

Approved Design Changes

CITY OF COLLEGE PLACE

Instructions: Attach this sheet to front of all distributed plan sets. Discard or note "superceded" on sheets replaced.
(Return six full-size and one 11" x 17" to the City of approvals on submittals larger than 11" x 17".)

JUL 09 2010

Project: Villages Phase VIII

Current as of July 8, 2010
Date

Verified by [Signature]
City Engineer



Approved Change	Date	Revision Description	Sheets Impacted	Comments
A	3/24/2009	New "Revised Pond D" Sheet (3/24/10)	1, 2, 3, 8, 9	Change in design of Pond D.
B	3/26/2010	Revised "Sheet 4" (3/25/10); New "Sheet 4a" (3/25/10)	1 - 5	Sewer Main Realignment/Extension along Nuthatch Drive.
C	5/4/2010	Revised "Sheet 2" (4/27/10)	1, 2, 4, 4a, 7	Grassy paver road section with delineating plantings; stormwater sleeve.
D	5/24/2010	Revised Road Section	2, 3, 4, 4a, 5	Level crushed rock road bed (thicker at edges).
E	6/1/2010	Landscape Plan --no sheet label	9	Replaces grassy swale plantings with full landscape plan. No apparent utility or sight triangle conflicts.
F	7/8/2010	Revised "Sheet 3", "Sheet 6" (3/4/2010) & new "Garrison Village Way & Golden Eye Apron" Speed Table Revision	1,3,6	Places a speed table at the entrance to Goldeneye to mitigate reduced corner clearance for lots abutting the private road.

Note: "Sheets Impacted" is not a thorough list of all sheets impacted and a full review of plans should be made.

Approved Design Changes

Instructions: Attach this sheet to front of all distributed plan sets. Discard or note "superceded" on sheets replaced.
(Return six full-size and one 11" x 17" to the City of approvals on submittals larger than 11" x 17".)

Project: Villages Phase VIII

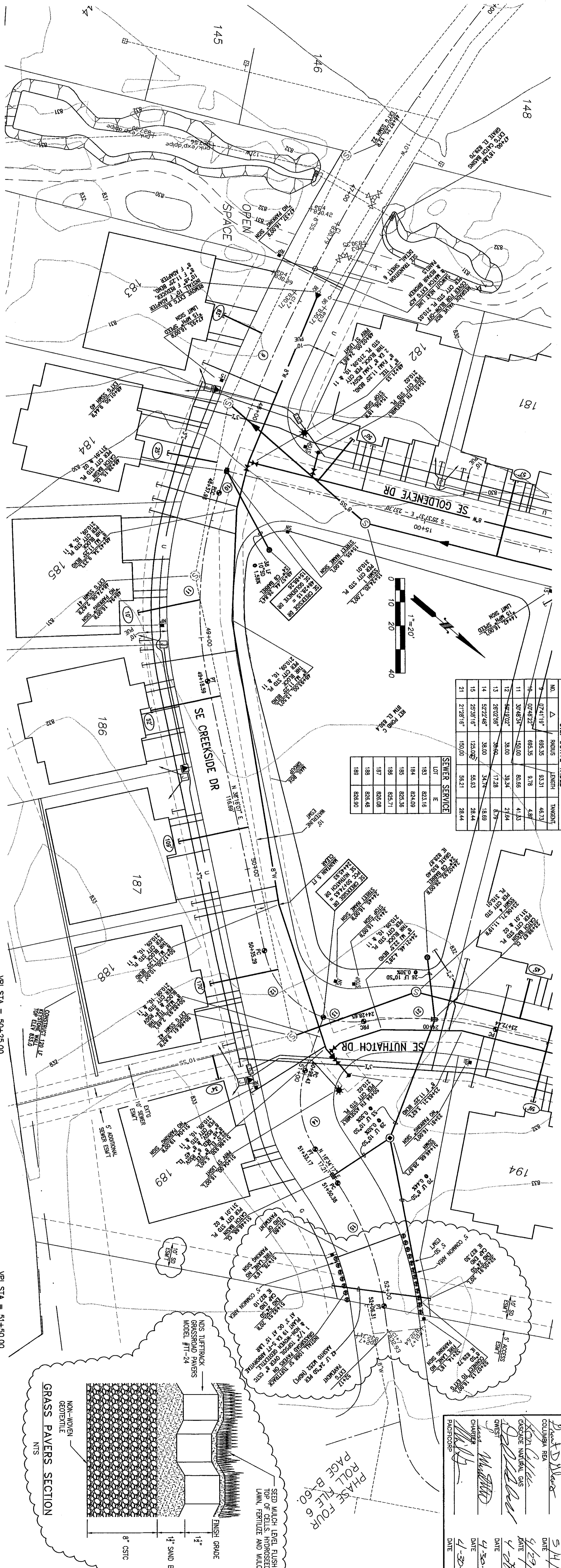
Current as of 6/1/10
Date

Verified by [Signature]
City Engineer



Approved Change	Date	Revision Description	Sheets Impacted	Comments
A	3/24/2009	New "Revised Pond D" Sheet (3/24/10)	1, 2, 3, 8, 9	Change in design of Pond D.
B	3/26/2010	Revised "Sheet 4" (3/25/10); New "Sheet 4a" (3/25/10)	1 - 5	Sewer Main Realignment/Extension along Nuthatch Drive.
C	5/4/2010	Revised "Sheet 2" (4/27/10)	1, 2, 4, 4a, 7	Grassy paver road section with delineating plantings; stormwater sleeve.
D	5/24/2010	Revised Road Section	2, 3, 4, 4a, 5	Level crushed rock road bed (thicker at edges).
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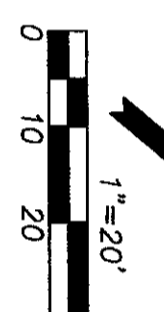


C.L. CURVE TABLE

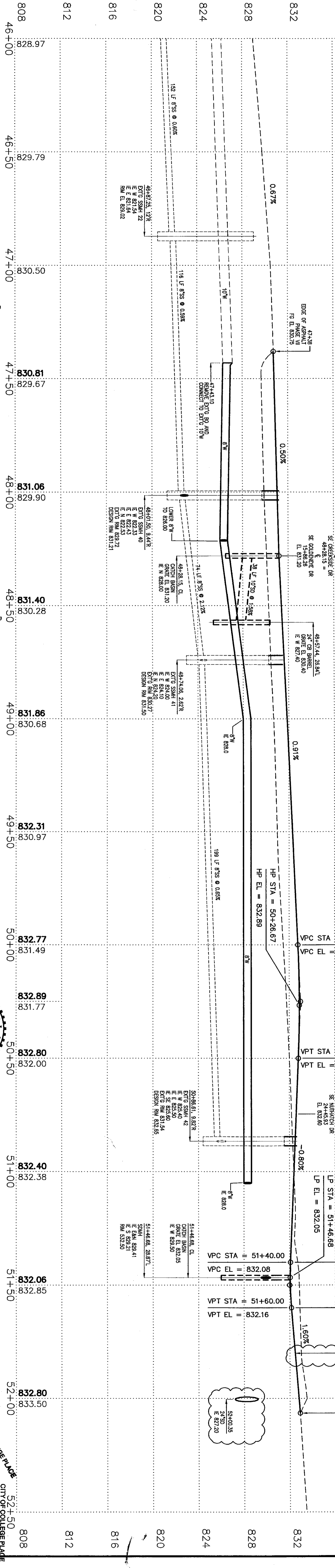
NO.	Δ	POBUS	LENGTH	TURNING
1	72°41'0"	895.35	83.31	48.73
10	57°02'27"	895.35	9.78	4.87
11	30°08'34"	120.00	60.88	41.53
12	42°42'02"	38.00	39.34	21.44
13	26°02'25"	38.00	17.28	8.78
14	32°22'08"	38.00	37.74	18.89
15	23°31'15"	123.00	55.53	28.44
21	21°08'16"	150.00	55.41	28.44

SEWER SERVICE

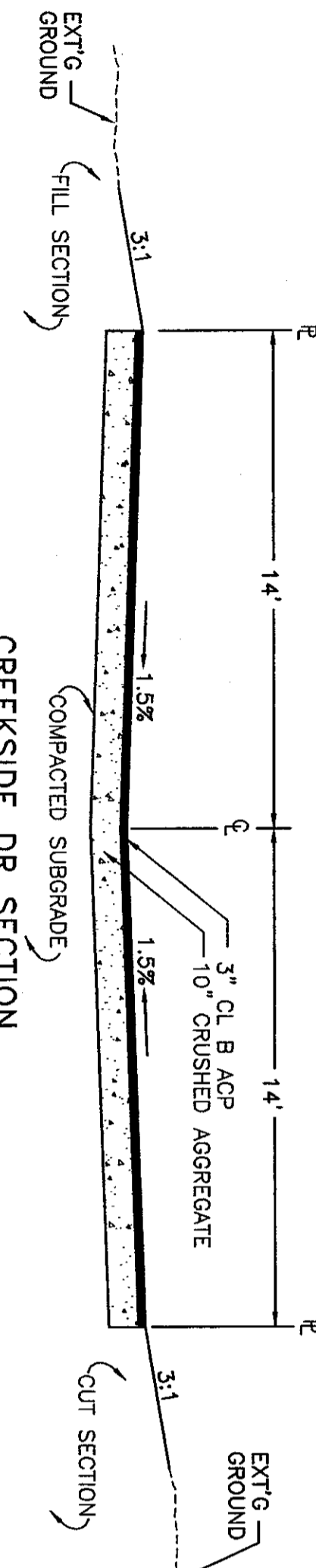
LOT	E
183	823.16
184	824.09
185	823.35
187	826.21
188	826.08
189	826.48
188	826.90



SCALES:
1" = 20' HOR
1" = 4' VER



PROFILE LEGEND
 --- EXISTING GROUND
 --- DESIGN & FINISH GRADE
 --- EXTG
 --- ELEVATION



APPROVED: *[Signature]*
 CITY OF COLLEGE PLACE



DATE: 04-27-10
 DRAWN BY: ATR
 DWG. NO: 061-0112

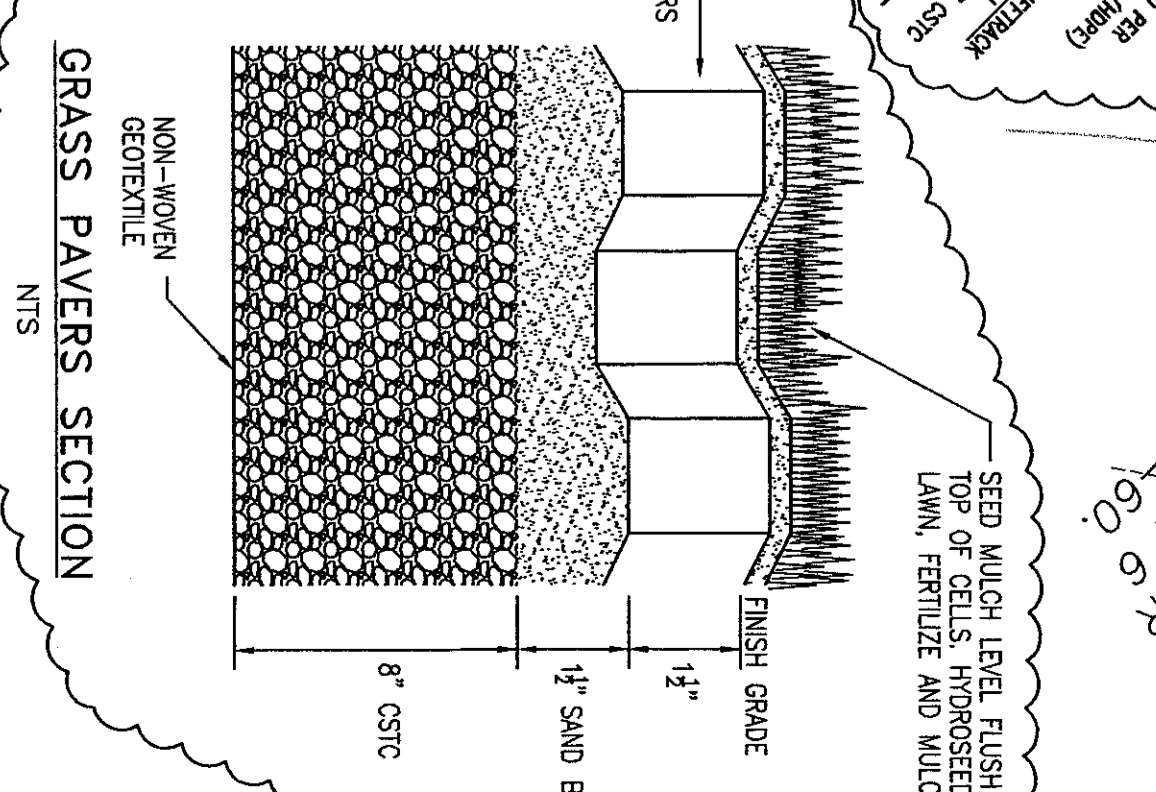
PHASE FIVE DEVELOPMENT, LLC
 VILLAGES AT GARRISON CREEK PHASE VIII
 PP SE CREEKSIDE DR 46+00 TO 52+50

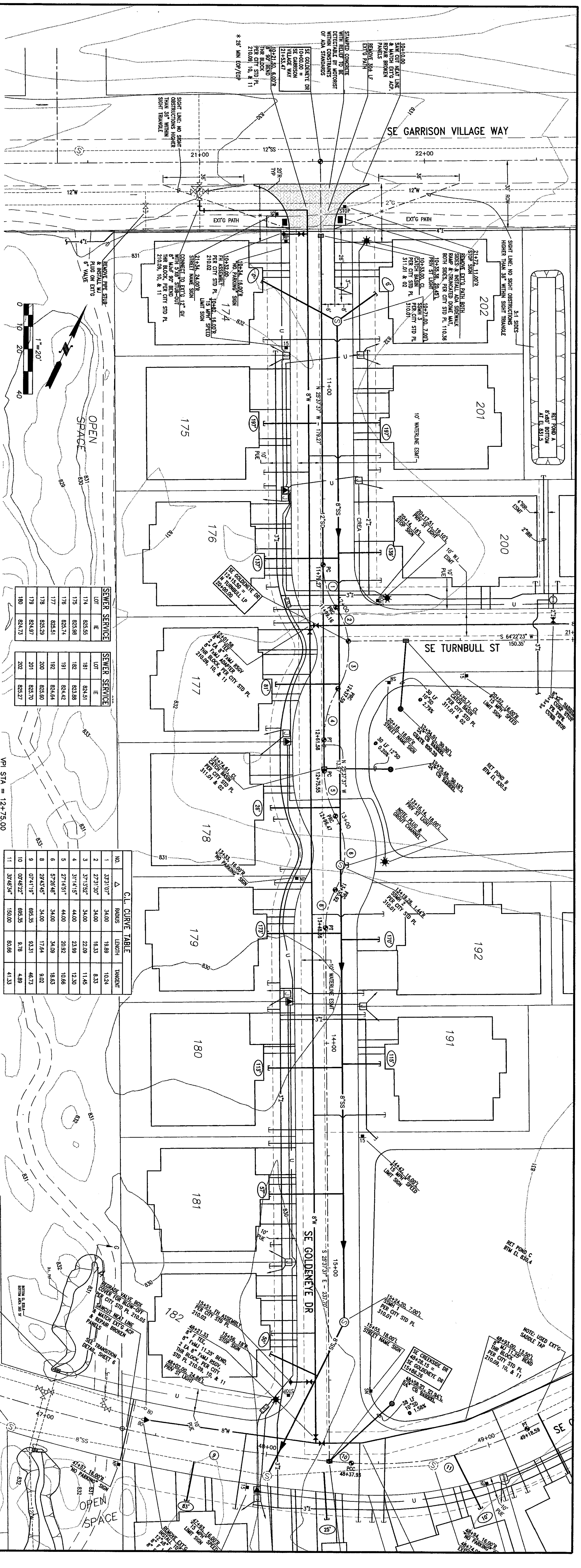
HALL ENGINEERING ASSOCIATES
 10 SOUTH AUBURN - KENNESAW, VA 24136
 (509) 582-2200 - FAX (509) 586-2827

REVISED SHEET 2 OF 1
 CALL BEFORE YOU DIG (800) 424-5522
 MAY 04 2010 RECEIVED
 CITY OF COLLEGE PLACE

APPROVED: *[Signature]*
 DATE: 5/4/10

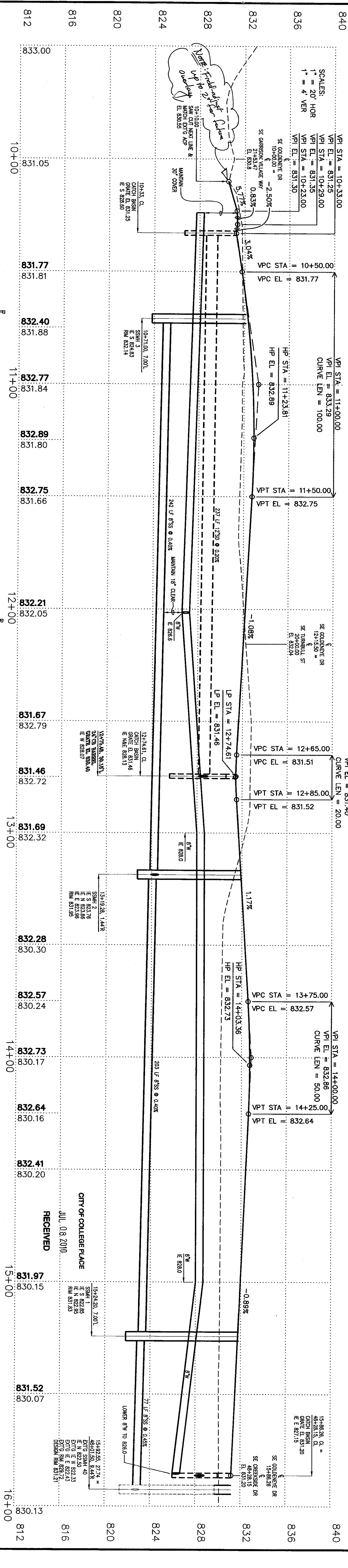
[Signature] DATE: 5/29/10
[Signature] DATE: 4/29/10
[Signature] DATE: 4/30/10
 DATE: 11-27-10





SEWER SERVICE		SEWER SERVICE	
LOT	E	LOT	E
174	825.58	181	824.51
175	825.88	182	824.86
176	825.74	191	824.42
177	825.51	192	824.44
178	825.29	200	825.69
179	824.97	201	825.70
180	824.73	202	825.27

C.L. CURVE TABLE					
NO.	Δ	RADIUS	LENGTH	TANGENT	CHORD
1	33°31'07"	34.00	18.88	10.24	18.33
2	27°31'07"	34.00	18.33	8.33	17.45
3	37°13'22"	34.00	22.09	11.45	12.30
4	31°14'51"	44.00	23.99	12.30	10.86
5	27°14'51"	44.00	20.92	10.86	18.83
6	57°28'46"	34.00	34.09	17.64	9.82
7	29°43'45"	34.00	17.64	9.82	4.73
8	07°41'19"	88.35	83.31	44.73	4.89
9	07°41'19"	88.35	83.31	44.73	4.89
10	08°46'22"	88.35	91.78	48.99	4.13
11	30°46'34"	150.00	80.66	41.33	



PROFILE LEGEND
 --- EXISTING GROUND
 --- DESIGN & FINISH GRADE

EXT'G. GROUND (HILL SECTION)
 3.1'
 1.5%
 14'
 1.5%
 14'
 3.1'
 EXT'G. GROUND (CUT SECTION)

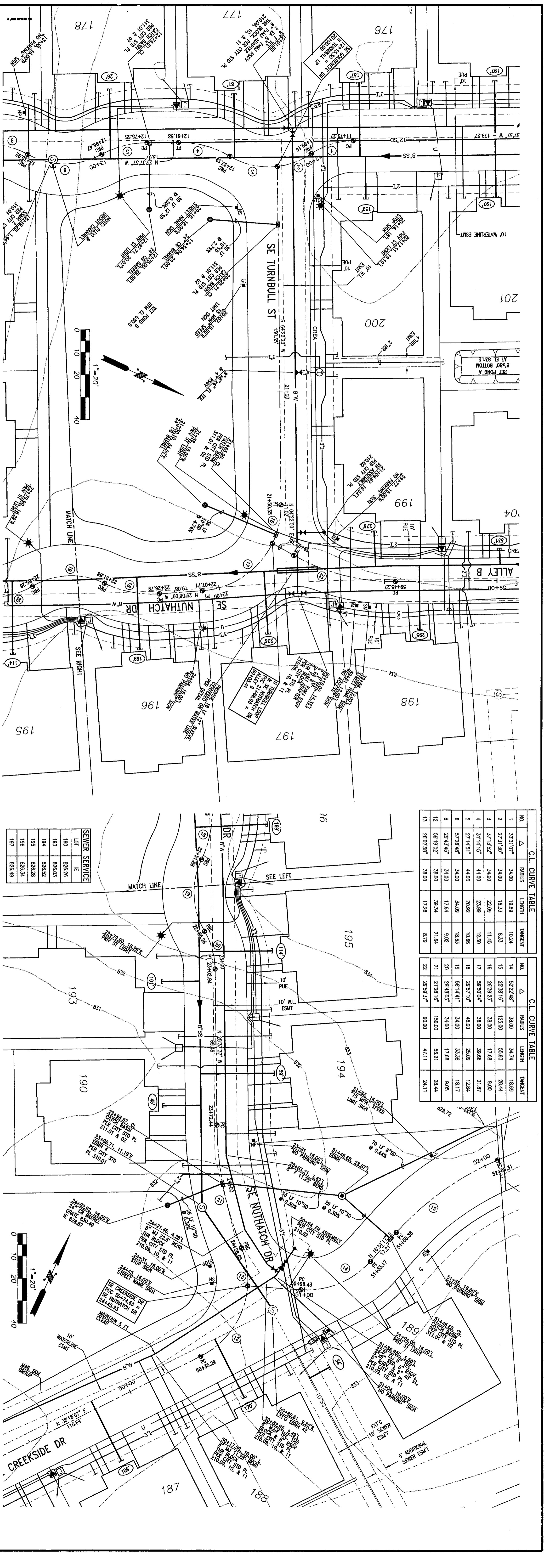
COMPACTED SUBGRADE
 3" CL. B. ASP.
 10" CRUSHED AGGREGATE
 1.5%
 14'

