

**CENTRE FOR ADVANCED TECHNOLOGY  
SITE ACCESS STUDY  
FORT COLLINS, COLORADO**

**MAY 1994**

**Prepared for:**

**Colorado State University Research Foundation  
P.O. Box 483  
Fort Collins, CO 80522**

**Prepared by:**

**MATTHEW J. DELICH, P.E.  
3413 Banyan Avenue  
Loveland, CO 80538  
Phone: 303-669-2061**

## I. INTRODUCTION

This traffic study for the Centre for Advanced Technology (CAT) and Windtrail developments addresses the capacity, geometric, and traffic control requirements associated with the proposed residential, business park, and commercial uses, located in the square mile bordered by Drake Road, Shields Street, Prospect Street, and College Avenue in Fort Collins, Colorado. The site location is shown in Figure 1. This report serves as an update for the "Centre for Advanced Technology Site Access Study," January 1990. This update was precipitated by a land trade between the Colorado State University Research Foundation (CSURF) and John McCoy (developer of Windtrail). As part of the land trade, both CSURF and John McCoy desired not to provide vehicular access between Parcel J and proposed Centre Avenue. City staff requested the update study due to the land use trade and street system change.

### Existing and Proposed Site Uses

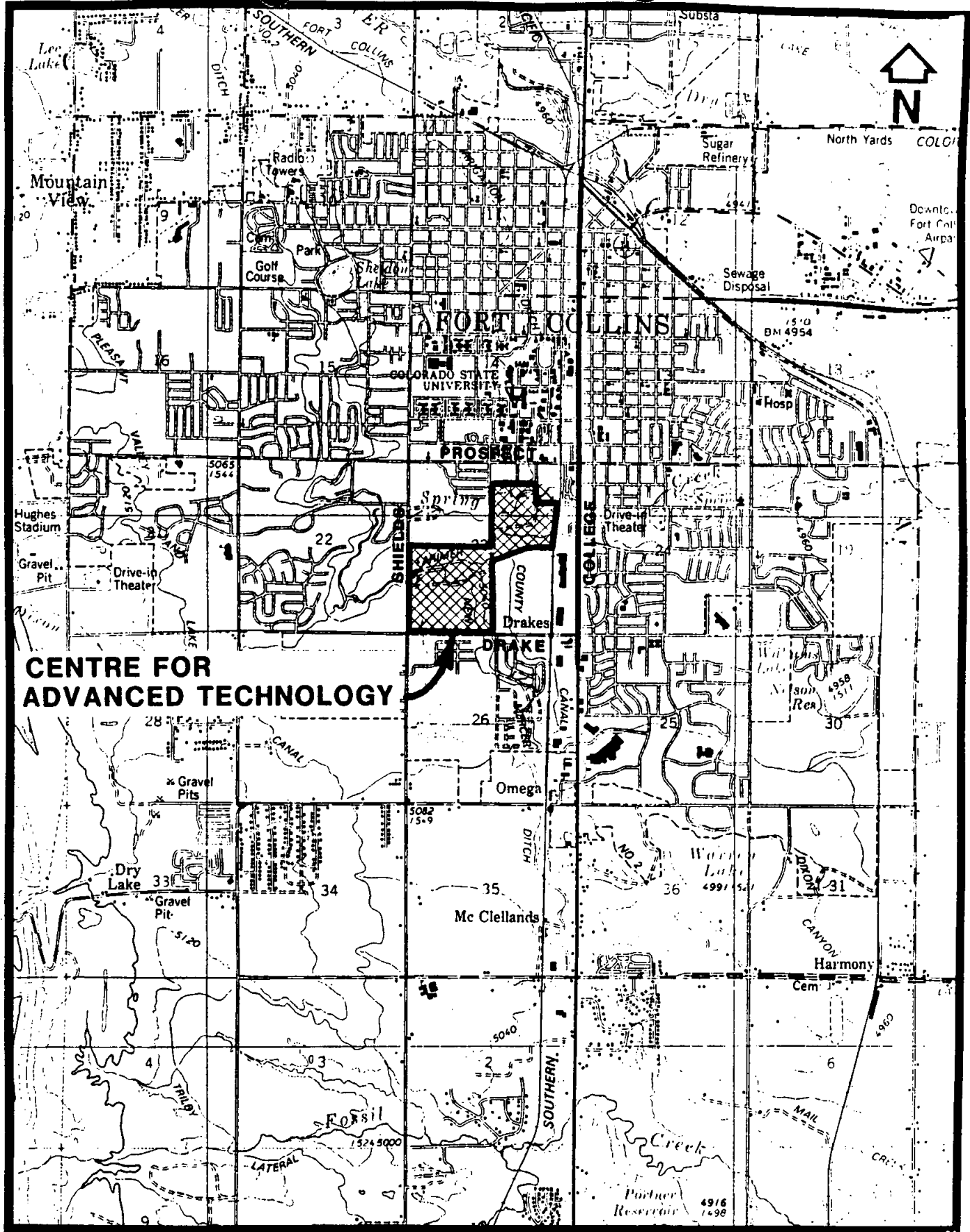
The land for these developments is currently in various stages of development. Figure 2 shows a site plan of the CAT and Windtrail properties. The south portion of CAT (parcels K through X) is being developed by Everitt Enterprises. This portion has experienced steady development since the mid 1980's. The north portion of CAT (parcels A through J) is being developed by CSURF. The land trade proposed expanding Parcel H and a portion of Parcel J (labelled as Ja in Figure 2) into the Windtrail area. The portion of Parcel J that is adjacent to Shields Street would be developed by John McCoy as various residential uses.

