ORIGINAL

AT&T

EX PARTE OR LATE FILED

February 16, 2000

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

RECEIVED
FEB 16 2000
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

RE: Ex Parte Presentation
CC Docket No. 96-45 – Universal Service/Proxy Cost Models
CC Docket No. 97-160 – Forward-Looking Cost Mechanism

Dear Ms. Salas:

On February 16, 2000, Richard Clarke, Mike Lieberman and Brenda Kahn of AT&T; and Brian Pitkin, Mike Boyles and David Mortlock of Klick, Kent & Allen; met with Katie King, Bob Loube, Bill Sharkey, Bryan Clopton, Jeff Prisbrey and Gene Fullano of the Common Carrier Bureau. Mark Kennet of the George Washington University and the Commission also participated by telephone. The purpose of this meeting was to communicate to the Commission staff the results of several analyses that AT&T and KK&A have performed on the Synthesis Model. The attached presentation shows several of the improvements that AT&T believes can reasonably be implemented into the Synthesis Model.

Two copies of this Notice are being submitted to the Secretary of the FCC in accordance with Section 1.1206(a)(2) of the Commission's rules. A copy is also being provided to ITS.

Sincerely,

Richard N. Clarke

Richard N. Clarke

Attachment

cc: Katie King
Bill Sharkey
Gene Fullano
Sheryl Todd
Bob Loube
Bryan Clopton
Jeff Prisbrey

No. of Copies rec'd 0+1
List A B C D E

Suggested Modifications to the Synthesis Model

AT&T / KK&A
February 16, 2000

Table of Contents

Implementation Issues

i. Drop Terminal Locations and Orientation

ii. Creating Lots Within Microgrids

iii. Sizing and Selection of OSP Inputs

iv. Residual Line Counts

Optimization Issues

v. Node Selection Criteria

vi. Overlapping Microgrids

Engineering Considerations

vii. Structure Sharing

Attachments

A. Georgia Sensitivity Runs

B. Current Drop Terminal Locations and Orientation - Map

C. Corrected Drop Terminal Locations - Map

D. Corrected Drop Terminal Locations and Orientation - Map

E. Corrected Lot Creation - Map

F. Comparison of Microgrid Lots and Drop Terminals

G. Overlapping Microgrids

H. Distribution/Feeder Route Sharing - Map (Feeder Only)

I. Distribution/Feeder Route Sharing - Map (Feeder and Distribution)

i. Drop Terminal Locations and Orientation

Intention

- The Synthesis Model places drop terminals along alternating lot columns and rows. Each drop terminal serves up to four lots (customers), and should be located in the same microgrid as the customers it serves.
- To the extent possible, the placement of drop terminals should reflect the location of the SAI relative to the locations of the customers being served.

i. Drop Terminal Locations and Orientation

Implementation

- The Model frequently places drop terminals outside the microgrids containing the customers they are intended to serve.
  - The formula used to calculate drop terminal locations assumes that the width and length of each microgrid is 1,000 feet. But because the default microgrid width and length is 360 feet, this coding error places most drop terminals outside the appropriate microgrid.
- Because the Model always locates drop terminals to the NE of the locations they serve, the distribution plant distance from the SAI will be exaggerated much of the time.

i. Drop Terminal Locations and Orientation

Proposed Solution

- Drop terminals will be placed appropriately if the Model uses actual microgrid width and length values, (rather than assuming 1,000 feet), and considers the orientation of the customers in relation to their SAI.
  - Attachment B: Current drop terminal locations (map)
  - Attachment C: Corrected drop terminal locations (map)
  - Attachment D: Corrected drop terminal locations and orientation (map)
- The proposed solution does not require significant modifications to the Model's code.
- *Impacts:*
  - Distribution route distance decreases by 3.98%
  - Basic local service costs drop by 1.28%
  - Universal Service Fund index drops by 8.30%.

ii. Creating Lots Within Microgrids

Intention

- The depth of a microgrid lot should not be more than twice the width of that lot.

Implementation

- The implementation appears to be inconsistent with the documentation. On occasion, the Model violates the depth/width constraint.

ii. Creating Lots Within Microgrids

Proposed Solution

- Correcting the implementation to agree with the stated intent introduces a tradeoff in that the Model will now create more "wasted" lots.
- Satisfying the Model's intent would not require significant modifications to its code.
  - Attachment E: Matching intent with implementation (map)
  - Attachment F: Comparison of microgrid lots and drop terminal locations
- *Impacts:*
  - Distribution route distance increases by 0.40%
  - Basic local service costs drop by 0.50%
  - Universal Service Fund index rises by 0.25%.

iii. Sizing and Selection of OSP Inputs

Intention

- The Synthesis Model should select, size and cost appropriate choices for OSP structures and equipment.

Implementation

- By failing to recognize the large number of lines demanded at many MDUs and businesses, the Model creates too many drop terminals.
- The price structure for drop terminals is unrealistic.
- The cost lookup functions for drop terminals, SAIs and manholes appear to pull data from incorrect cells of their input tables.

iii. Sizing and Selection of OSP Inputs

Proposed Solution

- Drop terminal, SAI and manhole costs should reflect their actually required sizes and costs, to ensure appropriate engineering of OSP structures and equipment in the network.

iv. Residual Line Counts

Intention

- The Model requires whole number line count values to be assigned to each microgrid. Fractional line differences from whole numbers are randomly reassigned across all populated microgrids in a cluster.
- The reassignment of fractional line counts should maintain, as closely as possible, a distribution of whole number line counts across microgrids that matches the distribution of "real" line counts across these microgrids.

iv. Residual Line Counts

Implementation

- The Model converts the number of lines *per customer* to a whole number -- before calculating the number of residual lines. These residual lines are then reassigned randomly across the entire cluster.
- This methodology develops an exaggerated count of lines that are residual to each microgrid.
- Because the number of residual lines is developed on a per customer basis, populous microgrids will have relatively large numbers of residual lines -- which will then be spread across all populated microgrids in the cluster.

