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INTRODUCTION

The earliest record of bridge inventory and inspection on a Colorado structure is dated 1921. The inspection was accomplished by the State Engineer's office before the Department of Highways(now included in the Department of Transportation) was established. The Department has had a formal bridge inspection program since 1941 under the supervision of the Staff Bridge Engineer. Since its inception, extensive inventory and rating systems have been maintained.

Following the catastrophic failure of West Virginia's Silver Bridge in 1967, the Federal Highway Act of 1968 required that a national bridge inspection standard and bridge inspector training be established. The National Bridge Inspection Standards (NBIS), inspector qualifications, inspection procedures and frequency of inspections were established in 1971. The inventory data was prescribed in FHWA's "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges" Commonly known as the Federal Coding Guide. To this day, albeit it has gone through several updates and revisions, the coding guide remains as the governing document for inspection and appraisal of bridges.

The purpose of this Colorado Coding Guide is to enhance and clarify the Federal Coding Guide. It is not the purpose of the Colorado Coding Guide to change the intent of the Federal Coding Guide but to be a supplement from which inspectors can get more guidelines and direction to properly fill out the Structure Inventory and Appraisal (SI&A) forms necessary for reporting the structure conditions. This guide is based on FHWA's 1995 coding guide.

All of the items in the Federal Coding Guide have been addressed. Several inventory items have been added to provide supplemental information for the Department's reports and to facilitate data base queries. The information contained herein has been divided into sections. Each section is prefaced with a brief explanation of all the items in that section and their interpretation.

All of the items in the manual constitute the record for one structure. The Data Base is set up to require a valid code for each item. A Blank or Fails condition is a valid code in some cases, but not in all situations. Read each item carefully to determine the valid code for each structure.

For questions regarding this manual or proper coding of these items, contact the CDOT Asset Management Unit at (303)757-9187

SECTION I

STRUCTURE INVENTORY AND LOCATION INFORMATION

The items in this Section are designed to identify the location, structural dimensions, design and construction information for each structure. These items are required by the Federal Highway Administration (FHWA) and are used by them to publish statistical information about structures for the entire nation.

This section consists of:

ITEM1	STATE CODE
ITEM2E,2M,2T	STATE HIGHWAY REGIONS
ITEM3	COUNTY CODE
ITEM3A	COUNTY NAME
ITEM4	CITY/TOWN CODE
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ITEM5A,5B,5C,5DN,5DX,5E	INVENTORY ROUTE
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ITEM23D	PROJECT YEAR OF COMPLETION
ITEM23E	SUB ACCOUNT NUMBER
ITEM23F	NAME OF DESIGNER
ITEM23G	NAME OF CONTRACTOR
ITEM23H	NAME OF FABRICATOR
ITEM23I,23J,23K	MICROFILM ROLLS 1,2 & 3
ITEM26	FUNCTIONAL CLASSIFICATIONS
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ITEM29	AVERAGE DAILY TRAFFIC
ITEM30	YEAR OF AVERAGE DAILY TRAFFIC
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ITEM32	APPROACH ROADWAY WIDTH
ITEM33	BRIDGE MEDIAN
ITEM34	SKEW ANGLE
ITEM35	STRUCTURE FLARED
ITEM36A,36B,36C,36D,36H	TRAFFIC SAFETY FEATURES
ITEM37	HISTORICAL SIGNIFICANCE

ITEM38	NAVIGATION CONTROL
ITEM39	NAVIGATION VERTICAL CONTROL
ITEM40	NAVIGATION HORIZONTAL CONTROL
ITEM41	STRUCTURE OPEN, POSTED, OR CLOSED TO TRAFFIC
ITEM42A,42B	TYPE OF SERVICE
ITEM43A,43B	STRUCTURE TYPE - MAIN SPAN
ITEM44A,44B	STRUCTURE TYPE - APPROACH SPANS
ITEM45	NUMBER OF MAIN SPANS
ITEM46	NUMBER OF APPROACH SPANS
ITEM47	INVENTORY ROUTE, TOTAL HORIZONTAL CLEARANCE
ITEM48	LENGTH OF MAXIMUM SPAN
ITEM49	TOTAL STRUCTURE LENGTH
ITEM50A,50B	CURB OR SIDEWALK WIDTHS
ITEM51	BRIDGE ROADWAY WIDTH, CURB TO CURB
ITEM52	DECK WIDTH, OUT-TO-OUT
ITEM53F,53I	MINIMUM VERTICAL CLEARANCE OVER BRIDGE ROADWAY
ITEM54A,54BF,54BI	MINIMUM VERTICAL UNDERCLEARANCE
ITEM55A,55B	MINIMUM LATERAL UNDERCLEARANCE ON RIGHT
ITEM56	MINIMUM LATERAL UNDERCLEARANCE ON LEFT

The Colorado Department of Transportation places structures in two categories, major and minor. Major structures are defined as over 20 feet in length, clear span, as measured along the center line of roadway. All major structures on public roads shall be inspected and reported to FHWA. Minor structures are defined as 4 to 20 feet in length, clear span, as measured along the centerline of roadway. Minor structures are not reported to FHWA. Some of the items in this section are directly affected by, or affect, items in other sections. Where this condition exists, the "Procedure" will describe the proper steps required to complete the item in both sections.

Grade separations, railroad overpasses, pedestrian facilities and interchange structures where more than one highway/roadway is involved require special coding. All routes at a structure must be inventoried and the conditions for each route being inventoried must be recorded. For state highway structures, most of the information for the items in this section will be found on construction plans, but sometimes may be obtained from other sources or by field investigation. Off-system structure information will generally be obtained from field investigation.

Location, route, and physical dimensions of the structure will rarely change, although some items may change due to maintenance repairs, major re-construction, system change or re-alignment. Therefore, the strict attention to detail required in reporting this information cannot be over emphasized.

Item 1 STATE CODE**FHWA****Comment [CD1]:** ITEM IS NOT
USED IN THE PONTIS DATABASE**DESCRIPTION:**

A three digit code used to identify the state where the structure is located. The first two digits are the Federal Information Processing Standards (FIPS) code for State, and the third digit is the FHWA region code.

PROCEDURE:

This item is coded 088 as determined from the list provided in the FHWA Coding Guide. This code is **pre-filled** in the data base.

CODING EXAMPLES:

The code for Colorado is 088.

Data Limits:

DESCRIPTION:

A three part, four digit code to identify the Engineering Regions Maintenance Sections and Transportation Planning Regions of the Colorado Department of Transportation in which the structure is located.

PROCEDURE:

The latest Engineering Region Maintenance Section and Transportation Planning region maps published by the Division of Transportation Development are used to determine the Region and Section where the structure is located.

ITEM2E, The first part of this code is a one digit number for the Engineering Region. The Engineering Region numbers and corresponding office locations are listed below:

REGION #	LOCATION	REGION #	LOCATION
1	Aurora	4	Greeley
2	Pueblo	5	Durango
3	Grand Junction	6	Denver

ITEM2M, The second part is a one digit code for the Maintenance Section number. The Maintenance Section numbers and corresponding office locations are listed below:

SECTION #	LOCATION	SECTION #	LOCATION
1	Greeley	5	Aurora
2	Grand Junction	6	Craig
3	Durango	7	Alamosa
4	Pueblo	8	Denver

ITEM2T, The third part of this code is a two digit number for the Transportation Planning Region. The region numbers and area names are listed below:

REGION #	LOCATION #
1	Northwest
2	Upper Front Range
3	Eastern
4	North Front Range (Ft. Collins)
5	Intermountain
6	Greater Denver
7	Grand Junction
8	Gunnison Valley
9	San Luis Valley
10	Central Front Range
11	Pikes Peak Area
12	Pueblo Region
13	Southeast
14	Southwest
15	South Central

Engineering Region, Maintenance Section Boundaries and Transportation Regions generally parallel county lines; when the proper location for the structure has been determined, code the appropriate number for the Engineering Region in 2E, the Maintenance Section in 2M and the Transportation Region in 2T.

CODING EXAMPLES:

Description	Code		
	2E	2M	2T
Horse Creek in Elbert County south of Kutch	1	5	3
Elk River in Routt County at Clark	3	6	1

Data Limits:

Item2E, Integer, (0 to 9) 1 Digit

Item2m, Integer, (0 to 9) 1 Digit

Item2T, Integer, (0 to 20) 2 Digits

ITEM3 COUNTY NAME**FHWA****Pontis Table and Column bridge.county_County (3)****DESCRIPTION:**

A three digit code to identify the county in which the structure is located.

PROCEDURE:

Each structure can be located by using the latest county maps published by the Division of Transportation Development. For structures located on county lines and maintained by the Division, code the county lowest in alphabetical order. For counties, cities and other municipalities with structures located on county lines, code the county that has the maintenance responsibility.

The source of this code is the current version of the U.S. Census of Population and Housing - Geographic Identification Code Scheme.

Listed below are the Colorado counties and their codes:

COUNTY	CODE	COUNTY	CODE	COUNTY	CODE	COUNTY	CODE
ALAMOSA	003	EL PASO	041	MONTEZUMA	083	YUMA	125
ARAPAHOE	005	FREMONT	043	MONTROSE	085		
ARCHULETA	007	GARFIELD	045	MORGAN	087		
BACA	009	GILPIN	047	OTERO	089		
BENT	011	GRAND	049	OURAY	091		
BOULDER	013	GUNNISON	051	PARK	093		
BROOMFIELD	014	HINSDALE	053	PHILLIPS	095		
CHAFFEE	015	HUERFANO	055	PITKIN	097		
CHEYENNE	017	JACKSON	057	PROWERS	099		
CLEAR CREEK	019	JEFFERSON	059	PUEBLO	101		
CONEJOS	021	KIOWA	061	RIO BLANCO	103		
COSTILLA	023	KIT CARSON	063	RIO GRANDE	105		
CROWLEY	025	LAKE	065	ROUTT	107		
CUSTER	027	LA PLATA	067	SAGUACHE	109		
DELTA	029	LARIMER	069	SAN JUAN	111		
DENVER	031	LAS ANIMAS	071	SAN MIGUEL	113		
DOLORES	033	LINCOLN	073	SEDGWICK	115		
DOUGLAS	035	LOGAN	075	SUMMIT	117		
EAGLE	037	MESA	077	TELLER	119		
ELBERT	039	MINERAL	079	WASHINGTON	121		
		MOFFAT	081	WELD	123		

**PONTIS
CODING EXAMPLE & LOCATION
TAB 5 INVENTORY
TOP LEFT QUADRANT**

County (3):

ITEM3A COUNTY CODE

FHWA

Comment [CD2]: ITEM IS NOT USED IN PONTIS

DESCRIPTION:

A twelve character description to identify the county name.

PROCEDURE:

Each county code in Item3 will have a county name in this Item. This Item will allow county names to be used when necessary for reports.

The source of this code is the current version of the U.S. Census of Population and Housing - Geographic Identification Code Scheme.

Listed below are the Colorado counties and their codes:

CODE	NAME	CODE	NAME	CODE	NAME
001	Adams	045	Garfield	089	Otero
003	Alamosa	047	Gilpin	091	Ouray
005	Arapahoe	049	Grand	093	Park
007	Archuleta	051	Gunnison	095	Phillips
009	Baca	053	Hinsdale	097	Pitkin
011	Bent	055	Huerfano	099	Prowers
013	Boulder	057	Jackson	101	Pueblo
015	Chaffee	059	Jefferson	103	Rio Blanco
017	Cheyenne	061	Kiowa	105	Rio Grande
019	Clear Creek	063	Kit Carson	107	Routt
021	Conejos	065	Lake	109	Saguache
023	Costilla	067	La Plata	111	San Juan
025	Crowley	069	Larimer	113	San Miguel
027	Custer	071	Las Animas	115	Sedgwick
029	Delta	073	Lincoln	117	Summit
031	Denver	075	Logan	119	Teller
033	Dolores	077	Mesa	121	Washington
035	Douglas	079	Mineral	123	Weld
037	Eagle	081	Moffat	125	Yuma
039	Elbert	083	Montezuma		
041	El Paso	085	Montrose		
043	Fremont	087	Morgan		

Comment [CD3]: ITEM NOT USED IN PONTIS

CODING EXAMPLES:

Description	ITEM3	ITEM3A
A structure in Douglas County on I-25	035	Douglas
A structure on a county road at the Arapahoe/Elbert county line, maintained by Elbert County.	039	Elbert

Data Limits:

Text, 12 Characters

ITEM4 PLACE CODE (CITY/TOWN)

FHWA

DESCRIPTION:

A five digit code to identify the municipality in which the structure is located.

PROCEDURE:

The source of these codes is the current version of the U.S. Census of Population and Housing - Geographic Identification Code Scheme. See Appendix "G" for current listing. If a city is encountered that is not on the list, contact The Bridge Management Unit for the assignment of a number.

The following codes apply to Federally owned structures stored in the FEDERAL STRUCTURES DATA BASE only:

Federal Agency	Code
BIA	00091
FEDERAL LANDS	00092
FOREST SERVICE	00093
CORPS OF ENGINEERS	00094

CODING EXAMPLES:

Description	Code
A structure in Denver	20000
A structure between Denver and Castle Rock	00000
A structure not in a city or town	00000

Data Limits:

Integer, (0 to 99999) 5 Digits

ITEM4A CITY/TOWN NAME

CDOT

Comment [CD4]: ITEM NOT USED
IN PONTIS DATABASE

DESCRIPTION:

A twenty-five character description to identify the municipality name.

PROCEDURE:

Each city code in Item4 will have a city name in this item. This item will allow city names to be used when necessary for reports.

The source of these codes is the current version of the U.S. Census of Population and Housing - Geographic Identification Code scheme. See Appendix "G" for current listing. If a city is encountered that is not on the list, contact Staff Bridge for the assignment of a number.

CODING EXAMPLES:

Description

	ITEM4	ITEM4A
A structure in Denver	20000	Denver
A structure in Castle Rock	12415	Castle Rock
Not in a city or town	00000	

Data Limits:

Text, 25 Characters

ITEM5A,5B,5C,5DN,5DX,5E INVENTORY ROUTE

MOD FHWA

DESCRIPTION:

A five part, nine digit code which identifies the record type, the route prefix, the designated level of service, the route number and the directional suffix.

PROCEDURE:

Each part of this item must be completed for each route that intersects a given structure. **"ON"** signifies that the route being inventoried is carried on the structure. **"UNDER"** signifies that the route being inventoried goes under the structure.

ITEM5A, Record Type: A one digit code from the list below to identify that the inventory route is **"ON"** or **"UNDER"** the structure. It cannot be overemphasized that all route-related data must agree with the route being inventoried and identified in ITEM5D whether it is **"ON"** or **"UNDER"** the structure.

When a structure is a tunnel or carries exclusively a railroad, pedestrian traffic, or a building, then code as an **"UNDER"** record only; that is, Item5A will be coded as a 2.

There are situations where a structure needs to have multiple records for the field log or FHWA. Use the appropriate code from the list below to identify these structures.

Description	Code
Route carried "ON" the structure	1
Single route "UNDER" the structure includes tunnels, railroad structures, pedestrian structures	2
Multiple routes "UNDER" the structure.	A - Z

WHERE DUPLICATE STRUCTURE RECORDS EXIST BECAUSE OF UNUSUAL CONDITIONS, USE THE FOLLOWING CODES:

Record not used in the Field Log not reported to FHWA	3
Record used in the Field Log, not reported to FHWA	4
Record not used as a Field Log record, not reported to FHWA, creates a duplicate record	6

ITEM5A,5B,5C,5DN,5DX,5E INVENTORY ROUTE

MOD FHWA

ITEM5B, Route Prefix: A one digit code to identify the type of highway. When two or more routes are concurrent, the highest hierarchy of the routes will be used.

Hierarchy	Code
Interstate Highway	1
U.S. Numbered Highway	2
State Highway	3
County Highway	4
City Street	5
Federal Lands Road	6
State Land Road	7
Other (describe)	8

ITEM5C, Designated Level of Service: A one digit code to identify the level of service for the route. Only those routes legally designated and signed will be identified with a code other than Mainline. The following codes will be utilized:

Designation	Code
None of Below	0
Mainline	1
Alternate	2
Bypass	3
Spur	4
Business Route	6
Ramp, Wye, Connector	7
Service and/or unclassified frontage road	8

ITEM5DN, Route Number (Numeric): on-system structures: Five digits to identify the State Highway number. For county roads, city streets or other roads that are not numbered, code 0.*

ITEM5DX, Route Number (Text): off-system structures: Five characters to identify county road or city street name/number.*

* When two or more routes are concurrent, the highest of the hierarchy of the systems (see Item5B) will be used. If the routes are of the same hierarchy level the lowest numbered route will be used.

* Item5DN is used to facilitate sorting State Highway system structures, and can be used with Off-System structures to facilitate sorting.

Comment [CD5]: ITEM NOT USED IN PONTIS DATABASE

NOTE: ONCE 5DN, AND 5DX ARE ESTABLISHED, DO NOT CHANGE THESE ITEMS WITHOUT APPROVAL OF THE BMS DATA MANAGER.

ITEM5A,5B,5C,5DN,5DX,5E INVENTORY ROUTE

MOD FHWA

ITEM5E, Directional Suffix: This last position is a one digit code indicating the directional suffix to the route number when one is part of the route number. This code is **pre-filled** with a zero.

Comment [CD6]: ITEM NOT USED
IN PONTIS DATABASE

CODING EXAMPLES:

Description	Code				
	5A	5B	5C	5DN	5E
Interstate 70 on the structure	1	1	1	00070	0
U.S. 40 Bypass on the structure	1	2	3	00040	0
D&RGW Railroad I-25 ML under	2	1	1	00025	0

Data Limits

ITEM5A, Integer, (0-9)	1 Digit
ITEM5B, Integer, (0-9)	1 Digit
ITEM5C, Integer, (0-9)	1 Digit
ITEM5DN, Integer, (0-666)	5 Digits
ITEM5DX, Text,	5 Characters
ITEM5E,	1 Digit

ITEM6 FEATURE INTERSECTED

MOD FHWA

DESCRIPTION:

A twenty-five character coded description of the feature(s) intersected by the structure, and a critical facility indicator.

PROCEDURE: The first twenty-four digits, **left justified**, will identify the name(s) of the feature(s) intersected by the structure. When more than one feature is intersected by the structure, the hierarchy is:

(leftmost Highway - Signed number or name
(second) Railroad - abbreviated as RR
(third) Waterway - common or local name

Staff Bridge has designated some common abbreviations or spellings to be used for this item. It is suggested that these common abbreviations be used as often as possible to facilitate searches for specific drainage areas/types. See Appendix "I" for these common abbreviations or spellings.

The 25th position is left blank EXCEPT when the structure is designated a Critical Facility then fill this position with a pound (#) sign.

When a structure is on a frontage/service road or a ramp, an access road or a bike path, it must be identified by one of the following abbreviations **in the 23rd and 24th positions**:

Description	Code
Frontage/Service Road	SR
Ramps	R
Access Roads	AC
Bike Path	BP

CODING EXAMPLES:

Description	Code
Interstate 25 over D&RGW Railroad	D&RGW RR
D&RGW Railroad over Interstate 25	I 25 ML
U.S. 85 over Platte River	S. PLATTE

Data Limits:

Text, 25 Characters

ITEM7 FACILITY CARRIED BY THE STRUCTURE

FHWA

DESCRIPTION:

An eighteen character code to identify the facility carried by the structure, including highway name, route number, street name or railroad name.

PROCEDURE:

The name or description of the facility being carried by the structure will be recorded in narrative form and left justified. Abbreviations may be used, but keep them meaningful and uniform. Refer to Appendix "I" for common uniform abbreviations. Periods may be omitted for extra space and a plus (+) sign may be used for the word "and". Left justify.

If there are two or more facilities on a structure, highways are listed first (leftmost), then railroads, and lastly, topographical features, if any.

CODING EXAMPLES:

Description	Code
Interstate 25 Mainline, Southbound	I 25 ML SBND
Otero Street & D&RGW RR	OTERO ST + D&RGW RR
County Road over Interstate 25	COUNTY ROAD

Data Limits:

Text, 18 Character

ITEM 8 STRUCTURE NUMBER

FHWA

DESCRIPTION:

A fifteen character code to identify the structure number.

PROCEDURE:

Structure numbers can be identified with up to fifteen characters. Each structure is assigned a specific number/name. Once assigned, **this number is unique and should never be revised or reused.** On system numbers are assigned by the BMS Unit. City and county numbers are assigned by the entity. If the structure is replaced, a new number should be assigned. A procedure for structure numbering may be found in Appendix "D". Left justify.

Parallel structures with a closed median should be considered one structure if of similar construction.

If a structure is 20' or less clear span, it is usually considered to be a minor structure. For State Highway (on system), where a structure is designated a minor structure, it will be identified by using a lower case letter (s) in last position (s) of the structure number followed by the word MINOR in upper case letters. The word MINOR will always start in column 9. i.e. A-19-f MINOR.

CODING EXAMPLES:

Structure Number	Code
A-25-AJ on State Highway 55	A-25-AJ
Baca County Bridge BA15-15-43.7-18	BA15-15-43.7-18
P-19-f on State Highway 160	P-19-f MINOR

Data Limits:

Text, 15 Character

ITEM8A ALIAS STRUCTURE NUMBER

CDOT

DESCRIPTION:

A fifteen character code to identify the alternate/commonly used name or structure number name, if one exists.

PROCEDURE:

Record the alternate/commonly used name if one exists. It is important to identify those structures that have to be carried on both the state highway system and city or county road system. This condition, although rare, must be noted to avoid duplication in the FHWA submittal. When recording alternate/commonly used names or numbers, be sure that they are recorded exactly like they have been assigned. Left justify

CODING EXAMPLES:

Description

S.H. Bridge H-02-GG is also a Mesa County
bridge, Str. No. MESA-23.95-E.96
S.H. Bridge F-11-T is also know as
Red Cliff Arch

Code

MESA-23.95-E.96

Red Cliff Arch

Data Limits:

Text, 15 Character

ITEM9 LOCATION

FHWA

DESCRIPTION:

A twenty five character code description of the structure location.

PROCEDURE:

The location will be keyed with a distance to a distinguishable feature on the route such as a road junction or topographical feature. This description will record the distance from the feature to where the structure is located. The distance should be measured in the direction of inventory. For multi-lane facilities the location should be recorded in the direction of the lane the structure is in.

For structures in cities and towns, only the city or town needs to be identified although other identifiers would be helpful.

Abbreviations may be used, but an effort should be made to keep them meaningful and uniform.

CODING EXAMPLES:

Description	Code
3.36 Miles East of Hugo on US 40	3.3 MI E OF HUGO
On Valley Highway in Denver	IN DENVER
Westbound I-70 over SH 26 near Denver	2.2 MI SW OF JCT US 6

Data Limits:

Text, 25 Characters

ITEM10F,10I INVENTORY ROUTE MAXIMUM VERTICAL CLEARANCE MOD FHWA

DESCRIPTION:

A two part, four digit code to identify the maximum usable vertical clearance over the inventory route. This is the **practical** maximum clearance.

PROCEDURE:

ID and record the maximum **practical** vertical clearance for a 10-foot wide lane, **excluding shoulders over the inventory route**. The **practical** vertical clearance represents the location under the structure where a typical high load truck can pass safely. **This vertical clearance location must be in the travel lanes only**. Measurements should be provided at each lane line to supply enough information to determine the correct clearance for this item. See Appendix "K" for instructions on taking and recording measurements.

For structures with multiple openings, the maximum of the practical clearances from all lanes should be reported.

The item must be completed for all structures that present an obstruction to the inventory route. This includes roadway, railroad, pedestrian facilities, tunnels, thru trusses and buildings. Clearances for county roads and city streets under State facilities must also be reported.

When no restrictions exists, code 99 for Item10F and 10I. When a clearance exists but is unknown or unmeasured, code 55 for Item10F and 10I.

Clearances will be measured to the nearest inch and reported in feet and inches. Truncate fractions of inches; do not round up.

ITEM10F, identifies clearance in feet only (2 digits).

ITEM10I, identifies clearance in inches only (2 digits).

CODING EXAMPLES:

Description	10F	10I
Westbound 19'2"	19	02
Clearance 26'6"	26	06
Unrestricted	99	99
Unknown or unmeasured	55	55

Data Limits:

ITEM10F, Integer, (0 to 99)	2 Digits
ITEM10I, Integer, (0 to 12, 55, 99)	2 Digits

ITEM 11 REFERENCE POINT

MOD FHWA

DESCRIPTION:

A seven digit code to identify the structure location according to a common reference point system.

PROCEDURE:

A Reference Point System has been established for state highways to identify the measured distance from the beginning of a route to the features on that route. The beginning of a route is usually the western or southern State Line or sometimes the junction with another highway. Reference points for odd numbered highways increase from South to North. Reference points for even numbered highways increase from West to East. Exceptions are stub routes, measured from their terminus with other highways along their route regardless of direction. This designation should not change.

This item will be coded for the route identified in Item5DN.

When parallel structures at the same location appear in the highway system, the structure carrying traffic in the direction of inventory is identified as the first reference point. The parallel structure in the opposite direction of inventory will be identified with a reference point one thousandth (0.001) mile larger. Code this information to the thousandth.

For county roads, city streets or other roads that are not numbered, code 0.

NOTE: DO NOT CHANGE THIS ITEM WITHOUT EXPLICIT APPROVAL OF BMS DATA MANAGER

CODING EXAMPLES:

<u>Structure</u>	<u>Highway</u>	<u>Ref. Point</u>	<u>Code Item11</u>	<u>Code Item136</u>
L-21-I	50B	39.480	39.480	B
F-16-EO	25A	211.464	211.464	A
F-16-EW	25A	211.465	211.465	A

Data Limits:

Real, (0.0 to 500.000) 7 Digits

ITEM12 BASE HIGHWAY NETWORK FHWA

DESCRIPTION:

A one digit code identifying whether an inventory route identified in Item5DN is on the Base Highway Network or not.

PROCEDURE:

This item is to be coded for all records in the inventory. The Base Highway Network includes the through lane (mainline) portions of the NHS, rural/urban principal arterial system and rural minor arterial system. Ramps, frontage roads and other roadways are not included in the Base Network. For the inventory route identified in Item5DN - Inventory Route, indicate whether the inventory route is on the Base Highway Network or not. Use one of the following codes.

CODING DESCRIPTION:

Description	Code
Inventory Route <u>is not</u> on the Base Network	0
Inventory Route <u>is</u> on the Base Network	1
Structure on I25 on Base Network	1
Structure on SH 13 not on Base Network	0

Data Limits:

Integer, 1 Digit

ITEM13A,13B LRS INVENTORY ROUTE, SUBROUTE NUMBER **FHWA**

DESCRIPTION:

A two part, twelve digit code identifying the LRS Inventory Route and Sub route Number.

PROCEDURE:

If Item12, Base Highway Network has been coded 1, the information to be recorded for this item is the inventory route for the State's linear referencing system (LRS). If Item12 has been coded 0, this entire item should be left blank.

ITEM13A, The LRS, inventory route and Sub route Numbers to be reported in this item must correspond to the LRS inventory route and Sub route Numbers reported by the State for the HPMS. The LRS inventory Route Number is coded in the ten positions of segment 13A, right justified and 0 filled.

The LRS Inventory Route Number can be alphanumeric, but must not contain blanks. The LRS Inventory Number is not necessarily the same as that posted along the roadway, but is a number used to uniquely identify a route within at least a county and perhaps throughout the State.

ITEM13B, The Sub route Number is a number that uniquely identifies portions of Inventory Route sections where duplicate kilometer points occur. These Sub route Numbers, if they exist, are identified in the State's HPMS-LRS records. If there is no Sub route Number, code 00 in this segment.

CODING EXAMPLES:

Description	Item13A	Item13B
Inventory Route 2775, Sub route Number 0	0000002775	00
Inventory Route 2775, Sub route Number 3	0000002775	03

Data Limits:

Item13A, Integer, (0-90,000)	10 Digits
Item13B, Integer, (0-99)	2 Digits

ITEM16D,16M LATITUDE

MOD FHWA

DESCRIPTION:

A two part, six digit code to identify the latitude of the structure.

PROCEDURE:

The latitude can be computed from existing U.S. Geological Survey maps. The point of the coordinate shall be the beginning of the structure in the direction of inventory and shall be coded in degrees, minutes and tenths of minutes.

ITEM16D, Degrees in Latitude.

ITEM16M, Minutes and Tenths of Minutes in Latitude.

CDOT's current required precision is to tenth of minute.

CODING EXAMPLES:

Latitude

	16D	16M
37°27'15"	37	27.3
36°41'42"	36	41.7
40°02'00"	40	02.0

Data Limits:

ITEM16D, Integer, (37 TO 41) 2 Digits

ITEM16M, Real, (0.1 to 59.9) 4 Digits

ITEM17D,17M LONGITUDE

MOD FHWA

DESCRIPTION:

A two part, seven digit code to identify the longitude of the structure.

PROCEDURE:

The longitude can be computed from existing U.S. Geological survey maps. The point of the coordinate shall be the beginning of the structure in the direction of inventory and shall be coded in degrees, minutes and tenths of minutes.

ITEM17D, Degrees of Latitude.

ITEM17M, Minutes and Tenths of Minutes of Latitude.

CDOT's current Fed required is to tenth of minute.

CODING EXAMPLES:

Longitude	Code	
	17D	17M
106°57'20"	106	57.3
109°02'30"	109	02.5
102°30'00"	102	30.0

Data Limits:

ITEM17D, Integer, (102 to 110)	3 Digits
ITEM17M, Real, (0.1 to 59.9)	4 Digits

ITEM18A,18B,18C RANGE, TOWNSHIP AND SECTION **CDOT**

DESCRIPTION:

A three-part, nine character code which identifies the Range, Township and Section for the location of the structure.

PROCEDURE:

This code provides an additional geographic locator for the location of the structure.

ITEM18A, Range, can usually be found on a county map. The Range number is always identified by the "**R**" at the beginning of the number and followed by an "**E**" or "**W**". Record just the number and the "**E**" or "**W**" indicating east or west range. Right justify the range.

ITEM18B, Township, can usually be found on a county map. The Township number is always identified by the "**T**" at the beginning of the number and followed by an "**N**" or "**S**". Record just the number and the "**N**" or "**S**" indicating North or South township. Right justify the township.

ITEM18C, Section, is identified within the Township and Range boundaries and noted in the appropriate square mile box. Record the Section indicator by using the appropriate two digit number between 1 and 36.

CODING EXAMPLES:

Location	Code		
	18A	18B	18C
E-16-NZ Just North of 62nd Av., Arvada	69W	3S	8
MGS-0.5-19 0.5 Miles E. of Co. Rd. 19	57W	3N	5

Data Limits:

ITEM18A, Text, (From 1 to 104) 4 Characters
 ITEM18B, Text, (From 1 to 51) 4 Characters
 ITEM18C, Integer,(From 1 to 36) 2 Digits

5/30/12: See FHWA
 Email Next Page.

ITEM19 BYPASS, DETOUR LENGTH

MOD FHWA

DESCRIPTION:

A two digit code identifying the detour length.

PROCEDURE:

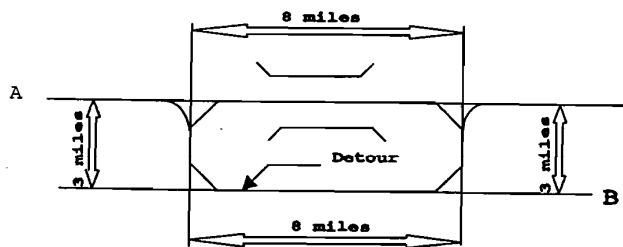
The detour length should identify the total **additional** travel for a vehicle which would result from closing of the structure. This **additional** travel will usually be the sum of the distance traveled **perpendicular to** the route the structure is located on. The parallel distance traveled is not to be counted as part of the detour length. Record the distance to the nearest mile.

Code this item 01 if the structure is one of twin structures, not an interchange, and where the other twin structures can be used as a temporary bypass with a reasonable amount of crossover grading.

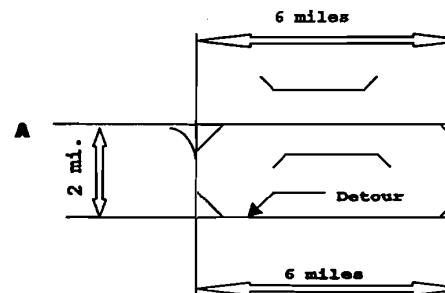
If the structure is an interchange or is otherwise a bypass, code 00. The factor to consider when determining if a bypass is available at the site is the potential for moving vehicles, including military vehicles, around the structure. For instance, a bypass would be available in the case of diamond interchanges, interchanges where there are service roads available, or other interchanges where the positioning and layout of the ramps is such that they could be used without difficulty to get around the structure. Code 99 for 99 miles or more.

Colorado allows any paved roadway to be used as a detour route for state highway structures. The detour route must be capable of carrying State Legal loads. Any passable roadway can be used for Off-System structures. These detours may or may not allow overloads depending on the roadway condition.

Detours may or may not allow overloads depending on the roadway condition.



Bypass, Detour Length A - B = 6 Miles



Bypass, Detour Length A - B = 4 mi

CODING EXAMPLES:

Description	Code
Diamond interchange, structure bypass	00
Cloverleaf, not a bypass; 8 mile detour	08
Structure over highway, no interchange, a bypass at ground level	00
Structure over river; 121 mile detour	99
Structure on dead end road.	99

Data Limits:

Integer, (00 to 99) 2 Digits

White, Steven

From: Matt.Greer@dot.gov
Sent: Wednesday, May 30, 2012 9:54 AM
To: Nord, Mark; White, Steven; Leonard, Mark
Subject: FW: question

fyi

From: Matias, Everett (FHWA)
Sent: Wednesday, May 30, 2012 9:53 AM
To: Shemaka, Ann (FHWA); Moss, Gary (FHWA)
Cc: Greer, Matt (FHWA)
Subject: RE: question

Ann,

Your thoughts are correct the detour should be capable of handling all traffic, and that length is to be used.

Everett

From: Shemaka, Ann (FHWA)
Sent: Wednesday, May 30, 2012 11:00 AM
To: Matias, Everett (FHWA); Moss, Gary (FHWA)
Cc: Greer, Matt (FHWA)
Subject: question

I got a question from Matt that I do not know the answer to and want to solicit some feedback from you.

When computing the detour length, if the shortest distance would use a bridge that is posted and cannot handle all the truck traffic should a longer detour length be entered using a structure that can accommodate all the truck traffic.

I know it talks about military traffic and Matt says that there is no military bases in the vicinity that would use the bridge.

My thoughts are that the detour should include all the traffic so the longer should be used.

Thanks for your consideration.

ITEM20 TOLL

FHWA

DESCRIPTION:

A one digit code to identify whether tolls are paid to use the structure.

PROCEDURE:

To identify the toll status of the structure or the road where the structure is located, select the proper code from the list below:

Description	Code
Toll Bridge, Where tolls are paid specifically to use the structure	1
On Toll Roads, The structure carries a toll road, where tolls are paid to use the facility, which includes both the highway and the structure	2
On Toll Free Road, The structure is toll free and carries a toll free highway	3
On Interstate Road, On Interstate toll segment under Secretarial Agreement. Structure functions as apart of the toll segment	4
Toll Bridge-Secretarial, The structure is separate agreement From highway segment	5

CODING EXAMPLES:

Description	Code
Toll Bridge	1
On Toll Free Road	3

Data Limits:

Integer, (1 to 5) 1 Digit

ITEM21 MAINTENANCE RESPONSIBILITY

FHWA

DESCRIPTION:

A two digit code to identify who has the maintenance responsibility for the structure.

PROCEDURE:

The codes below shall be used to identify the type of agency that has primary responsibility for maintaining the structure. If more than one agency has equal maintenance responsibility, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Description	Code
State Highway Agency	01
County Highway Agency	02
Town or Township Highway Agency	03
City or Municipal Highway Agency	04
State Park, Forest, or Reservation Agency	11
Local Park, Forest, or Reservation Agency	12
Other State Agencies	21
Other Local Agencies	25
Private (other than railroad)	26
Railroad	27
State Toll Authority	31
Local Toll Authority	32
Other Federal Agencies (not listed below)	60
Bureau of Indian Affairs	62
Bureau of Fish and Wildlife	63
U.S. Forest Service	64
National Park Service	66
Tennessee Valley Authority	67
Bureau of Land Management	68
Bureau of Reclamation	69
Corps of Engineers (Civil)	70
Corps of Engineers (Military)	71
Unknown	80

CODING EXAMPLES:

Description	Code
State Highway	01
U.S. Forest Service road	64

Data Limits:

Integer, (1 to 80) 2 Digits

ITEM22 OWNER

FHWA

DESCRIPTION:

A two digit code used to identify who is the primary owner of the structure.

PROCEDURE:

The codes below shall be used to identify the type of agency that has primary ownership for the structure. If more than one agency has equal ownership responsibility, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Description	Code
State Highway Agency	01
County Highway Agency	02
Town or Township Highway Agency	03
City or Municipal Highway Agency	04
State Park, Forest, or Reservation Agency	11
Local Park, Forest, or Reservation Agency	12
Other State Agencies	21
Other Local Agencies	25
Private (other than railroad)	26
Railroad	27
State Toll Authority	31
Local Toll Authority	32
Other Federal Agencies (not listed below)	60
Bureau of Indian Affairs	62
Bureau of Fish and Wildlife	63
U.S. Forest Service	64
National Park Service	66
Tennessee Valley Authority	67
Bureau of Land Management	68
Bureau of Reclamation	69
Corps of Engineers (Civil)	70
Corps of Engineers (Military)	71
Unknown	80

CODING EXAMPLES:

Description	Code
State Highway	01
U.S. Forest Service road	64

Data Limits:

Integer, (1 to 80) 2 Digits

ITEM23 ORIGINAL CONSTRUCTION PROJECT NUMBER **CDOT**

DESCRIPTION:

A twenty-five character code for identifying a project number related to the structure referred to in Item8.

PROCEDURE:

Record the project number related to work being performed on the structure noted in Item8. Any work performed during a construction project on the structure that would upgrade or improve the condition of the structure should be reported. There is no limit on the number of projects allowed for any one structure. Each project is a separate entry and the following items must also be reported for each entry: Item8, 23A, 23B, 23C, 23D, 23E, 23F, 23G, 23H and one or all of the following: 23I, 23J, 23K. Make the information as complete as possible.

For those structures where no project number is available, record "BRIDGE SURVEY" indicating that the structure was located during a structure inventory survey.

CODING EXAMPLE:

Description

Project I70-2(77)
No Project Number

Code

I70-2(77)
BRIDGE SURVEY

Data Limits:

Text, 25 Characters

ITEM23A PROJECT WORK TYPE

CDOT

DESCRIPTION:

A two digit code for identifying the type of work being performed on the project referenced in Item23.

PROCEDURE:

Using the codes listed below, identify the project work type based on the work being performed on the structure. The project type is directly related to the project referred to in Item23. Each project is a separate entry and the following items must also be reported for each entry: Item8, 23, 23B, 23C, 23D, 23E, 23F, 23G, 23H and one or all of the following: 23I, 23J, 23K.

Description	Code
ORIGINAL CONSTRUCTION, No other information available	01
FOUND ON BRIDGE SURVEY, Include the year, if known	02
RESURFACING, With surface material to improve serviceability	07
NEW BRIDGE, Where no bridge was replaced/relocated	08
BRIDGE REPLACEMENT, Where an existing structure was Replaced	09
MAJOR WIDENING, Where structure is widened to specified standards, includes major rehabs, i.e., deck replacement	10
MINOR REHABILITATION, When work is required to correct safety defects on deficiencies, i.e., deck patching upgrade rails, other minor bridge work	11
ENVIRONMENTAL IMPROVEMENTS, Such as noise barriers or beautification work	13
MISCELLANEOUS, For work that cannot be categorized above	14

CODING EXAMPLES:

Description

ITEM23

Project
 No Project Number

ITEM23A

I70-2(77)
 BRIDGE SURVEY

Data Limits:

Integer, (01 to 14) 2 Digits

ITEM23A BLANK

CDOT

NO LONGER USED TO BE DELETED

Data Limits:

Text, 25 Characters

ITEM23B PROJECT COST

CDOT

DESCRIPTION:

A twelve digit code for identifying the cost of the bridge work on the project referred to in Item23.

PROCEDURE:

Record the cost of the structure work on the project referred to in Item23. The cost should include all structure costs, PE, and mobilization where possible. Record all costs to the nearest dollar. When no cost is available, leave blank. Each project is a separate entry and the following items must also be reported for each entry: Item8, 23, 23A, 23C, 23D, 23E, 23F, 23G, 23H and one or all of the following: 23I, 23J, 23k. Make the information as complete as possible.

CODING EXAMPLES:

Description	ITEM23	ITEM23B
Project I70-2(77	I70-2(77)	\$893,968
Bridge/No Project Number Found 1956	BRIDGE SURVEY	Null

Data Limits:

Currency, 12 Digit

ITEM23B BLANK

CDOT

NO LONGER USED TO BE DELETED

Data Limits:

Text, 25 Characters

ITEM23C PROJECT DESCRIPTION

CDOT

DESCRIPTION

A twenty-five character code describing the work to be done on the project referred to in Item23.

PROCEDURE

Provide a general description of the work performed on the project that is identified in Item23. The description should include the terminology noted in Item23B. Make the information as concise as possible. Each project is a separate entry and the following items must also be reported for each entry: Item8, 23A, 23B, 23D, 23E, 23F, 23G, 23H and one or all of the following: 23I, 23J, 23K.

CODING EXAMPLES:

Description	ITEM23	ITEM23C
Project I70-2(77)/Widened	I70-2(77	Widening
No Project Number	BRIDGE SURVEY	BS 1954

Data Limits:

Text, 25 Characters

ITEM23C DATA BASE COMMENTS

CDOT

THIS ITEM TO BE RE-NAMED

DESCRIPTION:

A thirty character code used to manage the Data Base information.

PROCEDURE:

Code any record keeping information necessary to manage the data in the data base. This could be information such as "DUP" to identify the structures that are duplicated or "#GT" to identify those structures in the data base, that will be replaced by gas tax money. Any consistent wording can be used to identify structures within the data base that need coding for some reason.

It is imperative that when this code is no longer needed, it be removed from this item.

CODING EXAMPLE:

Description	Code
Structure E-17-FX	DUP
Baca County Structure BA 15-13-43.7-18 been approved for replacement by gas tax money	#GT

Data Limit:

Text, 30 Characters

ITEM23D PROJECT YEAR OF COMPLETION

CDOT

DESCRIPTION:

A four digit code identifying the year the project referred to in Item23 was completed.

PROCEDURE:

Record the year the project referred to in Item23 was completed or when it was found in the bridge survey. Each project is a separate entry and the following items should also be reported for each entry:Item8, 23, 23A, 23B, 23C, 23E, 23F, 23G, 23H, and one or all of the following 23I, 23J, 23k. Make the information as complete as possible.

Blank is not a valid code.

CODING EXAMPLES:

Description

Item23

Item23D

Project I70-2(77) Built 1968

I70-2(77)

1968

No Project Number Found 1956

BRIDGE SURVEY

1956

Data Limits:

Integer, (1850 to 2050) 4 Digit

ITEM23E SUBACCOUNT NUMBER **CDOT**

DESCRIPTION:

A five digit code identifying the sub account number related to the project number in Item23.

PROCEDURE:

Record the sub account number of the project referred to in Item23. If no number is available, leave blank. Each project is a separate entry and the following items must also be reported for each entry: Items8, 23, 23A, 23B, 23C, 23D, 23F, 23G, 23H, and one or all of the following: 23I, 23J, 23K. Make the information as complete as possible.

CODING EXAMPLE:

Description	Code
Project I70-2 (119)	84009
No Project Number	Leave Blank

Data Limits:

Integer, (0-99999) 5 Digits

ITEM23F DESIGNER

CDOT

DESCRIPTION:

A twenty-five character code identifying the name of the designer assigned to the project number in item23.

PROCEDURE:

Record the name of the designer assigned to the project referred to in Item23. If no name available, leave blank. If the designer is a consultant, the company name is preferable. Each project is a separate entry and the following items must also be reported for each entry: Item8, 23, 23A, 23B, 23C, 23D, 23E, 23H, and one or all of the following: 23I, 23J, 23K. Make the information as complete as possible.

CODING EXAMPLE:

Description	Code
Russ Struckman is designer on project X	Struckman
Lonco is designer on a project	Lonco

Data Limits:

Text, 25 Characters

ITEM23G NAME OF CONTRACTOR

CDOT

DESCRIPTION:

A twenty-five character code identifying the name of the contractor who built the project number referred to in Item23.

PROCEDURE:

Record the name of the contractor who worked on the project referred to in Item23. If no information is available leave blank. Company Names are preferable in this case. Each project is a separate entry and the following items must also be reported for each entry: Item8, 23, 23A, 23B, 23C, 23D, 23E, 23F, 23H, and one or all of the following: 23I, 23J, 23K. Make the information as complete as possible.

CODING EXAMPLE:

Description

Pioneer Construction Co. built project X
CDOT Maint built project Y

Code

Pioneer Const Co
Maint

Data Limits:

Text, 25 Characters

ITEM23H NAME OF FABRICATOR

CDOT

DESCRIPTION:

A twenty five character code identifying the name of the fabricator related to the project number in Item23.

PROCEDURE:

Record the name of the fabricator who provided material for the project referred to in Item23. If no information is available leave blank. The company name is preferred and the fabrication number if available. Each project is a separate entry and the following items must also be reported for each entry:Item8, 23, 23A, 23B, 23C, 23D, 23E, 23F, 23G, and one or all of the following: 23I, 23J, 23K. Make the information as complete at possible.

CODING EXAMPLE:

Description

US Steel fabricated girders, etc. on order #23752

Thompson Conc. provided PREFAB boxes

Code

US Steel, 23752

Thompson Conc.

Data Limits:

Text, 25 Characters

ITEM23I, 23J & 23K MICROFILM ROLLS 1,2 & 3

CDOT

DESCRIPTION:

A three part thirty character code identifying the microfilm roll number or numbers where the data is archived for the project referred to in Item23.

PROCEDURE:

ITEM23I, The first microfilm roll where project data related to the project number in Item23 is archived.

ITEM23J, The second microfilm roll where project data related to the project number in Item23 is archived.

ITEM23K, The third microfilm roll where project data related to the project number in Item23 is archived.

Each project referred to in Item23 should be microfilmed. Record the number of the microfilm roll for the project number in the first part. If more than one roll is used to archive this data, record in the second part. If a third roll is used record its # in the third part. If no information is available, leave blank. Each project is a separate entry and the following items must also be reported for each entry: Item8, 23, 23A, 23B, 23C, 23D, 23E, 23F, 23G and 23K. Make the information as complete as possible.

CODING EXAMPLE:

Description	Code		
	23I	23J	23K
Project IR025-2(183)	BDN256-1990	BDN290-1992	
Project I70-2(77)	Blank (Not microfilmed yet)		

Data Limits:

Item23I, Text, 10 Characters

Item23J, Text, 10 Characters

Item23K, Text, 10 Characters Table, PROJECT

ITEM26 FUNCTIONAL CLASSIFICATIONS

FHWA

DESCRIPTION:

A two digit code to identify the functional classification for the inventory route referred to in Item5DN or Item5DX.

PROCEDURE:

Functional Classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. The classifications are determined through a statewide planning process and approved by the Transportation Commission and then provided to BMS. Any changes to this classification must be addressed through the Division of Transportation Development and approved by the Transportation Commission.

If the structure carries a ramp, frontage road or access road and carries the main line number in Item5D, then it must be coded with the same functional classification (Item26) and NHS number (Item104) as the main line. If the structure carries a county road or city street over an NHS route, the "**ON**" condition must reflect the appropriate codes for the route and the "**UNDER**" condition must reflect the NHS codes.

The following list of codes is used to identify these routes. The appropriate code is based on the inventory route identified in Item5D and Item104.

Description	Code	Item104
<u>Rural</u>		
Principal Arterial-Interstate	01	1
Principal Arterial-Other	02	1
Minor Arterial	06	0
Major Collector	07	0
Minor Collector	08	0
Local	09	0
<u>Urban</u>		
Principal Arterial-Interstate	11	1
Principal Arterial-Other Freeways or Expressways	12	1
Other Principal Arterial.	14	1
Minor Arterial	16	0
Collector	17	0
Local	19	0

CODING EXAMPLES:

Description	Code
Interstate 25 in Denver and Item104 = 1	11
City Street in Vail and Item104 = 0	19

Data Limits:

Integer, (01 to 19) 2 Digits

ITEM27 YEAR BUILT

FHWA

DESCRIPTION:

A four digit code to identify the year in which the structure was originally constructed.

PROCEDURE:

Code all four digits of the year the structure was built. This year should be the date the construction was completed. If widening, rehabilitation or other re-construction is performed on the structure, the date the construction is completed should be coded in Item106, Year Re-constructed.

CODING EXAMPLES:

Description	Code
Found in Bridge Survey, 1954	1954
Built in 1932	1932
Built in 1985	1985

Data Limits:

Integer, (1800 to 2100) 4 Digits

ITEM28A, 28B LANES ON AND UNDER STRUCTURE **FHWA**

DESCRIPTION:

A two part, four digit code to identify the number of lanes on and under the structure.

PROCEDURE:

ITEM28A, Two digits indicating the number of lanes carried on the structure.

ITEM28B, Two digits indicating the number of lanes under the structure.

The codes will identify only the travel lanes which are striped or otherwise operated as a full width traffic lane for the entire length of the structure on or under the structure. This shall include any full width merge lanes and ramp lanes that run the full length of the structure, and shall be independent of direction of usage. Structures shall be classified as one lane structures if the roadway is less than 16'0" curb-to-curb or when one set of runners is placed on the structure.

When the inventory route is "**ON**" the structure and there are multiple routes under the structure, the sum of the total number of lanes for all inventoried routes under the structure shall be coded in Item28B. When the inventory route is "**UNDER**" the structure and there are multiple routes under the structure, the number of lanes under the structure shall be coded for the route being inventoried only.

When the inventory route is "**UNDER**" the structure and the structure carries something other than a roadway (railroad, pedestrian, pipeline, etc.), code Item28A 00. For tunnels, Item28A should be coded 00 and Item28B should be coded with the appropriate number of lanes.

CODING EXAMPLES:

Description	28A	28B
1 lane on, 0 lanes under	01	00
3 lanes on, 1 lane under	03	01
8 lanes on, 4 streets w/12 lanes under	08	12
Railroad on, 4 lanes under	00	04

Data Limits:

ITEM28A Integer, (0 to 20) 2 Digits

ITEM28B, Integer, (0 to 99) 2 Digits

ITEM29 AVERAGE DAILY TRAFFIC

FHWA

DESCRIPTION:

A six digit code to identify the average daily traffic volume (ADT).

PROCEDURE:

Code a six digit number that identifies the ADT volume for the route being inventoried on the structure, **including truck traffic from Item109**. The ADT count must be the most current count available and the data must be compatible with other items coded for the structure, i.e., The traffic count must be divided equally between parallel structures.

For routes under, RR structures, or pedestrian structures, code a six digit number that ID's the ADT volume for the route being inventoried under the structure.

When taking a traffic count, the counter shall be placed as necessary and operated for a minimum period of forty-eight hours, which will include two weekdays. The raw data obtained from the counters shall be adjusted using the seasonal adjustment rate tables provided by the CDOT yearly.

Orphan Roadways = City Streets & County Roads: ADT should be coded as 1.

CODING EXAMPLES:

Description	Code
Adjusted ADT Volume 540	000540
Adjusted ADT Volume 15660	015660

Data Limits:

Integer, (0 to 900000) 6 Digits

ITEM30 YEAR OF AVERAGE DAILY TRAFFIC

FHWA

DESCRIPTION:

A two digit code to identify the year the Average Daily Traffic count in Item29 was taken.

PROCEDURE:

Code the last four digits of the year the ADT (Item29) was taken. This item will be coded for the route being inventoried (Item5DN or Item5DX) at the structure.

Orphan Roadways = City Streets & County Roads: ADT Year should be coded as the current year of entry.

CODING EXAMPLES:

Description	Code
ADT Counted in 1976.	0076
ADT Counted in 1972	0072

Data Limits:

Integer, (0 to 99) 4 Digits Table, ALLDAT

ITEM31 DESIGN LOAD

FHWA

DESCRIPTION:

A one digit code to identify the live load for which the structure was designed.

PROCEDURE:

Use the codes below to identify the live load for which the structure was designed. The numerical value can usually be found on the plan sheets. This includes railroad and pedestrian loadings.

Loading	Code
H 10	1
H 15	2
HS 15	3
H 20	4
HS 20	5
HS 20+Mod	6
Pedestrian	7
Railroad	8
HS 25	9
Other or Unknown (describe on SI&A sheet)	0

This item should not be confused with Item64, Operating Rating or Item66, Inventory Rating. If the design load is not available, code this item with 0.

CODING EXAMPLES:

Description	Code
HS 20 Interstate Alternate Loading (HS20+Mod)	6
Railroad (Cooper E-72)	8
Pedestrian (85psf)	7
Unknown Design Loading	0

Data Limits:

Integer, (0 to 9) 1 Digit

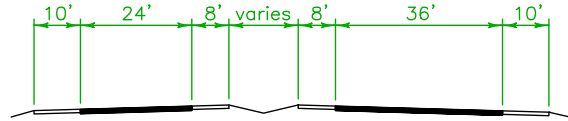
ITEM32 APPROACH ROADWAY WIDTH

FHWA

DESCRIPTION:

A three digit code to identify the normal approach roadway width at the structure.

PROCEDURE:



The approach roadway is the width of the usable traffic lanes and the usable shoulders approaching the structure. Usable shoulders are defined as a shoulder "constructed and normally maintained flush with the adjacent traffic lane, and must be structurally adequate for all weather and traffic conditions consistent with the facility carried". Unstable grass or dirt, with no base course, flush with or beside the traffic lane is not to be considered a shoulder for this item. Median widths which do not qualify as shoulders should not be included.

For structures with medians of any type, this item should be coded as the sum of the usable roadway widths. In this example the total approach roadway is 96 feet, (Code Item32-096).

When there is a variation between the approaches at either end of the structure, record and code the widest roadway condition as compared to the curb-to-curb condition of the structure.

If a ramp is adjacent to the through lanes approaching the structure, it shall be included in the approach roadway width.

In this example the total approach roadway is 94 feet, (Code Item32-096).



CODING EXAMPLES:

Description	Code
Normal roadway width measured at 31'-8"	032
Normal roadway width measured at 119'-4"	119

Data Limits:

Integer, (0 to 300) 3 Digit

ITEM33 BRIDGE MEDIAN

FHWA

DESCRIPTION:

A one digit code to identify the structure median type.

PROCEDURE:

The area between two roadways is considered the median. The median is closed when the area between the two roadways "at the structure" is bridged over and capable of supporting traffic. The median is open when the area between the two roadways "at the structure" is not covered, or connected in such a way as to support traffic. There is no median if the two roadways are separated only by a painted centerline/lane line. If two structures are widened, but not connected and the approach roadway is built with a closed median, consider the structure to have a closed median. Use the list below to determine the appropriate code for each structure. See the examples below.

