Lower

TRAFFIC COMMITTEE MEETING

MARCH 20, 2002 - 7:30 P.M.

LOWER LEVEL CONFERENCE ROOM

TROY CITY HALL

500 W. BIG BEAVER ROAD

1. Roll Call

2. Minutes – February 20, 2002

3. Visitors' Time

4. Install 4-way STOP Signs at Cliffside and Highbury
   Requested by Ron Borycki, Secretary of the Stoneridge II Board of Directors

5. Install Traffic Signal on Rochester Road at Rochester Court
   Requested by the Lane Family, 1049 Kelley

6. Install Fire Lanes at Delphi Automotive Systems, Delphi Drive
   Requested by Troy Fire Department

7. Other Business

8. Adjourn

cc: Traffic Committee Members, Including Ex-Officio Members
John Szerlag, City Manager
Gary A. Shripka, Assistant City Manager/Services
Steve Vandette, City Engineer
Captain Dane Slater, Police Department
Lt. Robert Rossman, Traffic Safety Unit
Lt. Robert Matlick, Fire Department
Lori Grigg Bluhm, City Attorney
John K. Abraham, Traffic Engineer

cc: Appropriate Sections to Interested Citizens:

4. Residents within 300 feet of Cliffside and Highbury
   Ron Borycki, (Secretary-Stoneridge II Board of Directors), 2147 Jeffrey Dr., 48085

5. Residents within 300 feet of Rochester Road and Rochester Court
   The Lane Family, 1049 Kelley
   All who attended the November 28, 2001 meeting on this concern.

6. Pat Landon, Ghafari Associates, LLC, 17101 Michigan Ave., Dearborn, MI 48126

TRAFFIC COMMITTEE

MESSAGE TO VISITORS, DELEGATIONS AND CITIZENS

The Traffic Committee is composed of seven Troy citizens who have volunteered their time to the City to be involved in traffic and safety concerns. The stated role of this Committee is:

a. To give first hearing to citizens' requests and obtain their input.

b. To make recommendations to the City Council based on technical considerations, traffic surveys, established standards, and evaluation of citizen input.

c. To identify hazardous locations and recommend improvements to reduce the potential for traffic accidents.

The recommendations and conclusions arrived at this evening will be forwarded to the City Council for their final action. Any citizen can discuss these recommendations before City Council. The items discussed at the Traffic Committee meeting will be placed on the City Council Agenda by the City Manager. The earliest date these items might be considered by City Council would normally be 10 days to 2 weeks from the Traffic Committee meeting. **If you are interested, you may wish to contact the City Manager's Office in order to determine when a particular item is on the Agenda.**

Persons wishing to speak before this Committee should attempt to hold their remarks to no more than 5 minutes. Please try to keep your remarks relevant to the subject at hand. Please speak only when recognized by the Chair. These comments are made to keep this meeting moving along. Anyone wishing to be heard will be heard; we are here to listen and help in solving or resolving your particular concerns.

AGENDA EXPLANATION

TRAFFIC COMMITTEE MEETING

MARCH 20, 2002

1. **Roll Call**

2. **Minutes – February 20, 2002**

3. **Visitors' Time** - (Items not on the Agenda)

4. **Install 4-way STOP Signs at Cliffside and Highbury**

The Traffic Engineering office received an email from Ron Borycki, 2147 Jeffrey Dr., who is Secretary of the Stoneridge II Board of Directors. He is requesting that the Traffic Committee consider recommending 4-way STOP signs at the intersection of Cliffside and Highbury. He says that the intersection is the site of frequent near-miss collisions.

A brochure on STOP signs was provided to Mr. Borycki, who shared it with the Homeowners' Association. He reported that the Board has reviewed the brochure and realizes that, per the brochure, the Highbury-Cliffside intersection likely doesn't meet the strict criteria for STOP signs on each corner. However, they feel that there has to be some common sense approach for unusual circumstances. The intersection gets a lot of use early in the morning and after school when parents are taking their children to school—because of the other young children that walk to school, this is when they want streets the safest. In addition, there's the extra traffic flowing off of John R during rush hour mentioned above.

They believe that a 4-way STOP sign would be better for the following three reasons:

1. There is no shortage of cars that cross Cliffside that ignore the STOP signs on Highbury.

2. Because there are no traffic stops on Cliffside from Laurel to Patterson or vice-versa, cars tend to speed down Cliffside.