APPROVED: *[Signature]*
 CITY OF COLLEGE PLACE
 JULY 6, 2010
 RECEIVED
 JUL. 08 2010
 CITY OF COLLEGE PLACE

REVISED SHEET 3 OF 11
 CALL BEFORE YOU DIG (800) 424-5555
PHASE FIVE DEVELOPMENT, LLC
 VILLAGES AT GARRISON CREEK PHASE VIII
 PIP SE GOLDENEYE DR 9+50 TO 16+00

HALL ENGINEERING ASSOCIATES
 10 SOUTH AUBURN • KENNESAW, WA 98336
 (360) 582-2200 • FAX (360) 588-2897

DATE: 07-06-10
 DRAWN BY: AIB
 DWG. NO.: 051-0113



C.L. CURVE TABLE

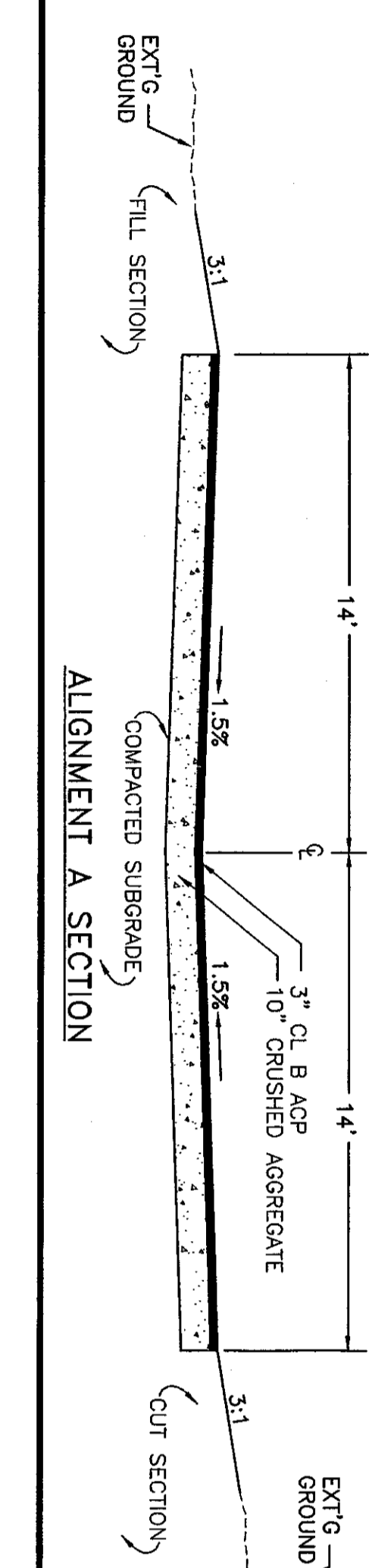
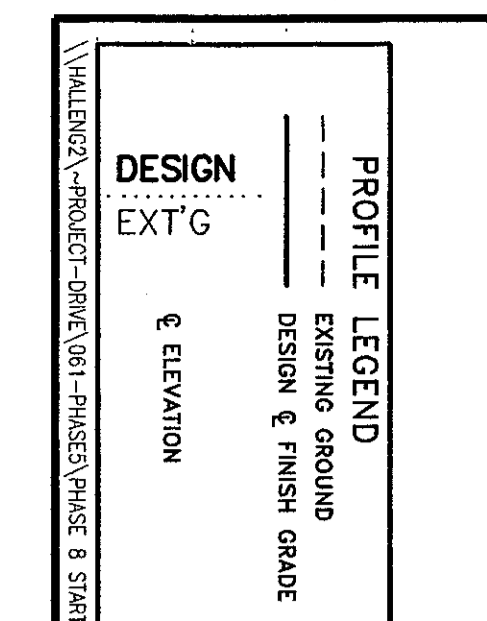
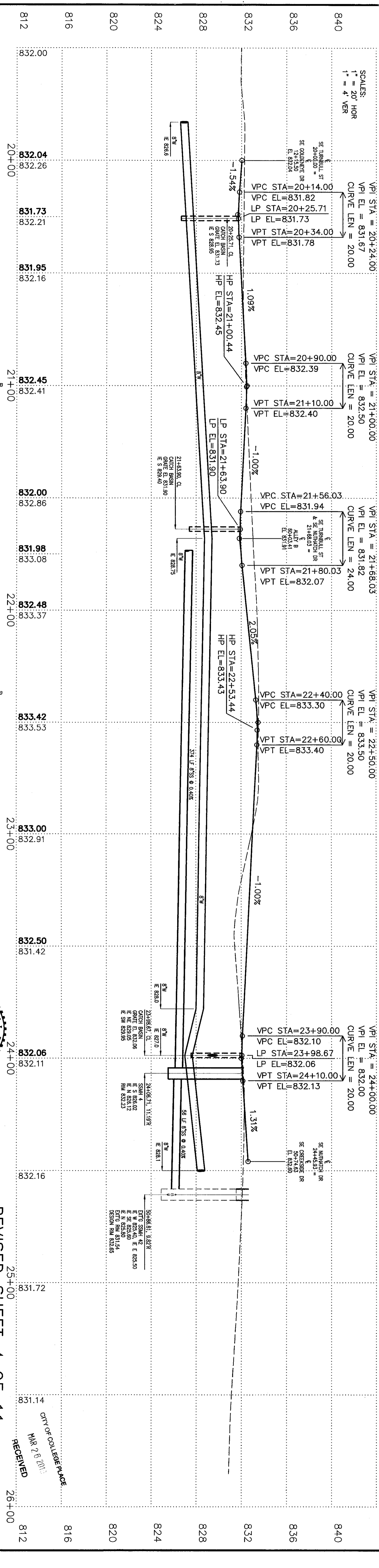
NO.	Δ	RADIUS	LENGTH	TANGENT
1	3531.07'	34.00	19.98	10.24
2	2731.07'	34.00	16.33	8.33
3	3713.92'	34.00	22.09	11.45
4	3714.15'	44.00	23.93	12.30
5	2714.51'	44.00	20.92	10.66
6	5728.46'	34.00	34.08	18.63
8	2934.45'	34.00	17.44	9.02
12	5979.02'	38.00	39.34	21.44
13	2670.59'	38.00	17.28	8.79

C.L. CURVE TABLE

NO.	Δ	RADIUS	LENGTH	TANGENT
14	5222.46'	38.00	34.74	18.69
15	2528.16'	38.00	55.93	28.44
16	2679.23'	38.00	17.88	9.00
17	3714.15'	44.00	30.88	21.87
18	2925.10'	48.00	28.08	12.84
19	5974.44'	34.00	33.39	18.17
20	2924.03'	34.00	17.88	9.05
21	2128.16'	38.00	56.21	28.44
22	2925.37'	38.00	47.11	24.11

SEWER SERVICE

LOT	E	EL
190	828.26	
193	828.03	
194	828.52	
195	828.28	
196	828.34	
197	828.49	



APPROVED FOR CONSTRUCTION:
DATE: 3/25/2010

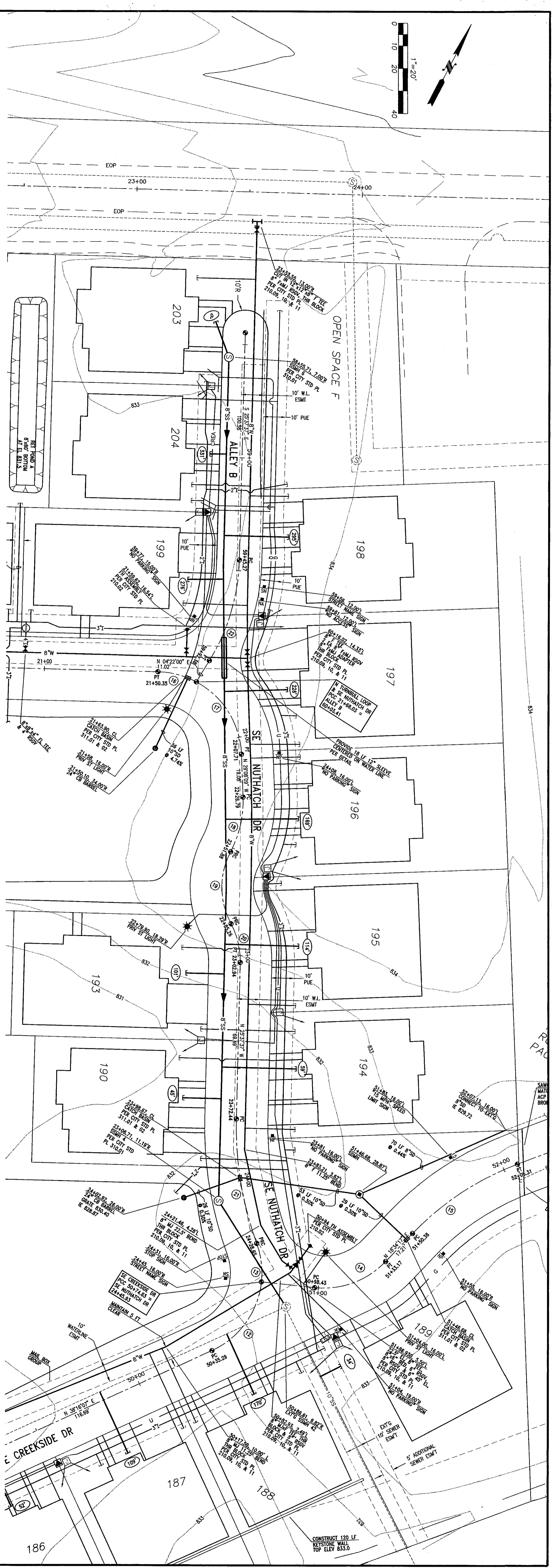
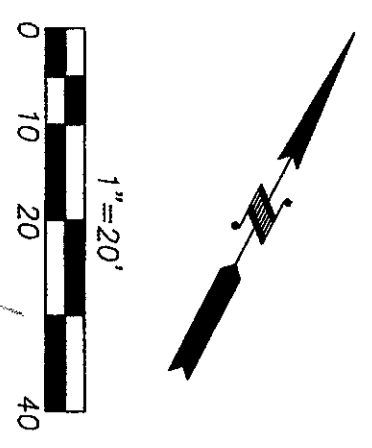


PHASE FIVE DEVELOPMENT, LLC
VILLAGES AT GARRISON CREEK PHASE VIII
PP ALIGNMENT A

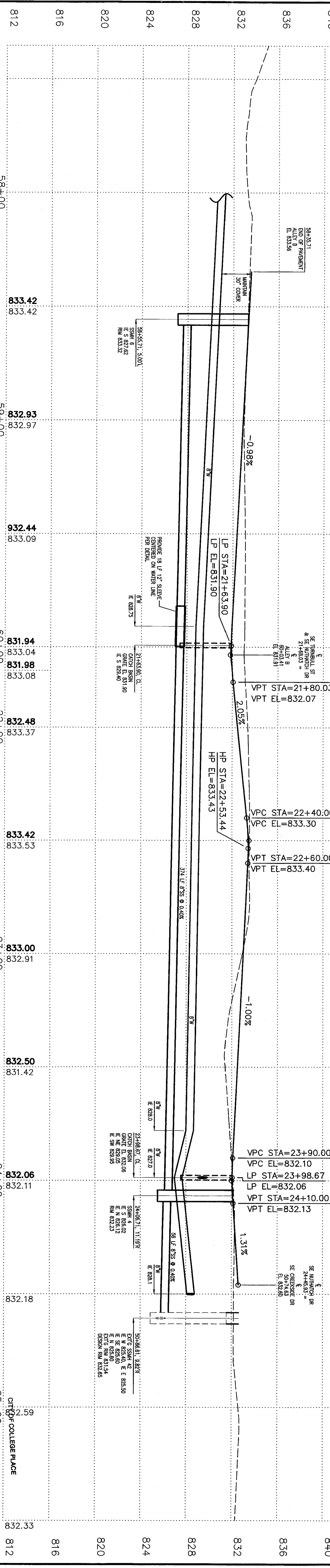
HALL ENGINEERING ASSOCIATES
10 SOUTH ALBURN
KENNESAW, VA 99335
(909) 562-2900
FAX (909) 568-2897

REVISED SHEET 4 OF 11
SUPERSEDES SHEET 4 DATED 03-02-10
CALL BEFORE YOU DIG (800) 424-5555

RECEIVED 26+00
MAY 2 8 2010
CITY OF COLLEGE PLACE

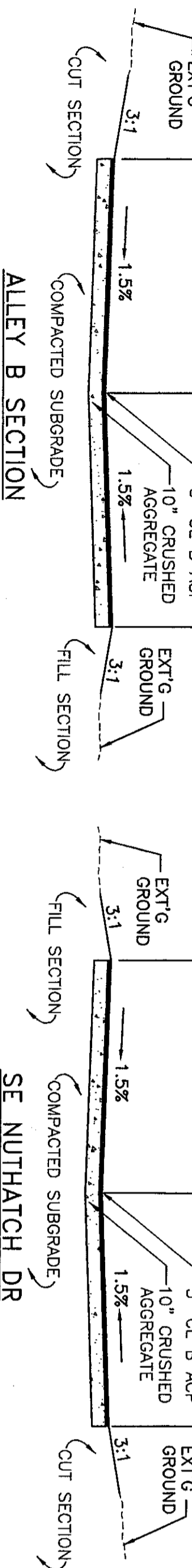


SCALES:
1" = 20' HOR
1" = 4' VER



PROFILE LEGEND

---	EXISTING GROUND
---	DESIGN & FINISH GRADE
---	ELEVATION



APPROVED FOR CONSTRUCTION:
DATE: 3/26/10
CITY OF COLLEGE PLACE



DATE: 03-25-10
DRAWN BY: DJK
DWG. NO: 061-0122

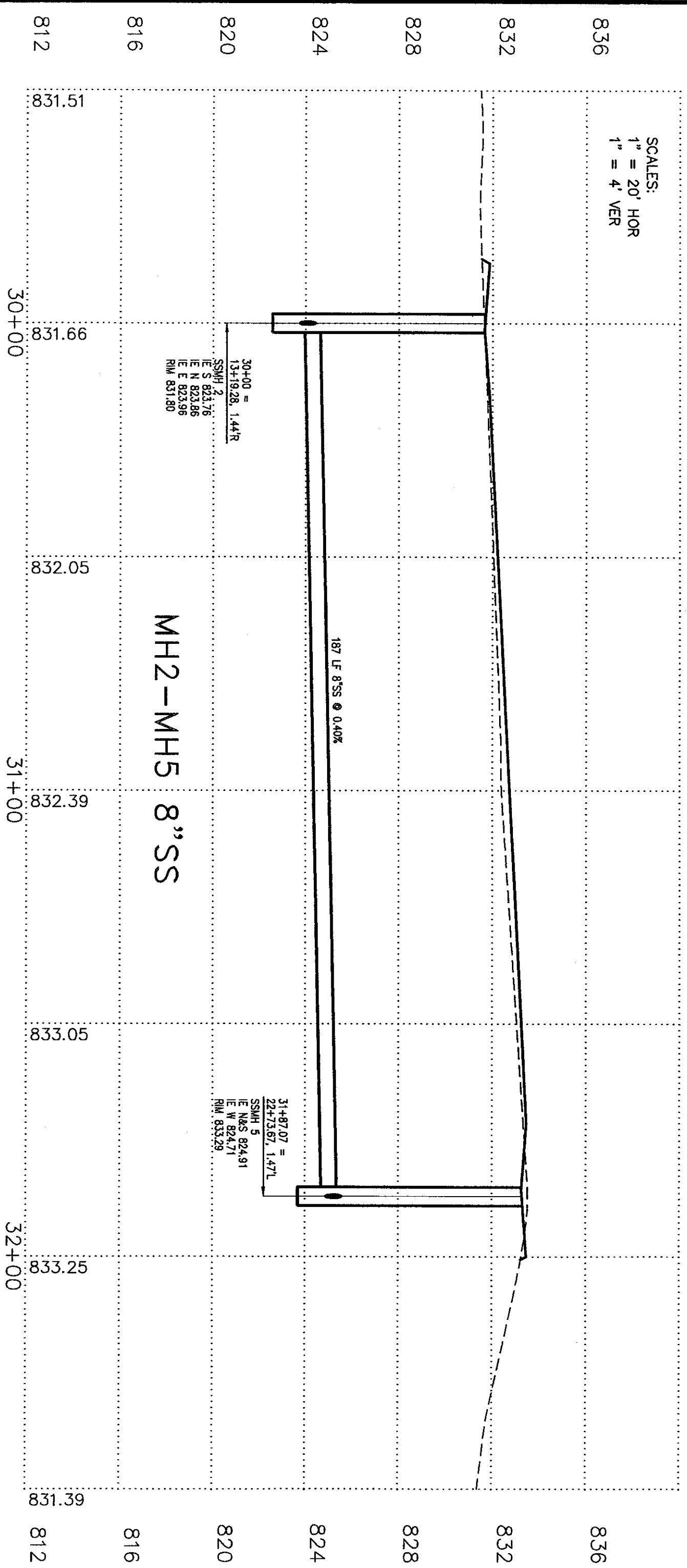
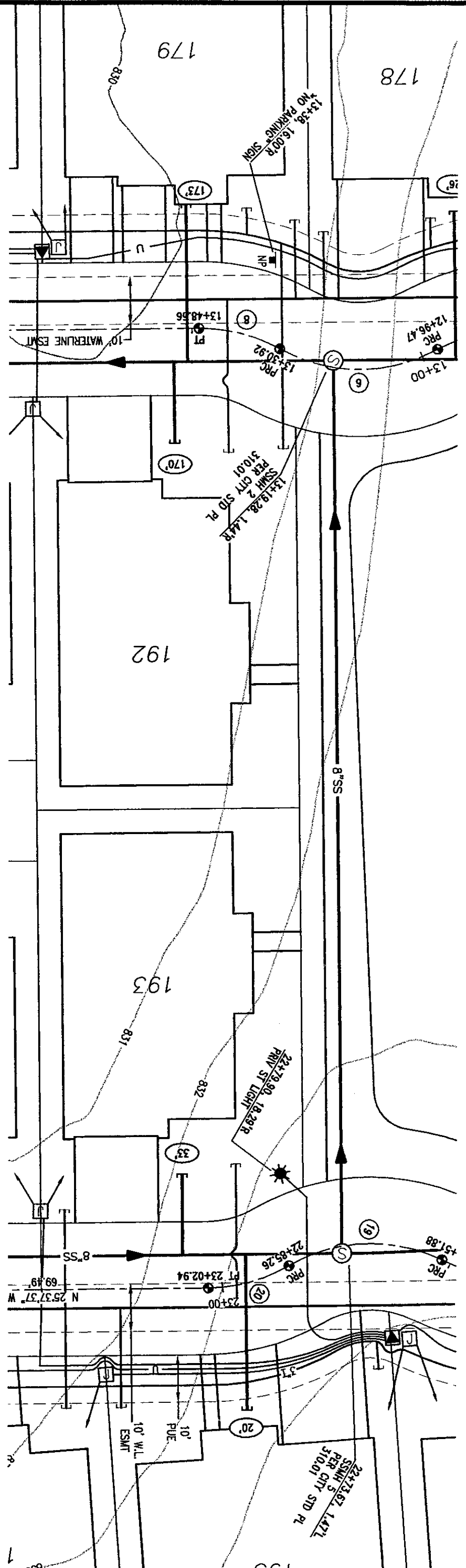
PHASE FIVE DEVELOPMENT, LLC
VILLAGES AT GARRISON CREEK PHASE VIII
ALTERNATE SE NUTMATCH DR/ALLEY B SEWER

