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ABSTRACT

This booklet describes the Enrollment and Facilities Projection Program, a computer program package developed as one part of a family of educational management systems. The program consists of three parts, including a means of projecting enrollment, a means of converting enrollment to teacher and facilities requirements, and a means of reporting the projections. The booklet is organized into two sections--a general description and a user's guide. A detailed outline of dialogue and operational flow is contained in the user's guide. Numerous examples of data reports that can be produced using the program are presented throughout the booklet. (JG)

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PROJECT SIMU-SCHOOL

DALLAS COMPONENT

Dallas Independent School District
3700 Ross Avenue Dallas, Texas 75204 (214) 824 1620

Dallas Independent School District
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Development Division
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Department of Research, Evaluation,
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ENROLLMENT AND FACILITIES PROJECTION PROGRAM: GENERAL DESCRIPTION AND USERS GUIDE

Research Report No. 75-616

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Approved report of the Department of Research, Evaluation, and Information Systems

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February, 1975

EXECUTIVE SUMMARY

Objectives of the Project: The Enrollment and Facilities Projection Program consists of three parts: a means of projecting enrollment, a means of converting enrollment to teacher and facilities requirements, and a means of reporting the projections. Inputs consist of birth and enrollment history data, projected average teachers salaries, class loading by TEA subject code, and facilities data for each school in the district. Data calculated is saved and can be output at the option of the user in a variety of printed reports.

The program is an independent computer program package and is one of the components in a comprehensive family of programs which includes the Faculty Projection Program and the Financial Projection Program. Separately or as a total set, the aim is to improve educational planning and decision-making at the district level.

Once a basic set of input data is prepared, the program can be used to examine the effect on the school district of variables affecting enrollment and facilities availability. Each of these variations can be run and reported as a separate case. The reports section of the program will report the results and can also compare selected cases.

The following reports are available:

District-wide Reports
- Total Enrollment (by case)
- Total Teachers (by case)
- Total Facilities (by case)

School Reports
- School Enrollment (by case and school)
- Teacher Requirements (by case and school)
- Facilities Utilization (by case and school)

Comparative Reports
- Total Enrollment (two cases)
- School Enrollment (two cases, school and grade)
- Teacher Requirements (two cases, school and grade)
- Facilities Utilization (two cases and school)
- Differences in Enrollment, Teachers, and Facilities (two cases and schools).

ENROLLMENT AND FACILITIES PROJECTION PROGRAM

GENERAL DESCRIPTION

Synopsis

The Enrollment and Facilities Projection Program consists of three parts: a means of projecting enrollment, a means of converting enrollment to teacher and facilities requirements, and a means of reporting the projections. Inputs consist of birth and enrollment history data, projected average teachers salaries, class loading by TEA subject code, and facilities data for each school in the district. Data calculated is saved and can be output at the option of the user in a variety of printed reports.

The program is operated in an interactive mode. A detailed outline of dialogue and operational flow is contained in the Users Guide.

Once a basic set of input data is prepared, the LEA Model can be used to examine the effect on the school district of variables effecting enrollment and facilities availability. Each of these variations can be run and reported as a separate case. The reports section of the LEA Model will report the results, and can also generate reports comparing selected cases.

Inputs Requirements

Three input data files must be prepared by the user before running the program. These are:

ENRLH - Enrollment history

TRPARA - Teacher utilization

FACDAT - Facilities data

The enrollment history file consists of 3 parts:

(1) beginning dates for history and projection

(2) birth history data

(3) enrollment history data

The teacher utilization file consists of two parts:

(1) Projected average teachers salaries by year for the next 10 years.

(2) Class loading data, ordered by TEA subject code and by school.

The facilities data file lists facilities data by school for each school in the district. This data describes the rooms available at each school by type code.

Functional Description

The Enrollment and Facilities Projection Program consists of three parts: a means of projecting enrollment, a means of converting enrollment to teacher and facilities requirements, and a means of reporting the projections.

Enrollment Forecasting

The enrollment projection is based on a cohort survival ration model. In this model, the ratio of the number of students in a given grade to the number of students one grade higher in the following year (called the "cohort survival ratio") is calculated. Then statistics describing the cohort survival ratio over a period of time can be calculated such as mean, variance, and standard deviation. The statistics calculated are then output in the form of a printed report.

Three methods are available for calculating the statistics on cohort survival. The first is called the Mean of the Ratios. In this method, the cohort survival ratio is calculated for each grade for each year of data. The mean and variance of these ratios are then calculated and reported.

The second method is called the Ratio of the Averages. In this method, the average number of pupils in a given grade is divided by the average number of pupils a year later in the following grade to determine the cohort survival ratio. The variance in the ratio of these averages is then calculated and

reported.

The third method involves first calculating the cohort survival ratio as in method one. The logarithm of each ratio is determined, and the mean of the logarithms and the variance in the mean is calculated. The anti-log of the mean is then determined, and the results of these calculations are reported. The anti-log of the mean is represented as the "log normal cohort survival ratio."

The cohort survival ratios calculated can be used as is to forecast future enrollment by grade, or the ratio can be modified by adding or subtracting some fraction of a standard deviation, and the modified ratio used to forecast future enrollment.

In the Enrollment and Facilities Projection Program, survival ratios are calculated for the total enrollment of the District, for the entire historic period of coverage. The ratios include the ratio of births six years previous to first grade enrollment, as well as the ratio of births five years previous to kindergarten enrollment; thus kindergarten and first grade enrollment are predicted on the basis of births, while enrollment in any other grade is simply the cohort survival ratio times the total enrollment in the previous grade one year earlier.

The last year of data is used with the survival ratios to calculate the enrollment in the first year of projection. The same ratios are applied using the first year of projection to project a second year and so forth until the final year of projection is reached. Enrollment is distributed among schools on the basis of the ratio of the enrollment in a given grade in a given school to the total enrollment in that grade in the district. These ratios are applied year by year in order to calculate the enrollment in a given school.

In addition to forecasting enrollment directly from the cohort survival ratios, the program makes provision for inward and outward migration of students. Migration can be applied to a district as a whole, representing growth or decline in total population, or it can be applied to an individual school and grade. If the migration figures are applied at the individual school level, it is the users responsibility to see that the net migration within the district is 0; that is, if 50 pupils are removed from one school, 50 pupils must be entered into another school. Any net change in total enrollment must be handled at the district-wide level.

Teacher Requirements

Once the enrollment by school has been calculated, the teacher requirements can be determined. For an elementary school, teacher requirements are calculated on the basis of pupil/teacher ratios by grade. The enrollment in a grade is multiplied by the reciprocal of the pupil/teacher ratio in order to calculate the number of teachers required for a given grade.