3. The extreme crowning of the road in the intersection of Highbury-Cliffside slows traffic, but many of the higher riding vehicles (Jeeps, SUVs) can cruise through without slowing or bottoming out. The crowning itself also leads to dangerous situations. Cars stop at the STOP signs in either direction on Highbury. As cars travel up/down Cliffside, they are generally forced to slow due to the crown in the intersection. The cars that are stopped on Highbury see the Cliffside cars slowing and either figure they're going to turn, or stop (not all drivers look for all STOP signs). The result is

that cars take off from STOP signs on Highbury while traffic is slowing, but still traveling on Cliffside.

Mr. Borycki and his wife have seen this quite a bit, and have seen several near misses. They feel that the average five or more reported crashes required annually to warrant 4-way STOP signs is unacceptable; they don't want any crashes in the neighborhood that could have been avoided.

Highbury is a street that runs from John R and connects to Wass Elementary School, and carries around 2200 vehicles in a day. Cliffside runs from Laurel off John R and runs north to Square Lake Road. Cliffside carries around 1200 vehicles per day. The intersection is controlled by STOP signs on Highbury at Cliffside. Field observations indicate that the intersection geometrics do not pose any significant sight obstructions. While traveling on Cliffside, there is a bump in the pavement, which slowed a considerable number of vehicles. There are two signs approaching the intersection that read "BUMP."

Pedestrian counts and observations were performed during school arrival and dismissal times. On one occasion three kids were found to cross Cliffside at Highbury, six during another and four during another observation. There is also a member of the school safety patrol who was helping kids cross the intersection safely. An ample number of gaps were observed for kids to cross the intersection safely.

In accordance with the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), four-way STOP signs are normally placed:

a. Where traffic signals are warranted and urgently needed, and the multi-way STOP is an interim measure that can be installed quickly to control traffic while arrangements are being made for traffic signal installation.

b. Where an accident problem is indicated by five or more reported accidents of the type susceptible to correction by a multi-way STOP during a 12-month period. Such accidents include right and left turn collisions.

c. Where the total vehicular volume entering the intersection from all approaches must average at least 500 vehicles per hour for any eight hours of an average day.

None of the above warrants are met for this intersection.

A license plate survey was performed on March 12, 2002, where one person took down license plate numbers of all vehicles entering Laurel Drive between 4:30 and 5:30 p.m. Another observer took down license plate numbers of all vehicles exiting Cliffside onto Square Lake Road. Eight matches were found, which means that in the one-hour observation period, eight vehicles entered through Laurel and exited Cliffside onto Square Lake. On an average, during the one hour between 4:30 and 5:30 pm, Cliffside carries 70-100 vehicles.

SUGGESTED RESOLUTION:

a. Recommend installation of 4-way STOP signs at the intersection of Cliffside and Highbury.

b. Recommend no changes.

5. **Install Traffic Signal at Rochester Court and Rochester Road to Aid Pedestrians**

This issue was first brought before the Traffic Committee in November of 2001. The Lane Family, 1049 Kelley, requests that a traffic signal be installed at the intersection of Rochester Court and Rochester Road. An e-mail with the request is attached herewith. The request is in response to a pedestrian crash at the intersection involving a kid crossing Rochester Road near Rochester Court to catch up with his friends on the other side of the roadway. Following are some reasons quoted in the email:

a. It's too dangerous to cross Rochester near the curve.

b, There have been too many car accidents at this intersection.

c. The cars take the curve at high speeds.

d. They ignore the speed limit.

e. Residents on the east side of Rochester Road are forced to cross here to get to Morse Elementary School and the park.

f. Kids should be allowed to go to their school and the park safely.

In response to the e-mail from the Lane Family, a traffic signal warrant study was performed to find if the requirements for a traffic signal (also called warrants) as prescribed in the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) are met for this intersection.

A traffic crash analysis indicates that there were 6 reported crashes in the past 3½ years at the intersection. There were two injury crashes and four property damage crashes. Out of the 6 crashes in the past 3½ years, four of them might have been prevented if there had been a traffic signal at the location. A traffic signal would be warranted as per the MMUTCD if there were a traffic crash problem as indicated by five or more reported crashes of the type susceptible to correction by a traffic signal in a 12-month period. Such traffic crashes include right and left turn collisions as well as right-angle collisions.

Speed studies conducted in this area indicate an average speed of 38.1 mph and 85th percentile of 44.5 mph. The posted speed limit on Rochester Road is 35 mph.

