

Survey

Processing

Guidelines

Georgia Department of Transportation

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**Current with
CAiCE Visual Transportation 10**

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Survey Processing Guidelines

Preface

These guidelines have been developed as part of the ongoing standardization process for the survey effort. These guidelines are implemented as approved by members of the Preconstruction Automation Committee. The intent of this document is to provide guidelines for processing survey data. The Guidelines cover the processing of aerial mapped projects, as well as field surveyed data in the form of an ASC file. Distinctions are made between the two types of datum throughout this document. **Automated survey data should be gathered, processed, formatted, and submitted in accordance with these guidelines. It is the responsibility of the District SDE to prepare, convert, and enhance all mapping and survey data prior to delivery to the Project Manager or Designer. At no time should the Project Manager or Designer revise, edit, or enhance this data.** Updates to this document will be made periodically when minor revisions, additional information, and/or enhancements are added.

If there is any approved deviation from the standard file and data naming/feature code conventions as prescribed by this document, a detailed description of the deviation(s) and approved reasons for the deviation(s) shall be documented and included with the project files in electronic format. All electronic documentation files shall be provided in a Microsoft Word format and located in a *Documentation* sub-folder of the project directory.

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Section 1 – Standard Conventions

I. Object Numbering and Naming

A. Point Numbering

Point numbering for the Location Survey should begin with the lowest available point number. In some cases this will be the first number higher than the control survey (ref. CTL File). This also applies to computed and digitized points. Point numbering should always be done consecutively. Once a point number has been used with any given alpha prefix (*SVX01*), it may not be used again with any other alpha prefix (*SVXA1*, *EP1*, *PRP1*, etc.). This applies **ONLY** to field Location Survey points.

Point numbers 1 - 9,999 are reserved for survey activities and data processing. However, if more points are required, the numbering should continue consecutively as needed.

When additional survey data is gathered in the field, the point numbers should begin with the lowest number that has not already been submitted to design. However, once the total number of survey points has reached the 9,999 point limit, the Survey Data Engineer should contact the designer and obtain a starting point number and the next available chain number.

Each time additional survey data is gathered, the new data should be added to the original database. This database is to be maintained by the District.

If the location survey exceeds 9,999 points, it shall be the responsibility of the designer to re-number his design points.

A gap in point numbering should only exist where the location survey points total less than 9,999. All other numbering gaps should be minimized.

B. Standard CAiCE Survey Prefixes

The prefix for CEAL DMM files converted to CAiCE SRV files using the **DMMTOSRV** program will be as follows:

“DM” + “segment letter”

where *“segment letter”* corresponds to the CAiCE project segment through which the SRV file will be imported (ie: *DMA*, *DMB*, etc.).

The prefix for SMI ASC files converted to CAiCE SRV files using the **ASCSRV** program will be as follows:

“SV” + “*segment letter*”

where “*segment letter*” corresponds to the CAiCE project segment through which the SRV file will be imported (ie: SVA, SVB, etc.). This prefix is automatically assigned by the ASCSRV program.

The prefix for objects generated in CAiCE while processing the survey data will be as follows:

“SV” + “*segment letter*”

where “*segment letter*” corresponds to the CAiCE project segment currently being processed (ie: SVA, SVXO, SVXA etc.).

II. CAiCE Segment Naming Conventions

The number of CAiCE project segments to be created will be based on the number of survey files, with one segment being created for each survey file.

A. Original Survey Data

All original survey data will be imported through segments beginning with the single alpha character “A” and continuing through the number of alpha characters (“B”, “C”, etc.) needed to cover the number of original survey files (See diagram below).

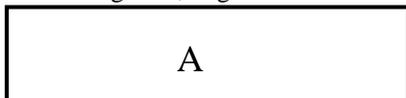
Field Surveyed Projects:

Full field survey projects will usually consist of only ONE original survey file, therefore, only ONE segment will be created initially, segment “A” (See diagram below).

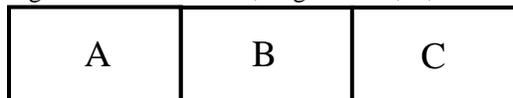
Aerial Mapped Projects:

Mapping projects may consist of multiple original survey files coming from the stereo plotter. This is due to breaking lengthy mapping projects into workable size units, thus creating multiple files that comprise the entire project. Therefore, multiple segments may need to be created beginning with the alpha character “A” and continuing through the number of alpha characters needed to cover the number of survey files (“B”, “C”, etc.) (See diagram below).

ONE Survey File (ASC File), so only ONE Segment, Segment “A”



Multiple survey files due to file sizes, so ONE segment for EACH file, Segments A, B, and C



B. Original Field Enhancements and Additional Survey Data Segments

All field enhancement and additional data segments will be designated as such by a two letter segment name beginning with “X”. The second letter will be based on the type of field survey data as described below.

Original Field Enhancements to Mapping Data:

Original field enhancement segments will conform to the following segment naming convention:

“X” = Field survey data segment

“O” = Original enhancements

Additional Survey Data:

Additional survey data segments will conform to the following segment naming convention:

“X” = Field survey data segment

“A” = First field enhancement data

Additional field enhancement survey data segments will simply be as follows:

“X” = Field survey data segment

“B” = Second field enhancement data

“X” = Field survey data segment

“C” = Third field enhancement data

and so forth. Conforming to these standard segment naming conventions provides an easy method of tracking and logging all survey data for a project.

NOTE: Field survey data (original enhancements to mapping or requested additional data) collected for a single submission over multiple days will be combined into ONE survey file (ONE ASC file resulting in ONE SRV file) and imported into CAiCE through ONE field segment (XO, XA, XB, etc.). In other words, one day’s field work does not constitute a segment. All field work for a single submission will be completed and combined into ONE survey file for importing and/or submission. (See Section on [“Reviewing Daily Survey Work”](#) in the *GDOT Surveyor’s Guide to CAiCE* for process information.)

III. CAiCE Zone Conventions

Zones in CAiCE are equivalent to levels in MicroStation or layers in AutoCAD. Zones allow for grouping of data and are used within the Department for grouping the various types of survey data.

Table 1.1 shows the zone specifications currently used within the Department.

Table 1.1

Zone	Source	Attribute	Description
1 – 9	G.O. and District Design Offices	2D – “F”	Design data
10 – 49	Aerial mapping or field	3D – “G”	Original segment data
50	District Field Survey/SDE	2D – “F”	Property (Geometry Chains)
51	District Field Survey/SDE	3D – “G”	3D Topographic data
52	District Field Survey/SDE	2D/3D – “F”	2D/3D Planimetric data

Zones 1-9 are reserved for use by design. Zones 10-49 will be used for the original Environment/Location stereo plotter SRV segment files or the original field surveyed SRV files. Each original survey data segment will correspond to a standard zone (ie: Segment “A” will correspond to Zone 10, Segment “B” will correspond to Zone 11,etc.) as shown in **Table 1.2**.

Table 1.2

Segment	Zone		Segment	Zone
A	10		N	23
B	11		O	24
C	12		P	25
D	13		Q	26
E	14		R	27
F	15		S	28
G	16		T	29
H	17		U	30
I	18		V	31
J	19		W	32
K	20		X	33
L	21		Y	34
M	22		Z	35

The topo data in an original field surveyed SRV file or in an enhanced mapping SRV file, which will be on zones 51-52, will need to be moved to the correct segment zones as discussed on the following page.

A. Original Survey Data

Mapping Projects:

Original survey data will normally come to the Survey Data Engineer as a SRV file which will be produced by the Photogrammetry Section of the Office of Environment/Location. The original survey data will be broken down into CAiCE zones by the photogrammetrist and will need to be directly imported into CAiCE using the *CAiCE Project Management System*. The original survey data will occupy Zones starting with 10 and continuing through the number of zones needed to cover the number of original survey segments (ie: 11, 12, etc.).

Zone 10	Zone 11	Zone 12
A	B	C

Field Surveyed Projects:

The original survey data will be in the form of a single field surveyed SRV file converted from an ASC file by using ASCSRV. In this case, the original survey data will occupy Zones 51 – 52 (See 3D Topographic Data and 2D/3D Planimetric Data below) based on the ASCSRV.TBL file and will need to be moved to the correct segment zone which will typically be Segment “A” or Zone 10.

B. Property Survey Data

Property points will come in from the field in the field enhanced SRV file or in the original field surveyed SRV file on **Zone 50**. These will be 2D (“F”) points that define any property corners found, property points on line, etc.

C. 3D Topographic Data

Data that will go to the DTM will come in from the field in the enhanced survey file or in the original field surveyed SRV file on **Zone 51**. This data will be moved to the correct segment zone later.

D. 2D/3D Planimetric Data

Data that has an attribute of “F” (other than property data) that will come in from the field in the enhanced survey file or in the original field surveyed SRV file will go to **Zone 52**. This data will be moved to the correct segment zone later.

IV. Project and File Naming Conventions

A. Project Name

All project names in CAiCE will be the P.I. Number of the project. For projects with **new** *TPRO* project numbers, the CAiCE project name will be the **last** six digits of the *TPRO* project number (ie: *TPRO* project number = 0001234 so CAiCE project name = 001234)

B. File Names

1. SRV Files

All CAiCE SRV filenames will conform to the standard, required CAiCE format of:

“ProjectName” + “SegmentLetter” .SRV

where *“ProjectName”* is the P.I. Number of the project and *“SegmentLetter”* is the segment through which the SRV file will be imported into CAiCE (ie: 123456A.SRV, 123456XO.SRV, etc.).

2. DTM File

When additional data is submitted to Design, a file of the new and revised DTM is also submitted along with the new, combined SRV file as documented below. The filename of the DTM file will be *Exist.zip*. This filename is automatically assigned by the macro used to compress the DTM Database. Please Note: the ZIP file format is now used instead of the LZH file format.

3. Property KCM Files

When additional/revised property is submitted to Design as documented in **Section 3**, the entire property data is submitted in the form of a CAiCE KCM file. The file naming scheme for the KCM file is as follows:

PI # + PR.KCM

ie: 123456PR.KCM

V. GDOT Standard Survey Feature Codes

SMI Code	Description	Feature Code	Zone	Point Type	Chain Type
1	TERRAIN POINT ON BREAK LINE	TPBL	51		G
2	RANDOM TERRAIN POINT	TRP	51	G	
3	RIGHT-OF-WAY MARKER FOUND	RWM	50	F	
4	RIGHT-OF-WAY POINT COMPUTED	RWC	50	F	
5	RIGHT-OF-WAY UTILIT COMPANY	RWU	50	F	
6	RIGHT-OF-WAY, EXISTING	RWE	50	F	
7	POINT ON EASEMENT LINE	POEL	50	F	
8	PROPERTY CORNER FOUND	PCF	50	F	
9	PROPERTY POINT ON LINE	PPOL	50	F	
10	PROPERTY POINT COMPUTED	PPC	50	F	
15	POINT ON TANGENT, EXISTING	APOT	50	F	
16	POINT OF CURVATURE, EXISTING	APOC	50	F	
17	POINT ON CURVE, EXISTING	APC	50	F	
18	POINT OF TANGENCY, EXISTING	APT	50	F	
19	POINT OF INTERSECTION	API	50	F	
20	ALIGNMENT CENTERLINE	ACL	52		F
24	EDGE OF DIRT ROAD	TEDR	51		G
25	EDGE ASPHALT DRIVE	TEAD	51		G
26	EDGE CONCRETE DRIVE	TECD	51		G
27	EDGE ASPHALT PAVEMENT	TEAP	51		G
28	EDGE ASPHALT SHOULDER	TEAS	51		G
29	EDGE CONCRETE PAVEMENT	TECP	51		G
30	EDGE SURFACE TREATMENT ROAD	TEST	51		G
31	CURB, ASPHALT	TAC	51		G
32	CURB, HEADER	THC	51		G
33	CURB & GUTTER, TOP	TCGT	51		G
34	CURB & GUTTER, F/L	TCGF	51		G
35	V-GUTTER	TVG	51		G
36	BRIDGE APPROACH SLAB, EDGE	TBAS	51		G
37	BRIDGE END, CENTER	TBRDG	52		F
38	BRIDGE END, CORNER	TBRDG	52		F
39	BRIDGE COLUMN, CENTER	TCOLC	52	F	
40	BRIDGE COLUMN, EDGE	TCOLE	52	F	
41	BRIDGE GUTTER LINE	TBGL	52		F
42	BRIDGE CENTERLINE	TBCL	52		F
43	ENDROLL	TENDROLL	51		G
44	BRIDGE CAP	TBCAP	52	F	
45	SINGLE CATCH BASIN,Gutr F/L	DCB	52	F	
47	DOUBLE CATCH BASIN,Gutr F/L	DDCB	52	F	
49	DROP INLET, TOP	DDI	52	F	
50	SPUR DIKE	DSPURDK	51		G
51	TOP OF WATER ELEVATION	DWE	52	F	

SMI Code	Description	Feature Code	Zone	Point Type	Chain Type
52	STREAM CENTER, F/L	DSC	51		G
53	STREAM EDGE	DSE	51		G
54	STREAM BANK TOP	DSB	51		G
55	DAM, TOP	DDT	51		G
56	DAM, TOE	DADB	51		G
57	OBSCURED AREA	OBSC	51		G
58	CULVERT END, F/L	DCEF	52		F
59	HEAD WALL, END	DHWE	52		F
60	CULVERT, WINGWALL END	DCWE	52		F
61	EDGE OF WATER	DEW	52		F
62	SWAMP EDGE	DSWE	52		F
63	WETLAND BOUNDARY	DWB	52		F
68	STRAIN POLE	USTRPOL	52	F	
69	ELECTRICAL BOX	UELBOX	52		F
70	OVERHEAD ELECTRICAL LINE	UOEL	52		F
71	OVERHEAD TELEPHONE LINE	UOTL	52		F
72	POWER POLE, CENTER	UPP	52	F	
73	LIGHT POLE, CENTER	ULP	52	F	
74	TELEPHONE POLE, CENTER	UTP	52	F	
75	TELEPHONE PEDESTAL, CENTER	UTPD	52	F	
76	GUY POLE, CENTER	UGP	52	F	
77	POLE ANCHOR	UPGA	52	F	
78	YARD LIGHT, ELECTRICAL	UYLE	52	F	
79	YARD LIGHT, GAS	UYLG	52	F	
80	WATER METER, CENTER	UWM	52	F	
81	WATER VALVE, CENTER	UWV	52	F	
82	FIRE HYDRANT, CENTER	UFH	52	F	
83	MANHOLE STORM SEWER, TOP	UMHST	52	F	
84	MANHOLE STORM SEWER, F/L	UMHSTF	52	F	
85	MANHOLE, TELEPHONE, TOP	UMHT	52	F	
86	MANHOLE, ELECTRICAL, TOP	UMHE	52	F	
87	MANHOLE, SANIARY SEWER, TOP	UMHSS	52	F	
88	MANHOLE, SANITARY SEWER,F/L	UMHSSF	52	F	
89	SANITARY SEWER LINE, CENTER	USSL	52	F	
90	GAS METER, CENTER	UGM	52	F	
91	GAS VALVE, CENTER	UNGV	52	F	
92	GAS VENT PIPE	UNGVP	52	F	
93	GAS LINE MARKER	UNGLM	52	F	
95	WALL FACE	TWF	52		F
96	WALL FACE, TOP	TWFT	51		G
97	WALL FACE, BOTTOM	TWFB	51		G
98	IRRIGATION PIVOT POINT	TIRRPVTP	52	F	
99	IRRIGATION LIMITS	TIRRLMT	52	F	
100	SIGN, CENTER	TS	52	F	

SMI Code	Description	Feature Code	Zone	Point Type	Chain Type
101	GASOLINE MONITORING WELL	TGMW	52	F	
102	GASOLINE FILLER VALVE	TGFV	52	F	
103	GASOLINE VENT PIPE	TGVP	52	F	
104	GASOLINE PUMP	TGP	52	F	
105	GASOLINE STORAGE TANK, END	TGST	52		F
106	GASOLINE PUMP ISLAND	TGPI	52		F
107	CANOPY	TCAN	52		F
108	BUILDING CORNER	TBLD	52		F
109	BUILDING ROOF LINE CORNER	TBLDRL	52		F
110	HOUSE CORNER	THCR	52		F
111	HOUSE ROOF LINE CORNER	THRL	52		F
112	MOBILE HOME CORNER	TMHCR	52		F
113	MOBILE HOME ROOF LINE CORNR	TMHRL	52		F
115	WOODS LINE	TWL	52		F
116	CULTIVATION LINE	TCUL	52		F
117	FENCE, FIELD WIRE	TFFW	52		F
118	FENCE, BARB WIRE	TFBW	52		F
119	FENCE, WOOD	TFW	52		F
120	RAILROAD, TOP OF RAIL	TRCR	52		F
121	RAILROAD, CENTERLINE	TRCL	52		F
122	CEMETERY LINE	TCEM	52		F
123	GRAVE	TGRV	52		F
124	GUARD RAIL	TGR	52		F
125	SIGN, END	TS	52		F
126	SATELLITE DISH	TSATDSH	52	F	
127	LIMIT LINE	TLIML	51		G
128	CONSTRUCTION BOUNDARY, ACTV	TCBA	51		G
129	CONSTRUCTION BOUNDARY, FIND	TCBF	51		G
130	COUNTY LINE	BCOL	50		F
131	CITY LIMIT LINE	BCTL	50		F
132	LAND DISTRICT LINE	BLDL	50		F
133	LAND LOT LINE	BLLL	50		F
134	STATE LINE	BSL	50		F
150	Surv Defn'd	X	51	G	
151	Surv Defn'd	X	51	G	
152	Surv Defn'd	X	51	G	
153	Surv Defn'd	X	51	G	
154	Surv Defn'd	X	51	G	
155	Surv Defn'd	X	51	G	
156	Surv Defn'd	X	52	F	
157	Surv Defn'd	X	52	F	
158	Surv Defn'd	X	52	F	
159	Surv Defn'd	X	52	F	
160	Surv Defn'd	X	52	F	

SMI Code	Description	Feature Code	Zone	Point Type	Chain Type
161	Surv Defn'd	X	52	F	
162	Surv Defn'd	X	52	F	
163	Surv Defn'd	X	52	F	
164	Surv Defn'd	X	52	F	
165	Surv Defn'd	X	52	F	
166	Surv Defn'd	X	52	F	
167	Surv Defn'd	X	52	F	
168	Surv Defn'd	X	52	F	
169	Surv Defn'd	X	52	F	
170	Surv Defn'd	X	52	F	
171	Surv Defn'd	X	51		G
172	Surv Defn'd	X	51		G
173	Surv Defn'd	X	51		G
174	Surv Defn'd	X	51		G
175	Surv Defn'd	X	51		G
176	Surv Defn'd	X	52		F
177	Surv Defn'd	X	52		F
178	Surv Defn'd	X	52		F
179	Surv Defn'd	X	52		F
180	Surv Defn'd	X	52		F
181	Surv Defn'd	X	52		F
182	Surv Defn'd	X	52		F
183	Surv Defn'd	X	52		F
184	Surv Defn'd	X	52		F
185	Surv Defn'd	X	52		F
186	Surv Defn'd	X	52		F
187	Surv Defn'd	X	52		F
188	Surv Defn'd	X	52		F
189	Surv Defn'd	X	52		F
190	Surv Defn'd	X	52		F
191	Surv Defn'd	X	52		F
192	Surv Defn'd	X	52		F
193	Surv Defn'd	X	52		F
194	Surv Defn'd	X	52		F
195	Surv Defn'd	X	52		F
196	Surv Defn'd	X	52		F
197	Surv Defn'd	X	52		F
198	Surv Defn'd	X	52		F
199	Surv Defn'd	X	52		F
200	DRAINAGE PIPE, F/L,C	DP	52		F
201	DRAINAGE PIPE, F/L,M	DP	52		F
202	DRAINAGE PIPE, F/L,P	DP	52		F
210	SIDEWALK, CENTER	TSW	52		F
211	FENCE, CHAIN LINK	TFCL	52		F

SMI Code	Description	Feature Code	Zone	Point Type	Chain Type
212	TREE, CENTER	TTRE	52	F	
213	WELL	TWELL	52	F	
225	DIRT ROAD, C/L	TDR	51		G
227	DIRT DRIVE, C/L	TDD	51		G
235	MILE POST, RAILROAD	TMPR	52	F	
236	KM POST, HIGHWAY	TKMP	52	F	
237	MILE POST, HIGHWAY	TMPH	52	F	
240	NGS CONTROL MONUMENT	SNGSCM	52	F	
241	LOCATION CONTROL MONUMENT	SLCM	52	F	
242	LOCATION CONTROL DELTA	SLCD	52	F	
243	DISTRICT CONTROL DELTA	SDCD	52	F	
244	CONTROL RE-SHOT FOR CHECK	SCCHK	52	F	
245	BENCHMARK	SBNCHMK	52	F	
250	Miscellaneous	MISC	52	F	

Additional standard feature codes used for storing geometry chains in CAiCE are as follows:

- PAR** Property parcel chains generated by the SDE
- CONSTCL** Construction centerline chain **provided by the Design office** on new location projects.

