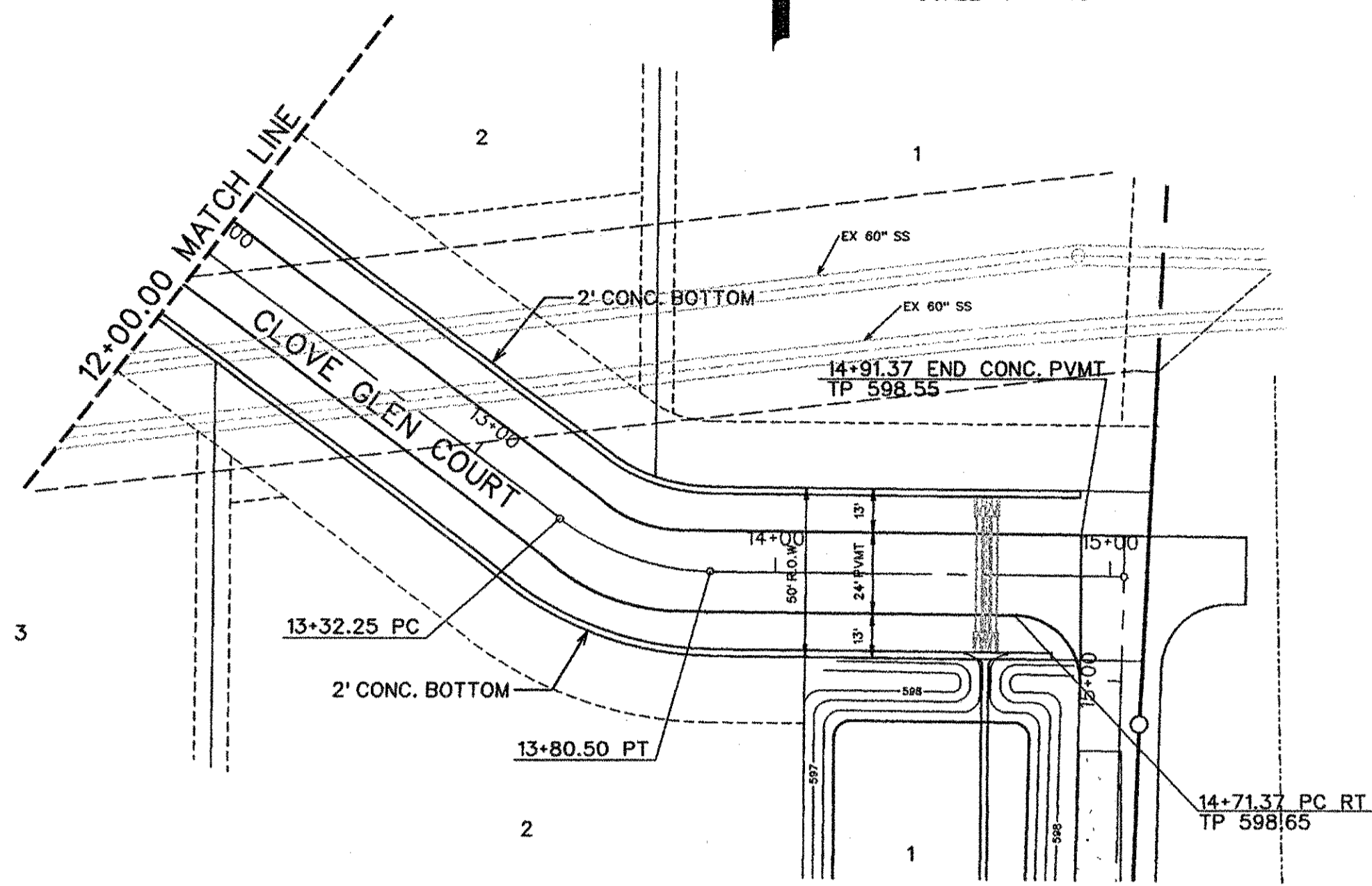
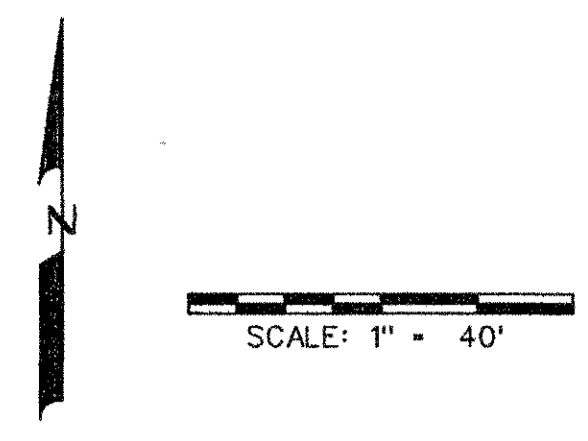
CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972) 396-1200
T&PE FIRM #5951

DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
LUCAS, TEXAS

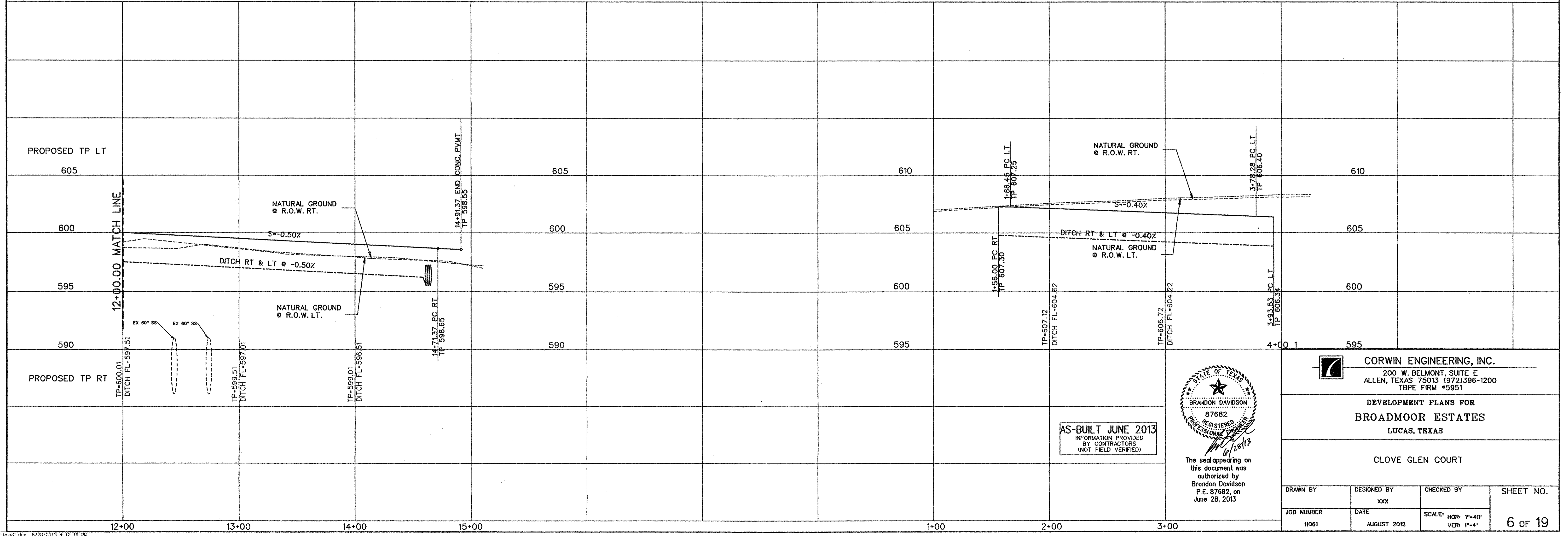
CLOVE GLEN COURT

DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
11061	XXX	XXX	
JOB NUMBER	DATE	SCALE: HOR: 1"=40' VER: 1"=4'	5 of 19
11061	AUGUST 2012		

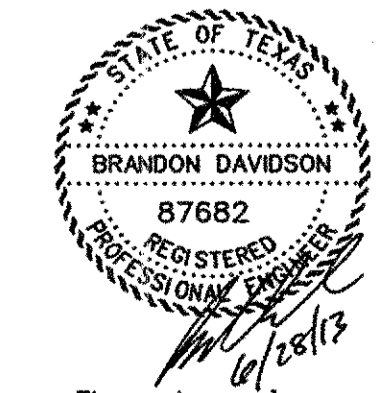
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NOTE:
 PROVIDE MINIMUM 4' SHOULDER FROM EDGE
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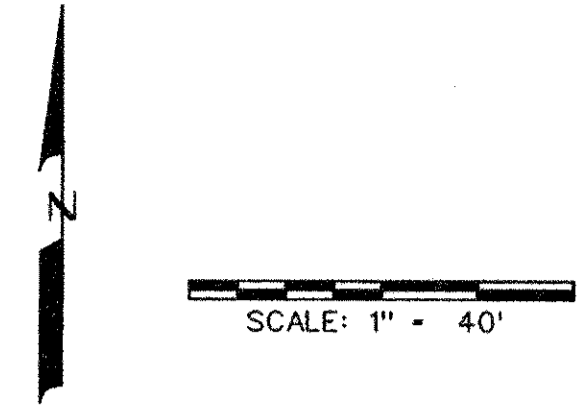
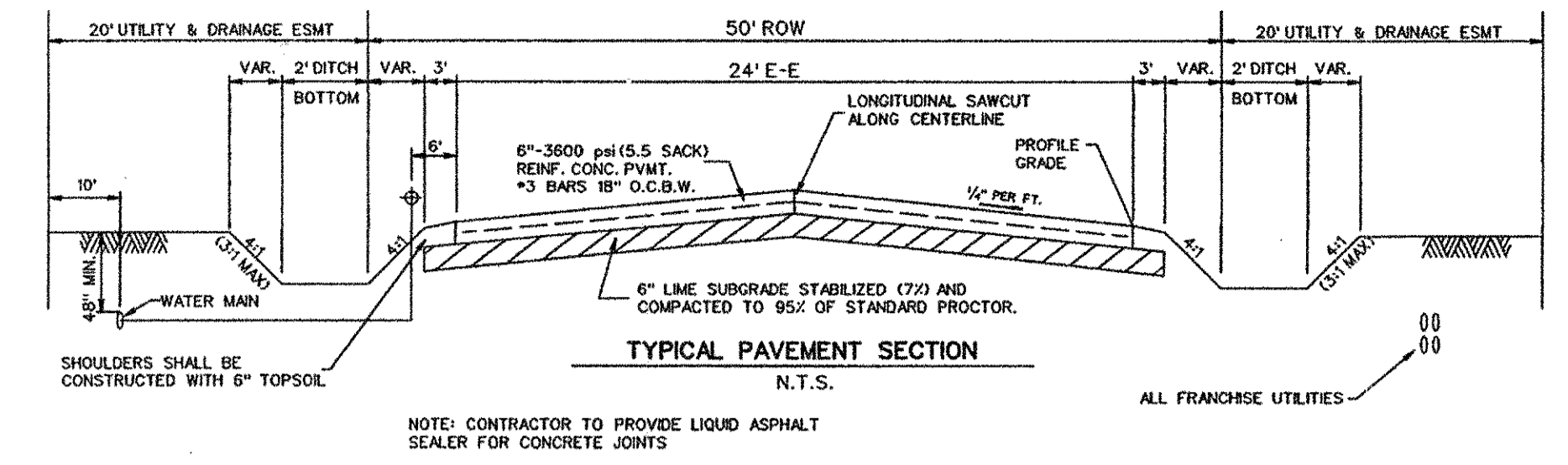
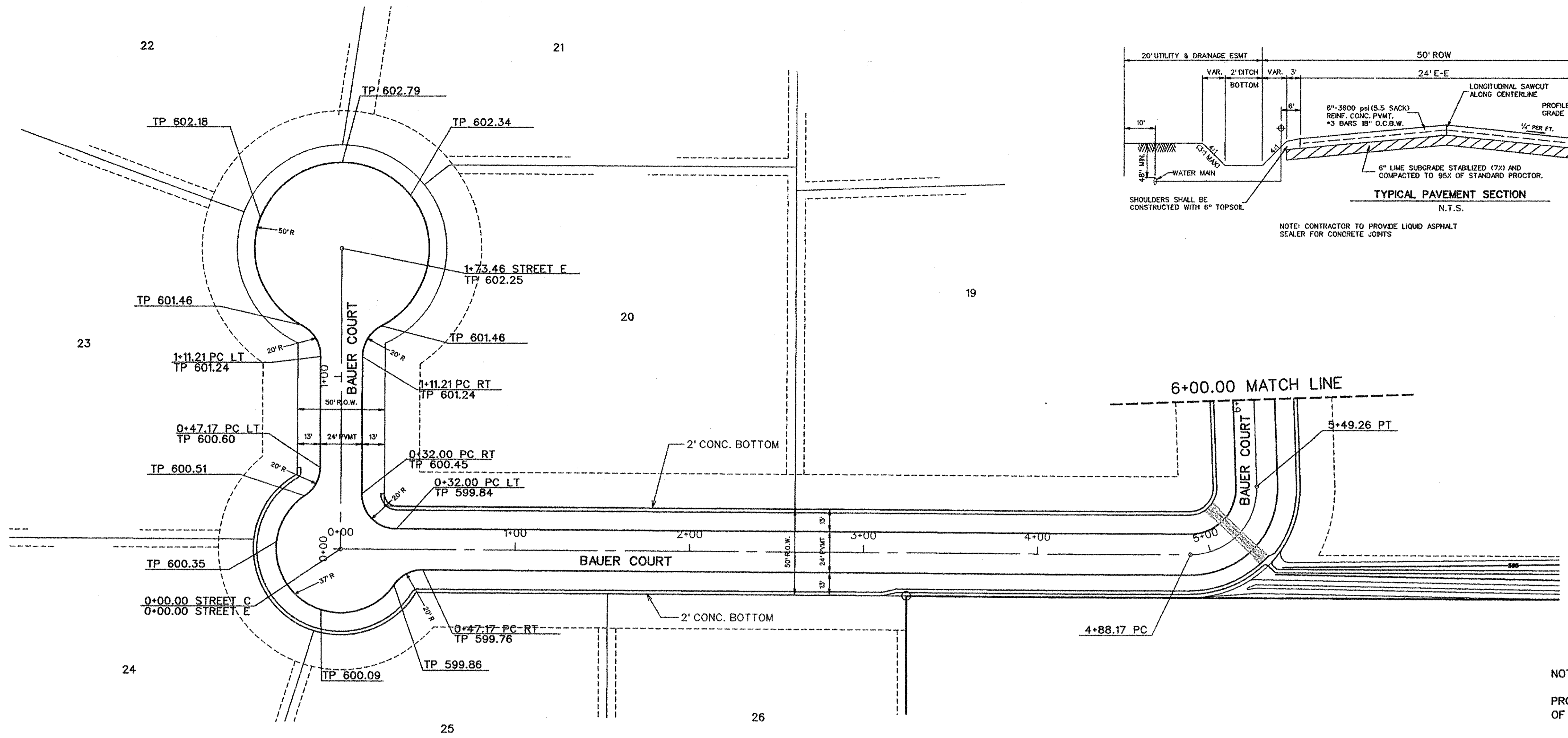
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CORWIN ENGINEERING, INC.
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DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
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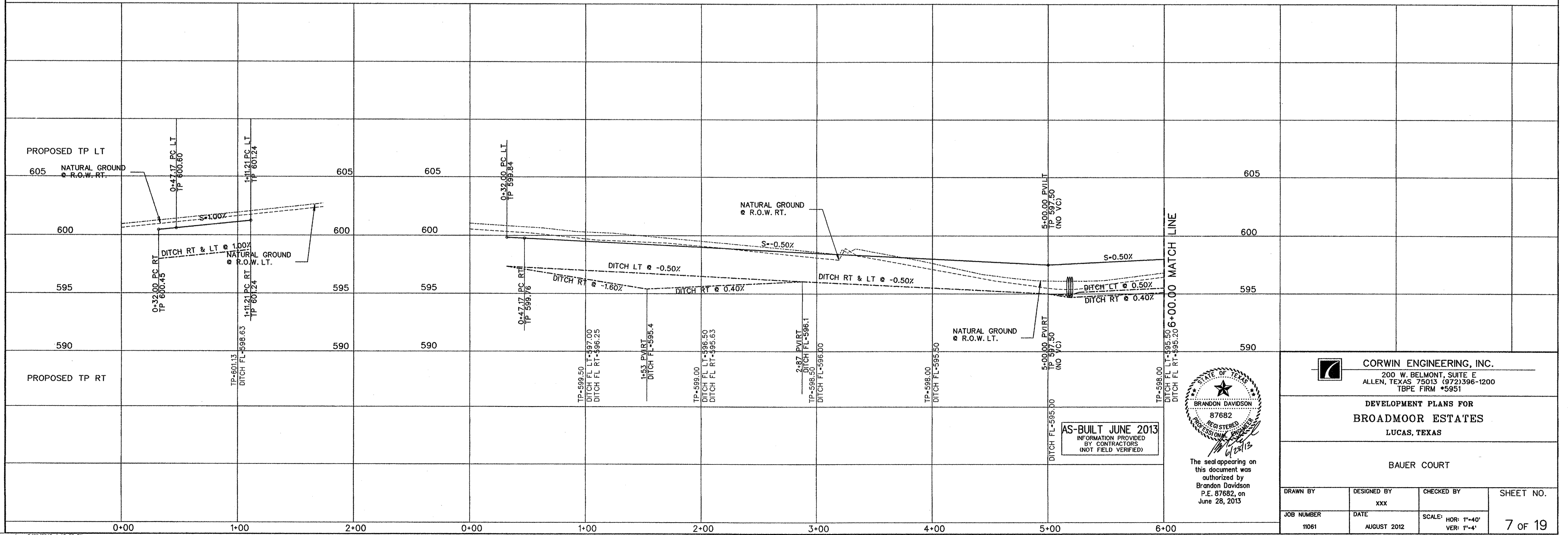
CLOVE GLEN COURT

DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
11081	XXX	XXX	
JOB NUMBER	DATE	SCALE	6 OF 19
11081	AUGUST 2012	HOR: 1"=40' VER: 1"=4'	

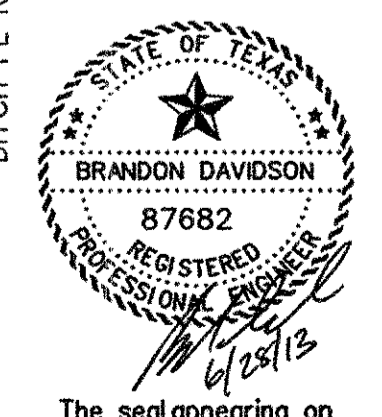


Note:
Contractor to contact NTMWD Line Locates at 972-442-5405, 48 hours prior to work in NTMWD Easement.

NOTE:
PROVIDE MINIMUM 4' SHOULDER FROM EDGE OF PAVEMENT TO TOP OF HEADWALLS.



AS-BUILT JUNE 2013
INFORMATION PROVIDED BY CONTRACTORS (NOT FIELD VERIFIED)



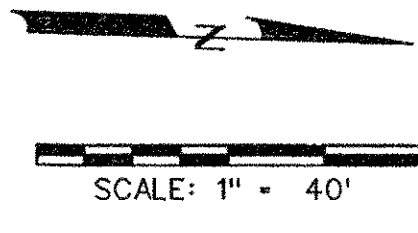
The seal appearing on this document was authorized by Brandon Davidson P.E. 87682, on June 28, 2013

CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972)396-1200
TBE FIRM #5951

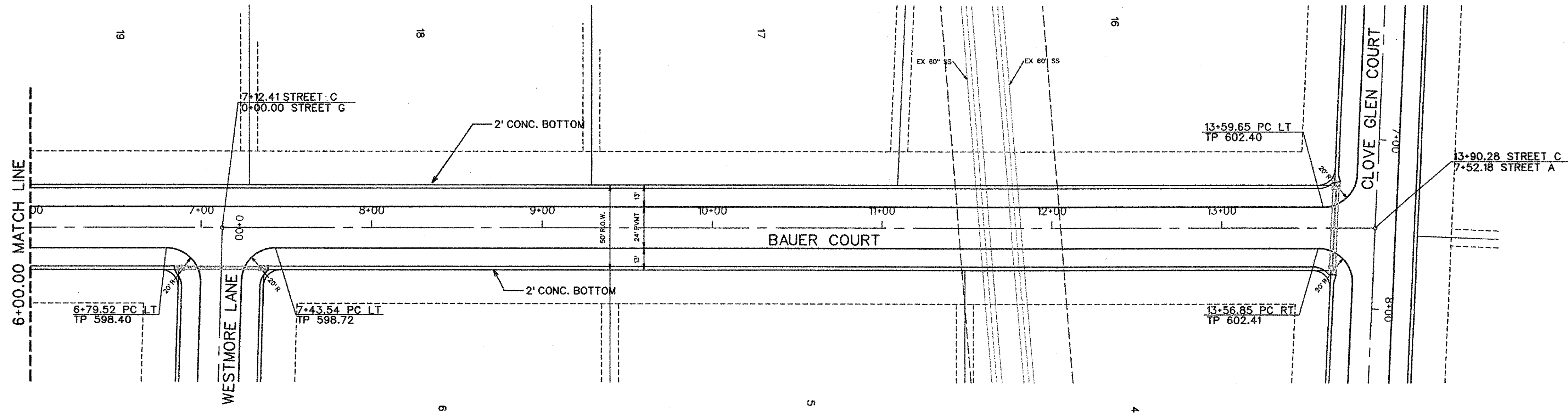
DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
LUCAS, TEXAS

BAUER COURT

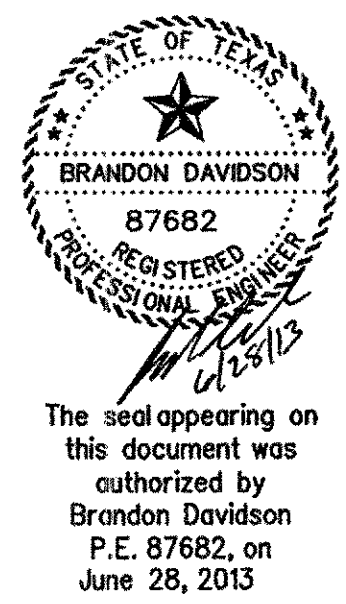
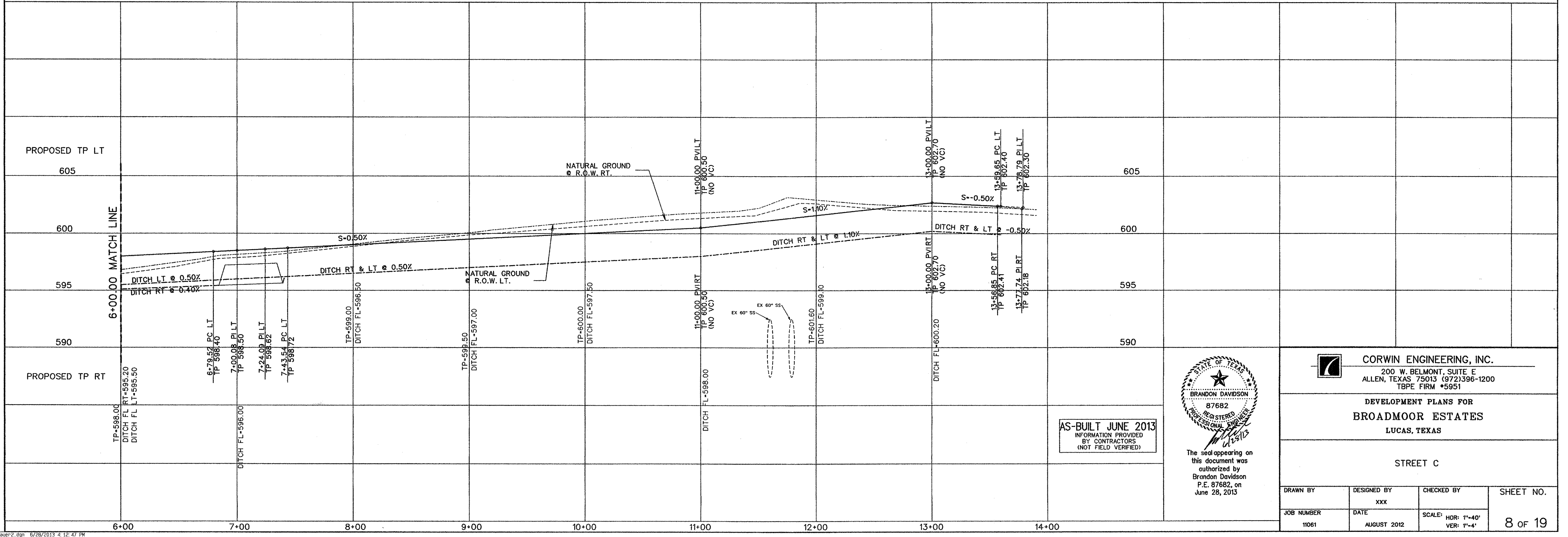
DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	xxx		
JOB NUMBER	DATE	SCALE: HOR: 1"=40' VER: 1"=4'	7 OF 19
11061	AUGUST 2012		



Note:
Contractor to contact NTMWD Line Locates at 972-442-5405,
48 hours prior to work in NTMWD Easement.



NOTE:
PROVIDE MINIMUM 4' SHOULDER FROM EDGE
OF PAVEMENT TO TOP OF HEADWALLS.



AS-BUILT JUNE 2013
INFORMATION PROVIDED
BY CONTRACTORS
(NOT FIELD VERIFIED)

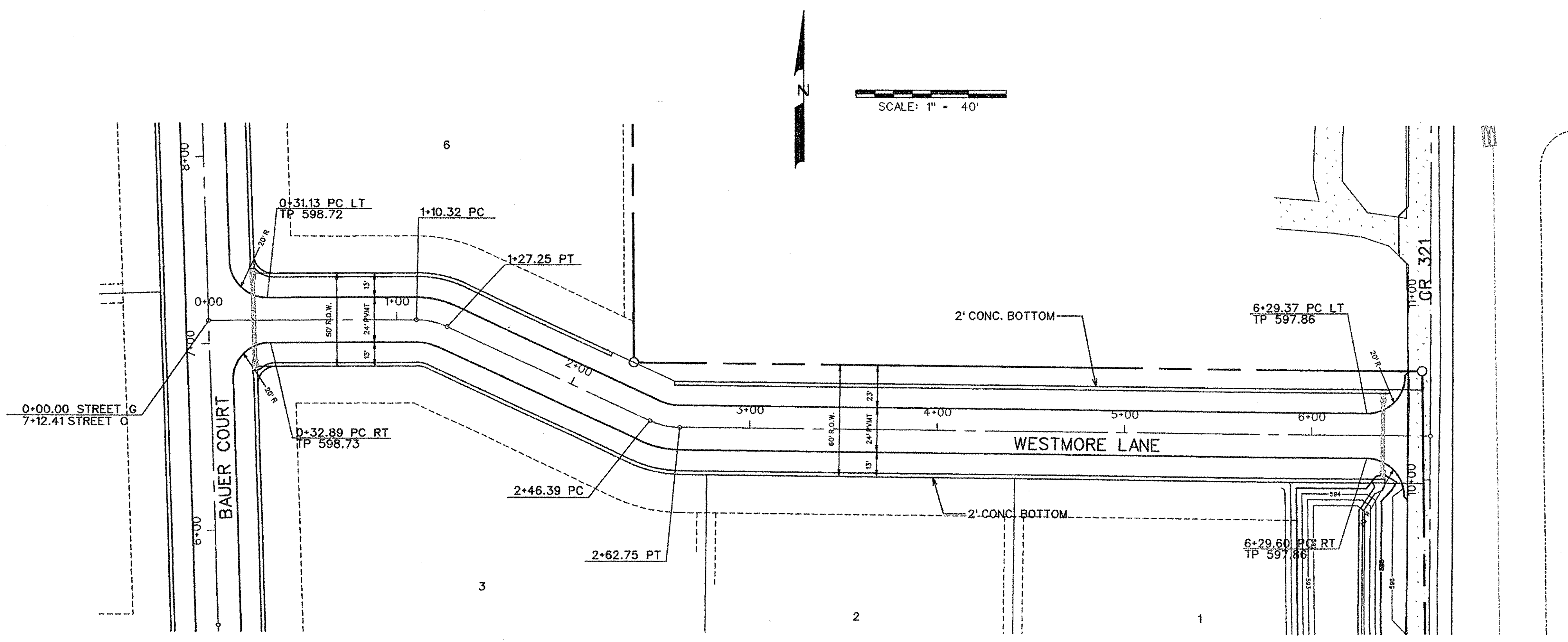
CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972)396-1200
TBPE FIRM #5951

DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
LUCAS, TEXAS

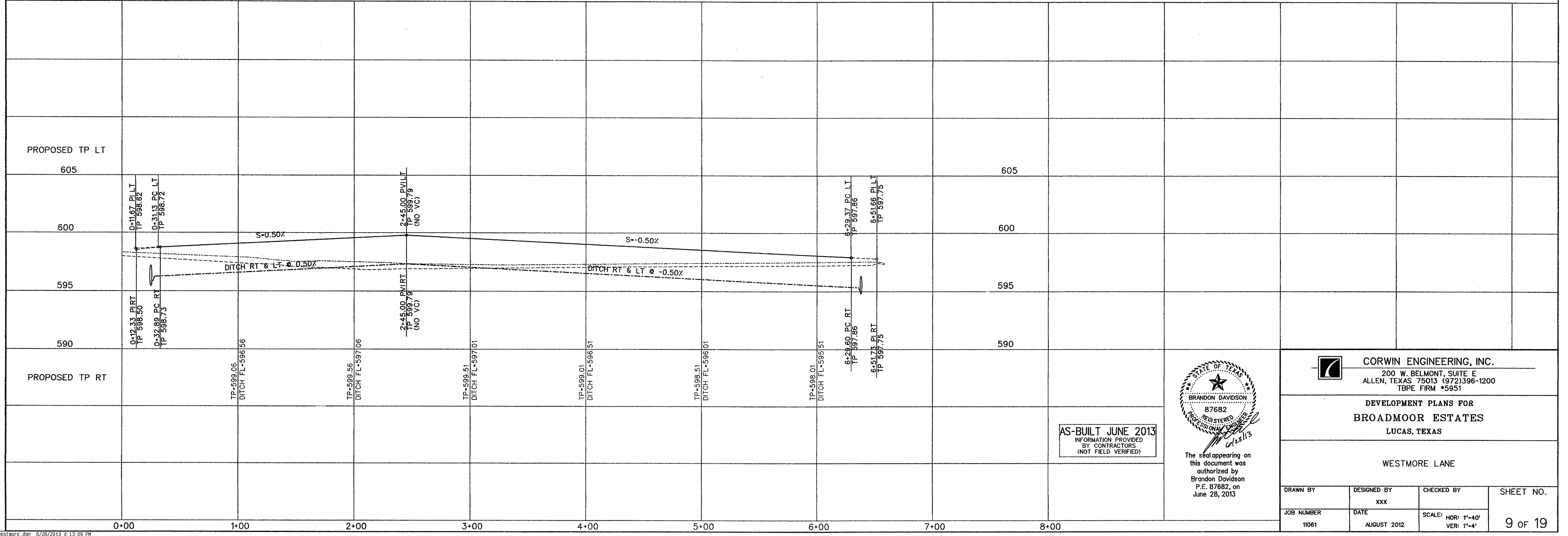
STREET C

DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	XXX		
JOB NUMBER	DATE	SCALE:	8 OF 19
11061	AUGUST 2012	HOR: 1"=40' VER: 1"=4'	

Note:
Contractor to contact NTMWD Line Locates at 972-442-5405,
48 hours prior to work in NTMWD Easement.



NOTE:
PROVIDE MINIMUM 4' SHOULDER FROM EDGE
OF PAVEMENT TO TOP OF HEADWALLS.



AS-BUILT JUNE 2013
INFORMATION PROVIDED
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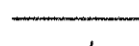

CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972) 396-1200
T&PE FIRM #5951

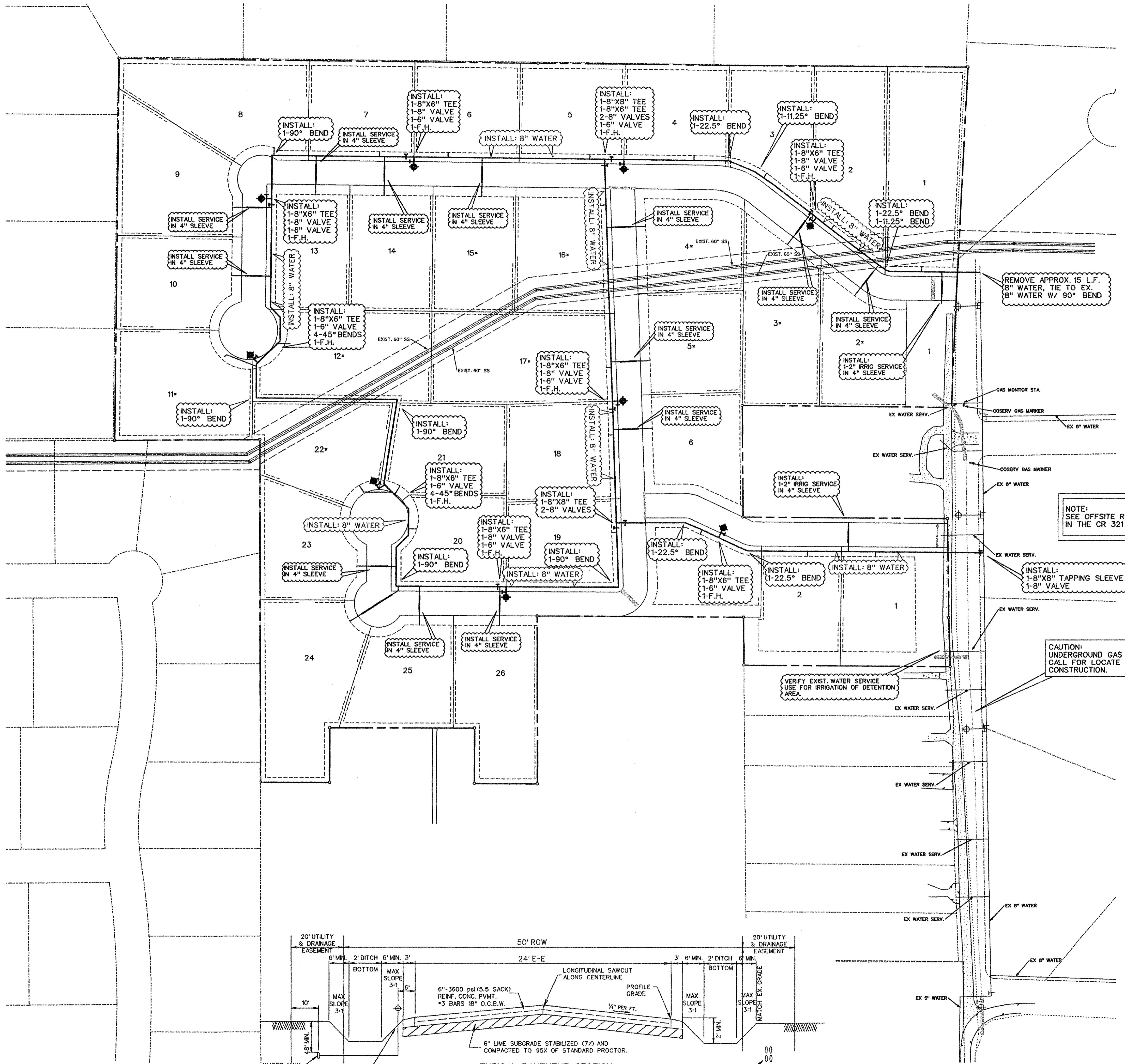
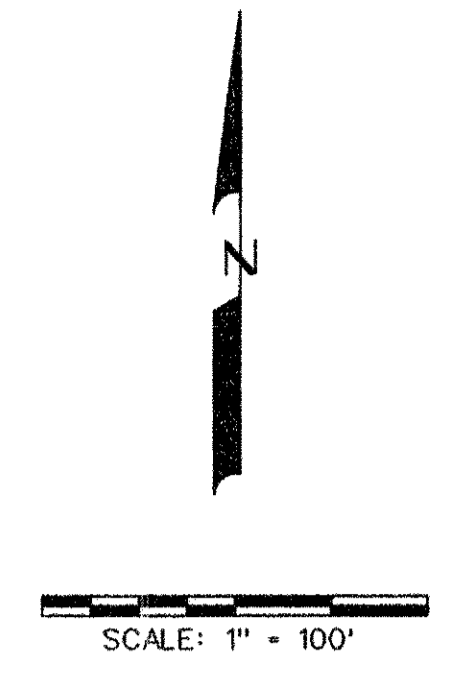
DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
LUCAS, TEXAS

WESTMORE LANE

DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	XXX		
JOB NUMBER	DATE	SCALE:	9 OF 19
11061	AUGUST 2012	HOR: 1"=40' VER: 1"=4'	

LEGEND

-  PROP. WATER LINE
-  PROP. FIRE HYDRANT AND VALVE
-  PROP. GATE VALVE
-  PROP. FLUSH VALVE
-  EXIST. WATER LINE
-  EXIST. FIRE HYDRANT AND VALVE



THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THIS PLAN ARE TAKEN FROM PUBLIC RECORDS. THE ENGINEER MAKES NO GUARANTEE THAT THE EXISTING UTILITIES SHOWN HEREON ARE COMPLETE OR IN THE CORRECT LOCATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

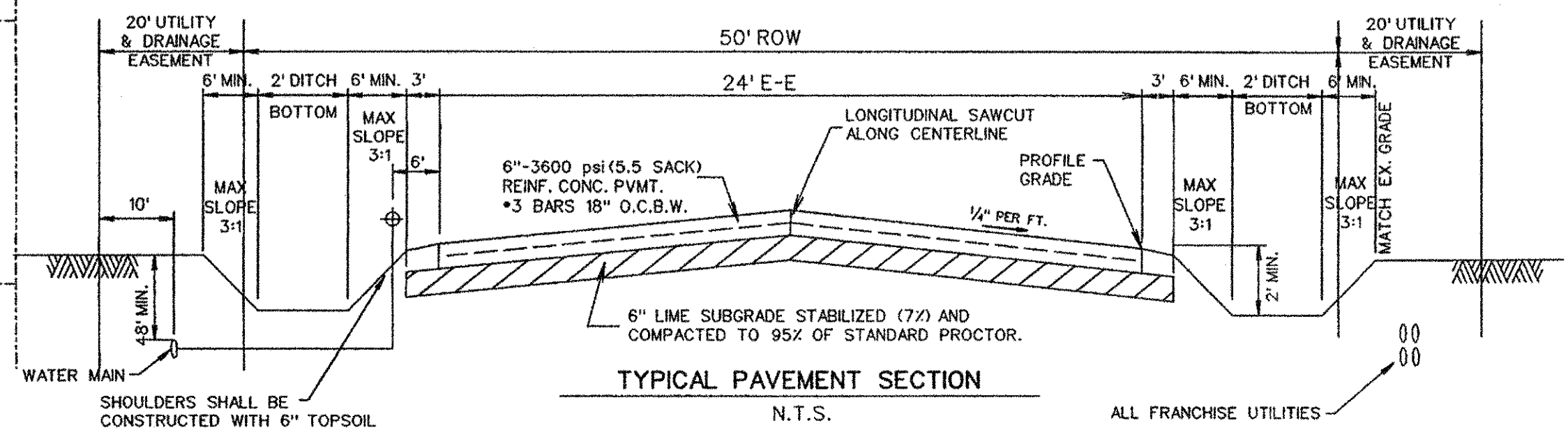
- NOTES:**
- ALL VALVES, FIRE HYDRANTS, METER BOXED, ETC. SHALL BE MARKED WITH A STAKE A MINIMUM OF 3 FEET ABOVE THE FIXTURE AND PAINTED ORANGE.
 - INDIVIDUAL SITE EVALUATIONS AND OSSF (ON-SITE SEWAGE FACILITIES) DESIGN PLANS MUST BE SUBMITTED TO AND APPROVED BY COLLIN COUNTY FOR EACH LOT PRIOR TO CONSTRUCTION OF ANY OSSF SYSTEM.
 - TCEQ SEPARATION CLEARANCES AND REQUIREMENTS TO BE FOLLOWED BY CONTRACTOR FOR INSTALLATION OF WATER LINE.

NOTE: SEE OFFSITE ROAD PLANS FOR WORK IN THE CR 321 R.O.W.

Note:
Contractor to contact NTMWD Line Locates at 972-442-5405, 48 hours prior to work in NTMWD Easement.

CAUTION: UNDERGROUND GAS LINE IN R.O.W. CALL FOR LOCATE PRIOR TO ANY CONSTRUCTION.

VERIFY EXIST. WATER SERVICE USE FOR IRRIGATION OF DETENTION AREA.