HALL ENGINEERING ASSOCIATES
10 SOUTH AUBURN KENNESAW, VA 20109
(509) 562-2000
FAX (509) 566-2897

SHEET 4a OF 11
RECEIVED
CITY OF COLLEGE PLACE
MAR 26 2010

CALL BEFORE YOU DIG (800) 424-5555
RECEIVED

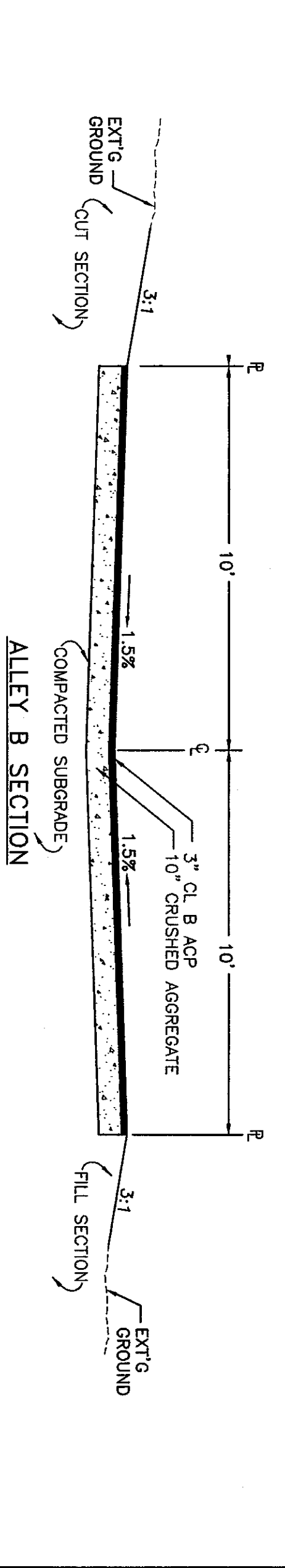
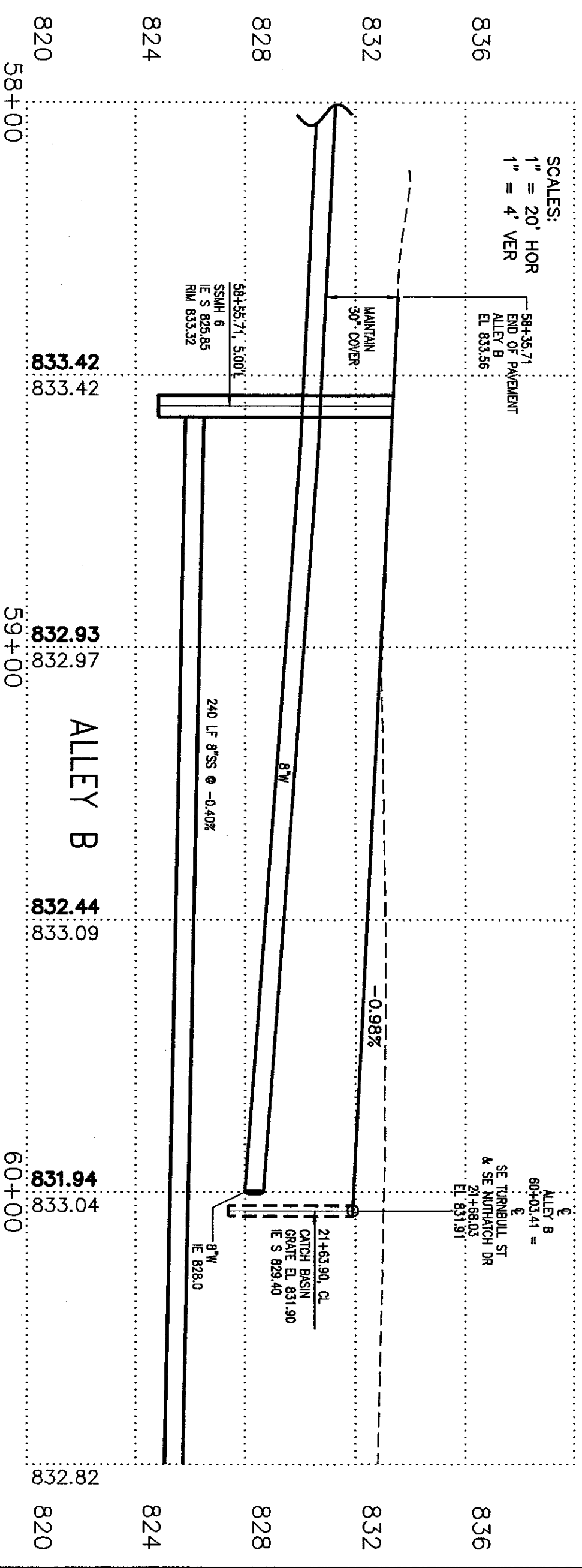
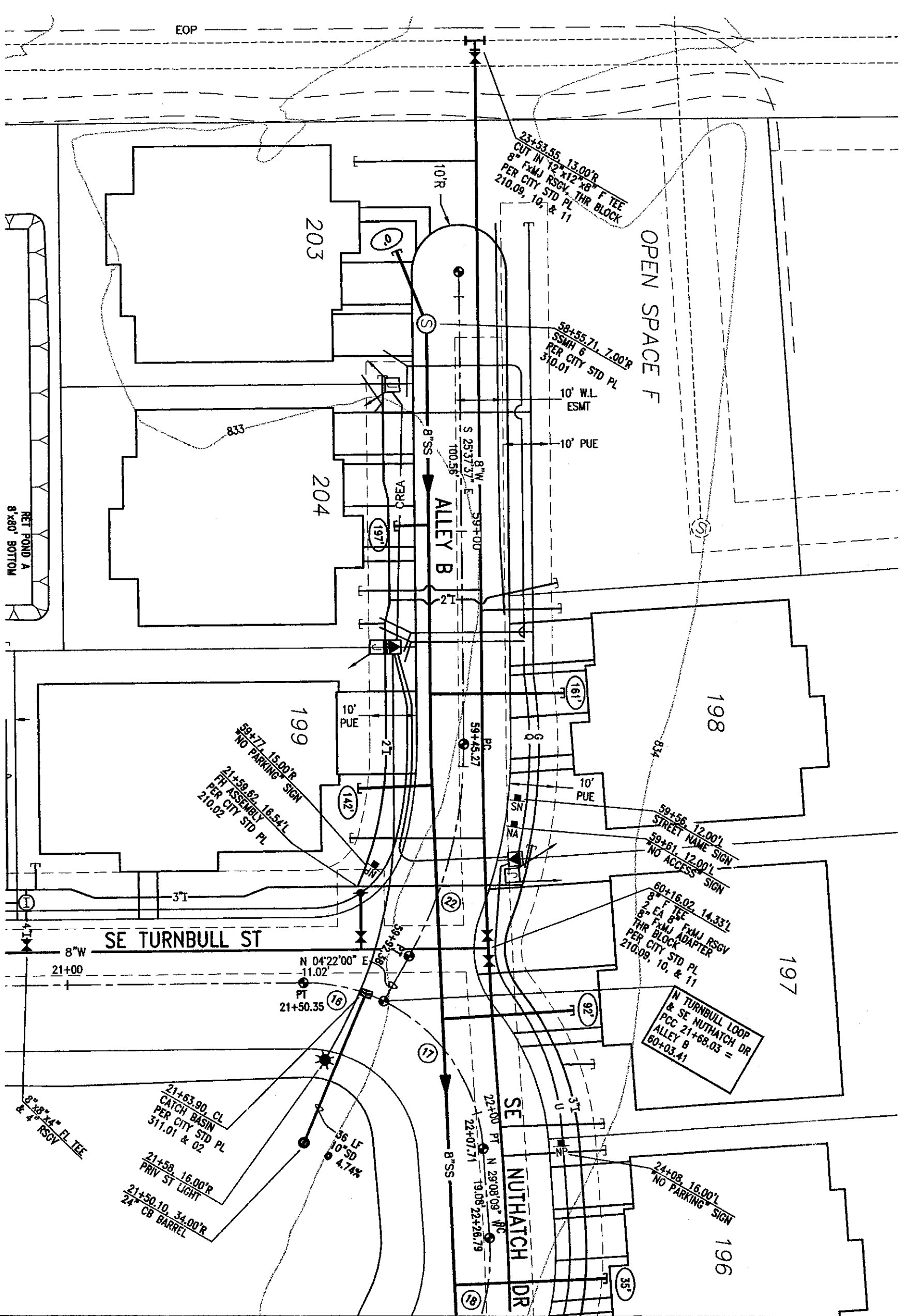
NO.	Δ	PIRUS	LENGTH	TANGENT
6	57°28'46"	34.00	34.00	18.63
8	29°24'56"	34.00	17.84	9.92
16	28°39'23"	38.00	17.88	9.00
17	59°50'04"	38.00	38.88	21.87
18	29°37'10"	48.00	28.08	12.84
19	59°14'41"	34.00	33.36	18.17
20	29°28'03"	34.00	17.88	9.95
22	29°39'37"	30.00	47.11	24.11



PROFILE LEGEND

---	EXISTING GROUND
---	DESIGN & FINISH GRADE
---	ELEVATION

P:\064-PHASE5 PHASE 5 STREET JULY 2009 DESIGN\2010-02-18 REV\VP071008.DWG



SEWER SERVICE

LOT	E
198	826.78
199	826.36
203	826.19
204	826.81

APPROVED: *[Signature]*
CITY OF COLLEGE PLACE 3/13/10



CITY OF COLLEGE PLACE
MAR 04 2010
RECEIVED

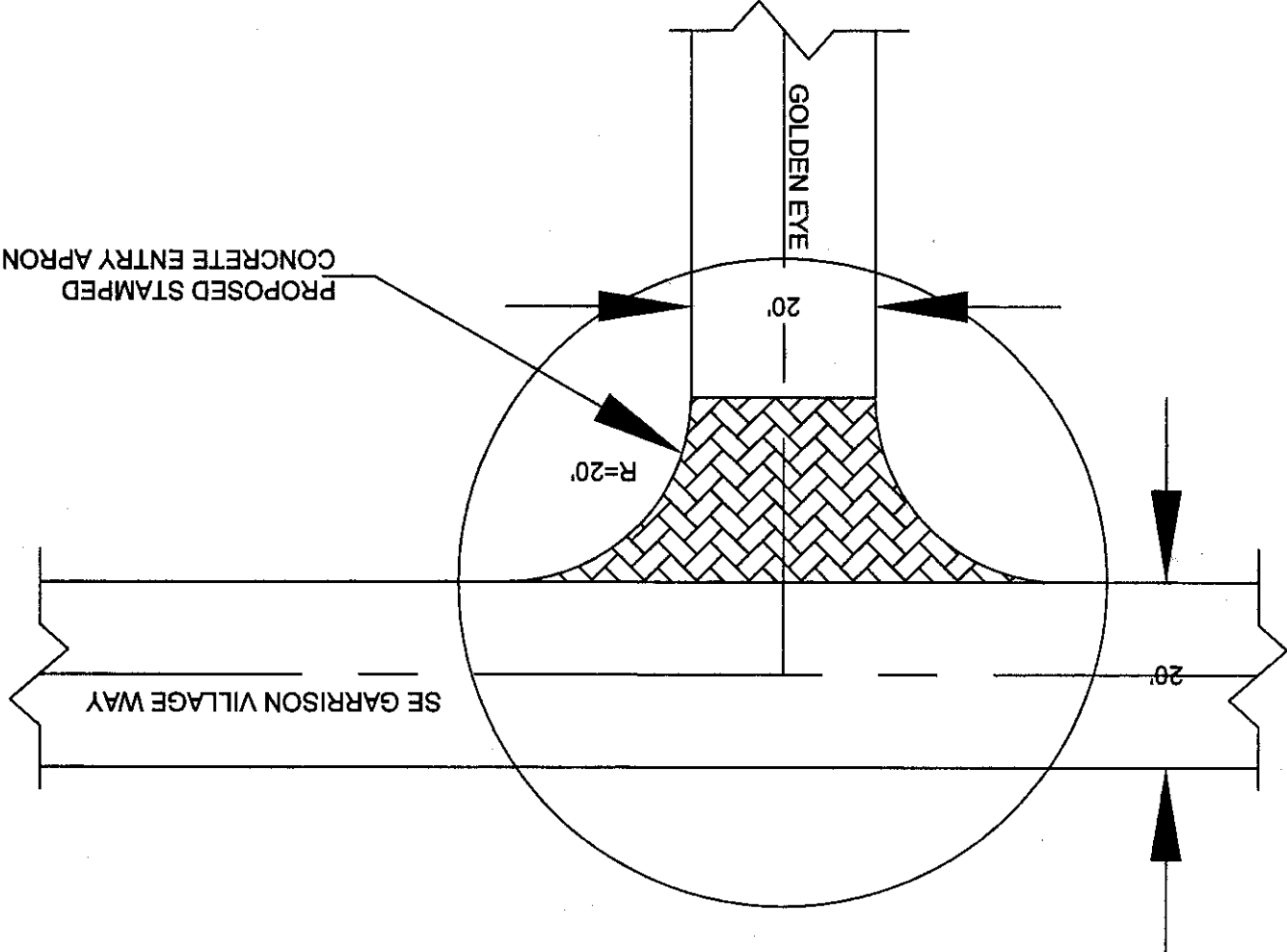
SHEET 5 OF 11

CALL BEFORE YOU DIG (800) 424-5555

DATE: 03-02-10
DRAWN BY: AIB
DWG. NO.: 061-D119

PHASE FIVE DEVELOPMENT, LLC
VILLAGES AT GARRISON CREEK PHASE VIII
PIP MH2-MH5 8"SS & PIP ALLEY B

HALL ENGINEERING ASSOCIATES
10 SOUTH AUBURN - KENNESAW, VA 99336
(509) 582-2200 • FAX (509) 586-2897



DESIGN GUIDE: AMERICAN CONCRETE PAVEMENT ASSOCIATION

CEMENT: FLEXURAL STRENGTH 500 TO 700 PSI 28 DAY MODULUS OF RUPTURE (4000 psi)
 564 POUNDS PORTLAND CEMENT PER CUBIC YARD
 INTRAINED AIR CONTENT 6% WITH -1 TO +2 FIELD VARIANCE
 MAXIMUM WATER TO CEMENT RATIO 0.45

STREET CLASSIFICATION: RESIDENTIAL 200-1000 VPD
 SUBGRADE SOIL: FINE GRAINED SILTS K VALUE 75-120 pci (100 used for thickness choice)
 CBR EQUIVALENT IS 5
 FULLY COMPACT SUBGRADE WITH PROPER MOISTURE CONTENT TO
 95% MODIFIED PROCTOR
 USE 3" OF 0"-5/8" FULLY COMPACTED LEVELING COURSE FOR BASE
 CONCRETE THICKNESS: 7 INCHES, K=100, 550 PSI MODULUS OF RUPTURE CONC. FLEX STR.
 MIN.
 WITHOUT CURBS, DESIGN PERIOD 30 YRS.
 RECOMMENDED JOINT SPACING 14' to 15'

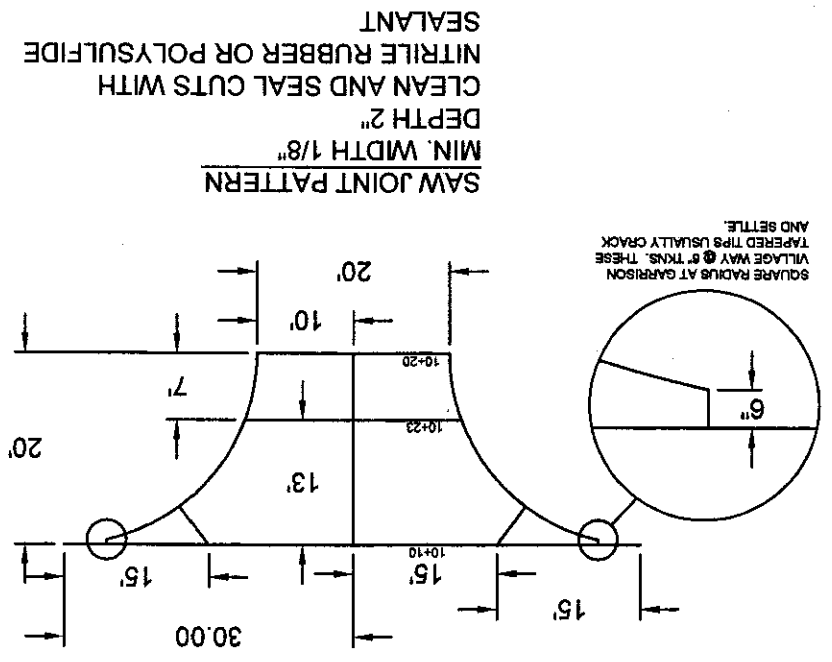
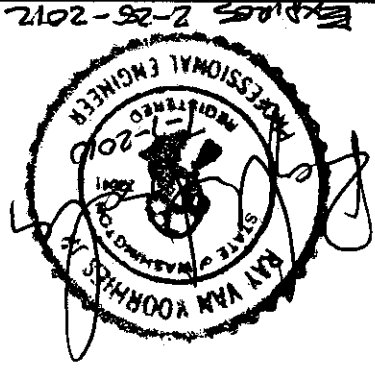
REINFORCEMENT: TYPICALLY LIGHT RESIDENTIAL PAVEMENTS ARE UNREINFORCED
 IF REINFORCEMENT IS USED THE FOLLOWING IS SUGGESTED:
 No. 4 BARS @ 24" O.C. AND WITH IN 4" OF ALL CONCRETE OUTER EDGES
 Gr. 40 BARS
 ADA WARNING PANELS: ADA RAMP AND OR TRANSITION WARNING PANELS SHALL COMPLY
 WITH CITY, RAMP SLOPES TO BE 1.5% TO A MAXIMUM OF 2%.

CONCRETE STAMP PATTERN: MATCH PATTERN AS CLOSE AS POSSIBLE TO THE
 ENTRANCE TO THE VILLAGES FROM LARCH STREET

Note: Extension of Pedestrian Pathway Across
 "Apron" to be ADA-compliant.
 Rdg 7/5/10