For secondary schools, the number of teachers is based on the TEA subject code. An array of ratios is calculated, each of which reflects the fraction of the pupils (in a given school or district wide) taking a given subject mulitplied by the reciprocal of the average number of pupils a teacher in a particular subject area meets for an average day. The matrix of ratios is multiplied by the total enrollment in the school in order to calculate the number of teachers required to teach a given subject in that school.

Salary is calculated on the basis of an average teacher's salary by year. The salary requirement at a school is obtained by multiplying the total number of teachers at that school by the average salary to be paid in a given year. This number is recorded as the teacher salaries for that year.

Facilities Projection

The facilities forecast is based on the teacher forecast. In general, rooms are assigned on the basis of one room for a teacher, with the class of room being determined by the subject code. The number of rooms required is increased by a fraction to reflect the fact that the room may be utilized by the teacher for activities other than classes. Thus in a 7-period day in which the room is utilized 6 periods for classes, seven-sixths of the total number of rooms is calculated as the number of rooms required.

The facilities portion of the program assumes that the current building program is fixed; however, the total number of available rooms at a given school can be changed for any one year of the projection. If this is done, the change is carried forward to all future years.

Major Reports

All of the data for district wide totals of enrollment, teachers and facilities as well as totals of enrollment, teachers and facilities by individual schools is saved in data files and can be printed by the report writing section of the program at the option of the user. Comparative reports are also available for total enrollment and for comparison among individual schools.

The reports available are:

District-wide Reports
- Total Enrollment (by case)
- Total Teachers (by case)
- Total Facilities (by case)

School Reports
- School Enrollment (by case and school)
- Teacher Requirements (by case and school)
- Facilities Utilization (by case and school)

Comparative Reports
- (as listed on next page)

Total Enrollment (two cases)

School Enrollment (two cases, school and grade)

Teacher Requirements (two cases, school and grade)

Facilities Utilization (two cases and school)

Differences in Enrollment, Teachers, and Facilities (two cases and schools)

Example reports using test data follow.

Report Requested by User:

Total Enrollment, Case 1

T 1

TOTAL CASE 1
ENROLLMENT REPORT
5 YEAR HISTORY FROM 1969 TO 1973
10 YEAR FORECAST FROM 1974 TO 1984

SCH YEAR	KINDN	1ST	2ND	3RD	4TH	5TH	6TH	SP EL
1969-70	100	230	271	265	287	276	260	49
1970-71	160	234	256	265	251	[illegible]	274	49
1971-72	193	290	283	261	267	250	237	49
1972-73	218	265	248	290	265	269	249	49
1973-74	258	301	280	276	291	266	259	49
1974-75	210	274	310	285	280	292	263	50
1975-76	226	243	282	315	289	281	294	51
1976-77	235	305	291	287	320	290	283	53
1977-78	209	317	314	296	291	322	292	[illegible]
1978-79	203	282	326	319	300	292	[illegible]	54
1979-80	209	274	290	331	324	301	294	55
1980-81	237	282	242	295	336	326	303	56
1981-82	237	320	290	287	299	338	[illegible]	57
1982-83	246	320	329	295	291	300	341	58
1983-84	255	332	329	335	299	292	[illegible]	59

SCH YEAR	7TH	8TH	9TH	10TH	11TH	12TH	SP EL	TOTAL
1969-70	283	291	243	226	170	144	1	3155
1970-71	265	290	230	231	167	145	0	3149
1971-72	273	293	248	231	165	150	0	3240
1972-73	280	299	263	241	170	153	0	3304
1973-74	260	276	270	250	161	150	1	3352
1974-75	264	284	[illegible]	266	184	179	0	3367
1975-76	273	[illegible]	255	[illegible]	[illegible]	171	[illegible]	3452
1976-77	300	298	258	251	183	182	0	3536
1977-78	289	327	267	254	145	170	0	[illegible]
1978-79	[illegible]	315	[illegible]	263	177	171	[illegible]	3627
1979-80	331	325	[illegible]	289	194	[illegible]	0	[illegible]
1980-81	300	361	291	274	213	186	0	3746
1981-82	369	327	324	[illegible]	[illegible]	[illegible]	0	[illegible]
1982-83	335	337	293	[illegible]	211	190	0	3466
1983-84	348	366	302	[illegible]	[illegible]	196	0	[illegible]

Report Requested by User:

Total Teacher Requirements, Case 1

? ? ?

TOTAL
TEACHER REQUIREMENTS
(10 YEAR FORECAST)

SCH YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1974-75	2	0	3	2	18	1	0	5	2	0	9	2	7	0
1975-76	3	0	3	2	18	1	0	5	3	0	9	2	7	0
1976-77	3	0	3	2	18	1	0	5	3	0	9	2	8	0
1977-78	3	0	3	2	19	1	0	6	3	0	9	2	8	0
1978-79	3	0	3	2	19	2	0	6	3	0	9	2	8	0
1979-80	3	0	4	2	19	2	0	6	3	0	10	2	8	0
1980-81	3	0	4	2	20	2	0	7	3	0	10	2	8	0
1981-82	3	0	4	2	20	2	0	7	3	0	10	2	9	0
1982-83	3	0	4	2	21	2	0	7	3	0	10	2	9	0
1983-84	3	0	4	2	21	2	0	7	3	0	11	2	9	0

SCH YEAR	15	16	17	18	19	20	21	22	23	TOTAL SALARIES
1974-75	11	0	13	0	76	3	0	0	0	1763000.00
1975-76	11	0	13	0	80	3	0	0	0	1568000.00
1976-77	11	0	13	0	81	3	0	0	0	1620000.00
1977-78	11	0	13	0	82	3	0	0	0	1683000.00
1978-79	11	0	14	0	83	3	0	0	0	1747200.00
1979-80	13	0	15	0	91	3	0	0	0	1833450.00
1980-81	13	0	15	0	93	3	0	0	0	1925100.00
1981-82	13	0	15	0	95	3	0	0	0	2011700.00
1982-83	13	0	16	0	97	3	0	0	0	2112900.00
1983-84	13	0	16	0	97	3	0	0	0	2184000.00

READY
?

Report Requested by User

Teacher Requirements, Case 3, School No. 5

SCHOOL NO. 5, KIMBERLY , CASE 3
TEACHER REQUIREMENTS
10 YEAR FORECAST

SCHOOL YEAR	AGE	1	2	3	4	5	6	7+	FTE	TOTAL SALARIES
1974-75	9	11	13	0	0	0	0		1	[illegible]000.00
1975-76	10	12	12	0	0	0	0		1	[illegible]000.00
1976-77	11	13	13	0	0	0	0		1	[illegible]000.00
1977-78	10	15	14	0	0	0	0		1	[illegible]000.00
1978-79	11	14	16	0	0	0	0		1	[illegible]000.00
1979-	12	15	16	0	0	0	0		1	[illegible]000.00
1980-81	15	17	17	0	0	0	0		1	[illegible]000.00
1981-	16	18	19	0	0	0	0		1	[illegible]000.00
1982-	17	21	23	0	0	0	0		1	[illegible]000.00
1984-85	22	25	26	0	0	0	0		1	[illegible]000.00

REPORTS
?