iv. Residual Line Counts

Proposed Solution

- Lines residual to a microgrid should be minimized by not rounding customer line counts until after they are added to form a true microgrid total.
- Reassignments should create minimum bias by taking microgrid density into account in redistributing lines across microgrids.
- *Impacts:*
    - Distribution route distance decreases by 0.10%
    - Basic local service costs drop by 0.17%
    - Universal Service Fund index drops by 0.01%

v. Node Selection Criteria

Intention

- The Synthesis Model uses a modified Prim algorithm to connect nodes and design distribution and feeder facilities.
- The Model intends to create a network of nodes that is least cost.

v. Node Selection Criteria

Implementation

- The current modified Prim algorithm uses an average cost per line function to select the next node to attach to the network.
- However, selecting nodes based on average cost appears not to result in a least cost network.

v. Node Selection Criteria

Proposed Solution

- While no perfect solution exists, better selection criteria would be based either on total cost or distance, rather than on cost per line.
- The proposed solution does not require significant modifications to the Model's code.
- *Impacts:*
  - Distribution route distance decreases by 8.86% if distance is minimized, or by 4.12% if total cost is minimized
  - Basic local service costs drop by 1.14% if distance is minimized, or by 1.25% if total cost is minimized
  - Universal Service Fund index drops by 6.78% if distance is minimized, or by 6.11% if total cost is minimized

vi. Overlapping Microgrids

Intention

- The Model intends to have distinct clusters. Populated microgrids from different clusters should not overlap.

Implementation

- Because the Model creates a 500 foot buffer around each cluster, and places lots within this buffer, "populated" microgrids associated with different clusters can overlap.
- These overlapping microgrids then have duplicative plant engineered to serve them.
    - Attachment G: Overlapping microgrids

vi. Overlapping Microgrids

Proposed Solution

- Modify slightly downward the microgrid size for each cluster so that a whole number of microgrids exactly encompasses all customers associated with that cluster -- with initial target microgrid size set at a user-selected value.
- The proposed solution does not require significant modifications to the Model's code.
- *Impacts:*
    - Distribution route distance decreases by 1.23%
    - Basic local service costs drop by 0.42%
    - Universal Service Fund drops by 0.37%

vii. Structure Sharing

Intention

- The Synthesis Model creates feeder routes using a modified Prim algorithm, based on the location of the switch and primary SAIs.
- The intention of the Model is to build a least-cost feeder network.

vii. Structure Sharing

Implementation

- The distribution network is constructed in its entirety before feeder are determined.
- The feeder network is built without regard to the structure routes engineered for the distribution network.

vii. Structure Sharing

Proposed Solution

- When building the feeder portion of the network, the Synthesis Model should consider the structures already built for distribution.
- The proposed solution does require significant modifications to the Model's code.
    - Attachment H: Distribution/Feeder Route Sharing
    - Attachment I: Distribution/Feeder Route Sharing
- *Impacts:*
    - Distribution plus feeder route distance decreases by 7.70% in preliminary sensitivity runs.

Attachments

Synthesis Model Discussion

02/16/2000

Attachment A

Georgia Sensitivity Runs

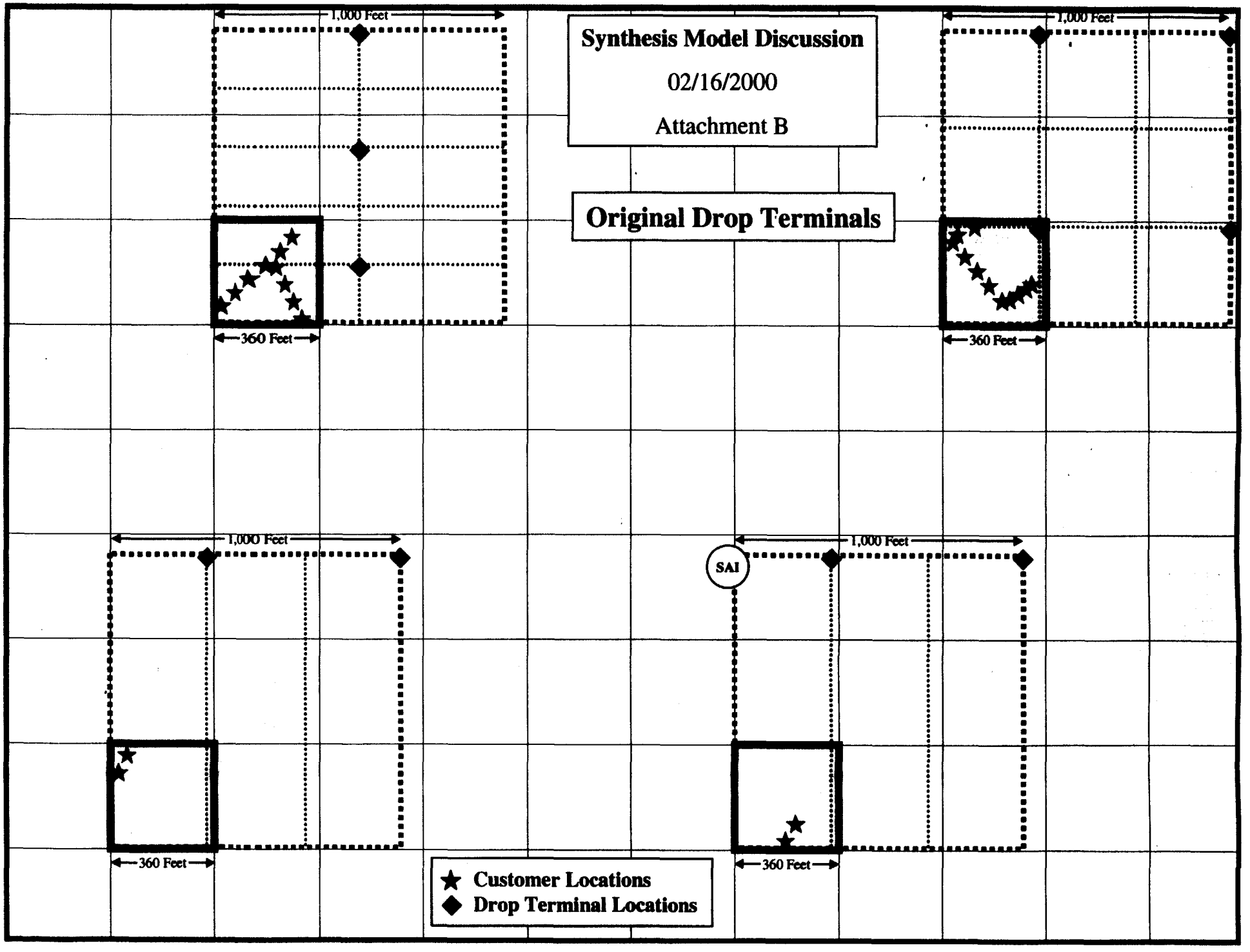
Run		Distribution Route Distance		Basic Local Service		Universal Service Fund	
No.	Description	Feet	% Change From Base	Cost/Line per Month	% Change From Base	Requirement Index	% Change From Base
00	Default	524,516,062	0.00%	$ 23.63	0.00%	$ 44,706,077	0.00%
01	Drop Terminal Locations and Orientation	503,614,578	-3.98%	$ 23.33	-1.28%	$40,994,410	-8.30%
02	Creating Lots Within Microgrids	526,604,496	0.40%	$ 23.51	-0.50%	$ 44,817,835	0.25%
03	Sizing and Selection of OSP Inputs	N/A	N/A	N/A	N/A	N/A	N/A
04	Residual Line Counts	523,993,751	-0.10%	$ 23.59	-0.17%	$ 44,703,137	-0.01%
05	Node Selection Criteria Distance	478,048,937	-8.86%	$ 23.36	-1.14%	$ 41,675,882	-6.78%
	Node Selection Criteria Total Cost	502,893,000	-4.12%	$ 23.33	-1.25%	$ 41,974,735	-6.11%
06	Overlapping Microgrids	518,050,422	-1.23%	$ 23.53	-0.42%	$ 44,542,891	-0.37%
07	Structure Sharing	Preliminary	-7.70%	N/A	N/A	N/A	N/A

