

MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT STPS 503-1(4)4 GRADE, GRAVEL, PL. MIX SURF. & STRUCTURE FOYS CANYON ROAD (A LIMITED ACCESS FACILITY) ③ FLATHEAD COUNTY

DESIGN	DATA
PRESENT 2003 A.D.T. =	210
LETTING 2004 A.D.T. =	230
DESIGN 2024 A.D.T. =	280
D.H.V. =	80
TRUCKS =	6.9%
V. =	40 km/h
80 kN ESAL'S =	65.6 DAILY
GROWTH RATE =	1.0% ANNUALLY

LETTING DATE - _____

CSF = 0.99925993 (RP 3.9 TO 7.6)

LENGTH 5.8 kilometers

SCALES

VERTICAL: 1 : 100

HORIZONTAL: 1 : 1000

CROSS SECTION - HORIZONTAL & VERTICAL: 1 : 100

REDUCED PRINTS ONE-HALF ORIGINAL SCALE

ALL SCALES ARE APPROXIMATE

SURFACING SOURCES -
CONTRACTOR FURNISHED

Reminders:

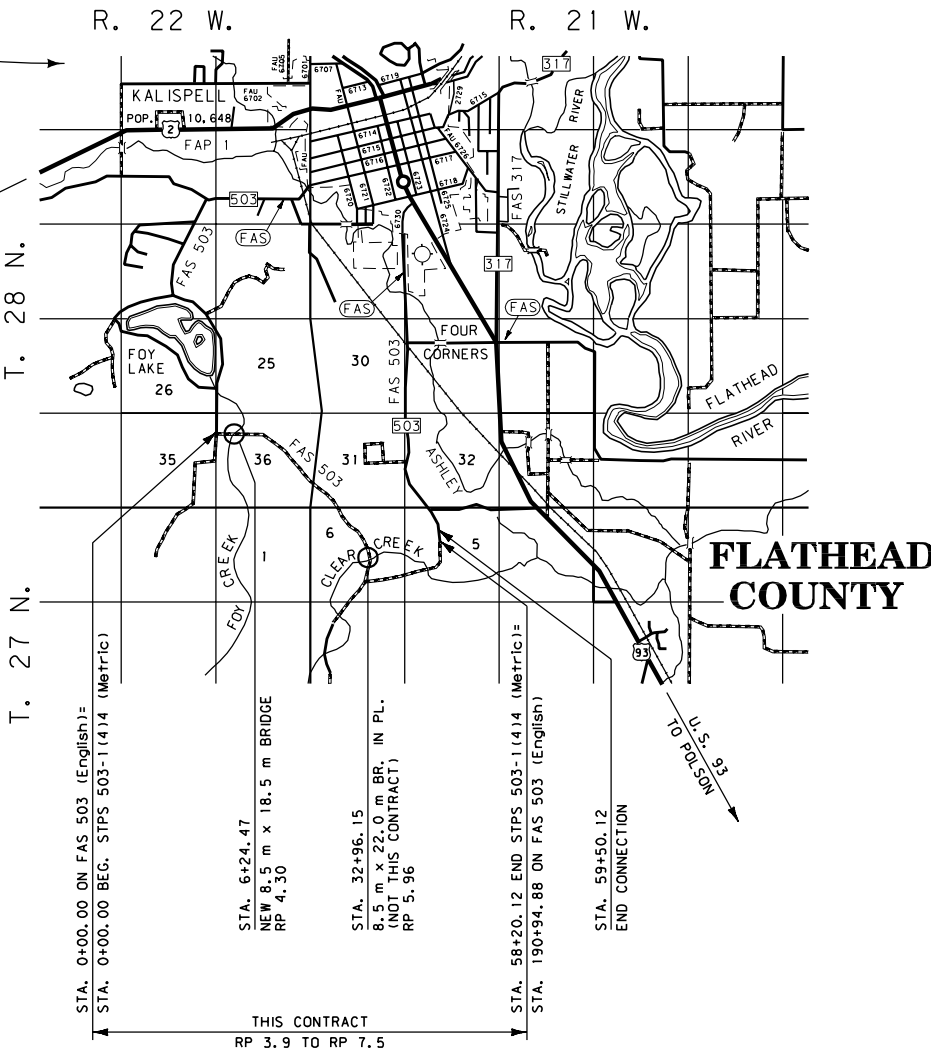
- ① Do not use this block for "AS BUILT" projects. Use for projects that are tied for letting or projects constructed in stages or units. Leave blank or "Mask" display if not needed.
- ② Design data usually is not shown for pavement preservation projects unless grade "S" plant mix is used. For projects having two or more road segments with different design data, prepare separate design data blocks for each segment.
- ③ Only shown for Limited Access Facilities.
- ④ Use the professional seal of the engineer in responsible charge (i.e. Highways Engineer, Bridge Engineer, Traffic & Safety Engineer, Consultant, etc.).
- ⑤ Copy portion of county map needed from \Astro\Maps.
- ⑥ Items applicable to Consultant Projects Only.
- ⑦ Consult with The Fiscal Programming Section for appropriate Project and Agreement Numbers (also available on OPX2 Project Management System.)
- ⑧ When multiple combination scale factors exist on a project, list each one of them, along with their respective RP range.

Consultant
Company
Logo
(Typ.)

PLANS PREPARED BY
Consultant Name, Address, and Phone Number

RELATED PROJECTS
①

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R /W & I.C.	STPS 503-1(5)4
P.E.	STPS 503-1(3)4

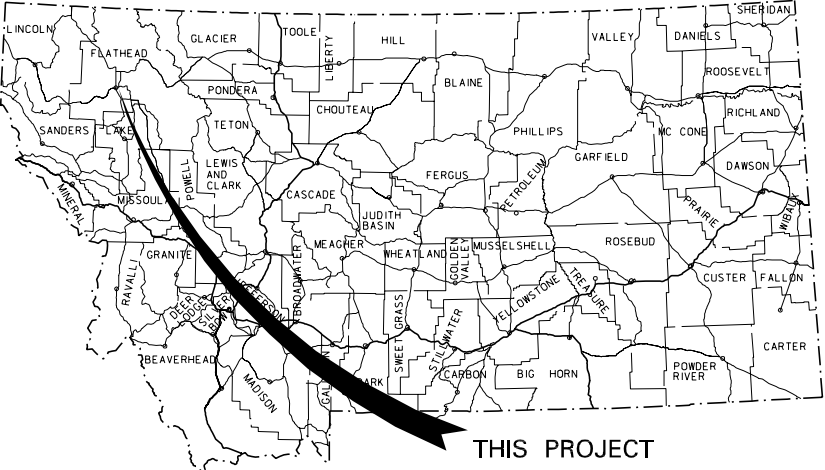


Consultant Name	
BY _____	④ MONTANA CONSULTANT SEAL XXXXXX REGISTERED PROFESSIONAL ENGINEER
DATE _____	
MONTANA DEPARTMENT OF TRANSPORTATION	
RECEIVED : _____	
BY _____	DATE _____
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION	
APPROVED : _____	
DIVISION ADMINISTRATOR	DATE

MONTANA DEPARTMENT OF TRANSPORTATION	
APPROVED : _____	④ MONTANA CONSULTANT SEAL PAUL R. FERRY 8425E REGISTERED PROFESSIONAL ENGINEER
JIM LYNCH DIRECTOR OF TRANSPORTATION	
BY _____	
HIGHWAYS ENGINEER	
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION	
APPROVED : _____	
DIVISION ADMINISTRATOR	DATE

metric

FIG. 4.4 B



THIS PROJECT

MONTANA DEPARTMENT
OF TRANSPORTATION

MONTANA
CADD

MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
CPS - U1861		

CONTROL NO. 1234

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

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Reminder:
① For GPS (State Plane coordinates) Projects,
just "Control Diagram". See Fig. 4.4F for
more information.



DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
7/18/2008 8:06:25 AM 2 CPS - U1861		

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

NOTES

BASIS OF PLAN QUANTITIES

(QUANTITIES FOR ESTIMATING PURPOSES ONLY)

COMP. AGGREGATE WEIGHT = 2200 kilograms per cubic meter ⑤
COMP. WEIGHT OF PL. MIX BIT. SURF. = 2287 kilograms per cubic meter
ASPHALT CEMENT = 6.0% OF PL. MIX BIT. SURF. ①
ASPHALT CEMENT - GRADE 5 - 19 mm AGG. = 5.4% OF PL. MIX BIT. SURF. } ②
ASPHALT CEMENT - GRADE 5 - 12.5 mm AGG. = 5.8% OF PL. MIX BIT. SURF. }
HYDRATED LIME = 1.4% OF PL. MIX BIT. SURF.
ASPHALT CEMENT = 3.0% OF RECYCLED PL. MIX (50%) } ④
HYDRATED LIME = 1.4% OF RECYCLED PL. MIX BIT. SURF. }
BITUMINOUS MATERIAL = 1.02 kilograms per liter
DUST PALLIATIVE = 1.3 kilograms per liter
AGGREGATE TREATMENT
DUST PALLIATIVE = 1.4 liters per square meter
AGG TACK = 0.23 liters per square meter (UNDILUTED)
TACK = 0.12 liters per square meter (UNDILUTED)
SEAL = 1.8 liters per square meter
COVER = 14.0 kilograms per square meter
CURING SEAL = 0.9 liters per square meter
CTB = 2148 kilograms per cubic meter
FLY ASH = 1.0% of CTB - DRY WT } ③
PORTLAND CEMENT = 4.0% of CTB - DRY WT
BLOTTER = 8.3 kilograms per square meter

Basis of Plan Quantities Reminders:

- ① All grades except grade 5
- ② Show for appropriate aggregate size
- ③ Applicable to projects with cement treated base (CTB)
- ④ Applicable to projects with recycled asphalt pavement (RAP)
- ⑤ When project will use Yellowstone River Aggregate, Comp. Agg. weight = 2375 kilograms per cubic meter and Comp. Pl. Mix Bit. Surf. weight = 2470 kilograms per cubic meter

APPROACHES

CONSTRUCT APPROACHES TO A 7.2 m FINISHED TOP ON A 10.6 m SUBGRADE UNLESS NOTED OTHERWISE IN THE PLANS.

PROVIDE THE FOLLOWING SURFACING:
60 mm PLANT MIX BITUMINOUS SURF.
190 mm CRUSHED AGGREGATE COURSE

PLANT MIX SURFACE ALL PUBLIC APPROACHES TO R/W.

QUANTITIES FOR ONE PUBLIC APPROACH:

AVERAGE LENGTH = meters
PLANT MIX BITUMINOUS SURF. = tons
CRUSHED AGGREGATE COURSE = cubic meters
ASPHALT CEMENT = tons
DUST PALLIATIVE = tons
AGG. TACK = liters

PLANT MIX SURFACE ALL PRIVATE APPROACHES TO R/W.

QUANTITIES FOR ONE PRIVATE APPROACH:

AVERAGE LENGTH = meters
PLANT MIX BITUMINOUS SURF. = tons
CRUSHED AGGREGATE COURSE = cubic meters
ASPHALT CEMENT = tons

GRAVEL SURFACE ALL FARM FIELD APPROACHES TO R/W WITH A 3.6 m WIDE PLANT MIX STRIP ADJACENT AND PARALLEL TO THE ROADWAY.

QUANTITIES FOR ONE FARM FIELD APPROACH:

AVERAGE LENGTH = meters
PLANT MIX BITUMINOUS SURF. = tons
CRUSHED AGGREGATE COURSE = cubic meters
ASPHALT CEMENT = tons

QUANTITIES FOR ONE FARM FIELD APPROACH: ①
12.2 m FINISHED TOP ON A 15.6 m SUBGRADE

AVERAGE LENGTH = meters
PLANT MIX BITUMINOUS SURF. = tons
CRUSHED AGGREGATE COURSE = cubic meters
ASPHALT CEMENT = tons

Approaches Reminder:

- ① For approaches with widths differing from standard.

APPROACHES ②

OVERLAY ALL PUBLIC APPROACHES TO R/W.

QUANTITIES FOR ONE EXISTING PUBLIC APPROACH:

AVERAGE LENGTH = meters
PLANT MIX BITUMINOUS SURF. = tons
ASPHALT CEMENT = tons
TACK = liters

PLACE A 1 m WIDE PLANT MIX STRIP ADJACENT AND PARALLEL TO ROADWAY ON ALL PRIVATE AND FARM FIELD APPROACHES.

QUANTITIES FOR ONE EXISTING PRIVATE OR FARM FIELD APPROACH:

PLANT MIX BITUMINOUS SURF. = tons
ASPHALT CEMENT = tons
TACK = liters

Approaches Reminder:

- ② For overlay projects

COMBINATION SCALE FACTOR

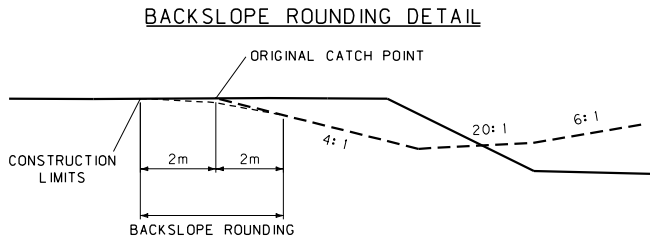
ALL COORDINATES ARE STATE PLANE METRIC (SEE CONTROL DIAGRAM.)
CSF FROM THE BEGINNING OF PROJECT TO RP 10.0 IS 0.99945558.
CSF FROM RP 10.0 TO THE END OF PROJECT IS 0.99948387.

PUBLIC LAND SURVEY MONUMENTS

ALL MONUMENTS TO BE REMOVED AND RELOCATED OR RESET BY STATE FORCES.

BACKSLOPE ROUNDING

BACKSLOPE ROUNDING IS NOT MEASURED FOR PAYMENT. INCLUDE THE COST OF BACKSLOPE ROUNDING IN THE UNIT PRICE BID FOR UNCLASSIFIED EXCAVATION.



① APPROACHES (FOR INFORMATION ONLY)										
STATION	TYPE	meters			EXISTING SURFACE	PROPOSED SURFACE	tons	cubic meters	REMARKS	
		WIDTH	RADIUS				PLANT MIX SURF.	CRUSHED AGG. COURSE		
			LEFT	RIGHT						
28+26	PUBLIC	7.2	7.5	7.5		GRAVEL	USE AS IS	~	~	RT. - COUNTY ROAD
30+31	FARM FIELD	7.2	7.5	7.5	25.9	GRAVEL	PAVED 3.6 m APRON	7	42	RT. - REBUILD APPROACH
31+75	PRIVATE	7.2	7.5	7.5	25.9	GRAVEL	PAVE TO R/W	25	42	RT.
33+12	PRIVATE	21.3	7.5	7.5	19.8	GRAVEL	PAVED 3.6 m APRON	14	71	RT.
33+72	PUBLIC	7.2	7.5	7.5	21.3	GRAVEL	PAVE TO R/W	20	33	LT. - PHILLIPS AVENUE
34+50	PRIVATE	7.2	7.5	7.5	12.2	GRAVEL	PAVE 3.6 m APRON INCL. VALLEY GUTTER #	7	17	LT. -
35+00	PRIVATE	15.2	7.5	7.5	18.3		PAVE TO R/W	38	56	RT. - NEW APPROACH
36+28	PUBLIC	7.2	7.5	7.5	13.7	PAVED	PAVE TO R/W	13	~	LT. - JOYLAND ROAD (FAS 237)
38+32	PRIVATE	7.2	7.5	7.5	10.7	PAVED	PAVED 3.6 m APRON	7	~	RT.
40+08	PUBLIC	7.2	7.5	7.5	13.7	GRAVEL	PAVE TO R/W INCL. VALLEY GUTTER #	13	20	LT. - ALLEY
42+91	PUBLIC	12.2	7.5	15.2	15.2	GRAVEL	PAVE TO R/W	21	35	LT. - EATON STREET
44+20	PUBLIC	24.4	*	*	12.2	PAVED	PAVE - SEE DETAIL	42	~	RT. - HURON STREET & 4TH AVENUE
46+10	PUBLIC	15.8	15.2	15.2	9.1	GRAVEL	PAVE TO RADIUS INCL. VALLEY GUTTER #	29	8	RT. - IDAHO STREET & 3RD AVENUE
48+19	PUBLIC	7.2	~	~	9.1	PAVED	USE AS IS - SEE DETAIL	~	~	RT. - CORCORAN STREET
								②	②	

* MATCH EXISTING CURB
SEE DETAIL

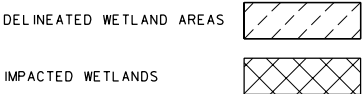
Approaches Frame Reminders:

- ① This frame is applicable for urban projects.
- ② Show total surfacing quantities for each type of approach in additional surfacing frame. Do not include notes for average approach quantities if this frame is used.

WETLANDS

ONLY WETLANDS WITHIN THE PROJECT LIMITS HAVE BEEN DELINEATED. WETLANDS MAY EXIST BEYOND THE PROJECT LIMITS AND ANY ACTION AFFECTING SUCH WETLANDS IS THE RESPONSIBILITY OF THE CONTRACTOR.

WETLAND LEGEND



TEMPORARY EROSION AND SEDIMENT CONTROL

- ① REFER TO SECTION 208 OF THE MDT DETAILED DRAWINGS FOR EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES.
- ② IF SITUATIONS ARE OBSERVED DURING CONSTRUCTION THAT MAY POTENTIALLY IMPACT WATER QUALITY, INCLUDING WETLAND AREAS, UTILIZE BEST MANAGEMENT PRACTICES (BMP) AND/OR TEMPORARY EROSION CONTROL MEASURES AS NECESSARY TO PROTECT THE RESOURCE. REFER TO SECTION 208 OF THE MDT DETAILED DRAWINGS FOR EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES.

INSTALL TEMPORARY EROSION CONTROL MEASURES AS DEEMED NECESSARY BY THE ENGINEER. PAYMENT TO BE DETERMINED USING THE EROSION AND SEDIMENT CONTROL RATE SCHEDULE AND PAID UNDER MISCELLANEOUS WORK.

Temporary Erosion and Sediment Control Reminders:

- ① Typical note when Erosion Control Plans are provided.
- ② Typical note when Erosion Control Plans are not provided (ie. pavement preservation projects).

MAILBOXES & MAILBOX TURNOUTS

MAILBOX TURNOUTS WILL BE CONSTRUCTED AT LOCATIONS SHOWN IN THE PLANS OR AS STAKED BY THE ENGINEER.

PROVIDE THE FOLLOWING SURFACING:
MAINLINE mm PLANT MIX BITUMINOUS SURF.
MAINLINE mm CRUSH AGGREGATE COURSE

QUANTITIES FOR ONE MAILBOX TURNOUT (FOR ESTIMATING PURPOSES ONLY):

AVERAGE LENGTH = meters
PLANT MIX BITUMINOUS SURF. = tons
CRUSHED AGGREGATE COURSE = cubic meters
ASPHALT CEMENT = tons
DUST PALLIATIVE = liters
AGG. TACK = tons

REMOVE ALL MAILBOXES AND REPLACE. PROVIDE TEMPORARY MAILBOXES. INCLUDE THE COST OF REMOVAL AND TEMPORARY MAILBOXES IN THE COST OF OTHER ITEMS.

LIMITED ACCESS CONTROL

THIS PROJECT IS A LIMITED ACCESS CONTROL FACILITY. OBTAIN APPROVAL FROM THE CHIEF OF THE RIGHT-OF-WAY BUREAU PRIOR TO ADDING, DELETING OR RELOCATING ANY APPROACHES.

SOILS INFORMATION

THE SOILS INFORMATION ON THE PLAN AND PROFILE SHEETS IS A BRIEF SUMMARY OF THE SOILS CLASSES. TO OBTAIN THE COMPLETE SOILS INFORMATION CONTACT THE MDT GEOTECHNICAL SECTION AT (406) 444-6281.

DO NOT DISTURB

WATER VALVE 10.8 m RIGHT OF STA. 4+30
PROPERTY PINS LEFT OF CENTERLINE FROM STA. 2+80 TO 15+24.

CONSTRUCTION NOTES

USE EXTREME CAUTION WHEN WORKING AROUND TRANSMISSION LINE POLES LOCATED LEFT OF THE FOLLOWING STATIONS:

43+00 59+75 103+44
55+97 81+25 112+16

WARP THE FILL SLOPES AROUND POWER POLES TO BE LEFT IN PLACE FROM STATION 135+00 TO 184+00 RIGHT.

FUTURE TOP WIDTH

THE FINISHED TOP WIDTH HAS BEEN INCREASED 0.8 m TO ACCOMMODATE FUTURE SURFACING.

UTILITIES

CALL THE UTILITIES UNDERGROUND LOCATION CENTER (1-800-424-5555) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICES BEFORE EXCAVATING. ALL CLEARANCES OR DEPTHS PROVIDED FOR UTILITIES ARE FROM THE EXISTING GROUND LINE.

CLEARING AND GRUBBING

CLEAR AND GRUB TO CONSTRUCTION LIMITS. INCLUDE THE COST OF CLEARING AND GRUBBING IN THE UNIT PRICE BID FOR UNCLASSIFIED EXCAVATION. ①

Clearing and Grubbing Reminder:

- ① If project is an embankment in place project, change note to "EMBANKMENT-IN-PLACE".

MISC. TO BE MOVED OR REMOVED BY OTHERS

ALL PRIVATELY OWNED SIGNS TO BE REMOVED BY OWNER.
ALL STATE-OWNED SIGNS TO BE MOVED BY STATE FORCES.

SKUEW DIAGRAM

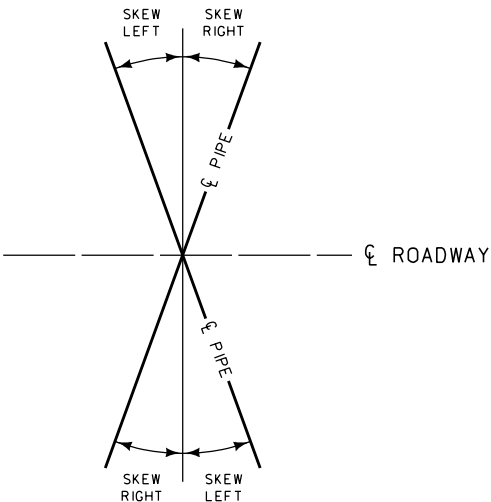


FIG. 4.4 D

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

LINEAR AND LEVEL DATA

CENTERLINE COORDINATE TABLE				
STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
151+35.39	POT	30 060.7634	31 311.6190	BEG. PROJECT
162+33.86	PC	29 639.2195	32 325.9760	
164+15.10	PI	29 569.6670	32 493.3696	
165+95.04	PT	29 535.9649	32 671.4191	
177+53.27	TS	29 320.5904	33 809.4419	
178+14.23	SC	29 309.7782	33 869.4335	
179+41.18	PI	29 285.6480	33 994.0746	
180+66.19	CS	29 296.5438	34 120.5615	
181+27.15	ST	29 300.9906	34 181.3573	
190+69.51	PC	29 377.9330	35 120.5705	
192+00.06	PI	29 388.5917	35 250.6790	
193+30.12	PT	29 379.7885	35 380.9262	
210+48.27	POT	29 263.8895	37 095.6955	END PROJECT

BENCH MARKS			
STATION	LOCATION	DESCRIPTION	ELEVATION
MAINLINE			
0+00.00	18.29 m LT.	PROJECT POST	1012.845
3+00.00	30.00 m LT.	IRON PIN	1036.037
6+00.00	27.56 m LT.	IRON PIN	1050.993
7+53.92	48.15 m LT.	SPIKE IN POWER POLE	1095.642
10+03.45	251.36 m RT.	USCGS BRASS CAP C-81	1076.099
13+00.00	32.09 m LT.	IRON PIN	1019.380
15+00.00	29.75 m LT.	IRON PIN	1024.464
COUNTY ROAD			
0+30.00	15.63 m RT.	IRON PIN	1019.326
2+50.00	19.47 m RT.	IRON PIN	1021.921
5+00.00	16.68 m RT.	IRON PIN	1010.448

BEARING SOURCE

- ① BEARINGS SHOWN ON THESE PLANS WERE COMPUTED FROM AS-BUILTS PROJECT FHP 51-2(1).
FROM PT STA. 1090+21.34 TO TS STA. 1116+12.22 THE BEARING IS S 00° 50'00" W.
- ② BEARINGS SHOWN ON THESE PLANS WERE COMPUTED FROM SOLAR OBSERVATION. FROM
CONTROL POINT 53B TO CONTROL POINT 53A THE BEARING IS S 23° 50'00" W.

- ③ THE BEARING SOURCE IS NAD 83-1992.

④

LEVEL DATUM SOURCE

- ① ② U.S.C. & G.S. BENCH MARK
BRASS CAP STAMPED "4405 BUTTE"
304.80 m LT. OF STA. 125+77.57
ELEVATION 1343.410

- ① IRON PIN
30 m RT. OF STA. 0+00.00
ASSUMED ELEVATION 1000.000

- ① ② LEVEL DATUM IS BASED ON A U.S.C. & G.S. BENCH MARK WHICH IS LOCATED ABOUT 5.5 km
SOUTHWEST ALONG NORTHERN PACIFIC RAILWAY FROM THE STATION AT BILLINGS, 2.13 m
WEST OF 3RD POLE SOUTHWEST OF M.P. 3, 11.58 m SOUTHEAST OF SOUTHEAST RAIL, 73.76
NORTHEAST OF CENTERLINE OF A ROAD CROSSING, 23.47 m NORTHWEST OF CENTERLINE
OF U.S. HIGHWAY 10 & 12, 0.61 m NORTHWEST OF A WHITE WOODEN WITNESS POST.
ABOUT 1 m BELOW LEVEL OF TRACKS & ABOUT LEVEL WITH HWY., ON TOP OF 16 mm COPPER
WEIGHTED ROD DRIVEN TO A DEPTH OF 0.95 m AND IS ENCASED IN A 150 mm TILE WHICH
PROJECTS 0.15 m A DISK, STAMPED "G 483 1957" ELEV. = 3168.99 FT. (1981 ADJUSTED) = 965.908 m.

- ③ LEVEL DATUM SOURCE IS NAVD 88

Reminders:

- ① For projects utilizing conventional survey
- ② For projects utilizing control traverse
- ③ For projects utilizing global positioning system (GPS)
- ④ Bearing source may be either NAD 83-1992 or NAD 83-1999.
List the one applicable to the project.

LENGTH OF ROADWAY	2 LANE RURAL	11 595.58 m
LENGTH OF BRIDGE	2 LANE RURAL	96.34 m

TOTAL LENGTH OF	NH-BR 5-1(5)7	2 LANE RURAL	11 691.92 m
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LENGTH OF ROADWAY IN ROOSEVELT COUNTY	2 LANE RURAL	543.02 m
LENGTH OF BRIDGE IN ROOSEVELT COUNTY	2 LANE RURAL	144.82 m
LENGTH OF ROADWAY IN RICHLAND COUNTY	2 LANE RURAL	513.84 m
LENGTH OF BRIDGE IN RICHLAND COUNTY	2 LANE RURAL	144.82 m

TOTAL LENGTH OF	STPS 262-1(5)3	2 LANE RURAL	1 346.50 m
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LENGTH OF ROADWAY	4 LANE URBAN	4 499.57 m
LENGTH OF ROADWAY	4 LANE RURAL	200.46 m
LENGTH OF ROADWAY	2 LANE RURAL	260.76 m

TOTAL LENGTH OF	URBAN ROADWAY	4 499.57 m
TOTAL LENGTH OF	RURAL ROADWAY	461.22 m
TOTAL LENGTH OF	4 LANE ROADWAY	4 700.03 m
TOTAL LENGTH OF	2 LANE ROADWAY	260.76 m
TOTAL LENGTH OF	STPP-STPU 29-4(7)84	4 960.79 m

LENGTH OF ROADWAY	4 LANE URBAN	1 944.36 m
LENGTH OF ROADWAY	4 LANE RURAL	17 275.37 m
LENGTH OF ROADWAY	URBAN (NOT THIS CONTRACT)	184.76 m
LENGTH OF BRIDGE	RURAL	23.78 m

TOTAL LENGTH OF	URBAN	2 129.12 m
TOTAL LENGTH OF	RURAL	17 299.15 m
TOTAL LENGTH OF	IR 15-5(83)270	19 428.27 m

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

⑤ CSF = 0.99926508 (RP 445.0 TO RP 446.0)
CSF = 0.99930844 (RP 446.1 TO RP 447.0)

① CONTROL TRAVERSE ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
445-A	10 000.0000	10 000.0000	973.804	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 445A 1197.86 m SW OF HOGANS SLOUGH CROSSING I-90, ON THE CENTERLINE OF THE MEDIAN AT STA.161+54.40
445-B	10 332.8553	10 481.8995	971.807	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 445B 612.40 m SW OF HOGANS SLOUGH CROSSING I-90 ON THE CENTERLINE OF THE MEDIAN AT STA.167+39.86
445-C	10 512.9180	10 821.1733	971.076	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 445C 238.05 m SW OF HOGANS SLOUGH CROSSING SOUTH FRONTAGE RD. AND 8.53 m SOUTH OF THE CENTERLINE OF SOUTH FRONTAGE RD. ON THE SHOULDER SLOPE
445-W	10 836.7537	10 747.2532	970.679	NAIL SET IN CENTERLINE OF PAVEMENT ON OVERLAND AVE. 361.19 m SW OF PEACHTREE RD. ON OVERLAND AVE.
445-X	11 212.5206	11 270.4091	968.571	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 445X 210.31 m SOUTH OF KING AVE. ON OVERLAND AVE. IN THE MEDIAN ISLAND NEAR THE QUALITY INN
445-Y	11 530.1112	11 227.7612	969.093	NAIL SET IN NORTH PARKING LANE OF HENESTA DR. PAVEMENT 60.96 m WEST OF 20TH ST. WEST
445-Z	11 440.2574	11 364.7344	968.152	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 445Z 131.06 m WEST OF THE INTERSECTION OF KING AVE. AND CARBON ST. AT THE END OF ACCESS ROAD, NEAR UTILITY POLE
446-W	11 437.4142	11 878.7976	966.545	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 446W 170.69 m EAST OF THE INTERSECTION OF KING AVE. AND S 18TH ST. WEST AND 9.14 m SOUTH OF THE CENTERLINE OF KING AVE.
446-X	11 646.4147	12 360.4903	965.816	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 446X 18.29 m WEST OF THE INTERSECTION OF LAUREL RD. AND PARKWAY LN. ON THE MEDIAN ISLAND
446-Y	11 462.9237	12 510.7842	965.656	NAIL SET IN LARGE MEDIAN ISLAND 21.34 m NE OF THE INTERSECTION OF PARKWAY LN. AND KING AVE. EAST
446-Z	11 248.5476	12 891.8441	963.268	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 446Z 420.62 m EAST OF THE INTERSECTION OF PARKWAY LN. AND SOUTHGATE DR. AND 12.19 m SOUTH OF THE CENTERLINE OF SOUTHGATE DR.
446-D	10 855.3513	12 891.4245	963.447	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 446D 847.34 m EAST OF THE INTERSECTION OF MULLOWNEY LN. AND MIDLAND RD. AND 6.10 m NORTH OF THE CENTERLINE OF MIDLAND RD.
446-C	10 832.4061	12 633.6007	964.501	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 446C 591.31 m EAST OF THE INTERSECTION OF MULLOWNEY LN. AND MIDLAND RD. AND 15.24 m SOUTH OF THE CENTERLINE OF MIDLAND RD.
446-B	10 455.5133	12 387.1470	965.685	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 446B 10.67 m SE OF THE SE CORNER OF THE ROADWAY INN MOTEL PARKING LOT & 33.53 m SE OF THE MOST EASTERLY LIGHT POLE ON THE SOUTH EDGE OF THE PARKING LOT
446-A	10 195.6682	12 093.9254	966.199	LAG BOLT SET IN CENTERLINE OF PAVEMENT ON MULLOWNEY LN. 108.20 m SOUTH OF THE INTERSECTION OF MULLOWNEY LN. AND HOLIDAY AVE.
445-D	10 238.3476	11 294.7065	969.100	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 445D 73.15 m SOUTH OF THE INTERSECTION OF MULLOWNEY LN. AND HOLIDAY AVE. AND 800.40 m WEST OF THE CENTERLINE OF MULLOWNEY LN.
445-V	10 520.7371	10 161.1898	973.404	51 mm ALUMINUM CAP & 16 mm REBAR MARKED 445V NORTH OF GABEL RD. AND ADJACENT TO HOGANS SLOUGH

NOTE - VERTICAL CONTROL ESTABLISHED FROM CONTROL TRAVERSE POINTS.

Reminders:

For GPS (State Plane Coordinates)

- ① Revise heading to read Control Abstract.
- ② Revise heading to read Control Diagram.
- ③ Include note.
- ④ Do not connect points with lines.
- ⑤ When multiple combination scale factors exist on a project, list each one of them, along with their respective RP range.
- ⑥ Control may be based on NAD 83-1992 or NAD 83-1999. List the one applicable to the project.

