MINNESOTA DEPARTMENT OF TRANSPORTATION
CROW WING COUNTY

MINN. PROJ. NO. ES 10ES (075)

CONSTRUCTION PLAN FOR

GRADING, AGGREGATE BASE, BITUMINOUS BASE & SURFACING, CONCRETE CURB AND GUTTER, STORM SEWER AND PAVEMENT MARKINGS.

S.P. NO. 18-620-11

LOCATED ON C.S.A.H. 20 BETWEEN NORTH AHRENS HILL DRIVE AND C.S.A.H. 49 (WISE ROAD) (GEOGRAPHIC DESCRIPTION)

FROM APPROX. 740 FT. NORTH AND 440 FT. EAST OF THE S.E. COR. OF SEC. 27, TWP.134N, R28W TO APPROX. 640 FT. EAST OF THE N.E. COR. OF SEC. 27, TWP.134N, R28W (LEGAL DESCRIPTION)

STATE PROJ. NO. 18-620-11

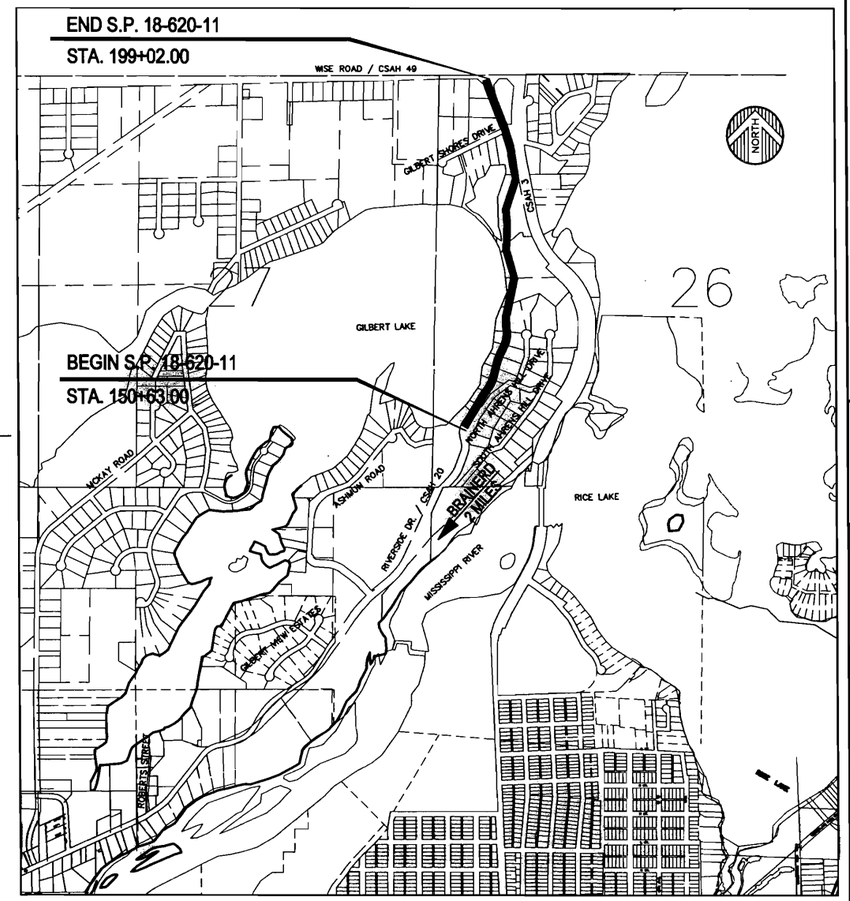
GROSS LENGTH	4839	FT.	0.916	MILES
BRIDGES-LENGTH	0	FT.	0	MILES
EXCEPTIONS-LENGTH	0	FT.	0	MILES
NET LENGTH	4839	FT.	0.916	MILES

DESIGN DESIGNATION
S.P. 18-620-11
URBAN DESIGN

ADT (Current Year)	2009	=	1687
ADT (Future Year)	2029	=	2868
DHV (Design Hr. Vol.)		=	NA
D (Directional Distr.)		=	NA %
T (Heavy Commercial)		=	5.9 %

ESALS	270,000	Design Speed	30	MPH	
R Value	70 (From Geotechnical Report)	Based on	STOPPING	Sight Distance	
Functional Classification	Major Collector	Height of eye	3.5 ft.	Height of object	2.0 ft.
No. of Traffic Lanes	2	Design Speed not achieved at:	N/A		
No. of Parking Lanes	0	G.E. Required		G.E. Provided	
Shoulder Width	2 ft.	Min. Bit. = 7.0"		7.88"	
Project HCADT	5.9%	Min. Base = 4.5"		5.00"	
Project Soil Factor	NA	Total = 11.5"		12.88"	

10 Ton Design



INDEX

SHEET	DESCRIPTION
1	TITLE SHEET
2	CHARTS AND STANDARD PLATES
3	STATEMENT OF ESTIMATED QUANTITIES
4	TYPICAL ROADWAY SECTIONS
5-6	MISCELLANEOUS ROADWAY DETAILS
7-12	TABULATED QUANTITIES
13	STORM SEWER SCHEDULE
14	STORM SEWER LATERAL PROFILES
15-17	ALIGNMENT PLAN AND TABULATION
18	TRAFFIC CONTROL PLAN
19-22	CONSTRUCTION PHASING PLAN
23-24	EROSION CONTROL PLAN
25-26	EROSION CONTROL DETAILS
27-30	REMOVAL PLAN AND PROFILE
31-33	STORMWATER POLLUTION PREVENTION PLAN
34-37	CONSTRUCTION PLAN AND PROFILE
38-41	REINFORCED SOIL SLOPE PROFILE
42	REINFORCED SOIL SLOPE TABULATION
43-44	REINFORCED SOIL SLOPE DETAILS
45-48	PAVEMENT MARKING PLAN
49	TYPICAL PAVEMENT MARKING DETAILS
50-58	STAIR PLANS
59-60	STAIR DETAILS
61-93	CROSS SECTIONS

THIS PLAN CONTAINS 93 SHEETS

GOVERNING SPECIFICATIONS
THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATION FOR CONSTRUCTION" SHALL GOVERN.

I hereby certify that Sheets 38-44 were prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: Stephan M. Gale Typed or Printed Name: STEPHAN M. GALE
Date 12/1/09 License No. 13854

I hereby certify that Sheets 50-60 were prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: Mark V. Hallan Typed or Printed Name: MARK V. HALLAN
Date 12/2/09 License No. 24997

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: Timothy M. Houle Typed or Printed Name: TIMOTHY M. HOULE
Date 12/1/09 License No. 25132

Approved: Crow Wing County Engineer Date: 12/2/09

District State Aid Engineer: Reviewed for Compliance with State-Aid Rules/Policy Date: 12/4/09

Approved for State Aid & Federal Aid Funding: State Aid Engineer Date: 1/15/10

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PLAN SYMBOLS

MONUMENT (STONE, CONCRETE OR METAL)
IRON PIPE OR ROD
CROSSING GATE
ELECTRIC WARNING SIGN
RAILROAD CROSSING BELL
RAILROAD CROSSING SIGN
HEDGE
STONEWALL OR FENCE
CULVERT
RAILROAD R/W
RAILROAD
CORPORATE OR CITY LIMITS
LOT LINE
R/W LINE
2+00 CENTERLINE
EXISTING SANITARY SEWER OR SERVICE
EXISTING STORM SEWER
EXISTING WATERMAIN OR WATER SERVICE
PROPOSED SANITARY SEWER OR SERVICE
PROPOSED STORM SEWER
PROPOSED WATERMAIN OR WATER SERVICE
G BURIED GAS MAIN
E BURIED ELECTRIC CABLE
T BURIED TELEPHONE CABLE
FO BURIED FIBER OPTIC CABLE
TV BURIED TELEVISION CABLE
OHW OVERHEAD WIRES
SL EXIST. STEAM LINE IN CONDUIT
EXISTING VALVE
PROPOSED VALVE
PROPOSED WATERMAIN TEE
CURB STOP
CATCH BASIN
PROPOSED CATCH BASIN
EXISTING M.H. (STORM OR SANITARY)
PROPOSED M.H. (STORM OR SANITARY)
EXISTING HYDRANT
PROPOSED HYDRANT
STREET LIGHT
POWER POLE W/ANCHOR
STREET SIGN
UTILITY PEDESTAL
TREE
SHRUB OR SAPLING
MARSH
CONCRETE SURFACE
101 HOUSE W/HOUSE NUMBER

BENCHMARKS

B.M. 5- C.G. PIN IN RAILROAD TIE
WEST GATE POST
NORTH OF ASHMUN ROAD AT DAM ACCESS ROAD
APPROX. STA. 128+00
ELEVATION 1239.95

B.M. 6- C.G. PIN IN 18" WHITE PINE-
S. SIDE C.S.A.H.20 &
S. SIDE OF NORTH AHRENS HILL DRIVE
ELEVATION 1255.33

B.M. 7- C.G. PIN IN 20" OAK
S. SIDE C.S.A.H.20 - STA. 163+83 RT
ELEVATION 1241.34

B.M. 8- R.R. SPIKE IN POWER POLE
N. SIDE C.S.A.H.49 & W. OF CL C.S.A.H.20
ELEVATION 1219.38

SCALES - FULL SIZE		SCALES - HALF SIZE	
PLAN & PROFILE (ROADWAY)	50' HOR. 10' VERT.	PLAN & PROFILE (ROADWAY)	100' HOR. 20' VERT.
PROFILE (RSS)	20' HOR. 10' VERT.	PROFILE (RSS)	40' HOR. 20' VERT.
CROSS SECTIONS	10' HOR. 10' VERT.	CROSS SECTIONS	20' HOR. 20' VERT.
INDEX MAP	NONE	INDEX MAP	NONE

PROJECT LOCATION
COUNTY : CROW WING
DISTRICT : 3

COUNTY PROJ. NO. S.P. 18-620-11

TITLE SHEET
S.P. NO. 18-620-11 SHEET NO. 1 OF 93 SHEETS

ENGINEERS ARCHITECTS LAND SURVEYORS ENVIRONMENTAL SERVICES
ALEXANDRIA, MN BRAINERD, MN DETROIT LAKES, MN GRAND FORKS, ND INTERNATIONAL FALLS, MN ROCHESTER, MN ROSEAU, MN
WWW.WSNINC.COM
WIDSETH SMITH NOLTING

REVISIONS DESCRIPTION | BY | REW | DATE

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
TIMOTHY M. HOULE DATE: LIC. NO. 25132

DATE: NOV. 2008
SCALE: AS SHOWN
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-TS-TITLE.dwg, 12/1/2009 4:19:09 PM, shayne.johnson

APPLICABLE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD PLATES

THE FOLLOWING STANDARD PLATES AS APPROVED BY FHWA SHALL APPLY TO THIS PROJECT

PLATE NO.	DESCRIPTION
3000L	REINFORCED CONCRETE PIPE
3006G	GASKET JOINT FOR R.C. PIPE
3022C	PRECAST CONCRETE SAFETY APRON (DESIGN OPT. 2)
3040F	CORRUGATED METAL PIPE CULVERT
3100G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE
3124B	METAL APRON CONNECTION
3128H	METAL SAFETY APRON & GRATE
3133C	RIPRAP AT RCP OUTLETS
3145F	CONCRETE PIPE TIES
3221C	CORRUGATED STEEL PIPE COUPLING BAND
4000J	MANHOLE OR CATCH BASIN - DESIGN A
4002F	MANHOLE OR CATCH BASIN - DESIGN C
4005L	MANHOLE OR CATCH BASIN - DESIGN F
4006L	MANHOLE OR CATCH BASIN - DESIGN G & H
4011E	PRECAST CONCRETE BASE
4020J	MANHOLE OR CATCH BASIN COVER - 2 SHEETS
4026A	CONCRETE ENCASED CONCRETE ADJUSTING RINGS
4101D	RING CASTING FOR MANHOLE OR CATCH BASIN (700-7)
4110F	COVER CASTING FOR MANHOLE (716)
4129G	CATCH BASIN FRAME CASTING
4160D	CURB BOX CASTING FOR CATCH BASIN (823A)
4180J	MANHOLE OR CATCH BASIN STEP
7100H	CONCRETE CURB AND GUTTER (B624)
7102I	CONCRETE CURB AND GUTTER (S524)
7111J	INSTALLATION OF CATCH BASIN CASTINGS (CONCRETE CURB & GUTTER)
8000I	STANDARD BARRICADES
8329H	ECCENTRIC LOADER BREAKAWAY CABLE TERMINAL
8338C	W-BEAM GUARDRAIL & END ANCHORAGES
9000D	APPROACHES AND ENTRANCES
9102D	TURF ESTABLISHMENT AREAS (AT PIPE CULVERT ENDS)
9350A	MAILBOX SUPPORT

BASIS OF ESTIMATED QUANTITIES

BITUMINOUS WEARING COURSE	- 115 LBS./SQ.YD./INCH THICKNESS
BITUMINOUS BASE COURSE	- 115 LBS./SQ.YD./INCH THICKNESS
AGGREGATE BASE CLASS 5	- 110 LBS./SQ. YD./INCH THICKNESS
BITUMINOUS MATERIAL FOR TACK COAT	- 0.05 GALLONS/SQ.YD.
TEMPORARY SEED MIXTURE 100	- 100 LBS./ACRE
SEED MIXTURE SPECIAL	- 120 LBS./ACRE
FERTILIZER TYPE 2 (23-0-30)	- 350 LBS./ACRE
MULCH MATERIAL TYPE 1	- 2 TONS/ACRE
MULCH MATERIAL TYPE 4	- 1.5 TONS/AC (TYPE 1) AND 750 LBS/AC (TYPE 5)

EROSION CONTROL NOTES:

1. EROSION CONTROL MEASURES, BOTH TEMPORARY AND PERMANENT SHALL BE COMPLETED AS GRADING OPERATIONS PROGRESS.
2. SILT FENCE SHALL BE ERECTED AS DIRECTED BY THE ENGINEER.
3. REFER TO EROSION CONTROL PLANS, DETAILS AND SWPPP FOR ADDITIONAL EROSION AND SEDIMENT CONTROL REQUIREMENTS.

CONSTRUCTION NOTES:

1. GOVERNING SPECIFICATIONS - SEE TITLE SHEET
2. THE LOCATION OF UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY UTILITY LOCATIONS AND DEPTHS AS REQUIRED DURING CONSTRUCTION. EXCAVATION TO LOCATE EXISTING UNDERGROUND UTILITIES SHALL BE INCIDENTAL.
3. THE CONTRACTOR SHALL NOTIFY THE UTILITY OWNERS AT LEAST 48 HOURS BEFORE BEGINNING CONSTRUCTION.
4. TOPSOIL, SEED, MULCH AND FERTILIZER QUANTITIES WILL VARY DEPENDING UPON CONSTRUCTION DISTURBANCE, OUTSIDE OF THE REINFORCED SOIL SLOPE WALL..
5. CONTRACTOR TO MINIMIZE DISTURBANCE THROUGHOUT PROJECT TO WITHIN EXISTING RIGHT OF WAY . USE OF TRENCH BOXES OR OTHER METHODS MAY BE REQUIRED.
6. MULCH MATERIAL TYPE 4 (HYDRO-SPRAY) IS INTENDED TO BE APPLIED TO THE ENTIRE EXPOSED FACE OF THE REINFORCED SOIL SLOPE WALL, ONLY IF SEED AND PREMIUM TOPSOIL BLEND WITHIN THE RSS DOES NOT BECOME ESTABLISHED WITHIN 6 MONTHS AFTER THE REINFORCED SOIL SLOPE WALL COMPLETION. SEE SPECIFICATIONS.

UTILITY OWNERS:

ELECTRICAL -
- CROW WING COOP 218-568-4744

COMMUNICATIONS-
- CHARTER COMMUNICATIONS 218-821-7672
- QWEST COMMUNICATIONS 800-283-4237

GAS -
- CENTERPOINT ENERGY 800-722-9326
- XCEL ENERGY 608-223-2014

SEWER & WATER-
- BRAINERD WATER & LIGHT 218-829-2193

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

PROJECT UTILITY LOCATE SUMMARY

ENTITY / UTILITY	MARCH 28, 2005 DESIGN LOCATE GSOC TICKET NUMBERS 50049753	AUGUST 21, 2006 DESIGN LOCATE GSOC TICKET NUMBERS 60509071	NOVEMBER 16, 2009 DESIGN LOCATE GSOC TICKET NUMBERS 90604385		
BRAINERD WATER AND LIGHT	NOT INCLUDED				
CHARTER COMMUNICATIONS	A				
CROW WING COOP	A		A		
CENTER POINT ENERGY	NOT INCLUDED	NOT INCLUDED	D		
ENTITY / UTILITY	NOT INCLUDED				
QWEST	A				
XCEL ENERGY	B				

A - Provided NTS (not to scale) maps with general layouts.
B - Provided field locate markings.
C - Provided 11x17 detailed drawings of utilities work completed in Project Area.
D - Utilities are clear of project areas.

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CHARTS AND STANDARD PLATES

S.P. NO. 18-620-11 SHEET NO. 2 OF 93 SHEETS

ENGINEERS ALEXANDRIA, MN BRAINERD, MN DETROIT LAKES, MN
ARCHITECTS BRAINERD, MN DULUTH, MN GRAND FORKS, ND
LAND SURVEYORS DETROIT LAKES, MN RED WING, MN ROCHESTER, MN
ENVIRONMENTAL SERVICES ROCHESTER, MN SIOUX FALLS, SD
WWW.WSNLLC.COM
WIDSETH SMITH NOLTING

REVISIONS DESCRIPTION	BY	DATE	REV#

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Timothy M. Houle 11/25/09
TIMOTHY M. HOULE DATE: LIC. NO. 25132

DATE: NOV. 2009
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-EQ-RIVERSIDE-AHRENS TO WISE.dwg, 11/24/2009 2:19:16 PM, shayne.johnson

STATEMENT OF ESTIMATED QUANTITIES

ITEM NO.	SHEET NO.	CHART LETTER	REMARKS	SPEC. NO.	ITEM DESCRIPTION	UNIT	S.P. 18-620-11 STORM SEWER	S.P. 18-620-11 ROADWAY	PROJECT TOTAL
1				2021.501	MOBILIZATION	LUMP SUM	0.13	0.87	1.00
2			1	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
3			2	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
4			3	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
5			4	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
6			5	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
7			6	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
8			7	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
9			8	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
10			9	2100.601	CONSTRUCT STAIRWAY	LUMP SUM		1	1
11	7	A		2101.501	CLEARING	ACRE		0.83	0.83
12				2101.502	CLEARING	TREE		20	20
13	7	B		2101.506	GRUBBING	ACRE		0.83	0.83
14				2101.507	GRUBBING	TREE		20	20
15	7	C		2104.501	REMOVE METAL CULVERT	LIN FT		257	257
16	7	D		2104.505	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	SQ YD		99	99
17	7	E		2104.505	REMOVE BITUMINOUS PAVEMENT	SQ YD		15,482	15,482
18				2104.509	REMOVE / SALVAGE EXISTING STAIRS	EACH		80	80
19	11	G		2104.513	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LIN FT		303	303
20				2104.523	SALVAGE & INSTALL 12" C.M. PIPE APRON	EACH		2	2
21	7-10	F		2105.501	COMMON EXCAVATION (P)	CU YD		19,471	19,471
22	7-10	F	10	2105.521	GRANULAR BORROW (P)	CU YD		4,637	4,637
23			11	2105.604	GEOCELL	SQ YD		3,500	3,500
24			10	2105.607	PREMIUM TOPSOIL BORROW	CU YD		740	740
25				2123.610	STREET SWEEPER (WITH PICKUP BROOM)	HOUR		20	20
26	11	H		2211.501	AGGREGATE BASE CLASS 5	TON		5,104	5,104
27	11	I		2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GALLON		713	713
28	11	J,K		2360.501	TYPE SP 12.5 WEARING COURSE MIXTURE (2,C)	TON		2,894	2,894
29	42		12	2411.604	REINFORCED EARTH WALL (R.S.S. WALL)	SQ YD		2,854	2,854
30	11	L	13	2452.510	STEEL H-PILE DRIVEN 10"	LIN FT		475	475
31	11	M		2501.511	18" RC PIPE CULVERT	LIN FT		54	54
32	13	N		2501.567	33" RC SAFETY APRON & GRATE DES 3128	EACH	1		1
33	11	M		2501.569	18" RC SAFETY APRON	EACH		2	2
34				2501.603	12" CM PIPE CULVERT	LIN FT		8	8
35	13	N		2503.511	12" RC PIPE SEWER DES 3006 CL V	LIN FT	1,239		1,239
36	13	N		2503.511	18" RC PIPE SEWER DES 3006 CL III	LIN FT	813		813
37	13	N		2503.511	21" RC PIPE SEWER DES 3006 CL III	LIN FT	1,035		1,035
38	13	N		2503.511	24" RC PIPE SEWER DES 3006 CL III	LIN FT	935		935
39	13	N		2503.511	33" RC PIPE SEWER DES 3006 CL III	LIN FT	77		77
40	13	N		2506.501	CONSTRUCT DRAINAGE STRUCTURE DESIGN A OR F	LIN FT	173.31		173.31
41	13	N		2506.501	CONSTRUCT DRAINAGE STRUCTURE DESIGN C OR G	LIN FT	121.14		121.14
42	13	N		2506.501	CONSTRUCT DRAINAGE STRUCTURE DESIGN H	LIN FT	2.50		2.50
43	13	N		2506.501	CONSTRUCT DRAINAGE STRUCTURE DESIGN 60-4020	LIN FT	8.78		8.78
44	13	N		2506.501	CONSTRUCT DRAINAGE STRUCTURE DESIGN 72-4020	LIN FT	7.19		7.19
45	13	O	14	2506.516	CASTING ASSEMBLY	EACH	54		54
46				2506.522	ADJUST FRAME AND RING CASTING	EACH	1		1
47		N		2506.602	CONNECT TO EXISTING DRAINAGE STRUCTURE	EACH	1		1
48	11	P		2511.501	RANDOM RIPRAP CLASS III	CU YD	25.6		25.6
49	11	Q		2511.515	GEOTEXTILE FILTER TYPE IV	SQ YD	66		66
50	11	R		2531.501	CONCRETE CURB & GUTTER DESIGN B624	LIN FT		3,259	3,259
51	11	S		2531.501	CONCRETE CURB & GUTTER DESIGN S524	LIN FT		6,552	6,552
52				2540.602	MAIL BOX SUPPORT	EACH		2	2
53				2540.602	TEMPORARY MAILBOX SUPPORTS	EACH		2	2
54	11	T		2554.501	TRAFFIC BARRIER DESIGN B8338	LIN FT		3,206	3,206
55	11	U		2554.523	END TREATMENT-ENERGY ABSORBING TERMINAL	EACH		22	22
56				2563.601	TRAFFIC CONTROL	LUMP SUM	0.13	0.87	1.00

STATEMENT OF ESTIMATED QUANTITIES

ITEM NO.	SHEET NO.	CHART LETTER	REMARKS	SPEC. NO.	ITEM DESCRIPTION	UNIT	S.P. 18-620-11 STORM SEWER	S.P. 18-620-11 ROADWAY	PROJECT TOTAL
57			15	2571.501	CONIFEROUS TREE 12" HT SEEDLING	TREE		500	500
58			15	2571.501	CONIFEROUS TREE 4' HT B&B	TREE		100	100
59	11	V		2573.502	SILT FENCE, TYPE HEAVY DUTY	LIN FT		3,240	3,240
60	11	W		2573.502	SILT FENCE, TYPE MACHINE SLICED	LIN FT		165	165
61				2573.530	STORM DRAIN INLET PROTECTION	EACH	31		31
62	11	X		2573.540	FILTER LOG TYPE WOOD FIBER BIOROLL	LIN FT		80	80
63				2573.550	EROSION CONTROL SUPERVISOR	LUMP SUM	0.13	0.87	1.00
64				2573.602	TEMPORARY ROCK CONSTRUCTION ENTRANCE	EACH		2	2
65	11	Y		2573.602	CULVERT PROTECTION	EACH		6	6
66	12	Z		2575.501	SEEDING	ACRE		1.29	1.29
67	12	AA		2575.502	SEED MIXTURE 100	POUND		130	130
68	12	BB		2575.511	MULCH MATERIAL TYPE 1	TON		5.20	5.20
69	12	CC	16	2575.511	MULCH MATERIAL TYPE 4	TON		1	1
70	12	DD	17	2575.523	EROSION CONTROL BLANKETS CATEGORY 1	SQ YD		1,144	1,144
71			18	2575.523	EROSION CONTROL BLANKETS CATEGORY 3	SQ YD		1,000	1,000
72	12	EE		2575.525	EROSION STABILIZATION MAT CLASS 3	SQ YD		2	2
73	12	FF		2575.532	FERTILIZER TYPE 2	POUND		910	910
74	12	GG		2575.608	SEED MIXTURE SPECIAL	POUND		155	155
75	12	HH		2580.603	INTERIM PAVEMENT MARKING	LIN FT		4,706	4,706
76	12	II		2582.501	PAVEMENT MESSAGE (LEFT ARROW) PAINT	EACH		2	2
77	12	JJ		2582.501	PAVEMENT MESSAGE (RIGHT ARROW) PAINT	EACH		2	2
78	12	KK		2582.502	4" SOLID LINE WHITE - PAINT	LIN FT		9,668	9,668
79	12	LL		2582.502	24" SOLID LINE WHITE - PAINT	LIN FT		59	59
80	12	MM		2582.502	24" STOP LINE WHITE - PAINT	LIN FT		49	49
81	12	NN		2582.502	4" DOUBLE SOLID LINE YELLOW - PAINT	LIN FT		4,706	4,706

NOTES
(P) PLANNED QUANTITY (CV) COMPACTED VOLUME (LV) LOOSE VOLUME

REMARKS
1. STATION 153+62.33
2. STATION 156+09.66
3. STATION 158+33
4. STATION 161+07.68
5. STATION 162+62
6. STATION 165+05
7. STATION 168+82.67
8. STATION 174+01.12
9. STATION 178+18.43
10. ROADWAY ONLY - RSS SELECT GRANULAR FILL AND TOPSOIL IS NOT INCLUDED.
11. REFERRED TO AS CELLULAR CONFINEMENT CELLS WITHIN THE SPECIFICATIONS.
12. (R.S.S.) REINFORCED SOIL SLOPE RETAINING WALL
13. STEEL 10" H-PILE AND TIMBERS/PLATING SHALL BE TEMPORARY AND REMOVED COMPLETELY AFTER STORM SEWER CONSTRUCTION IS COMPLETE.
14. INSTALLATION INCLUDED
15. TREES ARE TO BE PLANTED AT LOCATIONS AT THE FOOT OF THE RSS AND STAIRS AS SELECTED BY THE ENGINEER IN THE FIELD.
16. MULCH MATERIAL TYPE 4 IS TO BE APPLIED TO ENTIRE FACE OF THE RSS ONLY IF SEED MIX WITHIN RSS FACE WRAP DOES NOT BECOME ESTABLISHED WITHIN 6 MONTHS AFTER RSS COMPLETION.
17. CATEGORY 1 - STRAW RD 1S.
18. CATEGORY 3 - STRAW 2S. - USED BELOW RSS

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STATEMENT OF ESTIMATED QUANTITIES
S.P. NO. 18-620-11 SHEET NO. 3 OF 93 SHEETS

ENGINEERS ALEXANDRIA, MN BRAINERD, MN DETROIT LAKES, MN
ARCHITECTS BRAINERD, MN CROOKSTON, MN
LAND SURVEYORS GRAND FORKS, ND WILLMAR, MN
ENVIRONMENTAL SERVICES ROCHESTER, MN BOUK FALLS, SD
www.wsn.us.com
WIDSETH SMITH NOLTING

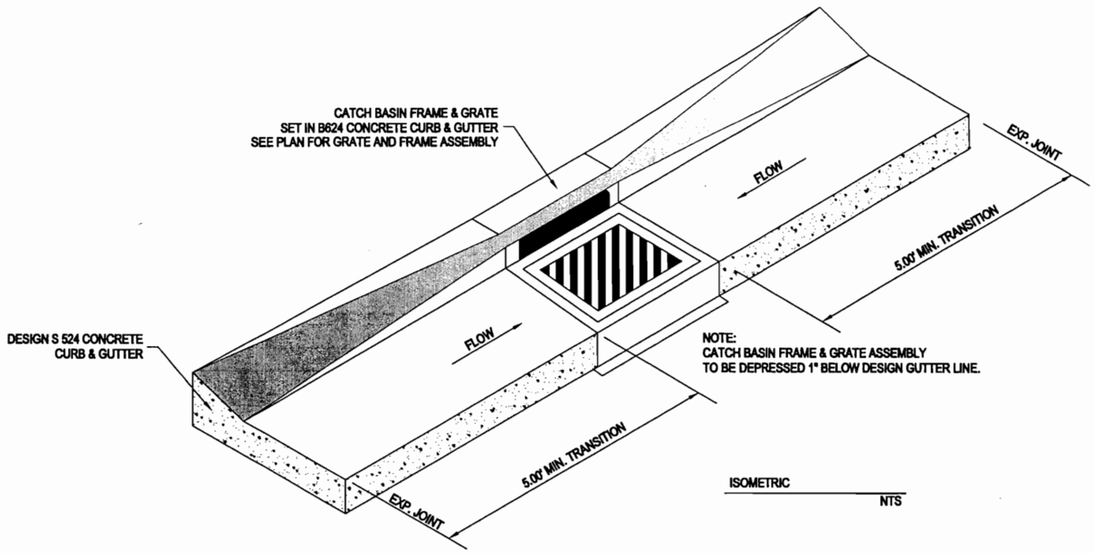
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
Timothy M. Hole 1/15/2010
TIMOTHY M. HOLE DATE LIC. NO. 23133

DATE	REV#	REVISIONS DESCRIPTION	BY
1-11-2010		PIPE LGTHS.-ITEM 37 & ITEM 38	BWJ

DATE: NOV. 2008
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

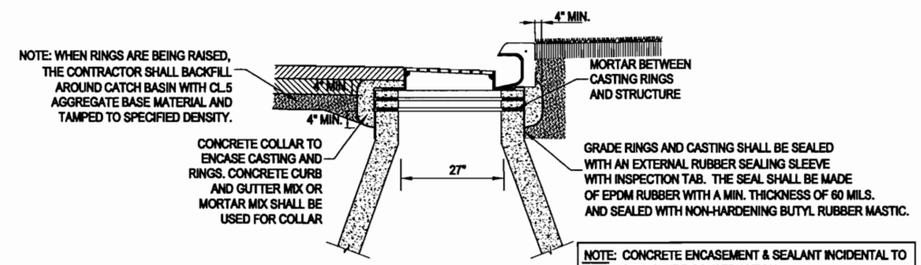
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\010880029-CSAH 20\010880029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-EQ-RIVERSIDE-AHRENS TO WISE.dwg, 1/15/2010 3:24:38 PM, Shayne.Johnson



ISOMETRIC

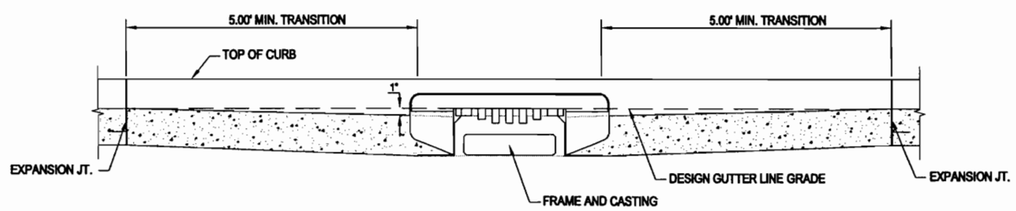
NTS



NOTE: CONCRETE ENCASEMENT & SEALANT INCIDENTAL TO STRUCTURE CONSTRUCTION.

CONCRETE & SEALANT DETAIL

SANITARY AND STORM SEWER MANHOLES &
STORM SEWER DRAINAGE STRUCTURES



ELEVATION

NTS

MISCELLANEOUS ROADWAY DETAILS

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S.P. NO. 18-620-11 SHEET NO. 6 OF 93 SHEETS

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS

NORTH AHRENS HILL TO C.S.A.H. 49

CROW WING COUNTY

DATE: NOV. 2008
SCALE: NONE
DRAWN BY: P.M.B.
CHECKED BY: T.M.K.
JOB NUMBER: 108B029.001

DATE	REV#	REVISIONS DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

TIMOTHY M. KOLLE DATE: 11/25/09 LIC. NO. 25132

WIDSETH SMITH NOLTING

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ENGINEERS
ARCHITECTS
LAND SURVEYORS
ENVIRONMENTAL SERVICES

ALEXANDRIA, MN
BEMIDJI, MN
BRAINERD, MN
DETROIT LAKES, MN
GRAND FORKS, ND
RED WING, MN
ROCHESTER, MN
SIOUX FALLS, SD

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\civil\C-DT-DETAIL SHEETS.dwg, 11/23/2009

CLEARING
SPEC NO. 2101.501 — A

STATION	TO	STATION	LOCATION	QUANTITY
			CSAH 20	ACRE
152+00		170+00	LT	0.42
164+65		165+07	RT	0.05
171+17		171+75	RT	0.05
171+27		173+76	LT	0.05
172+25		172+90	RT	0.05
174+90		181+58	RT	0.08
175+50		178+50	LT	0.04
181+74		183+49	RT	0.04
182+21		182+72	LT	0.05
			TOTAL	0.83

GRUBBING
SPEC NO. 2101.506 — B

STATION	TO	STATION	LOCATION	QUANTITY
			CSAH 20	ACRE
152+00		170+00	LT	0.42
164+65		165+07	RT	0.05
171+17		171+75	RT	0.05
171+27		173+76	LT	0.05
172+25		172+90	RT	0.05
174+90		181+58	RT	0.08
175+50		178+50	LT	0.04
181+74		183+49	RT	0.04
182+21		182+72	LT	0.05
			TOTAL	0.83

REMOVE METAL CULVERT
SPEC NO. 2104.501 — C

STATION	LOCATION	SIZE	QUANTITY
			LIN FT
152+34	CL - CSAH 20	15"	64
157+64	10' LT-CSAH 20	12"	33
157+97	CL - CSAH 20	15"	24
163+77	12' LT-CSAH 20	12"	25
164+95	CL - CSAH 20	12"	25
181+40	CL - CSAH 20	15"	51
196+41	36' RT	18"	35
		TOTAL	257

REMOVE BITUMINOUS DRIVEWAY PAVEMENT
SPEC NO. 2104.505 — D

STATION	LOCATION		QUANTITY
		SQ FT	SQ YD
173+05	DRIVEWAY RT	405	45
195+10	DRIVEWAY LT	485	54
		TOTAL	99

REMOVE BITUMINOUS PAVEMENT
SPEC NO. 2104.505 — E

STATION	LOCATION		QUANTITY
		SQ FT	SQ YD
151+47 - 191+30	LT & RT	102326	11370
191+30 - 199+12	LT & RT	37015	4113
		TOTAL	15482

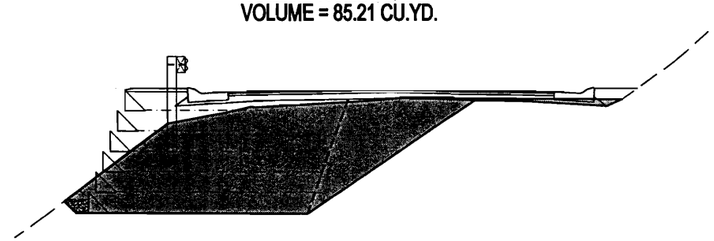
PHASE 1 - EARTHWORK VOLUMES — F

STATION	AREA (FT²)					VOLUME (YD³)					VOLUME BALANCE(YD³)	
	COMMON EXCAVATION	BIT. REMOVAL	GRAN. BORROW	FILL	TOPSOIL	COMMON EXCAVATION	BIT. REMOVAL	GRAN. BORROW	FILL	TOPSOIL	EXCESS	TOTAL CUMULATIVE
17000	200.00	5	54.76	245.25	3.00	0.00	0.00	0.00	0.00	0.00	0	0
17025	212.94	5	61.18	263.22	3.14	191.18	4.63	53.68	235.40	2.84	(119)	(119)
17050	176.47	5	50.21	233.37	2.72	180.28	4.63	51.57	229.90	2.71	(123)	(243)
17075	221.29	5	71.35	293.48	2.78	184.15	4.63	56.28	243.91	2.55	(138)	(380)
17100	194.77	5	60.29	261.96	2.72	192.62	4.63	60.94	257.15	2.55	(146)	(527)
17125	209.26	5	65.12	279.69	3.99	187.05	4.63	58.06	250.76	3.11	(144)	(670)
17150	178.23	5	54.87	250.31	3.75	179.39	4.63	55.55	245.37	3.58	(144)	(814)
17175	197.25	5	60.39	267.28	4.20	173.83	4.63	53.36	239.63	3.68	(142)	(957)
17200	178	5	44.53	243	5	173.73	4.63	48.57	236.24	4.26	(138)	(1095)
17225	208	5	54.79	269	6	178.70	4.63	45.98	237.04	5.09	(134)	(1229)
17250	198	5	51.44	250	6	187.96	4.63	49.18	240.28	5.56	(129)	(1358)
17275	242	5	65.13	292	6	203.70	4.63	53.97	250.93	5.56	(127)	(1485)
17300	263	5	62.59	272	5	233.80	4.63	59.13	261.11	5.09	(110)	(1595)
17308.26	288	5	62.53	272	6	84.28	1.53	19.14	83.21	1.68	(25)	(1621)
17325	249	5	45.48	224	6	166.47	3.10	33.48	153.76	3.72	(37)	(1657)
17350	151	5	20.94	93	5	185.19	4.63	30.75	146.76	5.09	(10)	(1667)
17366.13	147	5	12.43	69	4	89.01	2.99	9.97	48.39	2.69	23	(1644)
17400	109	5	2.50	28	5	160.57	6.27	9.36	60.84	5.64	75	(1569)
17421.33	87	5	3.20	32	4	77.42	3.95	2.25	23.70	3.56	43	(1526)
17425	84	5	3.30	32	4	11.62	0.68	0.44	4.35	0.54	5	(1521)
17450	54	5	3.73	35	5	63.89	4.63	3.25	31.02	4.17	19	(1502)
17475	33	5	3.45	41	5	40.28	4.63	3.32	35.19	4.63	(10)	(1512)
17500	27	5	26.67	58	5	27.78	4.63	13.94	45.83	4.63	(36)	(1549)
17525	31	5	34.30	80	3	26.85	4.63	28.23	63.89	3.70	(61)	(1610)
17550	105	5	34.63	159	4	62.96	4.63	31.91	110.65	3.24	(86)	(1695)
17575	152	5	52.23	232	4	118.98	4.63	40.21	181.02	3.70	(121)	(1816)
17600	207	5	72.62	294	4	166.20	4.63	57.80	243.52	3.70	(155)	(1971)
17603.38	202	5	70.80	291	4	25.60	0.63	8.98	36.62	0.50	(23)	(1994)
17650	161	5	51.73	238	4	313.39	8.63	105.78	456.70	6.91	(289)	(2283)
17700	141	5	34.82	187	4	279.63	9.26	80.14	393.52	7.41	(241)	(2524)
17750	82	5	19.34	96	6	206.48	9.26	50.15	262.04	9.26	(143)	(2667)
17800	79	5	26.53	98	8	149.07	9.26	42.47	179.63	12.96	(94)	(2761)
17807.89	79	5	16.64	98	8	23.09	1.46	6.31	28.64	2.34	(16)	(2777)
17825	62	5	15.19	79	7	44.68	3.17	10.09	56.08	4.75	(31)	(2808)
17850	78	5	25.84	110	7	64.81	4.63	19.00	87.50	6.48	(54)	(2861)
17875	59	5	34.57	105	5	63.43	4.63	27.97	99.54	5.56	(71)	(2932)
17900	55	5	29.81	99	4	52.78	4.63	29.81	94.44	4.17	(75)	(3007)
17916.48	55	5	32.38	99	4	33.57	3.05	18.98	60.43	2.44	(48)	(3055)
17925	57	5	35.73	109	4	17.67	1.58	10.75	32.82	1.26	(27)	(3081)
17940.48	40	5	28.60	86	4	27.81	2.87	18.44	55.90	2.29	(48)	(3129)
17950	47	5	28.73	92	5	15.34	1.76	10.11	31.38	1.59	(27)	(3156)
17956.03	47	5	28.77	92	5	10.50	1.12	6.42	20.55	1.12	(17)	(3174)
17956.48	47	5	28.88	92	5	0.78	0.08	0.48	1.53	0.08	(1)	(3175)
17964.48	47	5	24.81	92	5	13.93	1.48	7.95	27.26	1.48	(23)	(3198)
17975	39	5	23.88	66	5	16.75	1.95	9.49	30.78	1.95	(25)	(3223)
18000	53	5	34.14	79		42.59	4.63	26.86	67.13	2.31	(49)	(3272)
18025	30	5	34.86	78	6	38.43	4.63	31.94	72.69	2.78	(61)	(3333)
18050	41	5	33.19	73	6	32.87	4.63	31.50	69.91	5.56	(63)	(3396)
18075	44	5	33.37	91	7	39.35	4.63	30.81	75.93	6.02	(64)	(3460)
18100	49	5	29.23	88	6	43.06	4.63	28.98	82.87	6.02	(69)	(3529)
18125	74	5	23.04	93	7	56.94	4.63	24.20	83.80	6.02	(57)	(3586)
18142.35	38	5	65.55	124	10	35.99	3.21	28.46	69.72	5.46	(58)	(3644)
18150	45	5	26.89	81	6	11.76	1.42	13.10	29.04	2.27	(27)	(3671)
18158.35	9	5	0.00	54	7	8.35	1.55	4.16	20.87	2.01	(20)	(3691)
18182.35	9	5	0.00	36	7	8.00	4.44	0.00	40.00	6.22	(48)	(3740)
18200	14.21	5.00	0.00	24.61	6.59	7.59	3.27	0.00	19.81	4.44	(21)	(3761)
						COMMON	BIT	GRAN. BORROW	FILL	TOPSOIL	BALANCE	
PHASE 1 - TOTALS						5,232	222	1,614	6,747	219	(3,761)	

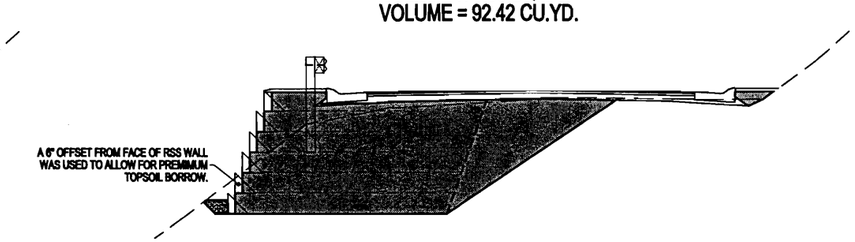
VOLUME BALANCES WERE OBTAINED BY THE FOLLOWING FORMULA: (COMMON VOLUME - BITUMINOUS VOLUME) - (FILL VOLUME x 1.30 SHRINKAGE FACTOR) = EXCESS OR SHORTAGE OF MATERIAL

NOTE: VOLUME NUMBERS IN THE **"VOLUME BALANCE"** COLUMN THAT **HAVE** PARENTHESES ( ) ARE VOLUME **SHORTAGE** NUMBERS.
VOLUME NUMBERS IN THE **"VOLUME BALANCE"** COLUMN THAT **DO NOT HAVE** PARENTHESIS ARE VOLUME **EXCESS** NUMBERS.

QUANTITY EXAMPLE AT STATION 153+50
COMMON EXCAVATION
AREA = 159.22 SQ. FT.
VOLUME = 85.21 CU.YD.



QUANTITY EXAMPLE AT STATION 153+50
FILL AREA
AREA = 174.36 SQ. FT.
VOLUME = 92.42 CU.YD.