Report Requested by User:

Total Facilities, Case 4

T F 4

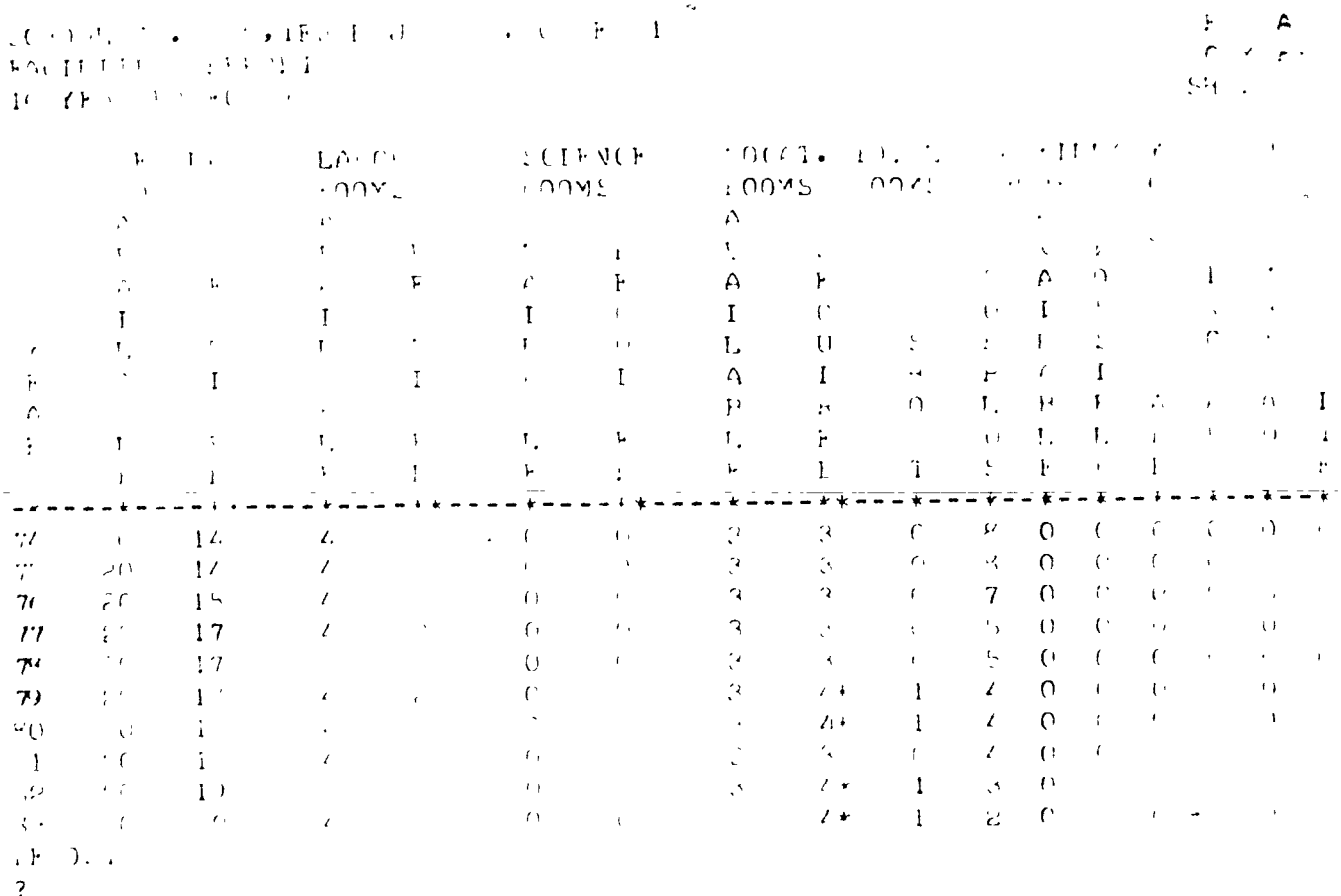
SCHOOL ID. C, TOTAL , CASE 4
FACILITIES REPORT
10 YEAR FORECAST

		REGULAR ROOMS	LARGE ROOMS		SCIENCE ROOMS		VOCAT. ROOMS		TOTAL ROOMS			AUXILIARY ROOMS			
72	1[illegible]	115	12	4	[illegible]	0	[illegible]	14*	1[illegible]	31	5	5	0	[illegible]	[illegible]
7[illegible]	1[illegible]	1[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]*	1	[illegible]	5	5	[illegible]	11	1[illegible]
[illegible]	1[illegible]	1[illegible]7	1	[illegible]	[illegible]	0	[illegible]	1[illegible]*	[illegible]5	[illegible]	5	5	[illegible]	15	1
[illegible]	1[illegible]	13[illegible]*	12	4	[illegible]	0	[illegible]	1[illegible]*	[illegible]	[illegible]	5	5	[illegible]	1[illegible]	1
78	1[illegible]	13[illegible]*	1[illegible]	[illegible]	[illegible]	0	[illegible]	1[illegible]*	[illegible]7	[illegible]	5	5	[illegible]	[illegible]	[illegible]
7[illegible]	1[illegible]	1[illegible]0*	1[illegible]	[illegible]	0	0	[illegible]	1[illegible]*	[illegible]	1[illegible]	5	5	[illegible]	[illegible]	[illegible]
[illegible]	1[illegible]	1[illegible]*	1[illegible]	4	[illegible]	[illegible]	[illegible]	1[illegible]*	[illegible]	1[illegible]	5	[illegible]	[illegible]	[illegible]	[illegible]
81	1[illegible]	17[illegible]*	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	15	5	[illegible]	[illegible]	[illegible]7	[illegible]
[illegible]	1[illegible]	19[illegible]*	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]*	[illegible]	[illegible]4	5	[illegible]	[illegible]	[illegible]1	[illegible]
[illegible]	1[illegible]	1[illegible]*	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]1*	1	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

END
?

Report Requested by User:

Facilities Report, Case 1, School No. 2



Report Requested by User:

Comparative Total Teachers, Case 1 and 2,

School No. 5

C T I [illegible]

SCHOOL [illegible] CASE 1 AND 2
TOTAL [illegible] COMPARATIVE [illegible]

[illegible]	[illegible]	COMP	DIF
1974-75	32.	20.	-12.
1975-76	32.	21.	-11.
1976-77	33.	22.	-11.
1977-78	33.	22.	-11.
1978-79	33.	20.	-13.
1979-80	31.	20.	-11.
1980-81	32.	[illegible]	-10.
1981-82	34.	[illegible]	-10.
1982-83	37.	[illegible]	-13.
1983-84	37.	24.	-13.