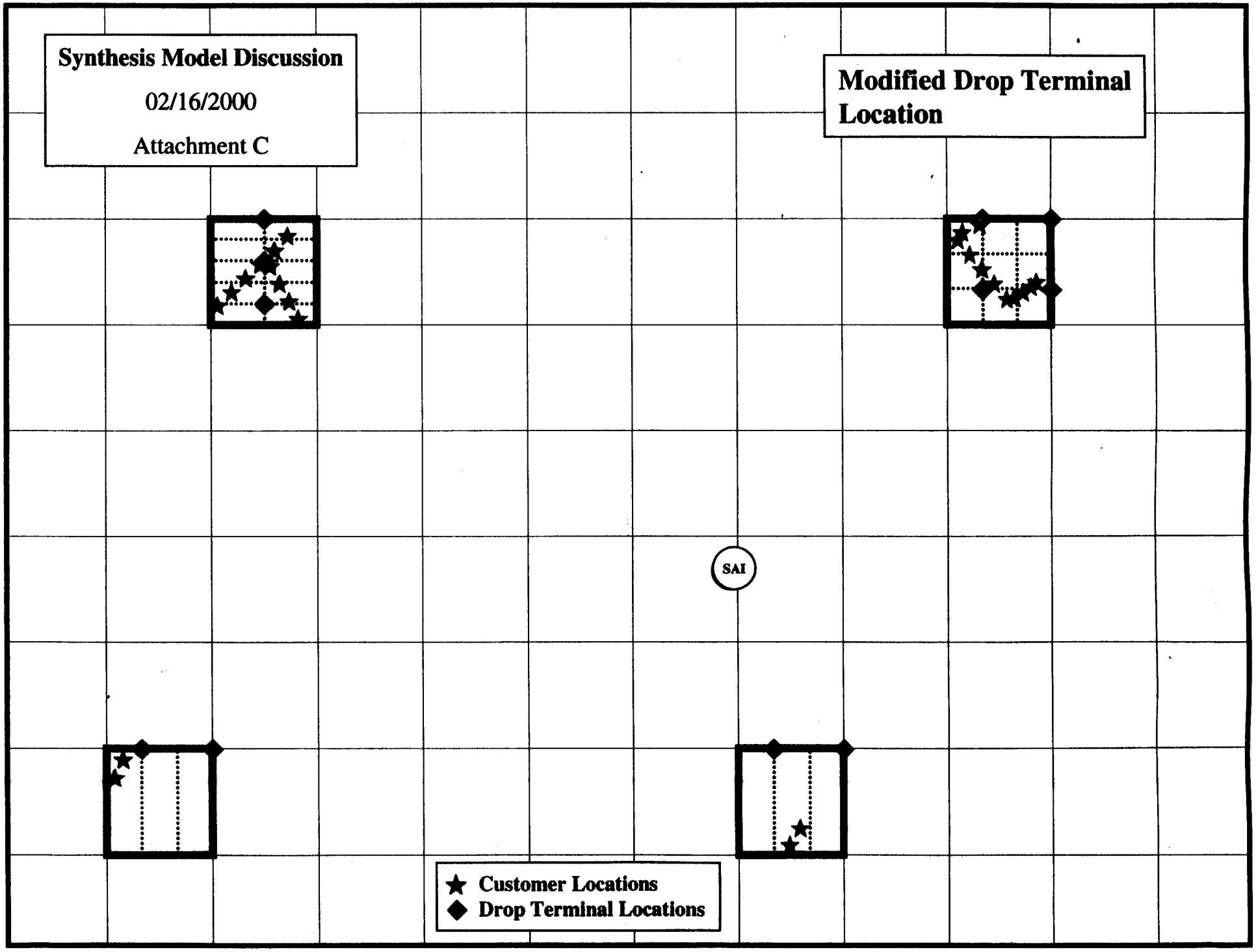
Synthesis Model Discussion

02/16/2000

Attachment B

Original Drop Terminals



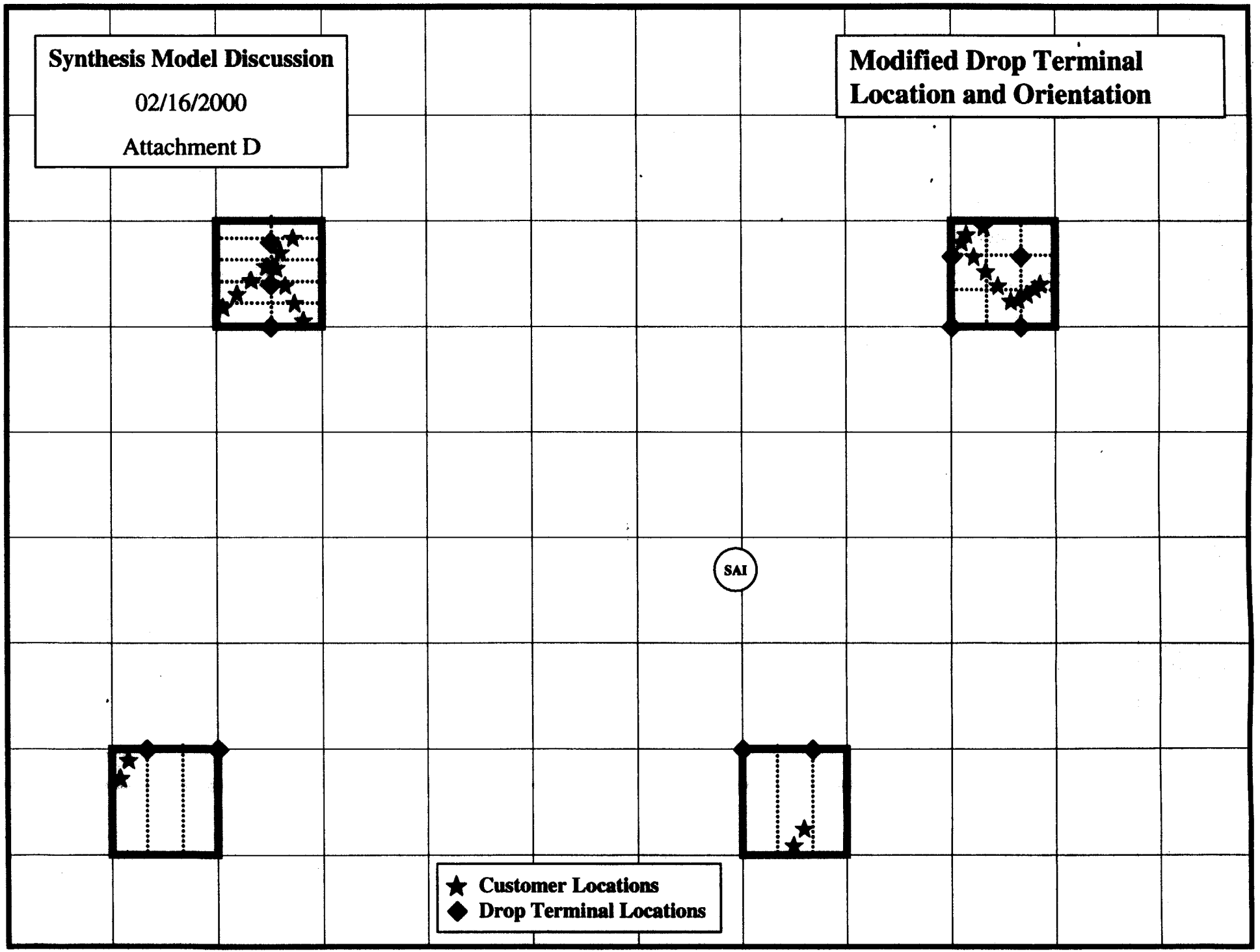

Synthesis Model Discussion
02/16/2000
Attachment C
Modified Drop Terminal Location
SAI
Customer Locations
Drop Terminal Locations