② CONTROL TRAVERSE DIAGRAM

SCALE = 1 : 6000

- ③ NOTE:
THIS PROJECT WAS SURVEYED UTILIZING THE GLOBAL POSITIONING SYSTEM (GPS).
ALL COORDINATES ARE METRIC STATE PLANE NAD 83-1992. ALL SURVEY AND
STAKING REQUIRES THE USE OF A COMBINATION SCALE FACTOR (CSF).
- ⑤ THE CSF FOR THIS PROJECT IS 0.99925993. ALL DIMENSIONS ON THE PLANS
ARE GRID DIMENSIONS AND MUST BE DIVIDED BY THE CSF TO ARRIVE AT GROUND
DIMENSIONS.
- ⑥

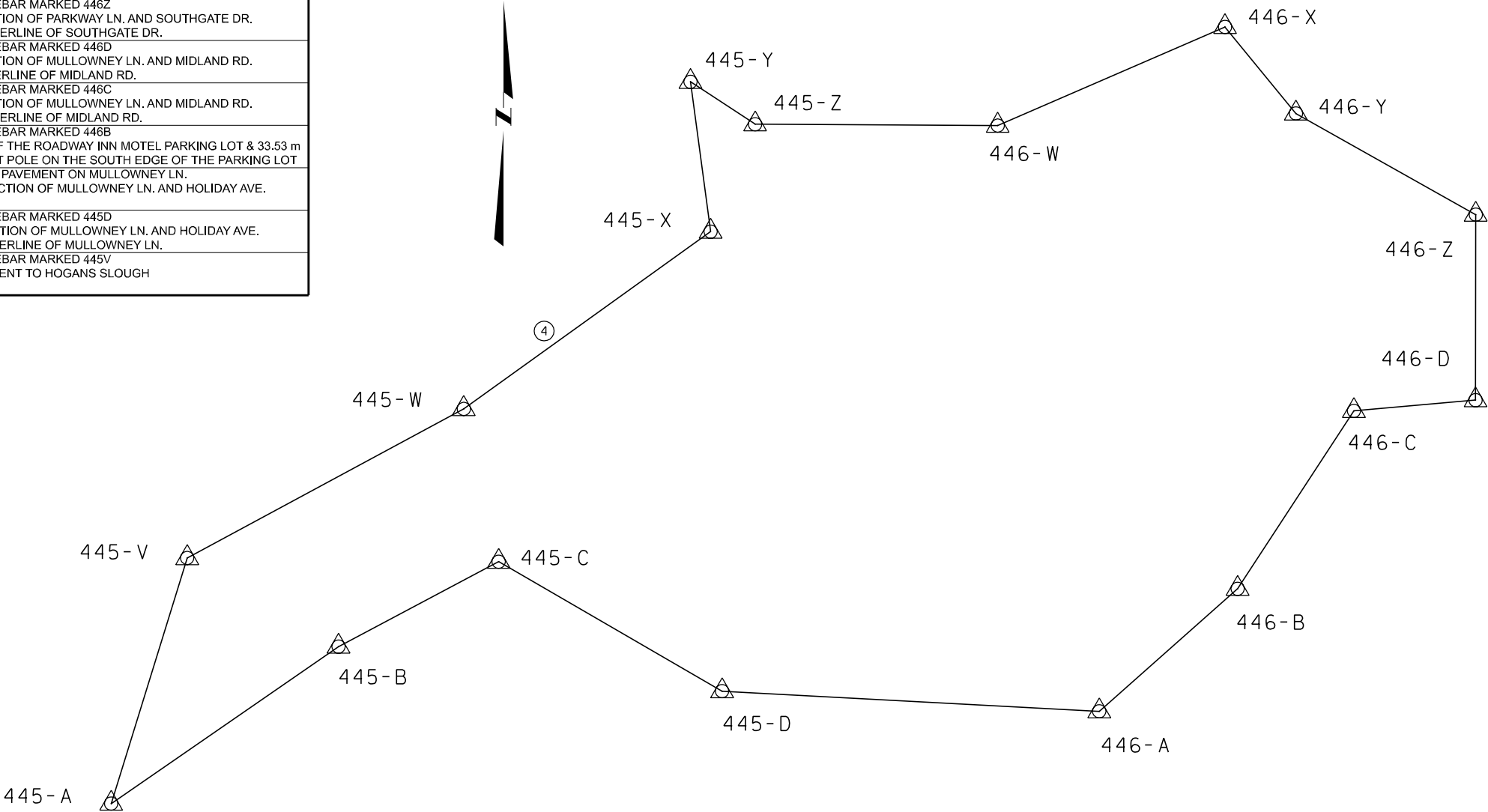


FIG. 4.4 F



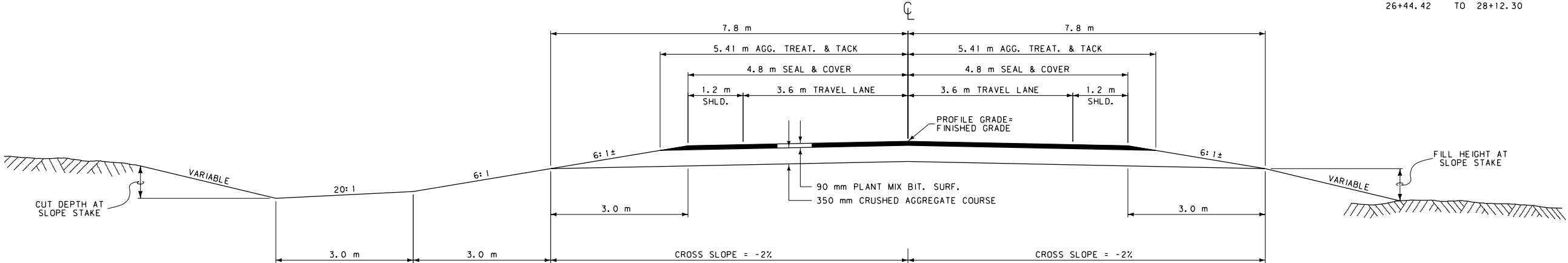
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REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
7/18/2008		
8:06:39 AM		
2	U1861	

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

(Reconstruct Project Tangent Typical Section Example)

TYPICAL SECTION NO. 1

9+76.73	TO	11+01.12	
11+01.12	TO	11+78.26	TRANS. TYP. NO. 1 TO TYP. NO. 2
14+92.58	TO	18+25.46	BE
18+62.14	BE	21+60.20	
21+60.20	TO	22+37.34	TRANS. TYP. NO. 1 TO TYP. NO. 2
26+44.42	TO	28+12.30	



QUANTITIES									
UNIT	AGGREGATE			UNIT	BITUMINOUS MATERIAL			AGG. TREAT.	
	COVER	PLANT MIX	CR. AGG. COURSE		ASPHALT CEMENT	SEAL	TACK	DUST PALLIATIVE	AGGREGATE TACK
AREA square meters		0.919	4.624	square meters PER STATION		960	1082		1082
cubic meters PER STATION		91.9	462.4	tons PER STATION	12.61	1.76	130	1.97	
tons PER STATION		210.2		liters PER STATION					249
square meters PER STATION	960								

SURFACING SECTION DESIGN BASED ON THE TOP 0.6 METERS OF SUBGRADE HAVING AN R-VALUE OF 10

BACK SLOPES *	
0 - 1.5 m	5:1
1.5 - 3 m	4:1
3 - 4.5 m	3:1
4.5 - 6 m	2:1
OVER 6 m	1.5:1

* SEE CROSS SECTIONS FOR DEVIATIONS

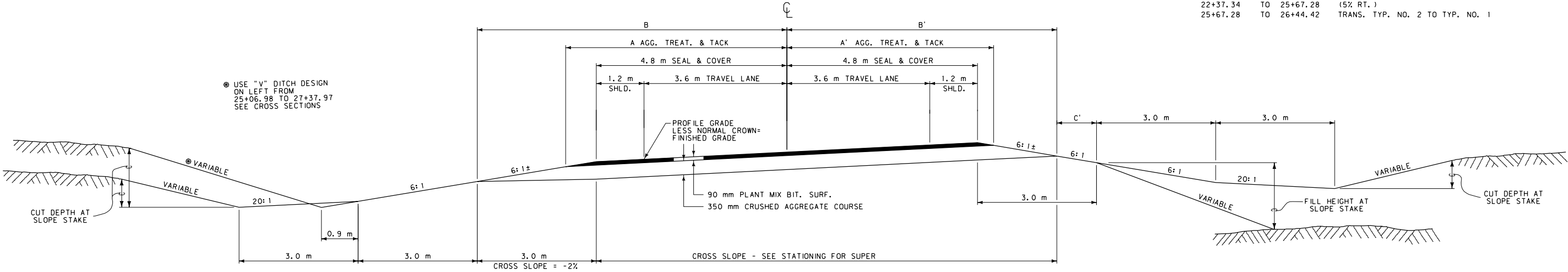
FILL SLOPES *	
0 - 3 m	6:1
3 - 6 m	4:1
6 - 9 m	3:1
OVER 9 m	2:1

* SEE CROSS SECTIONS FOR DEVIATIONS

(Reconstruct Project Superelevated Typical Section Example)

TYPICAL SECTION NO. 2

11+78.26	TO	14+15.44	(7% LT.)
14+15.44	TO	14+92.58	TRANS. TYP. NO. 2 TO TYP. NO. 1
22+37.34	TO	25+67.28	(5% RT.)
25+67.28	TO	26+44.42	TRANS. TYP. NO. 2 TO TYP. NO. 1



FOR QUANTITIES SEE TYPICAL NO. 1

SUPER %	WIDTHS (m)				
	A	B	A'	B'	C'
5 %	5.57	7.8	5.21	6.8	1.0
7 %	5.73	7.8	5.19	6.7	1.1

REVERSE DIMENSIONS FOR CURVES RT.

SURFACING SECTION DESIGN BASED ON THE TOP 0.6 METERS OF SUBGRADE HAVING AN R-VALUE OF 10

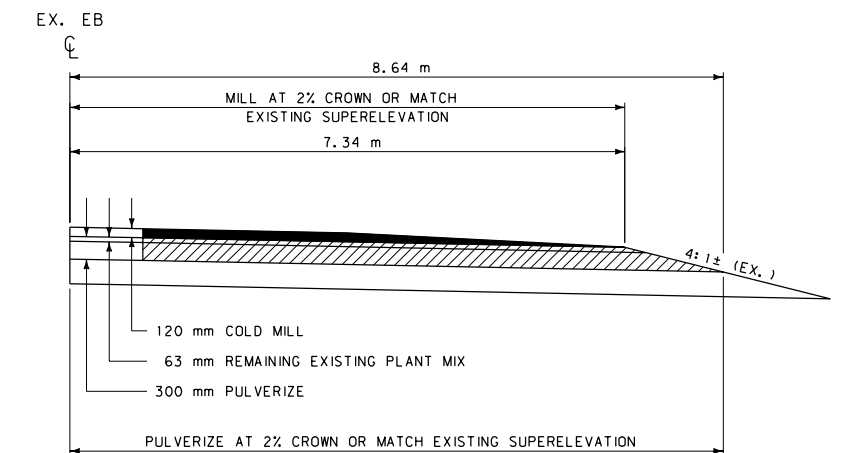
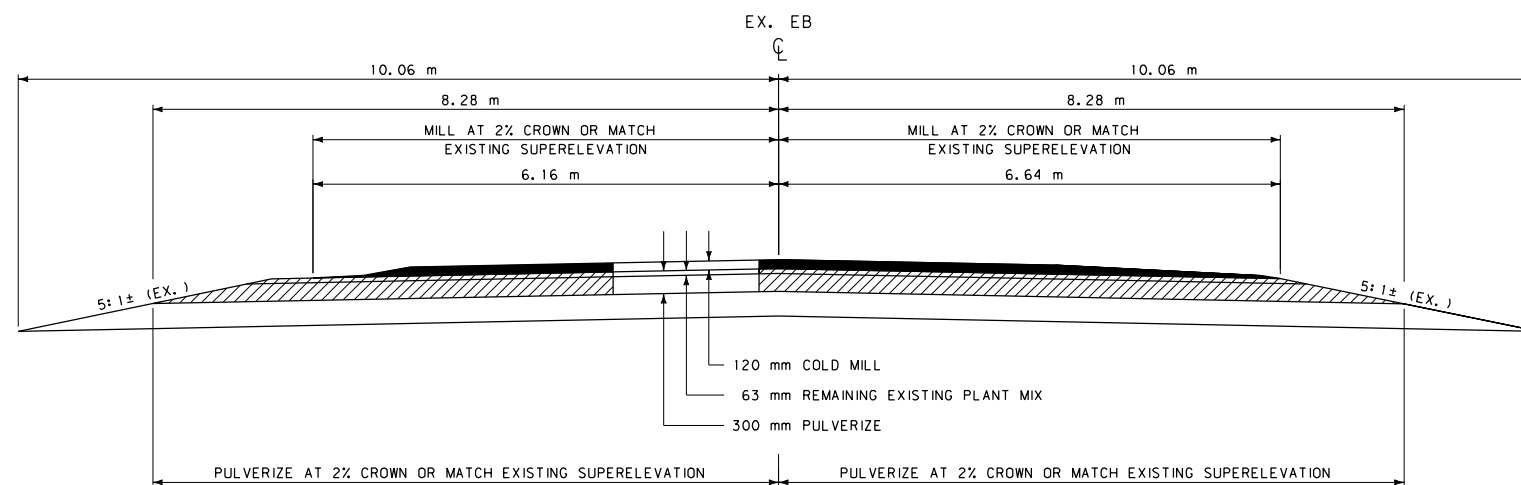
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

[illegible]

* NOTE: EXISTING CUT AND FILL SLOPES

SURFACING SECTION DESIGN BASED ON
THE TOP 0.6 METERS OF SUBGRADE
HAVING AN R-VALUE OF 20

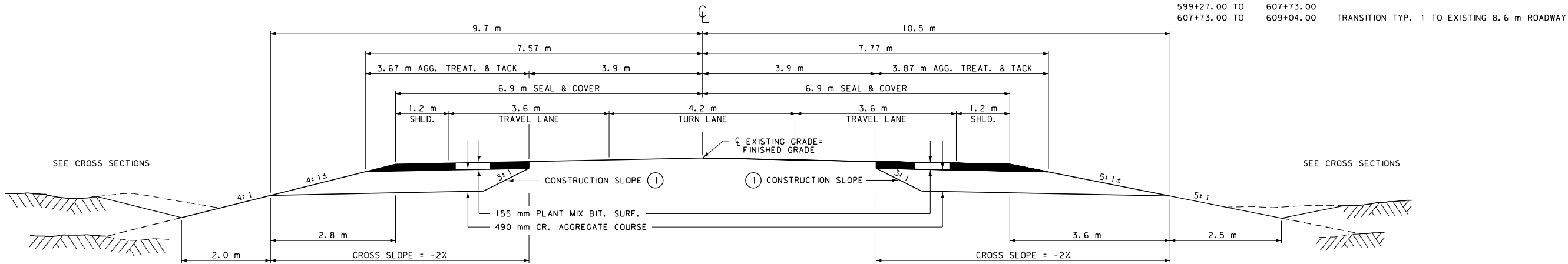
EXISTING GUARDRAIL AREA



(Notch & Widening Project Typical Section Example)

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

TYPICAL SECTION NO.1



Reminder:

- ① When notching & widening an existing Roadway Typical, it is impractical to achieve an exact vertical faced notch. Provide a 3:1 typical construction slope as shown from the bottom of the Plant Mix Surfacing to the top of the Subgrade. Draw the 3:1 slope on the cross sections as well. Quantities are calculated using this construction slope. Consult the District Construction Personnel to confirm that the use of a 3:1 construction slope is appropriate.

QUANTITIES									
UNIT	AGGREGATE			UNIT	BITUMINOUS MATERIAL			AGG. TREAT.	
	COVER	PLANT MIX	CR. AGG. COURSE		ASPHALT CEMENT	SEAL	TACK	DUST PALLIATIVE	AGG. TACK
AREA square meters		1,049	4,119	square meters PER STATION	14.39	1380	754	754	754
cubic meters PER STATION		104.9	411.9	tons PER STATION		2.53		1.37	
tons PER STATION		239.9		liters PER STATION			90		173
square meters PER STATION	1380								

SURFACING SECTION DESIGN BASED ON THE TOP 0.6 METERS OF SUBGRADE HAVING AN R-VALUE OF 20

1+77.88 TO 2+05.74
2+05.74 TO 2+50.74 TRANS. TYP. NO. 1 TO TYP. NO. 2



SURFACING SECTION DESIGN BASED ON
THE TOP 0.6 METERS OF SUBGRADE
HAVING AN R-VALUE OF 5

5+00.00	TO	11+08.13	
11+08.13	TO	11+17.88	TRANS. TYP. NO. 2 TO TYP. NO. 3
12+25.27	TO	31+21.76	
31+21.76	TO	31+31.52	TRANS. TYP. NO. 2 TO TYP. NO. 3



SURFACING SECTION DESIGN BASED ON
THE TOP 0.6 METERS OF SUBGRADE
HAVING AN R-VALUE OF 15

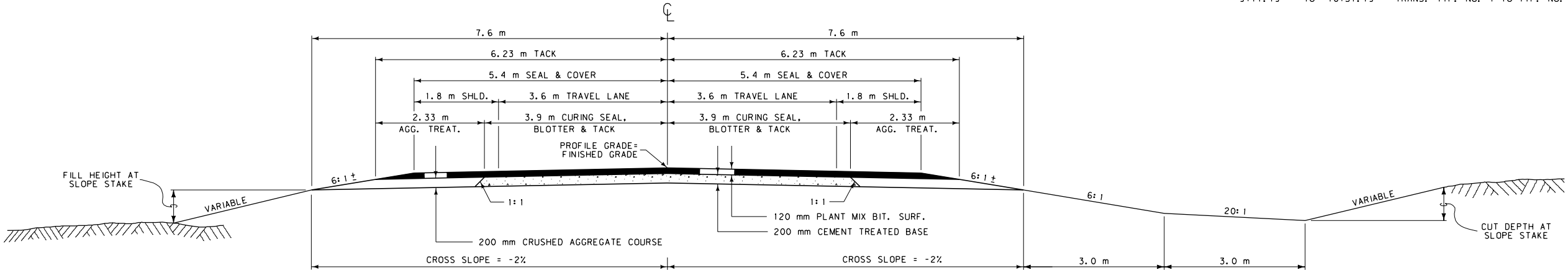
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

(Reconstruct with C.T.B. Project Typical Section Example)

TYPICAL SECTION NO. 1

AMSTERDAM RD.

8+77.19 TO 9+77.19 TRANS. P.T.W. TO TYP. NO. 1
9+77.19 TO 10+57.19 TRANS. TYP. NO. 1 TO TYP. NO. 2



QUANTITIES													
UNIT	AGGREGATE					UNIT	BITUMINOUS MATERIAL				CEMENT	AGG. TREAT.	
	COVER	PLANT MIX	CR. AGG. COURSE	CEMENT TR. BASE	BLOTTER MATERIAL		ASPHALT CEMENT	SEAL	TACK	CURING SEAL	PORTLAND CEMENT	DUST PALLIATIVE	AGG. TACK
AREA square meters	1080	1,396	1,166	1,600	6.5	square meters PER STATION	19.16	1080 1.98	2026 243	780 0.72	17.19	466	466
cubic meters PER STATION		139.6	116.6	160.0		tons PER STATION						0.85	
tons PER STATION		319.3		*343.7		liters PER STATION						107	
square meters PER STATION													

* FOR INFORMATION ONLY

SURFACING SECTION DESIGN BASED ON THE TOP 0.6 METERS OF SUBGRADE HAVING AN R-VALUE OF 10

FILL SLOPES *		
0 - 3 m	6:1	
3 - 6 m	4:1	
6 - 9 m	3:1	
OVER 9 m	2:1	

* SEE CROSS SECTIONS FOR DEVIATIONS

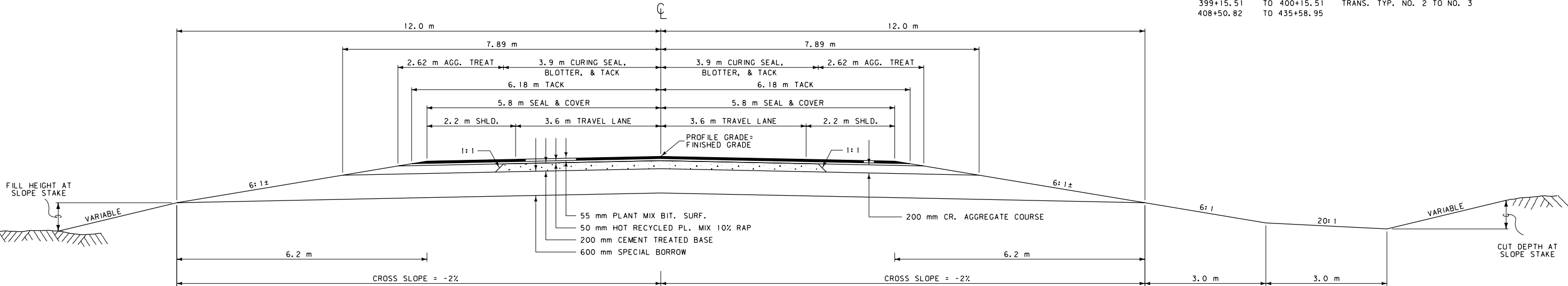
BACK SLOPES *		
0 - 1.5 m	5:1	
1.5 - 3 m	4:1	
3 - 4.5 m	3:1	
4.5 - 6 m	2:1	
OVER 6 m	1.5:1	

* SEE CROSS SECTIONS FOR DEVIATIONS

(Reconstruct with C.T.B. & R.A.P. Project Typical Section Example)

TYPICAL SECTION NO. 2

313+92.35 TO 399+15.51
399+15.51 TO 400+15.51 TRANS. TYP. NO. 2 TO NO. 3
408+50.82 TO 435+58.95



QUANTITIES																
UNIT	AGGREGATE							UNIT	BITUMINOUS MATERIAL					CEMENT		AGG. TREAT.
	COVER	PLANT MIX	RECYCLED PL. MIX	CR. AGG. COURSE	SPECIAL BORROW	CEMENT TR. BASE	BLOTTER MATERIAL		ASPHALT CEMENT	RECYCLED A.C.	SEAL	TACK	CURING SEAL	PORTLAND CEMENT	FLY ASH	
AREA square meters		0,659	0,635	1,282	11,934	1,600		square meters PER STATION	9.04	7.26	1160	2016	780	13.75	3.44	524
cubic meters PER STATION		65.9	63.5	128.2	1193.4	160.0		tons PER STATION			2.13		0.72			0.95
tons PER STATION		150.7	145.2			*343.7	6.5	liters PER STATION				242				121
square meters PER STATION	1160															

* FOR INFORMATION ONLY

SURFACING SECTION DESIGN BASED ON THE TOP 0.6 METERS OF SUBGRADE HAVING AN R-VALUE OF 5

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

SUMMARY

⑤ GRADING * (For Uncl. Exc. Projects with Borrow)					
STATION ①	cubic meters				REMARKS
	UNCL. EXC. ⑥	UNCL. BORROW	EMB.+ ②	ROADBED COMPAC- TION ③	
2+48.15					
	3 452		3 452		
6+32					
	2 186		2 186		
7+89					
	115 757		115 757		
28+17					
	136 412		136 412		
45+83					
	132 397		132 397		
59+76					
	19 871		19 871		
67+58		④			
	139 694	66 069	205 763		
87+62.50					
TOTAL	549 769	66 069	# 615 838	642 663	

* SEE MASS DIAGRAM FOR DISTRIBUTION OF GRADING QUANTITIES
FOR INFORMATION ONLY

⑤ GRADING * (For Uncl. Projects with Excess Excavation)				
STATION ①	cubic meters			REMARKS
	UNCL. EXC. ⑥	EXCESS EXC.	EMB.+ ②	
2+48.15				
	3 452		3 452	
6+32				
	2 186		2 186	
7+89				
	115 757		115 757	
28+17				
	136 412		136 412	
45+83				
	132 397		132 397	
59+76				
	19 871		19 871	
67+58		④		
	205 763	66 069	139 694	
87+62.50				
TOTAL	615 838	# 66 069	# 549 769	

* SEE MASS DIAGRAM FOR DISTRIBUTION OF GRADING QUANTITIES
FOR INFORMATION ONLY

ADDITIONAL GRADING (For Uncl. Exc. Projects)

ADDITIONAL GRADING (For Uncl. Exc. Projects)					
STATION		cubic meters			REMARKS
		INCL. IN ROADWAY		ADD. UNCL. EXC.	
		UNCL. EXC.	EMB.+		
FROM	TO				
2+18.15	2+48.15	15	160		CONN. TO P.T.W.
2+48.15	87+62.50		22 005		TOPSOIL REPLACEMENT + 35%
3+45			135		PUBLIC APP. RT.
12+67				15	OUTLET DT. LT.
15+30			430		FARM FIELD APP. LT.
17+24				20	INLET & OUTLET DITCHES
17+27			15		DITCH BLOCK LT.
20+30	30+80		6 120		SUBEXCAVATION REPLACEMENT
23+37.80	23+67.80		205		MAILBOX TURNOUT RT.
23+49		80	190		PRIVATE APP. RT.
41+25	42+75		1 460		DIGOUT REPLACEMENT
57+10	58+60			85	IRRIGATION DITCH RELOCATION RT.
57+50	60+90		3 310		MUCK EXCAVATION REPLACEMENT
60+70.20	61+61.40		1 215		MCS SCALE SITE
76+45				15	INLET DT. RT.
76+45	77+50			110	GRADE TO DRAIN LT.
78+00	80+00	2 000			SUBEXCAVATION
81+10	85+00		910		GUARDRAIL EMBANKMENT WIDENING LT.
87+62.50	87+92.50	65	110		CONN. TO P.T.W.
SUBTOTAL		~	~	245	

Additional Grading Frame Reminders:

- (1) Round to nearest 5 cubic meters, use 5 cubic meters as a minimum.
- (2) Quantities are added to mainline earthwork volumes.
This is a listing of the entries in the run as added quantities.
- (3) Material is usable for embankment construction.
- (4) Volumes are adjusted by shrink factor. THIS IS NOT A BID ITEM.
- (5) Material is unusable for embankment construction.
- (6) All embankment quantities should be added to mainline quantities.
- (7) Uncl. exc. material is acceptable as replacement material - special borrow is not required. (In this example.)
- (8) Add add. exc. to the mainline uncl. exc. for project total on estimate.
This quantity is not reflected in the mass diagram.
- (9) Topsoil replacement quantities are adjusted by project shrink factor.
Only the project total is shown.
- (10) Material is usable for embankment construction. (In this example.)

SUBEXCAVATION * (For Uncl. Exc. Projects)

SUBEXCAVATION * (For Uncl. Exc. Projects)				
STATION		cubic meters		REMARKS
		UNCL. EXC.	SPECIAL BORROW	
FROM	TO			
41+76	45+00	4 785	5 184	
78+00	80+00	# 2 000		
TOTAL		4 785	5 184	

* SEE DETAIL SHEET
INCLUDED IN ROADWAY QUANTITIES

SURFACING

SURFACING									
STATION		meters				FOR	square meters	liters	REMARKS
		GROSS	NET	+	-		RECYCLE ASPHALT PAVEMENT	RECYCLE AGENT	
FROM	TO								
118+00.00									
128+36.32	129+00.00				63.68	BRIDGE			
157+29.91	158+00.00				70.09	BRIDGE			
	215+38.98	9 738.98	9 605.21				69 158	63 581	WESTBOUND DRIVING LANES ONLY
118+00.00									
128+36.32	129+00.00				63.68	BRIDGE			
157+29.91	158+00.00				70.09	BRIDGE			
	215+38.98	9 738.98	9 605.21				69 158	63 581	EASTBOUND DRIVING LANES ONLY
TOTAL		19 477.96	19 210.42	~	267.54		138 316	127 162	

SUMMARY



DESIGNER NAME	DATE
SUPERVISOR NAME	DATE
CHECKER NAME	DATE
DESIGNED BY	
REVIEWED BY	
CHECKED BY	
7/18/2008	
8:07:12 AM	
U1861	

SURFACING														(Overlay Project Example)	
STATION		meters				FOR	tons	AGGREGATE		BITUMINOUS MATERIAL			REMARKS		
		GROSS	NET	+	-		HYDRATED LIME	sq. meters	tons	tons		liters			
FROM	TO							COVER TYPE ①	PLANT MIX BIT. SURF. GRADE S NV - ③	ASPHALT CEMENT PG ②	SEAL CRS-2P	TACK SS-1			
229+26.36					37.50	BRIDGE									
231+31.17	231+68.67					EQUATION									
237+08.24	236+99.31			8.93											
	236+99.31	772.95	744.38					16 376	1 802	97.3	30.1	2 058	TYP. SEC. NO. 1		
SUBTOTAL		772.95	744.38	8.93	37.50		~	16 376	1 802	97.3	30.1	2 058	NORTH BOUND		
229+23.27					37.50	BRIDGE									
231+27.35	231+64.85					EQUATION									
237+04.48	236+99.31			5.17											
	236+99.31	776.04	743.71					16 361	1 784	96.3	30.0	2 030	TYP. SEC. NO. 2		
SUBTOTAL		776.04	743.71	5.17	37.50		~	16 361	1 784	96.3	30.0	2 030	SOUTH BOUND		
236+99.31															
240+44.51	240+45.06				0.55	EQUATION									
255+26.32	255+28.12				1.80	EQUATION									
	258+08.25	2 108.94	2 106.59					44 238	4 811	259.8	81.2	5 480	TYP. SEC. NO. 3		
SUBTOTAL		2 108.94	2 106.59	~	2.35		~	44 238	4 811	259.8	81.2	5 480	NORTH BOUND & SOUTH BOUND		
TOTAL		2 883.44	2 850.64	7.05	39.85		118	76 975	8 397	453.4	141.3	Δ 9 568			

Δ FOR INFORMATION ONLY - BASED ON ONE APPLICATION

Surfacing Frame Reminders:

- ① Determine cover type and insert in heading. Use Type I for all rural areas. Use Type II in areas where higher ADT and turning movements are a concern. Determine proper usage during Plan-in-Hand.
- ② Provide appropriate asphalt cement grading, i.e. PG 64-28. Use appropriate percentage of asphalt cement based on aggregate size. (See chapter 5.)
- ③ Provide appropriate pl. mix. aggregate size; either 12.5 mm or 19 mm.

GRADING (For Emb.-in-Place Projects)				
STATION ①		cubic meters		REMARKS
		EXC. ②	EMB. IN PLACE ③	
FROM	TO			
2+48.15	87+62.50	953	4 794	
			④ 2 000	DISPOSAL OF UNSUITABLE MATERIAL
			⑤ 1 250	TOPSOIL REPLACEMENT
		160	7 065	ADDITIONAL GRADING
			3 785	SUBEXCAVATION
TOTAL		# 1 113	⑥ 18 894	

FOR INFORMATION ONLY

Grading Frame Reminders:

- ① Show project total only - no balances will be designated.
- ② Excavation is not a bid item - material is available for embankment construction. Include footnote for clarity.
- ③ Volumes are not adjusted by a shrink factor.
- ④ Disposal of unsuitable roadway excavation is measured and paid as Emb.-in-Place. (Poor material not accounted for in subexcavation or other quantities.)
- ⑤ Topsoil replacement volumes are not adjusted by shrink factor.
- ⑥ See section 5.2.7 of Rd. Design Manual and explanation of 20 000 cubic meter limit.

SUBEXCAVATION * (For Emb.-in-Place Projects)				
STATION		cubic meters ①		REMARKS
		EMB. IN PLACE	SPECIAL BORROW ③	
FROM	TO			
41+76	45+00	3 785	4 184	
TOTAL		② # 3 785	4 184	

* SEE DETAIL SHEET
INCLUDED IN GRADING FRAME

Subexcavation Frame Reminders:

- ① Volumes are not adjusted by shrink factor.
- ② Place quantity in grading frame as a line item and "#" the quantity shown in subexc. frame with note stating "included in grading frame."
- ③ Include a special provision stating in-place measurement of special borrow.

ADDITIONAL GRADING (For Emb.-in-Place Projects)					
STATION		cubic meters ⑥			REMARKS
		INCL. GRAD. FRAME		ADD. EMB. IN PLACE ③	
FROM	TO	EXC. ①	EMB. IN PLACE ②		
2+18.15	2+48.15	15	120		CONN. TO P.T.W.
3+45			100		PUBLIC APP. RT.
12+67				15	OUTLET DT. LT.
15+30			320		FARM FIELD APP. LT.
17+24				20	INLET & OUTLET DITCHES
17+27			15		DITCH BLOCK LT.
20+30	30+80		④ 2 035		SUBEXCAVATION REPLACEMENT
23+37.80	23+67.80		150		MAILBOX TURNOUT RT.
23+49		80	140		PRIVATE APP. RT.
41+25	42+75		④ 1 080		DIGOUT REPLACEMENT
57+10	58+60			85	IRRIGATION DITCH RELOCATION RT.
57+50	60+90		④ 1 450		MUCK EXCAVATION REPLACEMENT
60+70.20	61+61.40		900		MCS SCALE SITE
76+45				15	INLET DT. RT.
76+45	77+50			110	GRADE TO DRAIN LT.
81+10	85+00		675		GUARDRAIL EMBANKMENT WIDENING LT.
87+62.50	87+92.50	65	80		CONN. TO P.T.W.
SUBTOTAL		⑤ 160	⑤ 7 065	⑦ 245	

③ # EXCAVATION QUANTITIES-MATERIAL UNSUITABLE FOR ROADWAY EMBANKMENTS

Additional Grading Frame Reminders:

- ① Excavation is not a bid item - material is available for embankment construction.
- ② Volumes are not adjusted by shrink factor.
- ③ Material is unusable for embankment construction.
- ④ Excavated material obtained from roadway template or uncl. borrow source is acceptable as replacement material - special borrow is not required. (In this example.)
- ⑤ Subtotals are shown in grading frame to be added to mainline quantities, with remark "Additional Grading."
- ⑥ Round to nearest 5 cubic meters, use 5 cubic meters as a minimum.
- ⑦ Add additional Emb.-in-Place to the mainline Emb.-in-Place for the project total estimate. This quantity is not used to determine amount of borrow required.