RECEIVED
 JUL 07 2010
 CITY OF COLLEGE PLACE

RECEIVED
 JUL 09 2010
 CITY OF COLLEGE PLACE



SAW JOINT PATTERN
 MIN. WIDTH 1/8"
 DEPTH 2"
 CLEAN AND SEAL CUTS WITH
 NITRILE RUBBER OR POLYSULFIDE
 SEALANT

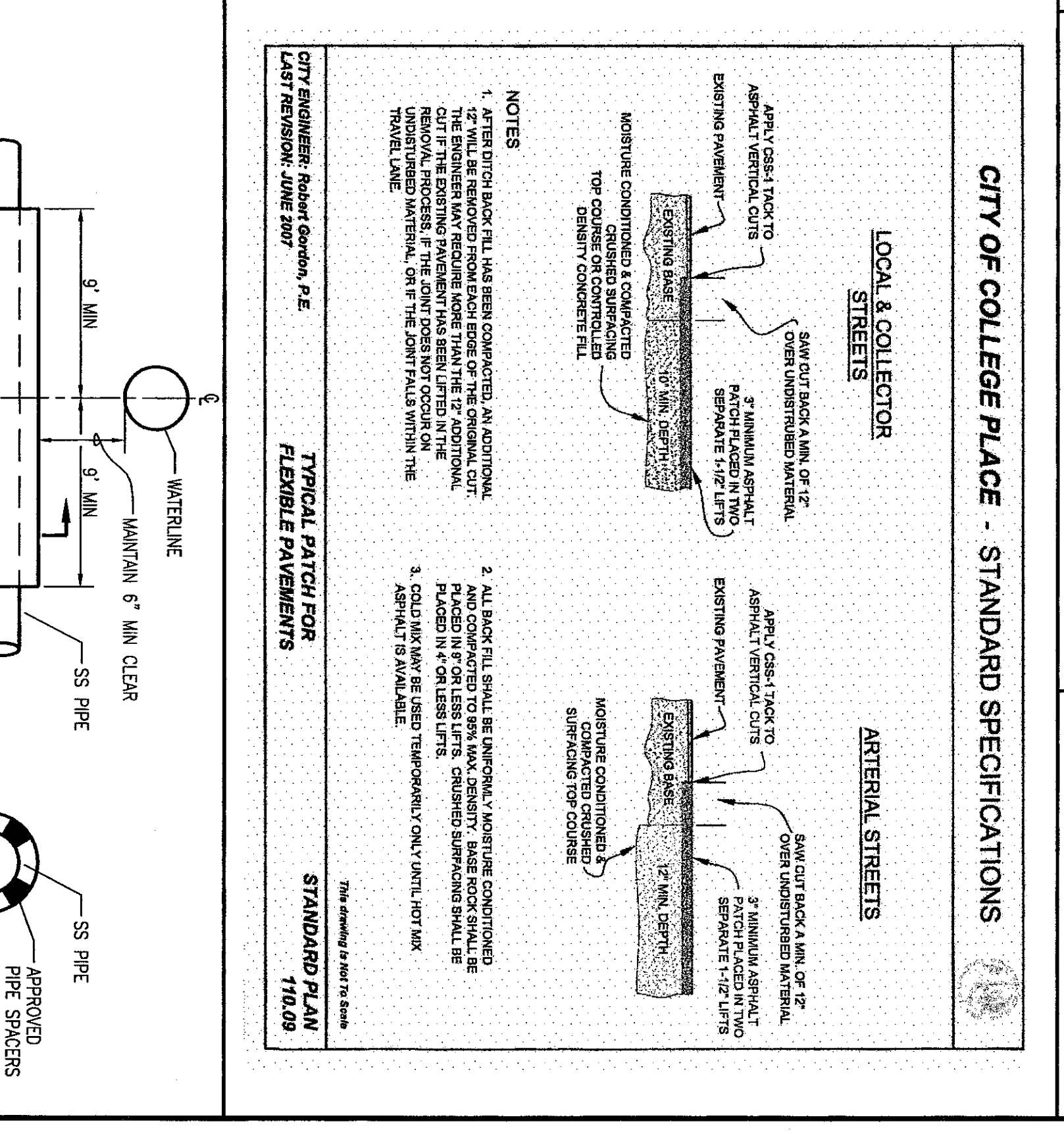
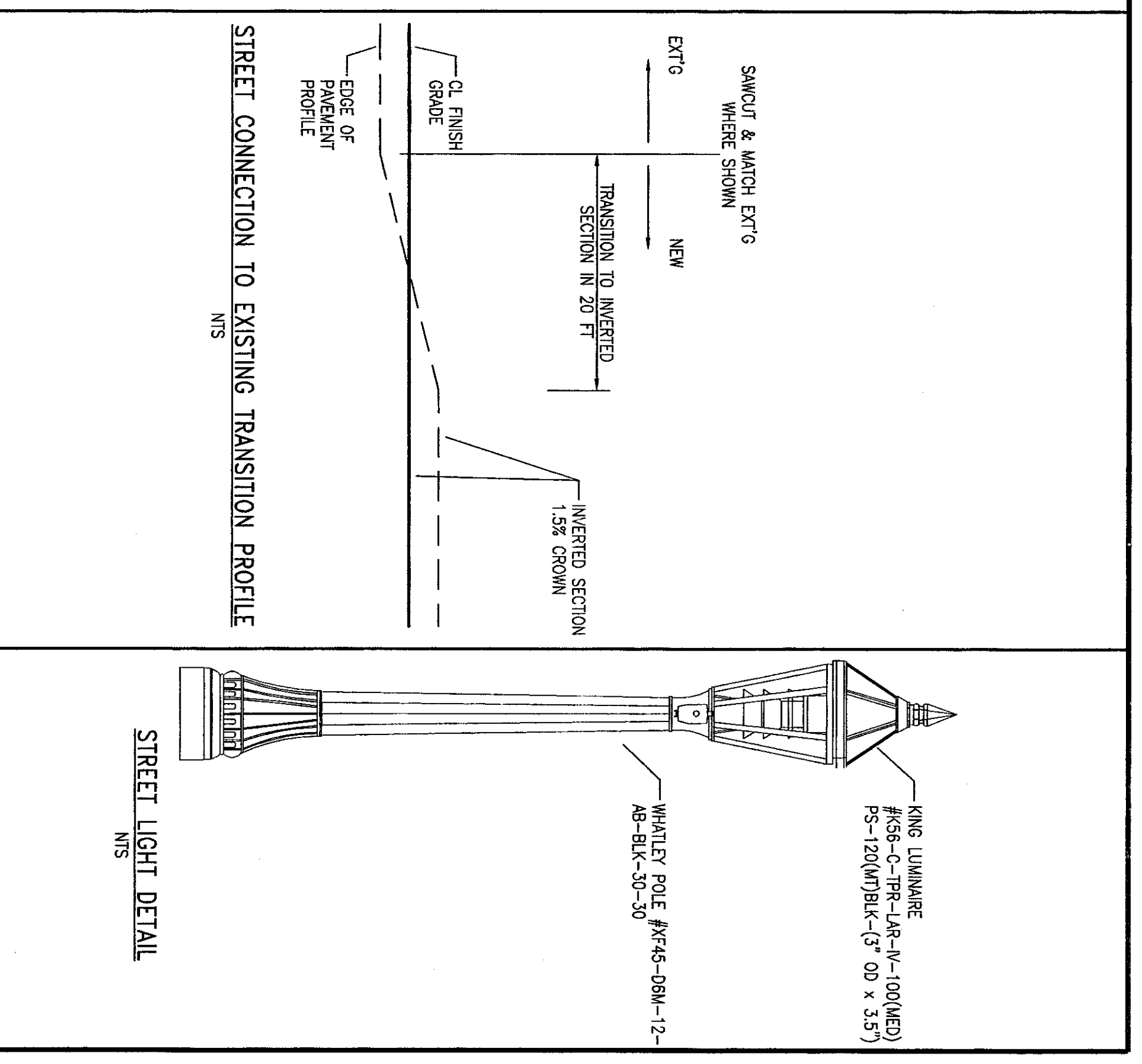
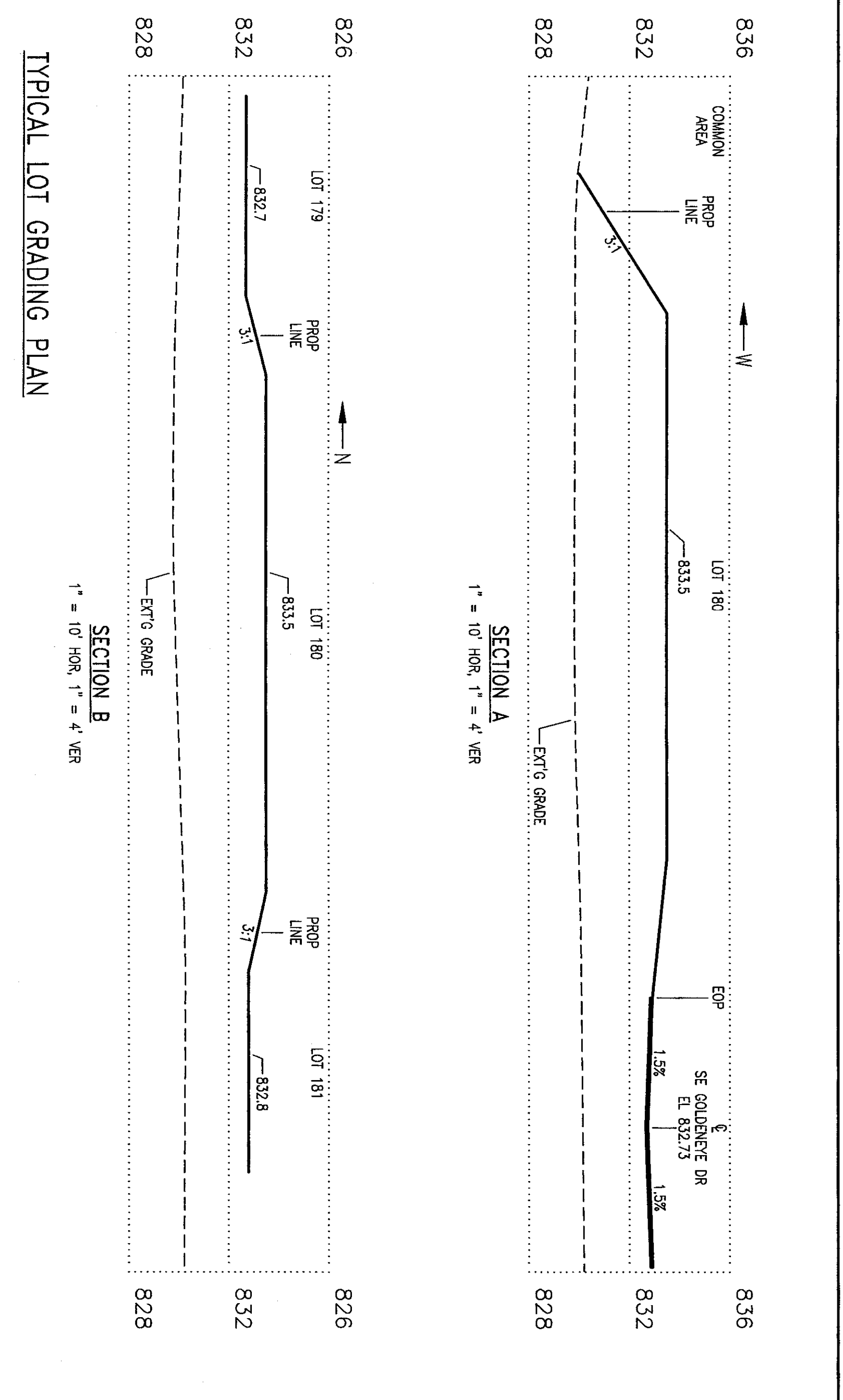
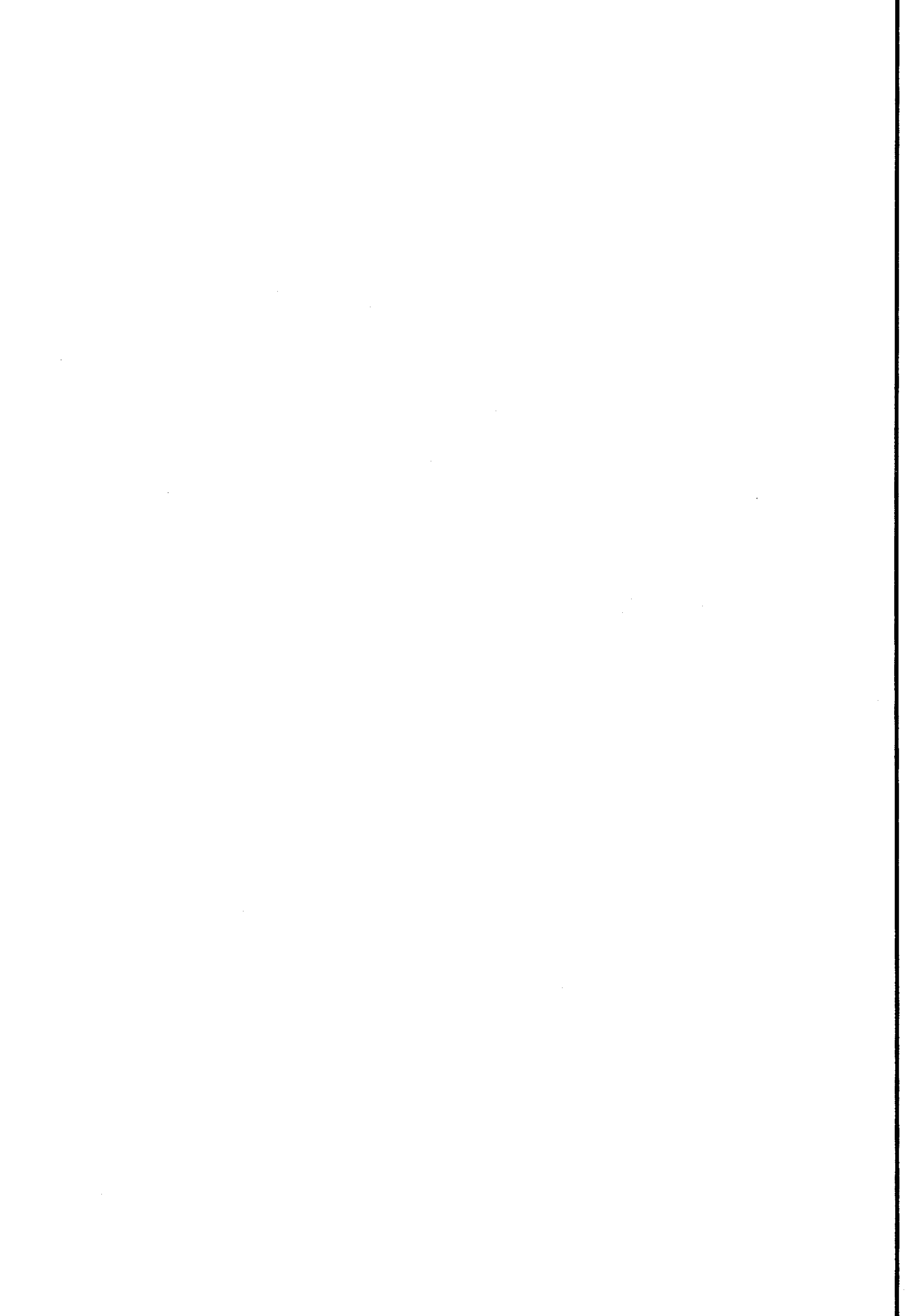
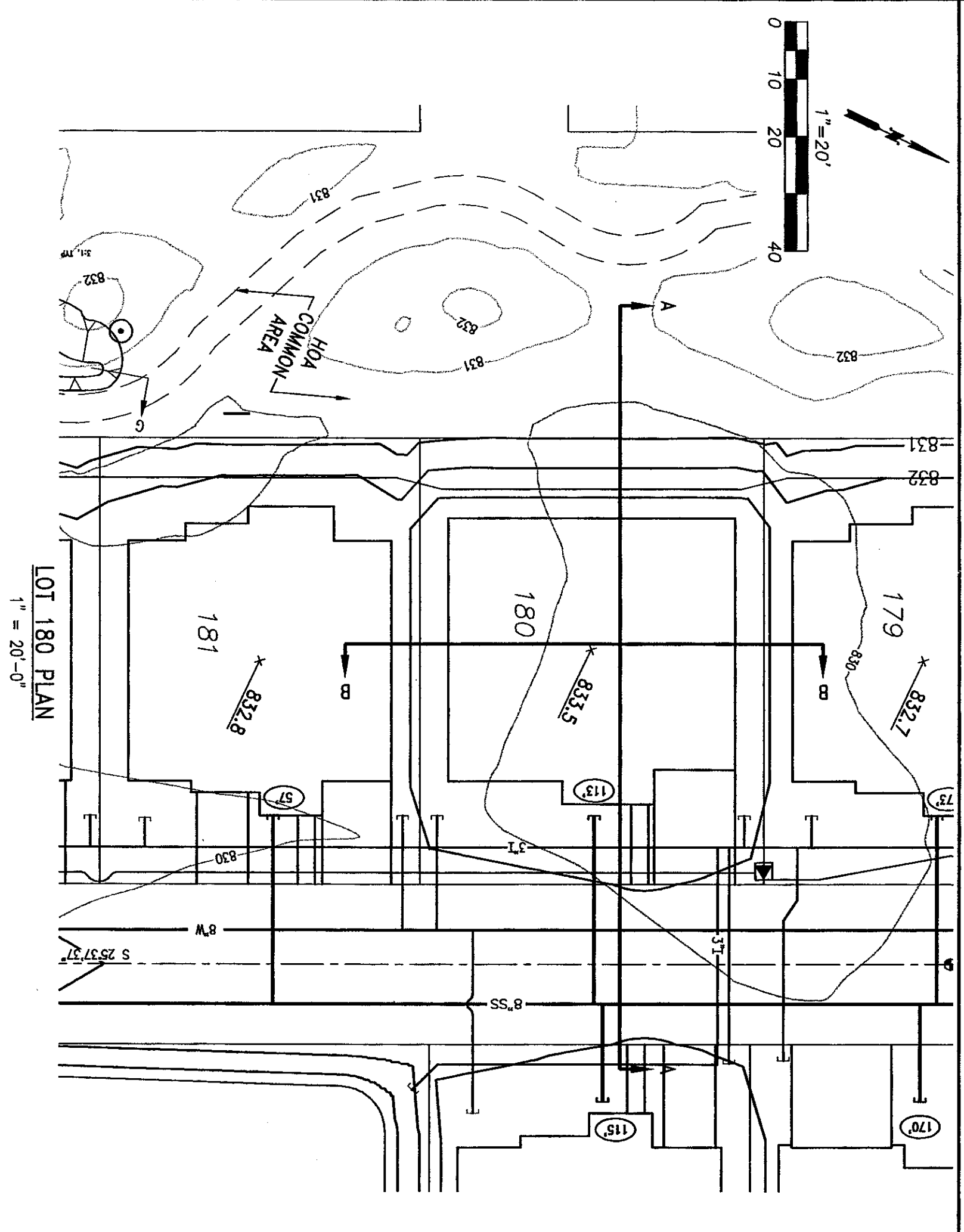
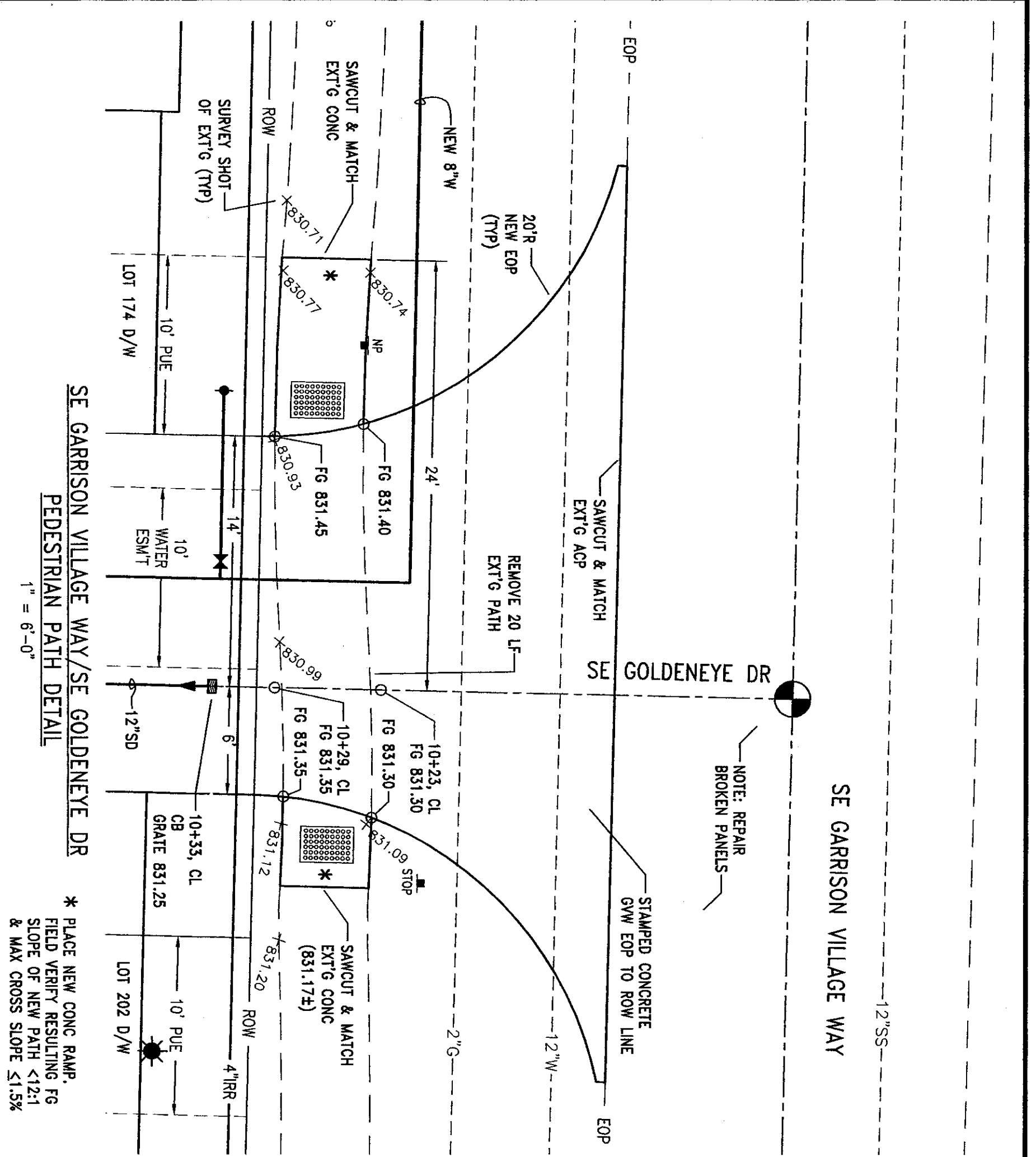
SQUARE RADIUS AT GARRISON
 VILLAGE WAY @ 6" THKS. THESE
 TAPERED TIPS USUALLY CRACK
 AND SETTLE.

48 MEADOWLARK LANE
 TOLUENET, WA 98360
 (509) 528-3800 PH.
 (509) 528-3801 FAX

GARRISON VILLAGE WAY & GOLDEN EYE APRON
 BOTIMER & ASSOCIATES
 P.O. BOX 2055
 WALLA WALLA, WA 98382
 (509) 525-2597 PH. (509) 301-6667

