



AS CONSTRUCTED

NO REVISIONS REVISED VOID

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NUMBER
VIII	COLORADO	Project BR 018A-002	

DEPARTMENT OF TRANSPORTATION - STATE OF COLORADO CONTROL SURVEY DIAGRAM

SH 18 at E. Plum Creek

COORDINATE SUMMARY TABLE
(ADJUSTED FIELD DATA)

POINT NAME	GEODETIC COORDINATES NAD-83(92) (CHARN)		ELEVATION (NAVD 883m)	MAPPING ANGLE	SCALE	NAD 83(92) ZONE Q502		PROJECT COORDINATES		ELEV (ft)	DESCRIPTION
	LATITUDE (N)	LONGITUDE (W)				NORTHING (m)	EASTING (m)	NORTH (ft)	EAST (ft)		
SH 18 CM-MP 0.0 GPS PROJECT STATION	39°14'33.22484"	104°52'59.33199"	2024.673	0°23'20.552"	0.999938951	461416.631	987650.931	514411.85	175919.41	6642.62	CDOT Type 2 Control Monument
SH 18 CM-MP 0.2 GPS PROJECT STATION	39°14'33.72850"	104°52'47.04855"	2024.287	0°23'28.298"	0.999938957	461434.167	987945.340	514469.40	176885.68	6641.35	CDOT Type 2 Control Monument
1-25 CM-MP 167.2 GPS PROJECT STATION	39°11'02.23043"	104°51'02.44518"	2108.183	0°24'34.271"	0.999936954	454929.927	970500.202	493121.89	185270.98	6815.61	CDOT Type 2 Control Monument
1-25 CM-MP 169.6 GPS PROJECT STATION	39°12'48.78593"	104°52'19.03533"	2080.755	0°23'45.966"	0.999937832	458207.292	968639.449	503863.60	179163.82	6826.61	CDOT Type 2 Control Monument
1-25 CM-MP 171.9 GPS PROJECT STATION	39°14'40.89334"	104°52'44.36177"	2024.850	0°23'30.006"	0.999939044	461658.633	988008.738	515208.12	177093.76	6643.25	CDOT Type 2 Control Monument
1-25 CM-MP 172.1 GPS PROJECT STATION	39°14'43.80231"	104°52'48.89076"	2024.028	0°23'27.137"	0.999939080	461743.589	987899.050	515498.08	176733.76	6640.57	CDOT Type 2 Control Monument
1-25 CM-MP 172.3 GPS PROJECT STATION	39°14'54.43190"	104°53'00.25160"	2015.274	0°23'19.972"	0.999939209	462070.429	987624.442	518552.67	175832.47	6611.81	CDOT Type 2 Control Monument
1-25 CM-MP 172.5 GPS PROJECT STATION	39°15'04.78446"	104°53'10.71880"	2014.926	0°23'13.370"	0.999939339	462387.966	987371.318	517599.86	175001.70	6610.66	CDOT Type 2 Control Monument
1-25 CM-MP 172.7 GPS PROJECT STATION	39°15'16.07435"	104°53'18.08182"	2008.492	0°23'08.096"	0.999939484	462734.753	987186.472	518738.05	174335.94	6589.55	CDOT Type 2 Control Monument
1-25 CM-MP 173.0 GPS PROJECT STATION	39°15'25.65062"	104°53'26.28438"	2007.086	0°23'03.553"	0.999939609	463028.891	986993.809	519703.43	173762.68	6584.90	CDOT Type 2 Control Monument
1-25 CM-MP 173.2 GPS PROJECT STATION	39°15'37.29317"	104°53'34.63251"	2005.908	0°22'58.288"	0.999939764	463386.588	986791.276	520877.36	173087.94	6581.05	CDOT Type 2 Control Monument
1-25 CM-MP 173.5 GPS PROJECT STATION	39°15'47.54163"	104°53'40.61383"	2002.956	0°22'54.515"	0.999939903	463701.636	986645.783	521911.44	172820.42	6571.32	CDOT Type 2 Control Monument
1-25 CM-MP 173.7 GPS PROJECT STATION	39°15'57.19281"	104°53'45.93784"	1998.529	0°22'51.164"	0.999940036	463989.400	986516.474	522885.45	172185.85	6550.40	CDOT Type 2 Control Monument
1-25 CM-MP 173.9 GPS PROJECT STATION	39°16'10.47635"	104°53'46.97555"	1992.330	0°22'50.503"	0.999940223	464407.848	986488.584	524229.30	172104.48	6536.47	CDOT Type 2 Control Monument
A 393 1983 GPS CHARN-DENSEF STATION	39°11'13.83018"	104°51'03.18035"	2103.767	0°24'33.870"	0.999937035	455281.325	970480.527	494275.21	185206.40	6802.11	Stainless Steel Rod Encased in Pipe
ASHBY 1993 GPS CHARN-DENSEF STATION	39°14'38.85969"	104°52'42.30800"	2023.121	0°23'31.288"	0.999939019	461593.171	988057.952	514991.27	177255.29	6637.52	USGS 3 1/2" Brass Cap
Q 393 1983 NGS BM (GPS)	39°12'01.10586"	104°51'23.56541"	2082.690	0°24'20.951"	0.999937406	456741.800	989980.492	499068.62	183565.24	6832.36	Stainless Steel Rod Encased in Pipe