Synthesis Model Discussion

02/16/2000

Attachment D

Modified Drop Terminal Location and Orientation

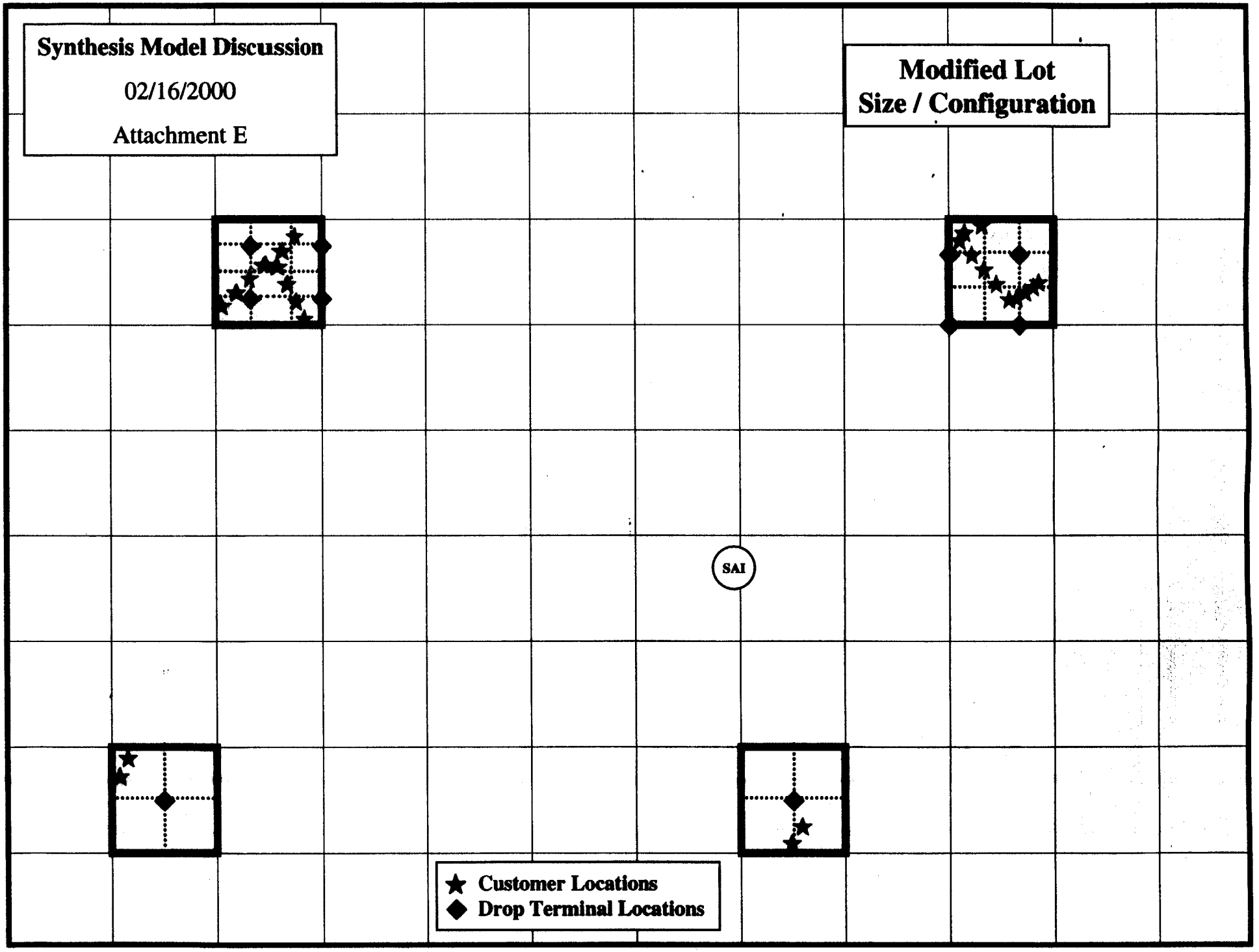


Synthesis Model Discussion

02/16/2000

Attachment E

Modified Lot Size / Configuration



Synthesis Model Discussion

02/16/2000

Attachment F

Comparison of Microgrid Lots and Drop Terminals

Current					
Lots	E/W	N/S	Built	Ratio	No. of DropTerm
1	1	1	1	1.00	1
2	2	1	2	0.50	1
3	3	1	3	0.33	2
4	2	2	4	1.00	1
5	3	2	6	0.67	2
6	3	2	6	0.67	2
7	4	2	8	0.50	2
8	4	2	8	0.50	2
9	3	3	9	1.00	4
10	2	5	10	2.50	3
11	4	3	12	0.75	4
12	4	3	12	0.75	4
13	5	3	15	0.60	6
14	5	3	15	0.60	6
15	5	3	15	0.60	6
16	4	4	16	1.00	4
17	3	6	18	2.00	6
18	3	6	18	2.00	6
19	5	4	20	0.80	6
20	5	4	20	0.80	6
21	3	7	21	2.33	8
22	6	4	24	0.67	6
23	6	4	24	0.67	6
24	6	4	24	0.67	6