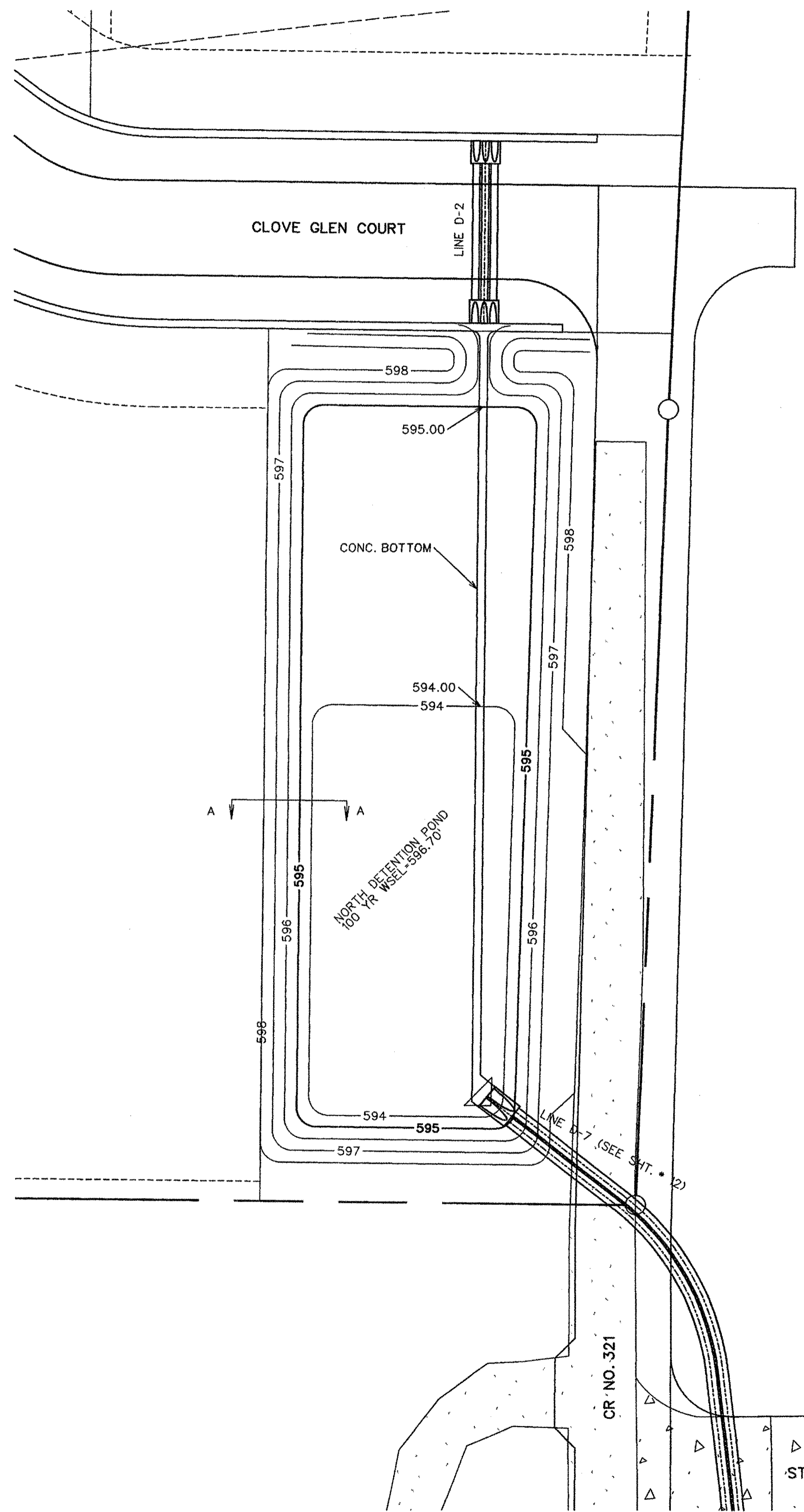
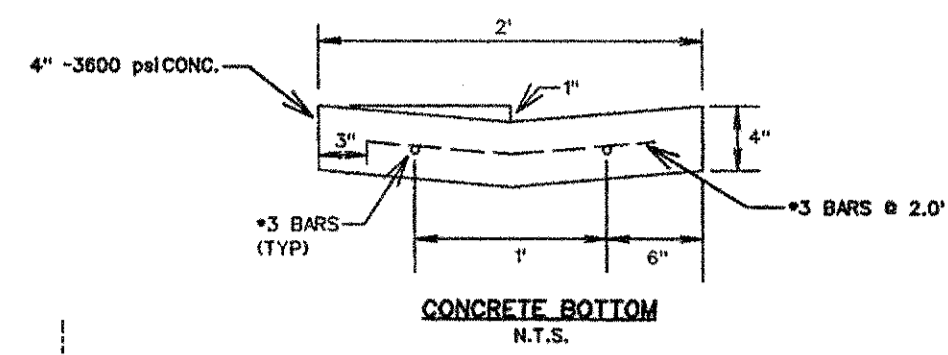
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AS-BUILT JUNE 2013
INFORMATION PROVIDED BY CONTRACTORS (NOT FIELD VERIFIED)

CORWIN ENGINEERING, INC.			
200 W. BELMONT, SUITE E ALLEN, TEXAS 75013 (972)396-1200 TBPE FIRM #5951			
DEVELOPMENT PLANS FOR BROADMOOR ESTATES LUCAS, TEXAS			
WATER PLAN			
DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
1061	XXX	XXX	10 of 19
JOB NUMBER	DATE	SCALE:	
1061	AUGUST 2012	1"=100'	

Note:
Contractor to contact NTMWD Line Locates at 972-442-5405,
48 hours prior to work in NTMWD Easement.

SCALE: 1" = 20'



Existing Flow to North Pond

SF	AC	C	I 100	Q 100	=Allowable Release Rate
894235	20.52881	0.3	7.52	46.31	

North Pond Detention Storage Calculations - 100 Year

Storm Duration	Outflow Duration	Area (AC)	Future "C"	Future "K"	Future "CA"	Rainfall intensity	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (acre-ft.)	Outflow (cfs)
10	20	20.53	0.40	1.00	8.21	8.88	72.9	43751	26241	17510	0.40	43.7
20	30	20.53	0.40	1.00	8.21	6.80	55.8	67006	39662	27645	0.63	43.7
30	40	20.53	0.40	1.00	8.21	5.60	46.0	82772	52482	30290	0.70	43.7
40	50	20.53	0.40	1.00	8.21	4.85	39.8	95582	65603	29980	0.69	43.7
50	60	20.53	0.40	1.00	8.21	4.30	35.3	105929	78723	27206	0.62	43.7
60	70	20.53	0.40	1.00	8.21	3.85	31.6	113812	91844	21968	0.50	43.7
70	80	20.53	0.40	1.00	8.21	3.50	28.7	120709	104964	15745	0.36	43.7
80	90	20.53	0.40	1.00	8.21	3.35	27.5	132041	118085	13957	0.32	43.7
90	100	20.53	0.40	1.00	8.21	3.15	25.9	139678	131205	8473	0.19	43.7

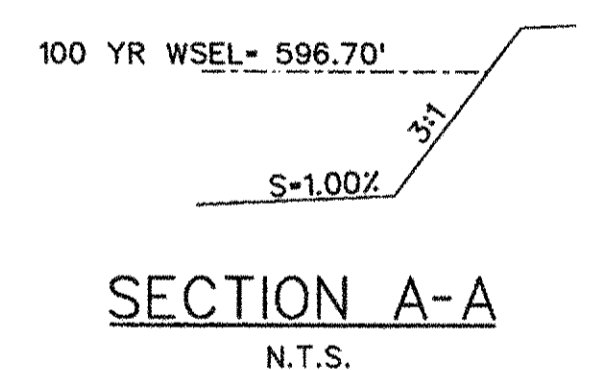
Notes: Difference between undeveloped and developed runoff 100 Year
0.30 undeveloped runoff coefficient
Maximum Storage Required 30290 cf

Pond Elevation/Storage North Pond

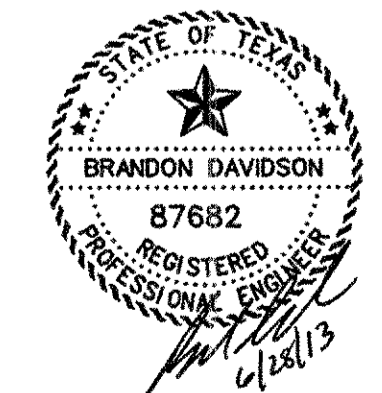
Elevation	Area	Storage
593	0	0
594	5121	2561
595	10604	10423
596	11714	21582
597	13249	34064

Outlet Control

Downstream HG	594.17
Pipe Length	77.37
Pipe Size	30
Number of barrels	2
S=	0.0029
V=	4.50
US HG=	595.84
H=	0.86
Check	Q= 43.7



AS-BUILT JUNE 2013
INFORMATION PROVIDED
BY CONTRACTORS
(NOT FIELD VERIFIED)



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<p>CORWIN ENGINEERING, INC. 200 W. BELMONT, SUITE E ALLEN, TEXAS 75013 (972)396-1200 TBPE FIRM #5951</p>			
<p>DEVELOPMENT PLANS FOR BROADMOOR ESTATES LUCAS, TEXAS</p>			
<p>NORTH DETENTION POND</p>			
DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	XXX	XXX	13 of 19
JOB NUMBER	DATE	SCALE:	
11061	AUGUST 2012	1"=20'	

Note:

Contractor to contact NTMWD Line Locates at 972-442-5405, 48 hours prior to work in NTMWD Easement.

Existing Flow to South Pond

SF	AC	C	1100	Q 100
866357	19.8882	0.3	7.52	44.87

South Pond Detention Storage Calculations - 100 Year

Storm Duration	Outflow Duration	Area (AC.)	Future "C"	Future "K"	Future "CA"	Rainfall Intensity (cfs)	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (acre-ft.)	Outflow (cfs)
10	20	19.89	0.40	1.00	7.96	8.88	70.6	42387	25707	16680	0.38	42.8
20	30	19.89	0.40	1.00	7.96	8.80	54.1	64917	38561	26357	0.61	42.8
30	40	19.89	0.40	1.00	7.96	8.60	44.6	80192	51414	28778	0.66	42.8
40	50	19.89	0.40	1.00	7.96	4.85	38.6	92602	64268	28335	0.65	42.8
50	60	19.89	0.40	1.00	7.96	4.30	34.2	102626	77121	25505	0.59	42.8
60	70	19.89	0.40	1.00	7.96	3.85	30.6	110264	89975	20289	0.47	42.8
70	80	19.89	0.40	1.00	7.96	3.50	27.8	116946	102828	14118	0.32	42.8
80	90	19.89	0.40	1.00	7.96	3.35	26.7	127925	115682	12243	0.28	42.8
90	100	19.89	0.40	1.00	7.96	3.15	25.1	135324	128535	6789	0.16	42.8

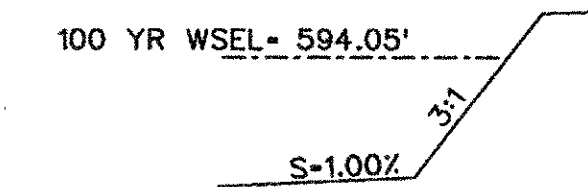
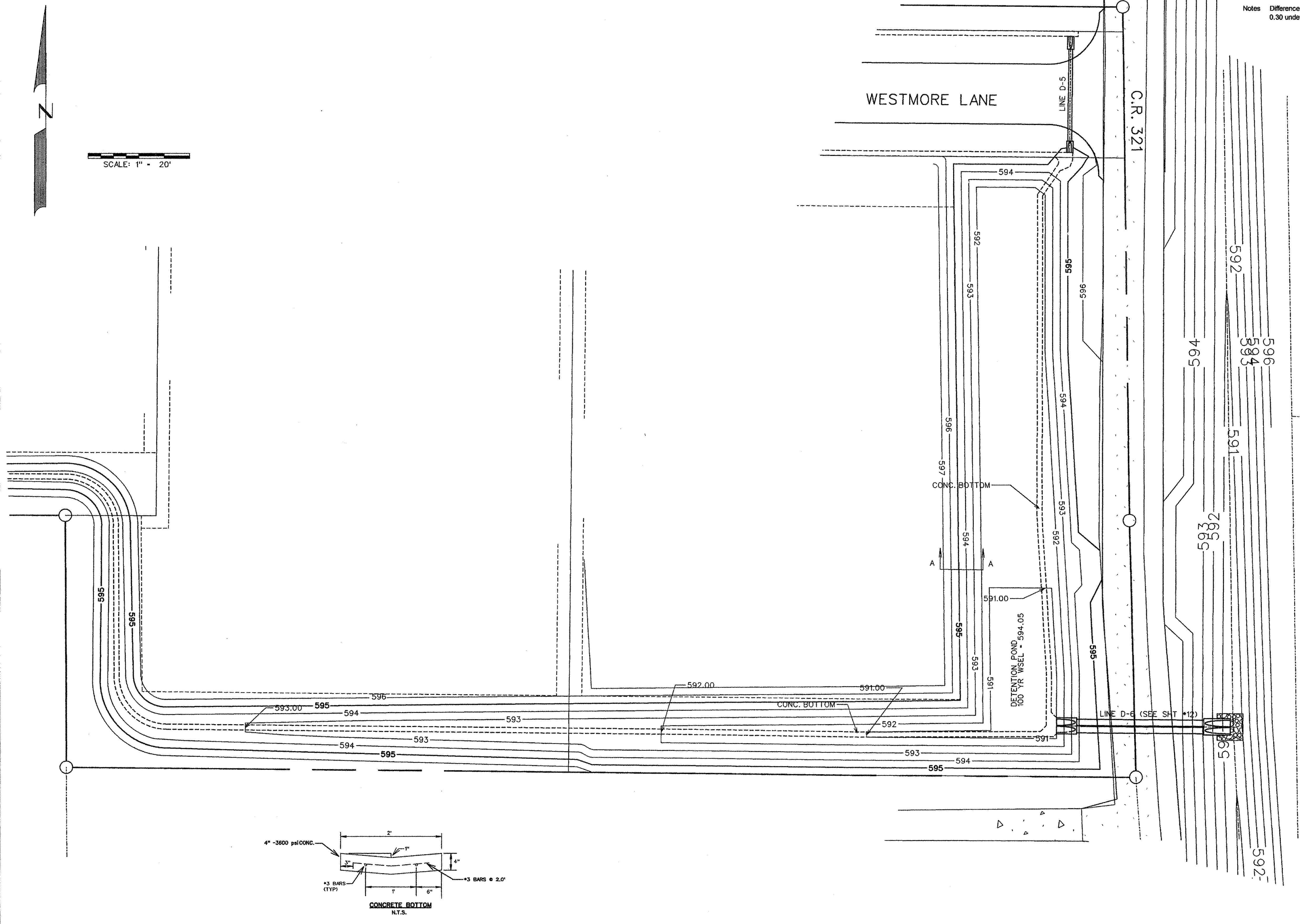
Notes: Difference between undeveloped and developed runoff 100 Year 0.30 undeveloped runoff coefficient

Maximum Storage Required 28778 cf

Pond Elevation/Storage South Pond

Elevation	Area	Storage
590.43	0	0
591	1669	835
592	7419	5379
593	11032	14604
594	15619	27930
595	21139	46309

Outlet Control	
Downstream HG	592.28
Pipe Length	70
Pipe Size	30
Number of barrels	2
S=	0.0028
V=	4.45
US HG=	593.28
H=	0.62
Check Q=	42.8

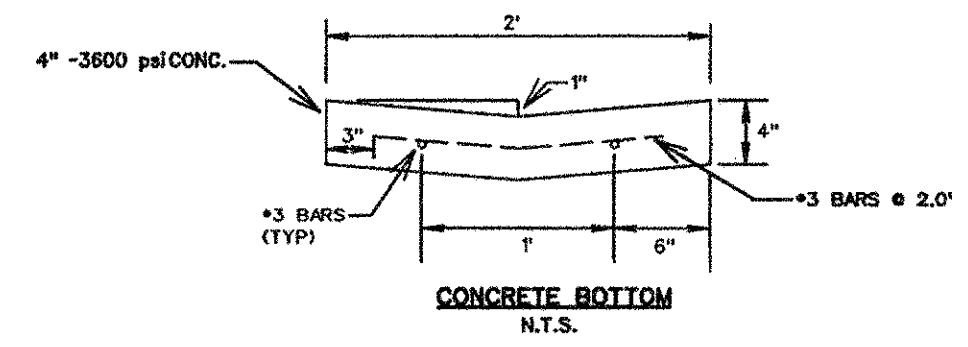


SECTION A-A
N.T.S.