Q 396 1983 NGS BM (GPS)	39°14'11.47026"	104°52'37.43160"	2039.079	0°23'34.364"	0.999936697	460749.383	988180.669	512221.88	177658.06	6689.88	Stainless Steel Rod Encased in Pipe
1-25 CM-MP 167.6	39°11'22.28543"	104°51'03.62174"	2104.145	0°24'33.529"	0.999937099	455248.138	970467.548	495150.92	185183.81	6803.33	CDOT Type 2 Control Monument
1-25 CM-MP 167.8	39°11'32.62318"	104°51'02.48990"	2103.538	0°24'34.243"	0.999937177	455867.107	970492.430	496197.80	185245.47	6801.27	CDOT Type 2 Control Monument
1-25 CM-MP 168.0	39°11'41.50674"	104°51'10.72614"	2102.129	0°24'29.048"	0.999937246	456138.630	970292.847	497082.24	184590.42	6806.82	CDOT Type 2 Control Monument
1-25 CM-MP 168.1	39°11'49.34415"	104°51'11.86705"	2104.254	0°24'28.329"	0.999937309	456381.109	970263.751	497884.80	184494.92	6803.79	CDOT Type 2 Control Monument
1-25 CM-MP 168.2	39°12'13.66965"	104°51'27.41901"	2089.909	0°24'18.520"	0.999937513	457128.562	988885.294	500338.01	183252.80	6856.63	CDOT Type 2 Control Monument
1-25 CM-MP 168.3	39°12'18.27128"	104°51'35.39685"	2077.090	0°24'13.489"	0.999937553	457269.107	988692.893	500799.29	182821.32	6814.56	CDOT Type 2 Control Monument
1-25 CM-MP 169.0	39°12'28.20953"	104°51'44.54203"	2081.689	0°24'07.721"	0.999937641	457574.020	989471.338	501800.04	181894.15	6829.63	CDOT Type 2 Control Monument
1-25 CM-MP 169.2	39°12'32.52393"	104°51'57.82319"	2071.019	0°23'59.345"	0.999937681	457704.830	989151.792	502229.37	180845.37	6794.67	CDOT Type 2 Control Monument
1-25 CM-MP 169.4	39°12'41.29134"	104°52'06.50105"	2075.744	0°23'53.874"	0.999937761	457973.732	988941.732	503111.94	180155.94	6798.68	CDOT Type 2 Control Monument
1-25 CM-MP 169.5	39°12'42.88317"	104°52'14.95289"	2073.520	0°23'48.541"	0.999937774	458015.244	988738.683	503248.18	179489.51	6802.86	CDOT Type 2 Control Monument
1-25 CM-MP 169.8	39°12'54.88515"	104°52'30.70114"	2065.255	0°23'38.609"	0.999937890	458388.898	988358.312	504474.55	178241.10	6775.68	CDOT Type 2 Control Monument
1-25 CM-MP 170.0	39°13'03.07543"	104°52'39.27846"	2071.481	0°23'33.199"	0.999937970	458640.043	988150.831	505298.83	177580.13	6796.42	CDOT Type 2 Control Monument
1-25 CM-MP 170.1	39°13'08.48407"	104°52'42.55713"	2075.084	0°23'31.131"	0.999938023	458840.296	988071.044	505644.46	177298.26	6808.28	CDOT Type 2 Control Monument
1-25 CM-MP 170.3	39°13'16.57216"	104°52'47.51498"	2078.694	0°23'31.158"	0.999938105	459055.699	988070.349	506663.05	177295.98	6820.11	CDOT Type 2 Control Monument
1-25 CM-MP 170.4	39°13'24.10445"	104°52'45.05577"	2075.370	0°23'29.555"	0.999938182	459287.548	988007.819	507424.00	177090.75	6809.06	CDOT Type 2 Control Monument
1-25 CM-MP 170.6	39°13'31.84391"	104°52'40.95747"	2068.500	0°23'32.140"	0.999938262	459528.877	988104.483	508209.50	177408.01	6786.72	CDOT Type 2 Control Monument
1-25 CM-MP 170.8	39°13'42.74797"	104°52'38.83565"	2060.069	0°23'32.846"	0.999938373	459874.683	988128.194	509263.07	177489.11	6759.10	CDOT Type 2 Control Monument
1-25 CM-MP 171.0	39°13'53.50285"	104°52'40.51255"	2048.426	0°23'32.421"	0.999938485	460194.823	988110.581	510401.78	177428.02	6713.84	CDOT Type 2 Control Monument
1-25 CM-MP 171.2	39°14'03.48839"	104°52'36.68545"	2046.895	0°23'34.835"	0.999938606	460503.375	988200.251	511414.46	177722.33	6715.43	CDOT Type 2 Control Monument
1-25 CM-MP 171.6	39°14'25.04713"	104°52'40.35931"	2027.738	0°23'32.517"	0.999938854	461167.583	988107.594	513594.38	177418.22	6652.73	CDOT Type 2 Control Monument
1-25 CM-MP 171.8	39°14'33.25406"	104°52'38.76030"	2025.867	0°23'33.526"	0.999938951	461420.898	988144.203	514425.85	177538.37	6646.57	CDOT Type 2 Control Monument
NW COR. SEC 27, T.9S., R.67W., 6th P.M.								515690.80	175228.58		Y Brass Cap LS 2890