VI. GDOT Standard Photogrammetric Feature Codes

AMSA Feature Code	CAiCE Topo Attrib.	CAiCE Feature Code
150	FP	BORDER
151	GP	DITCH
152	GP	EPSHLD
153	GP	EP
154	GP	TOC
155	GP	BOC
156	GP	CL
157	GP	CLIP
158	GP	RANDOM
159	GP	OBSC
160	GP	LAKE
161	GP	RRCL
162	GP	RIVERED
163	GP	TOWALL
164	GP	BOWALL
165	GP	BREAKLIN
166	GP	CONSTRB
5	GP	PAVEROAD

AMSA Feature Code	CAiCE Topo Attrib.	CAiCE Feature Code
6	GP	PAVESHLD
8	GP	CURBROAD
35	GP	CURBPARK
43	GP	DITCH
63	GP	PVDDRAIN
241	GP	TOC
242	GP	BOC
243	GP	BREAKLIN
244	GP	DEADIN
245	GP	RANDOM
246	FP	BORDER

VII. Standard File Download Locations

A. Internal to GDOT

All GDOT standard CAiCE files can be downloaded internally from the GDOT “R.O.A.D.S.” Homepage. For the Address or Location at the top, enter *TOPPS*. Then, make the following selections from the screens that follow:

- *GDOT Internal Web Server*
- *DOT Division and Office Pages*
- *Preconstruction Division*
- *R.O.A.D.S. Homepage*
- *Software Specific Files & Documentation*
- *Civil Design Software*
- *CAiCE Standard Files*
- *CAiCE Standard Files Download*

OR go straight to the link at:

http://www.dot.state.ga.us/dot/preconstruction/R-O-A-D-S/SWFilesDocs/SW_Design/SW_Design_KC_Files/index.shtml

A file called **CAICEALL.EXE** is available that will allow you to update all of the CAiCE standard files with one file. Download the file, execute it and specify the root drive of the CAiCE directory (default is C:\) and the files will be updated. This file is updated frequently. It is advisable to check the Web site weekly for the latest revisions. The latest revisions can be viewed by clicking on the “[CAiCEALL History \(Brief\)](#)” link, but a complete history of all revisions to the standard files can be viewed by clicking on the “[CAICEALL History \(Full\)](#)” link on the download page.

B. External to GDOT

All GDOT standard CAiCE files can be downloaded externally from the GDOT “R.O.A.D.S.” Homepage. To access the External GDOT CAiCE Homepage, enter Internet Explorer or Netscape. For the Address or Location at the top, enter *www.dot.state.ga.us*. Then, make the following selections from the screens that follow:

(From **Main Menu** selections on the left side of the screen)

- *About Georgia DOT*
- *General Information*
- *Divisions*
- *Preconstruction Division*
- *R.O.A.D.S. Homepage*
- *Software Specific Files & Documentation*
- *Civil Design Software*
- *CAiCE Standard Files*
- *CAiCE Standard Files Download*

OR go straight to the link at:

http://www.dot.state.ga.us/dot/preconstruction/R-O-A-D-S/SWFilesDocs/SW_Design/SW_Design_KC_Files/index.shtml

A file called **CAICEALL.EXE** is available that will allow you to update all of the CAiCE standard files with one file. Download the file, execute it and specify the root drive of the CAiCE directory (default is C:\) and the files will be updated. This file is updated frequently. It is advisable to check the Web site weekly for the latest revisions. The latest revisions can be viewed by clicking on the “CAiCEALL History (Brief)” link, but a complete history of all revisions to the standard files can be viewed by clicking on the “CAiCEALL History (Full)” link on the download page.

Section 2 – Initial Submission

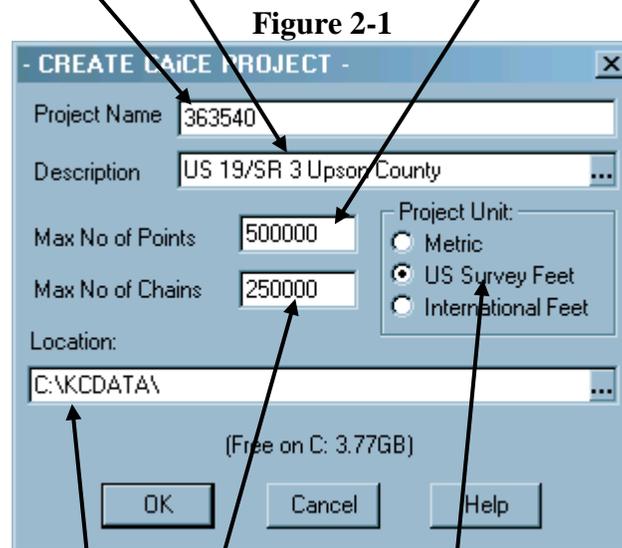
I. Create the New Project and Segments

A. Create the Project with the PI Number as the name (363540)

File=>Project Manager: Displays the *CAiCE Project Management System* dialog

From *CAiCE Project Management System*, select ***Project =>Create***

In the *Create CAiCE Project* dialog (see **Figure 2-1**), enter the **Project Name, Description, Max No of Points (500000),**



Max No of Chains (250000), Project Unit, and the project Location (KCDATA directory) and click on OK.

Set the *System Settings* as desired and click on **OK**.

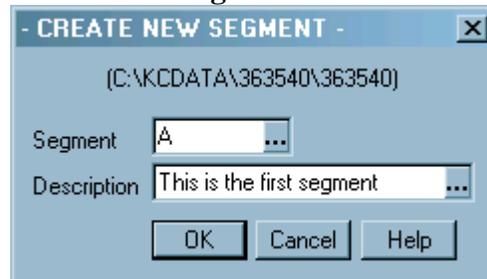
B. Create the correct number of segments

A segment will be created for each SRV file for the project. The first segment will be “A”, the second segment “B”, etc.

From the *CAiCE Project Management System* dialog with the new project highlighted, select ***Segment=>Create***.

In the *Create New Segment* dialog (see **Figure 2-2**), enter the **Segment** “A” and the **Description** and then click on **OK**. Do the same for the remaining segments, if any.

Figure 2-2



In the *CAiCE Project Management System* dialog click on **Close**.

C. Attach the standard Feature Table, Cell File, and Command Table

To attach the Command Table: ***Tools=>Attach=>Command Table***
DEFAULT.CTB = CAiCE-supplied command table

To attach the Feature Table: ***Tools=>Attach=>Feature Table (.FTB)***
GDOT20.FTB = English 20 Scale
GDOT50.FTB = English 50 Scale
GDOT100.FTB = English 100 Scale
GDOT250.FTB = Metric 250 Scale
GDOT500.FTB = Metric 500 Scale

Note: A file with the .FTM extension is used to control alignment chain features. This file will automatically be attached with the .FTB file.

To attach the Cell Library: ***Tools=>Attach=>Cell File (.CCL or .CEL)***
SDE.CCL = English CAiCE Cell File
SDEM.CCL = Metric CAiCE Cell File

II. Convert the Survey Data

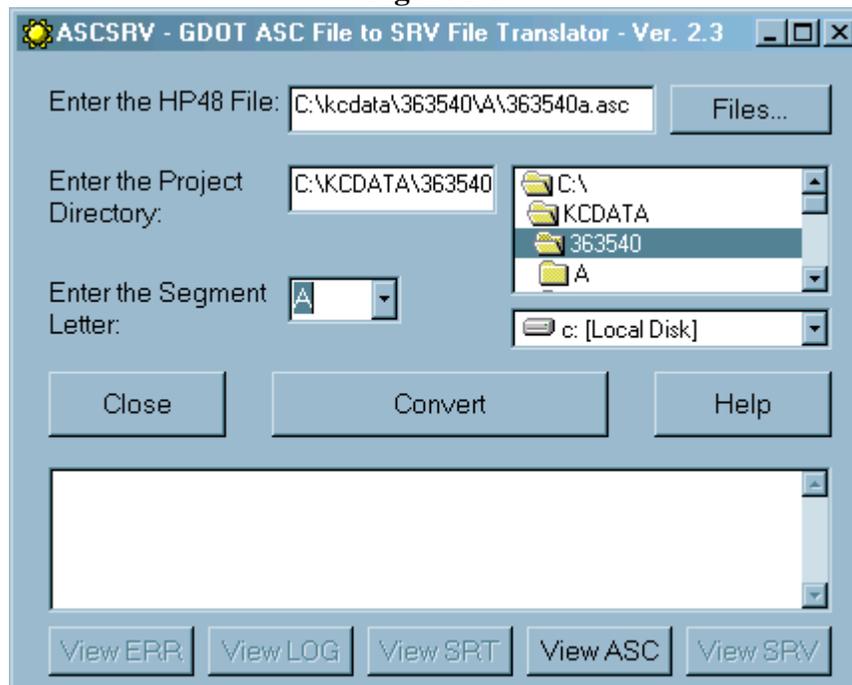
A. Field surveyed file

NOTE:

- 1) The original field survey file (.ASC), which is uploaded from the data collector, should be archived before processing.
- 2) The Survey Data Engineer should check the field survey file (.ASC) to insure that an error file is not created when the *ASCSRV* program is executed.
- 3) All field check points (field feature code 244) are created by the surveyor for the purpose of verifying horizontal and vertical coordinates and are to be deleted from the (.ASC) file by the Survey Data Engineer prior to submitting the data.

Run the *ASCSRV* program: ***Tools*** => ***Custom Tools*** => ***ASCSRV*** to display the *ASCSRV – GDOT ASC File to SRV File Translator* dialog (see **Figure 2-3**).

Figure 2-3



Click the **Help** button to display the on-line .PDF help file for the program.

The files **363540A.SRV**, **363540A.SRT**, **363540A.LOG**, and possibly **363540A.ERR** will be created in the project segment directory (*c:\kdata\363540\A*).

The header information from the ASC file will be written to the SRV file. All point names will have a prefix of “*SV + Segment Letter*” (*SVA*) where the segment letter is specified in the input to the program. All points and survey chains are assigned a *zone* (similar to a level in MicroStation) based on whether the data is Property (Zone 50), 3D Topographic data (Zone 51), or 2D/3D Planimetric data (Zone 52).

The *ASCSRV* Installation Program is available for download at the following WEB addresses:

Internal and External to GDOT

http://www.dot.state.ga.us/dot/preconstruction/R-O-A-D-S/SWFilesDocs/SW_Design/SW_Design_KC_Files/index.shtml

B. Stereo plotter (Aerial Mapping) file

The Photogrammetry Section at the Office of Environment/Location will convert these files from the AMSA format to the SRV format using the *AMSA2SRV* program and then forward them to the District Survey Data Engineer.

C. Digital Map Model file

On projects where surveys were completed under the Computer Engineering Automated Library (CEAL) format, the Survey Data Engineer will need to convert the CEAL formatted digital map model files (DMM) to a CAiCE format before importation into CAiCE can occur.

Run the *DMMTOSRV* process by one of the following methods:

- 1) By using *Start=>Programs=>MS-DOS Prompt* and keying-in *DMMTOSRV*.
- 2) By using *Start=>Run* and keying-in *C:\CAICE\DMMTOSRV* (or *D:\CAICE\DMMTOSRV* if CAiCE is loaded on drive D) or by browsing for the executable.
- 3) By using Windows NT Explorer and double clicking on the EXE file.
- 4) By creating a shortcut.

The program will prompt the user as follows:

Enter CEAL DMM File Name

====> *C:\SDECLASS\INTRO\LOCM.DMM*

Enter the path and filename of the DMM file to convert.

Enter CAiCE SRV File Name

====> *C:\KCDATA\123456\A\123456A.SRV*

Enter the path and filename of the SRV file to create. Remember, the filename MUST be **ProjectName + SegmentName.SRV**. The path should be the correct segment subdirectory under the project directory.

Enter Point Prefix <DMM>

====> *DMA*

The Standardization Committee has established standard prefixes to be used for all survey data. All DMM prefixes are to be “**DM**” + “**SegmentName**” (ie: **DMA, DMB, DMC...**).

Enter Chain Prefix <DMM>

====> *DMA*

The same information for the point prefix also applies for chain prefixes.

Enter Zone Number <1>

====> 10

The zone number will correspond to the segment the SRV will go into. Zones for original survey data start at 10 for segment “A” and continue up to 49. Therefore, an SRV file going into Segment “A” will have a Zone of 10. An SRV file going into Segment “B” will have a Zone of 11. (See **Table 2.1** for a table of zones and segments.)

Table 2.1

Segment Letter	Zone
A	10
B	11
C	12
D	13
E	14
F	15
G	16
H	17
I	18
J	19
K	20
L	21
M	22
N	23
O	24
P	25
Q	26
R	27
S	28
T	29
U	30
V	31
W	32
X	33
Y	34
Z	35

III. Import the SRV files into the CAiCE Database

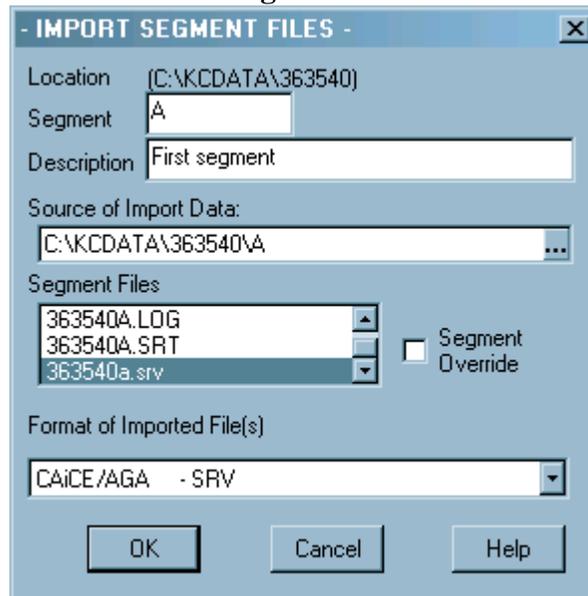
File=>Project Manager: Displays the *CAiCE Project Management System* dialog

Click on the new project to highlight it and then click on the segment to import to highlight it.

From *CAiCE Project Management System*, select ***Segment =>Import***

In the *Import Segment Files* dialog (see **Figure 2-4**), select the **Source of Import Data** to be the segment directory to import from, set the **Format of Imported File(s)** as “**CAiCE/AGA –SRV**”, click on the SRV file in the **Segment Files** field, and then click on **OK** to import the file. Click on **Yes** to proceed and **OK** after the conversion is complete.

Figure 2-4



Perform the same steps for the remaining segments (if any).

Click on the **Close** button when importing of files is complete.

This pulls in all the points and survey chains in the SRV files into the CAiCE project database with the correct feature code and zones.

IV. Convert and Import the Field Enhanced File
(**NOTE**: This section applies to Mapping Projects ONLY!)

A. Create the segment “XO” for the field enhanced file

(See [Create the New Project and Segments](#))

The segment for the field enhanced file will always be “XO”.

B. Run the [ASCSRV](#) process

The file **ProjectNameXO.SRV** and other files will be created in the project segment directory (*c:\kcddata\project\XO\ProjectNameXO.SRV*).

All point names will have a prefix of “SV + Segment Letter” (*SVXO*) where the segment letter is specified in the input to the program. All points and survey chains are assigned a *zone* based on whether the data is Property (Zone 50), 3D Topographic data (Zone 51), or 2D/3D Planimetric data (Zone 52).

C. Import the field enhanced file data from segment “XO”

(See [Import the SRV files into the CAiCE Database](#))

V. Move the 2D-Planimetric and 3D-Topographic Data to the Correct Zone

As the field survey data was converted using *ASCSRV*, it was assigned zones of Property (Zone 50), 3D Topographic data (Zone 51), and 2D/3D Planimetric data (Zone 52). The property will remain on Zone 50, but the planimetric and topographic data will need to be moved to the zone which corresponds to original segment (Segment “A” = Zone 10, Segment “B” = Zone 11, etc.).

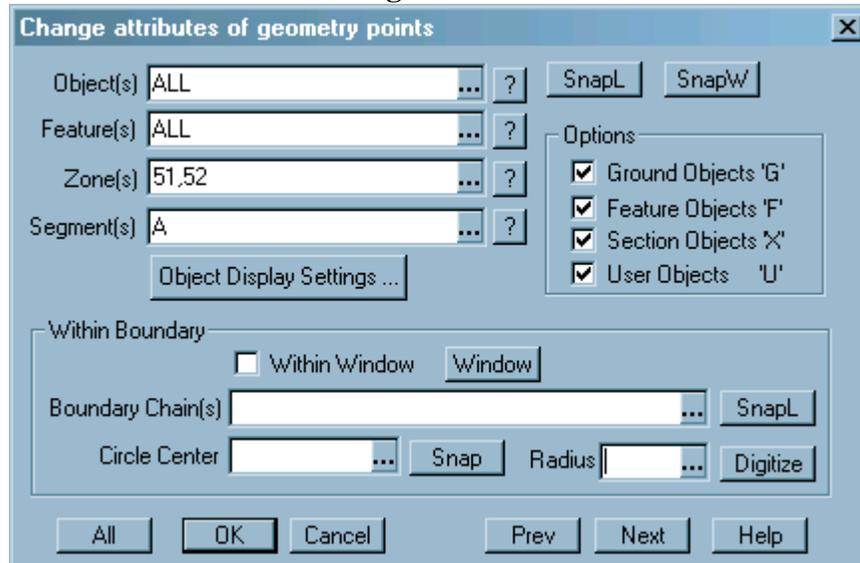
A. Original Field Surveyed SRV File (Full Field Survey Project)

ALL the data in a full field surveyed file will be moved to ONE zone typically. Typically, the zone will be Zone 10 (Segment “A”) since a field surveyed project usually only has ONE segment. Move the enhanced data to the correct segment zone (ie: 10), beginning with the points.

Geometry => Points => Change Attributes

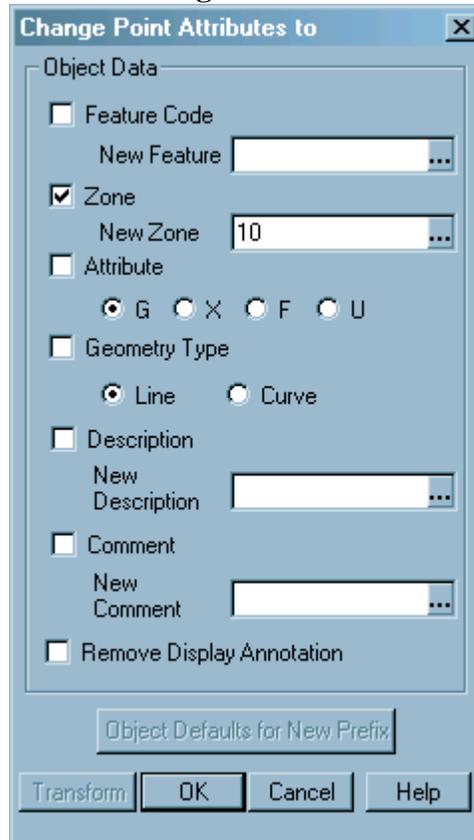
In the *Change attributes of geometry points* dialog, enter “51, 52” for the **Zone(s)** field and “A” for the **Segment(s)** field and click on the **OK** button (see **Figure 2-5**).

Figure 2-5



In the *Change Point Attributes to* dialog (see **Figure 2-6**), click in the checkbox next to **Zone**, enter “10” in the **New Zone** field, and then click on **OK**.

Figure 2-6



Now, the original data points are on the correct zone for that segment (Zone 10 in this case).

Repeat the same process using the command

Gometry => Survey Chains => Change Attributes

to move all the survey chains for the segment to the correct zone (Zone 10 in this case).

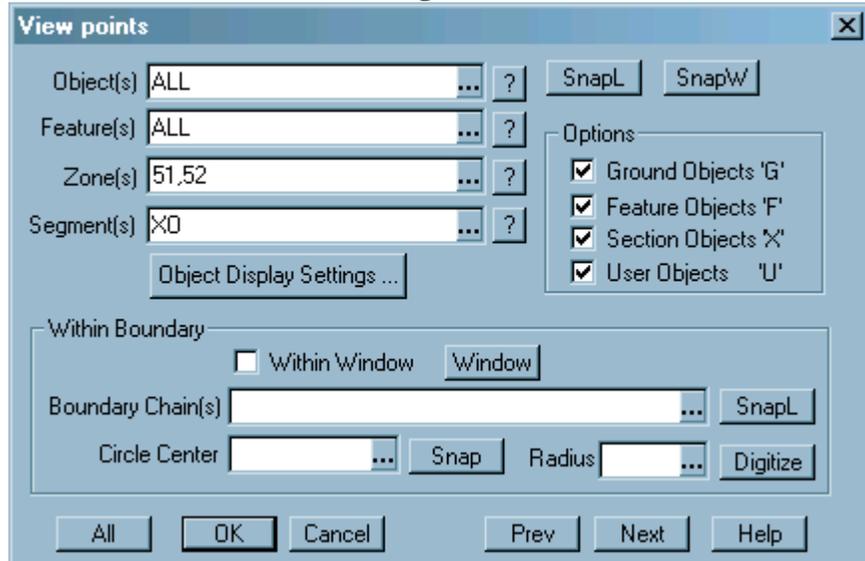
This process simply places the original data from the field-surveyed file on the correct zone to adhere to standard zone assignments in CAiCE.

B. Original Field Enhancements SRV File (Mapping Project)

- 1. View all the planimetric and topographic data in the original field enhanced file:**

View=>Points (Setting the **Zone(s)** field to “51, 52” and the **Segment(s)** field to “XO” as shown in **Figure 2-7**)

Figure 2-7



View=>Survey Chains (Setting the **Zone(s)** field to “51, 52” and the **Segment(s)** field to “XO” as shown in **Figure 2-7**)

- 2. View all data in the first segment to enhance (Assume it is “A”)**

View=>Points (Setting the **Zone(s)** field to “10”)

View=>Survey Chains (Setting the **Zone(s)** field to “10”)

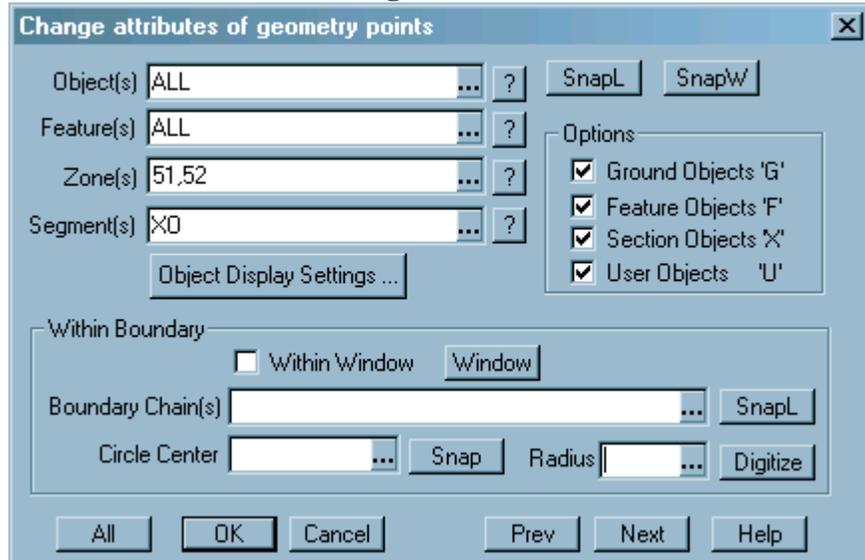
- 3. Move the enhanced data to the correct segment zone (10, etc.)**

Geometry=>Points=>Change Attributes

In order to not move ALL the points, in the *Change attributes of geometry points* dialog set the **Zone(s)** field to “51-52” and the **Segment(s)** field to the field enhanced segment “XO”.