AS-BUILT JUNE 2013
INFORMATION PROVIDED BY CONTRACTORS (NOT FIELD VERIFIED)

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CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972)396-1200
TBPE FIRM #5951

DEVELOPMENT PLANS FOR BROADMOOR ESTATES
LUCAS, TEXAS

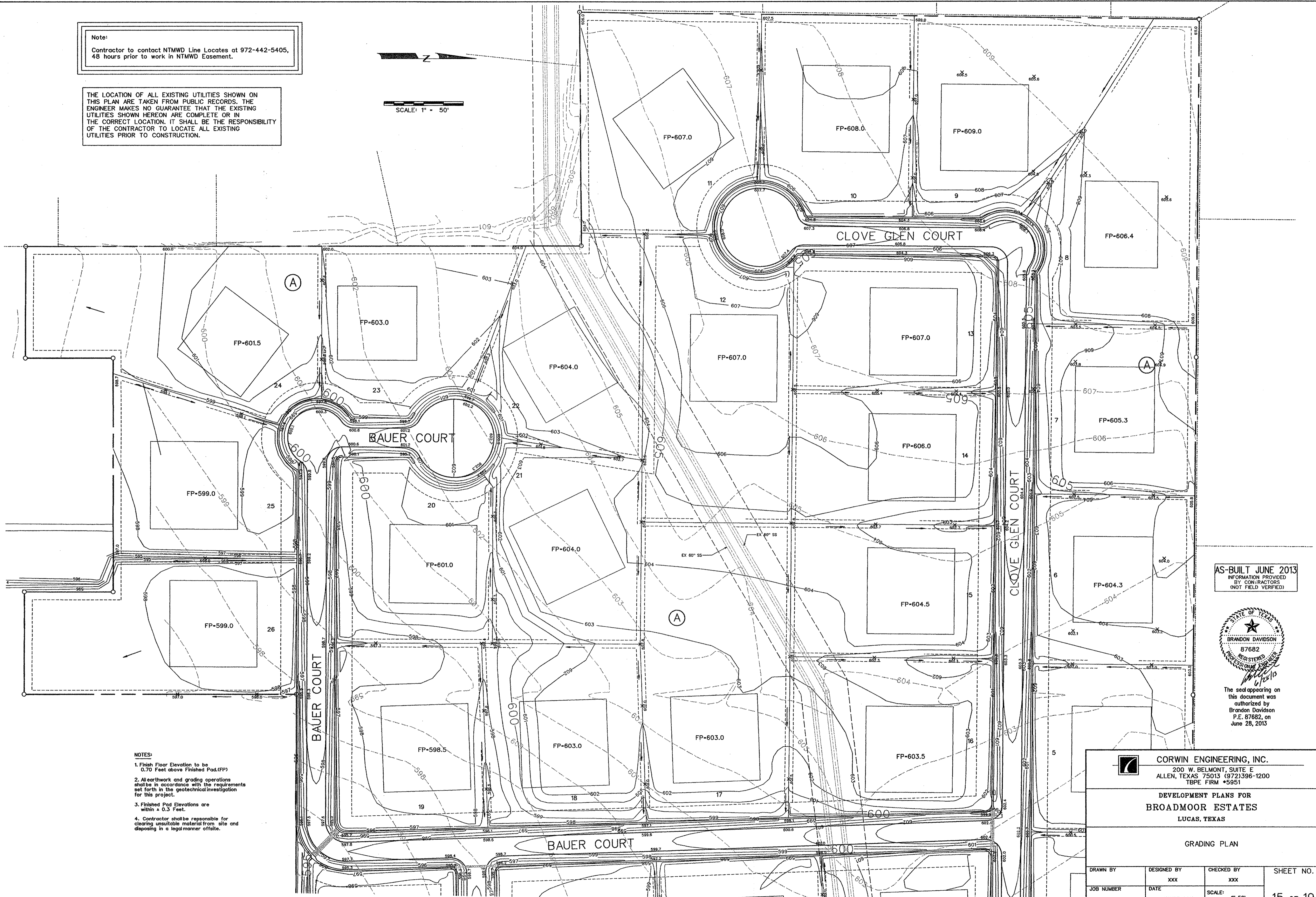
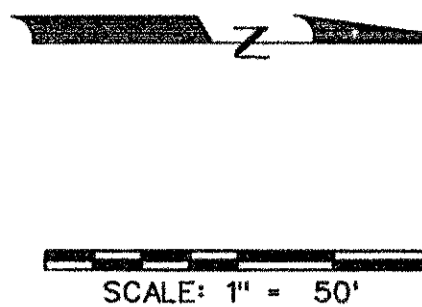
SOUTH DETENTION POND

DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	XXX	XXX	
JOB NUMBER	DATE	SCALE:	14 OF 19
11061	AUGUST 2012	1"=20'	

Note:

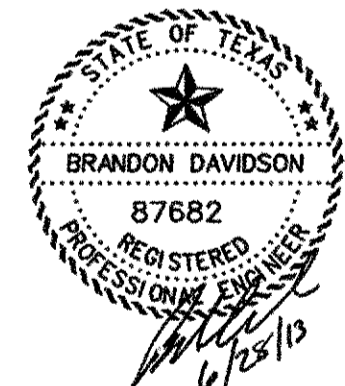
Contractor to contact NTMWD Line Locates at 972-442-5405, 48 hours prior to work in NTMWD Easement.

THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THIS PLAN ARE TAKEN FROM PUBLIC RECORDS. THE ENGINEER MAKES NO GUARANTEE THAT THE EXISTING UTILITIES SHOWN HEREON ARE COMPLETE OR IN THE CORRECT LOCATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.



- NOTES:**
1. Finish Floor Elevation to be 0.70 Feet above Finished Pad.(FP)
 2. All earthwork and grading operations shall be in accordance with the requirements set forth in the geotechnical investigation for this project.
 3. Finished Pad Elevations are within ± 0.3 Feet.
 4. Contractor shall be responsible for clearing unsuitable material from site and disposing in a legal manner offsite.

AS-BUILT JUNE 2013
INFORMATION PROVIDED BY CONTRACTORS (NOT FIELD VERIFIED)



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CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972)396-1200
TBPE FIRM #5951

DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
LUCAS, TEXAS

GRADING PLAN

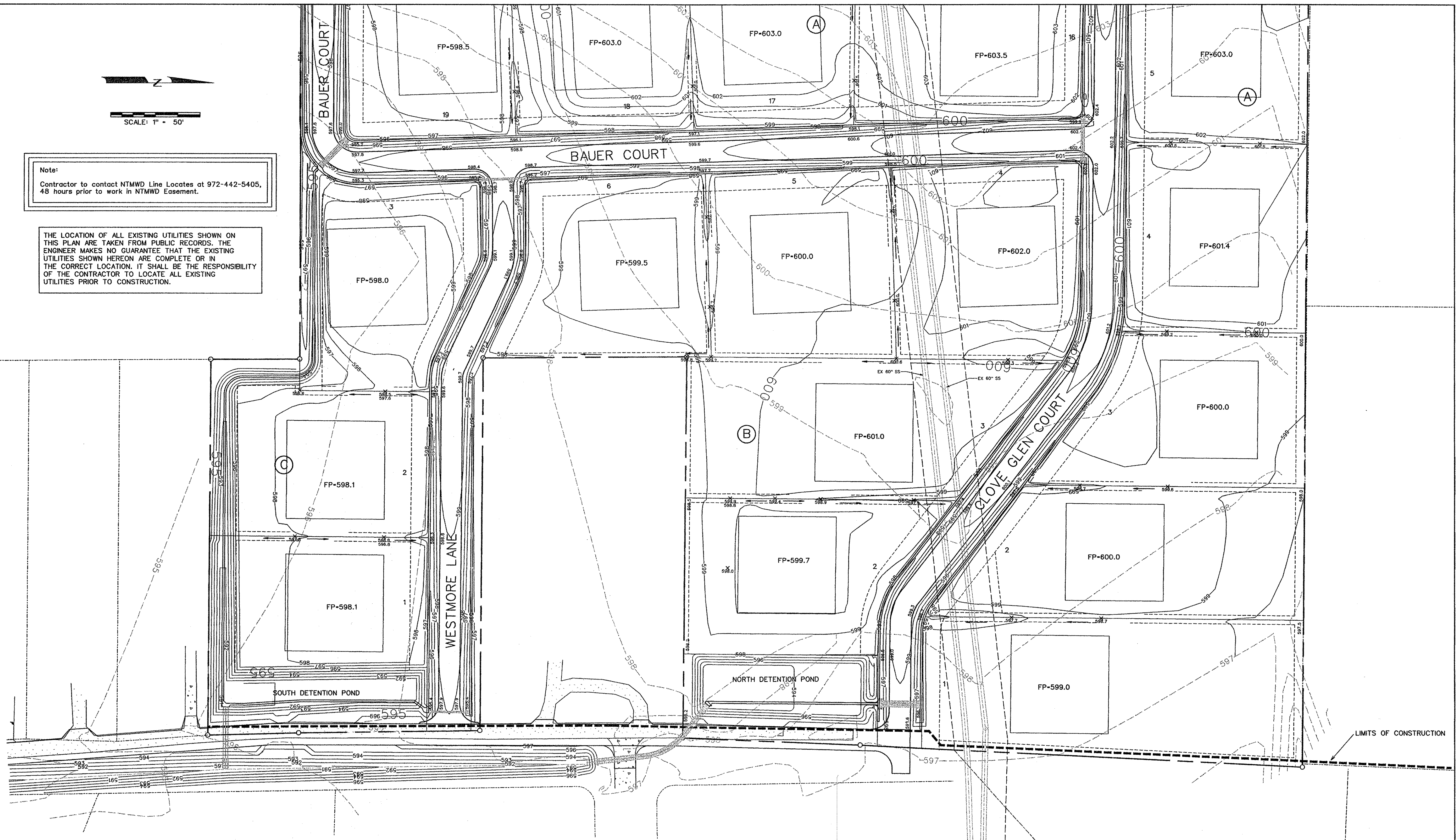
DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	XXX	XXX	15 of 19
JOB NUMBER	DATE	SCALE:	
11061	AUGUST 2012	1"=50'	



SCALE: 1" = 50'

Note:
Contractor to contact NTMWD Line Locates at 972-442-5405,
48 hours prior to work in NTMWD Easement.

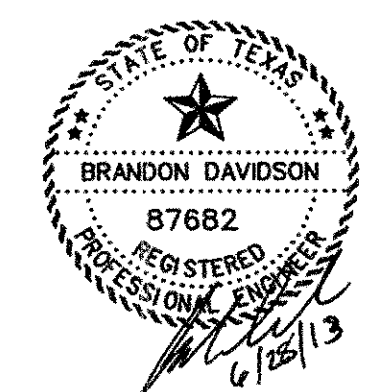
THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON
THIS PLAN ARE TAKEN FROM PUBLIC RECORDS. THE
ENGINEER MAKES NO GUARANTEE THAT THE EXISTING
UTILITIES SHOWN HEREON ARE COMPLETE OR IN
THE CORRECT LOCATION. IT SHALL BE THE RESPONSIBILITY
OF THE CONTRACTOR TO LOCATE ALL EXISTING
UTILITIES PRIOR TO CONSTRUCTION.



LIMITS OF CONSTRUCTION - - - - -

- NOTES:
1. Finish Floor Elevation to be 0.70 Feet above Finished Pad.(FP)
 2. All earthwork and grading operations shall be in accordance with the requirements set forth in the geotechnical investigation for this project.
 3. Finished Pad Elevations are within ± 0.3 Feet.
 4. Contractor shall be responsible for clearing unsuitable material from site and disposing in a legal manner offsite.