Report Requested by User:

Comparative Facilities, Case 1 & 2,

School No. 5

C [illegible] 1 2 5

SCHOOL NO. 5, [illegible] CASE 1 [illegible]

COMPARATIVE FACILITIES [illegible]

YEAR	BASE	CORE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1974-75	31	1[illegible]	-1[illegible]	35	35	-1[illegible]	-6
1975-76	31	[illegible]	-11	35	[illegible]	-1[illegible]	-15
1976-77	32	[illegible]1	-11	35	[illegible]	-1[illegible]	-14
1977-78	32	[illegible]1	-11	35	[illegible]	-1[illegible]	-14
1978-79	32	[illegible]	-1[illegible]	[illegible]	35	-16	-6
1979-80	30	1[illegible]	-11	[illegible]	[illegible]	-16	-16
1980-81	31	[illegible]1	-1[illegible]	3[illegible]	[illegible]5	-1[illegible]	-14
1981-[illegible]	[illegible]	[illegible]3	-10	[illegible]	[illegible]	-1	-12
19[illegible]	[illegible]	[illegible]3	-13	[illegible]5	[illegible]5	-1	-18
19[illegible]	3[illegible]	[illegible]	-13	[illegible]	[illegible]	-1	-1[illegible]

[illegible]

?

Report Requested by User:

Comparative Differences in Enrollment, Teachers, and Facilities

for Case 1 and 2, School 5

C 1 1 & 5

SCHOOL NO. 5, KENNELLY CASE 1 AND 2

DIFFERENCE REPORT

YEAR	ENROL	TEACH	ROOM. AVAIL.	[illegible]	[illegible]
1974-7[illegible]	-310	-1[illegible]	0	-11	-11
1975-76	-28[illegible]	-11	[illegible]	-1[illegible]	-10
1976-77	-291	-11	[illegible]	-[illegible]	-[illegible]
1977-7[illegible]	-314	-11	[illegible]	-[illegible]	-[illegible]
1978-79	-32[illegible]	-1[illegible]	[illegible]	-11	-11
1979-80	-[illegible]	-11	[illegible]	-11	-11
1980-81	-[illegible]	-10	0	-[illegible]	-[illegible]
1981-8[illegible]	-29[illegible]	-10	0	-7	-7
1982-8[illegible]	-32[illegible]	-13	0	-7	-7
1983-8[illegible]	-3[illegible]	-1[illegible]	0	-7	-7

ENROLLMENT AND FACILITIES PROJECTION PROGRAM

USERS GUIDE

Synopsis

The Enrollment and Facilities Projection Program consists of three parts: a means of projecting enrollment, a means of converting enrollment to teacher and facilities requirements, and a means of reporting the projections. Inputs consist of birth and enrollment history data, projected average teachers salaries, class loading by subject code, and facilities data for each school in the district. Data calculated is saved and can be printed at the option of the user in a variety of reports.

The program is operated in an interactive mode. A detailed outline of dialogue and operational flow is contained in the Users Guide.

Once a basic set of input data is prepared, the projection program can be used to examine the effect on the school district of variables effecting enrollment and facilities availability. Each of these variations can be run and reported as a separate case. The reports section of the program will report the results, and can also generate reports comparing selected cases.

Input Structure

Three input data files must be prepared by the user before running the Model. The files are:

Enrollment History

Teacher Utilization

Facilities Data

Enrollment History

The enrollment history file, ENRLH, consists of 3 parts:

(1) Beginning dates for history and projection

(2) Birth history data

(3) Enrollment history data

ENRLH Part 1. ENRLH Part 1 consists of one record that contains two fields read under a 2F10.0 format. Field 1 contains the year in which the birth history data (ENRLH Part 2) first affects the enrollment. For instance, if the earliest birth history data is for 1963, field 1 should contain 1969 (1963 + 6), the year in which persons born in 1963 will enroll in school.

Field 2 contains the first year for which projections will be made. In most cases, this will be the current year since birth data cannot be complete for the current year. In any event, the last year of birth data will be the year immediately preceeding the first year of projection.

ENRLH Part 2. ENRLH Part 2 consists of N records in I6 format, each of which contains the number of births in a given school year. The records must be in proper sequence according to year, and a record containing data must be present for each year within the range of years.

The expected list length N is implied by the data and the first year in which birth history affects the enrollment (ENRLH Part 1). For instance, if the first year of birth data is for the 1963 school year, the first year enrollment will be affected will be 1969. Field 1 of ENRLH Part 1 will contain 1969. If the current year is 1974, then birth data should be complete through 1973. Field 2 of ENRLH Part 1 will therefore contain 1974 as the first year of projection. Brith data will have to be present for 1963 through 1973, or 11 years. The list length N should be 11. Another way of determining N is $F_2 - F_1 + 6 = N$, where F_1 is the first year in

which birth history data affects enrollment (Field 1 on ENRLH Part 1), and F_2 is the first year of projection (Field 2 on ENRLH Part 1).

ENRLH Part 3. This part of the ENRLH file consists of enrollment history by school, and by year. Up to 10 years of enrollment history data can be supplied. Two records are required for each entry.

The format is: (I3, I1, A6, A5, I2, 7F5.0/17X, 7F5.0)

The fields are: F1 F2 F3 F4

Field F1 contains the school number. This number must be unique for each school within the system.

Field F2 contains the school type. The types are:

1 - Elementary School

2 - Middle school

3 - High school

Field F3 contains the name of the school.

Field F4 contains the school year which corresponds to the data contained on each pair of records read under the ENRLH Part 3 format. The school year is identified by fall semester number. Fall semesters for the maximum 10 years of enrollment history are numbered from earliest to most recent semester, as 1, 3, 5, ..., up to 19, with 19 identifying the fall semester of the most recent year, or the year immediately preceeding the first year of projection. If less than 10 years of enrollment history is supplied, 19 must still identify the fall semester of the most recent year of data (the year immediately preceeding the first year of projection). For example, if only 5 years of enrollment history are available, fall semester numbers will run from 11 to 19.

The remaining 14 fields contain enrollments by grade for the particular

school identified by the school number (F1). These are ordered as follows: Kindergarten, 1st grade, 2nd grade, ..., 12th grade, and special education only those fields that represent grades taught in the particular school identified should contain enrollment data, the others should be blank or zero.

The records must be grouped by year (fall semester number) with the most recent year last. Within each year, the records must be grouped in ascending order by school number.

Teacher Utilization

TRPARA, The Teacher Utilization file, consists of two parts. Part 1 contains the projected average teachers salaries by year for the next 10 years (beginning with the 1st year of projection). Part 2 contains class loading data, order by TEA subject code, and by school. The class loading is defined to be the fraction of the student body in a school who take a subject times the reciprocal of the average number of pupils a teacher in that subject area meets in an average day.

TRPARA Part 1. TRPARA Part 1 consists of 2 records. Each record contains 5 fields to be read under a 5F10.0 format. The ten fields will contain average teachers salaries for the next 10 years, in ascending order by year.