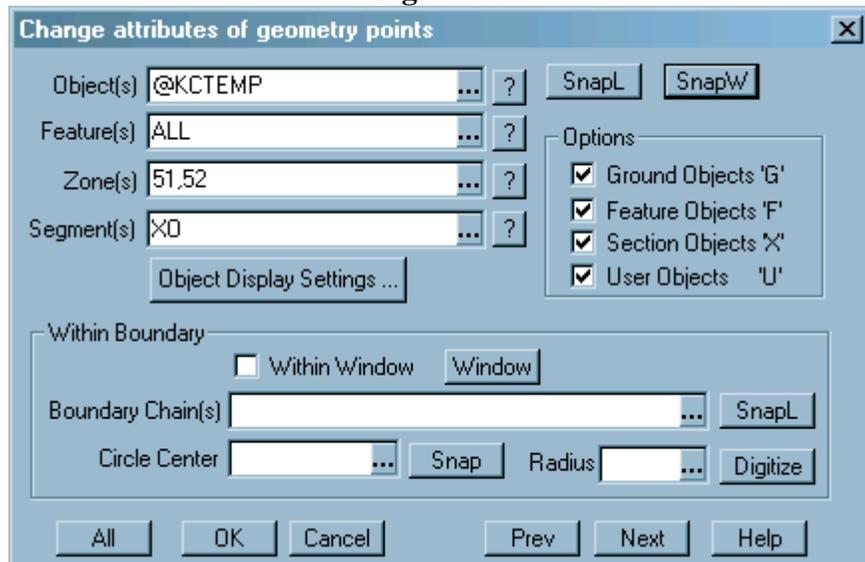
In the *Change attributes of geometry points* dialog, click on the **SnapW** button at the top of the dialog (see **Figure 2-8**).

Figure 2-8



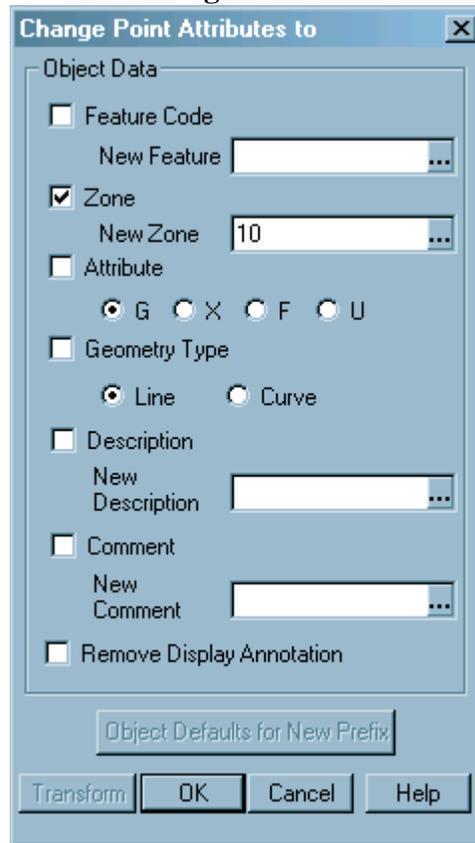
Holding down the left mouse button, drag a box around only the segment data to be moved (Segment “A” in this case) and let go of the left mouse button. The **Object** field should now reflect **@KCTEMP**. Click on the **OK** button (see **Figure 2-9**).

Figure 2-9



In the *Change Point Attributes to* dialog (see **Figure 2-10**), click in the checkbox next to **Zone**, enter “10” in the **New Zone** field, and click on **OK**.

Figure 2-10



Now, the original data points and the enhanced data points are on the same zone for that segment (Zone 10 in this case). Repeat the same process using the command

Geometry=>Survey Chains=>Change Attributes

In order to not move ALL the points, set the **Zone(s)** field to “51-52” and the **Segment(s)** field to the field enhanced segment “XO” to move all the survey chains for the enhanced segment to the correct zone (Zone 10 in this case).

If there are enhancements in the original field enhanced file for other segments as well, then repeat the point and survey chain commands for the remaining segments, using the correct zones.

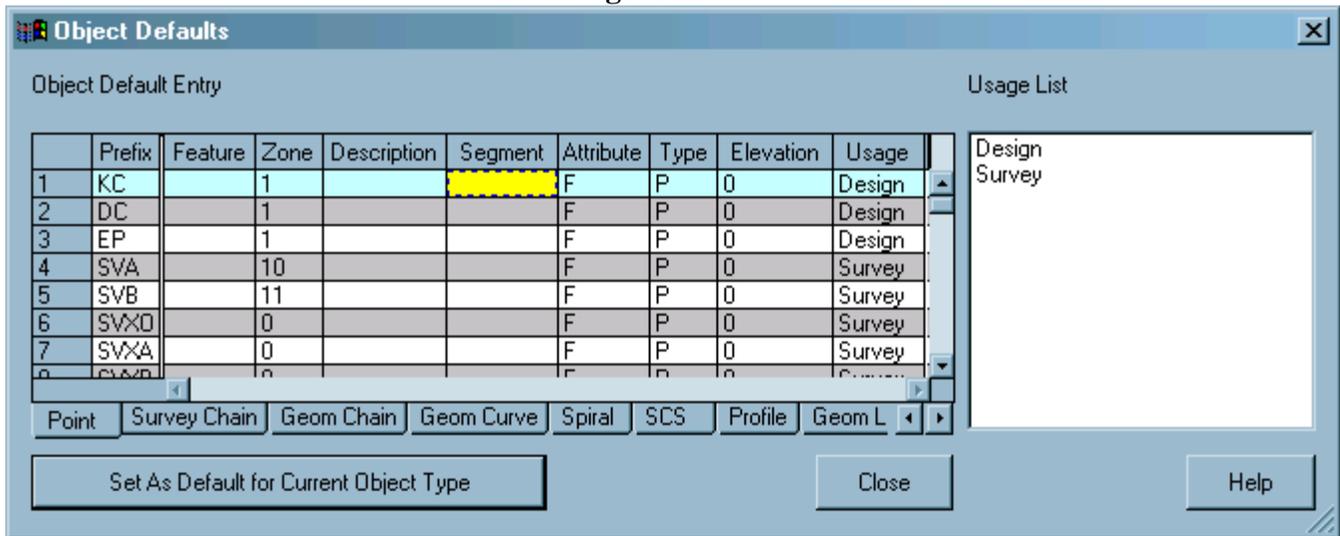
This process simply places the original data from the aerial mapped SRV file and the enhanced data from the original field enhanced SRV file on the same zone for processing.

VI. Object Default Settings

Object defaults (prefix, feature code, zone, etc.) can be set up front and then all commands used in CAiCE will automatically come up with those defaults set. This keeps the user from having to enter the default prefixes, etc. every time a command is run in CAiCE. This is especially helpful when repetitively storing objects with the same prefix, feature code, zone, etc. such as in the process of storing property. There are different settings for points, survey chains, etc. To access the object default settings, use the command:

Settings=>Object Defaults to view the dialog shown in **Figure 2-11**.

Figure 2-11



As shown above, a standard file has been setup for GDOT that reflects some of the most frequently used prefixes and zones where possible. The only prefixes used in Design are “KC, DC, and EP”, with “KC” reflected at the top of each object type’s listing. **The other prefixes pertain to survey.** Simply select the desired prefix from the list and then **enter additional information like the feature code, zone, and attribute.** Once the attributes are set as desired for one type of object (points, survey chains, etc.), click on the ***Set As Default for Current Object Type*** button to activate the settings before going to the next object type. Different types of objects can be selected by clicking on the tabs at the bottom of the dialog (*Point, Survey Chain, etc.*).

NOTES:

- 1) To have the default prefixes, etc. available, the latest **CAICEALL.EXE** file must be downloaded from the Homepage and ran to load the files into the CAICE directory.
- 2) The standard settings shown above reflect only the standard prefixes in most cases. Therefore, the other information must be filled-in by the user such as **Feature Code, Zone, and Attribute.**
- 3) **These settings do not affect ALL CAiCE commands!**

VII. Edit Survey Chains and Resolve Survey Chain Crossings
(**NOTE**: Topic “A” applies **ONLY** to Mapping Projects.)

- A. Include the enhanced field data into the original mapping data**
1. Clear all the views and then view only the data for the segment to be edited. This can be accomplished by viewing the data by the Zone of the segment to be edited. Assuming the segment to be edited is Segment “A”, then only the data from Zone 10 would be viewed. (Remember, the original data was already on Zone 10. We then moved the enhanced data to Zone 10 after it was imported.)
 2. With the data on Zone 10 viewed, begin including the data using the various Geometry=>Survey Chains commands (Combine Two Chains, Break One Chain Into Two, etc.).
- B. Resolve the survey chain crossings**
Resolve all survey chain crossings using the Geometry=>Survey Chain=>Resolve Survey Chain Crossings command.

NOTE: WHEN EDITING AND STORING CHAINS, MAKE SURE TO SPECIFY THE CORRECT PREFIX, FEATURE CODE, AND ZONE IN THE [OBJECT DEFAULTS](#) DIALOGS AS SHOWN ON THE PREVIOUS PAGE OR IN COMMAND DIALOGS FOR THE ITEMS BEING EDITED AND STORED.

The prefix will be the prefix of the segment data currently being worked on (SVA, SVXO, etc.).

The feature code will be the standard feature code.

The zone will be the zone of the segment being edited.

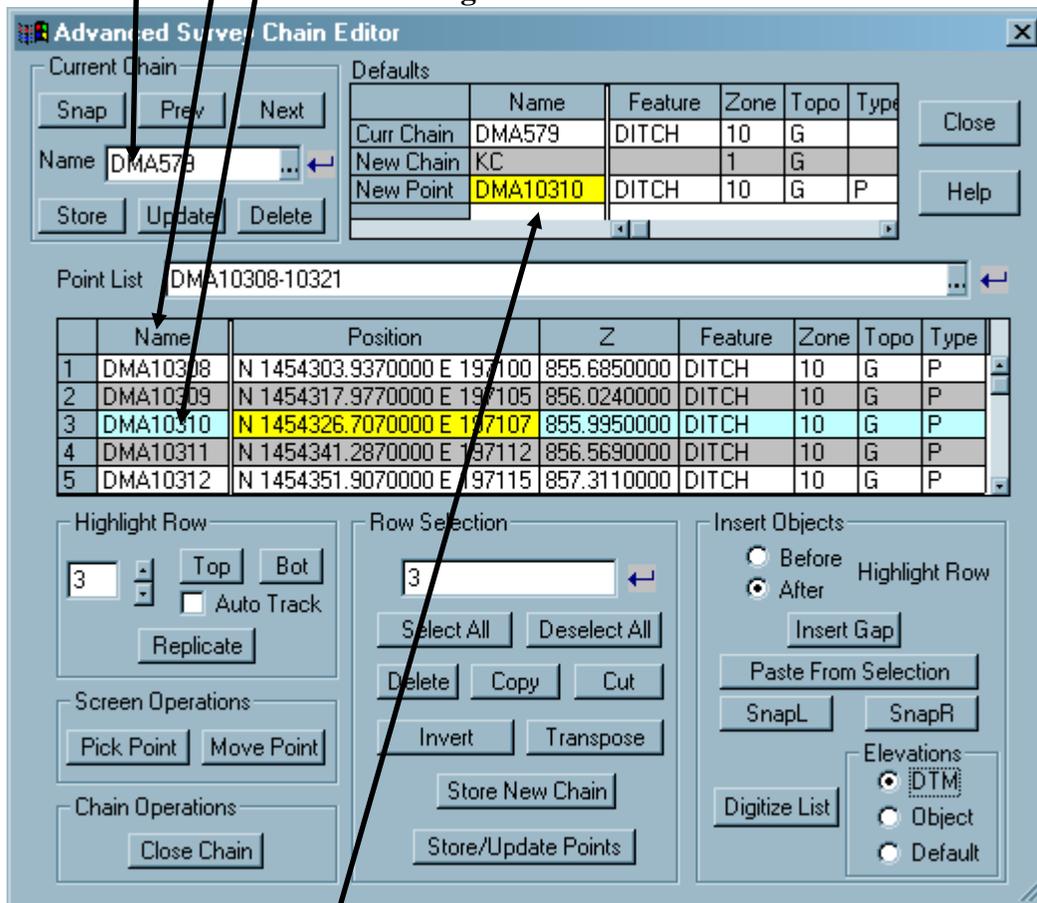
<p>By using the <u>zone</u> of the segment for ALL NEW DATA being stored (<i>Manual Entry</i>), the original data, the enhanced data, AND the manual entry data can ALL be written out together if needed for future enhancements.</p>

C. Advanced Survey Chain Editor

One of the tools used in the editing of survey data is the *Advanced Survey Chain Editor* command accessed by ***Geometry=>Survey Chains=>Advanced Survey Chain Editor***. It is also accessed through the ***Resolve Survey Chain Crossings*** command when editing chains to resolve crossings. This command is documented in CAiCE's documentation, but there is one thing that needs to be noted by all users when editing survey chains.

Once a chain has been selected,
The points loaded into the spreadsheet in the middle,
And a point in the spreadsheet is selected to be edited,

Figure 2-12



The user must enter a new point **name** and information (**feature code, zone, topo attribute**, etc.) the same as selected point. Otherwise, a **NEW** point name will be stored. By entering the same name and information as the point being edited, the user will be prompted to overwrite the old point or to store a next available point name.

VIII. Create the DTM

A. Make sure the Limit Line survey chain forms a closed area

Any survey data will contain a survey chain that defines the limits of the survey. For field surveys, the limit line survey chain will be a 3D -“G” chain with a feature code of *TLIML*. For aerial mapping projects, the limit line will be a 2D-“F” chain with a feature code of *BORDER*. The 2D *BORDER* chain will need to be draped onto an existing DTM surface to convert it to a 3D chain that can go to the DTM as documented later. The limit line chain is used to remove extraneous triangles from the DTM surface as documented later.

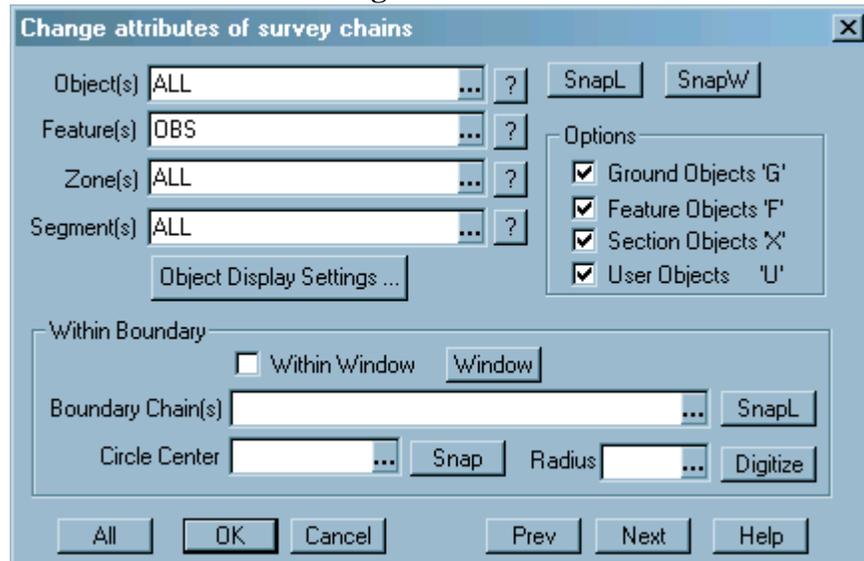
B. Change old CEAL *OBS* feature codes to *OBSC* (DMM files only!)

If the original survey data is aerial mapped and converted from DMM files, then the DMM files contained the CEAL obscured class code of *OBS*, not the CAiCE obscured feature code of *OBSC*. All the *OBS* chains will need to be changed to *OBSC*.

If the original survey data was converted from DMM files, the following steps must be followed:

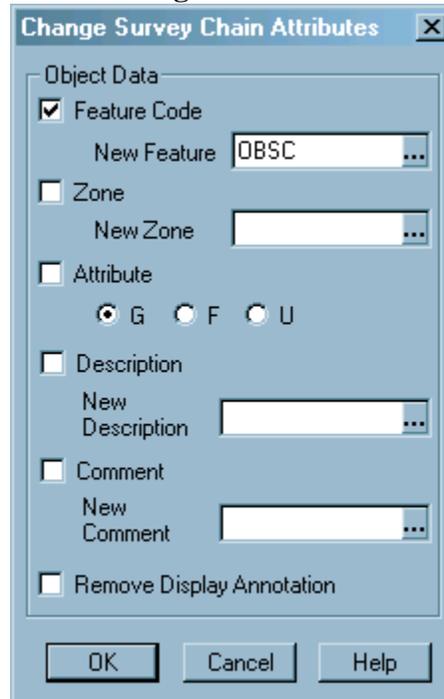
- 1) Select the command ***Geometry=>Survey Chains=>Change Attributes***. Enter “***OBS***” for the **Feature(s)** field and click on **OK** (see **Figure 2-13**).

Figure 2-13



- 2) In the *Change Survey Chain Attributes* dialog (see **Figure 2-14**), click in the checkbox next to **Feature Code** and enter “**OBSC**” for the **New Feature**. Click on **OK** and all *OBS* chains will be changed to *OBSC*.

Figure 2-14



C. Create the DTM

DTM=>DTM Database Manager

Enter **EXIST** for the **Name** and **Feature** and click on **Create** and then on **OK**.

DTM=>Load DTM Database=>From Survey Points and Chains

Leave everything set to **ALL** and click on **OK**.

DTM=>Build Triangles

D. Creating a 3D *BORDER* chain out of a 2D *BORDER* chain (Mapping Projects Only!)

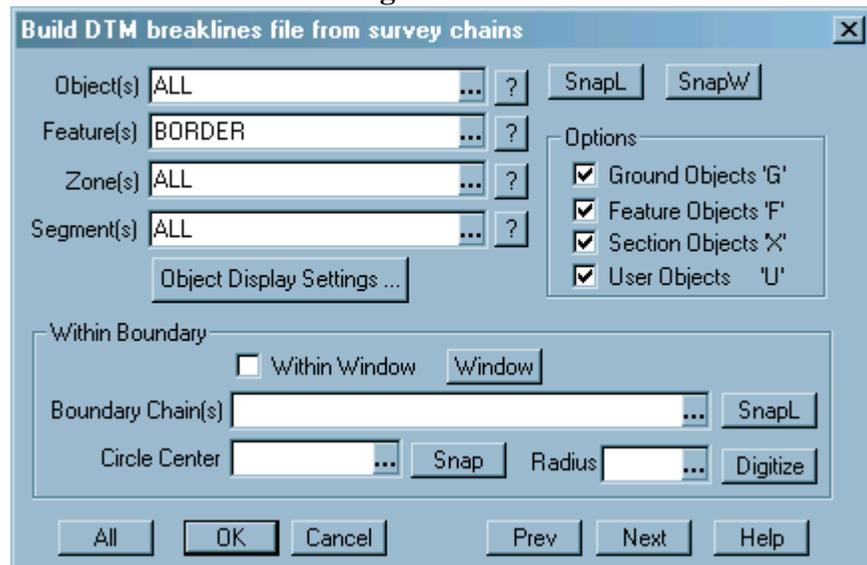
If the original survey data is **aerial mapped files**, then the limit line will be a 2D *BORDER* feature limit line survey chain. One additional step of draping the 2D chain onto the existing DTM to create a 3D chain must be done as documented on the following page.

First, follow the previous steps for creating the DTM. A DTM must first exist before the limit line can be draped.

1. Drape the 2D *BORDER* chain onto the DTM surface.

DTM=>Build Breaklines File from Survey Chains

Figure 2-15



Set the selection criteria in the **Feature(s)** field to *BORDER* and all other fields to *All* as shown in **Figure 2-15**.

Next, the user will be prompted for the filename of the SRV file to write the new, 3D *BORDER* chain to. There is no standard for this particular filename since it will be used only to load the new, 3D chain. Typically, *BORDER.SRV* is used.

2. Load the SRV file just created into the existing *EXIST* DTM Database and **append** it to the database.

DTM=>Load DTM Database=>From SRV File

3. Build triangles again.

DTM=>Build Triangles

Now, the extraneous triangles can simply be removed by using the ***DTM=>Apply Feature Codes to Triangles*** command as documented on the following pages.

E. Creating a 3D *BORDER* chain out of a 2D *BORDER* chain when additional field survey falls outside of the original mapping *BORDER* chain(s) (Mapping Projects Only!)

When this situation is encountered, adjustments must be made to the limit line survey chains **BEFORE** removing the extraneous triangles from the DTM.

1. Create a new 2D survey chain **inside** of the *TLIML* chain from the additional field survey. This will ensure that the new chain will project onto the DTM surface. The attributes of this chain will be as follows:

Feature Code = *BORDER*

Topo Attribute = *F*

Zone = the appropriate zone for the segment in which the chain falls

NOTE: This chain will not be a closed entity; however, it will share common endpoints with the mapping *BORDER* chain(s).