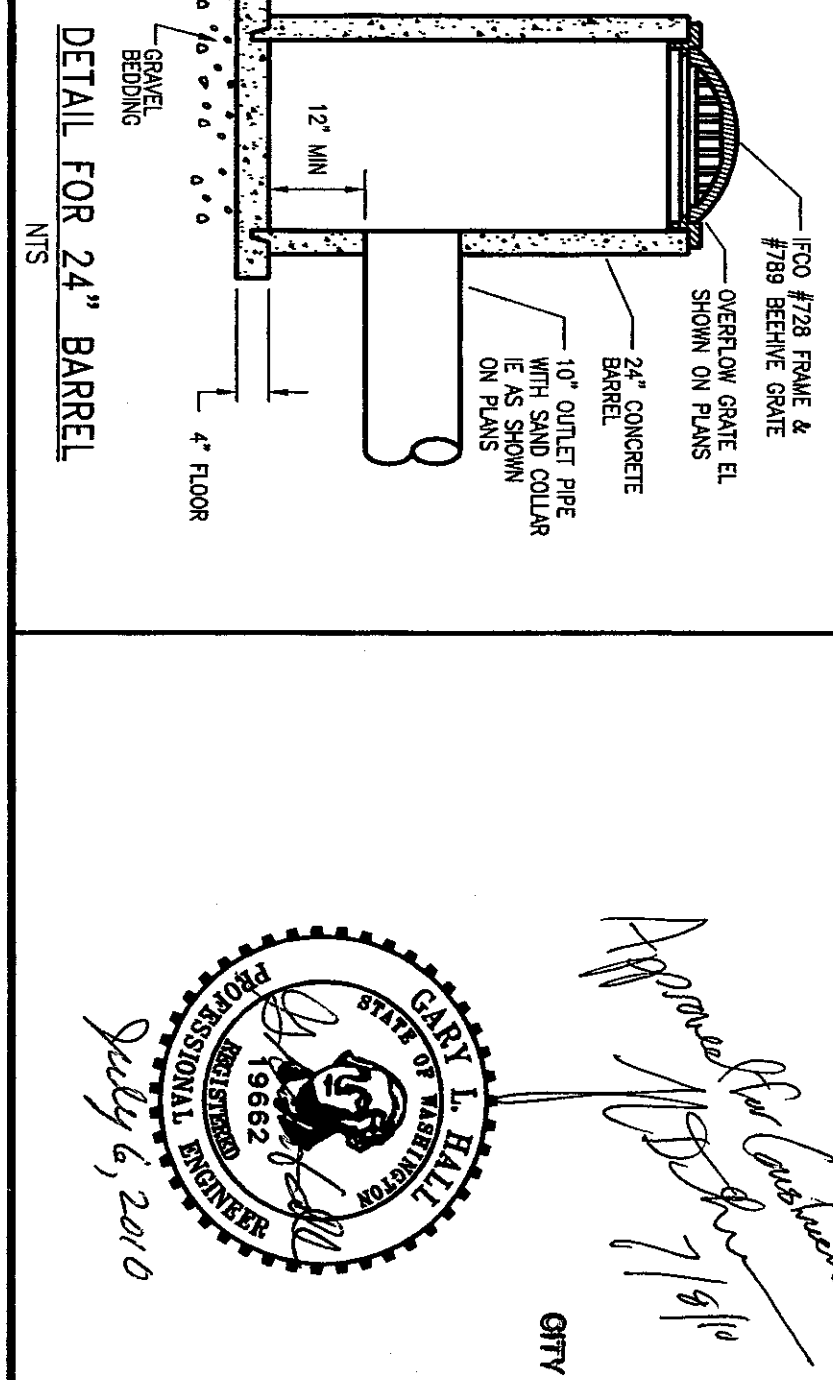


DRAWN BY: VV
 REVIEWED BY: VV
 DATE: 6/4/2010
 UPDATED: 7/3/2010



C:\PROJECT-DRIVE\081-PHASE5\PHASE 8 START JULY 2009\DESIGN\2010-02-18 REV\061-D114.DWG

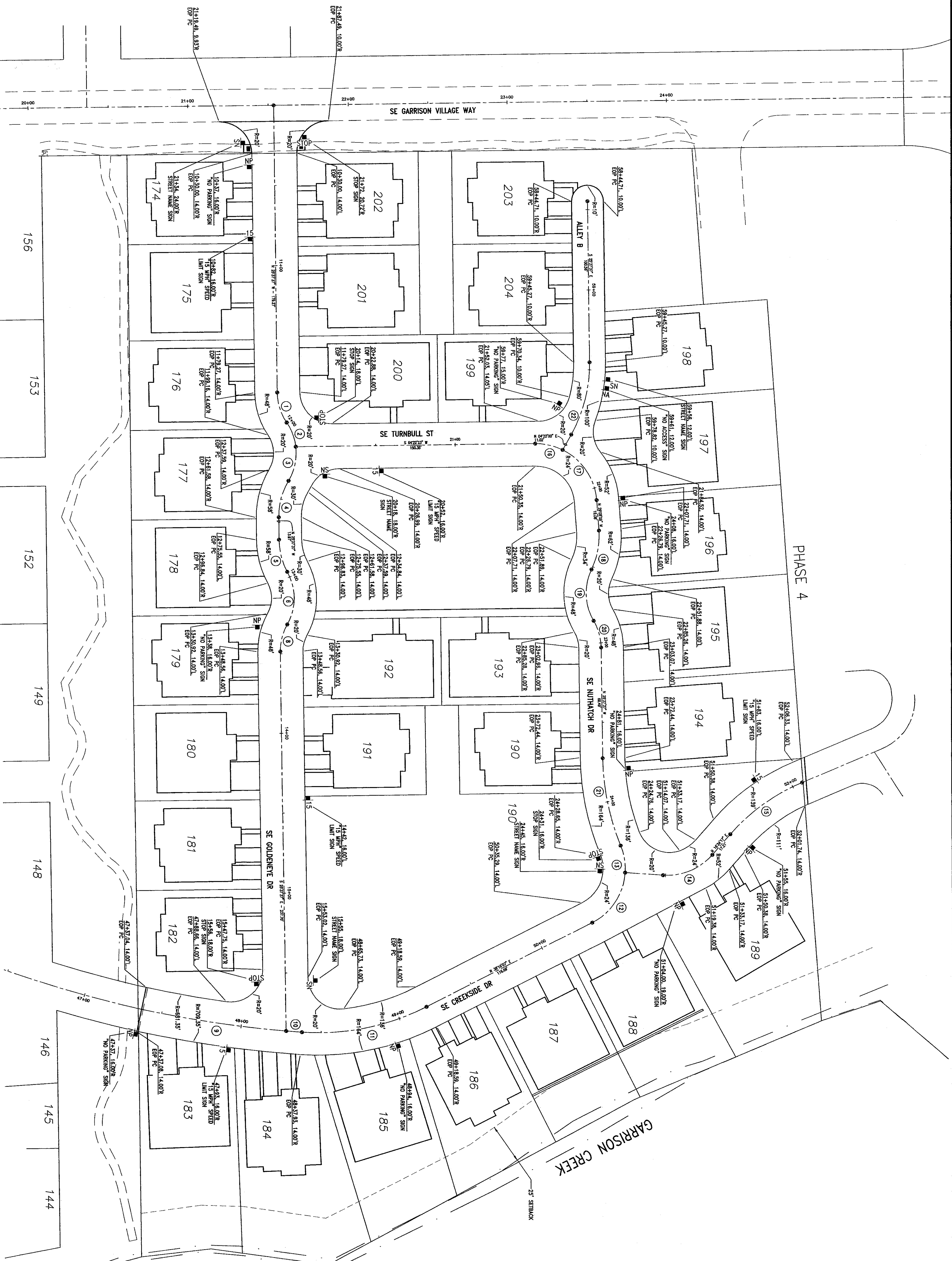
DATE: 07-6-10
 DRAWN BY: AIB
 DWG. NO.: 061-D114



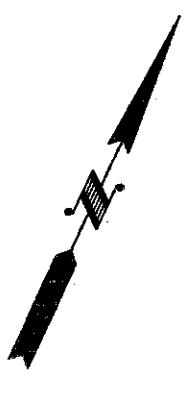
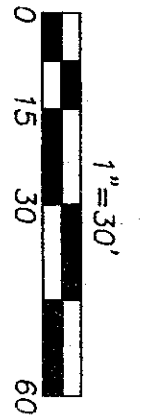
APPROVED FOR SUBMITTAL
 JUL 08 2010
 RECEIVED
 CITY OF COLLEGE PLACE

REVISED SHEET 6 OF 11
 CALL BEFORE YOU DIG (800) 424-5555
PHASE FIVE DEVELOPMENT, LLC
 VILLAGES AT GARRISON CREEK PHASE VIII DETAILS

HALL ENGINEERING ASSOCIATES
 10 SOUTH AUBURN • KENNEWICK, WA 99336
 (509) 582-2200 • FAX (509) 588-2897



PHASE 4



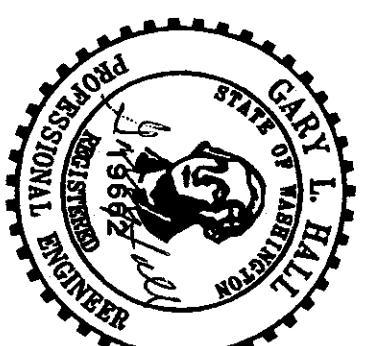
- SIGN LEGEND**
- | SIGN | DESCRIPTION | HEIGHT | STYLE |
|------|------------------------------|--------|-------|
| ■ | STOP SIGN (18" HEX) | 4' | * |
| □ | NO PARKING (10'x12') | 2' | * |
| □ | NO ACCESS (10'x12') | 2' | * |
| □ | STREET NAME SIGN (3'x6') | 6' | * |
| □ | 15 MPH SPEED LIMIT (10'x12') | 4' | * |
- * RUSTIC, REDWOOD-STAINED 4"x4" WITH PROPRIETARY SIGN MOUNTING EXISTING NEIGHBORHOODS SET IN CONCRETE.

C.L. CURVE TABLE

NO.	Δ	RADIUS	LENGTH	TANGENT
1	33°10'	34.00	19.89	10.24
2	27°31'07"	34.00	16.33	8.33
3	37°13'52"	34.00	22.09	11.45
4	31°14'15"	44.00	23.99	12.50
5	27°14'57"	44.00	20.92	10.55
6	57°28'48"	34.00	34.09	16.83
8	28°43'45"	34.00	17.64	9.02
9	07°41'19"	65.35	93.31	45.73
10	00°48'22"	65.35	9.78	4.89
11	30°48'34"	155.00	39.34	21.64
12	59°19'07"	38.00	39.34	21.64
13	28°02'58"	38.00	17.28	8.79
14	52°22'48"	38.00	34.74	18.69
15	25°09'16"	125.00	55.93	28.44
16	28°29'23"	38.00	17.88	9.00
17	59°50'04"	38.00	38.68	21.87
18	29°37'10"	48.00	26.09	12.84
19	58°14'41"	34.00	33.38	18.17
20	29°48'03"	34.00	17.88	9.05
21	21°28'15"	150.00	59.21	29.44
22	29°59'37"	90.00	47.11	24.11

Approved

 2/1/2010

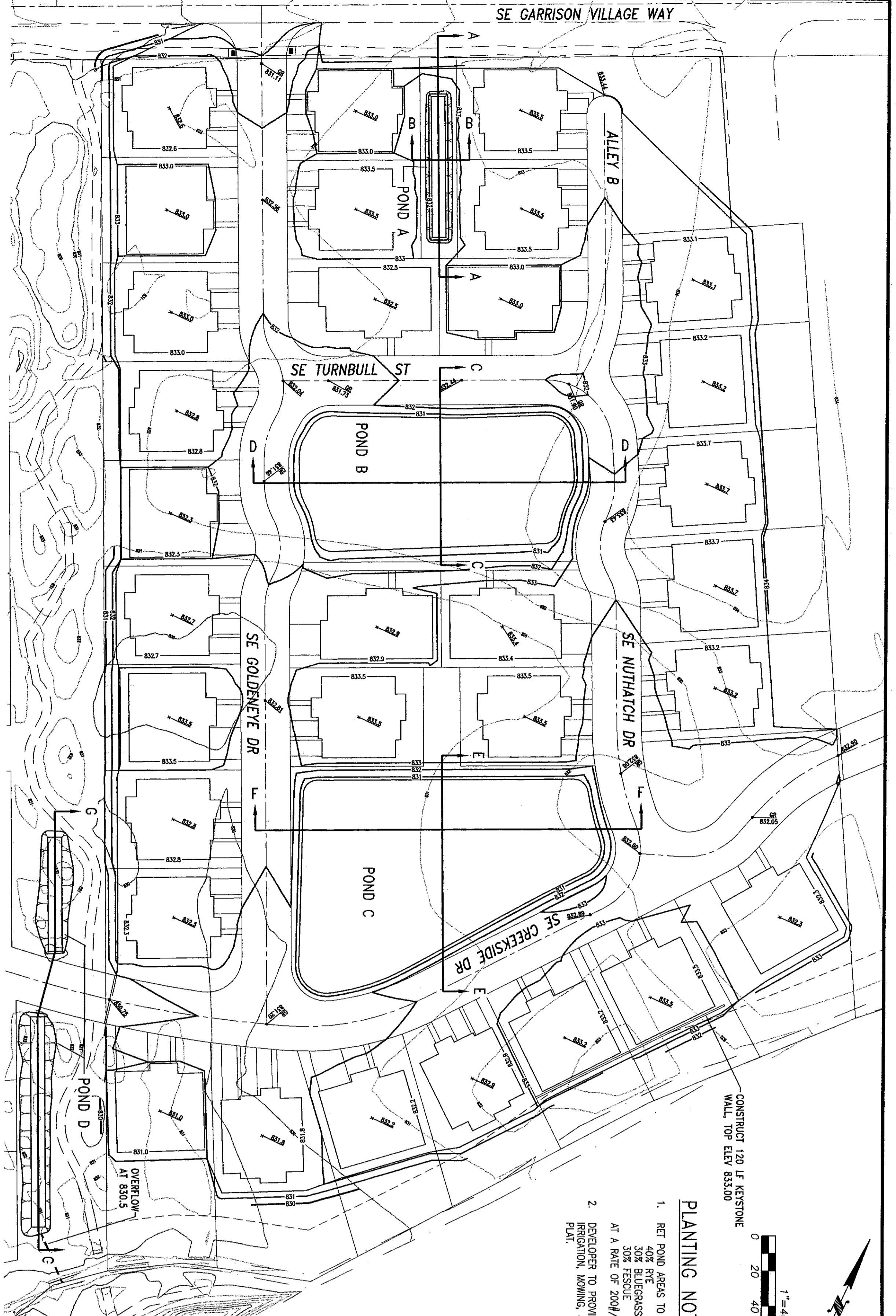


DATE: 01-25-10
 DRAWN BY: AIB
 DWG. NO.: 061-0110

PHASE FIVE DEVELOPMENT, LLC
 VILLAGES AT GARRISON CREEK PHASE VIII
 EOP CURVES & SIGN PLAN

SHEET 7 OF 11
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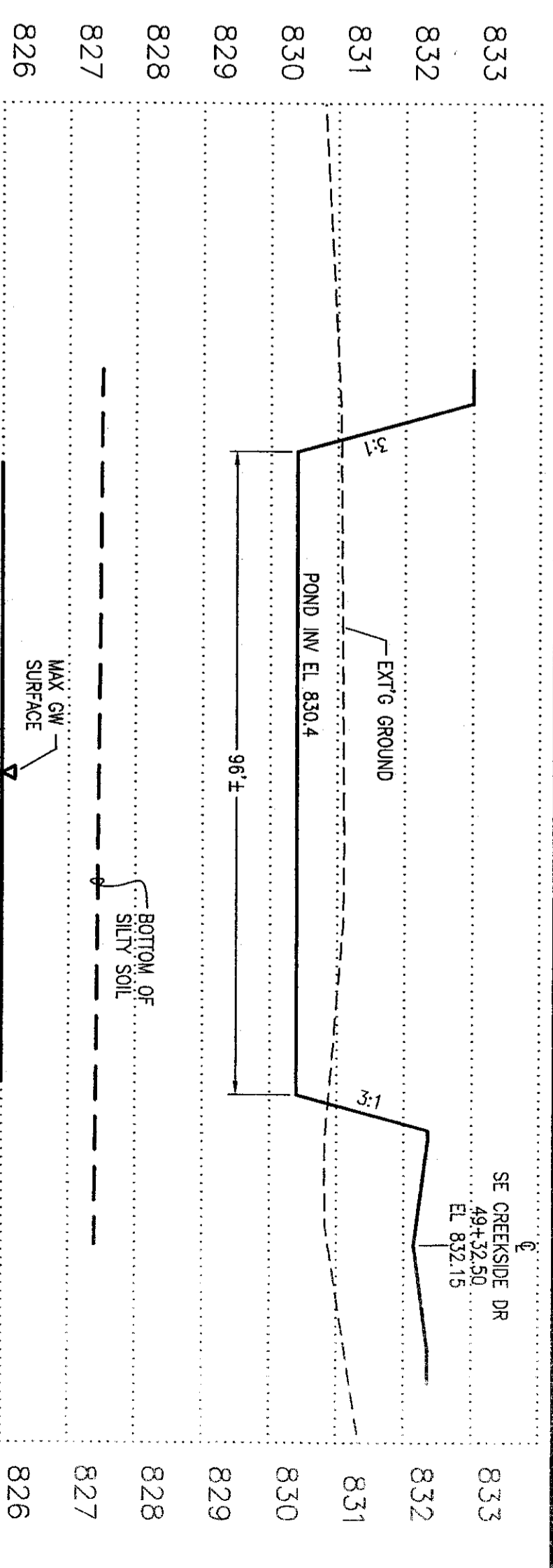
HALL ENGINEERING ASSOCIATES
 10 SOUTH AUBURN - KENNESAW, WA 99535
 (509) 388-2200 - FAX (509) 388-2887



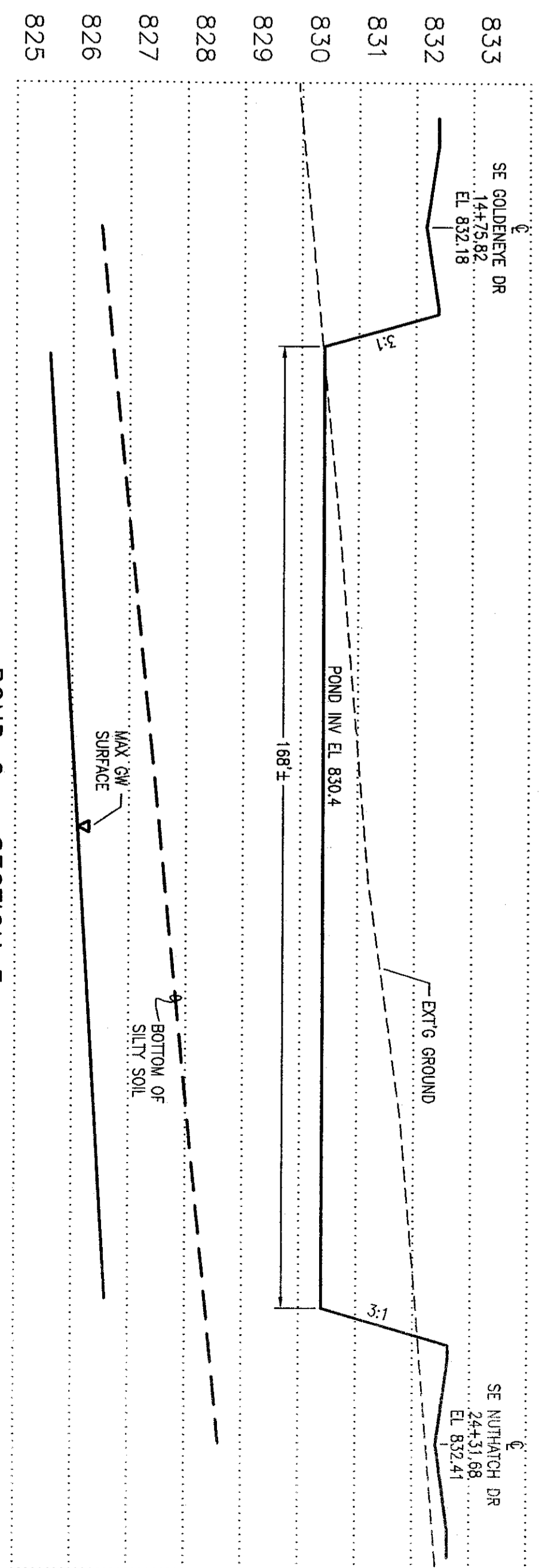
CONSTRUCT 120 LF KEYSTONE WALL, TOP ELEV 833.00

PLANTING NOTES

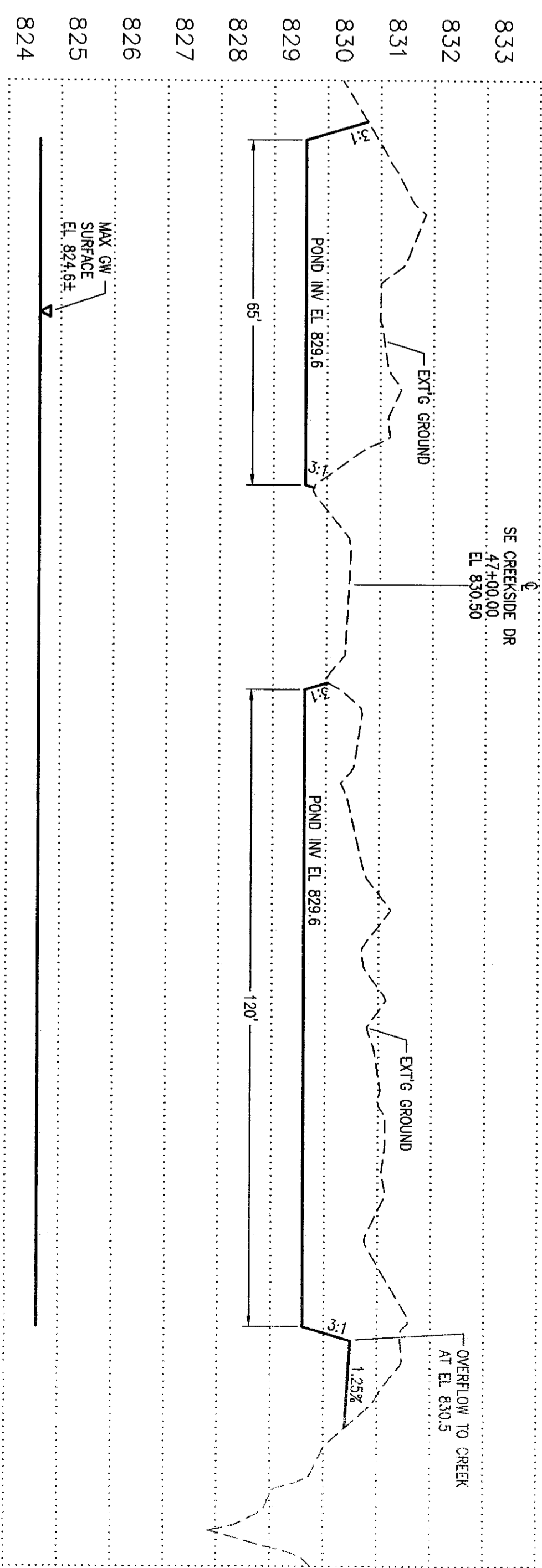
- RET POND AREAS TO BE PLANTED WITH TURF GRASS AS FOLLOWS:
40% BLUEGRASS
30% BLUEGRASS
30% FESCUE
AT A RATE OF 200#/AC.
- DEVELOPER TO PROVIDE MAINTENANCE OF TURF GRASS INCLUDING IRRIGATION, MOWING, & FERTILIZING FOR 12 MONTHS FROM FINAL PLANT.



