

# Design Standards Letter

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## Body

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ALL DIVISION AND DISTRICT ENGINEERS

This letter is to inform the Highway Designers of new plot programs available, and is an explanation of the Earthwork B & D Header Cards (Form SP 271B and SP 271D) used in controlling the plots obtained.

The Horizontal Control Plot Codes for plotting interchanges have been tested and are in production. An example is included at the back of this letter on how to use the codes and how the output appears.

The slope stake plot (plan view) can be requested by placing a 1, 2, 3, or 4 in column 74 of the B Header Card (Form SP 271B). A one (1) gives a plot scaled to one (1) inch equals 50 feet with 15 stations per plot page. A two (2) gives a plot at one (1) inch equals 100 feet with 30 stations used per plot page. A three (3) gives a plot at one (1) inch equals 50 feet, and is plotted continuously, with no page separation. A four (4) gives a plot at one (1) inch equals 100 feet, and is plotted continuously with no page separation.

A Profile Plot is also available and consists of the Profile Grade, the natural ground line at survey centerline, and the ditch profile. The ditch profile will be the ditch point in cut and the toe of fill slope in fill. This plot may be requested by coding 1, 2, 3, or 4 in column 59 of the B Header Card (Form SP 271B). A one (1) selects a plot of one (1) inch equals 10 feet in elevation, one (1) inch equals 100 feet in stations, and 30 stations are used per plot page. A two (2) selects a plot of one (1) inch equals 20 feet in elevation, one (1) inch equals 200 feet in stations and 60 stations are used per plot page. A three (3) selects a plot of one (1) inch equals 10 feet in elevation, one (1) inch equals 100 feet in stations and is plotted continuously with no page separation. A four (4) selects a plot of one (1) inch equals 20 feet in elevation, one (1) inch equals 200 feet in stations and is plotted continuously with no page separation. If the Designer wants two roadbeds on a plot, code the roadbed numbers in columns 52 and 53 of the B Header Card.

The first ten columns of the B Header Card (Form SP 271) (see example) requires no

coding. The fields beginning with azimuth, columns 11-20, begin X-Ordinate, columns 24-35, and begin Y-Ordinate, columns 39-50, are to be coded for future alignment plots, but are not presently used.

The fields to combine roadbed yardage A, columns 21-23, and combine roadbed yardage B, columns 36-38, and list yard, column 79, are used together and require coding only in jobs that have more than one roadbed, requiring separate balances. To continue the explanation, consider a job that has five roadbeds, (i.e., 1, 2, 3, 4, 5). If the Designer wants the yardage's all added together in the same balance, no coding is required. If each roadbed is to be balanced separately, follow the coding in Example one (1) of the enclosed B Header Cards. Example two (2) of the B Header Card Coding shows how to divide yardages into groups to balance. This example puts roadbeds 2, 3, and 4 in one group, and roadbeds one (1) and five (5) into another separate group. Note the one (1) in column 79. Example three (3) puts roadbeds two (2) and three (3) in one group and roadbeds 1, 4, and 5 in another group, and are listed and balanced independently of each other. Note the one (1) in column 79. Example four (4) places roadbeds 1, 2, 3 and 4 in one group with roadbed five (5) listed separately. Note the two (2) in column 79.

P.I.'s checked and listed, column 51, is used when there has been profile grade changes. A one (1) in this column causes the vertical curve data to be listed.

Columns 52, 53, 59, 74 and 79 have been explained in the paragraphs above. Columns 61, 75, 76, 77, 78 and 80 are not for district use.

Column 54, Detail I and II listed is for getting a listing of detail data and of Forms (SP 274 and SP 275) and should be used on all new jobs, and on jobs that had detail data changes.

Column 55 punch yardage, causes the yardage to be punched, but is not normally an option to the district.

Column 56, safety zone modifications list, causes the safety zone modifications (/Form SP 277B) to be listed.

Column 57, Ground Elevs/Rods listed in, cause the ground line information the Designer sent in to be listed. If the data sent in was in rods, the listing is in rods. If the data sent in was in elevations, the listing is in elevations.

Column 58, Ground Elevs listed out causes the ground line information as it goes into the Earthwork Program to be listed. This listing is always in elevations and offsets that are biased by 5000 feet.

Column 60, Design Data Listing, causes the station Design Data (Form SP 280A) to be listed. This listing should be requested every run with changes in input.

Column 62, Rock Slope List, causes the special rock slopes and benches (Form SP 280B) to be listed.

Column 63, Rock Depths list in, causes the special Rock Data. Form SP 281, to be listed in the form of data forwarded by the Designer. If the data was submitted in depths, this listing is in depths. If the data was submitted in elevations, this listing is in elevations.

Column 64, Rock Elevs list out, causes the Edited Rock Data to be listed. This rock data is always in elevations, and is extended to be as wide as the ground, and is biased to 5000 feet at center line.

Column 65, Punch New Super and Profile, is used to permanently update station design cards, concerning profile grade and super-elevation. This column will be used by the Main Office only after the Vertical and Horizontal Curve Data have been set.

Column 66, Link Jobs Yard Out, is used to add the yardages of independent runs together. This option is not used in a Multi-Roadbed Project that is run as one job.

Column 67, 1% adjust shrink to obtain zero bal., is used to compute the shrinkage factor necessary to obtain a zero balance at the end of the job, then the program checks if the new shrinkage is within 1% of the old.

Column 68, all adjust shrink to obtain zero bal., causes the shrinkage found using Column 67 to always be used.

Column 69, Mass Plot, causes the mass diagram to be plotted. This plot is scaled from the maximum ordinate.

Column 70, find adjusted mass and overhaul, causes the adjusted and overhaul program to be run.

Column 71, find borrow/waste causes the add yardage program to find the amount of borrow or waste necessary to have a balance at the end of job.

Column 72, Seed and Mulch, causes the Earthwork Program to compute Seeding and Mulching Quantities.

Column 73, Plot X-Sec., causes the cross-sections to be plotted. Use a one (1) for one (1) inch = 10 feet scale, and A two (2) to obtain one (1) inch = 20 feet scale.

A new D Header Card, to be used in connection with cross section plots, is introduced later in the letter.

Column 74, Plot Slope Stakes, was explained in a previous paragraph on slope stakes plots.

Column 75 to 78 are not used. Column 79 was also explained previously, and Column 80 is not used.

The enclosed D Header Card (Form SP 271D) is coded as an example. Assume a job

running from station 0+00. By using the D Header Card only, cross-sections stations 15+00 to 20+00 and 30+00 to 70+00 are plotted. Also, the ground line is not plotted wider than 140 feet left and 100 feet right. Columns 11 to 26 are not for district use. The D Header Card is not used if the entire job is being plotted, or the ground line cut off is not to be used.

The above explanation and following examples should be beneficial in clearing up some misunderstandings of the B & D Header usage and inform Designers of new plot programs available for their use.

Leland D. Fletcher  
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