2. Break the mapping *BORDER* chain(s) at the points where the new chain intersects it/them. Remember that the new endpoints must also be the endpoints of the new chain.
3. Use the **GDOT Project Border Chains** macro to ensure that all *BORDER* chains will project onto the DTM.

**Tools => *Custom Tools* => *GDOT Macro Menu*
=> *Survey Chains* tab => *Project Border Chains***

If a chain does not project onto the DTM at some locations, edit the chain to correct the problem.

4. Now continue the process as previously documented.

F. Obscure old CEAL class codes as necessary

Chains in CEAL could have a feature code and a type (ie: a chain in CEAL could have a meaningful class code like “LAKE”, but also be a type OBS so the triangles would be obscured within it). CAiCE only deals with feature codes currently and all obscuring of triangles is handled by feature codes. Therefore, some of the current GDOT CEAL class codes that are obscured in CEAL will not be obscured in CAiCE. These features are shown below.

LAKE	- Lake
RIVERED	- River
CONSTR_B	- Area currently under construction (aerial)
CONSTRB	- Area currently under construction (aerial)
TCBA	- Area currently under construction (field)
DEADIN	- Dead area (cannot read an elevation)

These features can all be obscured as part of the ***DTM=>Apply Feature Codes to Triangles*** command documented below.

G. Run the Apply Feature Codes Command

The command:

DTM=>Apply Feature Codes to Triangles

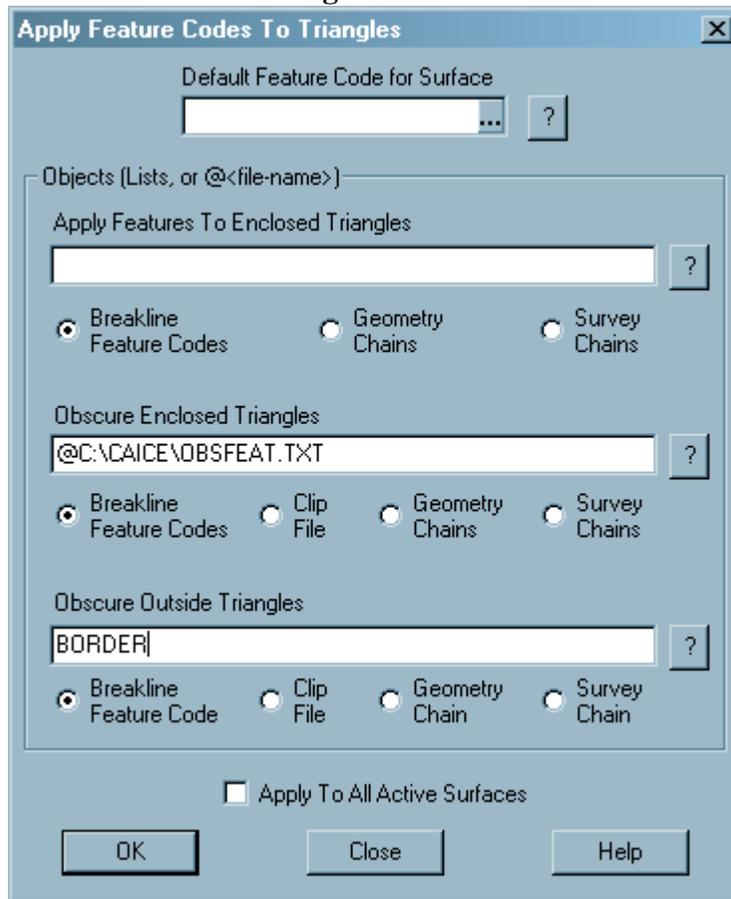
is used to remove triangles outside the limit line, to obscure all the special feature codes listed above, and to obscure the OBSC areas as well.

The dialog shown in **Figure 2-16** allows the user to specify a file containing all the survey chain feature codes for which the internal triangles will be obscured. This file has already been setup and is part of the GDOT standard files (*CAICEALL.EXE*) download. The filename is ***OBSFEAT.TXT***. This file can be specified in the **Obscure Enclosed Triangles** input field as shown in the dialog in **Figure 2-16**. Ensure that the *Breakline Feature Codes* radio button is selected.

The only other input to the command will be the feature code of *BORDER* or *TLIML* (based on a field surveyed project or an aerial mapped project) in the **Obscure Outside Triangles** input field. Ensure that the *Breakline Feature Codes* radio button is selected.

Click on the **OK** button to execute the command. The result should be triangles removed outside the limit line, all the special feature codes listed above obscured, and all OBSC areas obscured as well.

Figure 2-16



H. Review the DTM

View=>DTM=>Triangles

The triangles can also be rendered and viewed in perspective if desired.

IX. Property Data

A. Survey and Information Gathering Procedures

1. Parcel Data

- 1-a. The District shall provide the property information for all parcels within the limits of the project.
- 1-b. All parcels must be chained clockwise and the chains must close (first and last point number must be the same). The chain should be a graphic representation of all corners of the parcel as defined in the deed or plat. Property corners and lines which lie within the "right-of-way take", should be located by field survey if possible. If they cannot be found, their position should be computed from the deed or plat. The positions of corners which do not lie within the "right-of-way take" can be determined by digitizing from a plat or tax map, or by computation.
- 1-c. The chain for the parcel must contain sufficient information to accurately locate all curved property lines. The beginning and the ending point of each curve should be equated to a point number and those numbers must be included in the parcel chain.
- 1-d. The District shall provide the official area in acreage (Land Hectares when job is done in metric) for each parcel in the **Property Statistic Report (.XLS)**. This area, which is to be taken from the deed or plat, is to be used by the designer. The area which can be computed from the parcel chain is **not the official area** and therefore is **not** to be used in design. If an acreage is not provided on the deed or plat, the District shall be responsible for computing this area from a legal description.
- 1-e. If a parcel is split by the proposed right-of-way, or if existing access to the parcel is eliminated, all available access to a public roadway for the remaining parcel(s) should be identified by the surveyor or the Survey Data Engineer and a comment about this access should be added as an explanatory note in the **Property Design File (PROP.DGN)** (i.e. "access to County Road #77" - shown at the appropriate place in the file).

1-f. No deeds, plats or tax maps are to be submitted as part of the automated survey material. However, on occasion, tax maps and property owner names may be required prior to the survey in order to prepare public hearing displays. When this need arises, a request for this information will be made by letter. The submittal of these tax maps is not to be considered as part of the "**normal**" location survey material.

1-g. The following information for each parcel shall be provided in a **Property Statistic Report (.XLS)** File. The filename and location shall be provided to the designer. No printout of this file should be submitted.

- Land District/Section Number (See Note).
- Land Lot Number (See Note).
- Georgia Militia District (GMD).
- Block Number.
- Tax Map Number.
- Tax Map Parcel Number.
- Parcel Chain Number (This will be the chain number for the parcel).
- Area in acres (as recorded in the deed or plat).
- Book and Page Number of where the deed is recorded.
- Book and Page Number of where the Plat is recorded.
- Property Owner's Name and Address.

NOTE: Parcels not described by this system will be described by the legal description contained in the deed.

1-h. Explanatory notes (**Parcel Chain Number, Prescription R/W, Easements, etc.**) should be added to the **Property Design File (PROP.DGN)**. Additional text must have the correct attributes and level as indicated by the state-wide attributes and level conventions.

2. Right-of-Way (deeded/prescriptive) and Easement

- 2-a. The District shall provide all information about existing right-of-ways for public roadways (including railroads) located within the limits of the project.
- 2-b. The right-of-way data shall be chained.
- 2-c. The following procedures should be followed for surveying deeded Right-of-Way:
 - Locate the centerline alignment of the road that was used to describe the deeded right-of-way coordinating at least two (2) points on all tangents and three (3) points on all curves. It is very important to determine if any widening has taken place since the deed centerline was established. If widening was not symmetrical, use available field evidence to establish the deed centerline.
 - All existing right-of-way markers should be coordinated.
 - All existing property corners which will be used to determine the property take will be coordinated either by field survey or by computation from a deed or plat. All property points not directly impacting the "**take**" can be digitized from the deed, plat, or tax map.
 - The **Property Design File (PROP.DGN)** provided by the District **must** contain a notation which states that the "right-of-way is claimed by prescription".

2-d. The following procedures should be followed in developing the Property/Right-of-Way database for roads with deeded right-of-way:

- The alignment of the existing road should be determined by using the tangent and curve points from the field survey. Degrees of curves should be computed by using the field points, and then compared to old plans, and then an appropriate degree assigned to the curve.
- The Department's right-of-way should then be set to correspond with this alignment.
- At this point the differences between the Department's right-of-way and the existing right-of-way markers and property information should be evaluated. Major discrepancies should receive further investigation.
- When the District creates a chain from the field survey file, all corners and boundaries which conflict with the right-of-way should be projected or terminated to conform precisely with the deeded right-of-way ([See Attachment A](#)).
- The parcel chain should contain the newly created points which conform to the right-of-way. The chain should **not** include any property points that conflict with this right-of-way. These conflicting points should be retained in the data file as part of the project records.
- All existing right-of-way markers which conflict with the true position of the right-of-way are not to be used in any chains but are to be retained in the data files as part of the project records.
- Since there will be property and right-of-way points residing in the data file which are not included in any chains, the Survey Data Engineer should use caution before "**plotting all points**".

2-e. The following procedures should be followed for surveying a public roadway that does **not** have a deeded right-of-way:

- The surveyor will notify the Preconstruction Engineer in writing that the roadway does not have a deeded right-of-way.
- Locate the centerline alignment of the road by coordinating at least two (2) points on all tangents and three (3) points on all curves.
- Coordinate the limits of the area along the roadway which is maintained by the Department or by the local government (e.g., **back of ditch to back of ditch**). This area may be claimed by prescription if it meets the legal requirements.
- The surveyor is to document on a tax map, or other drawing, all areas for which the Department or a local government does not have deeded title.

2-f. The following procedures should be followed in developing the Property/Right-of-Way database for roads with **no** deeded right-of-way:

- The District shall create property chains from the field survey file that include all property corners (field located, computed or digitized) which identify parcels.
- The District shall create chains from the field survey file that reflect the right-of-way that is considered to have been acquired by prescription* (possession).
- The property and right-of-way chains shall show the conflicts between the property lines and these limits of the "claimed" (prescriptive) right-of-way. ([See Attachment B](#)).
- The **Property Design File (PROP.DGN)** provided by the District **must** contain a notation which states that the "right-of-way is claimed by prescription".

- 2-g. Easement right-of-ways for utility companies should be surveyed and chained.
- 2-h. Explanatory notes should be added to the **Property Design File (PROP.DGN)**. The text must have the correct attributes and level as indicated by the statewide attributes and level conventions.
- * Prescriptive R/W is acquired by long uninterrupted use (in GA usually 7 years).

3. BOUNDARY LINES

- 3-a. The District should provide the following types of boundary lines:
 - State
 - County
 - City
 - Land Lot
 - Public Lands
- 3-b. The boundary lines shall be chained.
- 3-c. Explanatory notes should be added to the **Property Design File (PROP.DGN)**. The text must have the correct attributes and level as indicated by the statewide attributes and level conventions.

B. Processing Property Data in CAiCE

- 1. **Using English units plats and old English units plans (Applies to METRIC projects ONLY!)**

If the property is going to be chained together using English plats and the project is a Metric project, then the property will need to be converted to English to use the plat dimensions. To do this, the property points will be converted to English units, chained together, and converted back to Metric units.

The ASCSRV program automatically assigns Zone 50 to all the standard property features. These feature codes are shown in **Table 2.2**.

Table 2.2

SMI Code	CAiCE Feature Code
3	RWM
4	RWC
5	RWU
6	RWE
7	POEL
8	PCF
9	PPOL
10	PPC
15	APOT
16	APOC
17	APC
18	APT
19	API

- **Archive the current project.**

File=>Project Manager: Displays the *CAiCE Project Management System* dialog

From *CAiCE Project Management System*

Project=>Archive

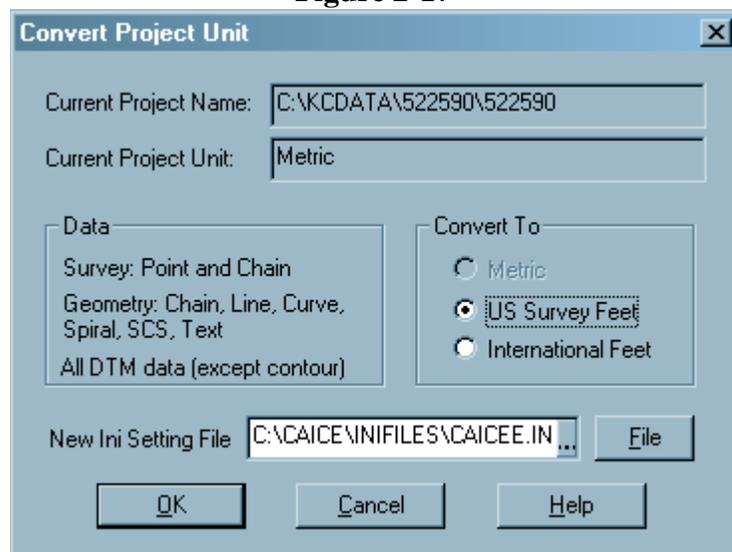
This is done as a precaution if anything should go wrong in the conversion or storing of property data.

- **Transform the project to English units.**
File=>Project Manager: Displays the *CAiCE Project Management System* dialog

From *CAiCE Project Management System*
Project=>Convert Project Units

The *Convert Project Unit* dialog (see **Figure 2-17**) will appear.

Figure 2-17



No settings should need to be revised in this dialog.

NOTE: The correct units Feature Table and Cell File will need to be re-attached after conversion.

2. Chain the Property Data together using the following information

⇒ **Property Parcels** will be stored as geometry chains using the Geometry=>Geometry Chains=>Store/Edit command.

***** All prefixes will be the same as the current segment being processed (SVA, SVXO, SVXA, etc.).**

Table 2.3

OBJECT	TYPE	ZONE	PREFIX	FEATURE CODE	ATTRIBUTE
Points	Geometry	50	***	PCF, PPC, PPOL, POEL	F
Curves	Geometry	50	***	PAR	N/A
Chains	Geometry	50	***	PAR	N/A

***** NOTE:** Use the [Object Default Settings command](#) for attributes!

Table 2.4

Prefixes for original property points

Source of orig. survey data:	Stereo plotter	Field Survey
Segment for field file:	“XO” (Enhanced Original)	“A” (Orig. field file is the only field file)
Prefix to use to store property points :	SVXO (ie: SVXO1-1000)	SVA (ie: SVA1-1000)

If additional or enhanced property survey is needed, then the SDE will provide the surveyor with a point number to start with in gathering the additional/enhanced property survey data. The point number will be a number higher than the last number used in chaining together the original property (ie: 1100). The surveyor will gather the additional/enhanced data and then deliver it to the SDE to process in CAiCE.

Table 2.5

Prefixes for additional/enhanced property points

Source of orig. survey data:	Stereo plotter	Field Survey
Segment for field file:	“XA” (First Enhancement)	“XA” (First Enhancement)
Prefix to use to store property points :	SVXA (ie: SVXA1100-1200)	SVXA (ie: SVXA1100-1200)

This scenario of providing the starting number to the surveyor and then processing the additional/enhanced property survey using the prefix of the segment being processed would continue until all property is processed. By using these guidelines, all doubts about duplicating point numbers needing to go back to the data collector will be removed.

=> **Existing centerlines** will be stored as geometry chains using the Geometry=>Geometry Chains=>Store/Edit command or using the Geometry=>Geometry Chains=>Edit Horizontal Alignment command.

*** All prefixes will be the same as the current segment being processed (SVA, SVXO, SVXA, etc.).

Table 2.6

OBJECT	TYPE	ZONE	PREFIX	FEATURE CODE	ATTRIBUTE
Points	Geometry	50	***	ACL	F
Curves	Geometry	50	***	ACL	N/A
Chains	Geometry	50	***	ACL	N/A

*** **NOTE:** Use the [Object Default Settings command](#) for attributes!

=> **Existing R/W chains** will also be stored as Geometry Chains and can be offset from the existing R/W centerline using the command Geometry=>Geometry Chains=>Store Offset Parallel. Remember, any **curves** will also be offset with the same zone as the chain.

*** All prefixes will be the same as the current segment being processed (SVA, SVXO, SVXA, etc.).

Make sure that a Zone of **50** is specified when storing all offset chains.

Table 2.7

OBJECT	TYPE	ZONE	PREFIX	FEATURE CODE	ATTRIBUTE
Points	Geometry	50	***	RWE	F
Curves	Geometry	50	***	RWE	N/A
Chains	Geometry	50	***	RWE	N/A

*** **NOTE:** Use the [Object Default Settings command](#) for attributes!

Locate the property points using the ***Geometry=>Points=>Locate Bearing/Distance from Point***, ***Geometry=>Points=>Locate Angle/Distance from Point***, ***Geometry=>Points=>Intersection***, and other commands using the English dimensions. **Make sure that a Zone of 50 is specified when storing all points.**

Chain the points together using the ***Geometry=>Geometry Chains=>Store/Edit*** command. **Make sure that a Zone of 50, the current segment prefix, and feature code “PAR” are used when storing all chains (see Table 2.3).**

*** **NOTE**: Use the [Object Default Settings command](#) for attributes!

NOTE:

If English units plats or plans were used to store the property, then the project units will need to be converted back to Metric units by using the Convert Project Units command again under CAiCE Project Management System. If no English plans or plats were used and no units conversion occurred, this step is not necessary.

NOTE: The correct units Feature Table and Cell File will need to be re-attached after conversion.

X. Survey Data (DGN) Files

NOTE: All plots of files should be readable at a scale of **1" = 50'** or less for **English** and **1:500** for **Metric**.

A. DGN File Creation Process

3 DGN files will be produced for use by the Designer as reference files in producing a set of plans. The DGN creation process has been automated somewhat through the use of CAiCE Command Files (.CMD). The DGN files are to be produced as follows. Steps 1 and 2 can be skipped if the file *DEFAULT.CTB* was attached as the project was created.

1. Select the command ***T*ools=>*A*ttach=>*C*ommand Table**.
2. In the *Attach Command Table – Open* dialog, click on the file *DEFAULT.CTB* and then click on the **Open** button. The attachment of the *DEFAULT.CTB* file is a **ONE TIME** attachment for the life of this project.
3. Select the command ***T*ools=>*E*xecute Command History**
4. In the *CAiCE Command System* dialog (see **Figure 2-18**), click on the **Files...** button at the bottom.
5. In the *Execute Command History – Open* dialog that will appear, click on the **Files** button and move to the **CAiCE\COMMAND** directory and click on one of the 3 standard command files and then click on the **Open** button. (*There are 4 .CMD files, one for each DGN to be produced as well as one .CMD file to produce all 3 DGN files at once.*)
6. The view commands for all the features to go into the **DGN** file will appear in the **Script** area of the dialog. Click on the **Run** button to execute the commands. All the features will be viewed on the screen in CAiCE.
7. Click on the **Close** button if you desire to close the dialog, or simply slide it out of the way if needed. The dialog need not be closed until all features have been viewed and DGN files built.
8. Once the data for the drainage has been viewed, the command file will automatically export the data to the standard DGN filenames shown in **Table 2.8**.

Figure 2-18

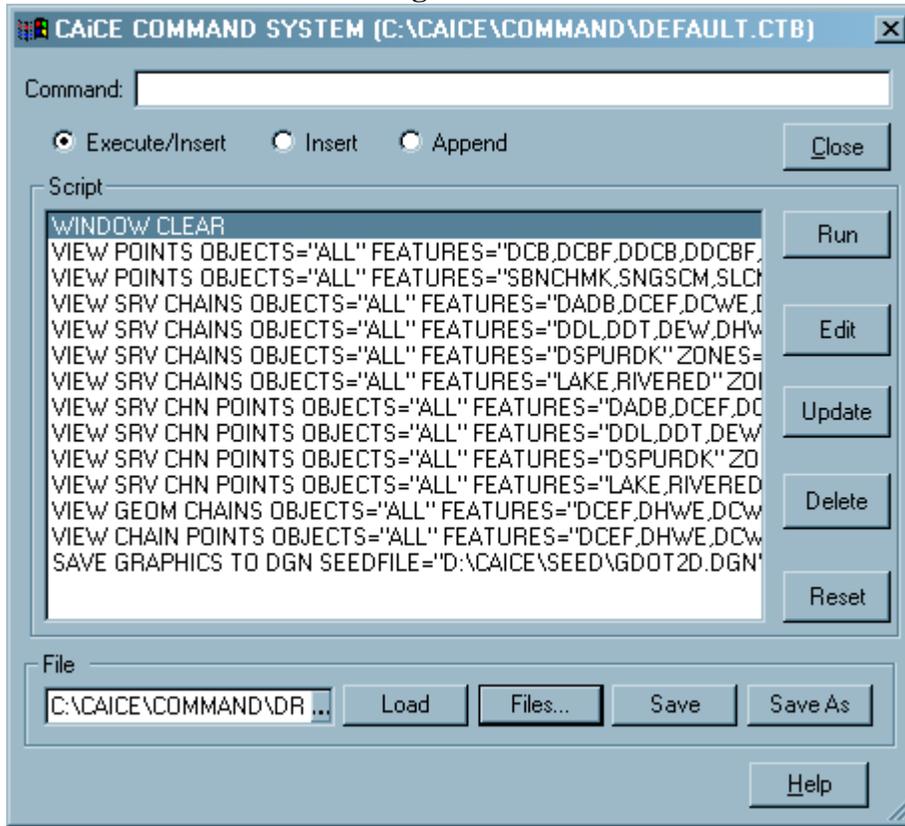


Table 2.8

CMD File	Seed File	Cell Library	DGN File
TOPO.CMD*	Gdot2d(m). DGN	SDE(M).CEL	TOPO.DGN
PROP.CMD*	Gdot2d(m).DGN	SDE(M).CEL	PROP.DGN
UTLE.CMD*	Gdot2d(m).DGN	SDE(M).CEL	UTLE.DGN

* **NOTE:** Another set of command files with an “M” added to the root name are for producing Metric units DGN files. These command files use the *GDOT2dm.DGN* Seed File and the *SDEM.CEL* Cell File.