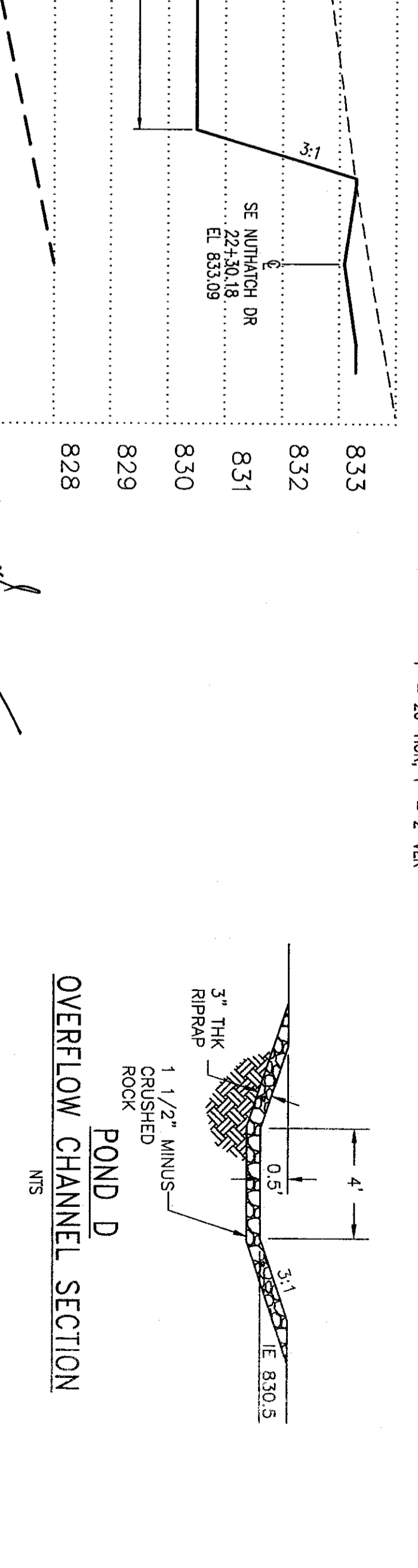
POND A - SECTION A
1" = 20' HOR, 1" = 2' VER



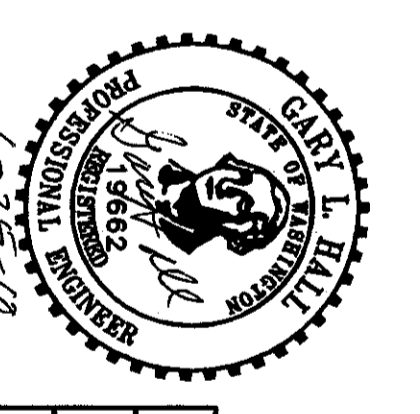
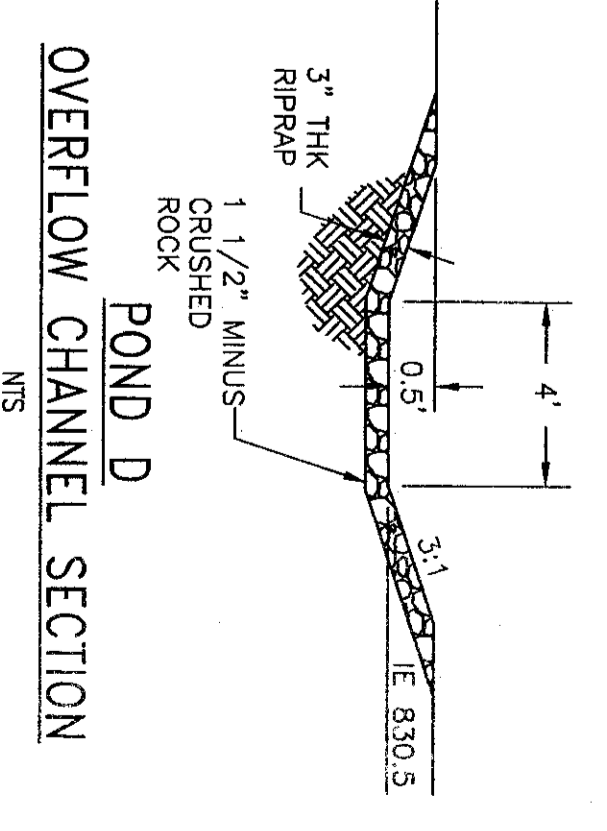
POND B - SECTION C
1" = 20' HOR, 1" = 2' VER



POND A - SECTION B
1" = 20' HOR, 1" = 2' VER



POND B - SECTION D
1" = 20' HOR, 1" = 2' VER

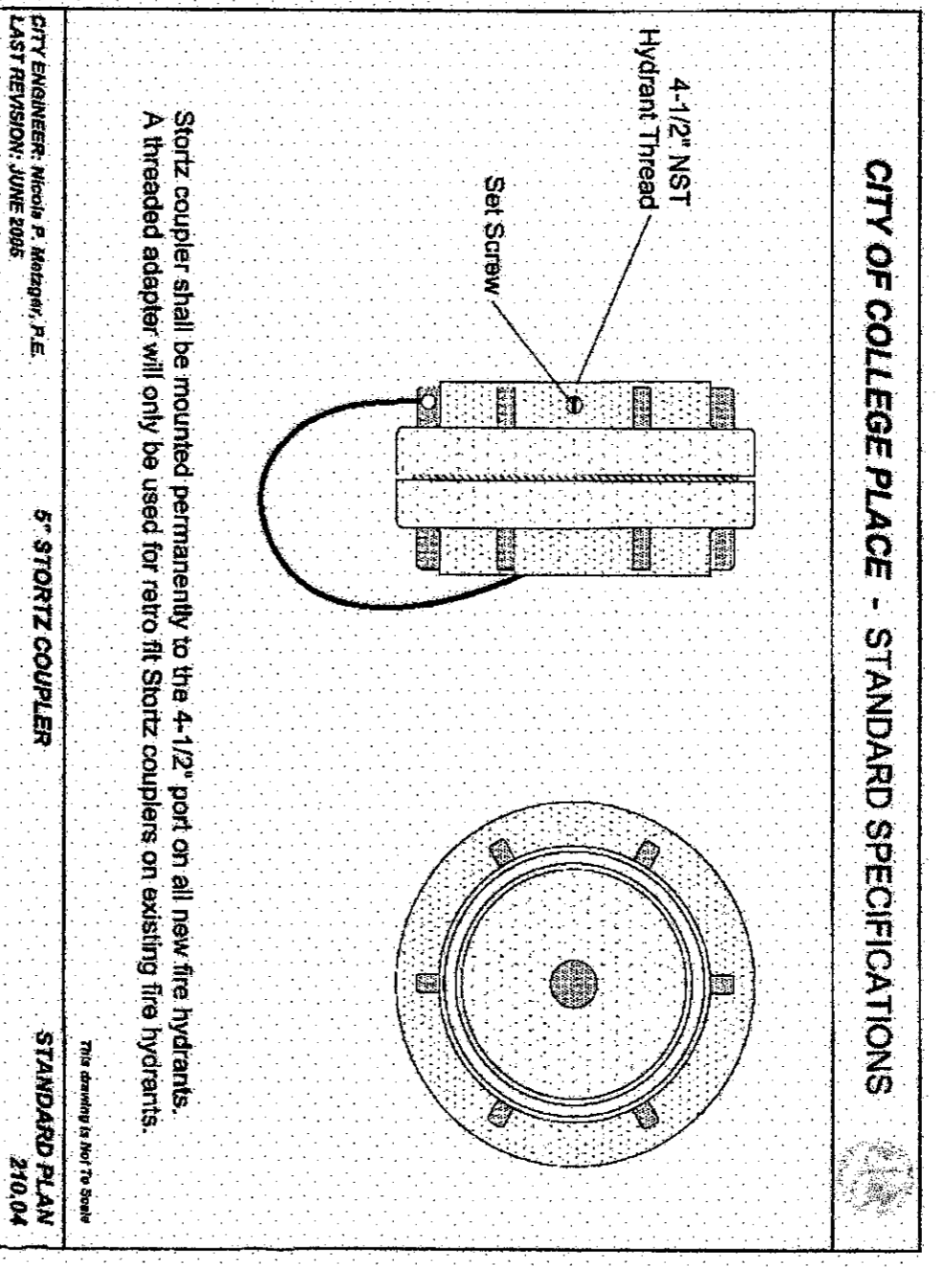
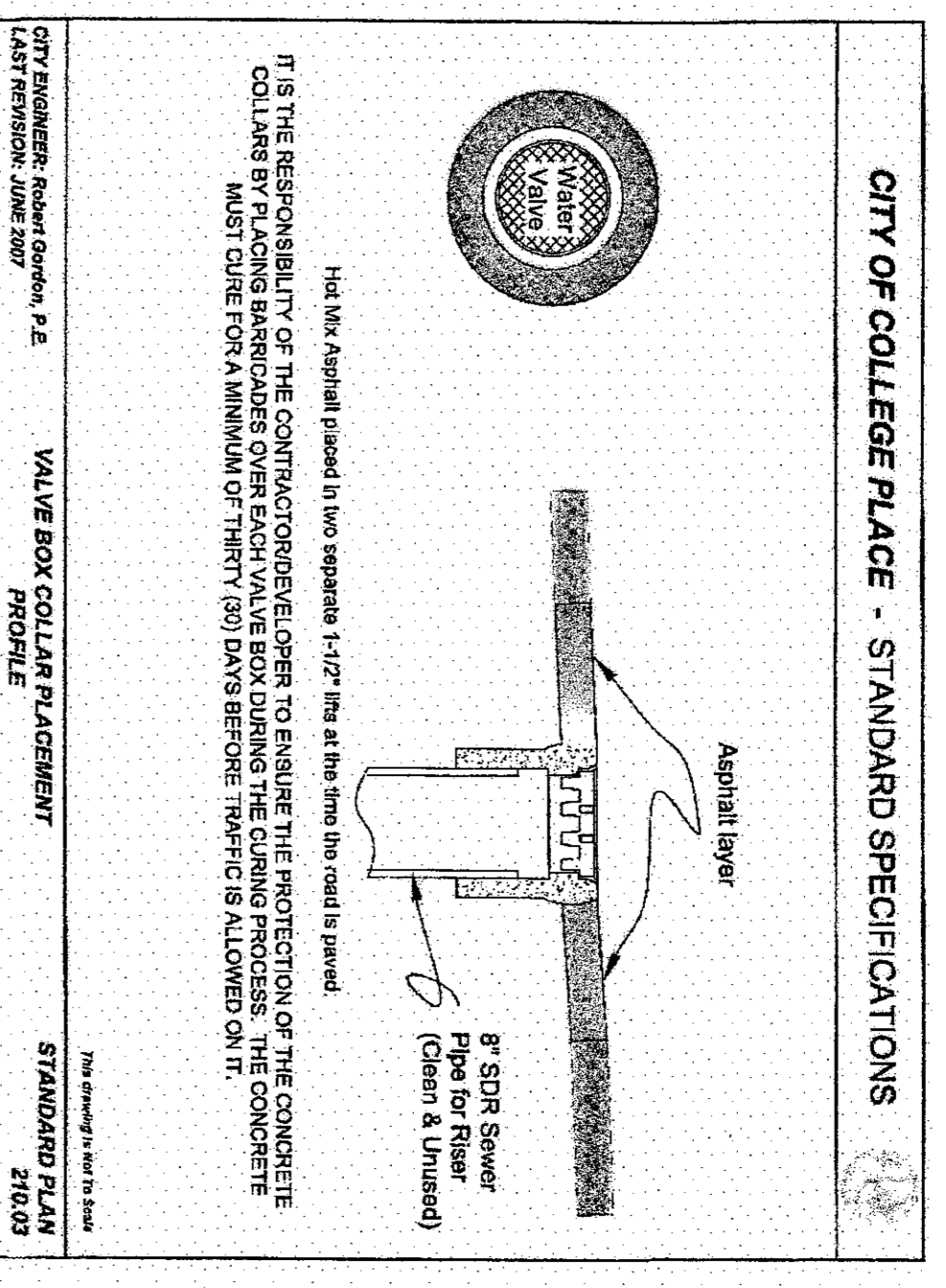
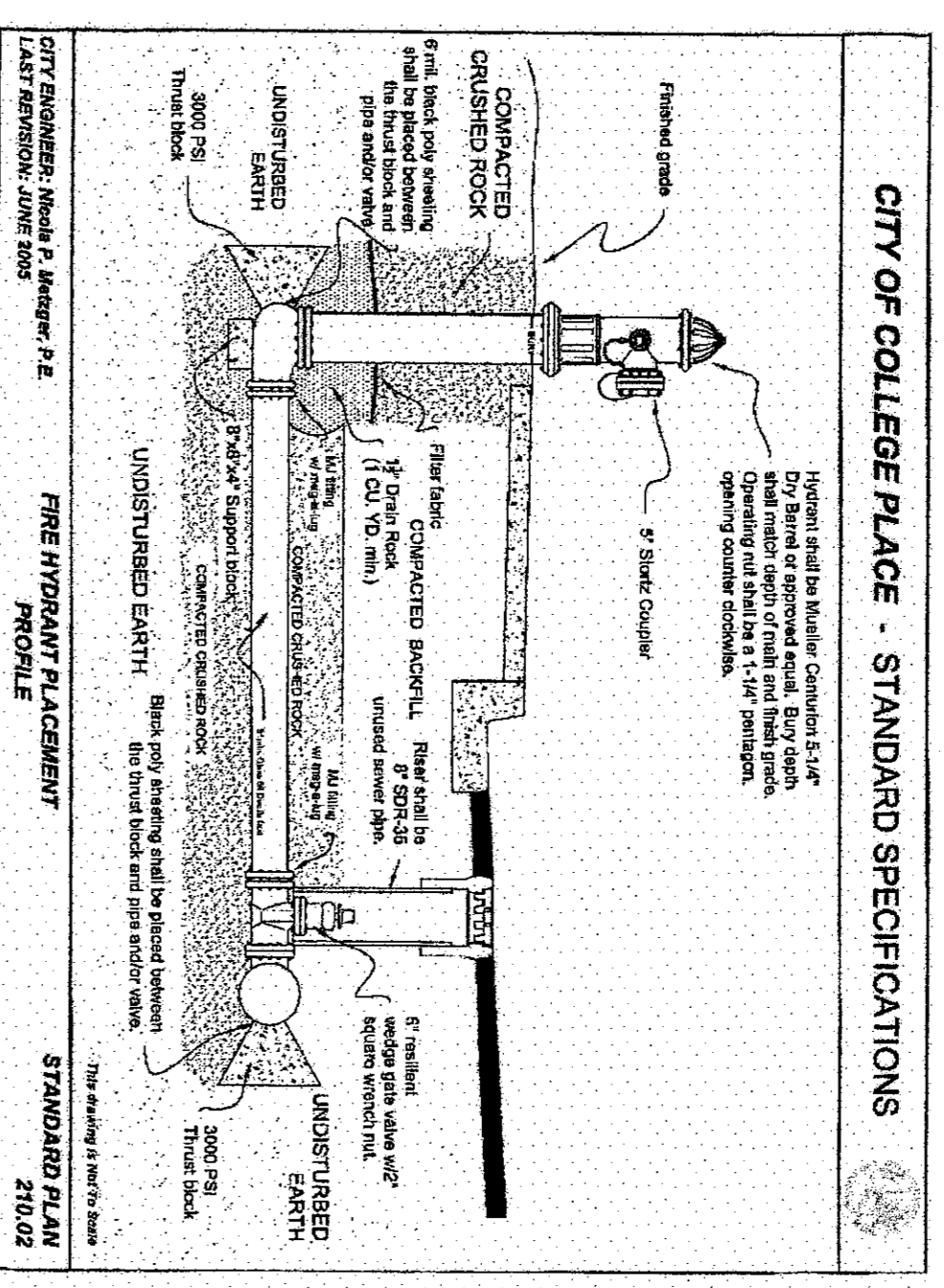
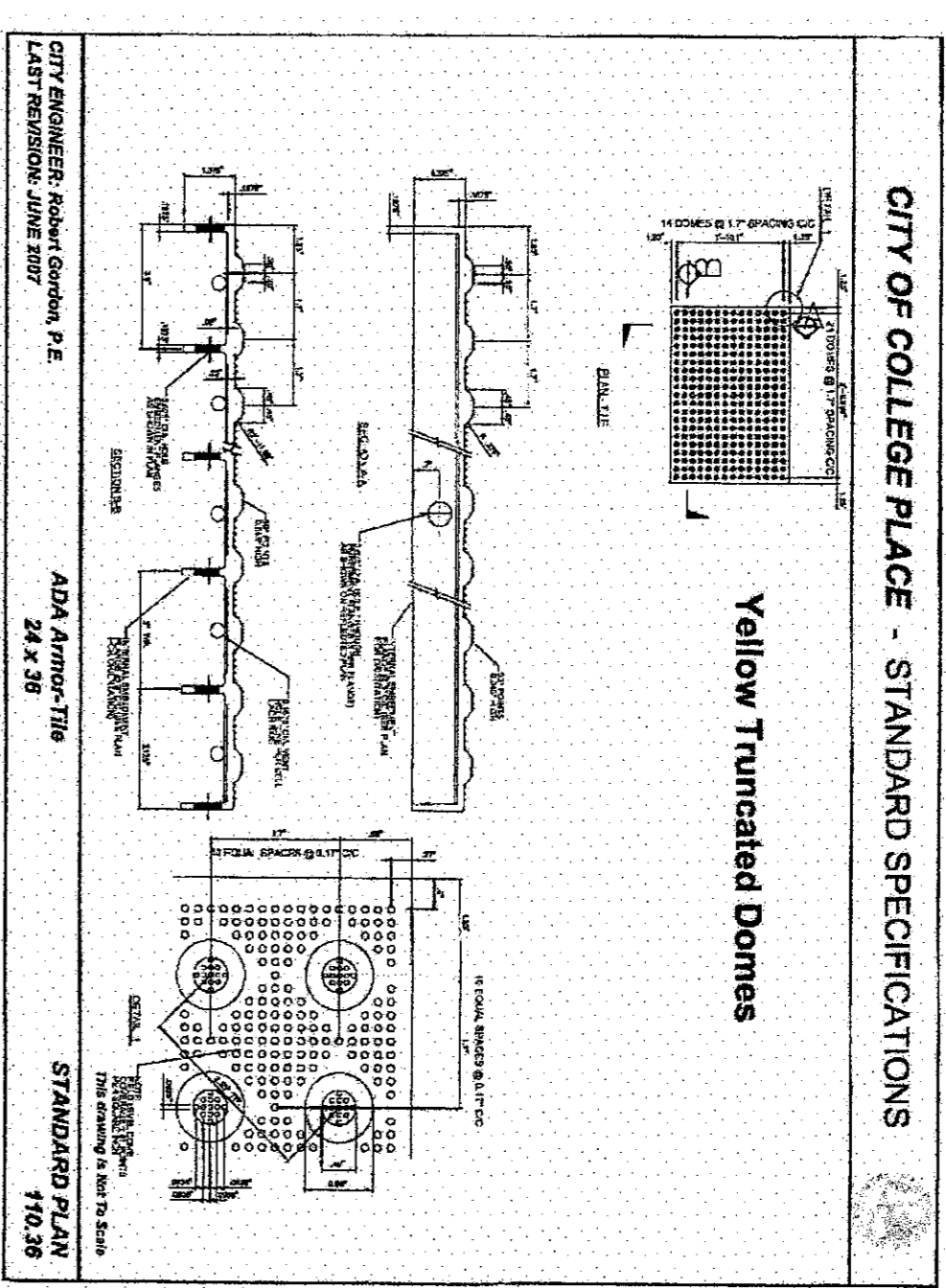


DATE: 01-25-10
DRAWN BY: DJR
DWG. NO.: 061-0112

PHASE FIVE DEVELOPMENT, LLC
VILLAGES AT GARRISON CREEK PHASE VIII
GRADING PLAN & POND SECTIONS

HALL ENGINEERING ASSOCIATES
10 SOUTH AUBURN • KENNESAW, VA 99336
(509) 582-2300 • FAX (509) 586-2897

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SHEET 9 OF 11



CITY OF COLLEGE PLACE - STANDARD SPECIFICATIONS

THRUST BLOCK NOTES

1. THRUST BLOCKS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
 - a. ALL CHANGES IN PIPE DIRECTION.
 - b. ALL CHANGES IN PIPE SIZE.
 - c. ALL CHANGES IN PIPE MATERIAL.
 - d. ALL CHANGES IN PIPE SLOPE.
 - e. ALL CHANGES IN PIPE SUPPORT.
2. THRUST BLOCKS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
 - a. ALL CHANGES IN PIPE DIRECTION.
 - b. ALL CHANGES IN PIPE SIZE.
 - c. ALL CHANGES IN PIPE MATERIAL.
 - d. ALL CHANGES IN PIPE SLOPE.
 - e. ALL CHANGES IN PIPE SUPPORT.
3. THRUST BLOCKS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
 - a. ALL CHANGES IN PIPE DIRECTION.
 - b. ALL CHANGES IN PIPE SIZE.
 - c. ALL CHANGES IN PIPE MATERIAL.
 - d. ALL CHANGES IN PIPE SLOPE.
 - e. ALL CHANGES IN PIPE SUPPORT.
4. THRUST BLOCKS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
 - a. ALL CHANGES IN PIPE DIRECTION.
 - b. ALL CHANGES IN PIPE SIZE.
 - c. ALL CHANGES IN PIPE MATERIAL.
 - d. ALL CHANGES IN PIPE SLOPE.
 - e. ALL CHANGES IN PIPE SUPPORT.
5. THRUST BLOCKS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
 - a. ALL CHANGES IN PIPE DIRECTION.
 - b. ALL CHANGES IN PIPE SIZE.
 - c. ALL CHANGES IN PIPE MATERIAL.
 - d. ALL CHANGES IN PIPE SLOPE.
 - e. ALL CHANGES IN PIPE SUPPORT.