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TABULATED QUANTITIES

S.P. NO. 18-620-11 — SHEET NO. 7 OF 93 SHEETS

ENGINEERS ARCHITECTS LAND SURVEYORS ENVIRONMENTAL SERVICES
ALEXANDRIA, MN BRAINERD, MN DETROIT LAKES, MN EVERGREEN, MN GRAND FORKS, ND RED WING, MN ROCHESTER, MN SAUK RAPIDS, MN
WWW.WSNLAB.COM
WIDSETH SMITH NOLTING

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BY: DATE: 1/13/2010
TIMOTHY M. HOULE — LIC. NO. 25132

#	REVISIONS DESCRIPTION	BY	DATE	REV#

DATE: JULY, 2008
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-TABULATED QUANTITIES.dwg, 1/13/2010 4:45:13 PM, Shayne.Johnson

PHASE 2 - EARTHWORK VOLUMES

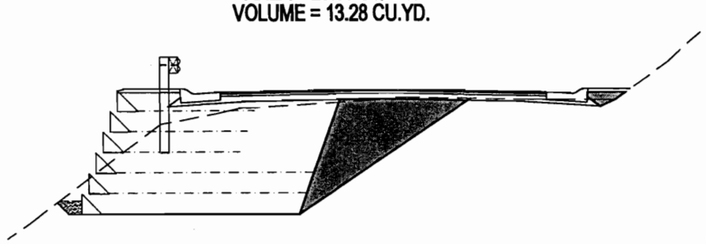
F

STATION	AREA (FT²)					VOLUME (YD³)					VOLUME BALANCE(YD³)	
	COMMON EXCAVATION	BIT. REMOVAL	GRAN. BORROW	FILL	TOPSOIL	COMMON EXCAVATION	BIT. REMOVAL	GRAN. BORROW	FILL	TOPSOIL	EXCESS	TOTAL CUMULATIVE
15750	149.98	5	32.89	199.74	3.78	0.00	0.00	0.00	0.00	0.00	0	0
15775	147.78	5	32.09	196.85	3.96	137.85	4.63	30.08	183.61	3.58	(105)	(105)
15800	148.46	5	32.89	202.22	3.66	137.15	4.63	30.08	184.75	3.53	(108)	(213)
15825	168.08	5	34.91	208.90	3.06	146.55	4.63	31.39	190.33	3.11	(106)	(319)
15850	184.51	5	42.01	224.25	2.87	163.24	4.63	35.61	200.53	2.75	(102)	(421)
15875	215.45	5	43.86	238.51	3.03	185.17	4.63	39.75	214.24	2.73	(98)	(519)
15900	242.21	5	50.69	260.63	4.49	211.88	4.63	43.77	231.08	3.48	(93)	(612)
15925	242.78	5	58.26	282.99	2.72	224.53	4.63	50.44	251.68	3.34	(107)	(719)
15935.19	296.88	5	79.91	343.99	3.22	101.84	1.89	26.07	118.31	1.12	(54)	(773)
15950	288.51	5	85.59	359.98	3.08	160.55	2.74	45.39	193.07	1.73	(93)	(866)
15975	337.39	5	115.79	443.62	4.04	289.77	4.63	93.23	372.04	3.30	(199)	(1065)
16000	303.49	5	106.19	416.64	3.68	296.70	4.63	102.77	398.27	3.57	(226)	(1290)
16025	340.74	5	118.15	446.83	4.67	298.25	4.63	103.86	399.75	3.87	(226)	(1516)
16050	261.34	5	83.73	369.69	4.71	278.74	4.63	93.46	378.02	4.34	(217)	(1734)
16075	292.78	5	94.19	392.48	4.92	256.54	4.63	82.37	352.86	4.46	(207)	(1941)
16100	263.04	5	81.82	355.28	4.50	257.32	4.63	81.49	346.19	4.36	(197)	(2138)
16125	236.31	5	68.87	313.16	4.52	231.18	4.63	69.76	309.46	4.18	(176)	(2314)
16150	236.86	5	69.38	315.94	3.69	219.06	4.63	64.00	291.25	3.80	(164)	(2478)
16175	232.54	5	68.02	311.93	3.01	217.31	4.63	63.61	290.68	3.10	(165)	(2643)
16192.63	229.96	5	67.13	307.08	2.79	151.00	3.26	44.12	202.10	1.89	(115)	(2758)
16200	225.47	5	66.35	304.63	2.71	62.16	1.36	18.22	83.49	0.75	(48)	(2806)
16250	248.00	5	72.74	324.23	2.81	438.40	9.26	128.79	582.28	5.11	(328)	(3134)
16287.26	232.14	5	59.04	286.16	2.68	331.30	6.90	90.93	421.17	3.79	(223)	(3357)
16300	229.93	5	55.11	271.69	2.70	109.01	2.36	26.93	131.61	1.27	(64)	(3421)
16311.26	226.29	5	50.88	258.83	2.94	95.13	2.09	22.10	110.62	1.18	(51)	(3472)
16327.26	172.90	5	31.90	193.59	2.54	118.28	2.96	24.53	134.05	1.62	(59)	(3531)
16335.26	171.57	5	30.14	185.23	2.66	51.03	1.48	9.19	56.12	0.77	(23)	(3554)
16350	70.83	5	14.72	75.79	2.94	66.17	2.73	12.25	71.25	1.53	(29)	(3583)
16375	42.70	5	5.36	40.25	2.70	52.56	4.63	9.30	53.72	2.61	(22)	(3605)
16400	37.86	5	3.67	31.58	2.68	37.30	4.63	4.18	33.25	2.49	(11)	(3616)
16425	52.30	5	6.77	47.52	3.50	41.74	4.63	4.83	36.62	2.86	(10)	(3626)
16450	35.72	5	11.81	48.85	2.83	40.75	4.63	8.60	44.62	2.93	(22)	(3648)
16475	48.72	5	26.66	82.25	4.21	39.09	4.63	17.81	60.69	3.26	(44)	(3693)
16489.25	40.43	5	33.93	91.90	4.76	23.53	2.64	15.99	45.96	2.37	(39)	(3732)
16497.25	75.53	5	35.27	134.62	5.03	17.18	1.48	10.25	33.56	1.45	(28)	(3760)
16500	108.90	5	44.95	167.46	5.52	9.39	0.51	4.09	15.38	0.54	(11)	(3771)
16513.25	96.51	5	45.31	169.38	4.45	50.40	2.45	22.15	82.65	2.45	(59)	(3830)
16537.25	120.82	5	59.86	206.70	3.60	96.59	4.44	46.74	167.15	3.58	(125)	(3955)
16540.77	159.42	5	72.96	244.97	4.14	18.27	0.65	8.66	29.44	0.50	(21)	(3976)
16550	156.34	5	73.08	246.42	3.81	53.97	1.71	24.96	83.99	1.36	(57)	(4033)
16575	142.03	5	56.50	207.14	3.32	138.13	4.63	59.99	209.98	3.30	(139)	(4172)
16600	138.07	5	37.76	164.25	3.26	129.68	4.63	43.64	171.94	3.05	(98)	(4271)
16625	77.19	5	12.78	69.62	2.57	99.66	4.63	23.40	108.27	2.70	(46)	(4317)
16650	74.27	5	5.19	42.01	2.79	70.12	4.63	8.32	51.68	2.48	(2)	(4318)
16675	51.57	5	0.80	16.22	2.54	58.26	4.63	2.77	26.96	2.47	19	(4300)
16700	43.86	5	8.00	52.82	2.87	44.18	4.63	4.07	31.96	2.50	(2)	(4302)
16724.72	91.83	5	14.42	108.73	2.43	62.12	4.58	10.26	73.95	2.43	(39)	(4340)
16750	163.79	5	44.39	214.31	2.62	119.67	4.68	27.53	151.23	2.36	(82)	(4422)
16800	210.64	5	78.33	309.21	3.35	346.69	9.26	113.63	484.74	5.53	(293)	(4715)
16850	205.84	5	78.40	309.05	3.70	385.63	9.26	145.12	572.46	6.53	(368)	(5082)
16900	215.99	5	74.35	300.63	3.13	390.58	9.26	141.44	564.52	6.32	(353)	(5435)
16950	192.14	5	56.51	249.57	2.48	377.90	9.26	121.17	509.44	5.19	(294)	(5729)
16952.18	191.28	5	55.40	247.50	2.50	15.48	0.40	4.52	20.07	0.20	(11)	(5740)
16975	179.35	5	48.34	226.07	2.62	156.63	4.23	43.84	200.13	2.16	(108)	(5847)
17000	200.00	5	54.76	245.25	3.00	175.63	4.63	47.73	218.20	2.60	(113)	(5960)
						COMMON	BIT	GRAN. BORROW	FILL	TOPSOIL	BALANCE	
PHASE 2 - TOTALS						8,287	231	2,439	10,781	154	(5,960)	

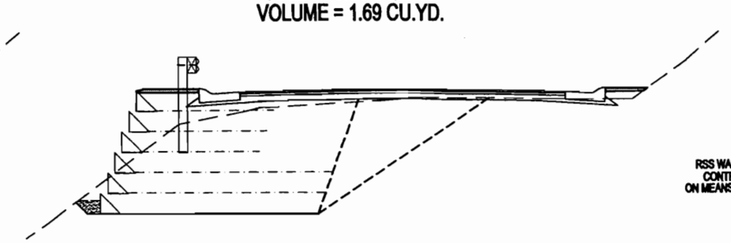
VOLUME BALANCES WERE OBTAINED BY THE FOLLOWING FORMULA: (COMMON VOLUME - BITUMINOUS VOLUME) - (FILL VOLUME x 1.30 SHRINKAGE FACTOR) = EXCESS OR SHORTAGE OF MATERIAL

NOTE: VOLUME NUMBERS IN THE **"VOLUME BALANCE"** COLUMN THAT **HAVE** PARENTHESES ( ) ARE VOLUME **SHORTAGE** NUMBERS.
VOLUME NUMBERS IN THE **"VOLUME BALANCE"** COLUMN THAT **DO NOT HAVE** PARENTHESES ARE VOLUME **EXCESS** NUMBERS.

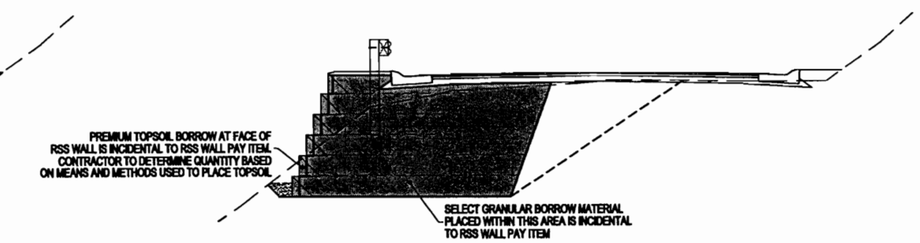
QUANTITY EXAMPLE AT STATION 153+50
GRANULAR BORROW AREA
AREA = 25.60 SQ. FT.
VOLUME = 13.28 CU.YD.



QUANTITY EXAMPLE AT STATION 153+50
TOPSOIL AREA
AREA = 3.06 SQ. FT.
VOLUME = 1.69 CU.YD.



CONTRACTOR DETERMINED QUANTITIES EXAMPLE AT STATION 153+50



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TABULATED QUANTITIES

S.P. NO. 18-620-11 SHEET NO. 8 OF 93 SHEETS

ALEXANDRIA, MN
BEMIDJI, MN
BRAINERD, MN
DETROIT LAKES, MN
GRAND FORKS, ND
RED WING, MN
ROCHESTER, MN
EDEN PRAIRIE, MN

ENGINEERS
ARCHITECTS
LAND SURVEYORS
ENVIRONMENTAL SERVICES

WWW.WSNINC.COM
WIDSETH SMITH NOLTING

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

TIMOTHY M. FRAHLER 1/13/2010
DATE: LIC. NO. 25152

REVISIONS DESCRIPTION	BY	DATE	REV#

DATE: JULY, 2009
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-TABULATED QUANTITIES.dwg, 1/13/2010 4:46:00 PM, Shayne.Johnson

PHASE 3 - EARTHWORK VOLUMES

STATION	AREA (FT²)					VOLUME (YD³)					VOLUME BALANCE (YD³)	F
	COMMON EXCAVATION	BIT. REMOVAL	GRAN. BORROW	FILL	TOPSOIL	COMMON EXCAVATION	BIT. REMOVAL	GRAN. BORROW	FILL	TOPSOIL	EXCESS	TOTAL CUMULATIVE
15150	63.98	5	0.00	2.37	5.56	0.00	0.00	0.00	0.00	0.00	0	0
15175	48.15	5	0.00	3.95	5.98	51.91	4.63	0.00	2.93	5.34	43	43
15187.75	42.64	5	0.00	5.26	6.32	21.44	2.36	0.00	2.17	2.90	16	60
15200	73.38	5	3.13	34.51	7.12	26.32	2.27	0.71	9.02	3.05	12	72
15210.57	59.47	5	2.92	32.86	6.30	26.00	1.96	1.18	13.19	2.63	7	79
15233.39	68.99	5	7.67	56.06	4.98	54.29	4.23	4.48	37.58	4.77	1	80
15250	66.47	5	7.81	53.55	3.71	41.67	3.08	4.76	33.72	2.67	(5)	75
15250.44	73.35	5	7.89	54.47	5.21	1.14	0.08	0.13	0.88	0.07	(0)	75
15275	63.10	5	8.72	55.86	3.52	62.06	4.55	7.55	50.18	3.97	(8)	67
15279.03	62.06	5	8.92	56.55	3.40	9.34	0.75	1.32	8.39	0.52	(2)	65
15300	55.37	5	10.57	62.22	2.77	45.60	3.88	7.57	46.12	2.40	(18)	47
15325	152.39	5	22.18	160.82	3.19	96.19	4.63	15.16	103.26	2.76	(43)	4
15335.37	155.30	5	23.41	166.77	3.18	59.09	1.92	8.75	62.91	1.22	(25)	(21)
15350	159.22	5	25.60	174.36	3.06	85.21	2.71	13.28	92.42	1.69	(38)	(58)
15400	178.71	5	33.14	203.18	2.78	312.90	9.26	54.39	349.57	5.41	(151)	(209)
15450	196.72	5	40.55	228.78	4.70	347.62	9.26	68.23	399.96	6.93	(182)	(391)
15464.5	197.71	5	43.29	236.11	3.94	105.91	2.69	22.51	124.83	2.32	(59)	(450)
15475	194.90	5	43.67	237.63	3.90	76.34	1.94	16.91	92.12	1.52	(45)	(495)
15500	189.94	5	42.49	234.55	3.74	178.17	4.63	39.89	218.60	3.54	(111)	(606)
15525	186.87	5	40.06	222.44	2.52	174.45	4.63	38.22	211.57	2.90	(105)	(711)
15535.53	180.75	5	38.56	217.43	2.57	71.69	1.95	15.33	85.77	0.99	(42)	(753)
15550	173.94	5	35.83	207.06	2.48	95.04	2.68	19.93	113.75	1.35	(56)	(808)
15600	161.90	5	21.47	157.07	4.65	310.96	9.26	53.06	337.16	6.60	(137)	(945)
15650	154.39	5	20.53	153.77	3.07	292.86	9.26	38.89	287.81	7.15	(91)	(1035)
15700	167.26	5	38.01	218.22	4.20	297.82	9.26	54.20	344.44	6.73	(159)	(1195)
15733.12	153.03	5	34.06	203.57	3.97	196.44	6.13	44.20	258.70	5.01	(146)	(1341)
15750	149.98	5	32.89	199.74	3.78	94.72	3.13	20.93	126.07	2.42	(72)	(1413)
						COMMON	BIT	GRAN. BORROW	FILL	TOPSOIL	BALANCE	
PHASE 3 - TOTALS						3,135	111	552	3,413	87	(1,413)	

VOLUME BALANCES WERE OBTAINED BY THE FOLLOWING FORMULA: (COMMON VOLUME - BITUMINOUS VOLUME) - (FILL x 1.3 SHRINKAGE FACTOR) = EXCESS OR SHORTAGE OF MATERIAL

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TABULATED QUANTITIES

S.P. NO. 18-620-11 SHEET NO. 9 OF 93 SHEETS

ENGINEERS ALEXANDRIA, MN BRAINERD, MN DULUTH, MN ORONOTORIA, MN
ARCHITECTS GRAND FORKS, ND RED WING, MN ROCHESTER, MN
LAND SURVEYORS ROCHESTER, MN
ENVIRONMENTAL SERVICES
WWW.WSN.US.COM
WIDSETH SMITH NOLTING

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Timothy M. Houle 1/13/2010

TIMOTHY M. HOULE DATE: LIC. NO. 25132

DATE	REV#	REVISIONS DESCRIPTION	BY

DATE: JULY, 2009
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\C\MC-DT-TABULATED QUANTITIES.dwg, 1/

PHASE 4 - EARTHWORK VOLUMES

STATION	AREA (FT²) COMMON EXCAVATION	AREA (FT²) BIT. REMOVAL	AREA (FT²) GRAN. BORROW	AREA (FT²) FILL	AREA (FT²) TOPSOIL	VOLUME (YD³) COMMON EXCAVATION	VOLUME (YD³) BIT. REMOVAL	VOLUME (YD³) GRAN. BORROW	VOLUME (YD³) FILL	VOLUME (YD³) TOPSOIL	VOLUME (YD³) EXCESS	F TOTAL CUMULATIVE
18200	14.21	5	0.00	24.61	6.59	0.00	0.00	0.00	0.00	0.00	0	0
18250	37.49	5	0.00	12.23	5.72	47.87	9.26	0.00	34.11	11.40	(6)	(6)
18300	39.67	5	0.00	2.23	2.31	71.44	9.26	0.00	13.39	7.44	45	39
18318.38	38.83	5	0.00	2.18	2.28	26.72	3.40	0.00	1.50	1.56	21	60
18325	38.45	5	0.00	4.24	4.72	9.47	1.23	0.00	0.79	0.86	7	68
18350	37.78	5	0.00	2.1	2.57	35.29	4.63	0.00	2.94	3.38	27	94
18375	41.96	5	0.00	2.19	2.32	36.92	4.63	0.00	1.99	2.26	30	124
18400	42.63	5	0.00	2.27	2.37	39.16	4.63	0.00	2.06	2.17	32	156
18425	40.98	5	0.00	4.27	3.51	38.71	4.63	0.00	3.03	2.72	30	186
18450	39.44	5	0.00	8.25	5.1	37.23	4.63	0.00	5.80	3.99	25	211
18475	40.43	5	0.00	6.57	5.6	36.98	4.63	0.00	6.86	4.95	23	235
18500	43.75	5	0.00	7.14	6.8	38.97	4.63	0.00	6.35	5.74	26	261
18525	43.04	5	0.00	6.1	6.01	40.18	4.63	0.00	6.13	5.93	28	288
18538.8	44.39	5	0.00	7.44	4.49	22.34	2.56	0.00	3.46	2.68	15	304
18550	63.97	5	0.00	25.4	4.03	22.47	2.07	0.00	6.81	1.77	12	315
18589.34	100.44	5	9.09	57.16	5.45	119.78	7.29	6.62	60.15	6.91	34	349
18598.35	94.17	5	9.65	59.27	4.74	32.47	1.67	3.13	19.43	1.70	6	355
18600	94.85	5	9.76	59.66	4.66	5.78	0.31	0.59	3.63	0.29	1	356
18625	77.42	5	5.11	42.02	4.41	79.75	4.63	6.88	47.07	4.20	14	370
18650	83.24	5	6.47	47.95	5.07	74.38	4.63	5.36	41.65	4.39	16	385
18675	62.12	5	2.91	30.91	4.79	67.30	4.63	4.34	36.51	4.56	15	401
18700	68.84	5	4.05	37.04	5.32	60.63	4.63	3.22	31.46	4.68	15	416
18725	32.39	5	0.00	16.92	7.68	46.87	4.63	1.88	24.98	6.02	10	425
18750	30.23	5	0.00	14.9	6.71	28.99	4.63	0.00	14.73	6.66	5	431
18775	27.42	5	0.00	18.48	6.66	26.69	4.63	0.00	15.45	6.19	2	433
18800	28.04	5	0.00	15.81	6.21	25.68	4.63	0.00	15.88	5.96	0	433
18825	27.69	5	0.00	14.44	5.55	25.80	4.63	0.00	14.00	5.44	3	436
18850	27.46	5	0.00	11.83	4.82	25.53	4.63	0.00	12.16	4.80	5	441
18875	26.91	5	0.00	12.32	4.85	25.17	4.63	0.00	11.18	4.48	6	447
18900	26.33	5	0.00	13.19	4.88	24.65	4.63	0.00	11.81	4.50	5	452
18925	25.97	5	0.00	7.80	4.44	24.21	4.63	0.00	9.72	4.31	7	459
18950	25.98	5	0.00	6.57	4.50	24.05	4.63	0.00	6.65	4.14	11	469
18975	24.65	5	0.00	5.04	4.41	23.44	4.63	0.00	5.38	4.13	12	481
18984.8	24.49	5	0.00	4.69	4.34	8.92	1.81	0.00	1.77	1.59	5	486
19000	24.88	5	0.00	5.44	4.23	13.90	2.81	0.00	2.85	2.41	7	493
19050	30.10	5	0.00	4.32	3.92	50.91	9.26	0.00	9.04	7.55	30	523
19100	32.37	5	0.00	3.39	3.81	57.84	9.26	0.00	7.14	7.16	39	563
19150	29.64	5	0.00	2.40	3.33	57.42	9.26	0.00	5.36	6.61	41	604
19161.28	24.64	5	0.00	1.08	1.78	11.34	2.09	0.00	0.73	1.07	8	612
19200	48.93	5	0.00	2.58	3.66	52.75	7.17	0.00	2.62	3.90	42	654
19250	27.19	5	0.00	3.26	4.25	70.48	9.26	0.00	5.41	7.32	54	708
19300	35.33	5	0.00	2.70	4.12	57.89	9.26	0.00	5.52	7.75	41	750
19350	41.56	5	0.00	2.42	3.83	71.19	9.26	0.00	4.74	7.36	56	806
19400	43.93	5	0.00	2.45	3.78	79.16	9.26	0.00	4.51	7.05	64	870
19450	43.48	5	0.00	2.58	3.44	80.94	9.26	0.00	4.66	6.69	66	935
19500	40.35	5	0.00	3.04	3.79	77.62	9.26	0.00	5.20	6.69	62	997
19509.55	59.16	5	0.00	1.99	2.33	17.60	1.77	0.00	0.89	1.08	15	1012
19550	34.14	5	0.00	4.46	3.58	69.89	7.49	0.00	4.83	4.43	56	1068
19600	36.75	5	0.00	11.68	6.79	65.64	9.26	0.00	14.94	9.60	37	1105
19638.81	47.51	5	0.00	4.46	4.11	60.56	7.19	0.00	11.60	7.83	38	1143
19650	50.68	5	0.00	4.59	4.22	20.35	2.07	0.00	1.88	1.73	16	1159
19651.79	51.16	5	0.00	5.77	4.22	3.38	0.33	0.00	0.34	0.28	3	1161
19675	58.62	5	0.00	10.24	5.93	47.19	4.30	0.00	6.88	4.36	34	1195
19700	62.10	5	0.00	10.08	5.44	55.89	4.63	0.00	9.41	5.26	39	1234
19725	64.74	5	0.00	8.85	5.44	58.72	4.63	0.00	8.76	5.04	43	1277
19750	68.32	5	0.00	5.51	4.94	61.60	4.63	0.00	6.65	4.81	48	1325
19775	71.14	5	0.00	4.37	4.27	64.56	4.63	0.00	4.57	4.26	54	1379
19800	75.67	5	0.00	5.87	4.36	67.97	4.63	0.00	4.74	4.00	57	1437
19820.25	76.55	5	0.00	6.24	8.98	57.08	3.75	0.00	4.54	5.00	47	1484
19825	76.82	5	0.00	2.87	4.38	13.49	0.88	0.00	0.80	1.18	12	1496
19850	72.02	5	0.00	2.36	3.02	68.91	4.63	0.00	2.42	3.43	61	1557
19874.05	88.85	5	0.00	2.55	3.44	71.65	4.45	0.00	2.19	2.88	64	1621
19875	98.99	5	0.00	2.38	3.06	3.30	0.18	0.00	0.09	0.11	3	1624
19894.8	103.20	5	0.00	1.27	0.51	74.14	3.67	0.00	1.34	1.31	69	1693
						COMMON	BIT	GRAN. BORROW	FILL	TOPSOIL	BALANCE	
PHASE 4 - TOTALS						2,817	314	32	623	280	1,693	

VOLUME BALANCES WERE OBTAINED BY THE FOLLOWING FORMULA: (COMMON VOLUME - BITUMINOUS VOLUME) - (FILL x 1.30 SHRINKAGE FACTOR) = EXCESS OR SHORTAGE OF MATERIAL

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TABULATED QUANTITIES

S.P. NO. 18-620-11 SHEET NO. 10 OF 93 SHEETS

ENGINEERS ARCHITECTS LAND SURVEYORS ENVIRONMENTAL SERVICES
ALEXANDRIA, MN BRAINERD, MN BRAINERD, MN DETROIT LAKES, MN GRAND FORKS, ND RED WING, MN ROCHESTER, MN SOUTH FALLS, SD
WWW.WSNG.COM
WIDSETH SMITH NOLTING

REVISIONS DESCRIPTION | BY | DATE | REVN

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TIMOTHY M. MOULE DATE: 1/13/2010 LIC.NO. 25132

DATE: JULY, 2009
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-TABULATED QUANTITIES.dwg, 1/13/2010 4:47:54 PM, Shayne.Johnson

SAWING BITUMINOUS PAVEMENT (FULL DEPTH) — G
SPEC NO. 2104.513

STATION	LOCATION		QUANTITY
			LIN FT
151+47	CSAH 20		34
173+05	DRIVEWAY RT		17
191+60	GILBERT SHORES LT		28
195+10	DRIVEWAY LT		13
199+02	CSAH 20 / CSAH 49		211
		TOTAL	303

AGGREGATE BASE CLASS 5 — H
SPEC NO. 2211.501

STATION	LOCATION		QUANTITY
		SQ YD	TON
151+47 - 199+02	CSAH 20	18246	5018
173+05 RT	DRIVEWAY	57	13
191+61 LT	GILBERT SHORES DR.	150	41
195+10 LT	DRIVEWAY	62	14
196+85 LT	DRIVEWAY	84	18
		TOTAL	5104

QUANTITIES BASED ON 4" CL. 5 BASE, BENEATH BITUMINOUS DRIVEWAYS.
QUANTITIES BASED ON 5" CL. 5 BASE, BENEATH CSAH 20 ROADWAY & GILBERT SHORES DRIVE

BITUMINOUS MATERIAL FOR TACK COAT — I
SPEC NO. 2357.502

STATION	LOCATION		QUANTITY
		SQ YD	GALLON
151+47 - 199+02	CSAH 20	14126	706
191+61	GILBERT SHORES DR.	141	7
		TOTAL	713

BASED ON 0.05 GAL. PER SQ YD

TYPE SP 12.5 WEARING COURSE MIXTURE (2,C) — J
SPEC NO. 2360.501

STATION	LOCATION		QUANTITY
		SQ YD	TON
151+47 - 199+02	CSAH 20	14126	1218
191+61	GILBERT SHORES DR.	141	12
		TOTAL	1230

QUANTITIES BASED ON 1.5" SP 12.5 WEARING COURSE MIX

TYPE SP 12.5 WEARING COURSE MIXTURE (2,C) — K
SPEC NO. 2360.501

STATION	LOCATION		QUANTITY
		SQ YD	TON
151+47 - 199+02	CSAH 20	14126	1624
191+61	GILBERT SHORES DR.	141	16
196+85 LT	DRIVEWAY	84	10
195+10 LT	DRIVEWAY	62	7
173+05 RT	DRIVEWAY	57	7
		TOTAL	1664

QUANTITIES BASED ON 2" SP 12.5 WEARING COURSE MIX

STEEL H-PILE DRIVEN 10" — L
SPEC NO. 2452.510

STATION TO STATION	LOCATION	QUANTITY
		LIN FT
161+00 - 164+00	7.25' RT	300
165+75 - 167+50	7.25' RT	175
	TOTAL	475

18" RC PIPE CULVERT — M
SPEC NO. 2501.511

STATION	LOCATION	INVERTS & SLOPE	APRONS	QUANTITY
			18" RC SAFETY	LIN FT
181+42	CL	NO. 1190.66, SO. 1189.65 & 1.44%	2	54
		TOTAL	2	54

RANDOM RIPRAP CLASS III — P
SPEC NO. 2511.501

STATION	LOCATION		QUANTITY
	CSAH 20		CU YD
181+42	33' LT.		5.9
181+42	41' RT.		5.9
181+78	57' RT.		13.8
		TOTAL	25.6

GEOTEXTILE FILTER TYPE IV — Q
SPEC NO. 2511.515

STATION	LOCATION		QUANTITY
	CSAH 20		SQ YD
181+42	33' LT.		17
181+42	41' RT.		17
181+78	57' RT.		32
		TOTAL	66

CONCRETE CURB & GUTTER DESIGN B624 — R
SPEC NO. 2531.501

STATION	TO	STATION	LOCATION	QUANTITY
			CSAH 20	LIN FT
151+47		152+63	CSAH 20	231
185+39		199+02	CSAH 20 (LT & RT)	2836
157+65		-	14' LT & 14' RT	32
164+92		-	14' LT & 14' RT	20
167+00		-	14' LT & 14' RT	20
170+00		-	14' LT & 14' RT	20
173+28		-	14' LT & 14' RT	20
177+00		-	14' LT & 14' RT	20
179+20		-	14' LT & 14' RT	20
182+40		-	14' LT & 14' RT	20
184+50		-	14' LT & 14' RT	20
			TOTAL	3259

CONCRETE CURB & GUTTER DESIGN S524 — S
SPEC NO. 2531.501

STATION	TO	STATION	LOCATION	QUANTITY
				LIN FT
152+62.5		185+39	CSAH 20 (LT & RT)	6552
			TOTAL	6552

TRAFFIC BARRIER DESIGN B8338 — T
SPEC NO. 2554.501

STATION	TO	STATION	LOCATION	QUANTITY
			CSAH 20	LIN FT
150+63		153+58.76	15.12 LT	300
153+65.76		156+06.16	15.12 LT	240
156+13.16		158+29.45	15.12 LT	213
158+36.65		161+04.24	15.12 LT	267
161+11.13		162+58.50	15.12 LT	149
162+65.50		165+01.50	15.12 LT	227
165+08.50		168+79.40	15.12 LT	380
168+86.40		173+97.62	15.12 LT	508
174+04.62		178+15	15.12 LT	420
178+22		181+57.93	15.12 LT	342
185+38.19		187+00.00	15.12 LT	160
			TOTAL	3206

END TREATMENT-ENERGY ABSORBING TERMINAL — U
SPEC NO. 2554.523

STATION	TO	STATION	LOCATION	QUANTITY
			CSAH 20	EACH
		150+65.05	15.12 LT	1
		153+58.76	15.12 LT	1
		153+65.76	15.12 LT	1
		156+06.16	15.12 LT	1
		156+13.16	15.12 LT	1
		158+29.45	15.12 LT	1
		158+36.65	15.12 LT	1
		161+04.24	15.12 LT	1
		161+11.13	15.12 LT	1
		162+58.50	15.12 LT	1
		162+65.50	15.12 LT	1
		165+01.50	15.12 LT	1
		165+08.50	15.12 LT	1
		168+79.40	15.12 LT	1
		168+86.40	15.12 LT	1
		173+97.62	15.12 LT	1
		174+04.62	15.12 LT	1
		178+15	15.12 LT	1
		178+22	15.12 LT	1
		181+57.93	15.12 LT	1
		185+38.19	15.12 LT	1
		187+00.00	15.12 LT	1
			TOTAL	22

SILT FENCE, TYPE HEAVY DUTY — V
SPEC NO. 2573.502

STATION	LOCATION		QUANTITY
	CSAH 20		LIN FT
151+17-181+50	23' LT-45' LT		3240
		TOTAL	3240

SILT FENCE, TYPE MACHINE SLICED — W
SPEC NO. 2573.502

STATION	LOCATION		QUANTITY
	CSAH 20		LIN FT
181+14-181+30	21'RT-64' RT		71
182+00-182+50	78' RT- 30' RT		94
		TOTAL	165

FILTER LOG TYPE WOOD FIBER BIOROLL — X
SPEC NO. 2573.540

STATION	LOCATION		QUANTITY
	CSAH 20		LIN FT
158+14	28' - 50' RT		30
163+80	32' - 42' RT		20
181+35	27' LT		10
191+18	35' LT		20
		TOTAL	80

CULVERT PROTECTION — Y
SPEC NO. 2573.602

STATION	LOCATION		QUANTITY
	CSAH 20		EACH
185+98	42' RT		1
192+02	35' LT		1
195+25	35' LT		1
197+03	36' LT		1
198+19	43' LT		1
198+45	45' RT		1
		TOTAL	6

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TABULATED QUANTITIES

S.P. NO. 18-620-11 SHEET NO. 11 OF 93 SHEETS

ENGINEERS ARCHITECTS LAND SURVEYORS ENVIRONMENTAL SERVICES
ALEXANDRIA, MN · BEMIDJI, MN · BRAINERD, MN · DETROIT LAKES, MN · GRAND FORKS, ND · RED WING, MN · ROCHESTER, MN · SIOUX FALLS, SD
WWW.WSNLLC.COM
WIDSETH SMITH NOLTING

BY | REVISIONS DESCRIPTION | DATE | REV#

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
TIMOTHY M. HOULE — DATE: 11/25/09 — LIC. NO. 25132

DATE: JULY, 2008
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 1085029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\01088-Crow Wing County Highway Department\01088B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-TABULATED QUANTITIES.dwg, 11/24/2009 2:10:41 PM, Mark.Skogen

SEEDING
SPEC NO. 2575.501 — Z

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
				SQ FT	ACRE
TEMPORARY					
151+47		187+00	CSAH 20 LT	16,492	0.38
187+00		191+50	CSAH 20 LT	4,638	0.11
191+75		195+00	CSAH 20 LT	2,009	0.05
195+20		195+60	CSAH 20 LT	1,807	0.04
195+80		END	CSAH 20 LT	1,436	0.03
PERMANENT					
151+47		END	CSAH 20 RT	29,996	0.69
				TOTAL	1.29

SEED MIXTURE 100
SPEC NO. 2575.502 — AA

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
				ACRE	POUND
151+47		END	CSAH 20 LT	0.61	61
151+47		END	CSAH 20 RT	0.69	69
				TOTAL	130

QUANTITIES BASED ON 100 LBS PER ACRE

MULCH MATERIAL TYPE 1
SPEC NO. 2575.511 — BB

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
					TON
TEMPORARY					
151+47		END	CSAH 20 LT	0.61	1.22
151+47		END	CSAH 20 RT	0.69	1.38
PERMANENT					
151+47		END	CSAH 20 LT	0.61	1.22
151+47		END	CSAH 20 RT	0.69	1.38
				TOTAL	5.20

MULCH MATERIAL TYPE 4
SPEC NO. 2575.511 — CC

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
				SQ YD	TON
PERMANENT					
152+00		181+50	CSAH 20 LT	2488	0.96
185+40		187+00	CSAH 20 LT	61	0.02
				TOTAL	1

QUANTITIES BASED ON 3750 LBS PER ACRE
USED ONLY IF SEED DOES NOT ESTABLISH WITHIN RSS

EROSION CONTROL BLANKETS CATEGORY 1
SPEC NO. 2575.523 — DD

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
					SQ YD
151+50		152+33	29.5' - 22' RT		100
152+00		152+10	4' LT		5
152+50		153+35	4' LT		40
154+00		155+00	4' LT		45
155+35		158+25	4' LT		129
158+75		162+87	4' LT		183
163+11		163+75	4' LT		28
164+25		166+75	4' LT		111
167+25		167+50	4' LT		11
169+75		172+25	4' LT		111
172+75		174+00	4' LT		56
174+50		174+75	4' LT		11
175+25		178+00	4' LT		122
178+25		178+50	4' LT		11
179+50		181+50	4' LT		89
181+41		181+41	17' RT		11
182+17		182+17	29.5' RT		27
185+50		186+50	4' LT		45
187+00		187+20	4' LT		9
				TOTAL	1144.0

EROSION STABILIZATION MAT CLASS 3
SPEC NO. 2575.525 — EE

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
					SQ YD
		197+96	30' RT.		2
				TOTAL	2

FERTILIZER TYPE 2
SPEC NO. 2575.532 — FF

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
				ACRE	POUND
TEMPORARY					
151+47		END	CSAH 20 LT	0.61	214
151+47		END	CSAH 20 RT	0.69	242
PERMANENT					
151+47		END	CSAH 20 LT	0.61	214
151+47		END	CSAH 20 RT	0.69	242
				TOTAL	910

SEED MIXTURE SPECIAL
SPEC NO. 2575.608 — GG

STATION	TO	STATION	LOCATION	QUANTITY CALCS	QUANTITY
				ACRE	POUND
151+47		END	CSAH 20 LT	0.61	73
151+47		END	CSAH 20 RT	0.68	82
				TOTAL	155

QUANTITIES BASED ON 120 LBS PER ACRE

INTERIM PAVEMENT MARKING
SPEC NO. 2580.603 — HH

STATION	LOCATION	QUANTITY
		LIN FT
151+47 - 198+95	DOUBLE YELLOW C/L 2353 x 2	4706
	TOTAL	4706

PAVEMENT MESSAGE(LEFT ARROW)PAINT
SPEC NO. 2582.501 — II

STATION	ARROW DIRECTION	QUANTITY
	CSAH 20	EACH
197+25	LEFT TURN	1
198+32	LEFT TURN	1
	TOTAL	2

PAVEMENT MESSAGE(RIGHT ARROW)PAINT
SPEC NO. 2582.501 — JJ

STATION	ARROW DIRECTION	QUANTITY
	CSAH 20	EACH
197+25	RIGHT TURN	1
198+32	RIGHT TURN	1
	TOTAL	2

4" SOLID LINE WHITE - PAINT
SPEC NO. 2582.502 — KK

STATION	LOCATION	QUANTITY
151+47 - 198+95	CSAH 20 RT & LT	9668
	TOTAL	9668

24" SOLID LINE WHITE-PAINT
SPEC NO. 2582.502 — LL

STATION	LOCATION	QUANTITY
		LIN FT
-	GORE AREA - CSAH 20	59
	TOTAL	59

24" STOP LINE WHITE-PAINT
SPEC NO. 2582.502 — MM

STATION	LOCATION	QUANTITY
191+61	GILBERT SHORES DRIVE	20
198+84	CSAH 20	14
198+91	CSAH 20	15
	TOTAL	49

4" DOUBLE SOLID LINE YELLOW-PAINT
SPEC NO. 2582.502 — NN

STATION	LOCATION	QUANTITY
		LIN FT
151+47 - 198+95	CSAH 20	4706
	TOTAL	4706

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ALEXANDRIA, MN BRAINERD, MN BRAINERD, MN CROOKSTON, MN GRAND FORKS, ND RED WING, MN ROCHESTER, MN SIOUX FALLS, SD
WWW.WSNLLC.COM
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REVISIONS DESCRIPTION | BY | DATE | REV#

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Timothy M. Foule 11/25/09
TIMOTHY M. FOULE DATE: LIC. NO. 28132

DATE: JULY, 2009
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.K.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B029-CSAH 20\0108B029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-TABULATED QUANTITIES.dwg, 11/24/2009 2:10:52 PM, Mark.Skogen

STORM SEWER SCHEDULE

N

STRUCTURE NO.	STATION	OFFSET	TOP OF CASTING ELEVATION	OUTLET ELEVATION	CASTING ASSEMBLY	PAY HEIGHT					PIPE SEWER					APRON	DRAINS TO	% GRADE	ELEV.
						DESIGN A or F	DESIGN C or G	DESIGN H	DESIGN 60-4020	DESIGN 72-4020	12" RCP	18" RCP	21" RCP	24" RCP	33" RCP	33" RC SAFETY APRON & GRATE DESIGN 3128			
						LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	EACH			
DS 1	152+22	14.43' LT	1232.80	1226.57	B	6.12						86					EX. DS	0.20	1226.40
DS 2	152+21.92	14.38' RT	1232.40	1228.15	B		4.14				29						DS 1	1.00	1227.86
DS 3	157+55.11	13' RT	1230.49	1226.23	B		4.15				10						DS 6	1.00	1226.13
DS 3A	157+00	13' RT	1230.98	1226.89	B		3.98				56						DS 3	1.00	1226.33
DS 4	157+65.07	13' LT	1230.48	1226.23	B		4.14				13						DS 5	1.00	1226.10
DS 5	157+65.58	CL	1230.79	1225.55	A	5.36						85					DS 7	0.60	1225.04
DS 6	157+65.12	13' RT	1230.48	1226.03	B		4.34				13						DS 5	2.00	1225.77
DS 7	158+50	CL	1231.62	1224.94	A	6.80						250					DS 8	0.60	1223.44
DS 7A	158+50	13' RT	1231.31	1225.17	B	6.03					13						DS 7	1.00	1225.04
DS 8	161+00	CL	1238.44	1223.34	A	15.22						200					DS 9	0.60	1222.14
DS 9	163+00	CL	1236.20	1222.04	A	14.28						100					DS 10	0.60	1221.44
DS 10	164+00	CL	1233.08	1221.34	A	11.86						92					DS 12	0.60	1220.79
DS 10A	164+00	13' RT	1232.77	1227.40	B	5.26					13						DS 10	1.00	1227.27
DS 11	164+92.88	13' LT	1231.74	1227.98	B		3.65				13						DS 12	1.00	1227.85
DS 12	164+93.07	CL	1232.13	1220.69	A	11.56							107				DS 14	0.60	1220.05
DS 13	164+93.25	13' RT	1231.74	1227.90	B		3.73				13						DS 12	1.00	1227.77
DS 14	166+00	CL	1232.62	1219.95	A	12.79							100				DS 16	0.60	1219.35
DS 15	167+00.09	13' LT	1231.23	1226.98	B		4.14				13						DS 16	1.00	1226.85
DS 16	167+00.10	CL	1231.54	1219.25	A	12.41							300				DS 19	0.96	1216.36
DS 17	167+00.11	13' RT	1231.23	1226.98	B		4.14				13						DS 16	1.00	1226.85
DS 18	170+00.08	13' LT	1222.03	1217.78	B		4.14				13						DS 19	1.00	1217.65
DS 19	170+00.09	CL	1222.34	1216.26	A	6.20							150				DS 21	2.94	1211.85
DS 20	170+00.11	13' RT	1222.03	1217.78	B		4.14				13						DS 19	1.00	1217.65
DS 21	171+50	6' RT	1216.33	1211.75	A		4.70						101				DS 22	2.85	1208.87
DS 22	172+50	6' RT	1213.37	1208.77	A		4.72						78				DS 25	2.77	1206.61
DS 22A	172+50	13' RT	1213.18	1208.94	B		4.13				7						DS 22	1.00	1208.87
DS 23	173+18.05	13' RT	1212.50	1208.33	C		4.06				10						DS 26	1.00	1208.23
DS 24	173+27.81	13' LT	1212.48	1208.13	B		4.24				13						DS 25	1.00	1208.00
DS 25	173+27.81	CL	1212.79	1206.51	A	6.40								172			DS 27	0.53	1205.59
DS 26	173+27.81	13' RT	1212.48	1208.13	B		4.24				13						DS 25	1.00	1208.00
DS 27	175+00	CL	1213.73	1205.49	A	8.36								200			DS 29	1.60	1202.30
DS 28	177+00.08	13' LT	1207.97	1203.72	B		4.14				13						DS 29	1.00	1203.59
DS 29	177+00.08	CL	1208.28	1202.20	A	6.20								220			DS 32	2.47	1196.77
DS 30	177+00.09	13' RT	1207.97	1203.72	B		4.14				13						DS 29	1.00	1203.59
DS 31	179+20.08	13' LT	1202.54	1198.29	B		4.14				13						DS 32	1.00	1198.16
DS 32	179+20.08	CL	1202.95	1196.67	A	6.40								154			DS 34	0.95	1195.20
DS 33	179+20.08	13' RT	1202.54	1198.29	B		4.14				13						DS 32	1.00	1198.16
DS 34	180+75	CL	1201.34	1195.10	A	6.36								176			DS 36	2.68	1190.38
APRON	181+78	57' RT	-	1189.87	-	-										1	-	-	-
DS 35 (1)	182+45.92	13' LT	1196.94	1192.80	B		6.14				13						DS 36	1.00	1192.67
DS 36	182+45.92	CL	1197.35	1190.28	A					7.19				13			DS 37	1.00	1190.15
DS 37 (1)	182+45.92	13' RT	1196.94	1190.05	B				8.78						77		OUTLET	0.23	1189.87
DS 38	184+50.08	13' LT	1201.02	1196.77	B		4.14				13						DS 39	1.00	1196.64
DS 39	184+50.08	CL	1201.33	1194.16	A	7.29							199				DS 36	1.90	1190.38
DS 40	184+50.08	13' RT	1201.02	1196.77	B		4.14				13						DS 39	1.00	1196.64
DS 41	186+50	CL	1204.21	1197.86	A	6.47					200						DS 39	1.80	1194.26
DS 42	188+50.08	15' LT	1207.52	1203.27	B		4.14				15						DS 43	1.00	1203.12
DS 43	188+50.08	CL	1207.83	1201.96	A	5.99					200						DS 41	2.00	1197.96
DS 44	188+50.08	15' RT	1207.52	1203.27	B		4.14				15						DS 43	1.00	1203.12
DS 45	192+20.08	15' LT	1214.93	1210.68	B		4.14				15						DS 46	1.00	1210.53
DS 46	192+20.08	CL	1215.29	1209.46	A	5.95					370						DS 43	2.00	1202.06
DS 47	192+20.08	15' RT	1214.93	1210.68	B		4.14				15						DS 46	1.00	1210.53
DS 48	197+96.28	22' LT	1215.84	1213.23	B			2.50			44						DS 49	0.50	1213.01
DS49	197+96.28	22' RT	1215.84	1212.91	B		2.82				6						OUTLET	1.00	1212.80
DS 50	198+74.05	43.18' RT	1216.39	1212.88	B							EXIST.					OUTLET	0.00	1212.76
				TOTALS	54	173.31	121.14	2.50	8.78	7.19	1239	813	1035	935	77	1			

PAY HEIGHT = T/C - 0.81' - OUTLET ELEV. + 0.70' (Casting assembly 'B' & 'C')

PAY HEIGHT = T/C - 058' - OUTLET ELEV. + 0.70' (Casting assembly 'A')

Structure Design Designation:
Des. A or F - Pay Height > 5.00'
Des. C or G - Pay Height < 5.00'
Des. H - 1 Pipe structure

(1) NOTE: FLOOR ELEVATION OF DRAINAGE STRUCTURE SHALL BE 2.00 FT. BELOW OUTLET PIPE INVERT ELEVATION AFTER 1ST LIFT OF BITUMINOUS PAVING IS PLACED, DRAINAGE STRUCTURE SHALL BE CLEANED OUT/VACUUMED OUT AND FILLED WITH CONCRETE UP TO OUTLET PIPE INVERT ELEVATION AND FINISHED OFF TO MATCH ALL PIPE INVERTS. CONCRETE FILLING SHALL BE INCIDENTAL TO DRAINAGE STRUCTURES. PAY HEIGHT SHOWN INCLUDES 2.00 FT. DEPTH TO FLOOR.