SUMMARY

SURFACING																			(Overlay Project Example)			
STATION		meters				FOR	tons	AGGREGATE					BITUMINOUS MATERIAL				AGG. TREATMENT		REMARKS			
		GROSS	NET	+	-		HYDRATED LIME	sq. meters	tons		cubic meters		tons			liters	tons	liters				
								COVER TYPE ②	PLANT MIX BIT. SURF. GRADE S - ④	HOT RECYCLE P.M.S. 50% RAP	CRUSHED AGG. COURSE	SHOULDER GRAVEL	ASPHALT CEMENT PG ③	HOT RECYCLE A.C. PG ③	SEAL CRS- 2P	TACK SS-1	DUST PALLIATIVE	AGG. TACK SS-1				
FROM	TO																					
664+14.46																						
709+87.56	0+00.00			70 987.56		PROJECT EQUATION																
	48+79.21	-61 535.25	9 452.31					90 742	9 660	13 904			521.6	417.1	166.6	24 313		TYP. NO. 1				
						ADDITIONAL SURFACING		1 787	217	77	871	15	11.7	2.3	3.3	128	0.5	63				
SUBTOTAL		-61 535.25	9 452.31	70 987.56	~		334	92 529	9 877	13 981	871	15	533.3	419.4	169.9	24 441	0.5	63				
48+79.21	146+11.06	9 731.85	9 731.85					93 426	9 946	14 316			537.1	429.5	171.5	25 032		TYP. NO. 1				
146+11.06																						
146+23.06	146+30.40			7.34		EQUATION																
	146+30.40	19.34	12.00					118	12	17			0.6	0.5	0.2	29		TRANS. TYP. NO. 1 TO TYP. NO. 2				
	160+30.40	1 414.27	1 414.27					11 880	1 271	1 840		141	68.6	55.2	21.8	3 224		TYP. NO. 2				
	160+44.67	162+16.43	171.76	171.76				1 408	156	229			8.4	6.9	2.6	400		TYP. NO. 3				
	162+16.43	32.00	32.00					280	34	50			1.8	1.5	0.5	87		TRANS. TYP. NO. 3 TO EX. B.E.				
						ADDITIONAL SURFACING		428	244	591	2 257	280	13.2	17.7	0.8	309	4.9	620				
SUBTOTAL		11 369.22	11 361.88	~	7.34		402	107 540	11 663	17 043	2 257	421	629.7	511.3	197.4	29 081	4.9	620				
TOTAL		-50 166.03	20 814.19	70 987.56	7.34		736	200 069	21 540	31 024	3 128	436	1 163.0	930.7	367.3	Δ 53 522	5.4	683				

Δ FOR INFORMATION ONLY - BASED ON ONE APPLICATION

ADDITIONAL SURFACING (INCLUDED IN SURFACING FRAME)																				(Overlay Project Example)			
STATION		meters				FOR	tons	AGGREGATE					BITUMINOUS MATERIAL				AGG. TREATMENT		REMARKS				
		GROSS	NET	+	-		HYDRATED LIME	sq. meters	tons		cubic meters		tons			liters	tons	liters					
								COVER TYPE ②	PLANT MIX BIT. SURF. GRADE S - ④	HOT RECYCLE P.M.S. 50% RAP	CRUSHED AGG. COURSE	SHOULDER GRAVEL	ASPHALT CEMENT PG ③	HOT RECYCLE A.C. PG ③	SEAL CRS- 2P	TACK SS-1	DUST PALLIATIVE	AGG. TACK SS-1					
FROM	TO																						
664+04.46	664+14.46					CONNECTION	960	10				0.5		1.8	13								
685+34.70	686+16.90					MAILBOX TURNOUT	412	8	10		10	0.4	0.3	0.8	18				RT.				
693+59.10	694+41.30					MAILBOX TURNOUT	412	8	10		5	0.4	0.3	0.8	18				LT.				
11+90.00	12+10.01					CULVERT REPLACEMENT STOCKPASS			57	141			1.7		30	0.5	63		105 mm HOT RECYCLE PMS ON 445 mm CAC				
12+00						2 - PUBLIC APPROACHES		5		2		0.3											
						2 - PRIVATE APPROACHES	①	42				2.3			49								
						16 - FARM FIELD APPROACHES		48		72		2.6		①									
								96		656		5.2											
SUBTOTAL		~	~	~	~		~	1 784	217	77	871	15	11.7	2.3	3.4	128	0.5	63	CUSTER COUNTY				
107+31.83	107+56.18					CULVERT REPLACEMENT			70	172			2.1		37	0.5	63		105 mm HOT RECYCLE PMS ON 445 mm CAC				
118+75.83	118+86.18					CULVERT REPLACEMENT			30	73			0.9		16	0.3	38		105 mm HOT RECYCLE PMS ON 445 mm CAC				
121+97.63	122+36.38					CULVERT REPLACEMENT			111	274			3.3		59	0.9	114		105 mm HOT RECYCLE PMS ON 445 mm CAC				
125+65.83	125+78.18					CULVERT REPLACEMENT			35	87			1.1		19	0.3	38		105 mm HOT RECYCLE PMS ON 445 mm CAC				
145+00.00	146+36.40					TRUCK TURNOUT	428	40	54		75	2.2	1.6	0.8	94				LT.				
153+82.45	154+13.55					CULVERT REPLACEMENT			84	168			2.5		40	0.6	76		115 mm HOT RECYCLE PMS ON 425 mm CAC				
161+40.00	162+48.43					DIGOUT REPLACEMENT			207	683			6.2			2.3	291						
						2 - PUBLIC APPROACHES		38				2.1			44								
						2 - PRIVATE APPROACHES	①	52		78		2.8		①									
						19 - FARM FIELD APPROACHES		114		722		6.2											
						GUARDRAIL WIDENING					205												
SUBTOTAL		~	~	~	~		~	428	244	591	2 257	280	13.3	17.7	0.8	△ 309	4.9	620	FALLON COUNTY				

Δ FOR INFORMATION ONLY - BASED ON ONE APPLICATION

Surfacing Frame and Additional Surfacing Frame Reminders:

- ① Discuss the need to apply seal and cover to approaches, turnouts, etc., during the Plan-in-Hand.
- ② Determine cover type and insert into heading. Use Type I for all rural areas. Use Type II in urban areas where higher ADT and turning movements are a concern. Determine proper usage during the Plan-in-Hand.
- ③ Provide appropriate asphalt cement grading, i.e. PG 64-28. Use appropriate percentage of asphalt cement based on aggregate size and % RAP. (See chapter 5.)
- ④ Provide appropriate pl. mix aggregate size; either 12.5 mm or 19 mm.

SUMMARY

SURFACING																			(Reconstruction Project Example)				
STATION		meters				FOR	tons	AGGREGATE					BITUMINOUS MATERIAL			AGG. TREATMENT		REMARKS					
		GROSS	NET	+	-		HYDRATED LIME	sq. meters	tons	cubic meters			tons		liters	tons	liters						
								COVER TYPE ②	PLANT MIX BIT. SURF. GRADE D #	CRUSHED AGG. COURSE	SPECIAL BORROW ④	TRAFFIC GRAVEL	ASPHALT CEMENT PG ③	SEAL CRS- 2P	TACK SS-1	DUST PALLIATIVE	AGG. TACK SS-1						
FROM	TO	235.39	235.39				2 448	726	632	2 809		43.6	4.5	341	5.2	652	TYPICAL SECTION NO. 2						
20+01.22	22+36.61	137.35	137.35				1 511	439	380	1 639		26.3	2.8	206	3.1	394	TYPICAL SECTION NO. 4						
22+36.61	23+73.96				58.96	BRIDGE																	
23+73.96	24+32.92	58.96																					
24+32.92	24+61.87	28.95	28.95				318	92	80	345		5.5	0.6	43	0.7	83	TYPICAL SECTION NO. 4						
						ADDITIONAL SURFACING	1 070	479	603		28.9	2.0	178	2.2	279								
TOTAL		460.65	401.69	~	58.96		* 24	5 347	1 736	1 695	4 793	100	* 104.3	9.9	△ 768	* 11.2	* 1 408						

GRADE D COMMERCIAL
* FOR INFORMATION ONLY, INCLUDE IN COST OF GRADE D COMMERCIAL PL. MIX SURFACING
△ FOR INFORMATION ONLY - BASED ON ONE APPLICATION

ADDITIONAL SURFACING																		
(INCLUDED IN SURFACING FRAME)																		
(Reconstruction Project Example)																		
STATION		meters				FOR	tons	AGGREGATE					BITUMINOUS MATERIAL			AGG. TREATMENT		REMARKS
		GROSS	NET	+	-		HYDRATED LIME	sq. meters	tons	cubic meters			tons		liters	tons	liters	
								COVER TYPE ②	PLANT MIX BIT. SURF. GRADE D #	CRUSHED AGG. COURSE	SPECIAL BORROW	TRAFFIC GRAVEL	ASPHALT CEMENT PG ③	SEAL CRS- 2P	TACK SS-1	DUST PALLIATIVE	AGG. TACK SS-1	
FROM	TO																	
19+11.22	20+01.22	90.00	90.00			CONNECTION TO P.T.W.		785	238	213			14.3	1.4	113	1.7	216	TRANS. TYP. NO. 1 TO TYP. NO. 2
						MAILBOX TURNOUT RT.			15	19			0.9		5			
						3 - PRIVATE APPROACHES		①	76	116			4.7	①				
						3 - FARM/FIELD APPROACHES			19	113			1.1					
						GUARDRAIL WIDENING			50	83			3.0		25			
						RADIUS CONN. WITH HWY 200		285	81	59			4.9	0.5	35	0.5	63	
SUBTOTAL		~	~	~	~		~	1 070	479	603	~	~	* 28.9	1.9	△ 178	* 2.2	* 279	

GRADE D COMMERCIAL
* FOR INFORMATION ONLY, INCLUDE IN COST OF GRADE D COMMERCIAL PL. MIX SURFACING
△ FOR INFORMATION ONLY - BASED ON ONE APPLICATION

- Surfacing Frame and Additional Surfacing Frame Reminders:
- ① Discuss the need to apply seal and cover to approaches, turnouts, etc., during the Plan-in-Hand.
 - ② Determine cover type and insert into heading. Use Type I for all rural areas. Use Type II in areas where higher ADT and turning movements are a concern. Determine proper usage during the Plan-in-Hand.
 - ③ Provide appropriate asphalt cement grading, i.e. PG 64-28.
 - ④ Include specialborrow in Surfacing Frame when quantities are shown on the TypicalSection.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

SUMMARY



DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
CPS - U1861		

SURFACING																							
(Reconstruct with CTB Project Example)																							
STATION		meters				FOR	tons	AGGREGATE								BITUMINOUS MATERIAL				AGG. TREATMENT		REMARKS	
		GROSS	NET	+	-		HYDRATED LIME	sq. meters	tons				cubic meters				tons			liters	tons		liters
								COVER TYPE ②	PLANT MIX BIT. SURF. GR. S ④	PLANT MIX BIT. SURF. GRADE C	PORTLAND CEMENT	FLY ASH	BLOTTER SAND SURF. GRADE 4	CEMENT TREATED BASE	CRUSHED AGG. COURSE	TRAFFIC GRAVEL	ASPHALT CEMENT PG ③	SEAL CRS- 2P	CURING SEAL CRS-2	TACK SS-1	DUST PALLIATIVE		AGG. TACK SS-1
FROM	TO	21+80.00	23+59.73	179.73	179.73			3 199	655		96.7	24.1	26	1 125			35.4	5.9	2.9	764			TYPICAL NO. 1
		23+59.73	24+46.13	86.40	86.40			1 356	283		42.0	10.5	11	489			15.3	2.5	1.3	330			TRANS. TYP. NO. 1 TO TYP. NO. 3
		24+46.13	31+27.36	681.23	681.23			9 537	1 977		295.7	74.3	79	3 443			106.8	17.5	8.8	2 303			TYPICAL NO. 3
		31+27.36	31+92.16	64.80	64.80			998	204		30.4	7.6	8	354			11.0	1.8	0.9	238			TRANS. TYP. NO. 3 TO TYP. NO. 4
		31+92.16	36+39.05	446.89	446.89			7 351	1 518		224.8	56.3	60	2 618			82.0	13.5	6.7	1 770			TYPICAL NO. 4
		36+39.05	36+83.32	44.27	44.27			788	166		21.4	5.4	6	249	50		9.0	1.4	0.7	184	0.2	25	TRANS. TYP. NO. 4 TO TYP NO. 5
		36+83.32	47+00.00	1 016.68	1 016.68			19 724	4 188		470.7	117.9	132	5 484	2 319		226.2	36.2	14.7	4 443	8.9	1 129	TYPICAL NO. 5
		47+00.00	48+47.00	147.00	147.00			2 573	542		59.2	14.8	17	690	335		29.3	4.7	1.8	568	1.3	163	TRANS. TYP. NO. 5 TO TYP. NO. 6
		48+47.00	50+99.00	252.00	252.00			3 352	727		73.3	18.4	20	853	575		39.3	6.2	2.3	738	2.2	280	TRANS. TYP. NO. 6 TO TYP. NO. 7
		50+99.00																					
		173+01.50	173+33.50		32.00	NEW STRUCTURE																	
			176+60.00	12 561.00	12 529.00			145 336	31 485		2 994.4	751.7	827	34 843	28 579		1 700.2	266.8	91.5	31 323	110.3	13 907	TYPICAL NO. 7
						ADDITIONAL SURFACING			1 734	104					3 839		93.6				13.0	335	
TOTAL		15 480.00	15 448.00	~	32.00		609	194 214	43 479	104	4 308.6	1 081.0	1 186	50 148	35 697	7 230	2 348.1	356.5	131.6	Δ 42 661	135.9	15 839	

Δ FOR INFORMATION ONLY - BASED ON ONE APPLICATION

ADDITIONAL SURFACING (INCLUDED IN SURFACING FRAME)																							(Reconstruct with CTB Project Example)			
STATION		meters				FOR	tons	AGGREGATE								BITUMINOUS MATERIAL				AGG. TREATMENT		REMARKS				
		GROSS	NET	+	-		HYDRATED LIME	sq. meters	tons				cubic meters				tons			liters	tons		liters			
								COVER TYPE ②	PLANT MIX BIT. SURF. GR. S ④	PLANT MIX BIT. SURF. GRADE C	PORTLAND CEMENT	FLY ASH	BLOTTER SAND SURF. GRADE 4	CEMENT TREATED BASE	CRUSHED AGG. COURSE	TRAFFIC GRAVEL	ASPHALT CEMENT PG ③	SEAL CRS- 2P	CURING SEAL CRS-2	TACK SS-1	DUST PALLIATIVE		AGG. TACK SS-1			
FROM	TO																									
12+80.00	25+05.00					PEDESTRIAN WALKWAY				104					151											
						GUARDRAIL WIDENING			119						194		6.4									
						MAILBOX TURNOUTS (2)			12						18		0.6									
						14 - PUBLIC APP. - 7.2 m WIDE		①	405						622			①			8.3	214				
						8 - PUBLIC APP. - 12.2 m WIDE			334						494		18.0			4.7	121					
						30 - PRIVATE APPROACHES			702						1 062		37.9									
129+40.00						26 - FARM FIELD APPROACHES			161						1 295		8.7									
						STOCKPASS			1						3		0.1									
SUBTOTAL		~	~	~	~		~	~	1 734	104	~	~	~	~	3 839	~	93.6	~	~	~	13.0	335				

Surfacing Frame and Additional Surfacing Frame Reminders:

- ① Discuss the need to apply seal and cover to approaches, turnouts, etc., during the Plan-In-Hand.
- ② Determine cover type and insert into heading. Use Type I for all rural areas. Use Type II in areas where higher ADT and turning movements are a concern. Determine proper usage during the Plan-In-Hand.
- ③ Provide appropriate asphalt cement grading, i.e. PG 64-28. Use appropriate percentage of asphalt cement based on aggregate size. (See chapter 5.)
- ④ Provide appropriate pl. mix aggregate size; either 12.5 mm or 19 mm.

SUMMARY

① BITUMINOUS PAVEMENT REMOVAL				
STATION		square meters	REMARKS	
		BIT. PAVEMENT REMOVAL		
FROM	TO			
138+10.00	138+40.00	252	CONNECTION TO P.T.W.	
146+08.26	146+38.26	252	BRIDGE END	
146+80.76	147+10.76	252	BRIDGE END	
170+45.90		180	CONNECTION TO HWY 300 LEFT	
170+45.90		180	CONNECTION TO HWY 300 RIGHT	
229+87.68	230+17.68	252	CONNECTION TO P.T.W.	
TOTAL		1 368		

Bituminous Pavement Removal Frame Reminder:

- ① Provide detail for width and depth of pavement removal.

① COLD MILLING *				
STATION		square meters	REMARKS	
		COLD MILLING		
FROM	TO			
9+70.00	10+00.00	288	CONNECTION TO P.T.W.	
35+54.53	35+84.53	288	BRIDGE APPROACH	
35+84.53	36+02.53	173	BRIDGE DECK	
36+02.53	36+32.53	288	BRIDGE APPROACH	
SUBTOTAL		1 037	STPP FUNDING	
95+44.80	95+74.80	288	CONNECTION TO P.T.W.	
SUBTOTAL		288	URBAN FUNDING	
TOTAL		1 325		

* SEE DETAILS

Cold Milling Frame Reminder:

- ① Provide detail for width and depth of cold milling.

CLEARING & GRUBBING ①			
STATION		hectares	REMARKS
		CLEARING AND GRUBBING	
FROM	TO		
0+00	50+00	1.4	RIGHT SIDE ONLY
0+00	80+00	2.3	LEFT SIDE ONLY
120+00	180+00	3.9	LEFT AND RIGHT
TOTAL		7.6	

Clearing and Grubbing Frame Reminder:

- ① Discuss the use of this bid item at Plan-in-Hand.

CONCRETE LINED DITCH *							
STATION		meters	cubic meters			square meters	REMARKS
		CONCRETE LINED DITCH	SPECIAL BACKFILL	DRAIN AGG.	BANK PROTECTION	GEO-MEMBRANE	
					TYPE 4		
FROM	TO						
231+22	231+26	4.0	1				DIVISION BOX
231+26	231+89	63.0	14	3.0			
231+89							INLET HEADWALL
231+97							OUTLET HEADWALL
231+97	232+54	57.0	13	2.7			
232+54							CUTOFF WALL
231+04	231+22	18.0	4		5.4	20	
232+54	232+64	10.0	2		9.8	28	
231+83	231+97	14.0	3	0.5			
TOTAL		166.0	37	6.2	15.2	48	

* SEE DETAIL SHEET

CATTLE GUARD					
STATION	each				REMARKS
	CATTLE GUARD			RESET CATTLE GUARD	
	3.0 meter	3.6 meter	7.2 meter		
12+67				1	LEFT - RESET ON R/W LINE (7.2 m) ①
22+30		1			LEFT
31+79			1		RIGHT
44+50	1				RIGHT
53+18				1	RIGHT - RESET AT STA. 52+95 (7.2 m) ①
TOTAL	1	1	1	2	

Cattle Guard Frame Reminder:

- ① Show reset cattle guard size in remarks section.

CONCRETE DRAINAGE CHUTES		
STATION	cubic meters	REMARKS
	CLASS ① CONCRETE	
12+45	3.5	LEFT
23+56	2.8	LEFT
33+20	3.2	RIGHT
TOTAL		9.5

Concrete Drainage Chute Frame Reminder:

- ① Obtain concrete class from hydraulics section.

CHANNEL RESTORATION & FISH PASSAGE *														
STATION		square meters		cubic meters						lump sum	each		REMARKS	
		GEOTEXTILE	COCONUT BLANKET	CLASS "AC" CONCRETE	CRUSHED AGG. COURSE	RANDOM RIPRAP	SPECIAL BACKFILL	STREAM- BED MATERIAL	CHANNEL EXC.	WILLOW CUTTINGS	BOULDER CLUSTERS	ROCK WEIRS		
		PERM. EROS. CNTRL.												
		— SURVIVABILITY CLASS — ③												
FROM	TO					CL. 2								
194+71.37		655		21.7	12	199.7	185	86	30		8			
203+87.57		373		18.2	11	101.7	175	36	35		8			
207+76								55					FISH PASSAGE	
234+76.05		393		14.1	9	107.3	125	131	90		7			
252+55	252+90		1 232					545	Δ 855	1		5	CHANNEL CHANGE LT. & FISH PASSAGE	
TOTAL		1 421	1 232	54.0	① 32	408.7	485	853	155	1	23	5		

* SEE DETAIL SHEET

Δ INCLUDED IN ROADWAY QUANTITIES ②

Channel Restoration and Fish Passage Frame Reminders:

- ① Add this quantity to quantity from surfacing frame and total for cost estimate.
- ② Confirm this quantity is shown in the additional grading frame for payment.
- ③ Consult with Geotechnical Section to determine Survivability and Class of Erosion Control Geotextile, based on subgrade conditions.

SUMMARY



MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
G:\dgn\mncrdsum07.dgn 7/18/2008 8:07:36 AM 2 CPS - U1861		

① CULVERTS (INCLUDED IN CULVERT SUMMARY RECAP)																												
STATION ④	BASIC BID ITEMS										PIPE OPTIONS mm		COATING * ⑧	END SECTIONS ⑤		cubic meters				square meters	meters	SKEW ANGLE	CULVERT IN PL. mm x m ③	REMARKS				
	CULVERT PIPE mm	meters				cubic meters					CULVERT EXC. **	FOUND- ATION MATERIAL				BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS 1	square meters GEOTEX- TILE #	FOUND- ATION MATERIAL	BEDDING MATERIAL				CLASS "DD" CONCRETE	RANDOM RIPRAP CLASS 1	GEOTEX- TILE #	HEIGHT OF COVER
		LENGTH OF PIPE	RELAY CULVERT		REMOVE CULVERT																							
30+00	600	33.0				55						600 RCP 600 CSP 600 CAP	CL.2 2.77 1.52	NONE YES NONE	FETS FETS FETS	FETS FETS FETS						1.5			DRAIN			
38+53	900	40.0				75						900 RCP 1050 CSP ~	CL.2 2.77	NONE YES	FETS FETS	FETS FETS						2.0	5° RT.		DRAIN			
42+64	1485x915 ⑥	29.5				5		54	3.5	6.6		1485x915 RCPA 1520x1170 CSPA ☉	CL.3 3.51	NONE YES	FETS 2:1 BEVEL	FETS 2:1 BEVEL		54	3.5	6.6		1.0			DRAIN			
43+03	450	15.5				5						450 RCP 450 CSP 450 CAP	CL.2 2.01 1.52	NONE NONE NONE	FETS FETS FETS	FETS FETS FETS						0.5			APP. LT.			
53+43	1050	29.0				10						1050 RCP 1440x970 CSPA ~	CL.2 2.77	NONE YES	FETS 2:1 BEVEL	FETS 2:1 BEVEL						1.0			DRAIN			
61+28	2400	4x35.5				885		388	16.0	33.6		~ 2400 CSP ☉	2.77	YES	2:1 ▣	2:1 ▣		388	16.0	33.6		1.4			DRAIN 4 PIPES			
61+87	900	30.0				30						~ 900 CSP ~	2.77	YES	FETS	FETS						1.2			DRAIN			
62+16	450	15.5				5						450 RCP 450 CSP 450 CAP ~	CL.2 2.01 1.52	NONE NONE NONE	FETS FETS FETS	FETS FETS FETS						0.6			APP. LT.			
91+90	450 IRR.	43.0			21.9	75						~ 450 CSP IRR. ~	2.01	YES	SQ.	SQ.						1.5	10° LT.	457x21.9 CSP IRR.	IRR.			
92+65	2840x1920 IRR.	29.0				195		82	5.2	10.1		~ 2840x1920 CSPA IRR. ☉ ~	2.01	YES	SQ.	2:1 BEVEL		82	5.2	10.1		1.5			IRR. SEE DETAIL FOR INLET			
93+63	600 IRR.	31.0				5						600 RCP IRR. 600 CSP IRR. ~	CL.2 2.01	NONE YES	FETS FETS	FETS FETS						1.5			IRR.			
94+62	1855x1145 IRR.	2x31.0				215		136	8.2	20.4		1855x1145 RCPA IRR. 2050x1500 CSPA IRR. ☉ ~	CL.3 2.01	NONE YES	FETS 2:1 BEVEL	FETS 2:1 BEVEL		136 137	8.2 6.7	20.4 13.5		1.8			IRR. DOUBLE PIPE			
94+70					19.5	30																		610x19.5 CSP				
95+12	600	16.0				5						600 RCP ~ ~	CL.2	NONE	FETS	FETS						3.0		610x29.0 RCP	DRAIN LENG. 3.5 m LT. & 12.5 m RT.			
96+10	600	9.0				5						~ 600 CSP ~	2.01	NONE	RACET	RACET						0.5		610x30.5 RCP	APP. RT. LENG. 5.5 m LT. & 3.5 m RT.			
98+65	450	2.0	2.0		2.0	5						450 RCP ~ ~	CL.2	NONE	~	FETS						1.4		457x30.0 RCP	DRAIN RELAY FETS LT. NEW FETS RT.			
100+93	450	8.5	14.0		14.0	45						450 RCP ~ ~	CL.2	NONE	~	~						1.4		457x14.0 RCP	APP. LT. RELAY & LENGTHEN			
106+68	450 SIPHON	30.5				40						~ 450 CSP SIPHON ~	2.01	YES	Δ	Δ						1.8			SIPHON			
107+28	450 SIPHON	37.0				45						450 RCP SIPHON 450 CSP SIPHON ~	CL.2 2.01	NONE YES	Δ Δ	Δ Δ						1.5			SIPHON			
109+73	3.670 m ⑦	38.0				185	102	162	8.1	17.1	171	~ 3.670 m SSPP ~	2.82	YES	2:1 ▣	2:1 ▣	102	162	8.1	17.1	171	3.7			DRAIN			
TOTAL	~	~	16.0			57.4	~	102	822	41.0	87.8	171	~	~	~	~	~	~	~	~	~	~	~	~				

STABILIZATION
* SEE STANDARD SPEC. SECT. 709.04 ⑧
** FOR INFORMATION ONLY
▣ STEP BEVEL
Δ SEE SIPHON DETAIL SHEET
☉ 75 x 25 mm CORR.

Culverts Frame Reminders:

- ① This frame used when culvert material type is optional- culvert summary recap must accompany this frame.
- ② Hard converted metric sizes for diameters of new pipe.
- ③ Soft converted metric sizes for diameters of in-place pipe (Rounded to nearest mm.)
- ④ Pipe location rounded to nearest meter.
- ⑤ List new end sections only - end sections included in length of new pipe for payment.
- ⑥ Arch pipes listed as span X rise.
- ⑦ SSPP diameters in meters.
- ⑧ Coating specifications could include 709.04, 709.05, or 709.12 in accordance with recommendations from the Materials Bureau and Hydraulics Section.

SUMMARY



DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
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① CULVERTS																									
STATION ④	② meters											COATING * ⑥	END SECTIONS ⑤		meters			cubic meters				HEIGHT OF COVER	SKEW ANGLE	CULVERT IN PL. mm x m ③	REMARKS
	RCP				RCP IRRIGATION		CSP - 68 x 13 mm CORR.			RELAY CULVERT	CLEAN CULVERT				REMOVE CULVERT	CULVERT EXC. **	BEDDING MATERIAL	CLASS "DD" CONCRETE	RANDOM RIPRAP CLASS 1						
	CLASS 2				CLASS 3	CLASS 4	CLASS 2		1.63 THK.											3.51 THK.	4.27 THK.				
	450 mm	600 mm	900 mm	1200 mm	600 mm	600 mm	450 mm	600 mm	450 mm											1800 mm	2100 mm				
4+16		2.0										NONE	~	FETS	2.0	16	2.0	5			1.4		610 x 18.3 RCP	RELAY FETS LT.	
15+80		16.0										NONE	~	FETS				5			3.0		610 x 24.4 RCP	LENGTHEN 3.5 m LT. & 12.5 m RT.	
19+44					12.5							NONE	~	FETS	1.5		1.5	5			4.3		610 x 22.6 RCP	RELAY 1.5 m RT. LENGTHEN 12.5 m LT.	
24+29	8.5											NONE	~	~	14.0		14.0	20			1.4		610 x 14.0 RCP	APP. LT.	
27+45												NONE	~	~			9.2	20					381 x 9.2 RCP	APP. LT.	
34+05				10.0								NONE	~	FETS				5			2.3		1219 x 30.5 RCP	LENGTHEN 4.5 m LT. & 5.5 m RT.	
38+20			5.0									NONE	~	~	5.0	14	5.0	5			1.1		914 x 18.9 RCP	RELAY FETS LENGTHEN 2.5 m LT. & RT.	
40+70						7.0						NONE	~	SQ.				5			10.4		610 x 28.0 RCP	LENGTHEN 7.0 m LT.	
45+18		11.0										NONE	~	RACET	RACET	9		15			0.5		610 x 14.0 RCP	APP. RT. LENG. 5.0 m LT. & 6.0 m RT.	
47+32										₹ 6.0		YES	2: 1 BEVEL	2: 1 BEVEL				5	7	3.6	10.0	3.1	11° RT.	1829 x 25.6 CSP	LENGTHEN 3.0 m LT. & RT.
50+74									5.5			NONE	~	FETS		18	1.0	5			1.5		457 x 17.7 CSP	REMOVE 1.0 m LT. LENG. 2.0 LT. & 3.5 m	
53+23											₹ 5.0	YES	1.5: 1 BEVEL	~				5	4	3.6	9.0	2.9		2134 x 23.8 CSP	LENGTHEN 5.0 m LT.
60+32	13.0											NONE	~	FETS				5			2.7		457 x 12.8 RCP	APP. LT. LENGTHEN 6.5 m LT. & RT.	
65+05												NONE	~	~			11.6	10					381 x 11.6 RCP	APP. RT.	
71+40							12.0					NONE	~	FETS				5			2.4		457 x 21.9 RCP IRR	LENGTHEN 6.0 m LT. & RT.	
72+09								7.0				NONE	~	FETS				5			2.5		610 x 28.0 RCP IRR	LENGTHEN 7.0 m RT.	
TOTAL	21.5	29.0	5.0	10.0	12.5	7.0	12.0	7.0	5.5	6.0	5.0	~	~	~	22.5	57	44.3	~	11	7.2	19.0	~	~	~	

₹ 75 x 25 mm CORRUGATION
*SEE STANDARD SPEC. SEC. 709.04 ⑥
** FOR INFORMATION ONLY

Culverts Frame Reminders:

- ① Use this frame when culvert material type for mainline and approach pipes is non-optional. Culvert summary recap is not used with this frame.

② Hard converted metric sizes for diameters of new pipe.
- ③ Soft converted metric sizes for diameters of in-place pipe (Rounded to nearest mm.)

④ Pipe location rounded to nearest meter.
- ⑤ List new end sections only - end sections included in length of new pipe for payment.

⑥ Coating specifications could include 709.04, 709.05, or 709.12 in accordance with recommendations from the Materials Bureau and Hydraulics Section.

① APPROACH PIPE (INCLUDED IN CULVERT SUMMARY RECAP)																	
STATION ④	BASIC BID ITEMS						② PIPE OPTIONS mm				END SECTIONS ⑤		meters	SKEW ANGLE	CULVERT IN PL. mm x m ③	REMARKS	
	CULVERT PIPE ② mm	meters				cubic meters CULVERT EXC. **	CONCRETE - CLASS 2	STEEL - 68 x 13 CORR. 1.63 THK.	ALUMINUM - 68 x 13 CORR. 1.52 THK.	CORRUGATED POLYETHYLENE PIPE	⑤		HEIGHT OF COVER				
		LENGTH OF PIPE	REMOVE CULVERT	RELAY CULVERT	CLEAN CULVERT						LEFT	RIGHT					
3+11	450	21.5				10	450	~	~	~	RACET	RACET	0.4			RT.	
13+58	450	21.5				5	450	450	450	450	RACET	RACET	0.5			RT.	
18+90	600	24.0				5	600	* 600	600	600	FETS	FETS	0.6			LT.	
24+21	450	32.5				15	450	* 450	450	450	FETS	FETS	1.2			LT.	
32+55	450	23.0				5	450	450	450	450	FETS	FETS	0.5	15° LT.		RT.	
35+55	450	24.0				5	450	450	450	450	FETS	FETS	0.5			RT.	
54+77	450	8.5	14.0	14.0		45	450	~	~	~	~	~	1.4			457 x 14.0 RCP	LT. - LENGTHEN 3.5 m LT. & 5.0 m RT.
57+93	450	29.5	9.1			50	450	450	450	450	FETS	FETS	1.2			381 x 9.1 RCP	LT.
68+68	450	9.0	2.0	2.0		5	~	450	~	~	FETS	~	1.8		457 x 20.7 CSP	RT. - RELAY FETS RT. LENG. 5.5 m LT. & 3.5 m RT.	
69+75			19.5			40	~	~	~	~	~	~			457 x 19.5 RCP	LT.	
75+66	450	5.0	4.0	3.5		5	450	~	~	~	~	~	0.8		457 x 20.4 RCP	LT. - RELAY FETS LENGTHEN 2.5 m LT. & RT.	
75+66	450 IRR.	25.5				10	450 IRR	450 IRR	~	~	FETS	FETS	0.8			RT. - IRR.	
76+24	725x460 ⑥	22.0				20	725x460 CL.3	* 680x500	680x500 1.91	~	~	~				LT.	
81+21					22										457 x 21.5 CSP	LT.	
TOTAL	~	~	48.6	19.5	22	~	~	~	~	~	~	~	~	~	~		

* COAT PIPE PER STANDARD SPEC. SEC. 709.04 ⑦
** FOR INFORMATION ONLY

Approach Pipe Frame Reminders:

- ① Use this frame only when plastic pipe is a recommended option for approach pipe, otherwise combine with culvert summary. Culvert summary recap must accompany this frame.

② Hard converted metric sizes for diameters of new pipe.

③ Soft converted metric sizes for diameters of in-place pipes (Rounded to nearest mm.)
- ④ Pipe location rounded to nearest meter.

⑤ List new end section only - end section included in length of new pipe for payment.

⑥ Arch pipes listed as span X rise.

⑦ When coating is required on an approach pipe, add a footnote specifying the coating specifications as shown here. Coating specifications could include 709.04, 709.05, or 709.12 in accordance with recommendations from the Materials Bureau and Hydraulics Section.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

SUMMARY



MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
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① CULVERT SUMMARY RECAP									
BASIC BID mm ②	meters				cubic meters				square meters
	NEW PIPE (TOTAL)	RELAY CULVERT	CLEAN CULVERT	REMOVE CULVERT	FOUND- ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	RANDOM RIPRAP	GEOTEXTILE STABILIZATION
								CLASS 1	
450	161.5								
450 IRR.	25.5								
450 SIPHON	37.0								
450 RCP CL. 2	45.5								
450 CSP x 1.63 THK.	9.0								
450 CSP IRR. x 2.01 THK.	43.0								
450 CSP SIPHON x 2.01 THK.	30.5								
600	57.0								
600 IRR.	31.0								
600 RCP CL. 2	16.0								
600 CSP x 2.01 THK.	9.0								
725 x 460	22.0								
900	40.0								
900 CSP x 2.77 THK.	30.0								
1050	29.0								
1485 x 915	29.5								
1855 x 1145 IRR.	62.0								
2400 CSP x 2.77 THK.	142.0								
2840 x 1920 CSPAIRR. x 2.01 THK.	29.0								
3.670 m SSPP x 2.82 THK.	38.0								
TOTAL	③	35.5	22	106.0	102	822	41.0	87.8	171

Culvert Summary Recap Frame Reminders:

- ① Used in conjunction with Optional Culvert (see Fig. 4.4 K-7) and Optional Approach Pipe (see Fig. 4.4 K-8) Summaries.
- ② For pipes with optional material types, list pipes by diameter, Irr., or Siphon only. For pipes with only one material type specified, also list the material type and class or thickness. Separate out the optional and non-optional pipes, even if they are the same size.
- ③ Enter project totals only.