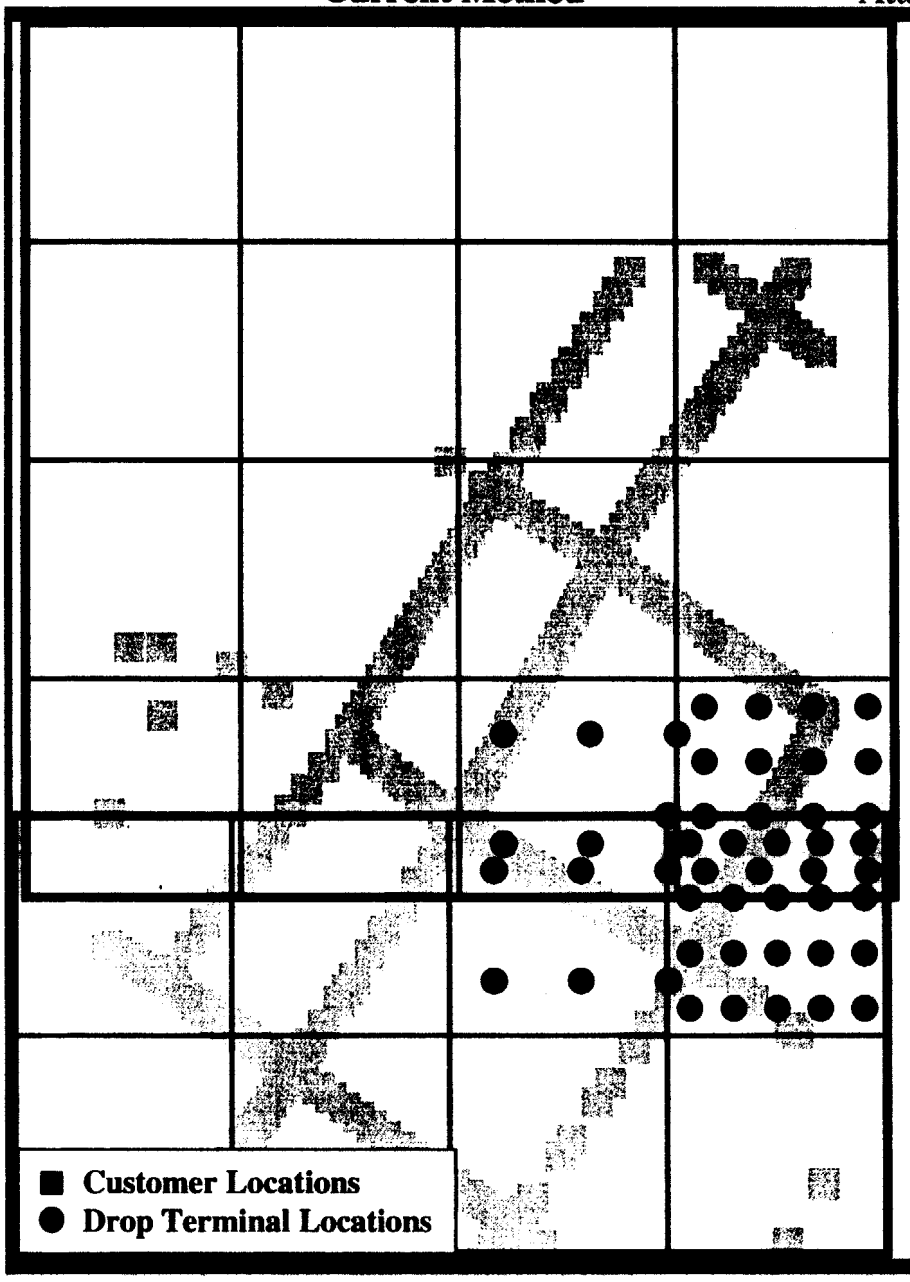
Proposed					
Lots	E/W	N/S	Built	Ratio	No. of DropTerm
1	1	1	1	1.00	1
2	1	2	2	2.00	1
3	2	2	4	1.00	1
4	2	2	4	1.00	1
5	2	3	6	1.50	2
6	2	3	6	1.50	2
7	2	4	8	2.00	2
8	2	4	8	2.00	2
9	3	3	9	1.00	4
10	3	4	12	1.33	4
11	3	4	12	1.33	4
12	3	4	12	1.33	4
13	3	5	15	1.67	6
14	3	5	15	1.67	6
15	3	5	15	1.67	6
16	3	5	15	1.67	6
17	3	6	18	2.00	6
18	3	6	18	2.00	6
19	4	5	20	1.25	6
20	4	5	20	1.25	6
21	4	6	24	1.50	6
22	4	6	24	1.50	6
23	4	6	24	1.50	6
24	4	6	24	1.50	6

