HEC-RAS Geometry elements not currently included in the RAS IDM as of 8/24/04

1. Header – The data from the 3 header lines is not stored (not essential).
2. Junction – No junction data is directly stored in the current IDM.
3. Reach – The reach data is not directly stored in the current IDM. The stream lines are stored, but not in the form used by the model.
4. Cross Section – Some of the basic and all of the optional elements for the cross section element. Most of what is in the IDM now for cross sections is geared to storing GeoRAS data and not the data that is directly used within the model. There also needs to be some means of identifying cross sections as interpolated. These sections are stored identically to standard cross sections except that the RM (river station/mile) ends in an asterix.
5. Culvert – Need provision for centerline stations for multiple barrels within a single culvert group.
6. Bridge – Need table to store internal bridge cross sections (these may be different from the bounding sections), need table for sloped abutments
7. Multiple Opening – Need fields for stagnation points
8. Inline Weir – The maximum number of gate openings is 25, the IDM has space for 6
9. Footer – No provision is currently made for the storage of channel modification data (this may not be essential)

Header Information
Geom Title=[Geometry title - 40char]
Program Version=3.12
Viewing Rectangle= LLX , URX , LLY , URY

Repeat this section for as many junctions as a present in the model.
Note that a split-flow junction definition would have one "Up River, Reach" line and two "Dn River, Reach" lines.
Junct Name=[Name *(16char)*]
Junct Desc=[Descr *(255char - all on one line)*],x1 ,x2 ,x3
x1=Toggle: (0=Energy, -1=Momentum)
x2=Toggle: Add Weight Component (0=No default, -1=yes) Momentum Solution
x3=Toggle: Add Friction Component (0=No, -1=yes default) Momentum Solution
Junct X Y & Text X Y=JX,JY,TX,TY
Up River,Reach=[River-16char],[Reach-16char] *(1)*
Up River,Reach=[River-16char],[Reach-16char] *(2)*
Dn River,Reach=[River-16char],[Reach-16char] *(3)*
Junc L&A=[Length],[Angle-Momentum only] *(3to1)*
Junc L&A=[Length],[Angle-Momentum only] *(3to2)*

Each river reach is a separate section in the model. This section serves as the header for each set of cross sections and structures within a reach.
River Reach=[River *(16char)*],[Reach *(16char)*]
Reach XY= [n - *Number of vertices (500 max)*]
X1 Y1 X2 Y2
..... Xn yn
Most appear to be separated by a space. However, at least one had no spaces between x's and y's. There appear to be 15-16 characters per x or y. There are two xy pairs per line with as many lines as necessary to reach n. Numbers are double precision.
Rch Text X Y=X,Y
Reverse River Text= [Toggle - 0=default, -1=reversed]

Cross section element. Several of the cross section data items are optional and may not be present in the geometry file for a particular cross section. These items are ineffective flow, levees, blocked obstructions, ice, lidded cross section, rating curve, skew and vertical variation of n-values.

Type RM Length L Ch R = x1 ,x2,x3,x4,x5

x1=Element Type (1=cross section, 2=Culvert, 3=bridge, 4=multiple opening 5=lateral weir, 6=inline weir)

x2=River station/mile (cross section identifier)

x3=Left overbank reach length

x4=Channel reach length

x5=Right overbank reach length

BEGIN DESCRIPTION:

[*Max 512char description*]

END DESCRIPTION:

XS GIS Cut Line=n

X1 Y1 X2 Y2

..... Xn yn

Two xy pairs per line with spaces separating numbers (double precision)

Node Last Edited Time=Aug/20/2004 15:55:25

#Sta/Elev= n

sta1 elev1 sta2 elev2 sta3 elev3 sta4 elev4 sta5 elev5

.... stan elevn

Five pairs per line (double precision)

#Mann= x1 , x2 , x3

x1=Number of n-values (or roughness heights). 3 is default

x2=Toggle: 0=n-values change at bank points (default), -1=horizontal variation

x3=Toggle: 0=use n-values (default), -1=use roughness heights (k)

sta1 n1 k1 sta2 n2 k2 sta3 n3 k3

.... stan nn kn

Three sets of station, n and k per line. Default for x1=3 has leftmost station as first station value, left bank then right bank. The k values are 0 by default.