CASTING ASSEMBLY SCHEDULE

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ASSEMBLY	RING	FRAME	GRATE	BOX	EACH
A	700-7		716		21
B		802A	816	823A	32
C		802A	816		1
				TOTAL	54

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STORM SEWER SCHEDULE

S.P. NO. 18-620-11 SHEET NO. 13 OF 93 SHEETS

ALEXANDRIA, MN
BRAINERD, MN
DETROIT LAKES, MN
GRACEVILLE, MN
GRAND FORKS, ND
RED WING, MN
WILLMAR, MN
ROLLA, MN
ENGINEERS
ARCHITECTS
LAND SURVEYORS
ENVIRONMENTAL SERVICES
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Timothy M. Hoole 1/13/2010

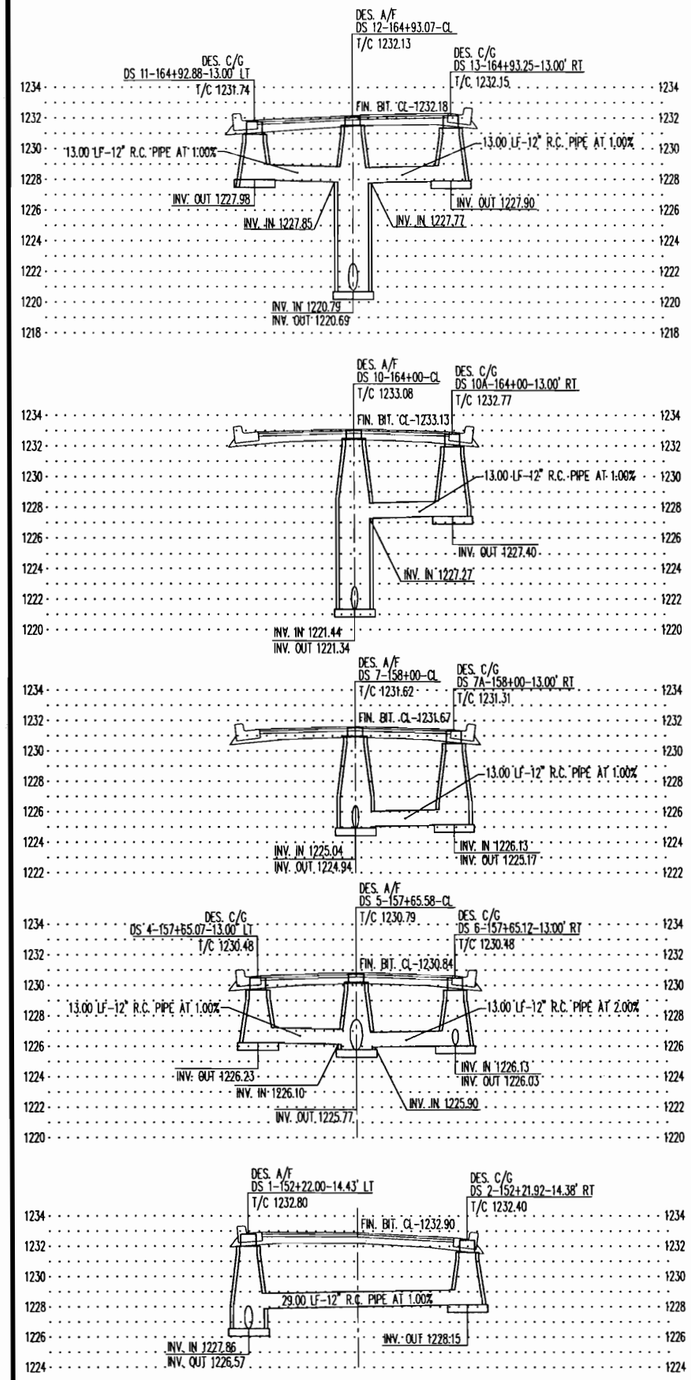
TIMOTHY M. HOOLE DATE: LIC. NO. 25132

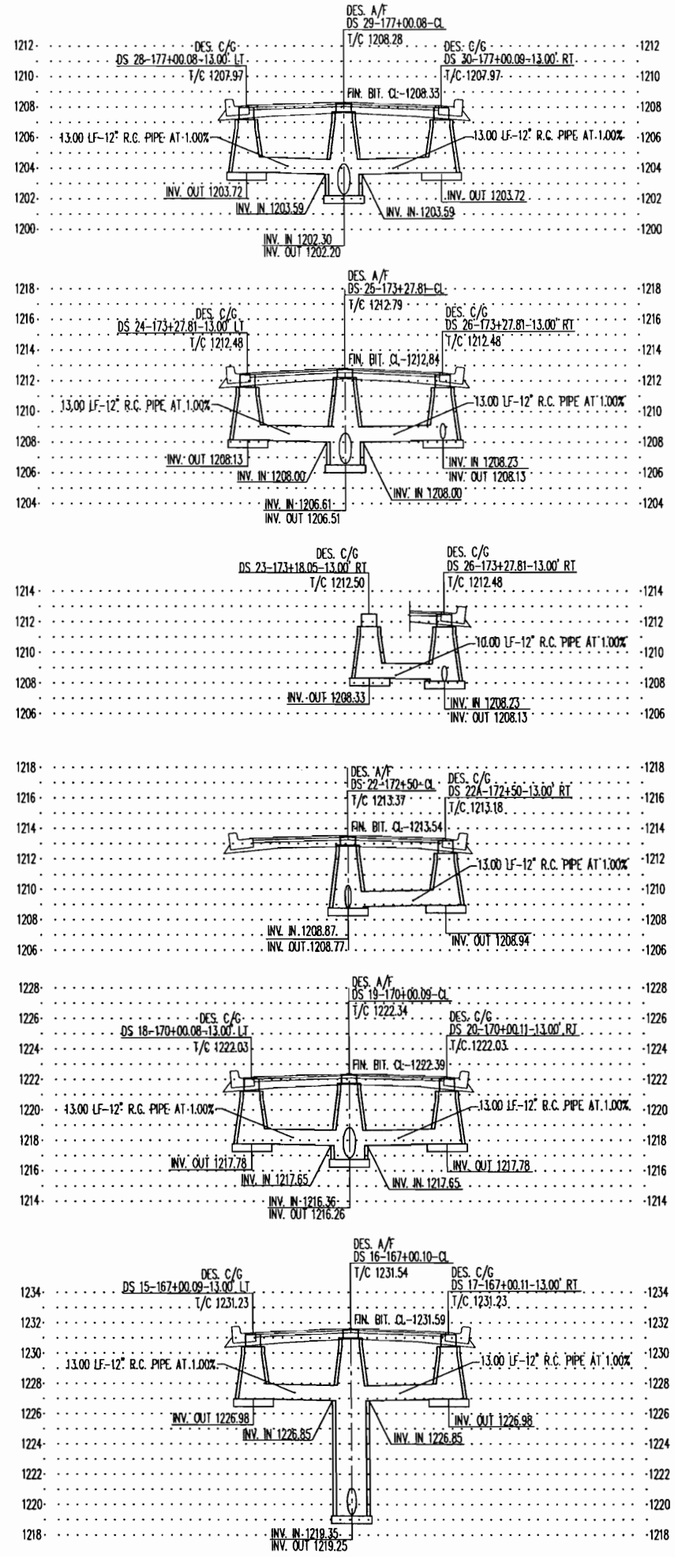
DATE	REV#	REVISIONS DESCRIPTION	BY
1-11-2010		PIPE LGTHS. DS34-DS36 & DS38-DS39	SWJ

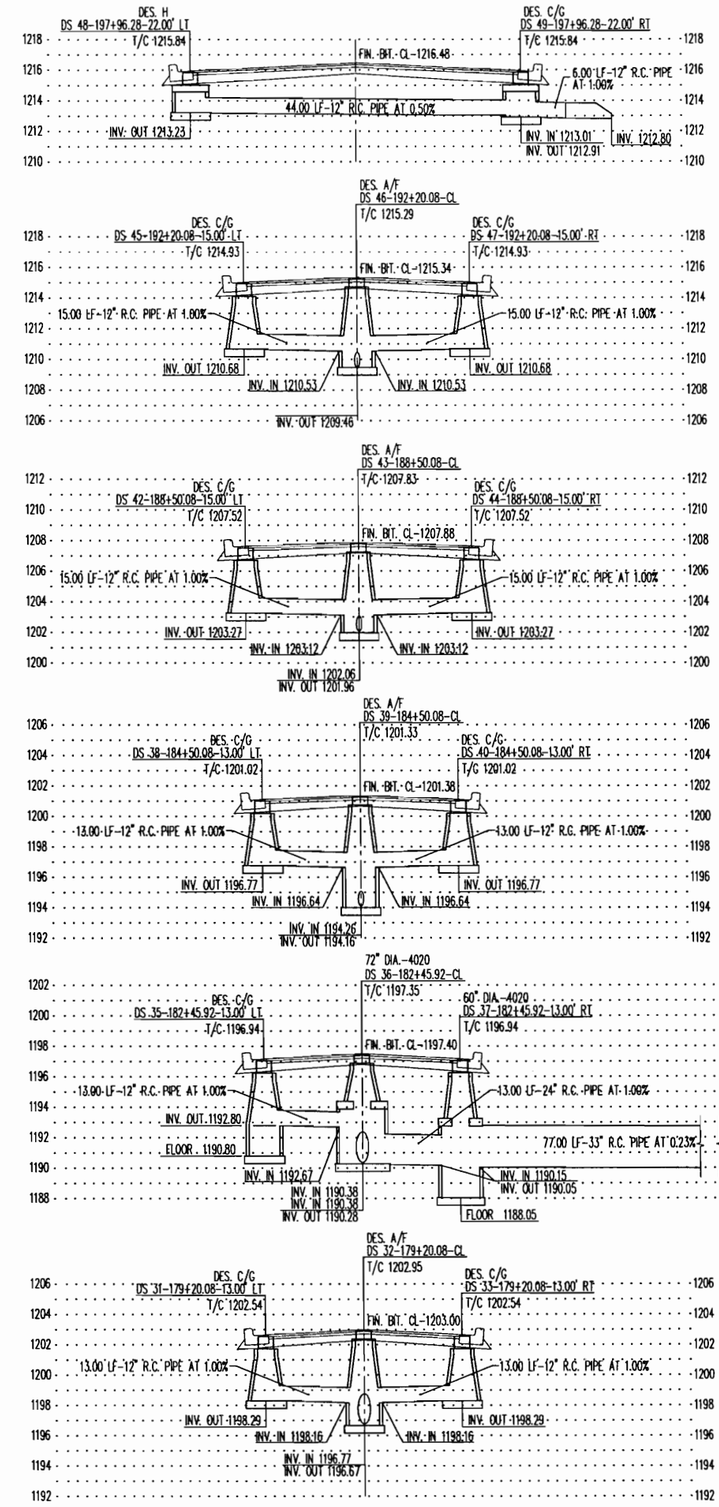
DATE: JULY, 2009
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-TABULATED QUANTITIES.dwg, 1/11/2010 10:32:34 AM, Shayne.Johnson







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STORM SEWER LATERAL PROFILES

S.P. NO. 18-620-11 SHEET NO. 14 OF 93 SHEETS

ENGINEERS
ARCHITECTS
LAND SURVEYORS
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ALEXANDRIA, MN
BEMIDJI, MN
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CROOKSTON, MN
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Timothy M. Hoole 11/25/09

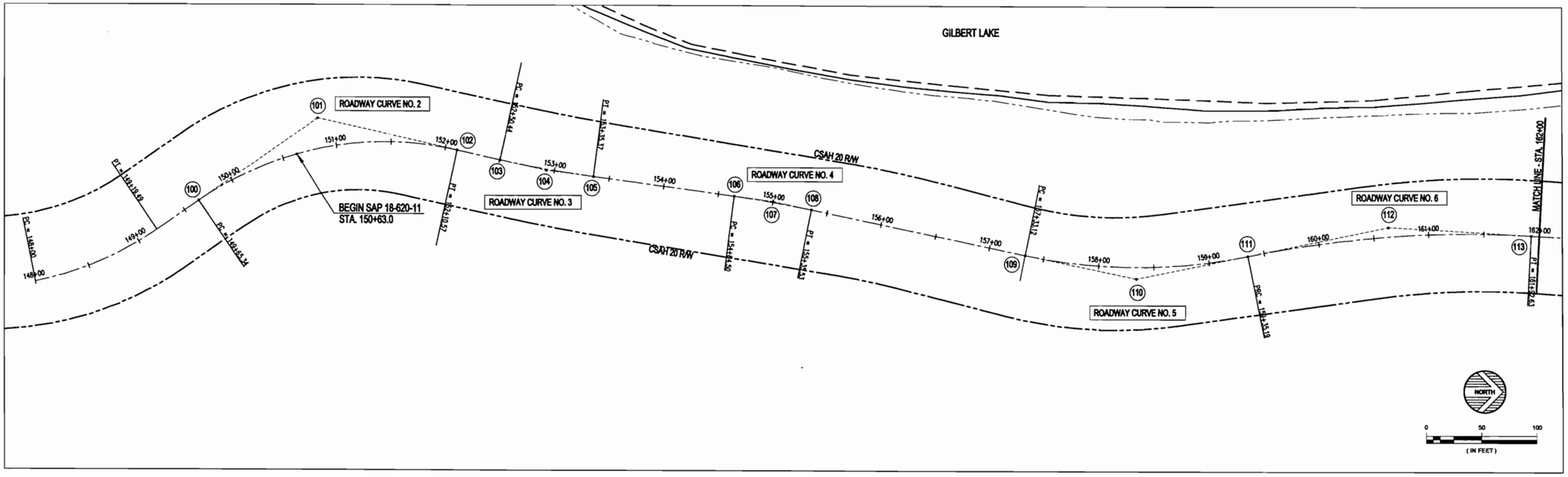
TIMOTHY M. HOOLE DATE: LIC. NO. 25132

BY	REVISIONS DESCRIPTION	REV#	DATE

DATE: NOV. 2009
SCALE: AS SHOWN
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-STORMLAT.dwg, 11/25/2009 11:11:51 AM, Mark.Skogen



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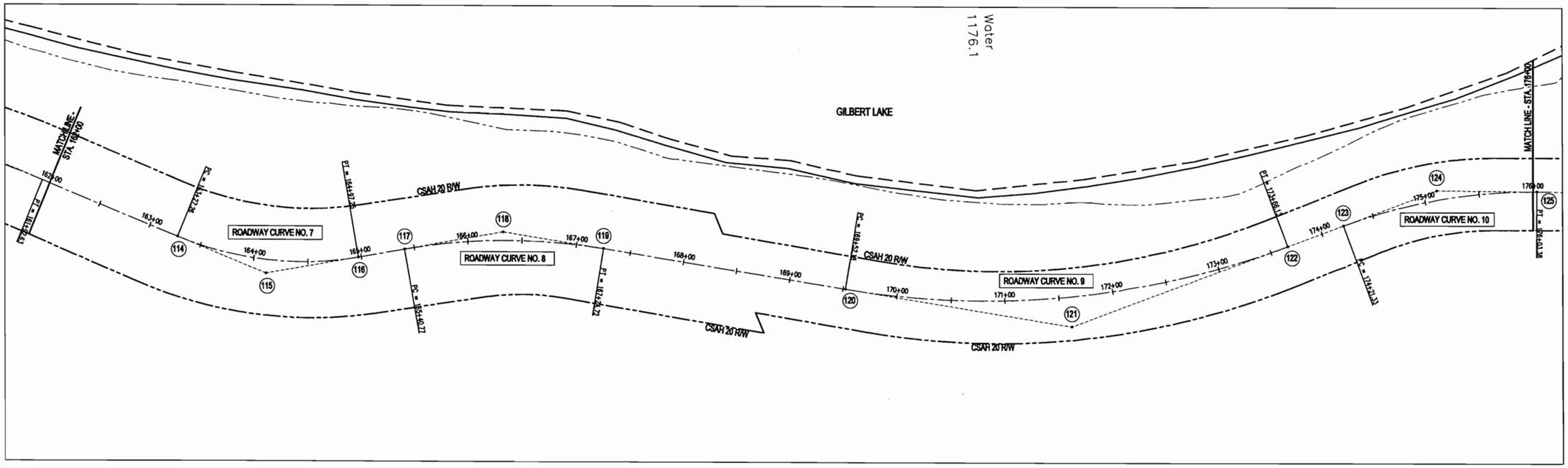

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ALIGNMENT PLAN

S.P. NO. 18-620-11 SHEET NO. 15 OF 93 SHEETS

ENGINEERS
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LAND SURVEYORS
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ALEXANDRIA, MN
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DETROIT LAKES, MN
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HIBBING, MN
ROCHESTER, MN
FOUR FALLS, SD

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Timothy M. Hoxie 11/25/09

TIMOTHY M HOXIE DATE: LIC. NO. 29132

DATE	REV#	REVISIONS DESCRIPTION	BY

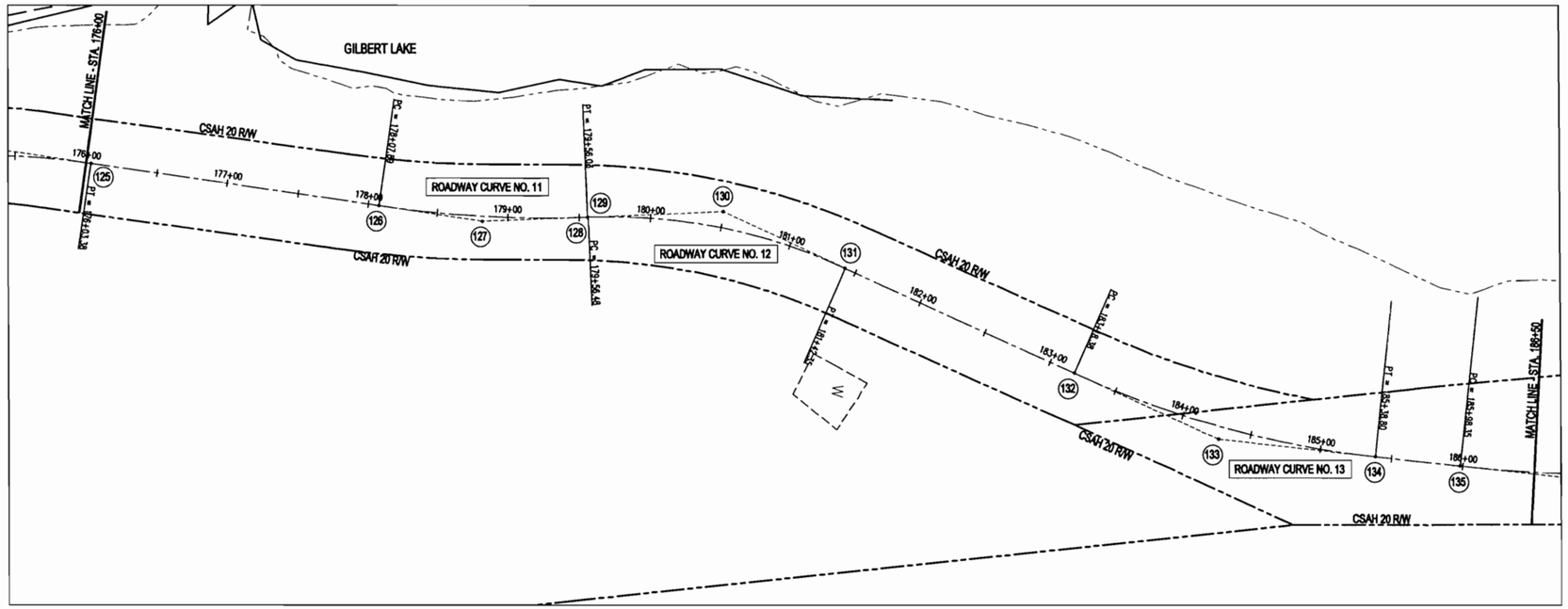
DATE: NOV. 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

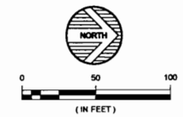
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS

NORTH AHRENS HILL TO C.S.A.H. 49

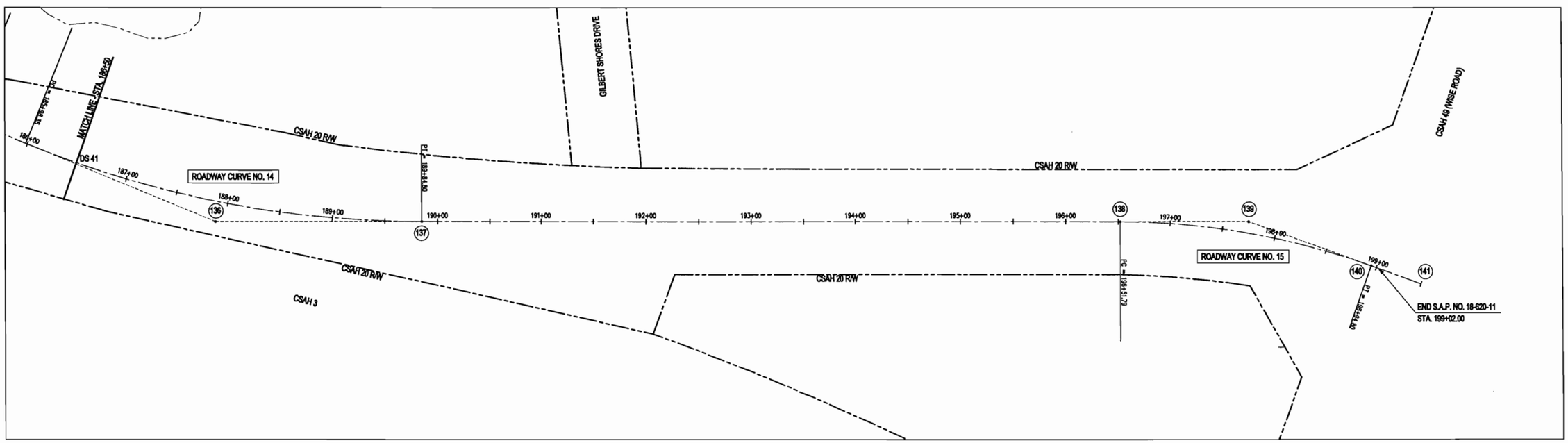
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-SP-ALIGNMENT PLAN & TAB.dwg, 1





CSAH 20



ALIGNMENT PLAN

S.P. NO. 18-620-11 SHEET NO. 16 OF 93 SHEETS

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ENGINEERS
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LAND SURVEYORS
ENVIRONMENTAL SERVICES

ALEXANDRIA, MN
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DETROIT LAKES, MN
GRAND FORKS, ND
RED WING, MN
ROCHESTER, MN
SIOUX FALLS, SD

WIDSETH SMITH NOLTING
www.wsnlive.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Timothy M. Houle 11/25/09
TIMOTHY M. HOULE DATE: LIC. NO. 23132

DATE	REV#	REVISIONS DESCRIPTION	BY

DATE: JULY, 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-SP-ALIGNMENT PLAN & TAB.dwg, 11/25/2009 11:16:02 AM, Mark.Skogen

ALIGNMENT TABULATION

POINT NO.	POINT	STATION	CURVE DATA					COORDINATES	
			DELTA	DEGREE	RADIUS	TANGENT	LENGTH	NORTHING	EASTING
100	PC	149+65.34						183792.952	572350.148
101	PI	150+95.27	46-50-09 RT.	19-05-55	300.00	129.93	245.23	183919.940	572322.641
102	PT	152+10.57						184026.874	572396.449
103	PC	152+50.44						184059.688	572419.098
104	PI	152+92.93	04-51-57 LT.	05-43-46	1000.00	42.49	84.92	184094.656	572443.233
105	PT	153+35.37						184131.544	572464.315
106	PC	154+64.50						184243.659	572528.390
107	PI	155+03.03	04-04-10 RT.	05-43-46	1000.00	35.53	71.02	184274.504	572546.018
108	PT	155+35.53						184304.020	572565.791
109	PC	157+33.12						184468.185	572675.763
110	PI	158+35.55	23-09-18 LT.	11-27-33	500.00	102.43	202.06	184553.285	572732.771
111	PRC	159+35.19						184653.947	572751.723
112	PI	160+64.62	14-45-02 RT.	05-43-46	1000.00	129.44	257.45	184781.150	572775.673
113	PT	161+92.63						184898.064	572831.221
114	PC	163+27.26						185019.663	572888.996
115	PI	164+14.61	32-28-01 LT.	19-05-55	300.00	87.35	170.00	185098.559	572926.481
116	PT	164+97.25						185185.246	572915.754
117	PC	165+40.77						185228.432	572910.411
118	PI	166+33.61	19-09-46 RT.	19-05-55	550.00	92.84	183.95	185320.570	572899.010
119	PT	167+24.72						185411.346	572918.486
120	PC	169+52.18						185633.744	572966.201
121	PI	171+63.90	29-38-49 LT.	07-09-43	800.00	211.72	413.95	185840.754	573010.615
122	PT	173+66.13						186042.633	572946.816
123	PC	174+21.33						186095.272	572930.181
124	PI	175+13.38	20-51-42 RT.	11-27-33	500.00	92.04	182.05	186183.038	572902.444
125	PT	176+03.33						186274.928	572907.780
126	PC	178+07.89						186479.095	572919.637
127	PI	178+82.17	10-36-34 LT.	07-09-43	800.00	74.28	148.14	186553.250	572923.944
128	PT	179+56.03						186626.931	572914.524
129	PC	179+56.48						186627.380	572914.466
130	PI	180+51.12	26-37-24 RT.	14-19-26	400.00	94.64	185.87	186721.258	572902.464
131	PT	181+42.35						186810.560	572933.803
132	PC	183+18.38						186976.658	572992.092
133	PI	184+29.51	18-02-32 LT.	08-11-06	700.00	111.13	220.43	187081.521	573028.892
134	PT	185+38.80						187192.626	573031.404
135	PC	185+98.35						187252.156	573032.750
136	PI	187+94.02	22-08-32 LT.	05-43-46	1000.00	195.67	386.45	187447.774	573037.174
137	PT	189+84.80						187630.633	572967.542
138	PC	196+51.79						188253.958	572730.181
139	PI	197+74.53	19-53-26 RT.	08-11-06	700.00	122.74	243.01	188368.663	572686.502
140	PT	198+94.80						188491.386	572684.454
141	PI	199+45.52						188542.097	572683.608

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ALIGNMENT TABULATION

S.P. NO. 18-620-11 SHEET NO. 17 OF 93 SHEETS

ENGINEERS ARCHITECTS LAND SURVEYORS ENVIRONMENTAL SERVICES
ALEXANDRIA, MN BRAINERD, MN BRAINERD, MN DETROIT LAKES, MN GRAND FORKS, ND RED WING, MN ROCHESTER, MN SOUX FALLS, SD
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REVISIONS DESCRIPTION	BY	DATE	REV#

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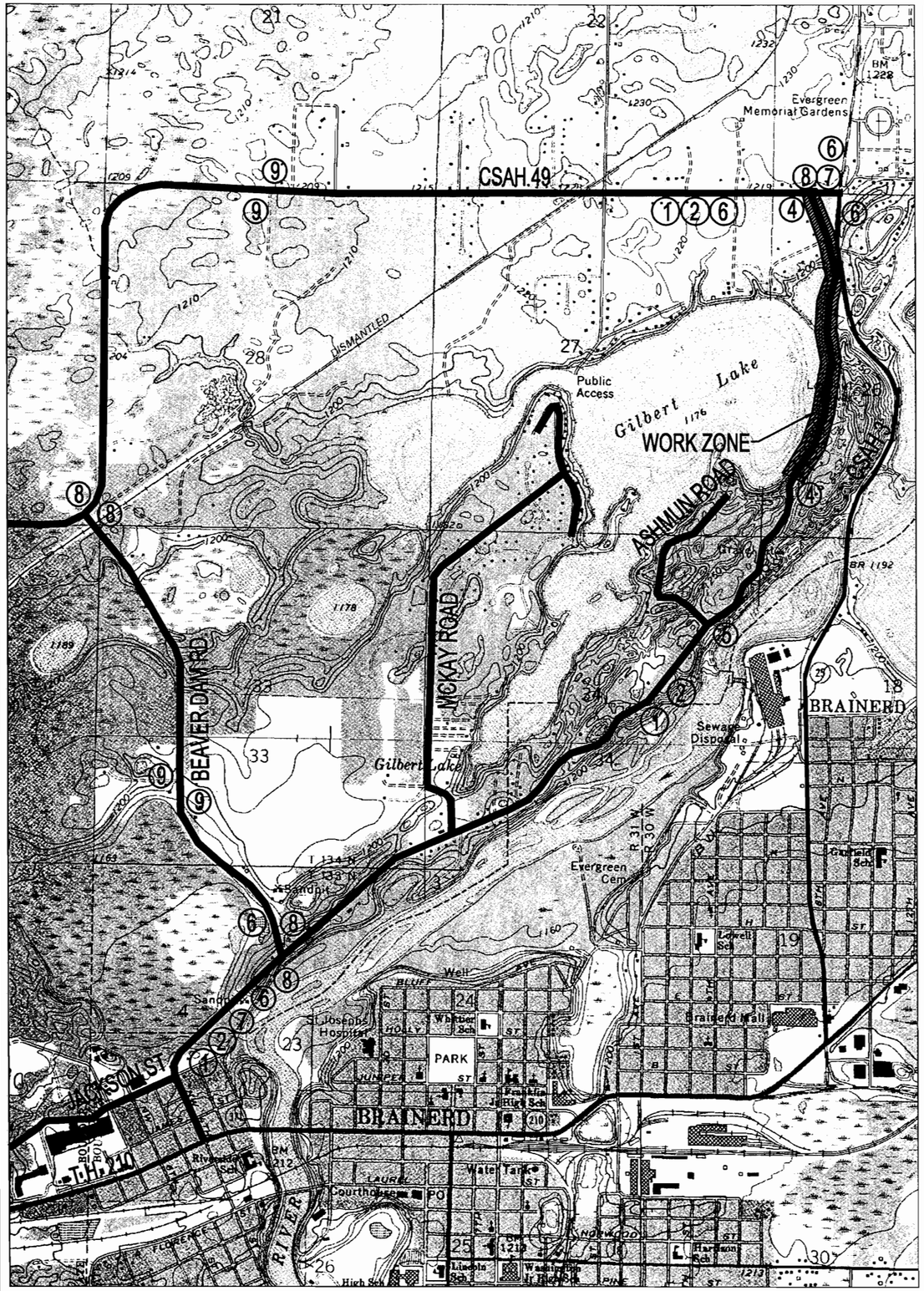
Timothy M. Houle 11/25/09
TIMOTHY M. HOULE DATE: LIC. NO. 25132

DATE: JULY, 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 1088029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-SP-ALIGNMENT PLAN & TAB.dwg, 11/25/2009 11:19:05 AM, Mark.Skogen



SIGN SCHEDULE

PLAN KEY	QTY.	NUMBER	DRAWING	COLOR	SIZE
1	3	W20-1	ROAD WORK AHEAD	BLACK ON ORANGE	36x36
2	3	W20-3	ROAD CLOSED AHEAD	BLACK ON ORANGE	36x36
3	0	1	RIVERSIDE DRIVE CLOSED USE ALTERNATE ROUTE	BLACK ON WHITE	72x48
4	2 6	R11-2 TYPE III BARRICADE	ROAD CLOSED	BLACK ON WHITE ORANGE ON WHITE	48 x 30 4' MIN.
5	1 1	R11-4 AND TYPE III BARRICADE	ROAD CLOSED TO THRU TRAFFIC	BLACK ON ORANGE ORANGE ON WHITE	48x18 4' MIN.
6	5	1	RIVERSIDE DRIVE CLOSED FROM N. AHRENS HILL RD TO WISE RD. FOLLOW DETOUR	BLACK ON WHITE	72x48

SIGN SCHEDULE

PLAN KEY	QTY.	NUMBER	DRAWING	COLOR	SIZE
7	2	W20-2	DETOUR AHEAD	BLACK ON ORANGE	36x36
8 (R or L)	5 5 5	M4-8 M1-X4A M6-1 (R or L)	DETOUR COUNTY 20 ←	BLACK ON ORANGE BLACK ON WHITE BLACK ON WHITE	24x12 18x18 21x15
9	4 4	M4-8 M1-X4A	DETOUR COUNTY 20	BLACK ON ORANGE	24x12 18x18

NORTH

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS"

THIS IS A SUGGESTED WORK ZONE TRAFFIC CONTROL (WZTC) LAYOUT. CONTRACTOR SHALL PREPARE A PROJECT SPECIFIC WZTC LAYOUT BASED ON HIS MEANS, METHODS, AND CONSTRUCTION SEQUENCE.

CONTRACTOR SHALL COORDINATE WZTC LAYOUT FOR ROADWAY CONSTRUCTION WITH THE WZTC LAYOUT FOR UTILITY CONSTRUCTION.

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TRAFFIC CONTROL PLAN

S.P. NO. 18-620-11 SHEET NO. 18 OF 93 SHEETS

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CROOKSTON, MN
DETROIT LAKES, MN
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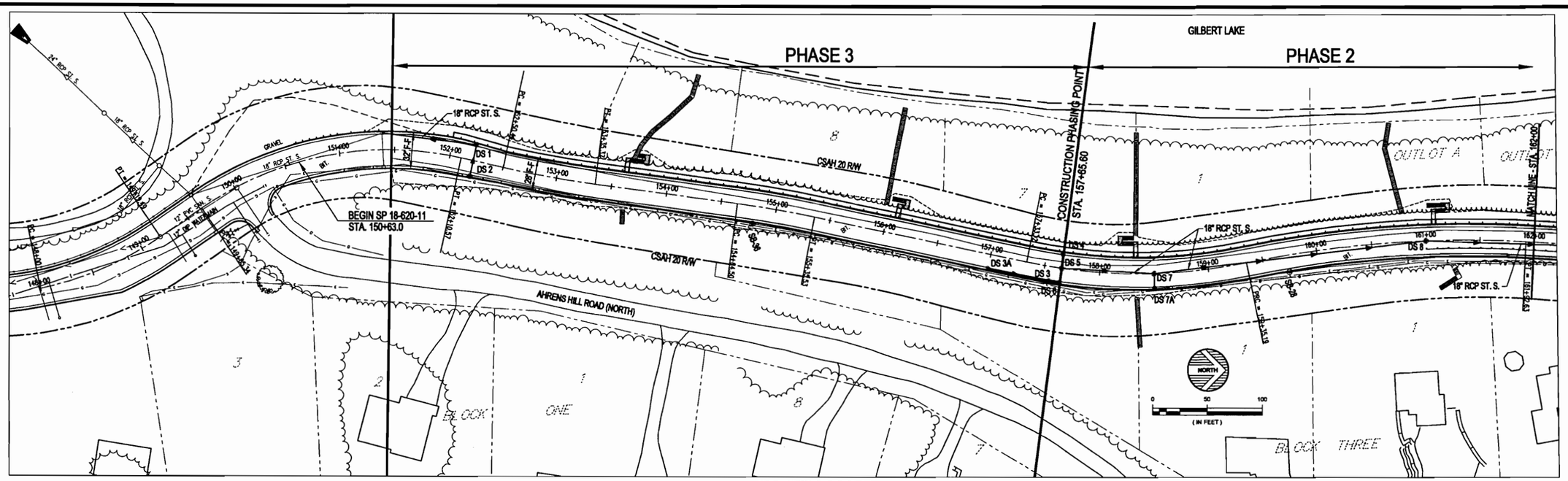
TIMOTHY M. KOULE DATE: 12/2/09 LIC. NO. 25132

BY	REVISIONS DESCRIPTION	REV#	DATE

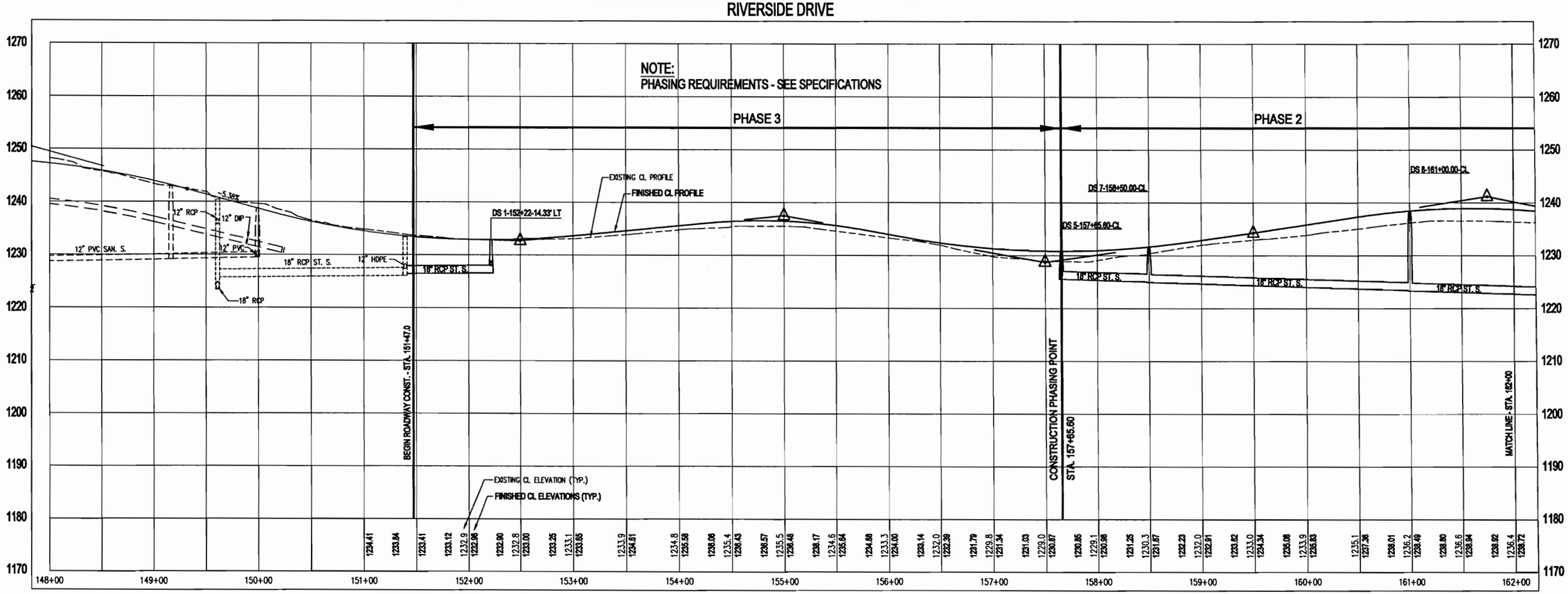
DATE: NOV. 2008
SCALE: AS SHOWN
DRAWN BY: P.M.B.
CHECKED BY: T.M.K.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-TRAF-PLAN.dwg, 12/2/2009 9:42:53 AM, shayne.johnson



RIVERSIDE DRIVE



CONSTRUCTION PHASING PLAN - STA. 151+47.00 - 162+00

S.P. NO. 18-620-11 SHEET NO. 19 OF 93 SHEETS

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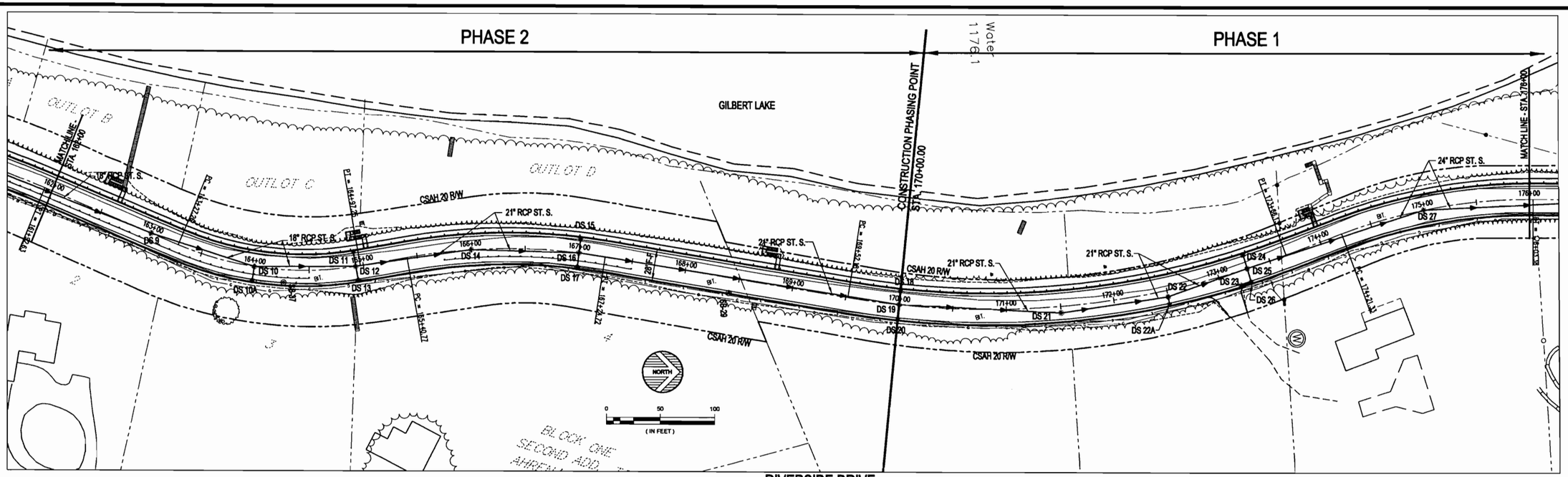
BY: TIMOTHY M. HOULE DATE: 11/13/2010 LIC. NO. 23132

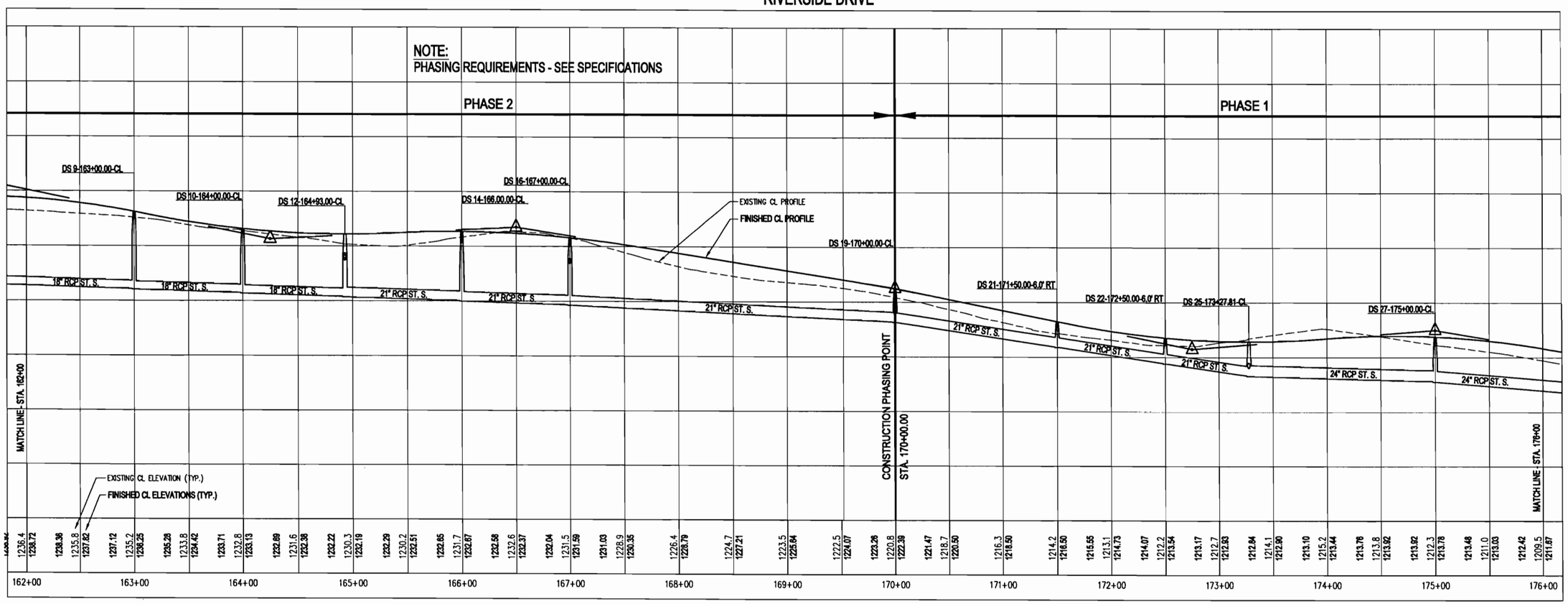
DATE	REV#	REVISIONS DESCRIPTION	BY

DATE: NOV. 2009
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



NOTE:
PHASING REQUIREMENTS - SEE SPECIFICATIONS



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CONSTRUCTION PHASING PLAN - STA. 162+00 - 176+00

S.P. NO. 18-620-11 SHEET NO. 20 OF 93 SHEETS

ALEXANDRIA, MN
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DETROIT LAKES, MN
GRAND FORKS, ND
RED WING, MN
ROCHESTER, MN
FOSS FALLS, ND

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LAND SURVEYORS
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Timothy M. Blake 11/25/09

TIMOTHY M. BLAKE DATE: LIC. NO. 23132

DATE	REV#	REVISIONS DESCRIPTION	BY

DATE: JULY, 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

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CROW WING COUNTY

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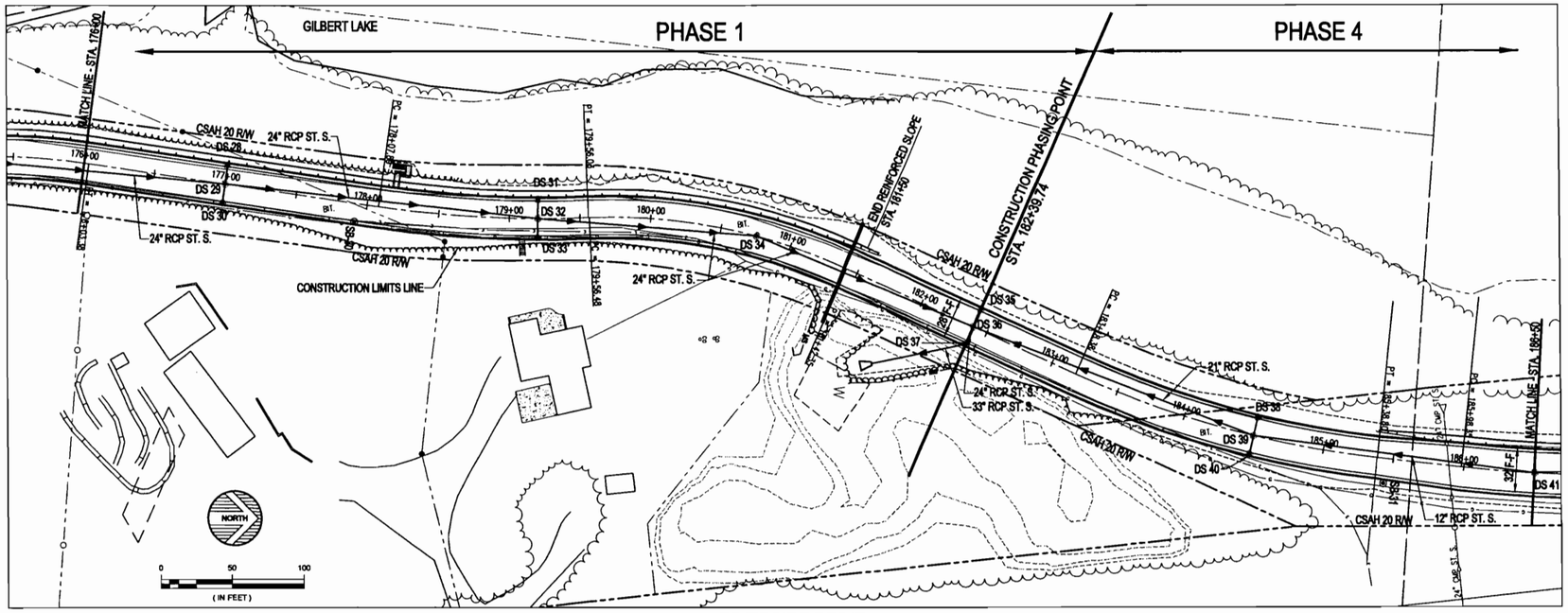
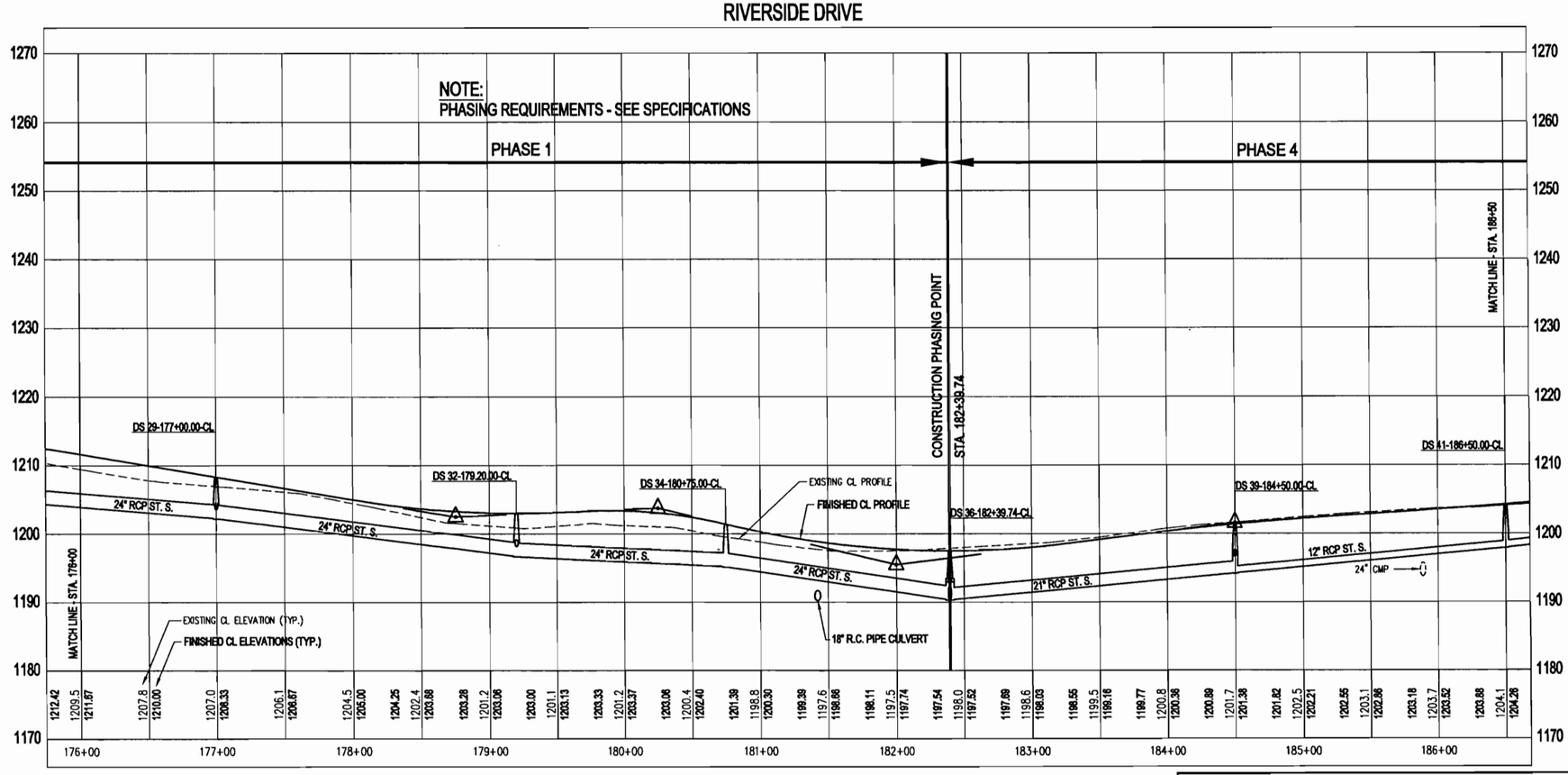