### Site Access

Access is proposed via existing and new streets. Figure 2 also shows the primary streets that will access CAT. The CAT development accesses the arterial street system via Shields Street and Drake Road. Figure 2 also shows that Centre Avenue will be extended to Prospect Road when development occurs in the north portion of CAT.

### Existing Land Uses

Land uses in the vicinity of CAT and Windtrail are predominantly residential, institutional, commercial, and recreational. Rolland Moore Park and Raintree Shopping Center are west of CAT. There is residential land north and south of CAT. Colorado State University (CSU) is north of Prospect Road. The CSU Veterinary Teaching Hospital is east of CAT.



**SITE LOCATION**

**Figure 1**

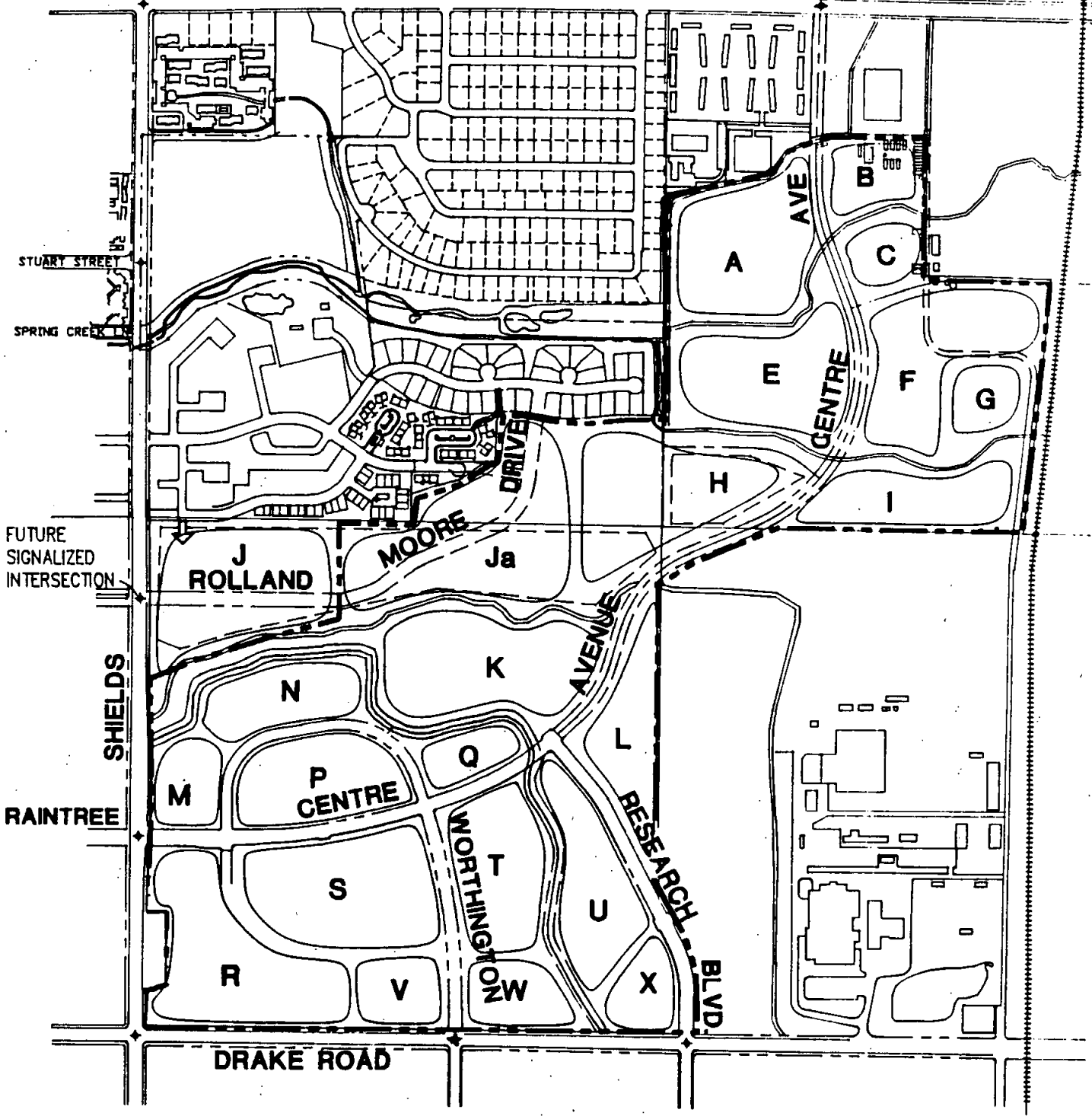
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COLORADO STATE UNIVERSITY