AS-BUILT JUNE 2013
INFORMATION PROVIDED
BY CONTRACTORS
(NOT FIELD VERIFIED)



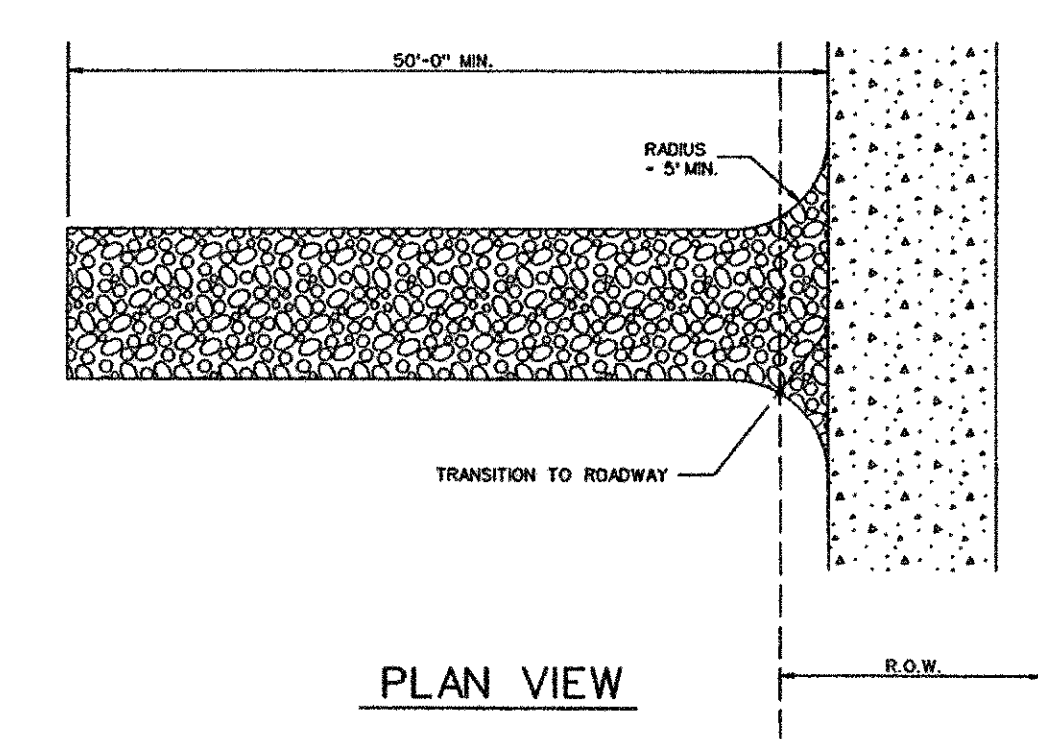
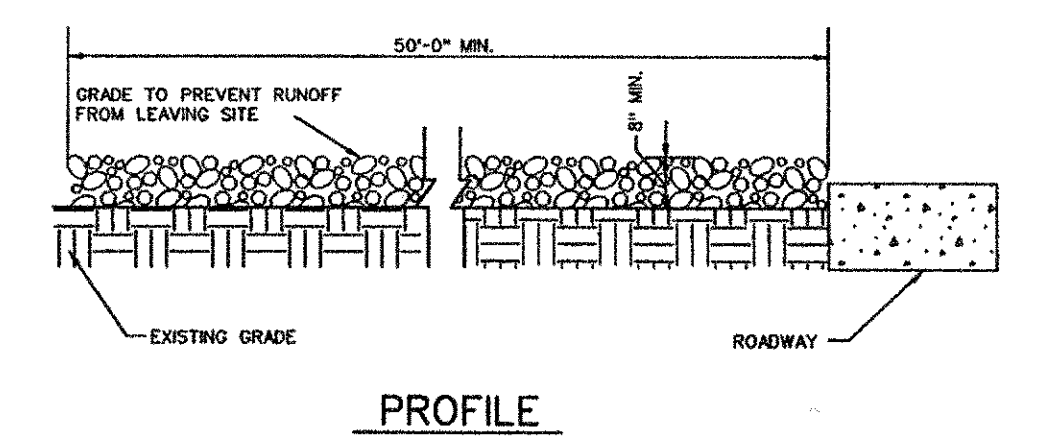
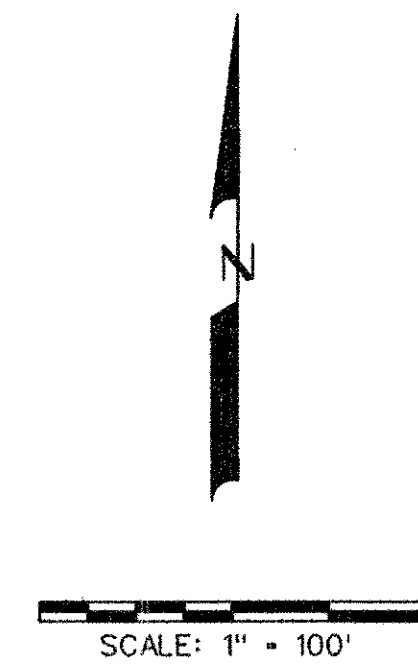
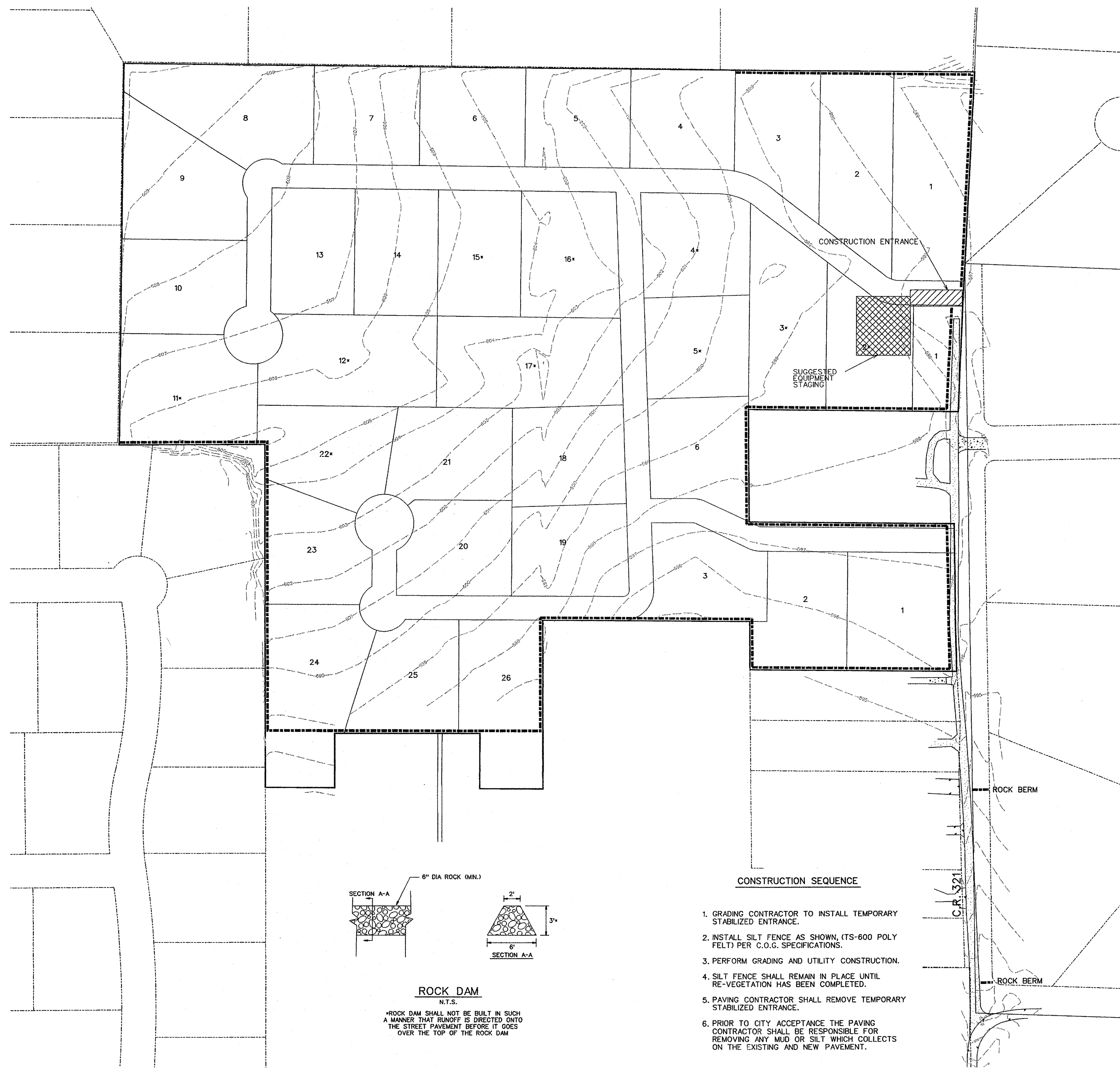
The seal appearing on
this document was
authorized by
Brandon Davidson
P.E. 87682, on
June 28, 2013

CORWIN ENGINEERING, INC.
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972)396-1200
TPE FIRM #5951

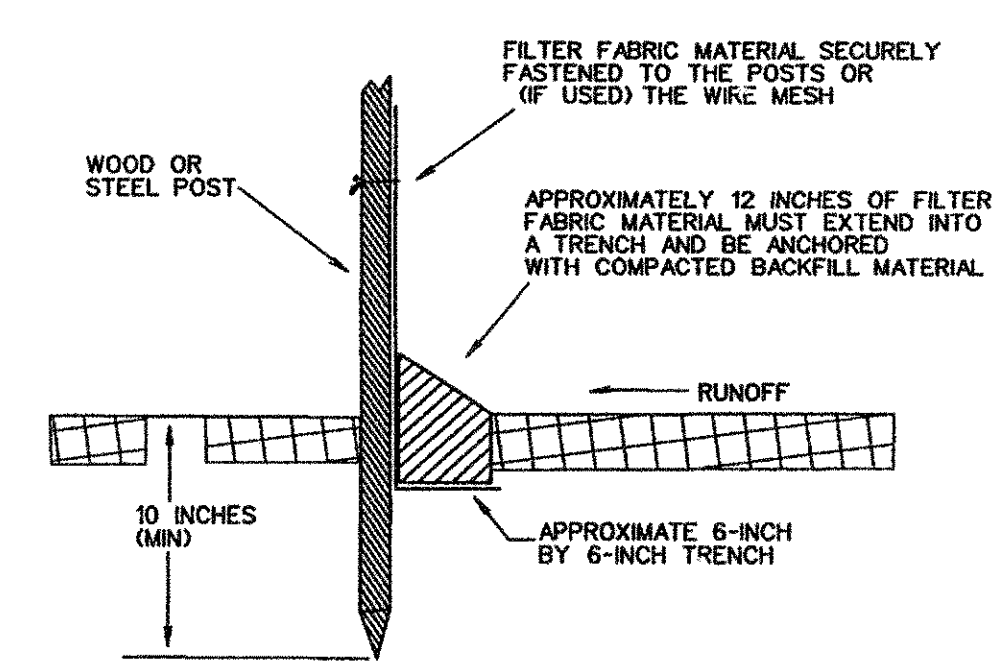
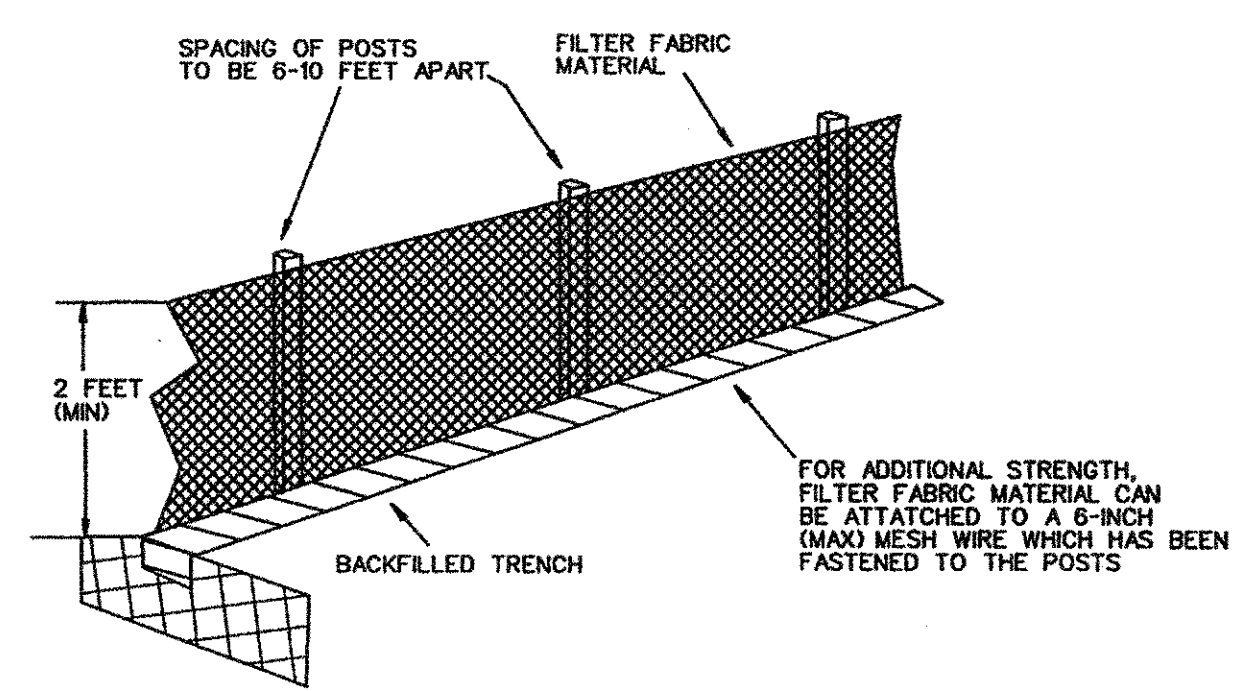
DEVELOPMENT PLANS FOR
BROADMOOR ESTATES
LUCAS, TEXAS

GRADING PLAN

DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	xxx	xxx	
JOB NUMBER	DATE	SCALE:	16 OF 19
11061	AUGUST 2012	1"=50'	

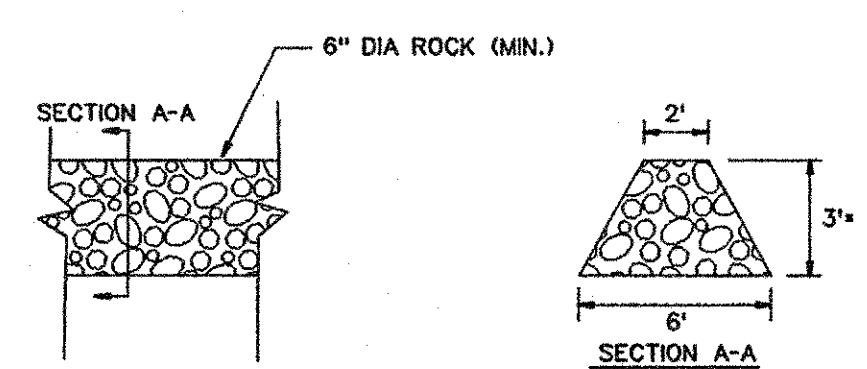


STABILIZED ENTRANCE DETAIL



FILTER FABRIC FENCE DETAIL

LEGEND
 SILT FENCE (BEFORE CONSTRUCTION) - - - - -



ROCK DAM
 N.T.S.