Description	Code
No median	0
Open Median	1
Closed median (no barrier)	2
Closed median (non-mountable barrier)	3

CODING EXAMPLES:

Description	Code
Str.#F-16-ES parallel to F-16-ET with open Median between structures	1

Data Limits:

Integer, (0 to 3) 1 Digit

ITEM34 SKEW ANGLE

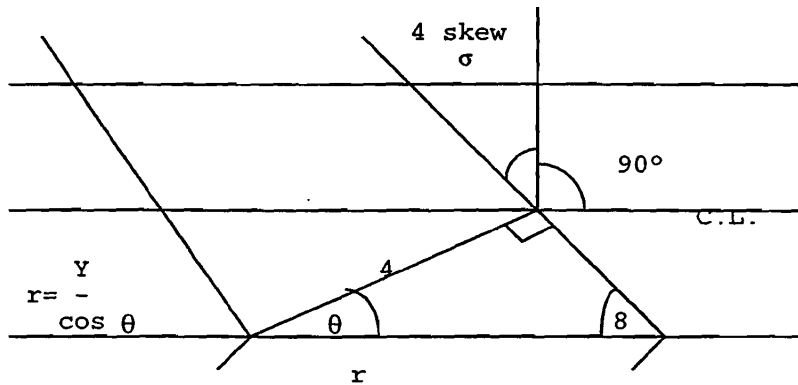
FHWA

DESCRIPTION:

A two digit code to identify the skew angle of the structure.

PROCEDURE:

The skew angle is the angle between the centerline of a pier and a line normal to the roadway centerline. When plans are available, the skew angle can be taken directly from the plans. If no plans are available, the angle should be field measured if possible. Record the skew angle to the nearest degree. Code with 0 if there is no skew angle. When the structure is on a curve or if the skew varies for some other reason, the average skew should be recorded, if reasonable. Otherwise, **record 99 to identify a major variation in the skews** of substructure units.



CODING EXAMPLES:

Description	Code
Str B-16-xx, no skew	0
Str K-18-xx, 7 degree, 43 minute skew	8
Str F-15-xx, 27 degree, 12 minute skew	27

Data Limits:

Integer, (0-to 99) 2 digits

ITEM35 STRUCTURE FLARED

FHWA

DESCRIPTION:

A one digit code to identify if the structure is flared (i.e., the width of the structure varies).

PROCEDURE:

If the width of the structure varies, the structure is considered to be flared. Generally, a variance in the deck width will occur as a result of ramps converging with or diverging from the through lanes on the structure, but there may be other causes. Minor flares at the ends of structures should be ignored.

Description	Code
No flare	0
Yes, flared	1

CODING EXAMPLES:

Description	Code
Str. B-16-X, Flared	1
Str. K-18-CT, No flare	0

Data Limits:

Integer, (0 TO 1) 1 Digit

ITEM36A, 36B, 36C, 36D, 36H TRAFFIC SAFETY FEATURES **MOD FHWA**

DESCRIPTION:

A five part, eight character code to identify the adequacy of the Traffic Safety Features for the route on the structure.

PROCEDURE:

ITEM36A, A one character code indicating structure railing acceptable standard condition.

ITEM36B, A one character indicating approach railing transition acceptable standard condition.

ITEM36C, A one character indicating approach guardrails acceptable standard condition.

ITEM36D, A one character indicating approach guardrail ends acceptable conditions.

Definition	Code
Inspected feature does not meet currently acceptable standards or a safety feature is required and none is provided	0
Inspected feature meets currently acceptable standards	1
Not applicable, or a safety feature is not required, no traffic on structure, e.g., pedestrian structure or railroad structure over highway	N

The important factor in determining adequacy is that each part of the rail system meets currently acceptable standards. An explanation of these standards can be found in Appendix "F". Box culverts and pipes, with fill slopes 3:1 or flatter, are considered acceptable if the horizontal distance from the outside of the travel lanes to the headwall or end of pipe is 30 feet or greater; in such cases code ITEMS36A, 36B, 36C and 36D 1111. If the distance is less than 30 feet, safety rail is required, regardless of slope.

ITEM36H, A four character code indicating guardrail height from the top of bare deck to the top of the rail. Code to the nearest tenth of an inch. Do not code the height from the top of the asphalt since this can vary.

CODING EXAMPLES:

Description	Code
	36 36 36 36 36
	A B C D H
All features of railing meeting currently acceptable standards and is 36" from bare deck to top of rail	1 1 1 1 36.0
Rail transition does not meet currently acceptable standards, the deck has 4" of asphalt and the top of rail is 29" above the top of asphalt	1 0 1 1 33.0

Data Limits:

ITEM36A, Text (0, 1, N) 1 Character
 ITEM36B, Text (0, 1, N) 1 Character
 ITEM36C, Text (0, 1, N) 1 Character
 ITEM36D, Text (0, 1, N) 1 Character
 ITEM36H, Real 4 Characters

ITEM37 HISTORICAL SIGNIFICANCE

FHWA

DESCRIPTION:

A one digit code identifying the historic significance of the bridge or bridge site.

PROCEDURE:

The historical significance of a structure involves many characteristics:

- (1) the structure may represent an example of engineering history;
- (2) the crossing itself might be historically significant;
- (3) the structure may be associated with an historic property or area
- (4) historical significance could be derived from the structure being associated with significant events or circumstances.

A survey of historical structures is conducted periodically and all historical structures are then identified and coded accordingly.

The list of codes below identifies the historical status of each structure.

Unless otherwise noted, all structures will be coded with a "5".

Use one of the following codes:

Description	Code
Structure is on the National Register of Historic Places	1
Structure is eligible for the National Register of Historic Places	2
Structure is possibly eligible for the National Register of Historic Places or is on a State or local historic register (requires further research before determination can be made)	3
Historic significance is not determinable at this time	4
Structure is not eligible for the National Register of Historic Places	5

NOTE: THESE CODES ARE SET BY, AND CAN BE CHANGED ONLY BY AN HISTORICAL BRIDGE SURVEY CONDUCTED BY CDOT's OFFICE OF ENVIRONMENTAL SERVICES.

M-09-D, on SH 149 is of unique engineering design possibly eligible for National Register of Historic Places	3
F-20-BN, on I-70 at Deer Trail, not eligible	5

Data Limits:

Integer, (1 to 5) 1 Digit Table, ALLDAT

ITEM38 NAVIGATION CONTROL

FHWA

DESCRIPTION:

A one digit code to identify whether or not navigation control (a structure permit) is required.

PROCEDURE:

There are no navigable rivers or water courses in Colorado. If a structure is over a waterway, code this item with a 0. If the structure is not over a waterway, code this item with an "N". This code is **pre-filled** in the data base.

CODING EXAMPLES:

Description	Code
Str F-16-JM over the South Platte	0
Str F-16-LM over D&RGW RR and ATSF RR	N

Data Limits:

ITEM39 NAVIGATION VERTICAL CLEARANCE

FHWA

DESCRIPTION:

A three digit code to identify the minimum Navigation Vertical Clearance at the structure.

PROCEDURE:

There are no navigable rivers or water courses in Colorado. Code this item with 000.

Data Limits:

ITEM40 NAVIGATION HORIZONTAL CLEARANCE

FHWA

DESCRIPTION:

A four digit code to identify the minimum Navigation Horizontal Clearance at the structure.

PROCEDURE:

There are no navigable rivers or water courses in Colorado. Code this item with 0000.

Data Limits:

ITEM41 STRUCTURE OPEN, POSTED, OR CLOSED TO TRAFFIC **MOD FHWA**

DESCRIPTION:

A one character code to identify the actual operational status of a structure.

PROCEDURE:

A field review will identify the operational status of a structure. Inspections, re-ratings or structural damage can cause the status to change. Use the list of codes below to identify the operational status of the structure. A structure may be posted in the field but Item70 "Bridge Posting" may indicate that Posting is not required. This is acceptable since Item70 is based on the operating stress level and the governing agency's posting procedures may specify posting at some stress level less than the operating rating.

Description	Code
Open, no restriction	A
Open, posting recommended but not legally implemented (all signs not in place, etc)	B
Open, would be posted or closed except for temporary shoring, etc., to allow for unrestricted traffic	D
Open, temporary structure in place to..... carry legal loads while original structure is closed and awaiting rehabilitation or replacement	E
New structure, not yet open to..... traffic	G
Bridge closed, to all traffic	K
Posted for load, (may include other restrictions)	P
Posted for other load capacity restriction, i.e. speed, number of vehicles on structure, or posted but not required	R
Structure reportedly replaced,..... no confirmation (CDOT's)	S

CODING EXAMPLES:

Description	Code
F-15-AJ - Load Posted, all signs in place	P
F-15-FA - Open with temporary shoring	D

Data Limits:

Text, 1 Character

ITEM42A.42B TYPE OF SERVICE

FHWA

DESCRIPTION:

A two part, two digit code to identify the type of service on and under the structure.

PROCEDURE:

ITEM42A, The first digit of this item is for the **service on the structure**. Select the proper code from the list below.

Description	Code
Highway	1
Railroad	2
Pedestrian-Bicycle	3
Highway/Railroad	4
Highway/Pedestrian	5
Overpass Structure at an Interchange, or Second	
Level of Multilevel Interchange	6
Third Level - Interchange	7
Fourth Level - Interchange	8
Building or Plaza	9
Other	0

NOTE: Of special interest is the description for code 6. This pertains to interchange structures where traffic may change from one route to another by a system of ramps or a cloverleaf, rather than a grade separation, which would be coded 1.

ITEM42B, The second digit is for **service under the structure**. Select the proper code from the list below:

Description	Code
Highway-with or without Pedestrian	1
Railroad	2
Pedestrian-Bicycle	3
Highway/Railroad	4
Waterway	5
Highway/Waterway	6
Railroad/Waterway	7
Highway/Waterway/Railroad	8
Relief	9
Other	0

No code exists for unknown for either part of this code. If the service is unknown, use the code 0 until a determination can be made at the site.

ITEM42A,42B TYPE OF SERVICE

FHWA

CODING EXAMPLES:

Description	Code	
	42A	42B
I-25 over Platte River	1	5
I-76 under I-225 Interchange with ramps	6	1
U.S. 40 over D&RGW RR	1	2

Data Limits:

ITEM42A, Integer,(0 to 9) 1 Digit

ITEM42B, Integer,(0 to 9) 1 Digit

ITEM43A, 43B STRUCTURE TYPE - MAIN SPAN

FHWA

DESCRIPTION:

A two part, three digit code to identify the material, type of design and construction used for the main span.

PROCEDURE:

Use the codes below to identify the type of material and the type of design construction needed to construct a structure.

ITEM43A, The first digit of this item will identify the **type of material and/or design**. Listed below are the descriptions and codes for Item43A.

Description	Code
Concrete	1
Concrete Continuous	2
Steel	3
Steel Continuous	4
Prestress Concrete	5*
Prestress Concrete Continuous	6*
Timber	7
Masonry	8
Aluminum, Wrought Iron or Cast Iron	9
Other	0

*Pre/post tensioned concrete should be coded as prestressed concrete

ITEM43B, The second and third digits will identify the **type of design and/or construction**. Select the proper code from the list below.

Description	Code
Slab	01
Stringer/Multi beam or Girder (I Beam)	02
Girder and Floor Beam System	03
Tee Beam (cast-in-place or pre-cast)	04
Box Beam or Girder - Multiple (Adjacent)	05
Box Beam or Girder - Single or Spread	06
Frame	07
Orthotropic	08
Truss - Deck	09
Truss - Thru/Pony	10
Arch - Deck	11
Arch - Thru	12
Suspension	13
Stayed Girder	14
Movable – Lift	15

ITEM43A, 43B STRUCTURE TYPE - MAIN SPAN

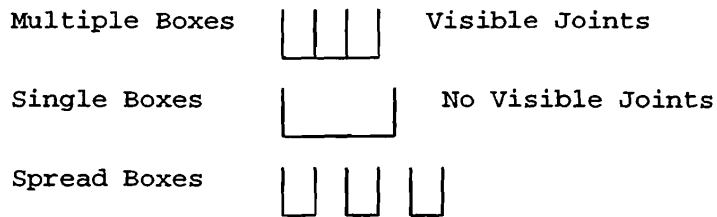
FHWA

Description	Code
Movable – Bascule	16
Movable - Swing	17
Tunnel	18
Culvert	19
Segmental Box Girder	21
Channel Beam	22
Other	00

See Appendix "C" for a cross reference of standard bridge types used by CDOT. This appendix identifies both the type of structure and the code.

BOX GIRDERS:

The following sketches indicate how to identify the different types of boxes:



CODING EXAMPLES:

Description	Code	
	43A	43B
Treated Timber Stringer Structure	7	02
Tunnel in Rock	0	18
Continuous Concrete Box Girder - Prestressed	6	05
Concrete Slab on I-Beam	3	02

Data Limits:

ITEM43A, Integer, (0 to 9) 1 Digit
 ITEM43B, Integer, (0 to 22) 2 Digits

ITEM44A, 44B STRUCTURE TYPE, APPROACH SPANS

FHWA

DESCRIPTION:

A two part, three digit code to identify the material, type of design and construction used for the approach spans.

PROCEDURE:

Use the codes below to identify the type of material and the type of design construction needed to construct the approach spans of a structure.

ITEM44A, The type of material and/or design for the approach spans. Select the proper code from the list below.

Description	Code
Concrete	1
Concrete Continuous	2
Steel	3
Steel Continuous	4
Prestress Concrete	5*
Prestress Concrete Continuous	6*
Timber	7
Masonry	8
Aluminum, Wrought Iron or Cast Iron	9
Other	0

*Pre/post tensioned concrete should be coded as prestressed concrete.

ITEM44B, The type of design and/or construction for the approach spans. Select the proper code from the list below.

Description	Code
Slab	01
Stringer/Multi beam or Girder (I Beam)	02
Girder and Floor Beam System	03
Tee Beam (cast-in-place or pre-cast)	04
Box Beam or Girder - Multiple (Adjacent)	05
Box Beam or Girder - Single or Spread	06
Frame	07
Orthotropic	08
Truss - Deck	09
Truss - Thru/Pony	10
Arch - Deck	11
Arch - Thru	12
Suspension	13
Stayed Girder	14
Movable - Lift	15
Movable - Bascule	16

ITEM44A, 44B STRUCTURE TYPE, APPROACH SPANS **FHWA**

Movable - Swing	17
Tunnel	18
Culvert	19
Mixed types	20
Segmental Box Girder	21
Channel Beam	22
Other	00

EXCEPTIONS:

1. When no one type of material, design or construction is predominant, code Item44A with 0 and Item44B with 20;
2. If all the spans in the structure are the same, they are considered as not having approach spans, code both Items 44A and 44B 000.

CODING EXAMPLES:

Description	Code	
	44A	44B
A steel through truss with timber approach spans	7	02
Tunnel in rock.	0	00
A rigid frame with concrete slab approach spans	1	01

Data Limits:

ITEM44A, Integer, (0 to 9) 1 Digit
 Item44B, Integer, (0 to 22) 3 Digits

ITEM45 NUMBER OF SPANS IN THE MAIN UNIT

FHWA

DESCRIPTION:

A three digit code to identify the number of spans in the main unit of a structure.

PROCEDURE:

Record the number of spans in the main or major unit of the structure. This item will include all spans of most structures, the major unit of a sizable structure only, or a unit of material or design different from that of the approach spans. Dissimilar span types will be recorded as approach spans (Item46).

CODING EXAMPLES:

Description

One Steel through Truss and three Timber Spans
Six Concrete Slab and Girder Spans

Code

001
006

Data Limits:

Integer, (0 to 200) 3 Digits

ITEM46 NUMBER OF APPROACH SPANS

FHWA

DESCRIPTION:

A four digit code to identify the number of approach spans to the major structure, or the number of spans of material different from that of the major structure.

PROCEDURE:

Record the number of spans of different material, design, or construction from that in the main unit spans. These are considered to be approach spans.

CODING EXAMPLES:

Description	Code
Six Concrete slab and girder spans (no approach spans)	0
One Steel through truss and three timber spans	3
Two continuous I-Beam spans and two concrete slab	2

Data Limits:

Integer, (0 to 1000) 4 Digits

ITEM47 INVENTORY ROUTE, TOTAL HORIZONTAL CLEARANCE **MOD FHWA**

DESCRIPTION:

A four digit code to identify the largest available horizontal clearance for the inventory route.

PROCEDURE:

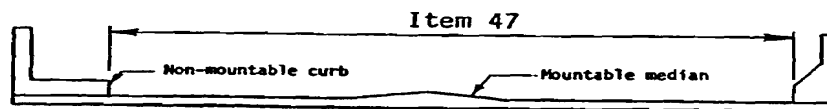
The horizontal clearance should be the largest available clearance measured between restrictive features: curbs, rails, walls, or other structural features limiting the roadway (surface and shoulders). The measurement should be recorded and coded to the nearest tenth of a foot.

This clearance has been identified in 3 ways; use the most applicable:

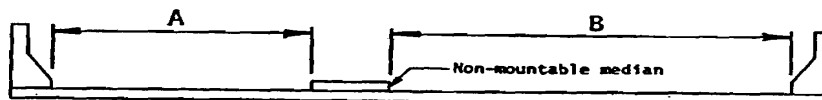
3. Roadway surface and shoulders.
3. Distance from face of pier (or rail around pier) to face of rail or toe of slope.
3. Include flush or mountable medians when Item33 is coded 2, but not raised medians when Item33 is coded 3.
 For a raised or non-mountable median record the greater of the restricted widths in either direction, not both directions.

Mountable medians are considered to be curbs 9-inches high or less. For railroad or pedestrian facilities over the inventory route, code this item for the inventory route. See Appendix "K" for coding railroad & pedestrian facilities

There should be a total horizontal clearance for each structure, therefore, no unknown code exists for this item. For clearances over 100 feet, code 99.9.



No Median or Flush or Mountable Median



Raised Median or Non-mountable Median
 $B > A$ **Item 47 = B**

CODING EXAMPLES:

Description	Code
Horizontal Clearance on Curb-to-curb 38'-6"	38.5
Horizontal Clearance Under from slope to median barrier 50'-5"	50.4

Data Limits:

Real, (.0 to 99.9) 4 Digits

ITEM48 LENGTH OF MAXIMUM SPAN

MOD FHWA

DESCRIPTION:

A four digit code identifying the length of the maximum span.

PROCEDURE:

Record the length of the maximum span in the structure by measuring the open/clear distance between the piers. The measurement shall be along the centerline of the structure. See Appendix "E" for sketches. Code this item to the nearest foot.

CODING EXAMPLES:

Description	Code
Str. F-20-BB, Length 40'-0" C-to-C	0040
Str. G-22-g MINOR, Length 18'-3" (clr).	0018

Data Limits:

Integer, (0 to 1000) 4 Digits

ITEM49 TOTAL STRUCTURE LENGTH

MOD FHWA

DESCRIPTION:

A six digit code to identify the total length of the structure.

PROCEDURE:

Record the length of roadway which is supported on the structure. The length should be measured from the backs of the back walls of abutments or from paving notch to paving notch. For box culverts, pipes, and arches, code the structure length along the centerline from inside faces of exterior walls, see Appendix "E" for sketches.

CODING EXAMPLES:

Description	Code
Str. F-20-BB, Length 44'3" O.to O	000044
Str. G-22-e MINOR, Length 20'-3" (see Appendix E)	000020

Data Limits:

Integer, (0 to 100000) 6 Digits

ITEM50A, 50B CURB OR SIDEWALK WIDTHS

MOD FHWA

DESCRIPTION:

A two part, eight digit code to identify the widths of the left and right curbs or sidewalks.

PROCEDURE:

Record any area between the face of the curb and the outside of the structure that could be considered a curb or sidewalk to the nearest tenth of a foot. See Appendix "E" for detailed sketches to identify the Horizontal Measurements.

ITEM50A, Code with a four digit number to identify the left curb or sidewalk, **determined by the direction of the inventory**. For example, on northbound routes, the sidewalk on the west would be the left sidewalk and the sidewalk on the east would be the right sidewalk.

ITEM50B, Code with a four digit number to identify the right curb or sidewalk, **determined by the direction of the inventory**.

For those structures that have curbs or sidewalks 3'-0" or greater, it is considered to have pedestrian service and Item42A should be checked for the proper type of coding. If there is no curb or sidewalk, code with zeroes. If the curb or sidewalk is greater than 20'.0", code 20.0.

CODING EXAMPLES:

Description	Code		
Left Side	Right Side	50A	50B
None	8.3	00.0	08.3
10.0	4.1	10.0	04.1
13.0	11.5	13.0	11.5

Data Limits:

ITEM50A, Real, (.0 to 20.0) 4 Digits

ITEM50B, Real, (.0 to 20.0) 4 Digits

ITEM51 BRIDGE ROADWAY WIDTH, CURB-TO-CURB

MOD FHWA

DESCRIPTION:

A five digit code to identify the roadway width provided on the structure.

PROCEDURE:

The information recorded here is the most restrictive minimum distance between curbs or rails on the structure. If the median is covered, the distance will be between the outside curbs or rails to include both roadways and median. The measurement should exclude flared areas for ramps or turn lanes; i.e., it should be the minimum or nominal width.

For CBC's or CMP's with headwalls that are at the same level as/or above the roadway, code the total length of the culvert between headwalls. Where the roadway is on fill carried across a culvert and the headwalls or parapets are **below** the roadway, code 0.0.

Raised or non-mountable medians, open medians, barrier widths, and barrier-protected bicycle and equestrian lanes are to be excluded from curb to curb width. See Appendix "E" for detailed sketches.

CODING EXAMPLES:

Description	Code
Structure roadway width curb-to-curb	038.0

Data Limits:

Real, (.0 to 999.9) 5 Digits

ITEM52 DECK WIDTH, OUT-TO-OUT

MOD FHWA

DESCRIPTION:

A five digit code to identify the out-to-out width of the deck.

PROCEDURE:

Record the out-to-out width to the nearest tenth of a foot. If the structure is a through structure, the number to be coded will identify the lateral clearance between superstructure members. The measurement should be exclusive of flared areas for ramps, i.e., it should be the minimum or nominal width.

For CBC's and culverts measure the distance along the length of the culvert from outside of headwall to outside of headwall and code this distance. **This item will always be coded as a width even when the curb-to-curb is coded**
0. If Item51 is coded 0's, then FHWA requires 0's to be coded in this Item. The data sent to FHWA will be changed for this item to meet this requirement. CDOT uses the width information and it will not be altered by this process.

See Appendix "E" for detailed sketches.

CODING EXAMPLES:

Description	Code
Deck width out-to-out 40'- 6"	040.5
Length of A CBC 113' - 0"	113.0

Data Limits:

Real, (.0 to 999.9) 5 Digits

ITEM53F,53I MINIMUM VERTICAL CLEARANCE OVER BRIDGE ROADWAY MOD FHWA

DESCRIPTION:

A two part, four digit code to identify the actual minimum vertical clearance over the structure roadway.

PROCEDURE:

When there is a restriction above the roadway of a structure, use this item to identify the actual minimum vertical clearance above the structure roadway, including shoulders, to any overhead restriction. If there is more than one roadway on the structure, note the minimum clearance for each roadway on the sketch, but record and code the lowest clearance to nearest inch.

If there is no vertical restriction, code 99 for each part. When a restriction is 99 feet or greater, code 99 for Item53F and code 12 for Item53I. If the vertical restriction is UNKNOWN, code 55 for each part.

See Appendix "E" for sketches and for procedures on coding special conditions such as trusses, tunnels, or tri-levels.

ITEM53F, Code the feet portion of actual minimum vertical clearance over the roadway.

ITEM53I, Code the inches portion of actual minimum vertical clearance over the roadway.

CODING EXAMPLES:

Description	Code
	53F 53I
Minimum vertical clearance 16'-8"	16 08
No Vertical Restriction	99 99
Unknown Vertical Clearance	55 55
Minimum Vertical Clearance Greater Than 100'	99 12

Data Limits:

ITEM53F, Integer, (0 to 99) 2 Digits

ITEM53I, Integer, (0 to 12, 55, 99) 2 Digits

ITEM54A, 54BF, 54BI MINIMUM VERTICAL UNDERCLEARANCE

MOD FHWA

DESCRIPTION:

A three part, five character code to identify the minimum vertical clearance beneath the structure.

PROCEDURE:

Whenever a structure intersects a roadway or a railroad, a minimum vertical under clearance must be recorded from the roadway or railroad track beneath the structure to the underside of the superstructure. Item 42B must be coded correctly to reflect a roadway or railroad. The minimum vertical under clearance is taken in the **travel lanes only**. Code the total clearance regardless of height to the nearest inch. (When multiple roadways or both a railroad and a highway are under the structure, code the most critical dimension.)

If not over a highway or railroad, the code 00 will be recorded for Item54BF and Item54BI and the code "N" will be recorded for Item54A. If the under clearance is unknown, code 00 for Item54BF and code 01 for Item54BI. For under clearances greater than 99', code 99 for Item54BF and code 12 for Item54BI.

ITEM54A, This mandatory code identifies whether the restriction is from a highway or a railroad. Using one of the codes below, code in the first position, the reference feature from which the clearance measurement is taken:

Description	Code
Highway beneath structure	H
Railroad beneath structure	R
Feature not a highway or railroad	N

ITEM54BF, identifies in feet the minimum vertical clearance beneath the structure.

ITEM54BI, identifies in inches the minimum vertical clearance beneath the structure.

See Appendix "E" for sketches and for procedures in coding special conditions.

ITEM54A, 54BF, 54BI MINIMUM VERTICAL UNDERCLEARANCE

MOD FHWA

CODING EXAMPLES:

Description	Code		
	54A	54BF	54BI
Minimum Clearance of 17' 10" from RR to Structure.....	R	17	10
Minimum Clearance of 34' 04" from Highway to Structure.....	H	34	09
Not Applicable.....	N	00	00
Minimum Clearance unknown.....	H	00	01

Data Limits:

Item54A, Text, (H,R,N) 1 Character
 Item54BF, Integer (0 to 99) 2 Digits
 Item54BI, Integer (0 to 12) 2 Digits

ITEM55A, 55B MINIMUM LATERAL UNDERCLEARANCE ON RIGHT MOD FHWA

DESCRIPTION:

A two part, five character code to identify the minimum lateral under clearance on the right edge of the roadway or railroad.

PROCEDURE:

When a structure has a minimum vertical under clearance, it will also have a lateral under clearance on the right. The lateral clearance should be measured from the **right** edge of the travel-way or from the centerline of the right-hand set of tracks of a railroad to the nearest substructure unit (pier, abutment, etc.), to a rigid barrier, or to the toe of a slope steeper than 3 to 1. The clearance measurements are recorded to the nearest tenth of a foot and will be the minimum measurement after measuring the clearance from **both** directions of travel. i.e., In the case of dual roadways, this would mean the outside clearances of both roadways should be measured and recorded, then code the smaller distance. If two unrelated features, RR and roadway, are below the structure, measure the lateral clearances of both and record the lesser measurement. Ramps are not considered in this item. The clearance should always be measured from the right edge of the **through** roadway.

If the feature beneath the structure is not a railroad or highway, code 99.9 for not applicable. For structures where the clearance has not be measured, code 99.0.

See Appendix "E" for sketches.

ITEM55A, Code the reference feature using one of the codes listed below:

DESCRIPTION	CODE
Highway beneath structure	H
Railroad beneath structure	R
Feature not a highway or railroad	N

ITEM55B, Code the minimum lateral under clearance in feet and tenths of feet.

NOTE: This item should usually match Item54A "Minimum Vertical Under clearance", however, it may differ where the highway (or railroad) is critical in one feature and not in the other.

CODING EXAMPLES:

Description	Code
	55A 55B
Railroad 20.4' centerline to pier	R 20.4
Highway 20.2' edge of pavement to pier	H 20.2
Creek beneath structure	N 99.9

Data Limits:

Item55A, Text, (H, R, N) 1 Character
 Item55B, Real, (0 to 99.9) 4 Digits

ITEM56 MINIMUM LATERAL UNDERCLEARANCE ON LEFT **MOD FHWA**

DESCRIPTION:

A four digit code to identify the minimum lateral under clearance on the left (median) side of a divided roadway.

PROCEDURE:

The left lateral clearance should be measured from the **left** edge of the travel way to the nearest substructure unit, to a rigid barrier, or to the toe of slope steeper than 3:1. In the case of a dual highway, the median side clearances of both roadways should be measured and recorded, and the smaller distance coded.

If there are no obstructions in the median area, a notation of "open" should be noted on the sketch and 99.9 should be coded. For clearances greater than 99.8 feet, code 99.8. For those structures where there is no left lateral clearance code 00.0 for not applicable. For structures where clearances have not been measured, code 99.0.

See Appendix "E" for sketches.

CODING EXAMPLES:

Description	CODE
I 25 ML Under Franklin St., NB 4.4', SB 3.2	3.2
County Road Under I 25, No Median	99.9
Creek Under I 70	00.0

Data Limits:

Real, (0 to 99.9) 4 Digits

SECTION II

COLORADO RATINGS

#ITEM58	DECK
#ITEM59	SUPERSTRUCTURE
#ITEM60	SUBSTRUCTURE
#ITEM61	CHANNEL AND CHANNEL PROTECTION
#ITEM62	CULVERTS
#ITEM63	OPERATING RATNG METHOD
#ITEM64	OPERATING RATING
#ITEM65	INVENTORY RATING METHOD
#ITEM66	INVENTORY RATING
#ITEM66A	GIRDER OPERATING RATING
#ITEM66L	LOAD FACTOR RATING INDICATOR
#ITEM66S	CONTROLLING OPERATING RATING INDICATOR
#ITEM66T	ASPHALT/FILL THICKNESS

Use the following guidelines to evaluate ITEMS58 through 62. These guidelines are designed to promote uniformity between inspectors.

Condition ratings are used to identify, in overall terms, the existing, in-place structure as compared to the as-built condition. Evaluation is for the materials related, physical condition of the deck, superstructure, and substructure components of the structure. The condition evaluation of culverts, channels, and channel protection is also included with additional guidelines for proper coding.

The correct assignment of a condition code must consider both the severity of the deterioration or disrepair and the extent to which it is widespread throughout the component being evaluated. Condition codes are properly used when they provide an overall characterization of the general condition of the entire component being evaluated. Conversely, they are improperly used if they attempt to describe localized or nominally occurring instances of deterioration or disrepair. Correct assignment of a condition code must, therefore, consider both the severity of the deterioration or disrepair and the extent to which it is widespread throughout the component being evaluated.

The load-carrying capacity will not be used in evaluating condition items. The fact that a structure was designed for less than current legal loads and may be posted shall have no influence upon condition ratings.

Portions of structure that are being supported or strengthened by temporary members will be evaluated based on their actual condition; that is, the temporary members are not considered in the evaluation of the item. (See ITEM103 "Temporary Structure Designation" for the definition of a temporary structure.)

A newly completed structure not yet opened to traffic, if evaluated, shall be coded as if open to traffic.

Tunnels will be appraised as one unit and the evaluated condition will be coded the same in ITEMS58, 59 and 60. ITEMS62 and 69 will be coded "N".

ITEM58 DECK

FHWA

DESCRIPTION:

A one character code which identifies the overall condition of the deck.

PROCEDURE:

Using the General Condition Ratings below, code the overall condition of the deck. Code all culverts as "N".

Concrete decks should be inspected for cracking, scaling, spalling, leaching, chloride contamination, potholding, delamination and full or partial depth failures. Steel decks should be inspected for broken welds, section loss, and growth of corrosion. Timber decks should be inspected for splitting, crushing, fastener failure and deterioration from rot.

The condition of the wearing surface/protective system, joints, expansion devices, curbs, sidewalks, parapets, fascias, structure rail, and scuppers shall not be considered in the overall deck evaluation, however, their condition should be noted on the Inspection form.

Decks integral with the superstructure will be rated as a deck only, and not how they may influence the superstructure rating. Similarly, the superstructure at the integral deck-type structure will not influence deck evaluation.

Description:

	Code
Not applicable.....	N
Excellent Condition.....	9
Very Good Condition-no problems noted	8
Good Condition-some minor problems	7
Satisfactory Condition-structural elements show some minor deterioration	6
Fair Condition-all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.....	5
Poor Condition-advanced section loss, deterioration, spalling or scour	4
Serious Condition-loss of section, deterioration spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present	3
Critical Condition-Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.....	2
Imminent Failure Condition – major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service	1
Failed Condition-out of Service-beyond corrective action	0

ITEM58 DECK

FHWA

CODING EXAMPLES:

Description	Code
Deck Slab, light to moderate transverse and/or random cracking.....	7
Deck Slab, local failures, temporary shoring Required	3

Data Limits:

Text, (0,1,2,3,4,5,6,7,8,9,N) 1 Character

ITEM59 SUPERSTRUCTURE

FHWA

DESCRIPTION:

A one character code that identifies the physical condition of all superstructure members.

PROCEDURE:

Using the General Condition Ratings below, inspect the superstructure members for signs of distress including cracking, deterioration, section loss, and malfunction and misalignment of bearings. Fracture critical components will always receive careful attention because failure could lead to collapse of a span or the entire structure. Code “N” for all culverts.

The physical condition of bearings, joints, paint system, etc., shall **NOT** be included in this evaluation, except in extreme situations, but should be noted on the inspection form.

On structures where the deck is integral with the superstructure, the superstructure condition evaluation may be affected by the deck condition. The resultant superstructure condition evaluation may be lower than the deck condition evaluation where the girders have deteriorated or been damaged.

Description:	Code
Not applicable.....	N
Excellent Condition.....	9
Very Good Condition-no problems noted	8
Good Condition-some minor problems	7
Satisfactory Condition-structural elements show some minor deterioration	6
Fair Condition-all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.....	5
Poor Condition-advanced section loss, deterioration, spalling or scour.....	4
Serious Condition-loss of section, deterioration spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present	3
Critical Condition-Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.....	2
Imminent Failure Condition – major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service	1
Failed Condition-out of service-beyond corrective action	0

ITEM59 SUPERSTRUCTURE

FHWA

Coding Examples:

Description	Code
Girders, Minor problems noted7	
Steel Girders, Minor measurable section loss	5
Concrete Girders, Minor spalling with reinforcement exposed	4
Timber Girder, Split or broken.....	3
Empirical Superstructure Component Rating	6
The structure has 12 rocker bearings. One of the bearings has become misaligned. No other superstructure problems are Detected.....	8*

*Make special note of misaligned bearing and bring to the attention of the Bridge Inspection Engineer.

Data Limits:

Text, (0,1,2,3,4,5,6,7,8,9,N) 1 Character

ITEM60 SUBSTRUCTUREMOD

FHWA

DESCRIPTION:

A one character code which identifies the condition of the substructure components.

PROCEDURE:

Using the General Condition Ratings below, rate the condition of piers, abutments, piles, fenders, footings, or other components.

All substructure elements will be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion.

Code "N" for all culverts.

The substructure condition rating will be made independent of the deck and superstructure.

Integral-abutment, wingwalls up to the first construction or expansion joint, shall be included in the evaluation. For non-integral superstructure and substructure units, the substructure shall be considered as the portion below the bearings. For structures where the substructure and superstructure are integral, the substructure shall be considered as the portion below the superstructure. The rating given by ITEM113 "Scour Critical Bridges" may have a significant effect on this item of existing scour has substantially affected the overall condition of the substructure. Use the following table to determine the effect that Item113 has on this item, if it is the controlling factor:

If Item113 = 4, then Item60 = 5

If Item113 ≤ 2, then Item60 ≤ 3

Description	Code
Not applicable.....	N
Excellent Condition.....	9
Very Good Condition – no problems noted.....	8
Good Condition – some minor problems.....	7
Satisfactory Condition – structural elements show some minor deterioration	6
Fair Condition – all primary structural elements are sound but may have minor section loss, cracking, spalling or scour	5
Poor Condition – advanced section loss, deterioration, spalling or scour	4
Serious Condition – loss of section, deterioration spalling or scour have seriously affected primary structural components. Local failures are possible. fatigue cracks in steel or shear cracks in concrete may be present	3
Critical Condition – Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.....	2

ITEM60 SUBSTRUCTUREMOD

FHWA

Imminent Failure Condition – major
 deterioration or section loss
 present in critical structural
 components or obvious vertical
 or horizontal movement affecting structure
 stability. Bridge is closed to traffic
 but corrective action may put back in light
 service..... 1
 Failed Condition – out of service – beyond
 corrective action 0

CODING EXAMPLES:

Description	Code
Piles, Minor section loss	5
Footings, Advanced section loss	4
Footings Scour, Close or monitor frequently (ITEM113=2).....	2
Slope Paving, Minor problems noted	7
Empirical Substructure Component Rating.....	4

Data Limits:

Text, (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, N) 1 Character

ITEM61 CHANNEL AND CHANNEL PROTECTION

FHWA

DESCRIPTION:

A one character code to identify the physical condition of the channel and channel protection.

PROCEDURE:

Rate the physical conditions associated with the flow of water through the structure and the condition of the channel, riprap, slope protection, or stream control devices, including spur dikes. Particular attention should be paid to visible signs of excessive water velocity such as undermining or erosion, and/or realignment of the stream. Use the codes listed below to best describe the situation:

Description	Code
Not applicable. Use when bridge is NOT over waterway	N
There are no noticeable deficiencies affecting the condition of the channel	9
Banks are protected or well vegetated. river control devices and embankment protection are not required or are in a stable condition	8
Bank protection needs minor repairs. River control devices and embankment protection have a little minor damage. Banks and/or channel have minor amounts of drift.....	7
Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. There is minor streambed movement evident. Debris restricting waterway slightly	6
Bank protection is being eroded. River control devices and /or embankment have major damage. Trees and brush restrict the channel.....	5
Bank and embankment protection is severely undermined. River control services have severe damage. Large deposits of debris are in waterway	4

ITEM61 CHANNEL AND CHANNEL PROTECTION

FHWA

Description

Code

Bank protection has failed/River control devices destroyed. Streambed aggradation, degradation or lateral movement has changed waterway is now threatening the structures and/or approach roadway	3
Structure near collapse due to waterway course change	2
Structure closed due to channel failure. Corrective action may allow light service	1
Structure closed due to channel failure. Replacement Necessary	0

CODING EXAMPLES:

Description

Code

Stream Stability, Good Condition	8
Riprap, Fair Condition	6
Spur Dikes, Good Condition	8
Empirical Channel Component Rating.....	7

Data Limits:

Text, (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, N) 1 Character

ITEM62 CULVERTS

FHWA

DESCRIPTION:

A one character code to identify the overall condition of a culvert.

PROCEDURE:

This item evaluates the alignment, settlement, joints, structural condition, scour, and other items associated with culverts. Integral wingwalls to the first construction or expansion joint shall be included in the evaluation. Use the descriptions and codes listed below to best describe the overall condition of the culvert.

Description

Code

Not applicable. Use if structure is not a culvert	N
No deficiencies	9
No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scraps marks caused by drift.....	8
Shrinkage cracks, light scaling, and insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift with no mis-alignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature, with superficial corrosion and no pitting	7
Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.....	6
Moderate to major deterioration/disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or mis-alignment. Noticeable scouring or erosion at curtain walls, wing walls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting	5

ITEM62 CULVERTS

FHWA

Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joint permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting..... 4

Any condition identified in Code 4, but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slab. Integral wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforation 3

Integral wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can not support embankment. Complete under-mining at curtain walls and pipes. Corrective action required to maintain traffic. Metal culverts have extreme distortion and deflection throughout with extensive perforations due to corrosion 2

Structure closed. Corrective action may allow light use 1

Structure closed. Replacement necessary 0

ITEM58-Deck, ITEM59-Superstructure, and ITEM60-Systructure shall be coded “N” for all culverts, that is where ITEM43B is coded 19.

See Report No. FHWA-1P-86-2 Culvert Inspection Manual, July 1986 for detailed information regarding inspection and rating of culverts.

ITEM62 CULVERTS

FHWA

CODING EXAMPLES:

Description	Code
Wall Alignment, Good Condition	9
Wall Stability, Good Condition.....	8
Foundation, Good Condition.....	8
Concrete, Fair Condition	6
Empirical Culvert Condition Rating.....	8

Data Limits:

Text, (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, N) 1 Character

ITEM63 OPERATING RATING METHOD

FHWA

DESCRIPTION:

One digit code to indicate which rating method was used to determine the operating rating.

PROCEDURE:

Use one of the codes below to indicate which rating method was used to determine the operating rating coded in ITEM64.

Description

	Code
Load Factor (LF)	1
Allowable Stress (AS)	2
Load & Resistance Factor	3
Load Testing	4
No Rating Analysis Performed	5

CODING EXAMPLES:

Description	Code
Structure F-16-FD	1
CBC E-16-BR Not Rated	5

Data Limits:

Integer, 1 Digit

ITEM64 OPERATING RATING

MOD FHWA

DESCRIPTION:

A three digit code to identify the absolute maximum permissible HS20 load level to which the structure may be subjected.

PROCEDURE:

The operating rating should be determined by using the latest edition of the "AASHTO Manual for Maintenance Inspection of Bridges". When the rating is determined for each major member, the rating for each should be recorded on the Rating Summary Sheet. Code the controlling operating rating chosen from the rated members.

The coded amount should not be an exterior girder. In certain cases an exterior girder may be used if it actually carries a direct wheel load. If a deck controls, code ITEM66A and ITEM66S accordingly. Use the codes below for the first digit to identify the type of loading used.

Description	Code
HS20.....	2
Railroad	7
Pedestrian	8
Gross load.....	9

For HS loadings, the total weight in tons of the entire vehicle should be coded; that is, HS20 shall be coded 236 even through the HS20 lane loading controls and is used to determine the rating.

The second and third digits will be the gross load in tons.

If the structure is closed and/or will not carry any live load, the second and third digits will be coded 00. If the structure will not carry a minimum of 3 tons at the operating level. IT MUST BE CLOSED. For railroad loadings code the second and third digits with the Cooper Class or its equivalent if known. If unknown, code 00. For pedestrian loadings code 00.

For structures that have not been rated, code 936 which is the gross load for an HS20 truck. For concrete structures that have been visually rated and load reductions are not required, code 240.

The use or presence of a temporary structure will require ITEMS64 and 66 to be coded as 200 even though the temporary structure is rated for as much as full legal load. A structure shored up or repaired on a temporary basis is considered a temporary structure and the operating rating should be coded as if the temporary shoring were NOT in place. See ITEM103 "Temporary Structure Designation" for definition of a temporary structure.

Code 90 for a structure under sufficient fill such that, according to AASHTO design, the live load is insignificant in the structure load capacity.

Please see next page for Technical Memorandum Dated 1/16/2009 for coding changes.

CODING EXAMPLES:

Description	Code
HS20 unit 31,000 lbs.....	231
HS20 unit, 26,000 lbs.....	226
Temporary bridge.....	200
Shored-up bridge.....	203
Structure under sufficient fill that live load is insignificant	90
*Load capacity without shoring	

Data Limits:

Integer, (200-299, 700-800, 936, 999) 3 Digits

MEMORANDUM

DEPARTMENT OF TRANSPORTATION

Design / Construction Branch
4201 E. Arkansas Avenue, Room 330
Denver, Colorado 80222
(303) 757-9309 FAX (303) 757-9197



DATE: Friday, January 16, 2009
TO: Users of AASHTOWare Pontis for Colorado DOT

Bridge Asset Management
Records
Load Rating Data

FROM: Mark A. Nord, P.E.
Bridge Asset Management Engineer
SUBJECT: Bridge Asset Management Technical Memorandum
AASHTOWare Pontis 4.1.1
Coding of Load Ratings

This memorandum is to document how load ratings are to be coded into AASHTOWare Pontis 4.1.1.

History

AASHTOWare Pontis 4.1.1 is used to create the NBI Update files that are submitted to FHWA on or before April 1st of each year. Load ratings greater than or equal to 100 tons were discovered to be incorrect in the NBI Update files. Specifically, only the first three digits of the load rating are used to create the NBI Update file. This results in an incorrect value since the load rating values in the NBI Update file includes an assumed decimal place between the 2nd and 3rd digit.

Policy

Code no load rating greater than 90 tons Customary U.S. in the load rating fields:

NBI Item 64, Operating Rating [Table & Column Name: `bridge.orload`], and
NBI Item 66, Inventory Rating [Table & Column Name: `bridge.irload`].

Code load ratings greater than 90 tons Customary U.S. in the Alternate Load Ratings fields:

Alt. Operating Rating [Table & Column Name: `bridge.altorload`], and
Alt. Inventory Rating [Table & Column Name: `bridge.altirload`]

Commentary

The use of the Alternate Load Ratings fields for the actual rating values when they exceed 90 tons Customary U.S. is so that the actual values will be in the AASHTOWare Pontis 4.1.1 database.

Concurrence

Jeffrey A. Anderson, P.E.
Bridge Inspection Engineer

Mark A. Leonard, P.E.
Staff Bridge Engineer

Mahmood "Mac" Hasan, P.E.
Project Support Engineer

ITEM65 INVENTORY RATING METHOD

MOD FHWA

DESCRIPTION:

One digit code to indicate which rating method was used to determine the inventory rating.

PROCEDURE:

Use one of the codes below to indicate which rating method was used to determine the inventory rating coded in ITEM66.

Description	Code
Load Factor (LF)	1
Allowable Stress (AS)	2
Load and Resistance Factor (LRFR)	3
Load Testing	4
No Rating Analysis Performed.....	5

CODING EXAMPLES:

Description	Code
Structure F-16-FD Load Factor Rated	1
CBC E-16-BR Not Rated	5

Data Limits:

Integer, 1 Digit

ITEM66 INVENTORY RATING

MOD FHWA

DESCRIPTION:

A three digit code to identify the load level which can safely utilize the structure for an indefinite period of time.

PROCEDURE:

The inventory rating should be determined by using the latest edition of the "AASHTO Manual for Maintenance Inspection of Bridges". When the rating is determined for each major member, the rating for each should be recorded on the Rating Summary Sheet. Code the controlling inventory rating chosen from the rated members.

The coded amount should not be an exterior girder. In certain cases an exterior girder may be used if it actually carries a direct wheel load. If a deck controls, code ITEM66A and ITEM66S accordingly.

The first digit will identify the type of loading. Select the correct code from the list below:

Description	Code
HS20.....	2
Railroad Loading.....	7
Pedestrian or Special Loading.....	8
Gross Load Only.....	9

The second and third digits will be the gross load in tons.

If the bridge is closed and/or will not carry a minimum of 3 tons of live load, the second and third digits will be coded 00. For railroad loadings code the second and third digits with the Cooper Class or its equivalent if know. If unknown, code 00. For pedestrian loadings code 00.

If the structure will carry 3 tons at the inventory level, the structure may be posted **NO TRUCKS** but remain open for cars.

For structures that have not been rated, code 936 which is gross load for an HS20 truck. For concrete structures that have been visually rated and load reductions are not required, code 236.

The use or presence of a temporary structure will require Items64 and 66 to be coded as 200 even though the temporary structure is rated for as much as full legal load. A structure shored up or repaired on a temporary basis is considered a temporary structure and the inventory rating should be coded as if the temporary shoring were not in place.

ITEM66 INVENTORY RATING

MOD FHWA

See ITEM103 "Temporary Structure Designation" for definitin of a temporary structure.

Code 90 for a structure under sufficient fill such that, according to AASHTO design, the live load is insignificant in the structure load capacity.

Please see next page for Technical Memorandum Dated 1/16/2009 for coding changes.

CODING EXAMPLES:

Description	Code
HS Truck – 26,000 lbs.	226
Pedestrian Loading.....	800
Temporary bridge.....	200
Shored-up bridge.....	203*
Structure under sufficient fill that live load is insignificant	90

*Load capacity without shoring

Data Limits:

Integer, (200-299, 700-800, 936, 999) 3 Digits

MEMORANDUM

DEPARTMENT OF TRANSPORTATION

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DATE: Friday, January 16, 2009
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FROM: Mark A. Nord, P.E.
Bridge Asset Management Engineer
SUBJECT: Bridge Asset Management Technical Memorandum
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Coding of Load Ratings

This memorandum is to document how load ratings are to be coded into AASHTOWare Pontis 4.1.1.

History

AASHTOWare Pontis 4.1.1 is used to create the NBI Update files that are submitted to FHWA on or before April 1st of each year. Load ratings greater than or equal to 100 tons were discovered to be incorrect in the NBI Update files. Specifically, only the first three digits of the load rating are used to create the NBI Update file. This results in an incorrect value since the load rating values in the NBI Update file includes an assumed decimal place between the 2nd and 3rd digit.

Policy

Code no load rating greater than 90 tons Customary U.S. in the load rating fields:

NBI Item 64, Operating Rating [Table & Column Name: `bridge.orload`], and
NBI Item 66, Inventory Rating [Table & Column Name: `bridge.irload`].

Code load ratings greater than 90 tons Customary U.S. in the Alternate Load Ratings fields:

Alt. Operating Rating [Table & Column Name: `bridge.altorload`], and
Alt. Inventory Rating [Table & Column Name: `bridge.altirload`]

Commentary

The use of the Alternate Load Ratings fields for the actual rating values when they exceed 90 tons Customary U.S. is so that the actual values will be in the AASHTOWare Pontis 4.1.1 database.

Concurrence

Jeffrey A. Anderson, P.E.
Bridge Inspection Engineer

Mark A. Leonard, P.E.
Staff Bridge Engineer

Mahmood "Mac" Hasan, P.E.
Project Support Engineer

ITEM66A GIRDER OPERATING RATING

CDOT

Description:

A three digit code to identify the most restrictive operating rating of the girders of the structures.

PROCEDURE:

The operating rating should be determined by using the latest edition of the "AASHTO Manual for Maintenance Inspection of Bridges". When the rating is determined for each major member, the rating for each should be recorded on the Rating Summary Sheet. Code the controlling **GIRDER** operating rating.

Do not code the rating of an exterior girder unless, it actually carries a direct wheel load.

If the structure is closed and/or will not carry any live load or if a temporary structure is in use, code 00. For railroad loadings, pedestrian loadings and tunnels, leave blank. For structures that have been visually rated and load reductions are not required, code 40.

For structures that have not been rated, code 936.

A structure shored up or repaired on a temporary basis is considered a temporary structure but coded with the girder operating rating for the **repaired condition**.

CODING EXAMPLES:

Description

Code

HS20 Operating Rating, Interior

Girder – 44 Tons 44

Data Limits:

Integer, (0-199, 936, Blank) 3 Digits

ITEM66L LOAD FACTOR RATING INDICATOR

CDOT

DESCRIPTION:

A one character code to identify the type of rating that is completed on the structure.

PROCEDURE:

Use the codes listed below to identify the type of rating that has been recorded for the structure.

Description	Code
Deck rating controlled, SWAG rating recorded. A load Factor rating will be done later	S
Structure rated using working stress only, includes timber structures and trusses	2
Visual rating only	5
Yes, Load Factor Rating Complete	1
Structure to be replaced soon, no rating performed. (recheck periodically)	#

CODING EXAMPLES:

Description	Code
Structure has been load factor rated	1
Structure has a visual rating only	5

Data Limits:

Text, 1 Character

ITEM66S CONTROLLING OPERATING RATING INDICATOR

CDOT

DESCRIPTION:

A one character code to identify which load carrying member of the structure is coded with the controlling operating rating in ITEM64.

PROCEDURE:

The controlling operating rating is chosen from the Rating Summary Sheet and coded in ITEM64. Chose from the codes below that best describe.

Description	Code
Exterior girder rating used for both the inventory and operating ratings	E
A combination of both deck and girder ratings used for inventory/operating ratings.	M
Not applicable, railroad, pedestrian loads or tunnel.....	N
The slab rating used for both the inventory and operating ratings	S
The girder, culvert or non-slab member used for the inventory and operating ratings.....	X

CODING EXAMPLES:

Description	Code
Interior girder controls, HS Truck=35,000 lbs.	X
Slab rating controls, HS Truck=24,000 lbs.	S

Data Limits;

Text, 1 Character

ITEM66T ASPHALT/FILL THICKNESS

CDOT

DESCRIPTION:

A five digit code to identify the asphalt thickness on the structure, or the fill depth on the culvert.

PROCEDURE:

The asphalt thickness or depth of fill will be checked at the structure and recorded on the inspection report. The amount of fill will be measured to the nearest foot and coded to the nearest inch. The asphalt thickness will be coded to the nearest quarter inch.

CODING EXAMPLES:

Description	Code
Structure has 5" measured asphalt.....	5.0
CBC has 4.5 feet of fill	54.0

Data Limit:

Real Number, 0-200.0) 5 digits

SECTION III

APPRAISAL

FHWA

The intention of the "Appraisal" Section is to evaluate the structure as a unit in relation to the highway system of which it is a part. The structure should be compared to a new one built to current standards for that type of highway.

This section consists of:

#ITEM67	STRUCTURAL CONDITION
#ITEM68	DECK GEOMETRY
#ITEM69	UNDERCLEARANCE, VERTICAL AND HORIZONTAL
#ITEM70	SAFE LOAD CAPACITY
#ITEM71	WATERWAY ADEQUACY
#ITEM72	APPROACH ROADWAY ALIGNMENT

ITEMS67, 68, 69, and 70 are not completed by the inspector.

ITEMS67, 68, and 69 are calculated by computer while ITEM70 will be determined by the BMS unit based on the results of the load rating provided by the Bridge Rating unit.

ITEMS71 and 72 will be coded by the inspector with a 1 digit code that indicates the appraisal rating for the item based on the actual condition that exists in the field. The codes for these items, based on the inspectors appraisal, are as follows:

Description	Code
Not applicable.....	N
Superior to present desirable criteria	9
Equal to present desirable criteria	8
Better than present minimum criteria	7
Equal to present minimum criteria	6
Somewhat better than minimum adequacy to tolerate being left in place as is	5
Meets minimum tolerable limits to be left in place as is	4
Basically intolerable requiring high priority of corrective action	3
Basically intolerable requiring high priority of replacement	2
This value of rating code not used.....	1
Bridge closed.....	0

Completed structures not yet opened to traffic, if rated, shall be appraised as if open to traffic. Design values, for example ADT, shall be used for the evaluation. The data provided will include a code of "G" for ITEM41 "Structure Open, Posted, or Closed to Traffic."

DESCRIPTION:

A one character code to identify the overall condition of the structure.

PROCEDURE:

This item is calculated and updated automatically. This item identifies the overall condition of the structure taking into account all major structural deficiencies.

The Code will be based on the value obtained from Table 1 which evaluates the inventory rating (HS equivalent) shown for various traffic volumes. The following specifications are also used to determine the correct code.

- For structures other than culverts, the lowest of the codes obtained from ITEM59-Superstructure, ITEM60-Substructure, or Table 1 is used.
- For culverts, the lowest of the codes obtained from Item62 Culverts, or Table 1 is used.
- If ITEM59, ITEM60 or ITEM62 is coded 1, then ITEM67 is equal to zero (0), regardless of whether the structure is actually closed. However, if the structure is closed, it does not mean that this value is zero (0) unless the overall condition and appraisal ratings indicate that a code of 0 is appropriate.

Table 1 Notes:

1. Use the lower rating code for values between those listed in the table.
2. Only the HS20 live load rating shall be used in establishing the Inventory Rating.
3. All bridges on the Interstate system shall be evaluated using the ADT column of >5000 regardless of the actual ADT on the structure.