① CULVERTS - ALTERNATE A1													
STATION ④	meters	END SECTIONS		cubic meters						square meters	meters	SKEW ANGLE	REMARKS
	DOUBLE CELL RCB *			# CULVERT EXCAVATION	FOUNDATION MATERIAL	BEDDING MATERIAL	SPECIAL BACKFILL	CLASS "DD" CONCRETE	RANDOM RIPRAP	GEOTEXTILE STABILIZATION	HEIGHT OF COVER		
	3350 mm x 3350 mm	LEFT	RIGHT										
12+72	33.5	2:1 SLOPE	2:1 SLOPE	545	186	108	425	9.3	19.1	372	1.8		S00566004+0.0001 DRAIN ③
TOTAL	33.5	~	~	545	186	108	425	9.3	19.1	372	~	~	

* SEE DETAIL
QUANTITY SHOWN FOR INFORMATIONAL PURPOSES ONLY. CULVERT EXCAVATION IS INCLUDED IN THE UNIT BID PRICE FOR NEW PIPE.

① CULVERTS - ALTERNATE A2															
STATION ④	meters	*# COATING	END SECTIONS		cubic meters						square meters	meters	SKEW ANGLE	REMARKS	
	SSPPA - 152 x 51 mm CORR.				## CULVERT EXCAVATION	FOUNDATION MATERIAL	BEDDING MATERIAL	SPECIAL BACKFILL	CLASS "DD" CONCRETE	RANDOM RIPRAP	* FLOWABLE FILL	GEOTEXTILE STABILIZATION			HEIGHT OF COVER
	2.82 THK.														
	4.390 m x 3.050 m														
12+72	2 at 31.5	YES	2:1 BEVEL	2:1 BEVEL	585	228	338	730	14.5	26.3	142.7	385	2.1		S00566004+0.0001 DRAIN ③
TOTAL	63.0	~	~	~	585	228	338	730	14.5	26.3	142.7	385	~	~	

*# SEE STANDARD SPEC. 709.04
* SEE DETAIL
QUANTITY SHOWN FOR INFORMATIONAL PURPOSES ONLY. CULVERT EXCAVATION IS INCLUDED IN THE UNIT BID PRICE FOR NEW PIPE.

Culverts-Alternate Frame Reminders:

- ① When reinforced concrete box (RCB) is an alternate (optional) bid item, then use these alternate frames. Use the non-optional or optional culvert frame for any non-alternate RCB callout.
- ② The use of alternate bid items/frames should be discussed and agree to at the Plan-In-Hand.
- ③ If a culvert is replacing an existing bridge, add NBInumber in remarks.
- ④ Pipe location rounded to nearest meter.

CURB										
STATION		meters				sq. meters		meters		REMARKS
		CONCRETE CURB AND GUTTER		REMOVE ① CURB AND GUTTER		CONCRETE VALLEY GUTTER		BITUMINOUS CURB ②		
		LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	
FROM	TO	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	
11+00.00	11+29.00								29.0	INCLUDES 2 - 7.5 m RADII
11+29.00	13+12.00	206.6								INCLUDES 2 - 6.0 m RADII
11+29.00	13+10.20		200.1							
13+10.20	13+25.20						15.0			
SUBTOTAL		206.6	200.1				15.0		29.0	NH FUNDING
13+25.20	15+08.20	197.1								INCLUDES 2 - 4.5 m RADII
13+23.20	15+08.20		203.9							INCLUDES 2 - 6.0 m RADII
13+50.50	14+88.00			152.0						
13+63.20	14+92.30				136.4					
SUBTOTAL		197.1	203.9	152.0	136.4					CMAQ FUNDING
TOTAL		807.7		288.4		15.0		29.0		

Curb Frame Reminders:

- ① If curb removal is included in reconstruction cross section, curb removal is included with street excavation quantity. Otherwise, show removal here as a bid item.
- ② When existing bituminous curb will be removed, handle the same way as curb and gutter removal.

① DUCTILE IRON FITTINGS				
DESCRIPTION	25% CITY FUNDS		100% CITY FUNDS	
	QUANTITY	WEIGHT (kg)	QUANTITY	WEIGHT (kg)
200 mm PLUG			2	46
200 mm x 200 mm x 150 mm TEE			2	158
250 mm PLUG			1	29
250 mm x 250 mm x 150 mm TEE	1	113	1	113
250 mm x 250 mm x 200 mm TEE			1	118
250 mm x 250 mm x 250 mm TEE			1	141
250 mm x 150 mm REDUCER	2	52		
250 mm 90° BEND	1	86		
450 mm x 500 mm INCREASER/REDUCER	2	462		
500 mm x 500 mm x 150 mm TEE			2	658
500 mm x 500 mm x 200 mm TEE			1	333
500 mm x 500 mm x 250 mm TEE	2	684		
500 mm 90° BEND	1	308		
TOTAL (INCLUDED IN WATER LINE FRAME)	~	1 705	~	1 596

Ductile Iron Fittings Frame Reminder:

- ① Use this frame if there are a variety of different fittings to reduce the size of the Water Line frame. If a small number of fitting types is needed, or if plastic fittings are used, columns can be added to the Water Line frame instead.

DETOUR *			
STATION		lump sum	REMARKS
		CONST., MAINTAIN & REMOVE DETOUR	
FROM	TO		
12+45.00	14+60.00	0.16	CULVERT REPLACEMENT
43+17.50	49+20.17	0.44	DRY CREEK
76+81.32	82+35.44	③ 0.40	HAY CREEK
TOTAL		1	

* SEE DETAIL SHEET

Detour Frame Reminders:

- ① Depending on specifics of project, this item may be revised to Construct & Maintain, Maintain, Maintain & Remove, or Remove.
- ② Provide quantities to construct on detail sheet.
- ③ If practical, prorate lump sum for each detour based on length.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

SUMMARY

EMBANKMENT PROTECTORS							
STATION		meters				cubic meters	REMARKS
		EMBANKMENT PROTECTOR*		BITUMINOUS CURB		BANK PROTEC- TION	
		300 mm					
FROM	TO	LEFT	RIGHT	LEFT	RIGHT	TYPE 3	
456+21		15.0				1.2	25° ELBOW (1)
456+21	456+39.50			18.5			
SUBTOTAL		15.0		18.5			
TOTAL		15.0		18.5		1.2	

* CULVERT EXC. INCLUDED IN COST OF EMB. PROTECTOR

Embankment Protectors Frame Reminder:

① Specify degree of bend on elbow.

EQUIPMENT				
STATION		hours		REMARKS
		MOTOR GRADER	DOZER	
FROM	TO			
568+23	580+20	11		RIGHT SIDE OF ROAD ONLY
620+00	630+00		8	LEFT AND RIGHT SIDE OF ROAD
TOTAL		11	8	

EDGE DRAIN *				
STATION		meters		REMARKS
		EDGE DRAIN	CORR. PLASTIC PIPE 150 mm	
FROM	TO			
32+75	36+75	400.0	55.0	DAYLIGHT TO DITCH AHEAD W.B.
33+50	37+50	400.0	12.5	DAYLIGHT TO DITCH AHEAD E.B.
66+90	67+85	95.0	13.0	DAYLIGHT TO MEDIAN BACK E.B.
67+20	67+85	65.0	7.5	DAYLIGHT TO DITCH BACK W.B.
TOTAL		960.0	88.0	

* SEE DETAIL SHEET

GABIONS *				
STATION		cubic meters		REMARKS
		GABIONS	SPECIAL BORROW ^①	
	TO			
0.00	15+90.00	40	104	RIGHT, SEE DETAIL
0.00	19+90.00	40	84	RIGHT, SEE DETAIL
0.00	41+70.00	20	46	RIGHT, SEE DETAIL
0.00	68+70.00	40	114	RIGHT, SEE DETAIL
4.00		24	~	RIGHT, SEE GABION SILL DETAIL
0.00	162+90.00	60	84	LEFT, SEE DETAIL
0.00	166+60.00	100	197	LEFT, SEE DETAIL
0.00	173+90.00	240	649	LEFT, SEE DETAIL
0.00	176+30.00	80	206	LEFT, SEE DETAIL
0.00	183+90.00	40	95	LEFT, SEE DETAIL
0.00	206+30.00	10	17	RIGHT, SEE DETAIL
0.00	209+90.00	80	142	RIGHT, SEE DETAIL
0.00	218+10.00	20	34	RIGHT, SEE DETAIL
0.00	220+90.00	40	78	RIGHT, SEE DETAIL
TOTAL		834	1 850	

* SEE DETAILS

Gabions Frame Reminder:

① Use Special Borrow for base material. Include a special provision stating the measurement of Special Borrow for payment is the final in-place volume. Provide specifications for the SpecialBorrow material.

FINISH GRADE CONTROL			
STATION		course kilometers	REMARKS
		FINISH GRADE CONTROL	
FROM	TO		
0+00.00	95+20.00	9.5	SUBGRADE MAINLINE
0+00.00	95+20.00	9.5	BASE COURSE MAINLINE
32+40.50	56+37.50	2.4	SUBGRADE CLIMBING LANE
32+40.50	56+37.50	2.4	BASE COURSE CLIMBING LANE
73+15.00		0.2	SUBGRADE INTERSECTING ROAD
73+15.00		0.2	BASE COURSE INTERSECTING ROAD
TOTAL		24.2	

DIGOUT EXCAVATION * ④					
STATION		cubic meters		square meters	REMARKS
		DIGOUT EXC. ①	SPECIAL BORROW ② ③	GEOTEXTILE STABILIZATION	
FROM	TO				
198+50	200+00	1 840	1 196	1 500	
254+80	256+00	1 656	1 076		
100+50	101+50.76	3 240	2 105		
102+70.76	103+70	2 750	1 787		
TOTAL		9 486	6 164	1 500	

* SEE DETAIL SHEET

Digout Excavation Frame Reminders:

- ① ② Measured and paid the same for both Uncl. Exc. and Emb.-in-Pl. projects.
- ② Volumes are not adjusted by shrink factor.
- ③ Include a special provision stating the measurement of special borrow for payment is the final in-place volume. Provide specifications for the SpecialBorrow material.
- ④ Do not use digout excavation on new construction/reconstruction projects. For these projects, removal of unsuitable material is paid for as either unclassified excavation or muck excavation.

FENCING												
STATION		meters				TEMP. FENCE	each		DEADMAN	meters		REMARKS
		FARM FENCE					FARM FENCE PANEL			FARM GATE		
		TYPE F2W- 813WW	TYPE F3M- 990WW	TYPE F4M	TYPE F5W		SINGLE	DOUBLE		TYPE G2	TYPE G3	
FROM	TO											
0+00.00	30+45.00			3 045.0			12	6			LEFT - TIE TO EXISTING FENCE	
30+45.00	30+49.80								4.8		LEFT	
30+49.80	47+80.00				1 730.2		8	1			LEFT - WING TO PIPE	
47+84.00	89+65.70				4 181.7		17	4			LEFT - WING TO PIPE	
89+65.70	115+20.00	2 554.3					21	5			LEFT	
115+20.00	115+24.80									4.8	LEFT	
115+24.80	117+00.00	175.2					2				LEFT - TIE TO EXISTING FENCE	
0+00.00	27+13.40		2 713.4				30				RIGHT - TIE TO EXISTING FENCE	
27+13.40	27+18.20								4.8		RIGHT	
27+18.20	47+80.00			2 061.8			8	3			RIGHT - WING TO PIPE	
47+84.00	65+32.30			1 748.3			10	1			RIGHT - WING TO PIPE	
65+32.30	74+97.60			965.3			5				RIGHT	
74+97.60	75+09.60								12.0		RIGHT	
75+09.60	117+00.00	4 190.4					34	8			RIGHT - TIE TO EXISTING FENCE	
TOTAL		6 919.9	2 713.4	7 820.4	5 911.9	1 755.0	147	28	70	21.6	4.8	



DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
CPS - U1861		
2		

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

SUMMARY

GUARDRAIL																											
STATION		meters										(6) each														REMARKS (8)	
		(1) REMOVE GUARDRAIL		(2)(9) METAL GUARDRAIL		(3) BOX BEAM GUARDRAIL		(4) CABLE GUARDRAIL		(5) INTERSECTING ROADWAY TERMINAL SECTION		OPTIONAL TERMINAL SECTION		ONE-WAY DEPARTURE TERMINAL SECTION		OPTIONAL BOX BEAM TERMINAL SECTION		BOX BEAM ONE-WAY DEPARTURE TERMINAL SECTION		CABLE GUARDRAIL TERMINAL SECTION		(7) BRIDGE APPROACH SECTION TYPE 1		(7) BOX BEAM BRIDGE APPROACH SECTION TYPE 1			
FROM	TO	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT		
NEW RAIL																											
145+54.75	146+19.52				41.91								1											1			
145+79.96	146+14.25			11.43								1											1				
146+56.83	147+21.60			41.91								1											1				
146+31.65	146+96.42				41.91								1											1			
175+92.75	179+31.84				308.61								2														
178+85.66	180+41.87			137.16								1		1													
184+19.80	192+31.33				792.48								1		1												
195+81.11	207+69.83			1158.24								2															
210+04.13	211+98.12				171.45						19.05		1														
215+30.00	217+50.98				201.93								1		1												7.3 m RADIUS
243+50.47	244+38.75																1		1								
254+75.54	255+60.70																	1		1						1	
255+02.99	255+60.70					27.45												1							1		NEW BOX BEAM - DUE TO DRIFTING
319+90.55	335+09.45									1503.04											6						NEW CABLE RAIL - DUE TO DRIFTING (3 RUNS)
REMOVE RAIL																											
145+77.61	146+19.52			41.91																							
145+76.15	146+14.25	38.10																									W-BEAM RAIL IN PLACE
146+79.69	147+21.60	41.91																									W-BEAM RAIL IN PLACE
146+58.32	146+96.42		38.10																								W-BEAM RAIL IN PLACE
162+95.20	165+39.20		244.00																								W-BEAM RAIL IN PLACE
175+99.30	179+06.74		307.44																								CABLE RAIL IN PLACE
179+00.90	180+18.02	117.12																									CABLE RAIL IN PLACE
255+12.68	255+39.35		26.67																								CABLE RAIL IN PLACE
319+90.55	334+84.07	1493.52																									W-BEAM RAIL IN PLACE
SUBTOTAL		1717.32	631.45	1348.74	1558.29	27.45	126.27	1503.04			19.05	5	7	1	2	1	2		1	6			2	2	1	1	
TOTAL		2348.77		2907.03		153.72		1503.04		19.05		12		3		3		1		6		4		2			

Guardrail Frame Reminders:

- ① Remove guardrail measured to the nearest 0.01 m.
- ② See Fig. 5. 4L for computing w-beam guardrail quantities.
- ③ See Fig. 5. 4N for computing box beam guardrail quantities.
- ④ See Fig. 5. 4M for computing cable guardrail quantities.
- ⑤ See Fig 5.40 for computing I.R.T. section quantities. When the approach is not perpendicular to mainline, provide a detail showing the I.R.T. section general layout.
- ⑥ Length not included in length of guardrail, but included for station range.
- ⑦ Check bridge plans to ensure bridge approach section type matches bridge rail type and bridge end stations.
- ⑧ Note the radius for Intersecting Roadway Terminal Sections. Note the number of runs of cable guardrail.
- ⑨ If 0.6 m widening behind rail is unattainable, include a column for "Metal Guardrail 2.4 m Posts." If stiffened guardrail is required (see Dtl. Dwg. 606-07), include a column for "Stiffened Guardrail Sections." If raise guardrail or reset guardrail is needed, add these columns using the same rounding criteria as for Remove Guardrail.

CONCRETE BARRIER RAIL									
④ STATION		each							REMARKS
		REMOVE CONCRETE BARRIER RAIL ③	CONCRETE BARRIER RAIL	TALL CONCRETE BARRIER RAIL	CONCRETE BARRIER RAIL TRANS.	CONCRETE BARRIER RAIL ② TERMINAL SECTION	REMOVE IMPACT ATTENUATOR	IMPACT ATTENUATOR 6 BAY ①	
FROM	TO								
102+10.26	102+17.00							1	E.B. SH. RT.
102+17.00	105+83.00		120						E.B. SH. RT.
105+83.00	105+86.05					1			E.B. SH. RT.
112+16.75	112+41.15	8							W.B. SH. RT. (TAPERED END SECT.)
112+16.75	112+19.80					1			W.B. SH. RT.
112+41.15	115+40.05	98							FROM W.B. SH. RT. TO MED. C/L
112+19.80	115+40.05		105						FROM W.B. SH. RT. TO MED. C/L
115+40.05	125+89.25	344							MED. C/L
115+40.05	117+65.75		74						MED. C/L
117+65.75	117+68.80				1				MED. C/L
117+68.80	121+80.55			135					MED. C/L
121+80.55	121+83.60				1				MED. C/L
121+83.60	126+41.10		150						MED. C/L
125+89.25	125+94.74						1		MED. C/L
126+41.10	126+47.84							1	MED. C/L
TOTAL		450	449	135	2	2	1	2	

Concrete Barrier Rail Frame Reminders:

- ① Impact attenuator may be shown in the Guardrail Frame when used in combination with Metal Guardrail.
- ② Only use as a One-Way Departure Terminal.
- ③ Existing Concrete Barrier Rail not meeting the current NCHRP 350 crash-tested design, as shown in the Detailed Drawings, designated to be removed, should be replaced with new Concrete Barrier Rail. Exceptions to this rule should be discussed at Plan-In-Hand.
- ④ Stations should be in 3.05 m increments for Concrete Barrier Rail and in the applicable increment for the size of Impact Attenuators selected.

CONCRETE BARRIER RAIL									
④ STATION		each							REMARKS
		REMOVE CONCRETE BARRIER RAIL ③	CONCRETE BARRIER RAIL	TALL CONCRETE BARRIER RAIL	CONCRETE BARRIER RAIL TRANS.	RESET CONCRETE BARRIER RAIL ③	RESET IMPACT ATTENUATOR	IMPACT ATTENUATOR 6 BAY ①	
FROM	TO								
TEMPORARY LOCATION									
67+24.16	67+30.90							1	MED. - 2.4 m RT.
67+30.90	76+82.50		312						MED. TO B.E. - 2.4 m RT.
67+76.65	76+82.50	297							MED. TO B.E. (INCL. TAPERED END SECT.)
77+43.46	92+16.61	483							MED. FROM B.E. (INCL. TAPERED END SECT.)
77+43.46	81+85.71		145						MED. FROM B.E. - 2.4 m RT.
81+85.71	81+88.76				1				MED. - 2.4 m RT.
81+88.76	88+14.01			205					MED. - 2.4 m RT.
88+14.01	88+17.06				1				MED. - 2.4 m RT.
88+17.06	91+64.76		114						MED. - 2.4 m RT.
91+64.76	91+71.50							1	MED. - 2.4 m RT.
FINAL LOCATION									
67+24.16	67+30.90						1		MED. C/L
67+30.90	76+82.50					312			MED. C/L TO B.E.
77+43.46	81+85.71					145			MED. C/L FROM B.E.
81+85.71	81+88.76					1			MED. C/L (TRANSITION RAIL)
81+88.76	88+14.01					205			MED. C/L (TALL RAIL)
88+14.01	88+17.06					1			MED. C/L (TRANSITION RAIL)
88+17.06	91+64.76					114			MED. C/L
91+64.76	91+71.50						1		MED. C/L
TOTAL		780	571	205	2	778	2	2	

SUMMARY

MAILBOXES		
STATION	each	REMARKS
	MAIL-BOXES	
1342+56	2	LEFT
1356+56	7	LEFT
TOTAL	9	

① MANHOLES IN PLACE *			
STATION	each		REMARKS
	ADJUST MANHOLE		
	LEFT	RIGHT	
2+23.0	1		0.6 m LEFT
5+56.2	1		0.7 m LEFT
10+56.3		1	1.0 m RIGHT
45+60.0	1		0.6 m LEFT
62+45.5		1	0.8 m RIGHT
SUBTOTAL	3	2	
TOTAL	5		

* FUNDING - 75% STATE, 25% CITY

Manholes In Place Frame Reminder:

① See Utility Agreement for funding splits.

MEDIAN CROSSOVER *			
STATION		Lump sum	REMARKS
		CONST., MAINTAIN & REMOVE CROSS-OVER	
FROM	TO		
89+00	91+15	0.5	① DOUBLE CROSSOVER
131+00	133+15	③ 0.5	② DOUBLE CROSSOVER
TOTAL		1	

* SEE DETAIL SHEET

Median Crossover Frame Reminders:

- ① Depending on specifics of project, this item may be revised to Construct & Maintain, Maintain, Maintain & Remove, or Remove.
- ② Provide quantities to construct on detailsheet.
- ③ When crossover characteristics are significantly different, prorate the lump sum for each crossover to more closely represent the amount of work required to construct them.

TEMPORARY GUARDRAIL									
STATION		meters		each	each				REMARKS
		TEMPORARY METAL GUARDRAIL		TEMPORARY CONCRETE BARRIER RAIL	TEMPORARY BRIDGE APPROACH SECTION TYPE 1		TEMPORARY OPTIONAL TERMINAL SECTION		
FROM	TO	LEFT	RIGHT		LEFT	RIGHT	LEFT	RIGHT	
6+92.05	7+50.00			19					1
15+92.45	16+26.00			11					1
51+22.85	51+93.00			23					1
89+00.00									
91+15.80	91+53.90		22.86					1	
91+25.00	91+63.10	22.86					1		
93+40.30	94+66.03	102.87			1		1		
93+40.30	94+66.03		102.87			1		1	
135+12.22	135+61.02			16					1
7+13.00	7+70.95			19					1
16+28.00	16+61.55			11					1
51+61.00	52+31.15			23					1
90+32.21	90+70.31	22.86					1		
90+42.71	90+80.81		22.86					1	
91+67.94	92+93.67	102.87			1		1		
91+67.94	92+93.67		102.87			1		1	
135+31.00	135+79.80			16					1
SUBTOTAL		251.46	251.46		2	2	4	4	
TOTAL		502.92		138	4		8		8

IRRIGATION STRUCTURES												
STATION		cubic meters		square meters	each						REMARKS	
		CLASS "DD" CONC.	RANDOM RIPRAP	GEOTEXTILE	CANAL GATE	HEAD GATE	TRASH GUARD	CHECK	TURNOUT	REMOVE IRRIGATION STRUC- TURE		
				PERM. EROS. CNTRL.								
				— SURVIVABILITY CLASS ①								
FROM	TO		CL. 1		450 mm	450 mm						
38+62		3.8	5.6	39								CANAL CHECK 30 m RT. - SEE DETAIL
41+15	42+00									1		IRR. DT. 30 m LT.
42+46											1	TURNOUT 22 m LT.
42+68		2.0	4.0	9			2					TRANSITIONS LT. &RT. *
44+21						1						LT.
44+35					1							RT.
46+74								1				LT. - SEE DETAIL
TOTAL		5.8	9.6	48	1	1	2	1	1	1		

* 600 mm CONC. INLET & OUTLET TRANS. (B = D + 300)

Irrigation Structures Frame Reminder:

① Consult with Geotechnical Section to determine Survivability and Class of Erosion Control Geotextile, based on subgrade conditions.

MEDIAN CONCRETE CURB				
STATION		meters		square meters
		MEDIAN CONCRETE CURB	REMOVE MEDIAN CURB	CONCRETE
FROM	TO	TYPE A		100 mm
16+02.94	16+12.70	44.9		72.1
16+67.07	18+10.45	288.3		239.8
20+25.31	21+94.90		340.2	
33+18.45	36+34.78	634.2		
TOTAL		967.4	340.2	311.9

Median Concrete Curb Frame Reminder:

① Reinforcing steel, expansion joint material, excavation, back fill, aggregate base, and disposal of surplus material are included in the cost of concrete.



SUMMARY



DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
7/18/2008 8:08:05 AM		
2 U 1861		

MEDIAN INLETS				
STATION	each		ADJUST MEDIAN INLET	REMARKS
	MEDIAN INLET			
	TYPE 2			
14+93.50			1	
16+74.30			1	
17+77.00	1			CENTER IN MED. & CONNECT TO W.B. CULV.
21+33.30			1	
35+53.60			1	
29+48.00			1	
TOTAL	1		5	

MISCELLANEOUS ITEMS				
STATION		lump sum	cubic meters	REMARKS
FROM	TO			
9+80.00	15+00.00		1 330	CONTAMINATED SOIL REMOVAL - STORM SEWER TRENCH
38+90		1		RESET HISTORICAL MARKER RT.
92+01		1		REVISE ROAD WEATHER INFORMATION SITE

MUCK EXCAVATION *				
STATION		cubic meters		REMARKS
FROM	TO	MUCK EXC.	SPECIAL BORROW	
		①	② ③	
15+00	25+00	12 750	16 000	
TOTAL		12 750	16 000	

* SEE DETAIL SHEET

Muck Excavation Frame Reminders:

- ① ② Measured and paid for on both Uncl. Exc. and Emb.-in-Place projects.
- ② Volumes are not adjusted by shrink factor.
- ③ Include a special provision stating the measurement of special borrow for payment is the final in-place volume.

OBLITERATE ROADWAY			
STATION		stations	REMARKS
FROM	TO	OBLIT- ERATE ROADWAY	
0+00	22+00	22	LEFT
56+00	65+00	9	RIGHT
93+00	101+50	9	RIGHT
TOTAL		40	

PAVEMENT MARKINGS				
ITEM	UNIT	INTERIM APPLICA- TION	FINAL APPLICA- TION	TOTAL
STRIPING - WHITE PAINT	liter	954		954
STRIPING - YELLOW PAINT	liter	405		405
WORDS & SYMBOLS - WHITE PAINT	liter	4		4
STRIPING - 100 mm YELLOW PLASTIC	meter		172	172
STRIPING - 600 mm WHITE PLASTIC	meter		13	13
WORDS AND SYMBOLS - WHITE PLASTIC	sq. meter		6.4	6.4
TEMPORARY PAVEMENT MARKINGS ①	kilometer			35.2
STRIPING - 100 mm WHITE EPOXY	liter		975	975
STRIPING - 100 mm YELLOW EPOXY	liter		420	420

Pavement Markings Frame Reminder:

- ① Temporary pavement markings quantities estimated by road designer; all other pavement marking quantities provided by Traffic and Safety Bureau.

PLANT MIX LINED DITCH *					
STATION		meters	tons		REMARKS
		PL. MIX LINED DITCH ①	PL. MIX SURF. GR. B ②	ASPHALT CEMENT PG 64-28 ②	
FROM	TO	237.0	42	2.5	
1+92	4+29				
TOTAL		237.0	# 42	# 2.5	

* SEE DETAIL SHEET

FOR INFORMATION ONLY

Plant Mix Lined Ditch Frame Reminder:

- ① A detail must be provided to show width and depth of plant mix.
- ② If there is other plant mix surfacing on the project, specify the same type as in the surfacing frame.

PULVERIZATION			
STATION		square meters	REMARKS
FROM	TO	PAVEMENT PULVERIZATION	
41+97.00	75+42.43	55 819	FULL WIDTH - TYP. NO. 3
75+42.43	139+11.10	168 666	FULL WIDTH - TYP. NO. 3
139+11.10	168+00.00	48 264	FULL WIDTH - TYP. NO. 3
TOTAL		272 749	

① RANDOM RIPRAP							
STATION		cubic meters		square meters		REMARKS	
		RANDOM RIPRAP		GEOTEXTILE			RIPRAP REVEGE-TATION
				PERM. EROS. CNTRL.			
				— SURVIVABILITY CLASS — ②			
FROM	TO	CL. 2	CL. 3				
57+83	58+44	338.3		558	447	RIVER BANK EMBANKMENT PROTECTION	
61+26	61+86	331.5		502	402	RIVER BANK EMBANKMENT PROTECTION	
93+26.20			581.2	832		BRIDGE END	
94+19.64			508.6	656		BRIDGE END	
138+50	139+00	232.0		362	290	RIVER BANK EMBANKMENT PROTECTION	
TOTAL		901.8	1 089.8	2 910	1 139		

Random Riprap Frame Reminder:

- ① Excavation is included in the cost of riprap.
- ② Consult with Geotechnical Section to determine Survivability and Class of Erosion Control Geotextile based on subgrade conditions.

REMOVE STRUCTURE		
STATION	lump sum REMOVE STRUC- TURE ①	REMARKS
1123+23	0.22	6.7x14.0 m WOOD STR. (P00001229+00271) ②
1160+00	0.11	6.1x7.3 m CONCRETE BOX
1192+00	0.18	6.1x12.2 m STEEL BRIDGE
1280+25	0.30	6.7x18.3 m WOOD STRUCTURE
1312+25	0.19	7.3x11.0 m STEEL BRIDGE
TOTAL	1	

Remove Structure Frame Reminders:

- ① Prorate lump sum for each structure based on square meters of bridge deck.
- ② If bridge is replaced with another structure (bridge or culvert), add NBI number in Remarks.

SUMMARY

① BRIDGE END BACKFILL					
STATION		cubic meters	square meters	REMARKS	
		BRIDGE END BACKFILL	GEOTEXTILE STABILIZATION		
FROM	TO	② ③			
86+12.50	87+62.50	4 500		BRIDGE END BENT#1	
89+03.00	90+53.00	4 500		BRIDGE END BENT#2	
TOTAL		9 000			

Bridge End Backfill Frame Reminders:

- ① Use this frame when bridge end backfill has been specified in conjunction with Geotech recommendation.
- ② Volumes are not adjusted by the shrink factor.
- ③ Include a special provision stating the measurement for payment is the final in-place volume.

REVEGETATION									
STATION		lump sum	cubic meters	hectares			REMARKS		
				REVEGE- TATION	TOPSOIL SALVAGING & PLACING *	SEED *		FERTI- LIZER *	CONDITION SEEDBED *
FROM	TO								
11+00	11+40	1	37	0.04	0.04	0.04	INCLUDES CONN. TO P.T.W.		
TOTAL		1	~	~	~	~			

* FOR INFORMATION ONLY

① ROAD LEVELER OPERATIONS			
STATION		hours	REMARKS
		ROAD LEVELER OPER- ATIONS	
FROM	TO		
1485+23	1780+56	292	
TOTAL		292	

Road Leveler Operations Frame Reminder:

- ① For dressing CTS riding course. Do not include Finish Grade Control for CTS.

RUMBLE STRIPS					
STATION		kilometers		liters	REMARKS
		① RUMBLE STRIPS		FOG SEAL SS-1 *	
		CONTINUOUS	INTERMITTENT		
FROM	TO				
231+32.46	332+86.51	10.1		1 212	E.B. LT.
231+32.46	332+86.51		9.6	1 152	E.B. RT.
231+32.46	332+86.51		9.6	1 152	W.B. LT.
231+32.46	332+86.51	10.1		1 212	W.B. RT.
SUBTOTAL		20.2	19.2	4 728	
TOTAL		39.4		~	

* FOR INFORMATION ONLY, INCLUDE IN THE COST OF RUMBLE STRIPS

Rumble Strips Frame Reminder:

- ① Deduct gaps for bridges, approaches, or ramps from length of rumble strip.

RIPRAP REVEGETATION		
STATION	square meters	REMARKS
	RIPRAP REVEGE- TATION	
34+95.70	261	LT. & RT.
35+21.18	388	LT. & RT.
TOTAL		649

SIDEWALK											
STATION		square meters								meters	REMARKS
		① CONCRETE SIDEWALK				TRUNCATED DOMES		② REMOVE SIDEWALK		WIDTH	
		100 mm		150 mm							
FROM	TO	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT		
36+08.23	37+13.46	132.7		71.7		1.8				1.6	INCL. 1-9.0 m R, 1-6.0 m R & EXTENSION
36+08.25	37+13.46		154.5		28.8		1.8			1.6	INCL. 1-9.0 m R, 1-6.0 m R
37+60.00	38+44.84	137.0		47.6		1.8				1.6	INCL. 2-6.0 m R & EXTENSIONS
37+60.00	38+44.84		103.4		44.8		1.8			1.6	INCL. 2-6.0 m R
38+75.60	39+96.00							168.8			
38+72.30	40+05.50								197.0		
SUBTOTAL		269.7	257.9	119.3	73.6	3.6	3.6	168.8	197.0		
TOTAL		527.6		192.9		7.2		365.8		~	

Sidewalk Frame Reminders:

- ① Reinforcing steel, expansion joint material, excavation, backfill, aggregate base, and disposal of surplus material are included in cost of sidewalk.
- ② If sidewalk removal is included in reconstruction cross section, sidewalk removal is included with street excavation quantity. Otherwise show removal here as a bid item.

SPECIAL BORROW ③			
STATION		cubic meters	REMARKS
		SPECIAL BORROW	
FROM	TO	② ①	
2+48.15	87+62.50	79 694	
TOTAL		79 694	

Special Borrow Frame Reminders:

- ① Volumes are not adjusted by the shrink factor.
- ② Include a special provision stating the measurement for payment is the final in-place volume.
- ③ When Special Borrow has been specified in conjunction with the Typical Section, show the Special Borrow in the Surfacing Summary Frame and not here.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

* SEE STANDARD SPEC. 709.04
⊕ STEP BEVEL
** FOR INFORMATION ONLY

* FUNDING - 50% STATE, 50% CITY
** FOR INFORMATION ONLY

Storm Drain Reminder:

① See Storm Drain agreement for funding splits.