RIVERSIDE DRIVE



CONSTRUCTION PHASING PLAN - STA. 176+00 - 186+50

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S.P. NO. 18-620-11 SHEET NO. 21 OF 93 SHEETS

ENGINEERS
ARCHITECTS
LAND SURVEYORS
ENVIRONMENTAL SERVICES

ALEXANDRIA, MN
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DETROIT LAKES, MN
GRAND FORKS, ND
RED WING, MN
ROCHESTER, MN
SAUK RAPIDS, MN

WWW.WSNLLC.COM

WIDSETH SMITH NOLTING

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TIMOTHY M. HOALE DATE: 11/25/09 LIC. NO. 29172

DATE	REV#	REVISIONS DESCRIPTION

DATE: JULY, 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

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CROW WING COUNTY

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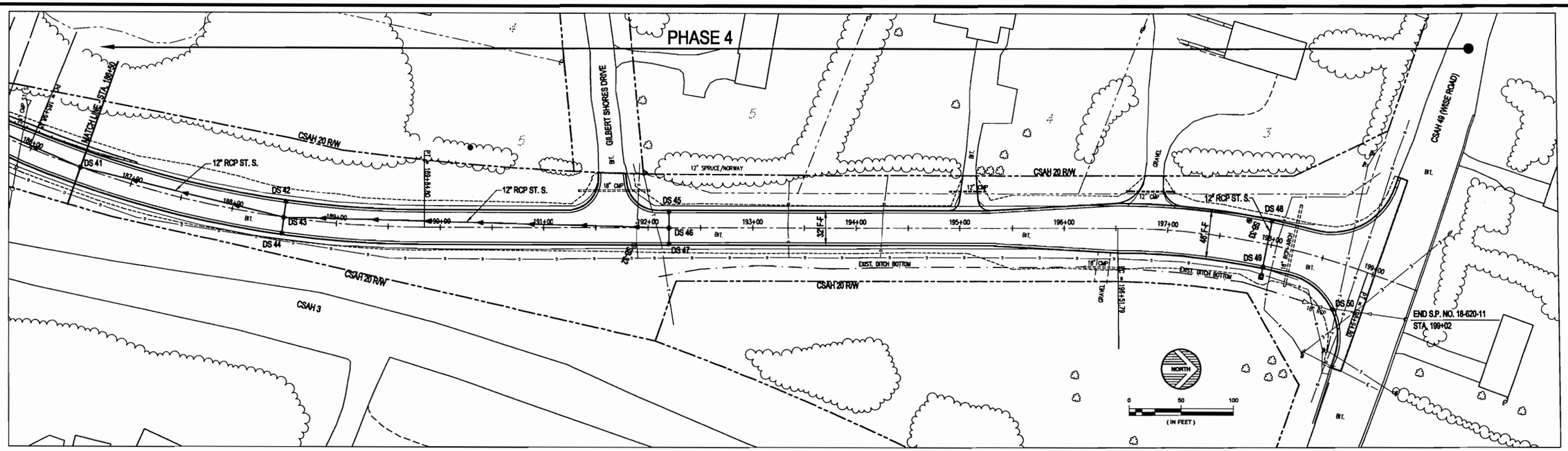
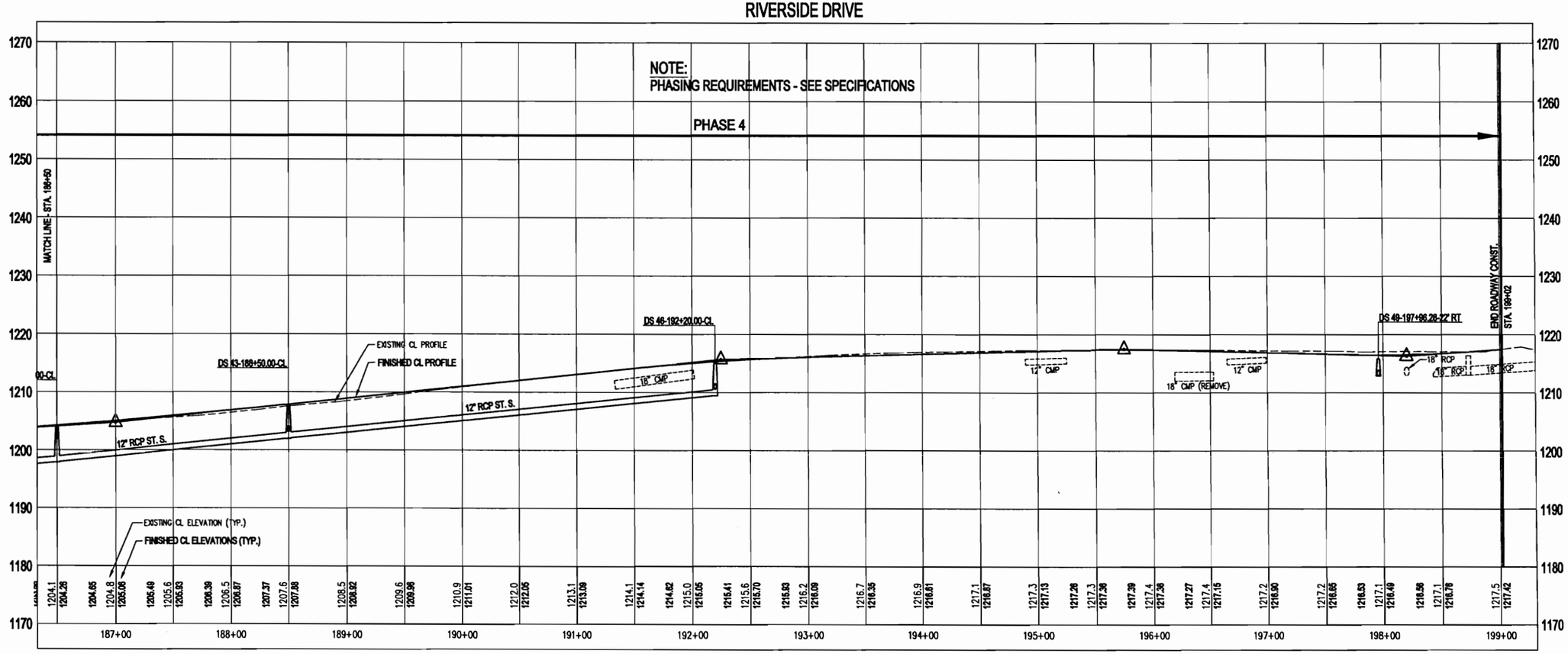


RIVERSIDE DRIVE



CONSTRUCTION PHASING PLAN - STA. 186+50 - END

S.P. NO. 18-620-11 SHEET NO. 22 OF 93 SHEETS

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ENGINEERS ARCHITECTS LAND SURVEYORS ENVIRONMENTAL SERVICES
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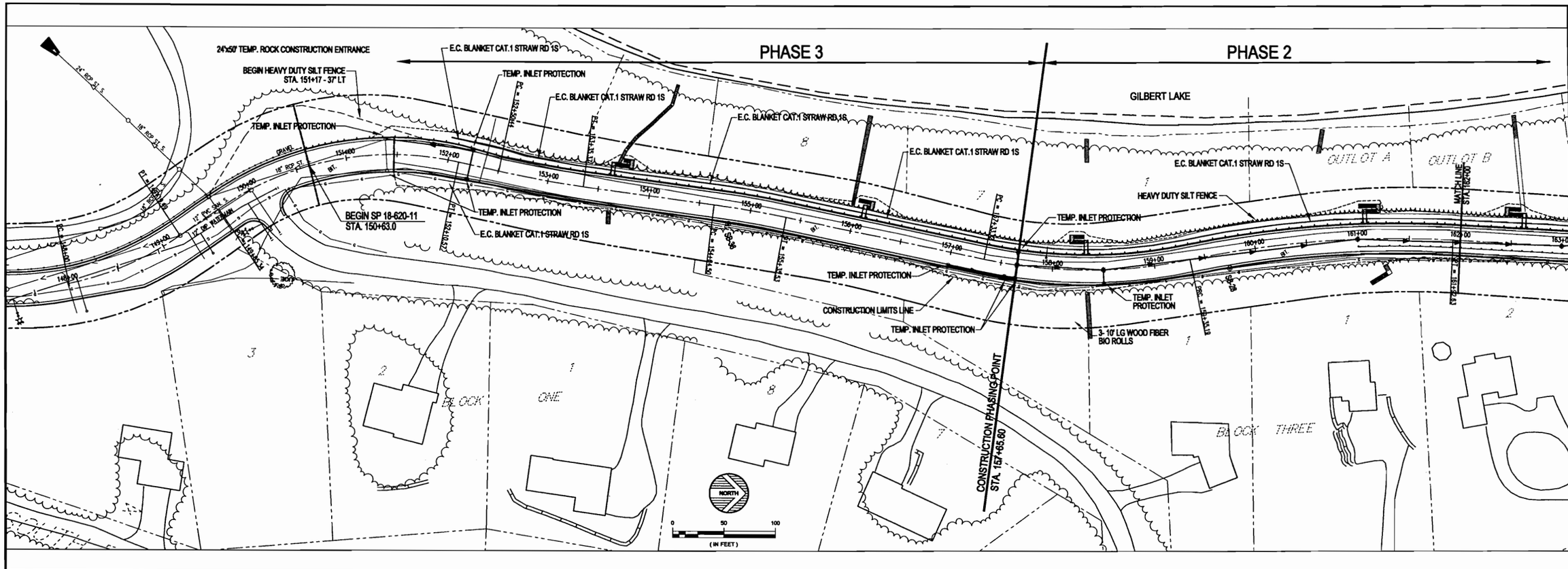
TIMOTHY M. HOULE DATE: 11/13/2009 LIC. NO. 25132

BY	REVISIONS DESCRIPTION	DATE	REV#

DATE: JULY, 2009
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



NOTE:
IT IS THE CONTRACTORS RESPONSIBILITY TO PROTECT ALL EXISTING TREES AND SHRUBS ADJACENT TO RIGHT OF WAY. THIS INCLUDES ROOT, TRUNK, AND BRANCH DAMAGE. TREES AND SHRUBS SPECIFICALLY TO BE REMOVED WILL BE INDICATED.

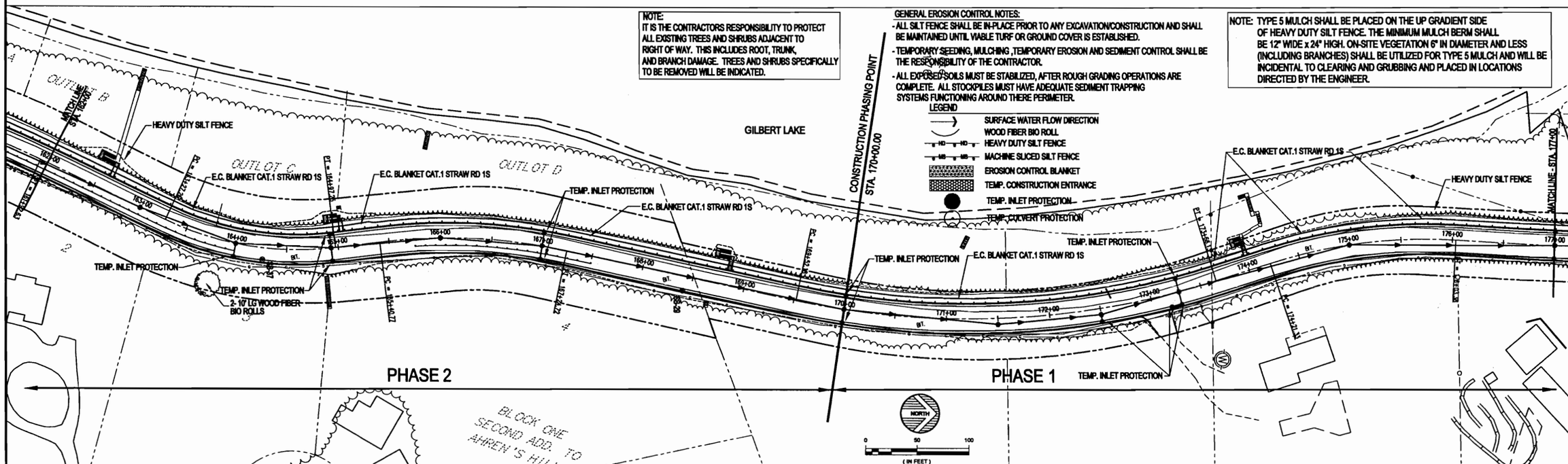
GENERAL EROSION CONTROL NOTES:

- ALL SILT FENCE SHALL BE IN-PLACE PRIOR TO ANY EXCAVATION/CONSTRUCTION AND SHALL BE MAINTAINED UNTIL VIABLE TURF OR GROUND COVER IS ESTABLISHED.
- TEMPORARY SEEDING, MULCHING ,TEMPORARY EROSION AND SEDIMENT CONTROL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL EXPOSED SOILS MUST BE STABILIZED, AFTER ROUGH GRADING OPERATIONS ARE COMPLETE. ALL STOCKPILES MUST HAVE ADEQUATE SEDIMENT TRAPPING SYSTEMS FUNCTIONING AROUND THERE PERIMETER.

LEGEND

- SURFACE WATER FLOW DIRECTION
- WOOD FIBER BIO ROLL
- HEAVY DUTY SILT FENCE
- MACHINE SLICED SILT FENCE
- EROSION CONTROL BLANKET
- TEMP. CONSTRUCTION ENTRANCE
- TEMP. INLET PROTECTION
- TEMP. CULVERT PROTECTION

NOTE: TYPE 5 MULCH SHALL BE PLACED ON THE UP GRADIENT SIDE OF HEAVY DUTY SILT FENCE. THE MINIMUM MULCH BERM SHALL BE 12" WIDE x 24" HIGH. ON-SITE VEGETATION 6" IN DIAMETER AND LESS (INCLUDING BRANCHES) SHALL BE UTILIZED FOR TYPE 5 MULCH AND WILL BE INCIDENTAL TO CLEARING AND GRUBBING AND PLACED IN LOCATIONS DIRECTED BY THE ENGINEER.



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EROSION CONTROL PLAN

S.P. NO. 18-620-11 SHEET NO. 23 OF 93 SHEETS

ENGINEERS
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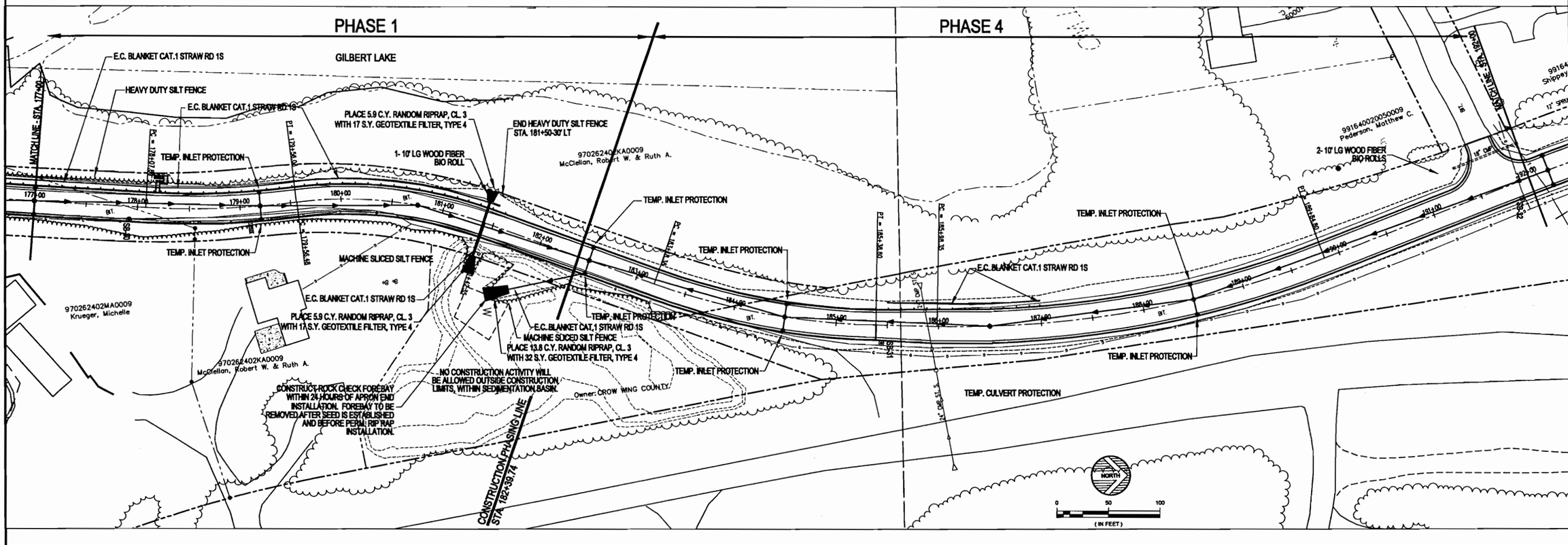
Timothy M. Houle 11/13/2009

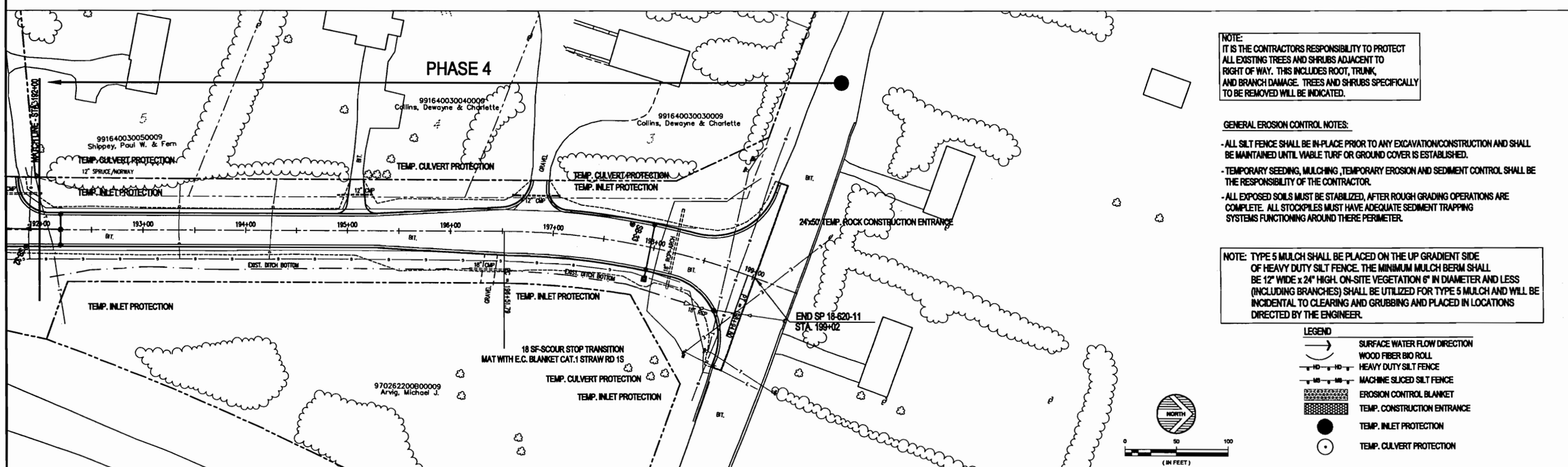
TIMOTHY M. HOULE DATE: LIC. NO. 25132

BY	REVISIONS DESCRIPTION	REV#	DATE

DATE: NOV. 2009
SCALE: 1:50
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY





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- TEMP. CONSTRUCTION ENTRANCE
- TEMP. INLET PROTECTION
- TEMP. CULVERT PROTECTION

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EROSION CONTROL PLAN

S.P. NO. 18-620-11 SHEET NO. 24 OF 93 SHEETS

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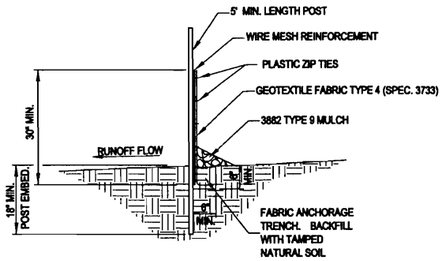
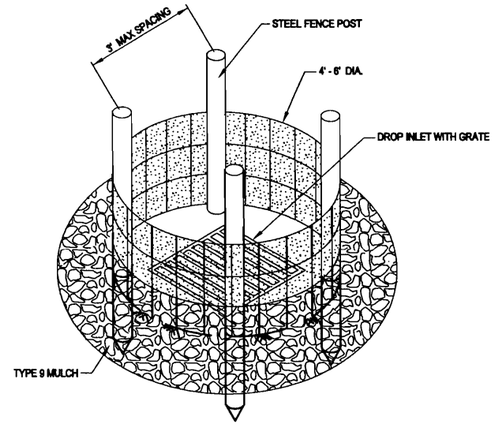
TIMOTHY M. ROULE DATE: 4/13/2010 LIC. NO. 29132

BY	REVISIONS DESCRIPTION	REV#	DATE

DATE: NOV. 2008
SCALE: 1:50
DRAWN BY: P.M.B.
CHECKED BY: T.M.R.
JOB NUMBER: 108B029.001

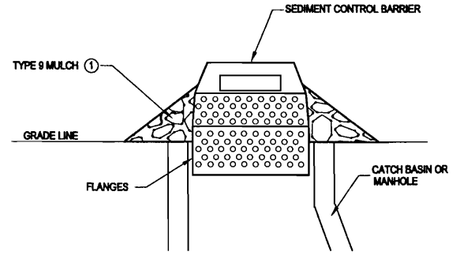
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY





INLET PROTECTION - (SILT FENCE RING AND ROCK FILTER BERM)

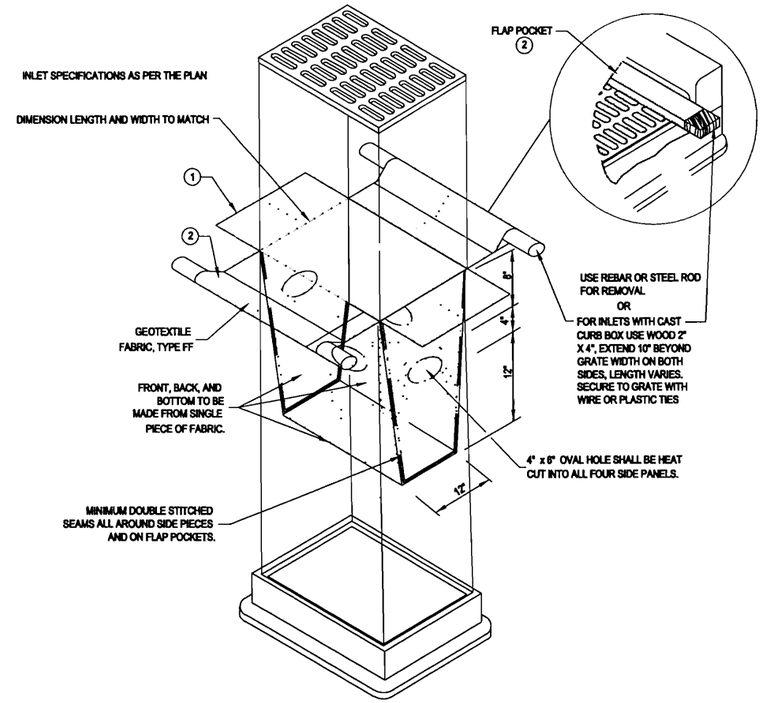
USE WHERE INLET DRAINS AN AREA WITH SLOPES AT 1:3 or LESS
USE BEFORE CURB AND GUTTER INSTALLATION
(MNDOT SPEC. 3891)



NOTES:
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHELENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.
(1) USE TYPE 9 MULCH, AS DIRECTED BY THE ENGINEER.

INLET PROTECTION - SEDIMENT CONTROL INLET HAT

USE BEFORE CURB AND GUTTER INSTALLATION



NOTES:

INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE ENGINEERS' EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

(1) FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

(2) FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4".

(3) INSTALLATION NOTES:

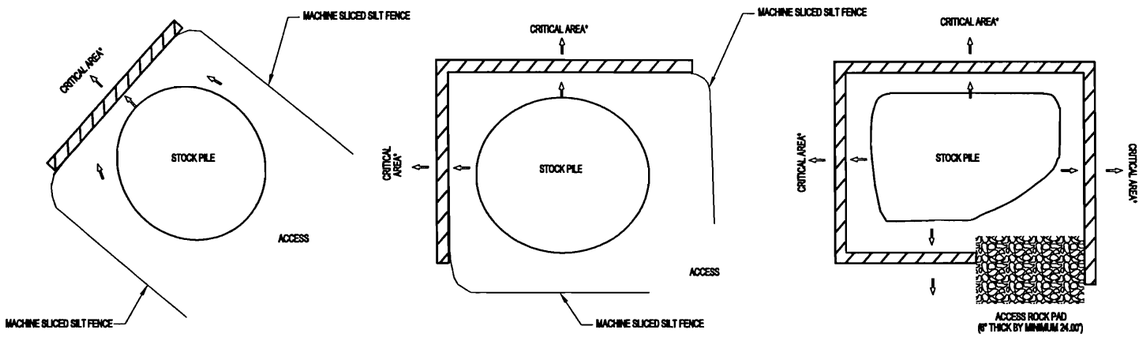
DO NOT INSTALL INLET PROTECTION IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

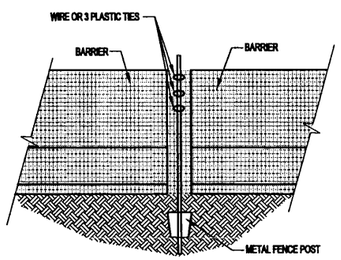
TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

INLET PROTECTION - FILTER BAG INSERT

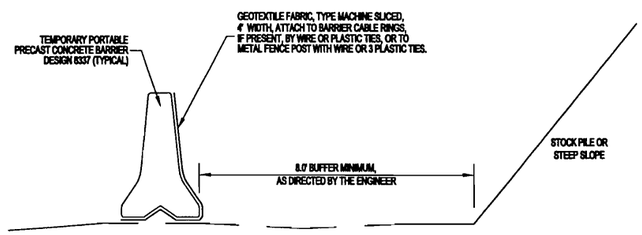
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)
USE AFTER CURB AND GUTTER INSTALLATION



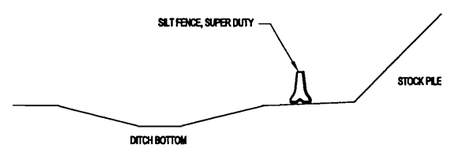


BARRIER WITHOUT CABLE RINGS

SIDE VIEW



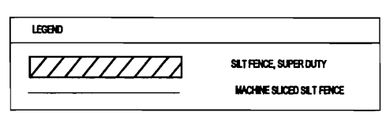
SILT FENCE, SUPER DUTY



SILT FENCE, SUPER DUTY - DITCH PROTECTION SYSTEM

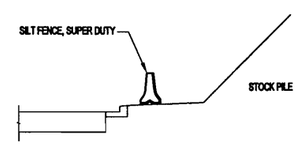
NOTES:
IT IS NOT RECOMMENDED TO PLACE STOCK PILES NEXT TO A CRITICAL AREA. WHEN THERE ARE NO FEASIBLE ALTERNATIVES, THE SUPERDUTY SILT FENCE IS TO BE USED AS SHOWN OR DIRECTED BY THE ENGINEER.

* CRITICAL AREAS INCLUDE WETLANDS, JUDICIAL DITCHES, STREAMS, WATER BODIES, AND OTHER AREAS IMPORTANT TO PROTECT



SILT FENCE, SUPER DUTY - CRITICAL RESOURCE PROTECTION SYSTEM

PLACEMENT SHALL BE DIRECTED BY THE ENGINEER



SILT FENCE, SUPER DUTY - CURB AND GUTTER PROTECTION SYSTEM

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MISCELLANEOUS DETAILS - EROSION CONTROL

S.P. NO. 18-620-11 SHEET NO. 25 OF 93 SHEETS

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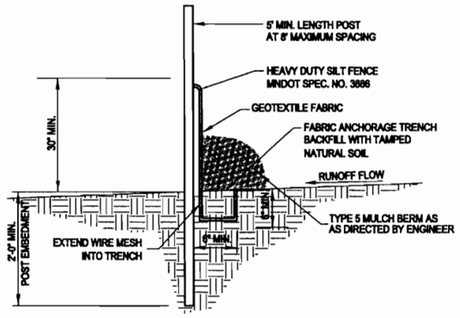
TIMOTHY M. PAULE DATE: 11/25/09 REG. NO. 25132

DATE	REV#	REVISIONS DESCRIPTION

DATE: NOV. 2008
SCALE: NONE
DRAWN BY: P.M.B.
CHECKED BY: T.M.K.
JOB NUMBER: 108B029.001

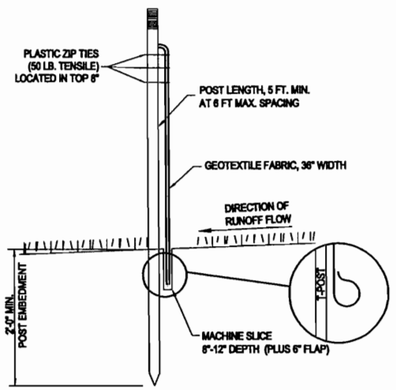
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-DETAIL SHEETS.dwg, 11/24/2009



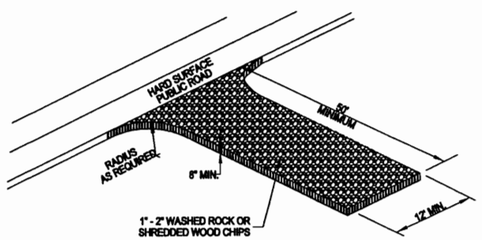
HEAVY DUTY SILT FENCE DETAIL

NO SCALE

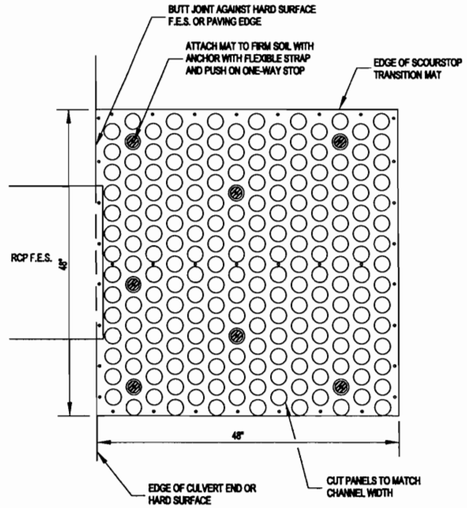


SILT FENCE DETAIL

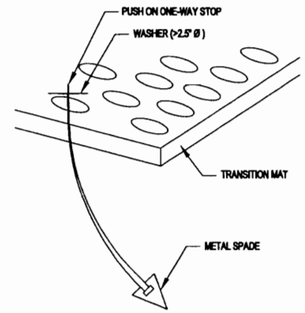
STANDARD MACHINE SLICED



CONSTRUCTION ENTRANCE

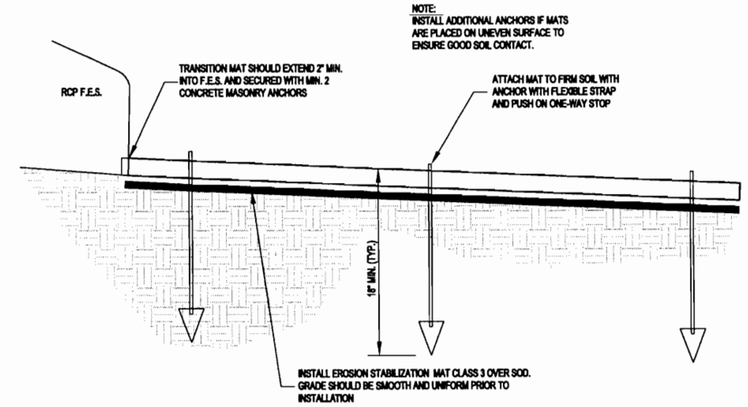


SCOURSTOP TRANSITION MAT DETAIL



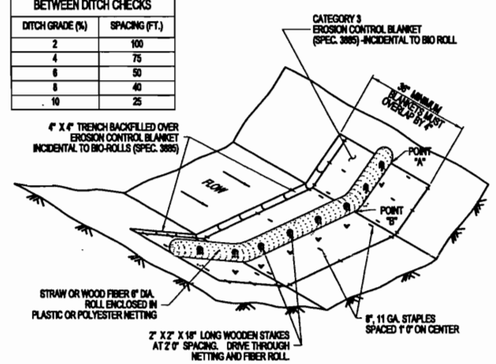
ANCHOR AND FLEXIBLE STRAP DETAIL

PIPE DIAMETER	DISCHARGE (CFS)	SCOURSTOP WIDTH x LENGTH	TRM WIDTH x LENGTH
12"	8	4' x 4'	6' x 6'
24"	30	4' x 8'	11 x 12'
36"	75	8' x 12'	17' x 16'
48"	100	12' x 16'	23' x 20'
60"	150	12' x 20'	29' x 24'



SCOURSTOP TRANSITION MAT SECTION

RECOMMENDED SPACING BETWEEN DITCH CHECKS	
DITCH GRADE (%)	SPACING (FT.)
2	100
4	75
6	50
8	40
10	25



NOTES:

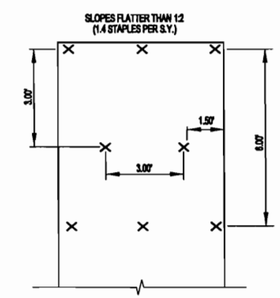
SEE SPECS. 2573, 3885, 3886 & 3888.

SPACING OF DITCH CHECKS IS DEPENDENT ON DRAINAGE AREA AND GRADES.

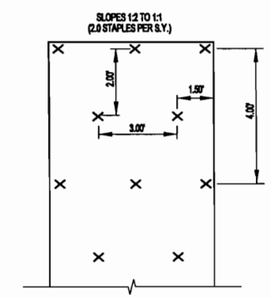
POINT A MUST BE 2' 0" MIN. HIGHER THAN POINT B.

WOOD FIBER BIOROLL BLANKET SYSTEM

NO SCALE



STANDARD 6.50' BLANKET



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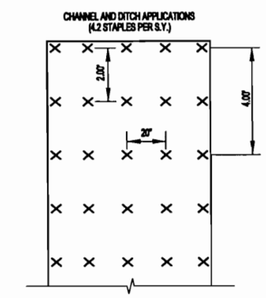

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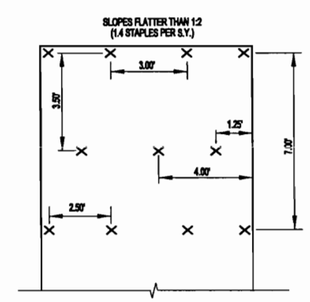
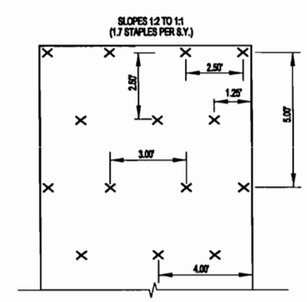


STANDARD 8.00' BLANKET



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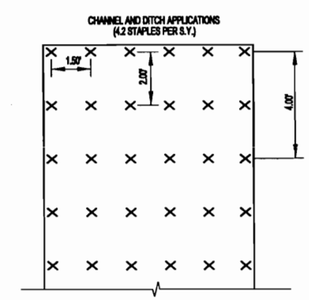

STANDARD 8.00' BLANKET

BLANKET STAPLING PATTERN

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MISCELLANEOUS DETAILS - EROSION CONTROL

S.P. NO. 18-620-11 SHEET NO. 26 OF 93 SHEETS

ENGINEERS ALEXANDRIA, MN BRAINERD, MN DETROIT LAKES, MN CROOKSTON, MN
ARCHITECTS GRAND FORKS, ND WILLMAR, MN
LAND SURVEYORS WILLMAR, MN ROCHESTER, MN
ENVIRONMENTAL SERVICES ROCHESTER, MN

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TIMOTHY M. HOLLE DATE: 11/24/09 LIC. NO. 25132

DATE	REV#	REVISIONS DESCRIPTION

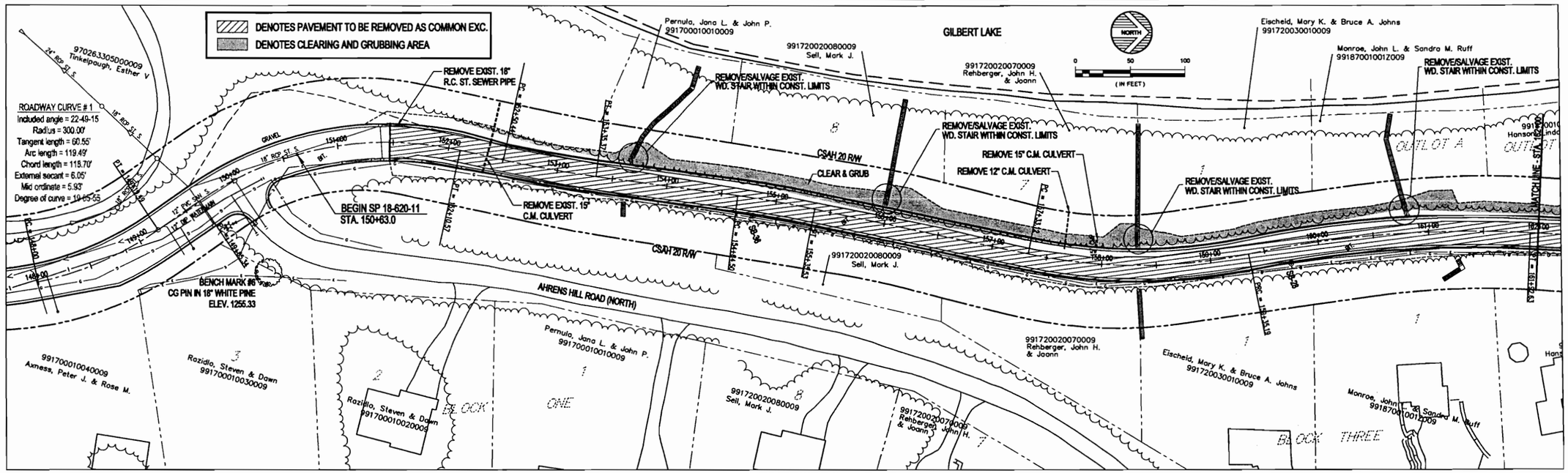
DATE: NOV. 2008
SCALE: NONE
DRAWN BY: P.M.S.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

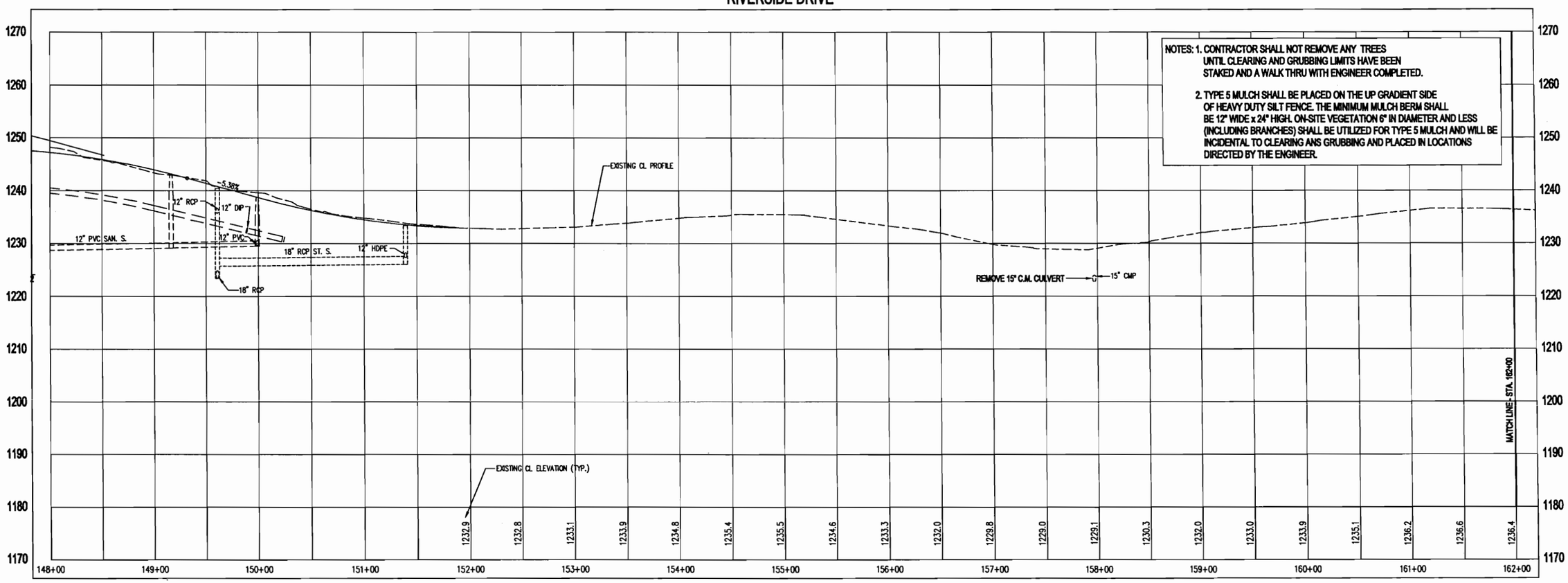
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS

NORTH AHRENS HILL TO C.S.A.H. 49

CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-DETAIL SHEETS.dwg, 11/24/2009 2:01:17 PM, shayne.johnson





REMOVAL PLAN & PROFILE - STA. 151+47.00 - 162+00

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S.P. NO. 18-620-11 SHEET NO. 27 OF 93 SHEETS

ENGINEERS ALEXANDRIA, MN BRAINERD, MN DETROIT LAKES, MN GRAND FORKS, ND
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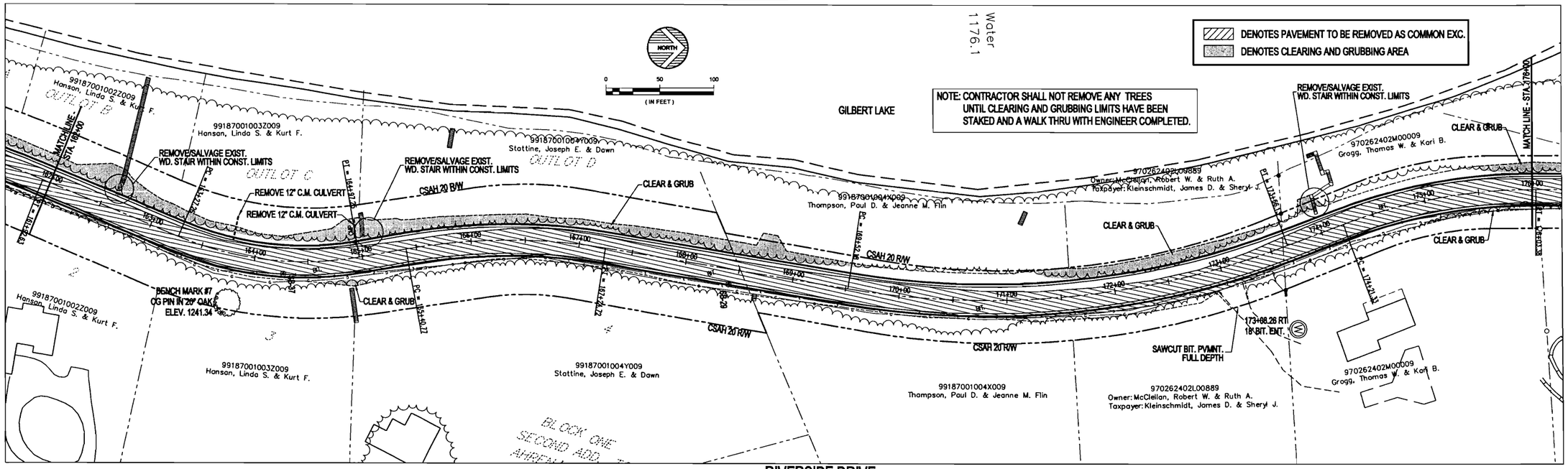
TIMOTHY M. KOBLE
DATE: 11/13/2012
LIC. NO. 29132

DATE	REV#	REVISION DESCRIPTION

DATE: NOV. 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

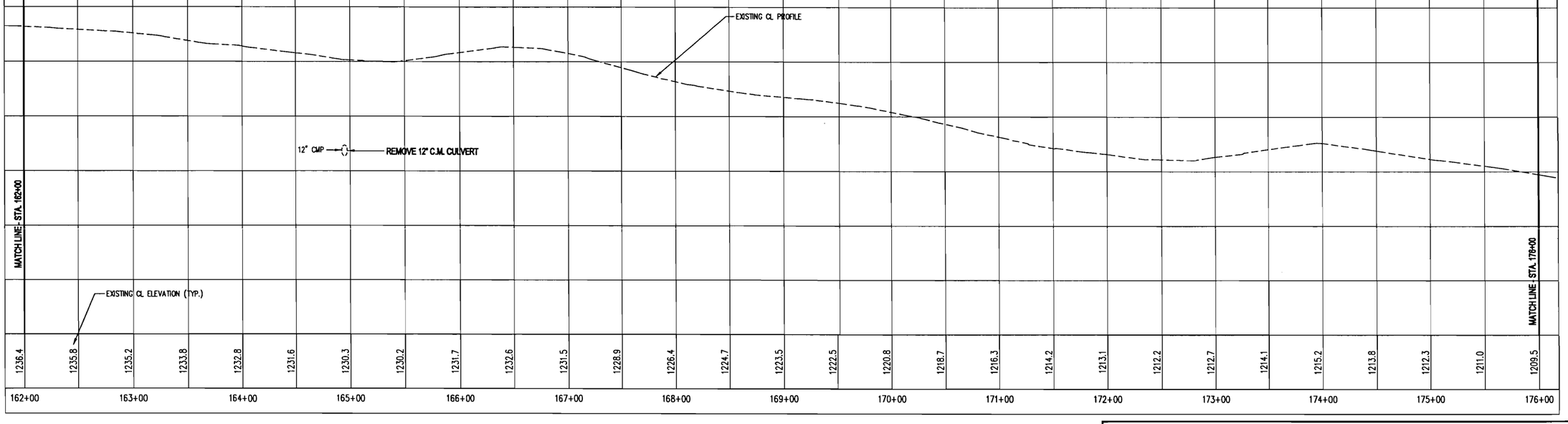
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



RIVERSIDE DRIVE

NOTES: 1. CONTRACTOR SHALL NOT REMOVE ANY TREES UNTIL CLEARING AND GRUBBING LIMITS HAVE BEEN STAKED AND A WALK THRU WITH ENGINEER COMPLETED.