NO SCALE

PROSPECT ROAD



SITE PLAN

Figure 2

## II. TRIP GENERATION

Trip generation was estimated using Trip Generation, 5th Edition, ITE. Table 1 shows the daily and peak hour trip generation for the various uses within these developments. A trip is defined as a one way vehicle movement from origin to destination. The origin or destination of a generated trip would be within the proposed developments. The trip generation shown in Table 1 is for those portions of CAT which are currently either under construction or vacant.

Table 1  
Trip Generation

Land Use	Daily Trips	A.M. Peak Trips in	Trips out	P.M. Peak Trips in	Trips out
A. Open Space/Recreation	40	6	4	5	8
B. Open Space/Recreation	20	3	2	2	4
C. Open Space/Recreation	20	2	2	2	3
E. Open Space/Recreation	50	8	6	8	12
F. Open Space/Recreation	50	8	5	7	11
G. Transitional	170	18	4	5	18
H. Industrial/Office/R&D	1570	198	33	37	179
I. Industrial/Office/R&D	910	115	19	21	104
J. Residential - SF DU	200	4	12	14	7
- MF DU	370	5	21	21	11
Ja. Residential	1240	25	71	86	45
K. Industrial/Office/R&D	1445	182	31	34	165
L. Industrial/Office/R&D	780	98	17	18	89
M. Office	320	39	5	7	35

