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REFUSE-COLLECTION SCHEDULING FOR SELECTED LOCATIONS. VOLUME II.--ETC(U)
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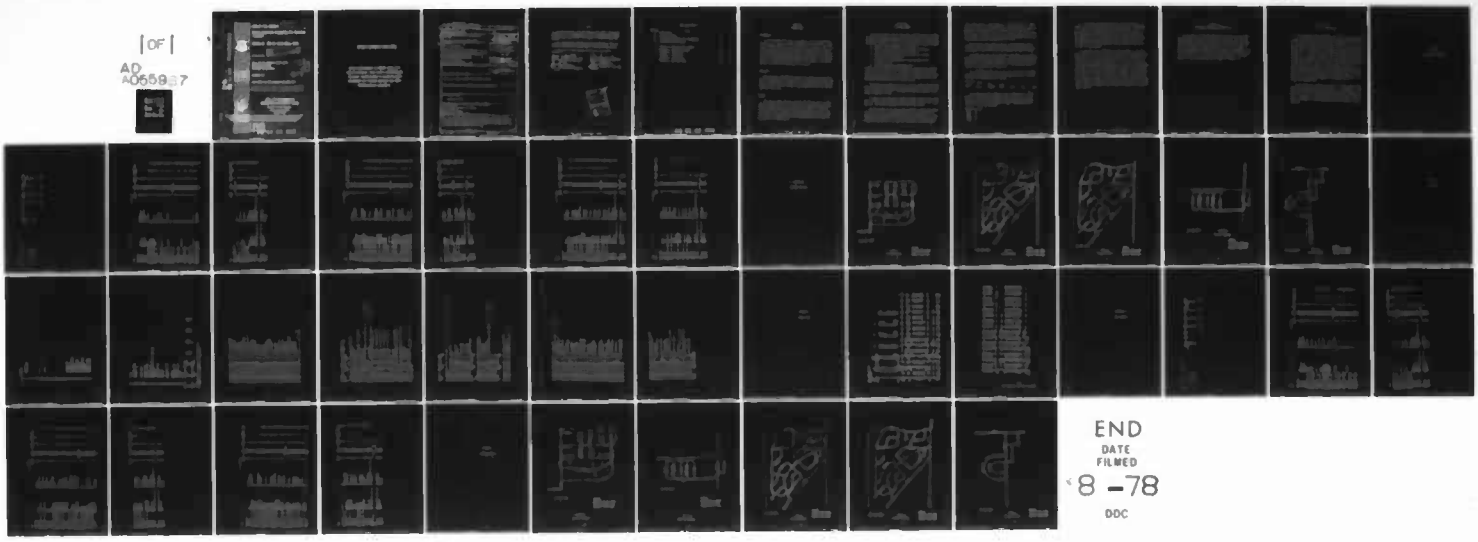

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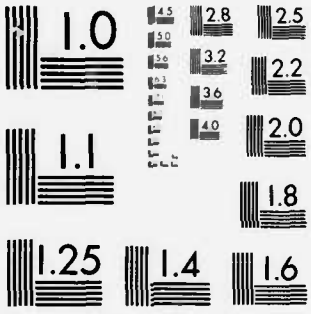

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Refuse-Collection Scheduling For Selected Locations

Volume II: Hill Air Force Base, Utah

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Harold J Iuzzolino

ERIC H. WANG CIVIL ENGINEERING RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO
BOX 25, UNIVERSITY STATION
ALBUQUERQUE, NEW MEXICO 87131

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FINAL REPORT FOR PERIOD JANUARY 1976-APRIL 1977

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CIVIL AND ENVIRONMENTAL
ENGINEERING DEVELOPMENT OFFICE
(AIR FORCE SYSTEMS COMMAND)
TYNDALL AIR FORCE BASE
FLORIDA 32403

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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER: CEEDO-TR-77-54, Vol II

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle): REFUSE-COLLECTION SCHEDULING FOR SELECTED LOCATIONS. Volume II. Hill Air Force Base, Utah.

5. TYPE OF REPORT & PERIOD COVERED: Final Technical Report, Jan. 1976 - Apr. 1977

6. PERFORMING ORG. REPORT NUMBER: CERF-EE-15

7. AUTHOR(s): Harold J. Iuzzolino

8. CONTRACT OR GRANT NUMBER(s): F29601-76-C-0015

9. PERFORMING ORGANIZATION NAME AND ADDRESS: Eric H. Wang Civil Engineering Research Facility, University of New Mexico, Box 25, University Station, Albuquerque, NM 87131

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: T.D. 4.03

11. CONTROLLING OFFICE NAME AND ADDRESS: DET 1 (CEEDO) HQ ADTC, Air Force Systems Command, Tyndall Air Force Base, FL 32403

12. REPORT DATE: Nov 1977

13. NUMBER OF PAGES: 50

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS. (of this report): Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE: --

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Available in DDC

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Refuse Collection
Refuse-Collection Scheduling Program
Vehicle scheduling
Computer-generated maps
Approximation of street shapes

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents maps and schedules produced by the Air Force Refuse-Collection Scheduling Program for residential refuse collection at Hill Air Force Base, Utah. The data required for scheduling are discussed briefly. The computer-generated schedule reduced the number of trips from 4 to 3 and the total mileage from 53.4 to 44.5 miles.

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PREFACE

This report documents work performed during the period January 1976 through April 1977 by the University of New Mexico under contract F29601-76-C-0015 with DET 1 (CEEDO) HQ ADTC, Air Force Systems Command, Tyndall Air Force Base, Florida 32403. Capt. Robert F. Olfenbuttel managed the program.

This report has been reviewed by the Information Officer and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

ROBERT F. OLFENBUTTEL, Capt, USAF
Chief, Resources Conservation Br

PETER A. CROWLEY, Maj, USAF, BSC
Director of Environics

EMIL C. FREIN, Maj, USAF
Chief, Env Engr & Energy Research Division

JOSEPH S. PIZZUTO, Col, USAF, BSC
Commander

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SECTION I
INTRODUCTION

BACKGROUND

From 1973 through 1975, a study was conducted at the Civil Engineering Research Facility (CERF) to evaluate the usefulness of the IBM Vehicle Scheduling Program for scheduling refuse collection at Air Force bases. This study indicated that reductions in manpower and total mileage of up to 20 percent could be obtained in some cases. The large amount of human effort required to put the routes produced by the IBM program in a useable form led to the development of the CERF Refuse-Collection Scheduling Program (RCSP). This program produces a printed schedule and maps that can be used, without modification, by the driver of the collection vehicle or in reports.

OBJECTIVE

The objective of this effort was to use RCSP to determine optimum refuse-collection schedules for four Air Force bases. These test bases provide enough variety in refuse-scheduling problems to allow a determination of the program's range of applicability and, ultimately, an evaluation of its potential for use on all Air Force bases.

SCOPE

This report presents the results obtained when RCSP was used to schedule refuse collection at Hill Air Force Base, Utah. The data required for scheduling are described briefly. The original and new schedules are compared. Since the new schedule requires only three collection trips, while the original required four, a procedure for verifying and implementing the new schedule is given. The original and the computer-generated routes are presented on maps and as printed schedules.

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SECTION II
DATA REQUIREMENTS

The data available for Hill Air Force Base included three maps, one showing the entire base with the path to Davis landfill sketched in, and the other two showing enlargements of the housing areas. The original routes were marked on the maps. In addition to the maps, the following information was provided:

1. unloading time at the landfill is 10 minutes,
2. speed of the refuse vehicles is 25 miles per hour on base,
3. one 16-cubic-yard vehicle services 100 houses,
4. distance from the main gate to Davis landfill is 3.2 miles traveled at 40 miles per hour,
5. the collection vehicle travels at 5 miles per hour in the housing area, and
6. the vehicle averages 40 seconds per stop.

Speed limits were treated in the following manner. Highway 193 was assigned a speed limit of 50 miles per hour. All other off-base roads were assigned speed limits of 40 miles per hour. All on-base roads outside of housing areas were assigned speed limits of 25 miles per hour. All streets within housing areas were assigned speed limits of 15 miles per hour.

Four routes were indicated on the maps. To obtain computer-generated maps and a schedule for these original routes, information describing the routes was used as input to program PHASE4. The schedule and maps thus obtained are presented in Appendixes A and B.

The computer-generated original schedule indicated that 300 families, not 100 as indicated in the information provided by the base, could be serviced on one trip. The 300-family capacity was selected for use in RCSP.

The route summary for the original routes indicated a total of 870 collection points. Of these, 520 represented families living outside the Wherry housing area and 350 represented individuals living in the Wherry area. (The route summary in Appendix A lists only 346 housing units for the Wherry area because the paths to four of the units were not shown on the original maps.)

With a vehicle capacity of 300 families, the 870 collection points could be serviced in three trips. Each Wherry housing unit was treated as 0.75 households; thus, the total refuse quantity for that area was counted as 262.5 households. Vehicle capacity was set at 270 households, allowing all refuse to be collected in three trips, one of them covering the Wherry housing area and the other two servicing the remainder of the base.

RCSP consists of four computer programs: the data-checking program (RCINPT), the section-assignment program (PHASE2), the route-traversing program (PHASE3), and the route-map and schedule-generating program (PHASE4).

The RCINPT data consist of seven records: street names, size of output map, and five records describing input maps. The third record describes the overall map without providing any details of the housing areas. Records four through seven are descriptions of housing areas. The actual data cards for Hill Air Force Base are listed in Appendix C.

Data for PHASE2 consist of only four cards: a title card, the vehicle-capacity card, the time-limits card, and an output-map size card. The data cards for Hill Air Force Base are as follows:

```
HILL AFB
          270.
 .667                10.       4.5
 0.        6.1       15.25      2.       12.       25.       10.
```

The required input data to PHASE3 consist of only two cards: a title card and a card giving the node numbers assigned to the landfill and the garage. Five optional cards were added, each reassigning a street segment to another section (sections correspond to trips). These data cards are as follows for Hill Air Force Base:

```
HILL AFB. UTAH
 1040    5
  182    3
  167    3
  171    3
  155    2
  156    2
```

The five segment reassignments were made to improve the schedule. In three cases, the close approximation of street shapes had caused segments of a single street to be assigned to different collection trips. If a coarser shape approximation had been used, these streets would have been shown as single segments, and the problem would not have arisen. The reassignments eliminated the need to use two trucks to service a single street. The other two segments were reassigned because the original assignment required the collection vehicle to travel them twice. The new assignment requires only one trip over these segments.

The three data records for PHASE4 are listed in Appendix D. The first record consists of a title card, a card giving the unit-of-refuse measurement, two time-limits cards, and a vehicle-identification card. The second record consists of cards specifying map boundaries. The third record consists of cards describing the paths in each of the routes. Normally, this information is passed from program PHASE3 to PHASE4 on disk or tape, but since some changes were desired in the final routes, the data were punched onto cards, modified, and included as card input to program PHASE4. The changes in the routes were of two types: minor changes in the direction of traversal for some loops and major changes to correct for improper traversal direction on one-way streets. Since E street has a median, it should have been treated as two one-way streets, but an inadequacy in PHASE3 made it necessary to treat E street as two two-way streets. The resulting wrong-direction travel was corrected on the path data cards to PHASE4.

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SECTION III
EVALUATION OF COMPUTER-GENERATED SCHEDULE

The original refuse-collection schedule for Hill Air Force Base required four trips covering 53.4 miles to service all of the houses. The computer-generated schedule requires only three trips and covers 44.5 miles. Thus the computer-generated schedule decreases total mileage by 17 percent and number of trips by 25 percent. The heaviest collection trip in the old schedule serviced 300 households, whereas the heaviest trip in the new schedule services 265, a reduction of about 12 percent. In either schedule, the Wherry housing area is serviced in one trip. The computer-generated schedule is given in Appendix E, and the corresponding maps are presented in Appendix F.

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SECTION IV
IMPLEMENTATION REQUIREMENTS

RCSP assumes that any two collection vehicles of the same capacity could service the same number of households. Therefore, the two most important preliminary verifications are that 1) the maximum number of households serviced on one trip has been correctly determined and 2) the vehicle involved is almost always capable of completing its route without overfilling. For Hill Air Force Base, the heaviest collection trip is labeled ROUTE2 in the original schedule (Appendix A). In the routes produced by RCSP, the heaviest trip services 265 households, so it need only be verified that at least 265 households are serviced by what is currently the largest-capacity trip. Even if considerably more than 265 households are actually serviced, there should be no problem with the vehicle overfilling because it is capable of servicing 300 households. If none of the current trips service at least 265 households, the Air Force Civil and Environmental Engineering Development Office should be given corrected route information so the capacity can be determined accurately and the program rerun. If the trip described as ROUTE2 does service approximately 300 households, then the new schedule in Appendix E and the maps in Appendix F will be suitable for implementation.

If the scheduling is under Air Force control, the new maps and schedules may be given to the person in charge of scheduling. If a contractor is responsible for scheduling and refuse collection, the new maps and schedules may be given to him; the savings in mileage and number of trips should provide incentive for implementation. When the refuse-collection contract goes out for open bidding, distribution of the computer-generated schedule may produce lower cost estimates.