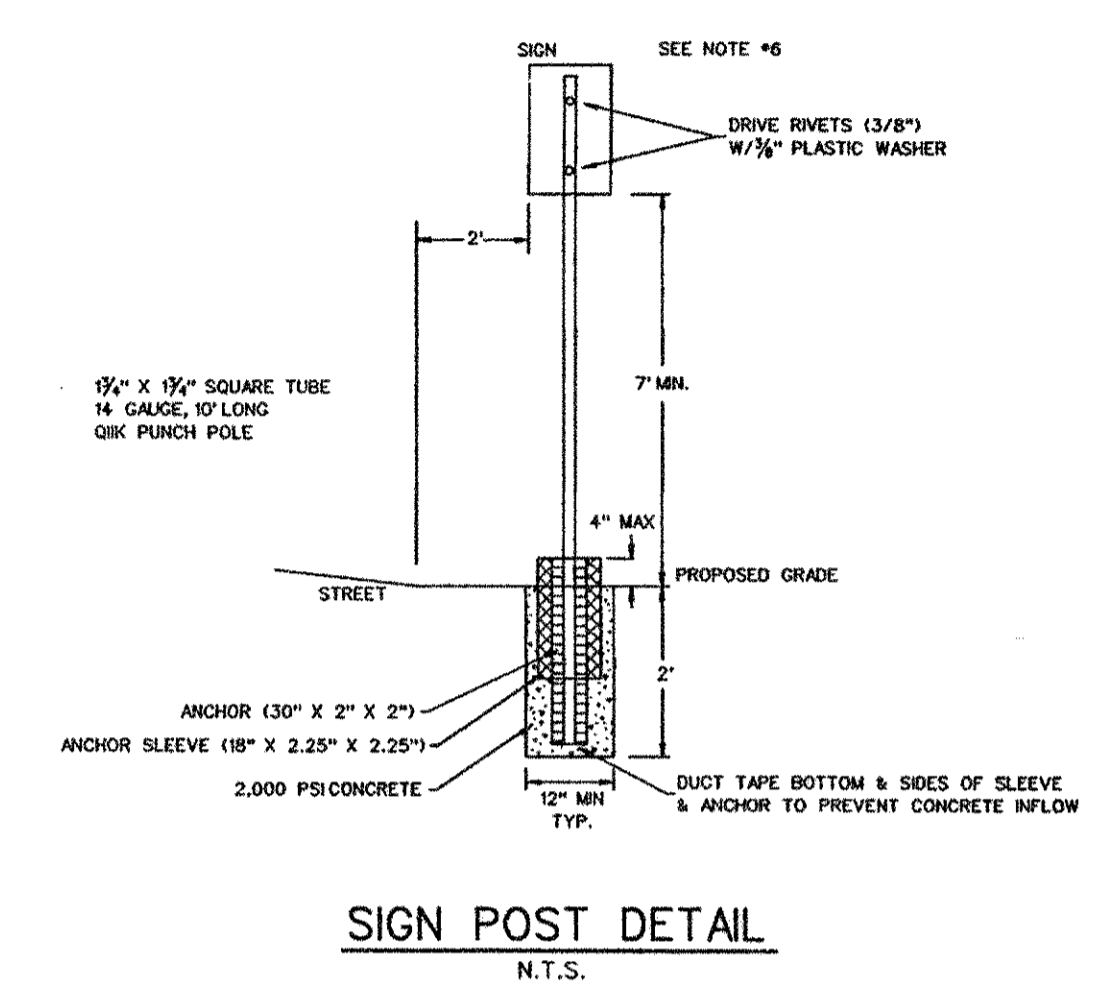
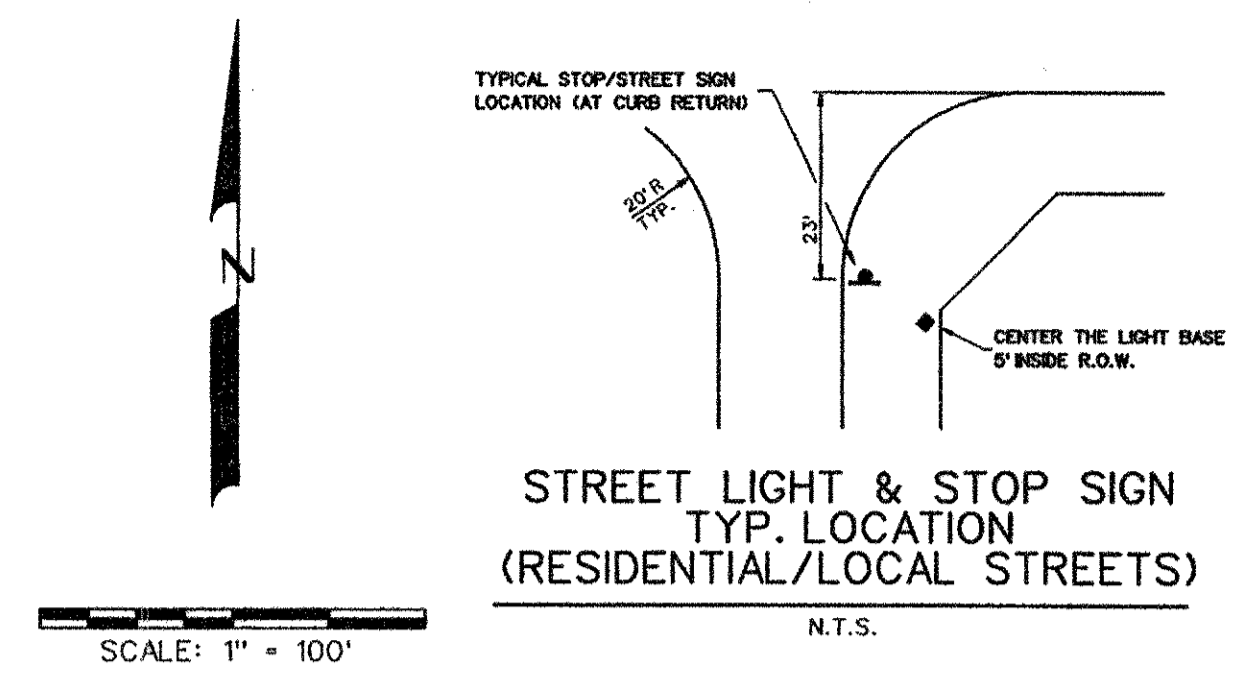
*ROCK DAM SHALL NOT BE BUILT IN SUCH A MANNER THAT RUNOFF IS DIRECTED ONTO THE STREET PAVEMENT BEFORE IT GOES OVER THE TOP OF THE ROCK DAM

CONSTRUCTION SEQUENCE

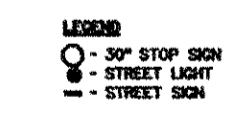
1. GRADING CONTRACTOR TO INSTALL TEMPORARY STABILIZED ENTRANCE.
2. INSTALL SILT FENCE AS SHOWN, (TS-600 POLY FELT) PER C.O.G. SPECIFICATIONS.
3. PERFORM GRADING AND UTILITY CONSTRUCTION.
4. SILT FENCE SHALL REMAIN IN PLACE UNTIL RE-VEGETATION HAS BEEN COMPLETED.
5. PAVING CONTRACTOR SHALL REMOVE TEMPORARY STABILIZED ENTRANCE.
6. PRIOR TO CITY ACCEPTANCE THE PAVING CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ANY MUD OR SILT WHICH COLLECTS ON THE EXISTING AND NEW PAVEMENT.

AS-BUILT JUNE 2013
 INFORMATION PROVIDED BY CONTRACTORS (NOT FIELD VERIFIED)


CORWIN ENGINEERING, INC. 200 W. BELMONT, SUITE E ALLEN, TEXAS 75013 (972)396-1200 TBPE FIRM #5951			
DEVELOPMENT PLANS FOR BROADMOOR ESTATES LUCAS, TEXAS			
EROSION CONTROL PLAN			
DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	xxx	xxx	
JOB NUMBER	DATE	SCALE:	
11061	AUGUST 2012	1"=100'	17 OF 19



- TRAFFIC CONTROL NOTES:**
1. ALL SIGNAGE, BARRICADES, AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE STANDARD HIGHWAY SIGN DESIGN FOR TEXAS.
 2. LOCATIONS SHOWN FOR SIGNAGE AND PAVEMENT MARKINGS ARE APPROXIMATE; FINAL LOCATIONS MAY CHANGE DUE TO POST CONSTRUCTION CONDITIONS AND PRESENCE OF OTHER PHYSICAL FEATURES. FINAL LOCATION OF ALL TRAFFIC CONTROL DEVICES SHALL BE FIELD VERIFIED WITH CITY PRIOR TO INSTALLATION.
 3. ALL PAVEMENT MARKINGS OTHER THAN BUTTONS SHALL BE THERMOPLASTIC UNLESS OTHERWISE NOTED.
 4. ALL SIGNS SHALL BE HIGH INTENSITY AND THE SIZES SHALL BE STANDARD UNLESS OTHERWISE NOTED.
 5. ALL TRAFFIC SIGNS, POSTS, AND MATERIALS SHALL BE INSTALLED PER DETAIL THIS SHEET.
 6. FOR STOP SIGNS THAT WILL ACCEPT FUTURE STREET SIGNS, EXTEND POST ABOVE STOP SIGN SO THAT 2 HOLES ARE AVAILABLE FOR MOUNTING. (FOR ALL OTHERS, POST SHALL NOT EXTEND ABOVE SIGN.)
 7. CHANGES TO TYPICAL SIGN POST LOCATION MADE AT ENGINEER'S DISCRETION.
 8. ALL STREET LIGHTS SHALL BE DARK SKY TYPE. CONTRACTOR SHALL SUBMIT SHOP DRAWING TO CITY PRIOR TO INSTALLATION FOR APPROVAL.



AS-BUILT JUNE 2013
 INFORMATION PROVIDED
 BY CONTRACTORS
 (NOT FIELD VERIFIED)

 CORWIN ENGINEERING, INC. 200 W. BELMONT, SUITE E ALLEN, TEXAS 75013 (972)396-1200 TBPE FIRM #5951			
DEVELOPMENT PLANS FOR BROADMOOR ESTATES LUCAS, TEXAS			
STREET LIGHT AND SIGN PLAN			
DRAWN BY	DESIGNED BY	CHECKED BY	SHEET NO.
	xxx	xxx	
JOB NUMBER	DATE	SCALE:	
11061	AUGUST 2012	1"=100'	18 OF 19

WATER SYSTEM

General Notes

All work and materials shall be in accordance with City's standard specifications and general design standards.

1. All topping sleeves and valves shall be full body ductile iron.
 2. Valves to be Mueller, Waterloo, or Clow -150 psi test.
 3. Fittings shall of the mechanical joint type, flanged where applicable, and be manufactured by US Pipe, American, or other as approved by the City - Class 250. All fittings shall be restrained by the use of Mega-Lugs or approved equal and concrete thrust blocking.
 4. Fire hydrants to be Mueller three-way standard thread with valve in lead or approved equal. All mains steamer nozzles shall have a nominal inside diameter of 4-inches.
 5. Water lines in the area of storm drain inlets shall be constructed behind the inlet by pulling the pipe using longitudinal bending in accordance with the manufacturer's requirements. Fittings may be used if bending is impractical consult the project City Construction Inspector.
 6. Water lines crossing under storm drains and sanitary sewer lines shall have a minimum of 18" clearance below storm drains and two (2) feet clearance below sanitary sewer lines or otherwise as governed by TNRCC Chapter 290 requirements. Parallel water lines shall be at least nine (9) feet clear horizontally to sanitary sewer lines and manholes. Where minimum clearance cannot be achieved, water lines shall be encased six (6) inches around in concrete to ten (10) feet either side of utility crossing. Where water lines cross creeks or ditches the water line shall be protected by concrete encasement at least ten (10) feet past the embankment slope on each side.
 7. Water mains: All water lines shall have a minimum of 48" cover over the top of the pipe. All new water mains shall be PVC pipe in accordance with the following: C900 DR 14 for 4"-8", C900 DR 18 for 12" and C905 DR 18 for over 12". All "blue in color as per City specifications; the pipe shall be laid on a minimum of class "B" embedment (see Detail Drawing No. 14-A). Water mains up to 12" shall be installed 2' back of curb mains larger than 12" shall be installed at least 3' from the back of curb depending upon conditions. Detectable metallic tape ("Blue-Cautious Buried Water Below" or approved equal) shall be installed to a maximum depth of 12" below finished grade (after compaction) above all PVC mains.
 8. The Contractor shall install fire hydrants as the locations shown. A M.J. and flanged tee with a flanged end to M.J. gate valve is required so that the gate valve is anchored to the main.
 9. Fire Hydrants shall be painted as follows:
A. Tnemec Series 43-38H Diffused Aluminum, Silver for 6 inch mains
B. Tnemec Series 2H Hi-Build Tnemec-Gloss, True Blue Safety for 8 inch mains.
C. Tnemec Series 2H Hi-Build Tnemec-Gloss, Yellow Safety for 12 inch or larger water mains.
- All hydrants shall be painted with two coats of Tnemec Series 43-38H Diffused Aluminum, Silver paint. When a color code other than Tnemec Series 43-38H Diffused Aluminum Silver is required the top bonnet, including the lip and all nozzle caps shall be painted the appropriate color.
10. All bolts and nuts used with mechanical joint fitting shall be "Cor-Ten" steel or approved equal.
 11. The installation of a blue stemsonite (or equal) model 88-SSA fire hydrant marker will be installed opposite fire hydrants just off center to the side of the street adjacent to the hydrant.
 12. Polyethylene encasement - The Contractor shall furnish and install polyethylene wrap around the ductile iron pipe, related fittings and valves. This wrap shall be an 8 mil. thickness polytube. Seams and overlaps shall be wrapped and held in place by two (2) inch wide plastic backed adhesive tape, Polyken 900 or Scotchrap no. 50, or an approved equal, with approximate two (2) foot laps on the polytube. The wrap on the barrel of the pipe shall be loose enough to allow the film to shift with the soil. The wrap shall be installed without breaks, tears, or holes in the film. The cost of the polyethylene tube wrap and complete installation shall be included in the unit price bid for the furnishing and the installation of ductile iron pipe and related fittings and valves.
 13. Valve boxes shall be furnished at the required length in order to be set to final grade on each gate valve. After the final clean up and alignment has been completed, the Contractor shall pour a reinforced concrete block 24" x 24" x 6" around all valve boxes so the finished grade is level with the finished roadway. All valve stack components shall be cast iron. Valve boxes over four (4) feet deep will require extensions. All valves shall be marked with a saw on the curb or pavement with "V". The "V" shall point to the location of the valve as follows: if the valve is in the paving, the "V" shall be marked upright; if the valve is outside the paving, the "V" shall be marked upside down.
 14. The Contractor shall coordinate operation of all existing valves with the City. Contact the City Construction Inspector at the Construction Inspection Department at 972-727-8999(office), or 469-628-8607 (Public Works Supervisor)
 15. All water lines shall be pressure tested to 200 psi for a three-hour continuous period. Leakage rate shall not exceed 25 gallons per inch of nominal diameter per mile of pipe over a 24-hour period. Contractor shall flush and sterilize lines and prove lines to be free of fecal coliform organisms by obtaining samples for laboratory tests for contamination. The Contractor shall reflush and resterilize until all samples prove free from contamination.
 16. All residential water services shall be as follows:
A. Water services shall be normally located in the center of the lot. A water meter box, as approved by the City, with lock lid shall be installed two (2) feet back of curb line.
B. The water service shall be a minimum of 1" diameter continuous type "K" soft copper pipe. Sand embedment shall be used around the pipe and corporation stop. Service saddles shall be brass body with double bronze flattened straps (no banded) - Ford, Mueller, or City approved equal.
C. Contractor shall tie a 1" wide piece of blue plastic flagging to the water service meter setter and shall leave a minimum of 36" of flagging exposed after backfill after curb and paving is completed.
D. The utility contractor shall install the water services to a point two (2) feet back of the curb line at a depth of 12 inches. The meter box shall be furnished and installed by the Contractor after the paving Contractor has completed the fine grading in back of the curb. Each service location will be marked on the curb with a single vertical saw mark by the utility Contractor and tied to property corners on the "As-Recorded" plans.
 17. For non-residential water services, the meter box shall be furnished and installed by the Contractor after the paving Contractor has completed the final grading in the back of the curb. Meter boxes/vaults shall be located outside of paving. Each service location will be marked on the curb or pavement with a single vertical saw mark by the utility Contractor and tied to property corners on the "As-Recorded" plans.
 18. Density testing requirements: Frequency of tests shall not be less than one every 300 linear feet of main pipe per 2.0' of lift until final grade, starting at 2.0' above top of pipe. Water services are to be tested at a rate of 1 for every 6 services that cross the proposed right-of-way or every 300 lf of water service installed. Every other main, stubout, and fire hydrant lead that cross the existing or proposed street, alley, or fire lane subgrade shall also receive at least one set of density tests. All ditches shall be mechanically tamped and compacted to 95% standard proctor density at 0-4% above optimum moisture. Water jetting is not permitted.
 19. The Contractor shall be responsible for providing "As-Recorded" plans to the engineer of record showing the location of water services and valves by distance to lot lines. This information shall be placed and marked "As-Recorded" by the engineer of record. Copies of these "As-Recorded" plans shall be furnished to the City as required.
 20. The Contractor shall furnish maintenance bond of 10% (ten percent) of the total contract price to the City to run two years from the date of acceptance of the system by the City