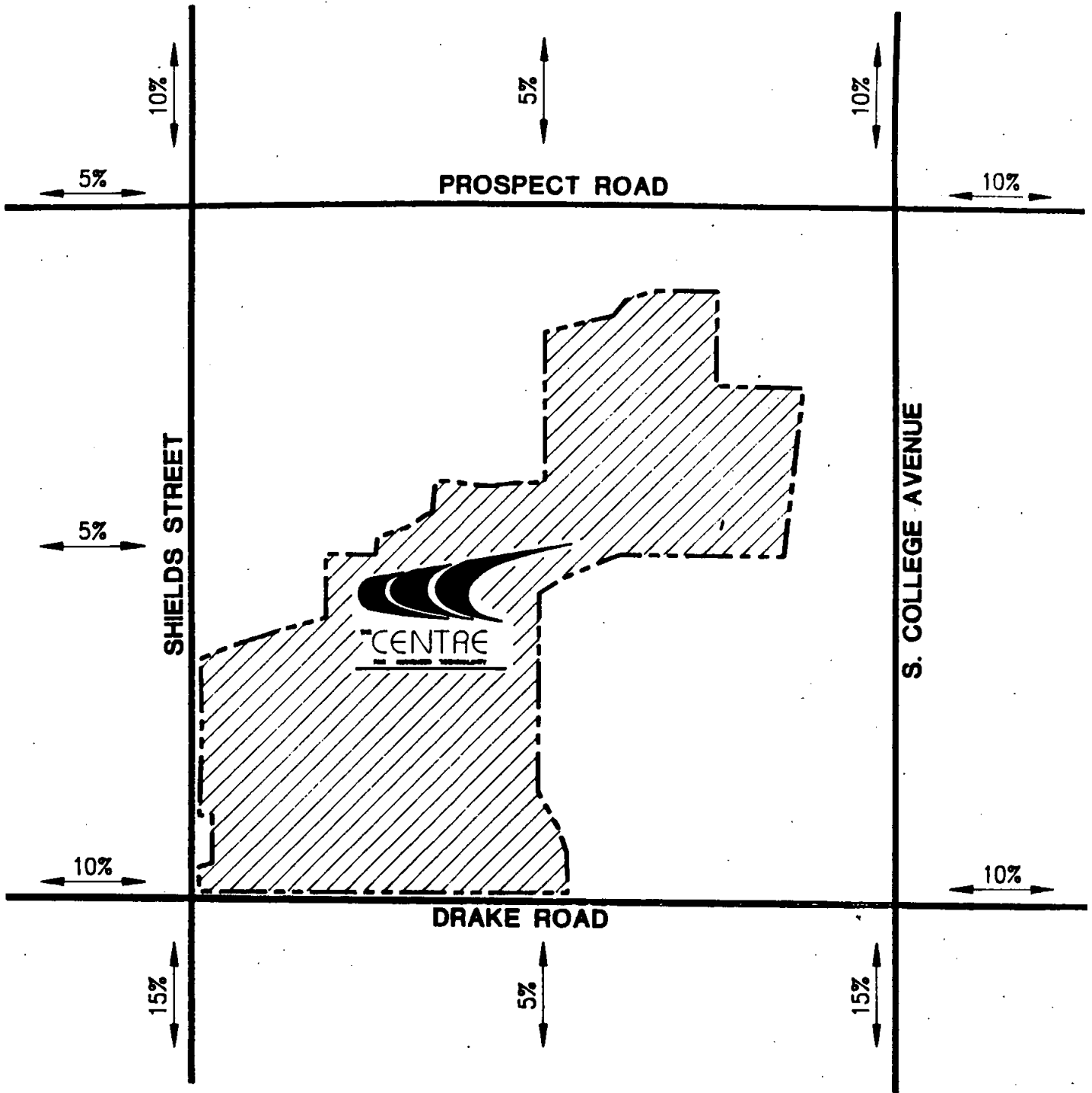
Table 1 (Cont.)

## Trip Generation

Land Use	Daily Trips	A.M. Trips in	Peak Trips out	P.M. Trips in	Peak Trips out
N. Elderly Housing (Developed)	-	-	-	-	-
P. Residential - New Mercer Commons	310	14	8	6	18
Q. Industrial/Office (N.T.U.)	210	27	5	5	24
R. Retail	6700	50	40	320	325
S. Industrial/Office/Retail	3940	153	43	168	295
T. Industrial/Office/R&D	980	115	18	23	113
U. Industrial/Office/R&D	660	85	14	16	76
V. Retail/Auto Related	2700	46	13	50	89
W. Commercial/Office/Auto Related	2000	64	19	87	115
X. Financial/Office/R&D (Developed)	-	-	-	-	-

### III. TRIP DISTRIBUTION

The overall directional distribution of the site generated traffic was based upon the existing travel patterns and taken from other traffic studies in this area of Fort Collins. Also considered in the trip distribution was trip productions in Fort Collins. Typical trip productions for employment and retail centers are residence locations. Trip distribution was developed and rounded to the nearest 5 percent as shown in Figure 3.