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APPENDIX A

ORIGINAL ROUTE SCHEDULE

FINAL ROUTE SUMMARY HILL AFB. UTAH

ROUTE	VEHICLE IDENTIFICATION	VEHICLE CAPACITY (HOUSEHOLDS	SECTION(S) TRIP1 TRIP2)	DISTANCE (MILES)	TIME (HR:MIN)	HOUSEHOLDS SERVICED	REFUSE QUANTITY (HOUSEHOLDS)
1	16 CU YD VEHICLE	270.0	1	13.5	4:47	346	259.5
2	16 CU YD VEHICLE	270.0	2	12.5	4:19	298	296.0
3	16 CU YD VEHICLE	270.0	3	12.2	3:02	194	194.0
4	16 CU YD VEHICLE	270.0	4	15.1	1:04	26	26.0
			TOTALS	53.4	13:12	864	777.5

ROUTE 1 HILL AFB. UTAH 16 CU YD VEHICLE

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
LEAVE GARAGE				8:00			
DRIVE ON		TO 2ND ST	25	8:00	.1		
DRIVE ON	2ND ST	TO SOUTHGATE DR	25	8:01	.2		
DRIVE ON	SOUTHGATE DR	TO 11TH ST	25	8:03	.8		
DRIVE ON	11TH ST	TO PERIMETER RD	25	8:03	.1		
DRIVE ON	PERIMETER RD	TO WHERRY RD	25	8:05	1.0		
DRIVE ON	WHERRY RD	TO 6TH ST	25	8:06	.3		
DRIVE ON	6TH ST	TO	15	8:06	.1		
PICK UP ON BOTH SIDES	6TH ST	TO VAMPIRE ST	5	8:09	.0	4	1
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	8:14	.0	6	2
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	8:30	.0	24	9
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	8:44	.1	20	14
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	8:58	.0	20	20
PICK UP ON BOTH SIDES	VAMPIRE ST	TO 4TH ST	5	9:01	.0	4	21
DRIVE ON	4TH ST	TO	15	9:01	.0		21
PICK UP ON BOTH SIDES		TO 4TH ST	5	9:16	.1	20	27
DRIVE ON	4TH ST	TO VALIANT ST	15	9:16	.1		27
DRIVE ON		TO	15	9:16	.0		27
PICK UP ON BOTH SIDES		TO VALIANT ST	5	9:24	.0	10	29
PICK UP ON BOTH SIDES	VALIANT ST	TO	5	9:27	.0	4	31
DRIVE ON		TO	15	9:27	.0		31
PICK UP ON BOTH SIDES		TO	5	9:34	.1	10	33
PICK UP ON BOTH SIDES		TO	5	9:40	.1	8	36
DRIVE ON		TO VALIANT ST	15	9:40	.0		36
PICK UP ON BOTH SIDES	VALIANT ST	TO	5	9:53	.1	18	41
DRIVE ON		TO	15	9:53	.0		41
PICK UP ON BOTH SIDES		TO	5	10:00	.0	10	43
BREAK TIME				10:00 TO 10:15			
PICK UP ON BOTH SIDES		TO	5	10:21	.0	8	46
DRIVE ON		TO	15	10:21	.0		46
DRIVE ON		TO	15	10:21	.0		46
PICK UP ON BOTH SIDES		TO	5	10:30	.0	12	49
PICK UP ON BOTH SIDES		TO	5	10:37	.0	10	52
DRIVE ON		TO	15	10:37	.0		52
DRIVE ON	VALIANT ST	TO	15	10:37	.0		52
DRIVE ON		TO	15	10:37	.0		52
PICK UP ON BOTH SIDES		TO	5	10:45	.0	10	54
PICK UP ON BOTH SIDES		TO	5	10:51	.0	8	57
DRIVE ON		TO	15	10:51	.0		57
DRIVE ON		TO	15	10:51	.0		57
PICK UP ON BOTH SIDES		TO	5	10:58	.0	10	59
PICK UP ON BOTH SIDES		TO	5	11:06	.0	12	63
DRIVE ON		TO	15	11:07	.0		63
PICK UP ON BOTH SIDES	VALIANT ST	TO 6TH ST	5	11:26	.1	28	71
DRIVE ON	6TH ST	TO	15	11:27	.1		71
PICK UP ON BOTH SIDES		TO 6TH ST	5	11:41	.1	20	76
PICK UP ON BOTH SIDES	6TH ST	TO VALIANT ST	5	11:46	.0	6	78
PICK UP ON BOTH SIDES	6TH ST	TO	5	11:50	.1	6	79

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
PICK UP ON BOTH SIDES		TO	5	12:03	.0	18	84
BREAK FOR LUNCH				12:03 TO 12:33			
DRIVE ON		TO 6TH ST	15	12:33	.0		84
DRIVE ON	6TH ST	TO	15	12:33	.0		84
PICK UP ON BOTH SIDES		TO	5	12:46	.2	16	89
DRIVE ON		TO VALIANT ST	15	12:47	.1		89
PICK UP ON BOTH SIDES	4TH ST	TO	5	12:51	.0	6	91
DRIVE ON	4TH ST	TO	15	12:51	.0		91
PICK UP ON BOTH SIDES	4TH ST	TO VAMPIRE ST	5	12:53	.0	2	91
PICK UP ON BOTH SIDES		TO	5	12:56	.0	4	92
PICK UP ON BOTH SIDES		TO	5	13:01	.1	6	94
PICK UP ON BOTH SIDES		TO 6TH ST	5	13:07	.2	6	96
DRIVE ON	6TH ST	TO WHERRY RD	15	13:07	.1		96
DRIVE ON	WHERRY RD	TO PERIMETER RD	25	13:08	.3		96
DRIVE ON	PERIMETER RD	TO 11TH ST	25	13:10	1.0		96
DRIVE ON	11TH ST	TO SOUTHGATE DR	25	13:10	.1		96
DRIVE ON	SOUTHGATE DR	TO HIGHWAY 193	25	13:11	.2		96
DRIVE ON	HIGHWAY 193	TO ROAD TO/FROM DAVIS LAND FILL	50	13:12	1.3		96
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO LAND FILL	40	13:15	1.6		96
UNLOAD				13:15 TO 13:25			
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO HIGHWAY 193	40	13:27	1.6		
DRIVE ON	HIGHWAY 193	TO SOUTHGATE DR	50	13:28	1.3		
DRIVE ON	SOUTHGATE DR	TO 2ND ST	25	13:31	1.0		
DRIVE ON	2ND ST	TO	25	13:31	.2		
DRIVE ON		TO GARAGE	25	13:31	.1		

ROUTE 2 HILL AFB, UTAH 16 CU YD VEHICLE

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
LEAVE GARAGE				8:00			
DRIVE ON		TO E ST	25	8:00	.1		
DRIVE ON	E ST	TO 8TH ST	25	8:01	.4		
DRIVE ON	8TH ST	TO MINUTEMAN AVE	25	8:03	.9		
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO COLONY LOOP	5	8:07	.0	5	1
DRIVE ON	COLONY LOOP	TO	15	8:07	.0		1
PICK UP ON BOTH SIDES	COLONY LOOP	TO	5	8:10	.0	3	2
PICK UP ON BOTH SIDES	COLONY LOOP	TO	5	8:11	.0	2	3
PICK UP ON BOTH SIDES	COLONY LOOP	TO	5	8:13	.0	2	4
DRIVE ON	COLONY LOOP	TO MINUTEMAN AVE	15	8:13	.0		4
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO LEXINGTON	5	8:15	.0	2	5
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO CONCORD ST	5	8:16	.0	2	5
PICK UP ON BOTH SIDES	CONCORD ST	TO	5	8:27	.1	14	11
PICK UP ON BOTH SIDES	CONCORD ST	TO	5	8:34	.1	10	14
PICK UP ON BOTH SIDES	CONCORD ST	TO	5	8:42	.1	10	18
PICK UP ON BOTH SIDES	CONCORD ST	TO LEXINGTON	5	8:48	.1	8	21
PICK UP ON BOTH SIDES	LEXINGTON	TO	5	8:50	.0	2	22
PICK UP ON BOTH SIDES	LEXINGTON	TO	5	8:53	.0	4	23
PICK UP ON BOTH SIDES	LEXINGTON	TO	5	9:02	.1	12	28
PICK UP ON BOTH SIDES	LEXINGTON	TO PRINCETON	5	9:09	.1	10	31
PICK UP ON BOTH SIDES	LEXINGTON	TO MINUTEMAN AVE	5	9:17	.1	10	35
DRIVE ON	MINUTEMAN AVE	TO CONCORD ST	15	9:17	.0		35
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO	5	9:29	.1	16	41
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO LEXINGTON	5	9:35	.1	8	44
DRIVE ON	MINUTEMAN AVE	TO CONSTITUTION	15	9:35	.1		44
PICK UP ON BOTH SIDES	CONGRESS	TO	5	9:37	.0	2	45
PICK UP ON BOTH SIDES	CONGRESS	TO	5	9:40	.0	4	46
PICK UP ON BOTH SIDES	CONGRESS	TO	5	9:52	.1	16	52
PICK UP ON BOTH SIDES	CONGRESS	TO	5	9:54	.0	2	53
PICK UP ON BOTH SIDES		TO LIBERTY RD	5	9:56	.1	2	54
PICK UP ON BOTH SIDES	LIBERTY RD	TO CONGRESS	5	10:03	.1	10	57
BREAK TIME				10:03 TO 10:18			
PICK UP ON BOTH SIDES	LIBERTY RD	TO	5	10:23	.0	6	59
PICK UP ON BOTH SIDES	LIBERTY RD	TO REVERE CIRCLE	5	10:27	.0	6	62
PICK UP ON BOTH SIDES	REVERE CIRCLE	TO	5	10:30	.0	4	63
PICK UP ON BOTH SIDES	REVERE CIRCLE	TO	5	10:33	.0	4	65
PICK UP ON BOTH SIDES	REVERE CIRCLE	TO	5	10:35	.0	2	65
DRIVE ON	REVERE CIRCLE	TO LIBERTY RD	15	10:35	.0		65
DRIVE ON	LIBERTY RD	TO FRANKLIN ST	15	10:35	.0		65
PICK UP ON BOTH SIDES	LIBERTY RD	TO	5	10:38	.0	4	67
PICK UP ON BOTH SIDES	LIBERTY RD	TO MINUTEMAN AVE	5	10:43	.1	6	69
PICK UP ON BOTH SIDES	LIBERTY RD	TO HALE	5	10:52	.1	12	74
PICK UP ON BOTH SIDES	CONSTITUTION	TO	5	11:02	.1	14	79
PICK UP ON BOTH SIDES	CONSTITUTION	TO	5	11:05	.0	4	80
PICK UP ON BOTH SIDES	CONSTITUTION	TO HALE	5	11:09	.0	4	82
PICK UP ON BOTH SIDES	CONSTITUTION	TO CONGRESS	5	11:12	.1	4	83
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO	5	11:22	.1	14	88
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO FRANKLIN ST	5	11:31	.1	12	93

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
PICK UP ON BOTH SIDES	FRANKLIN ST	TO LIBERTY RD	5	11:42	.1	14	98
DRIVE ON	LIBERTY RD	TO CONGRESS	15	11:42	.1		98
PICK UP ON BOTH SIDES	CONGRESS	TO	5	11:47	.1	6	100
PICK UP ON BOTH SIDES	CONGRESS	TO	5	11:53	.1	8	103
DRIVE ON		TO MINUTEMAN AVE	15	11:53	.1		103
DRIVE ON	MINUTEMAN AVE	TO CONSTITUTION	15	11:54	.1		103
DRIVE ON	CONSTITUTION	TO HALE	15	11:54	.1		103
PICK UP ON BOTH SIDES	HALE	TO	5	12:01	.1	10	107
BREAK FOR LUNCH				12:01 TO 12:31			
PICK UP ON BOTH SIDES	HALE	TO CONSTITUTION	5	12:35	.1	4	108
DRIVE ON	LIBERTY RD	TO MINUTEMAN AVE	15	12:35	.1		108
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO 12TH ST	5	12:39	.1	4	110
DRIVE ON	12TH ST	TO E ST	25	12:40	.6		110
DRIVE ON	11TH ST	TO SOUTHGATE DR	25	12:41	.4		110
DRIVE ON	SOUTHGATE DR	TO HIGHWAY 193	25	12:42	.2		110
DRIVE ON	HIGHWAY 193	TO ROAD TO/FROM DAVIS LAND FILL	50	12:43	1.3		110
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO LAND FILL	40	12:46	1.6		110
UNLOAD				12:46 TO 12:56			
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO HIGHWAY 193	40	12:58	1.6		
DRIVE ON	HIGHWAY 193	TO SOUTHGATE DR	50	13:00	1.3		
DRIVE ON	SOUTHGATE DR	TO 2ND ST	25	13:02	1.0		
DRIVE ON	2ND ST	TO	25	13:02	.2		
DRIVE ON		TO GARAGE	25	13:03	.1		