ITEM67 STRUCTURAL CONDITION

FHWA

TABLE 1. Rating by Comparison of ADT –
Item29 and Inventory Rating – Item66

Structural Evaluation Rating Code	Inventory Rating		
	Average Daily Traffic (ADT)		
	0-500	501-5000	>5000
9	>236* (HS20)**	>236 (HS20)	>236 (HS20)
8	236 (HS20)	236 (HS20)	236 (HS20)
7	231 (HS17)	231 (HS17)	231 (HS17)
6	223 (HS13)	225 (HS14)	227 (HS15)
5	218 (HS10)	220 (HS11)	222 (HS12)
4	212 (HS7)	214 (HS8)	218 (HS10)
3	Inventory rating less than value in rating code of 4 and requiring corrective action.		
2	Inventory rating less than value in rating code of 4 and requiring replacement.		
0	Bridge closed.		

*Coded HS rating load (typical)

**HS Designation (typical)

CODING EXAMPLES:

Description

Code

Structure has 490 ADT, HS20 load of 231,
ITEM59 = 8, Item60 = 8 7

Structure has 585 ADT, HS20 load of 221,
ITEM59 = 7, ITEM60 = 8 5

DATA LIMITS:

Text, (0,1,2,3,4,5,6,7,8,9,N)

1 Character

ITEM68 DECK GEOMETRY

FHWA

DESCRIPTION:

A one character code to identify the overall rating for the structure deck geometry.

PROCEDURE:

This item is calculated and updated automatically.

The overall rating for deck geometry includes two evaluations:

- (a) the curb-to-curb or face-to-face of rail bridge width using Table 2A, B, C or D and (b) the minimum vertical clearance over the structure roadway using Table 2E. The lower of the codes obtained from these tables is used as the code.

When an individual table lists several deck geometry rating codes for the same roadway width under a specific ADT, use the lower code.

(e.g. table 2A lists deck geometry rating codes of 6, 7 and 8 for 44 roadway width and an ADT of >5000, use the code of 6). For values between those listed in the tables the lower code is always used.

The curb-to-curb or face-to-face of rail dimension shall be taken from ITEM51 "Bridge Roadway Width, Curb-to-Curb". ITEM53 "Minimum Vertical Clearance Over Bridge Roadway" shall be used to evaluate the vertical clearance. If ITEM51 is coded 0, then ITEM68 should be coded N.

The values provided in the tables are for rating purposes only. Current design standards must be used for structure design or rehabilitation.

ITEM68 DECK GEOMETRY

FHWA

Table 2A & 2B. Rating by Comparison of ADT – ITEM29 and Bridge Roadway Width, Curb-to-Curb – ITEM51

Deck Geometry Rating Code	TABLE 2A						TABLE 2B	
	Bridge Roadway Width 2 Lanes; 2-Way Traffic						Bridge Roadway Width 1 Lane; 2-Way Traffic	
	ADT (Both Directions)						ADT (Both Directions)	
	0-100	101-400	401-1000	1001-2000	2001-5000	>5000	0-100	>100
9	>32	>36	>40	>44	>44	>44	-	-
8	32	36	40	44	44	44	15'11"	-
7	28	32	36	40	44	44	15	-
6	24	28	30	34	40	44	14	-
5	20	24	26	28	34	38	13	-
4	18	20	22	24	28	32 (28*)	12	-
3	16	18	20	22	26	30 (26*)	11	15'11"
2	Any width less than required for a rating code of 3 and structure is open							
0	Bridge Closed							

*Use value in parentheses for structures longer than 200 feet.

Notes:

1. Use the lower rating code for values between those listed in the table.
2. Dimensions are in feet.
3. For 1 lane of one way traffic, use Table 2A.
4. For 3 or more undivided lanes of 2 way traffic, use Table 2C, Other Multilane Divided Facilities.
5. Do not use Table 2B for code 9 and for codes 8 through 4 inclusive when the ADT>100. Single lane structures less than 16 fee wide carrying 2 way traffic are always appraised at 3 or below if they carry more than an ADT of 100.
6. One lane structures 16 feet and greater in roadway width, which are not ramps, are evaluated as a 2 lane bridge using Table 2A.

ITEM68 DECK GEOMETRY

FHWA

TABLE 2C & 2D. Rating by Comparison of Number of Lanes – ITEM28 and Bridge Roadway Width,
 Curb-to-Curb – ITEM51

Deck Geometry Rating Code	TABLE 2C Bridge Roadway Width 2 or More Lanes Each Direction				TABLE 2D Bridge Roadway Width 1-Way Traffic Ramps Only	
	Interstate and Other Divided Freeways		Other Multilane Divided Facilities			
	2 Lanes	3 or More Lanes	2 Lanes	3 or More Lanes	1 Lane	2 or More Lanes
9	>42	>12N+24	>42	>12N+18	>26	>12N+12
8	42	12N+24	42	12N+18	26	12N+12
7	40	12N+20	38	12N+15	24	12N+10
6	38	12N+16	36	12N+12	22	12N+8
5	36	12N+14	33	11N+10	20	12N+6
4	34(29)*	11N+12 (11N+7)*	30	11N+6	18	12N+4
3	33 (28)*	11N+11 (11N+6)*	27	11N+5	16	12N+2
2	Any Width less than required for a rating code of 3 and structure is open.					
0	Bridge Closed					

*Use value in parentheses for structures longer than 200 feet.
 N=number of lanes of traffic

Notes:

1. Use the lower rating code for values between those listed in the tables
2. Dimensions are in feet.
3. Use Table 2C, "Other Multilane Divided Facilities", for 3 or more undivided lanes of 2 way traffic.

ITEM68 DECK GEOMETRY

FHWA

TABLE 2E. Rating by Comparison of Minimum Vertical Clearance over Bridge Roadway – ITEM53 and Functional Classification – ITEM26

Deck Geometry Rating Code	Minimum Vertical Clearance		
	Functional Class		
	Interstate and Other Freeways	Other Principal and Minor Arterials	Major and Minor Collectors and Locals
9	>17'-0"	>16'-6"	>16'-6"
8	17'-0"	16'-6"	16'-6"
7	16'-9"	15'-6"	15'-6"
6	16'-6"	14'-6"	14'-6"
5	15'-9"	14'-3"	14'-3"
4	15'-0"	14'-0"	14'-0"
3	Vertical clearance less than value in rating code of 4 and requiring corrective action.		
2	Vertical clearance less than value in rating code of 4 and requiring replacement.		
0	Bridge Closed		

Notes

1. Use the lower rating code for values between those listed in the table.
2. Dimensions are in feet and inches.

CODING EXAMPLES:

Description	Code
Structure meets Interstate Standards has 2 foot area outside shoulders	8
Structure is 2 feet narrower than approach travel lanes	2

Data Limits:

Text
 (0,1,2,3,4,5,6,7,8,9,N)
 1 Character

ITEM69 UNDERCLEARANCE, VERTICAL AND HORIZONTAL

FHWA

DESCRIPTION:

A one character code to identify the appraisal of horizontal and vertical clearance under the structure.

PROCEDURE:

This item is calculated and updated automatically.

Vertical and horizontal underclearances are measured from the through roadway to the superstructure or substructure units, respectively. Code “N” is used unless the structure is over a highway or railroad.

The vertical underclearances is evaluated using Table 3A the horizontal underclearance is evaluated using Table 3B. The lower of the codes obtained from Table 3A and Table 3B is used by the Edit/Update Program.

Structures seldom are closed due to deficient underclearances, however, these structures may be good candidates for rehabilitation or replacement.

ITEM54 – Minimum Vertical Underclearance, ITEM55 – Minimum Lateral Underclearance on Right, and ITEM56 – Minimum Lateral Underclearance on Left are used to evaluate this item.

The functional classification used in the table is for the underpassing route. Therefore, the functional classification is obtained from the record for the route “under” the bridge (see ITEM5 – Inventory Route).

If the underpassing route is not on a Federal-aid system, is not a defense route, or is not otherwise important, an “under” record may not be available. If no “under” record exists, it is assumed that the route under the structure is a major or minor collector or a local road for the purpose of using Tables 3A and 3B.

ITEM69 UNDERCLEARANCE, VERTICAL AND HORIZONTAL

FHWA

Table 3A. Rating by Comparison of Minimum Vertical Underclearance – ITEM54 and Functional Classification of Underpassing Route – ITEM26

Underclearance Rating Code	Minimum Vertical Underclearance				
	Functional Class				Railroad
	Interstate and Other Freeways	Other Principal and Minor Arterials	Major and Minor Collectors and Locals		
9	>17'-0"	>16'-6"	>16'-6"	>16'-6"	>23'-0"
8	17'-0"	16'-6"	16'-6"	16'-6"	23'-0"
7	16'-9"	15'-6"	15'-6"	15'-6"	22'-6"
6	16'-6"	14'-6"	14'-6"	14'-6"	22'-0"
5	15'-9"	14'-3"	14'-3"	14'-3"	21'-0"
4	15'-0"	14'-0"	14'-0"	14'-0"	20'-0"
3	Underclearance less than value in rating code of 4 and requiring corrective action.				
2	Underclearance less than value in rating code of 4 and requiring replacement.				
0	Bridge Closed				

Notes

1. Use the lower rating code for values between those listed in the tables.
2. Dimensions are in feet and inches.
3. The functional classification of the underpassing route shall be used in the evaluation. If an **"UNDER"** record is not coded, the underpassing route shall be considered a major or minor collector or a local road.

ITEM69 UNDERCLEARANCE, VERTICAL AND HORIZONTAL

FHWA

Table 3B. Rating by Comparison of Minimum Lateral Underclearances Right & Left – ITEM55 and 56, the Functional Classification of Underpassing Route – ITEM26

UnderClearance Rating Code	Minimum Lateral Underclearance						
	Functional Class						
	1-Way Traffic				2-Way Traffic		Railroad
	Principal Arterials – Interstate Freeways or Expressways				Other Principal and Minor Arterials	Major and Minor Collectors and Locals	
	Main Line		Ramp				
	Left	Right	Right	Left			
9	>30	>30	>4	>10	>30	>12	>20
8	30	30	4	10	30	12	20
7	18	21	2	9	21	11	17
6	6	12	2	8	12	10	14
5	5	11	2	6	10	8	11
4	4	10	2	4	8	6	8
3	Underclearance less than value in rating code of 4 and Requiring corrective active						
2	Underclearance less than value in rating code of 4 and Requiring replacement						
0	Bridge Closed						

Notes:

1. Use the lower rating code of values between those listed in the tables
2. Dimensions are in feet.
3. When acceleration for deceleration lanes or ramps are provided under 2-way traffic, use the value from the right ramp column to determine code.
4. The functional classification of the underpassing route shall be used in the evaluation. If an **“UNDER”** record is not coded, the underpassing route shall be considered a major or minor collector or a local road.

CODING EXAMPLES:

Description	Code
Clearance 15’-2”-has been hit numerous times.....	3
Clearance 16’-9”	7

Data Limits:

Text,(0,1,2,3,4,5,6,7,8,9,N)
 1 Character

ITEM70 BRIDGE POSTING

FHWA

DESCRIPTION:

A one digit code to identify the load level capacity category of a structure at the states operating level.

PROCEDURE:

This item evaluates the load capacity of a structure in comparison to the state legal load. It differs from ITEM67 "Structural Evaluation" in that ITEM67 uses ITEM66 inventory rating while the bridge posting requirement is based on ITEM64 operating rating. This item will be coded by the Bridge Management unit.

Code this item 0 to 4 only if the legal load of the state exceeds that permitted under the operating rating of the type 3 truck. This item is also related to Item41: If ITEM70 equals 5, then ITEM 41 must be coded A,D,E, or G. If ITEM70 is less than 5, then ITEM41 must be coded B,K,P, or R.

The use or presence of a temporary structure affects the coding. The actual operating rating of the temporary structure should be used to determine this item. However, the highway agency may choose to post at a lower level. This also applies to structures shored up or repaired on a temporary basis.

Description	Code
Posting required.....	0,1,2,3 or 4
No posting required.....	5

The degree that the operating rating stress level is under the maximum legal load stress level may be used to differentiate between codes, as a guide and for coding purposes only, the following values may be used to code this item:

Description	Code
Type 3 Truck Capacity	
Equal to or Greater Than 27 Tons	5
24 to 26 Tons	4
22 to 23 Tons	3
19 to 21 Tons	2
16 to 18 Tons	1
0 to 15 Tons	0

CODING EXAMPLES:

Description	Code
Structure has type 3 truck rating of 21	2
Structure has type 3 truck rating of 36	5

Data Limits:

Integer
 (0 to 5)
 1 Digit

ITEM71 WATERWAY ADEQUACY

FHWA

DESCRIPTION:

A one character code to identify the appraisal of the waterway opening with respect to passage of flow through the structures.

PROCEDURE:

This item appraises the waterway opening with respect to passage of flow through the structure. The following codes shall be used in evaluating waterway adequacy (interpolate where appropriate). Site conditions may warrant somewhat higher or lower ratings than indicated by the table (e.g., flooding of an urban area due to a restricted structure opening).

Where overtopping frequency information is available, the description given in the table for change of overtopping mean the following:

Remote -	greater than 100 years
Slight -	11 to 100 years
Occasional -	3 to 10 years
Frequent-	less than 3 years

Adjectives describing traffic delays mean the following:

Insignificant	-	Minor inconvenience. Highway passable in a matter of hours.
Significant	-	Traffic delays of up to several days.
Severe	-	Long term delays to traffic with resulting hardship.

Item 26 – Functional Classification			
Principal Arterials – Interstates, Freeways or Expressways	Other Principal and Minor Arterials and Major Collectors	Minor Collectors, Locals	Description
Code			
N	N	N	Bridge not over waterway
9	9	9	Bridge deck and roadway approach above flood water elevations (high water). Chance of overtopping is remote.
8	8	8	Bridge deck above roadway approaches. Slight chance of overtopping roadway approaches.
6	6	7	Slight chance of overtopping bridge deck and roadway approaches.
4	5	6	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with insignificant traffic delays.
3	4	5	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with significant traffic delays.
2	3	4	Occasional overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	3	Frequent overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	2	Occasional or frequent overtopping of bridge deck and roadway approaches with severe traffic delays.
0	0	0	Bridge closed.

ITEM71 WATERWAY ADEQUACY

FHWA

CODING EXAMPLES:

Description	Code
Structure never overtopped	9
Structure on interstate overtopped once in last three years.....	4

DATA LIMITS:

Text
(0,2,3,4,5,6,7,8,9,N)
1 Character

ITEM72 APPROACH ROADWAY ALIGNMENT

FHWA

DESCRIPTION:

A one character code that identifies the adequacy of the approach roadway alignment.

PROCEDURE:

Code the rating based on the adequacy of the approach roadway alignment. This item identifies those structures which do not function properly or adequately due to the alignment of the approaches. It is not intended that the approach roadway alignment be compared to current standards but rather to the existing highway alignment. This concept differs from other appraisal evaluations. The establishment of set criteria to be used at all bridge sites is not appropriate for this item. The basic criteria is how the alignment of the roadway approaches to the bridge relate to the general highway alignment for the section of highway the bridge is on.

The individual structure shall be rated in accordance with the general appraisal rating guide described on page 453 in lieu of specific design values. The approach roadway alignment will be rated intolerable (a code of 3 or less) only if the horizontal or vertical curvature requires a substantial reduction in the vehicle operating speed from that on the highway section. A very minor speed reduction will be rated a 6, and when a speed reduction is not required, the appraisal code will be an 8. Additional codes may be selected between these general values.

For example, if the highway section requires a substantial speed reduction due to vertical or horizontal alignment, and the roadway approach to the structure requires only a very minor additional speed reduction at the structure, the appropriate code would be a 6. This concept shall be used at each bridge site.

Speed reductions necessary because of structure width and not alignment shall not be considered in evaluating this item.

CODING EXAMPLES:

Description

Code

Data Limits:

Integer, (0,1,2,3,4,5,6,7,8,9,N)

1 Character

SECTION IV

PROPOSED IMPROVEMENTS AND INSPECTION DATE

FHWA

The items in this section will be completed for all structures. If the structure meets the requirements of Structurally Deficient or Functionally Obsolete as defined to Appendix "B", improvement costs and related data must be calculated. If the structure is not structurally deficient or functionally obsolete, then ITEMS75, 76 and ITEMS94 through 97 are coded with zeroes.

This section consists of:

#ITEM75A,75B	TYPE OF WORK
#ITEM76	LENGTH OF STRUCTURE IMPROVEMENT
#ITEM90A,90B	INSPECTION DATE
#ITEM91	DESIGNATED INSPECTION FREQUENCY
#ITEM92A,92B,92C	CRITICAL FEATURE INSPECTION
#ITEM93A,93B,93C	CRITICAL FEATURE INSPECTION DATE
#ITEM94	BRIDGE IMPROVEMENT COST
#ITEM95	ROADWAY IMPROVEMENT COST
#ITEM96	TOTAL PROJECT COST
#ITEM97	YEAR OF IMPROVEMENT COST ESTIMATE
#ITEM98A,98B	BORDER BRIDGE
#ITEM99	BORDER BRIDGE STRUCTURE NUMBER
#ITEM100	DEFENSE HIGHWAY DESIGNATION
#ITEM101	PARALLEL STRUCTURE DESIGNATION
#ITEM102	DIRECTION OF TRAFFIC
#ITEM103	TEMPORARY STRUCTURE DESIGNATION
#ITEM104	HIGHWAY SYSTEM OF THE INVENTORY ROUTE
#ITEM105	FEDERAL LANDS HIGHWAYS
#ITEM106	YEAR RECONSTRUCTED
#ITEM107	DECK STRUCTURE TYPE
#ITEM108A, 108B, 108C	WEARING SURFACE/PROTECTIVE SYSTEM
#ITEM109	AVERAGE DAILY TRUCK TRAFFIC
#ITEM110	DESIGNATED NATIONAL NETWORK
#ITEM111	PIER OR ABUTMENT PROTECTION (FOR NAVIGATION)
#ITEM112	NBIS BRIDGE LENGTH
#ITEM113	SCOUR CRITICAL BRIDGES
#ITEM113C,113D,113E,113F 113G, 113H,113I,113J, 113K,113L,113M	SCOUR STUDY INFORMATION
#ITEM114	FUTURE AVERAGE DAILY TRAFFIC
#ITEM115	YEAR OF FUTURE AVERAGE DAILY TRAFFIC
#ITEM116	MINIMUM NAVIGATION VERTICAL CLEARANCE VERTICAL LIFT BRIDGE

***ITEMS73, 74 AND ITEMS 77 through 89 are no longer used.**

ITEM75A & 75B TYPE OF WORK

FHWA

DESCRIPTION:

A two-part, three-digit code identifying the type of work proposed to improve the structure and to identify who will perform the work.

PROCEDURE:

The information recorded here will be the type of work proposed to be accomplished on the structure to improve it to the point that it will provide the type of service needed and whether the proposed work is to be done by contract or State account.

ITEM75A, A two digit code that **must** be coded for structures eligible for the Highway Bridge Replacement and Rehabilitation Program. To be eligible, a structure must carry highway traffic, be structurally deficient or functionally obsolete and have a sufficiency rating of 80.0 or less. This item may be coded for other structures at the option of the highway agency. Use one of the following codes to represent the proposed work type, otherwise leave blank.

Description	Code
Replacement of bridges or other structure because of substandard load carrying capacity of substandard bridge roadway geometry	31
Replacement of bridge or other structure because of relocation of road	32
Widening of existing bridge or other major structure without deck rehabilitation or replacement; includes culvert lengthening	33
Widening of existing bridge with deck rehabilitation or replacement	34
Bridge rehabilitation because of general structure deterioration or inadequate strength.....	35
Bridge deck rehabilitation with only incidental widening	36
Bridge deck replacement with only incidental widening	37
Other structural work.....	38

ITEM75A & 75B TYPE OF WORK

FHWA

ITEM75B, If segment A is blank, leave segment B blank. Otherwise, the third digit shall be coded using one of the following codes to indicate whether the proposed work is to be done by contract or by force account:

Description	Code
Contract	1
State Forces	2

CODING EXAMPLES:

Description	Code	
	75A	75B
Replace structure by contract	31	1
Strengthen to carry live loads by maintenance Forces	36	2
Replace inadequate structure rail by Contract	35	1
Repair bridge deck by maintenance forces	35	2

Data Limits:

ITEM75A, Integer, (Blank, 31, 32, 33, 34, 35, 36, 37) 2 Digits

ITEM75B, Integer, (Blank, 1, 2)

1Digit

ITEM76 LENGTH OF STRUCTURE IMPROVEMENT

FHWA

DESCRIPTION:

A six digit code identifying the length of the proposed improvement to the nearest foot.

PROCEDURE:

This code represents the length of the proposed structure improvement and **must** be coded for structures eligible for HBRRP. It may be coded for other structures at the option of CDOT.

For replacement or rehabilitation of the entire structure, the length should be back-to-back of backwalls of abutments or from pavement notch to pavement notch. For replacement or rehabilitation of only part of the structure, use the length of the portion to be improved.

For culvert improvements, use the proposed length measured along the centerline of the barrel regardless of the depth below grade. The measurement should be made between the inside faces of the top parapet or edge-stiffening beam of the top slab.

For substructure or channel work only, code the length of superstructure over, or supported by, the substructure or channel.

Typically, a replacement structure is longer than the existing structure. Nationwide averages for the increase in structures length with replacement as a function of the existing length are given in the following figures. The length-expansion factors represent data for the years 1981 to 1985. Where site-specific data is lacking, these factors are suggested for estimating the length of replacement structures. For exceedingly long structures (e.g., 700 feet or more) the length-expansion approaches 1.0.

To determine the expansion factor for a structure up to 100' in length use the following formula:

$$\begin{aligned} X &= \text{Existing structure length} \\ Y &= \text{Length expansion factor} \\ Y &= 2.894 - 0.0585 (X) + 0.00076 (X)^2 - 0.0000033 (X)^3 \end{aligned}$$

Once the expansion factor is determined multiply it by the existing structure length.

Replaced structure length = Existing structure length X length expansion factor.

ITEM76 LENGTH OF STRUCTURE IMPROVEMENT

FHWA

To determine the expansion factor for a structure over 100' in length use the following formula:

$$\begin{aligned} X &= \text{Existing structure length} \\ Y &= \text{Length expansion factor} \\ Y &= 1.436 - 0.0019 (X) + 0.0000033 (X)^2 - 0.000000002 (X)^3 \end{aligned}$$

Once the expansion factor is determined multiply it by the existing structure length.

Replaced structure length = Existing structure length X length
 expansion factor.

Code to proposed length of improvement to the nearest foot.
 Code 000000 is not applicable.

CODING EXAMPLES:

Description	Code
Length of improvement 249'-10 000250	
Not applicable	000000

Data Limits:

Integer, (0 to 10000)
 6 Digits

ITEM90A & 90B INSPECTION DATE

MOD FHWA

DESCRIPTION:

A two-part, nine character, code to identify the day, month and year, for the last routine inspection that was performed of the structure. The code also identifies which inspection team did the inspection.

PROCEDURE:

ITEM90A, Record the last date that a routine inspection was conducted on the structure. The date includes the month/day/year.

ITEM90B, Record the inspection team identifier of the inspectors, chosen from the list below:

Description	Code	Description	Code
<u>CDOT INSPECTOR</u>		<u>CONSULTANT</u>	
Macias (Blue)	B	Alpha/HLA	A
Moss (Green)	G	Lonco	L
Ellsworth (Orange)	O	Range Engr	R
Riedel (Red)	R		
Gilliland (White)	W		

CODING EXAMPLES:

Description	Code
Inspection by Ellsworth May 16, 1997	05/16/97O
Inspection Lonco February 28, 1997	02/28/97L

Data Limits:

ITEM90A, Date 8 Digits
ITEM90B, Text (A,B,G,L,O,R,W)
1 Character

ITEM91 DESIGNATED INSPECTION FREQUENCY

FHWA

DESCRIPTION:

A two digit code identifying the number of months between designated inspections of the structure.

PROCEDURE:

The inspection interval is determined by the Bridge Inspection Unit. The standard interval is 24 months. For posted, understrength structures, this interval should be substantially less than the 24 month standard. The designated inspection interval could vary from inspection depending on the condition of the structure at the time of inspection. Leading zeroes shall be coded.

It should be noted that structures will also require special non-scheduled inspections after unusual physical traumas such as floods, earthquakes, fires or collisions. These special inspections may range from a very brief visual examination to a detailed in-depth evaluation depending upon the nature of the trauma. For example, when a substructure pier or abutment is struck by an errant vehicle, in most cases only a visual examination of the structure is necessary. After major collisions or earthquakes, in-depth inspections may be warranted as directed by the engineer in overall charge of the program. After and during severe floods, the stability of the substructure of bridges may have to be determined by probing, underwater sensors or other appropriate measures. Underwater inspection by divers may be required for some scour critical structures immediately after floods.

CODING EXAMPLES:

Description

Code

Posted bridge with heavy truck traffic and questionable structural details designated to be inspected each month	01
Bridge is scheduled or inspection every 24 months	24

Data Limits:

Integer

2 Digits

Table

ITEM91 DESIGNATED INSPECTION FREQUENCY

FHWA

DESCRIPTION:

A two digit code identifying the number of months between designated inspections of the structure.

PROCEDURE:

The inspection interval is determined by the Bridge Inspection Unit. The standard interval is 24 months. For posted, understrength structures, this interval should be substantially less than the 24 month standard. The designated inspection interval could vary from inspection to inspection depending on the condition of the structure at the time of inspection. Leading zeros shall be coded.

It should be noted that structures will also require special non-scheduled inspections after unusual physical traumas such as floods, earthquakes, fires or collisions. These special inspections may range from a very brief visual examination to a detailed in-depth evaluation depending upon the nature of the trauma. For example, when a substructure pier or abutment is struck by an errant vehicle, in most cases only a visual examination of the structure is necessary. After major collisions or earthquakes, in-depth inspections may be warranted as directed by the engineer in overall charge of the program.

After and during severe floods, the stability of the substructure of bridges may have to be determined by probing, underwater sensors or other appropriate measures. Underwater inspection by divers may be required for some scour critical structures immediately after floods.

CODING EXAMPLES:

Description	Code
Posted bridge with heavy truck traffic and questionable structural details designated to inspected each month	01
Bridge is scheduled for inspection every 24 months	24

Data Limits:

Integer
2 Digits
Table

ITEM92A, 92B, 92C CRITICAL FEATURE INSPECTION

FHWA

DESCRIPTION:

A three-part, nine character code indicating critical features and the designated inspection interval.

PROCEDURE:

This code denoted critical features that need special inspections or special emphasis during inspections and the designated inspections interval in months as determined by the Bridge Inspection Unit. The maximum interval for inspection of fracture critical details or underwater inspection (by a diving team) shall be 60 months.

ITEM92A, Fracture Critical Details
ITEM92B, Underwater Inspection
ITEM92C, Other Special Inspection

For each segment of ITEM921,B, and C, code the first digit Y for special inspection or emphasis needed and coded N for not needed. The first digit of ITEM92A, B, and C must be coded for all structures to designate either a yes or no answer. Those structures coded with a Y in ITEM92A and/or B should be the fracture critical and/or underwater inspection bridges. In the second and third digits of each segment, code a 2-digit number to indicate the number of months between inspections only if the first digit is coded Y. If the first digit is coded N, the second and third digit is left blank.

Current guidelines for the maximum allowable interval between inspections can be summarized as follows:

Fracture Critical Details	24 months
Underwater Inspection	60 months
Other Special Inspections	24 months

CODING EXAMPLES:

Description	92A	Code 92B	92C
2 girder system structure being inspected yearly with no special requirements.....	Y12	N	N
Fracture Critical and Underwater inspection required on a 1 year basis. No other special requirements.....	Y12	Y12	N
Temporary shoring with inspection interval of 6 months. No other special requirements.....	N	N	Y06

Data Limits:

ITEM92A,	Text,	3 Characters
ITEM92B,	Text,	3 Characters
ITEM92C,	Text,	3 Characters

ITEM93A, 93B, 93C CRITICAL FEATURE INSPECTION DATE

FHWA

DESCRIPTION:

A three-part, twelve digit code identifying the month and year of the last inspection of the denoted critical feature.

PROCEDURE:

CODE ONLY IF THE FIRST DIGIT OF ITEM92A, B or C IS CODED "Y".

Record in a series of 4 digit code segments, the month and year that the last inspection of the denoted critical feature was performed. Leading zeros will be used. If the first digit of any part of ITEM92 is coded "N", then the corresponding part of this item shall be left blank.

CODING EXAMPLES:

Description	93A	Code 93B	93C
F-17-AP has fracture critical members last inspected March 1986. No under water or other special requirements.....	0386	-	-
A-05-F no fracture critical but requires underwater inspection with other special features. Last underwater inspection April 1986 and last special inspection November 1985	-	0486	1185

Data Limits:

Integer
 12 Digits

ITEM94 BRIDGE IMPROVEMENT COST

...

FHWA

DESCRIPTION

A six digit code identifying the cost of proposed structure improvements.

PROCEDURE:

Code the estimated cost of the proposed structure or major structure improvements in thousand of dollars. This cost shall include only structure construction costs, **excluding** roadway, right of way, detour, demolition, preliminary engineering, etc. Code the base year for the cost in ITEM97 – Year of Improvement Cost Estimate. Do not use this item for estimating maintenance costs.

This item must be coded for structures eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other structures at the option of the highway agency.

Nationally, the deck area of replaced structures is averaging 2.2 times the deck area before replacement. The deck area of rehabilitated structures is averaging 1.5 times the deck area before rehabilitation. Widening square meter costs are typically 1.8 times the square meter cost of new structures with similar spans. For example, if the average cost of a new structure is \$500 per square meter, the average cost of the widened area would be \$900 per square meter.

Each highway agency is encouraged to use its best available information and established procedures to determine structure improvement costs. In the absence of these procedures, the highway agency may wish to use the following procedure as a guide in preparing bridge improvement cost estimates.

Apply a construction unit cost to the proposed structure area developed by using (1) current State deck geometry design standards and (2) proposed structure length from ITEM76 – Length of Structure Improvement.

CODING EXAMPLES:

Description	Code
Bridge Improvement Cost \$ 55,850	000056
\$ 250,000	000250
\$7,451,233	007451

Data Limits:

Integer
6 Digits

ITEM95 ROADWAY IMPROVEMENT COST

FHWA

DESCRIPTION:

A six digit code identifying the cost of proposed roadway improvements.

PROCEDURE:

Code the cost of the proposed roadway improvement in thousands of dollars. This shall include only roadway construction costs, excluding structure, right-of-way, detour, extensive roadway realignment costs, preliminary engineering, etc. Code the base year for the cost in ITEM97 – Year of Improvement Cost Estimate. Do not use this item for estimating maintenance costs.

This item must be coded for structures eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other structures at the option of the highway agency.

In the absence of a procedure for estimating roadway improvement cost, a guide of 10 percent for the structure costs is suggested.

CODING EXAMPLES:

Description	Code
Roadway Improvement Cost \$ 65,000	000065
Roadway Improvement Cost \$125,000	000125
Roadway Improvement Cost \$364,899	000365

Data Limits:

Integer, 6 Digits

ITEM96 TOTAL PROJECT COST

FHWA

DESCRIPTION:

A six digit code identifying the total project cost.

PROCEDURE:

Code the total project cost in thousands of dollars, including incidental costs not included in ITEMS94 and 95. This item should include all costs normally associated with the proposed structure improvement project. The Total Project Cost will therefore usually be greater than the sum of ITEMS94 and 95. Code the base year for the cost in ITEM96 – Year of Improvement Cost Estimate. Do not use this item for coding maintenance costs.

This item must be coded for structures eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other structures at the option of the highway agency.

In the absence of a procedure for estimating the total project cost, a guide of 150 percent of the structure cost is suggested.

CODING EXAMPLES:

Description

Code

Total Project Cost \$8,589,444..... 008589

Data Limits:

Integer

6 Digits

ITEM97 YEAR OF IMPROVEMENT COST ESTIMATE

FHWA

DESCRIPTION:

A two digit code to identify the year that costs are estimated.

PROCEDURE:

Record the year that the costs were estimated in ITEM94 "Bridge Improvement Cost", ITEM95 "Roadway Improvement Cost", and ITEM96 "Total Project Cost" were based upon. This date and the data provided in ITEM94 through 96 must be current, that is the date shall be no more than 8 years old. Code the last 2 digits of the year recorded.

CODING EXAMPLES:

Description	Code
Year of Cost Estimate 1990 costs.....	90
2010 costs	10

Data Limits:

Integer

2 Digits

ITEM98A & 98B BORDER BRIDGE

FHWA

DESCRIPTION:

A two-part, five digit code indicating structures crossing state borders.

PROCEDURE:

These items specify the responsibility for improvements to the existing structure when shared with a neighboring **STATE**.

However, since Colorado shares no structures with a neighboring state, always code these items with a blank. These items are **pre-filled**.

CODING EXAMPLES:

Descriptions	Code	
	98A	98B
Colorado has no shared structures.....	-	-

Data Limits:

Pre-filled

Blank

ITEM99 BORDER BRIDGE STRUCTURE NUMBER **FHWA**

DESCRIPTION:

A fifteen digit code designating the National Bridge Inventory (NBI) structure number for a border structure.

PROCEDURE:

Colorado shares no structures with neighboring states. Therefore always code this item blank. This item is **pre-filled**.

CODING EXAMPLES

Code

Description

Data Limits:

Pre-filled

Blank

ITEM100 DEFENSE HIGHWAY DESIGNATION

FHWA

DESCRIPTION:

A one digit code indicating STRAHNET highway designation for the inventory route identified in ITEM5.

PROCEDURE:

This item shall be coded for all records in the inventory. For the purposes of this item, the STRAHNET Connectors are considered included in the term STRAHNET. For the inventory route identified in ITEM%, indicate STRAHNET highway conditions using one of the following codes:

Description	Code
The route is not a STRAHNET highway	0
The route is a STRAHNET highway	1
The route is a STRAHNET highway and goes over or under another STRAHNET highway	2

Coding Examples:

Description	Code
F-15-LA on Colorado 74	0
I-06-AA on Interstate 70	1

Data Limits:

Integer, (0, 1, or 2)
1 Digit

ITEM101 PARALLEL STRUCTURE DESIGNATION **FHWA**

DESCRIPTION:

A one character code indicating separate parallel structures carrying the inventory route in opposite directions over the same feature.

PROCEDURE:

Code this item to indicate situations where separate structures carry the inventory route in opposite directions of travel over the same feature. The lateral distance between structures has no bearing on the coding of this item. One of the following codes shall be used.

Description:

Code

The right structure of parallel structures carrying the roadway in the direction of the inventory. (For a STRAHNET highway, this is west to east or south to north.) R

The left structure of parallel structures. This structure carries traffic in the opposite direction L

No parallel structure exists N

CODING EXAMPLES:

Description	Code
Structure #1	R
Structure #2	L

Data Limits:

Text, (R, L or N)
1 Character

ITEM102 DIRECTION OF TRAFFIC

FHWA

DESCRIPTION:

A one digit code identifying direction of traffic of the inventory route identified in ITEM5DN.

PROCEDURE:

Code the direction of traffic of the inventory route identified in ITEM5DN. This item must be compatible with other traffic-related items, e.g., ITEM28-Lanes on the Structure, ITEM29-Average Daily Traffic, ITEM47-Total Horizontal Clearance and ITEM51-Bridge Roadway Width, Curb-to-Curb. Use one of the codes below:

Description	Code
Highway traffic not carried	0
One way traffic	1
Two way traffic	2
One lane bridge for two way traffic.....	3

CODING EXAMPLES:

Description	Code
Pedestrian crossing over I-25	0
H-03-P	2

Data Limits:

Integer, (0, 1, 2, or 3)
1 Digit

ITEM103 TEMPORARY STRUCTURE DESIGNATION

FHWA

DESCRIPTION:

A one character code identifying where temporary structures/conditions exist.

PROCEDURE:

Code this item “T” to indicate situations where temporary structures or conditions exists. In all other cases this item should be left blank.

Temporary structure(s) or conditions are those which are required to facilitate traffic flow. This may occur either before or during the modification or replacement of a structure found to be deficient. Such conditions include the following:

- Structures shored up, including additional temporary supports
- Temporary repairs made to keep a structure open.
- Temporary structures, temporary run-around or bypasses.
- Other temporary measures, such as barricaded traffic lanes to keep the structure open

Any repaired structure or replacement structure which is expected to remain in place without further project activity, other than maintenance, for a significant period of time shall not be considered temporary. Under such conditions that structures, regardless of the type, shall be considered the minimum adequate to remain in place and evaluate accordingly.

If this item is coded “T”, then all data recorded for the structure shall be for the condition of the structure without temporary measures, except for the following items which shall be **for the temporary structure:**

ITEM10, Inventory Route, Minimum Vertical Clearance

ITEM41, Structure Open, Posted, or Closed to Traffic

ITEM47, Inventory Route, Total Horizontal Clearance

ITEM53, Minimum Vertical Clearance over Bridge Roadway

ITEM54, Minimum Vertical Underclearance

ITEM55, Minimum Lateral Underclearance on Right

ITEM56, Minimum Lateral Underclearance on Left

ITEM70, Bridge Posting

CODING EXAMPLE:

Description	Code
Temporary structure(s) or conditions exist	T
False bent under timber bridge to maintain legal loads.....	T
25% or more of timber girders/stringer are repaired (e.g. lag bolting or doubling of members)	T
Temporary support of a girder with major bearing loss	T

Pullpits and saddles are considered as a permanent repair and are **NOT** coded as temporary.

Data Limits:

Text, (T, Blank)

1 Character

ITEM104 HIGHWAY SYSTEM OF THE INVENTORY ROUTE **FHWA**

DESCRIPTION:

A one digit code identifying structures on the National Highway System (NHS).

PROCEDURE:

This item is to be coded for all records in the inventory. For the inventory route identified in ITEM5, indicate whether the inventory route is on the National Highway System (NHS) or not on that system. Initially, this code shall reflect an inventory route on the NHS as approved by Congress, the coding is to reflect the approved NHS. Use one of the following codes:

Description	Code
On National Highway System	1
Not on National Highway System	0

Data Limits:

Integer, (0 or 1)
1 Digit

ITEM105 FEDERAL LANDS HIGHWAYS

FHWA

DESCRIPTION:

A one digit code identifying which type of federal land a structure is located on.

PROCEDURE:

Structure owned by state and local jurisdictions on roads which lead to and traverse through federal lands sometimes require unique identification coding because they are eligible to receive funding from the Federal Lands Highway Program. For each structure code the following as applicable:

Description	Code
Not applicable.....	0
Indian Reservation Road (IRR)	1
Forest Highway (FH).....	2
Land Management Highway System (LMHS).....	3
Both IRR and FH.....	4
Both IRR and LMHS	5
Both FH and LMHS	6
Combined IRR, FH and LMHS	9

CODING EXAMPLES:

Descriptions	Code
Structure is on an Indian Reservation Rd	1

Data Limits:

Integer (0 through 9)
1 Digit

ITEM106 YEAR RECONSTRUCTED

FHWA

DESCRIPTION:

A four digit code to identify the year of reconstruction.

PROCEDURE:

Record and code the year of most recent reconstruction of the structure. Code all 4 digits of the latest year in which reconstruction of the structure was completed. If there has been no reconstruction code 0000.

For a structure to be defined as reconstructed, the type of work performed whether or not it meets current minimum standards, must have been eligible for funding under any of the Federal-aid funding categories. The eligibility criteria would apply to the work performed regardless of whether all State or local funds or Federal-aid funds are used.

Some types of eligible work not to be considered as reconstruction are listed:

- Safety feature replacement or upgrading (for example; bridge rail, approach guardrail or impact attenuators).
- Painting of structural steel.
- Overlay of bridge deck as part of a larger highway surfacing project (for example, overlay carried across bridge deck for surface uniformity without additional bridge work).
- Utility work.
- Emergency repair to restore structural integrity to the previous status following an accident.
- Retrofitting to correct a deficiency which does not substantially alter physical geometry or increase the load-carrying capacity.
- Work performed to keep a bridge operational while plans for complete rehabilitation or replacement are under preparation (for example, adding a substructure element or extra girder).

Coding this item has an effect on future eligibility of the structure to receive federal funding.

CODING EXAMPLES:

Description	Code
Reconstruction completed 1970	1970
No reconstruction has been done	0000

Data Limits:

Integer,
4 Digits

ITEM107 DECK STRUCTURE TYPE

FHWA

DESCRIPTION:

A one character code to identify the type of deck system used.

PROCEDURE:

Using one of the codes listed below, record the type of deck system on the bridge; if more than one type, code the most predominant. Code "N" for a filled culvert or arch with the approach roadway section carried across the structure.

Description	Code
Concrete Cast-in-Place	1
Concrete Pre-cast Panels	2
Open Grating	3
Closed Grating.....	4
Steel Plate (includes orthotropic)	5
Corrugated Steel	6
Aluminum.....	7
Timber	8
Other	9
Not applicable.....	N

CODING EXAMPLES:

Description	Code
K-09-J Steel plate	5

Data Limits:

Text, (1 through 9 or N)
1 Character

ITEM108A, 108B, 108C WEARING SURFACE/PROTECTIVE SYSTEM

FHWA

DESCRIPTION:

A three-part, three character code indicating the wearing surface and protective system of the structure deck.

PROCEDURE:

The type of wearing surface and protective system of the structure deck shall be coded using the codes listed below:

ITEM108A, Type of Wearing Surface:

Description	Code
Concrete	1
Integral Concrete (Separate layer added but not latex modified, low slump, etc.)	2
Latex Modified Concrete.....	3
Low Slump Concrete.....	4
Epoxy Overlay.....	5
Bituminous Overlay.....	6
Timber	7
Gravel.....	8
Other.....	9
None	0
Not applicable (applies only to structure with no deck)	N

ITEM108B, Type of Membrane:

Description	Code
Built-up.....	1
Performed Fabric	2
Epoxy	3
Unknown	8
Other.....	9
None	0
Not applicable (applies only to structure with no deck)	N

ITEM108C, Deck Protection:

Description	Code
Epoxy Coated Reinforcing	1
Galvanized Reinforcing.....	2
Other Coated Reinforcing.....	3
Cathodic Protection	4
Polymer Impregnated	6
Internally Sealed.....	7
Unknown	8
Other.....	9
None	0
Not applicable (applies only to Structure with no deck)	N

ITEM108A, 108B, 108C WEARING SURFACE/PROTECTIVE SYSTEM **FHWA**

CODING EXAMPLES

Description	Code		
	108A	108B	108C
D-16-AU	6	2	0

Data Limits:

ITEM108A,

Text

(0,1-9,N)

1 Character

ITEM108B

Text

(2,3,4,8,9,0,N)

1 Character

ITEM108C

Text

(0,1-9,N)

1 Character

ITEM109 AVERAGE DAILY TRUCK TRAFFIC

FHWA

DESCRIPTION:

A two digit code indicating the percentage of ITEM29 attributed to truck traffic.

PROCEDURE:

Code the percentage of ITEM29 "Average Daily Traffic" that is truck traffic. Do not include vans, pickup trucks and other light delivery trucks. If this information is not available, an estimate which represent the average percentage for the category of road carried by the structure may be used. **May be left blank if ITEM29 is not greater than 100.**

CODING EXAMPLES:

Description	Code
Average Daily Traffic is 7% trucks and ITEM29>100	07
Average Daily Traffic is 18% trucks and ITEM29>100	18
Average Daily Traffic is 10% trucks and ITEM29 ≤ 100	Blank

Data Limits:

Integer, (00 to 99 or Blank)
2 Digits

ITEM110 DESIGNATED NATIONAL NETWORK **FHWA**

DESCRIPTION:

A one digit code designating the route as a part of the National Network for trucks.

PROCEDURE:

The national network for trucks includes most of the Interstate System and those portions of the Federal-Aid highways identified in the Code of Federal Regulations (23 CFR 658). The national network for trucks is available for use by commercial motor vehicles of the dimensions and configurations described in these regulations. For the inventory route identified in ITEM5DN "Inventory Route", indicate the condition using one of the following codes:

Description:	Code
Not a part of the National Truck Network.....	0
A part of the National Truck Network.....	1

CODING EXAMPLES:

Description	Code
P-19-F on S.H. 160.....	1

Data Limits:

Integer,
 (0 or 1)
 1 Digit

ITEM111 PIER OR ABUTMENT PROTECTION (FOR NAVIGATION)

FHWA

DESCRIPTION:

A one digit code indicating the presence and adequacy of pier or abutment protection features.

PROCEDURE:

There are no navigable rivers or water courses in Colorado. If ITEM38, Navigational Control, has been coded **0** or **N**, leave blank to indicate not applicable. This code is **pre-filled** with a blank.

Description	Code
Navigation protection not required.....	1
In place and functioning	2
In place but in a deteriorated condition	3
In place but reevaluation suggested.....	4
None present but reevaluation suggested	5
ITEM38 coded zero or N.....	Blank

CODING EXAMPLES:

Description	Code
--------------------	-------------

Data Limits:

Pre-filled, Blank

ITEM112 NBIS BRIDGE LENGTH

FHWA

DESCRIPTION:

A one character code identifying qualification/non-qualification for the NBIS Bridge Length.

PROCEDURE:

This item code is based on the measurement between undercopings as shown in Appendix “E”.

Does this structure meet or exceed the minimum length specified to be designated as a bridge for National Bridge Inspection Standards purposes? the following definition of a bridge is to be used:

A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of roadway of more than 20 feet* between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. * (6.1 meters)

Description	Code
Yes	Y
No	N

This item differs from ITEM49 – Structure Length which is measured from backwall to backwall.

CODING EXAMPLES:

Description	Code
Length Greater Than 6.1 Meters (20 feet).....	Y
Length Less Than, or Equal to, 6.1 Meters (20 Feet)	N

Data Limits:

Text,
(Y, N)
1 Character

ITEM113 SCOUR CRITICAL BRIDGES

FHWA

DESCRIPTION:

A one character code identifying the current status of vulnerability to scour.

PROCEDURE:

Use a single-digit code as indicated below to identify the current status of the structure regarding its vulnerability to scour. Scour analyses shall be made by hydraulic/geotechnical/structural engineers. Details on conducting a scour analysis are included in the FHWA Technical Advisory 5140.23 titled, "Evaluating Scour at Bridges". Whenever a rating factor of 4 or below is determined for this item, the rating factor for ITEM60-Substructure may need to be revised to reflect the severity of actual scour and resultant damage to the structure. A scour critical structure is one with abutment or pier foundations which are rated as unstable due to (1) observed scour at the structure site or (2) a scour potential as determined from a scour evaluation study.

Description	Code
Structure not over waterway.....	N
Structure with "unknown" foundation that has not been evaluated for scour. Since risk cannot be determined, flag for monitoring during flood events and, if appropriate, closure U	
Structure over "tidal" waters that has not been evaluated for scour, but considered low risk. Structure will be monitored with regular inspection cycle and with appropriate underwater inspections. ("Unknown" foundations in "tidal" waters should be coded U.).....	T
Structure foundations (including piles) on dry land well above flood water elevations.....	9
Structure foundations determined to be stable for assessed or calculated scour conditions; calculated scour is above top of footing. (Example A)	8

ITEM113 SCOUR CRITICAL BRIDGES

FHWA

DESCRIPTION:	Code
Countermeasures have been installed to correct a previously existing problem with scour. Structure is no longer scour critical	7
Scour calculation/evaluation has not been made. <u>(Use only to describe case where structure has not yet been evaluated for scour potential.)</u>	6
Structure foundations determined to be stable for calculated scour conditions; scour within limits of footing or piles. (Example B)	5
Structure foundations determined to be stable for calculated scour conditions; field review indicates action is required to protect exposed foundations from effects of additional erosion and corrosion	4
Structure is scour critical; Structure foundations determined to be unstable for calculated scour conditions: -Scour within limits of footing or piles. (Example B) -Scour below spread-footing base or pile tips. (Example C)	3
Structure is scour critical; field review indicates that extensive scour has occurred at bridge foundations Immediate action is required to provide scour countermeasures.....	2
Structure is scour critical; field review indicates that failure of piers/abutments is imminent Structure is closed to traffic.....	1
Structure is scour critical. Structure has failed and is closed to traffic	0

Data Limits:

Text
 (0-9, N,T,U)
 1 Character Table

ITEM113C, 113D, 113E, 113F, 113G, 113H, 113I, 113J, 113K, 113L 113M SCOUR STUDY
INFORMATION **CDOT**

DESCRIPTION:

An eleven-part, thirty-eight character code to record the data used in calculating scour vulnerability.

PROCEDURE:

Each part of this item must be completed for each off system structure. This requires a scour vulnerability study. For on system structures a different method was used to determine scour vulnerability. Leave blank if not applicable.

ITEM113C, AREA OF OPENING: A four digit code to record the waterway opening under a structure. Code to the nearest Ft².

ITEM113D, SLOPE OF STREAM: A five digit code to record the slope of the stream bed passing under a structure. Code to at least the nearest hundredth of a foot. (Ft/Ft)

ITEM113E, DEPTH OF FLOW: A two digit code to record the depth of flow just upstream of the structure. This would be at flood stage. Code to the nearest foot.

ITEM113F, WIDTH OF PIER: A four digit code to record the width of the pier at the point of attack of the flow. If more than 1 pier is in the streambed use the worst case. Code to at least the nearest tenth of a foot.

ITEM113G, ANGLE OF ATTACK: A two digit code to record the angle of attach in degrees of the flow at the structure. Code to the nearest degree.

ITEM113H, WETTED PERIMETER: A three digit code to record the wetted perimeter, as dictated by the Mannings Formula. Code to the nearest foot.

ITEM113I, SCOUR DEPTH: A two digit code to record the calculated scour depth. Code to the nearest foot.

ITEM113J, MANNING'S COEFFICIENT: A five digit code to record the Mannings Coefficient as defined by the Manning Formula. Code to at least the nearest hundredth.

ITEM113K, "Q" DISCHARGE: A five digit code to record the feet³/sec of flow through the structure opening. Code to the nearest foot.

ITEM113L, LENGTH OF PIER: A five digit code to record the length of the pier that affects the flow through the structure. Code to at least the nearest tenth of a foot.

ITEM113C, 113D, 113E, 113F, 113G, 113H, 113I, 113J, 113K, 113L

113M SCOUR STUDY INFORMATION

CDOT

ITEM113M, SCOUR WATCH: A one character code to identify those structures that would require a watch be placed at the structure during a high-water event. This would be required if the scour could exceed the safe limit of the structure or if the foundation was undetermined, but the conditions warranted a watch. Use one of the codes below:

Description	Code
No watch required.....	N
A scour watch is required.....	Y

Data Limits:

ITEM113C	Integer	(0-999, Blank)	4 Digits
ITEM113D	Real	(0-20.00, Blank)	5 Digits
ITEM113E	Integer	(0-99, Blank)	2 Digits
ITEM113F	Real	(0-25.0, Blank)	4 Digits
ITEM113G	Integer	(0-90, Blank)	2 Digits
ITEM113H	Integer	(0-999, Blank)	3 Digits
ITEM113I	Integer	(0-99, Blank)	2 Digits
ITEM113J	Real	(0-50.00, Blank)	5 Digits
ITEM113K	Integer	(0-99999, Blank)	5 Digits
ITEM113L	Real	(0-100.0, Blank)	5 Digits
ITEM113M	Text	(Y, N, Blank)	1 Character

ITEM114 FUTURE AVERAGE DAILY TRAFFIC

FHWA

DESCRIPTION:

A six digit code forecasting average daily traffic (ADT).

PROCEDURE:

Code for all structures the forecaster average daily traffic (ADT) for the inventory route identified in ITEM5. This shall be projected at least 17 years but no more than 22 years from the year of inspection. the intent is to provide a basis for a 20 year forecast. This item may be updated anytime, but must be updated when the forecast falls below the 17-year limit. If planning data is not available, use the best estimate based on site familiarity.

The future ADT must be compatible with the other items coded for the structure. For example, parallel structures with an open median are coded as follows: If ITEM28 – Lanes On and Under the Structure and ITEM51 – Bridge Roadway Width Curb-to-Curb are coded for each bridge separately, then the future ADT must be coded for each structure separately (not the total for the route).

CODING EXAMPLES:

Description	Code
Future ADT 540	000540
15,600.....	015600

Data Limits:

Integer

6 Digits

ITEM115 YEAR OF FUTURE AVERAGE DAILY TRAFFIC **FHWA**

DESCRIPTION:

A four digit code representing the year of the future ADT in ITEM114.

PROCEDURE:

Code the year identified by the future ADT in ITEM114. The projected year shall be at least 17 years, but no more than 22 years from the year of inspection.

CODING EXAMPLES:

Description	Code
Year of future ADT 2018	2018

Data Limits:

Integer
4 Digits

ITEM116 MINIMUM NAVIGATION

VERTICAL CLEARANCE VERTICAL LIFT BRIDGE

FHWA

DESCRIPTION:

A three digit code identifying the minimum vertical clearance imposed.

PROCEDURE:

There are no navigable rivers or water courses in Colorado. If ITEM8, Navigational Control, has been coded with a 0 or N, leave blank to indicate not applicable. This code is pre-filled with a blank.

CODING EXAMPLES:

Description

Code

DATA LIMITS:

SECTION V

ADDITIONAL INVENTORY INFORMATION

The items in this section were designed to publish reports or develop special structure related data for the Colorado Department of Transportation.

The Field Log of Structures and Vertical Restriction Report required the addition of many of these items, some were developed around the more commonly used information in Staff Bridge Branch and others were designed to improve computer operations. These items are **NOT** part of the FHWA Recording and Coding Guide.

This section consists of:

#ITEM120A,120B	STRUCTURE/CONSTRUCTION TYPE-CDOT
#ITEM121	BLANK RESERVED FOR FUTURE USE
#ITEM122A,122AA,122B,122C,122CC 122D,122DD,122E,122EE	INSPECTION YEAR INDICATOR
#ITEM123	MAINTENANCE PATROL (STATE OWNED BRIDGES)
#ITEM124	EXPANSION DEVICES
#ITEM125A,125B	TYPE OF BRIDGE RAILING
#ITEM129A,129B,129C	LOAD POSTING
#ITEM130	DATE OF STRUCTURE RATING
#ITEM131	SCOUR FOUNDATION RESEARCH
#ITEM132	ORDINAL NUMBER
#ITEM133	SPECIAL INSPECTION EQUIPMENT
#ITEM134A,134B,134C,134D,134E	VERTICAL CLEARANCE-NBND & EBND
#ITEM135A,135B,135C,135D,135E	VERTICAL CLEARANCE-SBND & WBND
#ITEM136	MILEAGE LOG SECTION LETTER
#ITEM137A,137B	SUFFICIENCY RATING
#ITEM138	SELECT LIST INDICATOR
#ITEM139	BRIDGE WEIGHT LIMIT MAP COLOR
#ITEM140	BATCH ID NUMBER
#ITEM141	CONSTRUCTION FUNDING
#ITEM142	STRUCTURE PROJECT STATUS

*Items 126 through 128C are no longer used.

ITEM120A,120B STRUCTURAL/CONSTRUCTION TYPE - CDOT

CDOT

DESCRIPTION: A two-part, seven-character code to describe the type of main span used in the structure. This item is used to prepare the Field Log of Structures for Staff Bridge Branch.