Synthesis Model Discussion

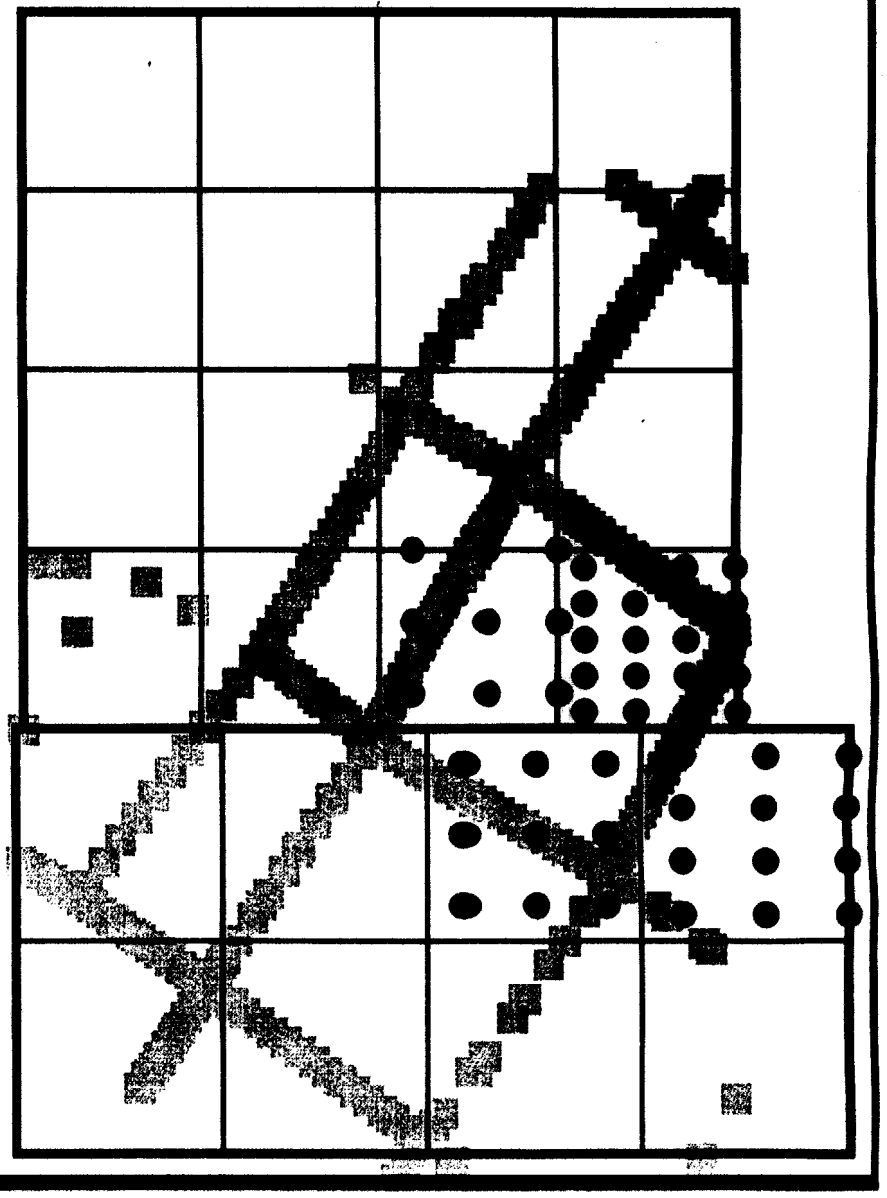
02/16/2000

Attachment G

Current Method



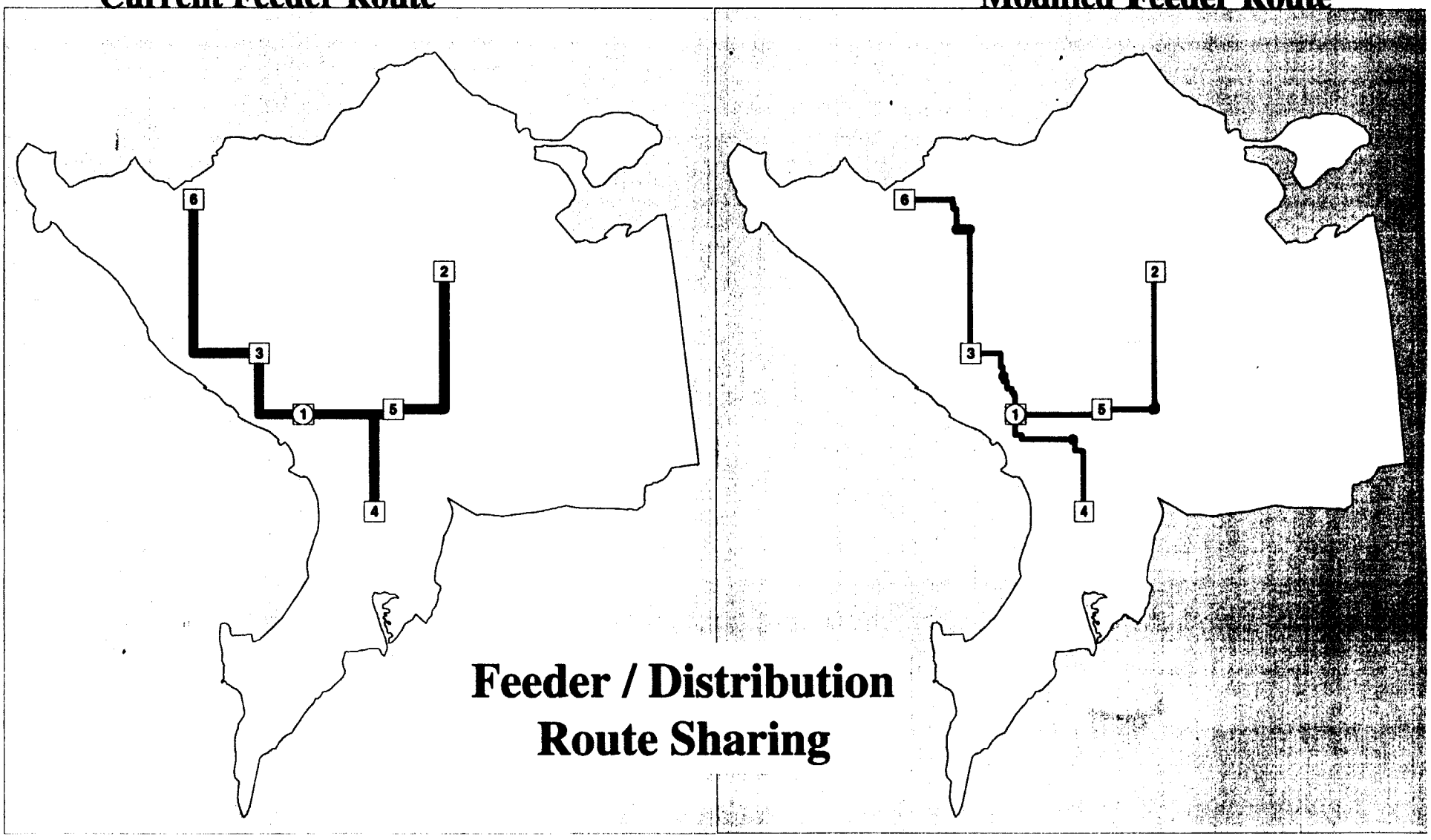
Modified Method



Synthesis Model Discussion

02/16/2000