ROUTE 3 HILL AFB, UTAH 16 CU YD VEHICLE

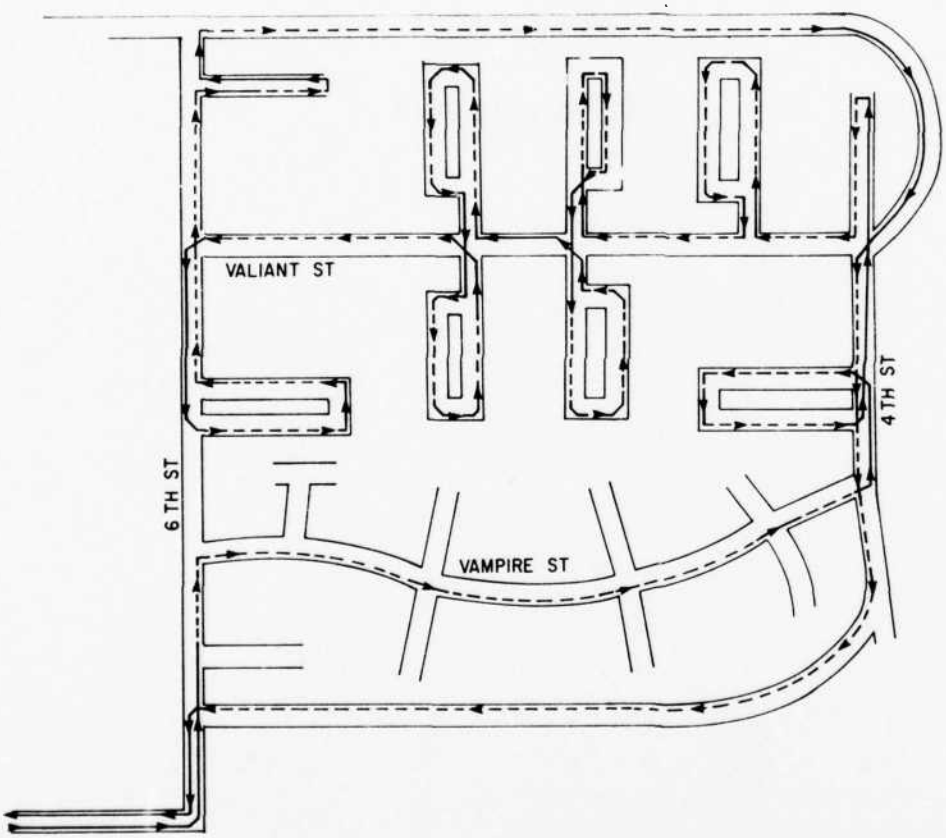
ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
LEAVE GARAGE				8:00			
DRIVE ON		TO E ST	25	8:00	.1		
DRIVE ON	E ST	TO 8TH ST	25	8:01	.4		
DRIVE ON	8TH ST	TO LIBERTY RD	25	8:04	1.1		
PICK UP ON BOTH SIDES	LIBERTY RD	TO HAMILTON	5	8:06	.0	2	
PICK UP ON BOTH SIDES	HAMILTON	TO	5	8:12	.1	8	3
PICK UP ON BOTH SIDES	HAMILTON	TO	5	8:15	.0	4	5
PICK UP ON BOTH SIDES	HAMILTON	TO PRINCETON	5	8:25	.1	14	10
PICK UP ON BOTH SIDES	PRINCETON	TO LEXINGTON	5	8:27	.1	2	11
DRIVE ON	PRINCETON	TO HAMILTON	15	8:28	.1		11
PICK UP ON BOTH SIDES	PRINCETON	TO LIBERTY RD	5	8:30	.1	2	11
PICK UP ON BOTH SIDES	LIBERTY RD	TO HAMILTON	5	8:37	.1	10	15
DRIVE ON	LIBERTY RD	TO PRINCETON	15	8:38	.1		15
PICK UP ON BOTH SIDES	LIBERTY RD	TO FREEDOM CIRCLE	5	8:45	.1	10	19
PICK UP ON BOTH SIDES	FREEDOM CIRCLE	TO	5	8:49	.1	4	20
PICK UP ON BOTH SIDES	FREEDOM CIRCLE	TO	5	8:52	.0	4	22
DRIVE ON	FREEDOM CIRCLE	TO LIBERTY RD	15	8:52	.1		22
DRIVE ON	LIBERTY RD	TO YORKTOWN	15	8:52	.1		22
PICK UP ON BOTH SIDES	YORKTOWN	TO SARATOGA ST	5	8:57	.1	6	24
PICK UP ON BOTH SIDES	YORKTOWN	TO	5	9:03	.0	8	27
PICK UP ON BOTH SIDES	YORKTOWN	TO	5	9:07	.1	6	29
PICK UP ON BOTH SIDES	YORKTOWN	TO SARATOGA ST	5	9:11	.1	4	31
PICK UP ON BOTH SIDES	SARATOGA ST	TO	5	9:16	.1	6	33
PICK UP ON BOTH SIDES	SARATOGA ST	TO	5	9:17	.0	2	34
PICK UP ON BOTH SIDES	SARATOGA ST	TO YORKTOWN	5	9:25	.1	10	37
DRIVE ON	YORKTOWN	TO LIBERTY RD	15	9:25	.1		37
PICK UP ON BOTH SIDES	LIBERTY RD	TO	5	9:44	.2	26	47
PICK UP ON BOTH SIDES	LIBERTY RD	TO YORKTOWN	5	9:55	.1	14	52
PICK UP ON BOTH SIDES	LIBERTY RD	TO SARATOGA ST	5	10:08	.1	16	58
BREAK TIME				10:08 TO 10:23			
PICK UP ON BOTH SIDES	SARATOGA ST	TO	5	10:34	.1	16	64
PICK UP ON BOTH SIDES	SARATOGA ST	TO YORKTOWN	5	10:38	.1	4	65
PICK UP ON BOTH SIDES	YORKTOWN	TO LIBERTY RD	5	10:44	.1	8	68
DRIVE ON	LIBERTY RD	TO SARATOGA ST	15	10:45	.1		68
PICK UP ON BOTH SIDES	LIBERTY RD	TO	5	10:51	.1	8	71
DRIVE ON	LIBERTY RD	TO MINUTEMAN AVE	15	10:52	.3		71
DRIVE ON	MINUTEMAN AVE	TO 12TH ST	15	10:53	.1		71
DRIVE ON	12TH ST	TO E ST	25	10:54	.6		71
DRIVE ON	11TH ST	TO SOUTHGATE DR	25	10:55	.4		71
DRIVE ON	SOUTHGATE DR	TO HIGHWAY 193	25	10:56	.2		71
DRIVE ON	HIGHWAY 193	TO ROAD TO/FROM DAVIS LAND FILL	50	10:57	1.3		71
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO LAND FILL	40	10:59	1.6		71
UNLOAD				10:59 TO 11:09			
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO HIGHWAY 193	40	11:12	1.6		
DRIVE ON	HIGHWAY 193	TO SOUTHGATE DR	50	11:13	1.3		
DRIVE ON	SOUTHGATE DR	TO 2ND ST	25	11:16	1.0		
DRIVE ON	2ND ST	TO	25	11:16	.2		
DRIVE ON		TO GARAGE	25	11:16	.1		

ROUTE 4 HILL AFB. UTAH 16 CU YD VEHICLE

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
LEAVE GARAGE				8:00			
DRIVE ON		TO 2ND ST	25	8:00	.1		
DRIVE ON	2ND ST	TO D ST	25	8:00	.0		
DRIVE ON	D ST	TO SERVICE ROAD	25	8:01	.2		
PICK UP ON	D ST	TO 4TH ST	5	8:02	.0	1	
PICK UP ON	D ST	TO SERVICE ROAD	5	8:03	.0	1	
PICK UP ON BOTH SIDES	SERVICE ROAD	TO E ST	5	8:08	.1	5	2
PICK UP ON	E ST	TO 4TH ST	5	8:09	.0	1	2
PICK UP ON	E ST	TO SERVICE ROAD	5	8:10	.0	1	3
PICK UP ON BOTH SIDES	SERVICE ROAD	TO D ST	5	8:16	.1	8	6
DRIVE ON	D ST	TO 2ND ST	25	8:17	.2		6
DRIVE ON	2ND ST	TO GEORGIA ST	25	8:23	2.7		6
DRIVE ON	GEORGIA ST	TO SERVICE ROAD	25	8:24	.2		6
DRIVE ON	SERVICE ROAD	TO	15	8:24	.0		6
PICK UP ON BOTH SIDES	SERVICE ROAD	TO	5	8:28	.1	3	7
DRIVE ON	SERVICE ROAD	TO GEORGIA ST	15	8:28	.0		7
DRIVE ON	GEORGIA ST	TO	15	8:28	.0		7
DRIVE ON		TO	15	8:28	.0		7
PICK UP ON BOTH SIDES		TO ASPEN AVE	5	8:30	.1	2	8
DRIVE ON	ASPEN AVE	TO	15	8:30	.0		8
DRIVE ON		TO ARSENAL RD	15	8:30	.0		8
PICK UP ON BOTH SIDES	ARSENAL RD	TO	5	8:33	.0	4	9
DRIVE ON	ARSENAL RD	TO	15	8:34	.0		9
DRIVE ON	ARSENAL RD	TO GEORGIA ST	15	8:34	.0		9
DRIVE ON	6TH ST	TO 8TH ST	25	8:38	1.8		9
DRIVE ON		TO	25	8:39	.5		9
DRIVE ON		TO HIGHWAY 193	40	8:40	.2		9
DRIVE ON	HIGHWAY 193	TO	40	8:42	1.3		9
DRIVE ON	HIGHWAY 193	TO ROAD TO/FROM DAVIS LAND FILL	50	8:43	1.4		9
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO LAND FILL	40	8:46	1.6		9
UNLOAD				8:46 TO 8:56			
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO HIGHWAY 193	40	8:58	1.6		
DRIVE ON	HIGHWAY 193	TO SOUTHGATE OR	50	9:00	1.3		
DRIVE ON	SOUTHGATE OR	TO 2ND ST	25	9:02	1.0		
DRIVE ON	2ND ST	TO	25	9:02	.2		
DRIVE ON		TO GARAGE	25	9:03	.1		