PROCEDURE:

ITEM120A: is a five-digit alphabetical code indicating the type of construction or design. These codes must agree with codes in Item43A & B. See Appendix “C” for cross reference. The types and the abbreviated codes are listed below:

Description	Code
Aluminum Arch Culvert.....	AAC
Concrete Arch.....	CA
Concrete Arch Culvert.....	CAC
Concrete Box Culvert.....	CBC
Concrete Box Girder.....	CBG
Concrete Box Girder, Continuous	CBGC
Concrete Box Girder, Continuous Prestressed	CBGCP
Concrete Box Girder, Prestressed.....	CBGP
Concrete Box Girder, Segmented.....	CBGS
Concrete Double T Prestressed Girder	CDTPG
Concrete on I-beam	CI
Concrete on I-beam, Continuous	CIC
Concrete on I-beam, Continuous and Composite	CICK
Concrete on I-beam,Continuous,Composite,Prestressed	CICKP
Concrete on I-beam, Composite	CIK
Concrete on I-beam, Composite, Prestressed	CIKP
Corrugated Metal Pipe.....	CMP
Concrete Prestressed Girder	CPG
Concrete Prestressed Girder, Continuous	CPGC
Concrete Rigid Frame.....	CRF
Concrete Slab.....	CS
Concrete Slab, Continuous	CSC
Concrete Slab and Girder	CSG
Concrete Slab and Girder, Continuous	CSGC
Concrete Slab and Girder, Continuous Prestressed	CSGCP
Concrete Slab and Girder, Prestressed	CSGP
Concrete Slab, Prestressed.....	CSP
Concrete Slab, Prestressed Continuous	CSCP
Overhead Pipe	OP
Precast Concrete Box Culvert.....	PCBC
Rubble Arch	RA
Rubble Arch Culvert.....	RAC
Reinforced Earth.....	RE
Reinforced Concrete Pipe Culvert.....	RCPC
Riveted Girder	RG
Riveted Girder Continuous.....	RGC
Steel Arch	SA
Steel Arch, Culvert/Multiplate Arch Culvert.....	SAC
Steel Box Girder	SBG
Steel Box Girder, Continuous.....	SBGC

ITEM120A,120B STRUCTURAL/CONSTRUCTION TYPE - CDOT

CDOT

Steel Box Girder, Prestressed	SBGP
Steel Box Girder, Prestressed, Continuous.....	SBGCP
Steel Deck Girder	SDG
Steel Deck Girder, Continuous.....	SDGC
Steel Deck Truss.....	SDT
Overhead Sign	SIGN
Overhead Sign, Butterfly.....	SIGNB
Overhead Sign, Cantilever.....	SIGNC
Steel Low Truss.....	SLT
Steel Stringer, Earth Fill (using 1/2 CMP)	SSE
Steel Stringer, Earth Fill (using 1/2 CMP) Continuous.....	SSEC
Steel Stringer, Metal Plank Floor	SSM
Steel Stringer, Continuous/Metal Plank Floor.....	SSMC
Steel Stringer, Timber Floor.....	SSS
Steel Stringer Continuous, Timber Floor	SSSC
Steel Thru Girder.....	STG
Steel Thru Truss	STT
Suspension Bridge.....	SUSP
Timber w/Concrete Deck.....	TD
Timber Laminated Arch (Gluelam).....	TLA
Timber Laminated Stringer (Gluelam)	TLS
Timber Low Truss	TLT
Timber w/Metal Deck.....	TM
Timber Slab	TSLAB
Timber Stringer w/Timber Deck	TS
Treated Timber Stringer w/Concrete Deck.....	TTD
Treated Timber Stringer w/Metal Plank Deck.....	TTM
Treated Timber Stringer w/Timber Deck	TTS
Timber Thru Truss.....	TTT
Tunnel, Concrete Lined	TUNC
Tunnel, Thru Rock - No Lining.....	TUNR
Retaining Wall.....	WALLR
Sound Barrier Wall.....	WALLS
Welded Girder	WG
Welded Girder, Continuous.....	WGC
Welded Girder, Continuous and Composite.....	WGCK
Welded Girder, Composite.....	WGK

When coding Item120A, left justify the letters that describe the type and leave extra spaces blank.

ITEM120A,120B STRUCTURAL/CONSTRUCTION TYPE - CDOT

CDOT

ITEM120B, a two digit item used to identify specific design, material or type of construction of the girders or stringers in the main span of the structure. More than one condition may exist. Underwater inspection types must be recorded in Item120B.

All other conditions can be noted in Remarks, e.g., for a CPG structure with G-68, Prestressed Continuous Spans which is also an SI/Category I UWI, code Item120B as 85 and in Remarks write, "Item120B = 85 and 33."

This information will further describe the type of construction already shown in Item43. The specific types of construction are listed below, select the code that applies in each case:

Description	Code
Not Applicable or Unknown	00
Pre-cast	01
Poured in Place.....	02
Pre-tensioned	03
Post-tensioned	04
Parabolic.....	05
Cantilevered.....	06
Curved	10
Concrete 'T' Girder, Prestressed	20
Concrete Twin 'T' Girder, Prestressed	21
AASHTO Type I, Prestressed	25
AASHTO Type II, Prestressed	26
AASHTO Type III, Prestressed.....	27
AASHTO Type IV, Prestressed	28
Colorado Type G-54, Prestressed, Simple Span.....	30
Colorado Type G-54, Prestressed, Continuous Spans	31
Colorado Type G-68, Prestressed, Simple Span.....	32
Colorado Type G-68, Prestressed, Continuous Spans	33
Colorado Type G-70, Prestressed, Simple Span.....	34
Colorado Type G-70, Prestressed, Continuous Spans	35
Colorado Type G-78, Prestressed, Simple Span.....	36
Colorado Type G-78, Prestressed, Continuous Spans	37
Colorado Type G-72, Prestressed, Simple Span.....	38
Colorado Type G-72, Prestressed, Continuous Spans	39

ITEM120A,120B STRUCTURE/CONSTRUCTION TYPE

CDOT

Description	Code
BULBT, Simple Span.....	40
BULBT, Continuous Span.....	41
Riveted Plate Girder	50
Slant Leg.....	51
Super Span.....	60
Pin & Link, w/Category III UWI (Water depth 4 to 6 ft) ..	80
SI/Pin & Link w/Category II UWI(Water depth 7 to 10 ft) ..	81
SI/Pin & Link w/Category I UWI (Water depth > 10 ft) ..	82
SI/Pin & Link connections	83
SI/Category I UWI (Water depth greater than 10 ft.).....	85
SI/Category II UWI (Water depth 7 ft to 10 ft).....	86
SI/Category III UWI (Water depth 4 ft to 6 ft).....	88
Research Required.....	90
Experimental Bridge.....	91
Multi-type Girder System.....	99

CODING EXAMPLE:

Description	Code
	120A 120B
Concrete Slab and Girder Continuous, T-beam	CSGC 05

Data Limits:

Item120A, Text, (Left Justify) 5 Character
 Item120B, Integer, (0 to 99) 2 Digits

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Prepared By: CDOT Staff Bridge
Revised: 6/10/2010

ITEM121

CDOT

NO LONGER USED, RESERVE FOR FUTURE USE

Data Limits:

Integer, 1 Digit

ITEM122A,122AA,122B,122C,122CC,122D,122DD,122E,122EE

INSPECTION YEAR INDICATOR

CDOT

DESCRIPTION:

These items are one character or two digit codes that identify the inspection schedule for each structure. **Some of these items are reserved for use by the Bridge Inspection Coordinator.**

PROCEDURE:

ITEM122A, This is a one character code to identify the inspection schedule for structures to be inspected on a less than twenty-four month cycle. Choose the code for the appropriate quarter found listed under Item122C. This would include deficient structures. Code those structures with a letter indicating the twelve month inspection quarter. For example, if a structure has a regular inspection quarter or Item122C of "A" then the corresponding Item122A code would be "E", the quarter 12 months from "A". For all other structures, leave Item122A blank. Consult with the Bridge Inspection Coordinator before changing this item.

ITEM122AA, This is a two digit code to identify the trip this structure is assigned to for the 12 month inspection cycle. This code can only be changed by the Bridge Inspections Coordinator.

ITEM122B, This is a one character code used to identify those structures which are of special interest when scheduling inspections. Code the structure according to the specific category affecting it and/or the scheduling problems encountered. The following codes are used for state inspected and consultant inspected bridges. However, only state inspected bridges use the temporary M designation for new structures. It is removed once a structure has been inspected.

Description	Code
Not Applicable.....	0
Timber Structures over Canal.....	2
Other Structures over Canal	3
New Structure not inspected.....	M
Revisit, (still under construction, can not inspect due to high water, etc.).....	R
Under construction (to be replaced)	U
Inspect on a less than 12 month cycle, (i.e. every quarter or every six months).....	X

ITEM122A,122AA,122B,122C,122CC,122D,122DD,122E,122EE

INSPECTION YEAR INDICATOR

CDOT

ITEM122C, A one character code to identify the quarter for twenty-four month inspection schedules. For off-system or consultant inspected structures, a one character code in Item122C will be used to identify the counties that are to be inspected in either an odd year or an even year. The code also identifies the consultant region where the counties are located.

Description	Code
State Inspected Bridges	
First Quarter, Even Year (Jan-Feb-Mar)	A
Second Quarter, Even Year (Apr-May-Jun)	B
Third Quarter, Even Year (Jul-Aug-Sep)	C
Fourth Quarter, Even Year (Oct-Nov-Dec)	D
First Quarter, Odd Year (Jan-Feb-Mar)	E
Second Quarter, Odd Year (Apr-May-Jun)	F
Third Quarter, Odd Year (Jul-Aug-Sep)	G
Fourth Quarter, Odd Year (Oct-Nov-Dec)	H
Tunnels monitored 24 hours (not inspected)	X

Description

Consultant Inspected Bridges

ODD YEAR CYCLE

Region	County	Code
Northern:	Garfield, Grand, Moffat, Rio Blanco, Washington, Weld, Yuma	A
Central:	Arapahoe, Clear Creek, Elbert, Gilpin, Jefferson, Lake, Lincoln, Mesa, Park, Pitkin, Summit, Teller	B
Southern:	Bent, Crowley, Delta, Fremont, Las Animas Montrose, Otero, Ouray, Prowers	C

EVEN YEAR CYCLE

Region	County	Code
Northern:	Boulder, Jackson, Larimer, Logan, Morgan, Phillips, Routt, Sedgwick	D
Central:	Adams, Cheyenne, Denver, Douglas, Eagle, El Paso, Kit Carson	E
Southern:	Alamosa, Archuleta, Baca, Chaffee, Conejos, Costilla, Custer, Dolores, Gunnison, Hinsdale, Huerfano, Kiowa, La Plata, Mineral, Montezuma, Pueblo, Rio Grande, Saguache, San Juan, San Miguel	F

ITEM122A,122AA,122B,122C,122CC,122D,122DD,122E,122EE

INSPECTION YEAR INDICATOR

CDOT

ITEM122CC, This is a two digit code to identify the trip this structure is assigned to for a normal twenty-four month inspection cycle. This code can only be changed by the Bridge Inspections Coordinator.

ITEM122D, This is a one character code to identify the quarter of inspection for forty-eight month inspection schedules. Use codes listed under Item122C.

ITEM122DD, This is a two digit code to identify the trip this structure is assigned to for the first forty-eight month inspection cycle. This code can only be changed by the Bridge Inspections Coordinator.

ITEM122E, This is a one character code to identify the quarter of inspection for forty-eight month inspection cycles. Use codes listed under Item122C.

ITEM122EE, This is a two digit code to identify the trip this structure is assigned to for the second forty-eight month inspection cycle. This code can be changed by the Bridge Inspections Coordinator.

CODING EXAMPLES:

Description	Code								
	122A	122AA	122B	122C	122CC	122D	122DD	122E	122EE
SD, P-28-Z	F	3	0	B	7	-	-	-	-
TTS/canal/E I-25	-	-	2	D	2	-	-	-	-
FRCO-111									
4 yr cycle F-26-A	-	-	0	-	-	C	12	-	-

DATA LIMITS:

Item122A, Text,	1 Character	
Item122AA,Integer,		2 Digits
Item122B, Text,	1 Character	
Item122C, Text,	1 Digit	
Item122CC,Integer,		2 Digit
Item122D, Text,	1 Character	
Item122DD,Integer,		2 Digit
Item122E, Text,	1 Character	
Item122EE,Integer,		1 Digit

ITEM122F RE-VISIT COMMENTS

CDOT

DESCRIPTION:

A twenty character code related to Item122B which describes the reason for a revisit.

PROCEDURE:

This character is used when an "R" is coded for Item122B. Describe why the bridge could not be inspected and when the inspection might be possible. The description will be put in the data base by the BMS unit.

CODING EXAMPLES:

Description	Code
New structure D-17-DI	In const 01/98
Concrete on rolled I-beam bridge C-16-AE	High water 10/98

Data Limits:

Text
20 Characters

ITEM123 MAINTENANCE PATROL (STATE OWNED BRIDGES)

CDOT

DESCRIPTION:

A two-digit code to identify the CDOT Maintenance Patrol Number.

PROCEDURE:

Each Maintenance Section is divided into Patrols. The Patrol Number can be obtained from the Maintenance Patrol Map published by Staff Maintenance. This number can be used to provide inspection schedules. Only those structures on the State Highway System need to be coded. For those structures that the Maintenance Patrol is UNKNOWN, Code 99 until the patrol is identified.

Off-System structures should be coded 0.

CODING EXAMPLES:

Description	Code
Structure on I-25 south of Trinidad, Patrol No. 1.....	01
Structure on U.S. 34 east of Akron, Patrol No. 46	46

Data Limits:

Integer
(0 to 99)
2 Digits

ITEM124 EXPANSION DEVICES

CDOT

DESCRIPTION:

A one character code to describe the type of expansion device.

PROCEDURE:

There are many types of expansion devices from sliding steel plates to compression joint seals. Some pre-molded rubber devices of the same type may be different from one manufacturer to another. Some groups have been developed to identify general categories of devices. This generally describes either the type of device or the material used.

Description	Code
Type of Device	
Sliding steel plates	1
Sliding steel plates with fingers	2
Pre-molded rubber device	A
Compression joint seal (elastomeric)	B
Compression joint seal (foamed)	C
Gland (modular or strip)	D
UNKNOWN	N
No expansion device	O
Plug (Rubberized Asphalt)	P
More than one type of device	X

CODING EXAMPLES:

Description	Code
3 sliding steel plate devices	1
2 pre-molded rubber devices Type 3	A

Data Limits:

Text, (1,2,A,B,C,D,N,O,P,X)
 1 Character

ITEM125A & 125B TYPE OF BRIDGE RAILING

CDOT

DESCRIPTION:

A two part, three character code to identify the type of railing, and if the rail has been modified.

PROCEDURE:

In Appendix "F" are sketches of standard bridge railings identified by a letter code for use in this item. If railings are encountered during inspection that are not shown, code as XX. This situation needs to be brought to the attention of the BMS unit.

ITEM125A, A two digit code identifying the most common TYPE of railing on the structure.

Identify the correct rail and select the appropriate code from Appendix "F". Left justify the appropriate code letter. If none of those codes apply, use the appropriate code listed below.

Description	Code
Known type of rail	A-AZ
Flex beam across CBC's or CMP's	FB
No bridge rail	X
Not applicable, RR, Ped structure	NA
Non typical rail	XX

ITEM125B, A one digit code indicating whether the railing identified in Part A is a standard or modified version:

Description	Code
Not Modified	0
Modified up-to-standards	1
Modified not-up-to-standards	2
If median rail and outside rail differ	3
More than one type of rail	4

CODING EXAMPLES:

Description	Code	
	125A	125B
Timber, Type F, No Modification	F	0
Type 3, Type G, Modified not up to standard	G	2

Data Limits:

Item125A, Text, 2 Characters
 Item125B, Integer, (0 to 9) 1 Digit

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Prepared By: CDOT Staff Bridge
Revised: 6/10/2010

ITEM126 TOTAL COST OF STRUCTURE

CDOT

NO LONGER USED. RESERVE FOR FUTURE USE.

Data Limits:

Integer, (0 to 99999) 5 Digits

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Prepared By: CDOT Staff Bridge
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ITEM127 COST OF STRUCTURE WIDENING

CDOT

NO LONGER USED. RESERVE FOR FUTURE USE.

Data Limits:

Integer, (0 to 99999) 5 Digits

ITEM128A,128B,128C COST OF STRUCTURE IMPROVEMENTS

CDOT

NO LONGER USED. RESERVE FOR FUTURE USE.

Data Limits:

Item128A, Text, 1 (Select appropriate code from description) 1 Character

Item128B, Integer, (0 to 99999) 5 Digits

Item128C, Integer, (0 to 99) 2 Digits

ITEM129A,129B,129C LOAD POSTING

CDOT

DESCRIPTION:

A three-part, six-digit number to identify the allowable capacity of the bridge for the three types of "Colorado" trucks.

PROCEDURE:

Structures where certain trucks, carrying the State legal load, will cause the structural members of a bridge to be over stressed determines load posting. This information will be used to publish reports of the load limits of posted structures.

When a structure is rated and determined to require load posting, the safe load capacity shall be recorded. The rated capacity for each of the typical trucks shall appear as a two digit number in tons. This limit will also appear on the load posting signs at the structure. Those structures that have not been rated or are not load posted should be coded with 00 for each truck. For those structures that are closed or have a rated capacity of 0 tons, code 01 for each truck.

CODING EXAMPLES:

Description	Code		
	<u>129A</u>	<u>129B</u>	<u>129C</u>
Structure rated, posted for 23T, 31T, 32T	23	31	32
Structure rated at 0 tons/close 01	01	01	
Structure not rated/not posted 00	00	00	

Data Limits:

Item129A, Integer, (0 to 50) 2 Digits
Item129B, Integer, (0 to 50) 2 Digits
Item129C, Integer, (0 to 50) 2 Digits

ITEM130 DATE OF STRUCTURAL RATING

CDOT

DESCRIPTION:

An eight digit date field for recording the date the structure was rated or re-rated.

PROCEDURE:

Record the date of the rating as found on the Rating Summary Sheet. Those structures that have not been rated, leave blank.

CODING EXAMPLES:

Description	Code
Rated Feb. 6, 1979	02/06/79
Re-rated May 23, 1989	05/23/89

Data Limits:

Date, (MM/DD/YY) 8 Digit Table, ALLDAT

ITEM131 SCOUR FOUNDATION RESEARCH

CDOT

DESCRIPTION:

A one character code to identify the type of structure foundations.

PROCEDURE:

In determining the structure foundation all sources of information must be used, including plans, microfilm records, photographs and field inspection reports. Code this item from the list below:

Description		Code
Abutments only on spread footers (no piers)	0	
Piles, Timber or Steel		1
Spread Footers	2	
Caissons	3	
Timber Bents		4
Abutments only with piles or caissons (no piers)		5
Abutments on spreads, pier on piles	6	
Abutments on piles, pier on spreads	7	
Mixed foundation system	8	
Other		9
Not applicable (culverts, concrete lined ditches)		N
UNKNOWN		X

CODING EXAMPLES:

Description		Code
F-17-BL: abuts. on spread footer, piers on piles	6	
B-20-C: 1 span timber bridge		5

Data Limits:

Text, (0 to 9, N, X) 1 Character

ITEM132 ORDINAL NUMBER

CDOT

DESCRIPTION:

A seven digit code to aid in computer operation and sorting of structure numbers within the data system.

PROCEDURE:

The Ordinal Number is intended to be used in numeric sequence. It generally has two decimal places to maintain alpha-numeric order and to allow for the addition of new structures. For this item the decimal point must be coded as part of the seven positions, making this item four whole numbers, the decimal and two decimal places. There is no code for UNKNOWN. Each system has a different numbering sequence. This number is assigned by the BRIAR unit.

ON SYSTEM: The ordinal number is assigned to each structure to produce an alpha-numeric listing in structure number order. The first number will start with 1000.00, and increase by 2 until all structures have been numbered.

OFF SYSTEM: The ordinal number is assigned by county and then in logical alpha-numeric order. i.e. the first 3 digits will be the county number followed by a number starting at 100 and increasing by 5's. This will allow for the addition of new structures. If more than one entity is included, a break should be made in the sequential number.

FOREST SERVICE: The ordinal number for a structure will start with 900000 and incremented by 20's. The number will be sequenced in numeric order within the following limits:

	<u>FROM</u>	<u>TO</u>
Forest Number (ie:02130600004.5)	900000	- 902000
Old Forest Number (ie:116-1.3)	902020	- 902400
Old County Number (ie:GUN634-01.50)	902400	- 904000
USFS Number (ie:USFS205-2.1)	904000	- 907000

CODING EXAMPLES:

Description	Code
Structure No. A-01-A	1000.00
Structure No. P-26-B	3599.00
Forest Service USFS 100-0.1	904000.
Off System MESA-43.5-U.2A	077065.

Data Limits:

Real, (0.00 to 9999.9) 7 Digits

ITEM133 SPECIAL INSPECTION EQUIPMENT

CDOT

DESCRIPTION:

A two digit code to identify special inspection equipment.

PROCEDURE:

Use the list below to identify special equipment necessary to complete an inspection.

Description	Code
Not Applicable	00
Snooper Only	01
Hi-Ranger Only	02
Boat Only	03
Transit Only	04
Level Only	05
Half-Cell Device and/or Drag Chain	06
Hi-Ranger and Radio Communications	07
Snooper and Radio Communications	08
Boat and Radio Communications	09
Radio Communications Only	10
Snooper and Hi-Ranger	11
Snooper and Generator	12
Magnetic Particle	13
Ultrasound	14
Unknown	99

CODING EXAMPLES:

Description	Code
No Special Equipment Required.....	00
Inspection Requires the Snooper Only.....	01

Data Limits:

Integer, (0 to 14, 99) 2 Digits

ITEM134A,134BF,134BI,134CF,134CI

VERTICAL CLEARANCE-NBND & EBND

CDOT

DESCRIPTION:

A five part, nine character code describing the direction of travel and the maximum and minimum vertical clearance for that lane or lanes.

PROCEDURE:

ITEM134A, A one character code describing the direction of the lane or lanes in which the clearances were taken. Use the following codes:

Description	Code
Northbound	N
Eastbound	E
Undivided	U
Not Applicable	X

ITEM134BF, A two digit code indicating the maximum vertical clearance in feet for the driving lane described above. Where no vertical restriction exists, code 99. For structures where the clearance is unknown, code 55.

ITEM134BI, A two digit code indicating the maximum vertical clearance in inches for the driving lane described above. Where no vertical restriction exists, code 99. For structures where the clearance is unknown, code 55.

ITEM134CF, A two digit code indicating the minimum vertical clearance in feet for the lane, as described above. The clearance reported should be the absolute minimum clearance. Where no restriction exists, code 00. For structures where the clearance is unknown, code 00.

ITEM134CI, A two digit code indicating the minimum vertical clearance in inches for the lane, as described above. The clearance reported should be the absolute minimum clearance. Where no restriction exists, code 00. For structures where the clearance is unknown, code 00.

See Appendix "K" for information on taking clearances.

ITEM134A,134BF,134BI,134CF,134CI

VERTICAL CLEARANCE-NBND & EBND

CDOT

CODING EXAMPLES:

Description	Code				
	134A	134BF	134BI	134CF	134CI
Northbound Lane Max. Clearance					
17' -8" Min. 16'-2"	N	17	08	16	02
Undivided Max. 27'-2" Min. 16'-5"...	U	27	02	16	05
Not Applicable Unrestricted.....	X	99	99	00	00
Unknown.....	X	55	55	00	01

Data Limits:

Item134A, Text, (N,E,U,X) 1 Character
 Item134BF, Integer,(0 to 99) 2 Digits
 Item134BI, Integer,(0 to 11) 2 Digits
 Item134CF, Integer,(0 to 99) 2 Digits
 Item134CI, Integer,(0 to 11) 2 Digits

ITEM135A,135BF,135BI,135CF,135CI

VERTICAL CLEARANCE-SBND & WBND

CDOT

DESCRIPTION:

A five part, nine character code describing the direction of travel and the maximum and minimum for that lane or lanes.

PROCEDURE:

ITEM135A, A one character code describing the direction of the lane or lanes, in which the clearances are measured. Use the following codes:

Description	Code
Southbound	S
Westbound	W
Undivided	U
Not Applicable	X

ITEM135BF, A two digit code that identify the maximum vertical clearance in feet for the lane described above. Where no restriction exists, code 99. For structures where the clearance is unknown, code 55.

ITEM135BI, A two digit code that identify the maximum vertical clearance in inches for the lane described above. Where no restriction exists, code 99. For structures where the clearance is unknown, code 55.

ITEM135CF, A two digit code that identify the minimum vertical clearance in feet for the lane described above. The clearance reported should be the absolute minimum clearance. Where no restriction exists, code 00. For structures where the clearance is unknown, code 00.

ITEM135CI, A two digit code that identify the minimum vertical clearance in inches for the lane described above. The clearance reported should be the absolute minimum clearance. Where no restriction exists, code 00. For structures where the clearance is unknown, code 00.

See Appendix "K" for information on taking clearances.

ITEM135A,135BF,135BI,135CF,135CI

VERTICAL CLEARANCE-SBND & WBND

CDOT

CODING EXAMPLES:

Description

Code

135A 135BF 135BI 135CF 135CI

Southbound Lane Max. Clearance

17' -8" Min. 16'-2"

N 17 08 16 02

Undivided Max. 27'-2" Min. 16'-5"

U 27 02 16 05

Not Applicable Unrestricted.....

X 99 99 00 00

Unknown.....

X 55 55 00 01

Data Limits:

Item135A, Text, (S,W,U,X) 1 Character

Item135BF, Integer,(0 to 99) 2 Digits

Item135BI, Integer,(0 to 11) 2 Digits

Item135CF, Integer,(0 to 99) 2 Digits

Item135CI, Integer,(0 to 11) 2 Digits

ITEM136 MILEAGE LOG SECTION LETTER

CDOT

DESCRIPTION:

A one character code that identifies the section letter assigned to a highway.

PROCEDURE:

The section letter is assigned by the Division of Transportation Development. Each highway starts with Section Letter 'A' and continues unless overlapped by another route. When that overlap ends and the highway continues in its own right-of-way, then the next sequential letter of the alphabet would be used. i.e. 'B'. This process continues until the highway leaves the State. Each section of highway, and the structures within each section, must have a Mileage Log Section Letter.

For those structures that carry a city street, county roads, or other conditions, choose the appropriate code listed below:

Description	Code
City structure	U
County structure	V
Unidentified routes	W
Structures on frontage Rd Nbnd side	X*
Structures on frontage Rd Sbnd side	Y*
Structures on one way reciprocal	Z**

*Do not use until DTD approves. Frontage road will continue to be coded to the main line.

**One-way reciprocal is a one-way street in the opposite direction of travel of the route.

All structures must be coded. There is no unknown condition.

CODING EXAMPLES:

Description	Code
F-12-A on State Highway 6, Section G near Dillon	G
City street on structure over I-25	U
County road on a structure over I-25	V

Data Limits:

Text, (A - Z) 1 Character

ITEM137,137A,137B,37C, SUFFICIENCY RATING

CDOT

DESCRIPTION:

A four part fifteen character code to identify the sufficiency rating.

PROCEDURE:

ITEM137, A 5 digit code which records the sufficiency rating as calculated with the AASHTO formula, see Appendix "A" The actual number will be automatically coded in this item to the nearest tenth.

ITEM137A, A 5 digit code to record the lowest sufficiency rating on record for that structure if it was ever eligible for the Select List.

ITEM137B, A 4 digit code to identify the year that the lowest sufficiency rating on record for the structure if it was ever eligible for the select list.

ITEM137C, A 1 character code (Y or N) to identify the structures that are not eligible for Federal Funds as defined under FHWA's ten year rule.

If the structures carries railroad, pedestrian overpass, or a tunnel, a rating is not calculated and is left blank.

CODING EXAMPLES:

Description	Code			
	137	137A	137B	137C
F-16-OP	98.0	-	-	-
B-23-A Reconstructed in last ten years	62.6	4.8	1987	N

DATA LIMITS:

Item137, Real, (0.0 TO 100.0, Blank) 5 Digits
Item137A, Real, (0.0 to 100.0, Blank) 5 Digits
Item137B, Integer, (1960-2060) 4 Digits
Item137C, Text, (Y,N) 1 Character

ITEM138 SELECT LIST INDICATOR

CDOT

DESCRIPTION:

A two character code to identify if a structure is structurally deficient, functionally obsolete or neither.

PROCEDURE:

The Select List indicator is automatically computed and up dated based on FHWA criteria listed in Appendix "B". For those structures carrying RR, ped., and tunnels that do not have a sufficiency rating, leave blank.

Description	Code
Structurally deficient structure	SD
Functionally obsolete	FO
Neither SD or FO	NO
RR, ped. overpass, tunnel	Blank

CODING EXAMPLES:

Description	Code
A-11-H Structurally Deficient	SD
F-16-AV Okay	NO

Data Limits:

Text, (SD,FO,NO,Blank) 2 Characters

ITEM139 BRIDGE WEIGHT LIMIT MAP COLOR

CDOT

DESCRIPTION:

A one digit code to identify the color assigned to a structure indicating the load carrying capacity at operating stress level.

This item will be coded by the Bridge Rating Unit.

PROCEDURE:

Load restricted structures are identified on a highway system map by color coding their Load Carrying Capacity. Codes have been established for the appropriate map color and are listed below:

Description	Code
White (49,500 lbs or more per tandem axle)	0
Yellow (45,500 lbs to 49,499 lbs per tandem axle)	3
Orange (41,500 lbs to 45,499 lbs per tandem axle)	2
Black (Less than 41,500 lbs per tandem axle) or Posted	1
Not Applicable	9

Select the appropriate color and code for each structure as it is rated or re-rated. The color should be noted on the Rating Summary Sheet.

CODING EXAMPLES:

Description	Code
F-17-GW Adequate for State Legal Loads	4
L-11-F Load Posted	1
H-20-W Load Restricted (42,500 lbs per tandem axle)	2

Data Limits:

Integer
(0-9)
1 Digit

ITEM140 BATCH ID NUMBER

CDOT

DESCRIPTION:

A six character code to identify the rating Batch ID Number.

PROCEDURE:

State Highway System:

The Batch ID Number is assigned to each structure at the time it is rated. The first character of the number consists of a letter to indicate the month and the next two digits indicate the year of initial rating. The last three digits indicate the numerical order the structure was rated in. This number is unique to each structure or each pair of similar parallel structures. For structures that have not been rated, code N00000.

County/Municipal Highway Systems:

Batch ID Numbers have been assigned to all current county/municipal bridges by the Bridge Inventory Unit. Batch ID numbers will be assigned to bridges as they are added to the inventory. The number will consist of the three digit county code and the next available sequential number. Batch ID numbers will not be reassigned.

CODING EXAMPLES:

Description

Larimer County Structure LR 20-1.3-S34
E-17-FH rated 44th in January 1974

Code

069126
A74044

Data Limits:

Text, 6 Character

ITEM141 CONSTRUCTION FUNDING

CDOT

DESCRIPTION:

A one character code to identify the type of funds used for the replacement or rehabilitation of the structure.

PROCEDURE:

Record a one digit code to indicate the type of funding to be used for the replacement or rehabilitation of the structure. If Item142 is coded '0' then Item141 is coded X. Select the proper code from the list below:

Description	Code
National Highway System (NHS)	A
Other Federal Funds (Not HBRRP)	B
Federal Bridge Replacement/Rehabilitation (HBRRP)	C
Indian Lands	D
State Funded (Not HUTF)	E
Colorado Highway Users Tax Fund (HUTF)	F
City/County Ventures	G
Private Venture	H
Railroad Ventures	I
Not Applicable	X

CODING EXAMPLES:

Description	Code
E-16-CK New Interstate structure	A
A-11-J Bridge Replacement project w/HBRRP funds	C

Data Limits:

Text,
1 Character

ITEM142 STRUCTURE PROJECT STATUS

CDOT

DESCRIPTION:

A one digit code to identify the current status of the planning and/or construction phase of the structure's replacement or rehabilitation project.

PROCEDURE:

Record the code to indicate the planning and/or construction phase in which the structure is currently programmed. Select the proper code from the list below:

Description		Code
Not currently programmed		0
Programmed in the Statewide Transportation Improvement Program (STIP)	1	
Funded for design		2
Has partial funding for construction		3
Currently being bid or under construction	4	

CODING EXAMPLES:

Description		Code
A-11-C in STIP	1	
F-15-FP on S.H. 74 Not Programmed	0	

Data Limits:

Integer,
(0,1,2,3,4)
1 Digit

SECTION VI

RECORDS FOR UNDER THE STRUCTURE

The items in this section were designed to identify the route **"UNDER"** the structure.

If there are no other routes involved at the structure other than what is shown in Item205, this item should be coded with zeroes and the remaining items in the 200 series should be coded with not applicable codes.

Generally, the items in this section are oriented to the route under the structure and are similar to items previously described in this manual, but have a number smaller than 200.

This section consists of:

ITEM205A,205B,205C,205D, 205X,205E	INVENTORY ROUTE
ITEM206	FEATURE INTERSECTED
ITEM210F,210I	INVENTORY ROUTE, MAXIMUM VERTICAL CLEARANCE
ITEM211	MILEPOINT
ITEM212	BASE HIGHWAY NETWORK
ITEM213A	LRS INVENTORY ROUTE
ITEM219	BYPASS, DETOUR LENGTH
ITEM226	FUNCTIONAL CLASSIFICATION
ITEM229	AVERAGE DAILY TRAFFIC
ITEM230	YEAR OF AVERAGE DAILY TRAFFIC
ITEM247	INVENTORY ROUTE, TOTAL HORIZONTAL CLEARANCE
ITEM300	STRAHNET HIGHWAY DESIGNATION
ITEM304	HIGHWAY SYSTEM OF THE INVENTORY ROUTE
ITEM309	AVERAGE DAILY TRUCK TRAFFIC
ITEM310	DESIGNATED NATIONAL NETWORK
ITEM315	MILEAGE LOG SECTION LETTER

DESCRIPTION:

A five part, nine digit code which identifies the record type, the route prefix, the designated level of service, the route number and the directional suffix of the Federal-Aid or STRAHNET route under the structure.

PROCEDURE:

Each part of this item must be completed for each route that goes under a given structure. **"UNDER"** signifies that the route being inventoried goes under the structure.

ITEM205A, Record Type: A one digit code from the list below to identify that the inventory route is **"UNDER"** the structure. It cannot be overemphasized that all route-related data must agree with the route being inventoried and identified in ITEM205D **"UNDER"** the structure.

There are situations where a structure needs to have multiple records for the field log or FHWA. Use the appropriate code from the list below to identify these structures.

Description	Code
No route carried "UNDER" the structure	0
Single route "UNDER" the structure includes tunnels, railroad structures, pedestrian structures	2
Multiple routes "UNDER" the structure	A - Z

**WHERE DUPLICATE STRUCTURE RECORDS EXIST
BECAUSE OF UNUSUAL CONDITIONS, USE THE
FOLLOWING CODES:**

Record not used in the Field Log	
not reported to FHWA	3
Record used in the Field Log,	
not reported to FHWA	4
Record not used as a Field Log record,	
not reported to FHWA, creates a duplicate record	6

ITEM205A,205B,205C,205D,250X, 205E INVENTORY ROUTE **MOD FHWA**

ITEM205B, Route Prefix: A one digit code to identify the type of highway under the structure. When two or more routes are concurrent, the highest hierarchy of the routes will be used.

Hierarchy	Code
Interstate Highway	1
U.S. Numbered Highway	2
State Highway	3
County Highway	4
City Street	5
Federal Lands Road	6
State Land Road	7
Other (describe)	8

ITEM205C, Designated Level of Service: A one digit code to identify the level of service for the route. Only those routes legally designated and signed will be identified with a code other than Mainline. The following codes will be utilized:

Designation	Code
None of Below	0
Mainline	1
Alternate	2
Bypass	3
Spur	4
Business Route	6
Ramp, Wye, Connector	7
Service and/or unclassified frontage road	8

ITEM205D, Route Number (Numeric): on-system structures: Five digits to identify the State Highway number. For county roads, city streets or other roads that are not numbered, code 0.*

ITEM205X, Route Number (Text): off-system structures: Five characters to identify county road or city street name/number.*

* When two or more routes are concurrent, the highest of the hierarchy of the systems (see Item205B) will be used. If the routes are of the same hierarchy level the lowest numbered route will be used.

* Item205D is used to facilitate sorting State Highway system structures, and can be used with Off-System structures to facilitate sorting.

NOTE: ONCE 205D, AND 205X ARE ESTABLISHED, DO NOT CHANGE THESE ITEMS WITHOUT APPROVAL OF THE BMS DATA MANAGER.

ITEM205E, Directional Suffix: This last position is a one digit code indicating the directional suffix to the route number when one is part of the route number. This code is pre-filled with a zero.

CODING EXAMPLES:

Description	Code			
	205A	205B	205C	205DN
Interstate 70 under the structure	2	1	1	00070
U.S. 40 Bypass the structure	2	2	3	00040

Data Limits:

Item205A, Text ,	1 Digit
Item205B, Integer, (0 to 9)	1 Digit
Item205C, Integer, (0 to 9)	1 Digit
Item205D, Integer, (0 to 9)	5 Digits
Item205X, Text,	5 Digits
Item205E, pre-filled,	1 Digit

ITEM206 FEATURE INTERSECTED

FHWA

DESCRIPTION:

A twenty-five character coded description of the feature(s) intersected by the inventory route and structure, and a critical facility indicator.

PROCEDURE:

The first twenty-four digits, **left justified**, will identify the name(s) of the feature(s) intersected. When more than one feature is intersected, the hierarchy is:

- (leftmost) Highway - Signed number or name
- (second) Railroad - abbreviated as RR

Staff Bridge has designated some common abbreviations or spellings to be used for this item. It is suggested that these common abbreviations be used as often as possible. See Appendix "I" for these common abbreviations or spellings.

The 25th position is left blank EXCEPT when the structure is designated a Critical Facility then fill this position with a pound (#) sign.

When an inventory route and structure is on a frontage/service road or a ramp, an access road or a bike path, it must be identified by one of the following abbreviations **in the 23rd and 24th positions:**

Description	Code
Frontage/Service Road	SR
Ramps	R
Access Roads	AC
Bike Path	BP

CODING EXAMPLES:

Description	Code
Interstate 25 under Evans Ave Evans Ave	
SH40 under I25ML	I25 ML

Data Limits:

Text, 25 Characters

**ITEM210F,210I INVENTORY ROUTE,
MAXIMUM VERTICAL CLEARANCE**

FHWA

DESCRIPTION:

A two part, four digit code to identify the maximum usable vertical clearance over the inventory route. This is the **practical** maximum clearance.

PROCEDURE:

ID and record the maximum **practical** vertical clearance for a 10-foot wide lane, **excluding shoulders over the inventory route**. The **practical** vertical clearance represents the location under the structure where a typical high load truck can pass safely. **This vertical clearance location must be in the travel lanes only**. Measurements should be provided at each lane line to supply enough information to determine the correct clearance for this item. See Appendix "K" for instructions on taking and recording measurements.

For structures with multiple openings, the maximum of the practical clearances from all lanes should be reported.

The item must be completed for all structures that present an obstruction to the inventory route.

When no restrictions exists, code 99 for Item210F and 210I. When a restriction exists but is unknown or unmeasured, code 55 for Item210F and 210I.

Clearances will be measured to the nearest inch and reported in feet and inches. Truncate fractions of inches; do not round up.

ITEM210F, identifies clearance in feet only (2 digits).

ITEM210I, identifies clearance in inches only (2 digits).

CODING EXAMPLES:

Description	Code	
	210F	210I
Westbound 19'2"	19	02
Clearance 26'6"	26	06
Unrestricted	99	99
Unknown or unmeasured	55	55

Data Limits:

ITEM210F, Integer, (0 to 99) 2 Digits

ITEM210I, Integer, (0 to 11,55,99) 2 Digits

ITEM211 MILEPOINT

FHWA

DESCRIPTION:

A seven digit code to identify the structure location according to a common reference point system.

PROCEDURE:

A Reference Point System has been established for state highways to identify the measured distance from the beginning of a route to the features on that route. The beginning of a route is usually the western or southern State Line or sometimes the junction with another highway. Reference points for odd numbered highways generally increase from South to North. Reference points for even numbered highways generally increase from West to East. Exceptions are stub routes, measured from their terminus with other highways along their route regardless of direction. This designation should not change.

This item will be coded for the route identified in Item205DN.

For county roads, city streets or other roads that are not numbered, code 0.

**NOTE: DO NOT CHANGE THIS ITEM WITHOUT EXPLICIT APPROVAL OF
BMS DATA MANAGER**

CODING EXAMPLES:

<u>Structure</u>	<u>Highway Item205D</u>	<u>Ref. Point</u>	<u>Code Item211</u>	<u>Code Item315</u>
L-21-I	50B	39.480	39.480	B
F-16-EW	25A	211.465	211.465	A

Data Limits:

Real, (0.0 to 500.000)

7 Digits

ITEM219 BYPASS, DETOUR LENGTH

FHWA

DESCRIPTION:

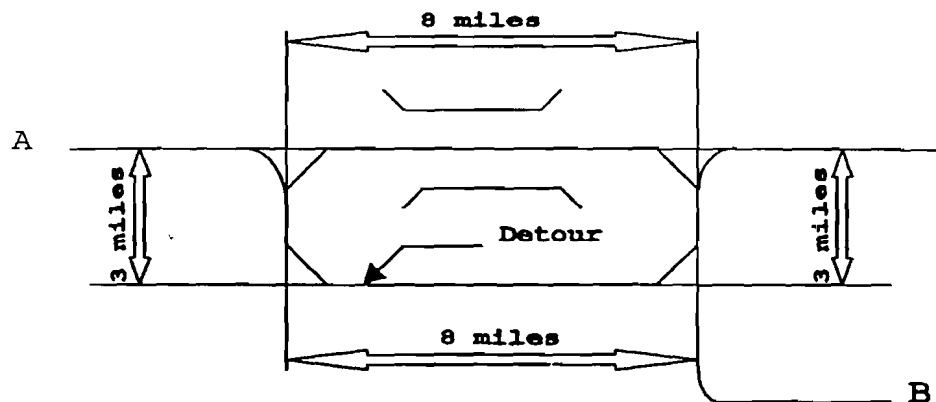
A two digit code identifying the detour length.

PROCEDURE:

The detour length should identify the total **additional** travel for a vehicle which would result from closing of the structure. This **additional** travel will usually be the sum of the distance traveled **perpendicular to** the route the structure is located on. The parallel distance traveled is not to be counted as part of the detour length. Record the distance to the nearest mile.

If the structure is an interchange or is otherwise bypassable, code 00. The factor to consider when determining if a bypass is available at the site is the potential for moving vehicles, including military vehicles, around the structure. For instance, a bypass would be available in the case of diamond interchanges, interchanges where there are service roads available, or other interchanges where the positioning and layout of the ramps is such that they could be used without difficulty to get around the structure. Code 99 for 99 miles or more.

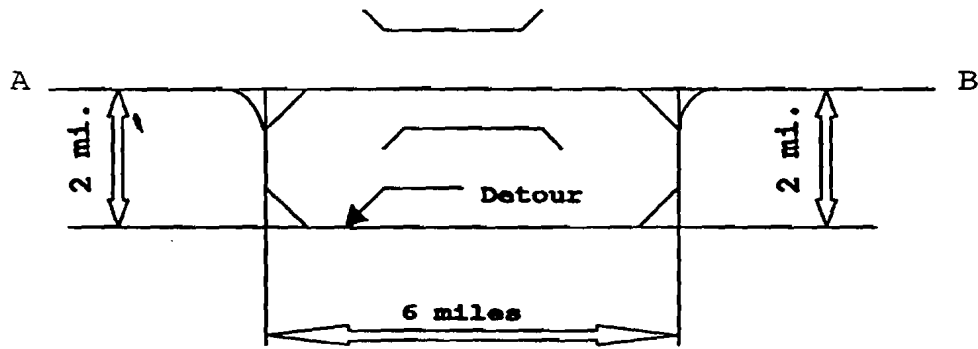
Colorado allows any paved roadway to be used as a detour route for state highway structures. Any passable roadway can be used for Off-System structures. The detour route must be capable of carrying state legal loads. These detours may or may not allow overloads depending on the roadway condition.



Bypass, Detour Length A - B = 4 Miles

ITEM219 BYPASS, DETOUR LENGTH

FHWA



Bypass, Detour Length A - B = 4 Miles

CODING EXAMPLES:

Description	Code
Diamond interchange, structure bypassable	00
Cloverleaf, not bypassable; 8 mile detour	08
Structure over highway, no interchange, bypassable at ground level	00
Structure over river; 121 mile detour	99
Structure on dead end road	99

Data Limits:

Integer, (00 to 99) 2 Digits

ITEM226 FUNCTIONAL CLASSIFICATIONS

FHWA

DESCRIPTION:

A two digit code to identify the functional classification for the inventory route referred to in Item205D or Item205X.

PROCEDURE:

Functional Classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. The classifications are determined through a statewide planning process and approved by the Transportation Commission and then provided to BMS. Any changes to this classification must be addressed through the Division of Transportation Development and approved by the Transportation Commission.

The following list of codes is used to identify these routes. The appropriate code is based on the inventory route identified in Item205D and Item304.

Description	Code	Item304
<u>Rural</u>		
Principal Arterial-Interstate	01	1
Principal Arterial-Other 02	1	
Minor Arterial	06	0
Major Collector	07	0
Minor Collector	08	0
Local	09	0
<u>Urban</u>		
Principal Arterial-Interstate	11	1
Principal Arterial-Other Freeways Or Expressways	12	1
Other Principal Arterial 14	1	
Minor Arterial	16	0
Collector	17	0
Local	19	0

CODING EXAMPLES:

Description	Code
Interstate 25, in Denver, Item304 = 1.....	11
City Street in Vail, Item304 = 0.....	19

Data Limits:

Integer, (01 to 19) 2 Digits

ITEM229 AVERAGE DAILY TRAFFIC

FHWA

DESCRIPTION:

A six digit code to identify the average daily traffic volume (ADT).

PROCEDURE:

Code a six digit number that identifies the ADT volume for the route being inventoried under the structure, **including truck traffic from Item309**. The ADT count must be the most current count available and the data must be compatible with other items coded for the structure.

When taking a traffic count, the counter shall be placed as necessary and operated for a minimum period of forty-eight hours, which will include two weekdays. The raw data obtained from the counters shall be adjusted using the seasonal adjustment rate tables provided yearly by the CDOT.

CODING EXAMPLES:

Description	Code
Adjusted ADT Volume 540.....	000540
Adjusted ADT Volume 15660.....	015660

Data Limits:

Integer, (0 to 900000) 6 Digits

ITEM230 YEAR OF AVERAGE DAILY TRAFFIC

FHWA

DESCRIPTION

A two digit code to identify the year the Average Daily Traffic count in Item229 was taken.

PROCEDURE:

Code the year the ADT (Item229) was taken. This item will be coded for the route being inventoried (Item205D or Item205X) at the structure.

CODING EXAMPLES:

Description	Code
ADT Counted in 1976.....	1976
ADT Counted in 1972.....	1972

Data Limits:

Integer, (0 to 99) 4 Digits

ITEM247 INVENTORY ROUTE,

TOTAL HORIZONTAL CLEARANCE

FHWA

DESCRIPTION:

A four digit code to identify the largest available horizontal clearance for the inventory route including all available roadway and shoulders.

PROCEDURE:

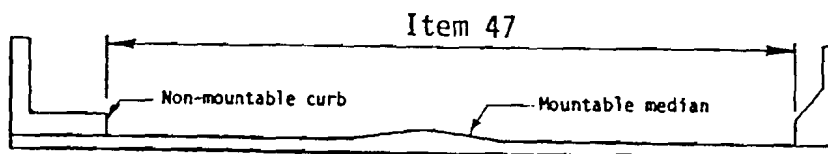
The horizontal clearance should be the largest available clearance measured between restrictive features: curbs, rails, walls, or other structural features limiting the roadway (surface and shoulders). The measurement should be recorded and coded to the nearest tenth of a foot.

This clearance has been identified in 3 ways; use the most applicable:

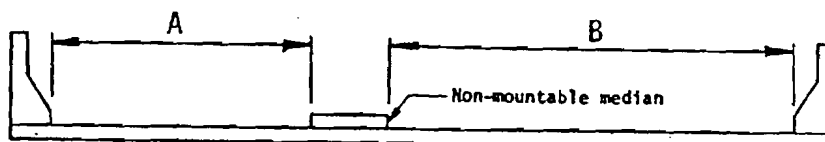
1. Roadway surface and shoulders.
2. Distance from face of pier (or rail around pier) to face of rail or toe of slope.
3. Include flush or mountable medians when Item33 is coded 2, but not raised medians when Item33 is coded 3.
 For a raised or non-mountable median record the greater of the restricted widths in either direction, not both directions.

Mountable medians are considered to be curbs 9-inches high or less. For railroad or pedestrian facilities over the inventory route, code this item for the inventory route. See Appendix "E" for coding railroad & pedestrian facilities

There should be a total horizontal clearance for each structure, therefore, no unknown code exists for this item. For clearances over 100 feet, code 99.9.



No Median or Flush or Mountable Median

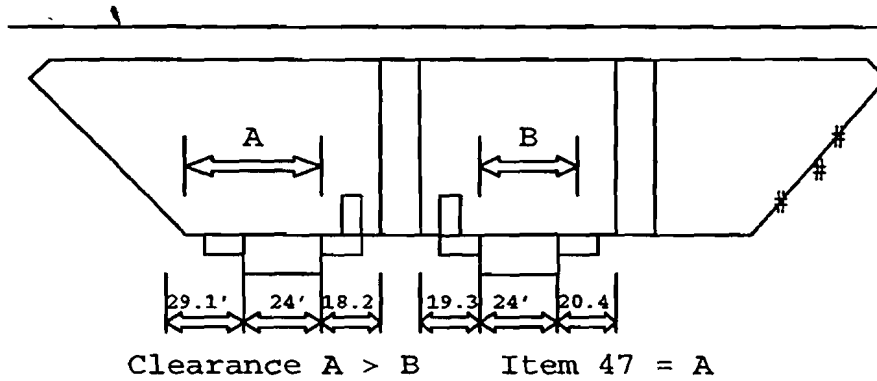


Raised Median or Non-mountable Median
 $B > A$ **Item 47 = B**

ITEM247 INVENTORY ROUTE,

TOTAL HORIZONTAL CLEARANCE

FHWA



CODING EXAMPLES:

Description

Code

Horizontal Clearance on Curb-to-curb 38'-6"

38.5

Horizontal Clearance Under from slope to median
 barrier 50'-5"

50.4

Data Limits:

Real, (.0 to 99.9) 4 Digits

ITEM300 STRAHNET HIGHWAY DESIGNATION

FHWA

DESCRIPTION:

A one digit code indicating STRAHNET highway designation for the inventory route identified in Item205D.

PROCEDURE:

This item shall be coded for all records in the inventory. For the purposes of this item, the STRAHNET Connectors are considered included in the term STRAHNET. For the inventory route identified in Item205D, indicate STRAHNET highway conditions using one of the following codes:

Description	Code
The route is not a STRAHNET highway	0
The route is a STRAHNET highway	1
The route is a STRAHNET highway and goes over or under another STRAHNET highway	2

CODING EXAMPLES:

Description	Code
F-15-LA on Colorado 74	0
I-06-AA on Interstate 70	1

Data Limits:

Integer
(0, 1, or 2)
1 Digit

ITEM304 HIGHWAY SYSTEM OF THE INVENTORY ROUTE

FHWA

DESCRIPTION:

A one digit code identifying structures on the National Highway System (NHS).

PROCEDURE:

This item is to be coded for all records in the inventory. For the inventory route identified in Item205D, indicate whether the inventory route is on the National Highway System (NHS) or not on that system. Use one of the following codes:

Description	Code
On National Highway System	1
Not On National Highway System	0

Data Limits:

Integer, (0 or 1) 1 Digit

ITEM309 AVERAGE DAILY TRUCK TRAFFIC

MOD FHWA

DESCRIPTION:

A two digit code indicating the percentage of Item229 attributed to truck traffic.

PROCEDURE:

Code the percentage of Item229 "Average Daily Traffic" that is truck traffic. Do not include vans, pickup trucks and other light delivery trucks. If this information is not available, an estimate which represent the average percentage for the category of road carried by the structure may be used. May be left blank if Item229 is not greater than 100.

CODING EXAMPLES:

Description

Code

Average Daily Traffic is 7% trucks and Item229 >100....

07

Average Daily Traffic is 18% trucks and Item229 >100....

18

Average Daily Traffic is 10% trucks and Item229 _100....

Blank

Data Limits:

Integer, (00 to 99 or Blank) 2 Digits

ITEM310 Designated National Network

FHWA

DESCRIPTION:

A one digit code designating the route as a part of the National Network for trucks.

PROCEDURE:

The national network for trucks includes most of the Interstate System and those portions of the Federal-Aid highways identified in the Code of Federal Regulations (23 CFR 658). The national network for trucks is available for use by commercial motor vehicles of the dimensions and configurations described in these regulations. For the inventory route identified in Item205D "Inventory Route", indicate the condition using one of the following codes:

Description:

Not a part of the National Truck Network
A part of the National Truck Network

Code

0
1

CODING EXAMPLES:

Description

SH160 under P-19-F

Code

1

Data Limits:

Integer, (0 or 1) 1 Digit

ITEM315 MILEAGE LOG SECTION LETTER

FHWA

DESCRIPTION:

A one character code that identifies the section letter assigned to a highway.

PROCEDURE:

The section letter is assigned by the Division of Transportation Development. Each highway starts with Section Letter 'A' and continues unless overlapped by another route. When that overlap ends and the highway continues in its own right-of-way, then the next sequential letter of the alphabet would be used. i.e. 'B'. This process continues until the highway leaves the State. Each section of highway, and the structures within each section, must have a Mileage Log Section Letter.

For those structures that carry a city street, county roads, or other conditions, choose the appropriate code listed below:

Description	Code
City structure	U
County structure	V
Unidentified routes	W
*Structures on frontage Rd Nbnd side	X
*Structures on frontage Rd Sbnd side	Y
**Structures on one way reciprocal	Z

*Do not use until DTD approves. Frontage road will continue to be coded to the main line.

**One way reciprocal is a one-way street in the opposite direction of travel of the route.

All structures must be coded. There is no unknown condition.

CODING EXAMPLES:

Description	Code
F-12-A on State Highway 6, Section G near Dillon	G
City street on structure over I-25	U
County road on a structure over I-25	V

Data Limits:

Text, (A - Z) 1 Character

SECTION VII

APPENDIXES

This section contains the Glossary of Terms and the Appendixes. They are provided for the convenience of the user of this manual.

The terms in the Glossary are: commonly used computer language, bridge terms of general usage and abbreviations used in the manual.

The Appendix has information necessary to code or complete some of the items or functions involved in the inventory or appraisal. As an example, Appendix "A" describes the calculation of the sufficiency rating and the determination of structural deficiency or functional obsolescence, while Appendix "C" gives a relationship between the FHWA codes and CDOT's structure types for coding purposes.