# TRIP DISTRIBUTION

Figure 3



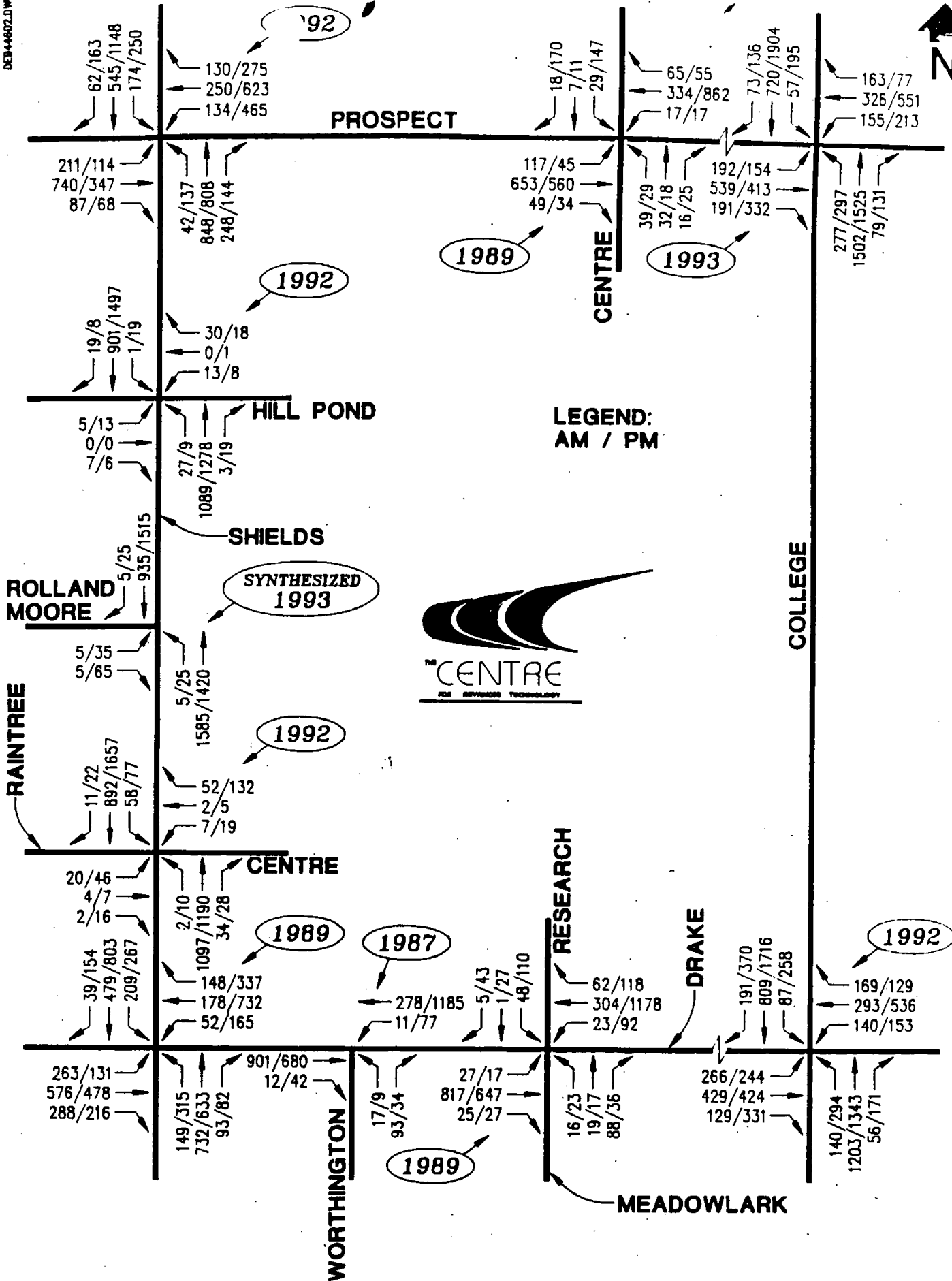
#### IV. TRAFFIC VOLUMES AND TRIP ASSIGNMENT

Morning and afternoon peak hour traffic counts were obtained at the key intersections as shown in Figure 4. Raw count data is provided in Appendix A.