APPENDIX B

ORIGINAL ROUTE MAPS



HILL AFB, UTAH

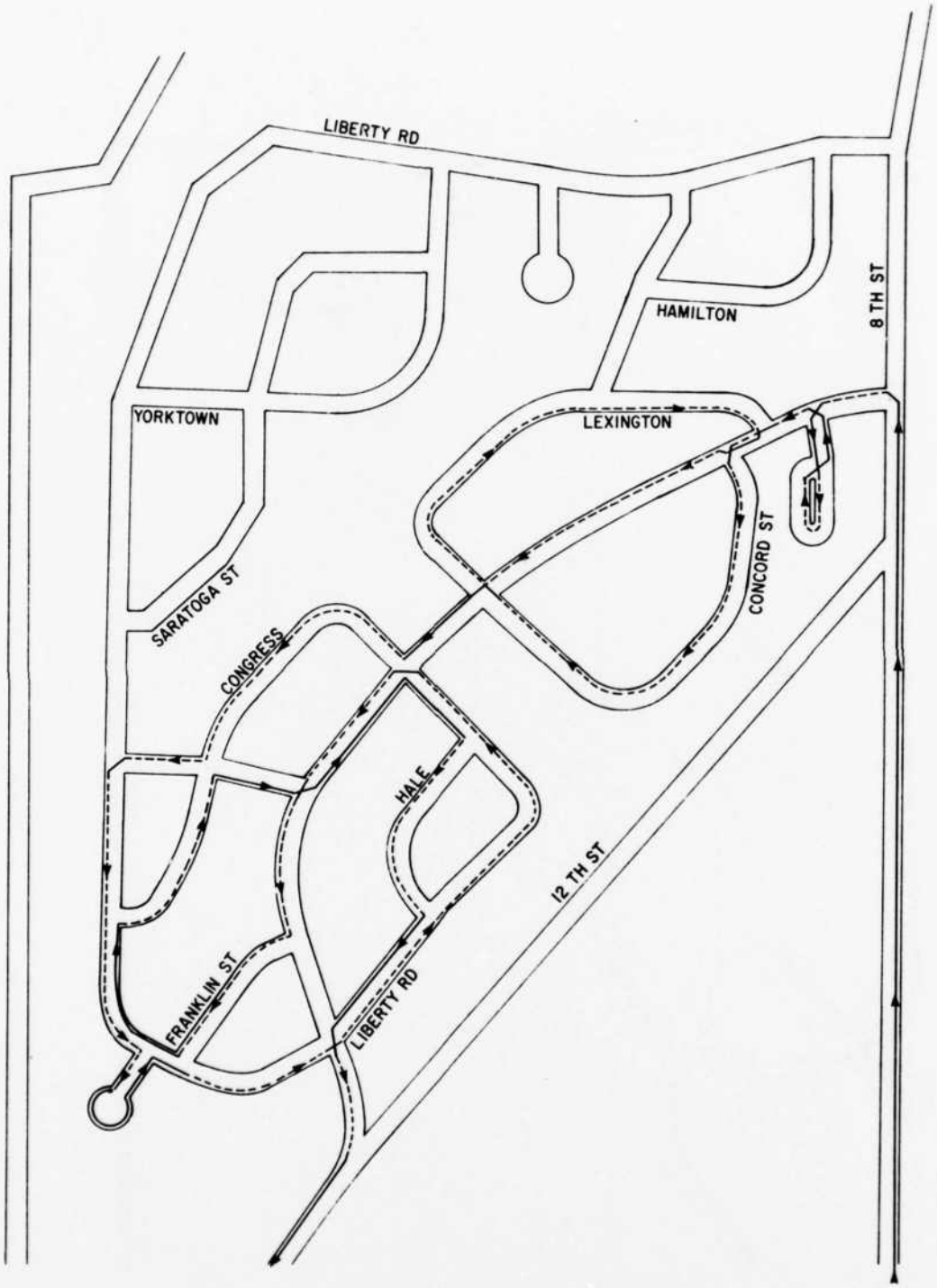
ROUTE 1

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE



HILL AFB, UTAH

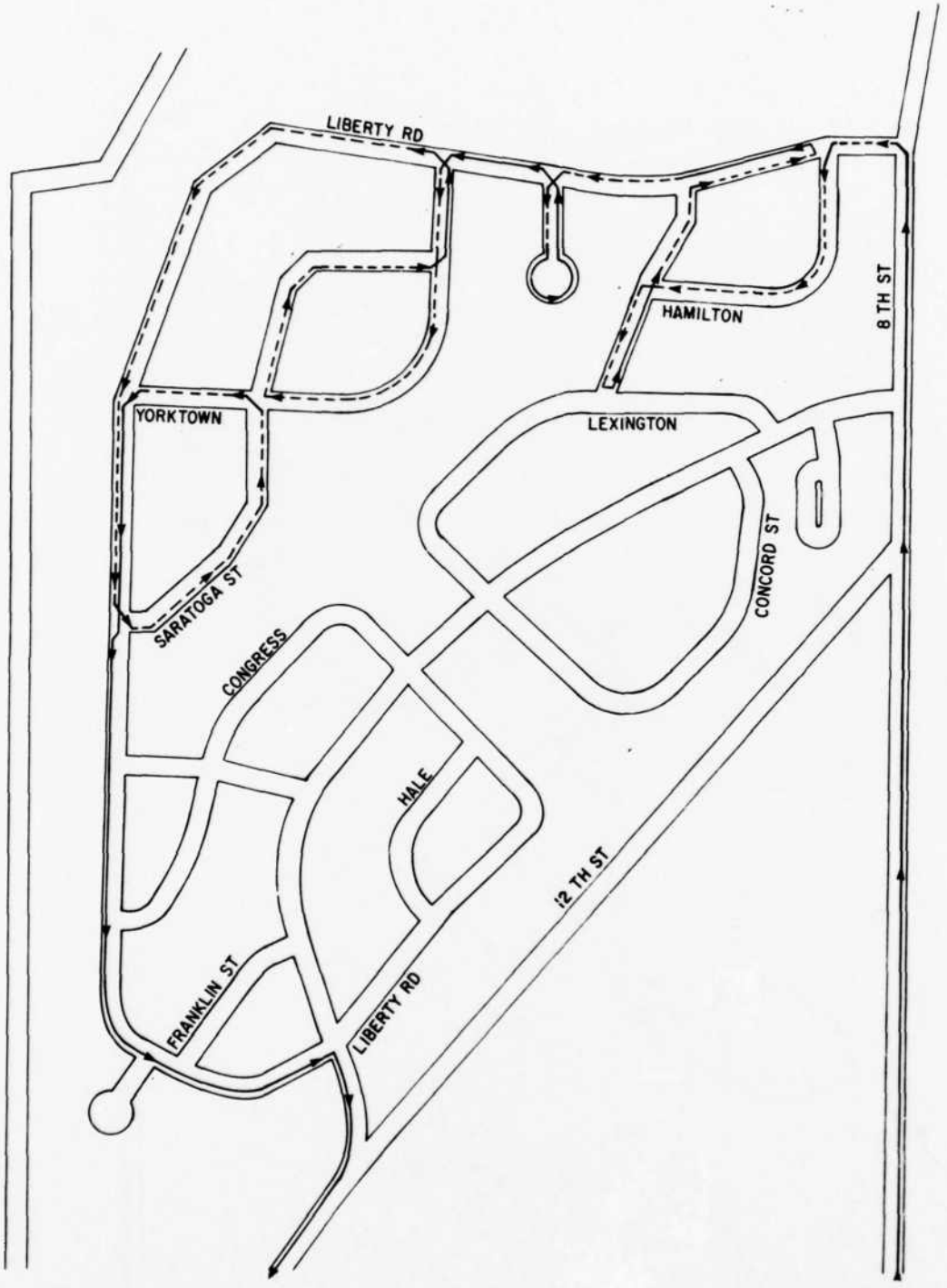
ROUTE 2

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE



HILL AFB, UTAH

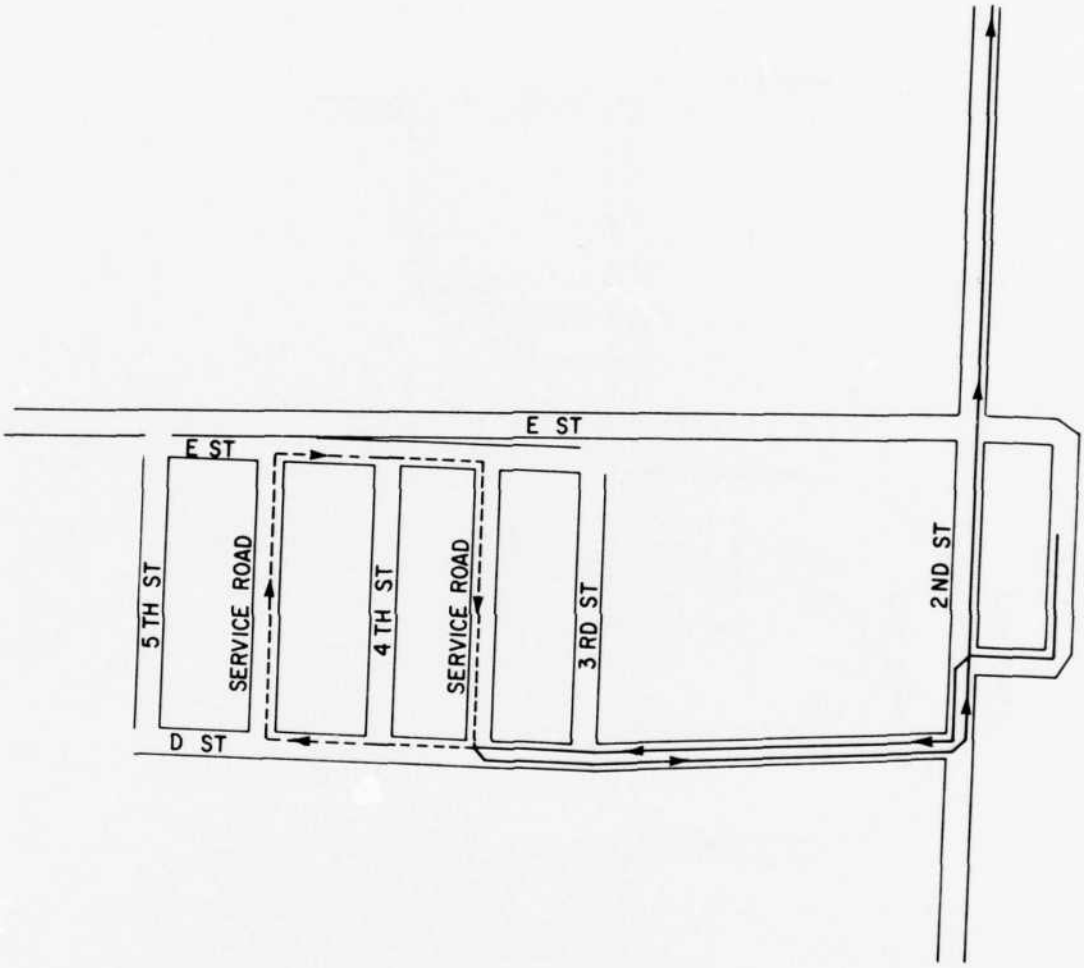
ROUTE 3

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE



HILL AFB, UTAH

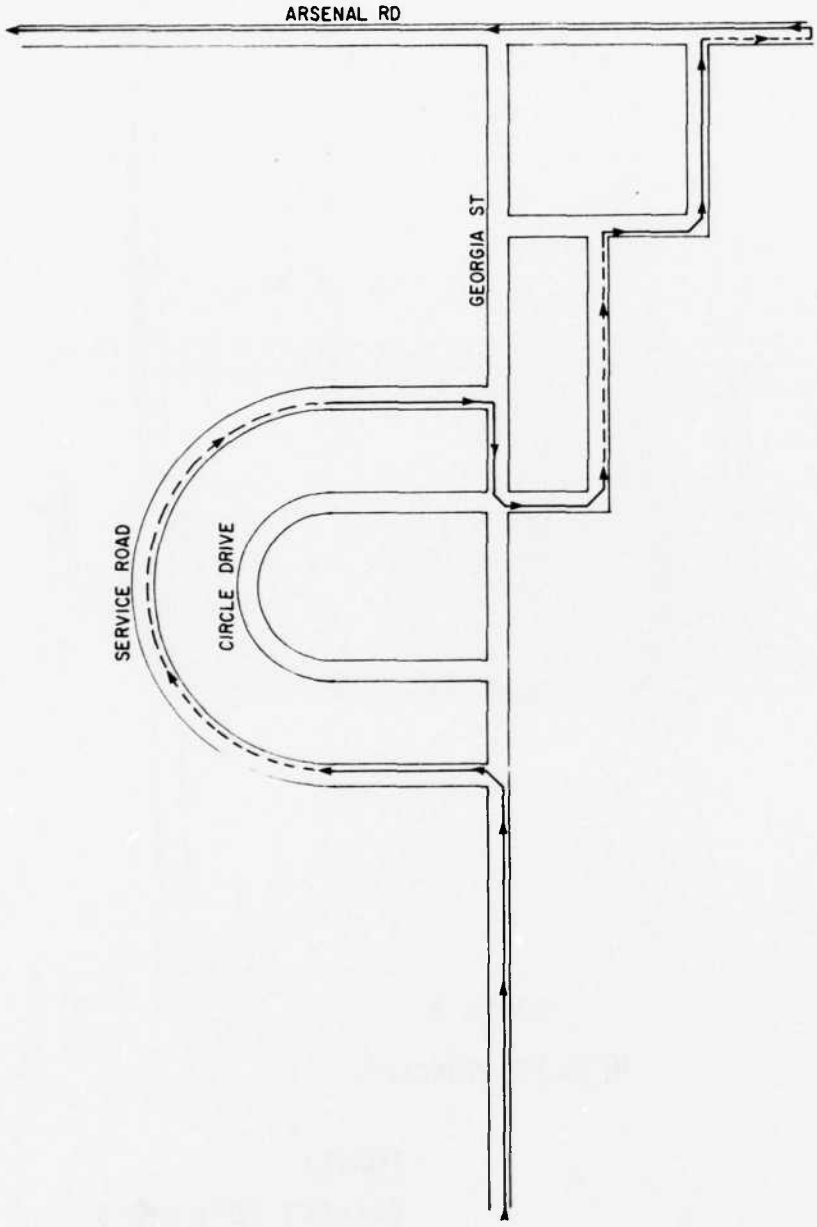
ROUTE 4

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE



HILL AFB, UTAH

ROUTE 4

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE

APPENDIX C

RCINPT DATA

HILL AFB. UTAH

1	
2	6TH ST
3	VAMPIRE ST
4	
5	
6	
7	
8	
9	
10	4TH ST
11	
12	
13	VALIANT ST
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
26	
31	LIBERTY RD
32	HAMILTON
33	PRINCETON
34	FREEDOM CIRCLE
35	YORKTOWN
36	SARATOGA ST
37	COLONY LOOP
38	LEXINGTON
39	CONCORD ST
40	MINUTEMAN AVE
41	CONGRESS
42	FRANKLIN ST
43	REVERE CIRCLE
44	CONSTITUTION

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   45      HALE
   46
   60      SERVICE ROAD
   61      GEORGIA ST
   62
   63
   64      ASPEN AVE
   65
   66      ARSENAL RD
   67      CIRCLE DRIVE
   70      6TH ST
   71      HIGHWAY 193
   72      ROAD TO/FROM DAVIS LAND FILL
   73      WHERRY RD
   74      11TH ST
   75      SOUTHGATE DR
   76      2ND ST
   78      12TH ST
   79      8TH ST
   80
   81      PERIMETER RD
   82      E ST
   83
   85      3RD ST
   86      SERVICE ROAD
   87      4TH ST
   88      SERVICE ROAD
   89      5TH ST
   90      D ST
   91      E ST
7/8/9      (END OF RECORD)
 0.         6.1        18.3       2.         12.        30.        10.
 0.         8.         8.         0.         10.        10.        10.        3
 0.         6.         15.        0.         8.         20.        10.        5
7/8/9      (END OF RECORD)
 .1         800.       2.5
  25.
72 1050 103 0.0 1040/40 (.55.1.5) (1.3.1.5)
71 1050 83 0.0 1070/50 (.) (.5.4.85)
```