* Surveyed by TruConsultants Inc. from 3-12-1993 to 11-12-1993. Shown here for information only. CDOT recalculated coordinates using angles and distances measured by TruConsultants Inc.

CONSTRUCTION SURVEYING AND MONUMENTATION REQUIREMENTS:

- This Survey Control Diagram represents the Division established horizontal and vertical control for the project. It is possible that some of the survey control monuments listed have been disturbed or obliterated. It is the Contractor's responsibility to verify the existence and stability of the control monuments before submitting a bid price.
- All Type 1 and Type 2 monuments shall be set flush with the ground. Witness posts shall be installed 1 foot from and facing all Type 1 and Type 2 monuments, or as directed by the Project Engineer.
- Installation of Type 3 and Type 3-A monuments shall be completed in the same day that installation is commenced. Under no circumstances shall holes in the roadway be left open overnight.
- When installing Type 3-A monuments, the aluminum access cover shall be positively secured to the PVC pipe with screws or glue. The access cover shall be caulked with asphalt caulking between the cover and the edges of the roadway surface to provide a positive moisture barrier around the access cover.
- Control survey procedures, statistical analysis, and accuracy obtained for horizontal and vertical control shall be documented in the field book.
- Legible copies of the field books shall be submitted to the Project Engineer for review on a monthly basis.