To produce all 3 DGN files at one time without interruption, run the command file *DGN.CMD* (*DGNM.CMD* to produce metric units DGN files). It will automatically produce all 3 DGN files.

The SDE does not need to run the command *File=>Export Translators=>To Intergraph/MicroStation=>Screen Graphics to DGN File*. As a default, the command files will use the **Seed File** *GDOT2d.DGN* or *GDOT2dm.DGN* and the **Cell File** *SDE.CEL* or *SDEM.CEL*.

9. **Editing of Standard Command (.CMD) Files**

The GDOT standard command files can, and will need to be, edited in the following situations.

- a) The path to the SEED and CELL file will need to be changed to reflect the path to your specific CAiCE directories. As a default, the DGN files will be created in the project directory. This can also be changed in the command files.
- b) If the user is plotting additional survey data, edit the command files and instead of specifying “ALL” in the segment for each view command, change the segment to be the segment name of the additional information (XA, XB, etc.). This will view only the additional information to be merged into the original mapping DGN files. It is advised to make copies of the standard command files under new names and leave the original files untouched.

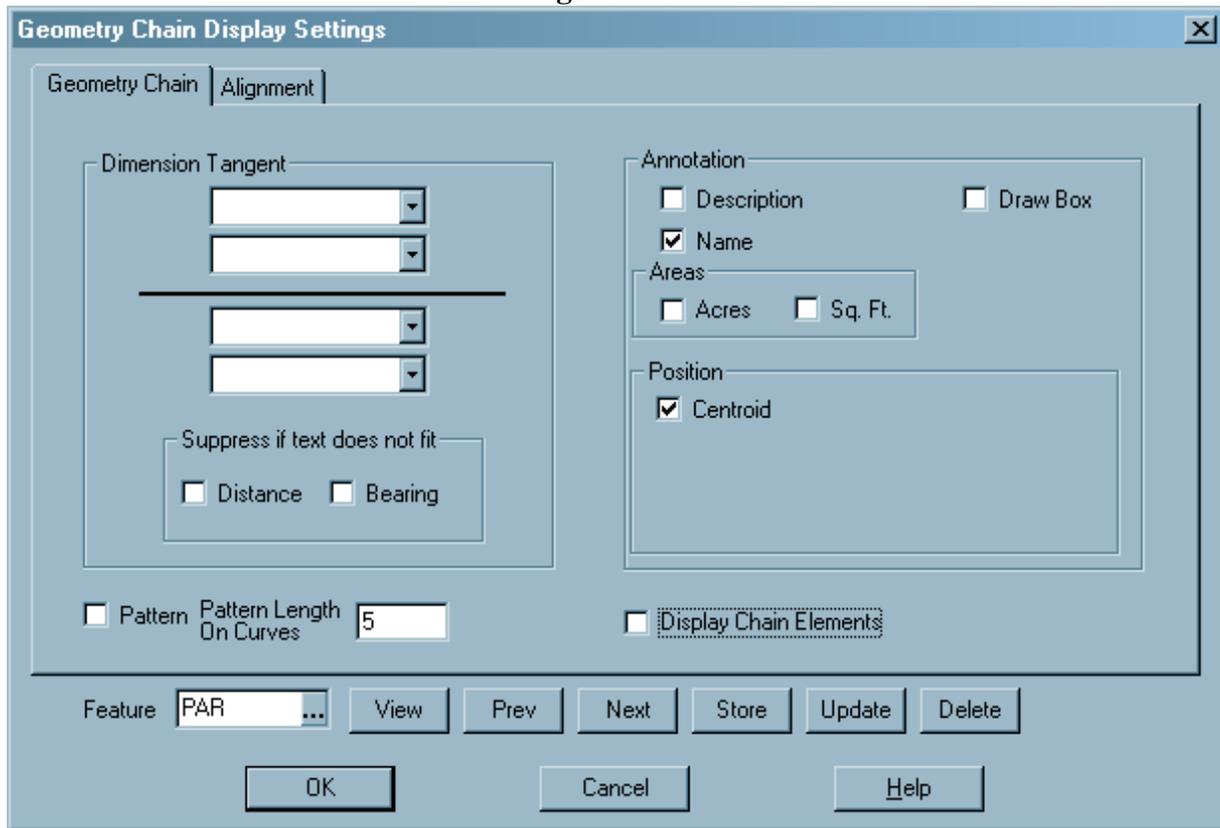
B. Where the DGN Files are to Reside

All 3 DGN files will be placed in a subdirectory under the project directory called *SDE*. This way, the DGN files will get archived as part of the project archive file (.ZIP) to send to the designer.

NOTE: To plot the parcel chain name in the center of the parcel, follow the steps below (see **Figure 2-19** for the dialog box).

- 1) *Settings=>Object Display=>Geometry Chains*
- 2) Click in the **Centroid** checkbox located near the center of the dialog. This will activate the *Annotation* section.
- 3) In the *Annotation* section, click in the checkbox beside **Name**. Now, the name will be plotted in the center of the parcel chain.
- 4) Make sure and click inside the **Name** and **Centroid** checkboxes again to turn off the labeling when you are through plotting the parcel chains.

Figure 2-19

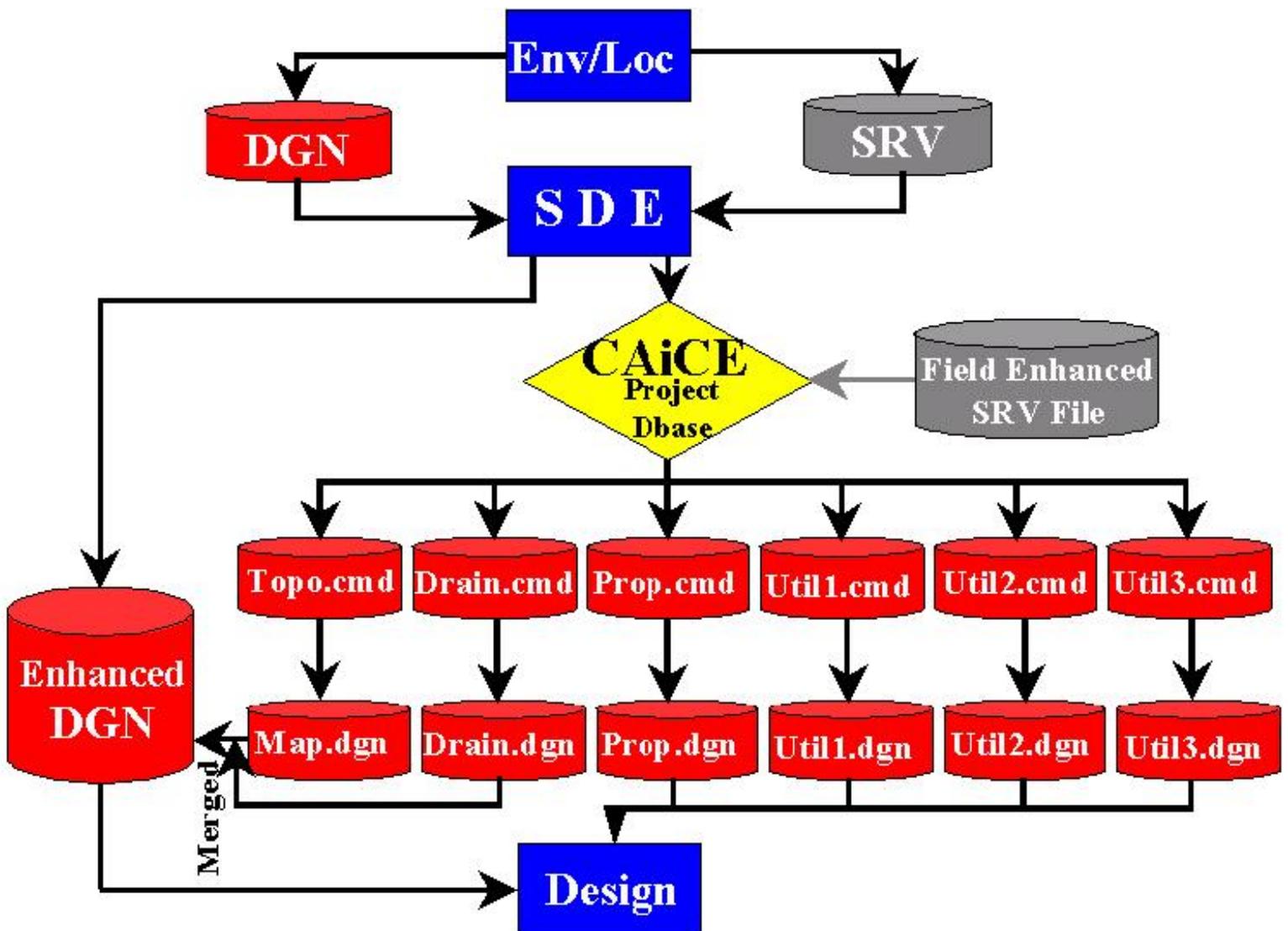


C. Field Enhanced DGN Process

There are basically two different times when the aerial mapping DGN files will be enhanced and submitted to Design: *initial (original) submission* and *additional enhancement submissions*.

If it is an *initial submission*, then the SDE is to merge the field enhanced DGN data into the original aerial mapped DGN file so that data in the DGN file agrees with data in the design database. Then, the enhanced DGN file is submitted to the Design office by the SDE as part of the CAiCE archive (.ZIP) file.

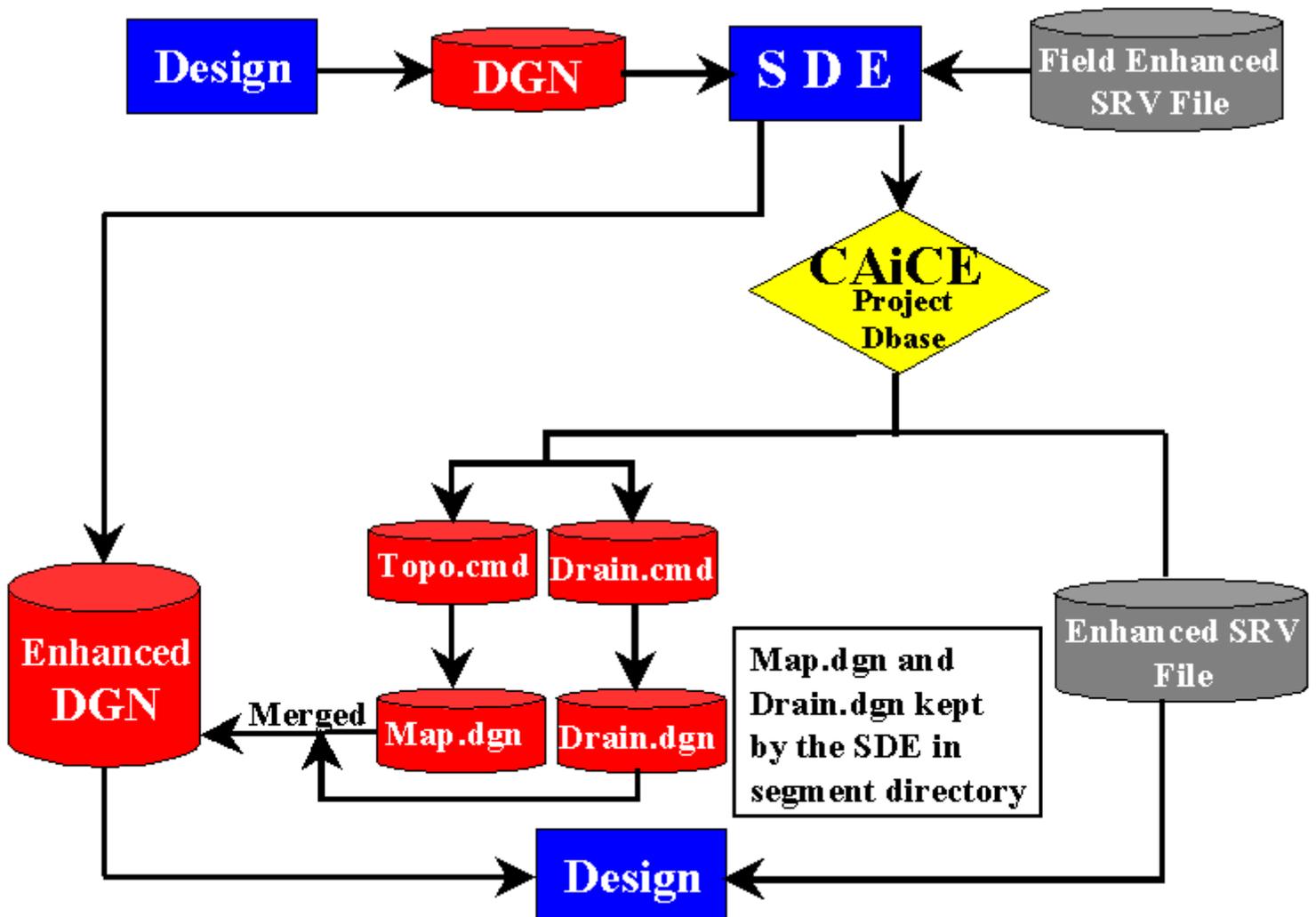
Figure 2-20



If it is an *additional enhancement submission*, then communication between the SDE and designer is critical due to one of two situations which may exist.

- 1) If the designer has not revised the aerial mapping DGN file (ie: moving text, etc.), then the SDE is to use the DGN file in his possession that was originally submitted by Environment/Location for enhancing. After the enhancements are merged, the new, enhanced DGN file is to be sent to Design.
- 2) If the designer has revised the aerial mapping DGN file, then the Designer must cease doing any further work in the DGN file and submit his file to the SDE for enhancement. The SDE will then revise the DGN for all field enhancements. After the enhancements are merged, the SDE will send the enhanced DGN file back to the Designer.

Figure 2-21



All survey features gathered in the field will be exported to the enhanced DGN file(s) through the use of standard GDOT CAiCE Command files. Except for the enhanced obscured areas, the only thing that will need to be done by the SDE to merge the enhanced data is possibly deleting out old, obsolete data. Obscured chains (feature OBSC) will also be exported to the enhanced DGN file(s) using CAiCE along with the other standard survey features. This should make the including of enhancements to obscured areas easier than in the former process in CEAL where the obscured chains did not go to the DGN file. There will be three different types of enhancements to obscured areas and each will be handled a little differently in the DGN file.

- 1) Obscured areas which were not enhanced: The DGN file will already contain a string defining the obscured area. Exporting the OBSC chains from CAiCE will create another (duplicate) string which will lie on top of the existing DGN string. This will create no problems in the DGN file, but the duplicate string can be removed from the DGN file if the SDE desires to do so and time permits.
- 2) Obscured areas which were fully enhanced: The SDE will simply delete the string in the DGN file which defines the obscured area.
- 3) Obscured areas which were partially enhanced: The SDE will delete out the old string from the DGN file defining the original obscured area before it was enhanced. This will leave the enhanced OBSC string exported from CAiCE.

D. Merging Field Enhanced DGN Files

Once all field enhanced data has been merged into the original data, then the DGN files are ready to be produced and merged.

To produce the *MAP.DGN* file, the command files will need to be edited and, instead of specifying “ALL” in the segment for each view command, change the segment to be the segment name of the additional information (XA, XB, etc.). This will view only the additional information to be merged into the original mapping DGN files. If the field enhancement contains OBSC or Construction Boundary enhancements, the SDE will also need to view the revised OBSC and CONSTRB chains which are part of a previous segment. In this case, the extra chains will need to be viewed first. Then, edit the command file to remove the first line, the Window Clear command, and then run the command file.

To produce the *PROP.DGN* file, there are two situations:

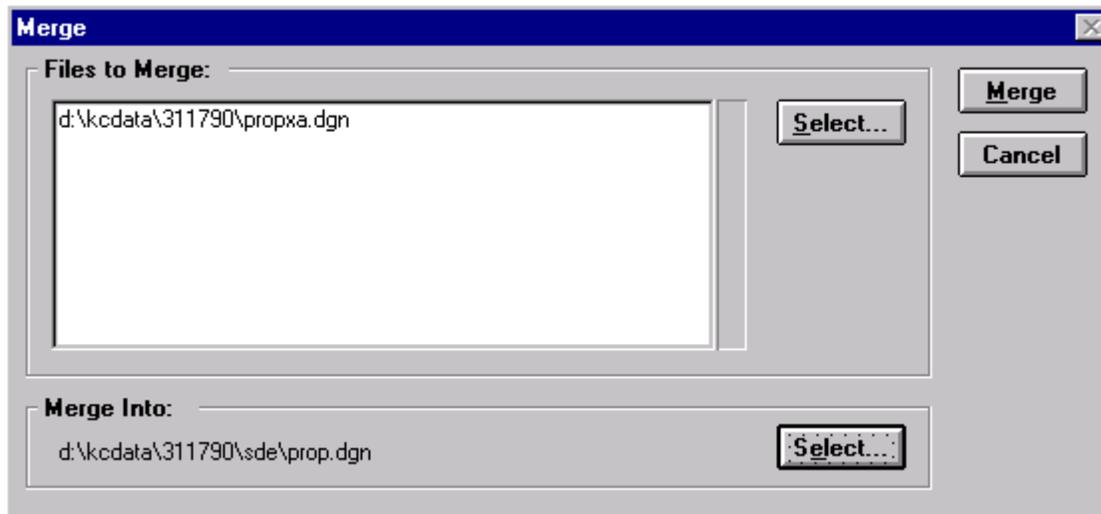
- 1) The original DGN file HAS NOT been modified by the Designer. In this case, simply run the *PROP(M).CMD* file to reproduce the entire *PROP.DGN* file and resubmit it.

- 2) The original DGN file HAS been modified by the Designer. In this case, the SDE will need to produce a DGN file of only the additional or revised property and merge it into the Designer's DGN file. To do this, edit the *PROP(M).CMD* file and remove all View Geometry Chain commands except the one which views the PAR feature code and change the OBJECTS field for the remaining View Geometry Chains command to be the prefix of the segment currently being processed with an asterisk (SVXA*, SVXB*, etc.).

To merge the field enhanced DGN file into the original DGN file:

- 1) Click on the MicroStation shortcut to launch MicroStation.
- 2) At the *MicroStation Manager*, select **File=>Merge**.
- 3) In the *Merge* dialog (see **Figure 2-22**):
 - a) Click on the **Select** button at the top of the dialog to select the small, field DGN file to merge into the original DGN file.
 - b) In the *Select Files to Merge* dialog, select the field DGN file and click on the **Done** button to add it to the **Files to Merge** field in the *Merge* dialog.
 - c) Click on the **Select** button at the bottom of the *Merge* dialog to select the original DGN file to merge the field file into.
 - d) In the *Select Destination File* dialog, select the original DGN file and click on the **Done** button.
 - e) Back in the *Merge* dialog, click on the **Merge** button to merge the two files.

Figure 2-22



XI. Send the initial submission to Design

After all the field enhancements have been included, the property chained together, all the data is verified, the DTM processed, and the DGN files produced, then the data is ready to be sent to the designer.

A. Create an Archive File of the project in CAiCE

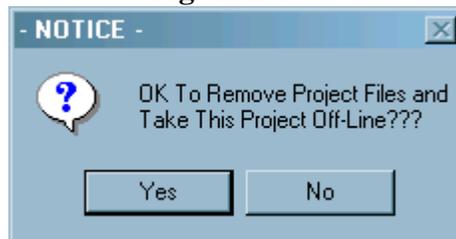
File => Project Manager

From *CAiCE Project Management System*:

Project => Archive

After the archive process is complete, close the *CAiCE Project Archive Utility*. The dialog shown in **Figure 2-23** will appear.

Figure 2-23



Click on “No”.

NOTE: Be sure the .ZIP file contains the SDE sub-directory under the project directory with the ASC file, PSR file, and DGN files in the SDE directory.

B. Archive Back-up

Prior to submitting automated survey information to the Design office, all files should be archived in a safe location (this is not the hard drive on the SDE’s PC).

C. Submit the .ZIP File to Design

No printouts or **plots** of the field sketches or files are to be submitted unless they are needed for clarification.

The cover letter for any submittal of survey data must state the **horizontal and vertical datum** on which the survey is based and also whether in metric or English units. Horizontal datums in use are North American Datum of 1927 (NAD27), North American Datum of 1983 (NAD83) - officially called the Georgia Coordinate System of 1985, and North American Datum of 1983/1994 (NAD83/94) for the HARN (GPS) Network. Vertical datums are the National Geodetic Vertical Datum of 1929 (NGVD29) and the North American Vertical Datum of 1988 (NAVD88).

Section 3 – Additional Survey Information and Enhancements

I. General Information

- When additional survey data is gathered, after the initial survey has been submitted, this data should be processed, formatted, and submitted in SRV file format (topo data) or KCM format (property data). The SRV and KCM files represent the original data plus any additional or enhanced data combined in ONE, new, complete, enhanced file.

- All location survey data and all requests for additional survey data should be submitted to the Engineering Management Section of the Office of Environment/Location.

II. Topo and Mapping Enhancements (2D and 3D)

A. Survey and Information Gathering Procedures

1. The District shall insure that all topography which affects the design of the project is provided.

2. All topography must be chained. The Survey Data Engineer should review chains to insure accuracy. Chains not accurately representing the item should be revised before submitting to design.

3. On projects which have been mapped photogrammetrically, the District should review the mapping to insure that it reflects the current topography of the project. The topo enhancements and notes should be provided in the CAiCE Archive File.