```
71 1070 9 0.0 1080 / 50 (.) LC (.58.5.21)
71 1080 88 0.0 1090 / 40 (.) (0.58.8.75)
50 1090 3 0.0 1095 / 40 (.) (0.71.8.77)
50 1095 7 0.0 1100 / 40 (.) (0.85.9.02)
50 1100 18 0.0 1110 / (.) (1.4.9.46)
50 1110 16 0.0 1120 / (.) (2.05.9.46)
70 1120 12 0.0 1130 / (.) (2.08.9.92)
70 1130 69 0.0 1140 / (.) (4.30.11.5)
70 1140 23 0.0 1150 / (.) LC (5.18.11.75)
70 1150 18 0.0 825 / (.) (5.9.11.77)
61 1170 12 0.0 1180 / (5.9.11.3) (5.9.10.8)
76 1180 35 0.0 1190 / (.) (4.5.10.8)
76 1190 24 0.0 1200 / (.) RC (3.68.10.4)
76 1200 25 0.0 1210 / (.) RC (3.2.9.5)
76 1210 35 0.0 1220 / (.) RC (2.9.8.15)
76 1220 54 0.0 1230 / (.) (2.9.6.0)
76 1230 5 0.0 1250 / (.) (2.9.5.78)
76 1250 2 0.0 1260 / (.) (2.9.5.7)
90 1260 9 0.0 950 / (.) (2.54.5.7)
76 1260 9 0.0 1270 / (.) (2.9.5.32)
75 1270 13 0.0 1280 / (.) (2.35.5.32)
75 1280 9 0.0 1290 / (.) RC (2.14.5.08)
75 1290 11 0.0 1300 / (.) LC (1.85.4.85)
75 1300 20 0.0 1310 / (.) (1.05.4.85)
75 1310 13 0.0 1070 / (.) (.)
74 1310 7 0.0 1320 / (.) (1.05.4.58)
81 1320 5 0.0 1330 / (.) (0.85.4.58)
81 1330 13 0.0 1340 / (.) RC (0.6.4.18)
81 1340 28 0.0 1350 / (.) (0.6.3.05)
81 1350 17 0.0 1360 / (.) RC (1.0.2.59)
73 1360 22 0.0 1370 / (.) (1.88.2.59)
74 1310 28 0.0 1470 / (.) (1.05.5.94)
82 1230 19 0.0 1240 5 0.0 1390 22 0.0 1470
78 1470 11 0.0 1460 / (.) LC (0.76.6.2)
78 1460 14 0.0 1450 / (.) (0.76.6.72)
78 1450 14 0.0 1445 / (.) (1.08.7.19)
78 1445 33 0.0 1400 / (.) (1.95.8.19)
79 1390 54 0.0 1400 / (.) (.)
79 1400 6 0.0 1405 10 0.0 1410 / (.) (1.95.8.82)
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79 1410 4 0.0 1411 13 0.0 1120 / (.)
83 1250 5.5 0.0 5 4.5 0.0 1230/(.) RR
7/8/9      (END OF RECORD)
.1         100.       2.5
                0.75
2 1370 19 0.0 10 / (0.75,0.18) (0.75,0.90)
1 10 81 0.6 15 / (.) (4.00,0.90)
23 20 43 6.0 15/(5.4,1.7) LC
23 30 19 2.2 20 / (5.3,2.48)
10 35 23 6.0 40 7 0.0 45 11 2.0 30 / (5.28,4.10)
11 50 26 10.0  35 / (5.28,5.15)
21 55 47 0.0 35/(5.25,5.6) LC
21 65 113 0.16 55/ (0.75,5.60)
2 10 10 0.0 70 17 4.0 75 22 4.0 80 6 0.0 85 24 6.0 90 27  6.0 95 10 0.0
65 / (.) (0.75,5.59)
19 100 25 0.18  95 / (1.72,5.20)
13 35 19 0.4 105 29 8.10 110 18 0.0 115 47 14,14 90 / (.) (0.75,4.10)
14 120 28 0.10  125 9 0.0 105 / (4.25,5.30) L7
14 120 28 8.0   125 / (.) R21
15 130 25 10.0  135 11 0.0 110 / (3.60,5.30) R6
15 130 25  0.8 135 / (.) L19
16 140 26  0.12 145 9 0.0 110 / (3.62,2.98) L7
16 140 26 10.0  145 / (.) R19
17 150 25  0.10 155 10 0.0 115 / (2.39,5.26) L6
17 150 25   8.0 155 / (.) R19
18 160 24 12.0  165 10 0.0 115 / (2.41,2.99) R6
18 160 24  0.10 165 / (.) L18
20 80 56 20.0 85/(.) RR
4 175 18 0.0 70 / (1.52,1.30)
3 75 17 2.4 265 24 12,12 190/(.) LC (2.35,1.8)
3 190 34 8.12 185 26 8,12 205/(.) RC (4.65,2.2)
3 205 18 2.2 30
26 210 12 0.0 205 19 0.0 220/(4.35,2.6) LC (4.9,1.5)
8 230 19  0.0 185 / (3.49,2.53)
9 235 17  0.0 185 / (3.81,1.13)
6 240 18  0.0 190 / (2.5,2.51)
7 245 18 0.0 190 / (2.2,1.08)
22 250 8 0.0 255 6 0.0 260 / (1.80,2.55) (1.24,2.55)
5 255 13 0.0 265
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12 40 59 20.0 45/(.) RR
7/8/9      (END OF RECORD)
 .1          50.        2.5

61 1170 26 0.0 805 43 2.1 810 26 0.0 815 42 0.0  820  48 0.0 825/ (4.8.2.55)
(4.8.10.0)
60 1170 42 0.0 830/(.) (3.1.2.55)
60 850 42 0.0 815/(3.1.6.4)
60 830 149 3.0 850/(.) LC
67 805 44 0.0 870/(.) (3.05.3.65)
67 880 44 0.0 810/(3.05.5.35)
67 870 67 0.0 880/(.) LC
62 810 25 0.0 890 / (.) (5.8.5.36)
63 890 68 2.0 895 / (.) (5.8.8.08)
64 820 25 0.0 895 / (.)
64 895 25 0.0 900 / (.) (6.8.8.08)
65 900 48 0.0 905 / (.) (6.8.10.0)
66 825 51 0.0 905 30 4.0 902/ (.) (8.10)
7/8/9      (END OF RECORD)
.1          50.        2.5
  25.
 89 1240 8 0.0 975/(.75,5.8) (.75,5.48)
90 950 40 0.0 955 / (7.31,1.0) (5.72,1.0)
90 955 38 0.1 960 / (.) (4.21,1.0)
90 960 44 0.1 965 / (.) (2.47,1.0)
90 965 43 0.0 970 / (.) (0.75,1.0)
89 970 112 0.0 975 / (.) (0.75,5.48)
91 975 43 0.0 980 44 1.0 985 38 1.0 990 40 0.0 995/     (.) (7.31.5.48)
85 995 112 0.0 950 / (.)
86 990 112 2.6 955 / (.)
87 985 112 0.0 960 / (.)
88 980 112 0.5 965 / (.)
7/8/9      (END OF RECORD)
 .1         200.        2.5

31 1410 13 2.0 300 / (5.4,7.65) (4.93,7.65)
31 300 22 6.4 315 / (.) (4.05,7.41)
31 315 21 6.4 320 / (.) LC (3.22,7.45)
31 320 17 0.0 325 41 14.12 335/ (.) R44 (1.04,7.35)
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31 335 35 4.10 340 / (.) (.57,6.05)
31 340 35 10.6 345 22 6.2  350 24 6.4 355 / (,) (0.50,2.78)
31 355 11 6.0 356 / (.) (0.5.2.32)
31 356 12 2.4 360 / (,) RC (0.75.1.95)
31 360 5 0.0 365 / (.) (0.92.1.85)
31 365 12 4.0 370 /(.) R7 (1.38.1.72)
31 375 15 2.4 370 / (1.89,2.0)
43 360 9 2.2 358 / (.) (0.55.1.65)
43 358 5 0.2 359 / (.) LC (0.48.1.52)
43 359 5 0.4 358 / (.) LC
40 1405 12 4.1 390 / (.) (4.9,5.98)
40 390 8 2.0 395 / (.) (4.61.5.85)
40 395 7 2.0 400 / (.) (4.36.5.72)
40 400 25 8.8 402 / (.) (3.45,5.25)
40 402 19 4.4 405 / (,) (2.83,4.8)
40 405 16 0.0 410 / (.) RC (2.34.4.35)
40 410 24 6.8 415 / (.) RC (1.73.3.58)
40 415 24 6.6 420 / (.) RC (1.67.2.65)
40 420 17 0.2 375 / (.) RC
31 375 25 6.6 430 / (.) (2.5.2.8)
37 390 7 0.0 435 / (.) (4.95.5.67)
37 435 10 0.3 440 / (.) (4.97,5.28)
37 440 6 0.2 445 / (.) LC (4.81.5.28)
37 445 8 0.2 450 / (.) (4.81.5.59)
37 450 4 0.0 435 / (.)
39 405 21 4.4 455 / (.) (3.48,4.22)
39 455 15 8.2 460 / (.) RC 14.(.4.29)
39 460 14 6.4 462 / (.) (4.4.4.68)
39 462 27 8.6 400 /(.) R21
38 405 10 2.0 465 / (.) (2.58,5.09)
38 465 11 0.4 470 / (.) LC (2.55,5.45)
38 470 14 6.6 472 / (.) (2.95,5.85)
38 472 16 4.6 475 / (.) LC (3.54.6.04)
38 475 29 2.8 395/(.) L23
33 475 19 0.2 485/(.) L6 (3.81.6.75)
33 485 18 0.2 315/(.) R13
32 485 21 8.6 495 / (.) RC (4.65.6.68)
32 495 11 2.2 500 / (.) RC (4.93.6.98)
32 500 18 4.4 300
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35 340 21 6.2 505 18 0.4 510 / (.) (2.1.6.0)
35 510 16 4.2 515 / (.) RC (2.51.6.43)
35 515 12 6.2 520 16 4.2 325 / (.)
36 520 18 4.6 525 / (.) (1.8.6.9)
36 525 7 2.0 530 / (.) RC (1.58.6.74)
36 530 19 6.0 505
36 505 25 4.0 545/(.) L16 (1.22.5.07)
36 545 21 6.10 345/(.) L16
41 410 11 2.0 555 / (.) (2.07.4.63)
41 555 9 4.0 560 / (.) RC (1.76.4.62)
41 560 21 8.8 565 / (.) (1.18.4.0)
41 565 7 2.0 570 14 4.4 575 / (.) (0.99.3.18)
41 575 18 0.6 355/(.) L12
46 415 16 0.0 570 15 2.0 350 / (.) R16
42 420 28 6.8 365/(.) R7
40 375 23 2.2 1445 / (.) LC (.)
34 320 14 4.0 321 4 4.0 322 / (.) (3.22.6.73)
34 322 7 0.0 321 / (.) RC
44 410 15 0.4 411 10 0.4 412 / (.) (3.05.3.6)
44 412 9 0.4 413 / (.) LC (3.02.3.31)
44 413 19 6.8 430 / (.)
45 430 17 0.4 414 / (.) LC (2.35.3.4)
45 414 16 4.6 411 / (.)
7/8/9      (END OF RECORD)
7/8/9      (END OF RECORD)
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APPENDIX D

PHASE4 DATA

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HILL AFB. UTAH
HOUSEHOLDS
 .667                    18.
 30.        12.          15.          10.          15.          14.
  270.     16 CU YD VEHICLE
7/8/9      (END OF RECORD)
    1     1 1.7          2.6          12.          2.57         3.47         12.
    1     2 1.7          2.6          12.          2.57         3.47         12.
    2     1 2.0          3.2          12.          5.5          6.4          9.
    2     2 2.0          3.2          12.          5.5          6.4          9.
    2     1 .5           2.0          12.          7.           9.           16.
    2     2 .5           2.0          12.          7.           9.           16.
    3     1 .5           2.0          12.          7.           9.           16.
    3     2 .5           2.0          12.          7.           9.           16.
    3     1 5.6          6.267        12.          11.03        12.03        18.
    3     2 5.6          6.267        12.          11.03        12.03        18.
7/8/9      (END OF RECORD)
   10      4.068
 1040    1T 1050    2T 1070   27T 1310   26T 1300   25T 1290   24T 1280   23T 1270   22T
 1260   20T 1250   47T    5
   15      2.502     1    270.000    262.500
    5   47T 1250   20T 1260   22T 1270   23T 1280   24T 1290   25T 1300   26T 1310   28T
 1320   29T 1330   30T 1340   31T 1350   32T 1360   33T 1370   49T   10   59T   70
   53      2.525     1    270.000    262.500
   70   60C   75   61C   80   62T   85   63C   90   64C   95   66C  100   66T   95   65T
   65   58C   55   57T   35   53C   40   54T   45   55C   30   92C  205   91C  185   90C
  190   89C  265   88C   75   81T   80   86C   85   63T   90   70C  115   84T  165   83C
  160   85C  165   84T  115   81T  155   80C  150   82C  155   81T  115   69T  110   78T
  145   77C  140   79C  145   78T  110   75T  135   74C  130   76C  135   75T  110   68C
  105   72T  125   71C  120   73C  125   72T  105   67C   35   56T   50   56C   35   53T
   40  102C   45   55T   30   52C   20   51C   15   50C   10
   10      4.445     1    270.000    262.500
   10   49T 1370   33T 1360   32T 1350   31T 1340   30T 1330   29T 1320   28T 1310   27T
 1070    2T 1050    1T 1040
    6                2    270.       265.
    5   47T 1250   20T 1260   21T  950  122T  955  123T  960  124T  965
   62                2    270.       265.
  965  134C  980  128C  985  129C  990  132C  955  123C  960  124C  965  125T  970  126T
  975  121T 1240   36T 1390   37T 1470   38T 1460   39T 1450   40T 1445  200C  375  161C
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 430 207C  413 206C  412 205C  411 204C  410 157T  405 156C  402 155C  400 170T
 462 169T  460 168T  455 167T  405 157T  410 204T  411 209C  414 208C  430 161T
 375 148C  370 147C  365 199C  420 159C  415 158C  410 191C  555 192C  560 193C
 565 194C  570 195C  575 196C  355 144C  356 145C  360 149C  358 151C  359 150C
 358 149T  360 145T  356 144T  355 143C  350 142C  345 141C  340 181T  505 189C
 545 190C  345 142T  350 198C  570 197T  415 159T  420 160C  375
   8      4.117     2   270.000   265.000
 375 200T 1445  40T 1450  39T 1460  38T 1470  34T 1310  27T 1070   2T 1050   1T
1040
   5      1.341     3   270.000   258.000
   5  48T 1230  35T 1240  36T 1390  42T 1400  43T 1405
  74      7.656     3   270.000   258.000
1405 152C  390 162T  435 166T  450 165C  445 164C  440 163C  435 162T  390 153C
 395 154C  400 170C  462 169C  460 168C  455 167C  405 171C  465 172C  470 173C
 472 174C  475 176C  485 177C  315 137C  320 201C  321 202C  322 203T  321 201T
 320 138T  325 139C  335 140C  340 181C  505 188C  530 187C  525 186C  520 184C
 515 183C  510 182C  505 188T  530 187T  525 186T  520 185C  325 138T  320 137T
 315 136C  300 135C 1410  45T 1411  46T 1120   9T 1130  10T 1140  11T 1150  12T
 825 119T  905 120C  902 120T  905 118T  900 117T  895 115C  890 114T  810 104C
 805 103T 1170 108T  830 110C  850 109T  815 106T  820 107T  825  12T 1150  11T
1140  10T 1130   9T 1120  46T 1411  45T 1410 135T  300 180C  500 179C  495 178C
 485 176T  475 175C  395
  11      4.697     3   270.000   258.000
 395 153T  390 152T 1405  43T 1400  41T 1445  40T 1450  39T 1460  38T 1470  34T
1310  27T 1070   2T 1050   1T 1040
7/8/9      (END OF RECORD)
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APPENDIX E