TRPARA Part 2. TRPARA Part 2 consists of five records for each school in the district, ordered by school number, with the 5 records for school number 1 first, the 5 for school number 2 next, and so on. Each record is read under a 5F10.0 format. The fields contain the class loadings for a particular class by TEA subject code, with the first field on record 1 containing the class loading for Subject 01 (Agriculture), field 2 containing the class

loading for Subject 02 (Art) and so on up to 5 fields for record 1. Field 1 on record 2 contains the class loading for Subject 06 (Foreign Languages) and so on through a total of 5 records and 25 subject codes. All five records for a school must be supplied, and fields for subjects not offered at the particular school should be blank or zero.

Facilities Data

The Facilities Data File, FACDAT, lists facilities data by school for each school in the district. Each record lists rooms by type for a school. The records must be in ascending order by school number.

Each record is read under a 615 format.

The six fields on a record contain room data (from left to right) as follows:

Field 1 - regular classrooms available at the school

Field 2 - large rooms available (library, auditorium, etc.)

Field 3 - science laboratories available

Field 4 - vocational classrooms available

Field 5 - auxiliary rooms on site

Field 6 - total auxiliary rooms that can be placed on site

Program Flow and Calculations

Enrollment Forecasting

Enrollment projections are made using one of several "cohort survival" techniques. In these techniques, a ratio of the number of students in a grade to the number in the previous grade the prior year is calculated. This ratio, called the cohort survival ratio, is calculated from the enrollment history. It takes into account grade retention, normal attrition in the school, and normal in-migration into the school. This ratio is used with enrollment information for a given year to project the number of students one grade higher, one year later.

Three methods are available for calculating the statistics on cohort survival. The first is called the Mean of the Ratios. In this method, the cohort survival is calculated for each grade for each year of data. The mean and variance of these ratios are then calculated and reported.

The configuration of enrollment data can be illustrated as follows using TE to refer to Total Enrollment:

	BIRTH DATA	KINDER-GARTEN	1st GRADE	2nd GRADE	3rd GRADE	
	$TE_{1,15}$	$TE_{2,15}$	$TE_{3,15}$	$TE_{4,15}$	$TE_{5,15}$	...
↑	$TE_{1,17}$	$TE_{2,17}$	$TE_{3,17}$	$TE_{4,17}$	$TE_{5,17}$	...
History	$TE_{1,19}$	$TE_{2,19}$	$TE_{3,19}$	$TE_{4,19}$	$TE_{5,19}$	...
Projection	$TE_{1,21}$	$TE_{2,21}$	$TE_{3,21}$	$TE_{4,21}$	$TE_{5,21}$	...
↓	.	.	.	.	$TE_{5,23}$	
	.	.	.	.		
	.	.	.	.		

$$\text{Cohort Ratio} = FI(I) = \frac{1}{N-I} \sum_{J} TE(I+1, J+2) / TE(I, J)$$

where $I - 2$ = grade, for $I = 3, 4, \ldots, 14$

J = semester ($J + 2$ refers to the following year)

N = number of semesters of history data

The second method is called the Ratio of the Averages. In this method, the average number of pupils in a given grade is divided by the average number of pupils a year later in the following grade to determine the cohort survival ratio. The variance in the ratio of these averages is then calculated and reported.

$$\text{Survival Ratio} = FI(I) = \left[\frac{1}{N-1} \sum_{J} TE(I+1, J+2)\right] \Big/ \left[\frac{1}{N-1} \sum_{J} TE(I, J)\right]$$

The third method involves first calculating the cohort survival ratio as in method one. The logarithm of each ratio is determined, and the mean of the logarithms and the variance in the mean is calculated. The anti-log of the mean is then determined, and the results of these calculations are reported. The anti-log of the mean is represented as the Log Normal Cohort Survival Ratio.

$$\text{Cohort Ratio} = FI(I) = \left[\prod_J TE(I+1, J+2) / TE(I, J)\right]^{1/(N-1)}$$

$$= \text{anti-log}\ \frac{1}{N-1}\ \log \prod_I \left[TE(I+1, J+2) / TE(I, J)\right]$$

$$= \text{anti-log}\ \frac{1}{N-1}\ \sum_J \log \left[TE(I+1, J+2) / TE(I, J)\right]$$

The cohort survival ratio FI is used to calculate an enrollment figure for I, semester J, as follows:

$$TE(I,J) = TE(I-1, J-2) * FI(I-1) \quad \text{for } I = 3, 4, \ldots 14$$

where I - 2 gives the grade and J - 2 represents the year immediately prece year J.

The cohort survival ratios calculated can be used as is to forecast future enrollment by grade, or the ratio can be modified by adding or subtracting fraction of a standard deviation to reflect future growth or decline not ac for by the history data. The modified ratio can then be used to forecast f enrollment.

The last year of data is used with the survival ratios to calculate the enr ment in the first year of projection. The same ratios are applied using th year of projection to project a second year and so forth until the final ye projection is reached. Enrollment is distributed among schools on the bas the ratio of the enrollment in a given grade in a given school to the tota enrollment in that grade in the district. These ratios are applied year by year in order to calculate the enrollment in a given school.

In addition to forecasting enrollment directly from the cohort survival ra the program makes provision for inward and outward migration of students. Migration can be applied to the district as a whole, representing growth o decline in total population, or it can be applied to an individual school grade. If the migration figures are applied at the individual school leve

it is the users responsibility to see that the net migration within the district is 0; that is, if 50 pupils are removed from one school, 50 pupils must be entered into another school. Any net change in total enrollment must be handled at the district wide level.

Teacher Requirements

Once the enrollment by school has been calculated, the teacher requirements can be determined. For an elementary school, teacher requirements are calculated on the basis of pupil/teacher ratios by grade. The enrollment in a grade is multiplied by the reciprocal of the pupil/teacher ratio in order to calculate the number of teachers required for a given grade.

For secondary schools, the number of teachers is calculated for each subject. An array of class loading ratios is calculated, each of which reflects the fraction of the pupils (in a given school or district wide) taking a given subject multiplied by the reciprocal of the average number of pupils a teacher in a particular subject area meets for an average day. The matrix of ratios is multiplied by the total enrollment in the school in order to calculate the number of teachers required to teach a given subject in that school.

For secondary schools, the calculations are as follows:

Teachers Required (I) = Students X Class Loading (I)

= Students X Fraction Taking I/Contact (I)

where

Teachers Required (I) = Number of teachers required for subject I

Students = Number of students (total for school)

Fraction Taking I = Fraction of students taking subject I

Contact (I) = Average number of pupils a teacher in subject I meets for an average day

= Average class size for subject I times average number of classes per teacher in subject I

Salary is calculated on the basis of an average teacher's salary by year. The salary requirement at a school is obtained by multiplying the total number of teachers at that school by the average salary to be paid in a given year. This number is recorded as the teacher salaries for that year.