4. A copy of the mylar map sheets provided by the Office of Environment/Location are enhanced during the location survey and submitted to the designer. All structures (houses and buildings) within the limits of the project should be identified on these copies as to their use (residential or commercial) and structure type (brick, block, wood, etc.). Other notes of clarification can also be added to these copies. All enhancements are to be noted **with a red ball point pen**. A copy of the enhanced mapping should be retained in the District.

5. The surveyor should provide coordinates at the plotting point of origin. The point of origin for plotting selected topographic features is shown in [Attachment C](#).

6. If the project is being collected in a **string** format, the edge of the pavement and the top of curb will be collected for curb and gutter.
7. Chains for v-gutters will always be in the center of the gutter. The points which locate the v-gutter should be taken in the center of the gutter and the elevations of these points should reflect flowline elevations.
8. Explanatory notes should be added to the correct Mapping Design File. The names of streams should be included in these notes. The text **must** have the correct attributes and level as indicated by the statewide attributes and level conventions.
9. The Office of Environment/Location will transmit to the District the electronic mapping (**DGN**) files along with the Mylar map sheets, survey control, and the **SRV** files if the project is a **string** survey. The Survey Data Engineer (SDE) will combine all topographic survey data collected by the surveyor with the appropriate photogrammetric mapping file. The data will be reviewed for accuracy and completeness.

When a file needs to be enhanced by the Office of Environment/Location, Photogrammetry Section, they will contact the District SDE for the latest mapping file. After completing the enhancement, the enhanced file will be returned to the SDE for archiving on tape.

B. Processing the Topo Enhancements in CAiCE

All topo enhancements will be supplied to the Designer in ONE, complete, enhanced SRV file (containing original data, enhanced data, and user-defined data all on the correct zone).

1. Convert and import the field enhanced file

Create a segment for the enhancement data according to the conventions below.

(See earlier documentation in this document for [creating the correct number of segments.](#))

NOTE:

Enhancements will adhere to the following convention for segment naming:

First enhancement = Segment XA

Second enhancement = Segment XB, etc.

The segment for the first field enhanced file will always be “XA”. The file **ProjectNameXA.SRV** and other files will be created in the project segment directory.

(ie: *c:\kcddata\project\XA\ProjectNameXA.SRV*)

2. Run ASCSRV

(See earlier documentation for running [ASCSRV](#))

The header information from the ASC file will be written to the SRV file. All point names will have a prefix of “SV + Segment Letter” (ie: SVXA) where the segment letter is specified in the input to the program. All points and survey chains are assigned a *zone* based on whether the data is Property (Zone 50), 3D Topographic data (Zone 51), or 2D/3D Planimetric data (Zone 52).

3. Import the field enhanced SRV file from the field enhancement segment

(See earlier documentation for [importing the SRV File\(s\) into the CAiCE database.](#))

4. Move all data to the correct zone

As the field survey data was converted using *ASCSRV*, it was assigned zones of Property (Zone 50), 3D Topographic data (Zone 51), and 2D/3D Planimetric data (Zone 52) in the SRV file. As the SRV file was imported, these zones came into the project database. The property will remain on Zone 50, but the planimetric and topographic data will need to be moved to the original segment zone that it corresponds to (Segment “A” = Zone 10, Segment “B” = Zone 11, etc.).

If the project has only ONE original segment, then ALL the field enhanced data on Zones 51-52 will be moved to that one segment’s zone, usually being 10 (segment “A”).

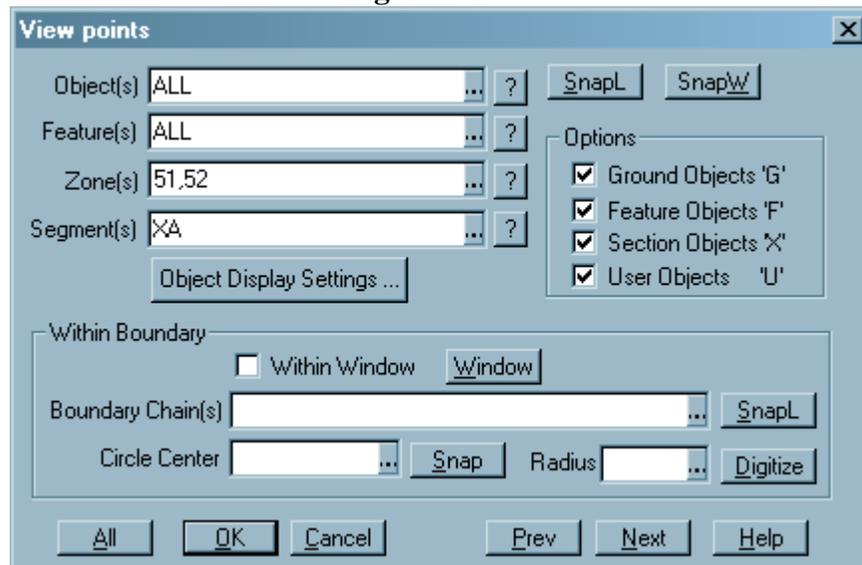
If the project has more than one original segment, then view the field enhanced data by Segment (ie: “XA”) and Zones 51-52. View as much of the original data as needed to verify the original enhanced segment, undo the viewing of the original data (for speed purposes), and move the enhanced data on Zones 51-52 to the correct Zone.

a. **View all the field enhanced data**

View => Points (Setting the **Zone(s)** field to “51, 52” and the **Segment** field to “XA” for example)

View => Survey Chains (Setting the **Zone(s)** field to “51, 52” and the **Segment** field to “XA” for example)

Figure 3-1



b. **View all the data in the first segment to enhance**

(Skip this step if only ONE original segment)

View => Points (Setting the **Zone(s)** field to the zone that corresponds to the original segment being enhanced)

View => Survey Chains (Setting the **Zone(s)** field to the zone that corresponds to the original segment being enhanced)

HINT: *UNDO* View of original data before moving for improved speed.

c. **Move the enhanced data to the correct segment zone (10, 11, etc.)**

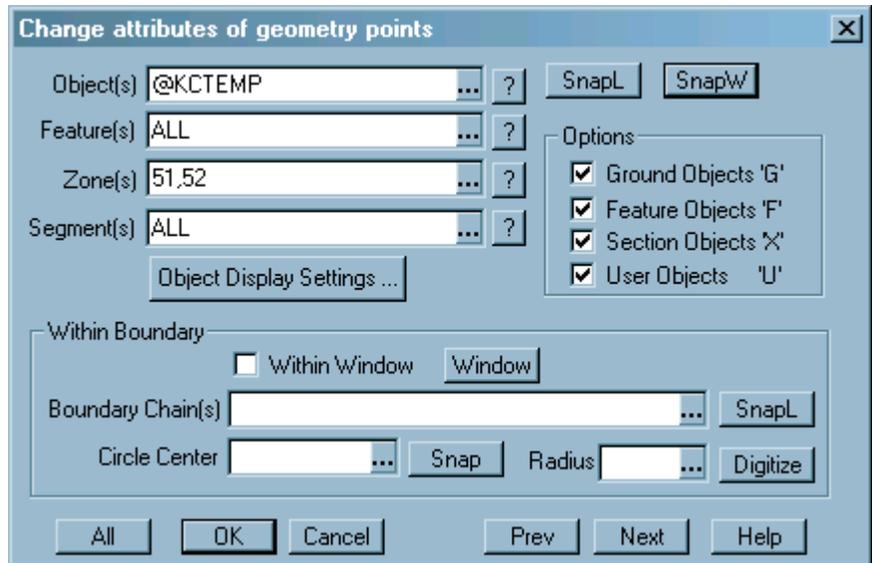
Geometry => Points => Change Attributes

From the *Change attributes of geometry points* dialog:

- 1) If the project has only ONE original segment, enter Zones 51-52 in the **Zone(s)** field, enter the enhancement segment designation (“XA” for example) in the **Segment(s)** field, and click on the **OK** button.

- 2) If the project has more than one original segment, click on the **SnapW** button (see **Figure 3-2**). Holding down the right mouse button, drag a box around only the segment data to be moved and let go of the right mouse button.

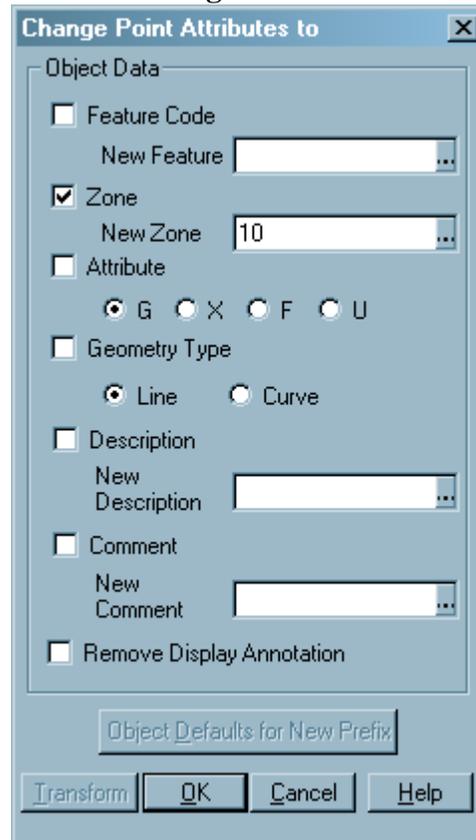
Figure 3-2



- 3) The **Object** field should now reflect **@KCTEMP**. Click on the **OK** button.

In the *Change Point Attributes to* dialog, click in the checkbox next to **Zone**, enter the zone that corresponds to the original segment being enhanced in the **New Zone** field, and click on **OK**.

Figure 3-3



Now, the original data points *and* the enhanced data points are on the same zone for that segment (Zone 10, 11, etc.).

Repeat the same process using the ***Geometry=>Survey Chains=>Change Attributes*** command to move all the survey chains to the zone that corresponds to the original segment being enhanced.

Repeat the point and survey chain commands for any remaining segments.

5. Include the enhanced data into each segment

- a. Clear all the views and then view only the data for the segment to be edited. This can be accomplished by viewing the data by the Zone of the segment to be edited. Assuming the segment to be edited is Segment “A”, then only the data from Zone 10 would be viewed.
(Remember, the original data was already on Zone 10. We then moved the enhanced data to Zone 10 after it was imported if this is field enhanced data.)
- b. With the data on Zone 10 viewed, begin including the data using the various Geometry=>Survey Chains commands (Combine Two Chains, Break One Chain Into Two, etc.).

6. Resolve the survey chain crossings

Resolve all survey chain crossings using the command:
Geometry=>Survey Chains=>Resolve Survey Chain Crossings

NOTE: WHEN EDITING AND STORING CHAINS, MAKE SURE TO SPECIFY THE CORRECT PREFIX, FEATURE CODE, AND ZONE FOR THE ITEMS BEING EDITED AND STORED in the [OBJECTS DEFAULT](#) DIALOG SHOWN ABOVE OR IN COMMAND DIALOGS.

The **prefix** will be the prefix of the segment data on which you are currently working (SVA, SVXA, etc.)

The **feature code** will be the standard feature code.

The **zone** will be the zone of the segment being enhanced (10, 11, etc.).

By using the ZONE of the segment for ALL NEW DATA being stored (*Manual Entry*), the original data, the enhanced data, AND the *Manual Entry* data can ALL be written out together if needed for future enhancements.

7. **Write out a new and complete SRV file to send to design**

The new and complete data will be written out by the Zone of the segment that was enhanced to a complete, enhanced SRV file to be sent to Design, which will include:

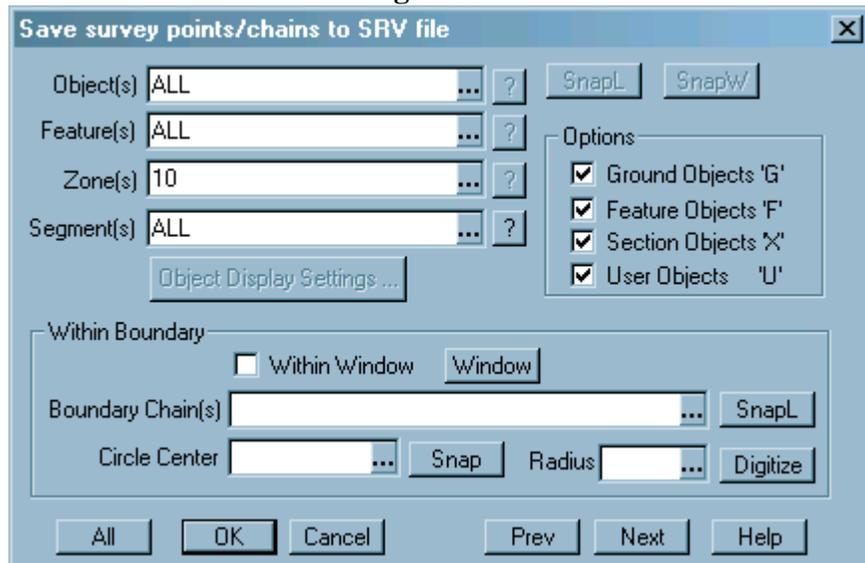
- Original data
- Field enhanced data
- User-generated data (Manual Entry)

a. Select the command:

File => Save => Survey Points/Chains to SRV File

b. Leave all fields set to “ALL” in the *Save survey points/chains to SRV file* dialog except the **Zone(s)** field. Enter the zone of the segment enhanced in the **Zone(s)** field. Click on **OK**.

Figure 3-4



c. When prompted for a filename for the SRV file to create, enter the name of the segment SRV file (*ProjectName + SegmentLetter.SRV*). Unless otherwise specified, the file will be created in the project directory, which is fine since the file will not reside with the SDE, but be sent to Design. (The SDE will not keep the new SRV file since it can be regenerated from the existing project at anytime.)

d. Perform this process for each enhanced segment.

8. Process the Revised DTM

- a. Delete the current DTM Database

DTM => DTM Database Manager => Delete

- b. Create, reload, and process the DTM Surface
(See earlier documentation for [Creating and Processing the DTM](#))

NOTE: If the project is a mapping project, then the *BORDER* chain needs to be re-draped onto the DTM surface and a new SRV file created **ONLY** if the *BORDER* chain was changed or affected in any way by the field enhancements. Otherwise, use the existing SRV file created under the original field enhancements.

- c. Write a revised DTM File to send to Design

Select ***Tools => Custom Tools=>GDOT Macro Menu***. In the *GDOT Macro Main Menu* dialog, click on the *DTM* tab and then click ***Compress DTM Database***. This macro will automatically compress all the EXIST.* files in the project directory into a file named *Exist.zip*. This is the DTM file to be submitted to Design. Please Note: the ZIP file format is now used instead of the LZH format.

9. Produce the new DGN File(s)

The additional topo data will also need to be exported to new DGN files as necessary for including into the original mapping DGN files as [previously documented](#). This can be done by running only the standard command files that pertain to the additional data. The command files will need to be edited and, instead of specifying “ALL” in the segment for each view command, change the segment to be the segment name of the additional information (*XA*, *XB*, etc.). This will view only the additional information to be merged into the original mapping DGN files. **It is advised to make copies of the original command files and use the copies to edit.**

(See [Merging Field Enhanced DGN Files](#) for information on merging the topo data into the original data.)

10. Send the new SRV File(s), DGN File(s), and the DTM File to Design

The designer will receive the updated files and will delete out the old data from the enhanced segment by zone, reset the prefixes for the deleted data, and import the new segment SRV file.

III. Property Enhancements (2D)

All property enhancements will be supplied to the Designer in CAiCE KCM files which will contain all the originally submitted property data plus any enhancements or additions.

A. Convert and import the field enhanced file

Create a segment for the enhancement data according to the conventions below.

(See earlier documentation in this document for [creating the correct number of segments.](#))

NOTE:

Enhancements will adhere to the following convention for segment naming:

First enhancement = Segment XA

Second enhancement = Segment XB, etc.

The segment for the first field enhanced file will always be “XA”. The file **ProjectNameXA.SRV** and other files will be created in the project segment directory.

(ie: *c:\kcddata\project\XA\ProjectNameXA.SRV*).

B. Run ASCSRV

(See earlier documentation for running [ASCSRV](#))

The header information from the ASC file will be written to the SRV file. All point names will have a prefix of “SV + Segment Letter” (ie: SVXA) where the segment letter is specified in the input to the program. All points and survey chains are assigned a *zone* based on whether the data is Property (Zone 50), 3D Topographic data (Zone 51), or 2D/3D Planimetric data (Zone 52).

C. Import the field enhanced SRV file from the field enhancement segment

(See earlier documentation for [importing the SRV File\(s\) into the CAiCE database.](#))

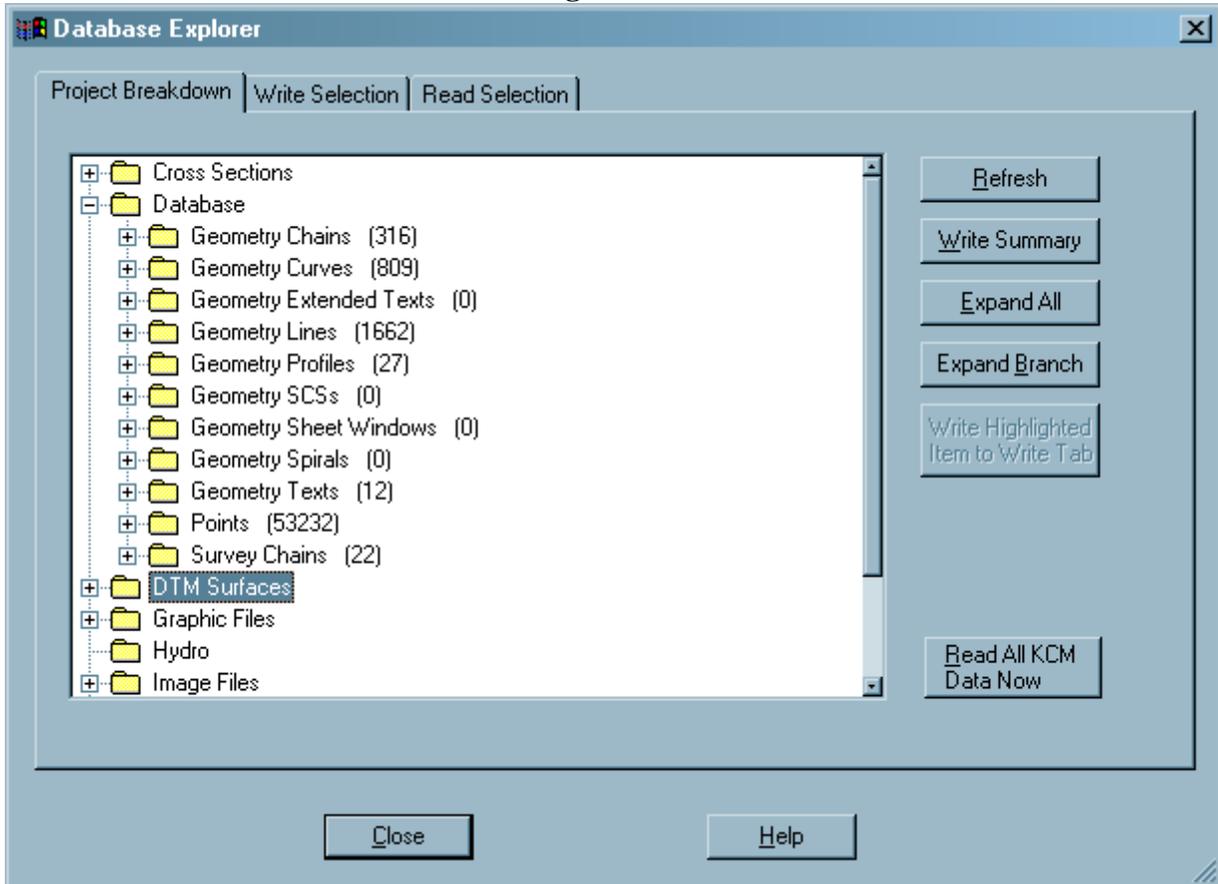
D. Process the additional/revised property data

(See earlier documentation for [chaining the property together.](#))

E. Write out the KCM files

The KCM file is produced through *Database Explorer*. The KCM file will contain the chains and all elements. The KCM file can also be used to export any type of geometry data out of CAiCE to send to another office. To produce the KCM files, use the ***Tools=>Database Explorer*** command. This command will open the *Database Explorer* dialog shown in **Figure 3-5**.