RCSP SCHEDULE

FINAL ROUTE SUMMARY HILL AFB, UTAH

ROUTE	VEHICLE IDENTIFICATION	VEHICLE CAPACITY (HOUSEHOLDS)	SECTION(S) TRIP1	TRIP2	DISTANCE (MILES)	TIME (HR:MIN)	HOUSEHOLDS SERVICED	REFUSE QUANTITY (HOUSEHOLDS)
1	16 CU YD VEHICLE	270.0	1		13.5	4:51	350	262.5
2	16 CU YD VEHICLE	270.0	2		13.2	3:59	265	265.0
3	16 CU YD VEHICLE	270.0	3		17.8	4:05	258	258.0
				TOTALS	44.5	12:55	873	785.5

ROUTE 1 HILL AFB. UTAH 16 CU YD VEHICLE

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LCAD (PCT)
LEAVE GARAGE				8:00			
DRIVE ON		TO 2ND ST	25	8:00	.1		
DRIVE ON	2ND ST	TO SOUTHGATE DR	25	8:01	.2		
DRIVE ON	SOUTHGATE DR	TO 11TH ST	25	8:03	.8		
DRIVE ON	11TH ST	TO PERIMETER RD	25	8:03	.1		
DRIVE ON	PERIMETER RD	TO WHERRY RD	25	8:05	1.0		
DRIVE ON	WHERRY RD	TO 6TH ST	25	8:06	.3		
DRIVE ON	6TH ST	TO	15	8:06	.1		
PICK UP ON BOTH SIDES	6TH ST	TO VAMPIRE ST	5	8:09	.0	4	1
PICK UP ON BOTH SIDES	6TH ST	TO	5	8:12	.0	4	2
DRIVE ON	6TH ST	TO	15	8:12	.0		2
PICK UP ON BOTH SIDES	6TH ST	TO VALIANT ST	5	8:17	.0	6	3
PICK UP ON BOTH SIDES	6TH ST	TO	5	8:22	.1	6	5
PICK UP ON BOTH SIDES		TO	5	8:34	.0	18	10
DRIVE ON		TO 6TH ST	15	8:34	.0		10
DRIVE ON	6TH ST	TO	15	8:34	.0		10
PICK UP ON BOTH SIDES		TO	5	8:48	.2	16	14
DRIVE ON		TO VALIANT ST	15	8:48	.1		14
PICK UP ON BOTH SIDES	4TH ST	TO	5	8:52	.0	6	16
DRIVE ON	4TH ST	TO	15	8:53	.0		16
PICK UP ON BOTH SIDES	4TH ST	TO VAMPIRE ST	5	8:54	.0	2	17
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	8:57	.0	4	18
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	9:11	.0	20	23
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	9:25	.1	20	29
PICK UP ON BOTH SIDES	VAMPIRE ST	TO	5	9:42	.0	24	36
PICK UP ON BOTH SIDES	VAMPIRE ST	TO 6TH ST	5	9:46	.0	6	37
DRIVE ON	6TH ST	TO	15	9:46	.0		37
PICK UP ON BOTH SIDES		TO 6TH ST	5	10:01	.1	20	43
BREAK TIME				10:01 TO 10:16			
DRIVE ON	6TH ST	TO VALIANT ST	15	10:16	.0		43
PICK UP ON BOTH SIDES	VALIANT ST	TO	5	10:36	.1	28	51
DRIVE ON		TO	15	10:36	.0		51
PICK UP ON BOTH SIDES		TO	5	10:45	.0	12	54
PICK UP ON BOTH SIDES		TO	5	10:52	.0	10	57
DRIVE ON		TO	15	10:52	.0		57
DRIVE ON		TO	15	10:52	.0		57
PICK UP ON BOTH SIDES		TO	5	10:59	.0	10	59
PICK UP ON BOTH SIDES		TO	5	11:05	.0	8	62
DRIVE ON		TO	15	11:05	.0		62
DRIVE ON	VALIANT ST	TO	15	11:05	.0		62
DRIVE ON		TO	15	11:05	.0		62
PICK UP ON BOTH SIDES		TO	5	11:14	.0	12	65
PICK UP ON BOTH SIDES		TO	5	11:21	.0	10	68
DRIVE ON		TO	15	11:21	.0		68
DRIVE ON		TO	15	11:21	.0		68
PICK UP ON BOTH SIDES		TO	5	11:29	.0	10	71
PICK UP ON BOTH SIDES		TO	5	11:34	.0	8	73
DRIVE ON		TO	15	11:35	.0		73

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
PICK UP ON BOTH SIDES	VALIANT ST	TO	5	11:47	.1	18	78
DRIVE ON		TO	15	11:47	.0		78
PICK UP ON BOTH SIDES		TO	5	11:55	.1	10	81
PICK UP ON BOTH SIDES		TO	5	12:01	.1	8	83
BREAK FOR LUNCH				12:01 TO 12:31			
DRIVE ON		TO VALIANT ST	15	12:31	.0		83
PICK UP ON BOTH SIDES	VALIANT ST	TO	5	12:34	.0	4	84
DRIVE ON		TO	15	12:34	.0		84
PICK UP ON BOTH SIDES		TO VALIANT ST	5	12:41	.0	10	87
DRIVE ON	4TH ST	TO	15	12:41	.0		87
PICK UP ON BOTH SIDES		TO 4TH ST	5	12:56	.1	20	92
DRIVE ON	4TH ST	TO VAMPIRE ST	15	12:56	.0		92
PICK UP ON BOTH SIDES		TO	5	12:59	.0	4	93
PICK UP ON BOTH SIDES		TO	5	13:04	.1	6	95
PICK UP ON BOTH SIDES		TO 6TH ST	5	13:10	.2	6	97
DRIVE ON	6TH ST	TO WHERRY RD	15	13:10	.0		97
DRIVE ON	WHERRY RD	TO PERIMETER RD	25	13:11	.3		97
DRIVE ON	PERIMETER RD	TO 11TH ST	25	13:13	1.0		97
DRIVE ON	11TH ST	TO SOUTHGATE DR	25	13:14	.1		97
DRIVE ON	SOUTHGATE DR	TO HIGHWAY 193	25	13:14	.2		97
DRIVE ON	HIGHWAY 193	TO ROAD TO/FROM DAVIS LAND FILL	50	13:16	1.3		97
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO LAND FILL	40	13:18	1.6		97
UNLOAD				13:18 TO 13:28			
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO HIGHWAY 193	40	13:30	1.6		
DRIVE ON	HIGHWAY 193	TO SOUTHGATE DR	50	13:32	1.3		
DRIVE ON	SOUTHGATE DR	TO 2ND ST	25	13:34	1.0		
DRIVE ON	2ND ST	TO	25	13:34	.2		
DRIVE ON		TO GARAGE	25	13:35	.1		

ROUTE 2 HILL AFB. UTAH 16 CU YD VEHICLE

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
LEAVE GARAGE				8:00			
DRIVE ON		TO 2ND ST	25	8:00	.1		
DRIVE ON	2ND ST	TO D ST	25	8:00	.0		
DRIVE ON	D ST	TO SERVICE ROAD	25	8:01	.3		
PICK UP ON BOTH SIDES	SERVICE ROAD	TO E ST	5	8:05	.1	5	1
PICK UP ON	E ST	TO 4TH ST	5	8:07	.0	1	2
PICK UP ON	E ST	TO SERVICE ROAD	5	8:08	.0	1	2
PICK UP ON BOTH SIDES	SERVICE ROAD	TO D ST	5	8:14	.1	8	5
PICK UP ON	D ST	TO 4TH ST	5	8:15	.0	1	5
PICK UP ON	D ST	TO SERVICE ROAD	5	8:17	.0	1	6
DRIVE ON	D ST	TO 5TH ST	25	8:17	.0		6
DRIVE ON	5TH ST	TO E ST	25	8:17	.1		6
DRIVE ON	E ST	TO 12TH ST	25	8:18	.4		6
DRIVE ON	12TH ST	TO MINUTEMAN AVE	25	8:19	.6		6
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO LIBERTY RD	5	8:23	.1	4	7
PICK UP ON BOTH SIDES	LIBERTY RD	TO HALE	5	8:32	.1	12	12
PICK UP ON BOTH SIDES	CONSTITUTION	TO	5	8:42	.1	14	17
PICK UP ON BOTH SIDES	CONSTITUTION	TO	5	8:46	.0	4	18
PICK UP ON BOTH SIDES	CONSTITUTION	TO HALE	5	8:49	.0	4	20
PICK UP ON BOTH SIDES	CONSTITUTION	TO CONGRESS	5	8:52	.1	4	21
DRIVE ON	MINUTEMAN AVE	TO LEXINGTON	15	8:52	.1		21
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO	5	8:58	.1	8	24
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO CONCORD ST	5	9:10	.1	16	30
DRIVE ON	CONCORD ST	TO LEXINGTON	15	9:11	.3		30
DRIVE ON	MINUTEMAN AVE	TO CONSTITUTION	15	9:12	.1		30
DRIVE ON	CONSTITUTION	TO HALE	15	9:12	.1		30
PICK UP ON BOTH SIDES	HALE	TO	5	9:19	.1	10	34
PICK UP ON BOTH SIDES	HALE	TO CONSTITUTION	5	9:23	.1	4	35
DRIVE ON	LIBERTY RD	TO MINUTEMAN AVE	15	9:23	.1		35
PICK UP ON BOTH SIDES	LIBERTY RD	TO	5	9:28	.1	6	38
PICK UP ON BOTH SIDES	LIBERTY RD	TO FRANKLIN ST	5	9:31	.0	4	39
PICK UP ON BOTH SIDES	FRANKLIN ST	TO MINUTEMAN AVE	5	9:42	.1	14	44
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO	5	9:51	.1	12	49
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO CONSTITUTION	5	10:01	.1	14	54
BREAK TIME				10:01 TO 10:16			
PICK UP ON BOTH SIDES	CONGRESS	TO	5	10:18	.0	2	55
PICK UP ON BOTH SIDES	CONGRESS	TO	5	10:21	.0	4	56
PICK UP ON BOTH SIDES	CONGRESS	TO	5	10:33	.1	16	62
PICK UP ON BOTH SIDES	CONGRESS	TO	5	10:34	.0	2	63
PICK UP ON BOTH SIDES	CONGRESS	TO	5	10:40	.1	8	66
PICK UP ON BOTH SIDES	CONGRESS	TO LIBERTY RD	5	10:45	.1	6	68
PICK UP ON BOTH SIDES	LIBERTY RD	TO	5	10:50	.0	6	70
PICK UP ON BOTH SIDES	LIBERTY RD	TO REVERE CIRCLE	5	10:54	.0	6	72
PICK UP ON BOTH SIDES	REVERE CIRCLE	TO	5	10:57	.0	4	74
PICK UP ON BOTH SIDES	REVERE CIRCLE	TO	5	11:00	.0	4	75
PICK UP ON BOTH SIDES	REVERE CIRCLE	TO	5	11:02	.0	2	76
DRIVE ON	REVERE CIRCLE	TO LIBERTY RD	15	11:02	.0		76
DRIVE ON	LIBERTY RD	TO CONGRESS	15	11:02	.1		76

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
PICK UP ON BOTH SIDES	LIBERTY RD	TO	5	11:10	.1	10	80
PICK UP ON BOTH SIDES	LIBERTY RD	TO SARATOGA ST	5	11:16	.1	8	83
PICK UP ON BOTH SIDES	LIBERTY RD	TO YORKTOWN	5	11:29	.1	16	89
DRIVE ON	YORKTOWN	TO SARATOGA ST	15	11:29	.1		89
PICK UP ON BOTH SIDES	SARATOGA ST	TO	5	11:33	.1	4	90
PICK UP ON BOTH SIDES	SARATOGA ST	TO LIBERTY RD	5	11:44	.1	16	96
DRIVE ON	LIBERTY RD	TO	15	11:45	.1		96
PICK UP ON BOTH SIDES		TO CONGRESS	5	11:47	.1	2	97
DRIVE ON		TO MINUTEMAN AVE	15	11:47	.1		97
DRIVE ON	MINUTEMAN AVE	TO FRANKLIN ST	15	11:47	.1		97
PICK UP ON BOTH SIDES	MINUTEMAN AVE	TO LIBERTY RD	5	11:49	.1	2	98
DRIVE ON	MINUTEMAN AVE	TO 12TH ST	15	11:50	.1		98
DRIVE ON	12TH ST	TO E ST	25	11:51	.6		98
DRIVE ON	11TH ST	TO SOUTHGATE DR	25	11:52	.4		98
DRIVE ON	SOUTHGATE DR	TO HIGHWAY 193	25	11:53	.2		98
DRIVE ON	HIGHWAY 193	TO ROAD TO/FROM DAVIS LAND FILL	50	11:54	1.3		98
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO LAND FILL	40	11:56	1.6		98
UNLOAD				11:56 TO 12:06			
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO HIGHWAY 193	40	12:09	1.6		
DRIVE ON	HIGHWAY 193	TO SOUTHGATE DR	50	12:10	1.3		
DRIVE ON	SOUTHGATE DR	TO 2ND ST	25	12:13	1.0		
DRIVE ON	2ND ST	TO	25	12:13	.2		
DRIVE ON		TO GARAGE	25	12:13	.1		