Facilities Forecasting

The facilities forecast is based on the teacher forecast. In general, rooms are assigned on the basis of one room for a teacher, with the type of room being determined by the subject taught. The number of rooms required is increased by a fraction to reflect the fact that the room may be utilized by the teacher for activities other than classes. Thus, in a 7-period day in which the room is utilized 6 periods for classes, seven-sixths of the total number of classes required is calculated as the total number of rooms required.

The facilities portion of the program can reflect changing inventories of classroom space. When the total number of available rooms at a given school is changed for any one year of the projection, the change is carried forward to all future years.

Program Flow

The following chart illustrates the interactive dialogue and program flow. Underlined segments are communications to the user, and the left brackets indicate user responses. Information describing program functions and flow is enclosed in parentheses.

(1) OPTIONS

- ⏎, N O, STOP, END - (GO TO 2)
- Y ES - (READ NAMELIST OPTION) - (GO TO 2)

(2) IS ENROLLMENT ON FILE

- ⏎, N O, - (READ DATA FROM FILES 10, 11, 12- ENRLH, TRPARA, & FACDAT) - (GO TO 3)
- Y ES - (READ BINARY DATA FOR ENRLH, TRPARA, & FACDAT STORED ON DISC) - (GO TO 3)
- STOP, END - (REWIND FILES) - (GO TO 4)

(3) (WRITE NEW BINARY DATA FILES ON DISC)

(CALCULATE LEAST SQUARES PROJECTION AND WRITE R SQUARE, A_o , A_1 , A_2)

INITIAL YEARS FOR DATA AND PROJECTION

(WRITE YEAR 1, YEAR 2)

THERE ARE (N-) SCHOOLS IN THIS SYSTEM

(N_1) OF THEM ARE HIGH SCHOOLS

(N_2) OF THEM ARE MIDDLE SCHOOLS

(N_3) OF THEM ARE ELEMENTARY SCHOOLS

DO YOU WANT THE INDEX?

- N O , ⏎, STOP, END - (GO TO 4)
- Y ES - (GO TO 5)

(5) SCHOOL INDEX SCHOOL TYPE NAME CHANGES

. . . .
. . . .
. . . .

(PRINT DATA UNDER COLUMN HEADINGS)

(4) INPUTS (USER MAY MODIFY INPUT DATA)

N O , STOP, END, EXIT - (GO TO 7)

Y ES - (GO TO 8)

O - (MODIFY NAMELIST OPTION) - GO TO 9)

B - (BIRTH DATA) - (GO TO 10)

M - (MIGRATION DATA) - (GO TO 15)

F - (FACILITIES DATA) - (GO TO 15)

T - (TEACHER DATA) - (GO TO 15)

(8) B,M,F,T,O

N O , STOP, END - (EXIT) - (GO TO 7)

O - (MODIFY NAMELIST OPTION) - (GO TO 9)

B - (BIRTH DATA) - (GO TO 10)

M - (MIGRATION DATA) - (GO TO 15)

F - (FACILITIES DATA) - (GO TO 15)

T - (TEACHER DATA - (GO TO 15)

(7) (IF CASE LT CASE MAX, GO TO 4, IF NOT, GO TO 75)

(9) (READ NAMELIST OPTION) - (GO TO 4)

(10) ENTER BIRTHS OR NUMBER OF YEARS FOR TREND

(WRITES 1ST YEAR)

(ENTER BIRTHS FOR EACH YEAR AFTER YEAR IS TYPED OUT -
MUST BE GREATER THAN 20; OR ENTER NUMBER OF
YEARS FOR TREND - MUST BE LESS THAN 20)

(IF BIRTH DATA BY YEAR ENTERED - GO TO 4)

(IF NUMBER OF YEARS FOR TREND ENTERED, CALCULATE LEAST SQUARES PROJECTION AND WRITE R SQUARE A_0, A_1, A_2.)

(GO TO 4)

(15) K AND J

(ENTER TWO NUMERIC FIELDS: SCHOOL NUMBER AND YEAR.
ZERO SCHOOL NUMBER INDICATES DISTRICT-WIDE INPUTS.)

(IF RESPONSE TO 11 WAS M, GO TO 16)

(IF RESPONSE TO 11 WAS F, GO TO 22)

(IF RESPONSE TO 11 WAS T, GO TO 23)

(16) MIGR

(ENTER 14 POSITIVE OR NEGATIVE NUMERIC FIELDS, IN SEQUENCE BY GRADE, AS IN KINDERGARTEN, 1ST, 2ND,.....12TH, SPECIAL EDUCATION. EACH NUMBER REPRESENTS MIGRATION INTO OR OUT OF EACH GRADE FOR SCHOOL AND YEAR IDENTIFIED IN 15)

(22) ROOMS

(ENTER 6 POSITIVE OR NEGATIVE NUMERIC FIELDS, REPRESENTING ROOMS AVAILABLE FOR THE SCHOOL AND YEAR IDENTIFIED IN 15, ACCORDING TO THE FOLLOWING SEQUENCE: 1-REGULAR CLASSROOMS, 2-LARGE ROOMS AVAILABLE, 3-LABORATORIES, 4-VOCATIONAL CLASSROOMS, 5-AUXILIARY ROOMS ONSITE, 6-TOTAL AUXILIARY ROOMS THAT CAN BE PLACED ON SITE.)

(23) TRPAR

(ENTER 25 NUMERIC FIELDS REPRESENTING CLASS LOADINGS, IN SEQUENCE BY TEA SUBJECT CODE, FOR SCHOOL AND YEAR IDENTIFIED IN 15)

(57) STATISTICS (1st TIME, OR IF "STAT" IS SET TO TRUE IN NAMELIST OPTION)

- N O , STOP, END - (GO TO 58)
- R - (RATIO OF AVERAGES - GO TO 53)
- A - (AVERAGE OF RATIOS - GO TO 54)
- L - (LOGNORMAL - GO TO 55)
- M - (USER SUPPLIED SURVIVAL RATIO - GO TO 56)

(53) (CALCULATE RATIO OF AVERAGES AND LIST - GO TO 58)

(54) (CALCULATE AVERAGE OF RATIOS AND LIST - GO TO 58)

(55) (CALCULATE LOGNORMAL AND PRINT - GO TO 58)

(56) (ENTER SURVIVAL RATIO IN FORM OF TWO NUMERIC FIELDS - 1st IS NUMERATOR AND 2nd IS DENOMINATOR - GO TO 58)

(58) CHANGE PREDICTORS

- N O , STOP, END - (GO TO 7)
- R - (RATIO OF AVERAGES - GO TO 53)
- A - (AVERAGE OF RATIOS - GO TO 54)
- M - (USER SUPPLIED RATIO FOR SURVIVAL - GO TO 56)

(61) ARE SCHOOLS CLUSTERED (IF "CLUS" IS SET TO TRUE IN NAMELIST OPTION)

- N O (GO TO 70)
- Y ES (GO TO 62)

(62) ENTER NUMBER IN CLUSTER AND SCHOOL IDs.

