USER'S MANUAL FOR

BRIDGE GEOMETRY
(BRGEO)

pennsylvania
DEPARTMENT OF TRANSPORTATION

Version 1.2.0.0

USER'S MANUAL FOR
COMPUTER PROGRAM BRGEO
BRIDGE GEOMETRY
Version 1.2.0.0

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SUMMARY OF FEBRUARY 2019 REVISIONS - VERSION 1.2.0.0

BRGEO v1.2.0.0 contains the following revisions and enhancements.

General Program Revisions

1. **Updated to Intel Parallel Studio XE 2017 Update 5 compiler using Visual Studio 2017. (Request 006)**

2. **Allow alignment with up to 5 vertical curves. (Request 004)**

3. **Added input check for the CTL Grade Elevation Increment parameter to require a value greater than zero be entered when "A" or "G" is entered for the CTL Grade Elevations parameter. (Request 005)**

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1 PROGRAM IDENTIFICATION

1.1 PROGRAM IDENTIFICATION

Program Title: Bridge Geometry

Program Name: BRGEO

Version: 1.2.0.0

Subsystem: Structure Design - Geometry

Authors: Engineering Software Section
Bureau of Business Solutions and Services
Pennsylvania Department of Transportation

ABSTRACT:

The Bridge Geometry program will compute the station, offset, coordinates and elevation of points of interest on a bridge. The bridge may be defined entirely on a tangent or curve, including a spiraled curve, or on a combination of tangent and curved sections. Either all or part of the bridge may be on a vertical curve.

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2 PROGRAM DESCRIPTION

2.1 PROGRAM OVERVIEW

The Bridge Geometry program is designed to compute some of the basic geometric relationships required for bridge design. The primary calculations solve for the stations, offsets, coordinates and elevations at the ends and selected intermediate points of each girder on a bridge. Other values computed include: the length along each bearing line from the outside of the left parapet to the outside of the right parapet, the length of each girder, and the minimum and maximum overhang from the centerline of the girder to the outside of the parapet for exterior girders. The left and right gutter line elevations and the corresponding profile grade line stations and elevations at specified intervals will also be computed if desired.

The description of the bridge must be provided in the form of data input. This consists of the horizontal and vertical alignment geometry, bridge deck cross sections, bearing line descriptions (distances and skew angles), slab and beam depths, and girder offsets.

The program will accommodate various bridge configurations with some limitations. The bridge may be entirely on a tangent or curve, including a spiraled curve, or a combination of tangent and curved sections. The bridge may also fall partially or entirely on a vertical curve **or a series of up to 5 vertical curves**. The bridge may be referenced from the profile grade line, a tangent to the profile grade line, or a long chord. The profile grade line may be offset from the centerline of the bridge. There may be widening and/or superelevation transitions on the bridge, but the program does not allow widening within a two-lane superelevation transition. Curved girders are not permitted and vertically placed girders are assumed. The program will not handle station equations and continuous stationing is assumed.

2.2 PROGRAM ASSUMPTIONS AND LIMITATIONS

The program does not permit curved girders. Vertically placed girders are assumed. **Up to 5 vertical curves can be input.** Continuous stationing is assumed. The program does not handle station equations.

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3 METHOD OF SOLUTION

3.1 REFERENCE

A reference point is chosen along the profile grade line. Zero coordinates are assigned to this reference point. Bearing lines and girders are then referenced from this point along the profile grade line, a tangent to the profile grade line, or a long chord. Distances and skews for the bearing lines and offsets to the girders are defined. Refer to Figure 3.1.1, Figure 3.1.2 and Figure 3.1.3.