2. TYPE 5 MULCH SHALL BE PLACED ON THE UP GRADIENT SIDE OF HEAVY DUTY SILT FENCE. THE MINIMUM MULCH BERM SHALL BE 12" WIDE x 24" HIGH. ON-SITE VEGETATION 6" IN DIAMETER AND LESS (INCLUDING BRANCHES) SHALL BE UTILIZED FOR TYPE 5 MULCH AND WILL BE INCIDENTAL TO CLEARING ANS GRUBBING AND PLACED IN LOCATIONS DIRECTED BY THE ENGINEER.



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TIMOTHY M. HYDE DATE: 11/25/08 LIC. NO. 25132

REVISIONS DESCRIPTION	BY	DATE	REV#

DATE: JULY, 2008
SCALE: 1"=60'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

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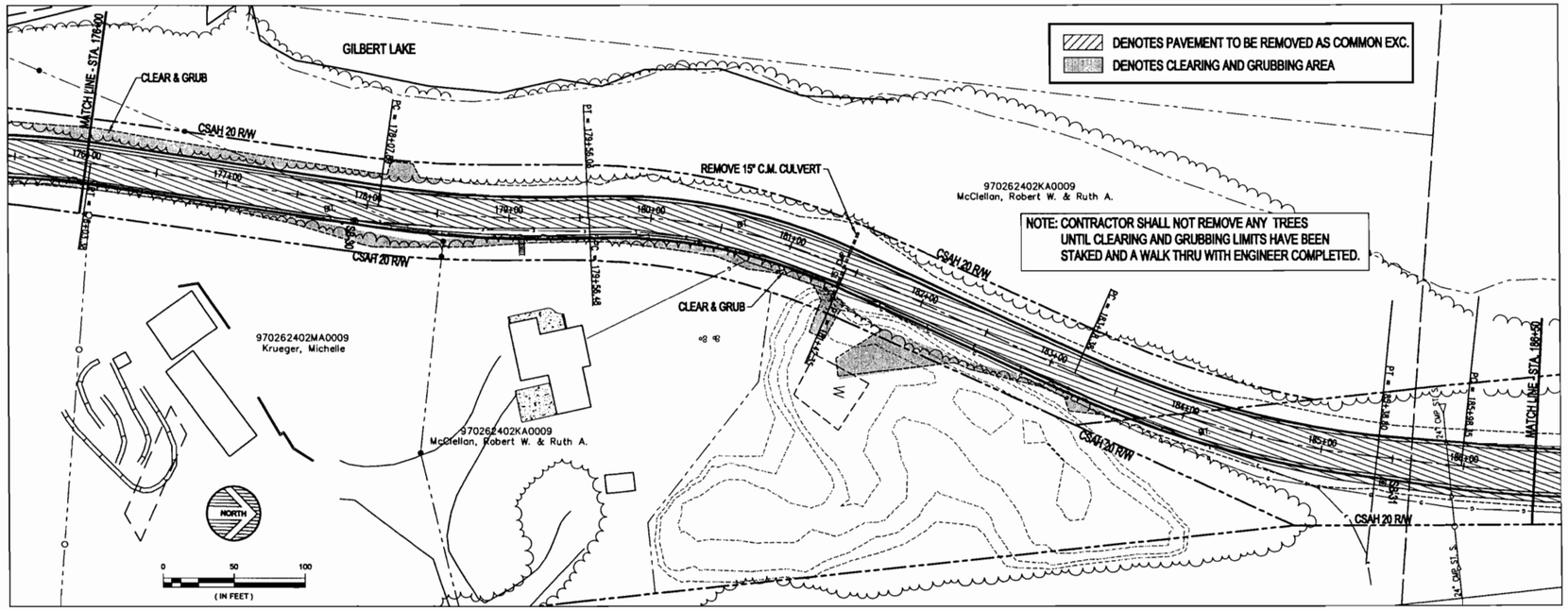
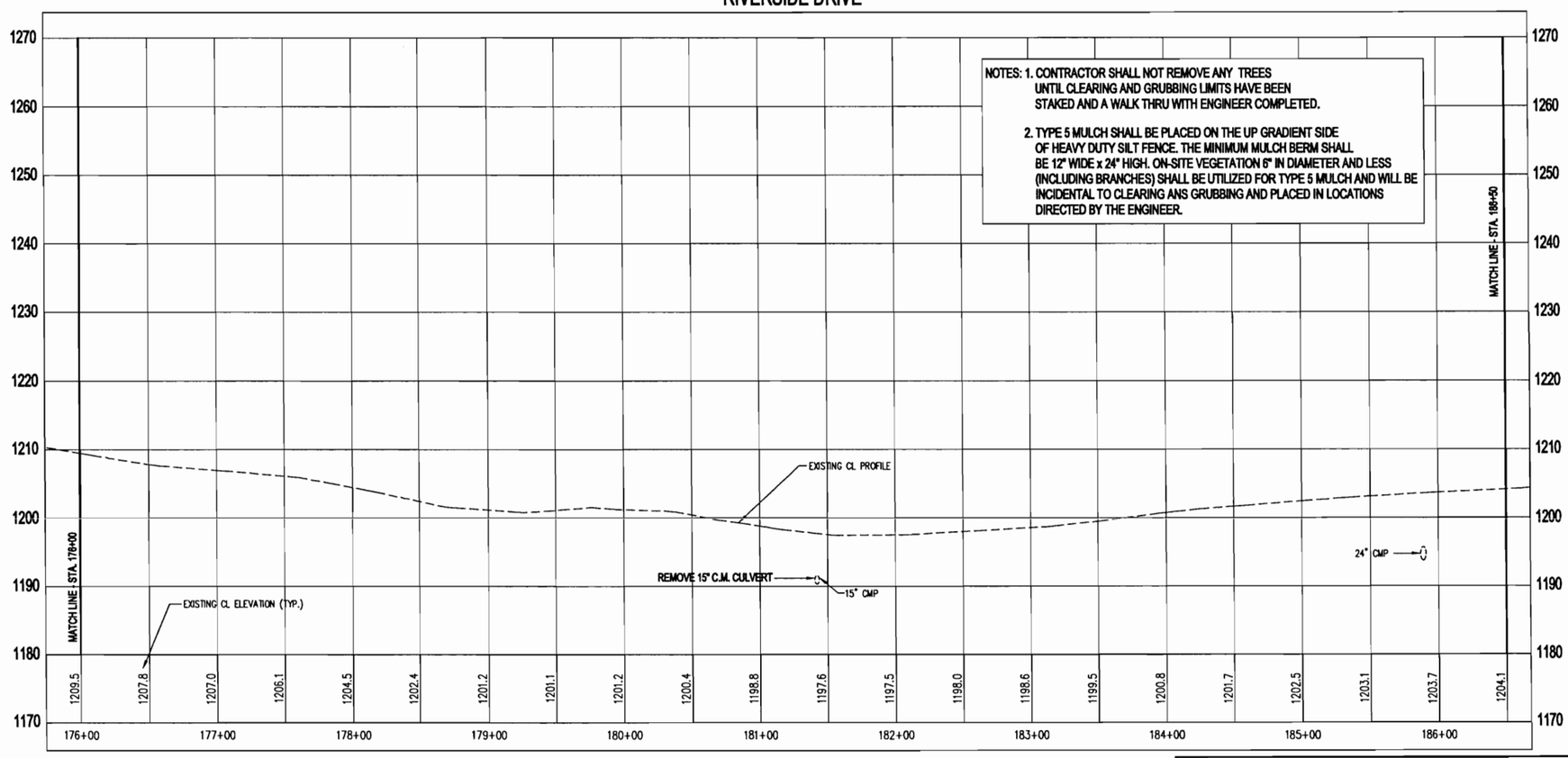


RIVERSIDE DRIVE



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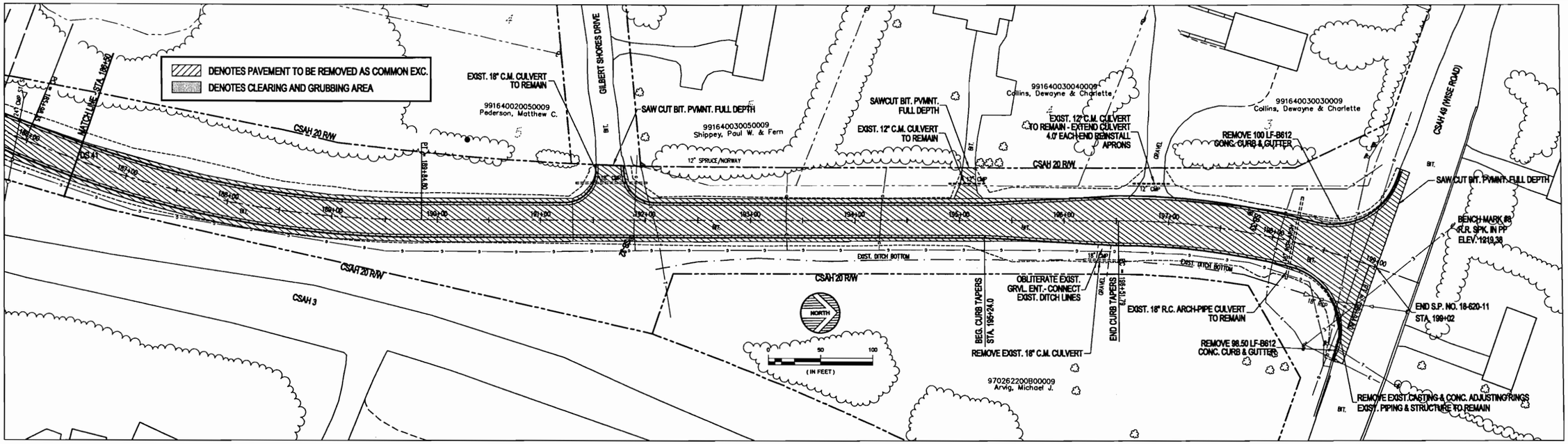
TIMOTHY M. HOLLE DATE: 11/25/09 LIC. NO. 29132

REVISIONS DESCRIPTION	BY	DATE	REV#

DATE: JULY, 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



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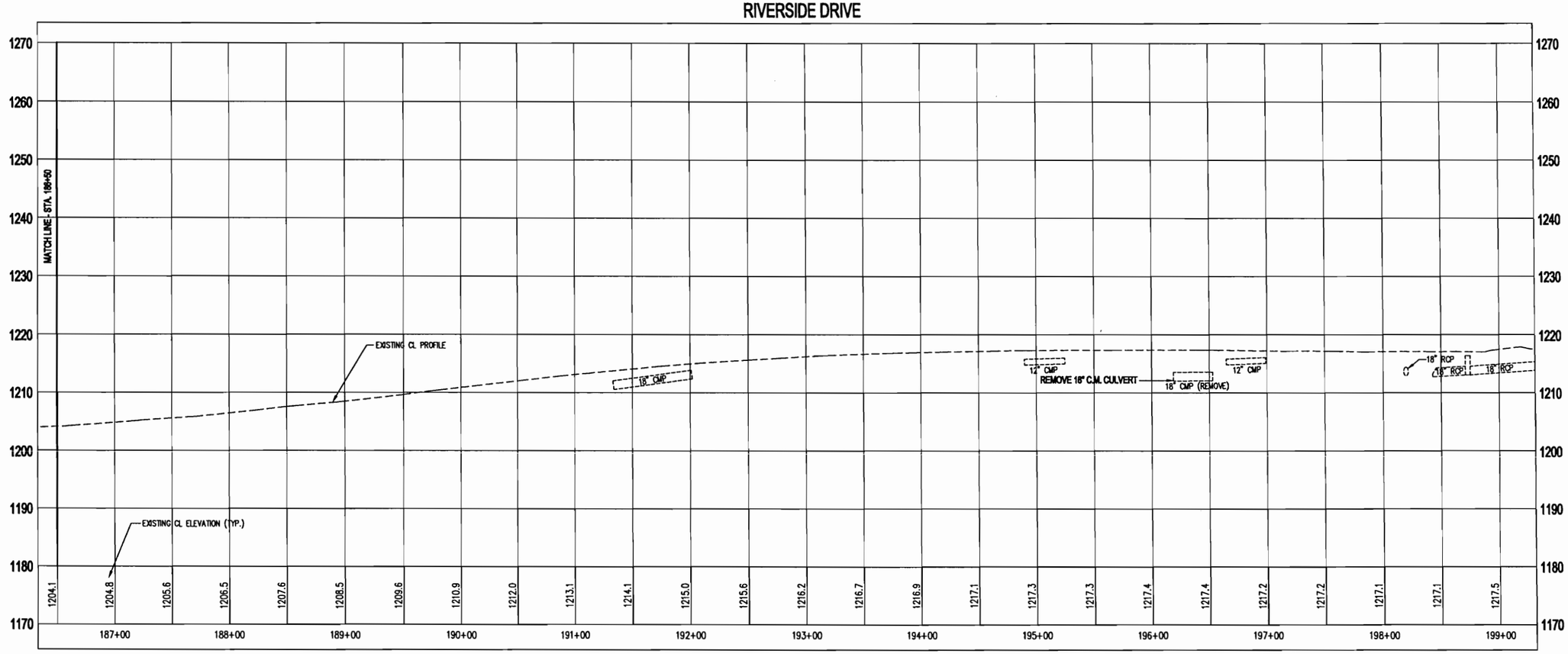

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TIMOTHY A. HOLLE DATE: 1/13/2010 LIC. NO. 25132

DATE: JULY, 2009
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 1088029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

STORM WATER POLLUTION PREVENTION PLAN

Project Location:
County State Aid Highway 20 (CSAH 20) is located in Crow Wing County in an unorganized township Section 26 Range 28 W Township 134 N. The entire county state aid route has been phased over the past several years, beginning in 2000 and will be completed after this phase of construction is complete. Total roadway length is approximately 3.8 miles. This phase of construction is approximately 0.92 miles.

Existing Site Description:
CSAH 20 is an established roadway within rolling to very hilly terrain that is moderately to heavily wooded. The variable terrain influenced early road construction with many horizontal curves and narrow shoulder widths. Although scenic, the segment located between Gilbert Lake Road and North Aherns Hill Road is very steep in cross section with a steep downslope to the lake on the west and a steep upslope on the east side of the road. The roadway also serves as an alternate traffic route from the north terminus with CSAH 49 to the northern limits of Baxter/Brainerd. The roadway is used to access residential properties via North Aherns Hill Road and three individual driveway entrances located at the north end of the project where terrain is generally more level. The south terminus of the project coincides with the northern portion of CSAH 20 that was improved to North Aherns Hill Road under SAP 18-620-09 (2006) and SAP 18-620-08 (2004). This project is intended to be a continuation to complete the northern portion of CSAH 20. Refer to the Project Manual for soil boring and soil log descriptions of existing soil conditions.

Proposed Project Description:
The estimated length of the proposed improvements for this segment of CSAH 20 (SP 18-620-11) is 4,839 lineal feet (0.92 miles). This segment will continue a 2 lane urban roadway section with the addition of curb and gutter and storm sewer improvements. Minor horizontal adjustments to curvature and a consistent 28-foot (curb to curb) bituminous road surface will minimize the impacts to existing terrain and vegetation. This will be accomplished through the use of a vegetative faced reinforced soil slope wall along the lake side of the roadway. A slope and retaining wall analysis was completed by Gal-Tech, Inc. and it was determined not to encroach into the uphill slope. Therefore, roadway widening and slope stabilization efforts will be focused on the downslope side of the roadway. Further explanation/clarification of the proposed project can be found in the Project Memo created for this project.
The total area disturbed for this segment of roadway is 227,948 s.f. (5.23 acres), this area is estimated within the project limits of construction which includes the outer limits of proposed clearing and grubbing operations. Existing impervious surfaces within the project, including bituminous roadway, bituminous driveways and gravel driveways is estimated at 132,712 s.f. (3.05 acres). The proposed impervious surfaces for the project are estimated at 156,681 s.f. (3.60 acres). An overall increase of 0.55 acres of impervious surface will be added to the project area. Hydraulic calculations have been performed to size the proposed storm sewer collection system, proposed culverts, and storm water ponding requirements. This segment of CSAH 20 will be phased in 4 sections. Phasing limits were determined by storm sewer and vegetative faced reinforced soil slope wall design and constructability.

PHASE 1 Sta. 170+00.00 - 182+39.74
Construction of storm sewer outfall into a natural low lying vegetated depression will ensure up gradient storm water will be discharged thru piping to this low area. Slope stabilization on the lake side of the hill will be constructed concurrently with the storm sewer and roadway improvements.

PHASE 2 Sta. 157+65.60 - 170+00.00
Construction of storm sewer to its' upslope western limit will be complete. Waters that will flow to this natural low lying depression will be completed. Slope stabilization again will be constructed concurrently with roadway improvements.

PHASE 3 Sta. 151+50.00 - 157+65.60
Two catch basins will control storm water within this phase. This piping will be connected to an existing storm line which drains north west of the project. Slope stabilization will be constructed concurrently with roadway improvements.

PHASE 4 Sta. 182+39.74 - End (CSAH 49)
The remaining portion of storm water that will flow to the natural low lying depression will be complete. The remaining portions of vegetative reinforced soil slopes will also be completed, along with the remaining portions of the roadway. Storm water from Gilbert Shores Road (Sta. 192+50) to CSAH 49 will be in a vegetated county ditch and transported by existing piping under CSAH 20 into the county ditch system.

The natural low area described above that will receive storm water has been reviewed by the County's technical evaluation panel and has been designed with overflow piping to handle a 100 year storm event. Storm water after treatment, will ultimately discharge to a back bay of Gilbert Lake. Drainage calculations have been submitted to MnDOT and are retained in the project design file

Special Emphasis Zone

The entire project area is identified as a special emphasis zone (sez).

The notes below are required in addition to any stipulations in permits from agencies that have jurisdictional control.

1. Effective temporary soil stabilization shall be in place on all erodable surfaces in the sez at the completion of each day's work. Work roads within the sez for all construction activities shall be constructed with a non-erodable surface. If rock products of any kind are used, they shall be washed, and the work road constructed of a thick enough section that will withstand construction traffic while still maintaining its non-erodable characteristics. Silt fence or other appropriate bmp's shall be installed and maintained as outlined in the Stormwater Pollution Prevention plan and/or directed by the project engineer at the end of each work day.

2. Individual site plans will be required by the E.C. Supervisor as deemed necessary by the project engineer. Refer to MnDOT 1717.

3. Type 3 mulch shall be applied at the end of each work day to all exposed soil areas, by hand, and spread evenly over the entire exposed soil area.
Anchoring of the mulch is not required for this daily operation.

4. A daily inspection log will be required by the E.C. Supervisor of all sediment, erosion and materials on site (ie: chemicals, etc). This log shall be presented daily to the observer on site.

5. The E.C. Supervisor shall provide an inlet staging schedule and protection plan for each phase of Construction activity. This plan and schedule shall be presented to the engineer prior to each phase of construction. Minimum requirements of the plan and schedule shall include:

- date of proposed inlet protection device installation
- phase of construction activity
- protection device utilized
- estimated duration of device in operation
- schedule of subsequent devices that will be utilized for inlet protection

6. The contractor shall have a petroleum release plan and shall have all necessary materials on hand to implement the plan. All employees shall be trained in implementation of the plan. The MPCA shall be informed of any petroleum spills.

7. Any turbid or sediment laden effluent resulting from dewatering operations shall be pumped into an effective temporary sediment basin.

8. Diversion ditches and temporary sediment basins shall be utilized to prevent sediment reaching Gilbert lake or discharge points to the lake.

Unique Storm Water Management Features
No unique storm water management features exist for this project. The nearest body of water that will likely receive storm water is Gilbert Lake. This body of water is not listed as a special or impaired water body by the MPCA or in Section 303d list.

TMDL Implementation Plans Containing Storm Water Requirements
No TMDL Implementation Plans currently exist for the receiving waters on this project.

Long Term Maintenance
Long term maintenance of the permanent storm water management system will be by Crow Wing County Highway Department personnel.

Erosion Control Supervisor Requirements
The Contractor must identify an Erosion Control Supervisor (ECS) who is knowledgeable and experienced in the application of erosion and sediment control Best Management Practices (BMP's). The ECS must work with the Project Engineer to oversee and implement the SWPPP, and the installation, inspection, and maintenance of erosion and sediment control BMP's before, during and after construction. The Contractor/ECS is required to comply with the training requirements in Part III.A of the NPDES Permit. The permittee(s) shall ensure that employees are properly trained in the following areas with certification proof provided at the pre-construction conference.

SWPPP Preparation:
Name: Shayne W. Johnson
Dates of Training: January 12 & 13, 2009 - Univ. of Minnesota
Instructors Name providing Training: J. Chapman, S. Missaghi, P. Leete, T. Smith
Content of Training (incl. hours): Design of SWPPP - 12 hrs.

Site Manager:
Name: _____
Dates of Training: _____
Instructors Name providing Training: _____
Content of Training (incl. hours): _____

BMP Installer:
Name: _____
Dates of Training: _____
Instructors Name providing Training: _____
Content of Training (incl. hours): _____

The Contractor/ECS shall develop a chain of responsibility with all operators on the site to ensure that the SWPPP will be implemented and stay in effect until the project site has undergone Final Stabilization in accordance with Part IV.G of the NPDES Permit and a Notice of Termination (NOT) has been submitted to the MPCA in accordance with Part II.C of the NPDES Permit. The Contractor/ECS must routinely inspect the entire construction site at least once every seven days during active construction and within 24 hours after a rainfall event greater that 0.5 inch in 24 hours. The Contractor shall take action to eliminate any deficiencies found during these inspections and contact the MPCA if contaminated stormwater has reached any surface water. The Contractor must provide 2 rain gauges to be installed on the construction site. Inspections, maintenance and documentation must be in accordance with the NPDES Permit Part IV.E. See Part III.D of the NPDES Permit for record retention requirements. Copies of the inspection records are to be submitted to the Engineer. The Contractor/ECS or Project Engineer must amend the SWPPP as necessary to include additional requirements, such as additional or modified BMP's, designed to correct problems or address situations in accordance with Part III.A.5 of the NPDES Permit.

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Timothy M. Heale 11/25/09
TIMOTHY M. HEALE DATE
LIC. NO. 25132

DATE	REV#	REVISIONS DESCRIPTION	BY

DATE: NOV. 2009
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\SWPPP\SWPPP Narrative -CSAH20.dwg, 11/23/2009 9:56:18 AM, shayne.johnson

STORM WATER POLLUTION PREVENTION PLAN

Construction Practices to Minimize Storm Water Contamination

-Stockpiles should be constructed away from slopes and natural drainage ways.
-Collected solid waste, sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes must be disposed of properly and must comply with MPCA disposal requirements.
-No construction materials can be buried on site.
-Licensed sanitary waste management handler must dispose of sanitary waste.
-Fertilizers must be stored in covered locations.
-Restricted access to chemical storage areas must be provided to prevent vandalism.
-All chemicals must be stored in locked containers when not in use.
-Oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spills, leaks or other discharge.
-Storage and disposal of hazardous waste must be in compliance with MPCA regulations.
-Vehicles must be monitored for leaks and preventative maintenance scheduled.
-Spill kits must be available during equipment fueling and maintenance operations.
-External washing of trucks and other construction vehicles must be limited to a defined area of the site. Runoff must be contained and waste properly disposed of. No engine degreasing is allowed on site.
-Asphalt substances must be applied according to manufactures recommendations.
-Spray guns must be cleaned on removable surfaces such as tarpaulins.
-Contractor/Erosion Control Supervisor must make a spill response plan before the application of any chemical that may be harmful to the environment.
-All spills must be reported immediately. Spill cleanup materials must be available on site. Material shall include but not limited to brooms, mops, rags, gloves, absorbent material, sand plastic and metal containers. Spills that reach storm water conveyance systems connected to a Water of the State must be immediately reported to the MPCA State Duty Officer.
-Contractor must control weeds on the entire project site.
-Form release oil must be applied over a pallet covered with absorbent material to collect excess fluid. The absorbent material shall be replaced when saturated.
-Dust control must be provided as conditions warrant.

Temporary and Permanent Erosion Control Practices

BMP's proposed for temporary and permanent erosion control are shown on the erosion control plan sheets and are further identified as follows:

Temporary Erosion Control Methods

All disturbed soil areas shall be temporarily stabilized with Type 1 mulch at the end of each work day. See SEZ note 1. Temporary seed mix 100 will be used only in cases where disturbed soil areas are anticipated to remain un worked in excess of 14 days prior to placement of Type 1 mulch.

Heavy duty silt fence shall be placed in all locations as indicated on the erosion control plan sheets prior to any clearing and grubbing operations. Type 5 mulch shall be placed along the up slope side of the silt fence as directed by the engineer and shall be considered incidental to clearing and grubbing operations (see erosion control details).

Machine sliced silt fence shall be placed in all locations as indicated on the erosion control plan sheets. No Type 5 mulch is required along these portions of silt fence.

Rock construction entrances shall be placed at all locations construction vehicles will be exiting the project area.

Storm drain inlet protection devices will change as construction progresses. It is intended that at a minimum of two different methods will be employed. One method before the curb and gutter is placed, and a different method prior to curb and gutter placement. See Sheet 25 for details.

No concrete washout liquid and /or solid waste shall be allowed on this project site. All waste generated by concrete washout shall be disposed of off-site, in accordance with Part IV. F. 4 of the NPDES permit.

Erosion control blankets Category 1 STRAW RD 1S shall be placed as indicated on the erosion control plan sheets.

Temporary Rock Forebay at the 33" R.C. pipe outlet to sedimentation basin, shall be constructed within 24 hours of the apron installation. Size of forebay will be at the direction of the engineer.

Permanent Erosion Control Methods

Permanent erosion control will be by seed mixture 240 on all areas disturbed by construction activities. Seed mix 240 , Commercial fertilizer Type 2, and Type 4 mulch shall be applied at the recommended rates per MnDOT.

Energy dissipation devices including scour stop mats and Class III rip rap shall be placed as indicated on the erosion control plan sheets at culvert ends.

Erosion control blanket MnDOT 3885.2 Category 4 Straw/Coconut blanket shall be utilized below the RSS as directed by the engineer.

Cellular Confinement cells as specified shall be utilized below the RSS as directed by the engineer.

Seed and Fertilizer blend within the RSS basket faces shall be MnDOT 3881.2b Type 4-Natural based fertilizer applied at 5 oz. per basket face. Seed blend within the RSS basket faces shall be MnDOT 3876 - Seed Mixture Special applied at 125 pounds-per 10,000 square foot of wire basket face. This blend of fertilizer and seeds shall be pre mixed with the premium topsoil before placement into the RSS face.

Unique Environmental Concerns

No unique environmental concerns exist for this project.

Timing of BMP Installation

Erosion and sediment control BMP's must be installed as necessary to minimize erosion from disturbed surfaces and capture sediment onsite. All BMP's must conform with Part IV of the NPDES Permit.

Erosion Prevention Practices

The Contractor/ECS is responsible for the Erosion Prevention Practices contained in Part IV.B of the NPDES Permit. The Contractor/ECS must plan for and implement appropriate construction phasing, vegetative buffer strips, horizontal slope grading and other construction practices that minimize erosion. The location of areas not to be disturbed must be delineated (marked) on the development site before work begins.
All exposed soil areas must be stabilized as soon as possible to limit soil erosion but in no case later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.
The normal wetted perimeter of any temporary or permanent drainage ditch or swale that drains water from any portion of the construction site, or diverts water around the construction site, must be stabilized within 200 lineal feet from the property edge, or from the discharge into any surface water. Stabilization must be complete within 24 hours after connecting to surface water.
Pipe outlets must be provided with temporary or permanent energy dissipation within 24 hours after connection to a surface water.

Sediment Control Practices

The Contractor/ECS is responsible for the Sediment Control Practices contained in Part IV.C of the NPDES Permit. Sediment Control Practices must be installed on all down gradient perimeters before any upgradient land disturbing activities begin. There shall be no unbroken slope length greater than 75 feet for slopes with a grade of 3:1 or steeper. These practices must remain in place until Final Stabilization has been established in accordance with Part IV.G of the NPDES Permit.
The timing of installation of Sediment Control Practices may be adjusted to accommodate short-term activities such as clearing or grubbing, or passage of vehicles. Short-term activities must be completed as quickly as possible and the practices must be installed immediately after the activity is completed. However, the Sediment Control Practices must be installed before the next precipitation event even if the activity is not complete.

All storm drain inlets must be protected by appropriate BMP's during construction until all sources with potential for discharging to the inlet have been stabilized. Inlet protection may be removed if a specific safety concern has been identified and the procedure in Part IV.C.4 of the NPDES Permit is followed.
Temporary soil stockpiles must have super duty silt fence or other effective sediment controls, and can not be placed in surface waters, including stormwater conveyances such as curb and gutter systems, or conduit and ditches unless there is a bypass for stormwater.
Vehicle tracking of sediment from the construction site must be minimized by BMP's such as stone or wood chip pads, concrete or steel wash racks, or equivalent systems. Street sweeping with collection must be used if such BMP's are not adequate to prevent sediment from being tracked onto the street (see Part IV.E.4.d of the NPDES Permit).
Dewatering related to the construction activity must comply with Part IV.D of the NPDES Permit. Dewatering discharge that may have turbid or sediment laden discharge must be discharged to a temporary or permanent sedimentation basin on the project site whenever possible and BMP's must be implemented to prevent water containing sediment or other pollutants from being discharged to a Water of the State.
Contractor may construct temporary sedimentation basins in accordance with Part III.B of the NPDES Permit.

Payment

Cost for permanent and temporary erosion and sediment control measures shown on the plans will be paid per unit bid prices. The costs to maintain and remove these devices shall be incidental to the bid items. The cost for temporary seeding, soil stabilization, or any additional temporary erosion and sediment control devices shall be paid according to MN/DOT Spec. 2573.5 or 2575.5 as applicable. All costs for documentation required by the Permit shall be incidental to other items unless a specific bid item is established.

Contacts:

Agency	Permit	Name	Phone Number
MPCA	NPDES	Scott Lucas	1-218-828-6069
Crow Wing County	Owner	Tim Bray	1-218-824-1110
SWCD	NPDES/Inspection Partner	Beth Hippert	1-218-828-6197
	NPDES/Inspection Partner	Jim Chamberlin	1-218-828-6197
SWPPP Design	NPDES	Shayne Johnson	1-218-829-5117
EC Supervisor			

Amendments to SWPPP — Date

1.

2.

3.

4.

5.

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STORM WATER POLLUTION PREVENTION PLAN

S.A.P. NO. 18-620-11 — SHEET NO. 32 OF 93 SHEETS

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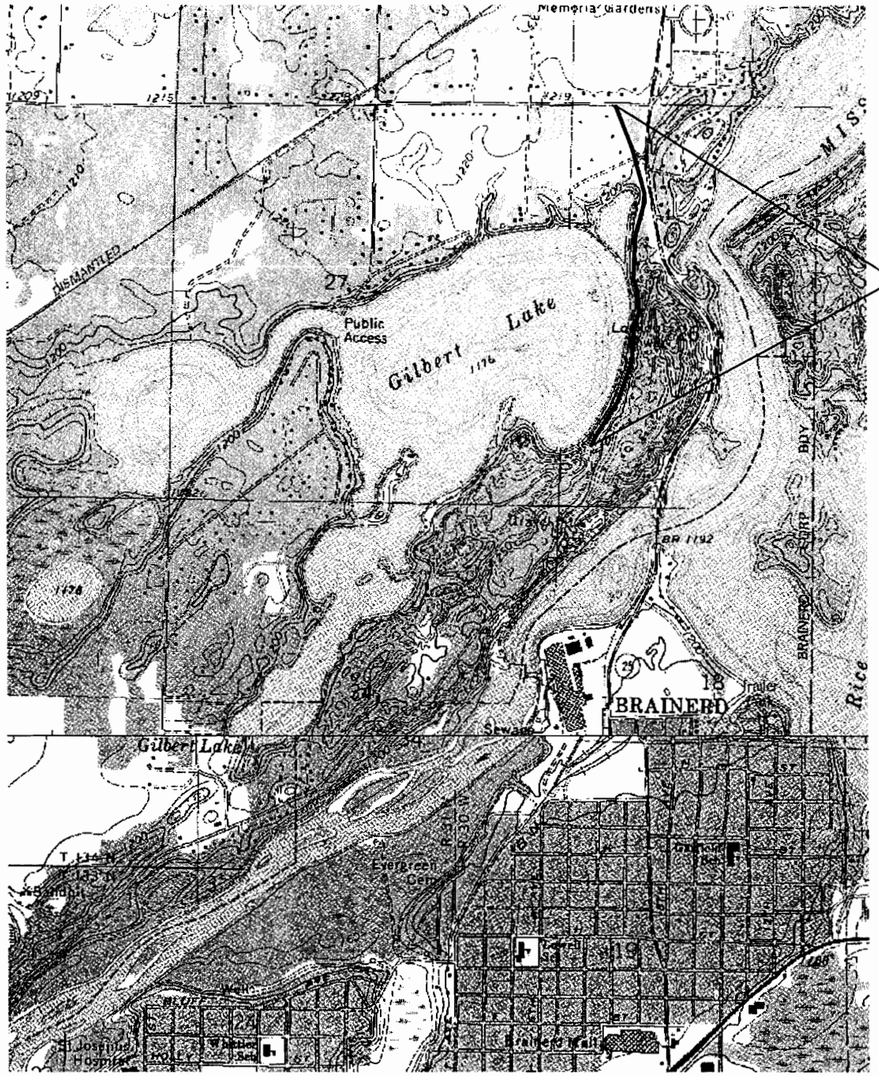
TIMOTHY M. HOULE — DATE: 11/25/09 — LIC. NO. 29132

BY	REVISIONS DESCRIPTION	REV#	DATE

DATE: NOV. 2008
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\SWPPP\SWPPP Narrative -CSAH20.dwg, 11/23/2009 9:56:32 AM, shayne.johnson



U.S.G.S. QUADRANGLE OF PROJECT LOCATION

NORTH

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STORM WATER POLLUTION PREVENTION PLAN

S.A.P. NO. 18-620-11 SHEET NO. 33 OF 93 SHEETS

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS

NORTH AHRENS HILL TO C.S.A.H. 49

CROW WING COUNTY

DATE: NOV. 2009
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JOB NUMBER: 108B029.001

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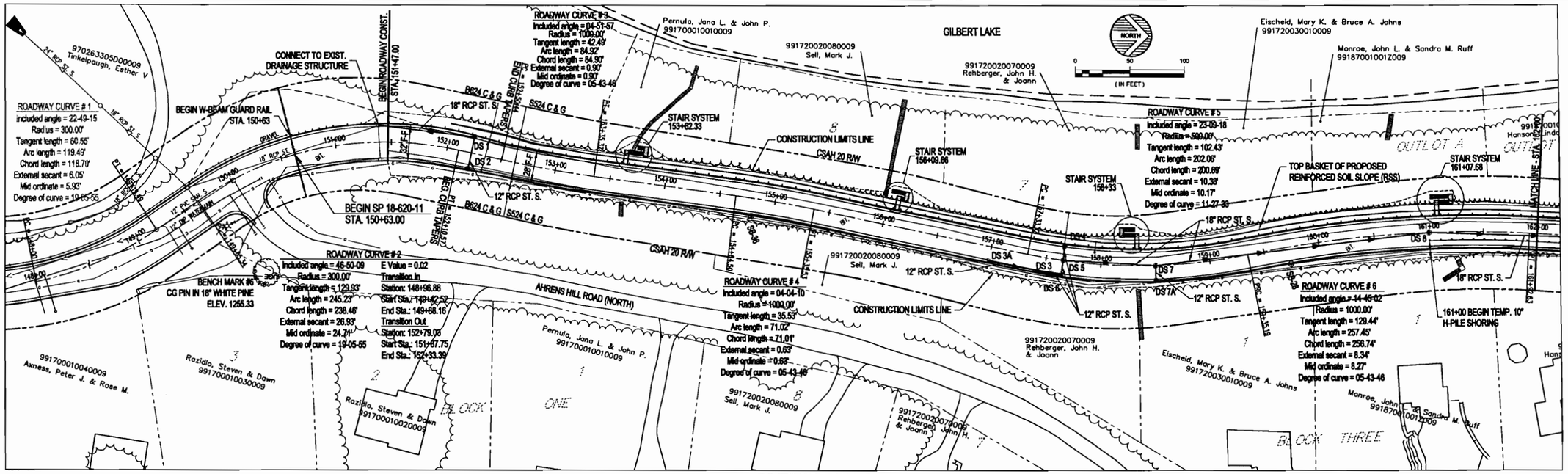
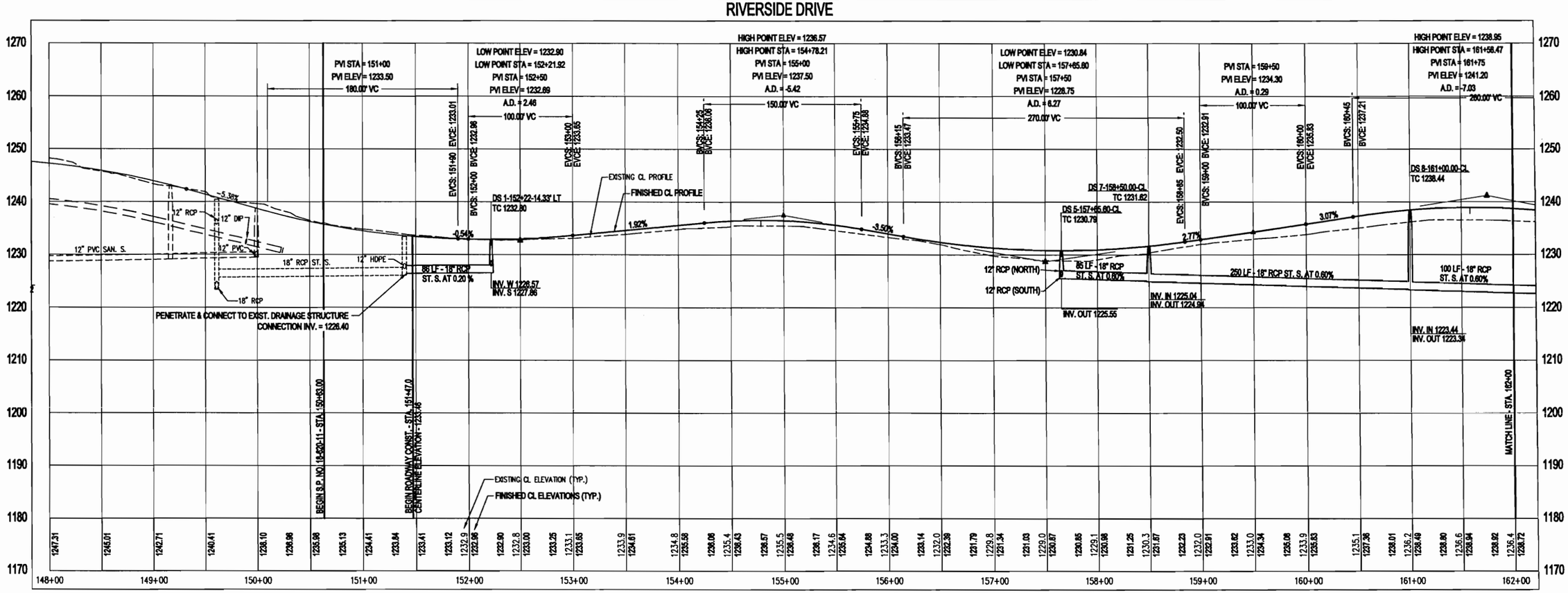


RIVERSIDE DRIVE



PLAN & PROFILE - STA. 151+47 - 162+00

S.P. NO. 18-620-11 SHEET NO. 34 OF 93 SHEETS

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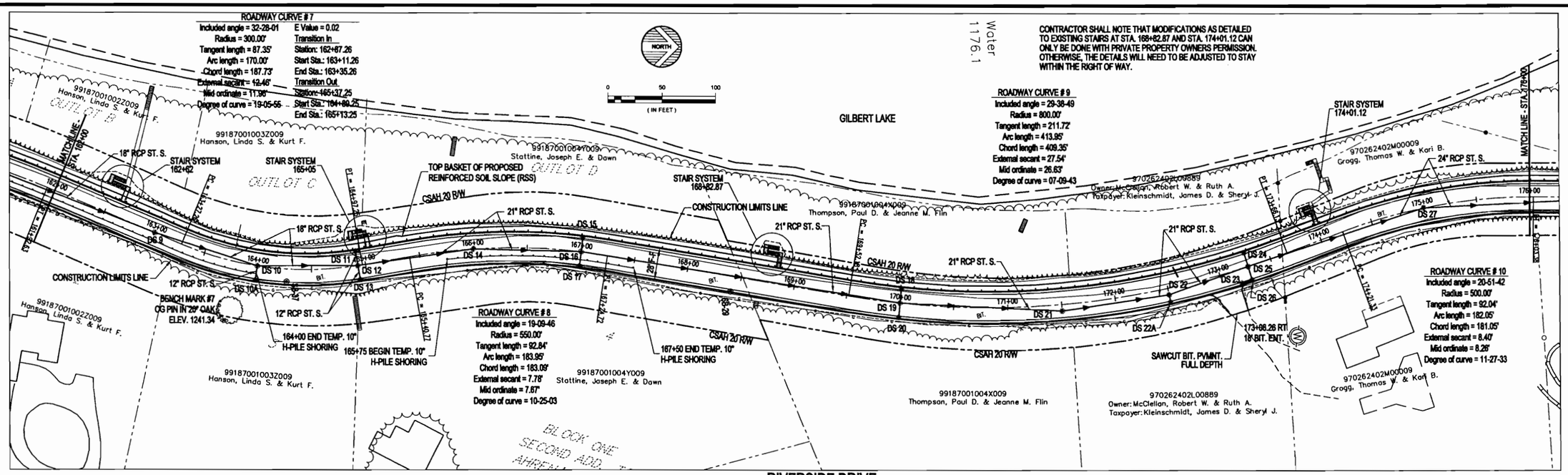
TIMOTHY M. KOULE LIC. NO. 23132 DATE: 4/13/09

BY	REVISIONS DESCRIPTION	DATE	REVN

DATE: JULY, 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.K.
JOB NUMBER: 108B029

C.S.A.H. 20-RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



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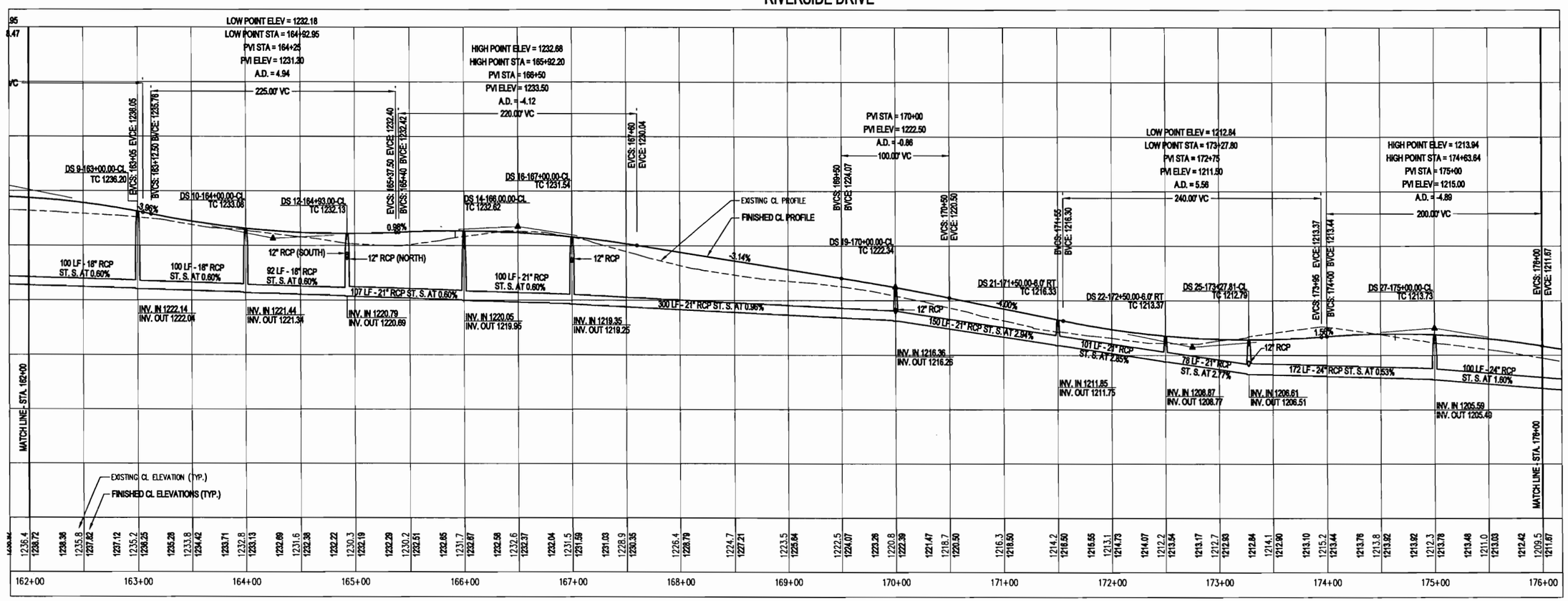

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S.P. NO. 18-620-11 SHEET NO. 35 OF 93 SHEETS

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Timothy M. Hoole 12/2/09

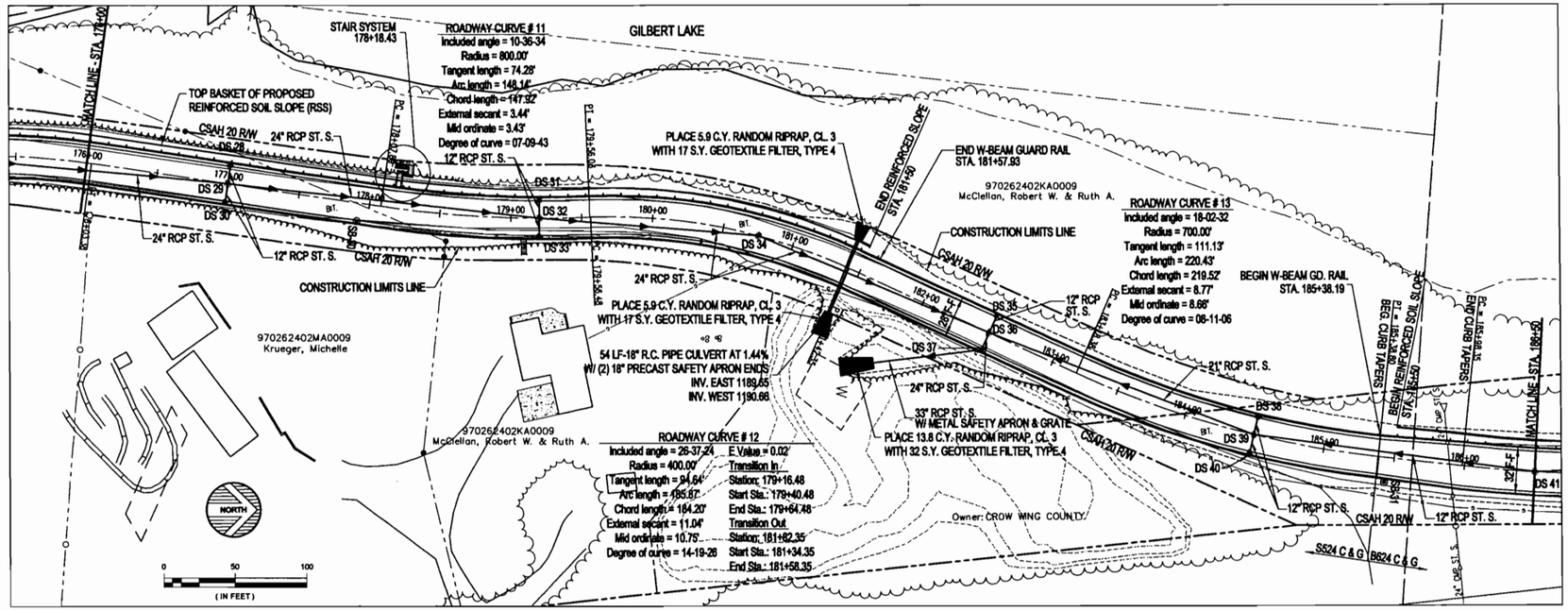
TIMOTHY M. HOOLE DATE: LIC. NO. 25132

BY	REVISIONS DESCRIPTION	DATE	REVR

DATE: JULY, 2008
SCALE: 1"=50'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-PP-RIVERSIDEDR-AHRENS TO WISE-RETWALL.dwg, 12/2/2009 10:00:36 AM, shayne.johnson