#XS Ineff= x1 ,-1

x1=Number of ineffective area settings (default, if present, is 2)

x2=Toggle: 0=Normal (default), -1=Multiple

Lsta1 Rsta1 elev1 Lsta2 Rsta2 elev2 Lsta3 Rsta3 elev3

.... Lstan Rstan elevn

Three sets of ineffective blocks per line. As many lines as required (max of 10 blocks).

Permanent Ineff=

F F

Toggles to indicate whether the left and right ineffective areas should still be in force once overtopped (F=no, T=yes). Up to 10 per line, one for each ineffective block.

Levee=x1,x2,x3,x4,x5,x6,,

x1=Toggle: 0=no levee on left bank, -1=yes levee on left bank

x2=Station of left levee

x3=Elevation of left levee

x4=Toggle: 0=no levee on right bank, -1=yes levee on right bank

x5=Station of right levee

x6=Elevation of right levee

x7=? Does not appear to be used

X8=? Does not appear to be used

#Block Obstruct= x1 ,x2

x1=Number of blocked obstructions (default=2, max=20)

x2=Toggle: 0=Normal (2 obstructions, 1 on left bank, 1 on right bank)

Lsta1 Rsta1 elev1 Lsta2 Rsta2 elev2 Lsta3 Rsta3 elev3

.. .. .. Lstan Rstan elevn

Minimum of 1 set (if blocked obstructions used), maximum of 3 sets per line with as many lines required up to 20 blocked obstructions.

Ice Thickness=x1,x2,x3
x1=left bank thickness
x2=Channel thickness
x3=right bank thickness

Ice Mann=nL,nC,nR
nL=left bank ice cover Manning's n
nC=channel bank ice cover Manning's n
nR=right bank ice cover Manning's n

Ice Specific Gravity=0.916 *(default)*
Ice Is Channel=-1 *(Toggle for wide river ice jam: 0=no, -1=yes in channel)*
Ice Is OB= 0 *(Toggle for wide river ice jam: 0=no, -1=yes in channel)*
Ice Friction Angle=45 *(default)*
Ice Porosity=0 *(default)*
Ice K1=0.33 *(default)*
Ice Max Mean Vel=5 *(default)*
Ice Cohesion=0 *(default - cannot be changed by user)*
Ice Fixed Mann=-1 *(Toggle: 0=User n-values, -1=from Nezhikovsky's data)*
#XS Lid=n *(number of station, upper and lower elev sets to define lid)*
Sta1 Uelev1 Lelev1 Sta2 Uelev2 Lelev2 Lelev1 Sta2 Uelev2 Lelev2
Station, upper lid elevation, lower lid elevation sets to define lid (minimum of 2 sets, maximum of 500 sets)

Bank Sta=Lbank,Rbank *(left and right channel bank stations {double precision})*
XS Rating Curve= n ,x
n=number of data pairs used to define rating curve
x=Toggle: 0=No, -1=yes for headwater check
0 960 2000 965 5000 970 20000 980
Sediment Elevation=Elev *(sediment elevation for cross section)*
Skew Angle= Angle *(0-90 degrees)*
Vertical n Elevations= n *(max=20)*
Elev1 Elev2 Elev3 .. Elevn *(max=20)*
Vertical n for Station=Sta1
n11 n21 n31 .. nn1
Vertical n for Station=Sta2
n12 n22 n32 .. nn2
Vertical n for Station=...
.. ..
Vertical n for Station=Stan *(max=20)*
n1n n2n n3n .. nnn
Vertical n Flow= n *(max=20, 0 if elevation used)*
Same data structure for variation by flow as used for variation by elevation.
Exp/Cntr=0.3,0.1 (default values)