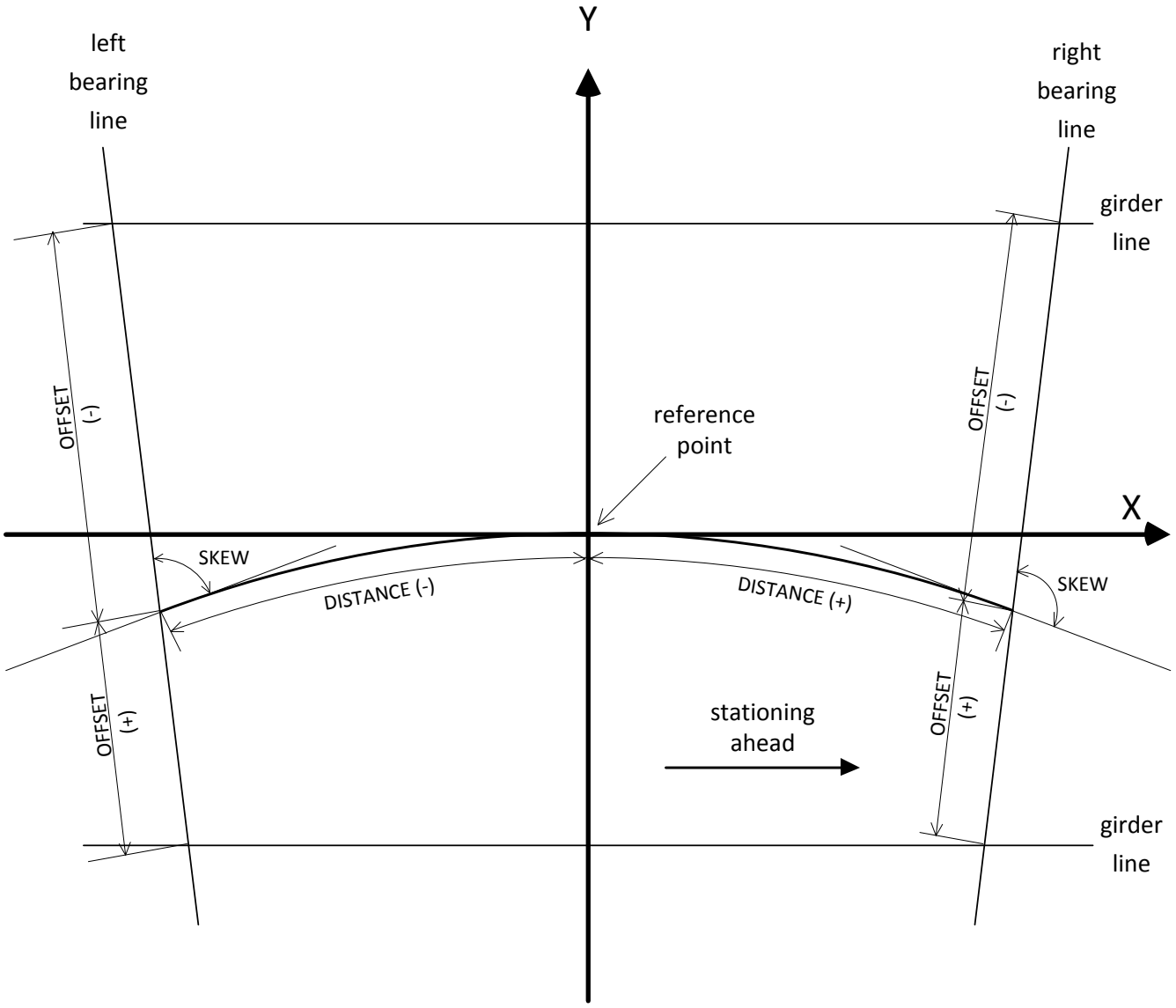

Figure 3.1.1 Bridge Referenced to Profile Grade Line

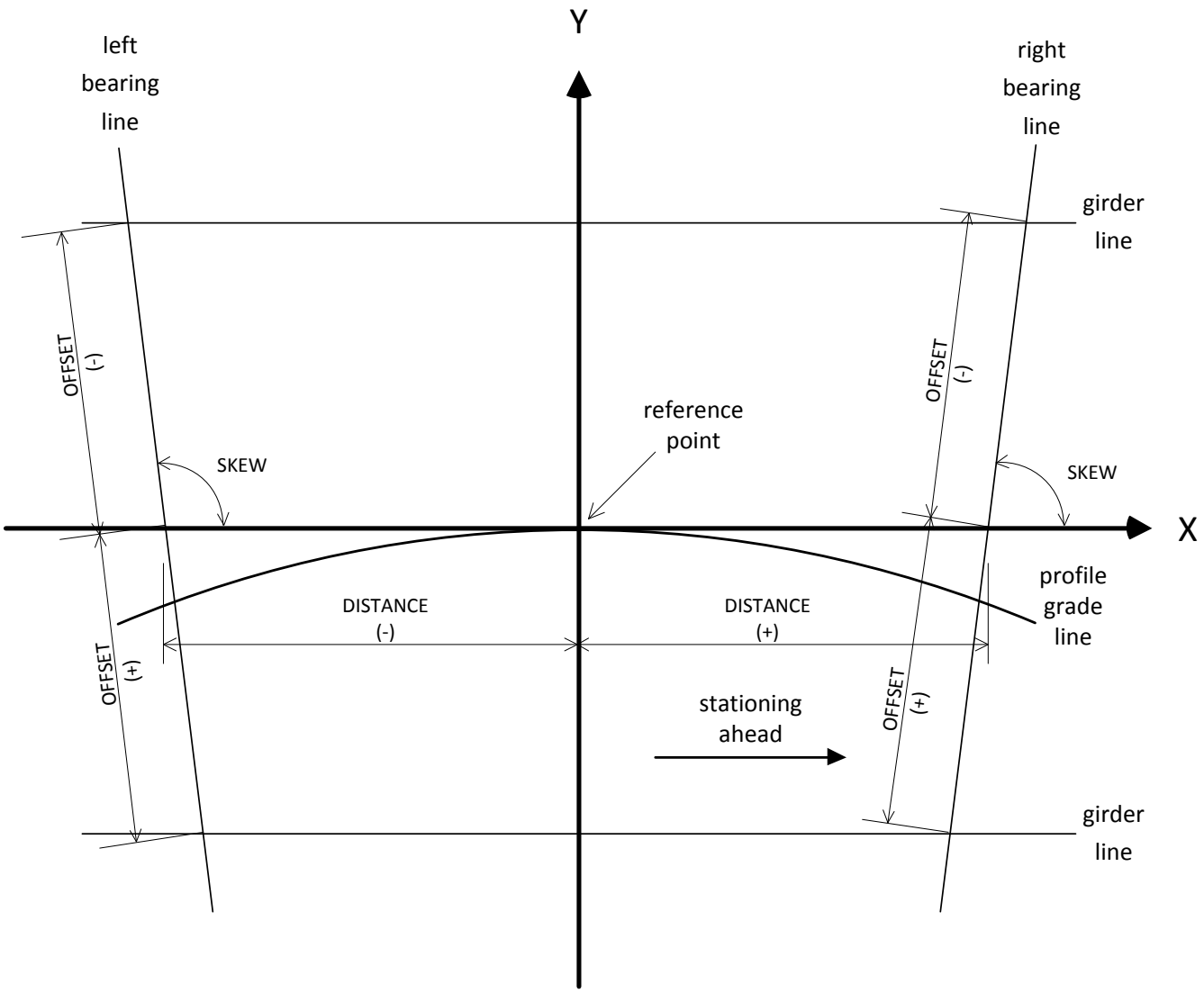

Figure 3.1.2 Bridge Reference To Tangent To Profile Grade Line

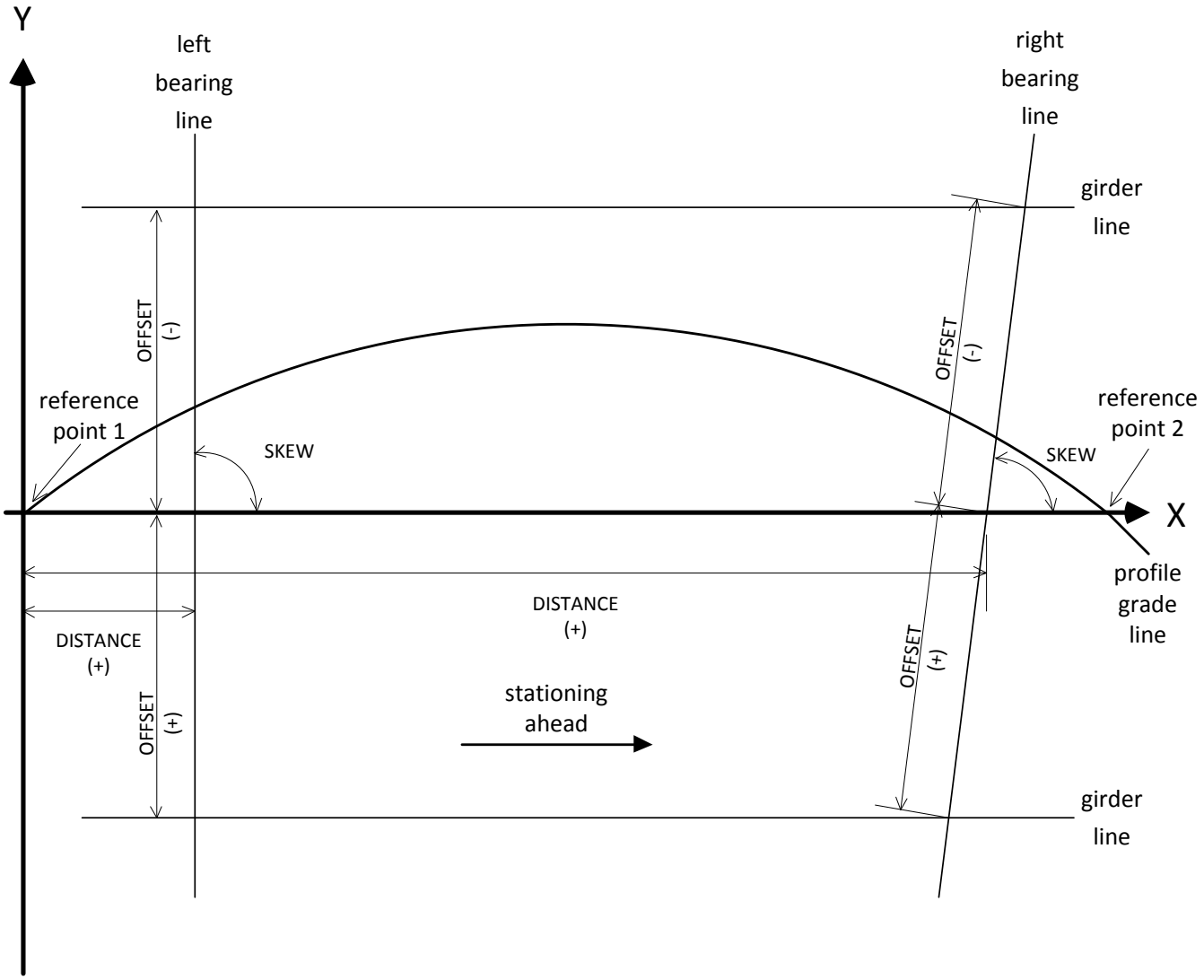

Figure 3.1.3 Bridge Reference to Long Chord

3.2 COMPUTATIONS

The sequence of computations for each span is as follows:

1. Coordinates are computed for the intersections of the bearing lines with the profile grade line, tangent to the profile grade line or long chord.
2. The distance along each bearing line from the outside of the left parapet to the outside of the right parapet is computed based on the input skew angle and cross section descriptions.
3. Using the input skew angle and girder offsets, coordinates are computed for the intersections of the girder lines with the bearing lines.
4. Radial offsets and the corresponding profile grade line stations are computed for the intersections of girder and bearing lines.
5. The elevations at the top of slab, bottom of slab, and bearing are computed at each of the above intersections. Each elevation is a function of:
    a. Profile grade elevation.
    b. Bridge deck cross section.
    c. Slab Depth.
    d. Beam and bearing depth.
6. If output is requested for intermediate points along the girders, the radial offsets, corresponding profile grade station, and elevation at the top and bottom of slab are computed.
7. For exterior girders, the overhang of the bridge is calculated for each point by the formula:

    OVERHANG = Radial offset to out edge of parapet - Radial offset of point along centerline of girder.

8. For exterior girders, the overhang of the bridge is calculated for each point by the formula:
9. If gutter line elevations are desired, the elevations of the profile grade line and the left and right gutter lines are computed at the specified interval.

3.3 PROGRAM FLOW

See Figure 3.3.1 on the following pages.

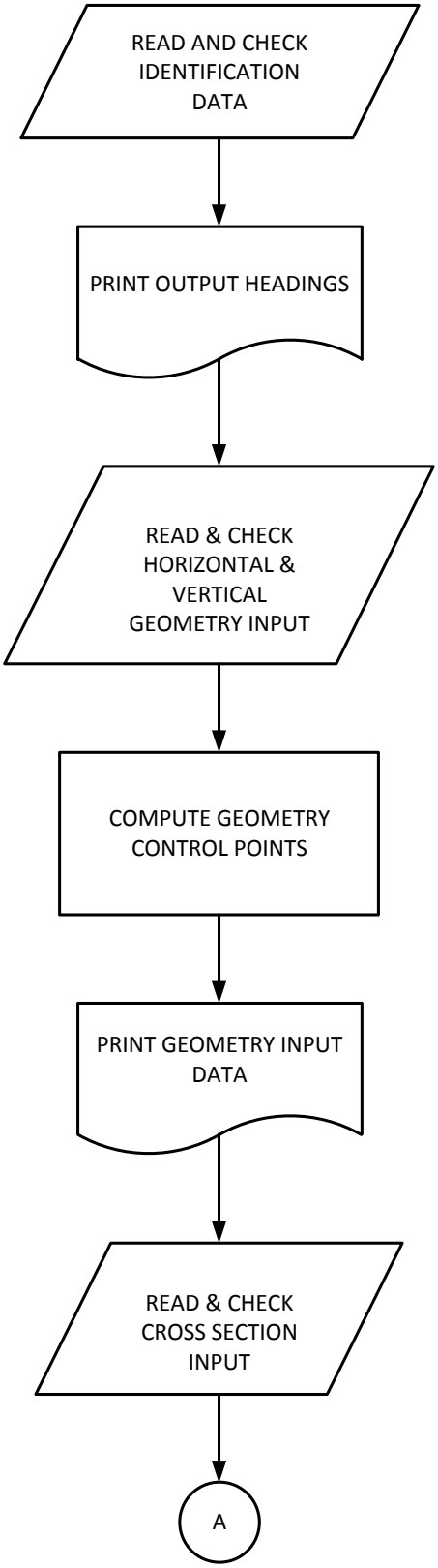

Figure 3.3.1 Flow Chart

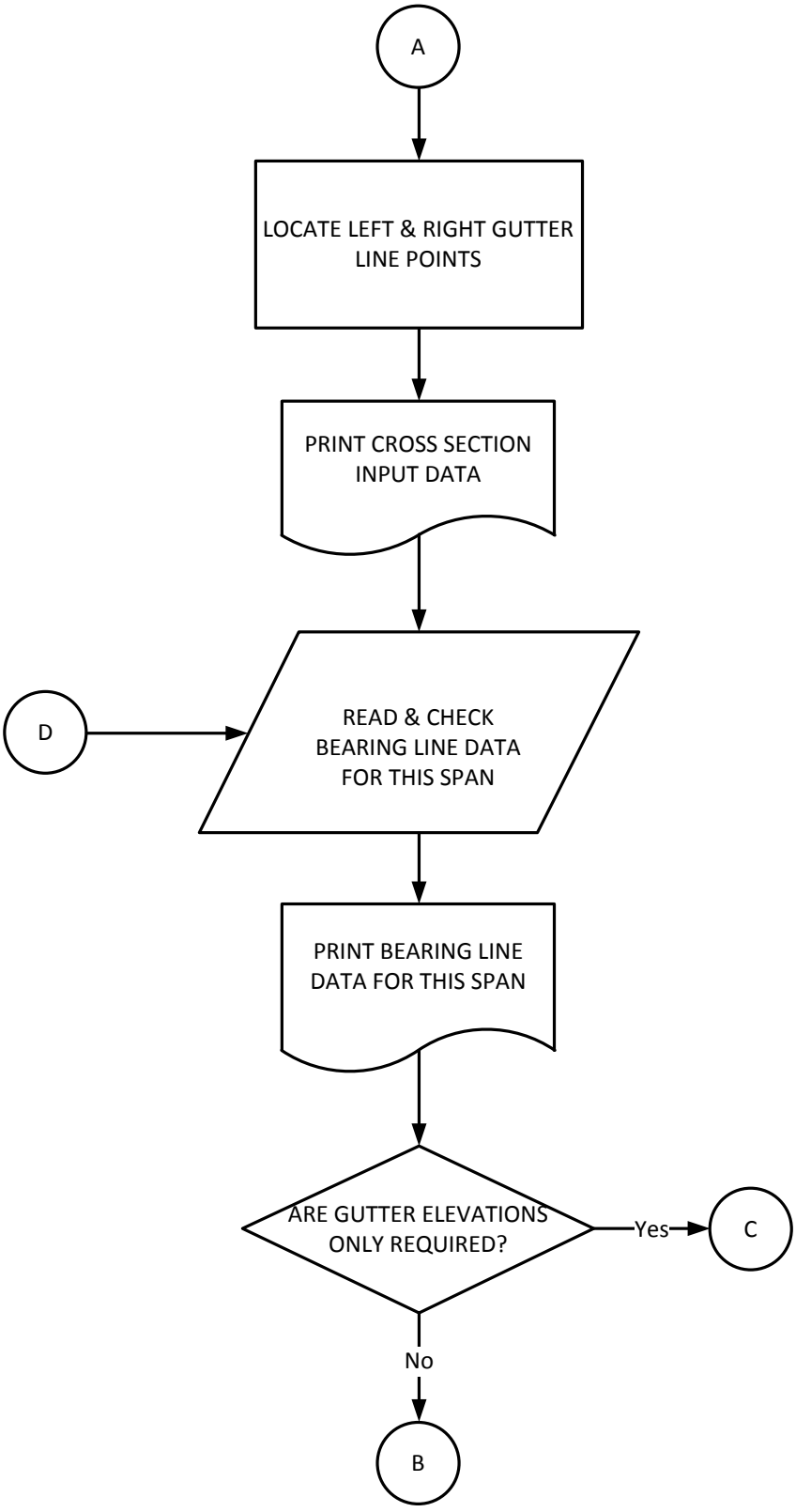

Figure 3.3.1 Flow Chart (Cont.)

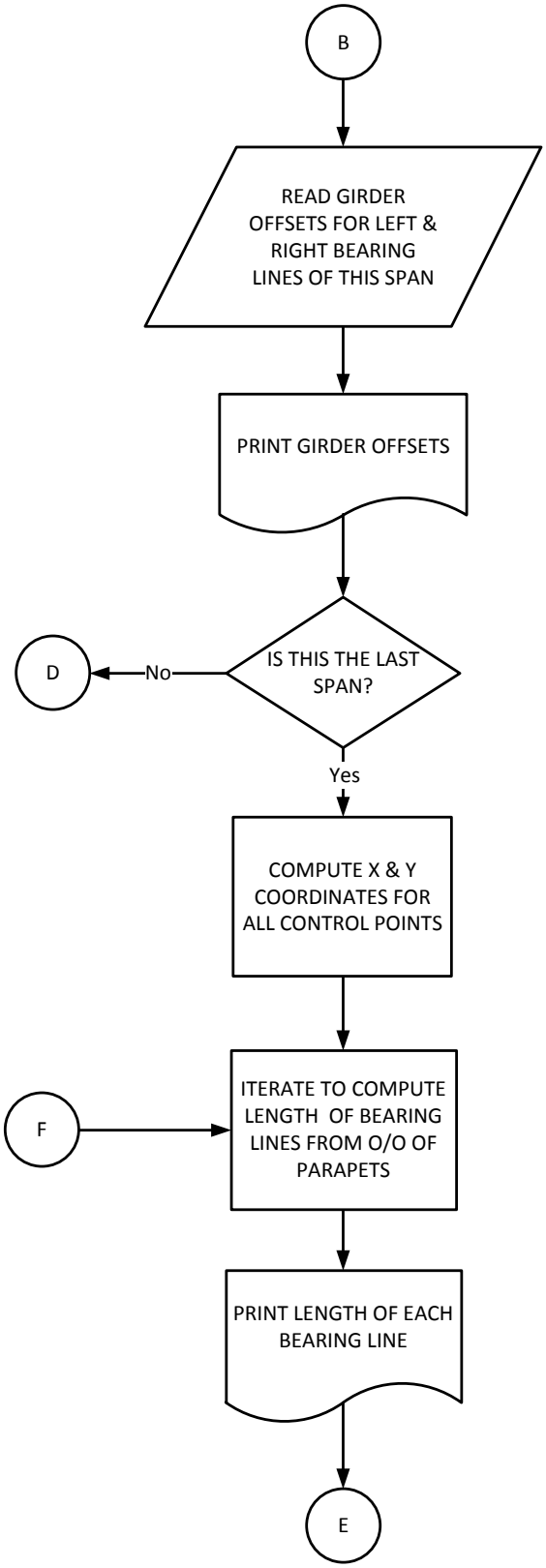

Figure 3.3.1 Flow Chart (Cont.)