- It is ultimately the Prime Contractors responsibility to insure that these requirements, as well as any contained in the CDOT specifications, project special provisions, and CDOT Survey Manual are fulfilled under this contract.
- The minimum staking intervals for each item are described on the plans or in the CDOT Survey Manual. If the contractor wishes to reduce the minimum intervals, a Contract Modification Order must be negotiated and the cost of the item reduced accordingly.

BASIS OF BEARINGS: Bearings used in the calculation of coordinates are based on a grid bearing of N 86°35'29" E from SH 18 CM-MP 0.0 to SH 18 CM-MP 0.2 as obtained from a Global Positioning System (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN).

BASIS OF ELEVATIONS: Project elevations are based on National Geodetic Survey (NGS) benchmarks using NAVD '88 elevations for benchmarks A 393 1983, B 393 1983, P 393 1983, C 393 1983, Q 396 1983, R 396 1983, S 396 1983, and T 396 1983 as obtained from a first order, second class Geodetic Leveling line Accession No. L24783 leveled in 1984.

COORDINATE DATUM: Project Coordinates are modified Colorado State Plane Central Zone NAD '83 coordinates. State Plane coordinates were modified to a mean project elevation of 2052.014m. The combined elevation/scale correction factor used to modify the coordinates was 1.000383653. Project Coordinates were truncated by 1,000,000 in the Northing and 3,000,000 in the Easting after conversion of meters to feet. The CHARN is based on the NAD-83 datum.

NOTE: Refer to M-629-1 SURVEY MONUMENTS of the STANDARD PLANS, COLORADO DEPARTMENT OF TRANSPORTATION, M & S STANDARDS NOVEMBER 1992 for survey monument descriptions. Refer to M-100-1 STANDARD SYMBOLS of the STANDARD PLANS, COLORADO DEPARTMENT OF TRANSPORTATION, M & S STANDARDS NOVEMBER 1992 for standard symbol definitions.

NOTE: This control survey is for the use of Colorado Department of Transportation personnel. The survey is not a complete Boundary Survey. Title Policy, Title Commitment, and Title Research were not part of this control survey, therefore, easements, rights, and restrictions of record are not shown. The verification of the physical evidence with relation to easements, rights of way, property boundaries, and restrictions, as described in the instruments of record, were not included in this control survey.

NOTE: According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the statement shown.

SURVEYORS STATEMENT: I, Joseph P. Conway, a Professional Land Surveyor in the State of Colorado, hereby state that this Control Survey Diagram was prepared under my supervision this 6 day of September 1995, from a field survey performed under my supervision from December 20, 1994 to March 31, 1995, and checking for and on behalf of the Department of Transportation, State of Colorado, and is not a Land Survey Plat or Right-of-Way Survey Plat and to the best of my knowledge and belief this control survey, as shown, meets the minimum horizontal control tolerances of a Type B Survey and this topographic survey, as shown, meets the minimum horizontal control tolerances of a Type D Survey as listed in the Colorado Department of Transportation Survey Manual, Chapter Three (Revised 4/29/92)

Joseph P. Conway L.S. 25618

To establish geometric control for the construction of this project, the Department has provided the following information:

- Horizontal Control
- Vertical Control
- Roadway Alignment
- Original Terrain Data
- Other: _____

Format
 CONTROL SURVEY DIAGRAM
 CONTROL SURVEY DIAGRAM

*Specify the information format, i.e. plan sheet, computer disk, computer printout, or other.

The information marked is either contained on the plans or is available from the Engineer.