Figure 3-5

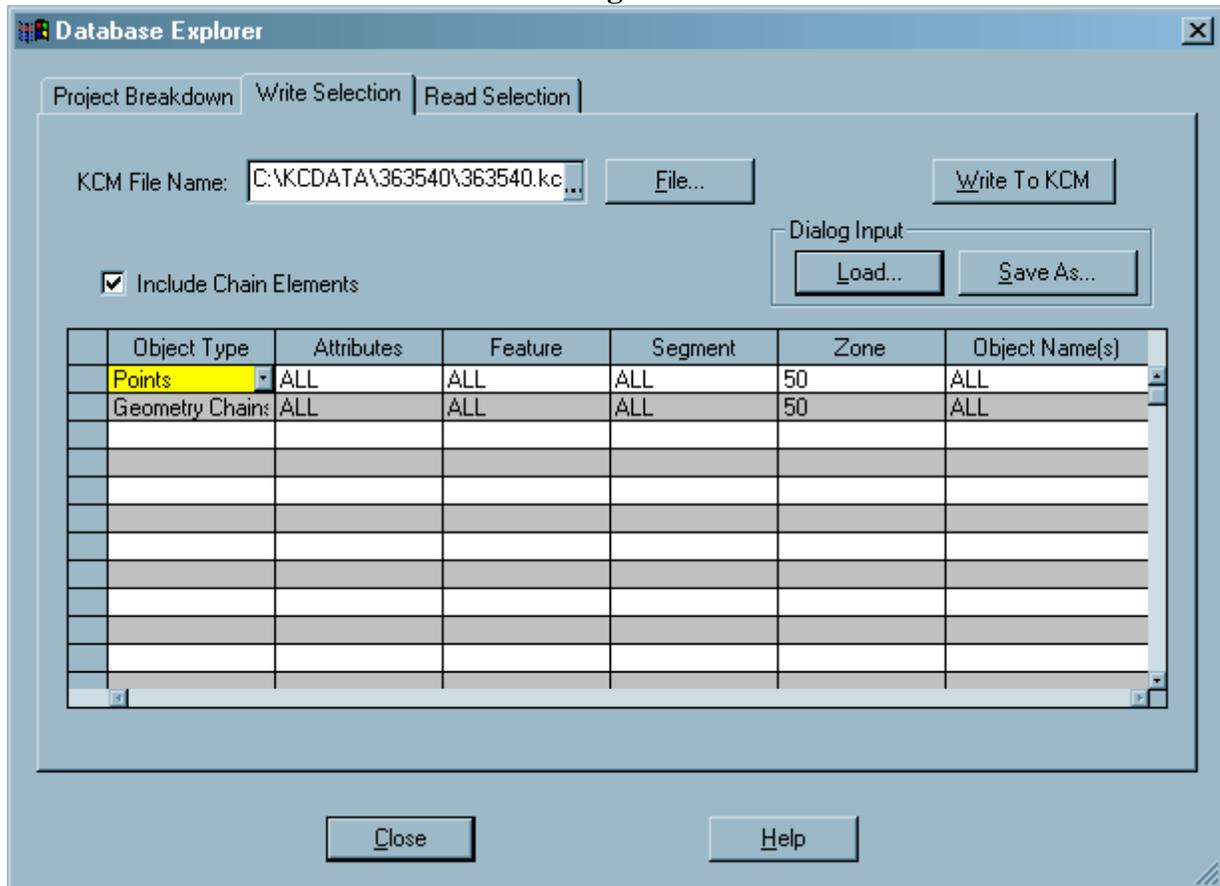


This command can be used to obtain detailed information about all files and objects associated with a project by using the **Project Breakdown** section and expanding the major categories shown above.

NOTE: For the following procedure to work as documented, all property must have been stored in CAiCE using the standard GDOT Property Zone of 50.

To write out the KCM file, click on the **Write Selection** tab to open the dialog shown in **Figure 3-6**.

Figure 3-6



In the Write Selection dialog (see **Figure 3-6**), click on the **Load** button under **Dialog Input**, navigate to the CAiCE directory, select the file **writeprp.txt**, and click on the **Open** button. This will fill in the dialog with the selection criteria for all property data by Zone. The file **writeprp.txt** is part of the standard downloadable file **CAICEALL.EXE** from the GDOT CAiCE Homepage. Make sure the **Include Chain Elements** option is checked so that the chains and all their elements will be written out at one time. In the **KCM File Name** field, enter a name of *ProjectNamePR.KCM* (ie: *123456PR.KCM*).

Next, click on the **Write to KCM** button to write the property data to the KCM file and click on the **Close** button to close the dialog. The resulting KCM file will reside in the project directory.

KCM File Naming Scheme:

PI# + PR.KCM (ie: *123456PR.KCM*)

F. Produce the Revised DGN File

The revised property data will need to be exported to a new DGN file. The command files will need to be edited to reflect viewing only the revised/additional data to be merged into the original property DGN files. **It is advised to make a copy of the original command file and use the copy to edit.**

(See [Merging Field Enhanced DGN Files](#) for information on merging the topo data into the original data.)

G. Send the new DGN and KCM files to design

When the designer receives the KCM file from the SDE, the designer will process the file according to the *Guidelines for Processing Design Data in CAiCE* so the property will be up to date.

Section 4 – Survey Data and Information Gathering Procedures

I. General Information

- It is very important, especially during the development of the automated surveying process, that the surveyors make free-hand sketches which show how the data was collected. These sketches are to be used for reference during the processing of the survey data. The sketches should be retained at the District as part of the project records but copies can be provided to the designer if clarification is needed.
- Upon transmitting the location survey data, the Survey Data Engineer should insure that the TPRO "**Finish Date**" for Field Surveys reflect this date. The survey percentage is to be increased to 99%.

II. Topo Enhancements

(See earlier section for [Topo Enhancements](#) information.)

III. Property Enhancements

(See earlier section for [Property Enhancements](#) information.)

IV. Drainage and Hydraulic Data

- The District should provide information about existing drainage structures and streams within the limits of the project. The coordinates for the structures and streams should define its location (center) and flow line elevations. Coordinates for certain drainage structures should be provided in accordance with the point of origin shown in [Attachment C](#). The structure's size and type should also be provided.
- All existing drainage structures and stream traverses should be chained.
- Bridge locations and elevations should be provided as requested with the CAiCE topo attribute set to be "*F*" (2D).
- A Hydraulic Report (Electronic File - **HYD**) should be provided for all bridges over streams within the limits of the project.
- Explanatory notes should be added to the correct Mapping Design File. The names of streams should be included in these notes. The text **must** have the correct attributes and level as indicated by the statewide attributes and level conventions.

V. Utility Data

- The District shall provide information as to the location and elevations of all storm and sanitary sewer systems within the limits of the project.
- Major utility items that are field collected will be provided by the District in the appropriate Utility Design File (ie: UTIL1.DGN, UTIL2.DGN, UTIL3.DGN).
- All other utility data (line and pipe locations) shall be provided to the designer by the utility companies.
- Explanatory notes should be added to the appropriate Utility Design File (ie: UTIL1.DGN, UTIL2.DGN, UTIL3.DGN). The text **must** have the correct attributes and level as indicated by the statewide attributes and level convention.

VI. Alignments

- The centerline alignment should only be staked for projects on new locations where field cross sections are required.
- When it becomes necessary to stake a centerline, the Survey Data Engineer should prepare this alignment for loading into the data collector. The point numbers for the stations to be staked (every 100') should reflect the centerline station numbers.

ENGLISH

Example: Point #55 = 55+00 or 155+00
Point #100 = 0+00 or 100+00

When computing the alignment to be loaded into the data collector it is imperative that the stationing remain identical to that which was provided by the designer.

METRIC

Metric stationing should be done in 20 meter intervals in rural areas and 10 meter intervals in congested areas and shall be numbered by the following format:

Kilometers + Meters

Example: 50+000, 142+155

The decimal place shall be carried to the third place past the whole number to reflect millimeters.

Example: 12+125.627

VII. Digital Terrain Modeling (DTM)

The State Environmental/Location Engineer shall determine which projects will be mapped in a DTM format. On full field surveyed projects the Preconstruction Engineer shall make this determination.

A. Mapped Projects

1. All areas shown as obscured on the mapping (**dense woods, water, etc.**), within the limits of the project, shall be enhanced by field survey. This will include lines of discontinuity (**break line**) and random points as required to accurately define the terrain. A minimum of one (1) point shall be gathered in each **enhanced** obscure area (**dead area**). This will serve as an indicator to the designer that the area has been enhanced. The surveyor should note on the enhanced mapping sheets all obscured areas which have **been enhanced** and those which have **not been enhanced**.
2. The back limit of the enhanced obscure area shall be defined by a **Limit Line**. This limit line should be a 3D String which profiles the terrain across the obscure area.
3. The Survey Data Engineer shall convert the field data into **SRV** files.
4. The Survey Data Engineer shall combine and plot the field data with the appropriate photogrammetric data. The Survey Data Engineer and the surveyor shall review the combined data (random points, break lines and contours) for accuracy and completeness.

B. Full Field Surveyed Projects

1. The surveyor shall be responsible for gathering terrain data (break lines and random points) of all areas within the limits of the project.
2. Same as above Item b thru d.

VIII. Reviewing Daily Survey Work

The process of gathering field survey data will almost always involve multiple days of survey work. At the end of each day, the survey data will need to be brought into CAiCE and reviewed for accuracy. The process for reviewing the daily work is documented as follows:

NOTE: Field survey data (original enhancements to mapping or requested additional data) collected for a single submission over multiple days will be combined into ONE survey file (ONE ASC file resulting in ONE SRV file) and imported into CAiCE through ONE field segment (XO, XA, XB, etc.). In other words, one day's field work does not constitute a segment. All field work for a single submission will be completed and combined into ONE survey file for importing and/or submission.

A. Create a CAiCE Project

The project created can be:

1. The actual CAiCE project (by PI Number) the data will be processed in until sent to the SDE

OR

2. It can be a “bogus” project simply used for reviewing survey data on ANY project.

Whichever method of project creation is chosen, the process will be basically the same.

B. Create a Segment to Import the Data Into

If the project created is the actual PI Number CAiCE project, then the segment will be the next standard field enhanced segment (XO, XA, XB, etc.).

If the project created is a “bogus” project, then the segment naming is optional since a final PI Number project with correct segment naming will be created later.

C. Convert the ASC File using ASCSRV

D. Import the SRV File

E. Review the Data

Use the CAiCE viewing and rendering commands to review the data.

NOTE: If errors are found, they MUST be corrected in the ASC file!

F. Delete the DTM Database

If a DTM was built in reviewing the data, then delete it when the review is complete.

DTM=>DTM Database Manager=>Delete

G. Reset the Project

File=>Project Manager

*(From CAiCE Project Management System) **Project=>Reset***

This will set the project back to its' original state before any work was done. Continue this process on a daily basis until the survey is done and then import to the final project correctly.

Section 5 – Converting Metric Survey Data to English

As the transition is made back to English units, some survey data will need to be converted from Metric to English units. This addendum is intended to provide directions for converting survey data. This addendum addresses various situations that will be encountered with DMM files, ASC files, and DGN files. It also provides detailed, step-by-step instructions for converting Metric CEAL projects to English CAiCE projects. The addendum is organized as follows: (I.) Original submission survey data, (II.) Additional Information/Enhancement Survey Data, (III.) DGN Files, and (IV.) Metric CEAL Project Files.

Two general rules will apply in converting survey data from Metric to English.

- 1) All conversions will be handled by the District Survey Data Engineer.
- 2) All conversions will be done in CAiCE using the *Convert Project Units* command.

NOTE: It is the responsibility of the District SDE to prepare, convert, and enhance all mapping and survey data prior to delivery to the Project Manager or Designer. At no time should the Project Manager or Designer revise, edit, or enhance this data.

I. Original Submission Survey Data

If the survey data is part of the original submission, then typically all the data will be brought into a Metric CAiCE (project) database and then the entire project will be converted to an English project using the *Convert Project Units* command.

The DMM/SRV files from the Office of Environment/Location will be sent to the District SDE for inclusion into the CAiCE project which will then be sent to Design.

A. Aerial Mapping DMM/SRV Files for English Projects

If the DMM/SRV files are in English units, then the SDE will simply create an English units CAiCE project and import the files into the project through segments.

If the DMM/SRV files are NOT in English units, then the SDE will create a Metric units CAiCE project and import the files into the project through segments. Once the field enhancements have been imported as well, then the entire project will be converted to English.

B. Field Enhancement ASC Files for English Projects

If the ASC file is in English units, then convert the project to English with the DMM/SRV data already imported and import the ASC field data through its segment into the English project.

If the ASC file is NOT in English units, then import the ASC field data into the existing Metric project. With all the survey data (mapping and field) imported, then convert the project to English.

C. Full Field Survey ASC Files for English Projects

If the project is full field survey and the ASC file is Metric, then the SDE has the option of:

1. Importing the field data directly into a Metric created CAiCE project and converting the project to English using the *Convert Project Units* command.

OR

2. Converting the ASC file to English using the GDOT utility program *ASCTR.EXE* and then importing it into an English created project in CAiCE.

II. Additional Information/Enhancement Survey Data

When the survey data is part of additional information or enhancements, then the ASC file will either be directly imported into CAiCE or converted based on its units since the existing project into which it will be imported is in English units.

If the ASC file is in English units already, then the ASC file can be converted using *ASCSRV* and imported directly into CAiCE through its field enhancement segment for processing.

If the ASC file is NOT in English units, then it will need to be converted to English units using the GDOT utility program *ASCTR.EXE* before converting it using *ASCSRV*.

<p><u>NOTE:</u> After the project has been converted in CAiCE, the standard <u>ENGLISH Feature Table</u> and <u>Cell File</u> will need to be attached to the current project using the <u>Tools=>Attach</u> commands.</p>

III. DGN Files

Several different situations will exist with DGN files and they will need to be handled basically on a project-by-project basis. The DGN files will include the mapping DGN files provided by the Office of Environment/Location as well as the DGN files produced by the District SDE.

A. Mapping DGN Files

The mapping DGN files produced by the Office of Environment/Location will be regenerated.

B. DGN Files Generated by the SDE

The DGN files produced by the SDE (property, topo, utility, etc.) will be handled as follows:

1. The DGN files were produced out of CEAL:
The DGN files will be regenerated out of CAiCE.
2. The DGN files were produced out of CAiCE:
The DGN files will be regenerated out of CAiCE.

IV. Metric CEAL Project Files

There are some projects that are scheduled to be converted from Metric to English units. The project survey data was originally submitted in CEAL (Metric) format. The following guidelines provide direction in converting CEAL (Metric) INT and DMM files to CAiCE (English) format for resubmission. **All units conversion will be done in CAiCE.**

The SDE should have submitted a Metric CEAL INT file and one or more Metric CEAL DMM files. The Metric DMM files can be converted directly to SRV files with no other steps needed. The Metric INT file will only be used to write out all chained property data to a separate INT file and then the remaining INT file discarded.

A. Metric Interface (INT) Files

The SDE will write out a separate INT file containing just the chained property information (and any alignments the SDE may have stored). The resulting INT file will be used to convert to CAiCE. Use the *WRITE Interface fname* command in CEAL to write out the property data to an INT file. This can be accomplished by:

1. Using the standard property class codes (*CLASS PAR, etc.*) or
Write Ifname CLASS PAR, etc.
2. Using the prefix on all property data (*SEL P*, etc.*).
Write Ifname SEL P001 to P999, R001 to R999

B. Create the METRIC CAiCE project by PI Number

File=>Project Manager: Displays the *CAiCE Project Management System* dialog

From *CAiCE Project Management System*, select ***Project =>Create***

In the *Create CAiCE Project* dialog, enter the **Project Name (Project P.I. Number), Description (optional), Max No. of Points (500000), Max No. of Chains (250000), Project Unit (Metric)**, and the project **Location (KCDATA directory)** and click on **OK**.

Set the *System Settings* as desired and click on **OK**.

C. Create the project segments

A segment will be created for each DMM/SRV file for the project.

From the *CAiCE Project Management System* dialog with the new project highlighted, select ***Segment=>Create***.

In the *Create New Segment* dialog, enter the **Segment (A, B, C, etc.)** and the **Description (optional)** and then click on **OK**.

Perform the same steps for creating the remaining segments.

D. Run the *DMMTOSRV* program on all ENHANCED DMM files

The ENHANCED DMM files will be used for converting to CAiCE, NOT the original Environment/Location DMM files. Using the ENHANCED DMM files will assure no field enhancement work will be lost and have to be redone when converting to CAiCE.

The ENHANCED DMM files for the project can be directly converted to SRV files using the *DMMTOSRV* program. The program will prompt the user as follows:

Enter CEAL DMM File Name
====> **C:\SDECLASS\INTRO\LOCM.DMM**
Enter the path and filename of the DMM file to convert

Enter CAiCE SRV File Name

====> *C:\KCDATA\123456\A\123456A.SRV*

Enter the path and filename of the SRV file to create. Remember, the filename MUST be **ProjectName + SegmentName.SRV**. The path can be any valid path or may be the segment path to put the SRV file directly into.

Enter Point Prefix <DMM>

====> *DMA*

The Standardization Committee has established standard prefixes to be used for all survey data. All DMM prefixes are to be “**DM**” + **SegmentName** (ie: **DMA, DMB, DMC...**).

Enter Chain Prefix <DMM>

====> *DMA*

The same information for the point prefix also applies for chain prefixes.

Enter Zone Number <1>

====> *10*

The zone number will correspond to the segment the SRV will go into. Zones for original survey data start at 10 for segment “A” and continue up to 49. Therefore, an SRV file going into Segment “A” will have a Zone of 10. An SRV file going into Segment “B” will have a Zone of 11. A table of zones and segments is provided below.

Table 5.1

Segment	Zone		Segment	Zone
A	10		N	23
B	11		O	24
C	12		P	25
D	13		Q	26
E	14		R	27
F	15		S	28
G	16		T	29
H	17		U	30
I	18		V	31
J	19		W	32
K	20		X	33
L	21		Y	34
M	22		Z	35

E. Import the INT file

File=>Import Translators=>From CEAL=>Geometry Interface File (INT)

Set all the prefixes (*except the Geometry Chains*) to **CINT** (CEAL *INT*erface).

Leave the Geometry Chains field blank and all Geometry Chains will be brought into CAiCE with the same alpha prefix and numbering as in CEAL. Then, select the INT file to import. This will import all the property data from the INT file with the same point numbers as in CEAL, except with the specified prefix of ***CINT***.

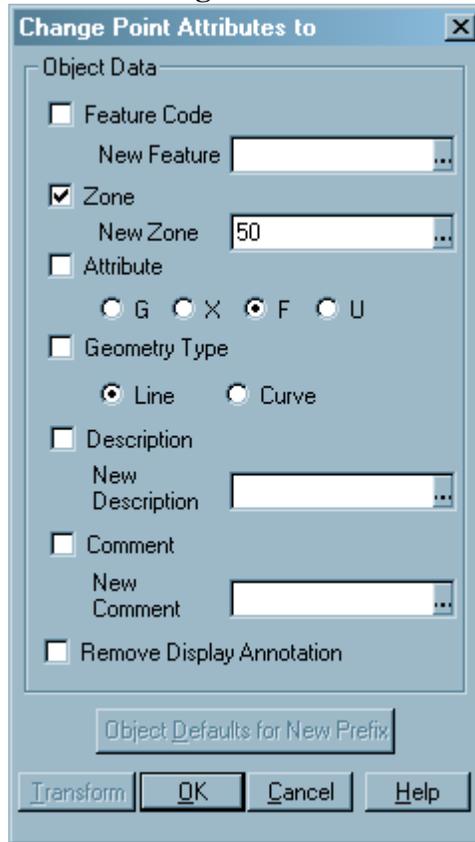
F. Move the Property Data to Zone 50

At this time, there should be no other data in the project except the property data. Simply use the Change Attributes commands for all the types of property objects to move them to **Zone 50**, the standard property zone.

Geometry=> OBJECT => Change Attributes

where ***OBJECT*** is *Points, Geometry Chains, Curves, Spirals*, etc. Leave all criteria set to *ALL* in each command. In each *Change OBJECT Attributes* dialog, select the **Zone** attribute to change and set the **New Zone** to **50** as shown in **Figure 5-1**.

Figure 5-1



G. Import the SRV file(s)

File=>Project Manager: Displays the *CAiCE Project Management System* dialog

Click on the new project to highlight it and then click on the segment to import to highlight it.

From Project Manager, select *Segment =>Import*

In the *Import Segment Files* dialog, select the **Source of Import Data** to be the directory where you created the SRV files. Then, click on the SRV file and click on **OK** to import the file.

Perform the same steps for the remaining segments.

This pulls in all the points and survey chains in the SRV files into the CAiCE project database.

H. Create the segment for the field enhanced data

The field ASC file that will be re-converted below will come into the CAiCE project just as the original enhancements would for any CAiCE surveyed project, through **segment XO**. Therefore, a segment **XO** will be created.

From the *CAiCE Project Management System* dialog with the new project highlighted, select **Segment=>Create**.

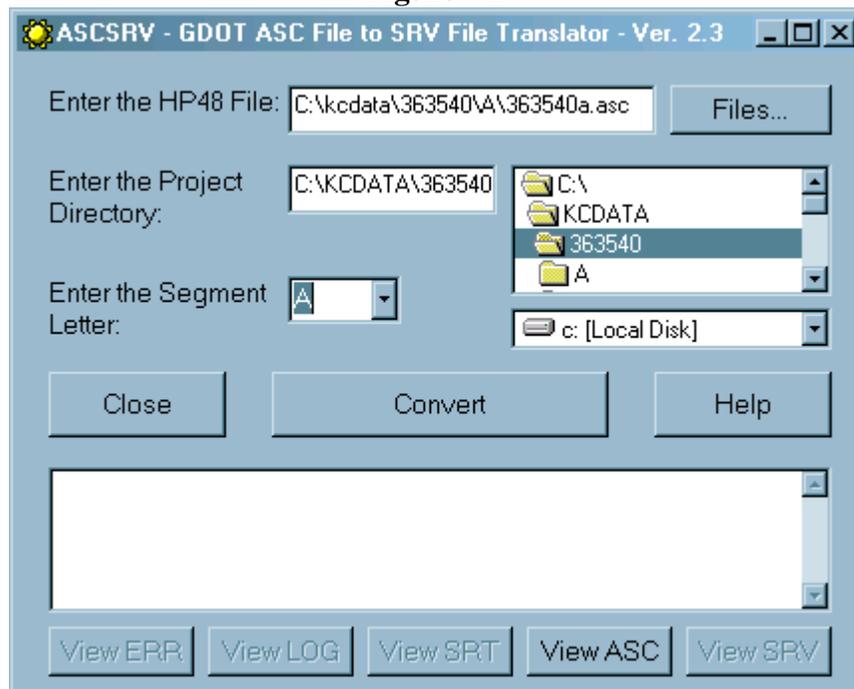
In the *Create New Segment* dialog, enter the **Segment (XO)** and the **Description (optional)** and then click on **OK**.

I. Convert the field ASC File using ASCSRV

Originally, the ASC file was converted using the *COMPILER* program and produced an INT file and a DMM file. The resulting DMM file was merged with the original DMM files and produced the enhanced DMM files converted above. The INT file was used to extract the property data and the resulting property INT file was imported into CAiCE above. The remaining topo data (2D/3D) will be brought into CAiCE by converting the original ASC file using *ASCSRV*. Re-converting the ASC file to an SRV file using *ASCSRV* allows all survey data to come into CAiCE as Survey Points and Chains instead of a mixture of Geometry and Survey data as would occur by importing the topo through the INT file.