Attachment H



Feeder / Distribution Route Sharing

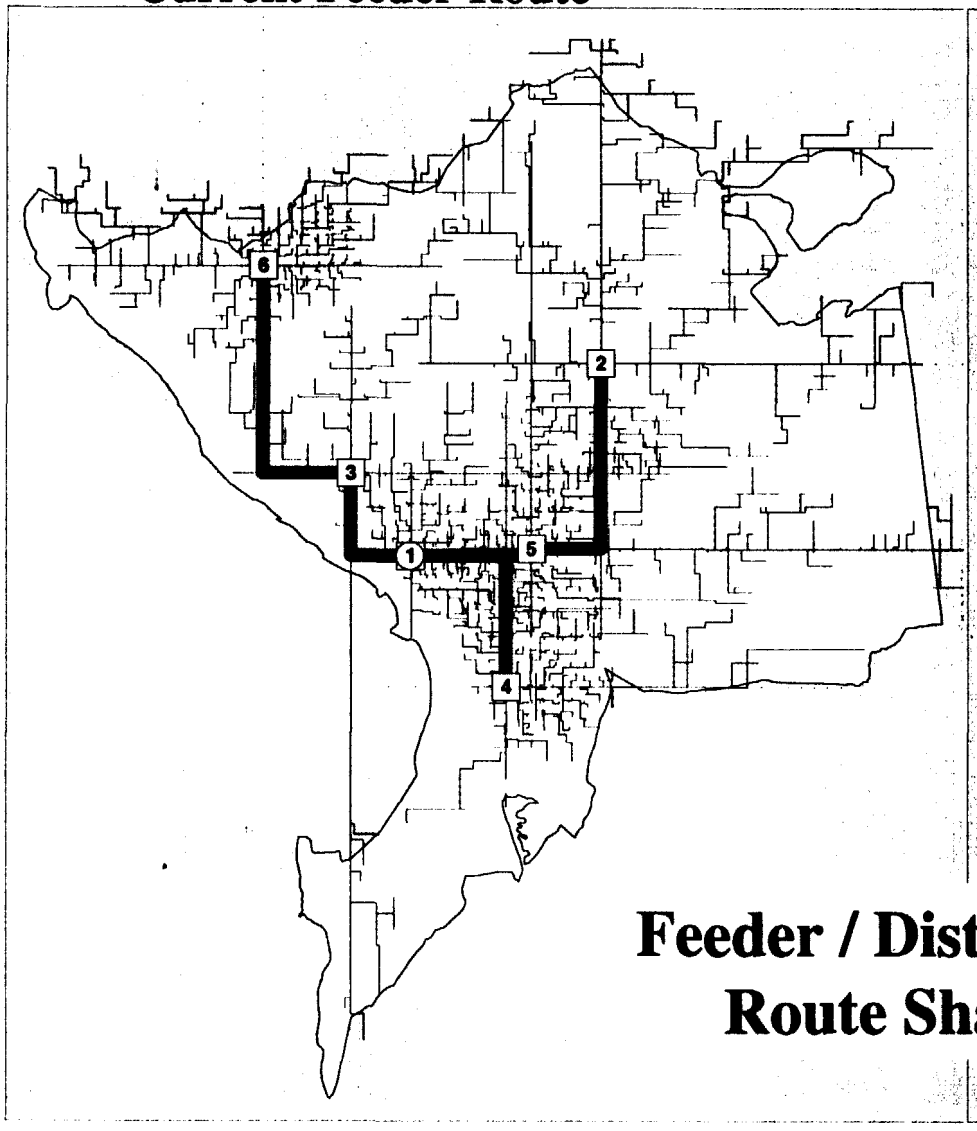
- **Feeder Only Facilities**
- **Shared Feeder/Distribution Facilities**

Synthesis Model Discussion

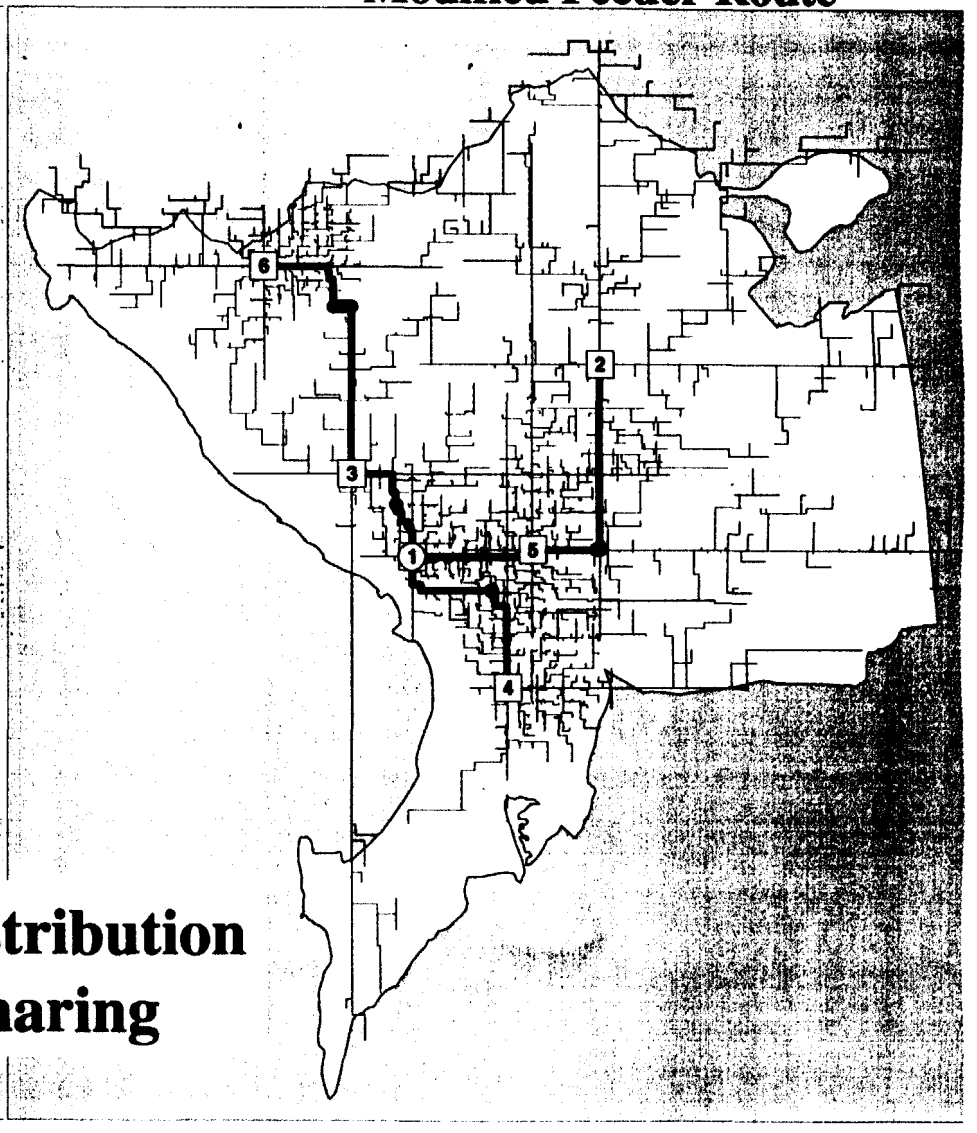
02/16/2000

Attachment I

Current Feeder Route



Modified Feeder Route



Feeder / Distribution Route Sharing

- Feeder Only Facilities
- Shared Feeder/Distribution Facilities
- Distribution Only Facilities