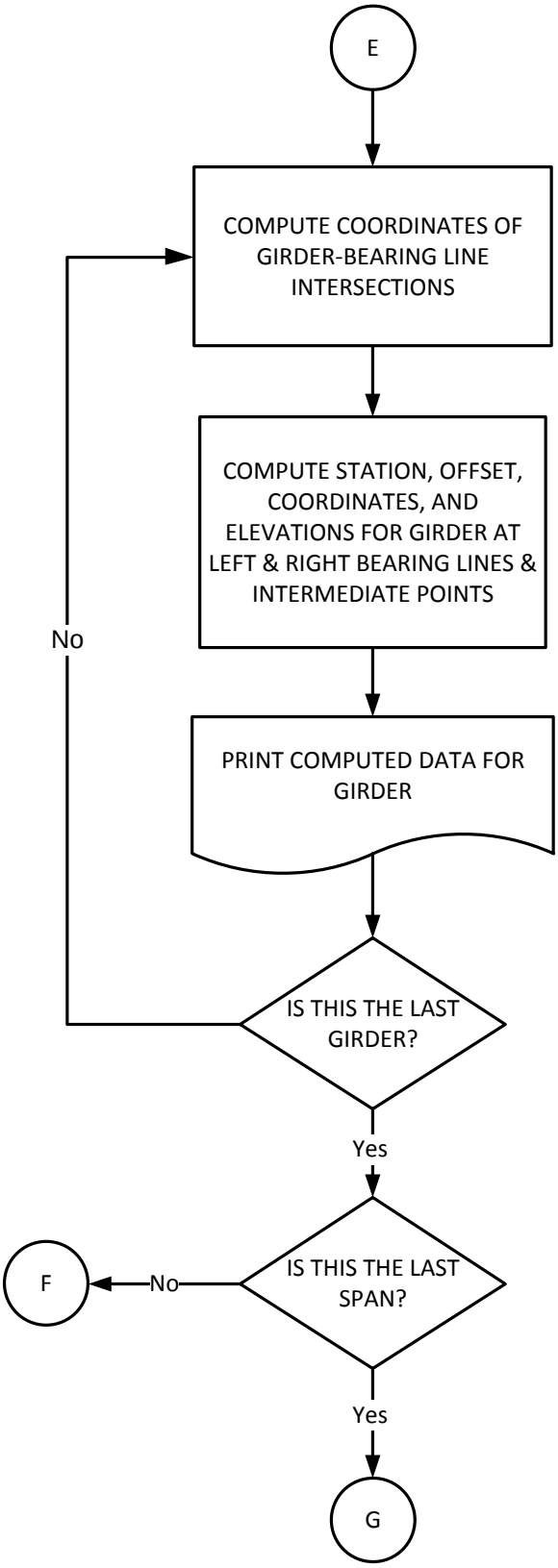

Figure 3.3.1 Flow Chart (Cont.)

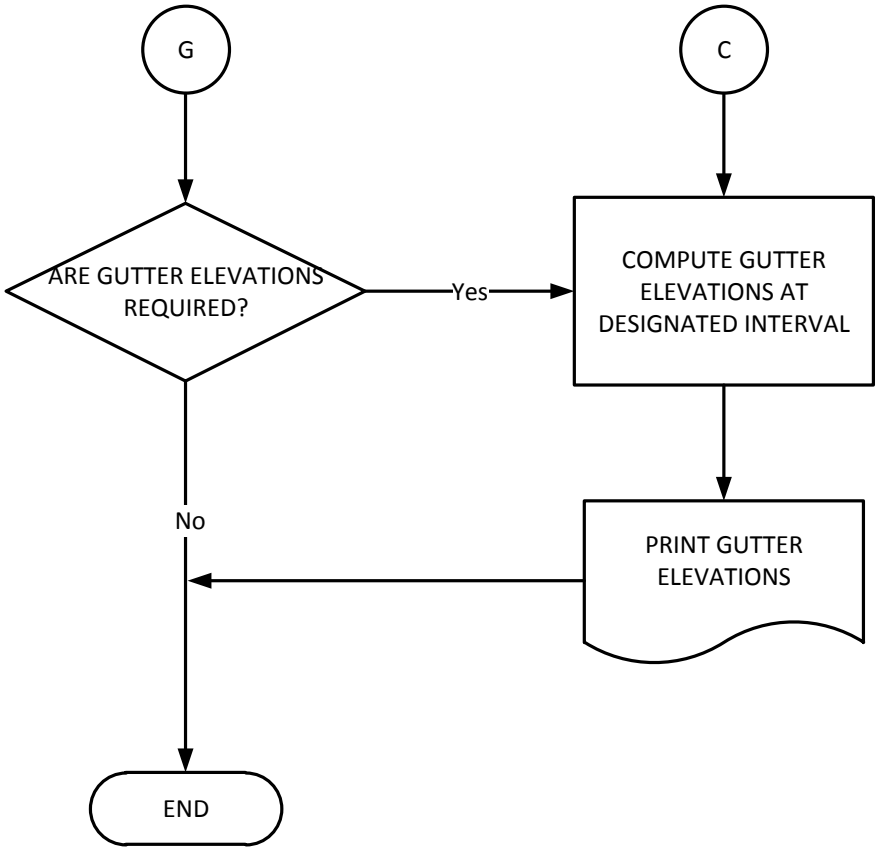

Figure 3.3.1 Flow Chart (Cont.)

4 GETTING STARTED

4.1 INSTALLATION

This program is delivered via download from the Department's website. Once payment has been received by PennDOT, you will receive a confirmation e-mail with instructions on how to download the software. The download file is a self-extracting installation file for the licensed PennDOT engineering software. The engineering program runs as a 32-bit application and is supported on Windows Vista, Windows 7 (32 and 64-bit versions), Windows 8 **and Windows 10** operating systems.

Your license number, license key and registered company name, found in the e-mail received from the Department, are required to be entered when installing the program and must be entered exactly as shown in the e-mail. The license number, license key and registered company name will also be needed when requesting future versions of the program (i.e., enhancements, modifications, or error corrections), and requesting program support. A backup copy of the program download and e-mail instructions should be made and used for future installations. You may want to print the software license agreement, record the license number, license key and registered company name and keep it in a safe place.

To install the program, follow the installation instructions provided with the original e-mail from the Department.

The following files will be installed in the program destination folder, which defaults to “C:\Program Files\PennDOT\BRGEO v<version_number>\” or "C:\Program Files (x86)\PennDOT\BRGEO v<version number>\" for 64-bit operating systems:

1. BRGEO.exe, BRGEO_DLL.dll – Executable program and Dynamic Link Library.
2. BRGEO.pd – Parameter definition file.
3. BRGEO Users Manual.pdf – Program User’s Manual (PDF Format).
4. BRGEORevisionRequestForm.dotx – Revision Request form (MS WORD template).
5. GettingStarted.pdf – A document describing installation and running of the program.
6. LicenseAgreement.pdf – The program license agreement.
7. MSVCR71.dll – Runtime Dynamic Link Library.

The program example problem files (ex*.dat) will be installed in the program example folder, which defaults to "C:\PennDOT\BRGEO v<*version_number*> Examples\". Users must have write access to this folder in order to run the input files from this folder.

4.2 PREPARING INPUT

The program requires an ASCII input file. The input file consists of a series of command lines. Each command line defines a set of input parameters that are associated with that command. A description of the input commands can be found in Chapter 5 of the User's Manual. The input can be created using Engineering Assistant, described below, or any text editor.

4.3 ENGINEERING ASSISTANT

The Engineering Assistant (EngAsst) is a Windows application developed by the Pennsylvania Department of Transportation (PennDOT) to provide a graphical user interface (GUI) for PennDOT's engineering programs. The data for the input to the engineering program is presented in a user-friendly format, reflecting the implied structure of the data, showing each record type on a separate tab page in the display and showing each field on each record with a defining label.

With EngAsst the user can create a new input file, modify an existing input file, import input files, run the associated engineering program and view the output in a Windows environment. The help and documentation are provided, including text descriptions of each field, relevant images, and extended help text at both the record/tab level and the field level. The entire Engineering Program User's Manual is also accessible within EngAsst.

EngAsst is not included with this software. It requires a separate license that can be obtained through the Department's standard Engineering software licensing procedures. Order forms can be obtained from the software support website at http://penndot.engrprograms.com.

4.4 RUNNING THE PROGRAM WITHOUT ENGINEERING ASSISTANT

The engineering programs are FORTRAN console application programs. They may be run from a command window, by double-clicking on the program icon from Windows Explorer, by selecting the shortcut from the Start menu under Programs\PennDOT, or by double-clicking the shortcut icon on the desktop. To run the program in a command window, the user must specify the directory in which the program has been installed or change to the directory.

The program will prompt for an input file name, and the user should then enter the appropriate input file name.

The input file must be created before running the program. The program will then prompt for whether the output should be reviewed on the screen. The user should enter Y if the output is to be reviewed on the screen after execution or N if the output is not to be reviewed on the screen. The program will then prompt for the name of the output file in which the output is to be stored, and the user should then enter the desired output file name. If a file with the specified output file name already exists, the program will ask the user whether to overwrite the existing file. The user should enter Y if the existing file is to be overwritten or N if the existing file is not to be overwritten. If the user enters N to specify that the existing file is not to be overwritten, the program will prompt the user for another output file name. The program will then execute.

To cancel the program during execution, press <Ctrl C> or <Ctrl Break>, and then press <Enter>.

When the program completes execution, the user is prompted to “Press <ENTER> to exit program.” This allows the user to view the last messages written to the screen when the program was started by double-clicking on the program icon from Windows Explorer.

The user can view the *.OUT output file with a text editor and the *.PDF output file (for those programs that produce it) with Adobe Acrobat.

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5 INPUT DESCRIPTION

5.1 INPUT DATA REQUIREMENTS

Before running the Bridge Geometry program, the user must create an input file. The input file consists of a series of command lines and comment lines. Each command line defines a set of input parameters that are associated with that command. The program interprets each command line and checks the input parameters to insure that the input data is of the correct type and within the allowable ranges set by the program. A comment line is designated by an exclamation point (!) in the first column of the line. Comment lines are ignored by the program. Any number of comment lines may be added to the input file by the user to clarify the information being entered.

The syntax of a command line is given as:

KWD parm1, parm2, , , parm5, ,

where, KWD is a 3 character keyword representing a command and,
parm1, parm2... are the parameter values associated with KWD.

A command line must not exceed 256 characters in length. Command lines can be continued on any number of data lines in the input file by placing a hyphen (-) at the end of each data line to be continued, and by placing any remaining parameters on the following lines starting in column 4 of each continuation line. The limit of 256 characters includes all characters and parameters on all continuation lines of a given command line. Some commands are repeatable and some commands have parameters or groups of parameters that are repeatable. When parameters are repeatable, the user has the option of repeating the parameters in a single command or repeating the command. For example, the GOL (Girder Offsets Left) command has Girder Number and Offset as repeatable parameters. The user could enter the Girder Number and Offset three times on one command and four times on another command, or seven times on a single command.

GOL 1, 1, -7.5, 2, -5.0, 3, -2.5
GOL 1, 4, 0.0, 5, 2.5, 6, 5.0, 7, 7.5

or

```
GOL  1,   1,-7.5,     2, -5.0,      3, -2.5,      4,  0.0,      5, 2.5,       6, 5.0,       7, 7.5
```

Groups of repeatable parameters, such as Girder Number and Offset, must stay together in a command line unless a continuation character (-) is used. That is, a command cannot end with a Girder Number input and continue using another GOL command having the Offset input. When a continuation character is used, the repeatable data can be separated on two lines. The program reads all continuation lines as one command. For example,

Correct input:

```
GOL  1,   1, -7.5,      2, -5.0,      3, -2.5
GOL  1,   4,  0.0,      5, -
              2.5,      6, 5.0,       7, 7.5
```

Incorrect input:

```
GOL  1,   1, -7.5,      2, -5.0,      3
               -2.5,      4,  0.0,      5, 2.5,       6, 5.0,       7, 7.5
```

The first three columns of each command line are reserved for keywords that define the command type. Columns 4 through 256 are to be used to input the parameters associated with a command. One or more spaces are recommended between the keyword and the input parameters to improve readability.

The parameters associated with each command must be entered in the order they appear in the command description tables. The user must place commas to separate the parameters on the command line. Blank spaces cannot be used to separate parameters. The parameter field width is not restricted; however, the total number of characters cannot exceed 256.