Run the *ASCSRV* program: **Tools => Custom Tools => ASCSRV** to display the *ASCSRV – GDOT ASC File to SRV File Translator* dialog (see **Figure 5-2**).

Figure 5-2



Click the **Help** button to display the on-line .PDF help file for the program.

J. Import the SRV file

File=>Project Manager: Displays the *CAiCE Project Management System* dialog

Click on the new project to highlight it and then click on the segment (XO) to highlight it.

From *CAiCE Project Management System*, select **Segment =>Import**

In the *Import Segment Files* dialog, select the **Source of Import Data** to be the directory where you created the SRV files (*XO*). Then, click on the SRV file and click on **OK** to import the file.

K. Delete the Duplicate Data on Zone 51

Once the resulting SRV file has been imported into CAiCE, the data on Zone 51 (3D data) will be deleted since it is also part of the enhanced DMM files already imported into CAiCE.

Geometry=>Points=>Delete

Leave all fields set to “*ALL*” except the **Zone(s)** field. Set the **Zone(s)** field to **51**.

Geometry=>Survey Chains=>Delete=>With Chain Points

Leave all fields set to “*ALL*” except the **Zone(s)** field. Set the **Zone(s)** field to **51**.

L. (OPTIONAL) Delete the Duplicate Data on Zone 50

The property data was imported already into CAiCE through the INT file. As part of this file, some of the field gathered property points were imported. The same field gathered points are also part of the converted ASC file as well. This will create some duplicate points. This will NOT create any problems, but the duplicate points coming in from the ASC file can be deleted if desired as follows.

Geometry=>Points=>Delete

Leave all fields set to “*ALL*” except the **Segment(s)** field and the **Zone(s)** field. Set the **Segment(s)** field to **XO** and set the **Zone(s)** field to **50**.

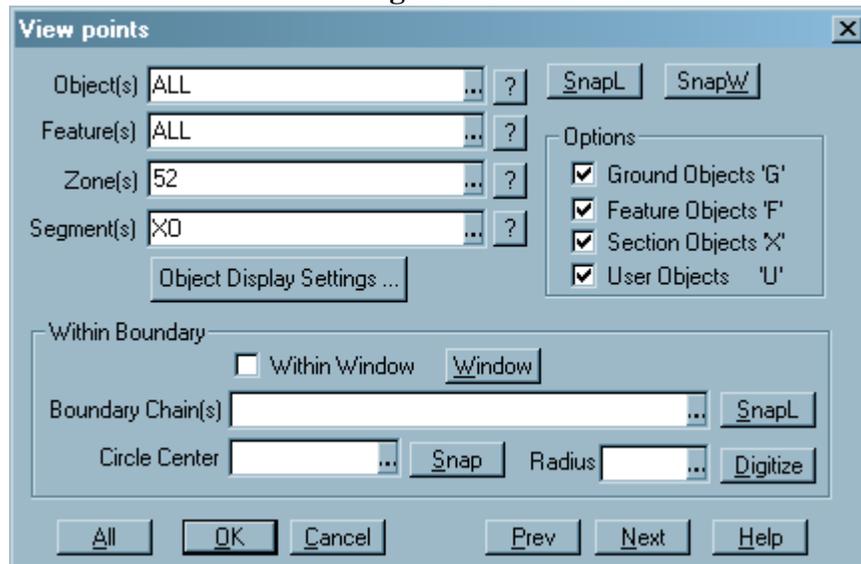
M. Move the 2D/3D Planimetric Data to the Correct Zone

The remaining topo data (2D/3D) on Zone 52 will be moved to the correct segment zone to merge it with the original mapping data.

1. View all the planimetric and topographic data in the field enhanced file:

View=>Points (Setting the **Zone(s)** field to **52** and the **Segment(s)** field to “**XO**” as shown in **Figure 5-3**).

Figure 5-3



View=>Survey Chains (Setting the **Zone(s)** field to **52** and the **Segment(s)** field to “**XO**” as shown above).

2. View all data in the first segment to enhance (Assume it is “A”)
View=>Points (Setting the **Zone(s)** field to **10**).

View=>Survey Chains (Setting the **Zone(s)** field to **10**).

3. Move the enhanced data to the correct segment zone (10, etc.)
Geometry=>Points=>Change Attributes

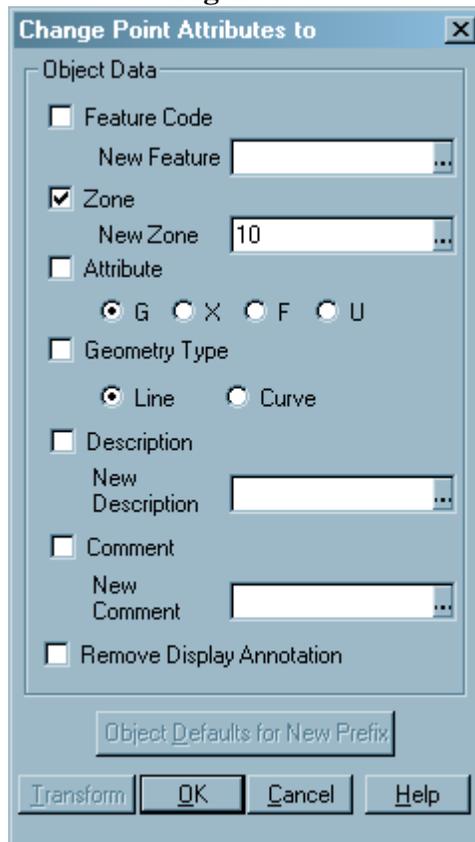
From the *Change attributes of geometry points* dialog, click on the **SnapW** button at the top of the dialog.

Holding down the left mouse button, drag a box around only the segment data to be moved (Segment “A” in this case) and let go of the left mouse button.

The **Object** field should now reflect **@KCTEMP**. Click on the **OK** button.

From the *Change Point Attributes to* dialog (see **Figure 5-4**), click in the checkbox next to **Zone**, enter **10** in the **New Zone** field, and then click on **OK**.

Figure 5-4



Now, the original data points and the enhanced data points are on the same zone for that segment (Zone 10 in this case).

Repeat the same process using the command

Gometry=>Survey Chains=>Change Attributes

to move all the survey chains for the enhanced segment to the correct zone (Zone 10 in this case).

Continue this process until all data on Zone 52 has been moved to the correct segment zones.

N. Convert the Project to English units

Once all survey data has been imported:

1. Archive the project:
(From *CAiCE Project Management System*)
Project=>Archive

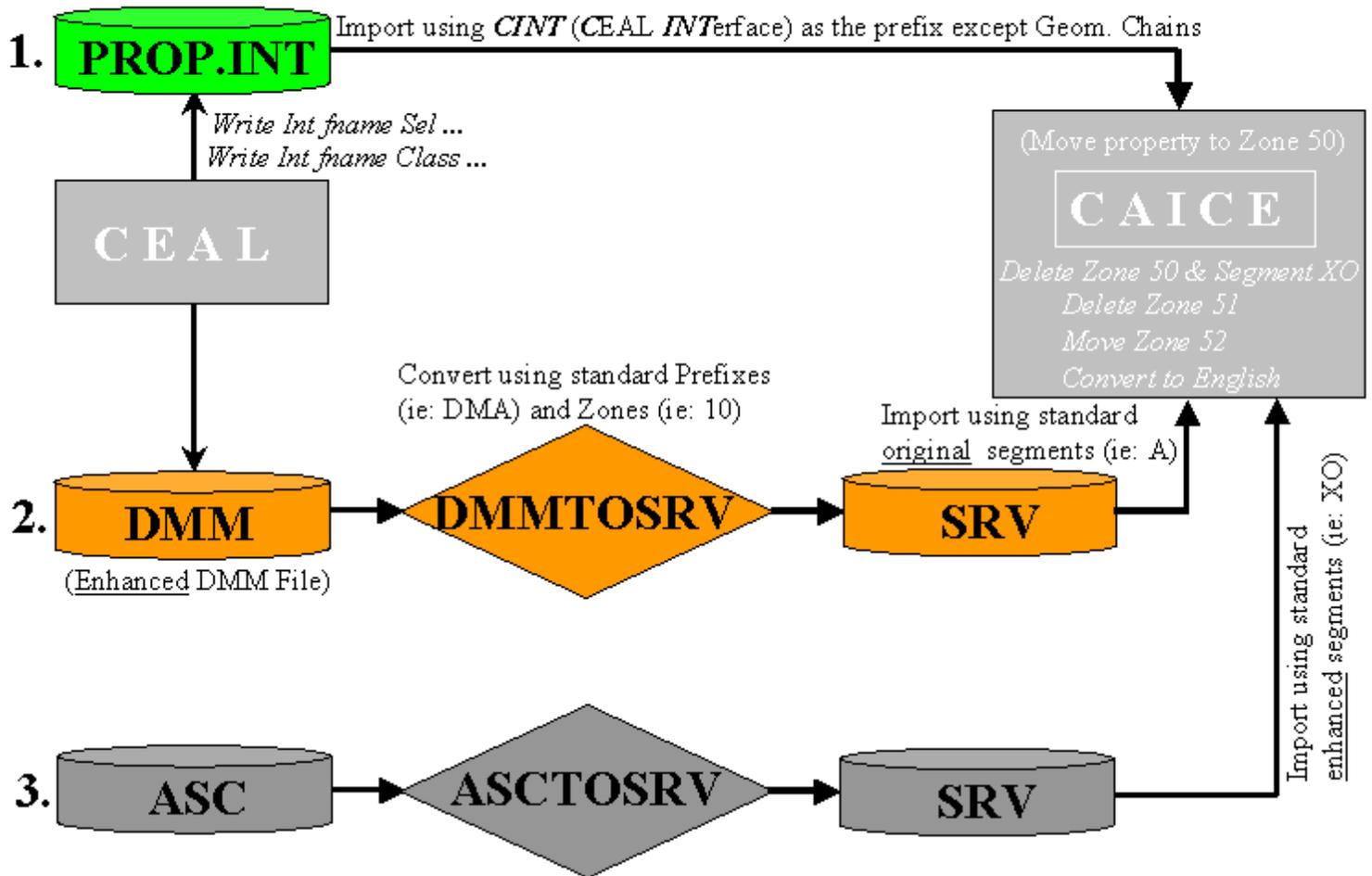
2. Convert the project:
(From *CAiCE Project Management System*)
Project=>Convert Project Units

NOTE: The correct units Feature Table and Cell File will need to be re-attached after conversion.

The flowchart shown in **Figure 5-5** summarizes the entire conversion process.

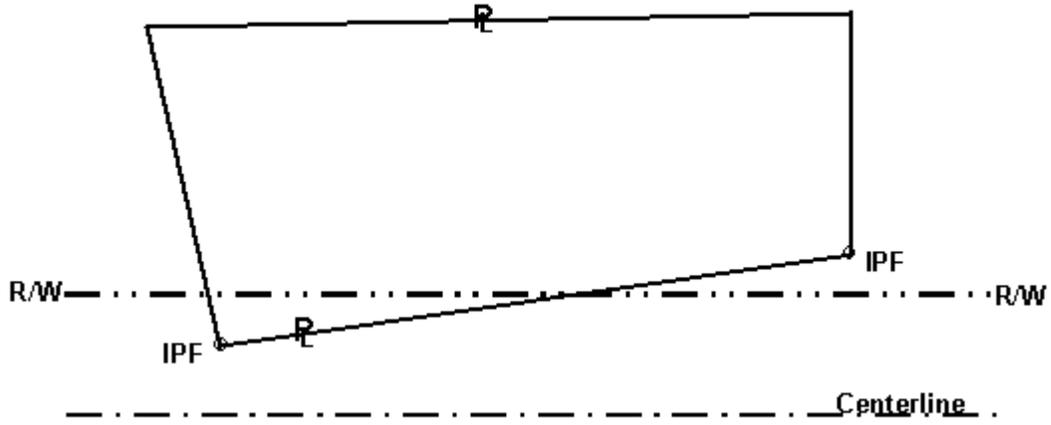
Figure 5-5

Converting Metric CEAL Projects to CAiCE English Projects

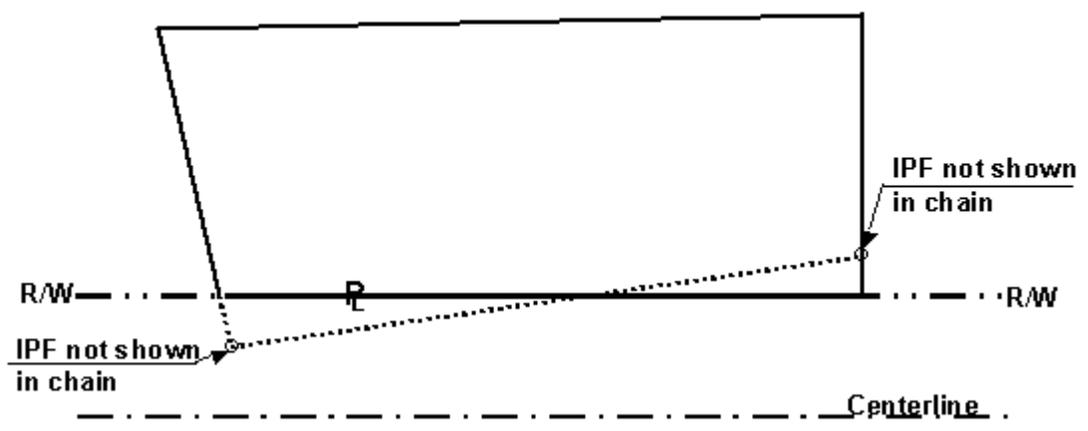


Attachment "A"
October 1995
Road with Deeded Right-of-Way

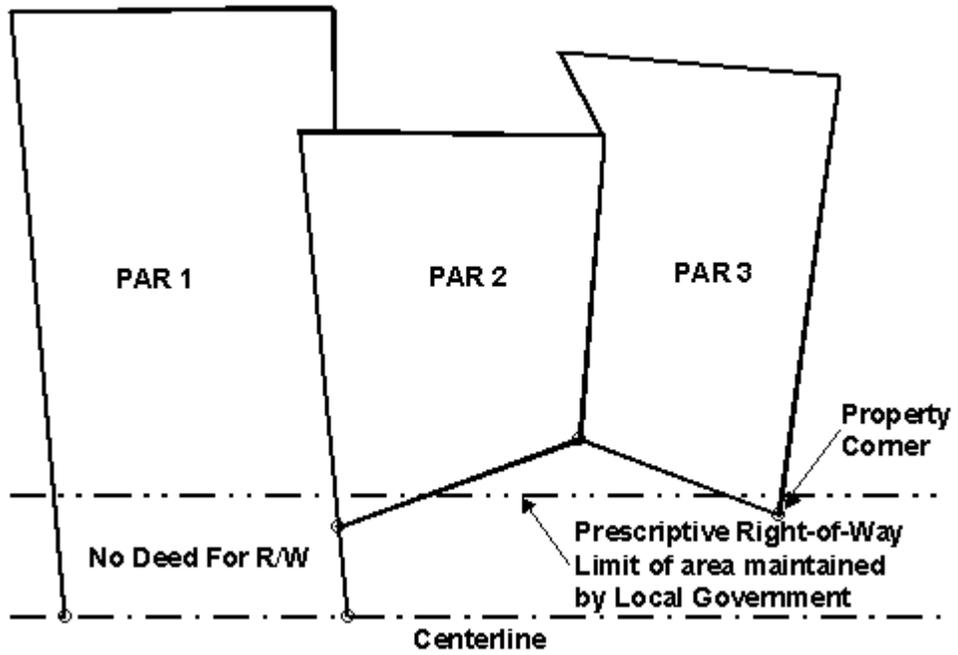
Field Data for Parcel



Correct Description for Parcel



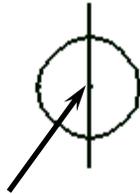
Attachment "B"
October 1995
Road without a Deeded Right-of-Way



Attachment "C"
October 1995
Symbols



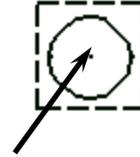
**Right-of-Way
 Marker
 (RWM)**



**Telephone
 Pole
 (UTP)**



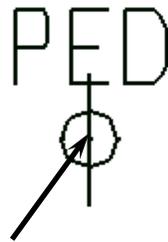
**Telephone
 Manhole
 (MHT)**



**Well
 (WEL)**



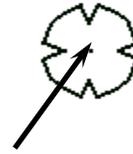
**Marker -
 Misc.
 (MAR)**



**Telephone
 Pedestal
 (TPD)**



**Electrical
 Manhole
 (MHE)**



**Tree
 (TRE)**



**Catch Basin
 Single
 (CBS)**



**Guy
 (GUY)**

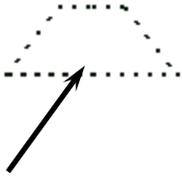


**Sanitary Sewer
 Manhole
 (MSS)**

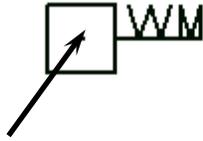


**Gas Monitoring
 Well
 (GMW)**

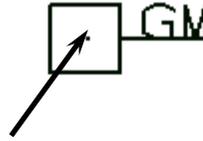
Attachment "C"
October 1995
Symbols



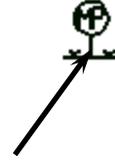
**Catch Basin
 Double
 (CBD)**



**Water Meter
 (WM)**



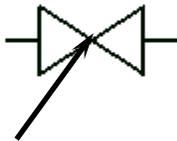
**Gas Meter
 (GM)**



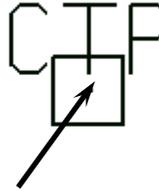
**Mile post
 Marker
 (TMP)**



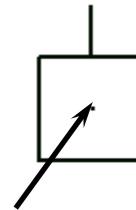
**Drainage
 Drop Inlet
 (DDI)**



**Water Valve
 (UV)**



**Cable TV
 Pedestal
 (CTP)**



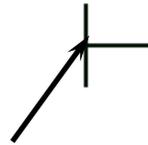
**Utility Power
 Pole
 (UPP)**



**Gas Pump
 (TGP)**



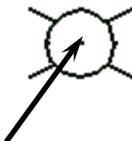
**Fire Hydrant
 (UFH)**



**Sign
 (TS)**



**Storm Drain
 Manhole
 (MST)**



**Light Pole
 (ULP)**

Attachment "D"
October 1995

NOMINAL SIZES OF TOPO FEATURES (PIPES, FENCES, ETC.)

<u>English Measurement</u>	<u>Metric Measurement</u>
3 inch dia. or height, width, length	0.08 meters
4 inch dia. or height, width, length	0.10 meters
6 inch dia. or height, width, length	0.15 meters
8 inch dia. or height, width, length	0.20 meters
10 inch dia. or height, width, length	0.25 meters
1 foot dia. or height, width, length	0.30 meters
15 inch dia. or height, width, length	0.38 meters
18 inch dia. or height, width, length	0.46 meters
2 feet dia. or height, width, length	0.61 meters
30 inch dia. or height, width, length	0.76 meters
3 feet dia. or height, width, length	0.91 meters
42 inch dia. or height, width, length	1.07 meters
4 feet dia. or height, width, length	1.22 meters
54 inch dia. or height, width, length	1.37 meters
5 feet dia. or height, width, length	1.52 meters
6 feet dia. or height, width, length	1.83 meters
7 feet dia. or height, width, length	2.13 meters
8 feet dia. or height, width, length	2.44 meters
9 feet dia. or height, width, length	2.74 meters
10 feet dia. or height, width, length	3.05 meters

For additional 1 foot increments add **0.3048 meter**

NOTE: As (") designates inches or seconds and (') designates feet or minutes, the lower case (**m**) will follow numerical values to designate meters.

Attachment "E"
October 1995
Equivalent English and Metric Scales

In order to produce drawings that are similar in size to current drawings when using metric scales, the following scale substitution is recommended:

<u>Metric Scale</u>	<u>Engineers Scale</u>	<u>Percent Enlargement Or Reduction Using Metric Scale</u>
1:50	1" = 5'	+20%
1:100	1" = 10'	+20%
1:200	1" = 20'	+20%
1:500	1" = 30'	-28%
1:500	1" = 40'	- 4%
1:500	1" = 50'	+20%
1:1000	1" = 60'	-28%
1:1000	1" = 100'	+20%

<u>Metric Scale</u>	<u>Architect Scale</u>	<u>Percent Enlargement Or Reduction Using Metric Scale</u>
1:10	1 1/2" = 1'-0	-20%
1:10	1" = 1'-0	+20%
1:20	3/4" = 1'-0	-20%
1:20	1/2" = 1'-0	+20%
1:50	3/8" = 1'-0	-36%
1:50	1/4" = 1'-0	- 4%
1:50	3/16" = 1'-0	+28%
1:100	1/8" = 1'-0	- 4%

Revision Summary Page

<u>Date</u>	<u>Description of Revision</u>	<u>Page</u>
1/9/03	Changed the Zone from 52 to 50 for the following standard survey feature codes: BCOL, BCTL, BLDL, BLLL, BSL	14
2/28/03	Changed the Description for the standard survey feature code RWE to "RIGHT-OF-WAY, EXISTING". Removed the Chain Type "F" and added the Point Type "F" for the following standard survey feature codes: RWU, RWE, POEL. Revised the FEATURE CODE column in Table 2.7 for Points, Curves, and Chains to "RWE".	12 12 50
9/26/03	Updated document to correspond with CAiCE VT 10	N/A
3/15/04	Changed information about producing standard DGN files to correspond with version 2 of the Electronic Data Guidelines (EDG-2).	52-54
3/15/06	Revised the Location of the web-page link to download the GDOT Standard Files (CAiCEALL.exe). Revised the Location of the web-page link to download the ASCSRV Installation Program.	17-18 22
12/01/12	Updated document to reflect changes in DTM files from LZH to ZIP format.	11 & 69