##### Trip Assignment

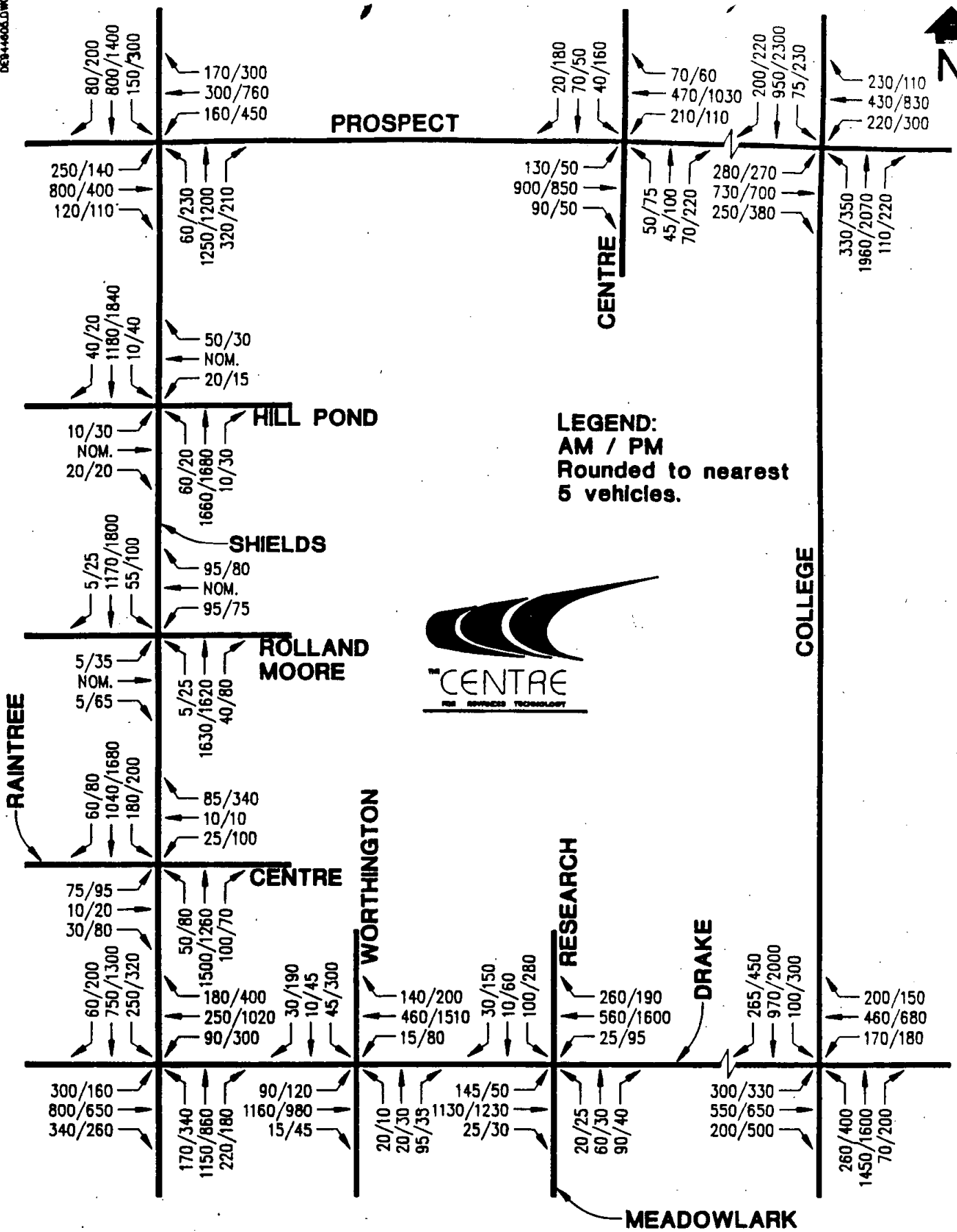
The trip assignment is the product of the trip generation and trip distribution process. Only a long range trip assignment was performed, since historic development of CAT has not followed an established phasing program. In the past, development has been "market driven."

Figure 5 shows the long range trip assignment assuming full build out of the subject properties. Background traffic was obtained from review of City of Fort Collins transportation planning forecasts and of historic trends in this area of Fort Collins. Since CAT can be defined as an "in fill" development, much of the traffic shown in Figure 5 will occur regardless of the level of development of CAT.



RECENT PEAK HOUR TRAFFIC

Figure 4



**FUTURE PEAK HOUR TRAFFIC  
CENTRE FOR ADVANCED TECHNOLOGY  
BUILDOUT**

**Figure 5**

## V. TRANSPORTATION IMPACTS

The key intersections were analyzed using the unsignalized and signalized analysis techniques as published in the "Highway Capacity Manual," Special Report 209, TRB, 1985.

Table 2 shows the level of service analysis, using the currently available morning and afternoon peak hour traffic at key intersections. Calculation forms are provided in Appendix B. The key intersections currently operate acceptably, except for minor street left turns at stop sign controlled intersections along Shields Street. Acceptable operation is defined as level of service D or better. The delay associated with level of service E operation during the afternoon peak hour is common and is generally accepted at stop sign controlled intersections on arterial streets in urban areas.

It is expected that traffic signals will be warranted at the Shields/Rolland Moore and Drake/Worthington intersections in the future. The Shields/Rolland Moore signal will likely be warranted in a relatively short period of time, given the development activity in Parcel J. Table 3 shows the level of service at the key intersections. Calculation forms are provided in Appendix C. Acceptable operation can generally be achieved. Figure 6 shows the geometrics necessary at each intersection to achieve the levels of service indicated in Table 3. The geometrics shown at some intersections may be beyond that which is considered to be practicable. However, this central area of Fort Collins is the best area for utilizing alternative modes (transit and bicycle), particularly for work trips. Therefore, the Figure 6 geometrics may not be required if some travel reductions can be realized for CAT and in Fort Collins, in general.