STANDARD PLAN 410.10
CITY ENGINEER: Robert Gordon, P.E.
LAST REVISION: JUNE 2007

CITY OF COLLEGE PLACE - STANDARD SPECIFICATIONS

THRUST BLOCK CALCULATION TABLES

TABLE NO. 1
THRUST BLOCK REQUIRED BY PIPE FOR WATER PRESSURE

PIPE DIA.	PIPE WALL THICKNESS	PIPE WEIGHT PER FOOT	PIPE STIFFNESS	PIPE RIGIDITY	PIPE STRENGTH	PIPE MODULUS OF ELASTICITY	PIPE COEFFICIENT OF EXPANSION	PIPE THERMAL EXPANSION
12"	0.250"	12.0	1.0	1.0	1.0	1.0	1.0	1.0
15"	0.312"	15.0	1.5	1.5	1.5	1.5	1.5	1.5
18"	0.375"	18.0	2.0	2.0	2.0	2.0	2.0	2.0
21"	0.437"	21.0	2.5	2.5	2.5	2.5	2.5	2.5
24"	0.500"	24.0	3.0	3.0	3.0	3.0	3.0	3.0
27"	0.562"	27.0	3.5	3.5	3.5	3.5	3.5	3.5
30"	0.625"	30.0	4.0	4.0	4.0	4.0	4.0	4.0
36"	0.750"	36.0	5.0	5.0	5.0	5.0	5.0	5.0
42"	0.875"	42.0	6.0	6.0	6.0	6.0	6.0	6.0
48"	1.000"	48.0	7.0	7.0	7.0	7.0	7.0	7.0
54"	1.125"	54.0	8.0	8.0	8.0	8.0	8.0	8.0
60"	1.250"	60.0	9.0	9.0	9.0	9.0	9.0	9.0
66"	1.375"	66.0	10.0	10.0	10.0	10.0	10.0	10.0
72"	1.500"	72.0	11.0	11.0	11.0	11.0	11.0	11.0
78"	1.625"	78.0	12.0	12.0	12.0	12.0	12.0	12.0
84"	1.750"	84.0	13.0	13.0	13.0	13.0	13.0	13.0
90"	1.875"	90.0	14.0	14.0	14.0	14.0	14.0	14.0
96"	2.000"	96.0	15.0	15.0	15.0	15.0	15.0	15.0
102"	2.125"	102.0	16.0	16.0	16.0	16.0	16.0	16.0
108"	2.250"	108.0	17.0	17.0	17.0	17.0	17.0	17.0
114"	2.375"	114.0	18.0	18.0	18.0	18.0	18.0	18.0
120"	2.500"	120.0	19.0	19.0	19.0	19.0	19.0	19.0

TABLE NO. 2
PIPE THRUST FORCE ON LAMBDA, POUNDS

PIPE DIA.	PIPE WALL THICKNESS	PIPE WEIGHT PER FOOT	PIPE STIFFNESS	PIPE RIGIDITY	PIPE STRENGTH	PIPE MODULUS OF ELASTICITY	PIPE COEFFICIENT OF EXPANSION	PIPE THERMAL EXPANSION
12"	0.250"	12.0	1.0	1.0	1.0	1.0	1.0	1.0
15"	0.312"	15.0	1.5	1.5	1.5	1.5	1.5	1.5
18"	0.375"	18.0	2.0	2.0	2.0	2.0	2.0	2.0
21"	0.437"	21.0	2.5	2.5	2.5	2.5	2.5	2.5
24"	0.500"	24.0	3.0	3.0	3.0	3.0	3.0	3.0
27"	0.562"	27.0	3.5	3.5	3.5	3.5	3.5	3.5
30"	0.625"	30.0	4.0	4.0	4.0	4.0	4.0	4.0
36"	0.750"	36.0	5.0	5.0	5.0	5.0	5.0	5.0
42"	0.875"	42.0	6.0	6.0	6.0	6.0	6.0	6.0
48"	1.000"	48.0	7.0	7.0	7.0	7.0	7.0	7.0
54"	1.125"	54.0	8.0	8.0	8.0	8.0	8.0	8.0
60"	1.250"	60.0	9.0	9.0	9.0	9.0	9.0	9.0
66"	1.375"	66.0	10.0	10.0	10.0	10.0	10.0	10.0
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90"	1.875"	90.0	14.0	14.0	14.0	14.0	14.0	14.0
96"	2.000"	96.0	15.0	15.0	15.0	15.0	15.0	15.0
102"	2.125"	102.0	16.0	16.0	16.0	16.0	16.0	16.0
108"	2.250"	108.0	17.0	17.0	17.0	17.0	17.0	17.0
114"	2.375"	114.0	18.0	18.0	18.0	18.0	18.0	18.0
120"	2.500"	120.0	19.0	19.0	19.0	19.0	19.0	19.0