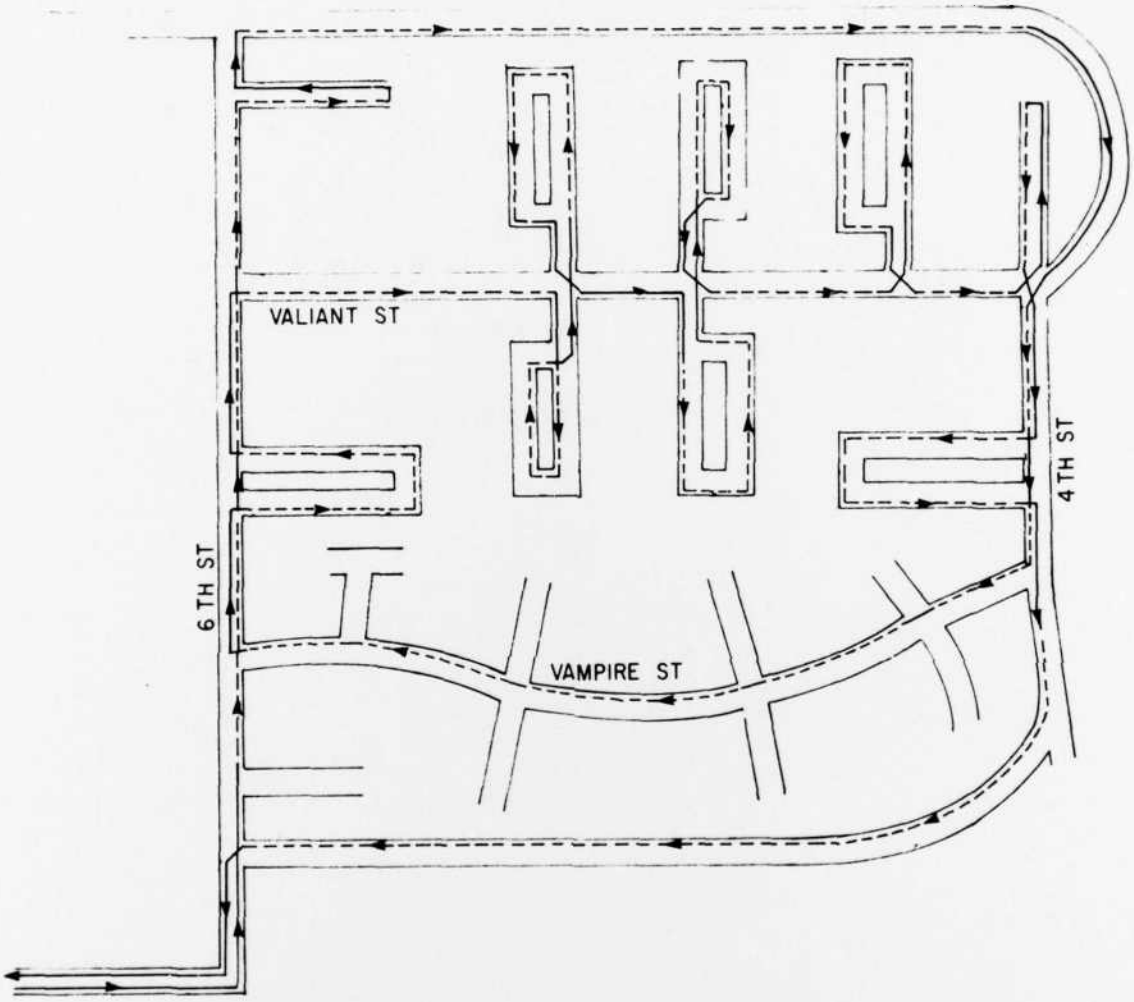
ROUTE 3 HILL AFB. UTAH 16 CU YD VEHICLE

ACTION		SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
LEAVE GARAGE			8:00			
DRIVE ON	TO E ST	25	8:00	.1		
DRIVE ON E ST	TO 8TH ST	25	8:01	.4		
DRIVE ON 8TH ST	TO MINUTEMAN AVE	25	8:03	.9		
PICK UP ON BOTH SIDES MINUTEMAN AVE	TO COLONY LOOP	5	8:07	.0	5	1
DRIVE ON COLONY LOOP	TO	15	8:07	.0		1
PICK UP ON BOTH SIDES COLONY LOOP	TO	5	8:09	.0	2	2
PICK UP ON BOTH SIDES COLONY LOOP	TO	5	8:11	.0	2	3
PICK UP ON BOTH SIDES COLONY LOOP	TO	5	8:13	.0	3	4
DRIVE ON COLONY LOOP	TO MINUTEMAN AVE	15	8:13	.0		4
PICK UP ON BOTH SIDES MINUTEMAN AVE	TO LEXINGTON	5	8:15	.0	2	5
PICK UP ON BOTH SIDES MINUTEMAN AVE	TO CONCORD ST	5	8:16	.0	2	5
PICK UP ON BOTH SIDES CONCORD ST	TO	5	8:27	.1	14	11
PICK UP ON BOTH SIDES CONCORD ST	TO	5	8:34	.1	10	14
PICK UP ON BOTH SIDES CONCORD ST	TO	5	8:42	.1	10	18
PICK UP ON BOTH SIDES CONCORD ST	TO LEXINGTON	5	8:48	.1	8	21
PICK UP ON BOTH SIDES LEXINGTON	TO	5	8:50	.0	2	22
PICK UP ON BOTH SIDES LEXINGTON	TO	5	8:53	.0	4	23
PICK UP ON BOTH SIDES LEXINGTON	TO	5	9:02	.1	12	28
PICK UP ON BOTH SIDES LEXINGTON	TO PRINCETON	5	9:09	.1	10	31
PICK UP ON BOTH SIDES PRINCETON	TO HAMILTON	5	9:11	.1	2	32
PICK UP ON BOTH SIDES PRINCETON	TO LIBERTY RD	5	9:13	.1	2	33
PICK UP ON BOTH SIDES LIBERTY RD	TO FREEDOM CIRCLE	5	9:21	.1	10	37
PICK UP ON BOTH SIDES FREEDOM CIRCLE	TO	5	9:24	.1	4	38
PICK UP ON BOTH SIDES FREEDOM CIRCLE	TO	5	9:27	.0	4	39
DRIVE ON FREEDOM CIRCLE	TO LIBERTY RD	15	9:27	.1		39
DRIVE ON LIBERTY RD	TO YORKTOWN	15	9:28	.1		39
PICK UP ON BOTH SIDES LIBERTY RD	TO	5	9:47	.2	26	49
PICK UP ON BOTH SIDES LIBERTY RD	TO YORKTOWN	5	9:58	.1	14	54
PICK UP ON BOTH SIDES YORKTOWN	TO SARATOGA ST	5	10:04	.1	8	57
BREAK TIME			10:04 TO 10:19			
PICK UP ON BOTH SIDES SARATOGA ST	TO	5	10:24	.1	6	59
PICK UP ON BOTH SIDES SARATOGA ST	TO	5	10:26	.0	2	60
PICK UP ON BOTH SIDES SARATOGA ST	TO YORKTOWN	5	10:33	.1	10	64
PICK UP ON BOTH SIDES YORKTOWN	TO	5	10:39	.0	8	67
PICK UP ON BOTH SIDES YORKTOWN	TO	5	10:44	.1	6	69
PICK UP ON BOTH SIDES YORKTOWN	TO SARATOGA ST	5	10:47	.1	4	71
DRIVE ON SARATOGA ST	TO YORKTOWN	15	10:48	.2		71
PICK UP ON BOTH SIDES YORKTOWN	TO LIBERTY RD	5	10:53	.1	6	73
DRIVE ON LIBERTY RD	TO PRINCETON	15	10:53	.1		73
PICK UP ON BOTH SIDES LIBERTY RD	TO HAMILTON	5	11:01	.1	10	77
PICK UP ON BOTH SIDES LIBERTY RD	TO 8TH ST	5	11:03	.0	2	77
DRIVE ON 8TH ST	TO 8TH ST	25	11:03	.3		77
DRIVE ON 8TH ST	TO ARSENAL RD	25	11:08	1.8		77
DRIVE ON ARSENAL RD	TO	15	11:08	.0		77
PICK UP ON BOTH SIDES ARSENAL RD	TO	5	11:11	.0	4	79
DRIVE ON ARSENAL RD	TO	15	11:11	.0		79
DRIVE ON	TO ASPEN AVE	15	11:11	.0		79

ACTION			SPEED (MPH)	TIME (HR:MIN)	DISTANCE (MILES)	HOUSEHOLDS SERVICED	LOAD (PCT)
DRIVE ON	ASPEN AVE	TO	15	11:11	.0		79
PICK UP ON BOTH SIDES		TO	5	11:14	.1	2	79
DRIVE ON		TO CIRCLE DRIVE	15	11:14	.0		79
PICK UP ON BOTH SIDES	GEORGIA ST	TO CIRCLE DRIVE	5	11:16	.0	3	81
DRIVE ON	GEORGIA ST	TO SERVICE ROAD	15	11:16	.0		81
DRIVE ON	SERVICE ROAD	TO	15	11:16	.0		81
PICK UP ON BOTH SIDES	SERVICE ROAD	TO	5	11:20	.1	3	82
DRIVE ON	SERVICE ROAD	TO GEORGIA ST	15	11:20	.0		82
DRIVE ON	GEORGIA ST	TO ARSENAL RD	15	11:21	.1		82
DRIVE ON	6TH ST	TO 8TH ST	25	11:25	1.8		82
DRIVE ON	8TH ST	TO LIBERTY RD	25	11:26	.3		82
DRIVE ON	LIBERTY RD	TO HAMILTON	15	11:26	.0		82
PICK UP ON BOTH SIDES	HAMILTON	TO	5	11:32	.1	8	85
PICK UP ON BOTH SIDES	HAMILTON	TO	5	11:35	.0	4	86
PICK UP ON BOTH SIDES	HAMILTON	TO PRINCETON	5	11:45	.1	14	91
DRIVE ON	PRINCETON	TO LEXINGTON	15	11:46	.1		91
PICK UP ON BOTH SIDES	LEXINGTON	TO MINUTEMAN AVE	5	11:54	.1	10	95
DRIVE ON	MINUTEMAN AVE	TO 8TH ST	15	11:54	.1		95
DRIVE ON	8TH ST	TO 12TH ST	25	11:54	.1		95
DRIVE ON	12TH ST	TO E ST	25	11:57	1.1		95
DRIVE ON	11TH ST	TO SOUTHGATE DR	25	11:58	.4		95
DRIVE ON	SOUTHGATE DR	TO HIGHWAY 193	25	11:58	.2		95
DRIVE ON	HIGHWAY 193	TO ROAD TO/FROM DAVIS LAND FILL	50	12:00	1.3		95
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO LAND FILL	40	12:02	1.6		95
BREAK FOR LUNCH				12:02 TO 12:32			
UNLOAD				12:32 TO 12:42			
DRIVE ON	ROAD TO/FROM DAVIS LAND FILL	TO HIGHWAY 193	40	12:45	1.6		
DRIVE ON	HIGHWAY 193	TO SOUTHGATE DR	50	12:46	1.3		
DRIVE ON	SOUTHGATE DR	TO 2ND ST	25	12:48	1.0		
DRIVE ON	2ND ST	TO	25	12:49	.2		
DRIVE ON		TO GARAGE	25	12:49	.1		