The default value for a parameter is assigned by the program by placing a comma without any value for the parameter. For example, in the command syntax example shown below, the default values will be assigned to parameters parm3 and parm4.

```
KWD parm1,    parm2,    ,    ,    parm5
```

If the user places a comma and there is no default value, the program will return an error status. If a comma is entered after the command keyword, the program will assign the default value to the first parameter. If the user does not enter all the parameters for a command, the program will assign default values for those parameters not entered. That is, the user is not required to place commas at the end of a command line. If the above example required 7 parameters, parm6 and parm7 would also be assigned default values by the program.

The default values are stored in a parameter file, which can be changed by the system manager. The parameter file stores the parameter description, type of data, units, upper limit, lower limit, error or warning status if the upper or lower limits are exceeded, and the default value for each parameter.

Any numerical value, within the upper and lower limits, can be entered for a parameter. The status codes, shown in parenthesis below the lower and upper limits, indicate the status if an input item exceeds the lower or upper limits. The status code, (E), indicates an error. The status code, (W), indicates a warning.

In the following sections, all available commands and associated parameters are described with two tables for each command. The first table contains the keyword for a particular command along with a description of the command. The second table gives all the parameters associated with the given command, parameter description, units, limits and default values.

The program will process all input and will check for errors and warnings. If the number of errors exceeds 25 during input processing, the program will terminate immediately. After all input is processed, the program checks if any errors were found. If an error was found, the program will terminate. If warnings are found, the program will continue to process. There is no limit on the number of warnings in a single run. The user should review all warnings in the output file to ensure that the input data is correct. Warnings are an indication that the input value has exceeded normally acceptable limits for that parameter.

5.2 ORDER OF COMMANDS

If the user wants to control the number of lines printed on a page or the number of lines to be left blank at the top of each page, the CFG (configure) command should be the first command. The CFG command is optional and the program will use default values if the CFG command is not entered. The first required command is the TTL (title) command, which is printed in the header at the top of each output page. The first 10 TTL commands are printed on the first page of the output. The second required command after the title commands is the CTL (control) command. The CTL command is used to specify the system of units (SI or US) which is required for checking the range of the input data. The CTL command also includes other major control parameters. Other required commands are the HGM (horizontal geometry) command, VGM (vertical geometry) command and CRS (cross sections) command. The BRL (bearing line) command, GOL (girder offsets left) command and GOR (girder offsets right) command are also required except when gutter elevations only are desired. The OUT (output) command is only required if the user wants to select output other than the standard output produced by the program.

The recommended order of commands is shown in Table 5.2.1 Recommended Order of Commands. The commands are shown in alphabetical order in Table 5.2-2 Commands in Alphabetical Order. Section in these

tables refers to the section number of this chapter where these commands are described. Figure 5.2.1 shows the overall view of the typical input file with these commands.

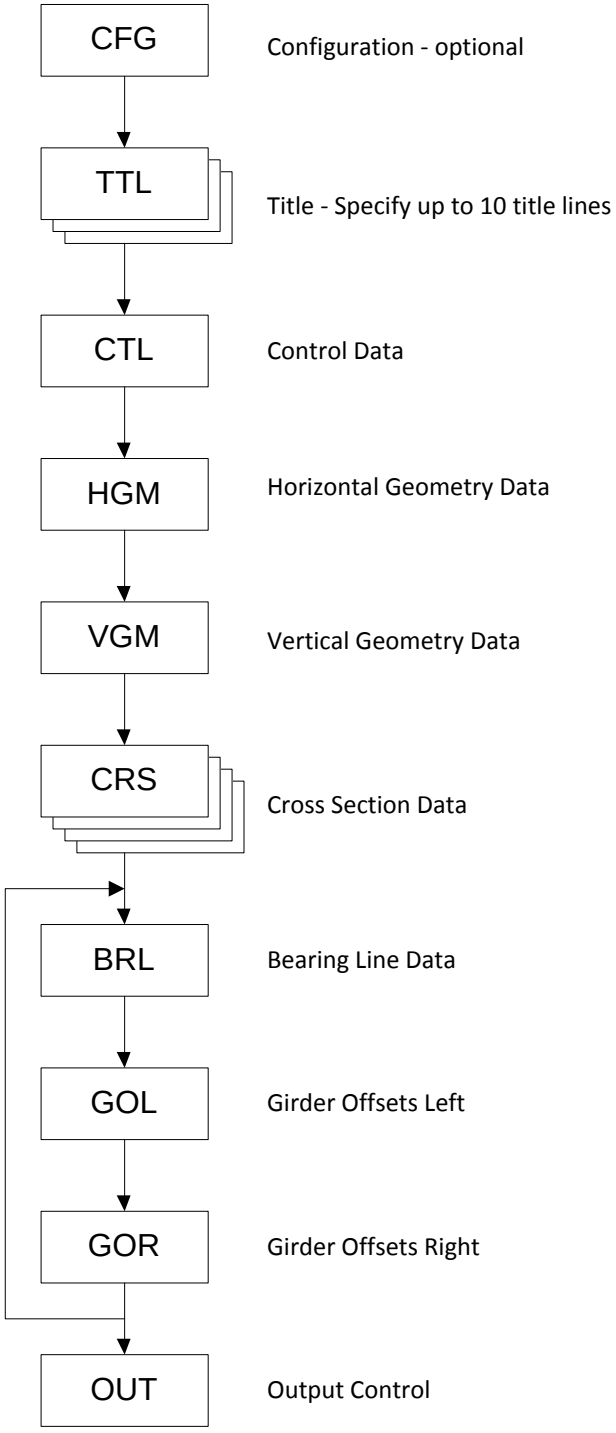


Figure 5.2.1 Overall View of Input File

Table 5.2.1 Recommended Order of Commands

Key-word	Command Description	Comments	Section
CFG	Configuration	Optional	5.3
TTL	Title	One TTL command required	5.4
CTL	Control	Required	5.5
HGM	Horizontal Geometry	Required	5.6
VGM	Vertical Geometry	Required	5.7
CRS	Cross Sections	Required	5.8
BRL	Bearing Line	Required except for gutter elevations only	5.9
GOL	Girder Offsets Left	Required except for gutter elevations only	5.10
GOR	Girder Offsets Right	Required except for gutter elevations only	5.11
OUT	Output	Required	5.12

Table 5.2-2 Commands in Alphabetical Order

Key-word	Command Description	Comments	Section
BRL	Bearing Line	Required except for gutter elevations only	5.9
CFG	Configuration	Optional	5.3
CRS	Cross Sections	Required	5.8
CTL	Control	Required	5.5
GOL	Girder Offsets Left	Required except for gutter elevations only	5.10
GOR	Girder Offsets Right	Required except for gutter elevations only	5.11
HGM	Horizontal Geometry	Required	5.6
OUT	Output	Required	5.12
TTL	Title	One TTL command required	5.4
VGM	Vertical Geometry	Required	5.7

5.3 CFG - Configuration Command

KEYWORD	COMMAND DESCRIPTION
CFG	CONFIGURATION - This command is used for configuring the program at a remote site. Only one CFG command may be used. If this command is not entered, each parameter listed below will be automatically set to its default value.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. Number of Lines Per Page	Enter the number of printable lines per output page.	-	50 (W)	100 (W)	60
2. Number of Top Blank Lines	Enter the number of lines to be left blank at the top of each output page.	-	0 (E)	5 (W)	0

5.4 TTL - Title Command

KEYWORD	COMMAND DESCRIPTION
TTL	TITLE - This command is used to place a title block in the output file. The input file must have at least one title command. The first title command is placed at the top of each output page. Use up to ten title commands as desired to describe the problem.

PARAMETER	DESCRIPTION
1. Title	Enter title information. Title information must be less than 77 characters in length. A maximum of 10 title commands can be entered. The input on the first title command will be displayed at the top of each output page. All remaining title information will be displayed on the first page of the output.

5.5 CTL - Control Command

KEYWORD	COMMAND DESCRIPTION
CTL	CONTROL - This command is used to set the control parameters for the input. An input file can have only one control command.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. System of Units	Enter type of units: SI - Metric (SI) units. US - US customary units.	-	SI,US (E)	-	SI
2. Reference System	Indicate the type of reference system used to describe the bearing line distances and skews and the girder offsets: G - Bearing lines and girders are referenced from the profile grade line. T - Bearing lines and girders are referenced from a tangent to the profile grade line. L - Bearing lines and girders are referenced from a long chord.	-	G, T, L (E)	-	-
3. Cross Section System	Indicate the method to be used to describe the bridge deck cross section: C - Coordinates of the cross-section points are to be coded. D - X and Y displacements for each point from the previous point are to be coded. Refer to the Cross Sections Command.	-	C,D (E)	-	-
4. Number of Spans	Enter the number of spans on the bridge.	-	1 (E)	20 (E)	-
5. Gutter Elevations	Indicate if gutter elevations are desired: A - Gutter elevations are desired in addition to the standard program output, i.e. slab, girder and bearing elevations. G - Gutter elevations only are desired. N - No gutter elevations are desired. See detailed input description.	-	N,G,A (E)	-	-
6. Gutter Elevation Increment	If gutter elevations are desired (i.e. either A or G entered for the preceding parameter), enter the stationing increment at which elevations are to be computed. Leave this field blank if gutter elevations are not desired (i.e. an N was entered for the preceding parameter).	ft m	-	-	-

5.6 HGM - Horizontal Geometry Command

KEYWORD	COMMAND DESCRIPTION
HGM	HORIZONTAL GEOMETRY - This command is used to specify the horizontal geometry for the roadway on the bridge.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. Radius	Enter the radius of the curve. See detailed input description.	ft m	-	-	-
2. Right or Left	Indicate the direction of the curve looking ahead in stationing: R - Curve to the right. L - Curve to the left. Leave blank when a radius is not entered.	-	R,L (E)	-	-
3. PC or SC Station	Enter the PC station for a simple curve. Enter the SC station for a spiraled curve. See detailed input description.	ft m	-	-	-
4. PT or CS Station	Enter the PT station for a simple curve. Enter the CS station for a spiraled curve. See detailed input description.	ft m	-	-	-
5. Spiral Length	If Radius is entered and the curve is spiraled, enter the spiral length.	ft m	-	-	-
6. Reference Station or Long Chord Beginning Station	If bearing lines and girders are referenced from the profile grade line or a tangent to the profile grade line (Reference System = G or T), enter the reference station point. Refer to Figures 3.1-1 and 3.1-2. If bearing lines and girders are referenced from a long chord (Reference System = L), enter the long chord beginning station (reference point 1).	ft m	-	-	-
7. Long Chord Ending Station	If bearing lines and girders are referenced from a long chord (Reference System = L) enter the long chord ending station (reference point 2). Refer to Figure 3.1-3. If bearing lines and girders are referenced from the profile grade line or a tangent to the profile grade line (Reference System = G or T), leave this field blank.	ft m	-	-	-
8. Offset	Enter the offset distance from the profile grade line to the centerline for the description of cross sections. This distance is negative if the cross section centerline is to the left of the profile grade line and positive if to the right.	ft m	-	-	-

5.7 VGM - Vertical Geometry Command

KEYWORD	COMMAND DESCRIPTION
VGM	VERTICAL GEOMETRY - This command is used to specify the vertical geometry for the roadway on the bridge. **Parameters 1 to 5 are repeatable. Up to 5 vertical curves can be entered.**

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. PVI Station	Enter the PVI station if the bridge falls on a vertical curve, otherwise leave this field blank.	ft m	-	-	-
2. PVI Elevation	Enter the PVI elevation if the bridge falls on a vertical curve. Enter the elevation of the Reference Station or the Long Chord Beginning Station if the bridge does not fall on a vertical curve.	ft m	-	-	-
3. Grade Ahead	Enter the profile grade if the bridge does not fall on a vertical curve. **If the bridge falls on a vertical curve, enter the ahead grade for the last PVI station entered. Leave blank for all other PVI stations.** Looking ahead in stationing, a positive grade is upward and a negative grade is downward.	%	-	-	-
4. Grade Back	Enter the back grade **for the first PVI station entered if the bridge falls on a vertical curve. Leave blank for all other PVI stations.** The grade is determined looking ahead in stationing. Leave this field blank if the bridge does not fall on a vertical curve.	%	-	-	-
5. Vertical Curve Length	Enter the length of vertical curve, if applicable.	ft m	-	-	-