Culvert Section
Type RM Length L Ch R = 2 ,186312.5,,,
BEGIN DESCRIPTION:
Culvert#2
END DESCRIPTION:
Node Last Edited Time=Aug/20/2004 13:09:37
Bridge Culvert--1,0,-1,-1, 0
Deck Dist Width WeirC Skew NumUp NumDn MinLoCord MaxHiCord MaxSubmerge Is_Ogee
20,100,2.6,0, 3, 3, , , 0.95, 0, 0,0,,
0 603.49 1467.46
1035 1035 1035
1010 1010 1010

```
       0  603.49 1467.46
    1035    1035    1035
    1010    1010    1010
BR Coef=-1 , 0 , 0 ,, 0 ,,,0.8,-1,,0,
WSPro=,,,, 1 ,,,, 0 ,,,, 0 ,,,,-1 ,-1 ,-1 , 0 , 0 , 0 , 0 , 0
Multiple Barrel Culv=2,5,10,100,0.013,0.7,1,8,1,1017.35,1017.35, 2,Culvert #2  , 0 ,20
     946     946   986.9   986.9
Culvert Bottom n=1
Culvert Bottom Depth=1
Culvert Depth Blocked=0.5
Multiple Barrel Culv=1,10,,40,0.013,0.7,1,1,1,1015.35,1015.35, 3,Culvert #1  , 0 ,20
   956.2   956.2   966.4   966.4   976.7   976.7
Culvert Bottom n=0.013
BC Design=,, 0 ,, 0 ,,,,,,


Bridge Section
Type RM Length L Ch R = 3 ,188300  ,,,
BEGIN DESCRIPTION:
Bridge
END DESCRIPTION:
Node Last Edited Time=Aug/19/2004 14:46:15
Bridge Culvert--1,0,-1,-1, 0
Deck Dist Width WeirC Skew NumUp NumDn MinLoCord MaxHiCord MaxSubmerge Is_Ogee
50,100,2.6,0, 6, 6, , , 0.95, 0, 0,0,,
       0     430     430     910     910    2000
    1040    1040    1040    1040    1040    1040
    1010    1010    1035    1035    1010    1010
       0     570     570    1025    1025    2000
    1040    1040    1040    1040    1040    1040
    1010    1010    1035    1035    1010    1010
Pier Skew, UpSta & Num, DnSta & Num=  ,450, 2 ,600, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,490, 2 ,640, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,530, 2 ,680, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,570, 2 ,720, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,610, 2 ,760, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,650, 2 ,800, 2 , 0 , 0 , 0 ,,
```

```
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,690, 2 ,840, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,730, 2 ,880, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,770, 2 ,920, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,810, 2 ,960, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,850, 2 ,1000, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Pier Skew, UpSta & Num, DnSta & Num=  ,890, 2 ,1040, 2 , 0 , 0 , 0 ,,
    1.25    1.25
    1030    1035
    1.25    1.25
    1030    1035
Abutment Skew #Up #Dn= , 2 , 2
     430  446.82
    1035 1022.27
     570  588.47
    1035 1027.14
BR Coef=-1 , 1 , 1 ,1.25, 0 ,,0.34,0.8,0,2,0,
WSPro=,,,, 1 ,,,, 0 ,,,, 0 ,,,,-1 ,-1 ,-1 , 0 , 0 , 0 , 0 , 0
BC Design=,, 0 ,, 0 ,,,,,,
BC HTab HWMax=1025


Multiple Opening Section
Type RM Length L Ch R = 4 ,188800  ,,,
BEGIN DESCRIPTION:
Culvert#1
END DESCRIPTION:
Node Last Edited Time=Aug/21/2004 15:08:50
Bridge Culvert--1,0,-1,-1, 0
Deck Dist Width WeirC Skew NumUp NumDn MinLoCord MaxHiCord MaxSubmerge Is_Ogee
20,100,2.6,0, 8, 8, , , 0.95, 0, 0,0,,
       0  603.49    1250    1270    1270    1400    1400    1600
    1035    1035    1035  1035.5  1035.5    1038    1038    1042
    1010    1010    1010    1010  1033.5    1036    1010    1010
```

```