APPENDIX F

RCSP ROUTE MAPS



HILL AFB, UTAH

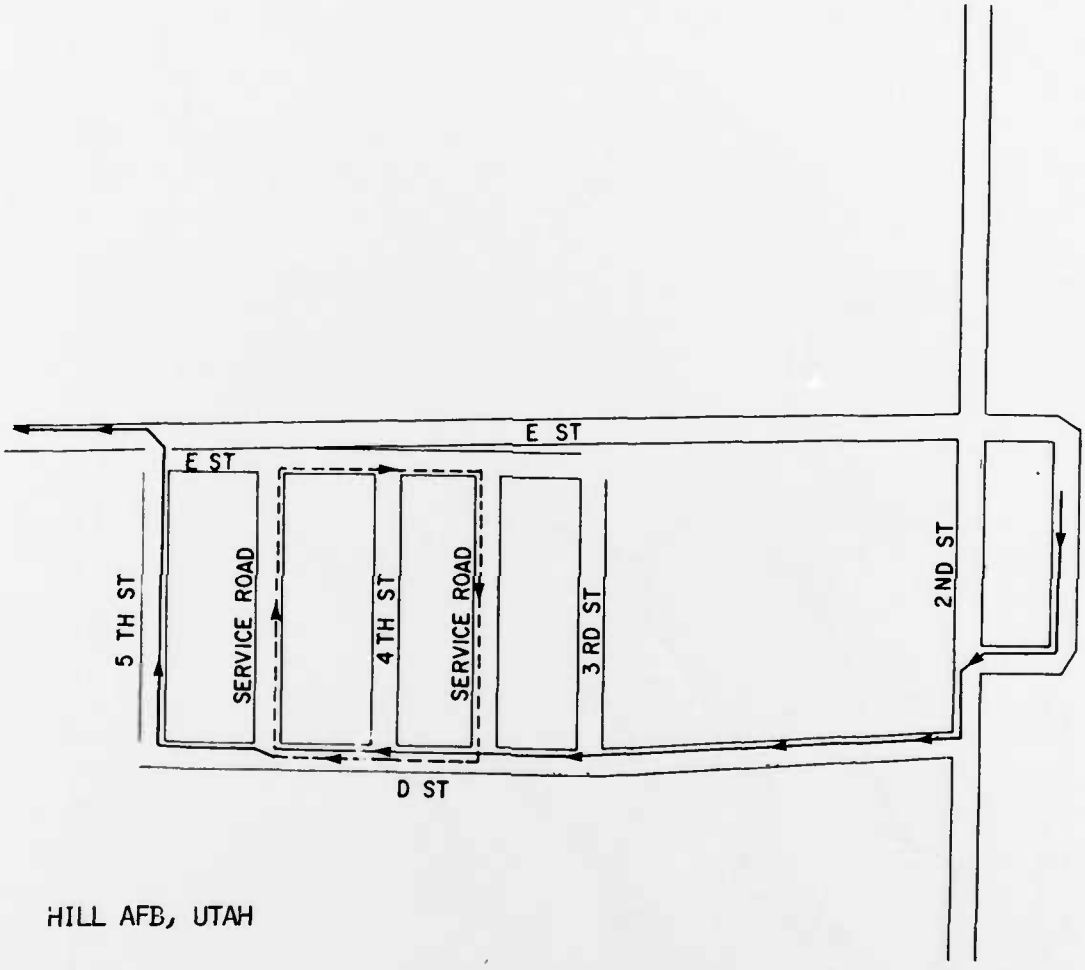
TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE

ROUTE I

16 CU YD VEHICLE



HILL AFB, UTAH

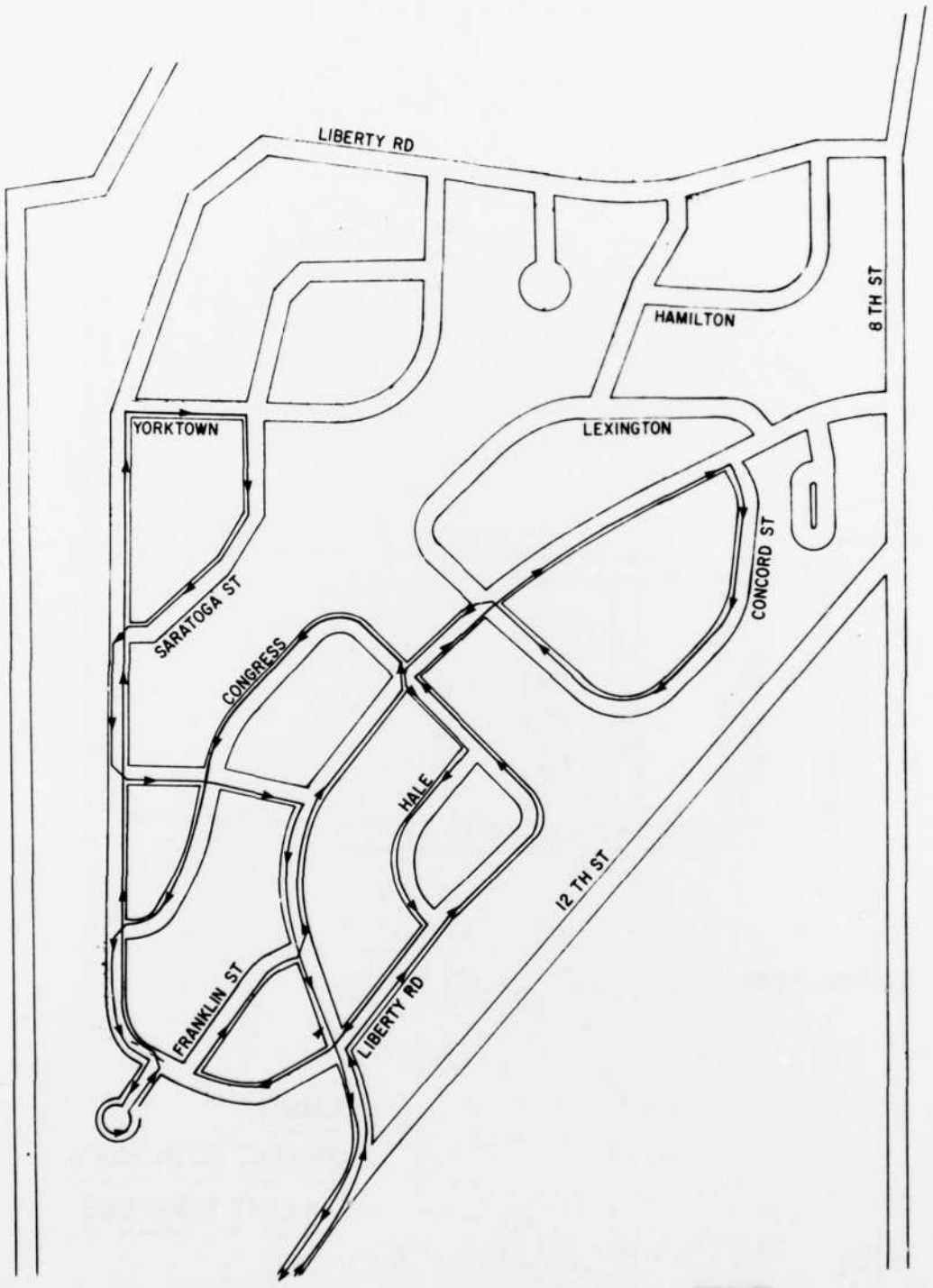
TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE

ROUTE 2

16 CU YD VEHICLE



HILL AFB, UTAH

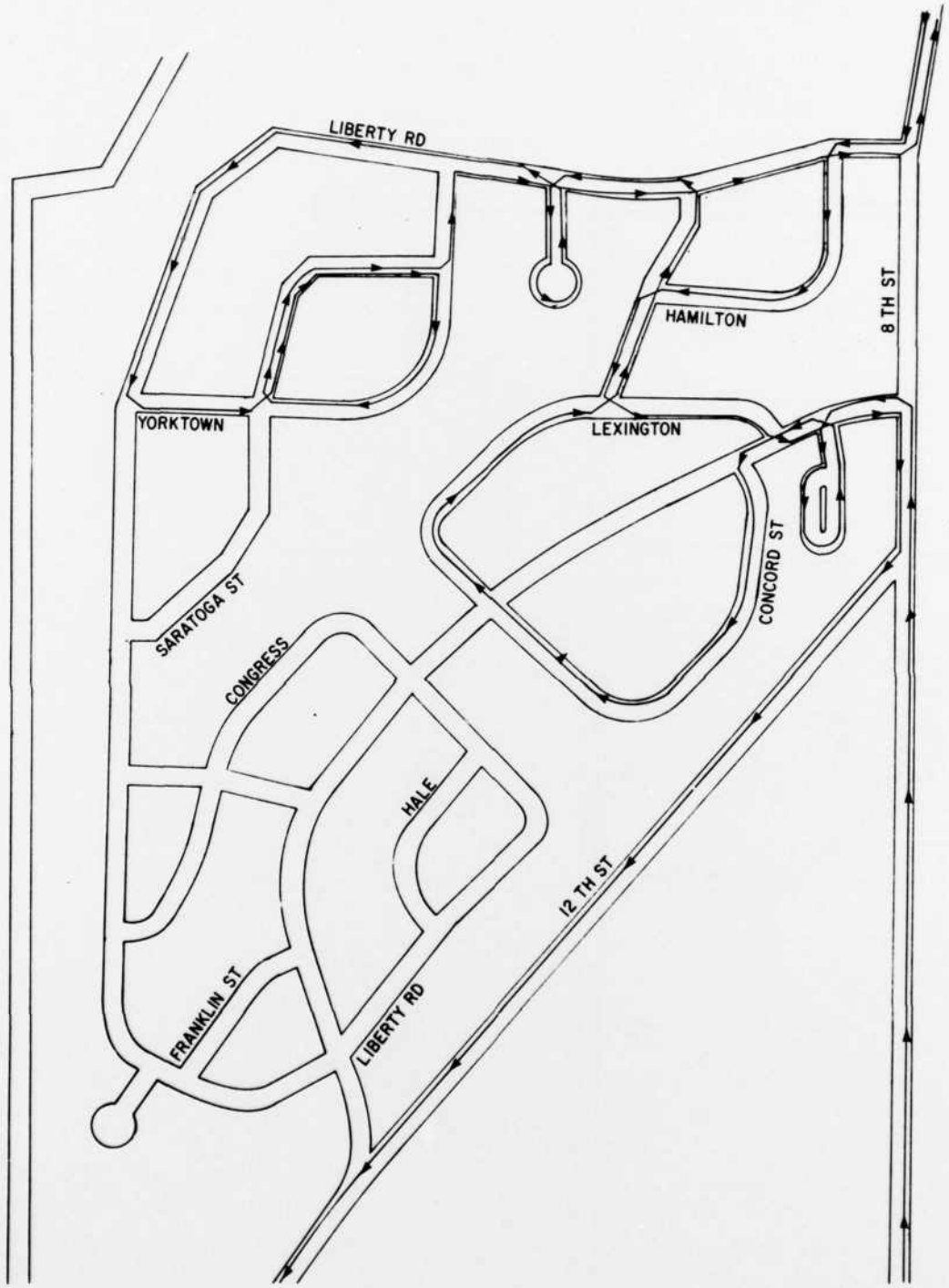
ROUTE 2

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE



HILL AFB, UTAH

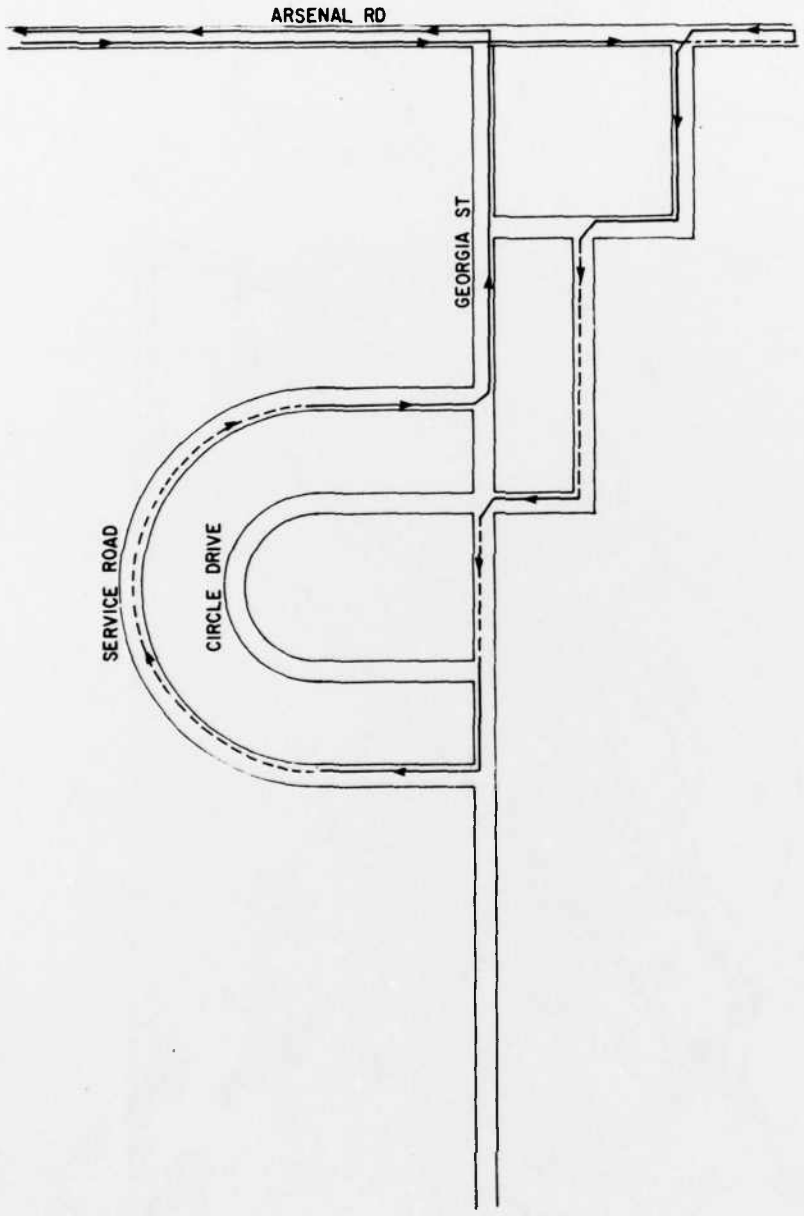
ROUTE 3

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE



HILL AFB, UTAH

ROUTE 3

16 CU YD VEHICLE

TRAVEL

COLLECT BOTH SIDES

COLLECT RIGHT SIDE