5.8 CRS - Cross Sections Command

KEYWORD	COMMAND DESCRIPTION
CRS	CROSS SECTIONS - Any normal or superelevated cross sections falling on the bridge must be described. If a superelevation or widening transition falls on the bridge, the cross sections at the beginning and end of the transition must both be described. If the PC and PT stations (or SC and CS stations for a spiraled curve) were entered and any portion of the bridge lies between the PC and PT (or SC and CS), cross sections must be entered for the entire length of the curve from the PC to the PT (or the SC to the CS). Similarly, if any portion of the bridge falls on a spiral, cross sections must be entered for the entire length of the spiral (TS to SC or CS to ST). Any reasonable number of cross sections may be input to define the bridge deck surface. Refer to 6.8 for detailed input description.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. From Station	Enter the station from which the cross section will start to be applied.	ft m	-	-	-
2. To Station	Enter the station through which the cross section will be applied.	ft m	-	-	-
3. Number of Points	Enter the total number of points on the cross section. There may be a maximum of 24 points.	-	1 (E)	24 (E)	-
4. Two Lane Super	Enter Y if a two lane superelevation transition is to be applied between this cross section and the following cross section (i.e. rotate about centerline of cross section until superelevation rate equals the normal crown rate, then rotate about the inside edge of traffic lane). Leave this field blank otherwise.	-	blank,Y (E)	-	-
5. Point	Enter the point number for this pair of x and y coordinates or displacements. Cross section points must be numbered sequentially from left to right, i.e., the left most point will always be point 1.	-	1 (E)	24 (E)	-
6. ΔX	Enter the X coordinate or displacement. This parameter should be paired with ΔY and repeated for each point in this cross section.	ft m	-	-	-
7. ΔY	Enter the Y coordinate or displacement. This parameter should be paired with ΔX and repeated for each point in this cross section.	ft m	-	-	-

5.9 BRL - Bearing Line Command

KEYWORD	COMMAND DESCRIPTION
BRL	BEARING LINE - One of these lines of data must be completed for each span of the bridge. Refer to Figures 3.1-1, 3.1-2 and 3.1-3 for illustrations of these items.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. Span Number	Enter the span number for this Bearing Line data.	-	1 (E)	20 (E)	-
2. Left Bearing Line Distance	Enter the distance from the reference point to the left bearing line. The distance is positive if the bearing line is ahead of the reference point and negative if before. See detailed input description.	ft m	-	-	-
3. Left Bearing Line Skew	Enter the skew angle of the bearing line, always measured counter clockwise, in decimal degrees. Refer to the sketches in Figures 3.1-1, 3.1-2 and 3.1-3. See detailed input description.	DEG	-	-	-
4. Right Bearing Line Distance	Enter the distance to the right bearing line. Refer to the Left Bearing Line Distance parameter.	ft m	-	-	-
5. Right Bearing Line Skew	Enter the skew angle of the right bearing line. Refer to the Left Bearing Line Skew parameter.	DEG	-	-	-
6. Number of Girders	Enter the number of girders on the span. There may be from 1 to 24 girders.	-	1 (E)	24 (E)	-
7. Slab Depth	Enter the depth of the slab plus haunch.	ft mm	-	-	-
8. Beam Depth	Enter the depth of the beam and bearing.	ft m	-	-	-
9. Girder Intervals Delta S	Enter the interval at which elevations are desired, starting at the left end of each girder. See detailed input description.	ft m	-	-	-
10. Girder Intervals Points	Enter the fractional point at which elevations are desired. For example, entering 4 will result in elevations at quarter points along each girder. Entering 1 will result in elevations at tenth points along each girder. See detailed input description.	-	1 (E)	9 (E)	-
11. Girder Intervals Even	Enter Y if elevations at even 10 meter (SI) or 10 foot (US) stations along each girder are desired. See detailed input description.	-	blank,Y (E)	-	-

5.9 BRL - Bearing Line Command (Cont.)

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
12. Same	Enter Y if the girder offsets are the same as those of the previous span. Do not enter girder offsets data for this span. Leave this field blank for the first span or if the girder offsets differ from those of the previous span. Girder Offsets data must then be entered for this span.	-	blank,Y (E)	-	-

5.10 GOL - Girder Offsets Left Command

KEYWORD	COMMAND DESCRIPTION
GOL	GIRDER OFFSETS LEFT - Girder offsets are entered if Same was blank in the BEARING LINE Command. The offsets are signed minus (-) if measured to the left and plus (+) if measured to the right of the applicable line, and are entered from left to right, stationing ahead. Refer to Figures 3.1-1, 3.1-2 and 3.1-3.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. Span Number	Enter the span number for this set of Girder Offsets Left.	-	1 (E)	20 (E)	-
2. Girder Number	Enter the girder number for this Offset. This field should be repeated as necessary to enter an offset for each girder on the left bent.	-	1 (E)	24 (E)	-
3. Offset	Enter the distance from the applicable line. This field should be repeated as necessary to enter an offset for each girder on the left bent. See detailed input description.	ft m	-	-	-

5.11 GOR - Girder Offsets Right Command

KEYWORD	COMMAND DESCRIPTION
GOR	GIRDER OFFSETS RIGHT - Girder offsets are entered if Same was blank in the BEARING LINE Command. The offsets are signed minus (-) if measured to the left and plus (+) if measured to the right of the applicable line, and are entered from left to right, stationing ahead. Refer to Figures 3.1-1, 3.1-2 and 3.1-3.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. Span Number	Enter the span number for this set of Girder Offsets Right.	-	1 (E)	20 (E)	-
2. Girder Number	Enter the girder number for this Offset. This field should be repeated as necessary to enter an offset for each girder on the right bent.	-	1 (E)	24 (E)	-
3. Offset	Enter the distance from the applicable line. This field should be repeated as necessary to enter an offset for each girder on the right bent. See detailed input description.	ft m	-	-	-

5.12 OUT - Output Command

KEYWORD	COMMAND DESCRIPTION
OUT	OUTPUT - This command is used to control the type of output reports, which can be requested by the user. This command is only necessary if the user wants to select output other than the standard output produced by the program. The standard output is indicated by the default values shown for each parameter in this command.

PARAMETER	DESCRIPTION	UNITS	LOWER LIMIT	UPPER LIMIT	Default
1. Input File	0 - Do not print the echo of the input file 1 - Print the echo of the input file	-	0 (E)	1 (E)	0
2. Input Commands	0 - Do not print the summary of input commands 1 - Print the summary of input commands	-	0 (E)	1 (E)	0
3 Input Summary	0 - Do not print the tabular summary of input 1 - Print the tabular summary of input	-	0 (E)	1 (E)	1

6 DETAILED INPUT DESCRIPTION

This chapter provides detailed description of some of the input parameters, which were described in Chapter 5 but may need further explanation or commentary. The numbering scheme used here is as follows. The section number for a command name corresponds to the same section number in Chapter 5. The parameter being described is preceded by a number where the last extension number refers to the parameter number in a corresponding command in Chapter 5, e.g., 6.5.5 Gutter Elevations corresponds to section 5.5 CTL - Control Command, parameter 5. Only the commands and parameters for which detailed description is given are included here.

6.5 CTL - Control Command

6.5.5 Gutter Elevations

Gutter elevations may be requested at a specified interval. They can be calculated in addition to the standard output, or separately. The following special procedure should be followed if only gutter elevations are desired (i.e. Gutter Elevations = G):

1. Enter 1 for Number of Spans.

2. Enter G and the desired spacing for Gutter Elevations.

3. Enter Horizontal Geometry, Vertical Geometry, and Cross Sections data.

Enter only Left Bearing Line Distance and Right Bearing Line Distance for Bearing Line data to indicate the points where gutter elevations are to begin and end. Leave the remainder of this data blank, and do not enter any Girder Offsets. The bearing line distances will be measured along the profile grade line.

6.6 HGM - Horizontal Geometry Command

6.6.1 Radius

Enter the radius of the curve if:

1. Bearing lines and girders are referenced from the profile grade line (Reference System = G) and the bridge falls partially or entirely on the curve or spiral.

   or

2. Bearing lines and girders are referenced from a tangent to the profile grade line (Reference System=T).

   or

3. Bearing lines and girders are referenced from a long chord (Reference System = L).

6.6.3 PC or SC Station

If a Radius is entered and the curve is spiraled, the SC station must be entered.

If a Radius is entered and the curve is simple, the PC station must be entered if:

1. Bearing lines and girders are referenced from the profile grade line (Reference System = G) and the bridge falls on both the tangent roadway and curve. If the bridge falls entirely on the curve, it is not necessary to enter the PC station.

   or

2. Bearing lines and girders are referenced from a tangent to the profile grade line (Reference System = T) and:

   a. The Reference Station lies on the tangent roadway and the bridge lies at least partially on the curve.

      or

   b. The Reference Station lies on the curve and the bridge lies at least partially on the tangent roadway. If the bridge falls entirely on the curve, it is not necessary to enter the PC station.

   or

3. Bearing lines and girders are referenced from a long chord (Reference System = L) and:

   a. The long chord beginning station falls on the PC

      or

b. The bridge lies on both the tangent roadway and curve.

6.6.4 PT or CS Station

If a Radius is entered and the curve is spiraled, the CS station must be entered.

If a Radius is entered and the curve is simple, the PT station must be entered if:

1. Bearing lines and girders are referenced from the profile grade line (Reference System = G) and the bridge falls on both the tangent roadway and curve. If the bridge falls entirely on the curve it is not necessary to enter the PT station.

or

2. Bearing lines and girders are referenced from a tangent to the profile grade line (Reference System = T) and:

   a. The Reference Station lies on the tangent roadway and the bridge lies at least partially on the curve.

   or

   b. The Reference Station lies on the curve and the bridge lies at least partially on the tangent roadway. If the bridge falls entirely on the curve it is not necessary to enter the PT station.

or

3. Bearing lines and girders are referenced from a long chord (Reference System = L) and:

   a. The long chord ending station falls on the PT

   or

   b. The bridge lies on both the tangent roadway and curve.

6.8 CRS - Cross Sections Command

Superelevation or widening transitions may be described in the following manner, refer to Figure 1:

1. Leave the To Station blank and the transition will start at the From Station for that cross section and end at the From Station for the next cross section.

or

2. When a gap is encountered between the To Station of one cross section and the From Station of the next cross section, transitioning will be performed through that gap.

Each cross section is described by entering displacements for each point from the previous point (Cross Section System = D) or coordinates for each point (Cross Section System = C). If the displacement method is used, enter each cross section adhering to the following conventions:

1. A cross section is DESCRIBED by points representing every break in slope across the deck surface. Each point is located from the previous point by horizontal and vertical displacements, delta X and delta Y. Include a point at the centerline, even if there is no break in slope at the line.

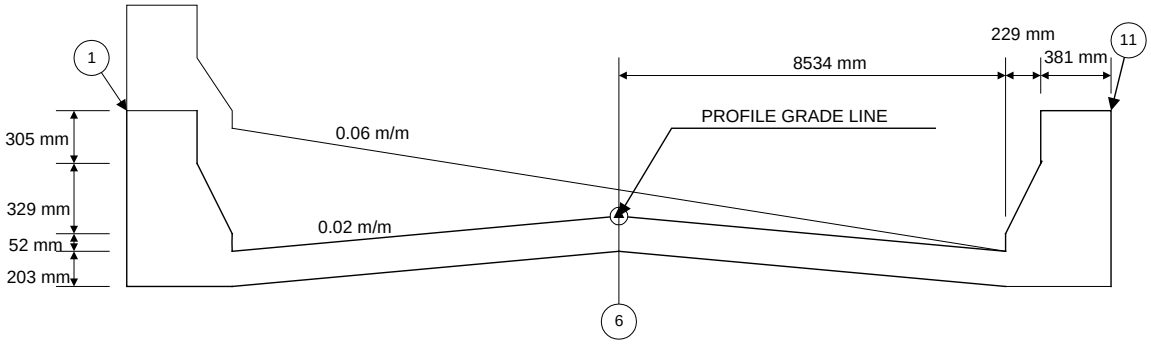
2. A cross section is REFERENCED horizontally and vertically to the centerline. Delta X will always be zero for the point at the line. Delta Y will usually be zero for the point at the line. On a superelevated section of class 2 or greater, if the rate of superelevation is greater than the normal crown slope, delta Y will be greater than zero at this point.

3. Displacements are SIGNED with respect to the previous point while working RIGHT and LEFT from the centerline, stationing ahead. Delta X values carry a plus (+) sign when moving to the right, and a minus (-) sign when moving to the left. For delta Y, plus (+) is up and minus (-) is down, from the previous point.

4. The input is CODED starting at the extreme left of the cross section, at the outer edge of parapet, and proceeding right to the outer edge of the parapet.

If the coordinate method is used, enter X and Y coordinates of each point working from left to right. The centerline will always have an X coordinate of zero. The X coordinate will be negative for points to the left, and positive for points to the right.

A distinct gutter line must be coded at both ends of each cross section. The complete parapet need not be defined as long as there is a vertical face to define the gutter line on each side of the centerline. When transitioning between two cross sections is desired, both cross sections must have the same number of points and the corresponding points on both cross sections (e.g. centerline, edges of pavement, etc.) must have the same cross section point number.



