2000 High School Mathematical Contest in Modeling (HiMCM)

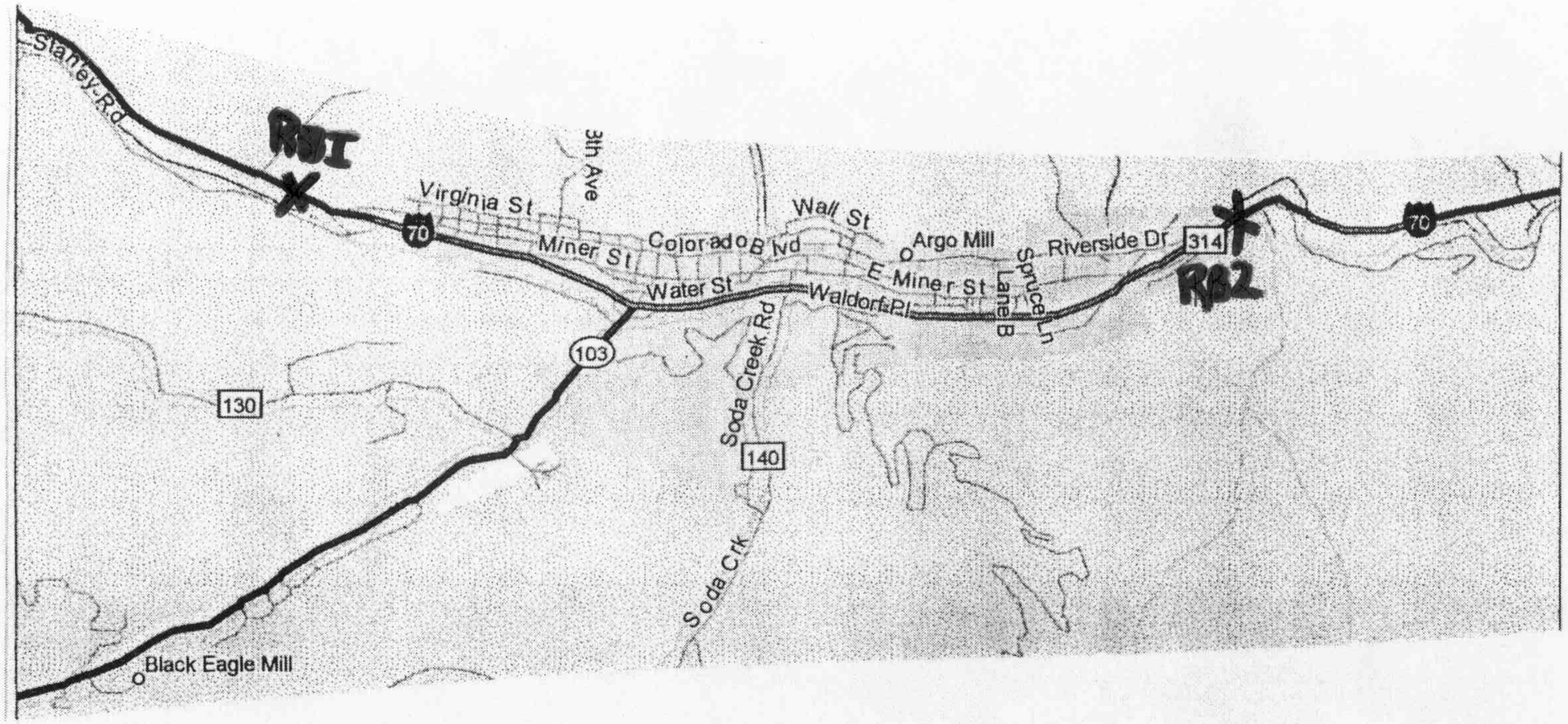
Problem A: Bank Robbers

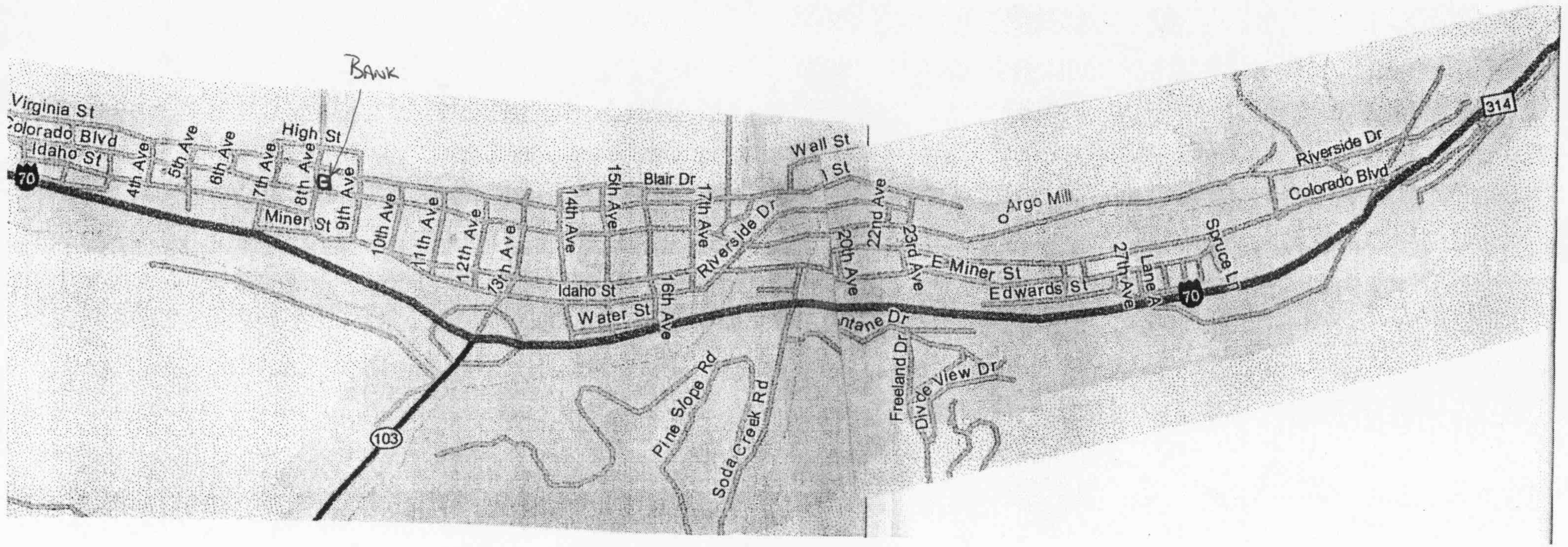
The First National Bank has just been robbed (the position of the bank on the map is marked). The clerk pressed the silent alarm to the police station. The police immediately sent out police cars to establish road blocks at the major street junctions leading out of town. Additionally, 2 police cars were dispatched to the bank.

Map information: (see the series of two maps on page 2)

The Bank is located at the corner of 8th Ave. and Colorado Blvd. and is marked with the letter B. The main exits where the two road blocks are set up are at the intersection of Interstate 70 and Colorado Blvd, and Interstate 70 (past Riverside Drive). These are marked with a RB1 and RB2 symbol.