TYPE OF SURVEY

- Item 625 - Construction
- Item 629 - Monumentation

TYPE OF PROJECT

- Landscaping
- Signalization
- Safety Improvement
- Asphalt Overlay
- Concrete Overlay
- Minor Widening
- Major Reconstruction
- New Roadway Construction
- Bridge Replacement
- Bridge Widening
- New Bridge
- Other: _____

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER ITEM 625:

- Verification and Maintenance of Horizontal and Vertical Control
- Verify or Determine existing grades and alignments
- Verify or Determine existing topography
- Clearing and Grubbing Limits
- Removal Limits

- Excavation and Embankment
 - Excavation
 - Unclassified
 - Stripping
 - Muck
 - Rock
 - Borrow
 - Other: _____
 - Embankment
 - Site Grading
 - Erosion Control (Perm)
 - Other: _____

SLICE STAKES	GRID	GRADE STAKES	SPECIAL INTERNAL
YES	-	-	50'
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

- Landscaping
 - Top Soil
 - Seeding
 - Mulching
 - Planting
 - Other: _____

- Erosion Control
 - Seeding (Temp)
 - Silt Fences
 - Straw Bales
 - Temporary Berm
 - Riprap (Temp)
 - Other (Temp Diversion, Temp Slope Drain, Bush Barrier, Check Dam, Other: _____)

- Roadway Bases
 - Untreated Subgrade
 - Treated Subgrade
 - Aggregate Base Course
 - Other: _____

- Pavements
 - PMBB - Plant Mix Bituminous Base
 - HBP - Hot Bituminous Pavement
 - Concrete
 - Other: _____

BLUE TOPS	GRID	SPECIAL INTERNAL
-	-	-
-	-	-
-	-	-
YES	-	50'
-	-	-
-	-	-

- Roadway Elements
 - Curb and Gutter
 - Drop Inlets - alignment and grades
 - Retaining Walls
 - Guard Rail
 - Sidewalk
 - Other: _____
- Riprap (Perm)
- Slope and Ditch Paving
- Minor Structures
 - Structure Excavation limits
 - Culverts
 - Culverts w/ Headwalls and Wingwalls
 - Concrete Box Culverts w/ Headwalls and Wingwalls
 - Pipes
 - Sanitary Sewer
 - Storm Sewer
 - Water
 - Irrigation
 - Manholes
 - Inlets
 - Other: _____
- Major Structures - Signs, Concrete Box Culverts, Bridges - anything assigned a structure number
 - Structure Excavation limits
 - Concrete Box Culverts w/ Headwalls and Wingwalls
 - Piling locations and cut off elevations
 - Caisson locations and elevations
 - Footing locations, alignment, and elevations
 - Abutment/Pier alignment
 - Abutment form locations
 - Wingwall skew angles/offsets
 - Structural concrete form locations
 - Substructure survey (See Subsection 601.12(m))
 - Bridge expansion joint(s) alignment and grade (longitudinal and transverse)
 - Girder 10th or "n" th point locations and elevations
 - Slope and Ditch Paving
 - Other: _____
- Fencing
 - Temporary
 - Permanent
 - Sound Barriers
 - Other: _____
- Definers
 - Temporary
 - Permanent
- Lighting and Traffic Control Devices (Perm)
 - Signal pole locations and elevations
 - Light pole locations and elevations
 - Signs
 - Field verify sign post locations, elevations, and lengths before fabrication
 - Other: _____
- Pavement Marking
 - Striping (Temp)
 - Striping (Perm)
 - Symbols
 - Other: _____
- Temporary Lighting and Construction Traffic Control Devices
 - Signal pole locations and elevations (Temp)
 - Light pole locations and elevations (Temp)
 - Signs (Temp)
 - Other: _____
- Easement (Temp)(Staking)

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER ITEM 629:

- Monumentation
 - Control
 - Right of Way (Temp) (Staking)
 - Right of Way
 - Land corners, Aliquot corners
 - Easement (Temp)(Staking)
 - Easement (Perm)
 - Reference the specified existing monuments: _____
 - Relocate the specified existing monuments: _____
 - Locate monuments. It is estimated that _____ hours are required and the hourly rate shall not exceed _____ per hour.