THIS SECTION CONSISTS OF:

GLOSSARY OF TERMS

APPENDIX A-SUFFICIENCY RATING INFORMATION

APPENDIX B-SELECT LIST DETERMINATION

APPENDIX C-STRUCTURE TYPES (FHWA AND CDOT)

APPENDIX D-STRUCTURE NUMBERING SYSTEM

APPENDIX E-STRUCTURE MEASUREMENTS

APPENDIX F-TRAFFIC SAFETY FEATURES & RAIL TYPES

APPENDIX G-CITY CODES

APPENDIX H-MAPS

APPENDIX I-ABBREVIATIONS

APPENDIX J-20 YEAR GROWTH FACTOR

APPENDIX K-LATERAL & VERTICAL CLEARANCE MEASUREMENTS

APPENDIX L-MAJOR IMPROVEMENT TYPES

GLOSSARY OF TERMS

GLOSSARY OF TERMS

AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
ALPHA	An Alphabetic Code or an Item that will accept only alphabetic characters.
BARS PROGRAM	<u>B</u> ridge <u>A</u> nalysis and <u>R</u> ating <u>S</u> ystem Program used to rate bridges for inventory and operating load carrying capacity.
BRIDGE SURVEY	Structure information determined in the field as opposed to construction plans.
CODE SCHEME	A system of numbers, letters or combination of numbers and letters used to identify specific information rather than using a narrative description.
CDOT	Colorado Department of Transportation (formerly Colorado Department of Highways also Colorado Division of Highways)
COLUMN	A specific list of information collected under a designated title. In this database the title is designated as an Item #.
DATABASE	The computer storage of all the items of information described in this manual.
DATA LIMITS	The length and character type of the field created in the database for a particular Item.
DIRECTION OF INVENTORY	Highways in Colorado are inventoried from South to North and from West to East, except for a stub route which starts at a junction with another highway and is inventoried outward to its terminus.

GLOSSARY OF TERMS

DTD	Division of Transportation Development
FHWA	Federal Highway Administration
FIELD	Refers to the area set aside in the data base for an item of information. It can be from one digit to thirty digits in length.
FUNCTIONALLY OBSOLETE	The condition where a structure functionally deteriorates to a “poor” condition
FIELD LOG OF STRUCTURES	A report published annually by Staff Bridge Branch Listing the structures, signs, overhead pipes, junctions with other highways, city limits, county and state lines, on all of the State Highways in highway and reference point order.
FIPS	Federal Information Processing Standards
HBRRP	Highway Bridge Replacement and Rehabilitation Program.
HIERARCHY	The order of importance of a highway within the State Highway System.
ITEM	Refers to one field of the information in the database.
LEADING ZEROS	Used to fill the beginning portion of a field
LEFT JUSTIFY	Refers to data beginning at the far left of a field.
MILITARY QUADRANGLE	An area of a map of 15 minutes of latitude by 15 minutes of longitude.
NHS ROUTE	A route designated by FHWA to be part of the National Highway System.

GLOSSARY OF TERMS

POSITION	Refers to the location of data within a field of information, as 5 th position of a 25 digit item.
PROGRAM	Refers to the computer system that processes the information stored in the database.
RIGHT JUSTIFY	Refers to data that occupies the right hand most position in a field.
ROADWAY	Generally, roadway refers to travel lanes and shoulders. If a variation occurs in this manual, it is explained in the text of the item.
ROUTE ORIENTED	That information referring to the highway, road or street, rather than the bridge.
STATE HIGHWAY SYSTEM	Those highways that are on Interstate, Primary, Secondary, and Non-Federal-Aid Highway, as described in State Highway Mileage Record, published by the Division of Transportation Development.
STRUCTURALLY DEFICIENT	The condition of a structure where the deck, superstructure, substructure, or a culvert deteriorates to a "poor" condition.
TRAVEL LANE	The area on a highway where vehicles travel, does not include the shoulder and is usually 12 feet wide.
TEXT	Means any alphabetic or numeric characters that may be used in a field.
USGS	United States Geological Survey
US NUMBERED ROUTE	A Trans-State or transcontinental Route approved by AASHTO. Not to be confused with Highway Systems; e.g., Federal-Aid Primary or Federal-Aid Secondary. The route can be Federal-Aid Primary or Secondary.
ZERO FILLED	Any unused portion of an item filled with zeros.

APPENDIX A SUFFICIENCY RATING CALCULATION

APPENDIX A SUFFICIENCY RATING CALCULATION

Bridges qualifying for federal funding are those that are deemed deficient and either functionally obsolete (FO) or structurally deficient (SD) and have a sufficiency rating of 80 or less. This rating is prescribed by AASHTO Specifications and formulas were adopted in 1977 by FHWA, and are utilized in the Highway Bridge Replacement Program (HBRRP) to qualify bridges for the federal "Select List".

AASHTO Formulas follow:

$$\text{Sufficiency Rating (S.R.)} = S_1 + S_2 + S_3 + S_4$$

S₁ is Structural Adequacy and Safety with a maximum of 55%; S₂ is Serviceability and Functional Obsolescence with a maximum of 30%; S₃ is Essentially for Public Use with a maximum of 15%; and S₄ is a Special Reduction used only when S₁+S₂+S₃ is greater than 50. The rating shall not be less than 0% nor more than 100%.

SUFFICIENCY RATING FORMULA

1. **Structural Adequacy and Safety (55% maximum)**

a. Only the lowest code of ITEM59, ITEM60, or ITEM62 applies.

If #59 (Superstructure Rating) or

#60 (Substructure Rating) is ≤ 2 then A=55%
= 3 A=40%
= 4 A=25%
= 5 A=10%

If #59 and #60 = N and

#62 (Culvert Rating) is ≤ 2 then A=55%
= 3 A=40%
= 4 A=25%
= 5 A=10%

APPENDIX A SUFFICIENCY RATING CALCULATION

b. Reduction for Load Capacity:

(1) Calculate AIT (Adjusted Inventory Tonnage) as follows:

If the 1st digit of #66 = 1, AIT = the 2nd and 3rd digits X 1.56;
 If the 1st digit of #66 = 2, AIT = the 2nd and 3rd digits X 1.00;
 If the 1st digit of #66 = 3, AIT = the 2nd and 3rd digits X 1.56;
 If the 1st digit of #66 = 4, AIT = the 2nd and 3rd digits X 1.01;
 If the 1st digit of #66 = 5, AIT = the 2nd and 3rd digits X 0.77;
 If the 1st digit of #66 = 6, AIT = the 2nd and 3rd digits X 0.67;
 If the 1st digit of #66 = 9, AIT = the 2nd and 3rd digits X 1.00;

(2) Calculate using the following formulas:

$$B = (36 - \text{AIT})^{1.5} \times 0.2778$$

$$\text{If } (36 - \text{AIT}) \leq 0 \text{ then } B = 0$$

“B” shall not be less than 0% nor greater than 55%

$$S_1 = 55 - (A + B)$$

S₁ Shall not be less than 0% nor greater than 55%

2. Serviceability and Functional Obsolescence (30% maximum)

a. Rating Reductions (13% maximum)

If #58 (Deck Condition) is	≤ 3 then	A = 5%
	= 4	A = 3%
	= 5	A = 1%

If #67 (Structural Evaluation) is	≤ 3 then	B = 4%
	= 4	B = 2%
	= 5	B = 1%

If #68 (Deck Geometry) is	≤ 3 then	C = 4%
	= 4	C = 2%
	= 5	C = 1%

APPENDIX A SUFFICIENCY RATING CALCULATION

If #69 (Under clearances) is	≤ 3 then	D = 4%
	= 4	D = 2%
	= 5	D = 1%

If #71 (Waterway Adequacy) is	≤ 3 then	E = 4%
	= 4	E = 2%
	= 5	E = 1%

If #72 (Approach Road Alignment) is	≤ 3 then	F = 4%
	= 4	F = 2%
	= 5	F = 1%

$$J = (A + B + C + D + E + F)$$

J shall not be less than 0% nor greater than 13%.

b. Width of Roadway Insufficiency (15% maximum)

Use the sections that apply:

1. applies to culverts;
2. applies to all bridges;
3. applies to 1-lane bridges only;
4. applies to 2 or more lane bridges
5. applies to all **except** 1-lane bridges

Also determine X and Y:

$$X (\text{ADT/Lane}) = \#29 (\text{ADT} \div \text{first 2 digits of } \#28 (\text{lanes}))$$

$$Y (\text{Width/Lane}) = \#51 (\text{Bridge Rdwy. Width}) \div \text{first 2 digits of } \#28$$

(1) Use when the last 2 digits of #43 (Structure Type) = 19 and #51 (Bridge Rdwy) = 0:

For 1 or 2 Lanes on a Culvert

If #51 (Bridge Rdwy) = 0 and the last 2 digits of #43 (Structure Type) = 19 and #28 (Lanes On) = 1 or 2 then Y = 18.

APPENDIX A SUFFICIENCY RATING CALCULATION

For 3 Lanes on a Culvert

If #51 (Bridge Rdwy) = 0 and the last 2 digits of #43 (Structure Type) = 19 and #28 (Lanes On) = 3 then Y = 12.

For 4 or More Lanes on a Culvert

If #51 (Bridge Rdwy) = 0 and the last 2 digits of #43 (Structure Type) = 19 and #28 (Lanes On) => 4 then Y = 9.

(2) Use when the last 2 digits of #43 (Structure Type) are not equal to 19 (Culvert):

If (#51 + 2 ft.) < #32 (Approach Roadway Width) G=5%

(3) **For 1-lane bridges only**, use the following:

If the first 2 digits of #28 (Lanes On) are equal to 01 and

$Y < 14$ then $H = 15\%$

$Y \geq 14 < 18$ $H = 15 \frac{18-Y}{4}\%$

$Y > 18$ $H = 0\%$

(4) **For 2 or more lane bridges.** If these limits apply, do not continue on to (4) as no lane width reductions are allowed.

If the first 2 digits of #28 = 02 and $Y \geq 16$, $H = 0\%$

If the first 2 digits of #28 = 03 and $Y \geq 15$, $H = 0\%$

If the first 2 digits of #28 = 04 and $Y \geq 14$, $H = 0\%$

If the first 2 digits of #28 ≥ 05 and $Y \geq 12$, $H = 0\%$

APPENDIX A SUFFICIENCY RATING CALCULATION

(5) For all except 1-lane bridges, use the following:

If $Y < 9$ and $X > 50$	then	$H = 15\%$
$Y < 9$ and $X \geq 50$		$H = 7.5\%$
$Y \geq 9$ and $X \geq 50$		$H = 0\%$

If $X > 50$ but ≤ 125	and	
$Y < 10$	then	$H = 15\%$
$Y \geq 10 < 13$		$H = \frac{13-Y}{3} \%$
$Y \geq 13$		$H = 0\%$

If $X > 125$ but ≤ 375	and	
$Y < 11$	then	$H = 15\%$
$Y \geq 11 < 14$		$H = 15 \frac{14-Y}{3} \%$

$Y \geq 14$		$H = 0\%$
-------------	--	-----------

If $X > 375$ but ≤ 1350	and	
$Y < 12$	then	$H = 15\%$
$Y \geq 12 < 16$		$H = 15 \frac{16-Y}{4} \%$

$Y \geq 16$		$H = 0\%$
-------------	--	-----------

If $X > 1350$	and	
$Y < 15$	then	$H = 15\%$
$Y \geq 15 < 16$		$H = 15(16-Y)\%$
$Y \geq 16$		$H = 0\%$

$G + H$ shall not be less than 0% nor greater than 15%

APPENDIX A SUFFICIENCY RATING CALCULATION

c. Vertical Clearance Insufficiency – (2% maximum)

If #100 (Defense Highway Designation) > 0 and

#53 (VC over Deck)

≥ 16 then $I = 0\%$

#53 < 16 $I = 2\%$

If #100 = 0 and

#53 > 14 then $I = 0\%$

#53 < 14 $I = 2\%$

$S_2 = 30 - [J + (G+H)+I]$

S_2 = shall not be less than 0% nor greater than 30%

3. Essentially for Public Use (15% maximum)

a. Determine:

b. Calculate:

$$A = \frac{\#29 \text{ (ADT)} \times \#19 \text{ (Detour Length)} \times 15}{200,000 \times K}$$

“A” shall not be less than 0% nor greater than 15%

c. Defense Highway Designation:

If #100 is > 0 then $B = 2\%$

If #100 = 0 then $B = 0\%$

$S_3 = 15 - (A + B)$

S_3 shall not be less than 0% nor greater than 15%.

4. Special Reductions (Use only when $S_1 + S_2 + S_3 \geq 50$)

APPENDIX A SUFFICIENCY RATING CALCULATION

a. Detour Length Reduction, use the following:

$$A = (\#19 \times (5.205 \times 10^{-8}))$$

“A” shall not be less than 0% nor greater than 5%

b. If the 2nd and 3rd digits of #43 (Structure Type, Main) are equal to 10, 12, 13, 14, 15, 16, or 17; then B = 5%

c. If 2 digits of #36 (Traffic Safety Features) = 0 C = 1%
If 3 digits of #36 = 0 C = 2%
If 4 digits of #36 = 0 C = 3%

$$S_4 = A + B + C$$

S₄ shall not be less than 0% nor greater than 13%.

$$\text{Sufficiency Rating} = S_1 + S_2 + S_3 - S_4$$

The rating shall not be less than 0% nor greater than 100%

APPENDIX B SELECT LIST DETERMINATION

APPENDIX B SELECT LIST DETERMINATION

In order to be considered for either the structurally deficient or functionally obsolete classification, the first digit of ITEM5 must be coded "1", and ITEM49 must be coded numeric and > 000020.

In addition, the following conditions must exist:

Structurally Deficient

1. A condition rating of 4 or less for:

ITEM58 – Deck; or
ITEM59 – Superstructures; or
ITEM60 – Substructures; or
ITEM62 – Culverts

- or 2. An appraisal rating of 2 or less for:

ITEM67 – Structural Condition; or
ITEM71 – Waterway Adequacy.¹

Functionally Obsolete

1. An appraisal rating of 3 or less for:

ITEM68 – Deck Geometry; or
ITEM69 – Underclearances;² or
ITEM72 – Approach Roadway Alignment.

- or 2. An appraisal rating of 3 for:

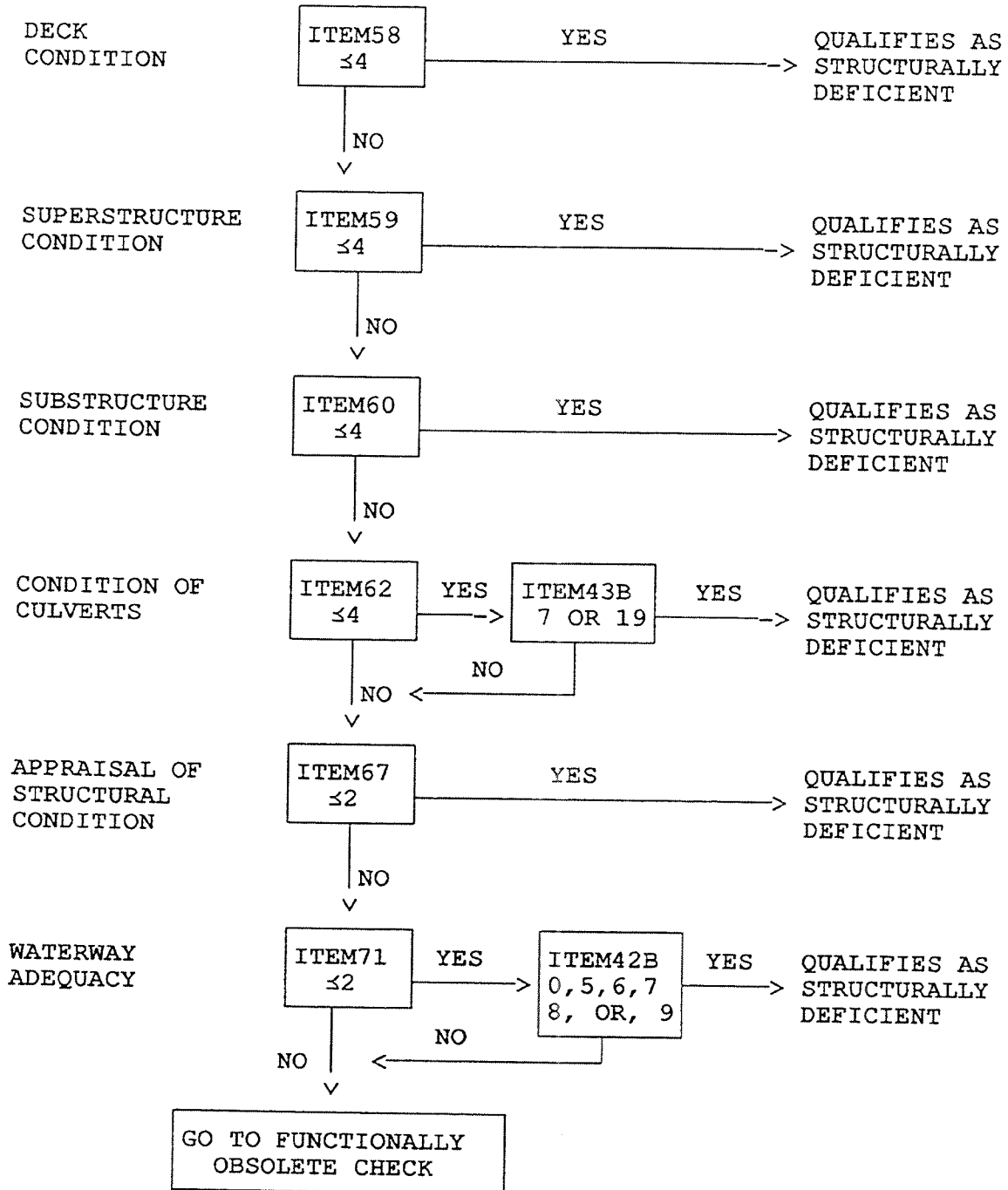
ITEM67 – Structural Condition; or
ITEM71 – Waterway Adequacy.²

Any bridge classified as structurally deficient is excluded from the functionally obsolete category.

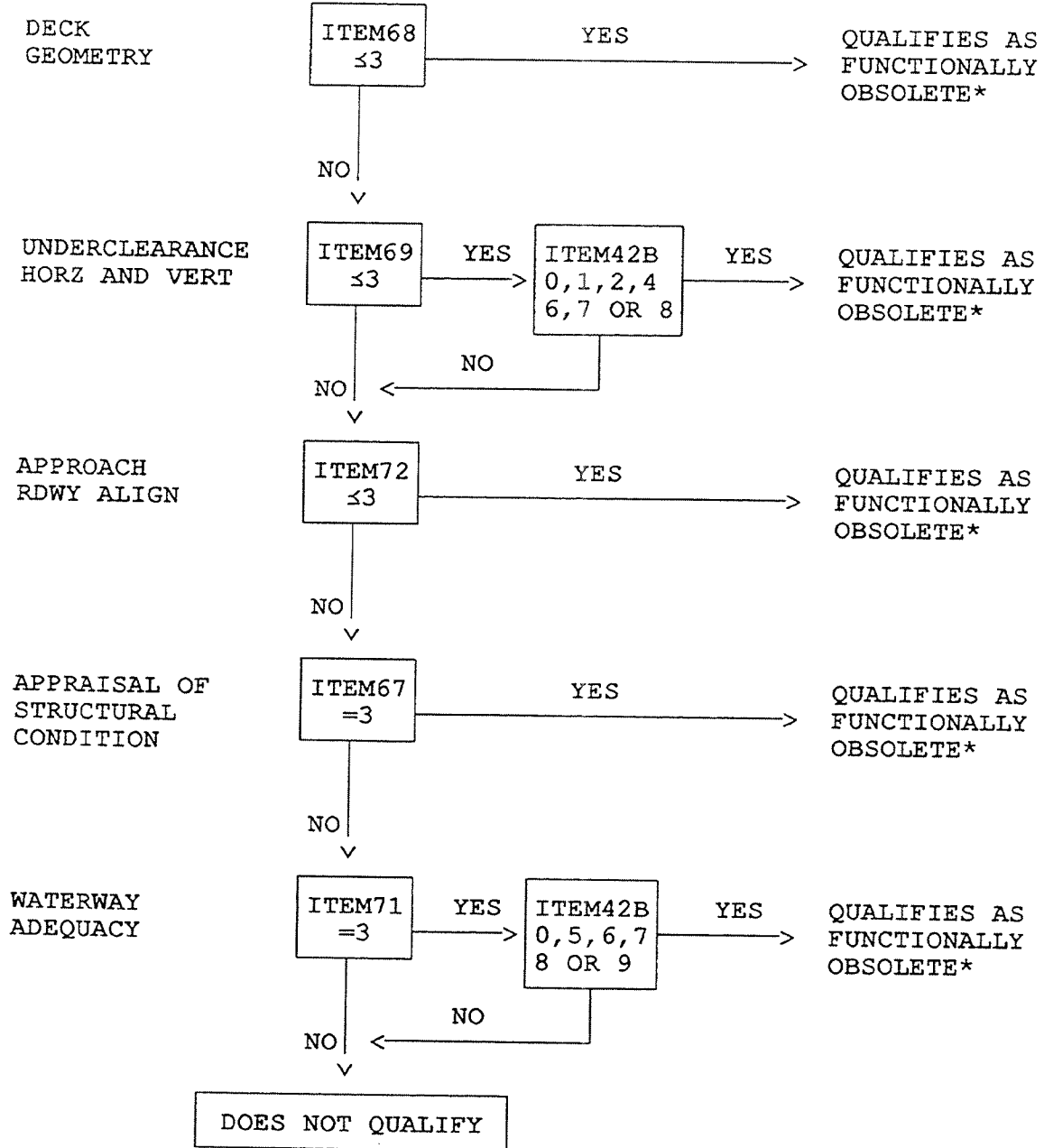
¹ ITEM71 applies only if the last digit of ITEM42 is coded 0,5,6,7,8 or 9.

² ITEM69 applies only if the last digit of ITEM42 is coded 0,1,2,4,6,7, or 8

STRUCTURALLY DEFICIENT



FUNCTIONALLY OBSOLETE



*NOTE: A structure which also qualifies as structurally deficient may not be included in functionally obsolete list. This does not mean that it cannot also be functionally obsolete.

APPENDIX C

STRUCTURE TYPES

FHWA & CDOT

APPENDIX C STRUCTURE TYPES

(FHWA AND CDOT)

The following list was compiled to show the FHWA codes described in ITEM43A and 43B relate to the CDOT structure types described in ITEM120A.

<u>ITEM43</u>	<u>STRUCTURE TYPE</u>	<u>ITEM120A</u>
<u>A B</u>		
1 01	Concrete Slab	CS
1 04	Concrete Slab	CSG
1 05	Concrete Box Girder, Multiple	CBG
1 06	Concrete Box Girder, Single or Spread	CBG
1 07	Concrete Rigid Frame	CRF
1 11	Concrete Arch	CA
1 19	Concrete Arch Culvert	CAC
	Concrete Box Culvert	CBC
	Reinforced Concrete Pipe Culvert	RCPC
	Precast Concrete Box Culvert	PCBC
2 01	Concrete Slab Continuous	CSC
2 04	Concrete Slab and Girder Continuous	CSGC
2 05	Concrete Box Girder Continuous, Multiple	CBGC
2 06	Concrete Box Girder Continuous, Single or Spread	CBGC
3 02	Concrete on I-beams	CI
	Concrete on I-beams, Composite	CIK
	Concrete on I-beams, Composite, Prestressed	CIKP
	Riveted GirderRG	
	Steel Stringer, Metal Plank Deck	SSM
	Steel Stringer, Timber Deck	SSS
	Steel Stringer Earth Fill (using ½ CMP)	SSE
	Welded Girder	WG
	Welded Girder, Composite	WGK
3 03	Steel Deck Girder	SDG
	Steel Deck Girder, Composite	DGK
	Steel Thru Girder	STG
3 05	Steel Box Girder, Multiple	SBG
3 06	Steel Box Girder, Single or Spread	SBG
3 09	Steel Deck Truss	SDT
3 10	Steel Low Truss	SLT

APPENDIX C STRUCTURE TYPES

(FHWA AND CDOT)

<u>ITEM43</u>	<u>STRUCTURE TYPE</u>	<u>ITEM120A</u>
<u>A B</u>		
	Steel Thru Truss	STT
3 11	Steel Arch, Deck	SA
	Steel Arch Culvert/Multi Plate Arch	
	Culvert	SAC
3 13	Steel Suspension Bridge	SUSP
3 19	Corrugated Metal Pipe Culvert	CMP
	Corrugated Metal Pipe (Reinforced Earth)	
	Culvert	RE
4 02	Concrete on I-beams, Continuous	CIC
	Concrete on I-beams, Continuous and	
	Composite	CICK
	Concrete on I-beams, Continuous, Composite	
	Prestressed	CICKP
	Riveted Girder, Continuous	RGC
	Steel Stringer, Earth Filled	
	Continuous	SSEC
	Steel Stringer, Metal Plank Deck,	
	Continuous	SSMC
	Steel Stringer, Timber Deck,	
	Continuous	SSSC
	Welded Girder, Continuous	WGC
	Welded Girder, Continuous and	
	Composite	WGCK
4 03	Steel Deck Girder, Continuous	SDGC
4 05	Steel Box Girder, Continuous, Multiple	SBGC
	Steel Box Girder, Prestressed	SBGP
	Steel Box Girder, Continuous,	
	Prestressed	SBGCP
4 06	Steel Box Girder, Continuous,	
	Single or Spread	SBGC
5 01	Concrete Slab, Prestressed	CSP
5 02	Concrete Prestressed Girder	CPG
5 04	Concrete Slab and Girder Prestressed	CSGP
	Concrete Double Tee Prestressed Girder	CDTPG
5 05	Concrete Box Girder, Prestressed,	
	Multiple	CBGP
5 06	Concrete Box Girder, Prestressed,	
	Single or Spread	CBGP
6 01	Concrete Slab, Prestressed, Continuous	CSPC

APPENDIX C STRUCTURE TYPES

(FHWA AND CDOT)

<u>ITEM43</u>	<u>STRUCTURE TYPE</u>	<u>ITEM120A</u>
<u>A B</u>		
6 02	Concrete Prestressed Girder, Continuous	CPGC
6 04	Concrete Slab and Girder, Continuous, Prestressed	CSGCP
6 05	Concrete Box Girder, Continuous, Prestressed, Multiple	CBGCP
6 06	Concrete Box Girder, Continuous, Prestressed Single or Spread	CBGCP
	Concrete Box Girder, Continuous, Prestressed, Segmented	CBGS
7 01	Timber Slab	TSLAB
7 02	Timber Laminated Stringer (Gluelam)	TLS
	Timber w/Concrete Deck	TD
	Timber w/ Metal Deck	TM
	Timber Stringer – Timber Deck	TS
	Treated Timber Stringer – Concrete Deck	TTD
	Treated Timber Stringer – Timber Deck	TTS
	Metal Plank Floor	TTM
7 10	Timber Low Truss	TLT
	Timber Thru Truss	TTT
7 11	Timber Laminated Arch (Gluelam)	TLA
8 19	Rubble Arch	RA
	Rubble Arch, Culvert	RAC
9 19	Aluminum Arch Culvert	AAC
0 18	Tunnel – Concrete Lined	TUNC
	Tunnel – Thru Rock – No Lining	TUNR

APPENDIX D

STRUCTURE NUMBERING

SYSTEM

APPENDIX D STRUCTURE NUMBERING SYSTEM

The structure number is one of the most important items of information in the inventory. It must be unique for each bridge; and once established should never change.

Structures not on the State Highway System; e.g., City and County are identified with a fifteen-digit code. Each agency should assign and code the structure number according to its own internal procedures. It is not necessary to code the structure number to an arbitrary National Standard. Any combination of letters, numbers, or symbols may be used. A suggestion would be to use an abbreviation for the City and County, followed by the route number/street name, the mileage of the structure on the route, and number/letter combination.

Structure numbers for State Highway System bridges are identified with a seven-digit code scheme, based on a military quadrangle system. The official State Tourist Map has marks on the border to show these quadrangles. These marks are 15 minute of latitude and longitude:

On the side of the map, from North to South, are letters from A through P. Across the top of the map, from West to East, are numbers from 1 through 28. These identify the quadrangles from A-01 in the northwest corner of the State; to P-28 in the southeast corner; and are used as the base for the structure number of each bridge within each quadrangle.

The last portion of the structure number is a letter or letters selected from A to ZZ; thus, structure numbers can be from A-01-A through P-28-ZZ.

There are two categories of structures: major structures which are indicated by uppercase letters for all characters of the structure number; or minor structures, which are indicated by lowercase letters for the last two characters of the structure number.

ITEM21 – Minor Structure Indicator must be coded to indicate major and minor structures.

APPENDIX D STRUCTURE NUMBERING SYSTEM

Code the structure number with dashes between each group of letters and numbers.

Examples of coding for State Highway Structure Numbers:

<u>Structure Number</u>	<u>Code for ITEM8</u>	<u>Code for ITEM121</u>
B-02-A	B-02-A	1
P-28-ZZ	P-28-ZZ	1
H-14-h H-14-h <u>MINOR</u>		2

On the following pages is the procedure to be used for assigning structure numbers for bridges on the State Highway System, with an explanation of major and minor structures and how they are measured, from the "Bridge Detailing and Checking Manual".

STRUCTURE NUMBER ASSIGNMENT

It is the responsibility of the Project Designer to contact the Bridge Management Unit to have a structure number(s) assigned before design commences on a structure(s).

The following information is necessary before they can assign a number to a given structure and will be of interest to the detailer and checker, alike:

- (a) Geographical Location (Give section, township, and range)
- (b) Route carried by structure
- (c) Stream and/or feature which is crossed
- (d) Furnish the line sheet or equivalent
- (e) Project Number
- (f) Structure Information (type, material, roadway, etc.)

Structures are placed into two categories; minor structures with lengths 20 feet or less, and major structures with lengths longer than 20 feet.

APPENDIX D STRUCTURE NUMBERING SYSTEM

A Minor Structure that does not have live load applied directly to the superstructure, generally will not have a number assigned. However, it will be necessary to assign numbers to minor structures that do carry live loads such as concrete I-beams, concrete box culverts with no fill or with asphalt surfacing only, etc. Decisions pertaining to structure numbers will be made by the BRIAR unit.

All Major Structures will be assigned a number. the BRIAR unit will maintain records on all major structures. Twin bridges with closed medians generally will be assigned ONE number.

Figure 1-1 shows the structure designation for E-06-AB. The first letter and the following two numbers describe the grid location of the structure as shown in Figure 1-2, and the last letter or letters are unique to the structure within the grid boundaries. Uppercase letters are reserved for major structures and lower case letters in the last two positions indicate minor structures.

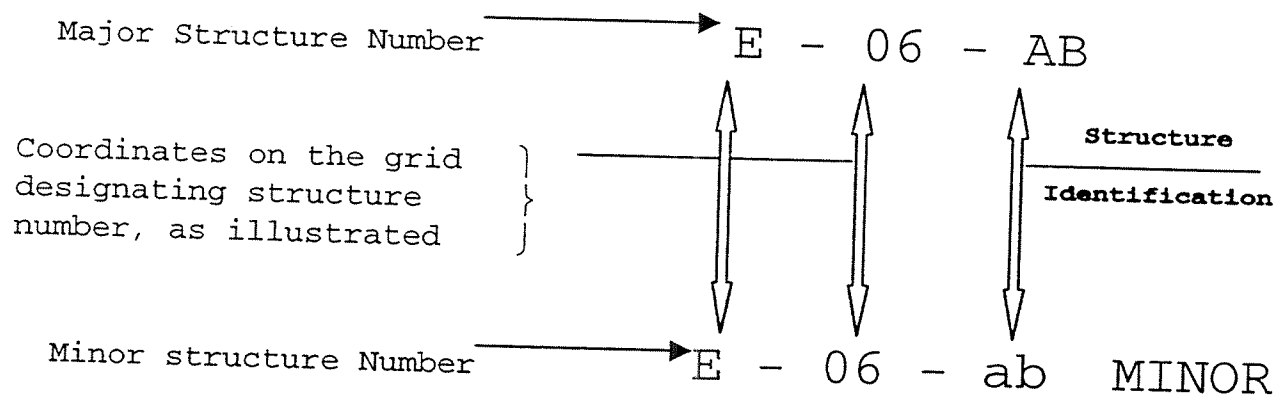


Fig. 1-1 MAJOR AND MINOR STRUCTURE DESIGNATIONS

APPENDIX D STRUCTURE NUMBERING SYSTEM

All Major Structures will be assigned a number. The BRIAR unit will maintain records on all major structures. Twin bridges with closed medians generally will be assigned one number.

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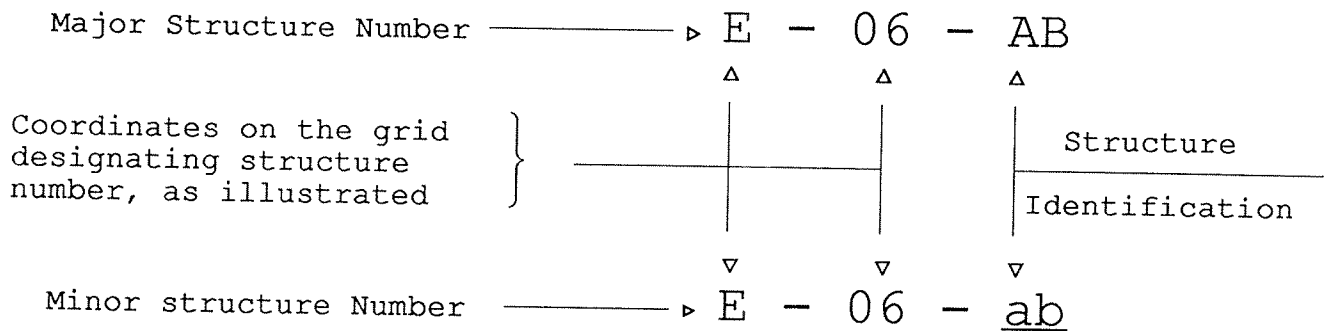


Fig. 1-1 MAJOR AND MINOR STRUCTURE DESIGNATIONS

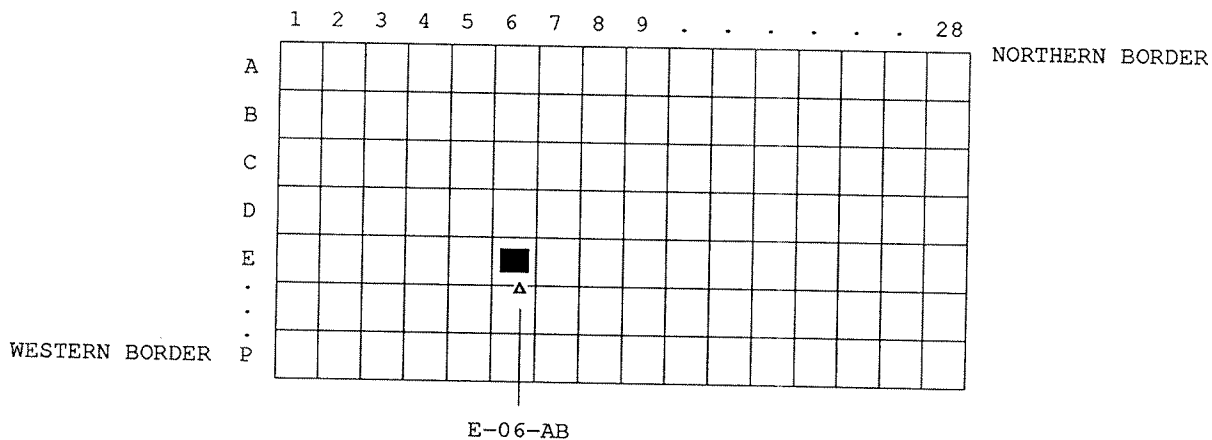


Fig.1-2 STRUCTURE DESIGNATIONS

APPENDIX E STRUCTURE MEASUREMENTS

APPENDIX E STRUCTURE MEASUREMENTS

The lengths to be used in determining a major or minor structure for various types of structures are as follows:

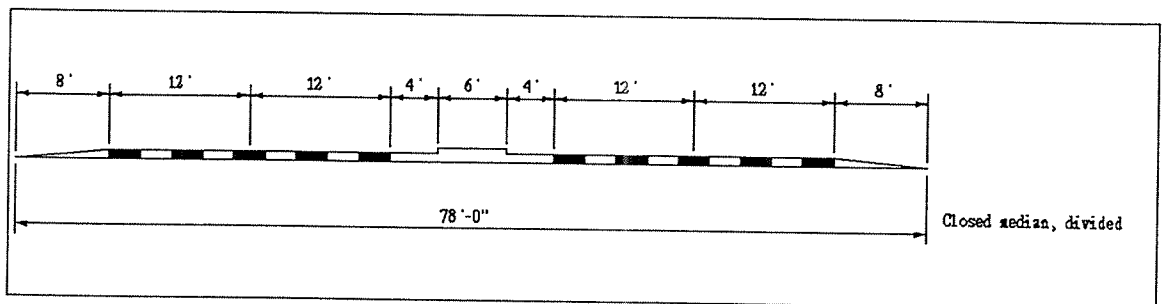
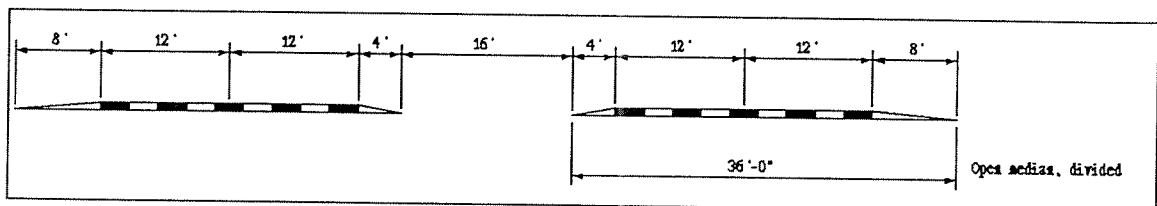
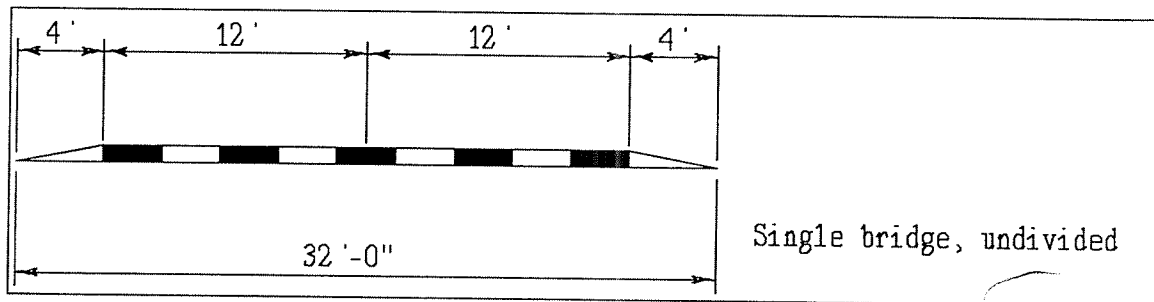
- (a) Bridges – The distance measured along the centerline of roadway between undercopings of abutments. Refer to Figure 1-3.
- (b) Arches – The distance measured along the centerline of roadway between the spring lines of arches. Refer to Figure 1-4.
- (c) Multiple Boxes – The distance measured along the centerline of roadway between extreme ends of openings. Refer to Figure 1-5.
- (d) Multiple Pipes – The distance measured parallel to the centerline of roadway from the outside of the first pipe to the outside of the last pipe. However, the distance between pipes must not be greater than one-half ($1/2$) the diameter of the smallest pipe in the group. Refer to Figure 1-6

APPENDIX F

STRUCTURE MEASUREMENTS

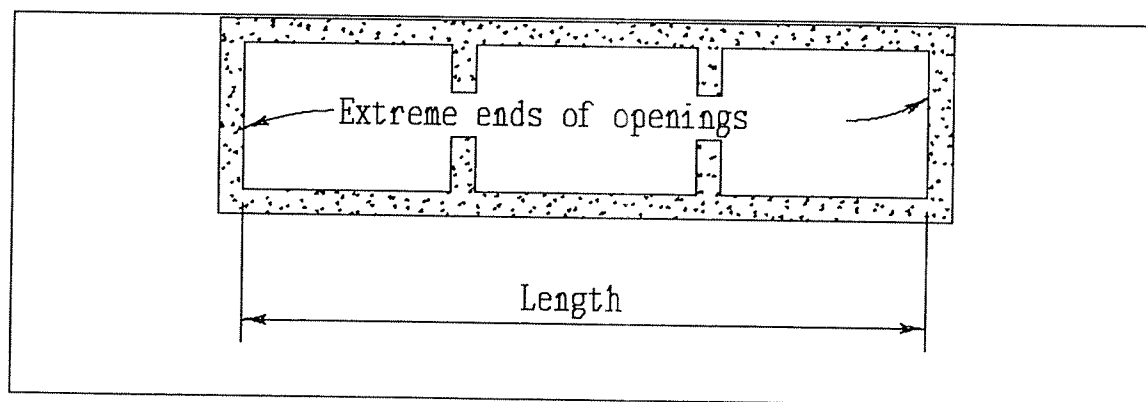
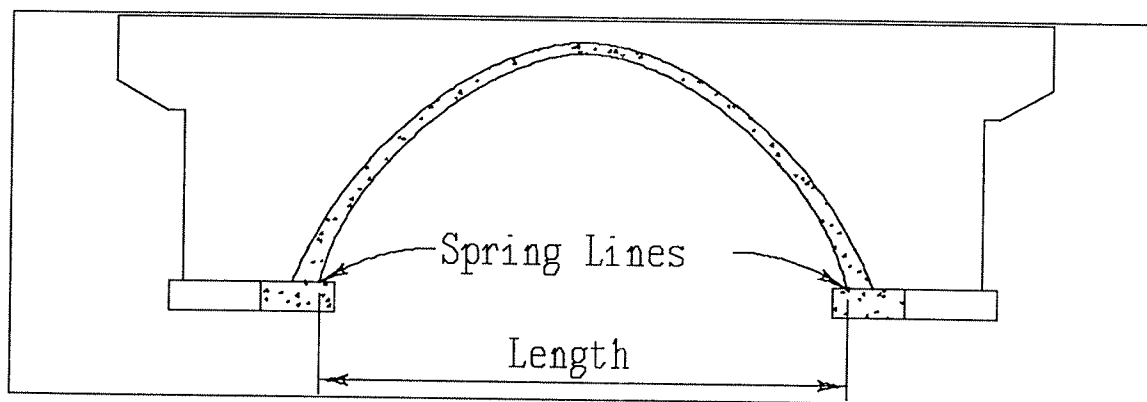
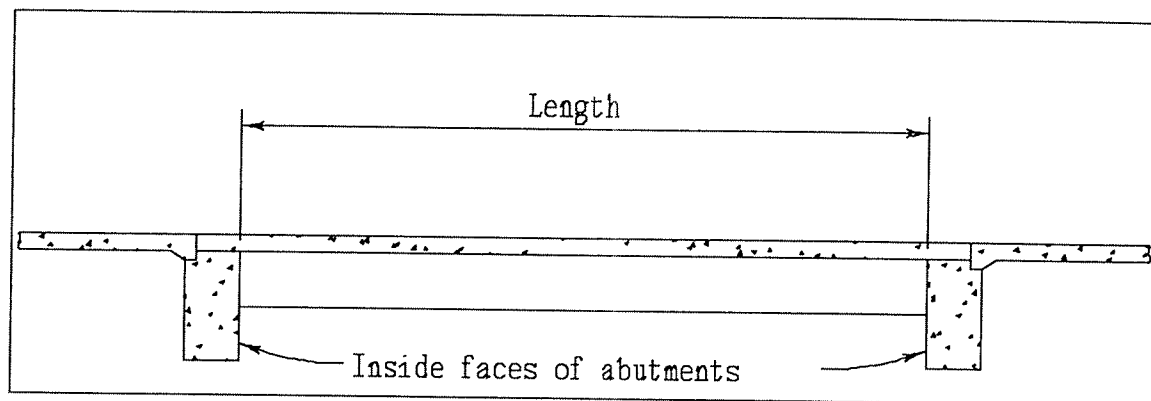
On the following pages are sketches to be used as a guide to measure and code some of the Items in this manual. These Items and sketches deal primarily with the measurement of vertical and horizontal clearances. Each sketch is identified with the Item number for which it is to be used.

ITEM32



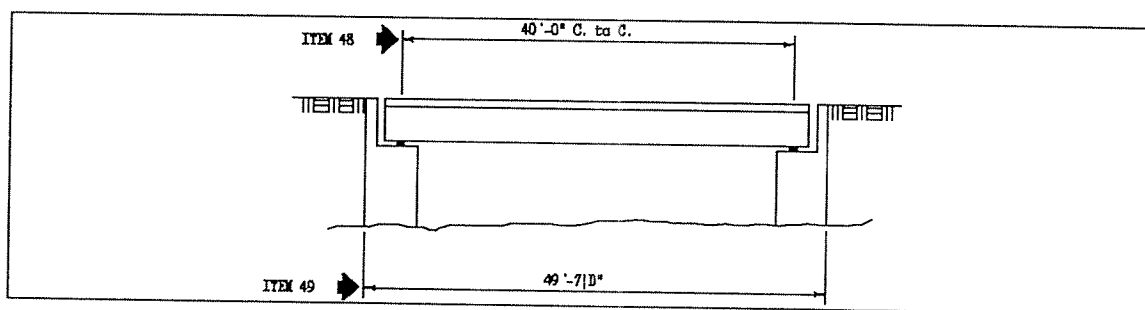
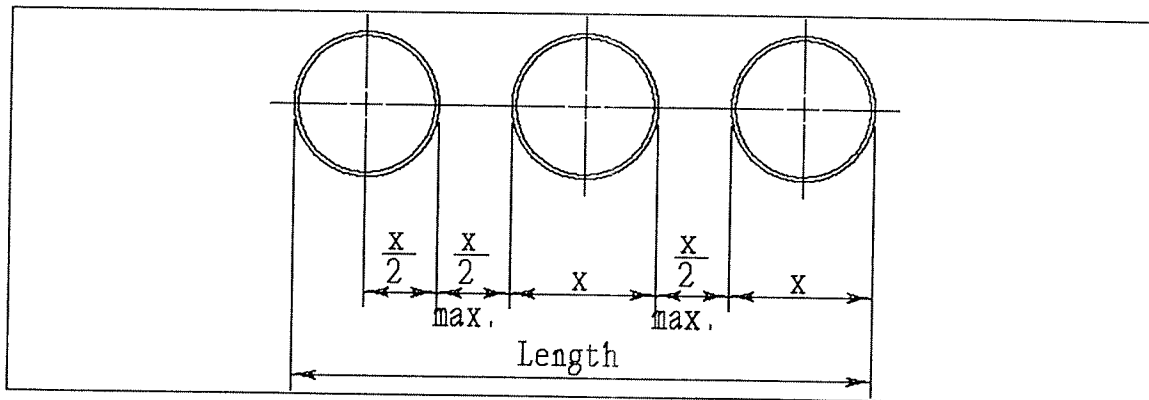
APPENDIX E

ITEMS 48 & 49

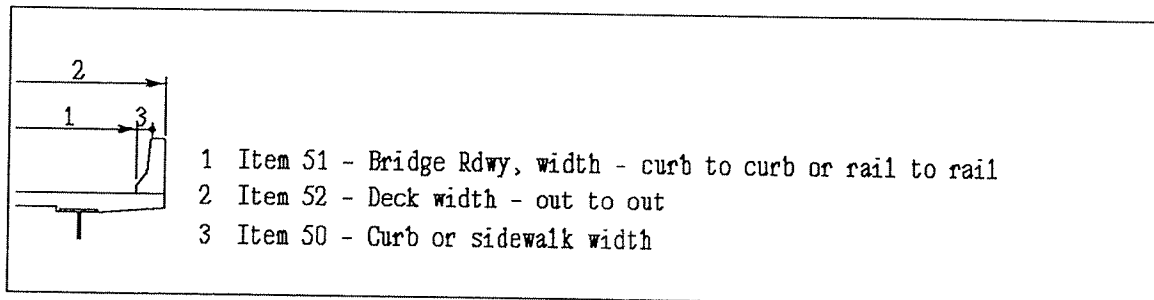
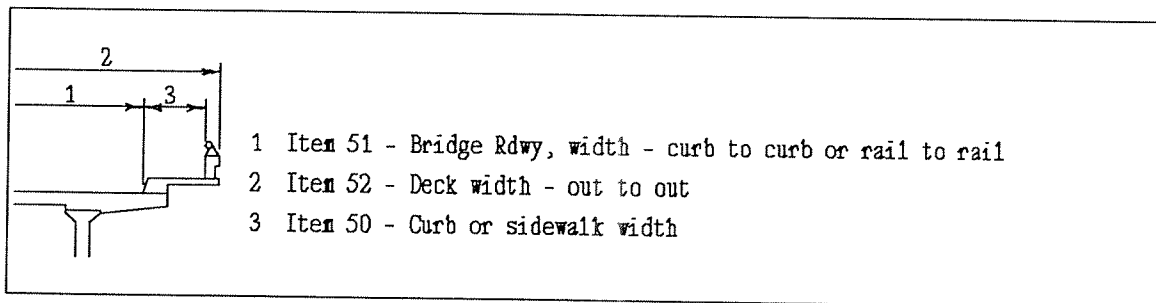
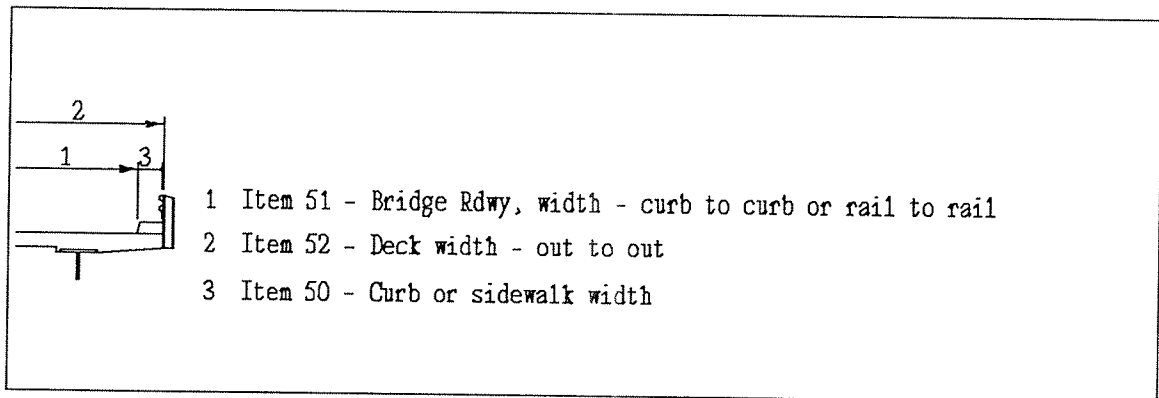
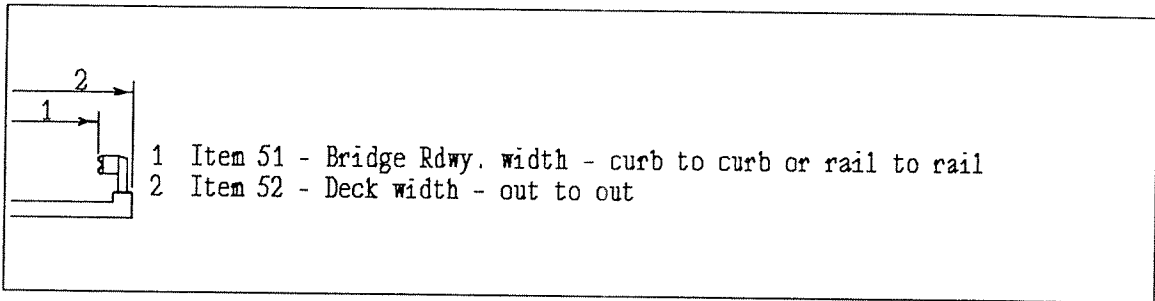


APPENDIX E

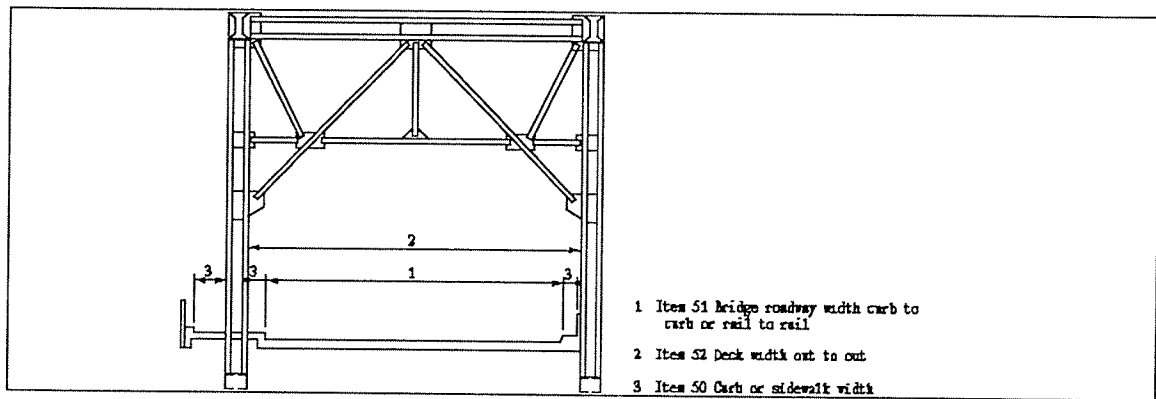
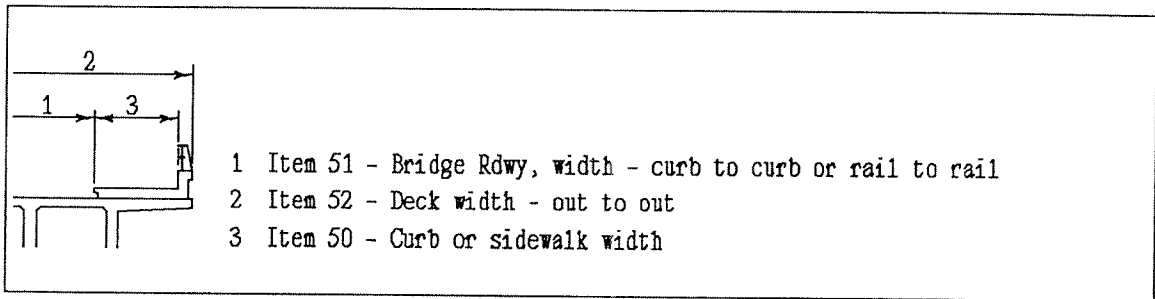
ITEMS 48 & 49