8:02:15 AM	DESIGNED BY	DESIGNER NAME	DATE
8:02:15 AM	REVIEWED BY	SUPERVISOR NAME	DATE
8:02:15 AM	CHECKED BY	CHECKER NAME	DATE

Topsoil & Seeding Frame Reminders:

- ① Area of condition seedbed = Area 1 plus Area 3 plus sod.
- ② Area of mulch = Area 2.
- ③ Include areas up to the R/W limits except for area steeper than 1.5:1.
- ④ See Dtl. Dwg. No. 610-00 for proper placement of Topsoil and Seeding.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

SUMMARY

UNDERDRAIN							
STATION		meters		square meters	cubic meters		REMARKS
		CORR. PERF. PLASTIC PIPE	CORR. PLASTIC PIPE	GEOTEXTILE STABILIZATION	TRENCH EXC.*	FILTER MATERIAL	
FROM	TO	150 mm	100 mm				
56+30.0	60+46.5	416.5		1 206	160	160	
56+90.0	60+88.0	398.0		1 153	150	150	RIGHT
60+46.5	60+76.0	29.5		84	10	10	LEFT - CONNECTION TO 100 mm PIPE
60+88.0	62+02.0	155.5		426	60	60	RIGHT - CONNECTION TO 100 mm PIPE
60+76.0	61+06.1		31.0				LEFT - CONNECTION TO DROP INLET
62+02.0	62+16.4		11.0				RIGHT - CONNECTION TO MANHOLE
TOTAL		999.5	42.0	2 869	~	380	

* FOR INFORMATION ONLY

① WATER VALVE BOXES *					
STATION	each				REMARKS
	ADJUST WATER VALVE BOX		RESET WATER VALVE BOX		
	LEFT	RIGHT	LEFT	RIGHT	
12+23.1	1				4.8 m LEFT
14+56.3	1				4.6 m LEFT
17+89.7			1		10.0 m LEFT - RESET 5.0 m LEFT
19+25.7				1	5.8 m RIGHT - RESET 5.0 m RIGHT
SUBTOTAL	2		1	1	
TOTAL	2		2		

* FUNDING - 75% STATE, 25% CITY

Water Valve Boxes Frame Reminder:

① See Utility Agreement for funding splits.

WETLAND SITE *				
STATION		lump sum	REMARKS	
		WETLAND MITIGATION SITE		
FROM	TO			
170+70	172+70	1	RT.	
TOTAL		1		

* SEE DETAIL

① WATER LINE																						
STATION		each		meters				kg	each					meters		each				cubic meters	REMARKS	
		WATER SERVICE WITH CORPORATION STOP		PVC WATER PIPE				DUCTILE IRON FITTINGS	GATE VALVE *					STEEL CASING 9.5 THK.	SPECIAL INST. OF PIPE	CONNECTION		DIS - CONNECT EXISTING MAIN #	PLUG LINE	FIRE HYDRANT Δ		FLOWABLE FILL
				CL. 150			CL. 200							900 mm		150 mm	500 mm					
FROM	TO	25 mm		150 mm	200 mm	250 mm	500 mm		150 mm	200 mm	250 mm	450 mm	500 mm			150 mm	500 mm					
1810+12		1																				
1810+24		1																				
1811+00	1812+40	9																				
SUBTOTAL		11																				
1809+33.00	1816+82.00						780					1								1 545	FUNDING - 100% STATE	
1809+33.00														15	15						INCL. TAPPING TEE UNDER RAILROAD	
1810+72.00																						
1810+88.00											1		1									
1810+88.00	1816+82.00				622															475		
1810+95.00																2		2				
1810+98.00											1		1									
1816+82.00											1		1			1	1		1			
SUBTOTAL						622	780	1 705			3	1	3	15	15	3	1	~	1		2 020	FUNDING - 75% STATE 25% CITY
1810+60.00					20				1											1		
1810+93.00				5	15						1									1		
1811+03.00					3															1		
1812+00.00				16	22						2	2	1							2		
SUBTOTAL				21	22	38		1 596	1	2	3		1							5		
TOTAL		11		21	22	660	780	3 301	1	2	6	1	4	15	15	3	1	~	1	5	2 020	FUNDING - 100% CITY

* INCL. VALVE BOX
 Δ INCL. AUXILIARY GATE VALVES AND 1 TAPPING TEE
 # INCLUDED IN COST OF OTHER ITEMS

Water Line Frame Reminder:

① See Utility Agreement for funding splits. Trench excavation is included in cost of water pipe.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

*

[illegible]

* H. W. ELEVATIONS SHOWN ARE BASED UPON PEAK FLOW ANALYSIS UNLESS NOTED IN REMARKS COLUMN.

⚠ CSP will normally be shown in this column when pipe options are shown in the plans. If only one option is shown, that will be the material referenced in this column.

- ① STRUCTURE SIZE OR TYPE AND RELATED HYDRAULIC DATA MAY NOT REFLECT CHANGES MADE DUE TO R/W OR OTHER CONSIDERATIONS (I.E., STOCKPASS ADDED, STRUCTURE SIZE OR TYPE CHANGED, ROAD GRADE CHANGED DURING CONSTRUCTION, ETC.)
- ①A BRIDGE LENGTH SHOWN EQUALS THE WATER SURFACE WIDTH IN THE OPENING AT THE DESIGN H. W. ELEVATION MEASURED NORMAL TO FLOW.
- ② OVERTOPPING IS DEFINED AS FLOW OVER THE ROAD, FLOW THROUGH A SIGNIFICANT RELIEF STRUCTURE OR FLOW OVER THE BASIN DIVIDE WHICHEVER IS LOWER.
- ③ FOR THOSE CROSSINGS NOTED BY $Op(max)$ IN THE REMARKS COLUMN OVERTOPPING DOES NOT OCCUR AND THE FLOOD MAGNITUDE LISTED CORRESPONDS TO THE FLOOD OF SECTION 650.115(a)(1)(ii) OF FEDERAL-AID POLICY GUIDE; SUBCHAPTER G, PART 650, SUBPART A (DEC. 1991)
THE FLOOD SPECIFIED IS SUBJECT TO STATE-OF-THE-ART CAPABILITY TO ESTIMATE THE EXCEEDANCE PROBABILITY.
- ④ HIGH WATER ELEVATIONS MAY VARY SLIGHTLY DEPENDING UPON THE PIPE OPTION SELECTED.
- ⑤ PROCEDURE MEMORANDUM NO. 10, HYDRAULICS MANUAL CHAPTER 9 APPENDIX H.

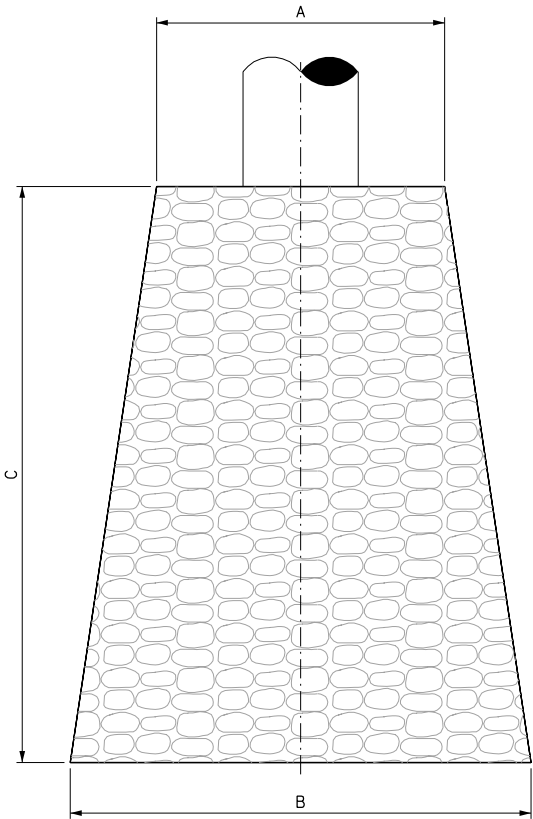
25 YEAR	4% CHANCE
50 YEAR	2% CHANCE
100 YEAR	1% CHANCE
200 YEAR	0.5% CHANCE
500 YEAR	0.2% CHANCE

FIG. 4.4 L

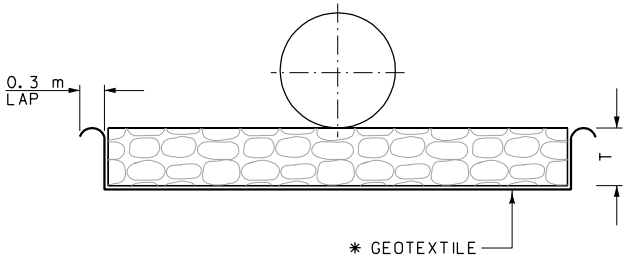
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
7/18/2008		
8:08:29 AM		
2	CPS - U1861	



PLAN VIEW



ELEVATION VIEW

MIN. T FOR
STREAM BANK EROSION BLANKET

CLASS 1 RIPRAP = 0.4 m
CLASS 2 RIPRAP = 0.8 m
CLASS 3 RIPRAP = 0.9 m

OUTLET RIPRAP APRON								
STATION	PIPE SIZE/TYPE	DIMENSIONS (m)				RIPRAP APRON (m³)	* GEOTEXTILE (m²)	REMARKS
		A	B	C	T		PERM. EROS. CNTRL. — SURVIVABILITY CLASS — ①	
12+95	2100 mm DRAIN	2.7	4.7	6.3	0.4	9.3	32.0	
35+09	DBL. 3.36 m SSPP	7.2	10.2	10.0	0.4	34.8	102.6	

Outlet Riprap Apron Reminders:

- ① Consult with Geotechnical Section to determine Survivability and Class of Erosion Control Geotextile, based on subgrade conditions.

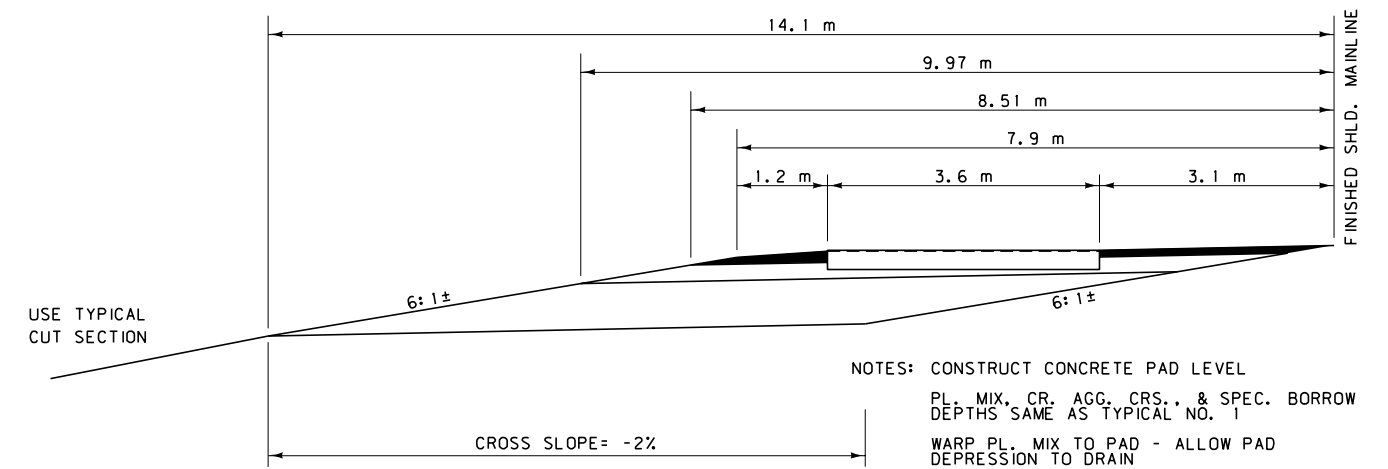
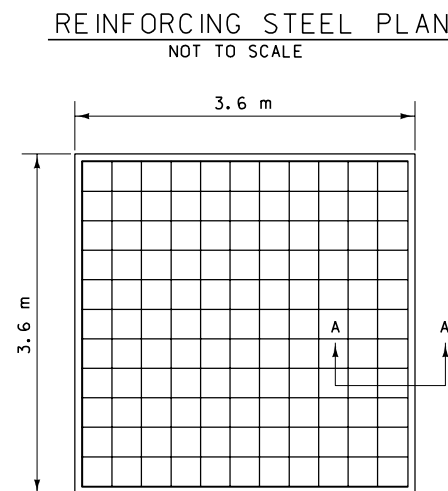
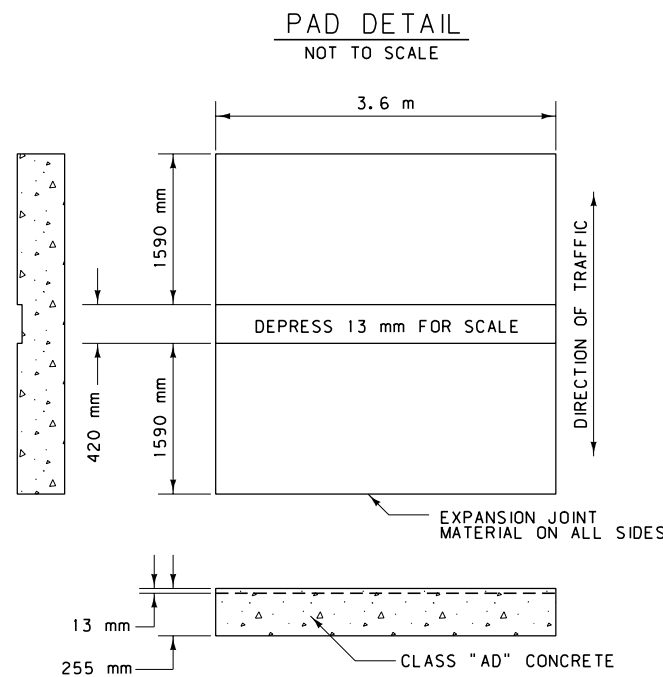
Richland Co. Line—North
Outlet Riprap Apron Detail
Richland Co.
STPS 261-2(4)28
Not To Scale

MONTANA DEPARTMENT
OF TRANSPORTATION



MONTANA
CADD

\\dgn\rman\ddrm02.dgn	DESIGNED BY	DESIGNER NAME	DATE
7/7/18/2008	REVIEWED BY	SUPERVISOR NAME	DATE
08:34 AM	CHECKED BY	CHECKER NAME	DATE
2008-07-18			



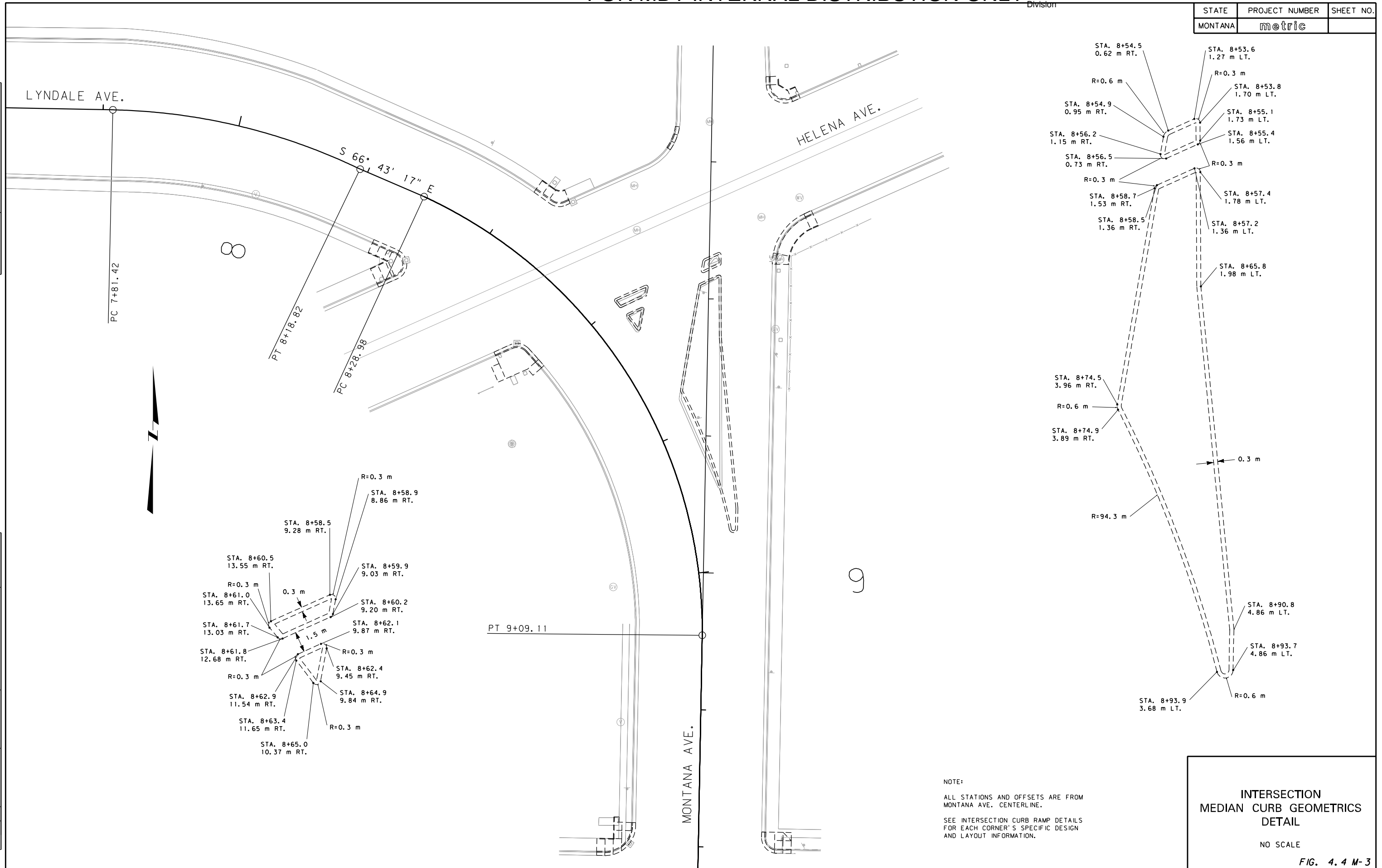
PAD QUANTITIES	
CLASS "AD" CONCRETE	3.3 m³
GR. 60 REINF. STEEL	83 kg*
EXPANSION JOINT MATERIAL	14.4 m*

DETAIL
M.C.S. SCALE SITE
TYPE "B"
STA. 356+52.80
NO SCALE

MONTANA DEPARTMENT
OF TRANSPORTATION

*MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET*

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE



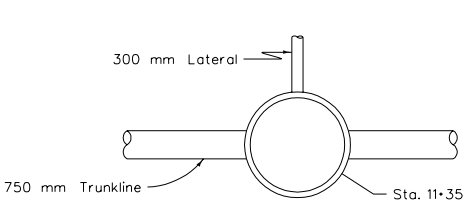
DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE



FOR MDT INTERNAL DISTRIBUTION ONLY

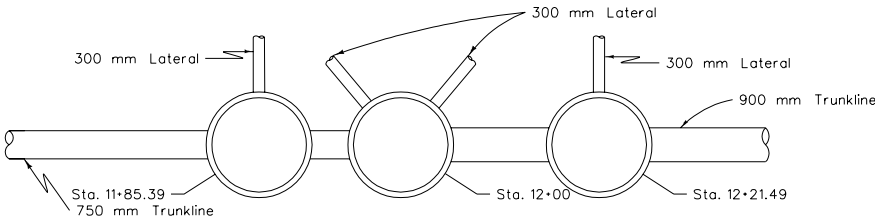
07/18/2008
Highways & Engineering
Division

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



PLAN VIEW
No Scale

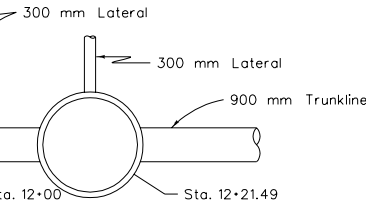
11+35 2 m RT.
1500 mm Type 3 Mn.
Rim Elev. = 1012.26
750 mm Inv. Elev. (W) = 1010.56
750 mm Inv. Elev. (E) = 1010.55
300 mm Inv. Elev. (N) = 1010.93



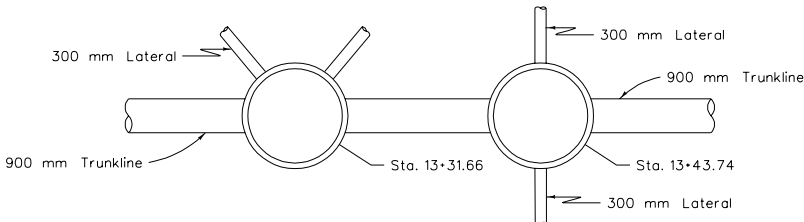
PLAN VIEW
No Scale

11+85.39 2 m RT.
1500 mm Type 3 Mn.
Rim Elev. = 1012.14
750 mm Inv. Elev. (W) = 1010.44
750 mm Inv. Elev. (E) = 1010.41
300 mm Inv. Elev. (N) = 1010.53

12+00 2 m RT.
1650 mm Type 3 Mn.
Rim Elev. = 1012.11
750 mm Inv. Elev. (W) = 1010.38
900 mm Inv. Elev. (E) = 1010.23
300 mm Inv. Elev. (NE) = 1010.40
300 mm Inv. Elev. (NW) = 1010.43



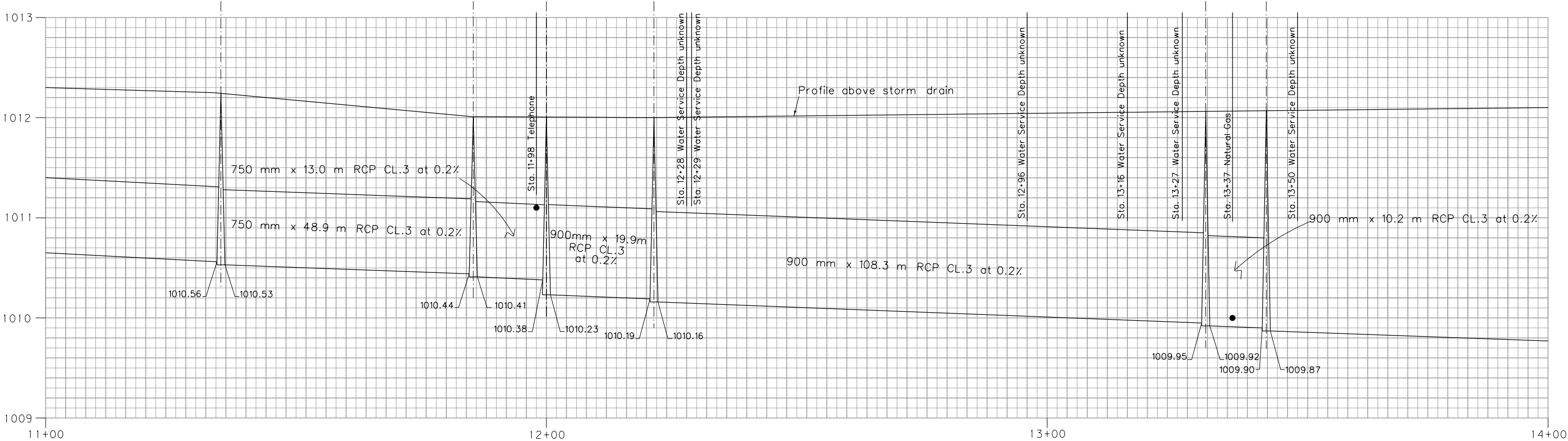
12+21.49 2 m RT.
1500 mm Type 3 Mn.
Rim Elev. = 1012.13
900 mm Inv. Elev. (W) = 1010.19
900 mm Inv. Elev. (E) = 1010.16
300 mm Inv. Elev. (S) = 1010.25



PLAN VIEW
No Scale

13+31.66 2 m RT.
2250 mm Type 3 Mn.
Rim Elev. = 1012.08
900 mm Inv. Elev. (W) = 1009.95
900 mm Inv. Elev. (E) = 1009.92
300 mm Inv. Elev. (N) = 1010.00

13+43.74 2 m RT.
1500 mm Type 3 Mn.
Rim Elev. = 1012.10
900 mm Inv. Elev. (W) = 1009.90
900 mm Inv. Elev. (E) = 1009.87
300 mm Inv. Elev. (N) = 1009.98
300 mm Inv. Elev. (S) = 1009.98



CENTRAL AVE. W.
STORM DRAIN PROFILE
3RD AVE. TO 9TH ST.

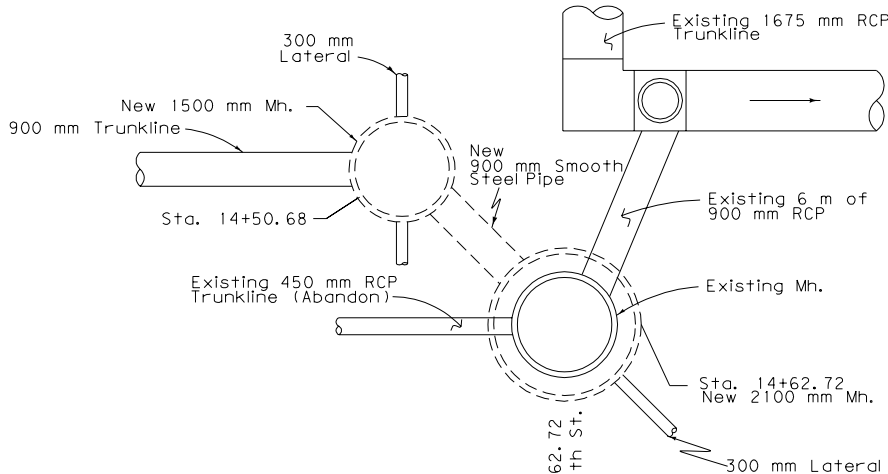
Scale: 1:200 vertical
1:400 horizontal

FIG. 4.4 M-4

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
DATE	DATE	DATE



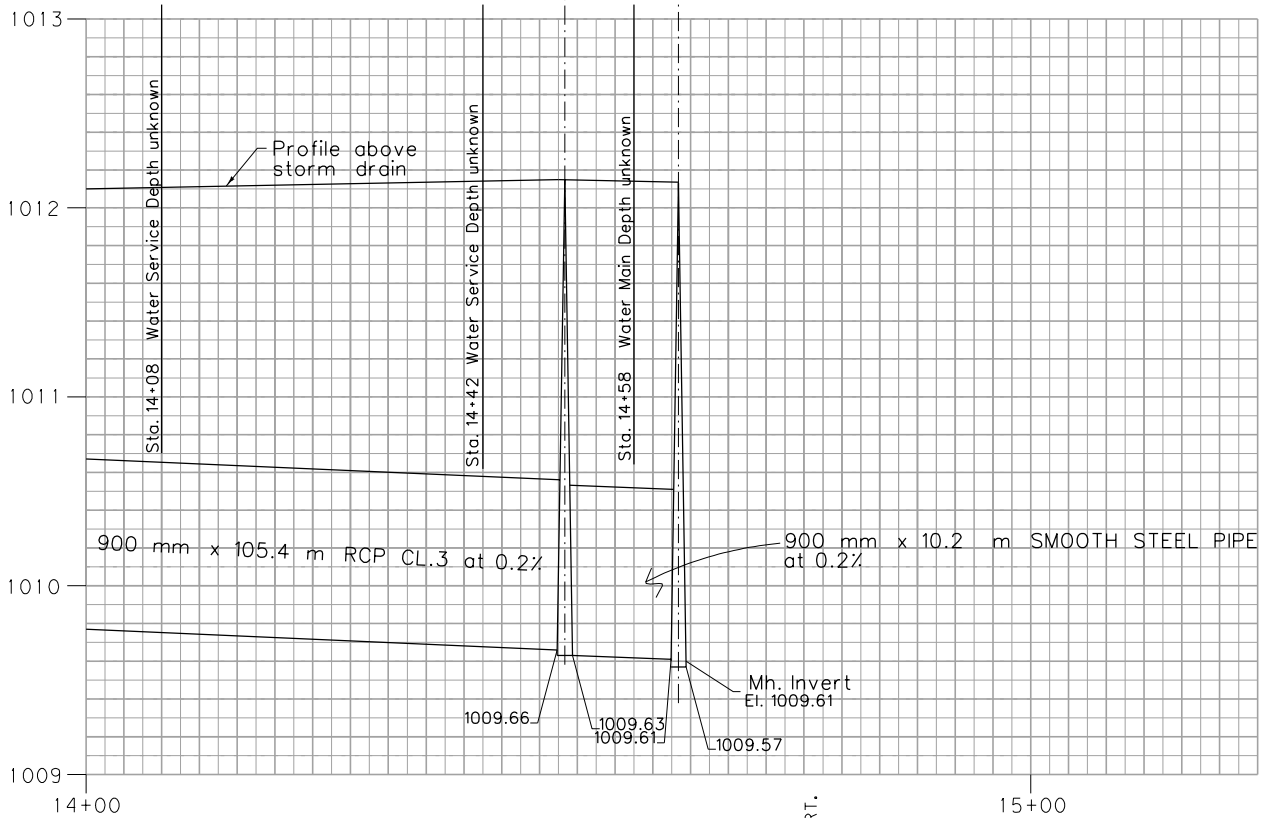
PLAN VIEW
No Scale

14+50.68 8.79 m LT. (N)
Type IV Drop Inlet
W/ 3 m Slotted Drain
Grate Elev. = 1011.86
300 mm Inv. Elev. = 1010.79

14+50.68 11.19 m RT. (S)
Type IV Drop Inlet
W/ 3 m Slotted Drain
Grate Elev. = 1011.88
300 mm Inv. Elev. = 1010.48
(See Note #5)

14+74.75 9.96 m LT. (N)
Type IV Drop Inlet
W/ 3 m Slotted Drain
Grate Elev. = 1011.97
300 mm Inv. Elev. = 1010.91

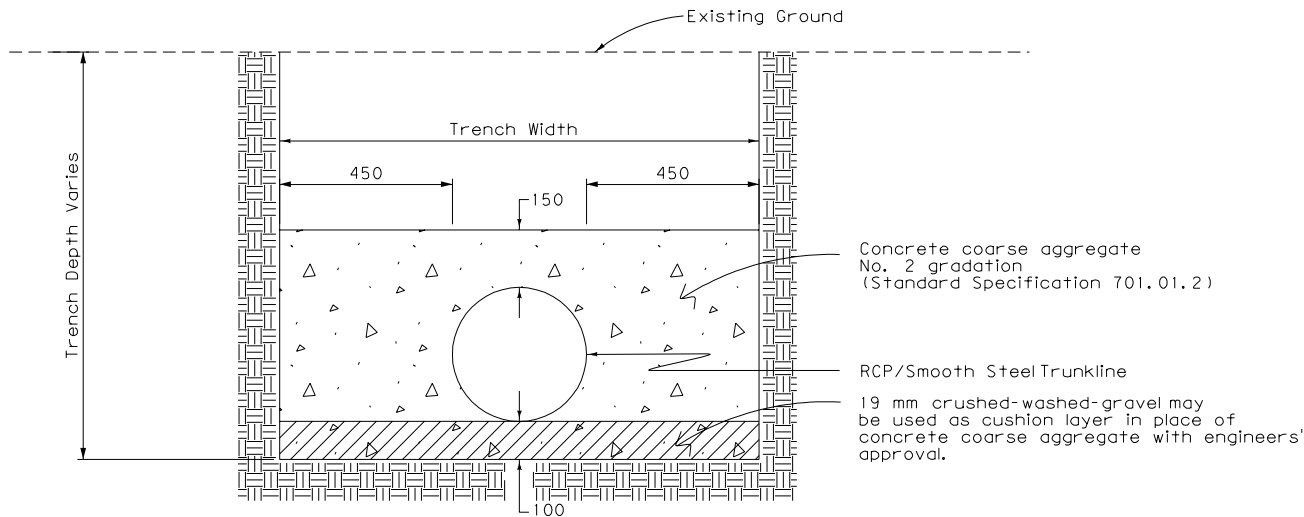
14+74.78 9.98 m RT. (S)
Type IV Drop Inlet
W/ 3 m Slotted Drain
Grate Elev. = 1011.89
300 mm Inv. Elev. = 1009.87
(See Note #5)



14+50.68 2 m RT.
1500 mm Type 3 Mh.
Rim Elev. = 1012.15
900 mm Inv. Elev. (W) = 1009.66
900 mm Inv. Elev. (E) = 1009.63
300 mm Inv. Elev. (N) = 1009.71
300 mm Inv. Elev. (S) = 1009.71

14+62.72 4.46 m RT.
New 2100 mm Type 3 Mh.
Remove 1200 mm Type 3 Mh.
Rim Elev. = 1012.01
900 mm Inv. Elev. (W) = 1009.61
900 mm Inv. Elev. (NE) = 1009.57
300 mm Inv. Elev. (SE) = 1010.75

14+66.90 Existing Mh. 2.35 m RT.



TRUNKLINE / LATERAL BEDDING DETAIL

No Scale

- See Detailed Drawing No. 604-04 & 604-06 for MDT Type IV Drop Inlet.
- Minimum slope on 300 mm RCP laterals from inlets to manholes shall be 0.0075 m/m min.
- Use irrigation class RCP for the trunkline.
- Use 300 mm irrigation class RCP for laterals.
- At Sta. 13+43.74 RT. to 14+50.68 RT., Use AWWA C200 Steelwater pipe with a thickness of 13 mm (See Standard Specifications 709.01.2). All welding will be done in accordance to Standard Specifications 556.03.10.
- Maximum cushion layer thickness shall be 100 mm. Keep cushion layer moist until backfill begins.

Mh. Station	① Edge to Edge length	② Center To Center Length
8+17.75	55.8 m	57.3 m
8+75	51.3 m	53.7 m
9+28.75	13.3 m	14.8 m
9+43.59	57.9 m	59.4 m
10+03	55.3 m	56.8 m
10+59.83	73.7 m	75.2 m
11+35	48.9 m	50.4 m
11+85.39	13.0 m	14.6 m
12+00	19.9 m	21.5 m
12+21.49	108.3 m	110.2 m
13+31.66	10.2 m	12.1 m
13+43.74	③ 105.4 m	③ 106.9 m
14+50.68	10.2 m	12.0 m
14+62.72		

Storm Drain Reminders:

- ① RCP will normally be specified for laterals.
- ② Bedding is generally not required for laterals unless specified by Hydraulics.

- ① Inside edge to inside edge of manhole used for slope.
- ② Center to center of manhole - bid length.
- ③ AWWA C200 Steelwater pipe with a thickness of 13 mm. (See Standard Specifications 709.01.2). All welding will be done in accordance to Standard Specifications 556.03.10.

CENTRAL AVE. W.
STORM DRAIN PROFILE
3RD AVE. TO 9TH ST.