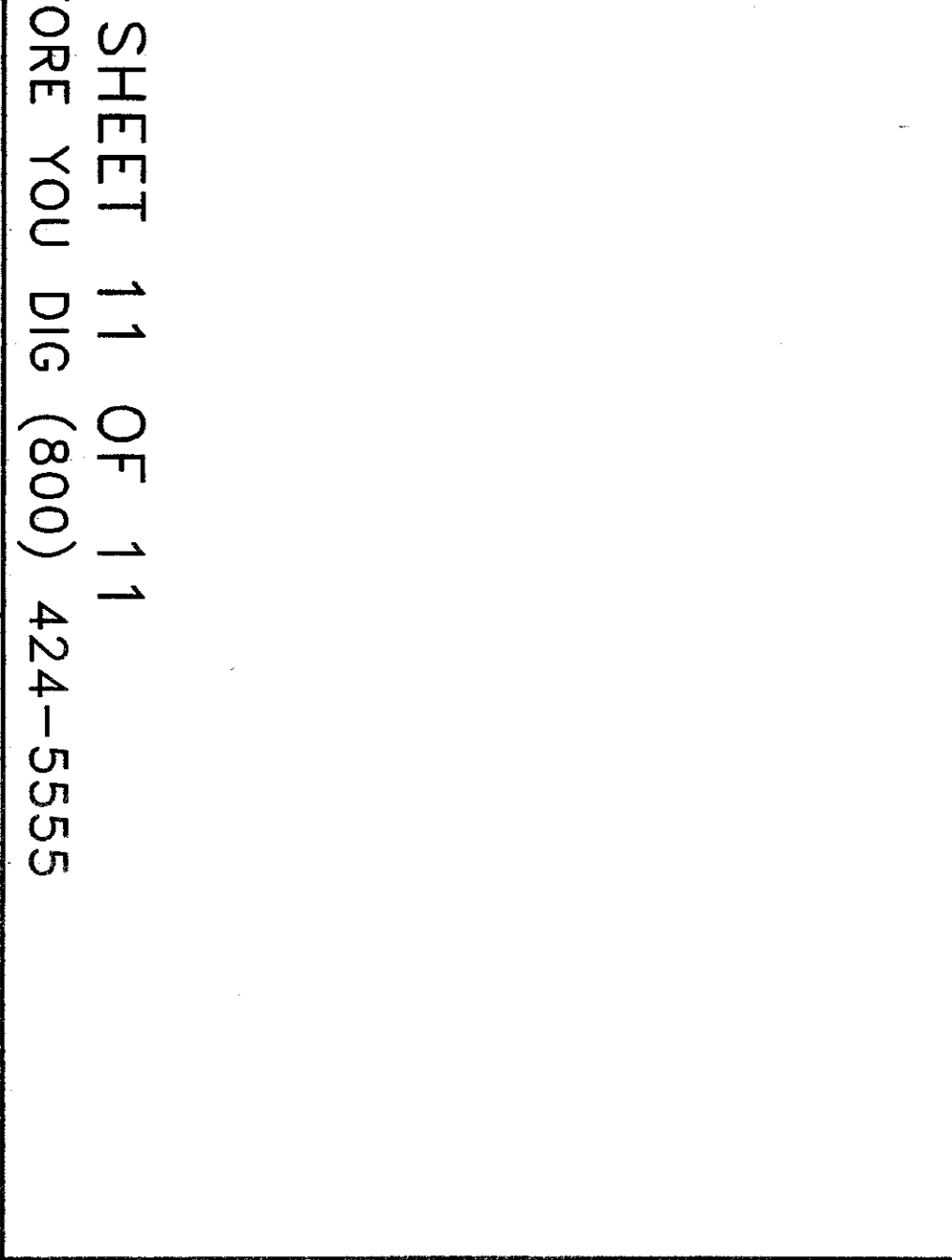
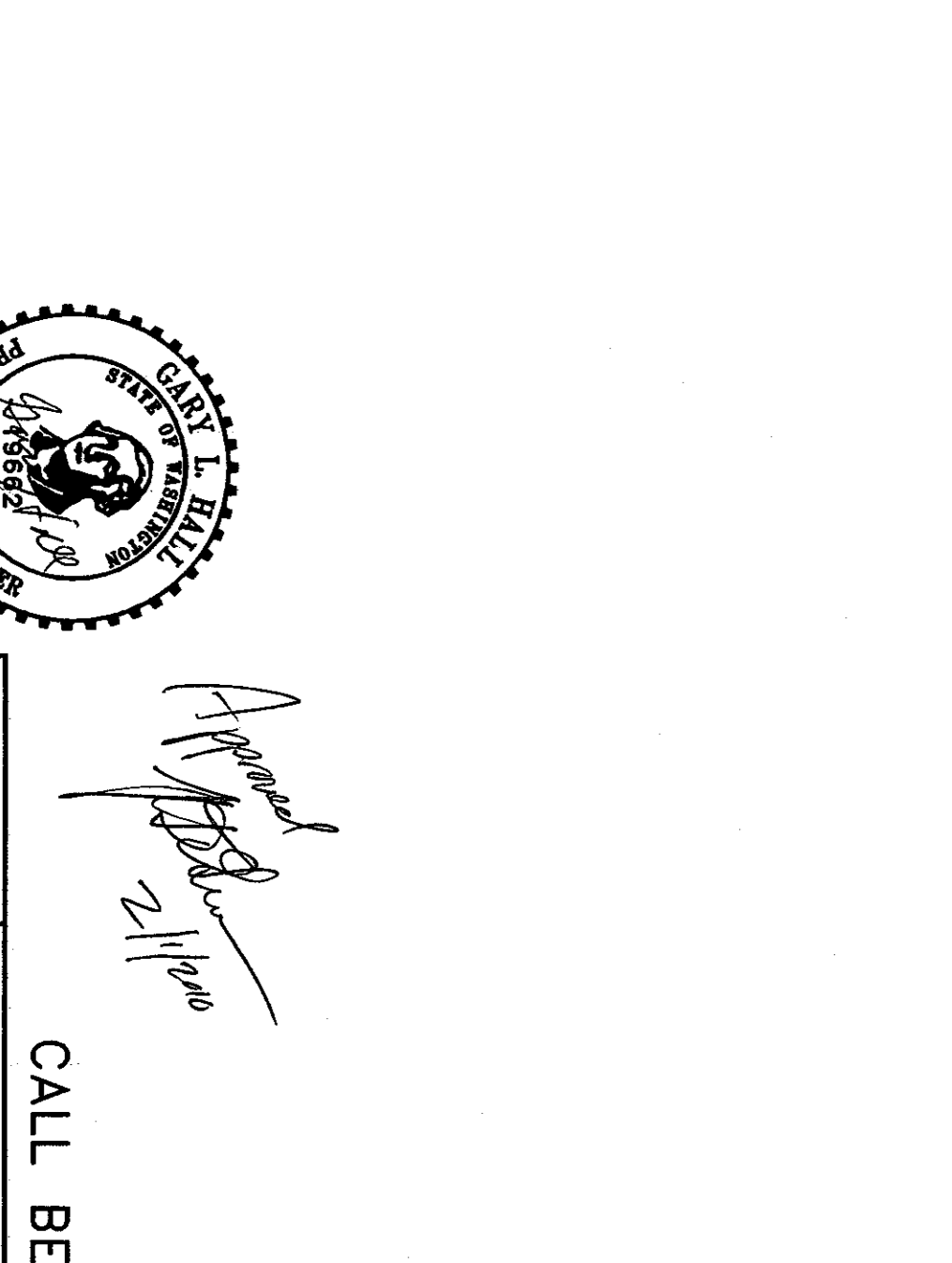
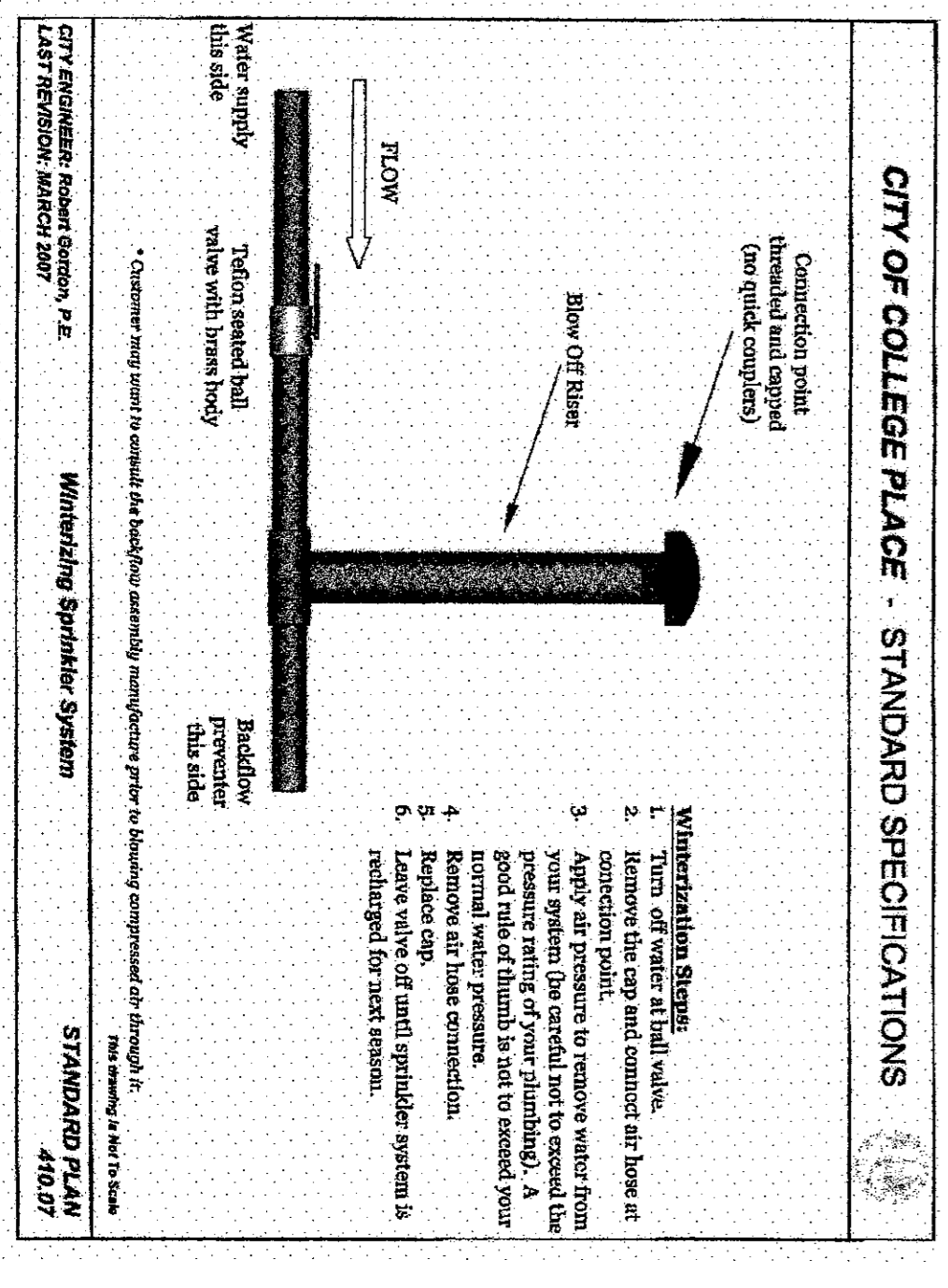
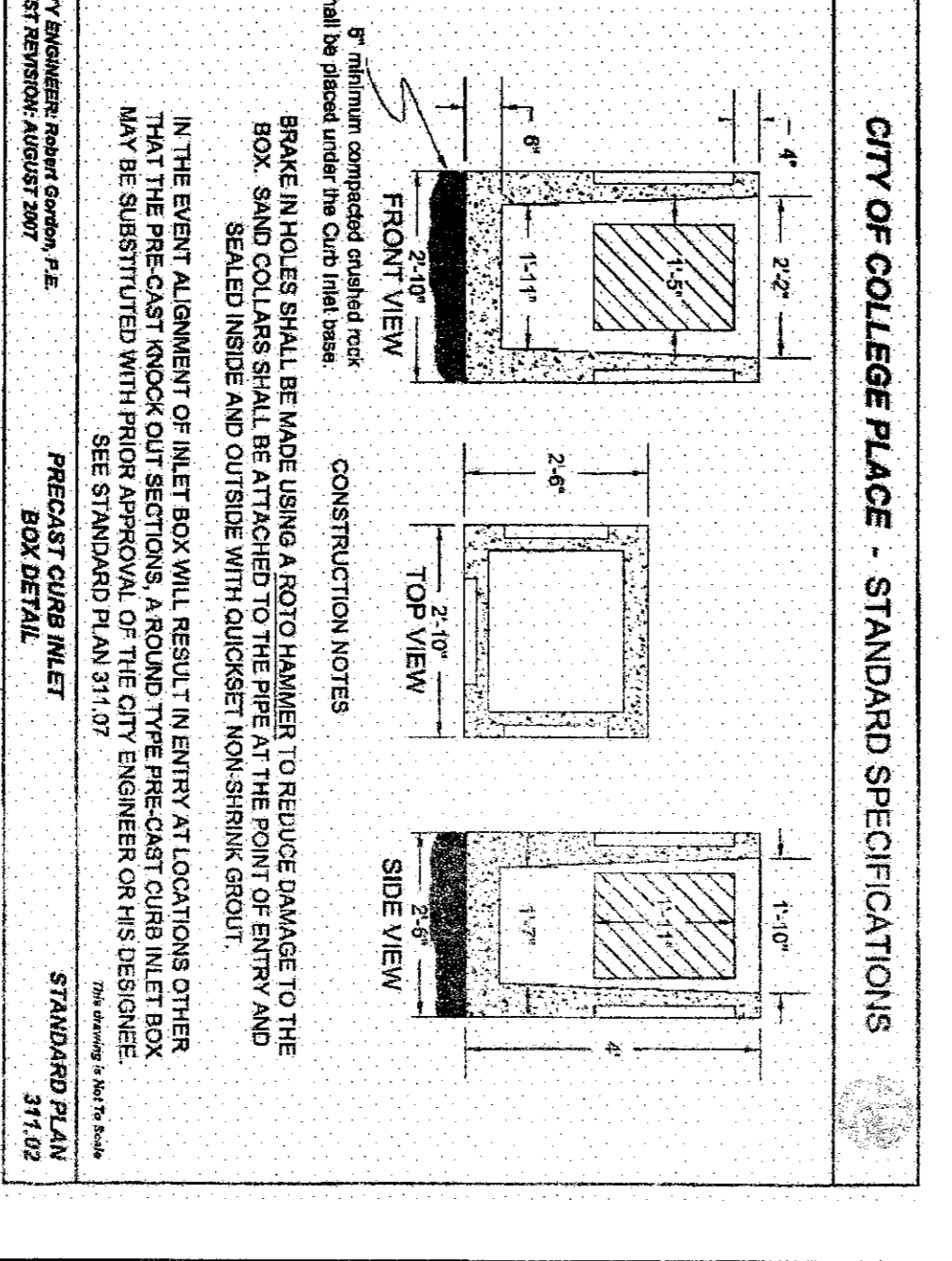
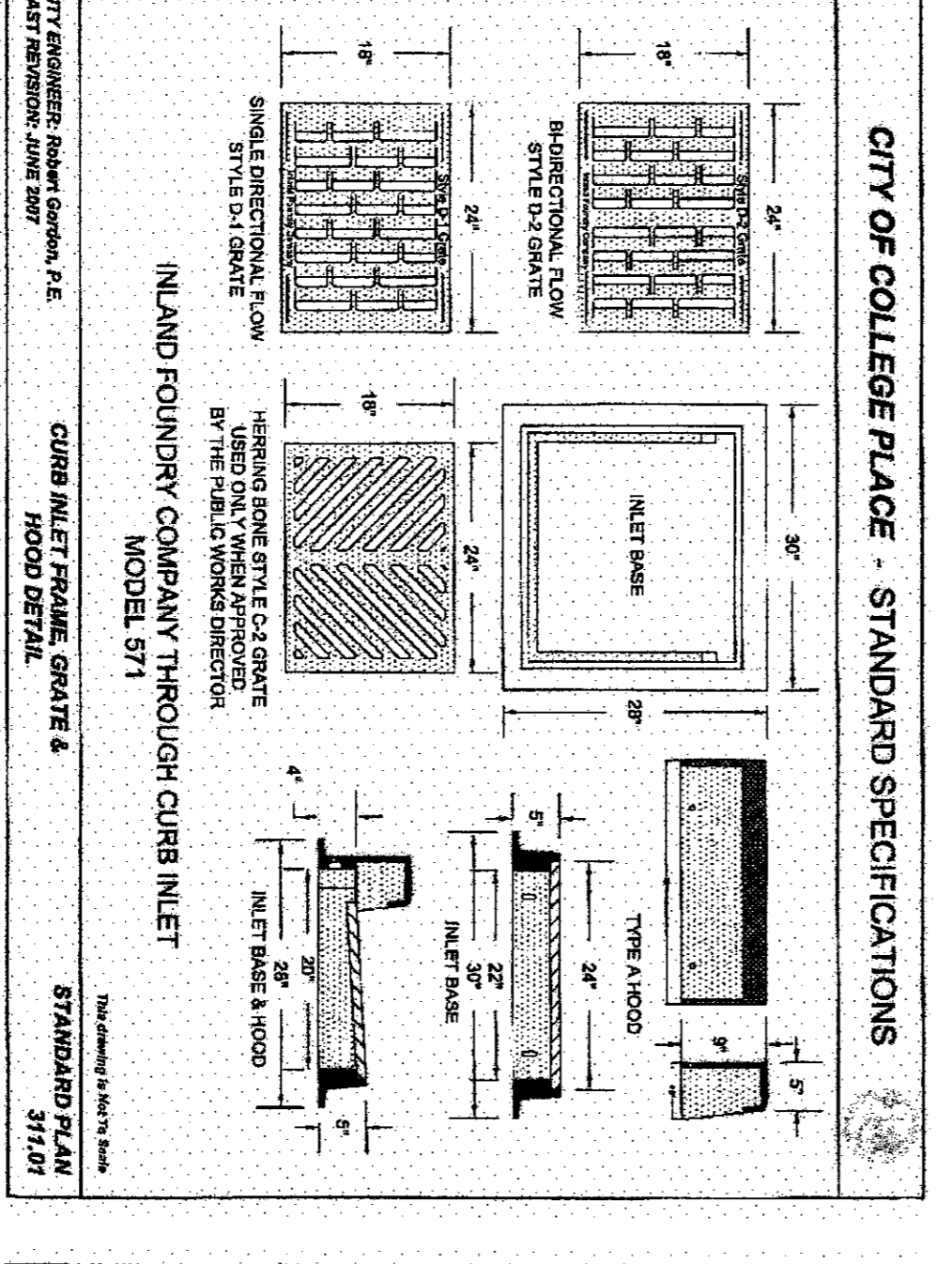
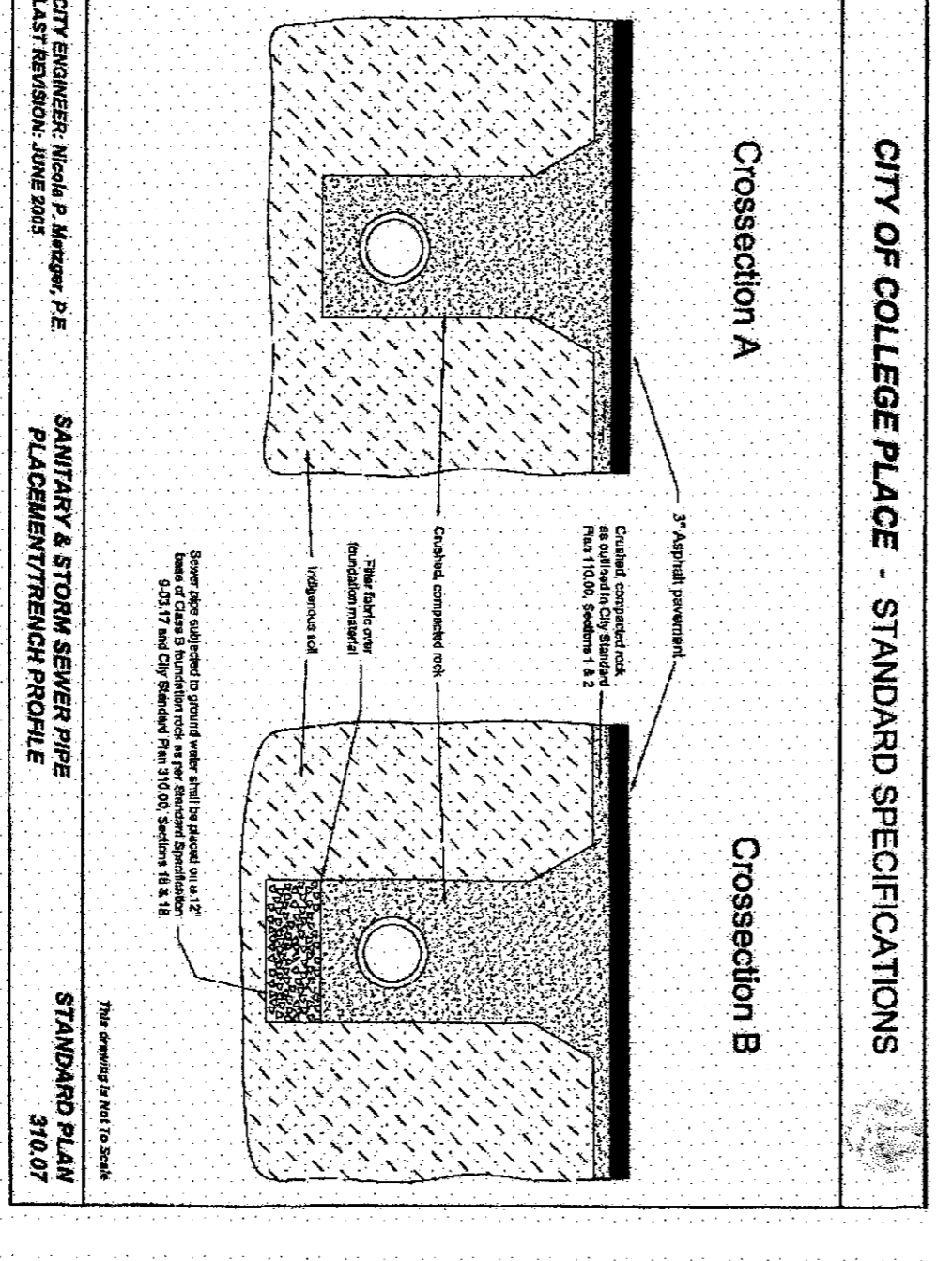
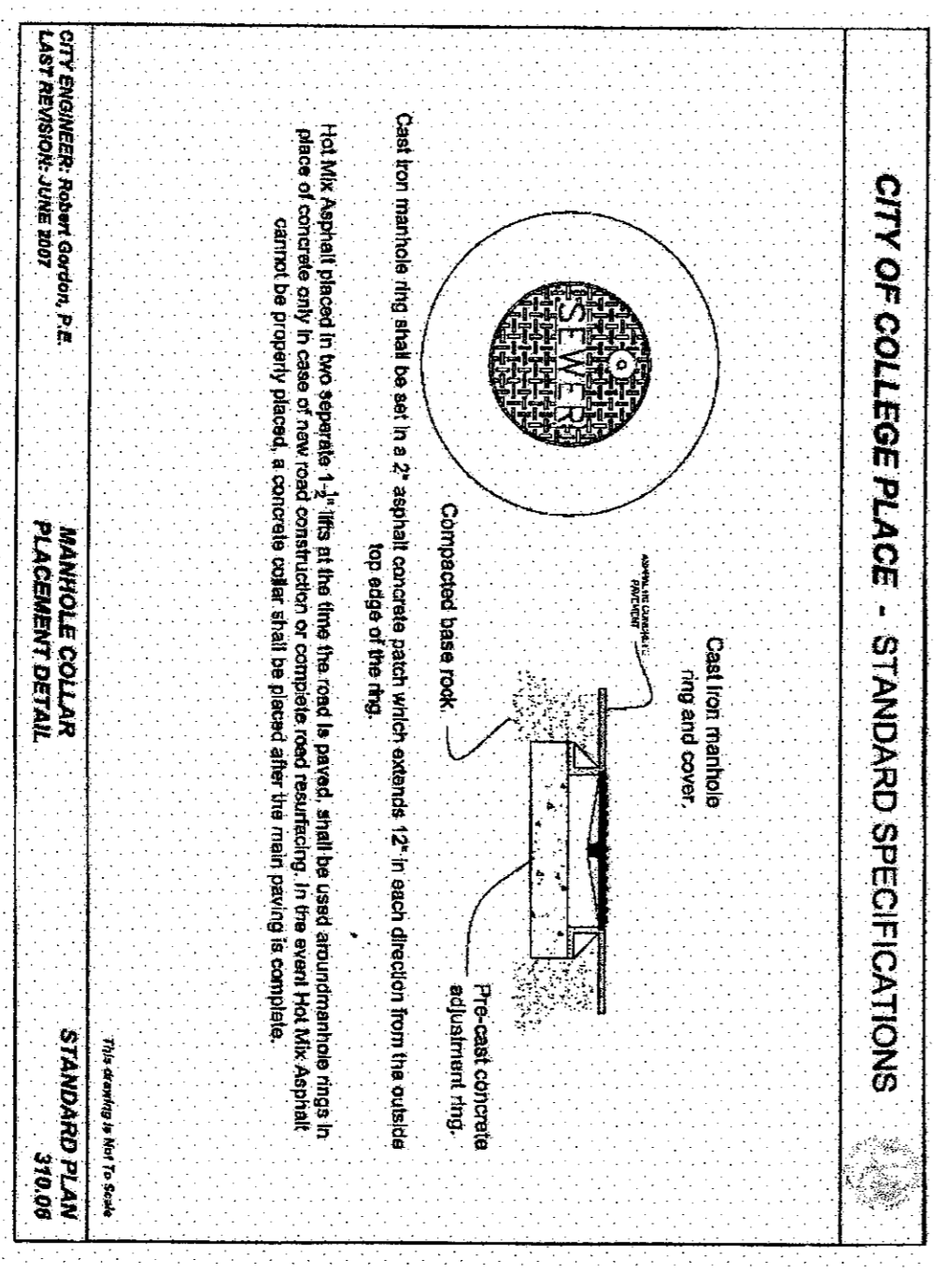
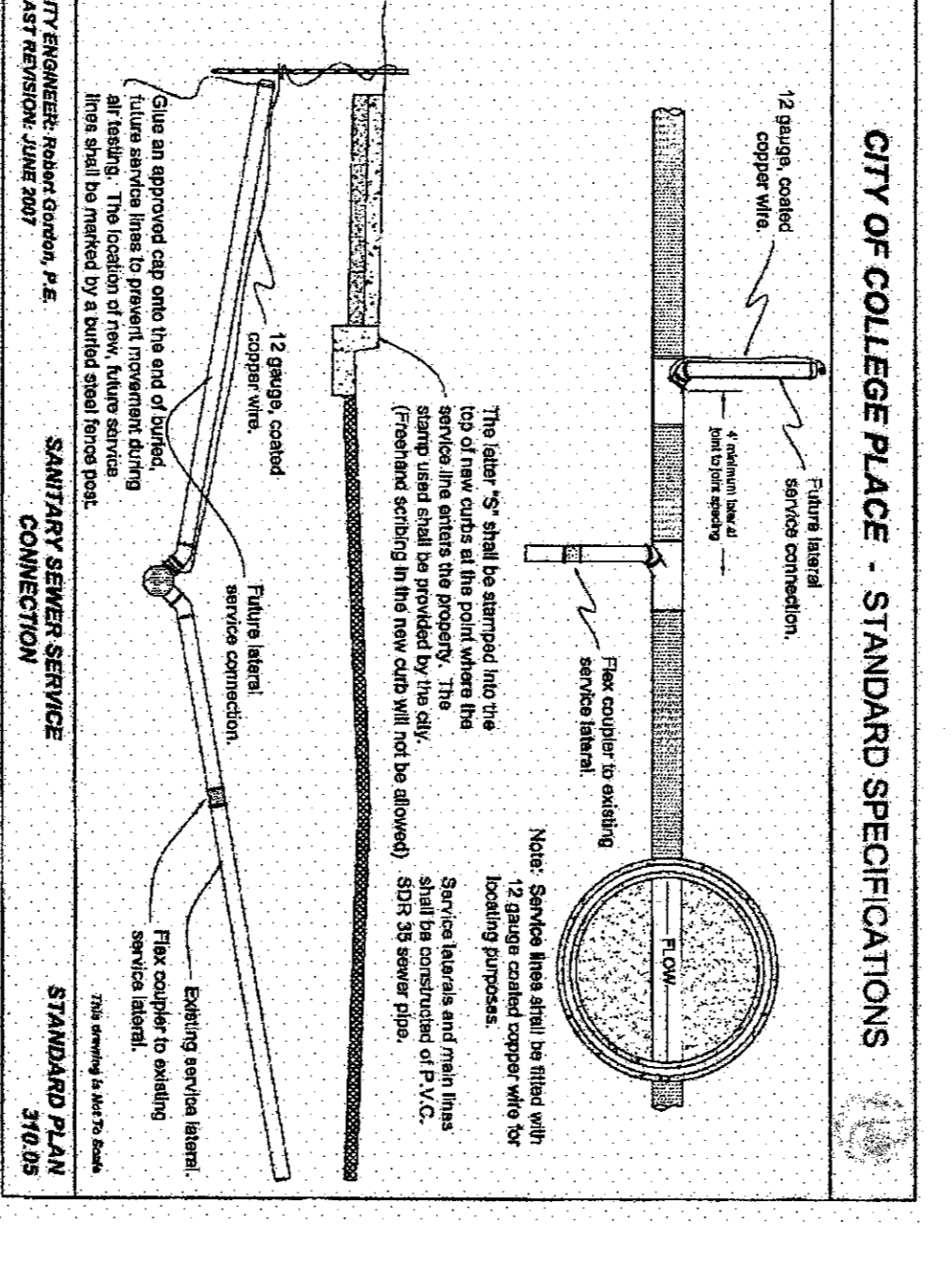
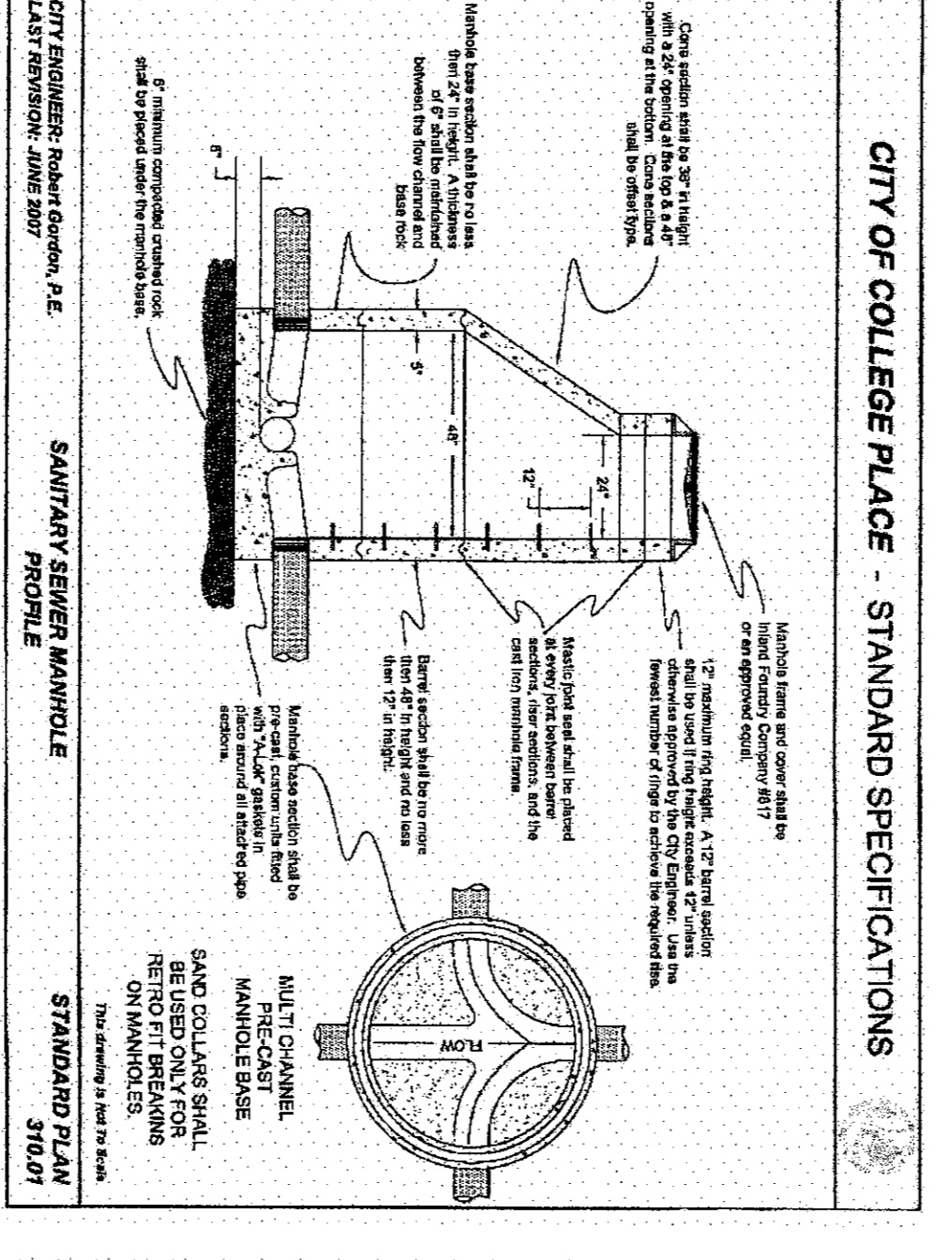
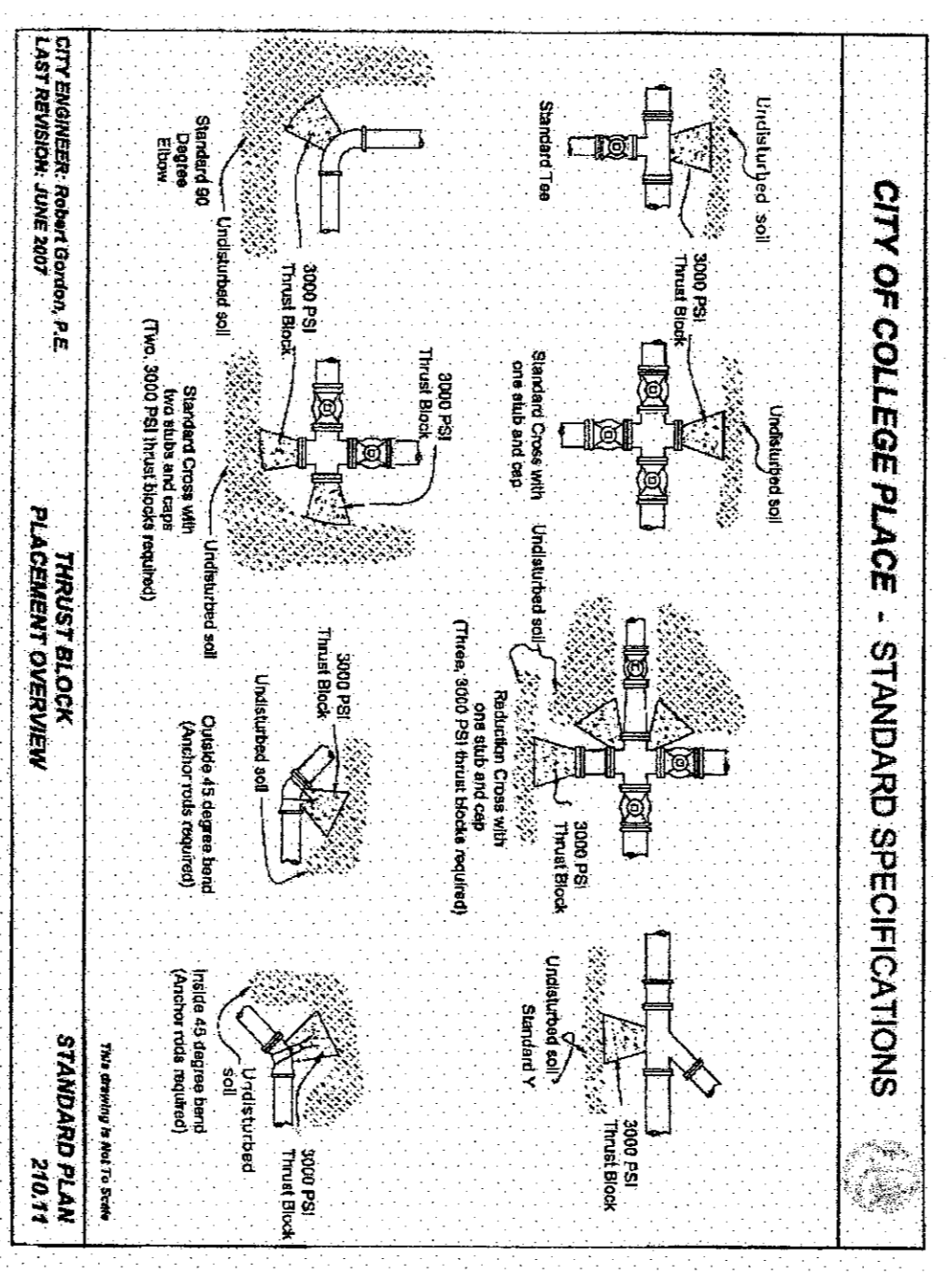
TABLE NO. 3
PIPE THRUST FORCE ON LAMBDA, POUNDS

PIPE DIA.	PIPE WALL THICKNESS	PIPE WEIGHT PER FOOT	PIPE STIFFNESS	PIPE RIGIDITY	PIPE STRENGTH	PIPE MODULUS OF ELASTICITY	PIPE COEFFICIENT OF EXPANSION	PIPE THERMAL EXPANSION
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15"	0.312"	15.0	1.5	1.5	1.5	1.5	1.5	1.5
18"	0.375"	18.0	2.0	2.0	2.0	2.0	2.0	2.0
21"	0.437"	21.0	2.5	2.5	2.5	2.5	2.5	2.5
24"	0.500"	24.0	3.0	3.0	3.0	3.0	3.0	3.0
27"	0.562"	27.0	3.5	3.5	3.5	3.5	3.5	3.5
30"	0.625"	30.0	4.0	4.0	4.0	4.0	4.0	4.0
36"	0.750"	36.0	5.0	5.0	5.0	5.0	5.0	5.0
42"	0.875"	42.0	6.0	6.0	6.0	6.0	6.0	6.0
48"	1.000"	48.0	7.0	7.0	7.0	7.0	7.0	7.0
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114"	2.375"	114.0	18.0	18.0	18.0	18.0	18.0	18.0
120"	2.500"	120.0	19.0	19.0	19.0	19.0	19.0	19.0

NOTE: FOR WATER PRESSURE EMPLOYED FROM THE POLYMER PIPE, THE THRUST FORCE SHALL BE MULTIPLIED BY THE POLYMER PIPE COEFFICIENT OF EXPANSION. SEE STANDARD PLAN 410.10 FOR POLYMER PIPE COEFFICIENT OF EXPANSION.

EXAMPLE: OTHER PRESSURE = 174.0 PSI, MULTIPLY VALUE IN TABLE BY 1.75

CITY ENGINEER: Robert Gordon, P.E.
LAST REVISION: JUNE 2007



CHALLENGE - PROJECT - PHASE 8 - START: JULY 2009 DESIGN STARTED: 2010-01-26 - 01-14-2010

DATE: 01-25-10
DRAWN BY: AIB
DWS: NO. 061-0114

PHASE FIVE DEVELOPMENT, LLC
VILLAGES AT GARRISON CREEK PHASE VIII
CITY OF COLLEGE PLACE DETAILS

SHEET 11 OF 11
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