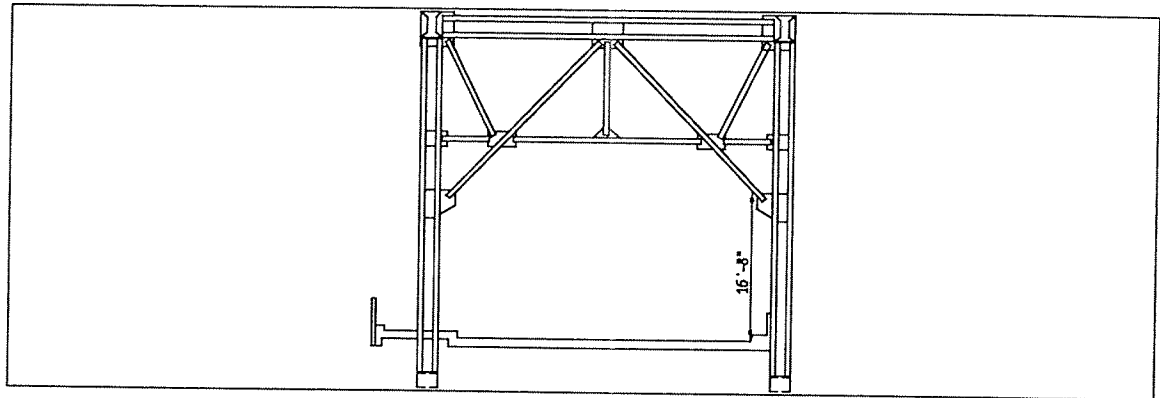
ITEMS 50, 51 & 52



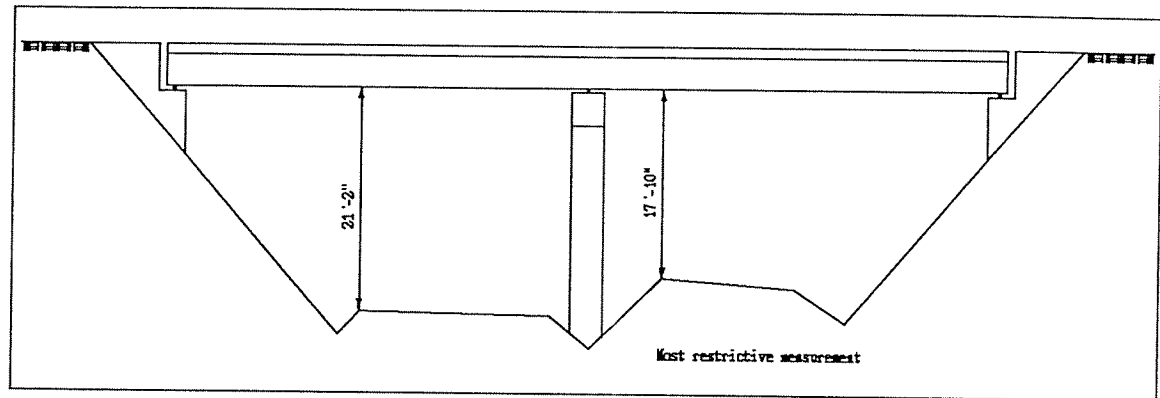
ITEMS 50, 51 & 52



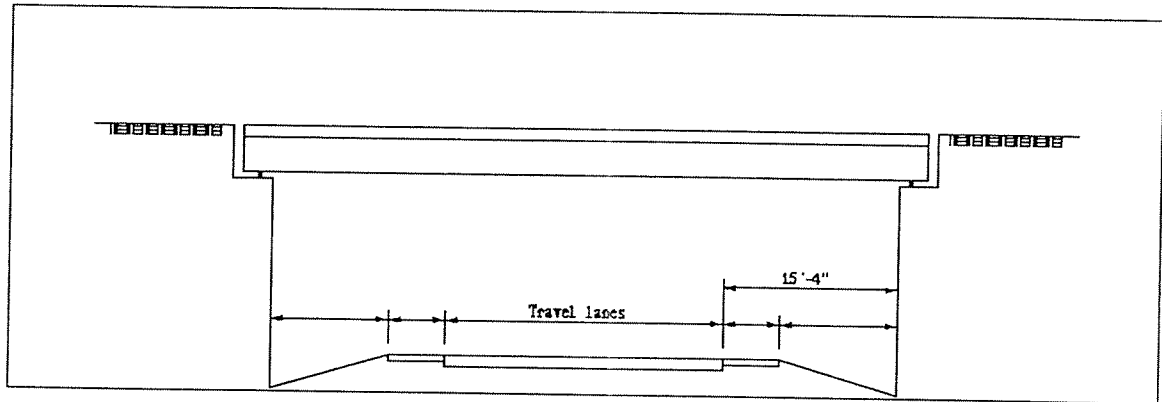
ITEM53



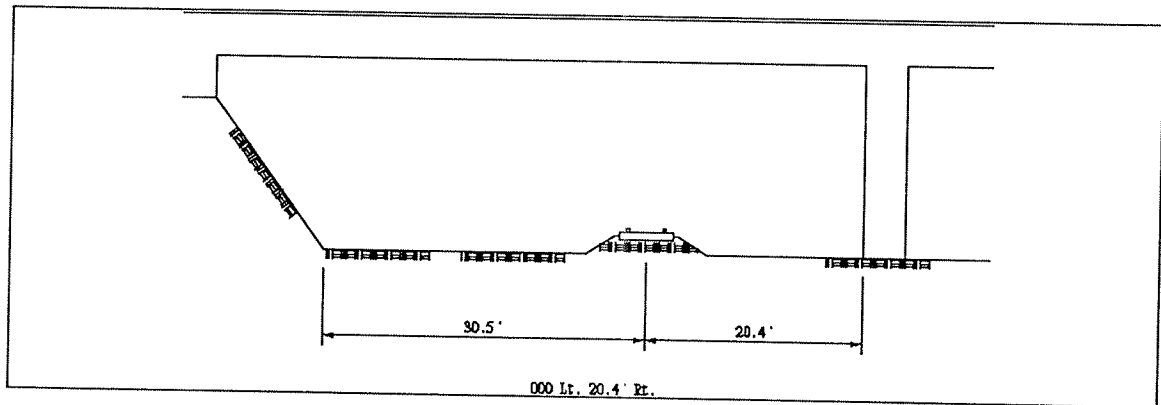
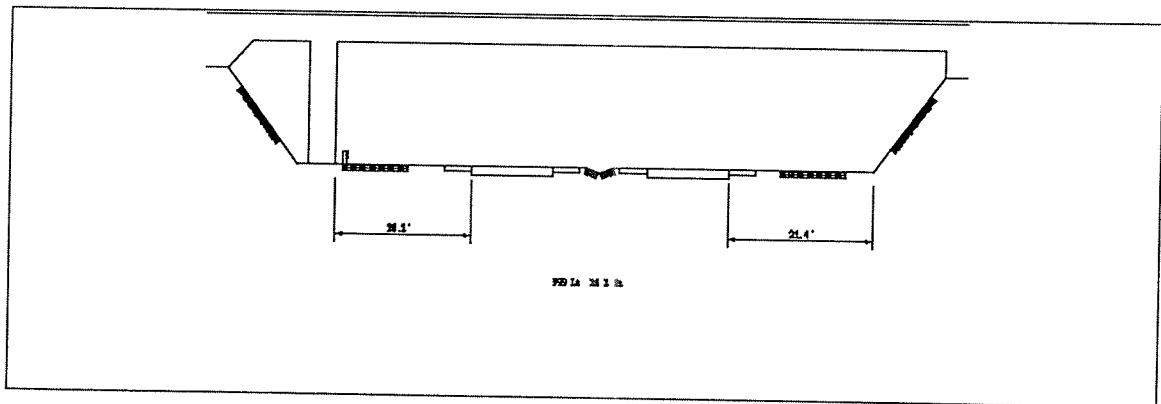
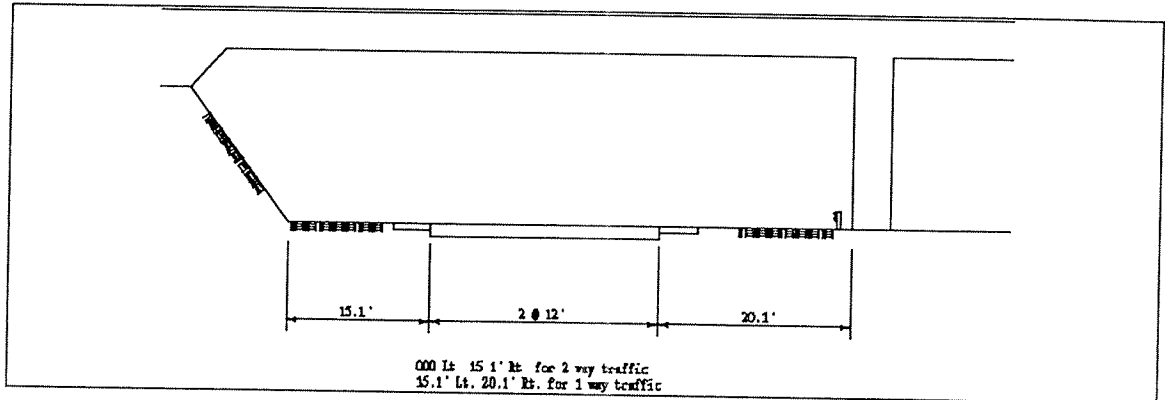
ITEM54



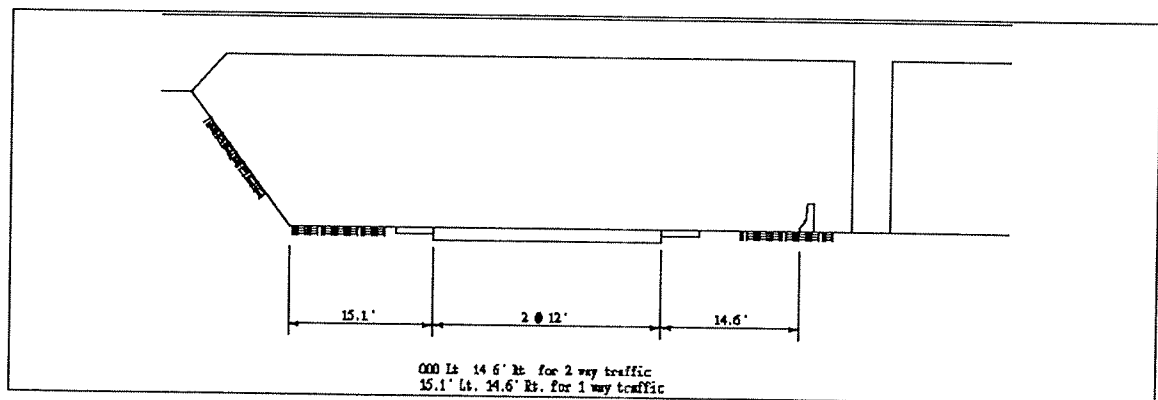
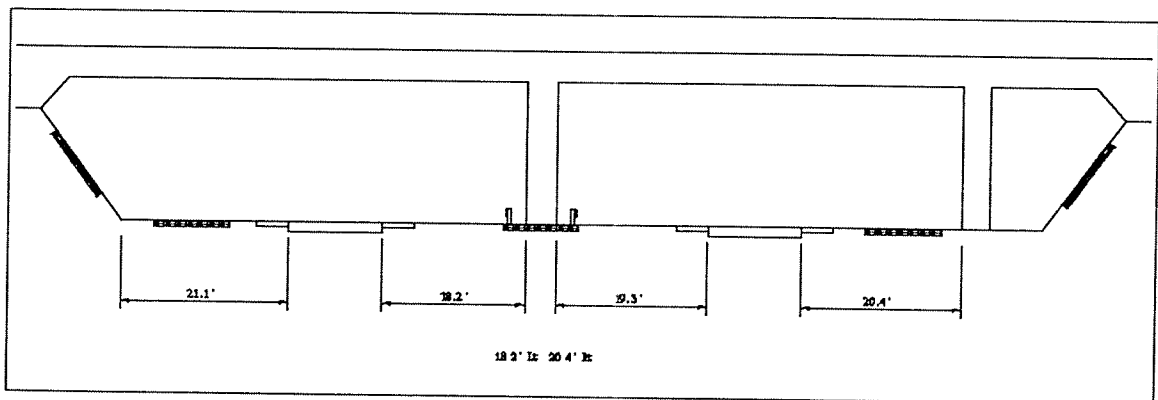
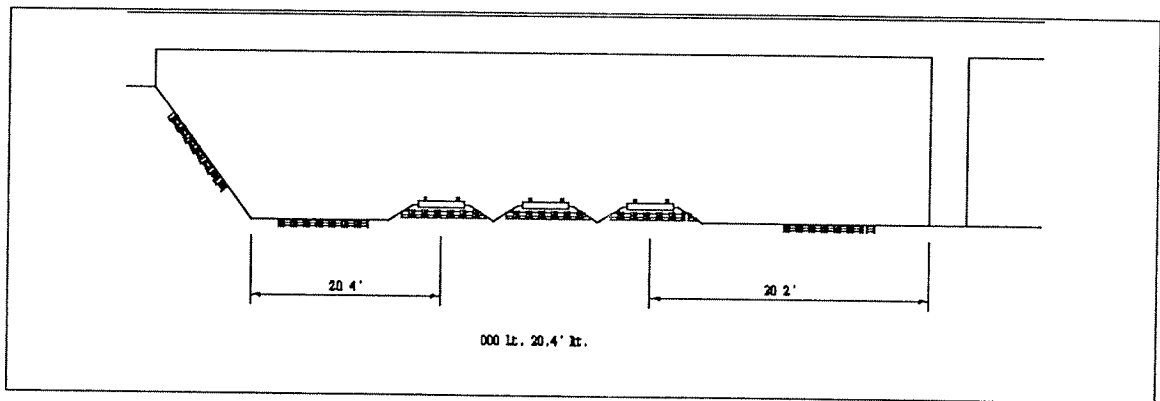
ITEM55



ITEMS 55 & 56



ITEMS 55 & 56



APPENDIX F

TRAFFIC SAFETY FEATURES AND RAIL TYPES

APPENDIX F TRAFFIC SAFETY FEATURES AND RAIL TYPES

Bridge rails and approach guardrails have experienced dramatic changes in recent years. In an effort to give the user more definitive, current information, a description of what constitutes Standard bridge rail and approach guardrails are described in this Appendix. Revisions will be made to this Appendix as they occur, and the user should try to maintain current status by checking with Staff Bridge Design. It is advisable for the user to obtain a current copy of the Division of Highway "M & S Standards". These will show the current Colorado Standard approach guardrails and rail ends, their placement at the bridge, the length, height, and general construction by types of material.

ITEM36: Traffic Safety Features, is to show adequacy of bridge railings and guardrails. Each of the four digits of this item relates to a specific part of the traffic rail system, and is coded for the route on the structure, only. The important factor in determining adequacy is that each part of the rail system meets currently acceptable standards.

Listed below are the four specific parts of the Traffic Safety Features in ITEM36, and currently acceptable standards with which to rate the rail system for adequacy.

BRIDGE RAILINGS: (1st Digit of ITEM36) Some factors that affect the proper function of bridge railings are height, material, strength, and geometric features. Railings must be capable of smoothly redirecting an impacting vehicle. Bridge railings should be evaluated using the "AASHTO Standard Specifications for Highway Bridges", as a guide for establishing a currently acceptable standard. The sketches on the following pages show the code for ITEM36 (0 or 1).

TRANSITION: (2nd Digit of Item 36) The transition from approach rail to bridge railing requires that the approach rail be firmly attached to the bridge railing. It also requires that the approach railing be gradually stiffened as it comes closer to the bridge railing. The ends of curbs and safety walks need to be gradually tapered out or shielded.

APPENDIX F TRAFFIC SAFETY FEATURES AND RAIL TYPES

APPROACH GUARDRAIL: (3rd Digit of ITEM36) The structural adequacy and compatibility of approach guardrail with transition designs should be determined. Rarely does the need for a barrier stop at the end of a bridge; thus, an approach guardrail with adequate length and structural qualities to shield motorists from the hazards at a bridge site needs to be installed. In addition to being capable of safely redirecting an impacting vehicle, the approach rail must also facilitate a transition to the bridge railing that will not cause snagging or pocketing of an impacting vehicle. Acceptable guardrail design suggestions are contained in the “AASHTO Guide for Selecting, Locating and Designing Traffic Barriers”.

APPROACH RAIL ENDS: (4th Digit of ITEM36) As with guardrail ends in general, the ends of the approach rails to bridges should be flared, made breakaway or shielded. Acceptable design treatment of guardrail ends are given in the “AASHTO Guide for Selecting, Locating and Designing Traffic Barriers”.

ITEM125A: There are many types of bridge railings. Most of the standard Colorado bridge rail types are shown on the following pages with the proper code for TYPE and adequacy. Not shown on the following pages are those listed below:

Flex-beam across a box culvert or pipe: code ‘FB’ for type, and ‘1’ for adequacy.

Not applicable; e.g., pedestrian and railroad overpasses: code ‘NA’ for type, and ‘O’ for adequacy.

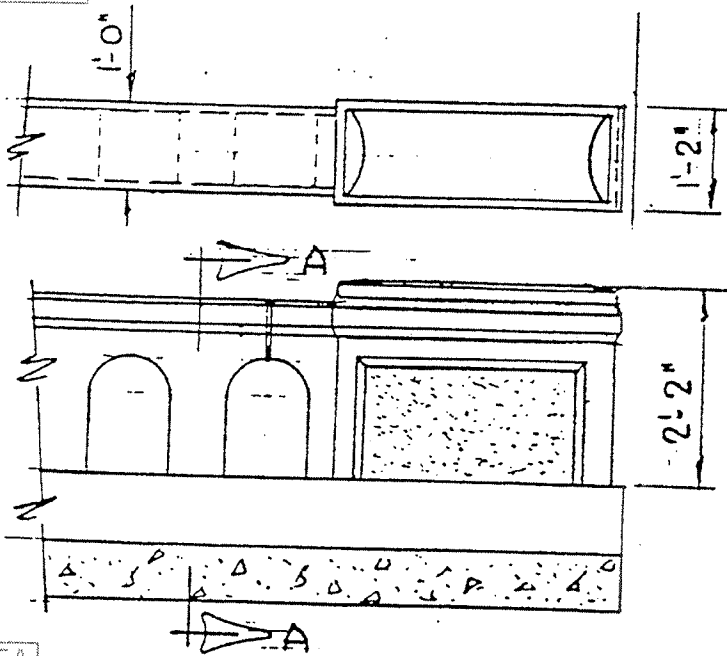
No bridge rail; e.g., trusses: code ‘X’ for type, and ‘O’ for adequacy.

Unknown or non-typical, non-qualifying inadequate rail: code ‘XX’ for type, and ‘O’ for adequacy.

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3/24/2010
M.Nord

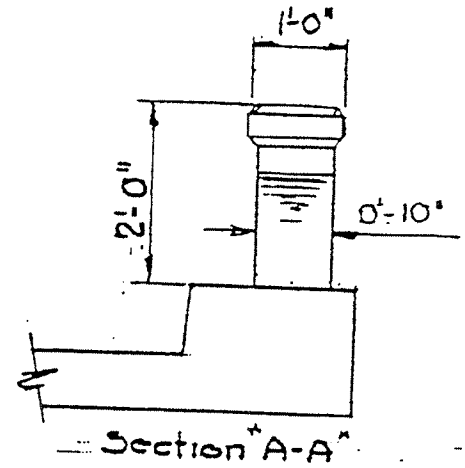
F
Appendix A
Item 98

125A



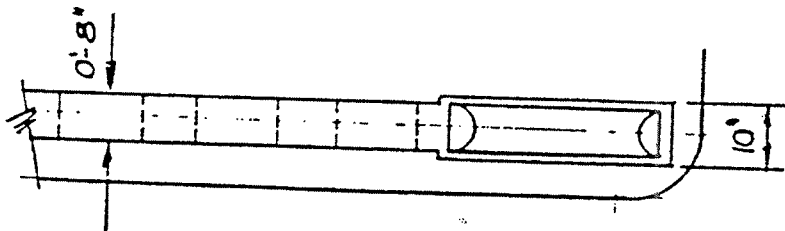
125A

Item 98-A = A



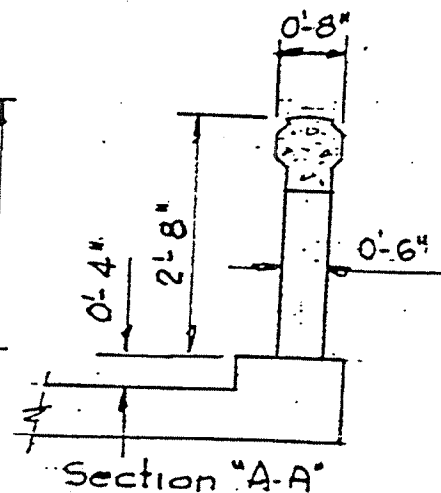
36A

Code Item 36 = 0



125A

Item 98-A = B



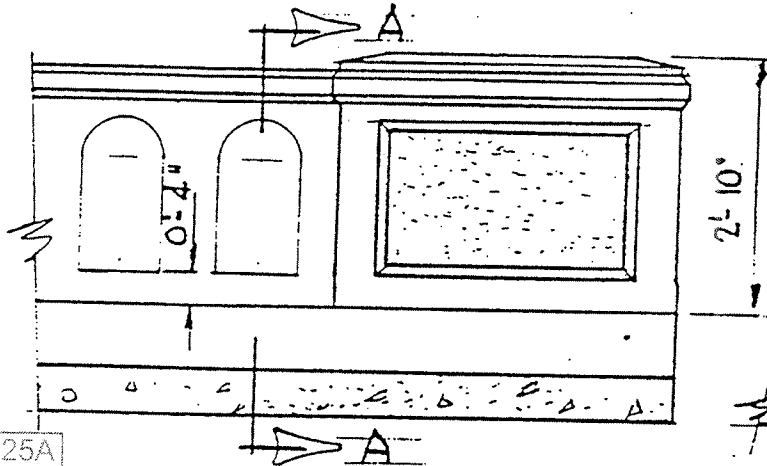
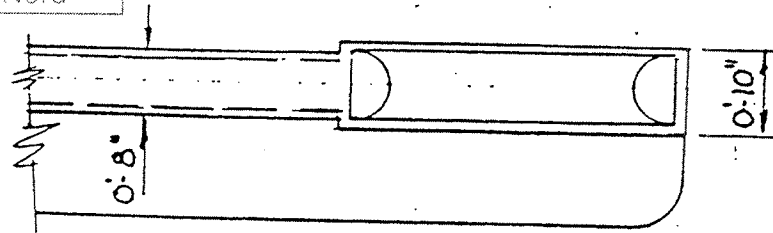
36A

Code Item 36 = 0

Marked up
3/24/2010
M.Nord

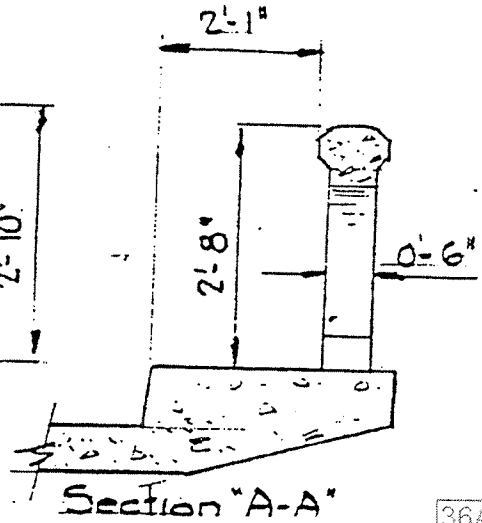
Appendix F
Item 98

125A



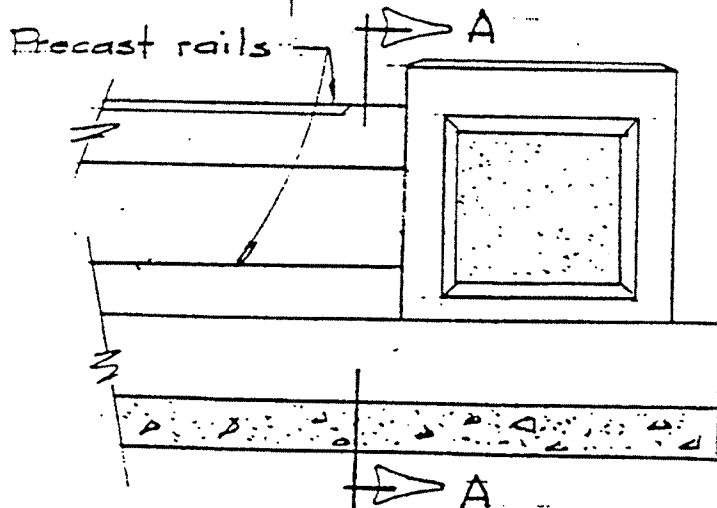
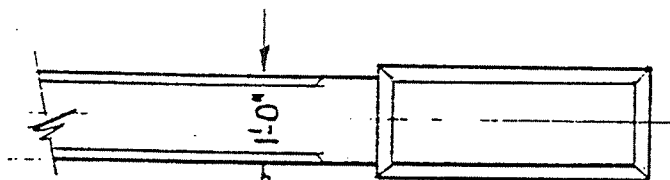
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Item 98-A = C



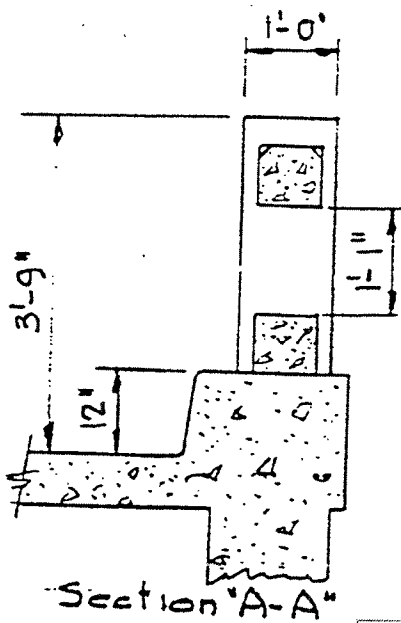
36A

Code Item 36 = 0



125A

Item 98-A = D



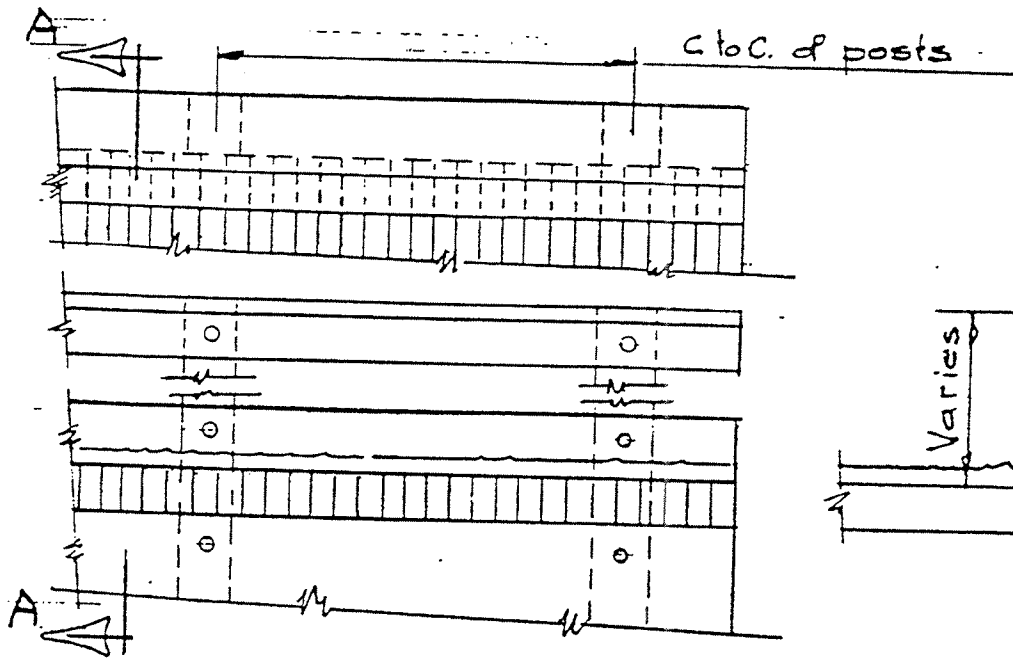
36A

Code Item 36 = 0

Marked up
3/24/2010
M.Nord

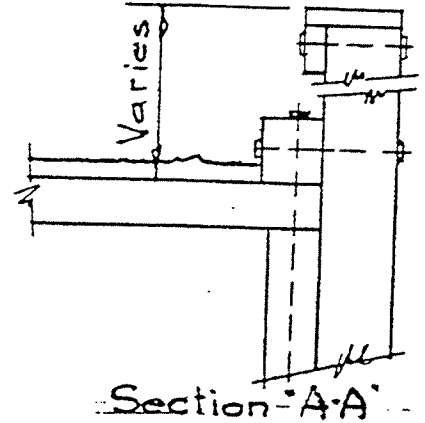
F
Appendix ~~10~~
Item 98

125A



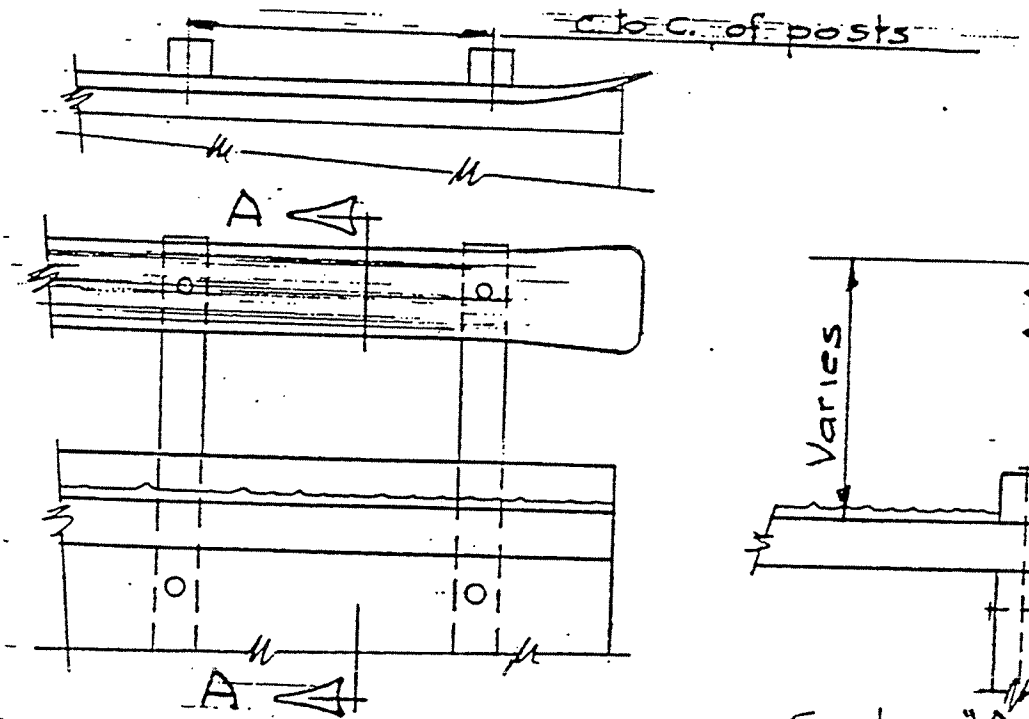
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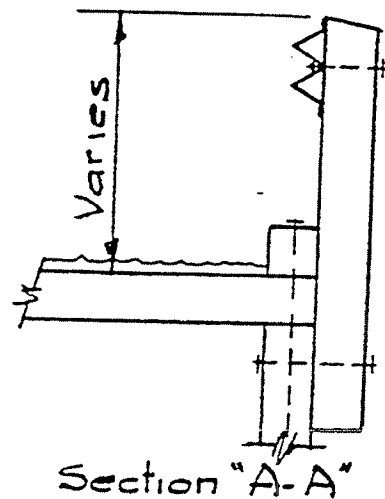
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36A



125A

Item 98-A = F



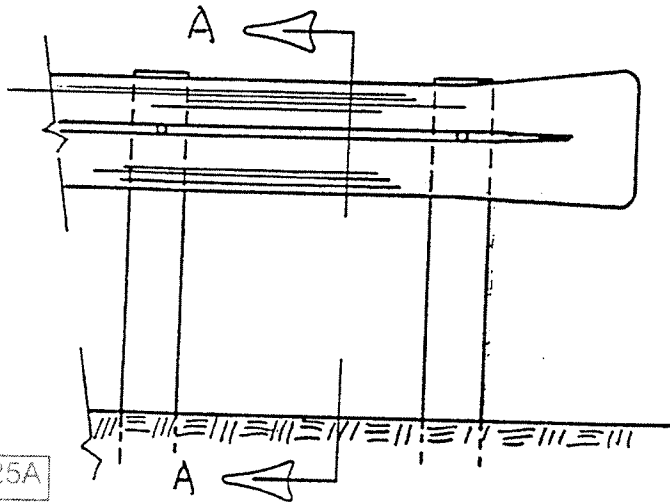
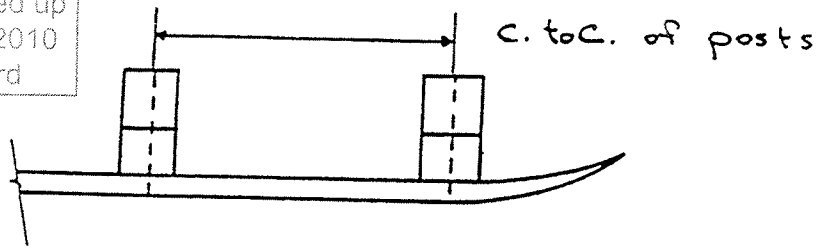
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Code Item 36 = 0

Marked up
3/24/2010
M.Nord

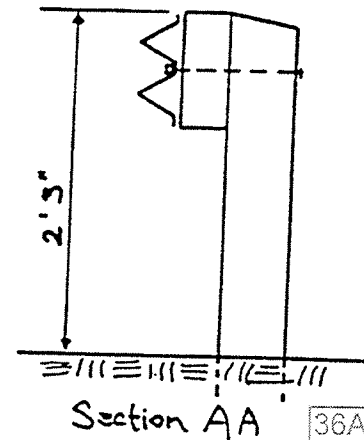
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Appendix B
Item 98

125A



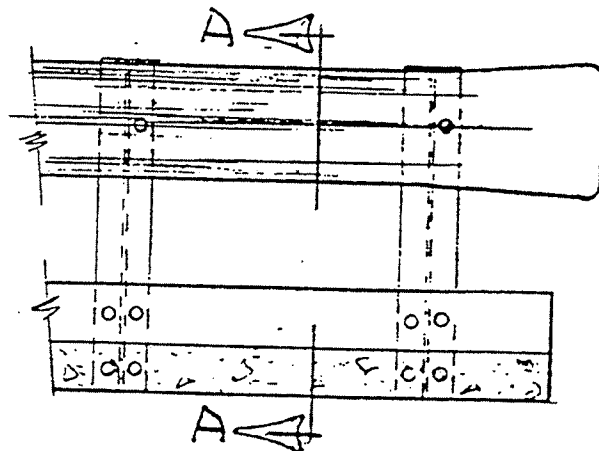
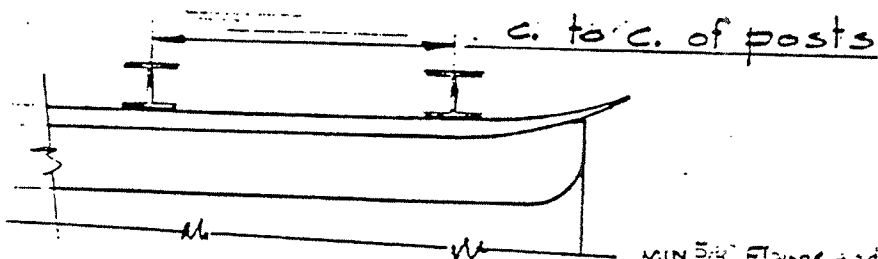
125A

Item 98-A = FB
For CBC's and Pipe Culverts with Fill

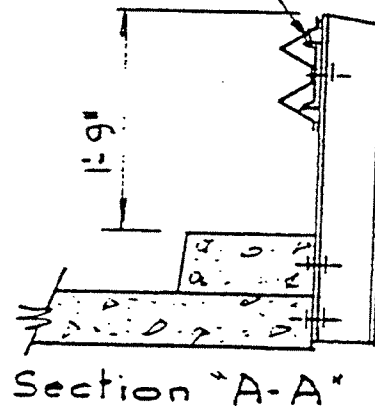


36A

Code Item 36 = 1



MIN 5/8" Flange and 1/2" web



Section "A-A"

125A

Item 98-A = G

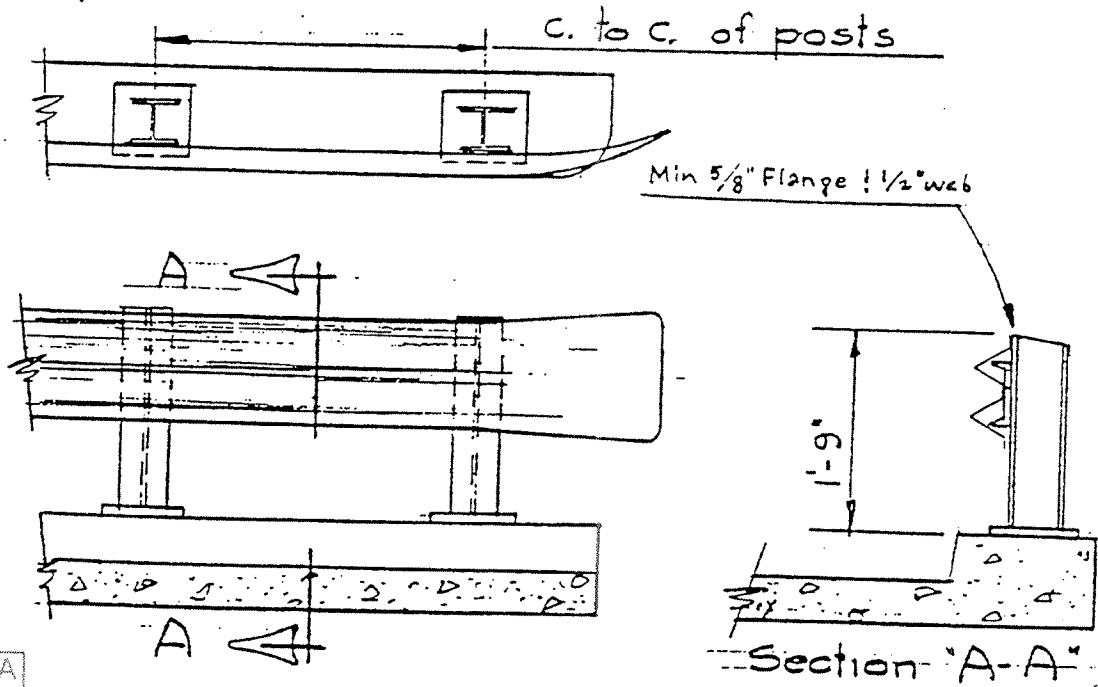
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Code Item 36 = 0

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3/24/2010
M.Nord

F
Appendix ~~10~~
Item 98

125A



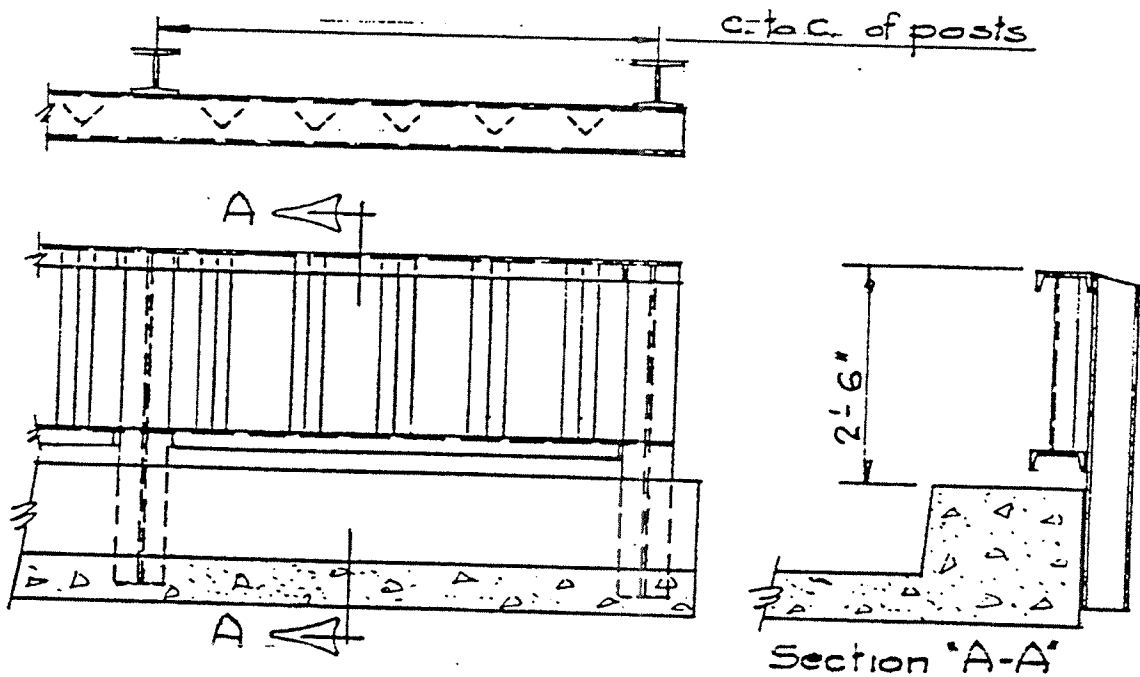
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Section "A-A"

36A

Code Item-36 = 0



125A

Item 98-A = I

Section "A-A"

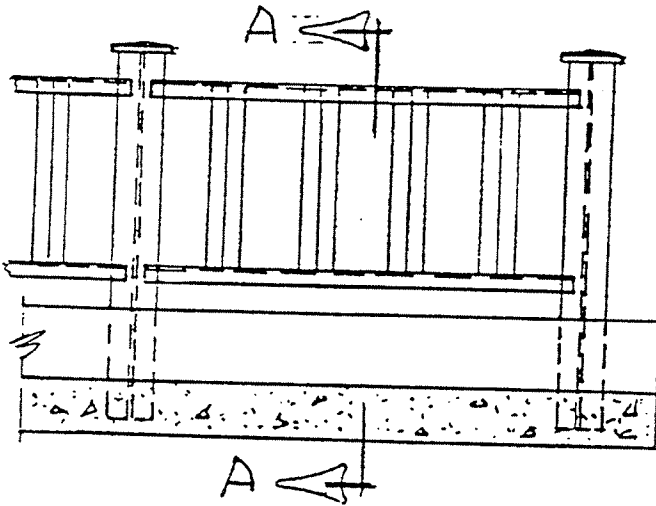
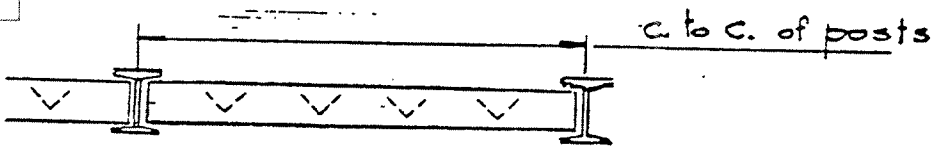
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Marked up
3/24/2010
M.Nord

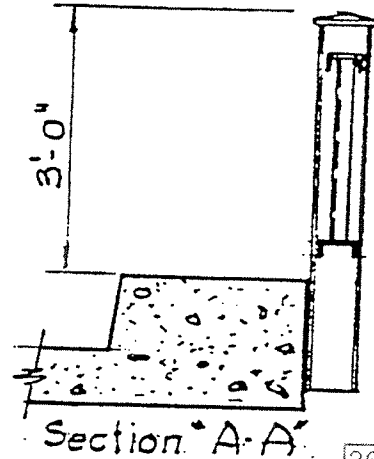
Appendix F
Item 98

125A



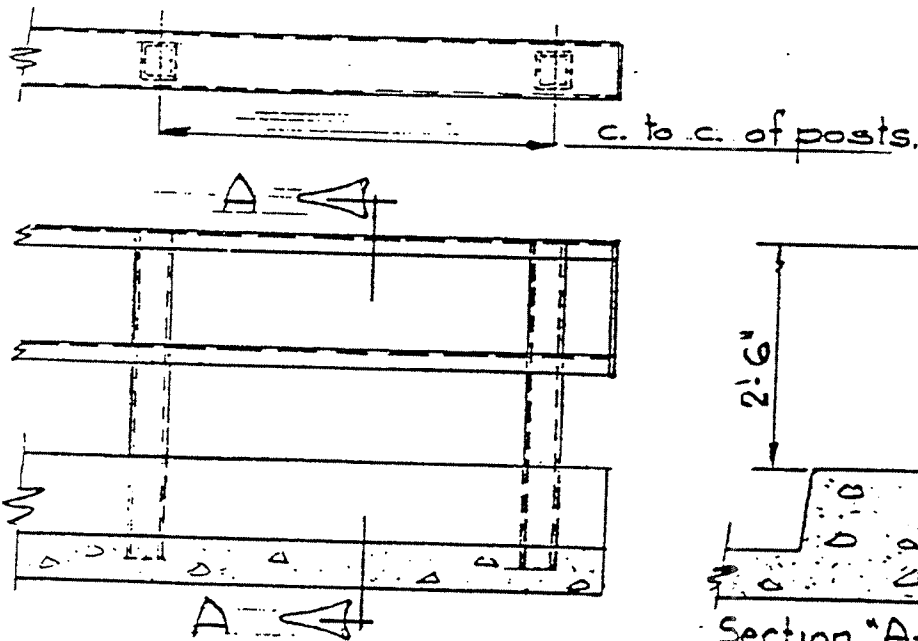
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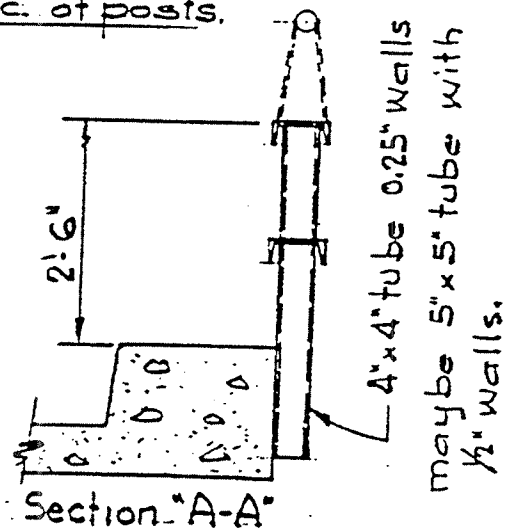
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Item 98-A = K



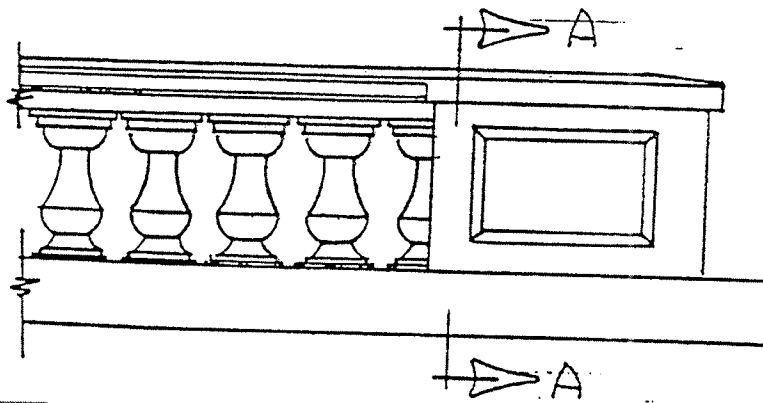
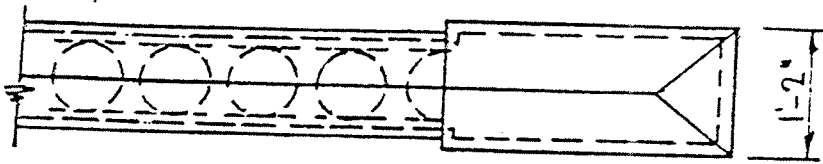
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Code Item 36 = 0

Marked up
3/24/2010
M. Nord

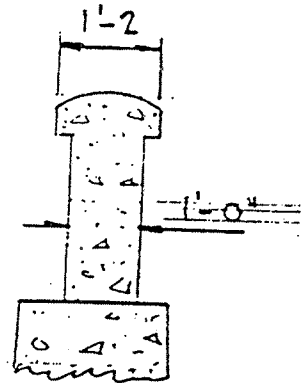
Appendix F
Item 98

125A



125A

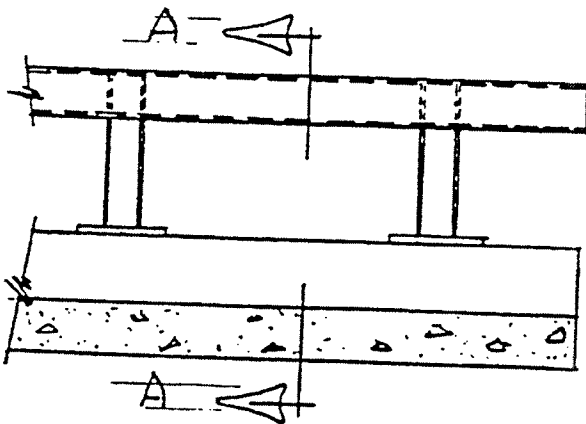
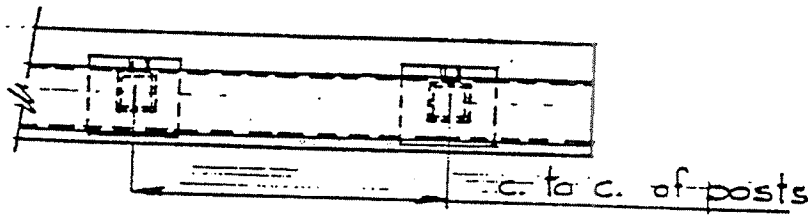
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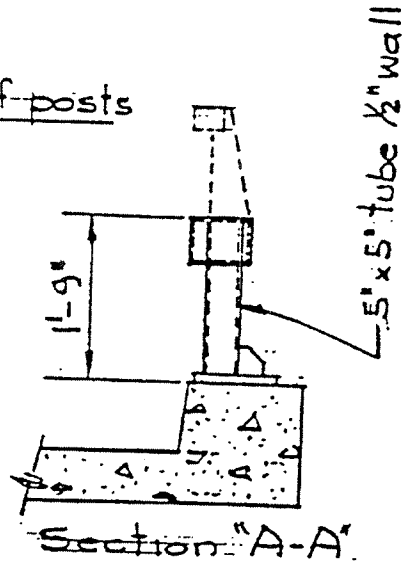
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Section "A-A"

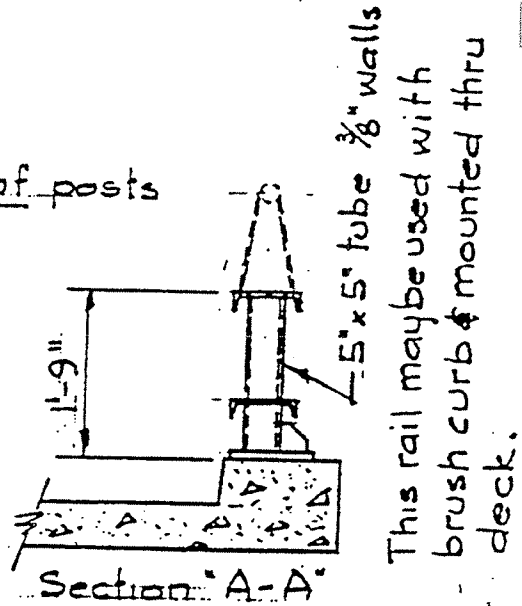
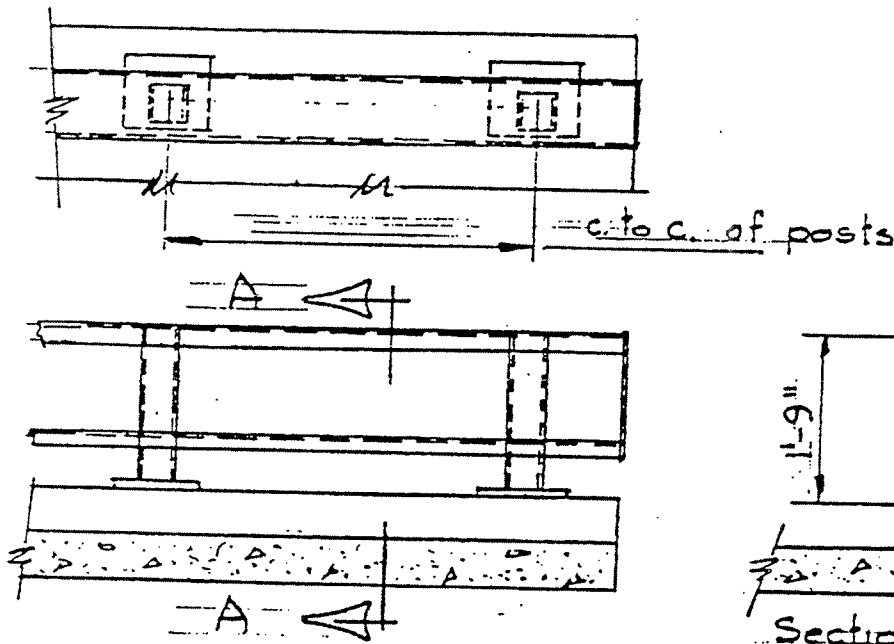
36A

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Marked up
3/24/2010
M. Nord

Appendix F
Item 98

125A

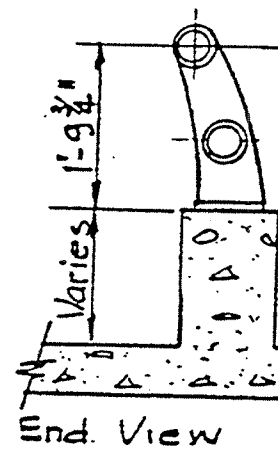
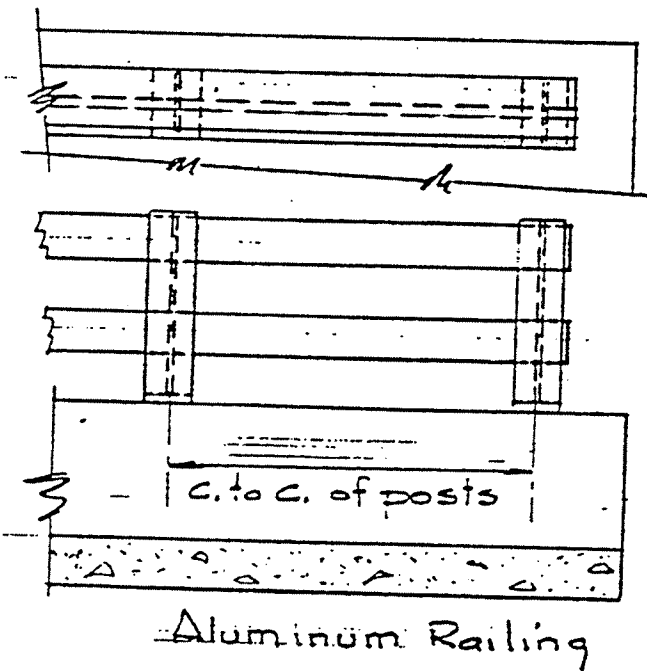