Scale: 1:200 Vertical
1:400 Horizontal

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

MASS DIAGRAM

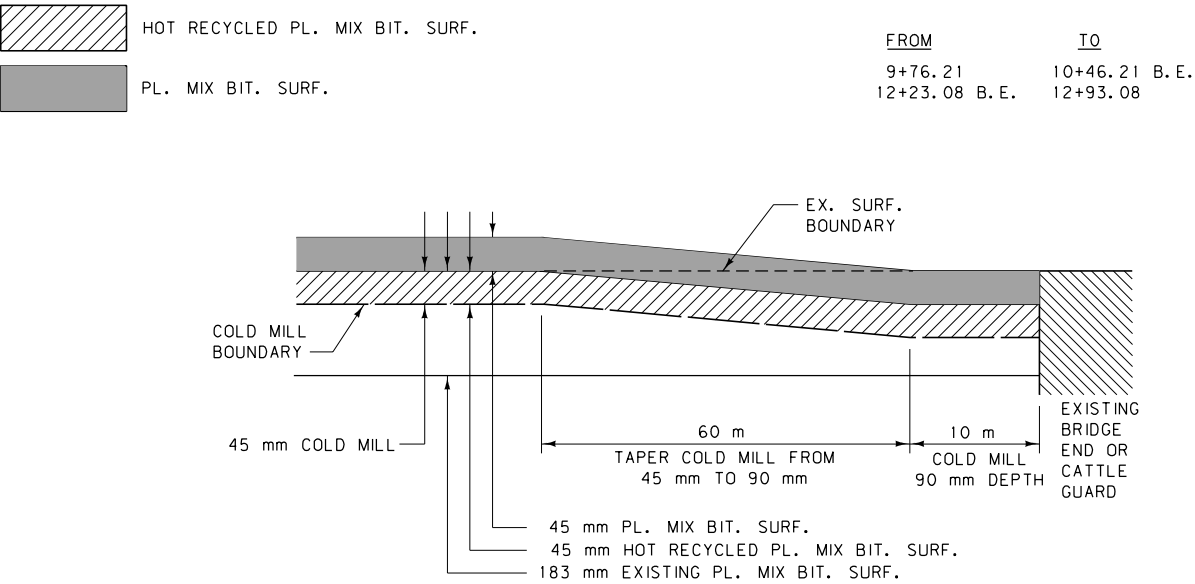


MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

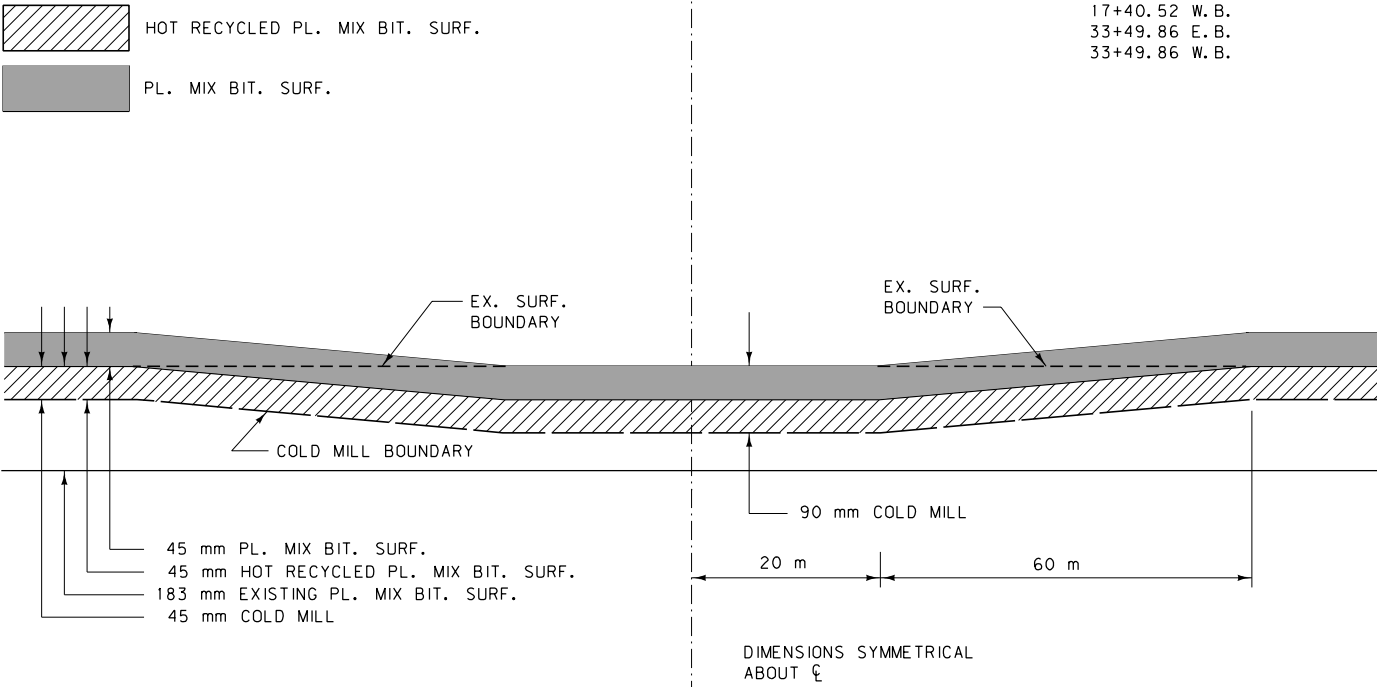
DESIGNER NAME	DATE
7/18/2008	
SUPERVISOR NAME	DATE
7/18/2008	
CHECKER NAME	DATE
7/18/2008	

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

BRIDGE ENDS & CATTLE GUARDS

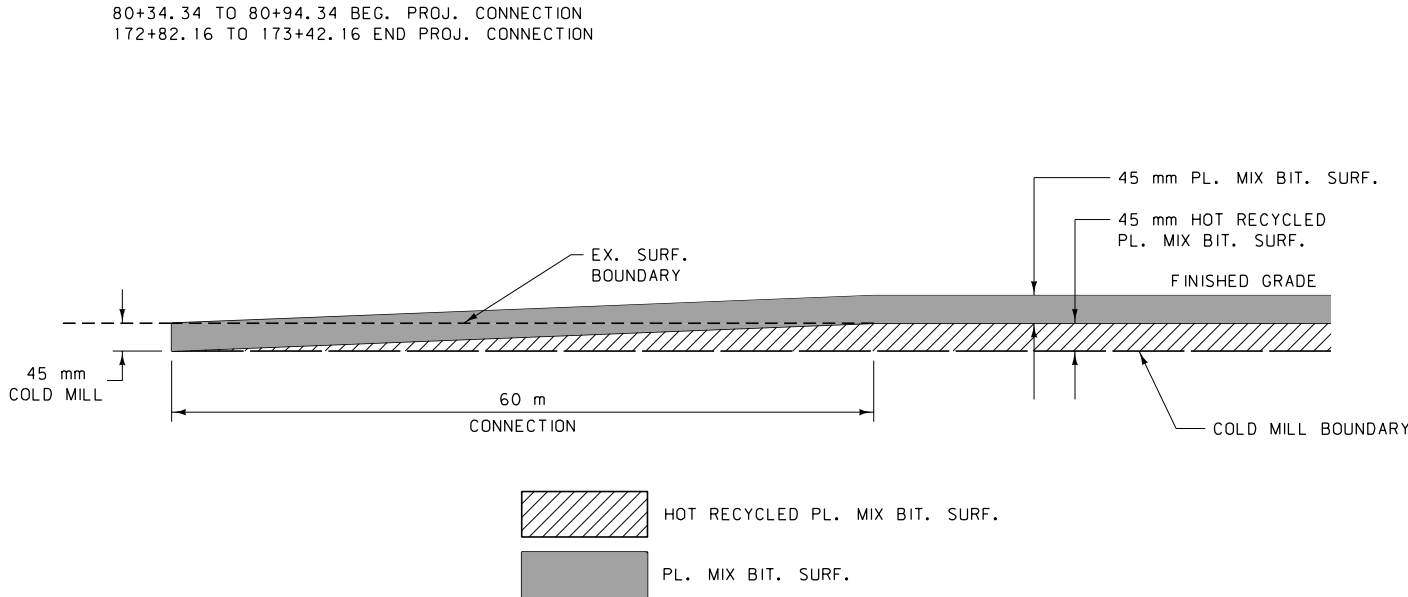


OVERHEAD STRUCTURES



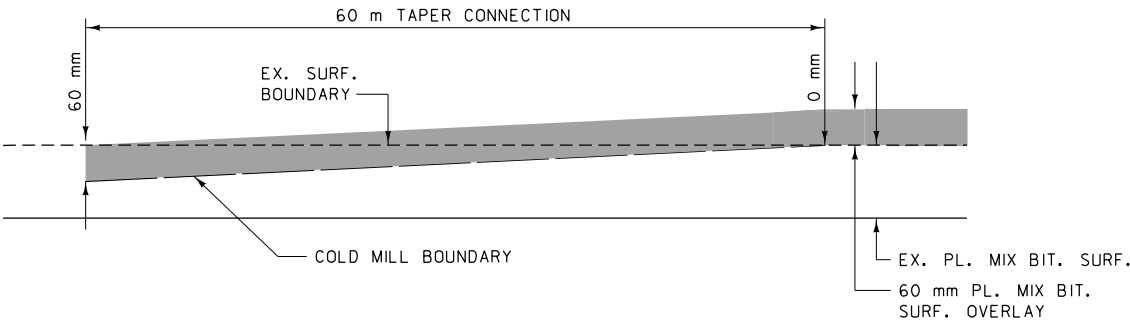
ℓ OF OVERHEAD STRUCTURE STATIONS
17+35.93 E.B.
17+40.52 W.B.
33+49.86 E.B.
33+49.86 W.B.

CONNECTIONS



CONNECTIONS

2+24.97 TO 2+84.97 BEG. PROJ. CONNECTION
35+56.64 TO 36+16.64 END PROJ. CONNECTION

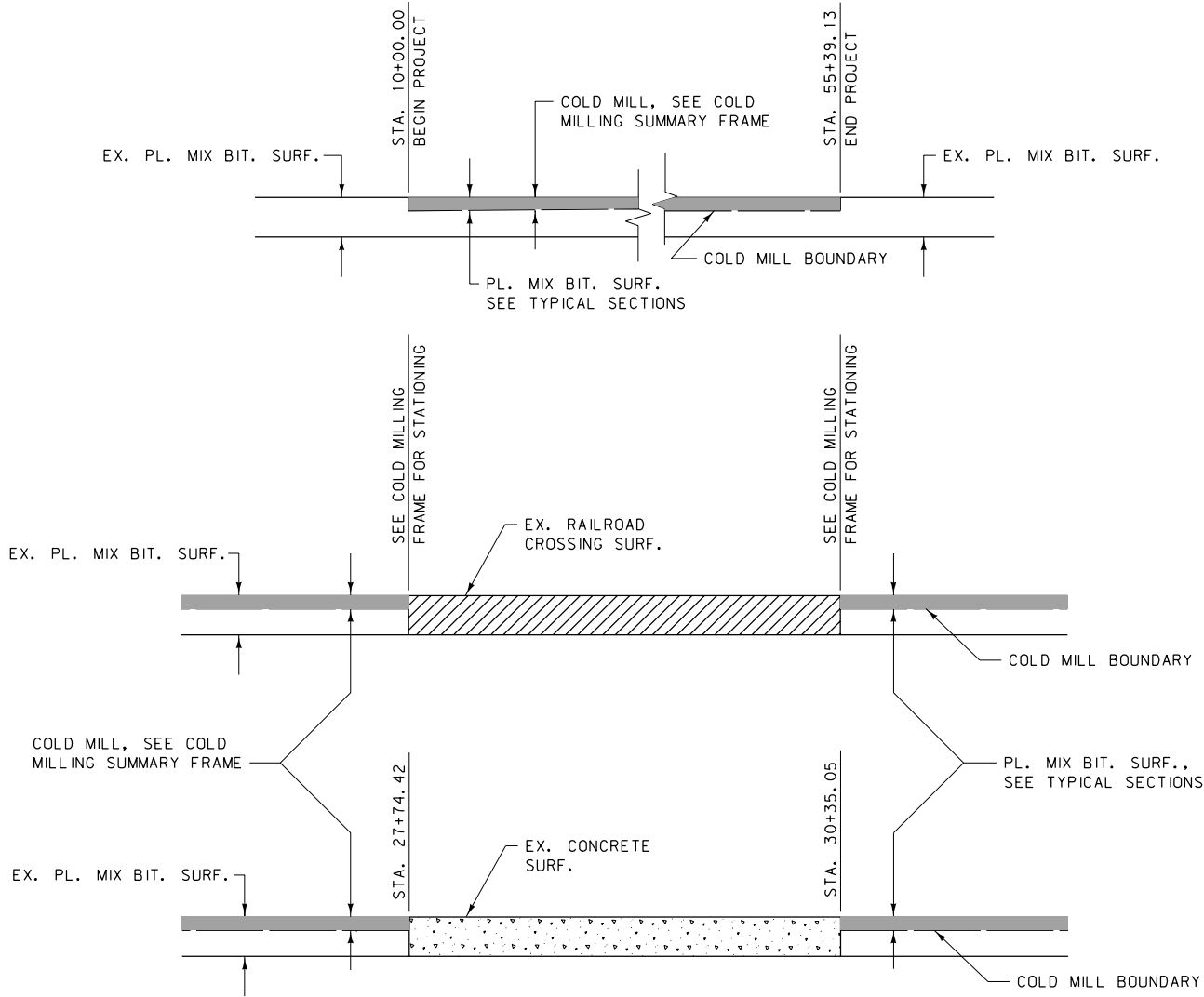


(Typical Rural Project Examples)

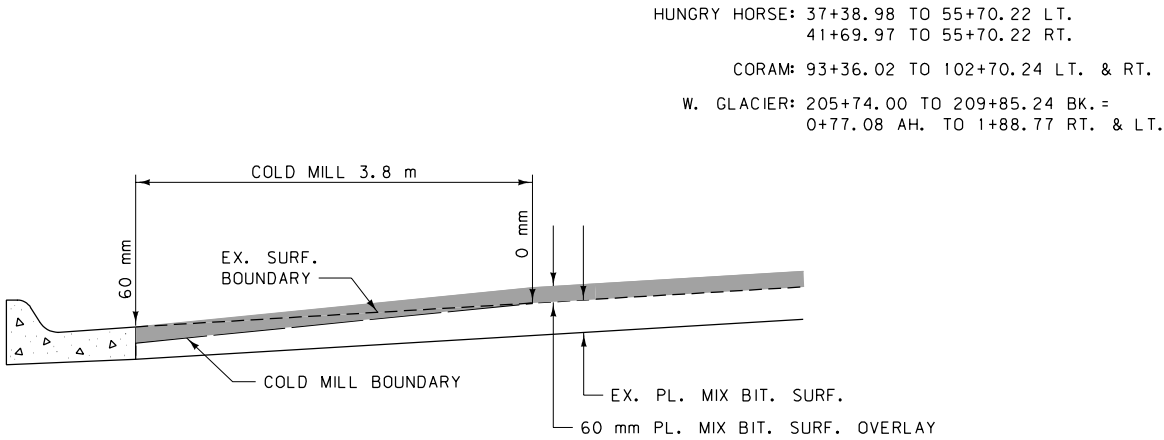
COLD MILLING
DETAILS
NO SCALE

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

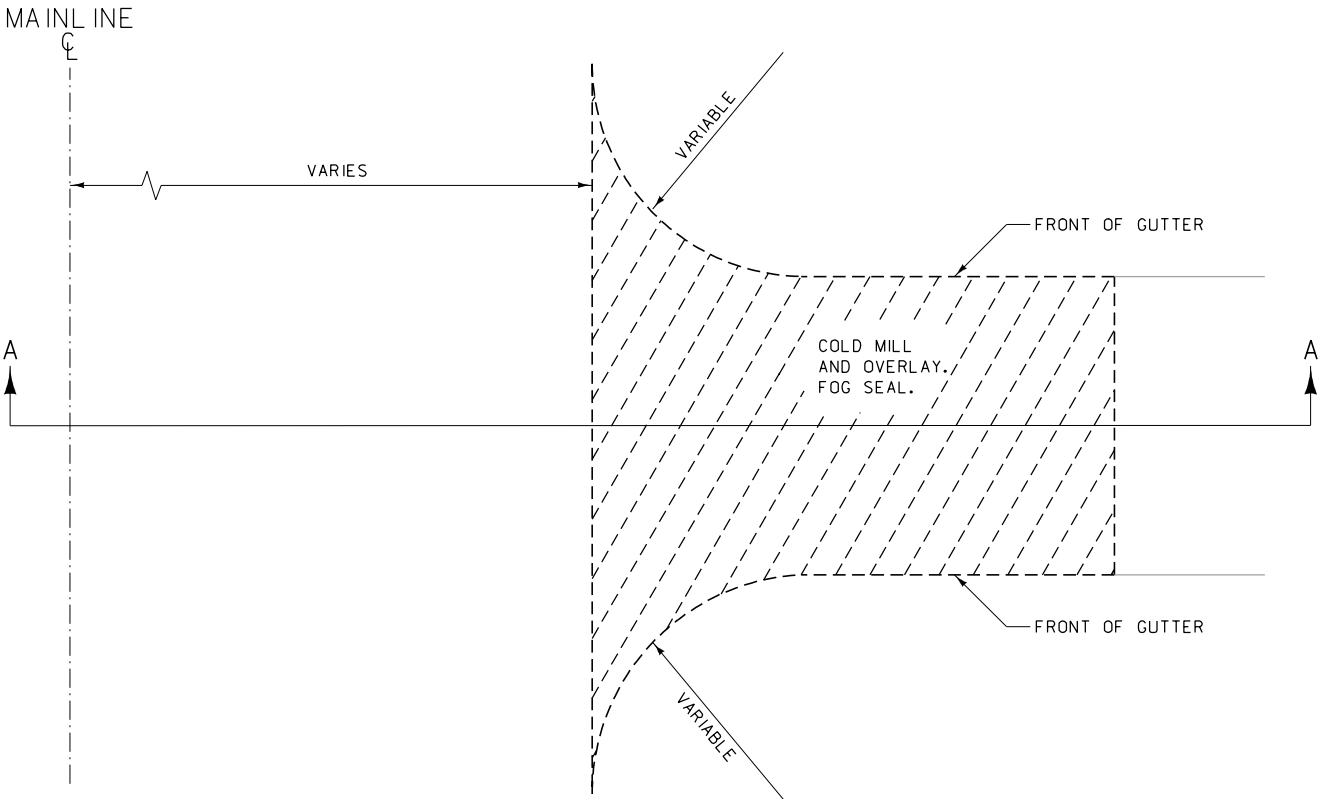
MAINLINE COLD MILLING DETAILS



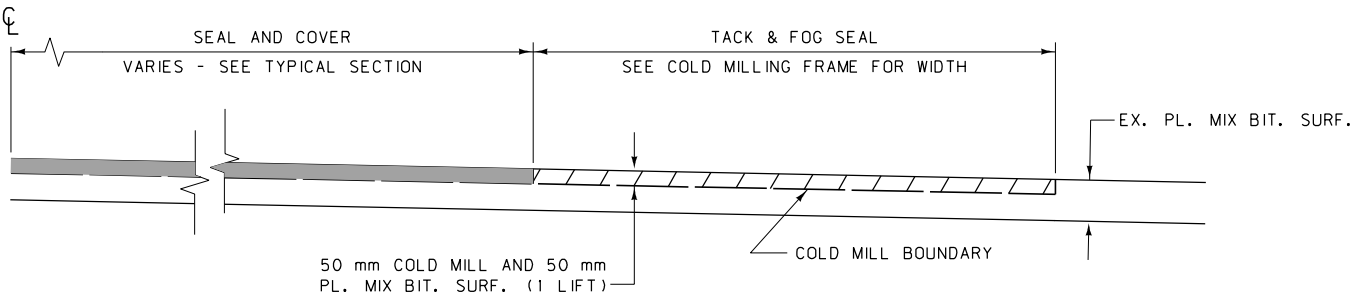
CURB & GUTTER SHOULDER COLD MILLING DETAIL



STREET INTERSECTION COLD MILLING AND SURFACING DETAIL



SECTION A-A

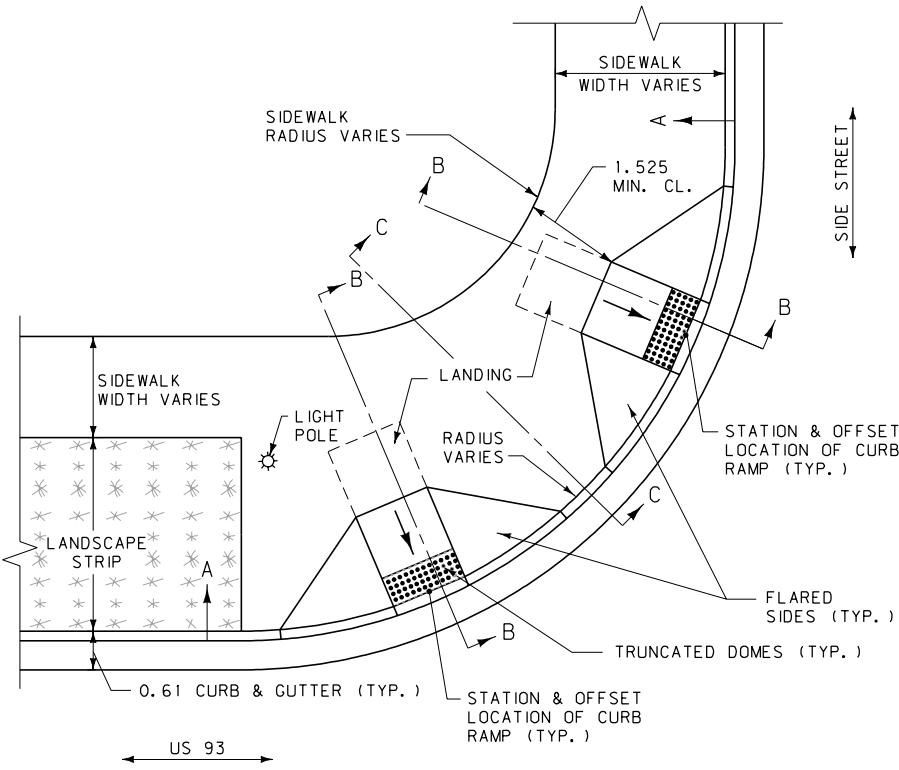


(Typical Urban Project Examples)

COLD MILLING
DETAILS
NO SCALE

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

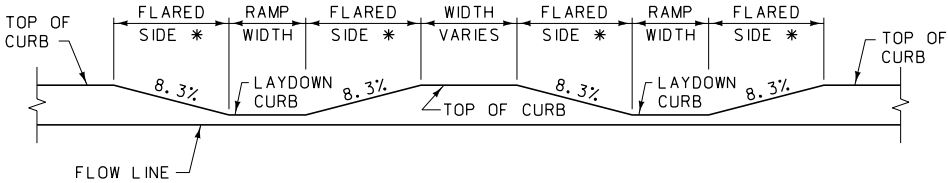
DIAGONAL PERPENDICULAR CURB RAMP DETAILS
US 93



PLAN

NEW CONSTRUCTION REQUIREMENTS:

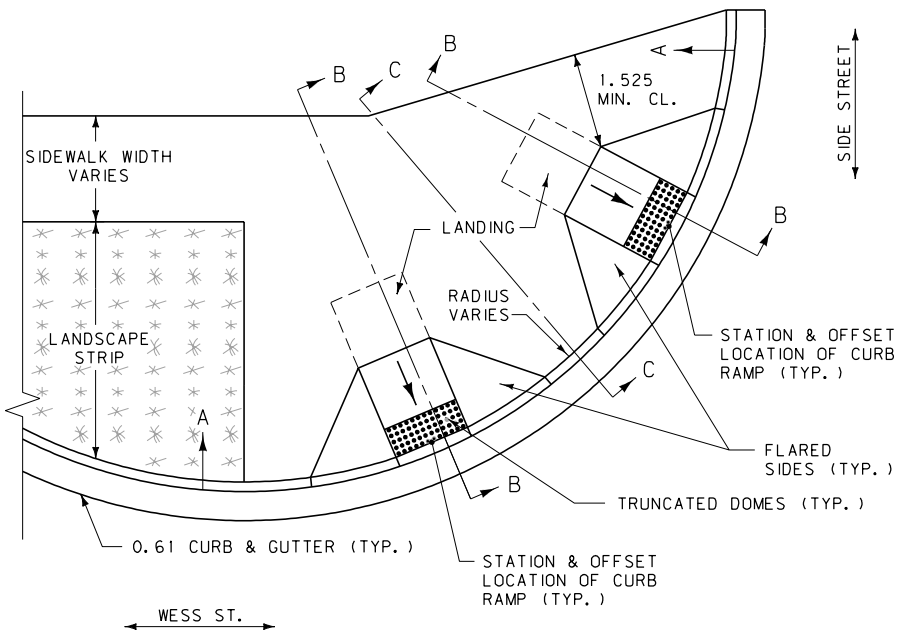
1. THE MINIMUM LENGTH OF THE LANDING IS 1525 mm.
2. THE DESIRABLE SLOPE FOR THE CURB RAMP IS 5% (1:20) OR FLATTER. THE MAXIMUM CURB RAMP SLOPE IS 8.3% (1:12).
3. THE DESIRABLE CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 1.5% (1:66.7). THE MAXIMUM CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 2% (1:50).
4. THE DESIRABLE SLOPE OF THE FLARED SIDE OF THE CURB RAMP IS 8.3% (1:12) OF FLATTER. THE MAXIMUM FLARED SIDE SLOPE IS 10% (1:10).
5. PROVIDE TRUNCATED DOMES ON THE BOTTOM 0.61 meters OF EACH RAMP AS SHOWN. SEE DTL. DWG. NO. 608-40 FOR TRUNCATED DOMES DETAILS.
6. FOR ADDITIONAL DETAILS, SEE DTL. DWG. NO. 608-25, 608-35, AND 609-05.



* ADJUST FLARED SIDE LENGTH AS NEEDED TO MAINTAIN DESIRABLE SLOPES

SECTION A-A

DIAGONAL PERPENDICULAR CURB RAMP DETAILS
WESS ST.

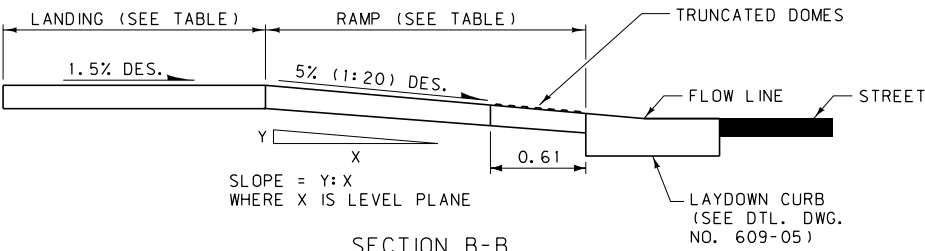


PLAN

STATION US 93	OFFSET (m)	RAMP AND TRUNCATED DOME WIDTH (m)	RAMP LENGTH (m)	RAMP DESIGN SLOPE (%)	LANDING LENGTH (m)
288+55.00	6.66 RT.	1.525	3.1	5.0	1.525
288+58.12	6.86 LT.	1.525	3.1	5.0	1.525
288+60.04	11.68 RT.	1.525	2.1	7.5	1.525
288+62.78	11.60 LT.	1.525	2.1	7.5	1.525
290+29.48	6.93 LT.	1.525	2.6	6.0	1.525
290+29.48	6.93 RT.	1.525	2.6	6.0	1.525
290+34.13	10.57 LT.	2.400	1.9	8.3	1.525
290+34.13	10.57 RT.	1.525	1.9	8.3	1.525
290+45.87	10.57 LT.	2.400	1.9	8.3	1.525
290+45.87	10.57 RT.	1.525	1.9	8.3	1.525
290+50.50	6.93 LT.	1.525	2.4	6.5	1.525
290+50.50	6.93 RT.	1.525	2.4	6.5	1.525
291+45.20	6.93 LT.	1.525	2.4	6.5	1.525
291+45.20	6.93 RT.	1.525	2.2	7.0	1.525
291+49.80	10.57 LT.	1.525	2.6	6.0	1.525
291+49.80	10.57 RT.	1.525	2.2	7.0	1.525

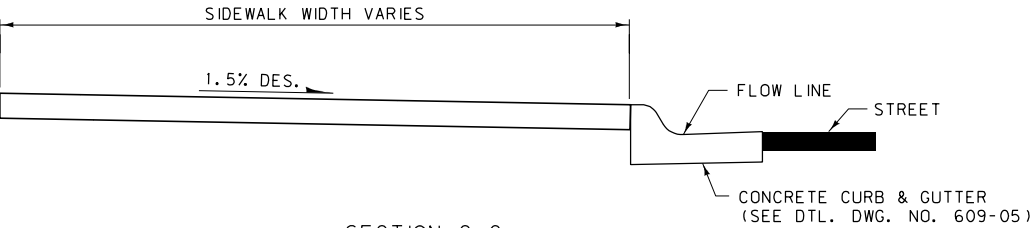
NOTES:

1. ALL DIMENSIONS ARE METERS (m) UNLESS OTHERWISE NOTED.
2. SEE SIDEWALK SUMMARY FRAME FOR WIDTHS OF SIDEWALK.
3. SEE PLAN & PROFILE SHEETS AND GEOMETRIC DETAILS FOR RADII OF CURB & GUTTER AND SIDEWALK.



SECTION B-B

STATION WESS ST.	OFFSET (m)	RAMP AND TRUNCATED DOME WIDTH (m)	RAMP LENGTH (m)	RAMP DESIGN SLOPE (%)	LANDING LENGTH (m)
0+09.97	4.67 LT.	1.525	3.1	5.0	1.525
0+10.25	4.72 RT.	1.525	3.1	5.0	1.525
0+14.63	8.88 LT.	1.525	2.2	7.0	1.525
0+14.91	9.06 RT.	1.525	2.2	7.0	1.525
0+71.50	5.03 LT.	1.525	2.4	6.5	1.525
0+71.50	5.03 RT.	1.525	2.4	6.5	1.525
0+75.33	8.68 LT.	2.400	2.1	7.5	1.525
0+75.33	8.68 RT.	1.525	2.1	7.5	1.525
0+85.71	8.68 LT.	2.400	2.2	7.0	1.525
0+89.53	5.03 LT.	1.525	2.6	6.0	1.525



SECTION C-C

(Typical New Construction Example)

DIAGONAL
PERPENDICULAR
CURB RAMP
DETAILS
NO SCALE

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

ISOMETRIC

100 mm WIDE
CONCRETE
RETAINING WALL

HIGH SIDE
RAMP LENGTH

LANDING
WIDTH

LOW SIDE
RAMP LENGTH

CONC. SIDEWALK

1.5% DES.

5% (1:20)
DESIRABLE

1.5% DES.

5% (1:20)
DESIRABLE

2% (MAX.)

STREET SLOPE

TRUNCATED DOMES (TYP.)

B

B

SIDEWALK WIDTH
VARIES

ISOMETRIC

STREET SLOPE	RAMP LENGTH (m)			
	AT 8.3% SLOPE		AT 5% SLOPE	
	LOW SIDE	HIGH SIDE	LOW SIDE	HIGH SIDE
0.00 %	1.5	1.5	2.5	2.5
1.00 %	1.4	1.8	2.1	3.2
2.00 %	1.3	2.0	1.8	4.2
3.00 %	1.1	2.5	1.5	6.7
4.00 %	0.9	3.3	1.3	-
5.00 %	0.8	4.5	1.1	-

1. THE MINIMUM WIDTH OF THE LANDING IS 1525 mm.
2. THE DESIRABLE SLOPE FOR THE CURB RAMP IS 5% (1:20) OR FLATTER. THE MAXIMUM CURB RAMP SLOPE IS 8.3% (1:12).
3. THE DESIRABLE CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 1.5% (1:66.7). THE MAXIMUM CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 2% (1:50).
4. PROVIDE TRUNCATED DOMES ON THE BOTTOM 0.61 meters OF EACH LANDING AS SHOWN. SEE DTL. DWG. NO. 608-40 FOR TRUNCATED DOMES DETAILS.
5. FOR ADDITIONAL DETAILS, SEE DTL. DWG. NO. 608-30 AND 609-05.

1. ALL DIMENSIONS ARE METERS (m) UNLESS OTHERWISE NOTED.
2. SEE SIDEWALK SUMMARY FRAME FOR WIDTHS OF SIDEWALK.
3. SEE PLAN & PROFILE SHEETS FOR RADII OF CURB & GUTTER.
4. THE COST OF THE RETAINING WALL IS INCLUDED IN THE UNIT PRICE BID FOR CONCRETE SIDEWALK.

PROFILE

* RAMP LENGTHS ARE FIGURED ASSUMING A 1.525 m LANDING WIDTH AT THE TOP BACK OF CURB. WHEN WIDTHS OTHER THAN THIS ARE USED, MAKE THE NECESSARY ADJUSTMENTS TO THE RAMP LENGTHS TO ACHIEVE THE DESIRED SLOPES.