AS CONSTRUCTED

NO REVISIONS REVISED VOID

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	OF SHEETS
33C	COLORADO	BR 018A-002		

SH 18 of E. Plum Creek

GENERAL NOTES:

All work shall be done in accordance with the CDOT Survey Manual.

Adequate information for establishing lines, grades, and locations for all work items have been specified on the plans. Any additional information required to stake the item or element shall be generated by the Contractor's surveyor.

The Contractor's surveyor shall provide an estimate of the man-hours necessary to complete the work items indicated on this sheet. A copy of this sheet, with the estimated man-hours written to the left of the specified items, shall be submitted with the survey schedule to the Engineer at the Presurvey Conference.

The following surveying notebooks are required:

- Alignment Notebook
- Benchmark Notebook
- Control Survey/Monumentation Notebook
- Minor Structure Notebook
- Major Structure Notebook
- Slope Staking Notebook
- Grade Notebook
- Miscellaneous Notebook(s)

Stakes and Monuments set by CDOT forces which are damaged or destroyed by the progress of construction shall be replaced by the Contractor at no additional cost to the Department.

The Contractor shall furnish an "as staked" earth work quantity to the Engineer prior to completion of twenty percent (20%) of the planned earth work in any phase as per the CDOT Survey Manual.

The Contractor shall coordinate construction staking on the project with any utility work.

The Contractor shall perform any field surveying and calculations necessary to tie plan grades into field grades.

Additional surveying shall be paid at a rate not to exceed \$ 100.00 per hour.

OTHERS WHO WILL PERFORM WORK: _____

COLORADO
 DEPARTMENT OF TRANSPORTATION
 SURVEY TABULATION
 SHEET

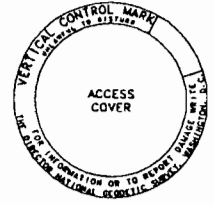
JUNE 1994



AS CONSTRUCTED		FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NUMBER
NO REVISIONS	REVISED	VOID	VI	COLORADO	Project BR 018A-002