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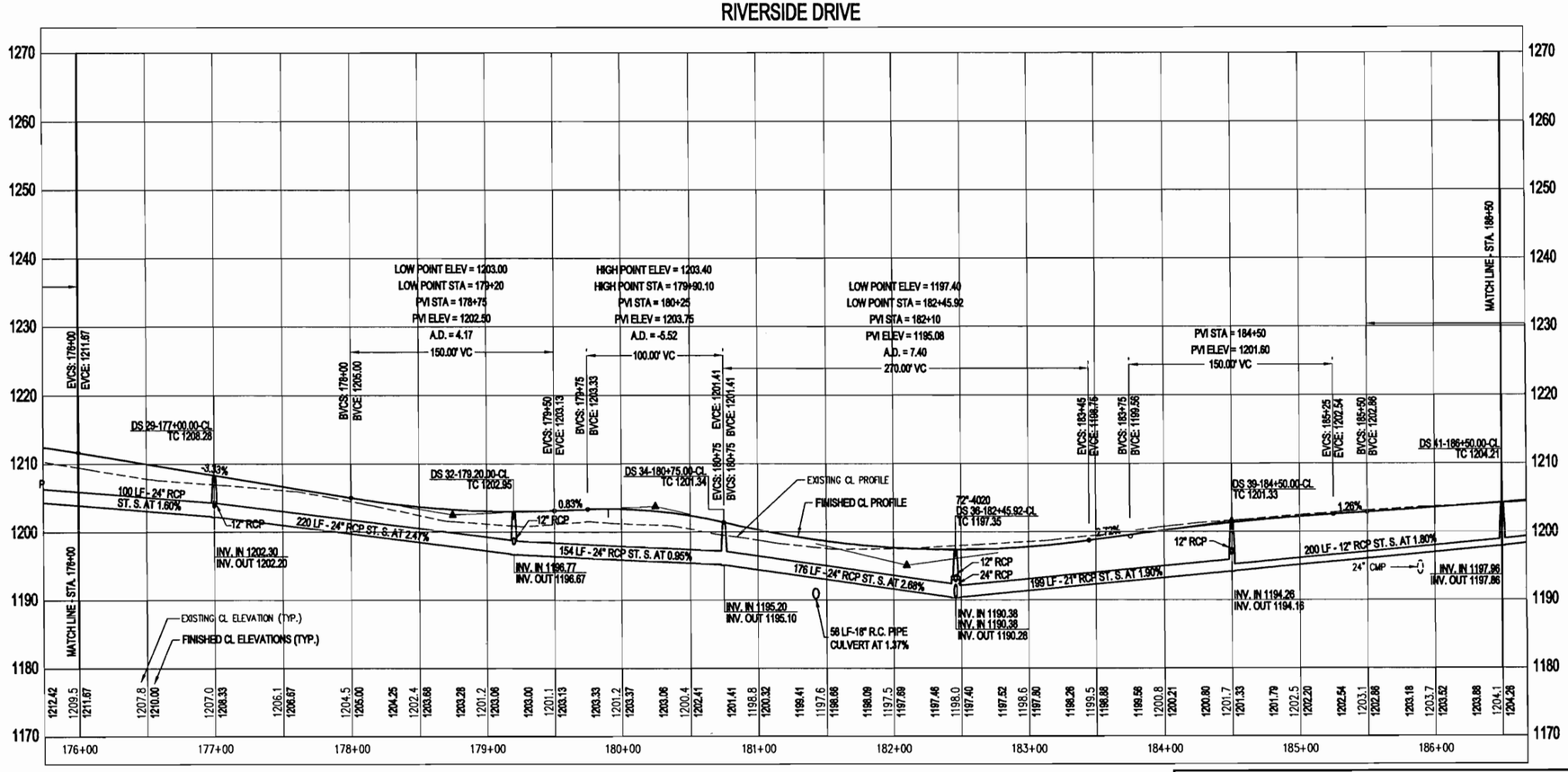

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TIMOTHY M. HOULE DATE: 11/25/09 LIC. NO. 23132

BY	REVISIONS DESCRIPTION	REV#	DATE

DATE: JULY, 2008
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C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
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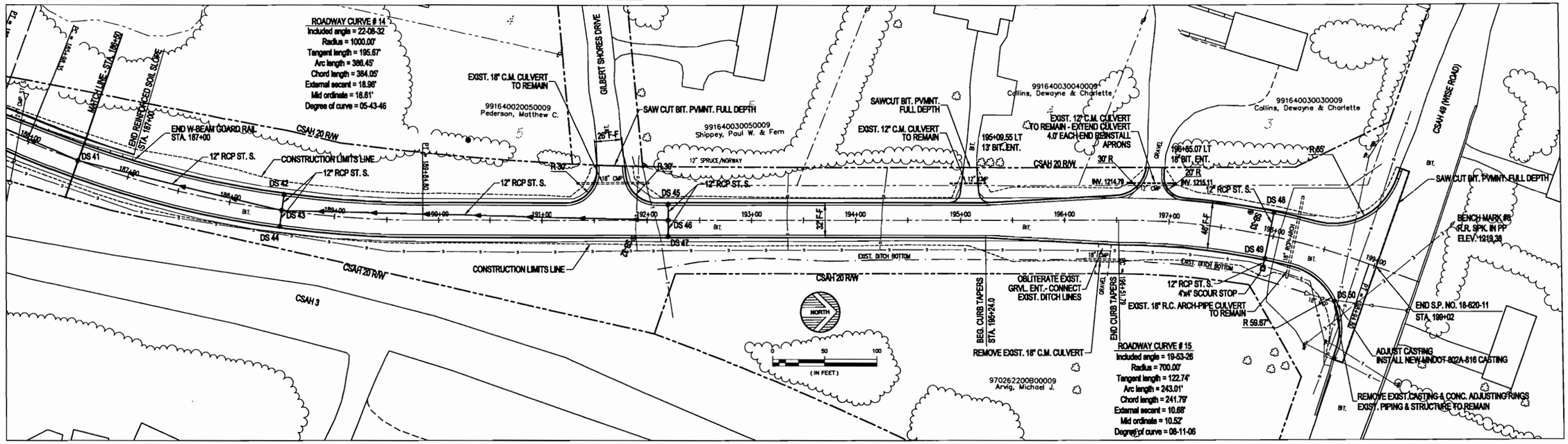
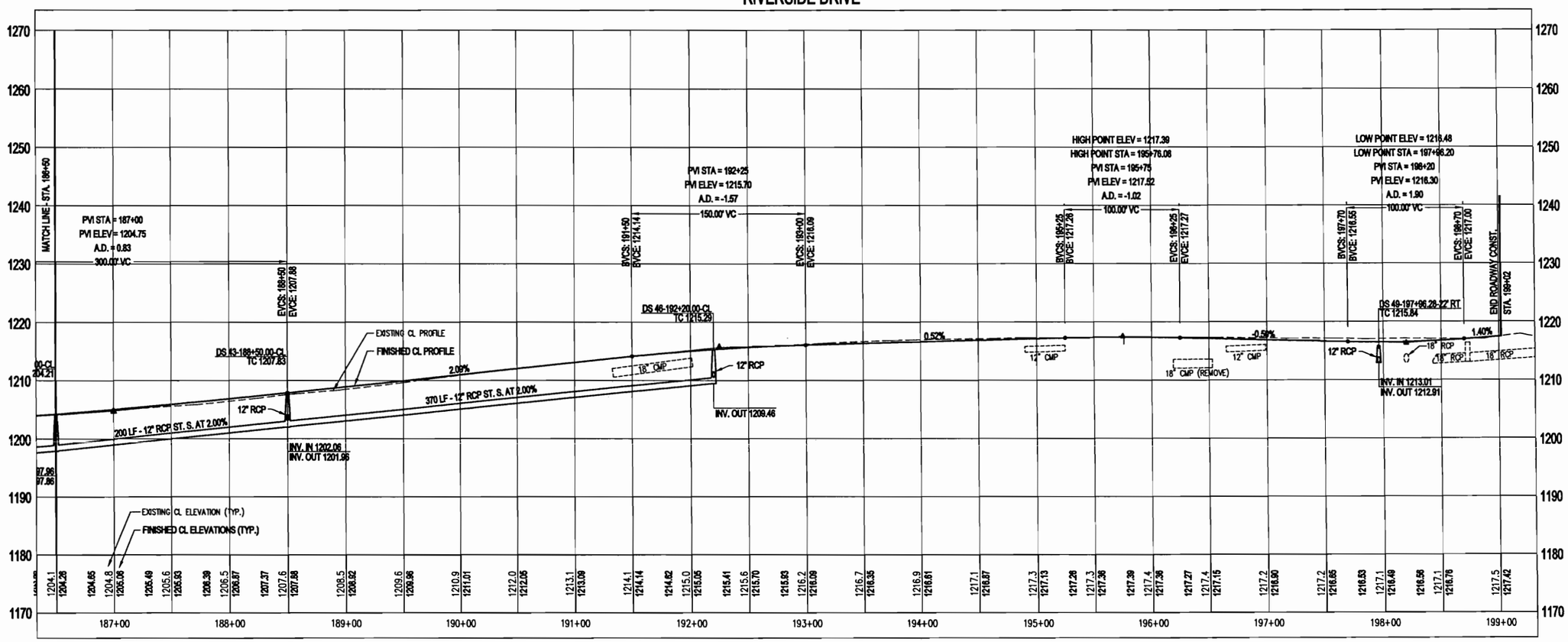
CROW WING COUNTY

J:\108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-PP-RIVERSIDEDR-AHRENS TO WISE-RETWALL.dwg, 11/24/2009 4:34:54 PM, Mark.Skogen



RIVERSIDE DRIVE



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DRAWN BY: P.M.B.
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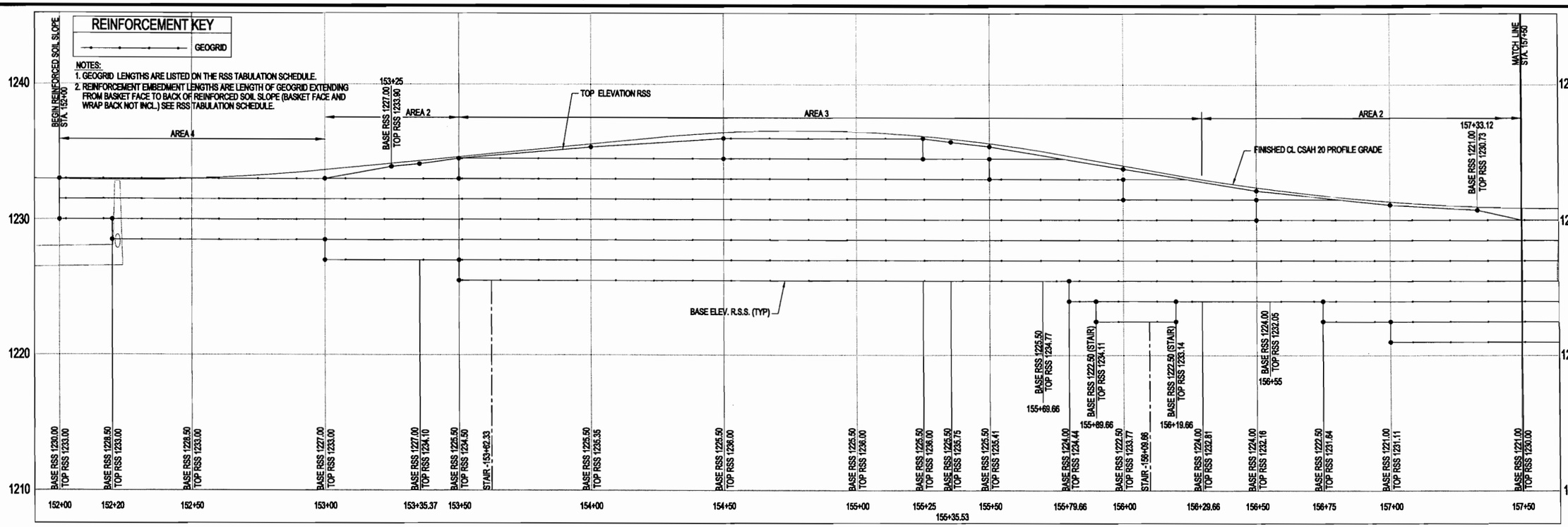
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



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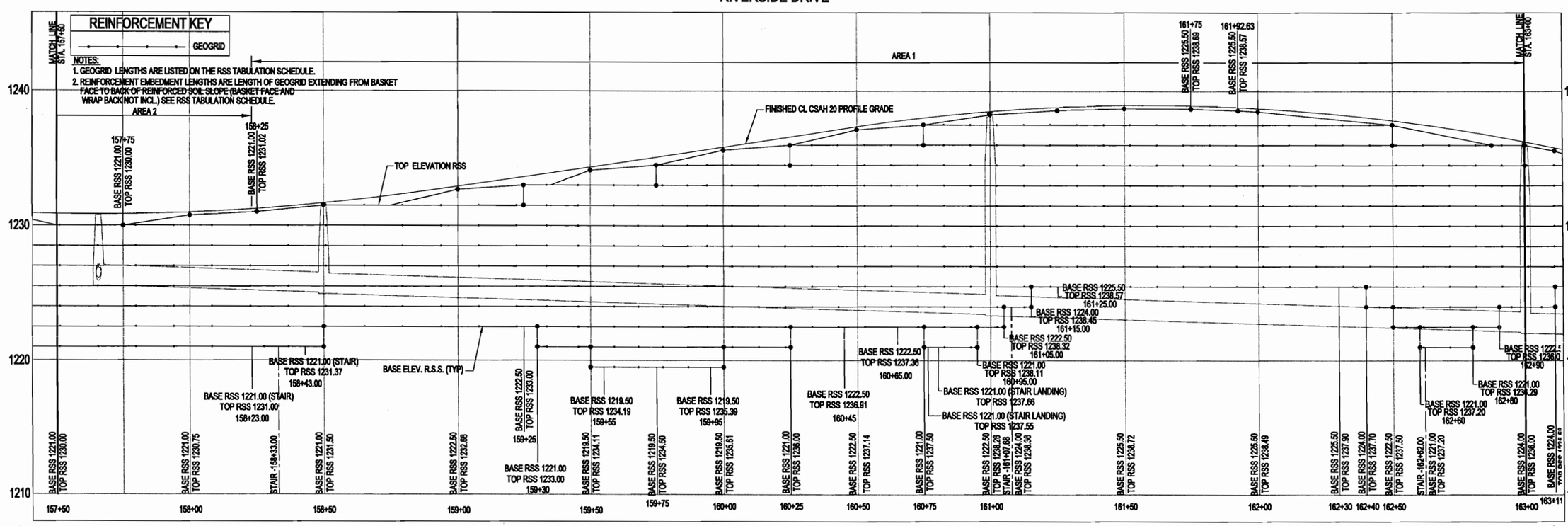

REINFORCED SOIL SLOPE PROFILE - STA. 152+00.00 - 163+00.00

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Stephen M. Gale 11/25/09

STEPHAN M. GALE DATE: LIC/ NO. 13854

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CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

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NORTH AHRENS HILL TO C.S.A.H. 49
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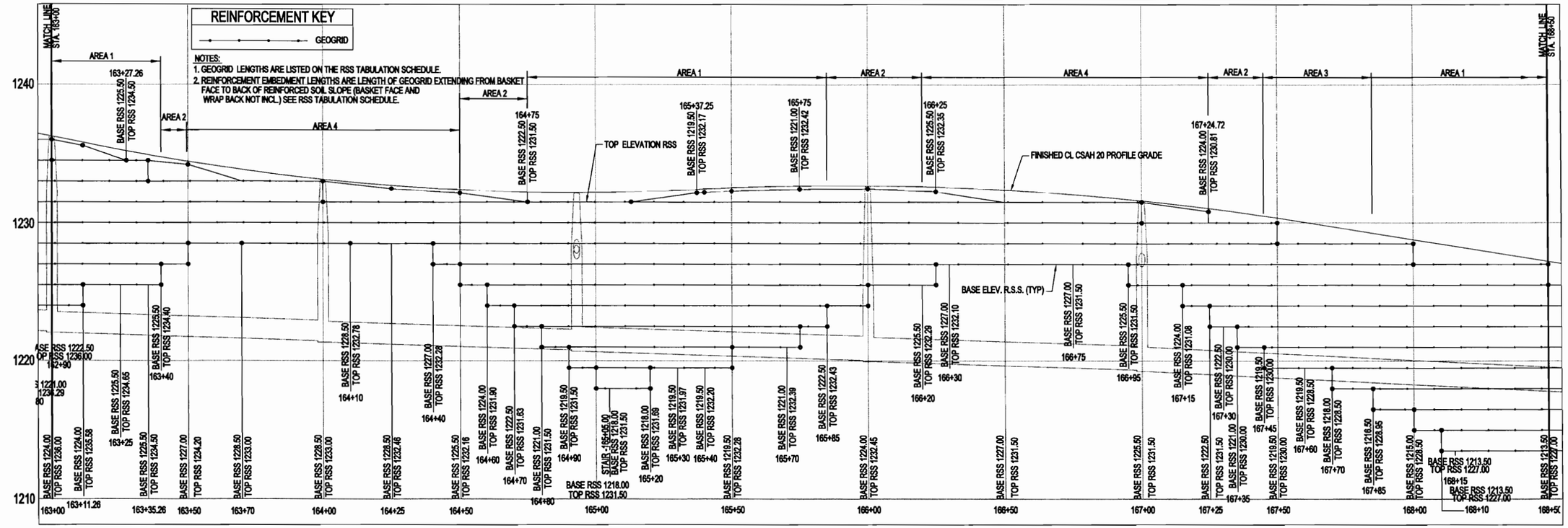
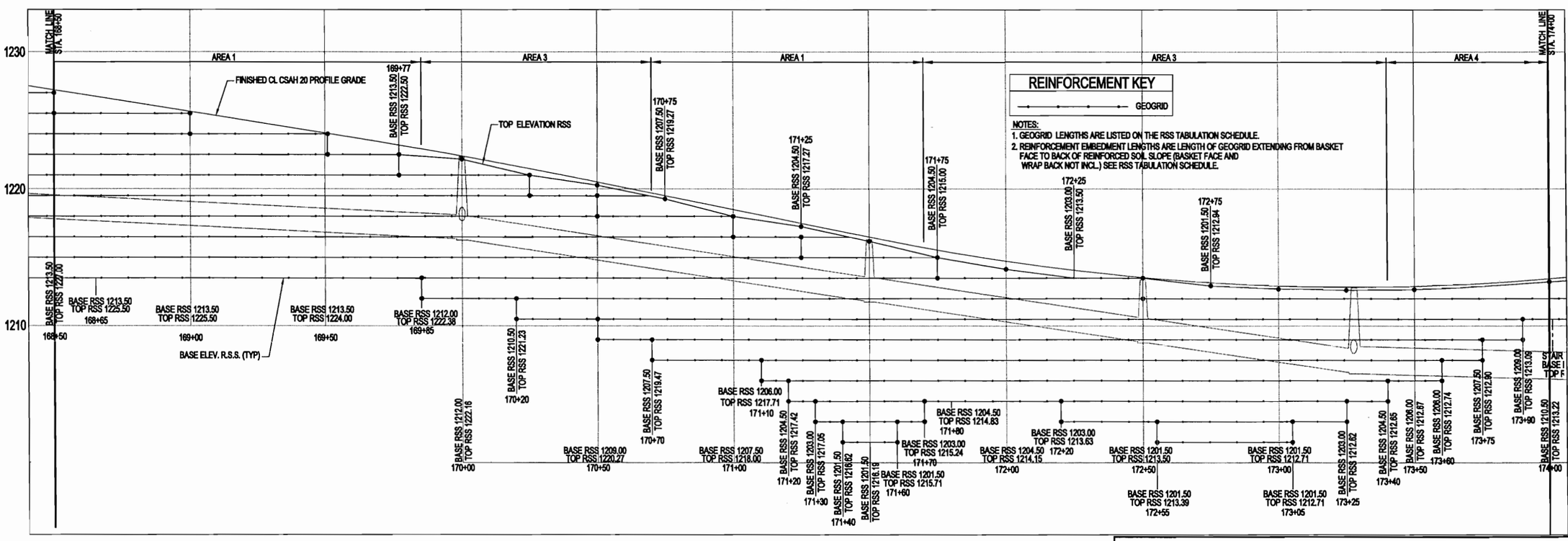


RIVERSIDE DRIVE



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Gale-Toe Engineering, Inc.

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STEPHAN M. GALE DATE: 11/25/09 LIC. NO. 13554

DATE	REV#	REVISIONS DESCRIPTION	BY

DATE: NOV. 2008
SCALE: 1"=20'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS

NORTH AHRENS HILL TO C.S.A.H. 49

CROW WING COUNTY

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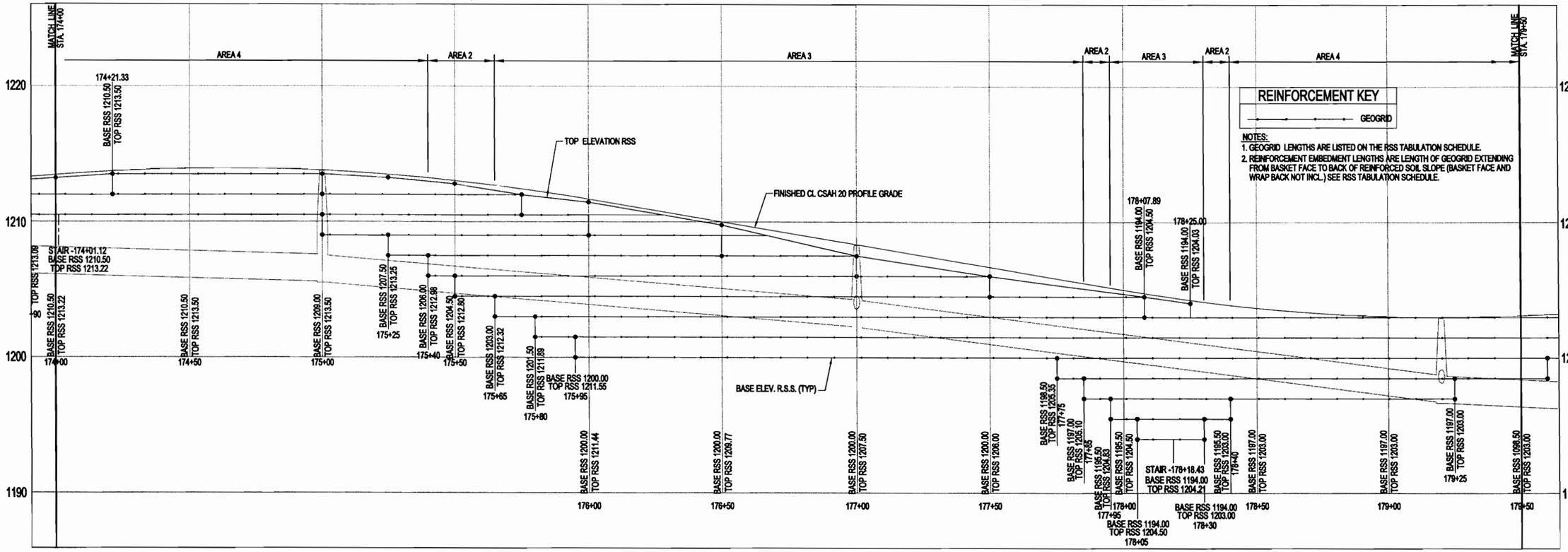

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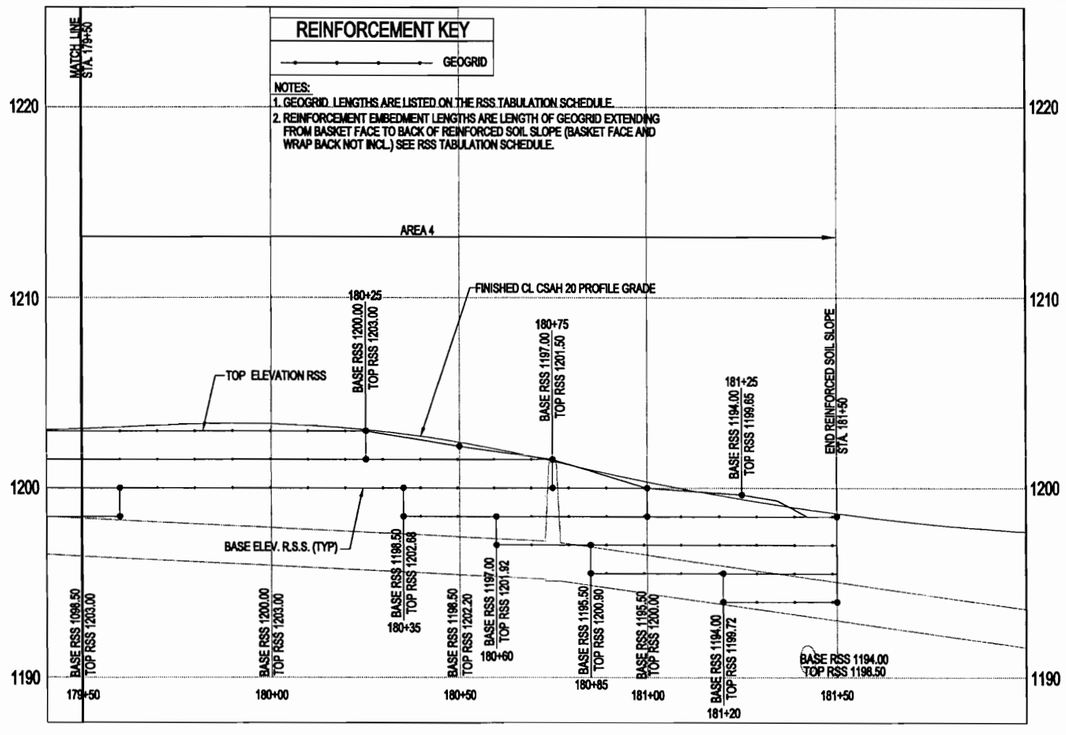

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STEPHAN M. GALE DATE: LIC. NO. 13854

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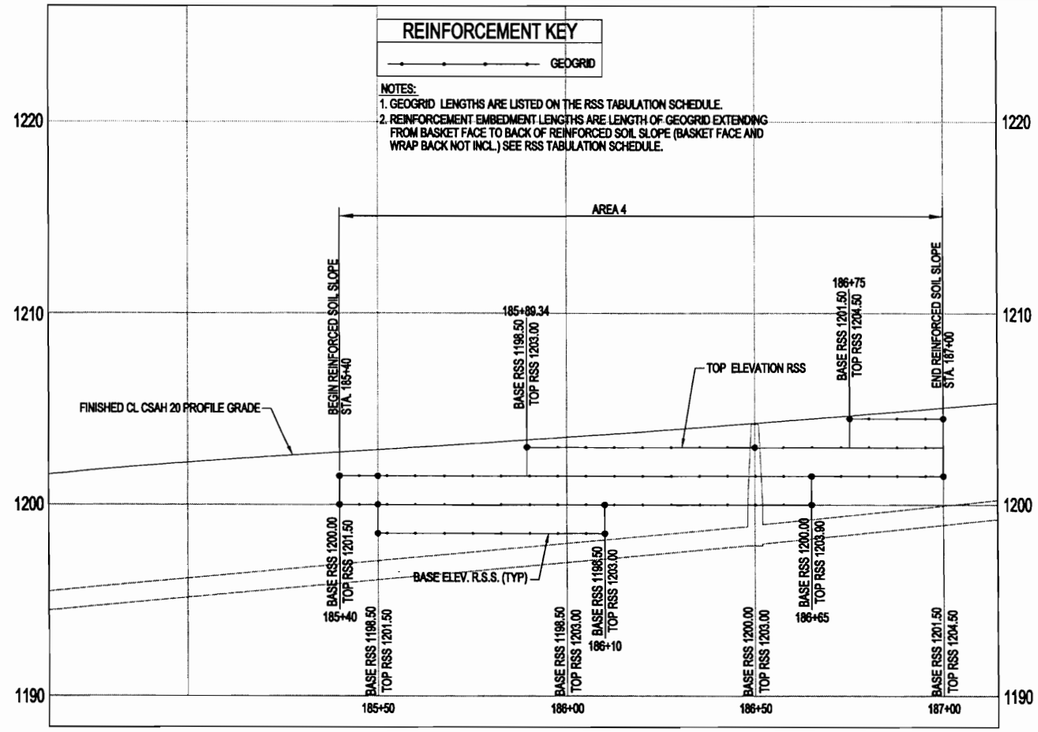

RIVERSIDE DRIVE

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S.P. NO. 18-620-11 SHEET NO. 41 OF 93 SHEETS

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

DATE: NOV. 2008
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DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

DATE	REV#	REVISIONS DESCRIPTION	BY

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Stephen M. Gale 11/25/09
STEPHAN M. GALE DATE
LIC. NO. 13854

GTE Gale-Tox Engineering Inc

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-PP-RIVERSIDEDR-AHRENS TO WISE-RETWALL.dwg, 11/25/2009 1:50:26 PM, Mark.Skogen

TABLE NO. 1 — REINFORCED SOIL SLOPE TABLE

Maximum Height of RSS (FT.)	Begin Station	End Station	Segment Length (FT.)	Base Elevation (Geogrid)	Top Elev Basket Begin Elev.	Top Elev Basket End Elev.	Face of Wall (sq yd)	Area Design Designation (Geogrid Reinf.)
3.0	152+00	152+20	20	1230.00	1233.00	1233.00	7	4
4.5	152+20	153+00	80	1228.50	1233.00	1233.00	40	4
7.5	153+00	153+50	50	1227.00	1233.00	1234.50	38	2
10.5	153+50	154+50	100	1225.50	1234.50	1236.00	108	3
10.5	154+50	155+25	75	1225.50	1236.00	1236.00	88	3
10.5	155+25	155+69.66	45	1225.50	1236.00	1234.77	49	3
9.3	155+69.66	155+79.66	10	1225.50	1234.77	1234.44	10	3
10.4	155+79.66	155+89.66	10	1224.00	1234.44	1234.11	11	3
10.6	155+89.66	156+19.66	30	1222.50	1234.11	1233.14	37	3
9.1	156+19.66	156+29.66	10	1224.00	1233.14	1232.81	10	3
8.8	156+29.66	156+55	25	1224.00	1232.81	1232.05	23	2
8.0	156+55	156+75	20	1224.00	1232.05	1231.64	17	2
9.3	156+75	157+00	25	1222.50	1231.84	1230.00	23	2
10.0	157+00	158+50	150	1221.00	1230.00	1231.00	158	2
8.9	158+50	159+30	80	1222.50	1231.00	1231.37	77	1
12.0	159+30	159+50	20	1221.00	1231.37	1233.00	25	1
14.7	159+50	160+00	50	1219.50	1233.00	1234.19	78	1
14.4	160+00	160+25	25	1221.00	1234.19	1235.39	38	1
13.5	160+25	160+75	50	1222.50	1235.39	1236.00	73	1
15.9	160+75	160+95	20	1221.00	1236.00	1236.91	34	1
14.9	160+95	161+05	10	1222.50	1236.91	1237.36	16	1
13.5	161+05	161+15	10	1224.00	1237.36	1237.50	15	1
12.6	161+15	162+40	125	1225.50	1237.50	1238.11	171	1
14.3	162+40	162+50	10	1224.00	1238.11	1238.32	16	1
16.0	162+50	162+60	10	1222.50	1238.32	1238.45	18	1
16.2	162+60	162+80	20	1221.00	1237.20	1236.29	35	1
13.8	162+80	162+90	10	1222.50	1236.29	1236.00	15	1
12.0	162+90	163+11.26	21	1224.00	1236.00	1236.00	28	1
10.5	163+11.26	163+40	29	1225.50	1236.00	1234.66	32	1
7.7	163+40	163+50	10	1227.00	1234.66	1234.40	8	2
5.9	163+50	164+40	90	1228.50	1234.40	1233.00	52	4
6.0	164+40	164+50	10	1227.00	1233.00	1232.78	7	4
7.3	164+50	164+60	10	1225.50	1232.78	1232.28	8	2
8.3	164+60	164+70	10	1224.00	1232.28	1232.18	9	2
9.7	164+70	164+80	10	1222.50	1232.18	1231.90	11	2
10.5	164+80	164+90	10	1221.00	1231.50	1231.50	12	1
12.0	164+90	165+00	10	1219.50	1231.50	1231.50	13	1
13.7	165+00	165+20	20	1218.00	1231.50	1231.69	30	1
12.5	165+20	165+50	30	1219.50	1231.69	1231.97	41	1
11.2	165+50	165+75	25	1221.00	1231.97	1232.20	31	1
9.9	165+75	165+85	10	1222.50	1232.20	1232.39	11	1
8.5	165+85	166+00	15	1224.00	1232.43	1232.45	14	2
7.0	166+00	166+25	25	1225.50	1232.45	1232.29	19	2
5.3	166+25	166+95	70	1227.00	1232.29	1232.10	40	4
6.6	166+95	167+15	20	1225.50	1232.10	1231.50	14	4
7.5	167+15	167+25	10	1224.00	1231.50	1231.50	8	4
9.0	167+25	167+35	10	1222.50	1231.50	1231.50	10	2
9.0	167+35	167+45	10	1221.00	1230.00	1230.00	10	2
10.5	167+45	167+70	25	1219.50	1230.00	1228.50	27	3
10.5	167+70	167+85	15	1218.00	1228.50	1228.50	18	3
12.0	167+85	168+00	15	1216.50	1228.50	1228.50	20	1
13.5	168+00	168+10	10	1215.00	1228.50	1227.00	14	1
13.5	168+10	169+85	75	1213.50	1227.00	1225.50	106	1
10.4	169+85	170+20	35	1212.00	1222.38	1221.23	38	3

TABLE NO. 1 — REINFORCED SOIL SLOPE TABLE

Maximum Height of RSS (FT.)	Begin Station	End Station	Segment Length (FT.)	Base Elevation (Geogrid)	Top Elev Basket Begin Elev.	Top Elev Basket End Elev.	Face of Wall (sq yd)	Area Design Designation (Geogrid Reinf.)
10.7	170+20	170+50	30	1210.50	1221.23	1220.27	34	3
11.3	170+50	170+70	20	1209.00	1220.27	1219.47	24	3
12.0	170+70	171+10	40	1207.50	1219.47	1217.71	49	1
11.7	171+10	171+20	10	1206.00	1217.71	1217.42	13	1
12.9	171+20	171+30	10	1204.50	1217.42	1217.05	14	1
14.1	171+30	171+40	10	1203.00	1217.05	1216.62	15	1
15.1	171+40	171+60	20	1201.50	1216.62	1215.71	33	1
12.7	171+60	171+70	10	1203.00	1215.71	1215.24	14	1
10.7	171+70	172+20	50	1204.50	1215.24	1214.83	59	3
10.6	172+20	172+50	30	1203.00	1213.63	1213.39	35	3
11.9	172+50	173+05	55	1201.50	1213.39	1212.71	71	3
9.7	173+05	173+25	20	1203.00	1212.71	1212.62	21	3
8.2	173+25	173+40	15	1204.50	1212.62	1212.65	14	3
6.7	173+40	173+60	20	1206.00	1212.65	1212.74	15	4
5.4	173+60	173+75	15	1207.50	1212.74	1212.90	9	4
4.1	173+75	173+90	15	1209.00	1212.90	1213.09	7	4
3.0	173+90	175+00	110	1210.50	1213.09	1213.50	34	4
4.5	175+00	175+25	25	1209.00	1213.50	1213.25	12	4
5.8	175+25	175+40	15	1207.50	1213.25	1212.98	9	4
7.0	175+40	175+50	10	1206.00	1212.98	1212.80	8	2
8.3	175+50	175+65	15	1204.50	1212.80	1212.32	13	2
9.3	175+65	175+80	15	1203.00	1212.32	1211.89	15	3
10.4	175+80	175+95	15	1201.50	1211.89	1211.55	17	3
11.6	175+95	177+75	180	1200.00	1211.55	1205.35	169	3
6.6	177+75	177+85	10	1198.50	1204.50	1205.10	7	3
8.1	177+85	177+95	10	1197.00	1205.10	1204.83	9	2
9.3	177+95	178+05	10	1195.50	1204.83	1204.57	10	3
10.6	178+05	178+30	35	1194.00	1204.57	1203.00	38	3
7.5	178+30	178+40	10	1195.50	1203.00	1203.00	8	2
6.0	178+40	179+25	85	1197.00	1203.00	1203.00	57	4
4.5	179+25	179+60	35	1198.50	1203.00	1203.00	18	4
3.0	179+60	180+35	75	1200.00	1203.00	1202.68	24	4
4.2	180+35	180+60	25	1198.50	1202.68	1201.92	11	4
4.9	180+60	180+85	25	1197.00	1201.92	1200.90	12	4
5.4	180+85	181+20	35	1195.50	1200.90	1199.72	19	4
5.7	181+20	181+50	30	1194.00	1199.72	1198.50	17	4
1.5	185+40	185+50	10	1200.00	1201.50	1201.50	2	4
3.0	185+50	185+89.34	40	1198.50	1201.50	1203.00	17	4
4.5	185+89.34	186+10	20	1198.50	1203.00	1203.00	10	4
3.0	186+10	186+65	55	1200.00	1203.00	1203.00	18	4
2.4	186+65	187+00	35	1201.50	1203.90	1204.50	11	4
	TOTAL		3020				2854	

TABLE NO.2 - GEOGRID REINFORCEMENT EMBEDMENT LENGTH PER AREA

Area 1		Embedment Length
Layers 1 - 4:	Geogrid Reinforcement,	22 ft Long
Layers 5 & up:	Geogrid Reinforcement,	16 ft Long
Area 2		
Layers 1, 2 & 3:	Geogrid Reinforcement,	16 ft Long
Layers 4 & up:	Geogrid Reinforcement,	10 ft Long
Area 3		
Layers 1, 2 & 3:	Geogrid Reinforcement,	20 ft Long
Layers 4 & up:	Geogrid Reinforcement,	12 ft Long
Area 4		
Layers 1 & 2:	Geogrid Reinforcement,	12 ft Long
Layers 3 & up:	Geogrid Reinforcement,	8 ft Long

NOTES:

1. LAYER 1 - BOTTOM MOST LAYER OF GEOGRID REINFORCEMENT.
2. GEOGRID REINFORCEMENT IDENTIFIED IN THE SPECIFICATIONS.
3. GEOGRID REINFORCEMENT EMBEDMENT LENGTH FROM FACE OF BASKET TO BACK OF REINFORCED SOIL ZONE. (DOES NOT INCLUDE (1.5') FACE AND (3') WRAP BACK LENGTH.
4. BASE ELEVATION (GEOGRID) SHALL BE FIELD FIT TO ACTUAL GRADES PER ENGINEER.

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REINFORCED SOIL SLOPE TABULATION

S.P. NO. 18-620-11 SHEET NO. 42 OF 93 SHEETS

GTE Gale-Tye Engineering, Inc.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

Stephen M. Gale 11/25/09

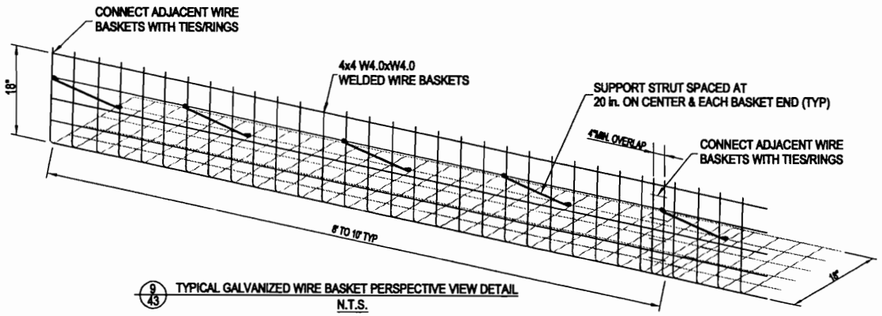
STEPHAN M. GALE DATE: LIC. NO. 13934

DATE	REV#	REVISIONS DESCRIPTION	BY

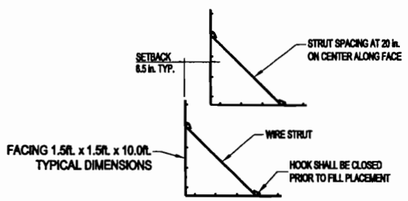
DATE: JULY, 2008
SCALE: NTS
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

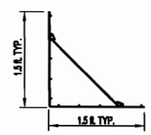
J:\0108B-Crow Wing County Highway Department\010BB0029-CSAH 20\010BB0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-TABULATED QUANTITIES.dwg, 11/25/2009 1:41:11 PM, Mark.Skogen



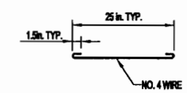
9/43 TYPICAL GALVANIZED WIRE BASKET PERSPECTIVE VIEW DETAIL
N.T.S.



TYPICAL GALVANIZED WIRE BASKET FACE DETAIL
N.T.S.

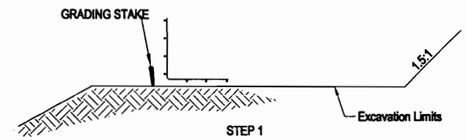


TYPICAL END VIEW DETAIL
N.T.S.



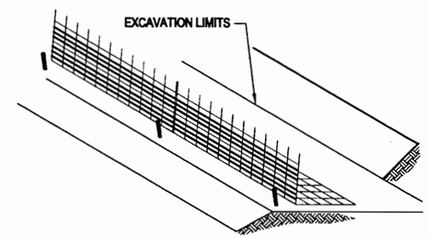
TYPICAL GALVANIZED SUPPORT STRUT DETAIL
N.T.S.

- EXCAVATION SLOPE PER OSHA REQUIREMENTS
- EXCAVATE FOR LEVEL BASE TO A LENGTH ADEQUATE FOR GEOGRID REINFORCEMENT EMBEDMENT.
- SET GRADING STAKES AT A 6 Inch OFFSET TO FACILITATE PROPER BASKET ALIGNMENT.
- FIELD VERIFY GRADING STAKE VERSUS EXISTING SLOPE VERSUS DESIGN; CONSULT WITH ENGINEER ON ANY NEEDED FIELD ADJUSTMENTS.



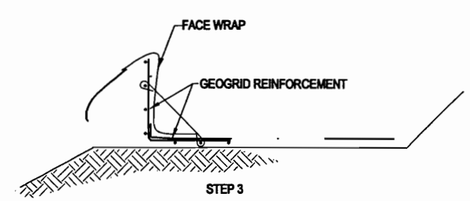
STEP 1

- PLACE WELDED WIRE BASKET ON PREPARED GRADE.
- FOR THE FIRST COURSE OF THE WALL, ALIGN BASKETS, MIN. 4" OVERLAP AND WIRE RING TOGETHER.



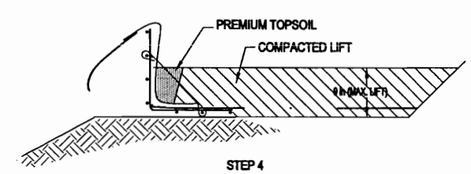
STEP 2

- PLACE GEOGRID ON GRADE AND DRAPE OVER BASKET ALLOWING FOR THE REQUIRED 36" TAIL EMBEDMENT.
- PLACE FACE WRAP ON GEOGRID AND DRAPE OVER BASKET ALLOWING FOR THE REQUIRED 12" TOP AND BOTTOM EMBEDMENT.
- SLIT FACE WRAP AT WIRE BASKET SUPPORT STRUT.
- INSTALL WIRE BASKET SUPPORT STRUTS AT 20" O.C. AND EACH END.



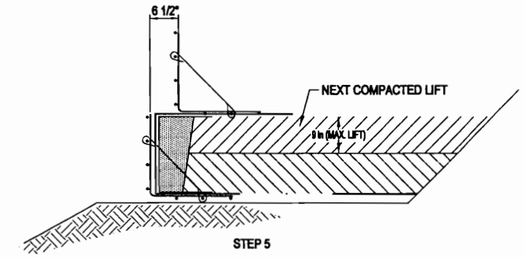
STEP 3

- BACKFILL CAREFULLY AS REQUIRED BY SPECIFICATION.
- COMPACT TO REQUIRED DENSITY.
- PLACE 6" TOPSOIL,SEED & FERTILIZER IN SPACE BETWEEN COMPACTED FILL AND WALL FACE.



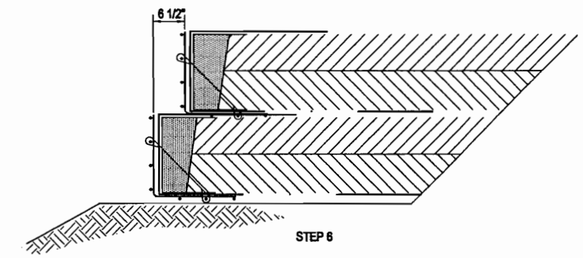
STEP 4

- PLACE NEXT LIFT OF BACKFILL AND COMPACT AS SPECIFIED.
- PLACE TOPSOIL IN OPEN SPACE AGAINST FACE.
- PULL FACE WRAP OVER COMPACTED FILL.
- PULL GEOGRID TAIL OVER COMPACTED FILL AND ANCHOR.
- PLACE NEXT BASKET 6 1/2 Inches OFFSET.



STEP 5

- REPEAT STEPS 2 THRU 5 UNTIL DESIRED HEIGHT OF WALL IS REACHED.
- IF TOP OF UPPERMOST WIRE BASKET IS MORE THAN 4" BELOW FINISHED GRADE BEHIND CURB, REFER TO STEP 7 BELOW.