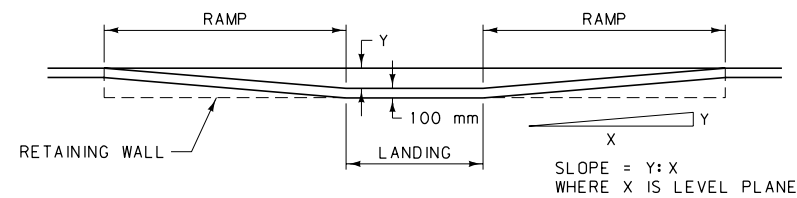
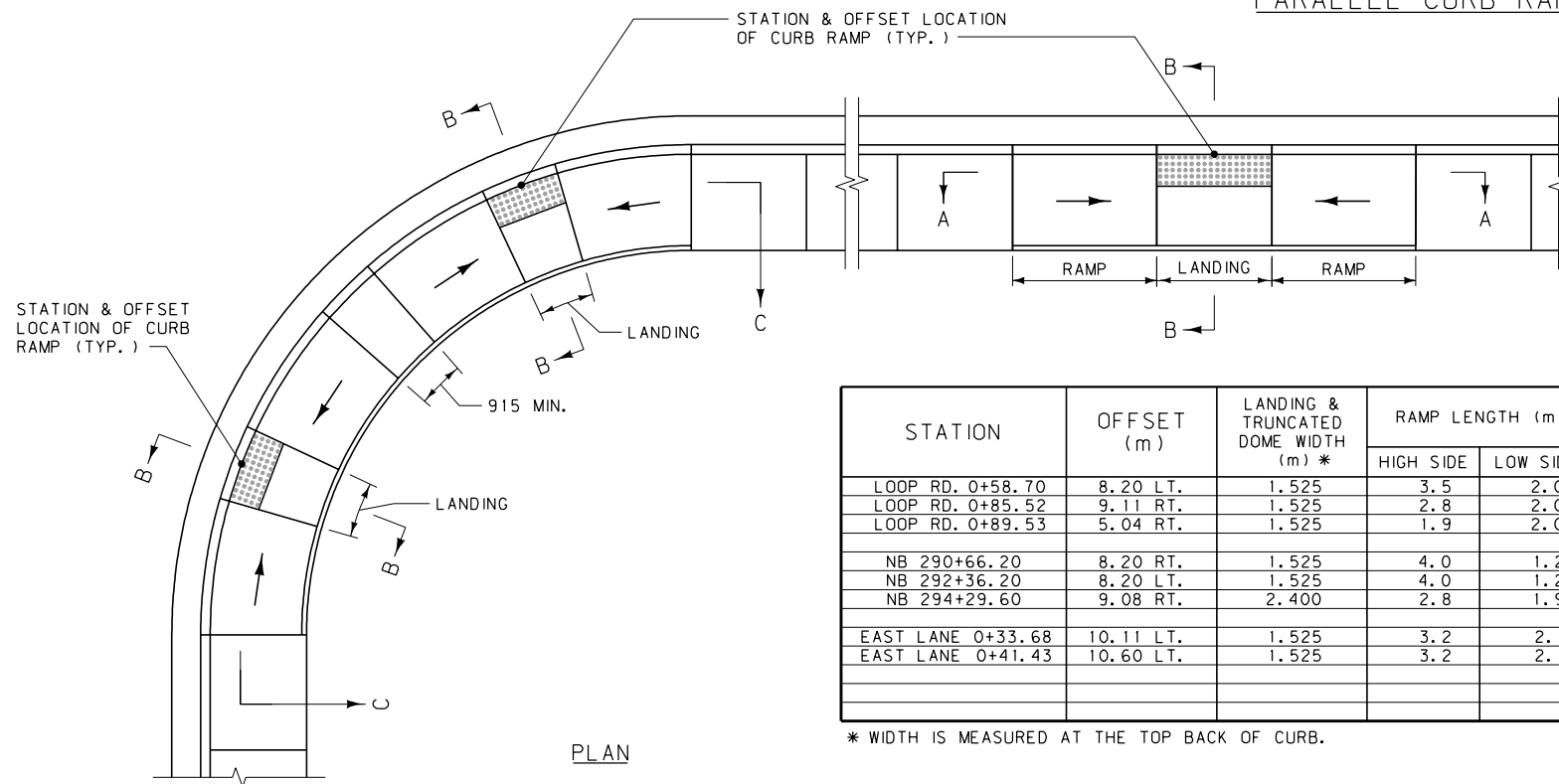
(Typical New Construction Example)

PARALLEL CURB RAMP DETAILS

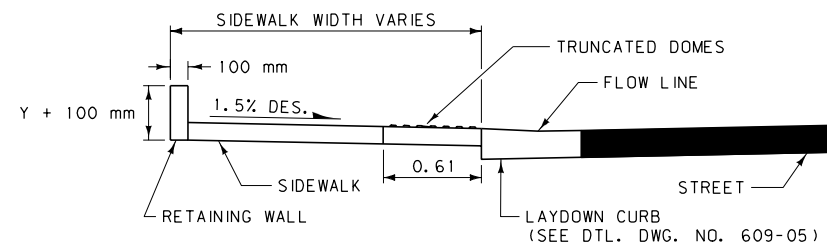
NO SCALE

FIG. 4.4M-10B

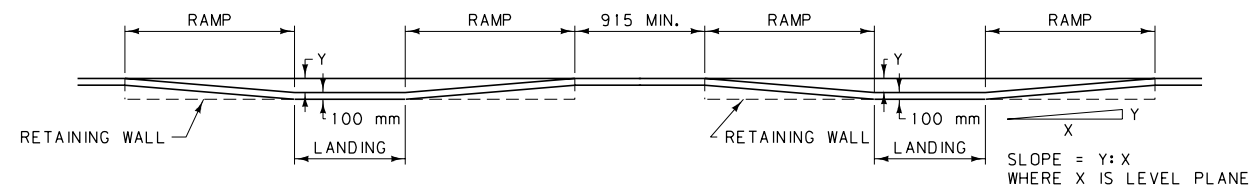
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7/7/18/2008	REVIEWED BY	SUPERVISOR NAME	DATE
8:09:14 AM	CHECKED BY	CHECKER NAME	DATE
3			



SECTION A-A



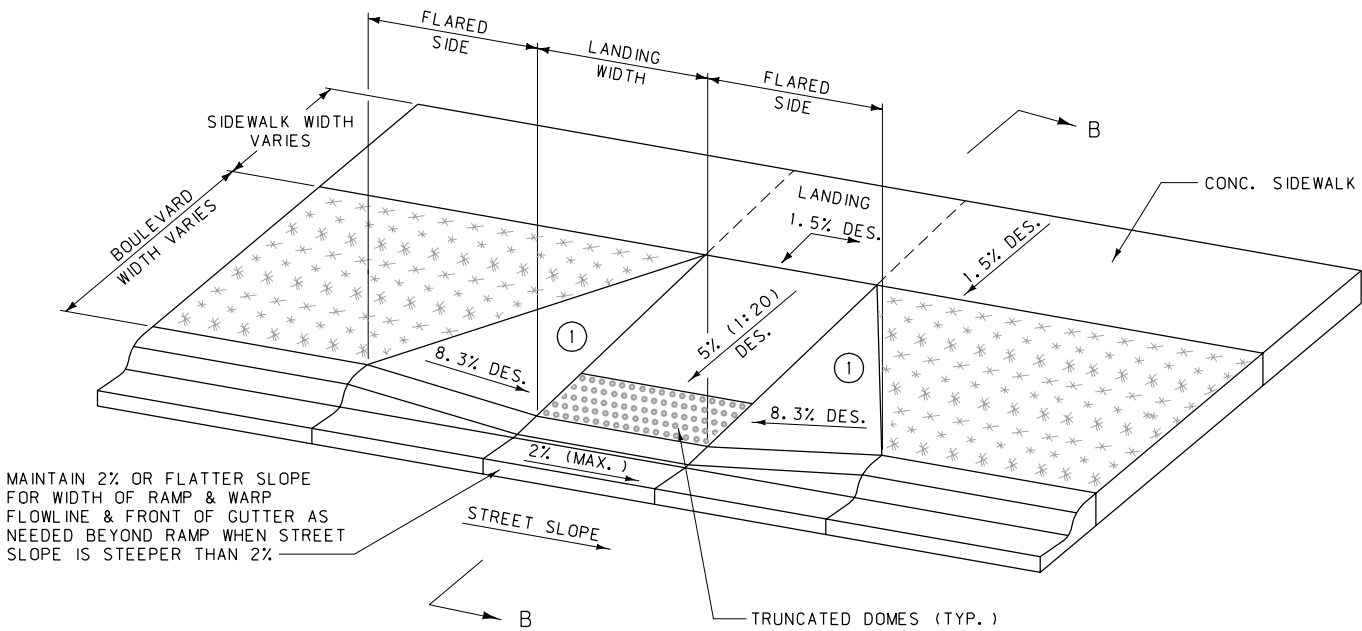
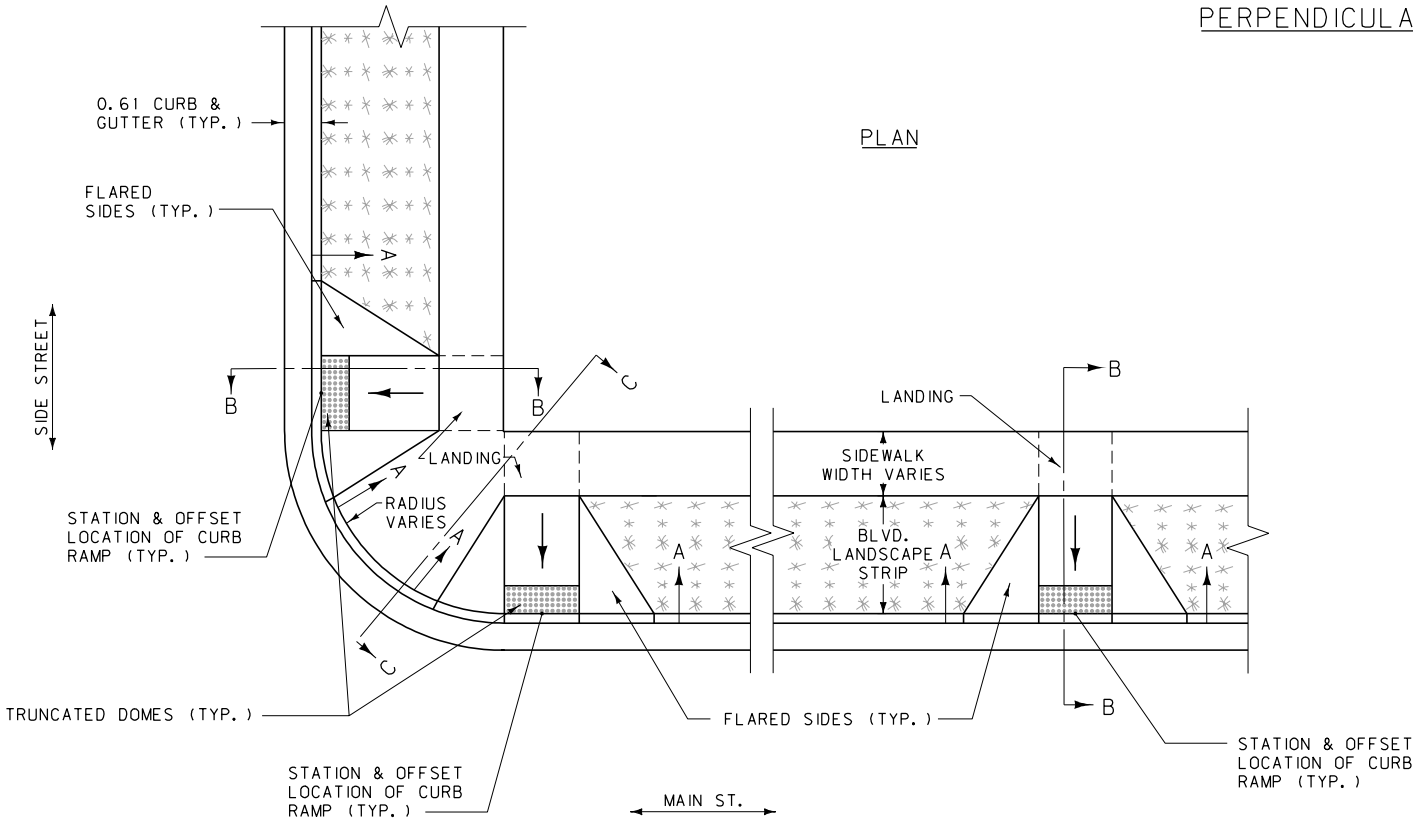
SECTION B-B



SECTION C-C

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

PERPENDICULAR CURB RAMP DETAILS



MAINTAIN 2% OR FLATTER SLOPE FOR WIDTH OF RAMP & WARP FLOWLINE & FRONT OF GUTTER AS NEEDED BEYOND RAMP WHEN STREET SLOPE IS STEEPER THAN 2%

Reminder:

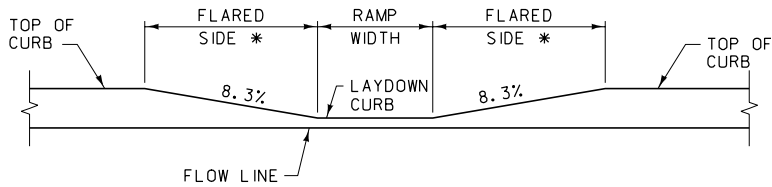
- ① Flared sides can be constructed using concrete or boulevard material,

NEW CONSTRUCTION REQUIREMENTS:

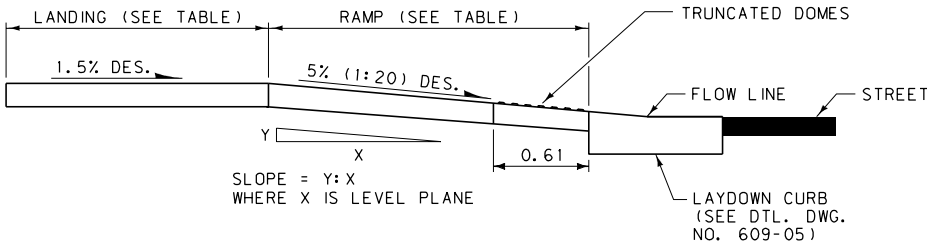
1. THE MINIMUM LENGTH OF THE LANDING IS 1525 mm.
2. THE DESIRABLE SLOPE FOR THE CURB RAMP IS 5% (1:20) OR FLATTER. THE MAXIMUM CURB RAMP SLOPE IS 8.3% (1:12).
3. THE DESIRABLE CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 1.5% (1:66.7). THE MAXIMUM CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 2% (1:50).
4. THE DESIRABLE SLOPE OF THE FLARED SIDE OF THE CURB RAMP IS 8.3% (1:12) OF FLATTER. THE MAXIMUM FLARED SIDE SLOPE IS 10% (1:10).
5. PROVIDE TRUNCATED DOMES ON THE BOTTOM 0.61 METERS OF EACH RAMP AS SHOWN. SEE DTL. DWG. NO. 608-40 FOR TRUNCATED DOMES DETAILS.
6. FOR ADDITIONAL DETAILS, SEE DTL. DWG. NO. 608-25, 608-35, AND 609-05.

NOTES:

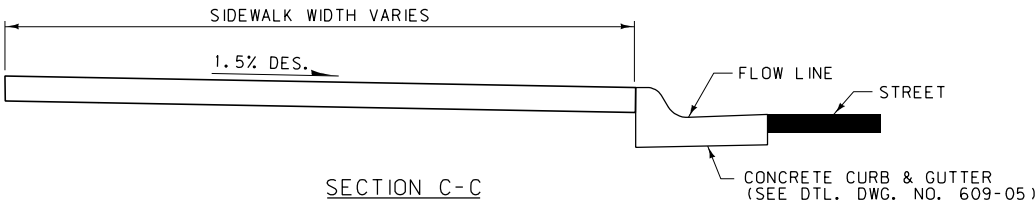
1. ALL DIMENSIONS ARE METERS (m) UNLESS OTHERWISE NOTED.
2. SEE SIDEWALK SUMMARY FRAME FOR WIDTHS OF SIDEWALK.
3. SEE PLAN & PROFILE SHEETS AND GEOMETRIC DETAILS FOR RADIUS OF CURB & GUTTER.



* ADJUST FLARED SIDE LENGTH AS NEEDED TO MAINTAIN DESIRABLE SLOPES



SLOPE = Y:X
WHERE X IS LEVEL PLANE



STATION MAIN ST.	OFFSET (m)	RAMP AND TRUNCATED DOME WIDTH (m)	RAMP LENGTH AND BLVD WIDTH (m)	RAMP SLOPES (%)	LANDING LENGTH (m)
88+55.00	11.41 LT.	1.525	1.8	8.3	2.100
88+58.12	11.41 RT.	1.525	1.8	8.3	2.100
88+60.26	6.15 LT.	1.525	2.4	6.5	1.525
88+63.38	6.15 RT.	1.525	2.4	6.5	1.525
90+29.48	6.15 LT.	1.525	2.4	6.5	1.525
90+29.48	6.15 RT.	1.525	2.4	6.5	1.525
90+34.74	11.41 LT.	2.400	1.8	8.3	2.100
90+34.74	11.41 RT.	1.525	1.8	8.3	2.100
90+45.24	11.41 LT.	2.400	1.8	8.3	2.100
90+45.24	11.41 RT.	1.525	1.8	8.3	2.100
90+50.50	6.15 LT.	1.525	2.4	6.5	1.525
90+50.50	6.15 RT.	1.525	2.4	6.5	1.525
91+45.20	6.15 LT.	1.525	2.4	6.5	1.525
91+47.50	6.15 RT.	1.525	2.4	6.5	1.525
91+50.46	11.41 LT.	1.525	1.8	8.3	1.525
91+52.76	11.41 RT.	1.525	1.8	8.3	1.525

(Typical New Construction Example)

PERPENDICULAR
CURB RAMP
DETAILS

NO SCALE

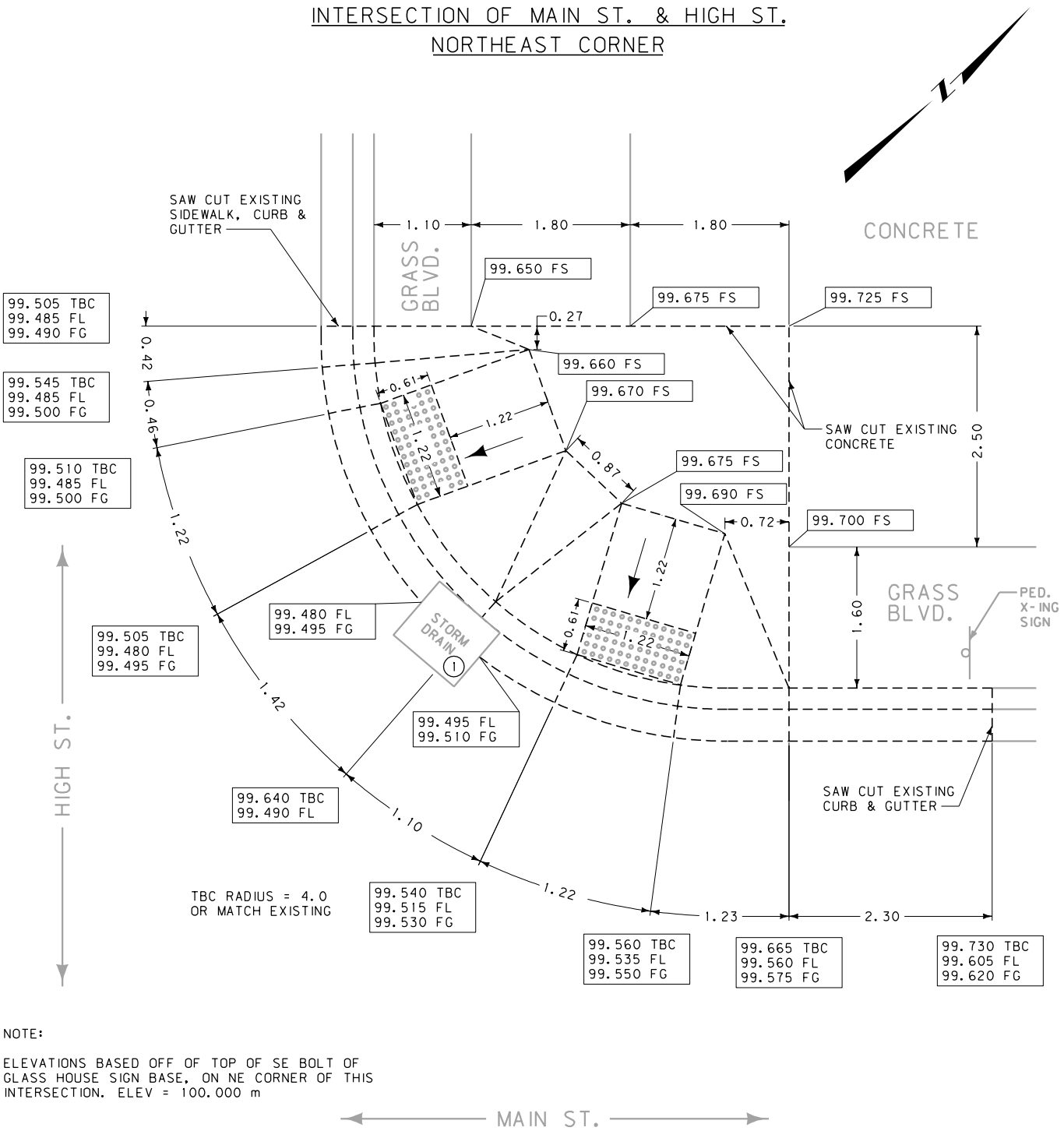
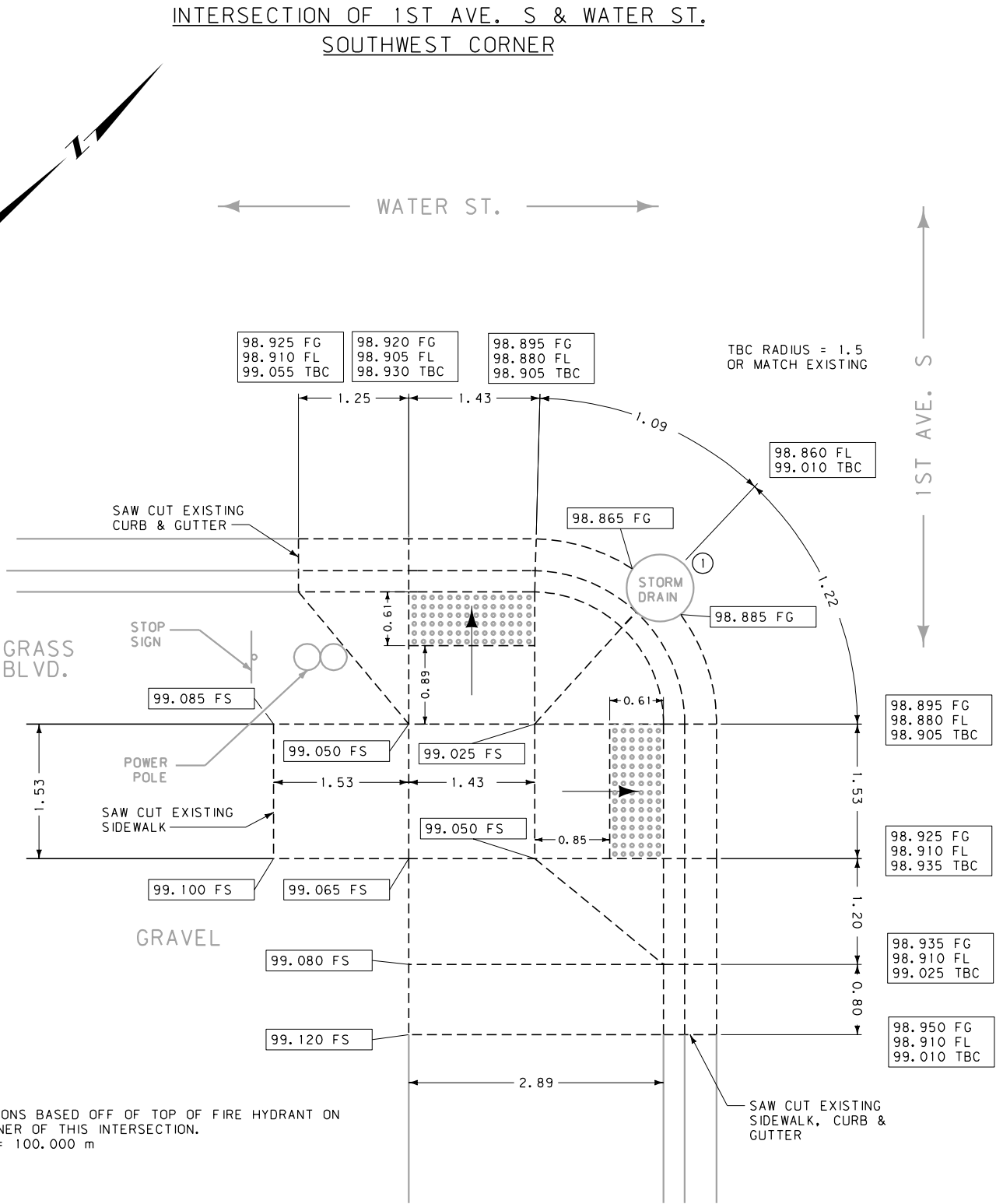
FIG. 4.4M-10C

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



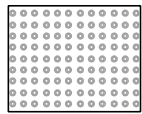
MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DATE	DESIGNER NAME	DESIGNED BY
7/18/2008	7/18/2008	7/18/2008
DATE	SUPERVISOR NAME	REVIEWED BY
8/09/21 AM	8/09/21 AM	8/09/21 AM
DATE	CHECKER NAME	CHECKED BY
8/09/21 AM	8/09/21 AM	8/09/21 AM



LEGEND

FS = FINISHED SURFACE ELEV.
TBC = TOP BACK OF CURB ELEV.
FL = FLOW LINE ELEV.
TRW = TOP OF RETAINING WALL ELEV.
FG = FRONT OF GUTTER ELEV.



TRUNCATED DOMES

PROVIDE TRUNCATED DOMES ON THE
BOTTOM 0.61 METERS OF EACH RAMP AS
SHOWN. SEE DTL. DWG. NO. 608-40
FOR TRUNCATED DOMES DETAILS.

NOTES:

ALL DIMENSIONS AND ELEVATIONS ARE
METERS UNLESS OTHERWISE NOTED.
ALL CURB AND GUTTER DIMENSIONS ARE
ALONG TBC.

CONTRACTOR VERIFY ELEVATIONS IN THE
FIELD PRIOR TO CONSTRUCTION.

Curb Ramp Detail Reminder:

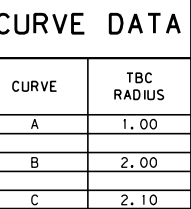
- ① Curb ramps must be designed such that there is
not a conflict with existing drainage structures
(i.e. storm drains, curb inlets, etc.)

(Typical Alteration to Existing
Facility Example)

CURB RAMP
DETAILS

NO SCALE

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



CURVE	TBC RADIUS
A	1.00
B	2.00
C	2.10

MONTANA DEPARTMENT
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MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE

FS = FINISHED SURFACE ELEV.
TBC = TOP BACK OF CURB ELEV.
FL = FLOW LINE ELEV.
TRW = TOP OF RETAINING WALL ELEV.
FG = FRONT OF GUTTER ELEV.



PROVIDE TRUNCATED DOMES ON THE
BOTTOM 0.61 meters OF EACH RAMP AS
SHOWN. SEE DTL. DWG. NO. 608-40
FOR TRUNCATED DOMES DETAILS.

NOTES:

ALL DIMENSIONS AND ELEVATIONS ARE METERS
UNLESS OTHERWISE NOTED.

ELEVATIONS BASED OFF OF ALUMINUM CAP LOCATED
ON NORTHEAST CORNER OF THIS INTERSECTION.
ELEV. = 100.000 m

ALL CURB AND GUTTER DIMENSIONS ARE ALONG TBC.

CONTRACTOR VERIFY ELEVATIONS IN THE FIELD PRIOR
TO CONSTRUCTION.

MATCH EXISTING ELEVATIONS AT ALL JOINTS BETWEEN
NEW AND EXISTING CONCRETE. ELEVATIONS SHOWN AT
MATCH LINE LOCATIONS ARE APPROXIMATE.

SEE DETAILED DRAWINGS FOR STANDARD SIDEWALK,
CURB & GUTTER AND RETAINING WALL DETAILS.

Curb Ramp Detail Reminder:

① Curb ramps must be designed such that there is not a conflict with existing drainage structures (i.e. storm drains, curb inlets, etc.)

(Typical Alteration to
Existing Facility Example)

INTERSECTION OF
E. BABCOCK & S. ROUSE
CURB RAMP DETAILS

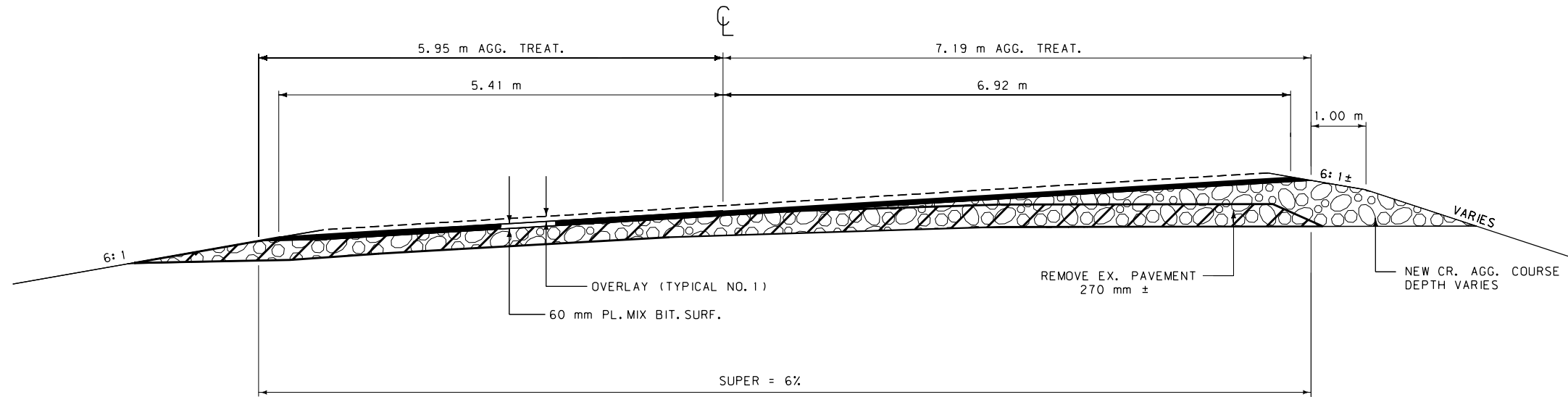
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



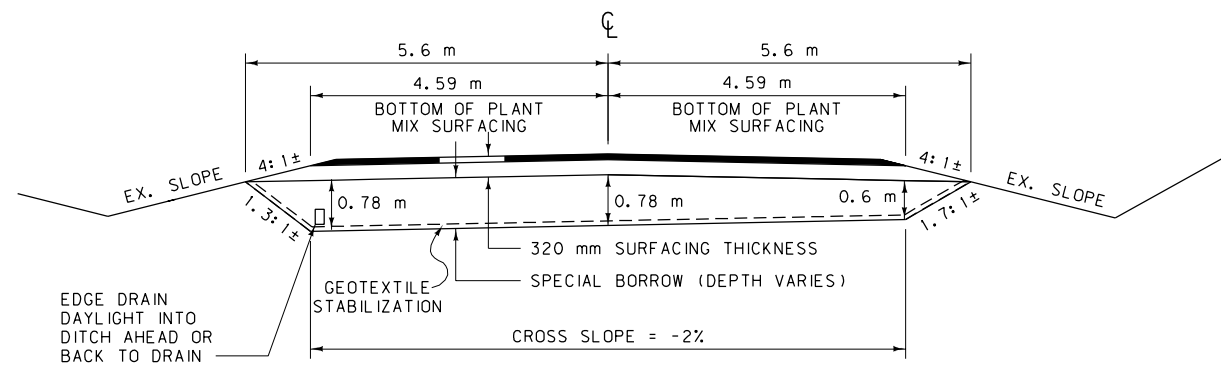
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SAMPLE PLAN SHEET*

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2013 CPS - 111861			

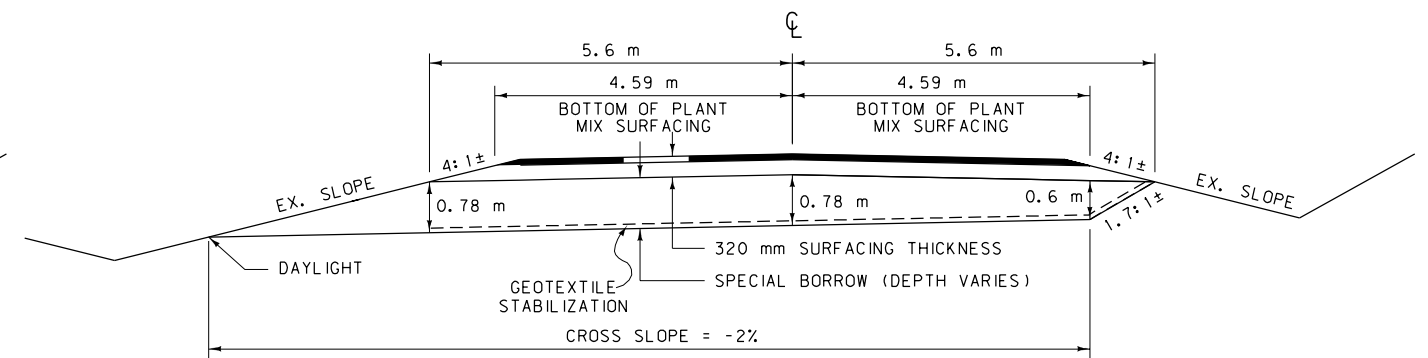


QUANTITIES *						
UNIT	AGGREGATE		UNIT	BIT. MATERIAL	AGG. TREAT.	
	PLANT MIX	CR. AGG. COURSE		ASPHALT CEMENT	DUST PALLIATIVE	AGGREGATE TACK
AREA square meters	0.764	5.360	square meters PER STATION		1314	1314
cubic meters PER STATION	76.4	536.0	tons PER STATION	10.48	2.39	
tons PER STATION	174.7		liters PER STATION			302

* - OVERLAY QUANTITIES NOT INCLUDED, SEE TYPICAL NO. 1 FOR OVERLAY QUANTITIES



123+00.00 TO 126+50.00
180+50.00 TO 182+00.00
210+35.00 TO 211+75.00



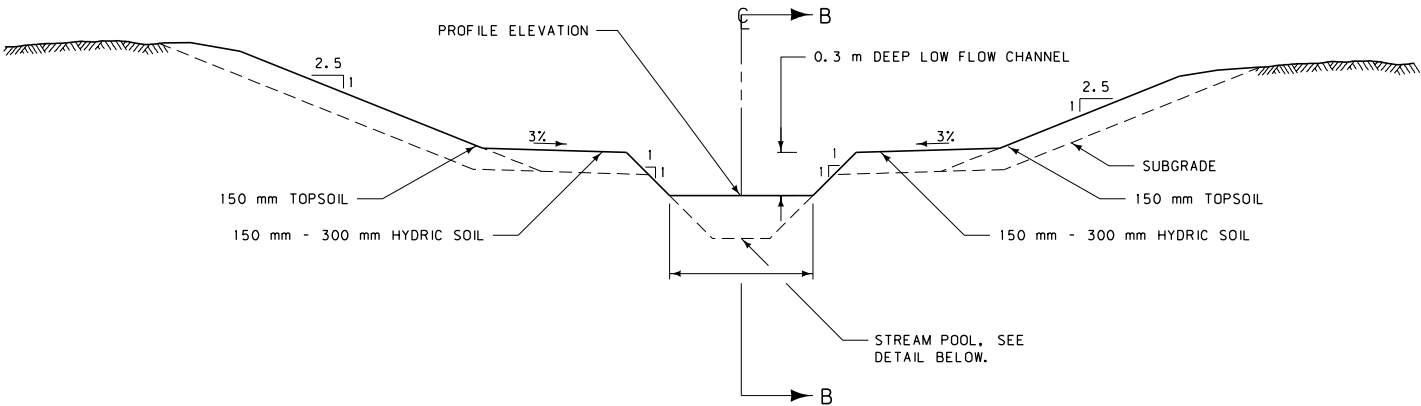
126+50.00 TO 130+00.00
175+25.00 TO 180+50.00

RE-SUPER CURVE
STA. 15+81.94
TO STA. 23+06.60 E.B.
NO SCALE

DIGOUT DETAILS
NO SCALE

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

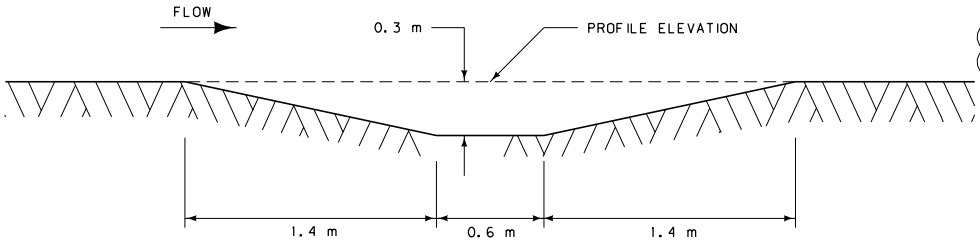
CHANNEL RELOCATION
TYPICAL SECTION
SECTION A - A



CHANNEL CENTERLINE COORDINATE TABLE			
POINT	PROFILE ELEVATION	N OR Y COORDINATE	E OR X COORDINATE
A	1 460.04	162 963.80	483 288.16
B	1 460.25	162 967.04	483 295.68
C	1 460.44	162 971.74	483 301.16
D	1 460.57	162 973.43	483 305.86
E	1 460.68	162 972.45	483 310.01
F	1 460.84	162 968.58	483 314.99
G	1 461.03	162 966.83	483 322.22
H	1 461.24	162 971.74	483 328.61
I	1 461.42	162 977.64	483 332.41
J	1 461.61	162 981.09	483 338.93
K	1 461.75	162 984.74	483 342.80
L	1 461.91	162 988.26	483 348.06

STREAM POOL DETAIL
SECTION B - B

CONSTRUCT POOL TO APPROXIMATE DIMENSIONS
SHOWN BELOW AT POINTS B, C, D, E, F, G, H, I, J, & K.