SH 18 at E. Plum Creek

DEPARTMENT OF TRANSPORTATION - STATE OF COLORADO CONTROL SURVEY DIAGRAM



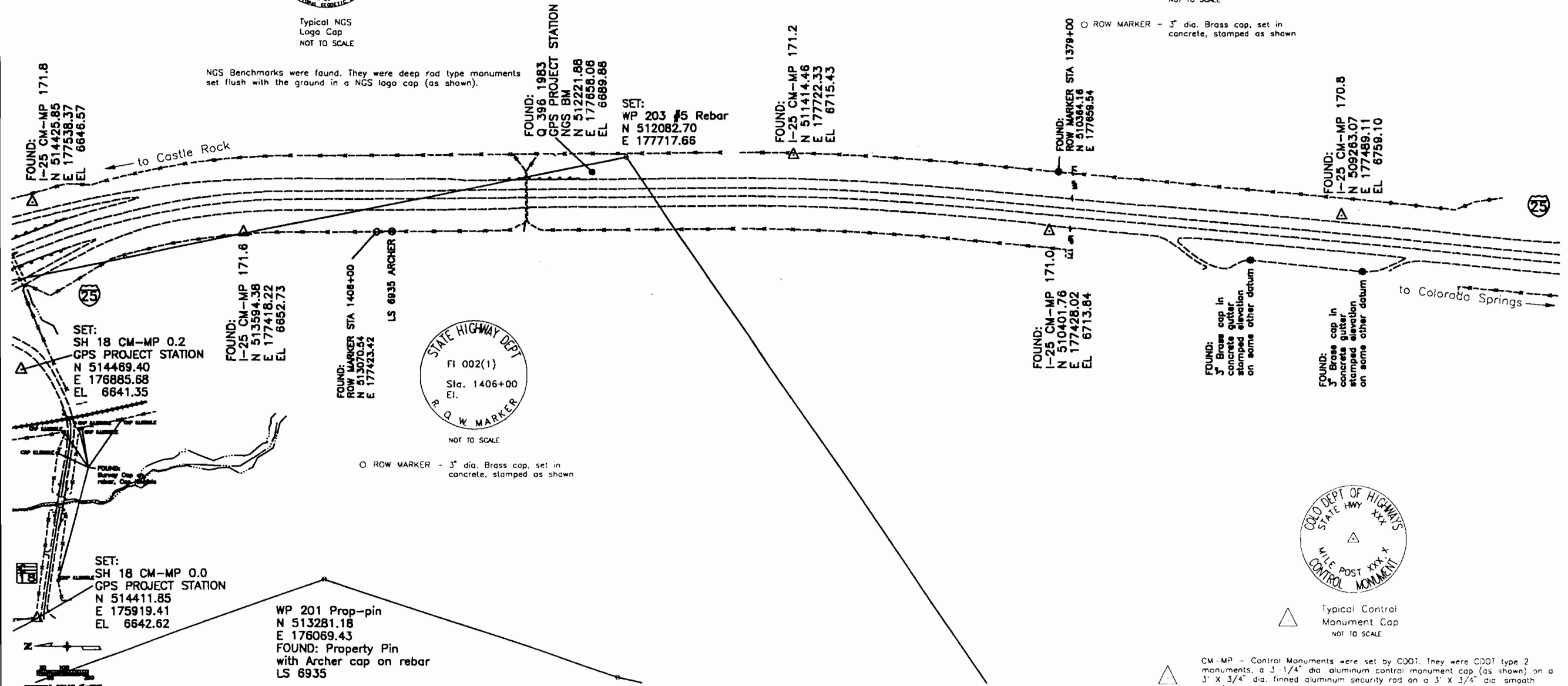
Typical NGS Logo Cap
 NOT TO SCALE



NOT TO SCALE

ROW MARKER - 3" dia. Brass cap, set in concrete, stamped as shown

NGS Benchmarks were found. They were deep rod type monuments set flush with the ground in a NGS logo cap (as shown).



FOUND: 3" Brass cap in concrete gutter stamped elevation on some other datum

FOUND: 3" Brass cap in concrete gutter stamped elevation on some other datum

Typical Control Monument Cap
 NOT TO SCALE

CM-MP - Control Monuments were set by CDOT. They were CDOT type 2 monuments, a 3-1/4" dia aluminum control monument cap (as shown) on a 3" X 3/4" dia. finned aluminum security rod on a 3" X 3/4" dia smooth aluminum rod.