TYPICAL CROSS SECTION

POINT	DELTA X (m)	DELTA Y (m)	
1	-0.381	0.000	
2	0.000	0.305	
3	-0.229	0.329	
4	0.000	0.052	
5	-8.534	-0.171(0.512)	DELTA Y VALUES FOR SUPERELEVATED CROSS SECTION
6	0.000	0.000(0.341)	
7	8.534	-0.171(-0.512)	
8	0.000	0.052	
9	0.229	0.329	
10	0.000	0.305	
11	0.381	0.000	

SLAB DEPTH = 204 mm

Figure 6.8.1 Typical Cross Section

6.9 BRL - Bearing Line Command

6.9.2 Left Bearing Line Distance

If Reference System = G, enter the distance along the profile grade line from the reference point to the intersection of the bearing line with the profile grade line.

If Reference System = T, enter the distance along the reference line from the reference point to the intersection of the bearing line with the reference line.

If Reference System = L, enter the distance along the long chord from reference point 1 to the intersection of the bearing line with the long chord.

6.9.3 Left Bearing Line Skew

If Reference System = G, the skew angle is measured from the tangent to the profile grade line at its intersection with the bearing line.

If Reference System = T, the skew angle is measured from the reference line at its intersection with the bearing line.

If Reference System = L, the skew angle is measured from the long chord at its intersection with the bearing line.

6.9.9 Girder Intervals

Girder and deck elevations may be obtained at intermediate points along the girder lines. Three options are available for specifying the intervals along the girder and may be requested independently or in combination with the other options.

Delta S

Starting at the left end of each girder, an interval (Girder Intervals Delta S) can be entered at which elevations are desired. The program will print elevations at every point that is a multiple of this specified number of feet or meters from the left end of each girder.

Points

Elevations may be obtained at fractional points along each girder. The fractional denominator for the desired interval should be entered for the Girder Intervals Points input parameter. For example, entering a 4 or 8 will result in elevations at quarter or eighth points along each girder respectively.

Even

Elevations will be computed at even 10 foot intervals or 10 meter intervals along each girder if a Y is entered for the Girder Intervals Even input parameter.

6.10 GOL - Girder Offsets Left Command

The girder offsets are measured along the bearing line from:

1. The profile grade line if Reference System = G.
2. The reference line if Reference System = T.
3. The long chord if Reference System = L.

6.11 GOR - Girder Offsets Right Command

The girder offsets are measured along the bearing line from:

1. The profile grade line if Reference System = G.
2. The reference line if Reference System = T.
3. The long chord if Reference System = L.

This page is intentionally left blank.

7 OUTPUT DESCRIPTION

7.1 GENERAL OUTPUT INFORMATION

This section of this chapter describes general information regarding the output. Information is provided for describing page format, page numbering and page header. In general, the page format is built into the program and cannot be changed by the user. The one exception is that the user can specify the number of blank lines to be printed at the top of the page before the page header is printed.

7.1.1 Page Format

There is a maximum of 79 columns in the output file. Column 80 is not used because it cannot be displayed on certain terminal devices. Columns 1, 2, 3 and 4 have been left blank to provide a margin on the left side of the page. This has been done to make the output file less dependent of the output device capabilities. The output is therefore limited to 75 characters, column 5 to 79. The user can specify the number of lines to be left blank at the top of the page with the CFG command.

7.1.2 Page Numbering

The program assigns page numbers and determines when a new page should begin. There are certain rules built into the program to determine when a new page should begin. Generally, the rules will try to keep small reports from being split onto different pages. Also, the rules are such that the report headers and the data appear on the same page.

7.1.3 Page Header

After the cover page, header information is shown at the top of each page. Header information is printed on every page. A sample header is shown in Figure 7.1.1.

```
Bridge Geometry, Version 1.2.0.0                                    PAGE   2
Input File: ...5.0.0)\BRGEO v1.2.0.0\BRGEO\Bin\Ex1.dat 02/12/2019  07:56:51
------------------------------------------------------------------------------
                              EXAMPLE PROBLEM 1
                                INPUT SUMMARY
------------------------------------------------------------------------------
```

Figure 7.1.1 Page Header

Information printed in the header includes:

1. Program Title, Version Number - the program title and version number are located at the top left corner of the header.
2. Page number - the page number appears at the top right corner of the header.
3. Input File - the name of the input file is shown at the beginning of the second line.
4. Date and Time - the date and time are printed at the right side of the second line.
5. A separator line is printed between program specific header information and title line.
6. The next header line contains the report title line.
7. The final header line is a separator line.

7.2 COVER PAGE

The first page of the output is the cover page. The following information is shown at the top of the cover page:

1. Program Title - Bridge Geometry
2. Program Name - BRGEO
3. Version ii.nn - where ii represents the numeric designation for major revisions and enhancements to the program and nn represents the numeric designation for minor revisions.
4. Last Updated - this is the date the program was last revised.
5. Documentation - this is the date the User's Manual was last revised.
6. License Number - this is a unique number assigned to all licensees per the License Agreement.

The middle section of the cover page is reserved for the first ten lines of the TTL command input by the user. This information typically should describe the bridge, location, span lengths and any other information the user would need to identify the output.

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7.3 INPUT ECHO

The input data entered by the user is printed on the output based on the options entered for the Input parameters on the OUT command. The input data is printed on the output in the following three formats.

7.3.1 Echo of Input File

The echo of the input file is a listing of the ASCII input file containing the commands and comments as entered by the user. The user can refer to this section to trace input error and warnings by comparing the input data to the input descriptions provided in Chapter 5. The input file can contain 256 characters in a single line but the output is limited to 76 characters on a single line. If the input file contains more than 76 characters, the echo of the input file will be wrapped to the next line. Other than this limitation, the echo of the input file should appear the same as the input data file.

7.3.2 Summary of Input Commands

The summary of input commands includes a detailed description of each input parameter for all commands **entered by the user. The summary of input commands is in a vertical format. Two examples are shown in** Figure 7.3.1.

```
COMMAND:  CTL
  SYSTEM OF UNITS                      SI
  REFERENCE SYSTEM                      T
  CROSS SECTION SYSTEM                  D
  NUMBER OF SPANS                       3
  GUTTER ELEVATIONS                     N
  GUTTER ELEVATION INCR                 * m

COMMAND:  HGM
  RADIUS                          698.550 m
  RIGHT OR LEFT                         R
  PC OR SC STATION                487.680 m
  PT OR CS STATION                731.520 m
  SPIRAL LENGTH                    60.960 m
  REF STA OR LONG CHORD BEG       426.720 m
  LONG CHORD END                        * m
  OFFSET                                * m
```

Figure 7.3.1 Summary of Input Commands

The summary of input commands includes the following information:

1. Command keyword.
2. Input parameter description.
3. Value of input parameter as entered by the default value stored in the program. The value is displayed to the same number of significant figures as entered by the user. The word (default) is placed to the right of the units when default values are used. An asterisk (*) indicates the input value is optional.
4. Units (US or SI) if applicable.

Input may be optional or required. Required input is input that is entered by the user or set to the default value in the program. Default values are indicated with the text (default) placed to the right of the units. If there is no default value stored in the program and the user does not enter a value, an error message is displayed.

Optional input does not need to be entered by the user. An asterisk (*) is printed for the value indicating the input value is optional. In some cases, when input is not entered the program sets the value. Some input is optional because it is not required for the particular problem being run. For more information regarding specific input requirements, refer to Chapter 5.

7.3.3 Tabular Summary of Input

The tabular summary of input includes a summary of all input parameters in a horizontal format. The tabular summary of input also includes processed input. Processed input is input that is computed by the program based on other items. Two examples of the tabular summary of input are shown in Figure 7.3.2.

```
                          CONTROL INFORMATION
                          -------------------
 System                    Cross      Number                      Gutter
   Of       Reference     Section       Of         Gutter       Elevation
  Units      System       System      Spans      Elevations       Incr
                                                                   (m)
   SI           T            D           3            N

                          HORIZONTAL GEOMETRY
                          -------------------
                          Right
                           or        PC or SC     PT or CS
              Radius      Left       Station      Station
                (m)                     (m)          (m)
             698.550        R         487.680      731.520

          Spiral       Ref Sta or       Long Chord
          Length    Long Chord Beg         End        Offset
           (m)            (m)              (m)         (m)
          60.960         426.720
```

Figure 7.3.2 Tabular Summary of Input

The tabular input summary contains the following information:

1. A description of the input data.
2. Input parameter header containing an abbreviated parameter description and units.
3. Input parameter values. The input values are shown to a fixed number of decimal places because of the tabular format. The actual input value may be rounded. Refer to the summary of input commands for the actual value input by the user.

7.4 COMPUTED OUTPUT

The Horizontal Geometry, Vertical Geometry and Cross Sections input data are printed.

The following data is given for each span:

1. The input data - left and right bearing line distances and skew angles, slab and beam depths and girder offsets.
2. The lengths along the left and right bearing lines from the outside of the left parapet to the outside of the right parapet.

The following is given for each girder:

1. The girder length in meters.
2. The minimum and maximum overhang from the centerline of the girder to the outside of the parapet for exterior girders.

The following is given for the left and right ends of each girder and the selected intermediate points:

1. The station and radial offset from the profile grade line.
2. The X and Y coordinates.
3. The top of slab elevation at the profile grade line.
4. The top and bottom of slab elevations.
5. The bearing elevations (left and right ends only).

If gutter elevations are requested, the left and right gutter elevations and the corresponding profile grade line stations and elevations are printed at the selected interval.

This page is intentionally left blank.

8 SAMPLE OUTPUT

This example shows a bridge that is located on a spiraled curve and referenced to the profile grade line at the T.S. point. A two-lane type superelevation transition is to be applied (i.e., adverse crown is removed in the tangent runout and the remaining superelevation is attained over the spiraled portion). The cross sections are coded using the displacement method and the superelevation transitions are described by coding the To Station blank in the transition areas.

The bridge starts at station 0+381.000 and ends at station 0+495.300 and consists of three spans. The reference point is at station 0+426.720 with an elevation of 0+152.400 meters. The bridge does not fall on a vertical curve. The profile grade is +1.000%. There are 7 girders on each span and the girder offsets are different for each span. Output information is not required for intermediate points along the girders, and no gutter line elevations are to be calculated.

8.1 Input and Output

The ASCII input file for this sample run is shown in Figure 8.1.1.

The output listing is shown in Figure 8.1.2.

```
!   Sample Run for Bridge Geometry Program
TTL Example Problem 1
CTL SI,T,D,3,N
HGM 698.55,R,487.68,731.52,60.96,426.72
VGM ,152.4,1.0
CRS 1,152.4,391.668,13,,1,-0.305,0.,2,-0.052,0.482,3,-0.177,0.253,-
    4,0.,0.076,5,-3.658,-0.146,6,-3.658,-0.073,7,0.,0.,-
    8,3.658,-0.073,9,3.658,-0.146,10,0.,0.076,11,0.177,0.253,-
    12,0.052,0.482,13,0.305,0.
CRS 2,391.668,,13,Y,1,-0.305,0.,2,-0.052,0.482,3,-0.177,0.253,-
    4,0.,0.076,5,-3.658,-0.146,6,-3.658,-0.073,7,0.,0.,-
    8,3.658,-0.073,9,3.658,-0.146,10,0.,0.076,11,0.177,0.253,-
    12,0.052,0.482,13,0.305,0.
CRS 3,487.680,731.520,13,,1,-0.305,0.,2,-0.052,0.482,3,-0.177,0.253,-
    4,0.,0.076,5,-3.658,-0.073,6,-3.658,0.219,7,0.,0.146,-
    8,3.658,-0.219,9,3.658,-0.219,10,0.,0.076,11,0.177,0.253,-
    12,0.052,0.482,13,0.305,0.0
BRL 1,-45.72,90.0,-7.62,90.0,7,253.0,1295.0
GOL 1,1,-7.087,2,-4.724,3,-2.362,4,0.0,5,2.362,6,4.724,7,7.087
GOR 1,1,-7.087,2,-4.724,3,-2.362,4,0.0,5,2.362,6,4.724,7,7.087
BRL 2,-7.62,90.0,30.48,89.375,7,253.0,1295.0
GOL 2,1,-7.087,2,-4.724,3,-2.362,4,0.0,5,2.362,6,4.724,7,7.087
GOR 2,1,-6.977,2,-4.615,3,-2.252,4,0.11,5,2.472,6,4.834,7,7.196
BRL 3,30.48,89.375,68.629,86.875,7,253.0,1295.0
GOL 3,1,-6.977,2,-4.615,3,-2.252,4,0.11,5,2.472,6,4.834,7,7.196
GOR 3,1,-5.825,2,-3.463,3,-1.1,4,1.262,5,3.624,6,5.986,7,8.348
OUT 3
```