LYMAN CREEK CHANNEL RELOCATION

LENGTH - REMOVED = 50.6 m
LENGTH - NEW = 72.5 m

EXISTING SLOPE = 2.6%
NEW SLOPE = 2.6%

BACKFILL AND
SEED OLD CHANNEL
(QUANTITIES INCLUDED
IN MAINLINE).

PROPOSED
DETOUR CONSTRUCTION LIMITS

DETOUR

WILLOWS

WILLOWS

WILLOWS

BRIDGER CREEK

NEW BRIDGE

UPSTREAM WETLAND
(SEE SEPARATE
DETAIL)

LYMAN CREEK
CHANNEL RELOCATION
DETAIL

NO SCALE

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
DATE	DATE	DATE

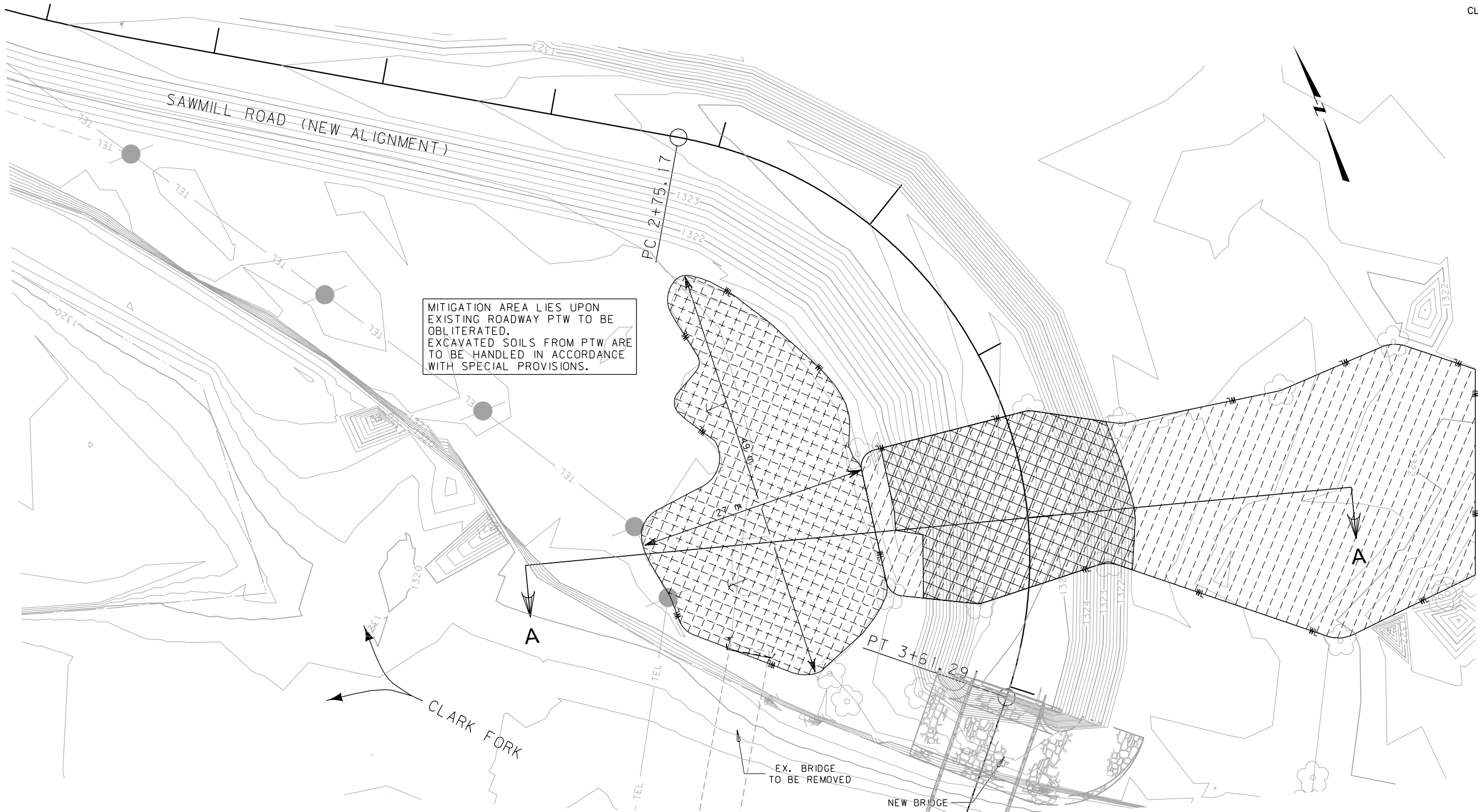
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	

CLARK FORK ON SAWMILL ROAD

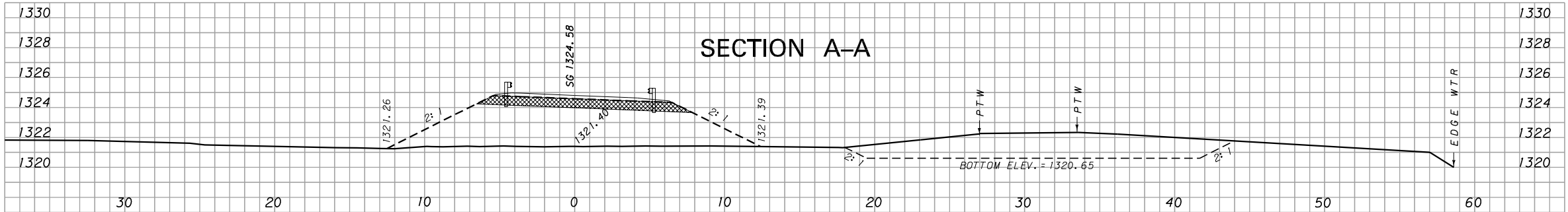


MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
2	CPS - U1861	



MITIGATED WETLANDS	AREA = 0.085 ha
IMPACTED WETLANDS	AREA = 0.050 ha
WETLANDS	AREA = 0.205 ha



CONTOUR INTERVAL = 0.2 m

WETLAND MITIGATION
POWELL COUNTY BRIDGES
CLARK FK /SAWMILL RD
DETAIL

NO SCALE

CSF = 0.99926508 (1)

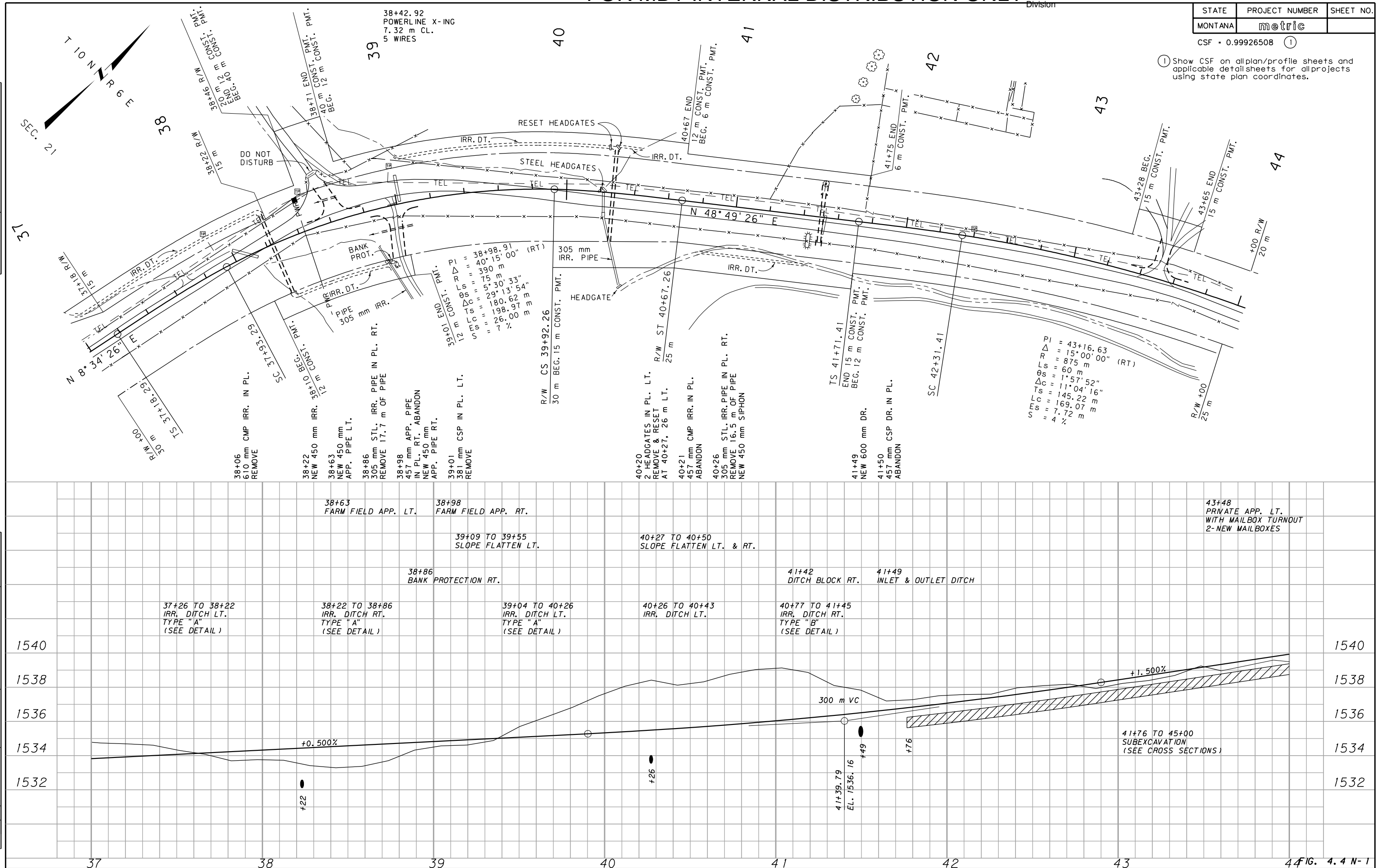


MONTANA
CADD



MONTANA DEPARTMENT
OF TRANSPORTATION

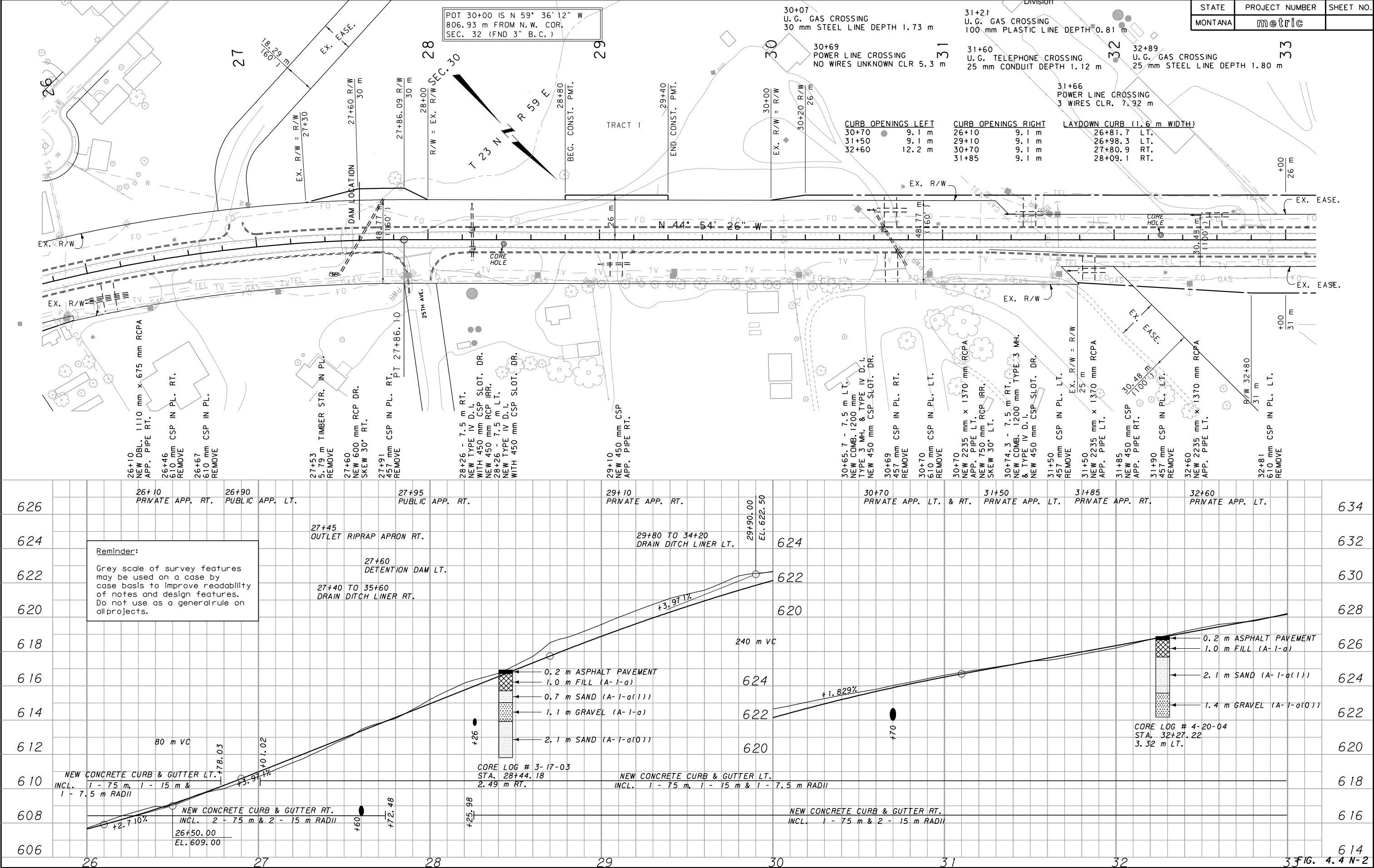
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3 CPS - U1861			



STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



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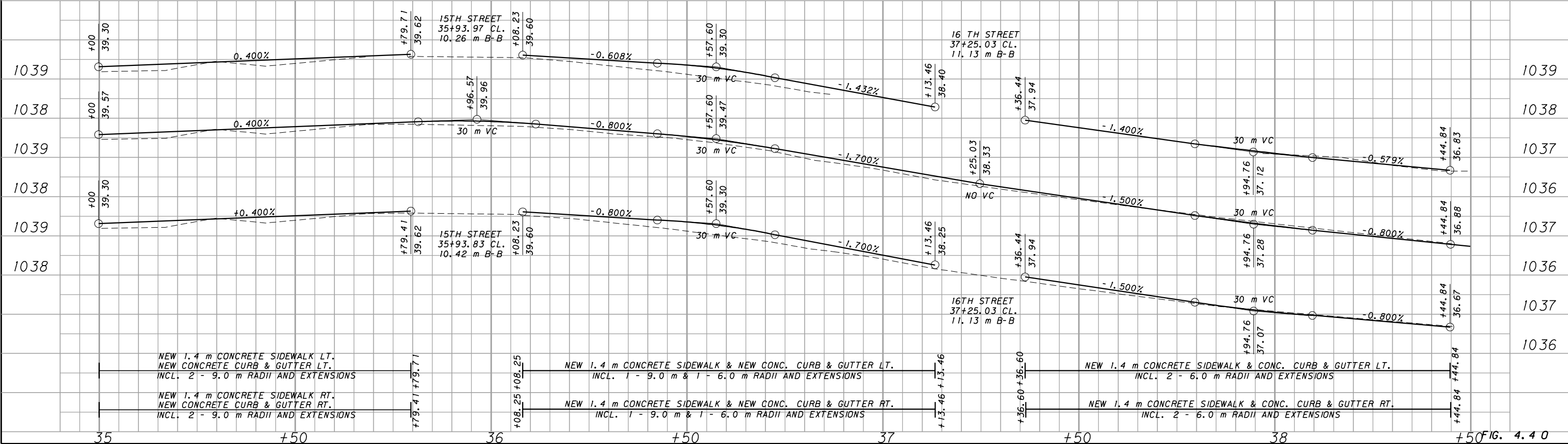
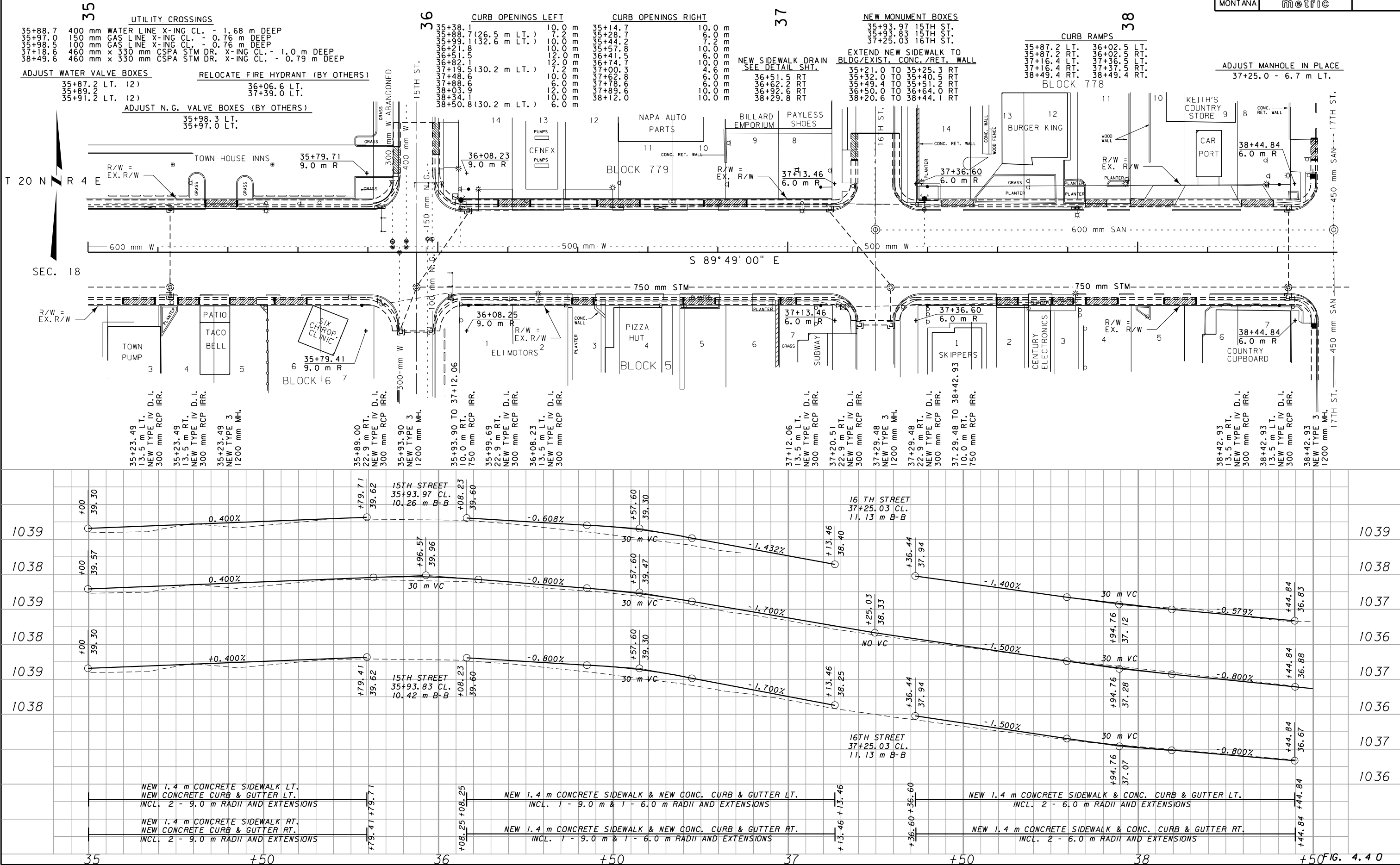


STATE	PROJECT NUMBER	SHEET NO.
MONTANA	metric	



MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
2	CPS - U1861	




**MONTANA DEPARTMENT
OF TRANSPORTATION**

**MONTANA
CADD**

MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE
8:10:00 AM		

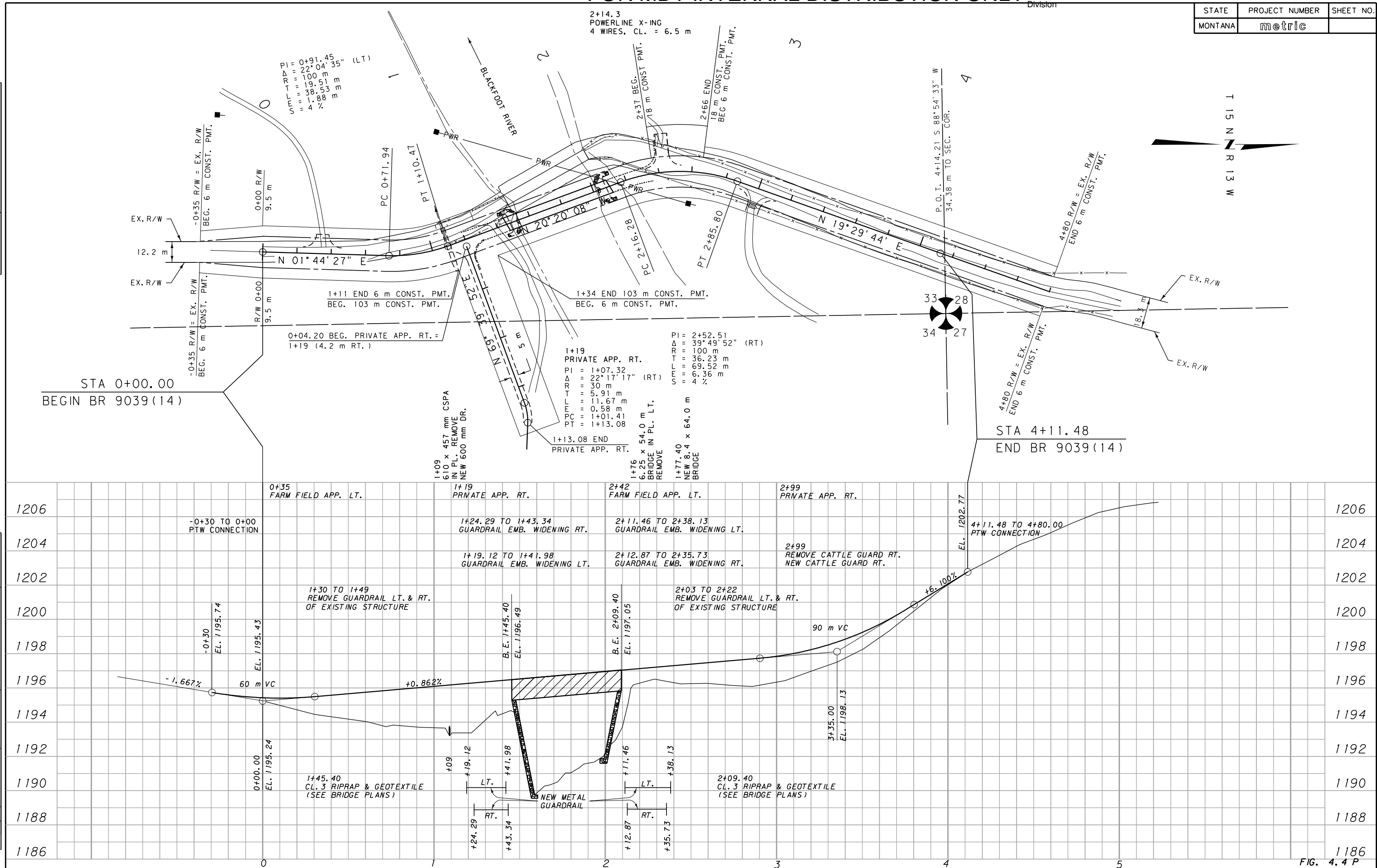


FIG. 4.4 P




MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE

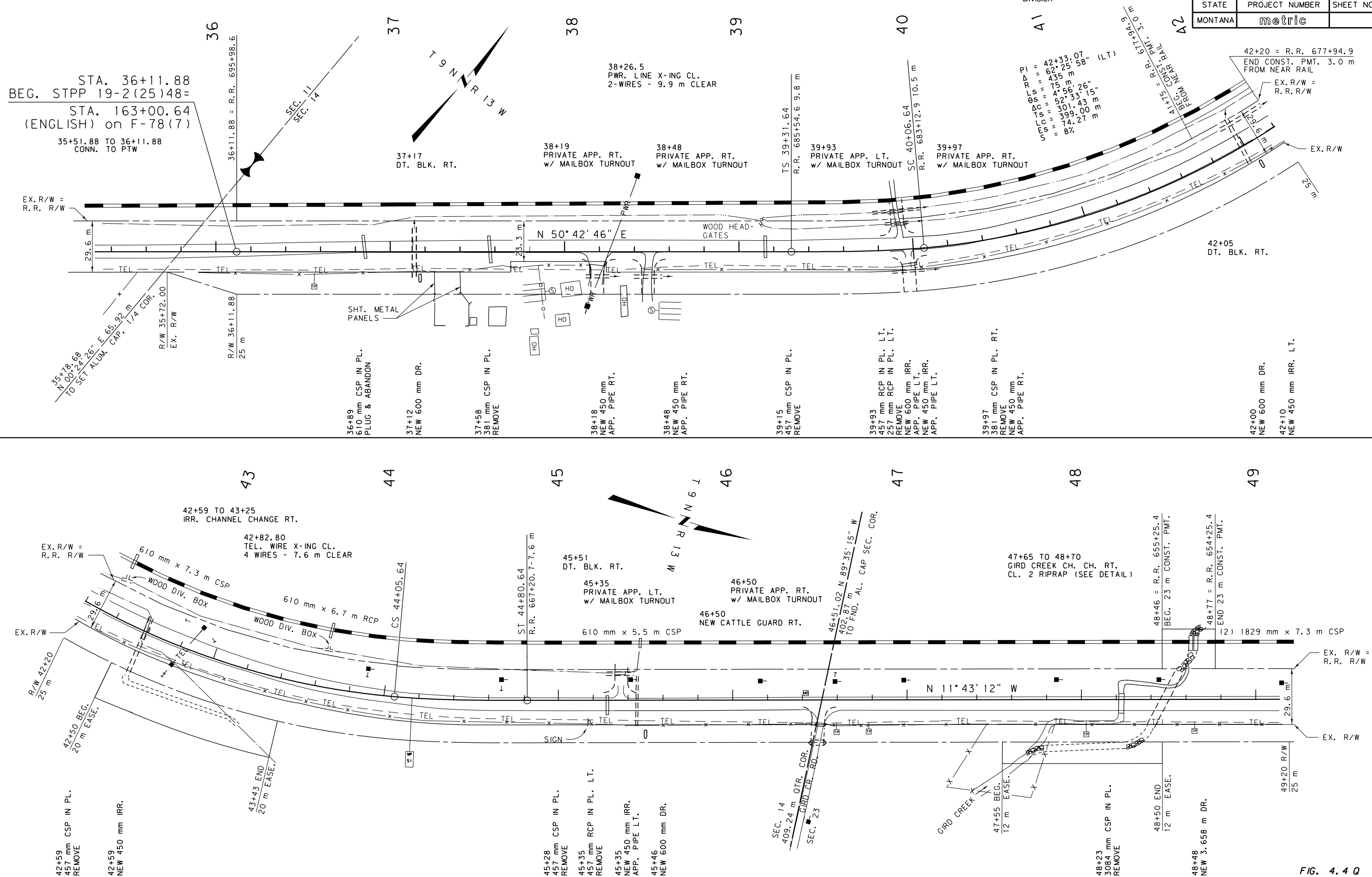


FIG. 4.4 Q



MONTANA ROAD DESIGN MANUAL
SAMPLE PLAN SHEET

DESIGNED BY	DESIGNER NAME	DATE
REVIEWED BY	SUPERVISOR NAME	DATE
CHECKED BY	CHECKER NAME	DATE

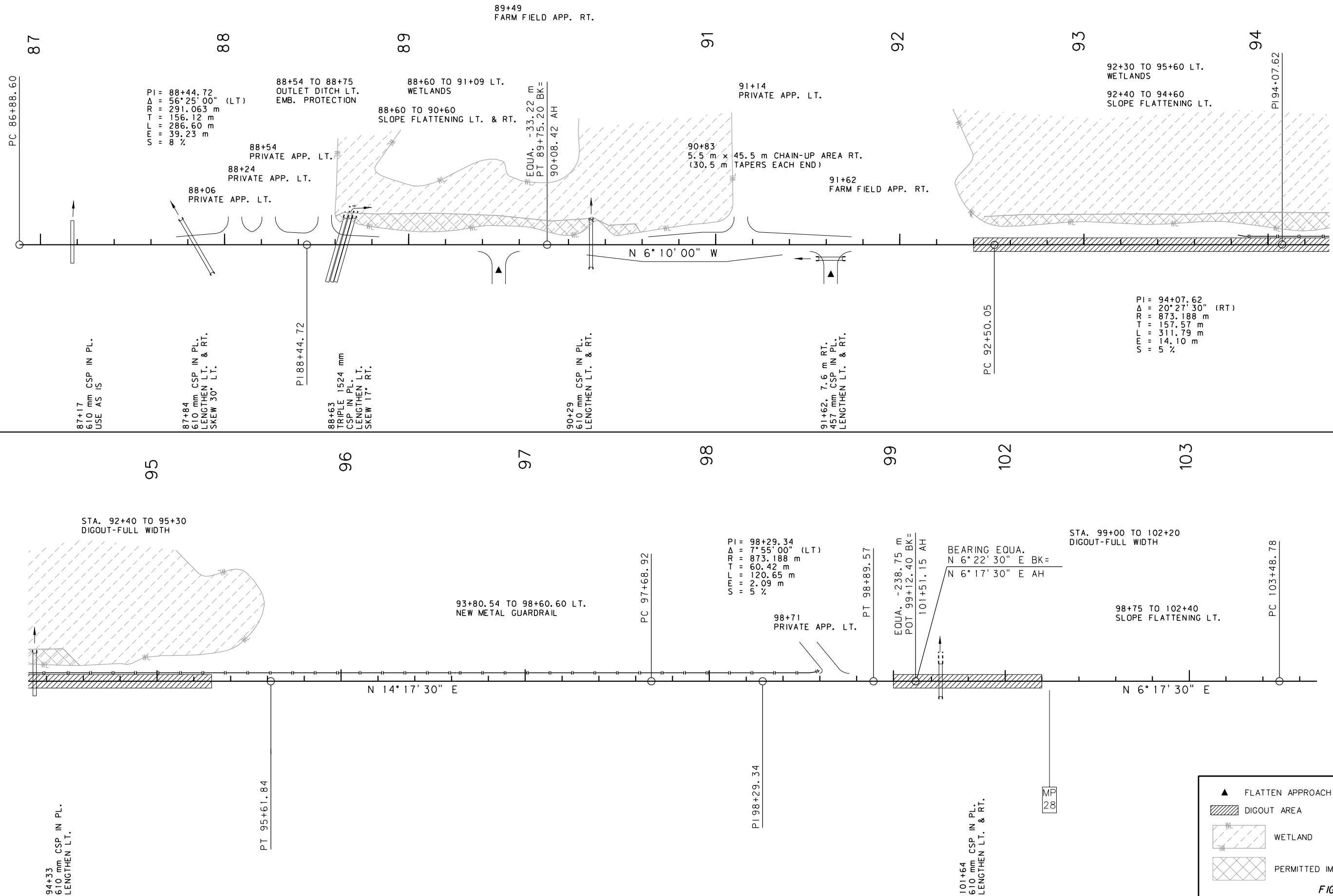


FIG. 4.4 R