125A

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36A

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125A

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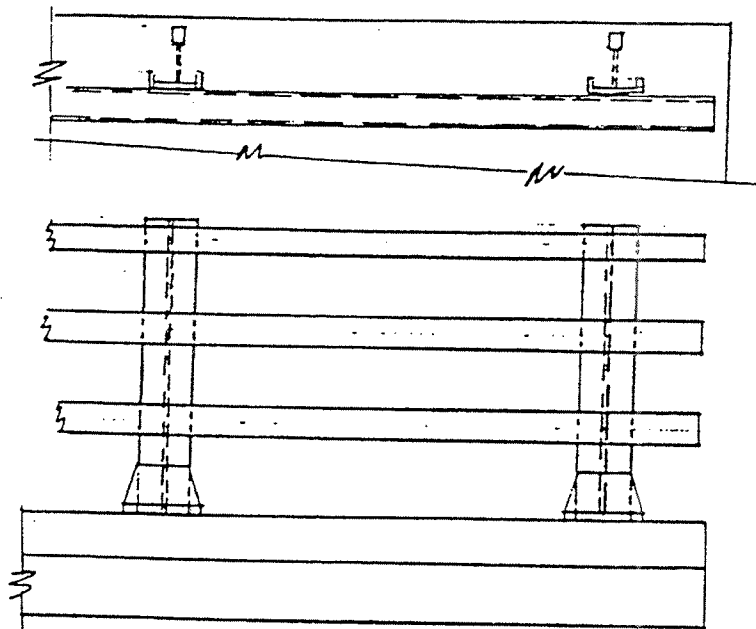
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Marked up
3/24/2010
M.Nord

Appendix F Item 98

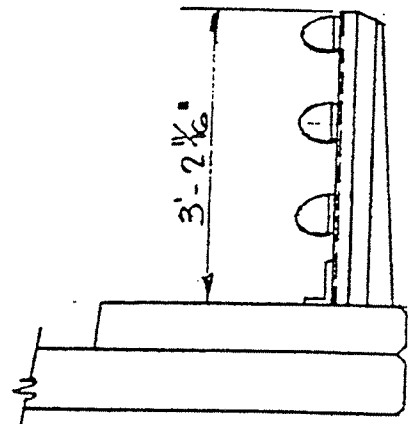
125A



125A

Aluminum Railing

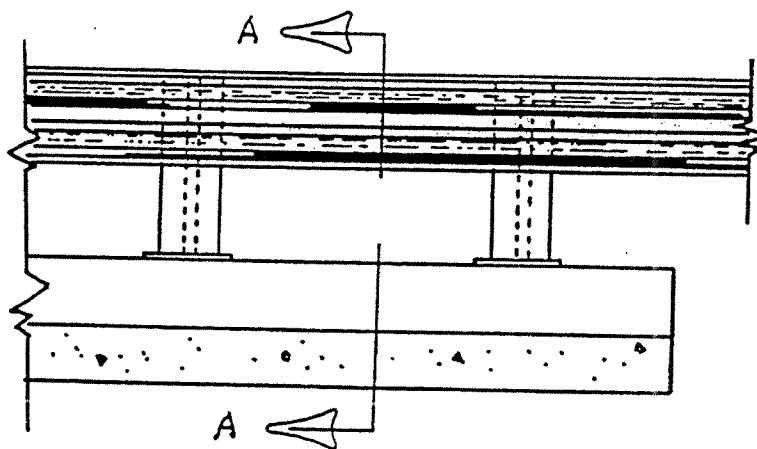
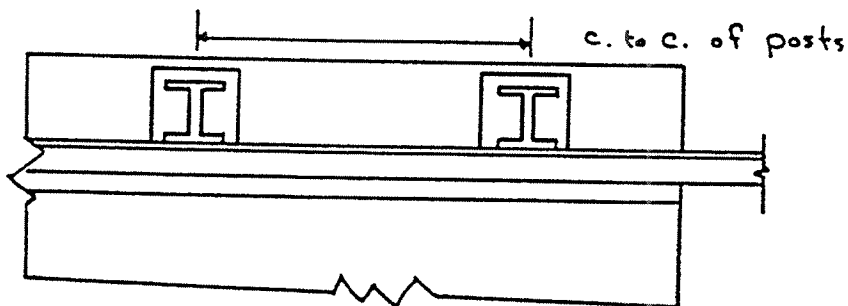
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End View

36A

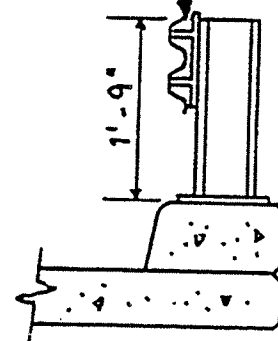
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125A

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Min. 7/8" flange and 1/2" = 1'-1" web



Section A-A

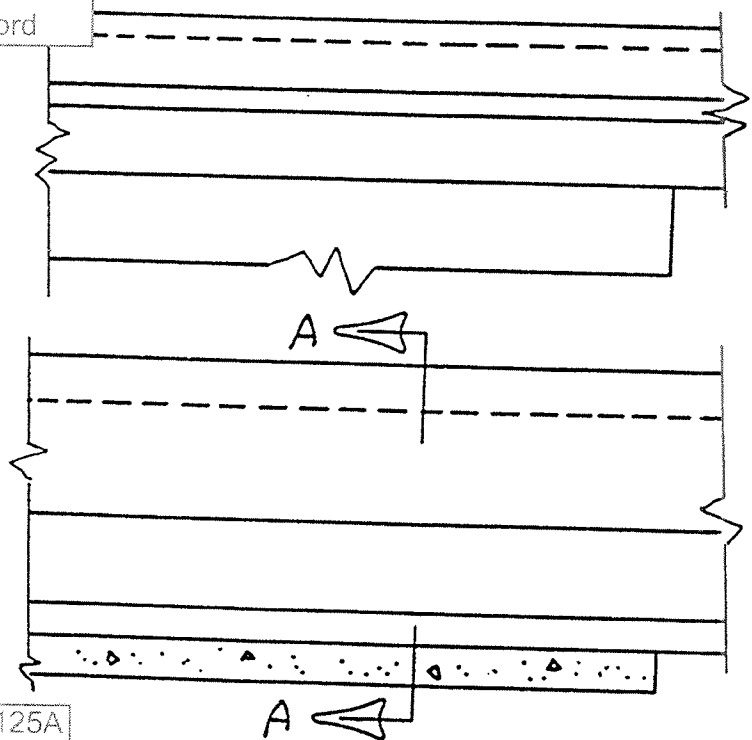
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Code Item 36 = 1

Marked up
3/24/2010
M.Nord

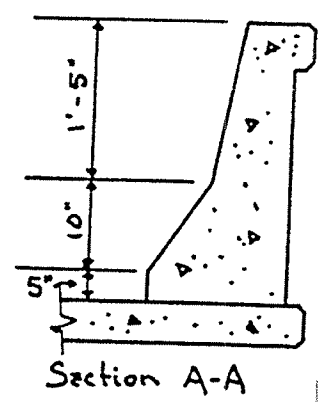
Appendix ^F
Item 98

125A



125A

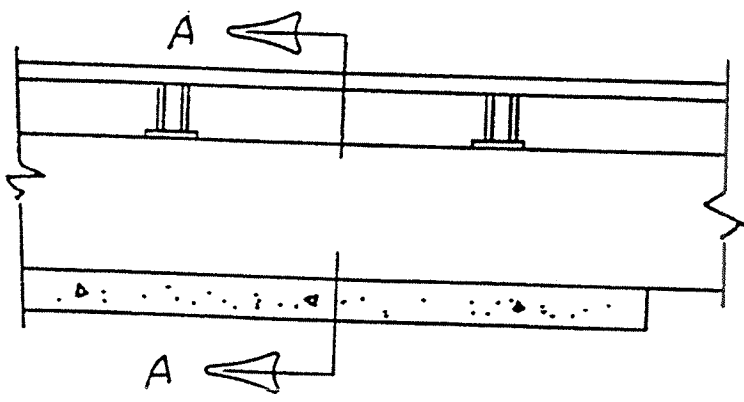
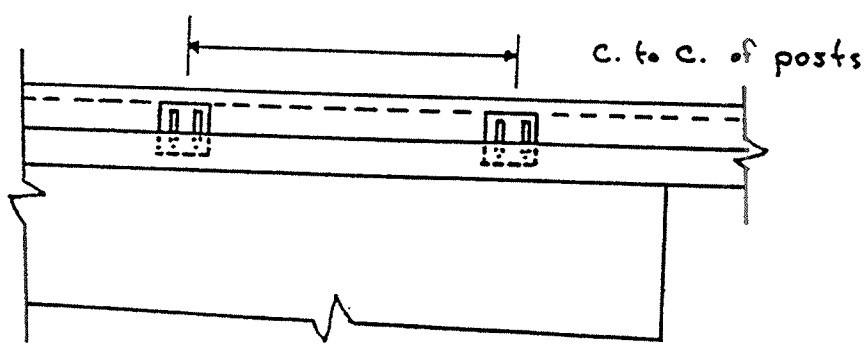
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Section A-A

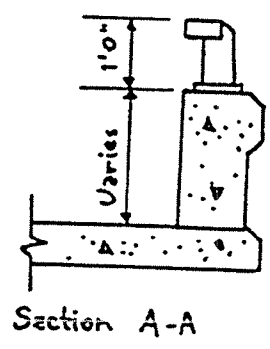
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Code Item 36 = 1



125A

Item 98-A = S



Section A-A

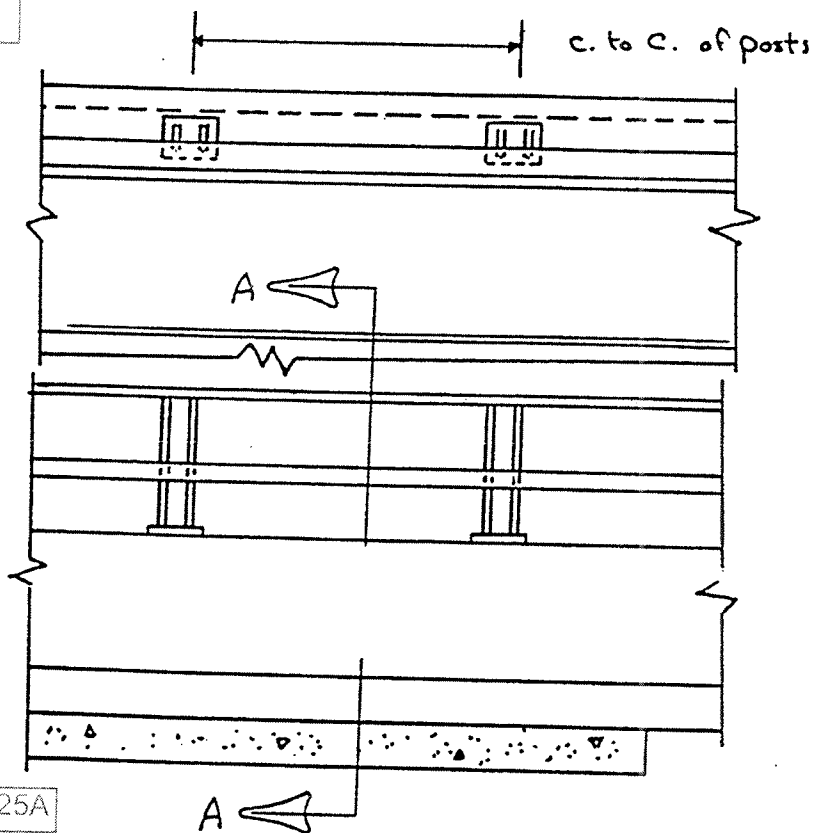
36A

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Marked up
3/24/2010
M.Nord

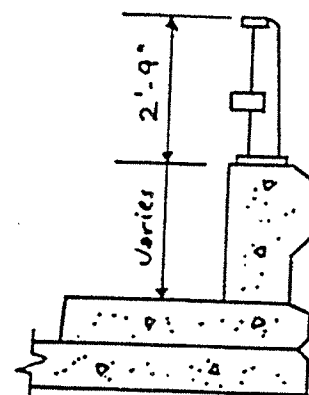
Appendix F Item 98

125A



125A

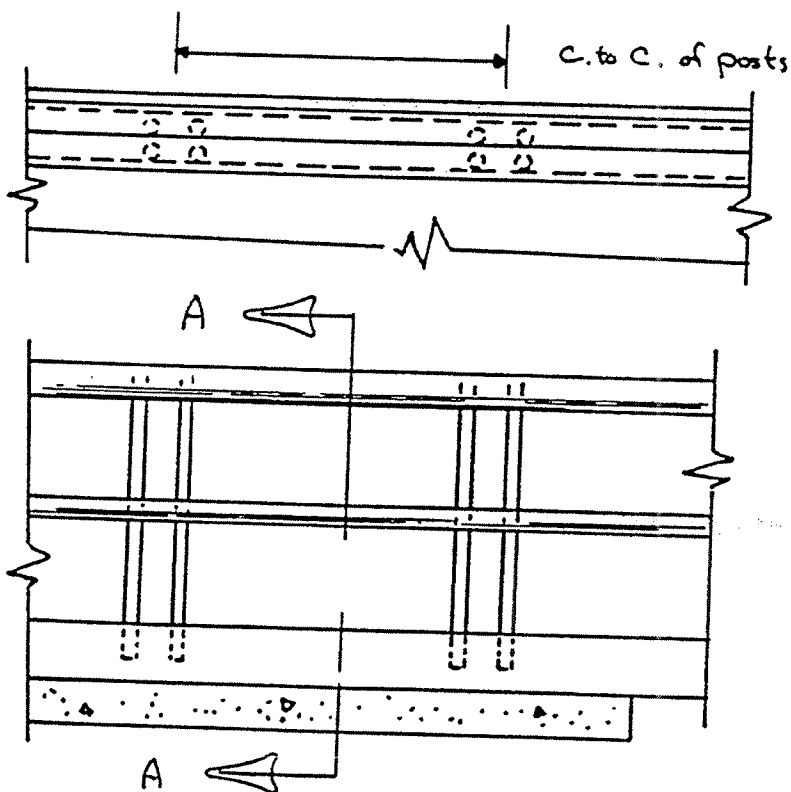
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Section A-A

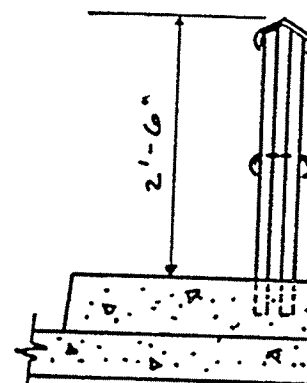
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125A

Item 98-A = U



Section A-A

36A

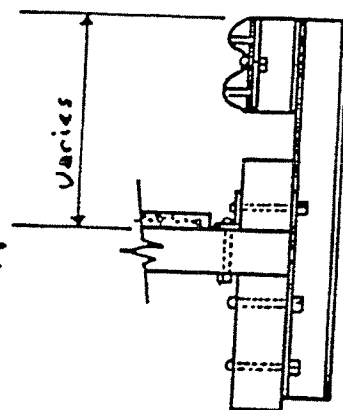
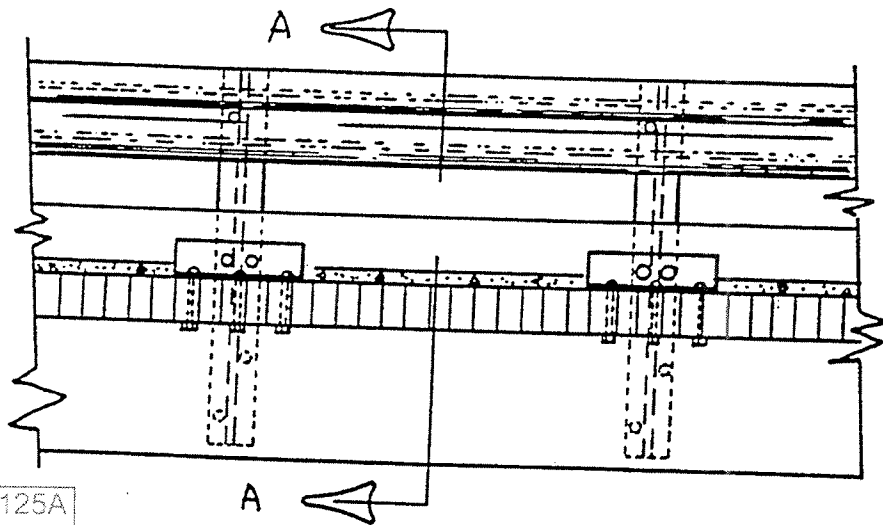
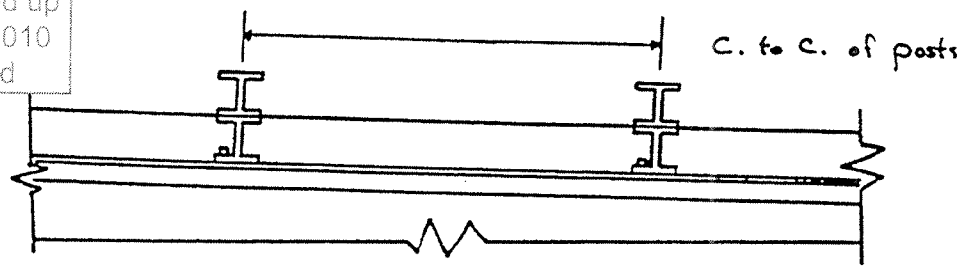
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Marked up
3/24/2010
M.Nord

F

Appendix 19 Item 98

125A

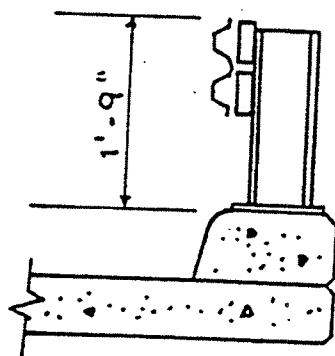
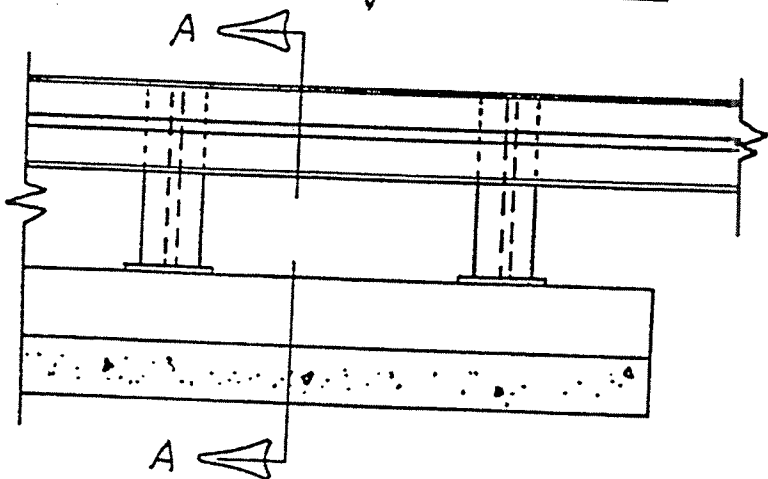
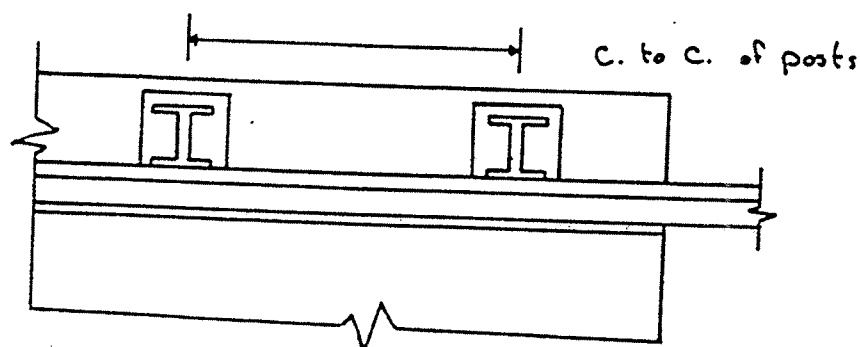


Section A-A

Code Item 36 = 1

36A

125A
Item 98-A = V



Section A-A

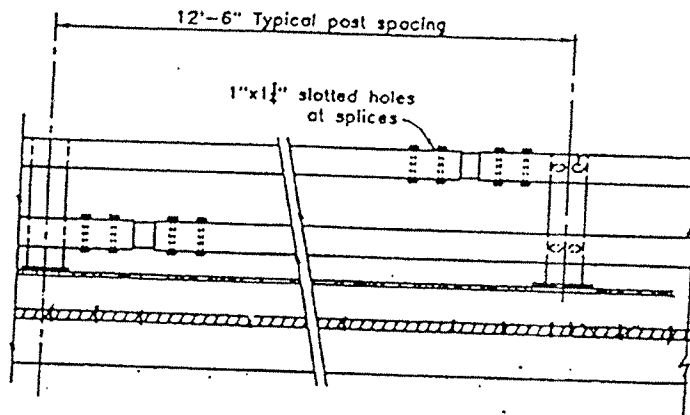
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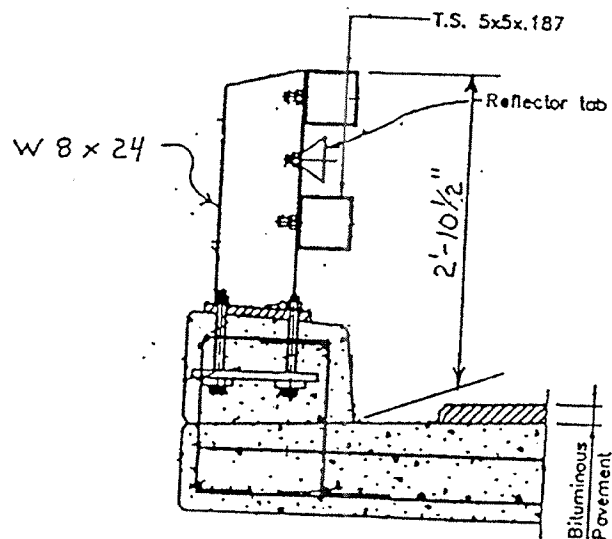
Marked up
3/24/2010
M.Nord

F
Appendix 14
Item 98

125A



ELEVATION — BRIDGE RAIL



SECTION

125A

Item 98-A = Y

36A

Code Item 36 = 1



SUBJECT

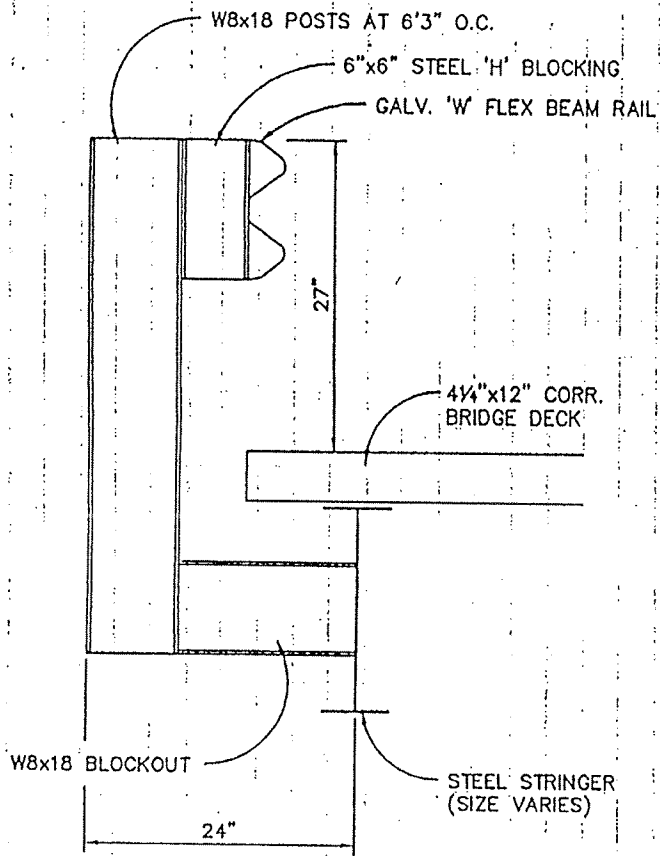
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DATE

SHEET

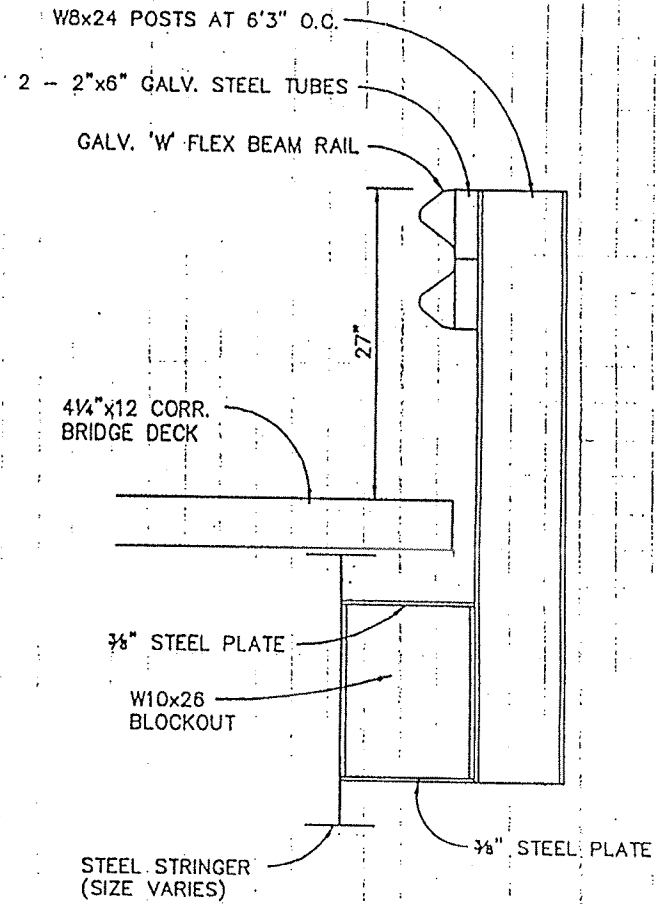
OF

Item 125A = AA



WELD COUNTY
STANDARD RAIL DETAIL

Item 125A = AB

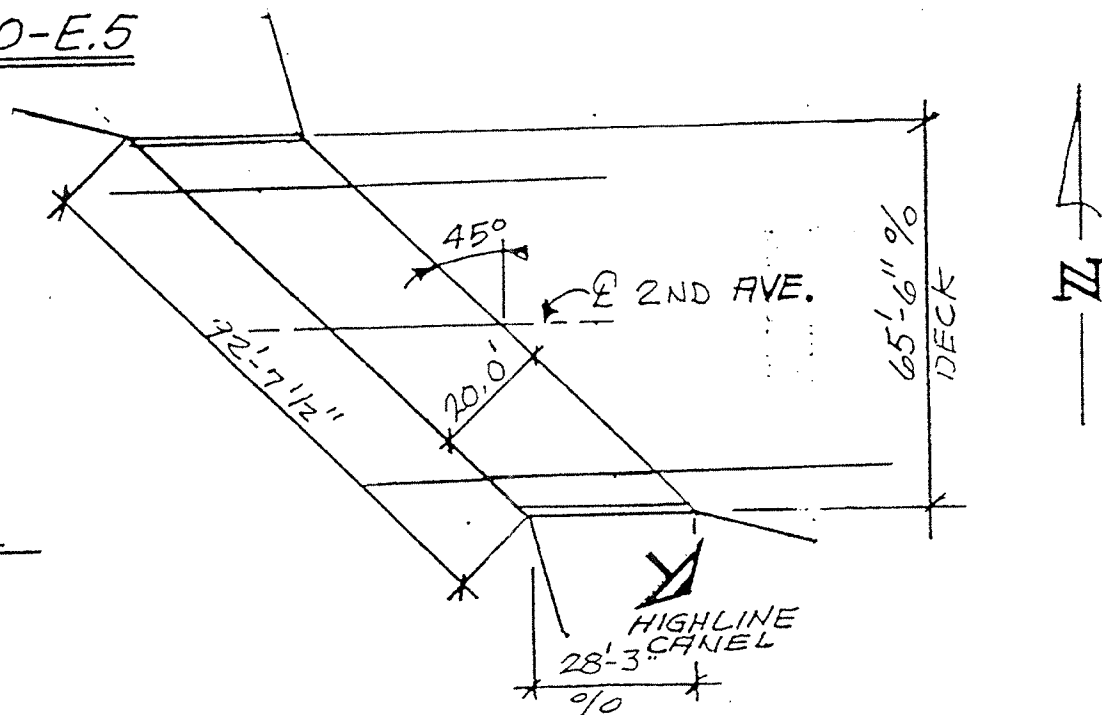


BIG 'R'
STANDARD RAIL DETAIL

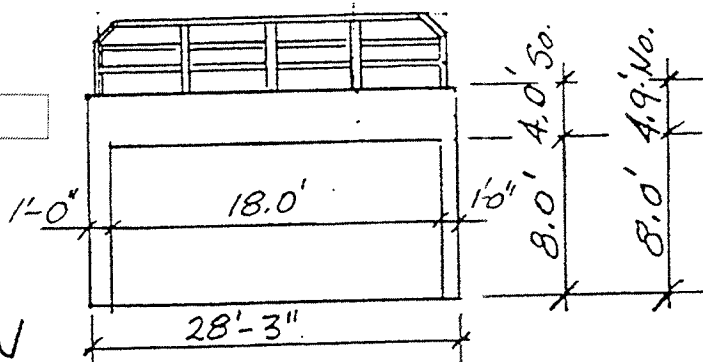
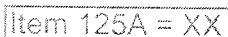
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Item 36A = 0

Marked up
3/24/2010
M.Nord

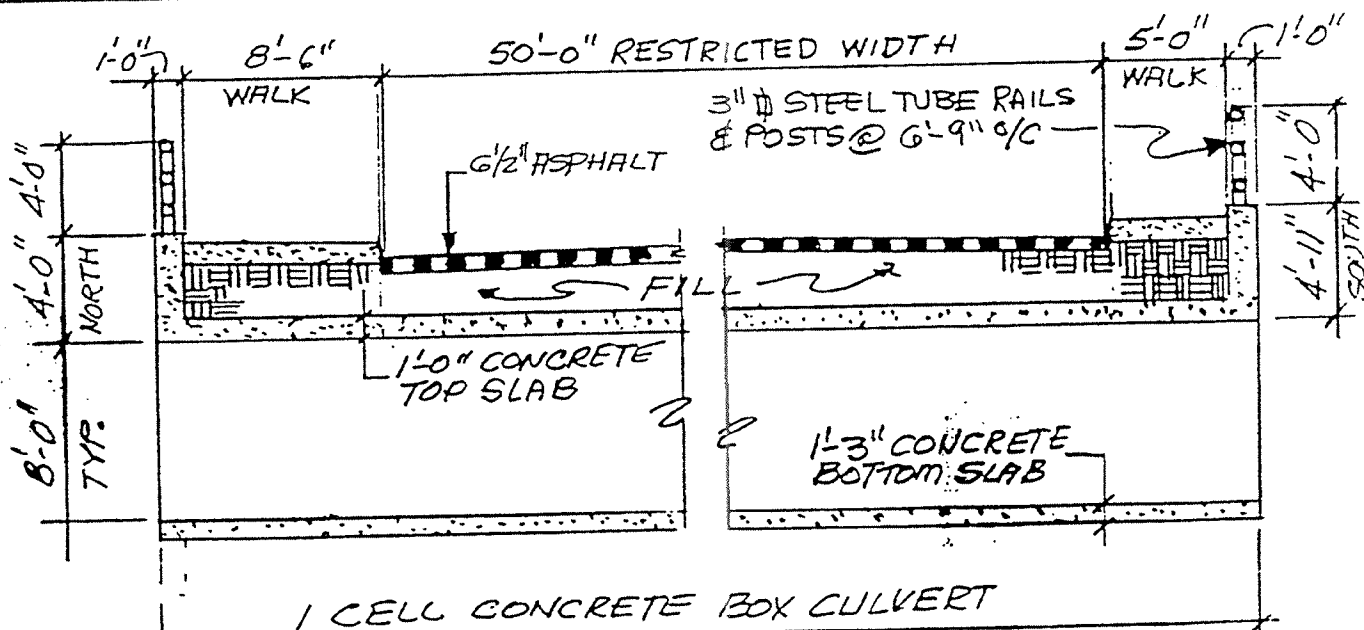


PLAN



Item 36A = 0

ELEVATION

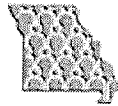


SECTION

8-4-88 AL

APPENDIX G

FIPS CITY CODES



Missouri Census Data Center

Rx A Cure for the Common Codes: Colorado

Counties	Places (cities)	Metro Areas 2000	Metropolitan and Micropolitan Statistical Areas (CBSAs)
Urbanized Areas	Urban Clusters	School Districts (NCES)	County Subdivisions (MCDs)

All codes are FIPS (Federal Information Processing Standard) unless otherwise specified

[Printing Tips](#) | [CCC home page](#)

State FIPS code: 08 **State Postal Abbreviation: CO** [2K Census Demographic Profile](#)

Colorado Counties

08001 Adams County	08025 Crowley County	08051 Gunnison County	08077 Mesa County	08103 Rio Blanco County
08003 Alamosa County	08027 Custer County	08053 Hinsdale County	08079 Mineral County	08105 Rio Grande County
08005 Arapahoe County	08029 Delta County	08055 Huerfano County	08081 Moffat County	08107 Routt County
08007 Archuleta County	08031 Denver County	08057 Jackson County	08083 Montezuma County	08109 Saguache County
08009 Baca County	08033 Dolores County	08059 Jefferson County	08085 Montrose County	08111 San Juan County
08011 Bent County	08035 Douglas County	08061 Kiowa County	08087 Morgan County	08113 San Miguel County
08013 Boulder County	08037 Eagle County	08063 Kit Carson County	08089 Otero County	08115 Sedgwick County
08014 Broomfield County	08039 Elbert County	08065 Lake County	08091 Ouray County	08117 Summit County
08015 Chaffee County	08041 El Paso County	08067 La Plata County	08093 Park County	08119 Teller County
08017 Cheyenne County	08043 Fremont County	08069 Larimer County	08095 Phillips County	08121 Washington County
08019 Clear Creek County	08045 Garfield County	08071 Las Animas County	08097 Pitkin County	08123 Weld County
08021 Conejos County	08047 Gilpin County	08073 Lincoln County	08099 Prowers County	08125 Yuma County
08023 Costilla County	08049 Grand County	08075 Logan County	08101 Pueblo County	

Data are as of 2003.

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Data Source: [/pub/data/popests.uscom03](#) See also [\(113-page pdf file\)](#) [2k Census Demographic Profiles](#)

Colorado Places (Cities)

00760 Aguilar town **18420** Crestone town **32650** Green **48555** Marble town **65740** Romeo town

00925 Akron town	18530 Cripple Creek city	Mountain Falls town	49600 Mead town	66895 Rye town
01090 Alamosa city	18640 Crook town	33035 Greenwood Village city	49875 Meeker town	67005 Saguache town
01530 Alma town	18750 Crowley town	33310 Grover town	50040 Merino town	67280 Salida city
02355 Antonito town	19080 Dacono city	33640 Gunnison city	50480 Milliken town	67830 Sanford town
03235 Arriba town	19355 De Beque town	33695 Gypsum town	50920 Minturn town	68105 San Luis town
03455 Arvada city	19630 Deer Trail town	34520 Hartman town	51250 Moffat town	68655 Sawpit town
03620 Aspen city	19795 Del Norte town	34740 Haswell town	51635 Monte Vista city	68930 Sedgwick town
03950 Ault town	19850 Delta city	34960 Haxtun town	51690 Montezuma town	69040 Seibert town
04000 Aurora city	20000 Denver city	35070 Hayden town	51745 Montrose city	69150 Severance town
04110 Avon town	20440 Dillon town	36610 Hillrose town	51800 Monument town	69645 Sheridan city
04935 Basalt town	20495 Dinosaur town	37215 Holly town	52075 Morrison town	69700 Sheridan Lake town
05265 Bayfield town	20770 Dolores town	37270 Holyoke city	52350 Mountain View town	70195 Silt town
06090 Bennett town	21265 Dove Creek town	37380 Hooper town	52550 Mountain Village town	70250 Silver Cliff town
06255 Berthoud town	21650 Durango city	37600 Hot Sulphur Springs town	52570 Mount Crested Butte town	70360 Silver Plume town
06530 Bethune town	22145 Eads town	37820 Hudson town	53120 Naturita town	70525 Silverthorne town
07025 Black Hawk city	22200 Eagle town	37875 Hugo town	53175 Nederland town	70580 Silverton town
07190 Blanca town	22860 Eaton town	38370 Idaho Springs city	53395 New Castle town	70635 Simla town
07410 Blue River town	23025 Eckley town	38535 Ignacio town	54330 Northglenn city	71755 Snowmass Village town
07571 Bonanza town	23135 Edgewater city	38590 Liff town	54880 Norwood town	72395 South Fork town
07795 Boone town	23740 Elizabeth town	39195 Jamestown town	54935 Nucla town	73330 Springfield town
07850 Boulder city	24620 Empire town	39855 Johnstown town	55045 Nunn town	73715 Starkville town
08070 Bow Mar town	24785 Englewood city	39965 Julesburg town	55155 Oak Creek town	73825 Steamboat Springs city
08345 Branson town	24950 Erie town	40185 Keenesburg town	55540 Olathe town	73935 Sterling city
08400 Breckenridge town	25115 Estes Park town	40515 Kersey town	55705 Olney Springs town	74485 Stratton town
08675 Brighton city	25280 Evans city	40570 Kim town	55870 Ophir town	74815 Sugar City town
09115 Brookside town	25610 Fairplay town	40790 Kiowa town	55980 Orchard City town	75640 Superior town
09280 Broomfield city	26270 Federal Heights city	41010 Kit Carson town	56145 Ordway town	75970 Swink town
09555 Brush city	26600 Firestone town	41560 Kremmling town	56365 Otis town	76795 Telluride town
10105 Buena Vista town	26765 Flagler town	41835 Lafayette city	56420 Ouray city	77290 Thornton city
10600 Burlington city	26875 Fleming town	42055 La Jara town	56475 Ovid town	77510 Timnath town
11260 Calhan town	27040 Florence city	42110 La Junta city	56860 Pagosa Springs town	78610 Trinidad city
11645 Campo town	27425 Fort Collins city	42495 Lakeside town	56970 Palisade town	79270 Two Buttes town
11810 Canon City city	27700 Fort Lupton city	43000 Lakewood city	57025 Palmer Lake town	80040 Vail town
12045 Carbondale town	27810 Fort Morgan city	43110 Lamar city	57245 Paoli town	80865 Victor city
12415 Castle Rock town	27865 Fountain city	43550 Larkspur town	57300 Paonia town	81030 Vilas town
12635 Cedaredge town	27975 Fowler town	43605 La Salle town	57400 Parachute town	81690 Vona town
12815 Centennial city	28105 Foxfield town	43660 Las Animas city	57630 Parker town	82130 Walden town
12855 Center town	28305 Fraser town	44100 La Veta town	58235 Peetz town	82350 Walsenburg city
12910 Central City city	28360 Frederick town	44320 Leadville city	59005 Pierce town	82460 Walsh town
13460 Cheraw town	28690 Frisco town	44980 Limon town	59830 Pitkin town	82735 Ward town
13845 Cherry Hills Village city	28745 Fruita city	45255 Littleton city	60160 Platteville town	83230 Wellington town
14175 Cheyenne Wells town	29185 Garden City town	45530 Lochbuie town	60600 Poncha Springs town	83450 Westcliffe town
15330 Coal Creek town	29680 Genoa town	45695 Log Lane Village town	61315 Pritchett town	83835 Westminster city
15550 Cokedale town	29735 Georgetown town	45955 Lone Tree city		
15605 Collbran town	29955 Gilcrest town	45970 Longmont city		
16000 Colorado	30340 Glendale city	46355 Louisville city		
	30780 Glenwood			

Springs city	Springs city	46465 Loveland city	62000 Pueblo city	84440 Wheat Ridge city
16385 Columbine Valley town	30835 Golden city	47070 Lyons town	62660 Ramah town	city
16495 Commerce City city	31550 Granada town	48060 Manassa town	62880 Rangely town	84770 Wiggins town
17375 Cortez city	31605 Granby town	48115 Mancos town	63045 Raymer town	85045 Wiley town
17760 Craig city	31660 Grand Junction city	48445 Manitou Springs city	63265 Red Cliff town	85155 Williamsburg town
17925 Crawford town	31715 Grand Lake town	48500 Manzanola town	64090 Rico town	85485 Windsor town
17980 Creede town	32155 Greeley city		64200 Ridgway town	85705 Winter Park town
18310 Crested Butte town			64255 Rifle city	
			64970 Rockvale town	
			65190 Rocky Ford city	86090 Woodland Park city
				86310 Wray city
				86475 Yampa town
				86750 Yuma city

Data are as of 2003.

[Return to Top](#)Data Source: </pub/data/popests.ussc03> [2k Census Demographic Profiles](#)

Colorado Metro Areas 2000 (MSAs, CMSAs and PMSAs)

1125 Boulder--Longmont, CO PMSA	2082 Denver--Boulder--Greeley, CO CMSA	3060 Greeley, CO PMSA
1720 Colorado Springs, CO MSA		6560 Pueblo, CO MSA
2080 Denver, CO PMSA	2670 Fort Collins--Loveland, CO MSA	
	2995 Grand Junction, CO MSA	

Data are as of 2000. These entities and their 4-digit codes used to publish Census 2000 results. But they are now obsolete, replaced by the 5-digit metropolitan area codes displayed in the next table.

[Return to Top](#)Data Source: </pub/data/sf32000.usgeos> [See also](#) [2k Census Demographic Profiles](#)

Colorado Metropolitan and Micropolitan Statistical Areas (CBSAs)

14500 Boulder, CO Metropolitan Statistical Area	20780 Edwards, CO Micropolitan Statistical Area	33940 Montrose, CO Micropolitan Statistical Area
15860 Canon City, CO Micropolitan Statistical Area	22660 Fort Collins-Loveland, CO Metropolitan Statistical Area	39380 Pueblo, CO Metropolitan Statistical Area
17820 Colorado Springs, CO Metropolitan Statistical Area	22820 Fort Morgan, CO Micropolitan Statistical Area	43540 Silverthorne, CO Micropolitan Statistical Area
19740 Denver-Aurora, CO Metropolitan Statistical Area	24300 Grand Junction, CO Metropolitan Statistical Area	44540 Sterling, CO Micropolitan Statistical Area
20420 Durango, CO Micropolitan Statistical Area	24540 Greeley, CO Metropolitan Statistical Area	

Data are as of December 2003. The term CBSA ("Core Based Statistical Area") was used to describe these areas when they were first released, but has now been abandoned.

[Return to Top](#)Data Source: </pub/data/georef.cbsaprinclities> [See also](#)

Colorado Urbanized Areas

09298 Boulder, CO Urbanized Area	30628 Fort Collins, CO Urbanized Area	46126 Lafayette--Louisville, CO Urbanized Area
18856 Colorado Springs, CO Urbanized Area	34273 Grand Junction, CO	51175 Longmont, CO Urbanized

23527 Denver--Aurora, CO
Urbanized Area

Urbanized Area

34786 Greeley, CO Urbanized Area

Area

72613 Pueblo, CO Urbanized Area

Data are as of 2000

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Data Source: [/pub/data/sf32000.usgeos](#) See also [2k Census Demographic Profiles](#)

Colorado Urban Clusters

00847 Alamosa, CO UC	13564 Carbondale, CO UC	30007 Florence, CO UC	58546 Monte Vista, CO UC	84790 Sterling, CO UC
03520 Aspen, CO UC	14563 Castle Rock, CO UC	30817 Fort Morgan, CO UC	58951 Montrose, CO UC	88516 Trinidad, CO UC
04492 Avon, CO UC	20368 Cortez, CO UC	32005 Fruita, CO UC	62110 New Castle, CO UC	89920 Vail, CO UC
05410 Basalt, CO UC	20827 Craig, CO UC	33652 Glenwood Springs, CO UC	66889 Pagosa Springs, CO UC	91486 Walsenburg, CO UC
05734 Battlement Mesa, CO UC	21907 Dacono, CO UC	36001 Gunnison, CO UC	74935 Rifle, CO UC	93673 Wellington, CO UC
09811 Breckenridge, CO UC	23230 Delta, CO UC	36136 Gypsum, CO UC	75961 Rocky Ford, CO UC	96238 Windsor, CO UC
10270 Brighton, CO UC	25147 Durango, CO UC	43318 Johnstown--Milliken, CO UC	76528 Roxborough Park, CO UC	97048 Woodland Park, CO UC
11080 Brush, CO UC	25390 Eagle, CO UC	46450 La Junta, CO UC	78256 Salida, CO UC	98047 Yuma, CO UC
11242 Buena Vista, CO UC	27928 Estes Park, CO UC	47287 Lamar, CO UC	82090 Silverthorne, CO UC	
11647 Burlington, CO UC	28441 Evergreen, CO UC	47908 Las Animas, CO UC	83224 South Florence (Federal Correctional Institution), CO UC	
13267 Canon City, CO UC		48448 Leadville, CO UC	84682 Steamboat Springs, CO UC	

Data are as of 2000.

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Data Source: [/pub/data/sf32000.usgeos](#) See also [2k Census Demographic Profiles](#)

Colorado School Districts (NCES)

800001 Cheyenne County RE-5	802760 Campo RE-6	804110 Fowler R-4J	805340 Lone Star 101	806570 Silverton 1
800004 Expeditionary Boces	802790 Canon City RE-1	804140 Sierra Grande R-30	805370 St Vrain Valley Re 1J	806600 Big Sandy 100J
800008 West Central Boces	802850 Center 26 Jt	804200 Weld County RE-1	805400 Thompson R-2J	806630 Springfield RE-4
800009 Adams County Boces	802880 Cheraw 31	804230 Gilpin County RE-1	805460 Mancos RE-6	806660 Steamboat Springs RE-2
800010 Larimer Boces	802910 Cherry Creek 5	804260 Roaring Fork RE-1	805490 Manitou Springs 14	806690 Valley RE-1
800011 Grand Valley Boces	802940 Cheyenne Mountain 12	804290 Granada RE-1	805520 Manzanola 3J	806720 Prairie RE-11
800012 Mt Evans Boces	803000 Clear Creek RE-1	804320 East Grand 2	805550 Mapleton 1	806750 Strasburg 31J
800013 Uncompahgre Boces	803030 Plateau Valley 50	804350 Mesa County Valley 51	805580 Mc Clave RE-2	806780 Stratton R-4
800014 Santa Fe Trail Boces	803060 Colorado Springs 11	804380 Garfield 16	805610 Meeker Re1	806810 Summit RE-1
	803090 Montezuma-Cortez RE-1	804410 Greeley 6	805640 Buffalo RE-4	806840 Swink 33
	803120 Cotopaxi RE-12	804440 Pawnee RE-12	805670 Miami/Yoder	806870 Telluride R-1
				806900 Northglenn-Thornton 12
				806930 Plainview

800015 Front Range Boces	3	803150 Creede Consolidated 1	804470 Gunnison Watershed Re1J	60 Jt	RE-2
800016 Yuma 1		803180 Cripple Creek-Victor RE-1	804500 Hanover 28	805700 Moffat 2	806960 Trinidad 1
800017 Wray RD-2		803210 Crowley County RE-1-J	804530 Harrison 2	805730 Moffat County Re:No 1	806990 Vilas RE-5
800018 Idalia RJ-3		803240 De Beque 49Jt	804560 Haxtun RE-2J	805760 Monte Vista C-8	807050 North Park R-1
800019 Liberty J-4		803270 Deer Trail 26J	804590 Hayden RE-1	805790 Montrose County RE-1J	807080 Huerfano RE-1
801920 Academy 20		803300 Del Norte C-7	804620 Hinsdale County Re 1	805820 Lewis-Palmer 38	807110 Walsh RE-1
801950 Adams County 14		803330 Delta County 50(J)	804650 Hoehne Reorganized 3	805850 West End RE-2	807140 Weldon Valley RE-20(J)
801980 Agate 300		803360 Denver County 1	804680 Holly RE-3	805880 Norwood R-2J	807200 Custer County
802010 Aguilar Reorganized 6		803390 Dolores RE-4A	804710 Holyoke RE-1J	805910 South Routt Re 3	807230 Westminster 50
802040 Akron R-1		803420 Dolores County Re No.2	804740 Genoa-Hugo C113	805940 Otis R-3	807260 Primero Reorganized 2
802070 Alamosa RE-11J		803450 Douglas County Re 1	804770 Ignacio 11 Jt	805970 Ouray R-1	807290 Wiggins RE-50(J)
802130 South Conejos RE-10		803480 Durango 9-R	804800 Jefferson County R-1	806000 Platte Valley RE-3	807320 Wiley Re-13 Jt
802190 Archuleta County 50 Jt		803510 Eads RE-1	804830 Johnstown-Milliken RE-5J	806030 Plateau RE-5	807350 Windsor RE-4
802220 Arickaree R-2		803540 Eagle County Re 50	804860 Julesburg RE-1	806060 Peyton 23 Jt	807380 Woodland Park RE-2
802260 Arriba-Flagler C-20		803600 Eaton RE-2	804890 Karval RE-23	806090 Pritchett RE-3	807410 Woodlin R-104
802280 Aspen 1		803630 Edison 54 Jt	804920 Keenesburg RE-3(J)	806120 Pueblo City 60	899080 East Central Boces
802310 Ault-Highland RE-9		803690 Elbert 200	804950 Platte Valley RE-7	806150 Pueblo County Rural 70	899160 Mountain Boces
802340 Adams-Arapahoe 28J		803720 Elizabeth C-1	804980 Kim Reorganized 88	806180 Rangely RE-4	899180 Northeast Boces
802370 Platte Canyon 1		803750 Ellicott 22	805010 Kiowa C-2	806210 Ridgway R-2	899200 Centennial Boces
802400 Bayfield 10 JT-R		803780 Englewood 1	805040 Kit Carson R-1	806240 Garfield RE-2	899220 Northwest Colo Boces
802430 Bennett 29J		803810 Park (Estes Park) R-3	805070 West Grand 1-JT.	806270 Rocky Ford R-2	899240 Pikes Peak Boces
802460 Bethune R-5		803840 Park County RE-2	805100 North Conejos RE-1J	806300 Mountain Valley Re 1	899280 Rio Blanco Boces
802490 Boulder Valley Re 2		803870 Falcon 49	805130 East Otero R-1	806330 Salida R-32	899300 San Juan Bocs
802520 Branson Reorganized 82		803930 Frenchman RE-3	805160 La Veta RE-2	806360 Centennial R-1	899320 San Luis Valley Boces
802550 Briggsdale RE-10		803960 Florence RE-2	805190 Lake County R-1	806390 Sanford 6J	899340 South Central Boces
802580 Brighton 27J		803990 Poudre R-1	805220 Lamar RE-2	806420 Sangre De Cristo RE-22J	899360 South Platte Valley Boces
802610 Brush RE-2 (J)		804020 Weld County S/D RE-8	805250 Las Animas RE-1	806450 Sargent RE-33J	899400 Southeastern Boces
802640 Buena Vista R-31		804050 Fort Morgan RE-3	805280 Limon RE-4J	806480 Widefield 3	899420 Southwest Boces
802670 Burlington RE-6J		804080 Fountain 8	805310 Littleton 6	806510 Hi-Plains R-23	
802700 Byers 32J				806540 Sheridan 2	
802730 Calhan RJ-1					

Data are as of 2002-2003.