Figure 8.1.1 Input File

```
*******************************************************************************
*                                                                             *
*  Program Title        Bridge Geometry                                       *
*  Program Name         BRGEO                                                 *
*  Version              1.2.0.0                                               *
*  Last Updated         02/20/2019                                            *
*  Documentation        02/2019                                               *
*  License No.                                                                *
*                                                                             *
*******************************************************************************
*                                                                             *
*   EXAMPLE PROBLEM 1                                                         *
*                                                                             *
*******************************************************************************
*                                                                             *
*                              COPYRIGHT (C) 1996-2018                        *
*                            COMMONWEALTH OF PENNSYLVANIA                     *
*                            DEPARTMENT OF TRANSPORTATION                     *
*                                                                             *
*                                 ALL RIGHTS RESERVED                         *
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*                                                                             *
*******************************************************************************
```

Figure 8.1.2 Output

```
Bridge Geometry, Version 1.2.0.0                                             PAGE 2
Input File: Ex1.dat                                              02/10/2019  10:42:56
-------------------------------------------------------------------------------------
                                  EXAMPLE PROBLEM 1
                                    INPUT SUMMARY
-------------------------------------------------------------------------------------

                                 CONTROL INFORMATION
                                 -------------------
      System                    Cross      Number                   Gutter
        of      Reference      Section       of        Gutter      Elevation
      Units      System        System      Spans     Elevations      Incr
                                                                      (m)
        SI         T             D           3           N

                                 HORIZONTAL GEOMETRY
                                 -------------------
                                Right
                                  or        PC or SC       PT or CS
                      Radius    Left        Station        Station
                        (m)                   (m)            (m)
                     698.550      R        0+487.680      0+731.520

                  Spiral      Ref Sta or        Long Chord
                  Length    Long Chord Beg         End          Offset
                   (m)           (m)               (m)           (m)
                  60.960      0+426.720

                                  VERTICAL GEOMETRY
                                  -----------------
                                                                      Vertical
          PVI           PVI          Grade         Grade         Curve
        Station      Elevation       Ahead          Back          Length
          (m)           (m)           (%)           (%)            (m)
                      152.400        1.000

                                   CROSS SECTIONS
                                   --------------
   Cross Section No.  1 From Station    0+152.400 To Station    0+391.668
   Number of Points : 13
   Two Lane Super   : N

   Point      :      1        2        3        4        5        6        7
   Delta X (m):   -0.305   -0.052   -0.177    0.000   -3.658   -3.658    0.000
   Delta Y (m):    0.000    0.482    0.253    0.076   -0.146   -0.073    0.000

   Point      :      8        9       10       11       12       13
   Delta X (m):    3.658    3.658    0.000    0.177    0.052    0.305
   Delta Y (m):   -0.073   -0.146    0.076    0.253    0.482    0.000

   Cross Section No.  2 From Station    0+391.668 To Station
   Number of Points : 13
   Two Lane Super   : Y

   Point      :      1        2        3        4        5        6        7
   Delta X (m):   -0.305   -0.052   -0.177    0.000   -3.658   -3.658    0.000
   Delta Y (m):    0.000    0.482    0.253    0.076   -0.146   -0.073    0.000
```

Figure 8.1-2 Output (cont.)

EXAMPLE PROBLEM 1
INPUT SUMMARY (cont.)

CROSS SECTIONS (cont.)

Point	8	9	10	11	12	13
Delta X (m):	3.658	3.658	0.000	0.177	0.052	0.305
Delta Y (m):	-0.073	-0.146	0.076	0.253	0.482	0.000

Cross Section No. 3 From Station 0+487.680 To Station 0+731.520
Number of Points : 13
Two Lane Super : N

Point	1	2	3	4	5	6	7
Delta X (m):	-0.305	-0.052	-0.177	0.000	-3.658	-3.658	0.000
Delta Y (m):	0.000	0.482	0.253	0.076	-0.073	0.219	0.146

Point	8	9	10	11	12	13
Delta X (m):	3.658	3.658	0.000	0.177	0.052	0.305
Delta Y (m):	-0.219	-0.219	0.076	0.253	0.482	0.000

BEARING LINE

Span Number	Left Bearing Line Dist (m)	Left Bearing Line Skew (degs)	Right Bearing Line Dist (m)	Right Bearing Line Skew (degs)	Number of Girders
1	-45.720	90.000	-7.620	90.000	7

Slab Depth (mm)	Beam Depth (mm)	Girder Intervals Delta S (m)	Girder Intervals Points	Girder Intervals Even	Same
253.	1295.	0.000	0	N	N

GIRDER OFFSETS LEFT

Span Number: 1

Girder	1	2	3	4	5	6	7
Offset (m) :	-7.087	-4.724	-2.362	0.000	2.362	4.724	7.087

GIRDER OFFSETS RIGHT

Span Number: 1

Girder	1	2	3	4	5	6	7
Offset (m) :	-7.087	-4.724	-2.362	0.000	2.362	4.724	7.087

Figure 8.1-2 Output (cont.)

EXAMPLE PROBLEM 1
INPUT SUMMARY (cont.)

BEARING LINE

Span Number	Left Bearing Line Dist (m)	Left Bearing Line Skew (degs)	Right Bearing Line Dist (m)	Right Bearing Line Skew (degs)	Number of Girders
2	-7.620	90.000	30.480	89.375	7

Slab Depth (mm)	Beam Depth (mm)	Girder Intervals Delta S (m)	Girder Intervals Points	Girder Intervals Even	Same
253.	1295.	0.000	0	N	N

GIRDER OFFSETS LEFT

Span Number: 2

Girder	1	2	3	4	5	6	7
Offset (m)	-7.087	-4.724	-2.362	0.000	2.362	4.724	7.087

GIRDER OFFSETS RIGHT

Span Number: 2

Girder	1	2	3	4	5	6	7
Offset (m)	-6.977	-4.615	-2.252	0.110	2.472	4.834	7.196

BEARING LINE

Span Number	Left Bearing Line Dist (m)	Left Bearing Line Skew (degs)	Right Bearing Line Dist (m)	Right Bearing Line Skew (degs)	Number of Girders
3	30.480	89.375	68.629	86.875	7

Slab Depth (mm)	Beam Depth (mm)	Girder Intervals Delta S (m)	Girder Intervals Points	Girder Intervals Even	Same
253.	1295.	0.000	0	N	N

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                              PAGE 5
Input File: Ex1.dat                                          02/10/2019  10:42:56
-------------------------------------------------------------------------------
                              EXAMPLE PROBLEM 1
                            INPUT SUMMARY (cont.)
-------------------------------------------------------------------------------

                              GIRDER OFFSETS LEFT
                              -------------------
   Span Number: 3
   Girder     :      1        2        3        4        5        6        7
   Offset (m) :   -6.977   -4.615   -2.252    0.110    2.472    4.834    7.196


                             GIRDER OFFSETS RIGHT
                             --------------------
   Span Number: 3
   Girder     :      1        2        3        4        5        6        7
   Offset (m) :   -5.825   -3.463   -1.100    1.262    3.624    5.986    8.348
```

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                              PAGE 6
Input File: Ex1.dat                                          02/10/2019  10:42:56
-------------------------------------------------------------------------------
                                EXAMPLE PROBLEM 1
                                     OUTPUT
-------------------------------------------------------------------------------

                                     SPAN  1
                                     -------

   LENGTH ALONG LEFT BEARING LINE FROM O/O OF PARAPETS (m)  : 15.700
   LENGTH ALONG RIGHT BEARING LINE FROM O/O OF PARAPETS (m) : 15.700

   * GIRDER  1

   LENGTH (m) : 38.100  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -7.087
                                                            RIGHT   -7.087

   LEFT BEARING ELEVATION (m)  :  150.185

                                                    TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD     AT PG.    TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)        (m)       (m)       (m)

     L     0+381.000  -7.087  -45.720    7.087    151.943   151.733   151.480

     R     0+419.100  -7.087   -7.620    7.087    152.324   152.259   152.006

   RIGHT BEARING ELEVATION (m) :  150.711

   OVERHANG (m) :  MINIMUM  0.763  MAXIMUM  0.763

   * GIRDER  2

   LENGTH (m) : 38.100  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -4.724
                                                            RIGHT   -4.724

   LEFT BEARING ELEVATION (m)  :  150.279

                                                    TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD     AT PG.    TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)        (m)       (m)       (m)

     L     0+381.000  -4.724  -45.720    4.724    151.943   151.827   151.574

     R     0+419.100  -4.724   -7.620    4.724    152.324   152.339   152.086

   RIGHT BEARING ELEVATION (m) :  150.791

   * GIRDER  3

   LENGTH (m) : 38.100  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -2.362
                                                            RIGHT   -2.362
```

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                              PAGE 7
Input File: Ex1.dat                                          02/10/2019  10:42:56
-------------------------------------------------------------------------------
                                EXAMPLE PROBLEM 1
                                 OUTPUT (cont.)
-------------------------------------------------------------------------------

                                  SPAN  1 (cont.)
                                  ---------------

   LEFT BEARING ELEVATION (m)  :  150.348

                                                          TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD   TOP SLAB  AT PG.   BOT SLAB
             (km)       (m)     (m)      (m)       (m)      (m)       (m)

     L     0+381.000  -2.362  -45.720    2.362   151.943   151.896   151.643

     R     0+419.100  -2.362   -7.620    2.362   152.324   152.357   152.104

   RIGHT BEARING ELEVATION (m) :  150.809

   * GIRDER  4

   LENGTH (m) : 38.100  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     0.000
                                                            RIGHT    0.000

   LEFT BEARING ELEVATION (m)  :  150.395

                                                          TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD   TOP SLAB  AT PG.   BOT SLAB
             (km)       (m)     (m)      (m)       (m)      (m)       (m)

     L     0+381.000   0.000  -45.720    0.000   151.943   151.943   151.690

     R     0+419.100   0.000   -7.620    0.000   152.324   152.324   152.071

   RIGHT BEARING ELEVATION (m) :  150.776

   * GIRDER  5

   LENGTH (m) : 38.100  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     2.362
                                                            RIGHT    2.362

   LEFT BEARING ELEVATION (m)  :  150.348

                                                          TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD   TOP SLAB  AT PG.   BOT SLAB
             (km)       (m)     (m)      (m)       (m)      (m)       (m)

     L     0+381.000   2.362  -45.720   -2.362   151.943   151.896   151.643

     R     0+419.100   2.362   -7.620   -2.362   152.324   152.277   152.024

   RIGHT BEARING ELEVATION (m) :  150.729

   * GIRDER  6

   LENGTH (m) : 38.100  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     4.724
                                                            RIGHT    4.724
```

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                                PAGE 8
Input File: Ex1.dat                                          02/10/2019  10:42:56
-------------------------------------------------------------------------------
                                EXAMPLE PROBLEM 1
                                 OUTPUT (cont.)
-------------------------------------------------------------------------------

                                  SPAN  1 (cont.)
                                  ---------------

   LEFT BEARING ELEVATION (m)  :  150.279

                                                          TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD   AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)      (m)       (m)       (m)

     L     0+381.000   4.724  -45.720   -4.724   151.943   151.827   151.574

     R     0+419.100   4.724   -7.620   -4.724   152.324   152.208   151.955

   RIGHT BEARING ELEVATION (m) :  150.660

   * GIRDER  7

   LENGTH (m) : 38.100  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     7.087
                                                           RIGHT    7.087

   LEFT BEARING ELEVATION (m)  :  150.185

                                                          TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD   AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)      (m)       (m)       (m)

     L     0+381.000   7.087  -45.720   -7.087   151.943   151.733   151.480

     R     0+419.100   7.087   -7.620   -7.087   152.324   152.114   151.861

   RIGHT BEARING ELEVATION (m) :  150.566

   OVERHANG (m) :  MINIMUM  0.763  MAXIMUM  0.763

                                    SPAN  2
                                    -------

   LENGTH ALONG LEFT BEARING LINE FROM O/O OF PARAPETS (m)  : 15.700
   LENGTH ALONG RIGHT BEARING LINE FROM O/O OF PARAPETS (m) : 15.700

   * GIRDER  1

   LENGTH (m) : 38.176  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -7.087
                                                           RIGHT   -6.977

   LEFT BEARING ELEVATION (m)  :  150.711

                                                          TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD   AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)      (m)       (m)       (m)

     L     0+419.100  -7.087   -7.620    7.087   152.324   152.259   152.006
```