- Assume the robbers left the bank just before the police cars arrived. Develop an efficient algorithm for the police cars to sweep the area in order to force the bank robbers (who were fleeing by car) into one of the established road blocks.
- Assume that no cars break down during the chase or run out of gas.
- Further assume that the robbers do not decide to flee via other transportation means.


Stanley Rd
RB1
Virginia St
3th Ave
Wall St
Miner St
Colorado Blvd
Argo Mill
Riverside Dr
314
RB2
70
Water St
Waldorf Pl
E Miner St
Spruce Ln
Lane B
103
130
Soda Creek Rd
140
Soda Crk
Black Eagle Mill


BANK
Virginia St
Colorado Blvd
Idaho St
4th Ave
5th Ave
6th Ave
7th Ave
High St
8th Ave
9th Ave
10th Ave
11th Ave
12th Ave
13th Ave
14th Ave
15th Ave
Blair Dr
17th Ave
Wall St
1 St
Riverside Dr
Argo Mill
20th Ave
22nd Ave
23rd Ave
E Miner St
Edwards St
27th Ave
Lane A
Spruce L
Colorado Blvd
Riverside Dr
314
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Miner St
Idaho St
Water St
16th Ave
ntane Dr
Freeland Dr
Divide View Dr
Pine Slope Rd
Soda Creek Rd
103