Data Source: NCES

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Colorado County Subdivisions (MCDs) by county

<u>08001 Adams CO</u>	<u>08003 Alamosa CO</u>	<u>08005 Arapahoe CO</u>	<u>08007 Archuleta CO</u>	<u>08009 Baca CO</u>
90399 Brighton CCD 90760 Commerce City CCD 91159 East Adams CCD 92622 North Aurora CCD 93800 West Adams CCD	90076 Alamosa CCD 92584 Mosca-Hooper CCD	91178 East Arapahoe CCD 93382 South Aurora CCD 93458 Southwest Arapahoe CCD	90114 Arboles CCD 92812 Pagosa Springs CCD	90475 Campo CCD 92964 Pritchett CCD 93477 Springfield CCD 93762 Walsh CCD
<u>08011 Bent CO</u>	<u>08013 Boulder CO</u>	<u>08015 Chaffee CO</u>	<u>08017 Cheyenne CO</u>	<u>08019 Clear Creek CO</u>
92185 Las Animas CCD 92356 McClave CCD 93021 Purgatoire Valley CCD	90228 Bald Mountain CCD 90342 Boulder CCD 92052 Lafayette- Louisville CCD 92318 Longmont CCD 93686 Upper St. Vrain CCD	90437 Buena Vista CCD 93173 Salida CCD	90646 Cheyenne Wells CCD 92014 Kit Carson CCD	91463 Georgetown CCD 91843 Idaho Springs CCD
<u>08021 Conejos CO</u>	<u>08023 Costilla CO</u>	<u>08025 Crowley CO</u>	<u>08027 Custer CO</u>	<u>08029 Delta CO</u>
90095 Antonito CCD 90779 Conejos West CCD 92071 La Jara CCD 92375 Manassa CCD	90323 Blanca CCD 93192 San Luis CCD	92755 Ordway CCD 93553 Sugar City CCD	93819 Westcliffe CCD	90532 Cedaredge CCD 90988 Delta CCD 91786 Hotchkiss CCD 92831 Paonia CCD
<u>08031 Denver CO</u>	<u>08033 Dolores CO</u>	<u>08035 Douglas CO</u>	<u>08037 Eagle CO</u>	<u>08039 Elbert CO</u>
91007 Denver CCD	91064 Dove Creek CCD 93078 Rico CCD	90513 Castle Rock CCD 92850 Parker CCD 93249 Sedalia CCD	90247 Basalt CCD 91140 Eagle-Gypsum CCD 92489 Minturn-Red Cliff CCD	90019 Agate CCD 91190 Elizabeth CCD 93325 Simla CCD
<u>08041 El Paso CO</u>	<u>08043 Fremont CO</u>	<u>08045 Garfield CO</u>	<u>08047 Gilpin CO</u>	<u>08049 Grand CO</u>
90304 Black Forest- Peyton CCD 90627 Cheyenne Mountain CCD 90741 Colorado Springs CCD 91197 Elsmere CCD 91387 Fountain CCD 92565 Monument CCD 92907 Pikes Peak	90494 Canon City CCD 90836 Cotopaxi CCD 91311 Florence CCD 92888 Penrose- Portland CCD	91520 Glenwood Springs CCD 91615 Grand Valley CCD 92603 New Castle CCD 93097 Rifle CCD	90570 Central City CCD	91577 Granby CCD 92033 Kremmling CCD

CCD

93420 Southeastern El
Paso CCD

<u>08051</u> <u>Gunnison CO</u>	<u>08053 Hinsdale</u> <u>CO</u>	<u>08055</u> <u>Huerfano CO</u>	<u>08057 Jackson</u> <u>CO</u>	<u>08059</u> <u>Jefferson CO</u>
90893 Crested Butte CCD 91672 Gunnison CCD 93211 Sapinero CCD 93363 Somerset CCD	92109 Lake City CCD	91444 Gardner CCD 92204 La Veta CCD 93743 Walsenburg CCD	93724 Walden CCD	90589 Central Jefferson CCD 91539 Golden CCD 92641 Northeast Jefferson CCD 93439 South Jefferson CCD
<u>08061 Kiowa</u> <u>CO</u>	<u>08063 Kit</u> <u>Carson CO</u>	<u>08065 Lake</u> <u>CO</u>	<u>08067 La Plata</u> <u>CO</u>	<u>08069</u> <u>Larimer CO</u>
91121 Eads CCD 91691 Haswell CCD 93268 Sheridan Lake CCD	90456 Burlington CCD 91273 Flagler CCD 93534 Stratton CCD	92223 Leadville CCD 92242 Leadville North CCD	90266 Bayfield CCD 91083 Durango CCD 91102 Durango Southwest CCD 91862 Ignacio CCD	90285 Berthoud CCD 91235 Estes Park CCD 91330 Fort Collins CCD 92299 Livermore CCD 92337 Loveland CCD 93610 Timnath- Wellington CCD
<u>08071 Las</u> <u>Animas CO</u>	<u>08073 Lincoln</u> <u>CO</u>	<u>08075 Logan</u> <u>CO</u>	<u>08077 Mesa CO</u>	<u>08079 Mineral</u> <u>CO</u>
90038 Aguilar CCD 90361 Branson CCD 91976 Kim CCD 92508 Model CCD 93648 Trinidad CCD 93838 Weston CCD	90133 Arriba CCD 91824 Hugo CCD 91919 Karval CCD 92261 Limon CCD	90931 Crook CCD 91292 Fleming CCD 92470 Merino CCD 92869 Peetz CCD 93515 Sterling CCD	90665 Clifton CCD 90703 Collbran CCD 90950 De Beque CCD 91425 Fruita CCD 91501 Glade Park- Gateway CCD 91596 Grand Junction CCD 93857 Whitewater- Kahnah Creek CCD	90874 Creede CCD
<u>08081 Moffat</u> <u>CO</u>	<u>08083</u> <u>Montezuma CO</u>	<u>08085</u> <u>Montrose CO</u>	<u>08087 Morgan</u> <u>CO</u>	<u>08089 Otero</u> <u>CO</u>
90855 Craig CCD 91017 Dinosaur CCD 92432 Maybell-Powder Wash CCD	90817 Cortez CCD 91045 Dolores CCD 92394 Mancos CCD 92945 Pleasant View CCD 93705 Ute Mountain CCD	92546 Montrose CCD 92698 Nucla CCD 92736 Olathe CCD	90418 Brush CCD 91368 Fort Morgan CCD 93781 Weldonia CCD 93876 Wiggins CCD	90608 Cheraw CCD 91406 Fowler CCD 92090 La Junta CCD 92413 Manzanola CCD 93116 Rocky Ford CCD 93629 Timpas CCD
<u>08091 Ouray</u> <u>CO</u>	<u>08093 Park CO</u>	<u>08095 Phillips</u> <u>CO</u>	<u>08097 Pitkin</u> <u>CO</u>	<u>08099</u> <u>Prowers CO</u>

92793 Ouray CCD	91254 Fairplay CCD	91710 Haxtun CCD	90171 Aspen CCD	91558 Granada CCD
	92128 Lake George CCD	91767 Holyoke CCD	93344 Snowmass Village CCD	91748 Holly CCD
				92147 Lamar CCD
				93667 Two Butte Creek CCD

<u>08101 Pueblo CO</u>	<u>08103 Rio Blanco CO</u>	<u>08105 Rio Grande CO</u>	<u>08107 Routt CO</u>	<u>08109 Saguache CO</u>
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90209 Avondale CCD	92451 Meeker CCD	90969 Del Norte CCD	91729 Hayden CCD	90551 Center CCD
90722 Colorado City-Rye CCD	93040 Rangely CCD	92527 Monte Vista CCD	92717 Oak Creek CCD	90684 Cochetopa CCD
91805 Huerfano Valley CCD		93230 Sargent CCD	93496 Steamboat Springs CCD	93135 Saguache CCD
92660 Northeast Pueblo CCD			93933 Yampa CCD	
92983 Pueblo CCD				
93002 Pueblo West CCD				
93154 St. Charles Mesa CCD				

<u>08111 San Juan CO</u>	<u>08113 San Miguel CO</u>	<u>08115 Sedgwick CO</u>	<u>08117 Summit CO</u>	<u>08119 Teller CO</u>
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93306 Silverton CCD	91482 Gladel CCD	91900 Julesburg CCD	90380 Breckenridge CCD	90912 Cripple Creek CCD
	92679 Norwood CCD	93572 Table Land CCD	93287 Silverthorne CCD	91026 Divide CCD
	93591 Telluride CCD			

<u>08121 Washington CO</u>	<u>08123 Weld CO</u>	<u>08125 Yuma CO</u>
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90057 Akron CCD	90190 Ault CCD	93401 South Divide CCD
90798 Cope CCD	91216 Erie-Frederick CCD	93914 Wray CCD
92280 Linden CCD	91349 Fort Lupton CCD	93952 Yuma CCD
92774 Otis CCD	91634 Greeley CCD	
	91653 Grover CCD	
	91881 Johnstown-Milliken CCD	
	91938 Keenesburg-Hudson CCD	
	91957 Kersey-Gill CCD	
	92166 La Salle-Gilcrest CCD	
	92926 Platteville CCD	
	93059 Raymer CCD	
	93895 Windsor CCD	

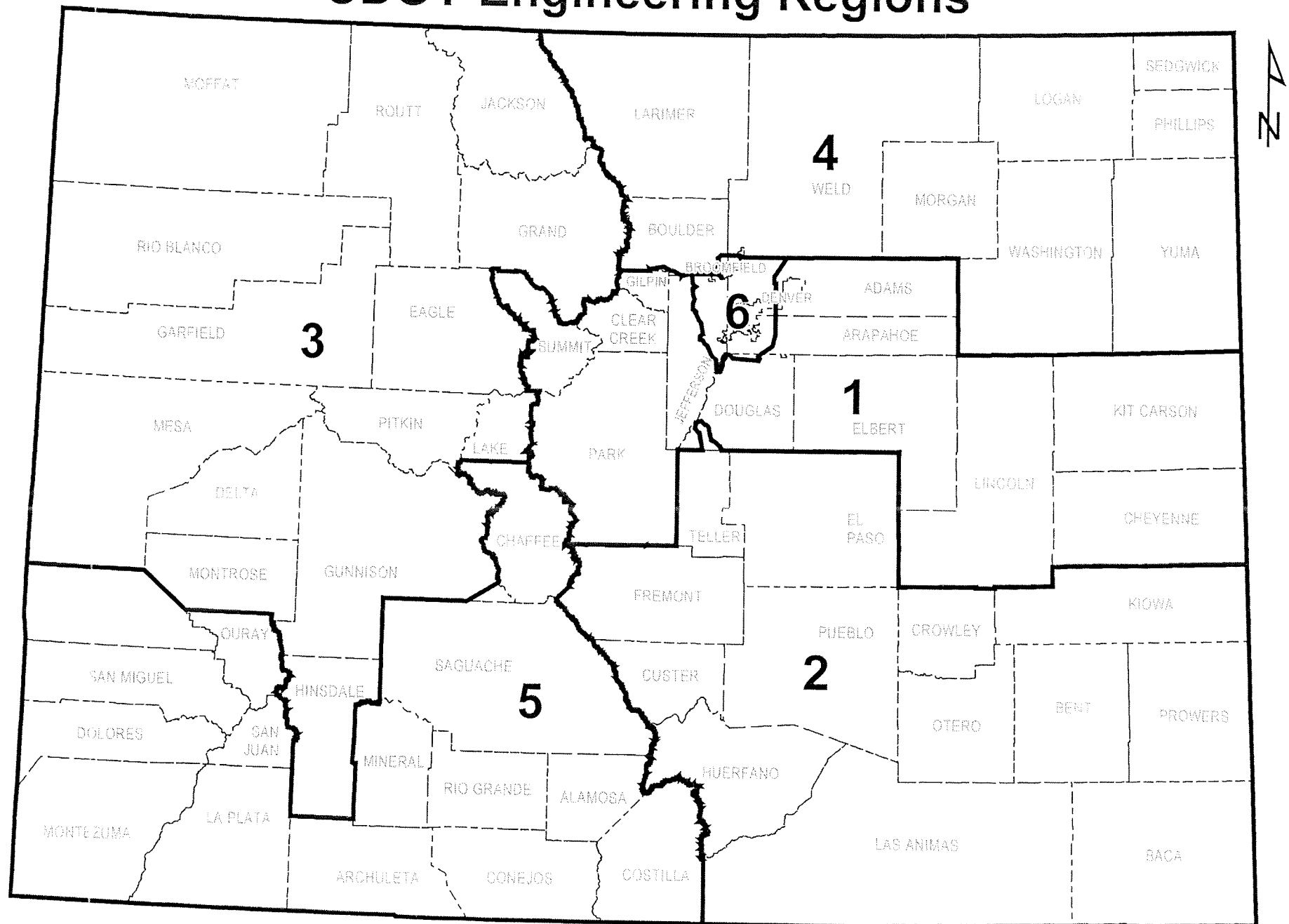
Data are as of 2000.

[Return to Top](#)Data Source: [/pub/data/sf32000.usgeos](#) [2k Census Demographic Profiles](#)[CCC home page](#)

APPENDIX H

MAPS

CDOT Engineering Regions



COMMISSION DISTRICTS

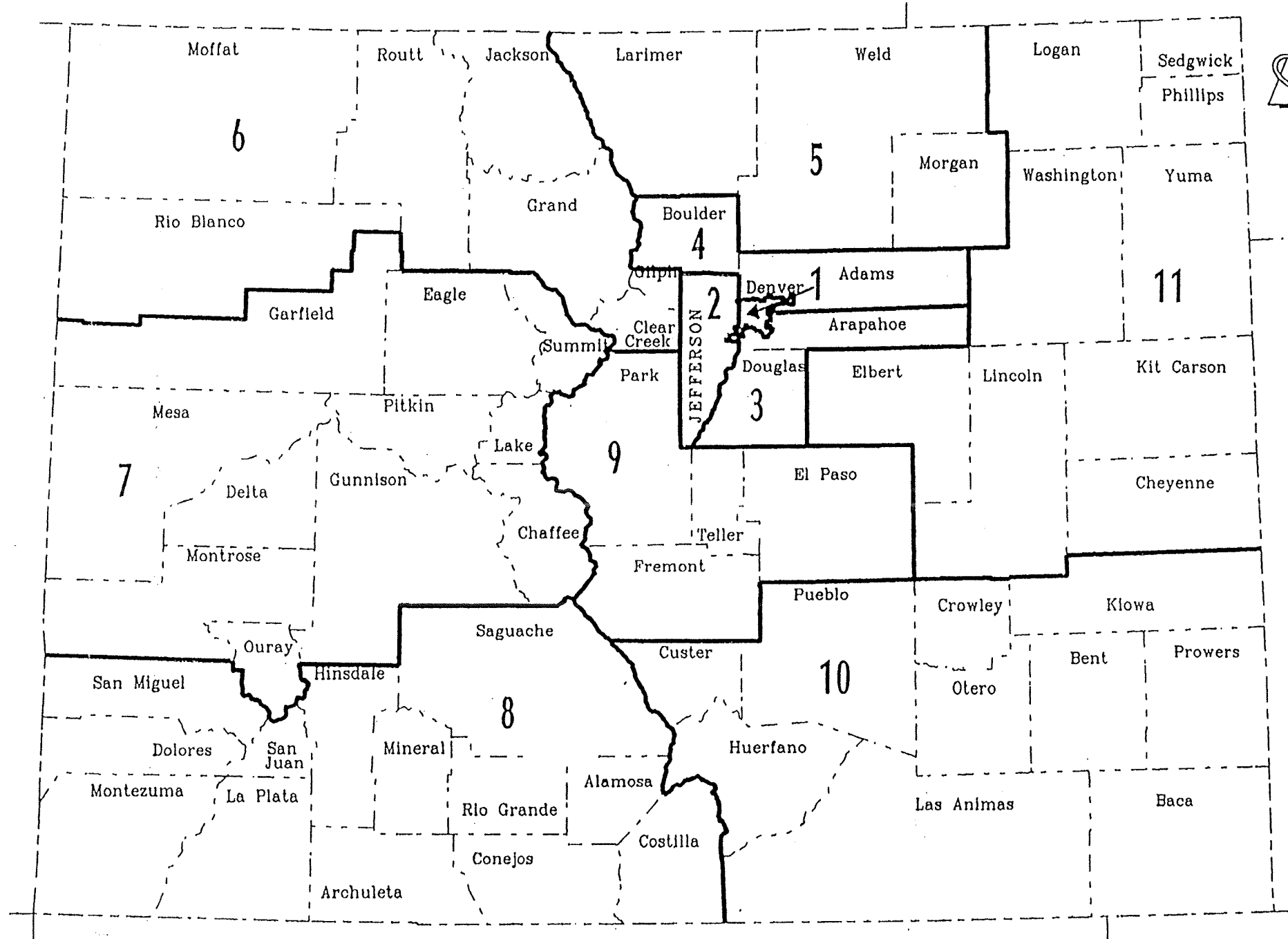
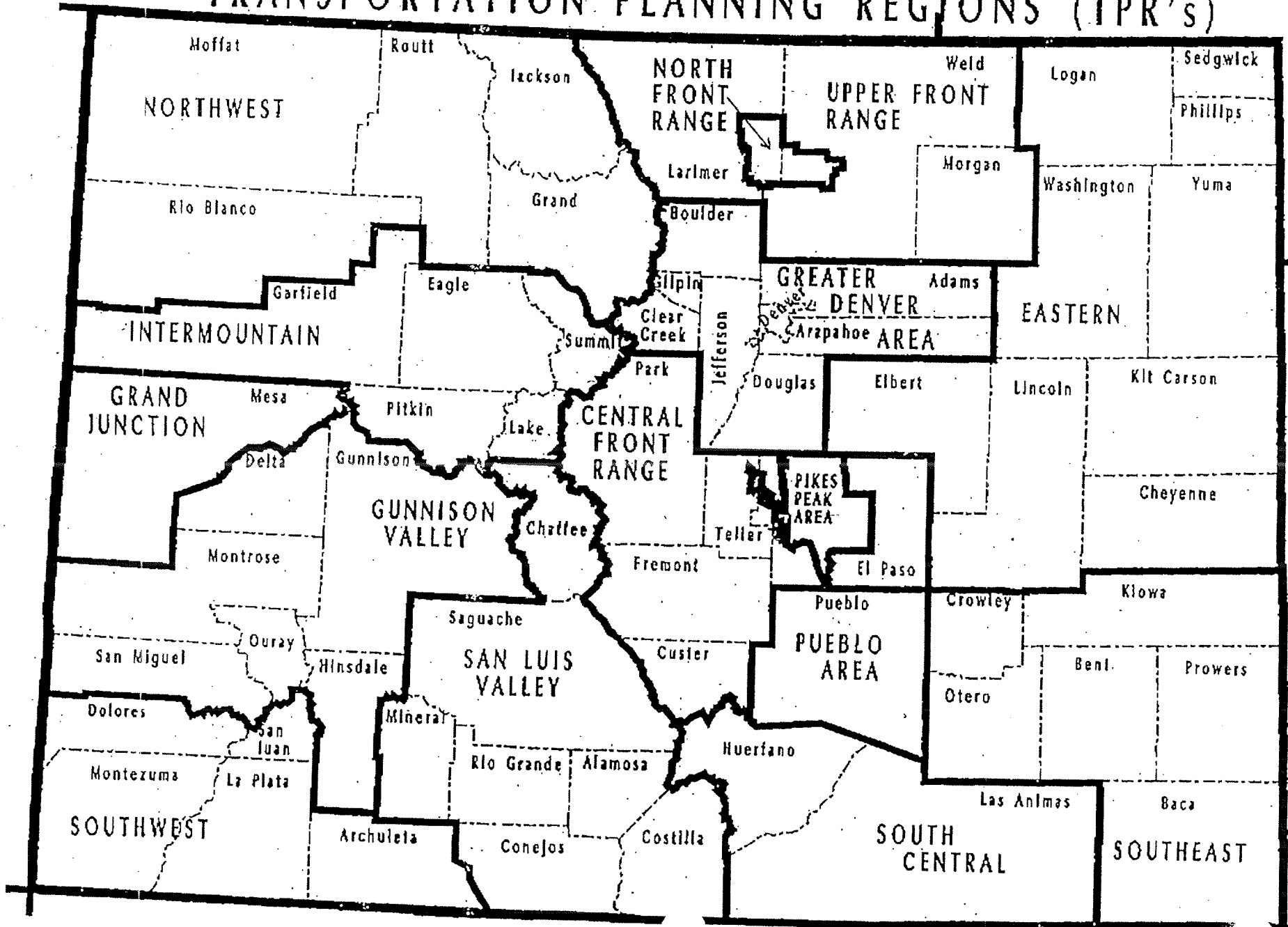


Figure 1

TRANSPORTATION PLANNING REGIONS (TPR's)



APPENDIX 9

APPENDIX I

ABBREVIATIONS

APPENDIX I ABBREVIATIONS

Recommended Abbreviations for ITEM6:

Access Road	AR
Avenue	AVE
Boulevard	BLVD
Business	BUS
County	CO
Creek	CRK
Ditch	DTCH
Diversion	DIV
East	E
Eastbound	EEND
Fork	FK
Frontage	FR
Gulch	GUL
Interstate	I
Lower	LWR
Mainline	ML
Maintenance	MAINT
Mile	MI
Mount	MT
North	N
Northbound	NBND
Overflow	OVFLW
Pedestrian	PED
Railroad	RR
Ramp	R
Reservoir	RES
River	RVR
Road	RD
Roadway	RDWY
Route	RT
Saint	ST
Service Road	SR
South	S
Southbound	SBND
Street	ST
United States	US
Route	RTE
West	W
Westbound	WBND
First	1 st
Second	2 nd

APPENDIX I ABBREVIATIONS

Railroad Companies:

Atchison, Topeka and Santa Fe	AT&SF
Burlington Northern	BN
Colorado and Southern	C&S
Denver and Rio Grande Western	D&RGW
Great Western	GW
Missouri Pacific	MP
Chicago, Rock Island and Pacific	CR&P
Union Pacific	UP

COLORADO DEPARTMENT OF TRANSPORTATION STAFF BRIDGE BRIDGE DETAIL MANUAL	Chapter: Appendices Effective: January 2, 2009 Supersedes: NEW
APPENDIX A - Abbreviations & Acronyms	

A(1) ABBREVIATIONS & ACRONYMS

The use of abbreviations and acronyms is generally discouraged unless required due to time or space limitations. If more than one abbreviation is shown, the first abbreviation is currently preferred although the others are acceptable and have been used in the past. This list may not be inclusive. Where special abbreviations are used, a descriptive tabulation may be necessary and is allowed in the plan drawings. See the Field Log of Structures for Structure Type abbreviations.

<u>Abbreviation or Acronym</u>	<u>Meaning</u>
Symbols	
@	at
&	and
[channel (steel)
⌀ , ∅	Diameter
#	pound or number
3R	Resurfacing, Restoration, Rehabilitation
8UN	8 thread series (screw thread)
Ⓔ	Epoxy Coated Rebar
Ⓝ	Non-Epoxy Coated Rebar
A	
&	and
@	at
AADT	Annual Average Daily Traffic
AAN	American Association of Nurserymen
AAR	Association of American Railroads (functions of the Communications and Signal Division merged into AREMA)
AASHO	American Association of State Highway Officials (defunct 1973, now known as AASHTO)
AASHTO	American Association of State Highway and Transportation Officials
ABS	Acrylonitrile-Butadiene-Styrene Pipe
Abt.	About
Abut.	Abutment
ACI	American Concrete Institute
ACM	Asbestos Containing Materials
ADA	Americans with Disabilities Act
ADJ.	Adjust
ADT	Average Daily Traffic
AESC	American Engineering Standards Committee (defunct, now known as ANSI)
AGA	American Gas Association
AGC	Associated General Contractors of America
AH, A.H., Ah.	Ahead
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
Alt.	Alternate
ANSI	American National Standards Institute, Inc. (formerly USASI, ASA and AESC)
API	American Petroleum Institute
APL	Approved Products List

<u>Abbreviation or Acronym</u>	<u>Meaning</u>
ARBBA	American Railway Bridge and Building Association (merged into AREMA)
Approx.	Approximate
APWA	American Public Works Association
AQCC	Air Quality Control Commission
AGCM	Air Quality Congestion Mitigation
ARA	American Railway Association (merged into Association of American Railroads)
AREA	American Railway Engineering Association (merged into AREMA)
AREMA	American Railway Engineering & Maintenance-of-Way Association
ARTBA	American Road and Transportation Builders Association
AS, A.S.	Ahead Station
ASA	American Standards Association (defunct, now known as ANSI)
ASBI	American Segmental Bridge Institute
ASCE	American Society of Civil Engineers
ASD	Allowable Stress Design
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering, American Society of Safety Engineers
Asst.	Assistant
ASTM	American Society for Testing and Materials
ATSSA	American Traffic Safety Services Association
AUTS	Actual Ultimate Tensile Strength
Ave.	Avenue
AWG	American Wire Gauge
AWPA	American Wood Protection Association, formerly American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association

B

BAFO	Best and Final Offer
B to B	Back to Back
B.E.I.	By Equal Increments
B.M.	Bench mark
B.P.F.	Blows Per Foot
BT, B.T.	Beginning of Transition
B/	Bottom of
Bbl.	Barrels
BC, B.C.	Bolt Circle
Beg.	Begin
BFBW, B.F.B.W.	Back Face of Backwall
BK, B.K., Bk.	Back
Bldg.	Building
BLM	Bureau of Land Management
Blvd.	Boulevard
BMP	Best Management Practice
Bms.	Beams
BM ₁	Quantities of Structure Backfill (Class 1) without Shoring
BM ₂	Quantities of Structure Backfill (Class 1) with Shoring
Bott., Bot.	Bottom
BP	Maximum Required Allowable Bearing Pressure
BPO	Business Programs Office (CDOT)
BR, Br.	Bridge On-System Program, Bridge
Brg.	Bearing

<u>Abbreviation or Acronym</u>	<u>Meaning</u>
BRO	Bridge Off-System Program
BS, B.S.	Back Station
Btwn.	Between
C	
C, CL	Centerline
[channel (steel)
C&G	Curb and Gutter
C.R.S.	Colorado Revised Statutes, as amended. "43-1-225, C.R.S." means "\$ 225, Article 1 of Title 43, C.R.S., as amended."
CAD	Computer Aided Design or Computer Aided Drafting
CADD	Computer Aided Design and Drafting
CatEx	Categorical Exclusion
CBC	Concrete Box Culvert
CCA	Colorado Contractors Association
CCI	Construction Cost Index
CCR	Code of Colorado Regulations, as amended
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CE	Construction Engineering
CF, Cu. Ft.	Cubic Feet
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CFS, C.F.S.	Cubic Feet per second
CG, C.G.	Center of Gravity
CHP	Colorado Highway Patrol
CI, C.I.	Cast Iron
CIOG, C.I.O.G.	Cast Iron Ogee (Washer)
CIP, C.I.P.	Cast-in-Place, Cost in Place
CL., Clr.	Clear
CM, C.M.	Corrugated Metal
CMAQ	Congestion Mitigation Air Quality
CMO	Contract Modification Order
CMP, C.M.P.	Corrugated Metal Pipe
CMS	Changeable Message Sign
CMU	Concrete Masonry Unit
COFRS	Colorado Financial Reporting System
Col.	Column
Comp.	Composite
Con.	Connection
Conc.	Concrete
Conn.	Connections
Const.	Construction
Const. Jt.	Construction Joint
Cont.	Continuous
Corr.	Corrugated
Cov.	Cover
CP	Colorado Procedure
CPE	Corrugated Polyethylene Pipe
CP-L	Colorado Procedure - Laboratory
CPM	Critical Path Method
CPT	Corrugated Polyethylene Tubing
CRS	Colorado Revised Statutes, 1973, as amended
CRSI	Concrete Reinforcing Steel Institute
CS, C.S.	Curve to Spiral, Commercial Standard
Csk.	Countersunk
CSL	Cross Sonic Log
CSP	Corrugated Steel Pipe
CTR	Certified Test Reports

**Abbreviation or
Acronym**

Meaning

Ctr.
CY, Cu. Yd., c.y.

Center
Cubic Yards

D

D
D/B
DAS, D.A.S.
DI, D.I.
dB
DBE
Dbl.
Deg., °
Deg., °F., °C.,

Degree of Curvature, Depth, Density, Distance,
Diameter
Design Build
Deformed Anchor Stud
Ductile Iron
decibels
Disadvantaged Business Enterprise
Double
Degrees (Angular)
Degrees (Thermal) - Degrees Fahrenheit, Degrees
Celsius
Department
Design, Microstation Drawing
Design Height (or, Avg. height for qty. calculations)
Design Hour Volume
Design High Water

Dia., ϕ , \oslash

Diameter

Dist.
Div.
DNR
DOR
DOW
DPA
DRCOG
DS, D.S.
DSR
DTD
DTM
Dwg.

District
Division
Department of Natural Resources
Design Office Review
Division of Wildlife (Colorado)
Department of Personnel & Administration
Denver Regional Council of Governments
Down Station
Design Scoping Review
Division of Transportation Development (CDOT)
Digital Terrain Model
Drawing, Sheet

E

\textcircled{E}

E to E
E/A
EA
Ea., EA
EB, E.B.
EEO
EF, E.F.

Epoxy Coated Rebar
End to End
Engineer and/or Architect
Environmental Assessment
Each
Eastbound
Equal Employment Opportunity
Each Face
Electronic Industries Alliance (formerly Electronic
Industries Association)
Environmental Impact Statement
Elevation
Elastomeric
Electrical Conduit
Quantity of Structure Excavation without Shoring
Quantity of Structure Excavation with Shoring
Engineer
Environmental Protection Agency
Eethylene Propylene Ddiene Monomer-class rubber
Equal
Equivalent Single Axle Load
Emerging Small Business
Estimate
Ending of Transition

EIA
EIS
El., EL, Elev.
Elast.
Elect. Cond.
EM₁
EM₂
Engr.
EPA
EPDM
Eq.
ESAL
ESB
Est.
ET, E.T.

**Abbreviation or
Acronym**

Meaning

Ex, E	Expansion Bearing
Ex.	Example, Except
Exc., Excav.	Excavation
Exist.	Existing
Exp	Non-guided (free floating) expansion bearing
Exp. Jt.	Expansion Joint
Expn., Exp'n	Expansion
Ext.	Exterior

F

FAA	Federal Aviation Administration
FAPG	Federal Aid Policy Guide
F to F	Face to Face
F.A.P., FAP	Federal Aid Project
FF, F.F.	Far Face, Front Face
FIPI	Finding-in-the-Public-Interest
F.L.	Flow Line
fpm, F.P.M.	Feet Per Minute
Fps, F.P.S., FPS	Feet Per Second
FS, F.S.	Planned Finish Surface
Fdn.	Foundation
FCM	Fracture Critical Member
Fed.	Federal
FEMA	Federal Emergency Management Agency
FES	Flared End Section
FFBW, F.F.B.W.	Front Face of Backwall
FHWA	Federal Highway Administration
Fig.	Figure
Fin.	Finished
FIPI	Finding-in-the-Public-Interest
FIR	Field Inspection Review
Fl.	Floor
Flg.	Flange
FM	Factory Mutual
FMV	Fair Market Value
FONSI	Finding of No Significant Impact
FOR	Final Office Review
FRA	Federal Railroad Administration
Freq.	Frequency
FRP	Fiber Reinforced Polymer
FSS	Federal Specifications and Standards
Ft. Kip.	Foot Kips
Ft. Lb., FT LB	Foot Pounds
FT, Ft., ft	Feet
FTA	Federal Transit Administration
Ftg.	Footing
FTP	File Transfer Protocol
Fut.	Future
Fx, F	Fixed Bearing

G

Ga.	Gage, Gauge
Gal.	Gallons
Galv.	Galvanized
Gd	Guided expansion bearing
GEIA	Government Electronics and Information Technology Group (ITAA)
Gird.	Girder
GIP	Galvanized Iron Pipe
GIS	Geographical Information System
GPM	Gallons Per Minute

<u>Abbreviation or Acronym</u>	<u>Meaning</u>
GRS	Geosynthetic Reinforced Soil
GUTS	Guaranteed Ultimate Tensile Strength (replaced by AUTS & MUTS)
H	
H	Depth of Excavation at Wall Layout Line
HAS, H.A.S.	Headed Anchor Stud
HAZMAT	Hazardous Materials
HBP	Hot Bituminous Pavement
HC	Horizontal Clearance
HCL, H.C.L.	Horizontal Control Line
HCM	Highway Capacity Manual
HD, Hd.	Head
HDPE	High Density Polyethylene
HDPP	High Density Polypropylene
HES	Hazard Elimination System
Hex. Hd.	Hexagonal Head
HID	High Intensity Discharge (Lamps)
HLMR	Highload Multi-Rotational
HMA	Hot Mix Asphalt
Horz., Horiz., Hor.	Horizontal
HOV	High-Occupancy Vehicle
HP	H pile
HP	Horsepower
HS Bolt, H.S. Bolt	High Strength Bolt
HS, H.S.	High Strength
Ht.	Height
HTF	Highway Trust Fund (Federal)
HUTF	Highway Users Tax Fund (State)
HW, H.W.	High Water
Hwy.	Highway
Hyd.	Hydraulic
Hyd.	Hydraulic
I	
I	I beam or Wide Flange section (steel), Interstate
ICEA	Insulated Cable Engineers Association, formerly IPCEA
ID, I.D.	Inside Diameter
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IGA	Inter-Governmental Agreement
IMP	Incident Management Plan
IMSA	International Municipal Signal Association
Incl., Inc.	Included
In. Kips	Inch Kips
In. Lb.	Inch Pounds
In., IN	Inches
Insp.	Inspector
Int.	Interior
Inv.	Invert
IP	Iron Pipe
IPCEA	Insulated Power Cable Engineers Association (defunct, currently known as ICEA)
IRI	International Roughness Index
IRIS	Inventory Road Information System
ISA	Initial Site Assessment
ISO	International Organization for Standards
ISP	Information or Internet Service Provider
ISTEA	Intermodal Surface Transportation Efficiency Act
ITAA	Information Technology Association of America
ITE	Institute of Transportation Engineers

<u>Abbreviation or Acronym</u>	<u>Meaning</u>
ITS	Intelligent Transportation System
IVHS	Intelligent Vehicle Highway System
J	
J, JB	Junction Box
JBC	Joint Budget Committee
Jct.	Junction
Jt., jt.	Joint
K	
kips, Kip	Kilo Pounds, Thousand Pounds
ksf	kips per square foot
ksi	Kips per square inch
KW	Kilowatt
L	
L	Length
L, L	Angle (steel)
LS, L.S.	Lump Sum, Length of Spiral
LA	Local Agency
Lac.	Lacing
LAN	Local Area Network
LB, Lb., lb	Pounds
lb./ft.	pound per foot
Lb/sy	Pounds per square yard
lb-ft.	pound foot
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LFD	Load Factor Design
LF, Lin. Ft.	Linear Feet
LRFD	Load and Resistance Factor Design
Lt.	Left
LTDS	Required Long Term Design Strength
Lum.	Luminaire
M	
M	Mass
Maint.	Maintenance
MARV	Minimum Average Roll Value
Matl.	Material
Max., max.	Maximum
MBTA	Migratory Bird Treaty Act
MCR	Minor Contract Revision
MD	Machine Direction
MFBM, M.F.B.M.	Thousand Foot Board Measure
Mfg.	Manufactured, Manufacturer
MHT	Method of Handling Traffic
Mi.	Mile
MIL	Military Specification
Min., min.	Minimum
Misc.	Miscellaneous
MMIS	Maintenance Management Information System
MMP	Materials Management Plan
MMS	Maintenance Management System
MOA	Memorandum of Agreement
Mobl.	Mobilization
MOT	Maintenance of Traffic
MOU	Memorandum of Understanding
MP, M.P.	Milepost
MPH	Miles Per Hour
MPH, M.P.H.	Miles Per Hour
MPO	Metropolitan Planning Organization

<u>Abbreviation or Acronym</u>	<u>Meaning</u>
MRS	Quantity of Mechanical Reinforcement for prescribed Soil zone
MSE	Mechanically Stabilized Earth
MSEW	Mechanically Stabilized Earth Wall
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry
MTIP	Materials Testing and Inspection Plan
MUTCD	Manual on Uniform Traffic Control Devices
MUTS	Minimum Ultimate Tensile Strength
N	
(N)	Non-Epoxy Coated Rebar
NAD	North American Datum
NAVD	North American Vertical Datum
NB, N.B.	Northbound, Total Number of Blocks
NBIS	National Bridge Inspection Standards
NBS	National Bureau of Standards
NC	Uniform National Coarse (screw thread)
NCHRP	National Cooperative Highway Research Program
NCR	Nonconformance Report
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NF, N.F.	Near Face, Uniform National Fine (screw thread)
NFPA	National Fire Protection Association
NFRT&AQPC	North Front Range Transportation & Air Quality Planning Council
NGS	National Geodetic Survey
NGVD	National Geodetic Vertical Datum of 1929
NHI	National Highway Institute
NHS	National Highway System
NIC, N.I.C.	Not in Contract
NIP, N.I.P.	Nail in Place
NIST	National Institute of Standards and Technology
No.	Number
Nom.	Nominal
NPDES	National Pollutant Discharge Elimination System
NPT	National Pipe Thread
NS, N.S.	Near Side
NSF	NSF International, formerly National Sanitation Foundation
NTCIP	National Transportation Communications for ITS Protocol
NTP	Notice to Proceed
NTS, N.T.S.	Not to Scale
NWN	Nonconforming Work Notice
O	
OC, O.C.	On Center
OD, O.D.	Outside Diameter
OG, O.G.	Original Ground
OFMB	Office of Financial Management and Budget
OJT	On-the-Job Trainee or On-the-Job Training
Opp. Hand	Opposite Hand
OSHA	Occupational Health and Safety Administration
Oz.	Ounces

**Abbreviation or
Acronym**

Meaning

P

#	pound or number
PGL, P.G.L.	Profile Grade Line
POC, P.O.C.	Point on Curve
POT, P.O.T.	Point on Tangent
PS, P.S.	Planned Subgrade
PS&E, P.S. & E.	Plans, Specification and Estimate
PACOG	Pueblo Area Council of Governments
PC, P.C.	Point of Curve
PCA	Portland Cement Association
PCC, P.C.C.	Point of Compound Curve
PCCP	Portland Concrete Cement Pavement
PCI	Precast/Prestressed Concrete Institute
PCO	Potential Change Order
PCP	Product Control Plan
PD	Procedural or Policy Directive
PDA	Pile Driving Analyzer
PE	Preliminary Engineering, Professional Engineer, Permanent Easement
PG	Profile Grade, Performance Grade
PGL	Profile Grade Line
PI, P.I.	Point of Intersection
PIP	Public Information Plan
PL, PL., Pl.	Plate
PLS	Professional Land Surveyor
PM	Project Manager
PPACG	Pikes Peak Area Council of Governments
PPE	Personal Protective Equipment
PPPP	Project Priority Programming Process
PRC, P.R.C.	Point of Reverse Curve
Prin.	Principle
Proj.	Project, Projection
ProMIS	Project Management Information System
Prov.	Provisions
PSC	Prestressed Concrete
PS&E	Plans, Specifications and Estimate
psf	pounds per square foot
PSI	Preliminary Site Investigation
psi, P.S.I.	Pounds per square inch
PSIG	Pounds Per Square Inch Gauge
PT, P.T.	Point of Tangent
PTFE	Polytetrafluoroethylene
PTI	Post-Tensioning Institute
PUC	Public Utilities Commission
PVC	Poly Vinyl Chloride (pipe), Point of Vertical Curve
PVI	Point of Vertical Intersection
Pvmt.	Pavement
PVT	Point of Vertical Tangency

Q

Q	Peak Discharge or Flow Volume
QA	Quality Assurance
QC	Quality Control

R

R, R., Rad.	Radius
RC, R.C.	Reinforced Concrete, Reverse Crown
RCO	Request for Change Order
RCP, R.C.P.	Reinforced Concrete Pipe, Request for Change Proposal
ROW, R.O.W., R/W, RW	Right of Way

**Abbreviation or
Acronym**

Meaning

rad	radians
RCRA	Resource Conservation and Recovery Act
Rdwy.	Roadway
RE	Resident Engineer, Railroad Easement
Ref.	Reference
Reinf.	Reinforcing
Rem.	Remove, Removal
Repl.	Replace
Req., Req'd, Reqd.	Required
Rev.	Revised
RFC	Released for Construction
RFP	Request for Proposals
RFQ	Request for Qualifications
RHM	Recognized Hazardous Materials
RL	Reinforcement Length
RME	Region Materials Engineer
RMWA	Roadmasters and Maintenance of Way Association (merged into AREMA)
ROD	Record of Decision
RPC	Region Planning Commission
RPM, rpm	Revolutions Per Minute
RSC	Rigid Steel Conduit
RSS	Reinforced Soil Slope
Rt.	Right
RTD	Region Transportation Director
RWIS	Road Weather Information System

S

S	Tributary reinforcement spacing for MSE walls
SB, S.B.	Southbound
SCS, S.C.S	Spiral Curve Spiral
SAE	Society of Automotive Engineers
San.	Sanitary
SAP	Sample Analysis Plan
SBA	Small Business Administration
SC, S.C.	Spiral to Curve
Sch.	Schedule
SDI	Steel Decks Institute or Steel Door Institute
Sec.	Section
SF, Sq. Ft.	Square Feet
Shldr.	Shoulder
SHPO	State Historic Preservation Office
Sht.	Sheet
SIA, SI&A	Structural Inventory & Appraisal
SIC	Standard Industrial Code
Sim.	Similar
SIP, S.I.P.	Stay in Place
SJI	Steel Joists Institute
SLWK., Sdwk	Sidewalk
SMA	Stone Matrix Asphalt
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SMP	Safety Management Plan
SMSE	Shored Mechanically Stabilized Earth
SOQ	Statement of Qualification
Spa.	Spaces or Spaced
Specs.	Specifications
Spl.	Splice
Sq. In.	Square Inches
Sq. Mi.	Square Miles
SRW	Segmental Retaining Walls

**Abbreviation or
Acronym**

Meaning

SSPC	Society for Protective Coatings, formerly Steel Structures Painting Council
ST, S.T.	Spiral to Tangent
St.	Straight, Street
STA, Sta.	Station
STAC	Statewide Transportation Advisory Committee
Std.	Standard
STIP	Statewide Transportation Improvement Program
STP	Surface Transportation Program
Str.	Structure, Structural
SWMP	Stormwater Management Plan
SY, Sq. Yd.	Square Yards
Symm.	Symmetrical

T

T&B	Top and Bottom
T&E	Threatened & Endangered Species
T.	Tons
TAS, T.A.S.	Threaded Anchor Stud
TS, T.S.	Tangent to Spiral
TC, T.C.	Tangent to Curve
TCC	Traffic Communications Center
TCP	Traffic Control Plan
TDH	Total Dynamic Head
TE	Transportation Enhancement funding
TEA-21	Transportation Efficiency Act for the 21st Century
Temp.	Temporary, Temperature
Thd.	Thread
THHN	Thermoplastic High Heat-resistant Nylon coated (Insulation designation for wire)
THWN	Thermoplastic High Water-resistant Nylon coated (Insulation designation for wire)
TIG	Tungsten Inert Gas (Welding)
TIP	Transportation Improvement Program
TOC	Traffic Operations Center
Tot.	Total
TPI	Threads per Inch
TPR	Transportation Planning Region
TRB	Transportation Research Board
Typ.	Typical

U

8UN	8 thread series (screw thread)
UDBE	Underutilized Disadvantaged Business Enterprises
UG	Underground
UL	Underwriters Laboratories, Inc.
UMTA	Urban Mass Transportation Administration
UNC	Uniform National Coarse (screw thread)
UNCC	Utility Notification Center of Colorado
UNF	Uniform National Fine (screw thread)
UNO	Unless Noted Otherwise
UON	Unless Otherwise Noted
UPRR	Union Pacific Railroad
UPS	Uninterruptible Power Supply
US, U.S.	Upstation, United States
USACE	United States Army Corp of Engineers
USASI	United States of America Standards Institute (defunct, now known as ANSI)
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture

<u>Abbreviation or Acronym</u>	<u>Meaning</u>
USDOT	U.S. Department of Transportation
USFWS	U. S. Fish and Wildlife Service
USGS	US Geological Survey
Util.	Utility, Utilities
UV	Ultraviolet
V	
VC, V.C.	Vertical Curve
VCP	Vitrified Clay Pipe
VE	Value Engineering
VECP	Value Engineering Change Proposal
Veh.	Vehicle
Vert.	Vertical
VMS	Variable Message Sign
VMT	Vehicle Miles Traveled
Vol.	Volume
W	
Wash.	Washer
WASHTO	Washington Association of State Highway and Transporation Officials
WB, W.B.	Westbound
WBS	Work Breakdown Structure
W/C	Water-Cement Ratio
WF	Wide Flange (Steel section)
WP, W.P.	Work Point
WPA	Works Projects Administration (formerly Works Progress Administration (defunct as of 1943)
WQCD	Water Quality Control Division (Colorado Department of Public Health and Environment)
WS, W.S.	Water Surface
Wt.	Weight
WWF	Welded Wire Fabric, typically referred to very light gauge wire for crack control
WWR	Welded Wire Reinforcement
WRI	Wire Reinforcement Institute
X	
XD	Cross Machine Direction
Y	
Yd.	Yard

APPENDIX J

20 YEAR FACTORS

APPENDIX J 20 YEAR FACTORS

20 YEAR GROWTH FACTOR

1970-1990

(1980-2000)

1. Adams	1.7	(1.6)
2. Alamosa	1.4	(1.5)
3. Arapahoe	2.2	(1.7)
4. Archuleta	2.1	(1.7)
5. Baca	1.3	(1.2)
6. Bent	1.2	(1.0)
7. Boulder	1.9	(1.7)
8. Chaffee	1.5	(1.6)
9. Cheyenne	1.0	(1.1)
10. Clear Creek		(1.1)
11. Conejos	1.0	(1.1)
12. Costilla	1.0	(1.0)
13. Crowley	1.0	(1.1)
14. Custer	1.4	(1.1)
15. Delta	2.3	(1.8)
16. Denver	1.0	(1.1)
17. Dolores	1.0	(1.1)
18. Douglas	8.1	(4.9)
19. Eagle	3.4	(2.4)
20. Elbert	2.1	(1.4)
21. El Paso	1.5	(1.5)
22. Fremont	1.4	(1.4)
23. Garfield	2.4	(2.1)
24. Gilpin	2.2	(1.2)
25. Grand	3.1	(2.3)
26. Gunnison	2.3	(2.1)
27. Hinsdale	3.5	(1.6)
28. Huerfano	1.0	(1.0)
29. Jackson	1.0	(1.2)
30. Jefferson	2.0	(1.6)
31. Kiowa	1.3	(1.2)
32. Kit Carson	1.2	(1.4)
33. Lake	1.5	(2.1)
34. La Plata	2.1	(1.9)
35. Larimer	2.3	(1.9)
36. Las Animas	1.0	(1.0)
37. Lincoln	1.2	(1.1)
38. Logan	1.1	(1.1)
39. Mesa	1.9	(1.8)
40. Mineral	1.8	(2.2)

APPENDIX J 20 YEAR FACTORS

20 YEAR GROWTH FACTOR

1970-1990

(1980-2000)

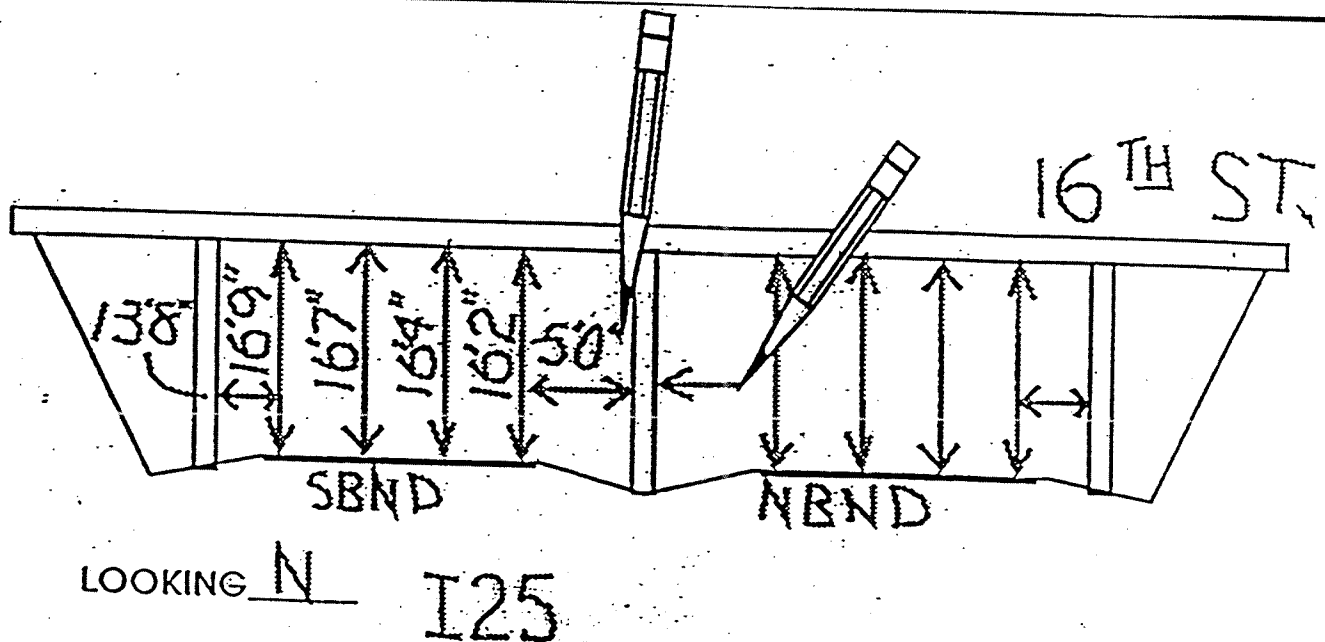
41. Moffat	2.9	(2.2)
42. Montezuma	1.4	(1.4)
43. Montrose	1.9	(1.8)
44. Morgan	1.1	(1.2)
45. Otero	1.0	(1.0)
46. Ouray	1.3	(1.0)
47. Park	2.6	(1.3)
48. Phillips	1.3	(1.2)
49. Pitkin	2.6	(2.0)
50. Prowers	1.6	(1.6)
51. Pueblo	1.1	(1.0)
52. Rio Blanco	3.6	(2.9)
53. Rio Grande	1.2	(1.4)
54. Routt	3.1	(2.3)
55. Saguache	1.6	(1.8)
56. San Juan	1.4	(1.4)
57. San Miguel	2.5	(2.1)
58. Sedgwick*	1.0	(1.0)
59. Summit	4.5	(2.4)
60. Teller	3.5	(1.9)
61. Washington	1.0	(1.1)
62. Weld	1.9	(1.8)
63. Yuma	1.3	(1.3)

APPENDIX K LATERAL & VERTICAL CLEARANCE MEASUREMENTS

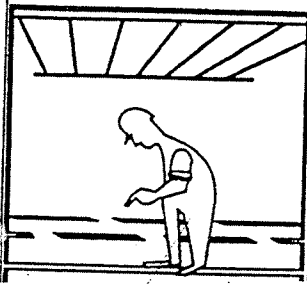
PROCEDURE FOR MEASURING AND DOCUMENTING VERTICAL AND
LATERAL CLEARANCES FOR
BRIDGES AND SIGNS

THIS PROCEDURE APPLIES TO NEW CONSTRUCTION,
RECONSTRUCTION, OVERLAYS AND REHABS

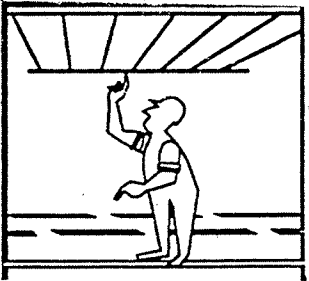
- ✓ MAKE AN ACCURATE SKETCH OF THE BRIDGE OR SIGN STRUCTURE
- ✓ TAKE MEASUREMENTS OF VERTICAL CLEARANCES AS SHOWN ON THE OPPOSITE PAGE. BE SURE TO MEASURE THE CLEARANCES UNDER ALL THE GIRDERS SO THAT YOU CAN DETERMINE THE MINIMUM ONE ALONG EACH LANE LINE.
- ✓ ON SIGN STRUCTURES, THE MINIMUM MAY NOT BE THE SIGN SUPPORT. IT MAY BE A CAT WALK OR AN APPURTENANCE HANGING LOWER.
- ✓ RECORD THE MEASUREMENT ON A SKETCH OF THE BRIDGE OR SIGN AS SHOWN BELOW.
- ✓ NOTE WHICH DIRECTION YOU ARE LOOKING ON THE SKETCH. ON A DIVIDED HIGHWAY, RECORD MEASUREMENTS FOR BOTH STRUCTURES WHILE LOOKING IN ONE DIRECTION ONLY. DON'T LOOK IN THE DIRECTION OF TRAFFIC FOR EACH OF THE BRIDGES
- ✓ SEND THE INFORMATION TO THE BRIDGE MANAGEMENT UNIT IN STAFF BRIDGE
- ✓ BE SURE TO MEASURE AND RECORD LATERAL CLEARANCES INCLUDING SHOULDERS.



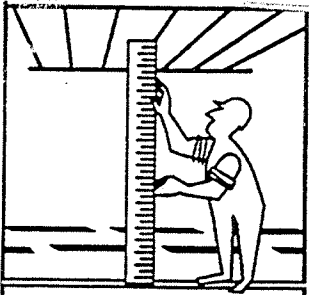
MEASURING VERTICAL CLEARANCES



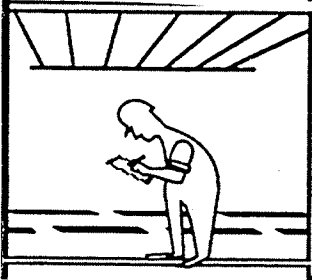
- ✓ LOCATE THE EDGE OF THE ROADWAY, AND SHOULDER. TYPICALLY, A SOLID WHITE LINE WILL REPRESENT THE EDGE OF THE ROADWAY



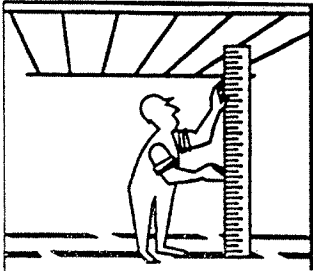
- ✓ LOCATE THE LOWEST POINT OF THE STRUCTURE DIRECTLY ABOVE THAT LINE.



- ✓ MEASURE THE CLEARANCE



- ✓ RECORD THE MEASUREMENT ON THE ACCOMPANYING FORMS



- ✓ REPEAT STEPS 2, 3, AND 4 FOR EACH OF THE ROADWAY LINES

APPENDIX L

MAJOR IMPROVEMENT

TYPES

APPENDIX L MAJOR IMPROVEMENT TYPES
FROM FHWA ORDER H4500.2A (REV. AUG. 27, 1984)

<u>CODE</u>	<u>DEFINITION</u>
01	NEW CONSTRUCTION-Construction of a new facility that will provide: (1) a facility where none existed or (2) an additional and alternate facility to an existing facility that will remain open and continue to serve through traffic.
02	RELOCATION-Construction of a facility on a new location that replaces an existing route. The new facility carries all the through traffic with the previous facility being closed or retained as a and-service road only.
03	RECONSTRUCTION-Construction on the approximate alignment of an existing route where the old pavement structure is substantially removed and replaced. Such reconstruction may be to the existing number of lanes or may include widening to provide continuous additional throughout lane(s) or dualizing, adding or revising interchanges, replacing other highway elements such as a grade separation to replace an existing at grade intersection or otherwise improving the existing facility without changing the basic character of the facility .
04	MAJOR WIDENING-The addition of lanes or dualization of an existing facility where the existing pavement is salvaged. Also included, where necessary, is the resurfacing of the existing pavement and other incidental improvements such as drainage and shoulder improvements.
05	MINOR WIDENING-Widening the lanes and/or shoulders of an existing facility without adding through lanes. In many cases, the improvement will include resurfacing the existing pavement and other incidental improvements such as shoulder and drainage improvements.
06	RESTORATION & REHABILITATION-Work required to return an existing pavement (including shoulders) to a condition of a adequate structural support or to a condition adequate for placement of an additional stage of construction, i.e., bridge deck protective system or resurfacing.

APPENDIX L MAJOR IMPROVEMENT TYPES

<u>CODE</u>	<u>DEFINITION</u>
06 (cont.)	There may be some upgrading of unsafe features or other incidental work in conjunction with restoration and rehabilitation. Typical improvements would include replacing spalled or malfunctioning joints; substantial pavement stabilization prior to resurfacing; grinding/grooving of rigid pavements; replacing deteriorated materials; reworking or strengthening bases or sub bases, and adding under drains.
07	RESURFACING-Placement of additional surface material over the existing roadway or bridge deck to improve serviceability or to provide additional strength. There may be some upgrading of unsafe features and other incidental work in conjunction with resurfacing. Where surfacing is constructed by separate project as a final stage of construction, the type of improvement should be the same as that of the preceding stage-new route, relocation, reconstruction, minor widening, etc.
08	NEW BRIDGE-The construction of a new bridge which does not replace or relocate an existing bridge. Includes new ramps, flyovers and signs.
09	BRIDGE REPLACEMENT-The total replacement of a structurally inadequate or functionally obsolete bridge with a new structure constructed in the same general traffic corridor to current geometric construction standards. A bridge removed and not replaced or replaced with a lesser facility is considered a bridge replacement. Incidental roadway approach work is included.
10	MAJOR BRIDGE REHABILITATION-The major work required to restore the structural integrity of a bridge as well as work necessary to correct major safety defects. Bridge deck replacement (both partial and complete) and the widening of bridges to specified standards are included. Construction of a dual structure to alleviate a capacity deficiency is also included.

APPENDIX L MAJOR IMPROVEMENT TYPES

<u>CODE</u>	<u>DEFINITION</u>
11	MINOR BRIDGE REHABILITATION-Work required to correct minor structure and safety defect or deficiencies, such as deck patching, deck resurfacing, deck protective systems, upgrading railings, curb and gutter, and other minor bridge work.
12	SAFETY/TRAFFIC OPERATIONS/TSM (Traffic System Management)-A project or a significant portion of a project which provides features or devices to enhance safety; or a traffic operation improvement which is designed to reduce traffic congestion and to facilitate the flow of traffic, both people and vehicles, an existing system, or to conserve motor fuels, crash guards, end rail connections & rail repairs which are designed to reduce vehicle use or to improve transit service.
13	ENVIRONMENTALLY RELATED-This category includes improvements that do not provide any increase in the level of service, in the condition of the facility, or in safety features. Typical improvements which would fall in this category would be noise barriers, beautification, and other environmentally related features not built as a part of the above identified improvement types.
14	MISCELLANEOUS-None of the above-For items that cannot be categorized.

*NOTE: BY FHWA DEFINITION, WORK TYPES 05 06, 07, 11 AND 14 ARE 3R WORK TYPES, AND 01, 02, 03, 04, 09, 10, 12, 13 ARE 4R WORK TYPES.