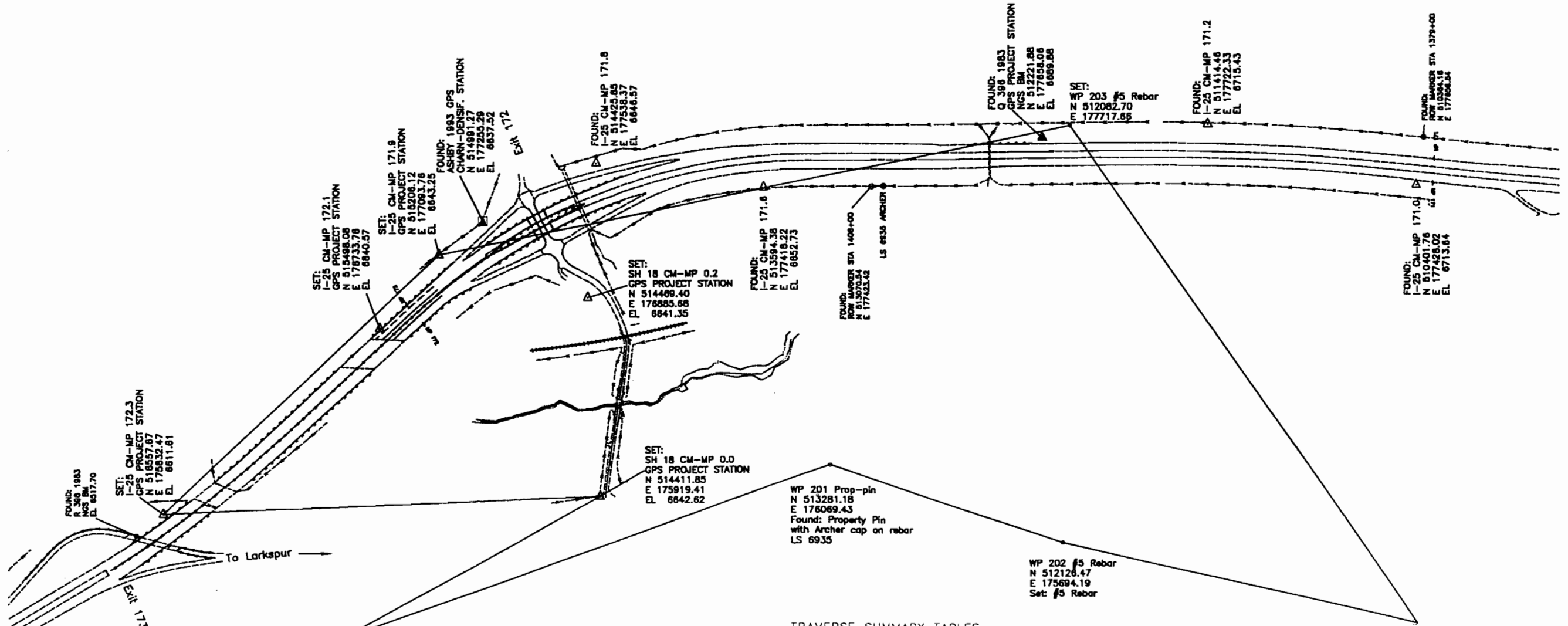


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SH 18 at E. Plum Creek



NW COR. SEC. 27
 T.9 S., R.67 W., 6th P.M.
 N 515690.80
 E 175228.58
 Found: 3" Brass Cap
 LS 2690 (stamped as shown)



NOT TO SCALE

TRAVERSE SUMMARY TABLES
 (UNADJUSTED FIELD DATA)
 PRIMARY CONTROL TRAVERSE

OCCUPIED POINT	BACK POINT	AHEAD POINT	MEAN HORIZ. DIST. (±.02')	MEAN HORIZ. ANG. RT. (±5')
I-25 CM-MP 171.9	WP 201 #5 Rebar	I-25 CM-MP 172.3	1848.66'	148°16'18"
I-25 CM-MP 172.3	I-25 CM-MP 171.9	SH 18 CM-MP 0.0	2147.62'	40°41'58"
SH 18 CM-MP 0.0	I-25 CM-MP 172.3	NW COR. SEC 27	1453.67'	333°56'40"
NW COR. SEC 27	SH 18 CM-MP 0.0	WP 201 Prop-pin	2552.12'	9°08'28"
WP 201 Prop-pin	NW COR. SEC 27	WP 202 #5 Rebar	1214.15'	217°14'20"
WP 202 Prop-pin	WP 201 Prop-pin	RAILROAD RAIL	1768.57'	174°46'50"
RAILROAD RAIL	WP 202 Prop-pin	WP 203 #5 Rebar	2942.24'	42°22'29"
WP 203 Prop-pin	RAILROAD RAIL	I-25 CM-MP 171.9	3185.17'	113°32'50"

NOTE: Closure of unadjusted control traverses are calculated to be greater than 1 part in 50000.

Found: Railroad rail standing on end, protruding 2.6' above ground
 N 510401.73
 E 175302.89