STEP 6

FOR THE UPPERMOST WIRE BASKET : ADJUSTMENTS TO ITS' HEIGHT WILL NEED TO BE MADE BASED ON THE FOLLOWING TABLE -

VERTICAL DISTANCE FROM TOP OF LAST FULL HEIGHT 18-INCH TALL WIRE BASKET TO THE TOP BACK OF CURB	CONSTRUCTION
22 INCHES TO 12 INCHES	18 INCHES TO 8 INCH WIRE BASKET COVERED WITH 4 INCHES TOPSOIL
11 INCHES TO 5 INCHES	7 INCHES TO 1 INCH OF EARTH WRAPPED WITH FACE WRAP AND GEOGRID THEN COVERED WITH 4 INCHES TOPSOIL
4 INCHES	4 INCHES OF TOPSOIL

STEP 7

10/43 TYPICAL CONSTRUCTION SEQUENCE

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REINFORCED SOIL SLOPE DETAILS

S.P. NO. 18-620-11 SHEET NO. 43 OF 93 SHEETS

GTE Geo-Tech Engineering, Inc.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Stephen M. Gale 11/25/09

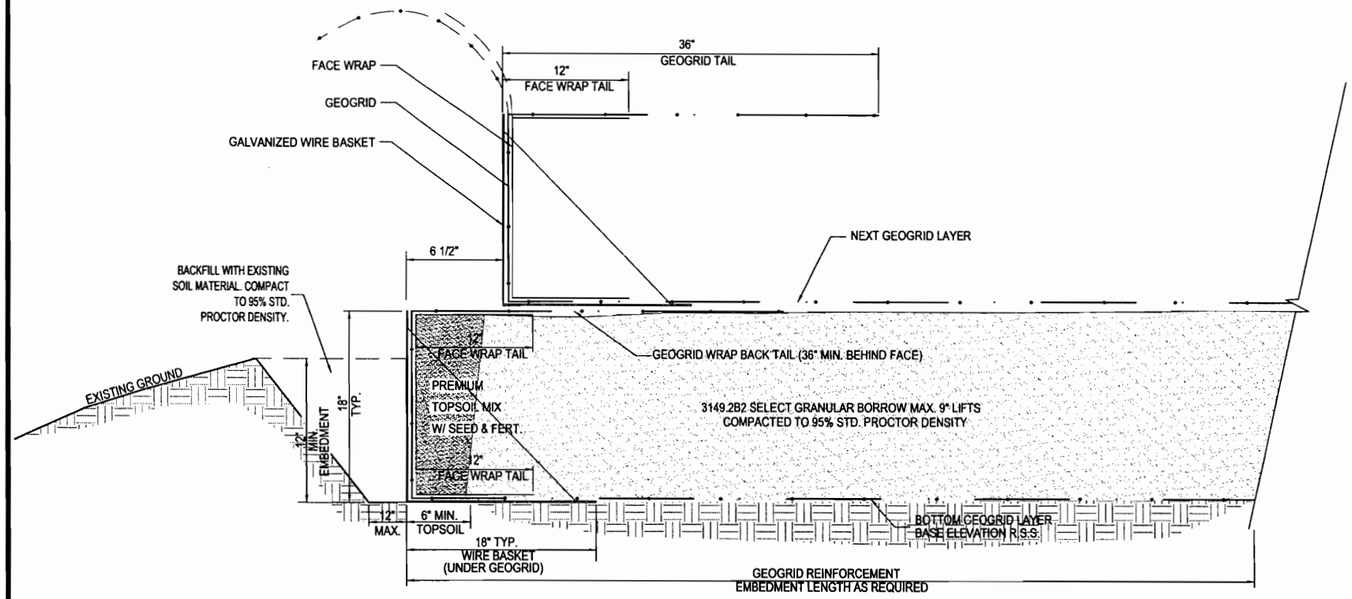
STEPHAN M. GALE DATE: LIC. NO. 13604

DATE	REV#	REVISION DESCRIPTION	BY

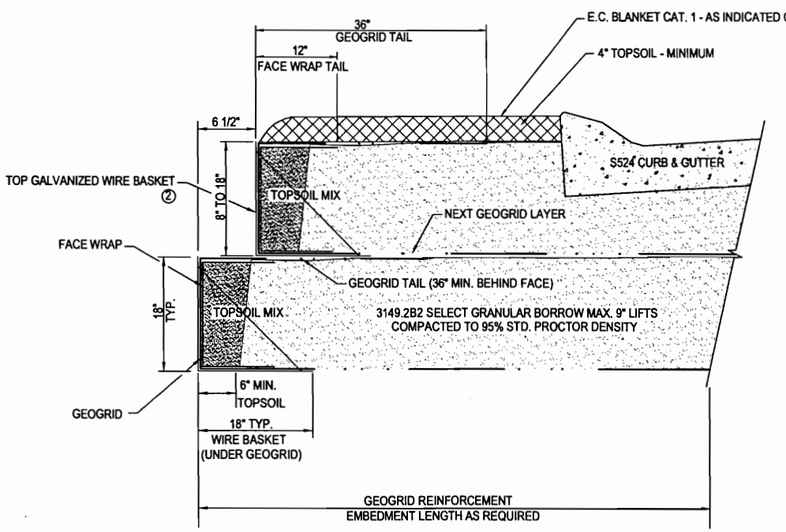
DATE: NOV. 2009
SCALE: NONE
DRAWN BY: P.M.S.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-DT-DETAIL SHEETS.dwg, 11/25/2009 1:38:24 PM, Mark.Skogen

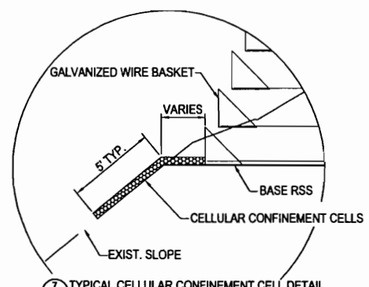


1/44 BOTTOM BASKET (AND ABOVE) RSS CONSTRUCTION DETAIL
N.T.S.

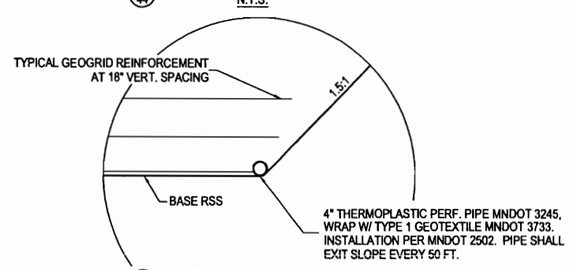


2/44 TOP BASKET (AND BELOW) RSS CONSTRUCTION DETAIL
N.T.S.

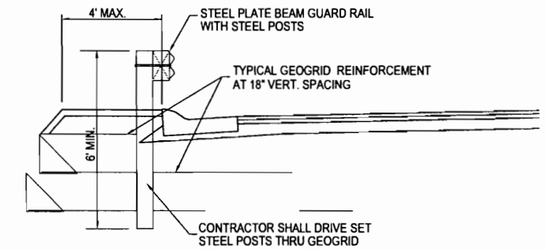
NOTES:
1. TOP BASKET SHALL BE CUT TO A MINIMUM OF 8" HIGH.
2. RSS TOP TO CONSIST OF TOP BASKET 8 - 18" HIGH, FACE WRAP AND GEOGRID WRAP BACK.



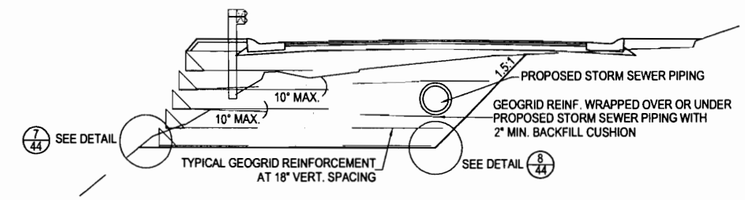
7/44 TYPICAL CELLULAR CONFINEMENT CELL DETAIL
N.T.S.



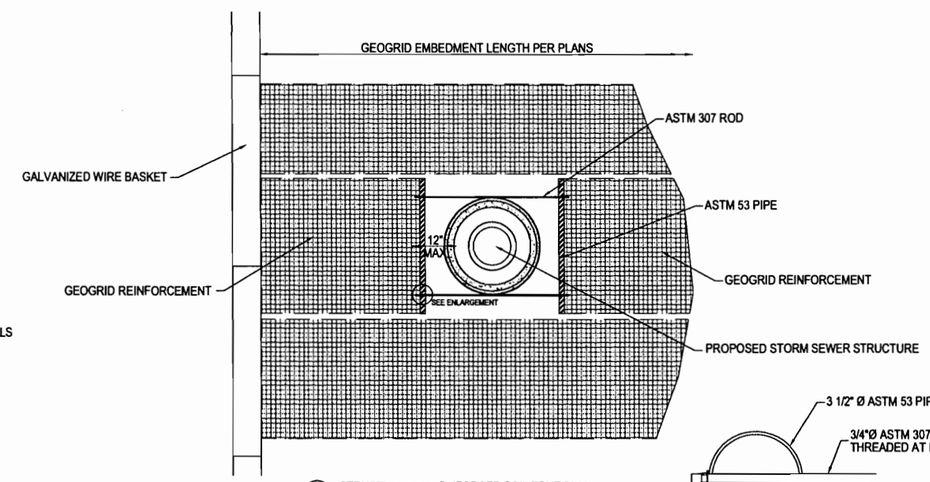
8/44 TYPICAL T.P. PIPE DRAIN DETAIL
N.T.S.



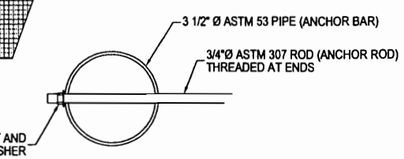
3/44 TYPICAL STEEL PLATE BEAM GUARD RAIL POST DETAIL
N.T.S.



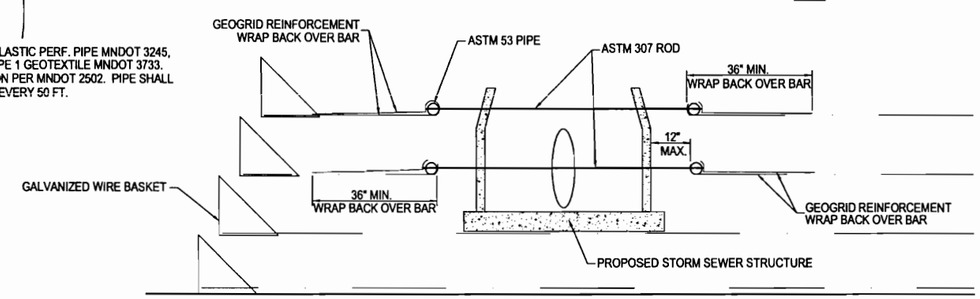
4/44 TYPICAL GEOGRID AT STORM SEWER PIPING
N.T.S.



5/44 STRUCTURES IN REINFORCED SOIL ZONE PLAN
N.T.S.



PIPE AND ROD DETAIL ENLARGEMENT
N.T.S.



NOTE:
PIPE & ROD CONFIGURATION ON BOTH SIDES OF PROPOSED STRUCTURES AT EVERY GEOGRID LEVEL THAT IS INTERRUPTED BY STRUCTURE.

6/44 STRUCTURES IN REINFORCED SOIL ZONE SECTION
N.T.S.

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REINFORCED SOIL SLOPE DETAILS

S.P. NO. 18-620-11 SHEET NO. 44 OF 93 SHEETS

GTE Gale-Tye Engineering, Inc.

DATE	REW	REVISIONS DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Stephen M. Gale 11/25/09

STEPHAN M. GALE DATE: LIC. NO. 13834

DATE: NOV. 2006
SCALE: NONE
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029.001

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

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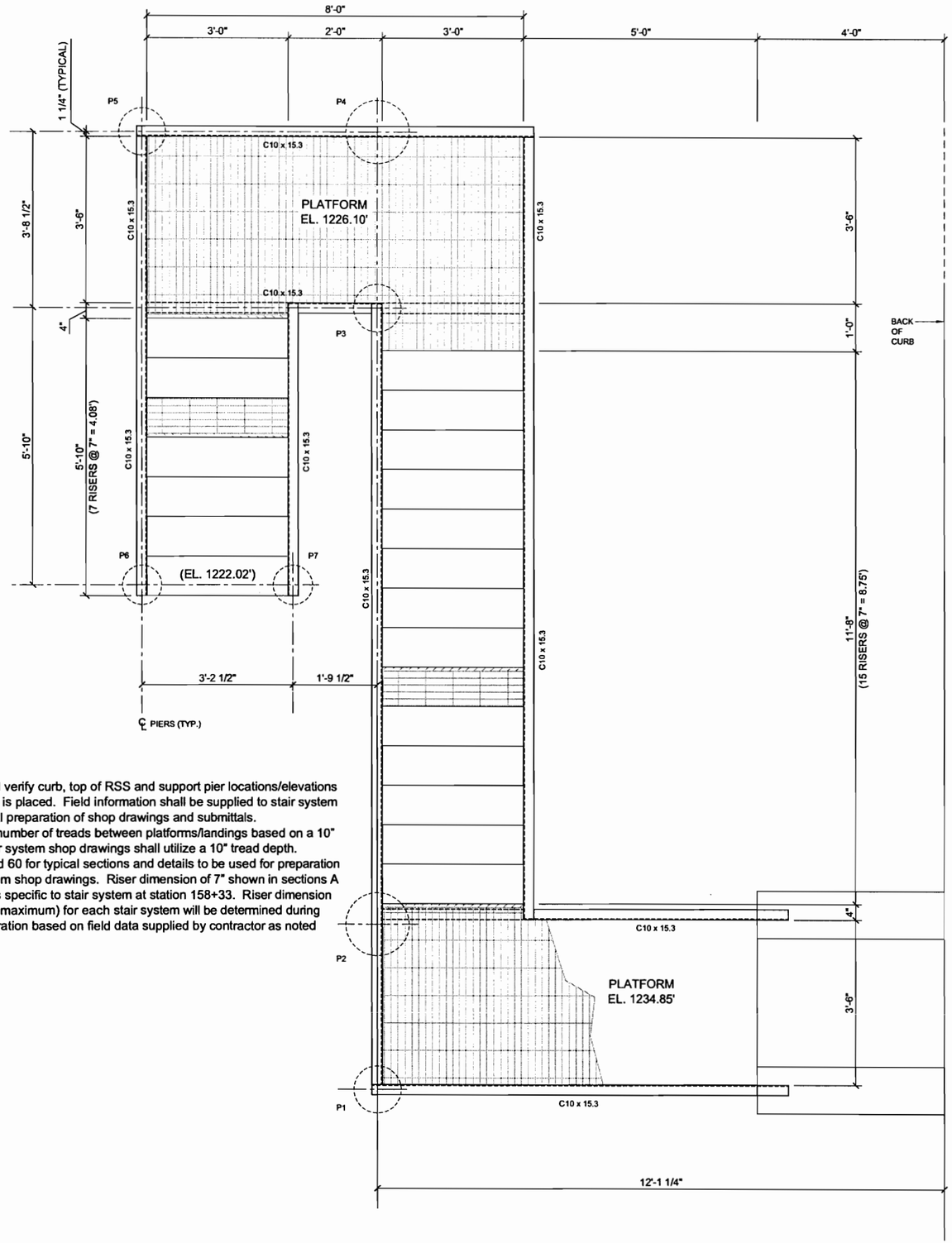


PLAN
3/8" = 1'-0"

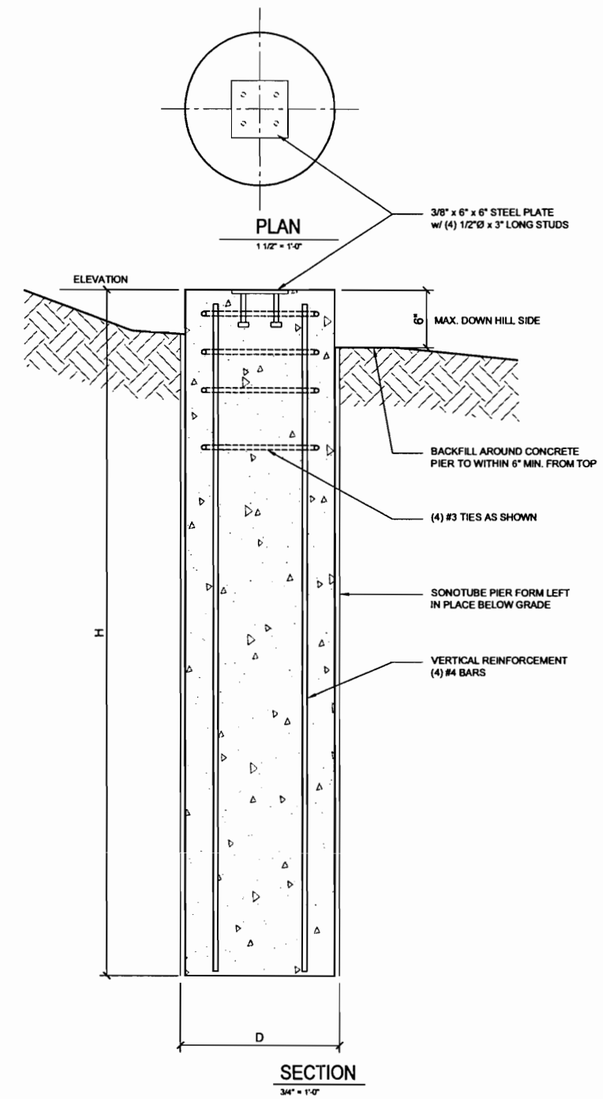
General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
2. Stair plans indicate number of treads between platforms/landings based on a 10" tread depth. All stair system shop drawings shall utilize a 10" tread depth.
3. See drawings 59 and 60 for typical sections and details to be used for preparation of all nine stair system shop drawings. Riser dimension of 7" shown in sections A and B on sheet 59 is specific to stair system at station 158+33. Riser dimension (7" minimum - 7.75" maximum) for each stair system will be determined during shop drawing preparation based on field data supplied by contractor as noted above.

STAIR SYSTEM AT STATION 153 + 62.33

PIER SCHEDULE

MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1225.0	
P2	16"	6'	1225.0	
P3	12"	5'	1225.0	
P4	16"	5'	1225.0	
P5	12"	5'	1222.0	
P6	10"	4'	1221.5	
P7	10"	4'	1221.5	



SECTION
3/4" = 1'-0"

STAIR PLAN - STA. 153+62.33

S.P. NO. 18-620-11 SHEET NO. 50 OF 93 SHEETS

ENGINEERS
ARCHITECTS
LAND SURVEYORS
ENVIRONMENTAL SERVICES

ALEXANDRIA, MN
BEMIDJI, MN
BRAINERD, MN
COLUMBIA HEIGHTS, MN
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WIDSETH SMITH NOLTING

DATE	REV#	REVISIONS DESCRIPTION	BY
11/25/09			

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME, OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

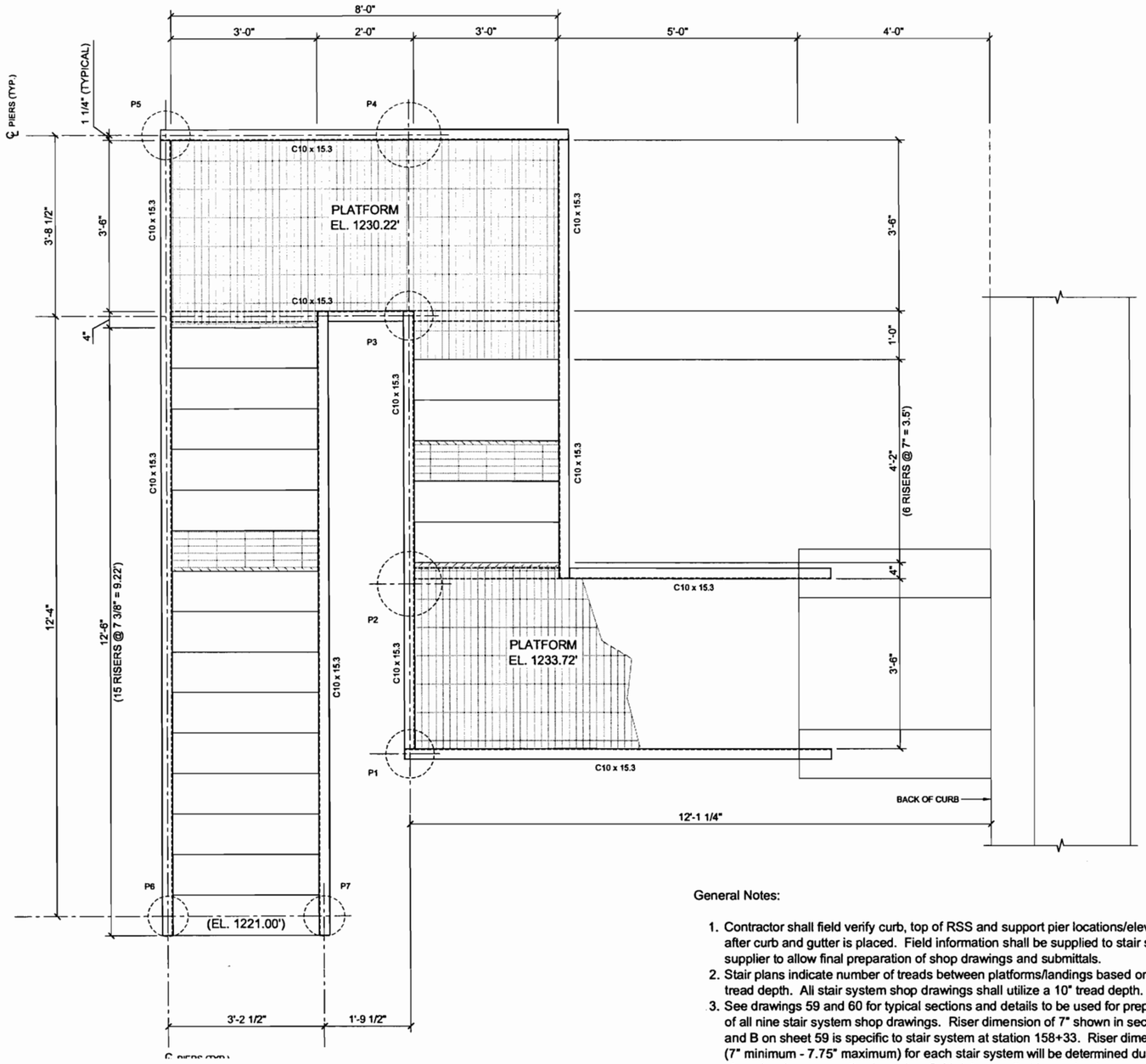
MARK V. HALLAN DATE 11/25/09 LIC. NO. 24097

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: C.J.B
CHECKED BY: M.V.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 153-62.dwg, 11/25/2009 10:43:50 AM, Chris.Satterlund

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 153-62.dwg Plotted by: Chris Satterlund 11/25/2009 10:43:50 AM © 2009 WIDSETH SMITH NOLTING



PLAN
3/8" = 1'-0"

General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
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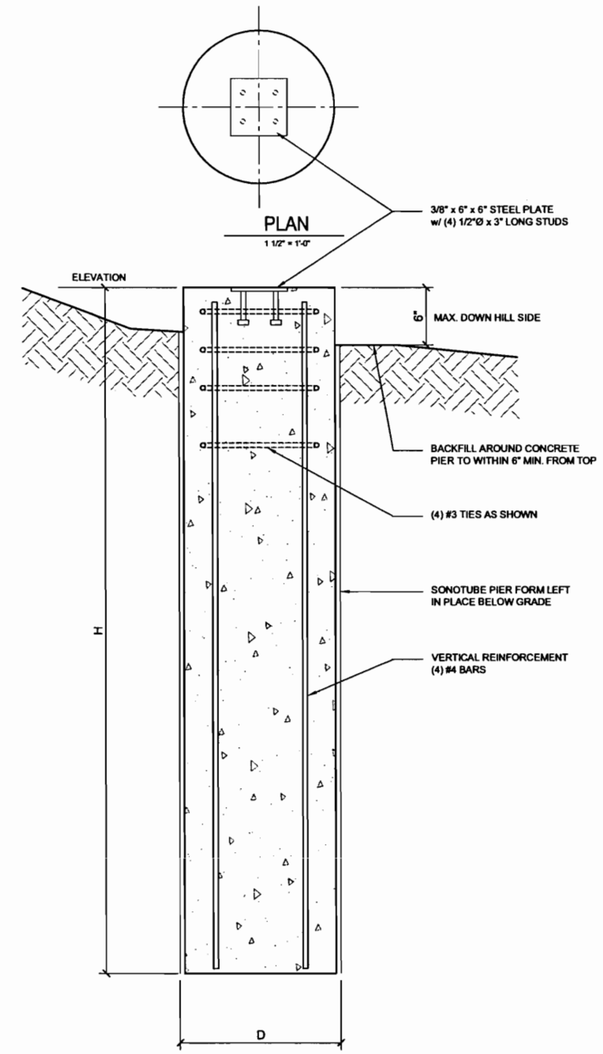
STAIR SYSTEM AT STATION 156 + 09.66

PIER SCHEDULE

MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1224.50	
P2	16"	6'	1224.50	
P3	12"	6'	1224.50	
P4	12"	6'	1224.50	
P5	12"	5'	1220.50	
P6	10"	4'	1220.50	
P7	10"	4'	1220.50	



SECTION
3/4" = 1'-0"

STAIR PLAN - STA. 156+09.66

S.P. NO. 18-620-11 SHEET NO. 51 OF 93 SHEETS

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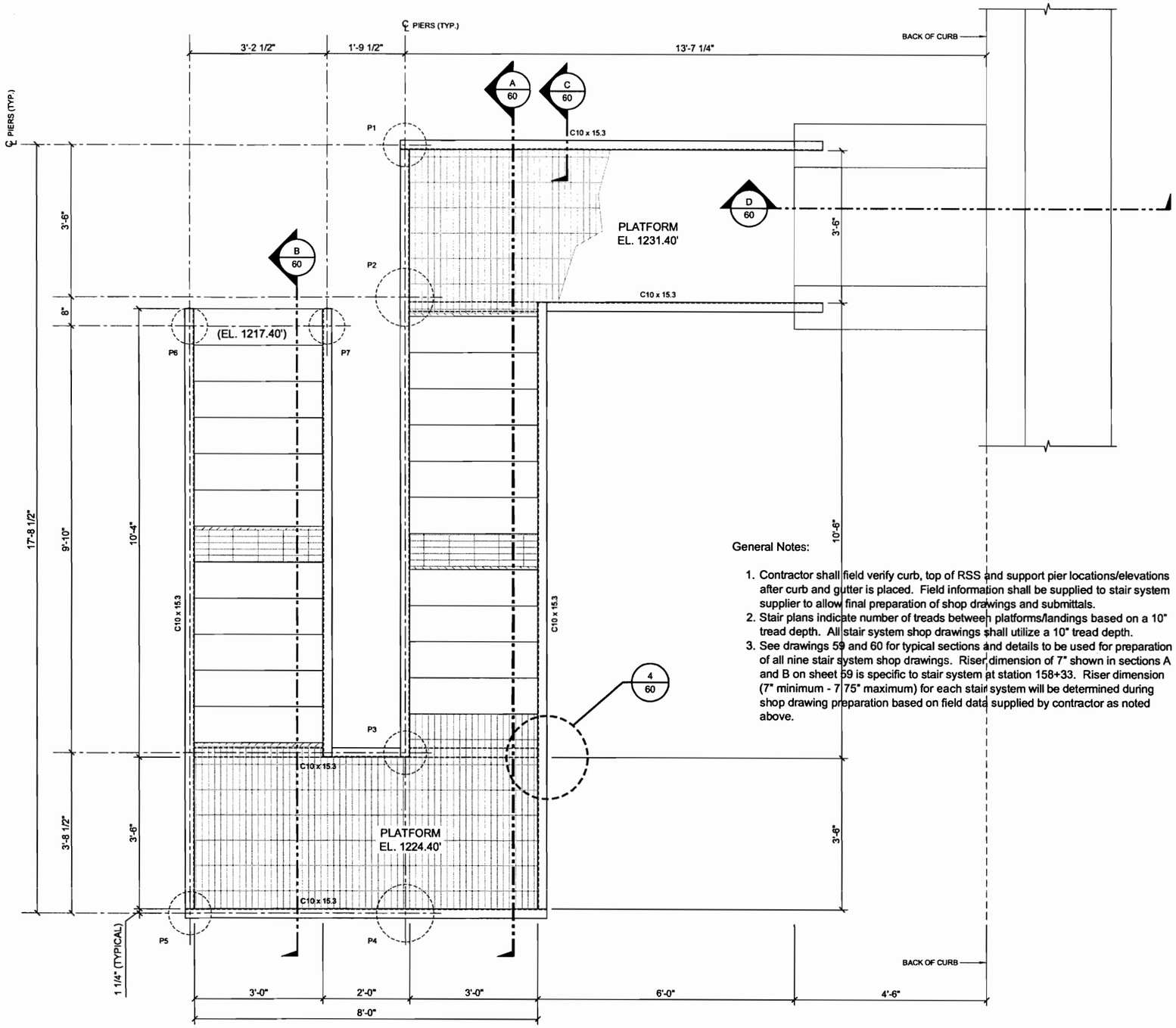
MARK V. HALLAN DATE: 11/25/09 REG. NO. 24997

DATE	REV	REVISIONS DESCRIPTION	BY
11/25/09		MN DOT REVIEW	

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: CJS
CHECKED BY: MVH
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 156-10.dwg, 11/25/2009 11:54:43 AM, Chris.Satterlund



PLAN
3/8" = 1'-0"

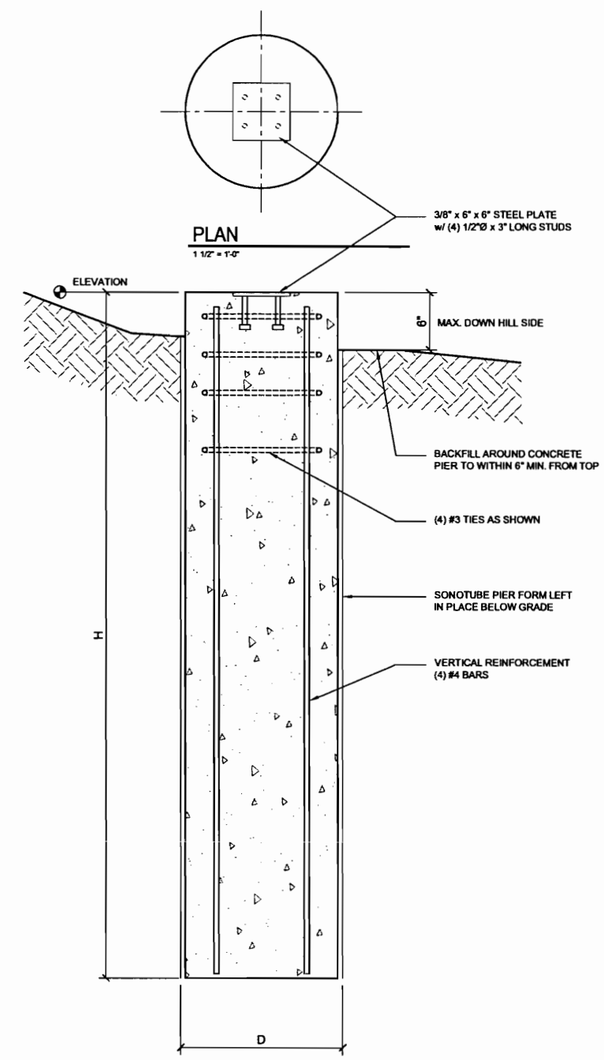
General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
2. Stair plans indicate number of treads between platforms/landings based on a 10" tread depth. All stair system shop drawings shall utilize a 10" tread depth.
3. See drawings 59 and 60 for typical sections and details to be used for preparation of all nine stair system shop drawings. Riser dimension of 7" shown in sections A and B on sheet 59 is specific to stair system at station 158+33. Riser dimension (7" minimum - 7.75" maximum) for each stair system will be determined during shop drawing preparation based on field data supplied by contractor as noted above.

STAIR SYSTEM AT STATION 158 + 33

PIER SCHEDULE

MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1219.0	
P2	16"	6'	1219.0	
P3	12"	5'	1219.0	
P4	16"	5'	1219.0	
P5	12"	5'	1217.0	
P6	10"	5'	1217.0	
P7	10"	4'	1217.0	



SECTION
3/4" = 1'-0"

STAIR PLAN & PIER SCHEDULE - STA. 158+33

S.P. NO. 18-620-11 SHEET NO. 52 OF 93 SHEETS

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

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MARK V. HALLAN DATE 11/25/09 LIC. NO. 24997

BY	REVISIONS DESCRIPTION	REW	DATE

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: C.J.S
CHECKED BY: M.V.H.
JOB NUMBER: 108B029

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 158-33.dwg, 11/25/2009 11:20:12 AM, Chris.Satterlund

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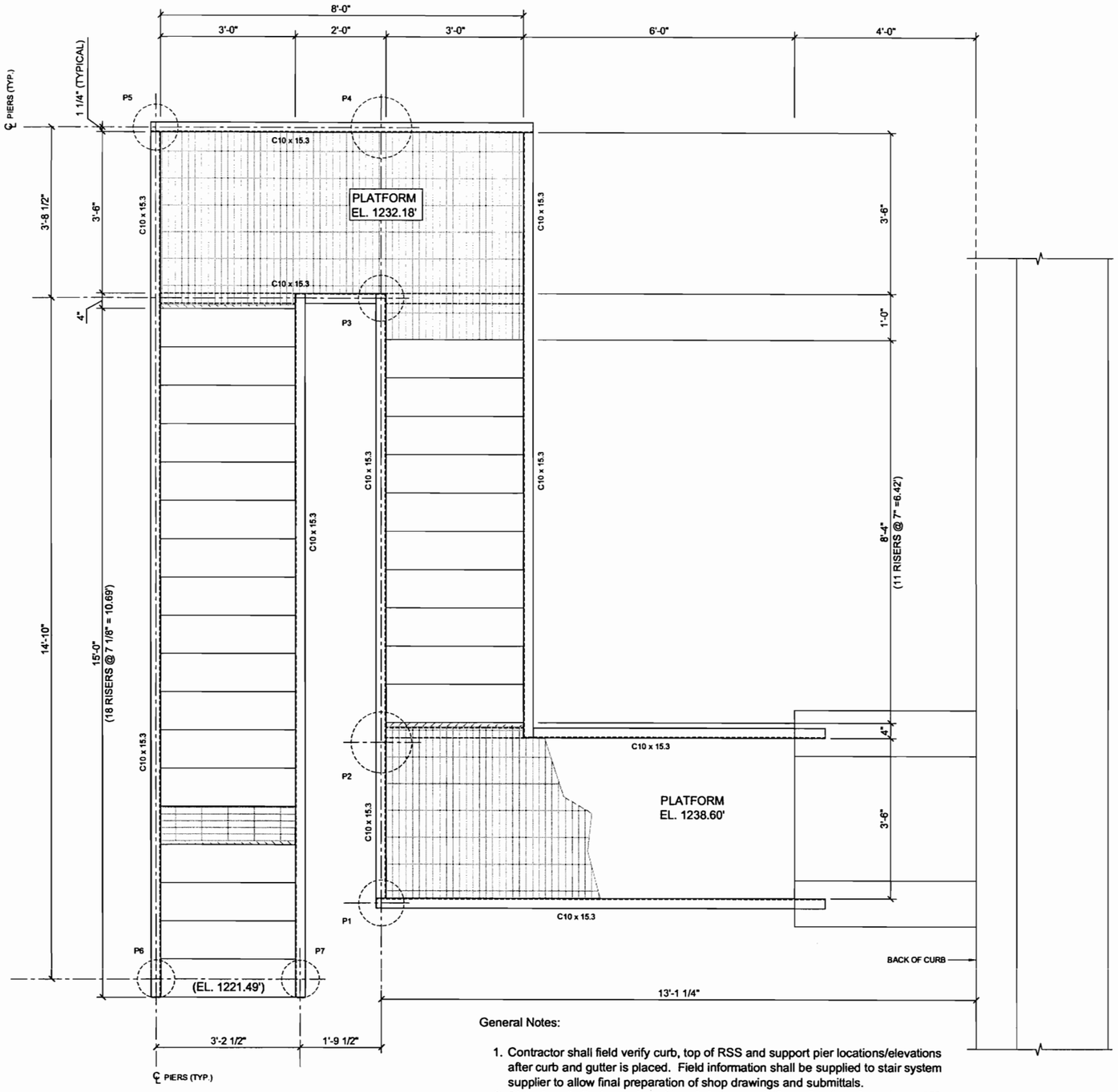

PLAN

3/8" = 1'-0"

STAIR SYSTEM AT STATION 161 + 07.68				
PIER SCHEDULE				
MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1224.00	
P2	16"	6'	1224.00	
P3	12"	5'	1225.00	
P4	16"	5'	1225.00	
P5	14"	6'	1221.50	
P6	10"	4'	1221.00	
P7	10"	4'	1221.00	

General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
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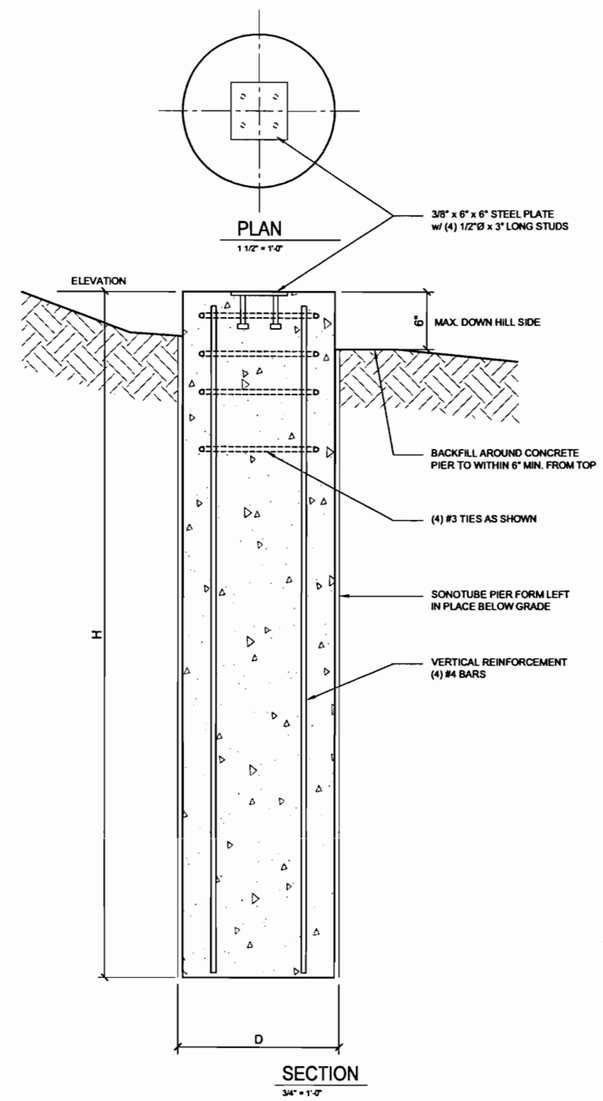

STAIR PLAN - STA. 161+07.68

S.P. NO. 18-620-11 SHEET NO. 53 OF 93 SHEETS

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 161-08.dwg Plotted by: Chris Satterlund 11/25/2009 2:00:04 PM © 2009 WIDSETH SMITH NOLTING

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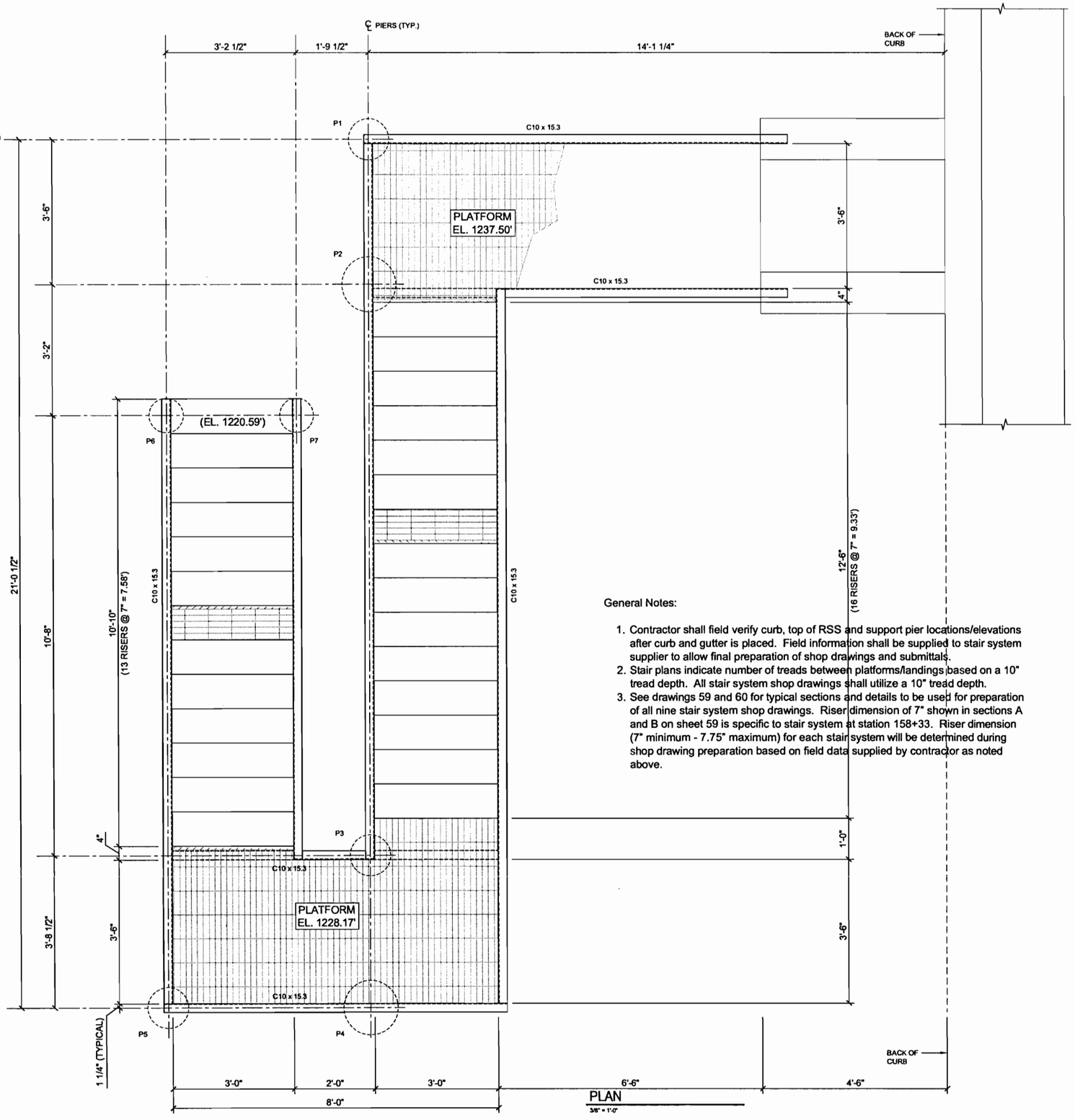
MARK V. HALLAN DATE 11/25/09 REG. NO. 24997

REVISIONS DESCRIPTION	BY	DATE	REV#
	MJW	11/25/09	

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: CJB
CHECKED BY: MVH
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



PLAN
3/8" = 1'-0"

General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
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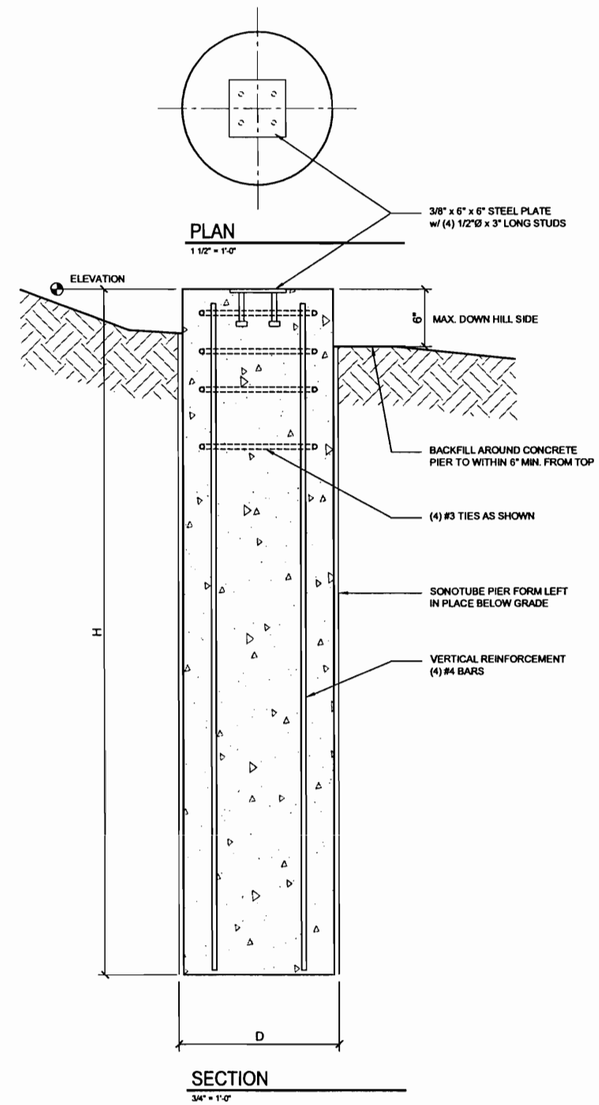
3. See drawings 59 and 60 for typical sections and details to be used for preparation of all nine stair system shop drawings. Riser dimension of 7" shown in sections A and B on sheet 59 is specific to stair system at station 158+33. Riser dimension (7" minimum - 7.75" maximum) for each stair system will be determined during shop drawing preparation based on field data supplied by contractor as noted above.