PAVING SYSTEM

General Notes

1. Absolutely no earthwork, lime application, or other preparation of the subgrade for paving of streets, alleys, or fire lanes shall be initiated without authorization from the City Construction Engineer. Once all testing of underground facilities has been completed and verified to meet the City's specifications, the City Construction Engineer will issue a letter to the project owner or superintendent that will authorize the initiation of all subgrade work in preparation for paving.
2. All street, alley, and fire land right-of-way or easement width shall be excavated full width in accordance with the street and sidewalk section to be constructed.
3. The subgrade for all streets, alleys, and fire lanes shall be stabilized with hydrated lime material to a distance 12 inches beyond the back of curb or edge of paving as applicable. The amount of lime material shall be that amount which will reduce the plasticity index (PI) below fifteen (15) as verified by testing by an approved laboratory; the City will add one (1) percent to the laboratory results for field variation. Laboratory testing (lime series) shall generally be conducted when all utilities are complete and the roadway subgrade is complete. Lime shall be applied by percentage dry unit weight of soil treated to a minimum in place compacted thickness of six (6) inches. At the discretion or the City, additional testing for the presence of sulfates in the pavement subgrade may be required at the Contractor's expense. If the sulfates are present at an unacceptable concentration, the City may require a recommendation for further treatment of the soil from the approved laboratory.
4. Subgrade testing requirements: All fill and shall be compacted to no less than 95% of standard proctor density at 0 - 4% above optimum moisture content. Frequency of tests shall not exceed every 300 linear feet of fill. Frequency of testing shall not exceed every 300 linear feet per 2.0' of lift until final grade starting at 2.0' above natural/sound grade to top of subgrade. All street alley, and fire land subgrade shall be compacted to no less than 95% of standard proctor density at 0 - 4% above optimum moisture content. Frequency of tests shall not exceed every 300 linear feet of subgrade, alternating from left quarter point to center line to right quarter point. Verification of lime depth, testing for subgrade gradations/pulverizations, and plasticity indices of the soil shall also be conducted; the frequency of this testing shall be as previously mentioned. All testing of materials required for the construction of any street, alley or fire lane shall be performed by an approved agency for testing materials. The nomination of the testing laboratory and the payment of such testing services shall be made by the Contractor. The engineer shall approve the laboratory nominated to do the testing of materials. It shall be the Contractor's responsibility to show by standard testing procedures that the work constructed does meet the requirements of the City's specifications.
5. Minimum design requirements: All street, alley and fire lane paving shall be designed to have a minimum compressive strength of 3500 psi at twenty-eight (28) days with a minimum of five (5) sacks of cement as verified by testing in an approved laboratory. Two batch designs shall be submitted to the City Construction Engineer for approval: one for machine work and one for hand work. All batch designs must be signed by the testing laboratory and include all documentation, such as results of field trial testing. A fly ash batch design may be submitted for approval on a specific job basis; fly ash up to twenty (20%) by weight of cement replacement may be used in machine pours. If applicable, all batch designs shall specify an appropriate sulfate resistant cement or equivalent. Slump shall be 1 - 3 inches for all machine work and 1 - 4 inches for all hand work. Streets (depending on classification) and fire lanes shall have a minimum thickness of six (6) inches; alleys shall have a minimum thickness of 8" - 5'-8". Upon completion of construction, all streets and fire lanes shall be cored for depth (2" cores) at a spacing of 300 ft maximum alternating from left quarter point to center line to right quarter point. Alleys shall be cored for depth (2" cores) at a spacing of 300 ft maximum, along the center line. Pavement of a thickness less than the thickness shown on the plans by more than one-quarter (1/4) inch but less than three-quarter (3/4) inch will be considered deficient. The Contractor shall pay to the City two (2) times the unit bid price per square yard for the area determined to be deficient in thickness as defined above. Pavement deficient in strength by more than three-quarter (3/4) inch shall be removed and replaced completely. The deficient area shall be cored immediately on ten (10) foot centers or one (1) per panel to be proved out. All streets, alleys, and fire lanes and will require cylinders to be made for strength tests by the approved laboratory. Samples for strength tests of each class of concrete placed each day shall be taken by an approved laboratory not less than once a day, nor less than once for each 100-150 cu yd of concrete. Four (4) cylinders shall be made: one shall be broken at 7 day, two (2) shall be broken at twenty-eight (28) days, and one shall be held in case of damage of any of the other three (3). The average strength of two (2) cylinders from the same sample, tested at twenty-eight (28) days is required for each strength test; an average strength test beyond twenty-eight (28) days is unacceptable. If the twenty-eight (28) day design strength is not reached upon strength testing the cylinders, the deficient area shall be cored immediately on ten foot centers or one per panel to be proved out. For any areas deficient in strength by not more than 500 psi, the Contractor shall pay to the City one (1) time the unit bid price per square yard for the area determined to be deficient in strength. For any areas deficient in strength by more than 500 psi but more than 1000 psi, the Contractor shall pay to the City two (2) times the unit bid price per square yard for the area determined to be deficient in strength. Pavement deficient in strength by more than 1000 psi shall be removed and replaced completely. No more than three (3) - four (4) inch cores shall be extracted per panel without prior City approval. A rebar detector shall be used to ensure that the cored areas are clear of any rebar. All coring and additional laboratory testing shall be at the expense of the Contractor. The width to be considered for any deficiencies shall be the full width of the pavement.
6. Any section of all existing public or private streets, alleys or firelanes shall be replaced within 72 hours of removal.
7. The Contractor shall furnish a maintenance bond of 10% (ten percent) of the total contract price to the City to run two (2) years from the date of final acceptance of the system by the City.

UTILITY CROSSINGS

General Notes

1. Tunneling and boring under City streets shall be accomplished by means of jacking, boring, or tunneling equipment which is subject to the City approval prior to start of construction.
2. The voids outside of the carrier pipe or casing pipe shall be backfilled by hydraulically placed materials so that there are no open voids over the roof of the tunnel or bore. This shall be done without damage to the roadway structure.
3. All bore pits, trenches, and inspection holes shall be backfilled within 48 hours of the installation of utility lines. The method of compaction shall be such that a soil density equal to that existing prior to the start of construction will be required as verified by any approved testing laboratory. Any excess or surplus material resulting due to displacement of utility lines and conduits shall be disposed of in an acceptable manner to the City.
4. The street sections that are shown as typical sections shall apply to any alleys, driveways, roadways, etc. that will be within a City right-of-way of easement.
5. The Contractor shall be required to install a necessary warning and safety devices that would protect the safety and health of the public until the work has been finished and accepted by the City.
6. The use of a casing pipe will be based upon specific project location and soil conditions. In general, the minimum casing thickness is 0.25 inch and the material shall be steel. Where more than one section is required, the casing ends shall be welded together. Road spacers, or City approved equal shall be used to support the carrier pipe. The use of wood slides is no long permitted.


STORM SEWER SYSTEM

General Notes

1. All storm sewer pipe or box culvert in right-of-way or fire lanes shall be reinforced concrete pipe as per City Specifications and shall be laid on a minimum of a compacted crushed stone or pea gravel cushion, four inches thick below the bottom of the pipe shall unless otherwise approved by the City. The initial backfill of select material or fine granular shall be required to a minimum of the spring line of the pipe unless otherwise approved by the City.
2. Density testing requirements: Frequency of tests shall not be less than one every 300 linear feet of pipe per 2.0' of lift until final grade, starting at 2.0' above top of pipe. Every other lateral stubout that crosses the existing or proposed street, alley, or fire lane subgrade inlet and junction box will receive a density test every lift. All ditches shall be mechanically tamped and compacted to 95% of standard proctor density at 0 - 4% above optimum moisture. Water jetting is not permitted.
3. The joints shall be constructed and jointed together in such a manner that no spill through of backfill will occur. This includes the lift holes used in certain pipe or box sizes. Approved joint materials are concrete mortar cold applied, plastic asphalt joint compound; rubber gaskets; and cold applied, preformed plastic gaskets.
4. Storm drainage inlets shall be as indicated on the approved construction plans. For secondary and major street intersections, a recessed type inlet will be required. For industrial and residential streets, a curb line inlet will be required unless otherwise approved. A round manhole cover with locking device shall be placed on all inlet tops. The top shall be placed near the outlet pipe. All inlets shall have a shall have a compressive strength of 4000 psi at 28 days.
5. All precast box culverts or other special structures in any right-of-way or fire lane easement will require a certification from the manufacturer that the product meets the design dimensions and twenty-eight (28) day compressive strength. All cast-in-place box culverts or other special structures in and right-of-way and fire lane or utility easements will require cylinders to be made for strength tests by the approved laboratory. Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100-150 cu yd of concrete, nor less than once for each 5000 sq ft of surface area for slabs or walls. Four (4) cylinders shall be made: one shall be broken at 7 day, two (2) shall be broken at twenty-eight (28) days, and one shall be held in case of damage of any of the other three (3). The average strength of two (2) cylinders from the same sample, tested at twenty-eight (28) days, is required for each strength test; an average strength test beyond twenty-eight (28) days is unacceptable. If the twenty-eight (28) day design strength is not reached upon strength testing the cylinders, the deficient area shall be cored immediately to be proved out. For any areas deficient in strength by not more than 500 psi, the Contractor shall pay to the City one (1) time the unit bid price per square yard for the area determined to be deficient in strength. For any areas deficient by more than 500 psi but not more than 1000 psi, the Contractor shall pay to the City two (2) times the unit bid price per square yard for the area determined to be deficient in strength. For any areas deficient in strength by more than 1000 psi, the structure shall be removed and reconstructed at the full expense of the Contractor. Prior to City acceptance of any penalty payments for any traffic bearing structure that does not meet 28 day design strength, the Design Engineer shall provide a sealed structural evaluation that assesses the performance adequacy of the deficient structure as constructed under the design service loads. All coring and additional laboratory testing shall be at the expense of the Contractor.
6. The Contractor shall furnish a maintenance bond of 10% (ten percent) of the total contract price to the City to run two (2) years from the date of final acceptance of the system by the City.

NOTES FOR CONSTRUCTION WITH THE NORTH TEXAS MUNICIPAL WATER DISTRICT EASEMENT

- A. North Texas Municipal Water District's (NTMWD's) easement is located within the limits of construction.
- B. Operation of heavy earthmoving equipment, compaction equipment or heavy construction equipment, such as concrete trucks, shall be restricted to specific crossing points across NTMWD easements, as approved by the NTMWD. The crossing shall be designated and verified to provide a minimum of five-feet of cover.
- C. To assure that placing of significant loads over the NTMWD pipeline does not damage the existing pipeline, no materials shall be stockpiled on the NTMWD easement, without authorization from the NTMWD. If the contractor desires to use NTMWD's easement for stockpile of materials, contact NTMWD's Engineering Department at (972) 442-5405 so your plans for use of NTMWD's easement can be reviewed.
- D. A minimum of three feet separation between the bottom of the pavement and top of NTMWD pipeline is required. In addition, if separation between the bottom of the pavement and the top of the pipeline is less than 3.5 feet, a thickened pavement section is required.
- E. Crossing of the NTMWD easement with other utilities, such as TV cable, phone, gas and electric, shall be coordinated with the NTMWD to avoid damage to the NTMWD facilities.
- F. Outdoor lighting, landscaping, screening walls or other facilities shall not be installed in NTMWD easements without written approval of the NTMWD.
- G. Unless otherwise shown or required a minimum of one-foot clearance shall be provided for all utilities crossing the NTMWD pipelines.
- H. The contractor shall contact NTMWD Engineering at (972) 442-5405 at least 48 hours prior to performing any work in the vicinity of the NTMWD facilities.

 **CORWIN ENGINEERING, INC.**
200 W. BELMONT, SUITE E
ALLEN, TEXAS 75013 (972) 396-1200
TBP E FIRM #5951

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GENERAL NOTES

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