### Rolland Moore Drive

The developers of the north portion of CAT (CSURF) and Windtrail (John McCoy) desire not to have Rolland Moore Drive connect to Centre Avenue through Parcel J. This connection has been shown on all previous CAT plans. However, deleting the connection is in response to neighborhood concerns and the desire of the developers to not mix commercial and residential traffic.

A sensitivity analyses was performed with and without this access. From a purely technical basis, provision of this access will not significantly affect the operation at any key intersection in the vicinity of CAT. This connection between Shields Street and Centre Avenue has always been considered to be a minor connection, not intending to carry high traffic volumes. However, the connection has benefits to both the neighborhood (present and future) and CSURF.

Centre Avenue will be a collector street that will connect Shields Street to Prospect Road. It will also connect to Drake Road via Research Boulevard. The neighborhood (Windtrail, Sundering, Hill Pond) will benefit by not creating an enclave with only access to an arterial street (Shields). This connection will remove some traffic from some arterial/arterial intersections that will experience operational problems. While there will likely be some traffic utilizing this connection which the neighborhood will label as undesirable, this traffic will be small in volume due to the circuitous nature of the connection. Conversely, the connection may benefit CSURF and its expected tenants by providing a second access to Shields Street.

With the connection, it is expected that Rolland Moore drive will carry 3000-4000 vehicles per day on the segment closest to Shields Street. At a point 400 feet east of Shields Street, Shire Way intersects from the north and a shared loop driveway intersects from the south. The 3000-4000 daily traffic will decrease rather dramatically at this location. It is recommended that the 400 foot segment east of Shields Street have a collector level cross section. However, east of Shire Way, Rolland Moore Drive will function as a local street and should, therefore, have a local street cross section.

The neighborhood contends that this connection will be a convenient route for park users and others desiring a short cut. The fact is, that if the connection is made, some of this will occur. Assuming that the overall CAT project is desirable for this area, in particular, and the City of Fort Collins as a whole, then the issue of the road connection should have no bearing on the desirability of the CAT or Windtrail developments.