       0  603.49    1250    1270    1270    1400    1400    1600
    1035    1035    1035  1035.5  1035.5    1038    1038    1042
    1010    1010    1010    1010  1033.5    1036    1010    1010
Pier Skew, UpSta & Num, DnSta & Num=  ,1340, 4 ,1340, 4 , 0 , 0 , 1 ,10,5
       3       3       2       2
    1010    1030    1030    1035
       3       3       2       2
    1010    1030    1030    1035
Abutment Skew #Up #Dn= , 2 , 2
    1270    1280
  1033.5    1028
    1270    1280
  1033.5    1028
Abutment Skew #Up #Dn= , 2 , 2
    1392    1400
  1027.5    1036
    1392    1400
  1027.5    1036
BR Coef=-1 , 1 , 0 ,, 0 ,,,0.8,-1,1.2,6,
WSPro=,,,, 1 ,,,, 0 ,,,, 0 ,,,,-1 ,-1 ,-1 , 0 , 0 , 0 , 0 , 0
Multiple Barrel Culv=2,5,10,100,0.013,0.7,1,8,1,1025,1024, 2,Culvert #2  , 0 ,20
     832   829.8   867.5   870.7
Culvert Bottom n=0.013
Multiple Barrel Culv=1,8,,40,0.013,0.7,1,1,1,1024,1023, 3,Culvert #1  , 0 ,20
   841.7     840     850     850   858.3   860.2
Culvert Bottom n=0.013
BC Mult= 2 ,0,1150,0,1150
BC Mult= 3 ,1150,2882.25,1150,2882.25
BC Design=,, 0 ,, 0 ,,,,,,


Inline Weir Section
Type RM Length L Ch R = 5 ,177463.9,,,
Node Last Edited Time=Aug/19/2004 14:53:43
IW Pilot Flow=0
#Inline Weir SE= 9
       0    1025 1544.18    1025 1544.18    1005 1694.18    1005 1694.18     990
 1744.18     990 1744.18    1005 1744.18    1025    3000    1025
IW Dist,WD,Coef,Skew,MaxSub,Min_El,Is_Ogee,SpillHt,DesHd
40,50,2.8,0,0.95,, 0 ,,,2,2,
IW Gate Name
Wd,H,Inv,GCoef,Exp_T,Exp_O,Exp_H,Type,WCoef,Is_Ogee,SpillHt,DesHd,#Openings
Gate #1     ,50,10,990,0.8,0.16,0.72,0.62, 1 ,3, 0 ,,, 3 ,10,0.8, 0
    1450    1505    1560


Lateral Weir Section
Type RM Length L Ch R = 6 ,183000  ,,,
Node Last Edited Time=Aug/19/2004 16:49:22
Lateral Weir Pos= 3
Lateral Weir End=                ,               ,        ,
Lateral Weir Distance=20
Lateral Weir WD=30
Lateral Weir Coef=2
Lateral Weir Is Ogee= 0
Lateral Weir WSCriteria=-1
Lateral Weir Flap Gates= 0
```

```
Lateral Weir SS=0.05,0.05,
Lateral Weir Type= 0
Lateral Weir Connection Pos and Dist= 0 ,
Lateral Weir SE= 6
       0    1035     100    1035     100    1020     150    1020     150    1035
     200    1035
LW Gate Name
Wd,H,Inv,GCoef,Exp_T,Exp_O,Exp_H,Type,WCoef,Is_Ogee,SpillHt,DesHd,#Openings
Gate #1     ,10,10,1010,0.6,0,1,0.5, 0 ,3, 0 ,,, 4 ,0,0.8, 0
      35      46      57      68
LW Div RC= 0 ,False,


Channel Modification and GIS Information
Chan Stop Cuts=-1
Chan Mod River=Salado
Chan Mod Reach=Reach2
Chan Mod RS=183346.8,0,469.99,580.65,574.69,1783.65,100,990,3,3,0.035,,,995,,,,,,995,,,
Chan Mod RS=182766.1,0,596.86,537.05,309.75,1745.2,100,984.19,3,3,0.035,,,989.19,,,,,,989.19,,,
Chan Mod RS=182229.1,0,1379.64,1130.91,330.32,1627.88,100,978.82,3,3,0.035,,,983.82,,,,,,983.82,,,
Use User Specified Reach Order=0
User Specified Reach Order=River           ,Reach1
GIS Units=
GIS DTM Type=TIN
GIS DTM=J:\HYDRO\441184_SARB\AB17851\TestDataset\tin
GIS Stream Layer=J:\HYDRO\441184_SARB\AB17851\TestDataset\case1.mdb\River
GIS Cross Section Layer=J:\HYDRO\441184_SARB\AB17851\TestDataset\case1.mdb\XSCutLines
GIS Map Projection=STATEPLANE
GIS Projection Zone=
GIS Datum=NAD83
GIS Vertical Datum=
```