- (ENTER ONE NUMERIC FIELD INDICATING NO. OF SCHOOLS IN CLUSTER; THEN ENTER CORRESPONDING NO. OF FIELDS IDENTIFYING SCHOOLS IN CLUSTER BY SCHOOL I.D.)

(63) PRINT ENROLIMENT?

- N O - (GO TO 70)
- Y ES - (PRINT ENROLLMENTS, THEN GO TO 70)

(70) REPORTS

N O , STOP, END - (GO TO 80)

T, (CASE NO.) - (TOTAL ENROLLMENT, CASE NO.)

TT, (CASE NO.) - (TOTAL TEACHERS, CASE NO.)

F, (CASE NO.) - (TOTAL FACILITIES, CASE NO.)

E, (CASE NO.), (SCHOOL) - (ENROLLMENT BY CASE AND SCHOOL)

T, (CASE NO.), (SCHOOL) - (TEACHER REQUIREMENTS BY CASE AND SCHOOL)

F, (CASE NO.), (SCHOOL) - (FACILITIES REQUIREMENTS BY CASE AND SCHOOL)

CT, (CASE), (CASE) - (COMPARATIVE TOTAL ENROLLMENTS, TWO CASES)

CE, (CASE), (CASE), (SCHOOL), (GRADE) - (COMPARATIVE ENROLLMENT, TWO CASES, BY SCHOOL AND GRADE)

CT, (CASE), (CASE), (SCHOOL), (GRADE) - (COMPARATIVE TEACHER REQUIREMENTS TWO CASES, BY SCHOOL AND GRADE)

CF, (CASE), (CASE), (SCHOOL) - (COMPARATIVE FACILITIES UTILIZATION, TWO CASES, AND SCHOOL)

CD, (CASE), (CASE), (SCHOOL) - (COMPARATIVE DIFFERENCES IN ENROLLMENT, TEACHERS AND FACILITIES, TWO CASES AND SCHOOL)

(80) WHAT NOW?

I QUIT - (END OF PROGRAM) (GO TO 2)

The reports available are:

District-wide Reports

- Total Enrollment (by case)
- Total Teachers (by case)
- Total Facilities (by case)

School Reports

- School Enrollment (by case and school)
- Teacher Requirements (by case and school)
- Facilities Utilization (by case and school)

Comparative Reports

- Total Enrollment (two cases)
- School Enrollment (two cases, school and grade)
- Teacher Requirements (two cases, school and grade)
- Facilities Utilization (two cases and school)
- Differences in Enrollment, Teachers, and Facilities (two cases and sch

Example reports using test data follow.

Report Requested by User:

Total Enrollment, Case 1

T 1

TOTAL CASE 1
ENROLLMENT REPORT
5 YRS. HISTORY FROM 1969 TO 1973
10 YRS. FORECAST FROM 1974 TO 1984

SCH YEAR	KINDN	1ST	2ND	3RD	4TH	5TH	6TH	SP EL
1969-70	100	280	271	265	287	270	269	49
1970-71	160	284	256	265	251	[illegible]	274	49
1971-72	193	290	283	261	267	250	287	49
1972-73	218	265	248	290	265	269	249	49
1973-74	258	301	280	276	291	266	259	49
1974-75	210	274	310	285	280	292	264	50
1975-76	226	283	282	315	289	281	294	51
1976-77	235	305	291	287	320	290	283	53
1977-78	209	317	314	296	291	322	292	53
1978-79	203	282	326	319	300	298	324	54
1979-80	209	274	290	331	324	301	294	55
1980-81	237	281	[illegible]	295	336	326	303	56
1981-82	[illegible]	[illegible]	290	287	[illegible]	338	[illegible]	57
1982-83	246	320	[illegible]	295	291	300	341	58
1983-84	[illegible]	[illegible]	[illegible]	335	299	292	302	[illegible]

SCH YEAR	7TH	8TH	9TH	10TH	11TH	12TH	SP EL	TOTAL
1969-70	282	291	243	226	170	144	1	3155
1970-71	265	[illegible]	230	231	167	145	0	3149
1971-72	273	293	248	231	165	150	0	3240
1972-73	280	289	263	241	170	158	0	3304
1973-74	266	276	270	250	161	150	1	3352
1974-75	264	284	251	266	184	149	0	3367
1975-76	273	283	255	278	196	171	0	3452
1976-77	300	294	258	251	183	182	0	3536
1977-78	289	327	267	254	185	170	0	3586
1978-79	[illegible]	315	293	263	187	171	0	3687
1979-80	331	325	282	289	194	173	0	3672
1980-81	306	361	291	278	213	180	0	3746
1981-82	309	317	324	287	205	197	0	3805
1982-83	[illegible]	337	293	320	211	190	0	3866
1983-84	[illegible]	366	302	289	236	196	0	3940

Report Requested by User:

- Total Teacher Requirements, Case 1

1 1 1

TOTAL
TEACHER REQUIREMENTS
10YEAR FORECAST

SCH YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1974-75	2	0	3	2	18	1	0	5	2	0	9	2	7	0
1975-76	3	0	3	2	18	1	0	5	3	0	9	2	7	0
1976-77	3	0	3	2	18	1	0	5	3	0	9	2	8	0
1977-78	3	0	3	2	19	1	0	6	3	0	9	2	8	0
1978-79	3	0	3	2	19	2	0	6	3	0	9	2	8	0
1979-80	3	0	4	2	19	2	0	6	3	0	10	2	8	0
1980-81	3	0	4	2	20	2	0	7	3	0	10	2	8	0
1981-82	3	0	4	2	20	2	0	7	3	0	10	2	9	0
1982-83	3	0	4	2	21	2	0	7	3	0	10	2	9	0
1983-84	3	0	4	2	21	2	0	7	3	0	11	2	9	0

SCH YEAR	15	16	17	18	19	20	21	22	23	TOTAL SALARIES
1974-75	11	0	13	0	76	3	0	0	0	1463000.00
1975-76	11	0	13	0	80	3	0	0	0	1568000.00
1976-77	11	0	13	0	81	3	0	0	0	1620000.00
1977-78	11	0	13	0	82	3	0	0	0	1683000.00
1978-79	11	0	14	0	83	3	0	0	0	1747200.00
1979-80	13	0	15	0	81	3	0	0	0	1838250.00
1980-81	13	0	15	0	83	3	0	0	0	1925000.00
1981-82	13	0	15	0	85	3	0	0	0	2011400.00
1982-83	13	0	16	0	87	3	0	0	0	2129400.00
1983-84	13	0	16	0	86	3	0	0	0	2184000.00

REPORTS
?