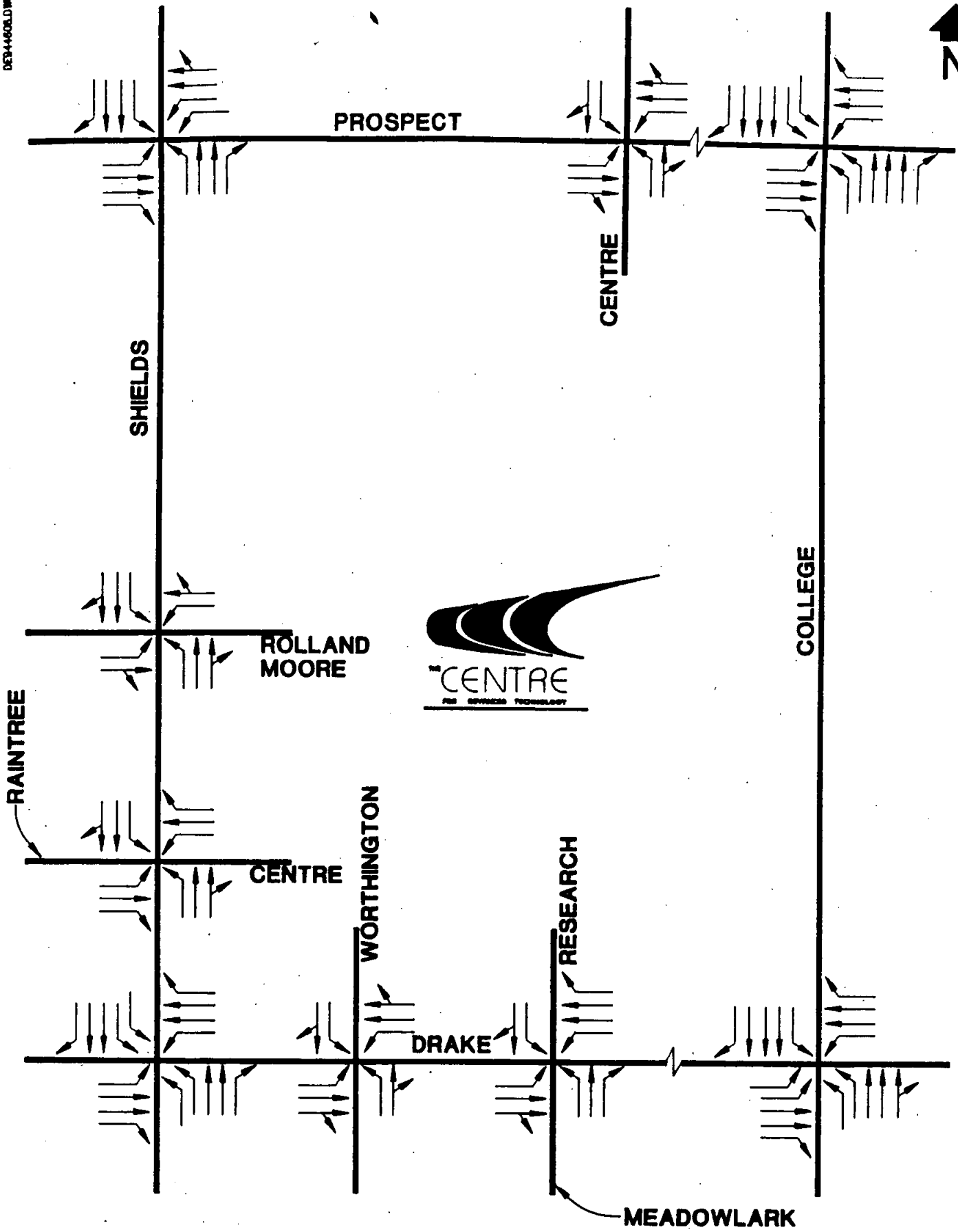
Table 2  
Current Peak Hour Operation

<u>Intersection</u>	Level of Service	
	<u>AM</u>	<u>PM</u>
College/Prospect (signal)	C	C
College/Drake (signal)	B	C
Drake/Meadowlark/Research (signal)	B	B
Drake/Worthington (stop sign)		
NB LT/RT	A	B
WB LT	A	A
Drake/Shields (signal)	C	C
Shields/Centre/Raintree (signal)	B	B
Shields/Rolland Moore (stop sign)		
EB LT	E	E
EB RT	A	A
NB LT	A	B
Shields/Hill Pond (stop sign)		
EB LT/T/RT	D	E
WB LT/T/RT	C	D
SB LT	A	A
NB LT	A	B
Shields/Prospect (signal)	B	C
Prospect/Centre (signal)	B	B

Table 3

Future Peak Hour Operation  
(With Geometrics Shown in Figure 6)

<u>Intersection</u>	Level of Service	
	<u>AM</u>	<u>PM</u>
College/Prospect (signal)	C	D
College/Drake (signal)	C	D
Drake/Meadowlark/Research (signal)	B	B
Drake/Worthington (signal)	B	C
Drake/Shields (signal)	C	C
Shields/Centre/Raintree (signal)	B	C
Shields/Rolland Moore (signal)	B	C
Shields/Hill Pond (stop sign)		
EB LT/T/RT	D	E
WB LT/T/RT	E	E
SB LT	B	C
NB LT	B	C
Shields/Prospect (signal)	C	E
Prospect/Centre (signal)	B	B



# LONG RANGE GEOMETRICS

Figure 6



## VI. RECOMMENDATIONS

This study assessed the transportation impacts of the continued development of CAT and Windtrail, located east of Shields Street and between Prospect Road and Drake Road in Fort Collins, Colorado. Currently, the key signalized intersections operate acceptably. The unsignalized intersections operate acceptably, except for minor street left turns during the afternoon peak hour at the intersections along Shields Street.

With full development of CAT and Windtrail, the unsignalized intersections will operate acceptably, except for minor street left turns at some intersections along Shields Street. This type of operation is normal along arterial streets. It is expected that the Shields/Rolland Moore and Drake/Worthington intersections will warrant signalization in the future. Key signalized intersections will generally operate acceptably with geometric improvements. The location of these properties within Fort Collins provides opportunities for high transit and bicycle usage.

The long standing connection between Shields Street and Centre Avenue via Rolland Moore Drive has circulation benefits to both the neighborhood and CAT tenants, as well as the city in general. Both the developers and the neighborhood desire not to have this connection. There are no technical reasons why this connection should not be made.