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                              PAGE 9
Input File: Ex1.dat                                          02/10/2019  10:42:56
-------------------------------------------------------------------------------
                                EXAMPLE PROBLEM 1
                                 OUTPUT (cont.)
-------------------------------------------------------------------------------

                                 SPAN  2 (cont.)
                                 ---------------

     R     0+457.199  -7.088   30.556    6.977   152.781   152.841   152.588
                                          ( 152.705 PG)

   RIGHT BEARING ELEVATION (m) :  151.293

   OVERHANG (m) :  MINIMUM  0.762  MAXIMUM  0.763

   * GIRDER  2

   LENGTH (m) : 38.150  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -4.724
                                                            RIGHT   -4.615

   LEFT BEARING ELEVATION (m)  :  150.791

                                                  TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD    AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)       (m)       (m)       (m)

     L     0+419.100  -4.724   -7.620    4.724   152.324   152.339   152.086

     R     0+457.199  -4.726   30.530    4.615   152.781   152.903   152.650
                                          ( 152.705 PG)

   RIGHT BEARING ELEVATION (m) :  151.355

   * GIRDER  3

   LENGTH (m) : 38.125  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -2.362
                                                            RIGHT   -2.252

   LEFT BEARING ELEVATION (m)  :  150.809

                                                  TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD    AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)       (m)       (m)       (m)

     L     0+419.100  -2.362   -7.620    2.362   152.324   152.357   152.104

     R     0+457.199  -2.363   30.505    2.252   152.781   152.878   152.625
                                          ( 152.705 PG)

   RIGHT BEARING ELEVATION (m) :  151.330

   * GIRDER  4

   LENGTH (m) : 38.099  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     0.000
                                                            RIGHT    0.110
```

Figure 8.1-2 Output (cont.)

EXAMPLE PROBLEM 1
OUTPUT (cont.)

SPAN 2 (cont.)

LEFT BEARING ELEVATION (m) : 150.776

POINT	STATION (km)	OFFSET (m)	X-COORD (m)	Y-COORD (m)	TOP SLAB AT PG. (m)	TOP SLAB (m)	BOT SLAB (m)
L	0+419.100	0.000	-7.620	0.000	152.324	152.324	152.071
R	0+457.199	-0.001	30.479	-0.110	152.781	152.781	152.528
					(152.705 PG)		

RIGHT BEARING ELEVATION (m) : 151.233

* GIRDER 5

LENGTH (m) : 38.073 DELTA S (m) : 0.000 OFFSETS (m) : LEFT 2.362
RIGHT 2.472

LEFT BEARING ELEVATION (m) : 150.729

POINT	STATION (km)	OFFSET (m)	X-COORD (m)	Y-COORD (m)	TOP SLAB AT PG. (m)	TOP SLAB (m)	BOT SLAB (m)
L	0+419.100	2.362	-7.620	-2.362	152.324	152.277	152.024
R	0+457.199	2.361	30.453	-2.472	152.781	152.685	152.432
					(152.705 PG)		

RIGHT BEARING ELEVATION (m) : 151.137

* GIRDER 6

LENGTH (m) : 38.047 DELTA S (m) : 0.000 OFFSETS (m) : LEFT 4.724
RIGHT 4.834

LEFT BEARING ELEVATION (m) : 150.660

POINT	STATION (km)	OFFSET (m)	X-COORD (m)	Y-COORD (m)	TOP SLAB AT PG. (m)	TOP SLAB (m)	BOT SLAB (m)
L	0+419.100	4.724	-7.620	-4.724	152.324	152.208	151.955
R	0+457.199	4.723	30.427	-4.834	152.781	152.578	152.325
					(152.705 PG)		

RIGHT BEARING ELEVATION (m) : 151.030

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                              PAGE 11
Input File: Ex1.dat                                              02/10/2019  10:42:56
--------------------------------------------------------------------------------
                                EXAMPLE PROBLEM 1
                                 OUTPUT (cont.)
--------------------------------------------------------------------------------

                                  SPAN  2 (cont.)
                                  ---------------

   * GIRDER  7

   LENGTH (m) : 38.022  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     7.087
                                                             RIGHT    7.196

   LEFT BEARING ELEVATION (m)  :  150.566

                                                    TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD     AT PG.    TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)        (m)        (m)       (m)

     L     0+419.100   7.087   -7.620   -7.087    152.324    152.114   151.861

     R     0+457.199   7.085   30.402   -7.196    152.781    152.459   152.206
                                                 ( 152.705 PG)

   RIGHT BEARING ELEVATION (m) :  150.911

   OVERHANG (m) :  MINIMUM  0.763  MAXIMUM  0.765

                                       SPAN  3
                                       -------

   LENGTH ALONG LEFT BEARING LINE FROM O/O OF PARAPETS (m)  : 15.700
   LENGTH ALONG RIGHT BEARING LINE FROM O/O OF PARAPETS (m) : 15.700

   * GIRDER  1

   LENGTH (m) : 38.408  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -6.977
                                                             RIGHT   -5.825

   LEFT BEARING ELEVATION (m)  :  151.293

                                                    TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD     AT PG.    TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)        (m)        (m)       (m)

     L     0+457.199  -7.088   30.556    6.977    152.781    152.841   152.588
                                                 ( 152.705 PG)

     R     0+495.301  -7.087   68.947    5.816    153.232    153.382   153.129
                                                 ( 153.086 PG)

   RIGHT BEARING ELEVATION (m) :  151.834

   OVERHANG (m) :  MINIMUM  0.762  MAXIMUM  0.763
```

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                              PAGE 12
Input File: Ex1.dat                                          02/10/2019  10:42:56
-------------------------------------------------------------------------------
                                EXAMPLE PROBLEM 1
                                 OUTPUT (cont.)
-------------------------------------------------------------------------------

                                 SPAN  3 (cont.)
                                 ---------------

   * GIRDER  2

   LENGTH (m) : 38.305  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -4.615
                                                            RIGHT   -3.463

   LEFT BEARING ELEVATION (m)  :  151.355

                                                  TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD    AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)       (m)       (m)       (m)

     L     0+457.199  -4.726   30.530    4.615   152.781   152.903   152.650
                                          ( 152.705 PG)

     R     0+495.301  -4.725   68.818    3.458   153.232   153.430   153.177
                                          ( 153.086 PG)

   RIGHT BEARING ELEVATION (m) :  151.882

   * GIRDER  3

   LENGTH (m) : 38.202  DELTA S (m) :  0.000  OFFSETS (m) : LEFT    -2.252
                                                            RIGHT   -1.100

   LEFT BEARING ELEVATION (m)  :  151.330

                                                  TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD    AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)       (m)       (m)       (m)

     L     0+457.199  -2.363   30.505    2.252   152.781   152.878   152.625
                                          ( 152.705 PG)

     R     0+495.301  -2.362   68.689    1.098   153.232   153.373   153.120
                                          ( 153.086 PG)

   RIGHT BEARING ELEVATION (m) :  151.825

   * GIRDER  4

   LENGTH (m) : 38.099  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     0.110
                                                            RIGHT    1.262
```

Figure 8.1-2 Output (cont.)

EXAMPLE PROBLEM 1
OUTPUT (cont.)

SPAN 3 (cont.)

LEFT BEARING ELEVATION (m) : 151.233

POINT	STATION (km)	OFFSET (m)	X-COORD (m)	Y-COORD (m)	TOP SLAB AT PG. (m)	TOP SLAB (m)	BOT SLAB (m)
L	0+457.199	-0.001	30.479	-0.110	152.781 (152.705 PG)	152.781	152.528
R	0+495.301	-0.000	68.560	-1.260	153.232 (153.086 PG)	153.232	152.979

RIGHT BEARING ELEVATION (m) : 151.684

* GIRDER 5

LENGTH (m) : 37.996 DELTA S (m) : 0.000 OFFSETS (m) : LEFT 2.472
RIGHT 3.624

LEFT BEARING ELEVATION (m) : 151.137

POINT	STATION (km)	OFFSET (m)	X-COORD (m)	Y-COORD (m)	TOP SLAB AT PG. (m)	TOP SLAB (m)	BOT SLAB (m)
L	0+457.199	2.361	30.453	-2.472	152.781 (152.705 PG)	152.685	152.432
R	0+495.301	2.362	68.431	-3.619	153.232 (153.086 PG)	153.090	152.837

RIGHT BEARING ELEVATION (m) : 151.542

* GIRDER 6

LENGTH (m) : 37.893 DELTA S (m) : 0.000 OFFSETS (m) : LEFT 4.834
RIGHT 5.986

LEFT BEARING ELEVATION (m) : 151.030

POINT	STATION (km)	OFFSET (m)	X-COORD (m)	Y-COORD (m)	TOP SLAB AT PG. (m)	TOP SLAB (m)	BOT SLAB (m)
L	0+457.199	4.723	30.427	-4.834	152.781 (152.705 PG)	152.578	152.325
R	0+495.301	4.724	68.303	-5.977	153.232 (153.086 PG)	152.949	152.696

Figure 8.1-2 Output (cont.)

```
Bridge Geometry, Version 1.2.0.0                                              PAGE 14
Input File: Ex1.dat                                              02/10/2019  10:42:56
-------------------------------------------------------------------------------------
                                  EXAMPLE PROBLEM 1
                                   OUTPUT (cont.)
-------------------------------------------------------------------------------------

                                   SPAN  3 (cont.)
                                   ---------------

   RIGHT BEARING ELEVATION (m) :  151.401

   * GIRDER  7

   LENGTH (m) : 37.790  DELTA S (m) :  0.000  OFFSETS (m) : LEFT     7.196
                                                            RIGHT    8.348

   LEFT BEARING ELEVATION (m)  :  150.911

                                                      TOP SLAB
   POINT   STATION    OFFSET  X-COORD  Y-COORD   AT PG.   TOP SLAB  BOT SLAB
             (km)       (m)     (m)      (m)      (m)       (m)       (m)

     L     0+457.199   7.085   30.402   -7.196   152.781   152.459   152.206
                                              ( 152.705 PG)

     R     0+495.301   7.086   68.174   -8.336   153.232   152.808   152.555
                                              ( 153.086 PG)

   RIGHT BEARING ELEVATION (m) :  151.260

   OVERHANG (m) :  MINIMUM  0.764  MAXIMUM  0.765
```

Figure 8.1-2 Output (cont.)

9 TECHNICAL QUESTIONS AND REVISION REQUESTS

This chapter contains a reply form to make it easier for users to convey their questions, problems or comments to the proper unit within the Department. General procedures for using these forms are given. Users should keep the forms in the manual as a master copy which can be reproduced as needed. It is also included as a Word template as part of the program installation.

Technical questions related to the interpretations of the design specifications as implemented in this program, why certain assumptions are made, applicability and limitations of this program, and other questions not related to the operation of this program can be directed to the appropriate person in PennDOT using the form or the information provided on the form. Please review the information provided in this User's Manual and the references given in Chapter 1 before submitting this form for processing or calling for assistance.

The form can also be used to report suspected program malfunctions that may require revisions to the program or to request revisions that may be required due to changes in specifications and for the enhancement of the program. Unexpected or incorrect output, rejection of input data, endless program cycling, and program abortion are examples of program malfunctions. Users are requested to review their input data and the program User's Manual before submitting the form for processing.

The form may also be used to submit suggestions for improving the User's Manual for this program. Suggestions might include typographical error correction, clarification of confusing sections, expansion of certain sections, changes in format, and the inclusion of additional information, diagrams, or examples.

The completed form should be sent to the Engineering Software Section via fax or e-mail.

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BRGEO
TECHNICAL QUESTION / REVISION REQUEST

This form is to be used to report suspected program malfunctions, or to request revisions to the program or its documentation. Users are requested to review their input data and the program User's Manual before submitting this form.

CONTACT PERSON: _____ DATE: _____
ORGANIZATION: _____ PHONE: _____
E-MAIL ADDRESS: _____ FAX: _____
PROGRAM VERSION: _____

Define your problem and attach samples and/or documentation you feel would be helpful in correcting the problem. If the input data is more than 4 or 5 lines, please provide the input data file as an e-mail attachment. If you require more space, use additional 8½ x 11 sheets of plain paper.

FORWARD COMPLETED FORM TO:
Pennsylvania Office of Administration
Infrastructure and Economic Development
Bureau of Solutions Management/ Highway Applications Division
Commonwealth Keystone Building, 5th Floor
400 North Street
Harrisburg, PA 17120-0041
PHONE: (717) 787-8407 / (717) 783-8822
E-MAIL: penndotbisengineer@pa.gov

FOR DEPARTMENT USE ONLY

RECEIVED BY: _____ ASSIGNED TO: _____ DATE: _____

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