Report Requested by User:

Teacher Requirements, Case 3, School No. 5

SCHOOL NO. 5,KENNELY , CASE 3
TEACHER REQUIREMENTS
10 YEAR FORECAST

SCH YEAR	K	1	2	3	4	5	6	SP ED	TOTAL SALARIES
1974-75	9	11	13	0	0	0	0	1	323000.00
1975-76	10	12	12	0	0	0	0	1	343000.00
1976-77	11	13	13	0	0	0	0	1	380000.00
1977-78	10	15	14	0	0	0	0	1	408000.00
1978-79	11	14	16	0	0	0	0	1	436800.00
1979-80	12	15	16	0	0	0	0	1	473000.00
1980-81	15	17	17	0	0	0	0	1	550000.00
1981-82	16	20	19	0	0	0	0	2	644100.00
1982-83	18	22	23	0	0	0	0	2	760500.00
1983-84	22	25	26	0	0	0	0	2	900000.00

READY
?

Report Requested by User:

Total Facilities, Case 4

T F 4

SCHOOL NO. 0, TOTAL , CASE 4

FACILITIES REPORT

10 YEAR FORECAST

Y E A R	REGULAR ROOMS AVAIL	REGULAR ROOMS NEED	LARGE ROOMS AVAIL	LARGE ROOMS NEED	SCIENCE ROOMS AVAIL	SCIENCE ROOMS NEED	VOCAT. ROOMS AVAIL	VOCAT. ROOMS NEED	TOTAL ROOMS SURPLUS	AUXILLARY ROOMS AVAIL	AUXILLARY ROOMS NEED	AUXILLARY ROOMS CALC	REG ROOMS SHORT	AUX ROOMS SHORT	AUX ROOMS SURPLUS
74	130	115	12	4	0	0	6	14*	16	31	5	5	0	8	8	5
75	130	120	12	4	0	0	6	16*	21	29	5	5	0	11	11	5
76	130	127	12	4	0	0	6	16*	25	26	5	5	0	15	15	5
77	130	132*	12	4	0	0	6	16*	29	25	5	5	0	19	19	5
78	130	138*	12	4	0	0	6	18*	37	25	5	5	0	25	25	5
79	130	150*	12	4	0	0	6	18*	42	18	5	5	0	29	29	4
80	130	162*	12	4	0	0	6	18*	52	16	5	5	0	35	35	0
81	130	175*	12	4	0	0	6	19*	65	15	5	5	0	47	47	0
82	130	190*	12	4	0	0	6	19*	79	14	5	5	0	61	61	0
83	130	210*	12	4	0	0	6	21*	100	13	5	5	0	80	80	0

REPORTS

?

Report Requested by User:

Facilities Report, Case 1, School No. 2

SCHOOL NO.- 2, TERM. J: , CASE 1
FACILITIES REPORT
10 YEAR FORECAST

REG AUX ROOMS ROOMS SHORT SHORT

	REGULAR ROOMS AVAILABLE	REGULAR ROOMS REQUIRED	LARGE ROOMS AVAILABLE	LARGE ROOMS REQUIRED	SCIENCE ROOMS AVAILABLE	SCIENCE ROOMS REQUIRED	VOCAT. ROOMS AVAILABLE	VOCAT. ROOMS REQUIRED	TOTAL ROOMS SHORT	AUXILIARY ROOMS SURPLUS	AVAILABLE	POSSIBLE	CAN ALL	USING AUD	MAN ANE	SUITE
74	20	14	4	2	0	0	3	3	0	8	0	0	0	0	0	0
75	20	14	4	2	0	0	3	3	0	8	0	0	0	0	0	0
76	20	15	4	2	0	0	3	3	0	7	0	0	0	0	0	0
77	20	17	4	2	0	0	3	3	0	5	0	0	0	0	0	0
78	20	17	4	2	0	0	3	3	0	5	0	0	0	0	0	0
79	20	18	4	2	0	0	3	4*	1	4	0	0	0	0	0	0
80	20	18	4	2	0	0	3	4*	1	4	0	0	0	0	0	0
81	20	18	4	2	0	0	3	3	0	4	0	0	0	0	0	0
82	20	19	4	2	0	0	3	4*	1	3	0	0	0	0	0	0
83	20	20	4	2	0	0	3	4*	1	2	0	0	0	-0	-0	0

READY.
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Report Requested by User:

Comparative Total Teachers, Case 1 and 2,

School No. 5

C T 1 2 5

SCHOOL NO. 5, KENNELY CASE 1 AND 2
TOTAL TEACHERS COMPARATIVE REPO. 1

YEAR	BASE	COMP	DIF
1974-75	32.	20.	-12.
1975-76	32.	21.	-11.
1976-77	33.	22.	-11.
1977-78	33.	22.	-11.
1978-79	33.	20.	-13.
1979-80	31.	20.	-11.
1980-81	32.	22.	-10.
1981-82	34.	24.	-10.
1982-83	37.	24.	-13.
1983-84	37.	24.	-13.

Report Requested by User:

Comparative Facilities, Case 1 & 2,

School No. 5

C H I C S

SCHOOL NO. [illegible], KENNELY CASE 1 AND 2
COMPARATIVE FACILITIES REPORT

REGULAR AND AUXILLIARY ROOMS

	FACILITY			AVAILABLE		SHOULD USING	
YEAR	BASE	COMP	DIF	BASE	COMP	BASE	COMP
1974-75	21	19	-12	35	35	-16	-16
1975-76	21	20	-11	35	35	-15	-15
1976-77	32	21	-11	35	35	-14	-14
1977-78	32	21	-11	35	35	-14	-14
1978-79	32	19	-13	35	35	-16	-16
1979-80	30	19	-11	35	35	-16	-16
1980-81	31	21	-10	35	35	-14	-14
1981-82	33	23	-10	35	35	-12	-12
1982-83	36	23	-13	35	35	-12	-12
1983-84	36	23	-13	35	35	-12	-12

END OF REPORT

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Report Requested by User:

Comparative Differences in Enrollment, Teachers, and Facilities for Case 1 and 2, School 5

C I 1 2 5
SCHOOL NO. 5, KENNEDY CASE 1 AVL 2
DIFFERENCE REPORT

YEAR	ENROL	TEACH	ROOMS AVAIL	ROOMS SHORT	ROOMS SHORT
1974-75	-310	-12	0	-11	-11
1975-76	-282	-11	0	-10	-10
1976-77	-291	-11	0	-9	-9
1977-78	-314	-11	0	-9	-9
1978-79	-326	-13	0	-11	-11
1979-80	-290	-11	0	-11	-11
1980-81	-282	-10	0	-9	-9
1981-82	-290	-10	0	-7	-7
1982-83	-329	-13	0	-7	-7
1983-84	-329	-13	0	-7	-7