STAIR SYSTEM AT STATION 162 + 62

PIER SCHEDULE

MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1222.50	
P2	16"	6'	1222.50	
P3	12"	5'	1222.50	
P4	16"	5'	1222.50	
P5	12"	5'	1220.00	
P6	10"	4'	1220.00	
P7	10"	4'	1220.00	



PLAN
1 1/2" = 1'-0"

SECTION
3/4" = 1'-0"

STAIR PLAN & PIER SCHEDULE - STA. 162+62

S.P. NO. 18-620-11 SHEET NO. 54 OF 93 SHEETS

ENGINEERS ALEXANDRIA, MN BEMIDJI, MN BRAINERD, MN CROOKSTON, MN DETROIT LAKES, MN FARGO, ND RED WING, MN ROCHESTER, MN SIOUX FALLS, SD
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MARK V. HALLAN DATE 11/25/09 REG. NO. 24997

REVISIONS DESCRIPTION	REV#	DATE
MN DOT Review		11/25/09

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: C.J.S
CHECKED BY: M.V.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 162-62.dwg, 11/25/2009 1:11:29 PM, Chris.Satterlund
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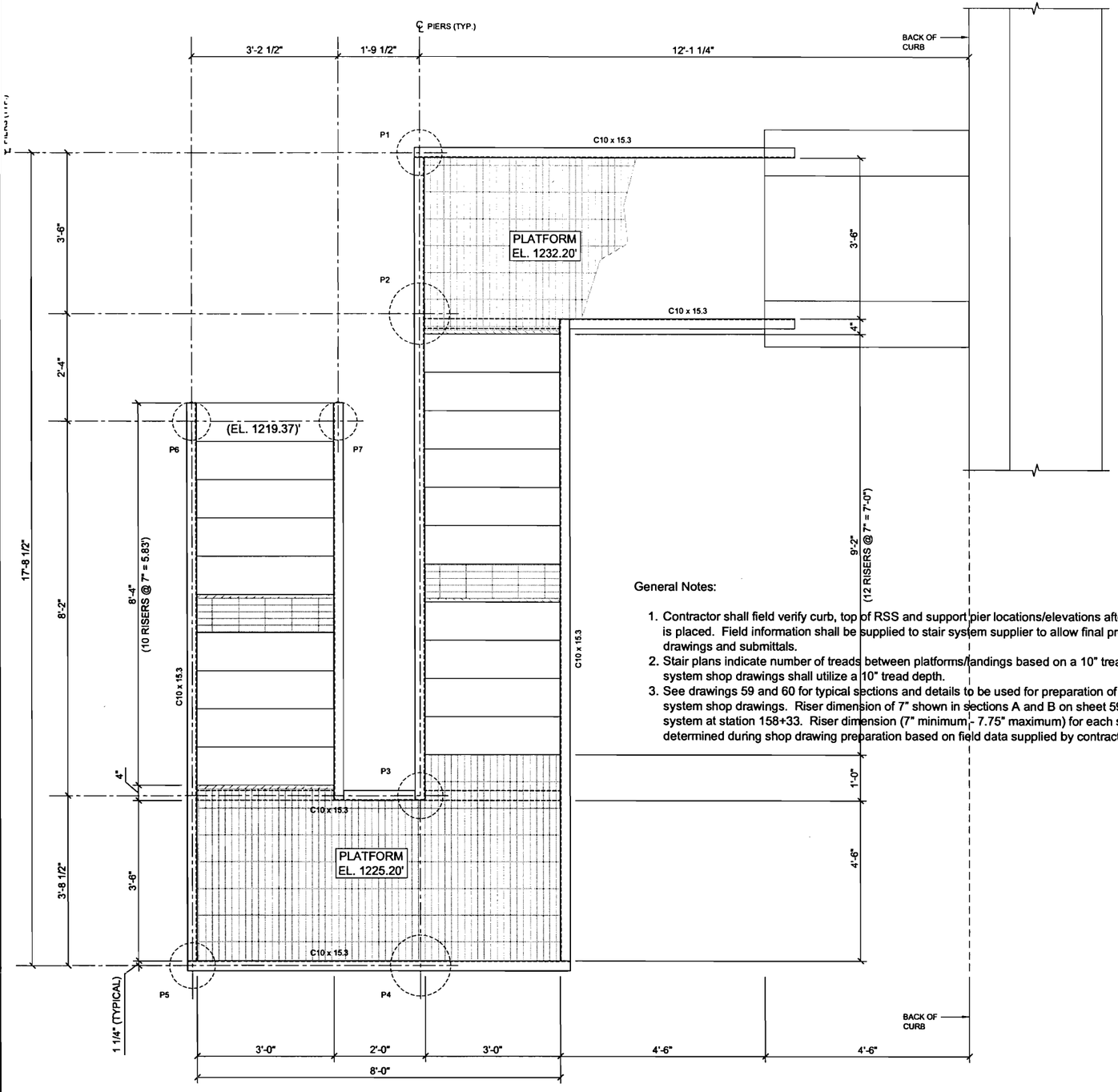

PLAN
3/8" = 1'-0"

General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
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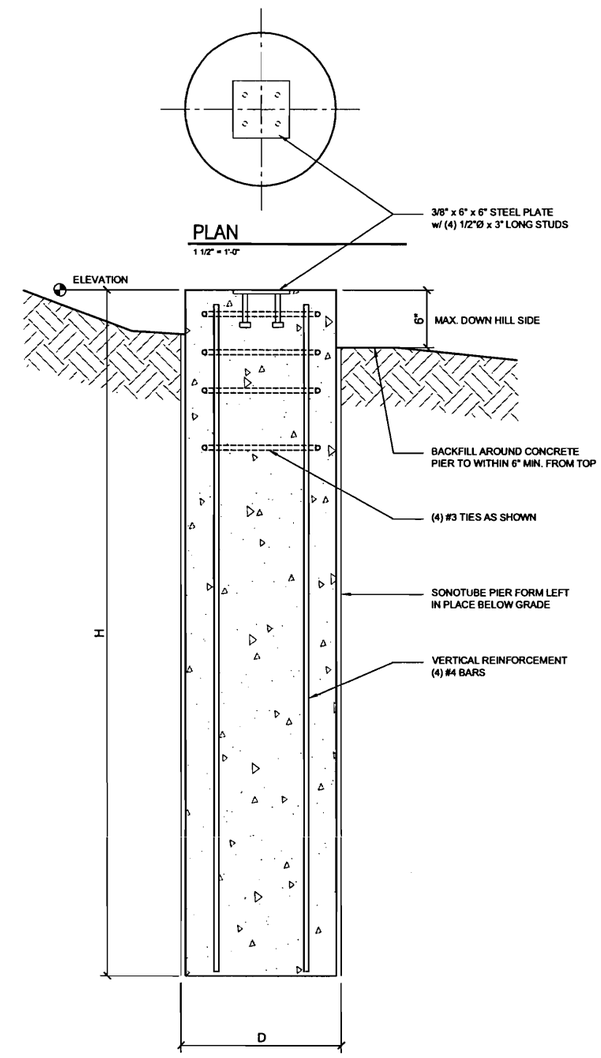
STAIR SYSTEM AT STATION 165 + 05

PIER SCHEDULE

MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1221.50	
P2	16"	6'	1221.50	
P3	12"	5'	1223.50	
P4	16"	5'	1223.50	
P5	12"	5'	1221.00	
P6	10"	4'	1218.90	
P7	10"	4'	1218.90	



SECTION
3/4" = 1'-0"

STAIR PLAN & PIER SCHEDULE - STA. 165+05

S.P. NO. 18-620-11 SHEET NO. 55 OF 93 SHEETS

ENGINEERS ARCHITECTS LAND SURVEYORS ENVIRONMENTAL SERVICES

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REVISIONS DESCRIPTION	BY	DATE	REV#

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CHECKED BY: M.V.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 165-05.dwg, 11/25/2009 1:30:02 PM, Chris.Satterlund

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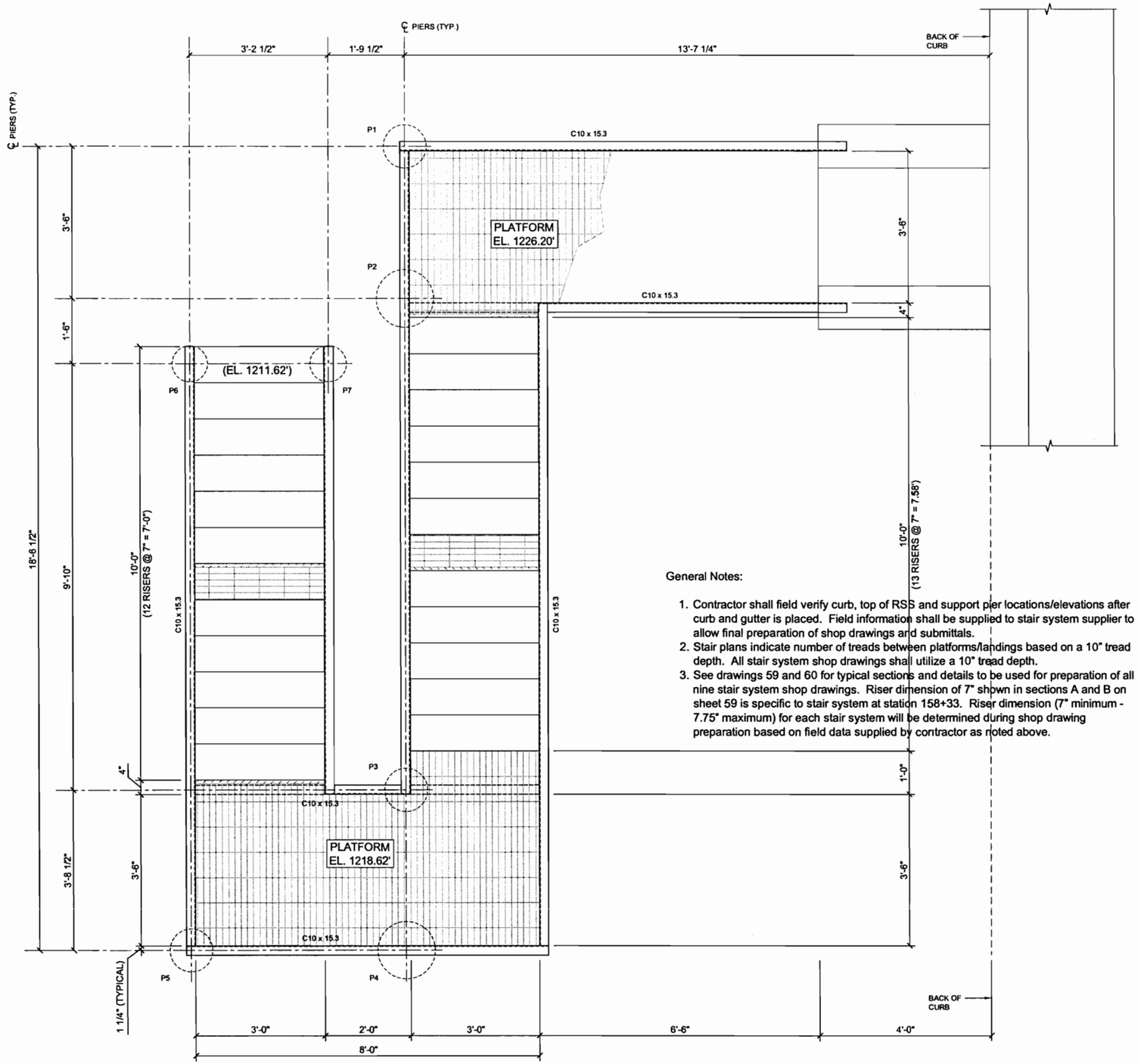

PLAN
3/8" = 1'-0"

General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
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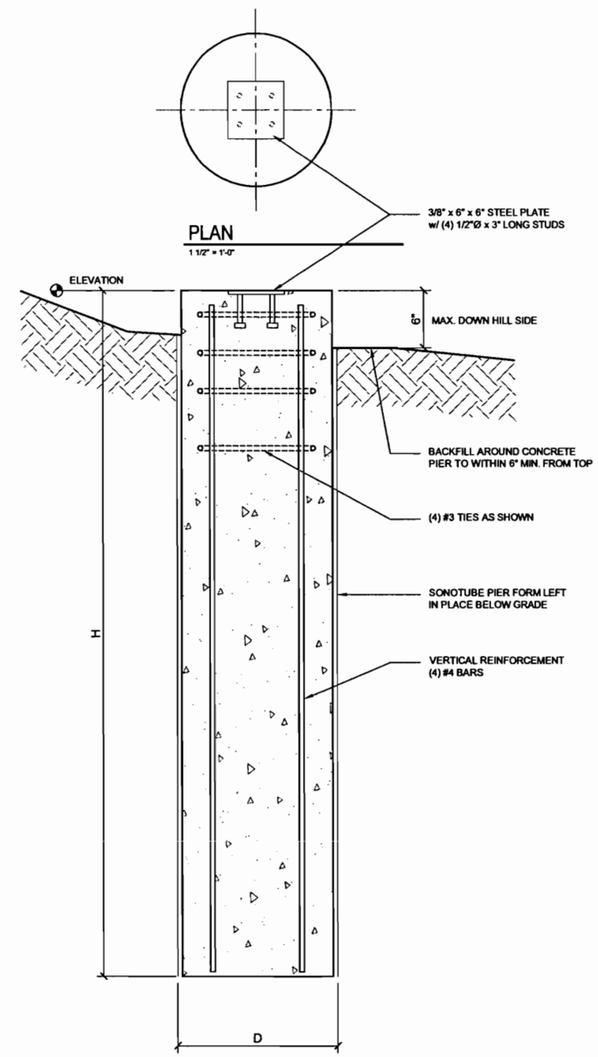
STAIR SYSTEM AT STATION 168+82.87

PIER SCHEDULE

MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1213.00	
P2	16"	6'	1213.00	
P3	12"	5'	1213.00	
P4	16"	5'	1213.00	
P5	12"	5'	1211.10	
P6	10"	4'	1211.10	
P7	10"	4'	1211.10	



SECTION
3/4" = 1'-0"

STAIR PLAN & PIER SCHEDULE - STA. 168+82.87

S.P. NO. 18-620-11 SHEET NO. 56 OF 93 SHEETS

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MARK V. HALLAN DATE 11/25/09 LIC. NO. 24997

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11/25/09			

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: C.J.S.
CHECKED BY: M.V.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

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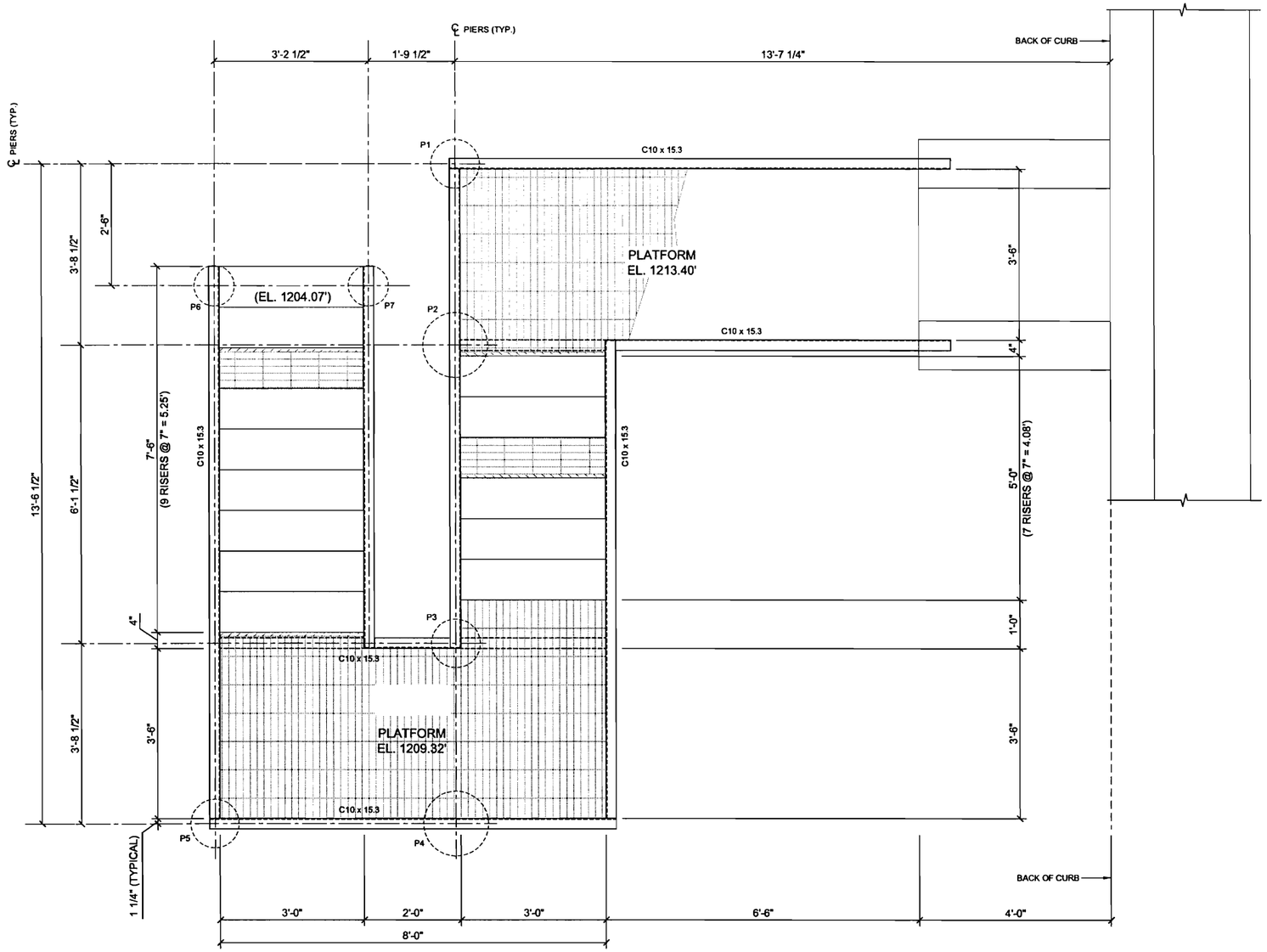

PLAN
3/8" = 1'-0"

General Notes:

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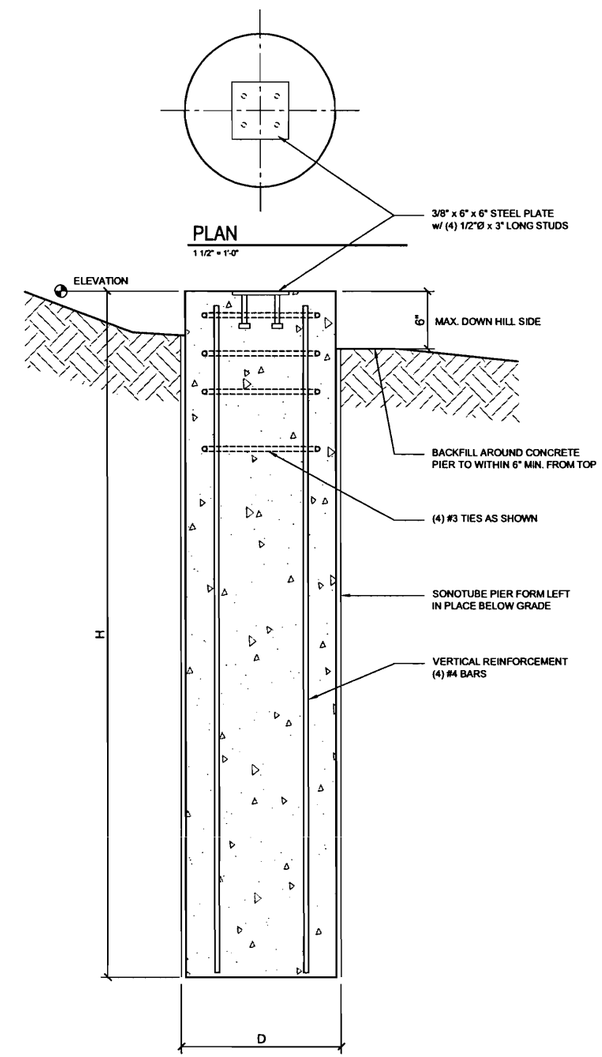
STAIR SYSTEM AT STATION 174+01.12

PIER SCHEDULE

MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1206.50	
P2	16"	6'	1206.50	
P3	12"	5'	1206.50	
P4	16"	5'	1206.50	
P5	12"	5'	1203.50	
P6	10"	4'	1203.50	
P7	10"	4'	1203.50	



SECTION
3/4" = 1'-0"

STAIR PLAN & PIER SCHEDULE - STA. 174+01.12

S.P. NO. 18-620-11 SHEET NO. 57 OF 93 SHEETS

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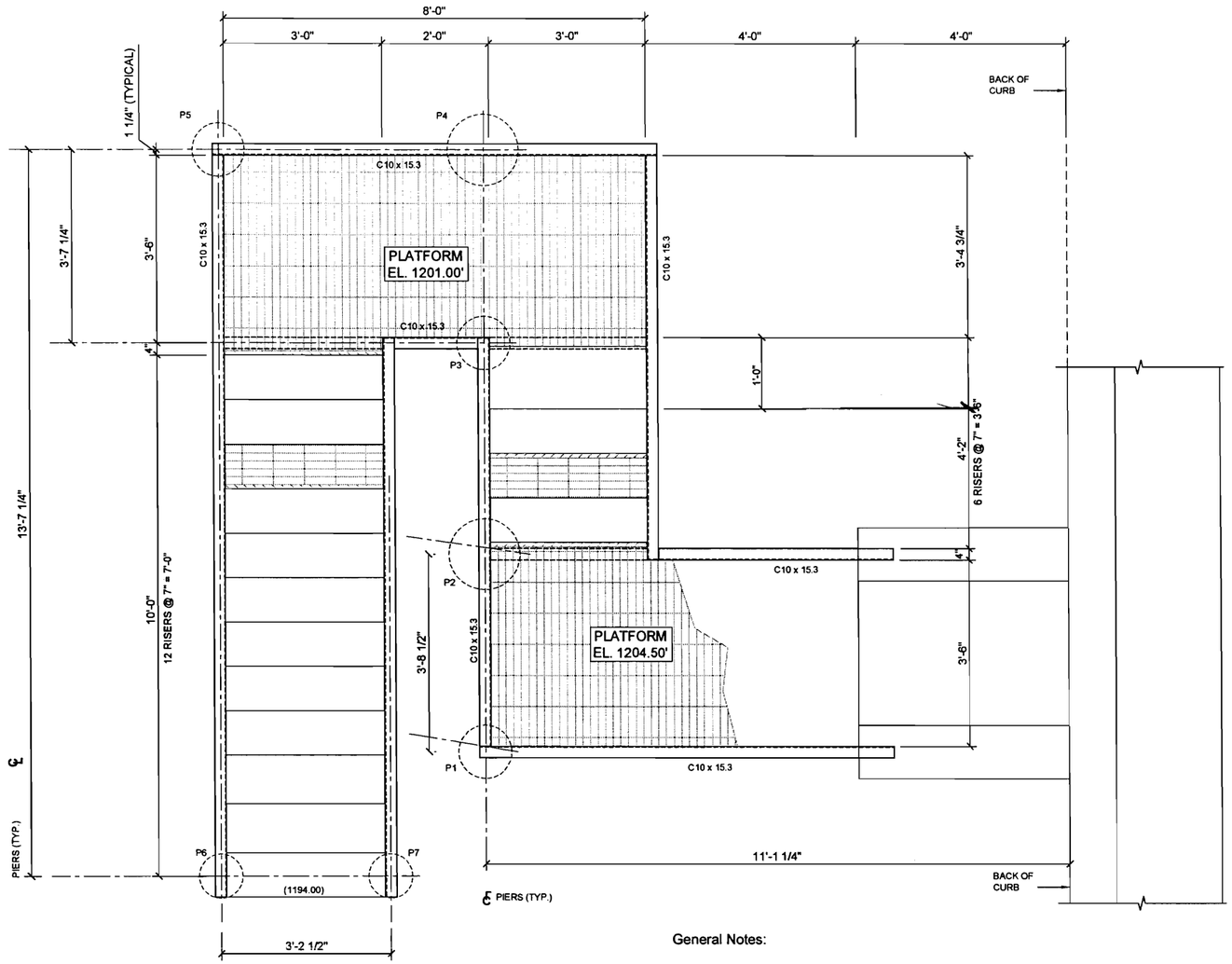
MARK V. HALLAN DATE 11/25/09 LIC. NO. 24997

BY	REVISIONS DESCRIPTION	REV#	DATE

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: C.J.S
CHECKED BY: M.V.H.
JOB NUMBER: 0108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

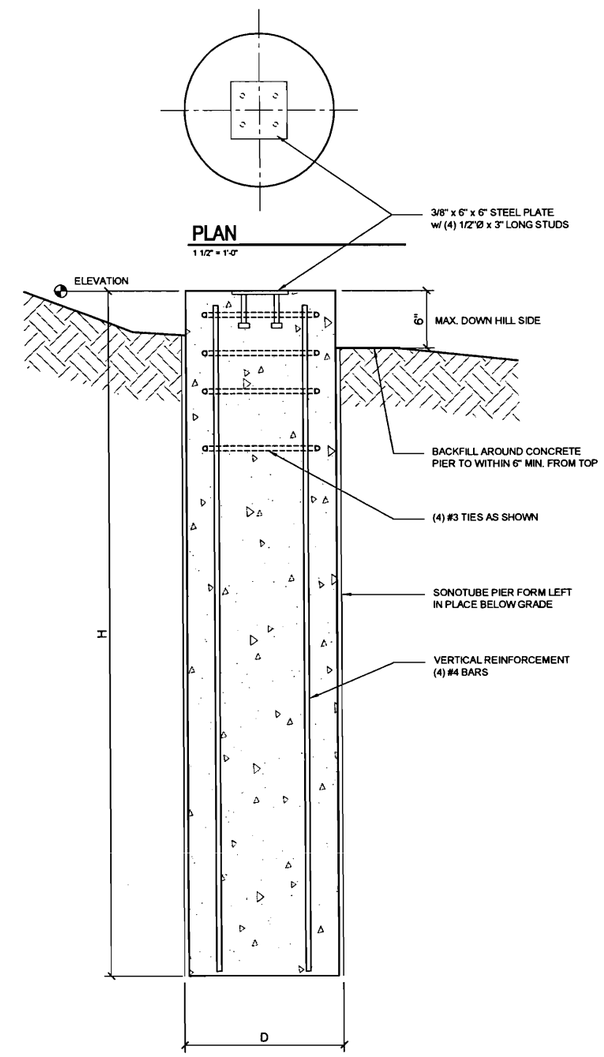
STAIR SYSTEM AT STATION 178+18.43				
PIER SCHEDULE				
MARK NO.	DIAMETER (D)	HEIGHT (H)	TOP OF PIER ELEVATION	REMARKS
P1	12"	6'	1196.00	
P2	16"	6'	1196.00	
P3	12"	5'	1196.00	
P4	16"	5'	1196.00	
P5	12"	5'	1193.50	
P6	10"	4'	1193.50	
P7	10"	4'	1193.50	



PLAN
3/8" = 1'-0"

General Notes:

1. Contractor shall field verify curb, top of RSS and support pier locations/elevations after curb and gutter is placed. Field information shall be supplied to stair system supplier to allow final preparation of shop drawings and submittals.
2. Stair plans indicate number of treads between platforms/landings based on a 10" tread depth. All stair system shop drawings shall utilize a 10" tread depth.
3. See drawings 59 and 60 for typical sections and details to be used for preparation of all nine stair system shop drawings. Riser dimension of 7" shown in sections A and B on sheet 59 is specific to stair system at station 158+33. Riser dimension (7" minimum - 7.75" maximum) for each stair system will be determined during shop drawing preparation based on field data supplied by contractor as noted above.



SECTION
3/4" = 1'-0"

STAIR PLAN & PIER SCHEDULE - STA. 178+18.43

S.P. NO. 18-620-11 SHEET NO. 58 OF 93 SHEETS

ENGINEERS
ARCHITECTS
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BRAINERD, MN
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DATE	REV#	REVISIONS DESCRIPTION	BY

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DATE 11/25/09 LIC. NO. 24997

MARK V. HALLAN

DATE: NOVEMBER, 2009
SCALE: AS INDICATED
DRAWN BY: C.J.S.
CHECKED BY: M.V.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 178-18.dwg, 11/25/2009 3:03:26 PM, Pat.Beste

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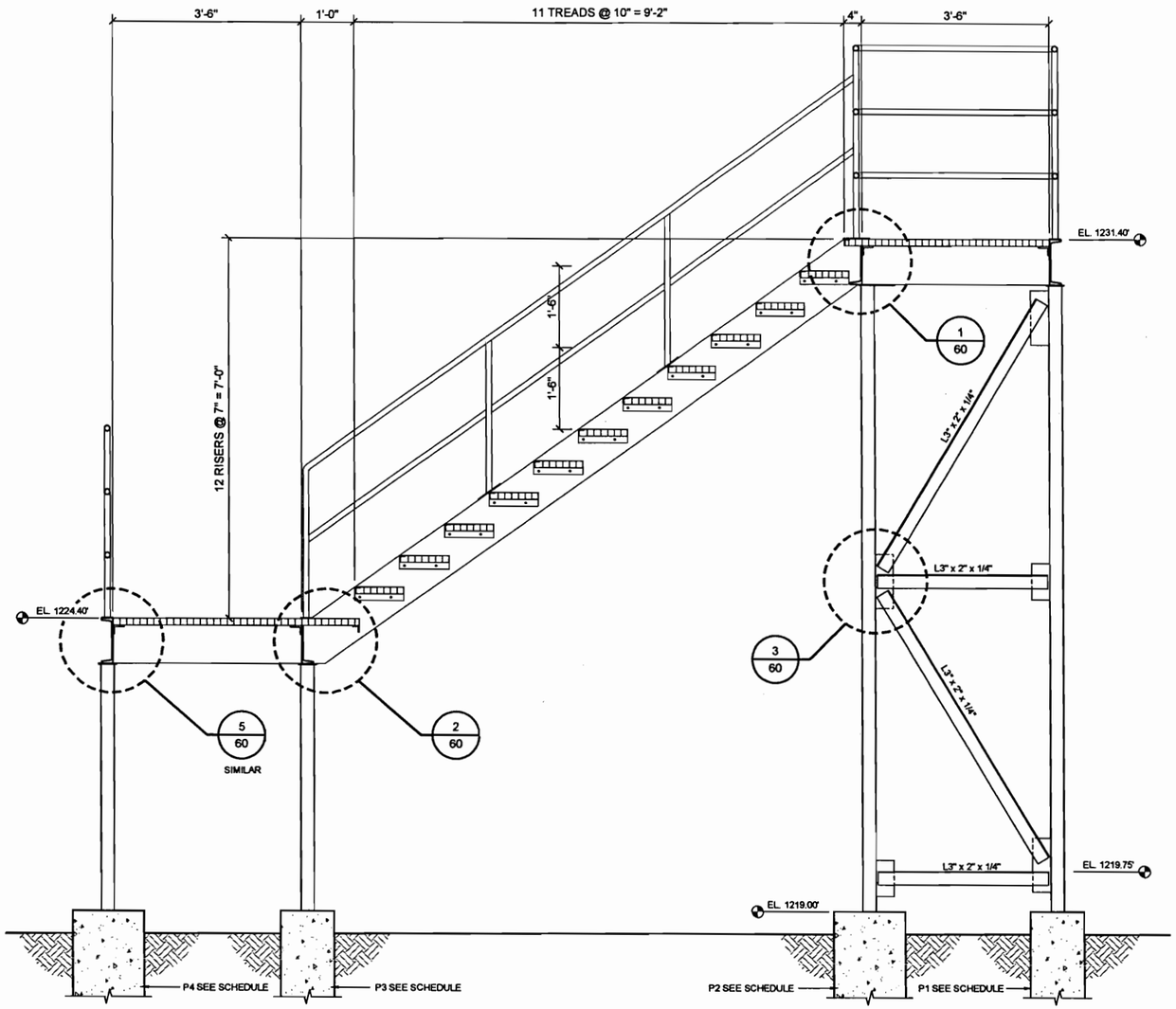
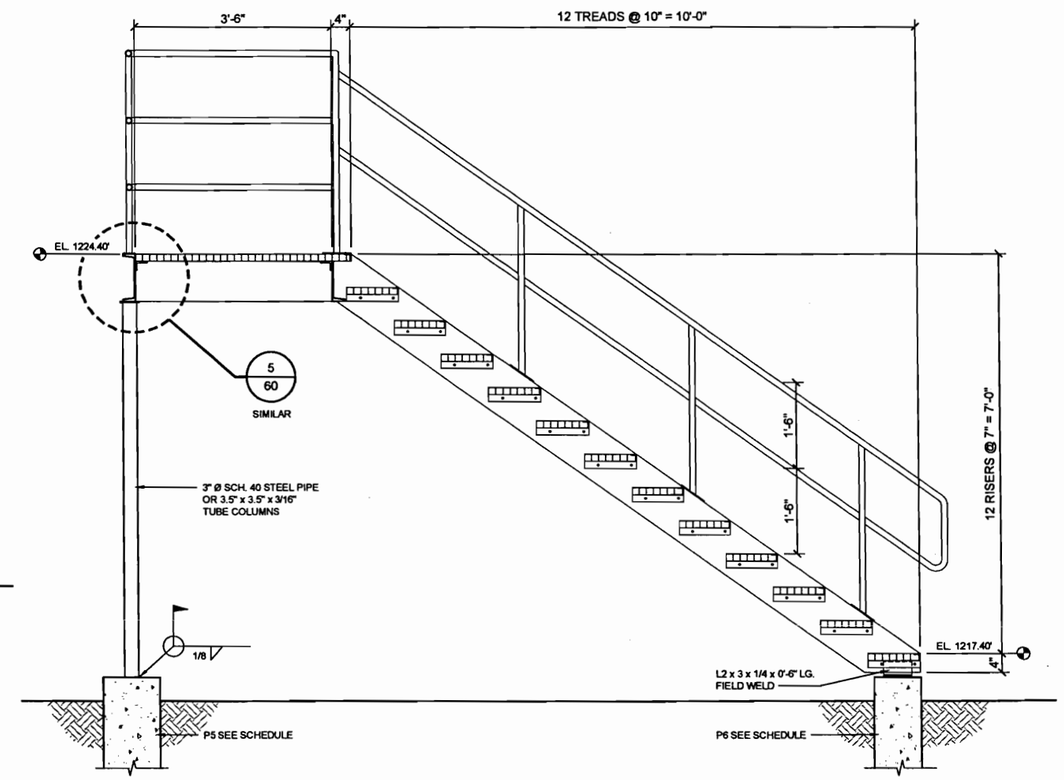


A SECTION
3/8" = 1'-0"



B SECTION
3/8" = 1'-0"

STAIR SECTIONS & DETAILS

S.P. NO. 18-620-11 SHEET NO. 59 OF 93 SHEETS

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 158-33.dwg Plotted by: Shayne Johnson 1/13/2010 9:34:14 AM © 2010 WIDSETH SMITH NOLTING

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 158-33.dwg, 1/13/2010 9:34:14 AM, Shayne Johnson

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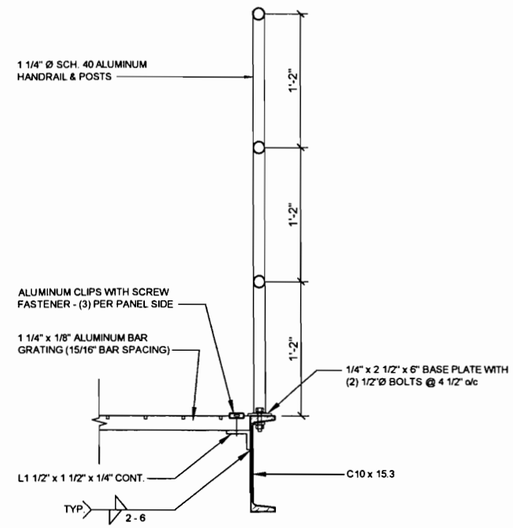
MARK V. HALLAN
DATE 1/13/10 LIC. NO. 24997

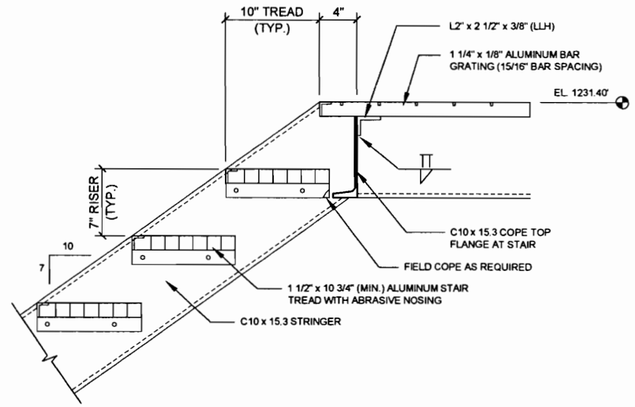
DATE	REV#	REVISIONS DESCRIPTION	BY
1-13-2010		HANDRAIL HGT. FROM 1'-4" TO 1'-6"	BWJ

DATE: NOVEMBER, 2009
SCALE: 1"=50'
DRAWN BY: C.J.S.
CHECKED BY: M.V.H.
JOB NUMBER: 1089029

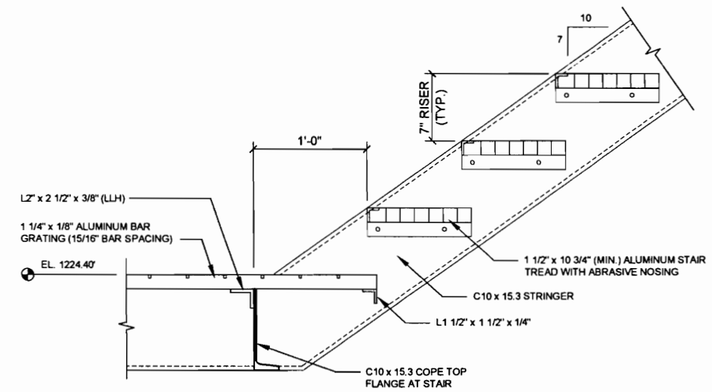
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY



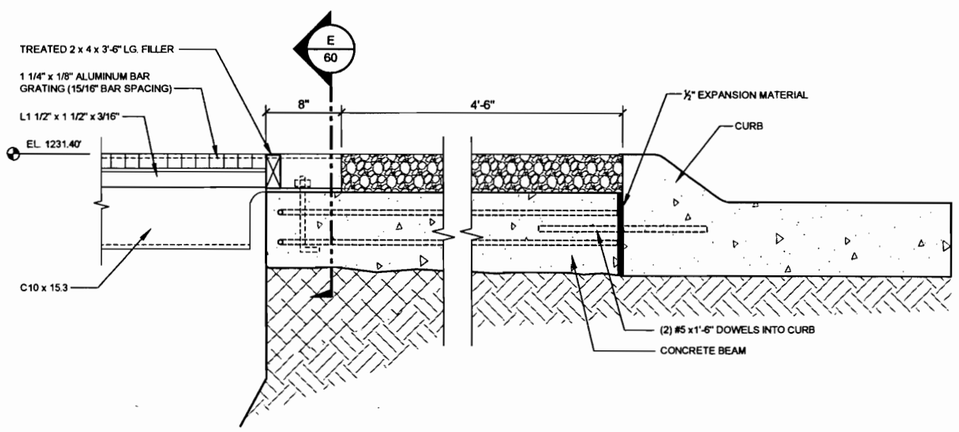
C SECTION (TYPICAL)
3/4" = 1'-0"



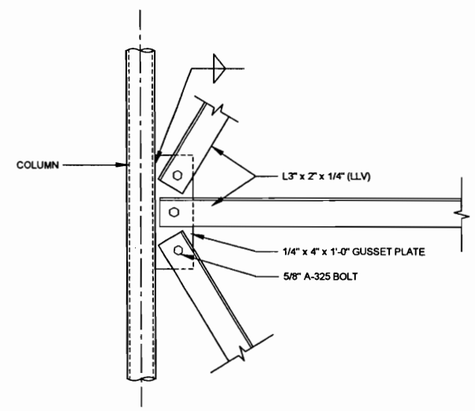
1 DETAIL
3/4" = 1'-0"



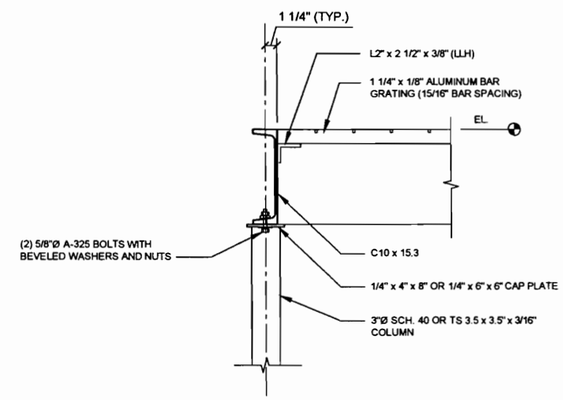
2 DETAIL
3/4" = 1'-0"



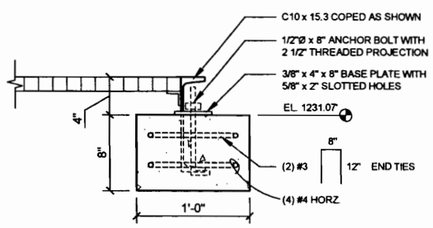
D SECTION
3/4" = 1'-0"



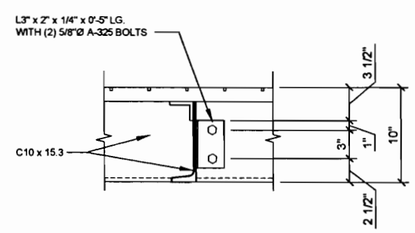
3 DETAIL
3/4" = 1'-0"



5 DETAIL
3/4" = 1'-0"



E SECTION
3/4" = 1'-0"



4 DETAIL (TYP. FRAMING CONNECTION)
3/4" = 1'-0"

STAIR SECTIONS & DETAILS

S.P. NO. 18-620-11 SHEET NO. 60 OF 93 SHEETS

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\ARCH\dwg\A-PL-SC-DT-RIVERSIDEDR-AHRENS TO WISE-STAIR 158-33.dwg Plotted by: Shayne Johnson 11/23/2009 12:35:35 PM © 2009 WIDSETH SMITH NOLTING

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MARK V. HALLAN DATE 11/23/09 LIC. NO. 24997

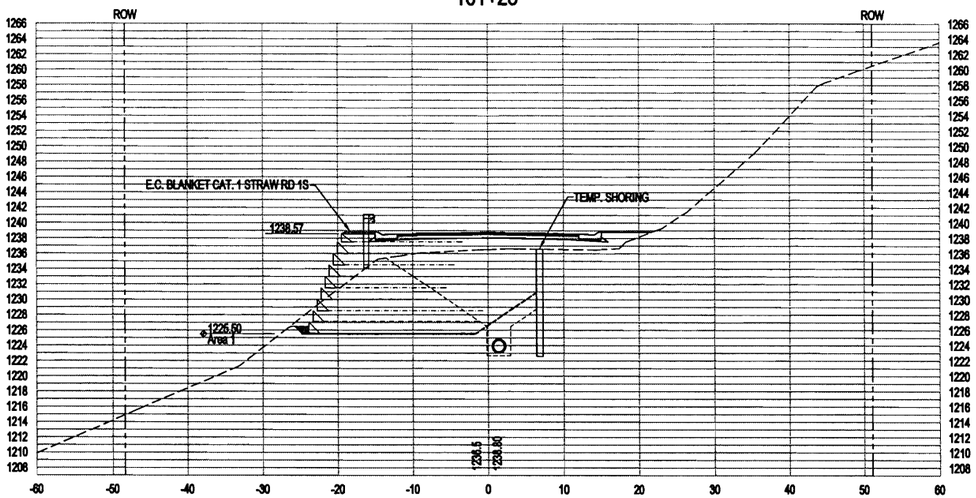
BY	REVISIONS DESCRIPTION	DATE	REV#
	MJ DOT Review	11/23/09	

DATE: NOVEMBER, 2009
SCALE: 1"=50'
DRAWN BY: C.J.S.
CHECKED BY: M.V.H.
JOB NUMBER: 1068029

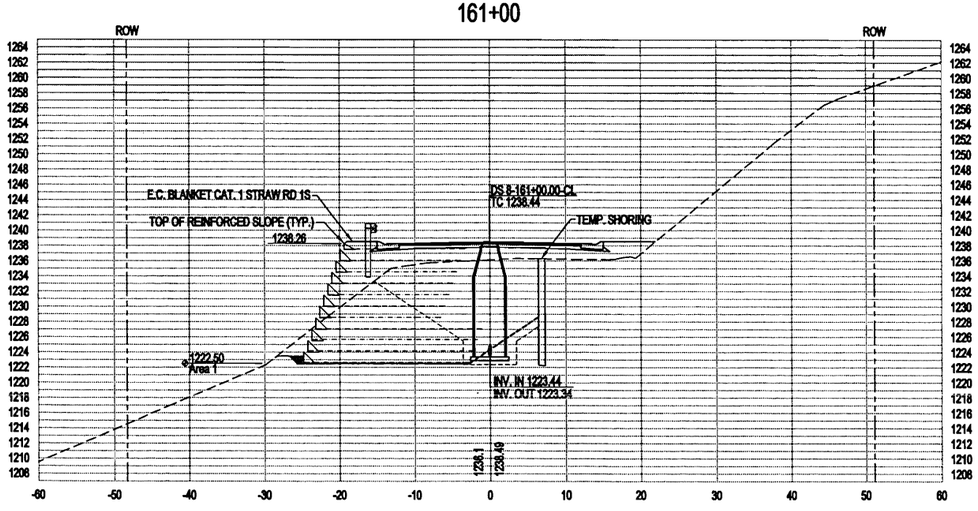
C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
CROW WING COUNTY

J:\0108B-Crow Wing County Highway Department\0108B0029-CSAH 20\0108B0029.001-North Ahrens Hill to CSAH 49\CADD\Civil\C-PP-RIVERSIDEDR-AHRENS TO WISE-RETWALL.dwg, 11/23/2009 2:46:48 PM, shayne.johnson

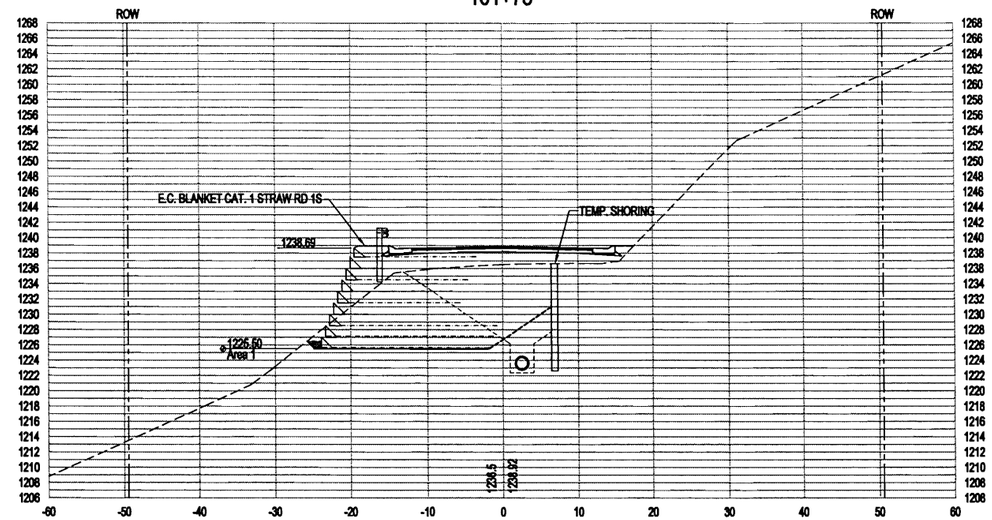
161+25



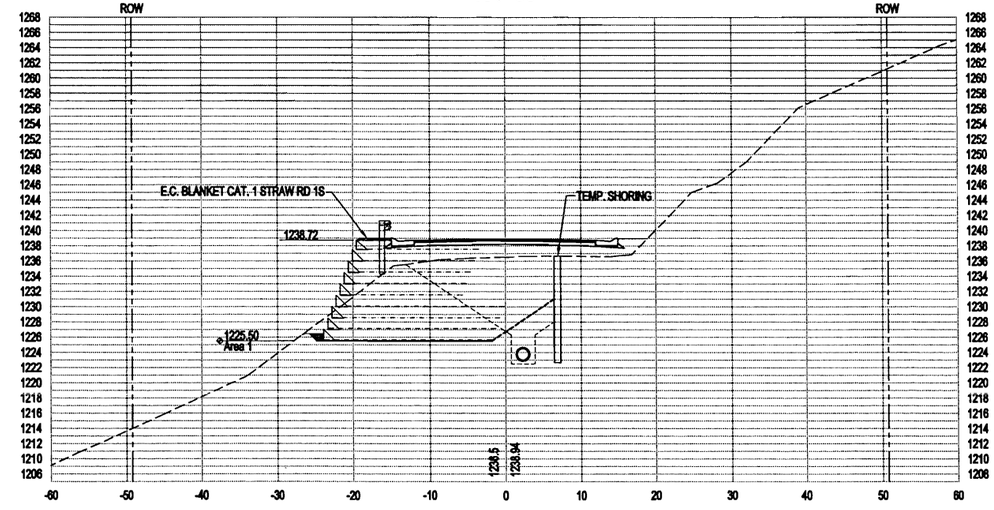
161+00



161+75



161+50



SCALE
1" = 10' HORIZ.
1" = 10' VERT.

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CROSS SECTIONS

S.P. NO. 18-620-11 SHEET NO. 68 OF 93 SHEETS

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Timothy M. Houle 11/25/09

TIMOTHY M. HOULE LIC. NO. 25132 DATE:

REVISIONS DESCRIPTION	BY	DATE	REV#

DATE: JULY, 2008
SCALE: 1"=10'
DRAWN BY: P.M.B.
CHECKED BY: T.M.H.
JOB NUMBER: 108B029

C.S.A.H. 20 - RIVERSIDE DRIVE IMPROVEMENTS
NORTH AHRENS HILL TO C.S.A.H. 49
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