In the afternoon, the average speed was 28.9 mph and the 85th percentile 45 mph. This would indicate a more than average number of motorists driving at speeds higher than the posted speed limit. Ideally the 85th percentile speed should be within 5 mph of the posted speed limit. Field observations during school arrival and dismissal times showed no pedestrians crossing Rochester Road. Further, the Troy School District indicated that all kids who live on the east side of Rochester are transported to Morse Elémentary School. There may be pedestrians during the evening hours going to the park or going to school for after-hour activities. A gap study indicated that during the observation period there were gaps in traffic to cross Rochester, however, with a wait time involved.

A traffic volume study indicates that the average daily traffic on Rochester Road is around 16,000 vehicles per day and on Rochester Court around 6,000 vehicles per day. Traffic volume warrants as prescribed by the MMUTCD are not met for this intersection.

The site geometrics show that the intersection itself is on a curve. Traffic signals are normally not installed on curves due to sight distance and other safety concerns.

The Traffic Committee recommended a detailed engineering study of the intersection and that the item be brought back to the March 20, 2002 meeting. The Engineering Department met to discuss the issue. Following are some of the options considered:

a. Traffic Signal: This would involve installing a traffic signal and the associated roadwork. Roadwork would involve adding a center left turn lane on Rochester at the intersection. This may be a significant expense since the tapers have to be extended almost 500-600 feet on both sides. Kelly Street would need some reconfiguration to meet the intersection square. There would be a pedestrian push button to activate the signal, and the signal would also be "semi-actuated" only wherein a vehicle waiting on Rochester Court or Kelly Street would trigger the signal. This would mean the signal would stay green predominantly for Rochester Road. Pedestrians would have to wait up to 120 seconds before they got a green signal. The Rochester Court approach would have to be improved to allow two lanes in and two lanes out (one right, one left). The extra "in" lane would help the traffic bound for Rochester Court to make their free right turns while traffic bound for Robinwood would use the left lane.

   The City's engineering consultant, Hubbell, Roth and Clark, was requested to do preliminary engineering and cost estimate. They analyzed this configuration and estimated the cost of the improvements at $480,000 (inclusive of the traffic signal). If this project were to be rated for funding through the Transportation Improvement Program, based on relatively few traffic crashes and traffic congestion at this location, it would be low in the ranking. Without this funding, in the past, such special projects were

funded through "Special Assessment Districts" where residents in the area would be assessed for the improvements.

b. Improve the Rochester Court approach as explained above, and move the crosswalk to Larchwood Drive. Mid-block crossings are not usually recommended on major roadways. However, the Larchwood location may be better than at the curve. Observations indicate very few pedestrians cross Rochester. Studies can be conducted again when the weather is warmer. Based on the number of pedestrians who cross Rochester Road, pedestrian crossing signs may also be considered.

Since the last meeting, additional signs have been installed on southbound Rochester Road. One reads "Reduced Speed Limit 35" and the other is a "Speed Limit 35" sign. This is to inform motorists entering Rochester either from southbound Rochester or from I-75. A speed study was also performed for the southbound traffic on Rochester Road, near Rochester Court. The average speed in the morning off-peak time was around 35 mph, as opposed to 38 mph that was observed in November of 2001.

Other options considered but discarded include:

- Restrict left turns from Rochester Court
- Build a median along the curve—Rochester Court would be "right in" – "right out" only. This would involve buying a number of properties for the widening at a very high cost. Pedestrians could cross 2 lanes of traffic and find refuge in the median, then cross the other two lanes.
- Close Rochester Court altogether
- Bring Rochester Court down farther—this will result in a skewed intersection of Rochester Court with Rochester Road, which may be of more concern.

SUGGESTED RESOLUTION:

a. Install traffic signal on Rochester Road at Rochester Court.

b. Improve the Rochester Court approach to allow two lanes in and two lanes out (one right, one left), and move the crosswalk to Larchwood Drive.

c. Make no changes.

6. Install Fire Lanes at Delphi Automotive Systems

The Troy Fire Department requests establishment of the proposed fire lanes at Delphi. Section 8.28, Chapter 106, Troy City code, provides for the establishment of fire lanes on private property. The Fire Department recommends that the fire lanes shown on the attached sketch be provided to allow proper deployment of and travel by emergency vehicles (fire, police, medical).

SUGGESTED RESOLUTION:

a. Recommend that the fire lanes/tow away zones shown in the attached sketch be established at Delphi Automotive Systems on Dephi Drive.

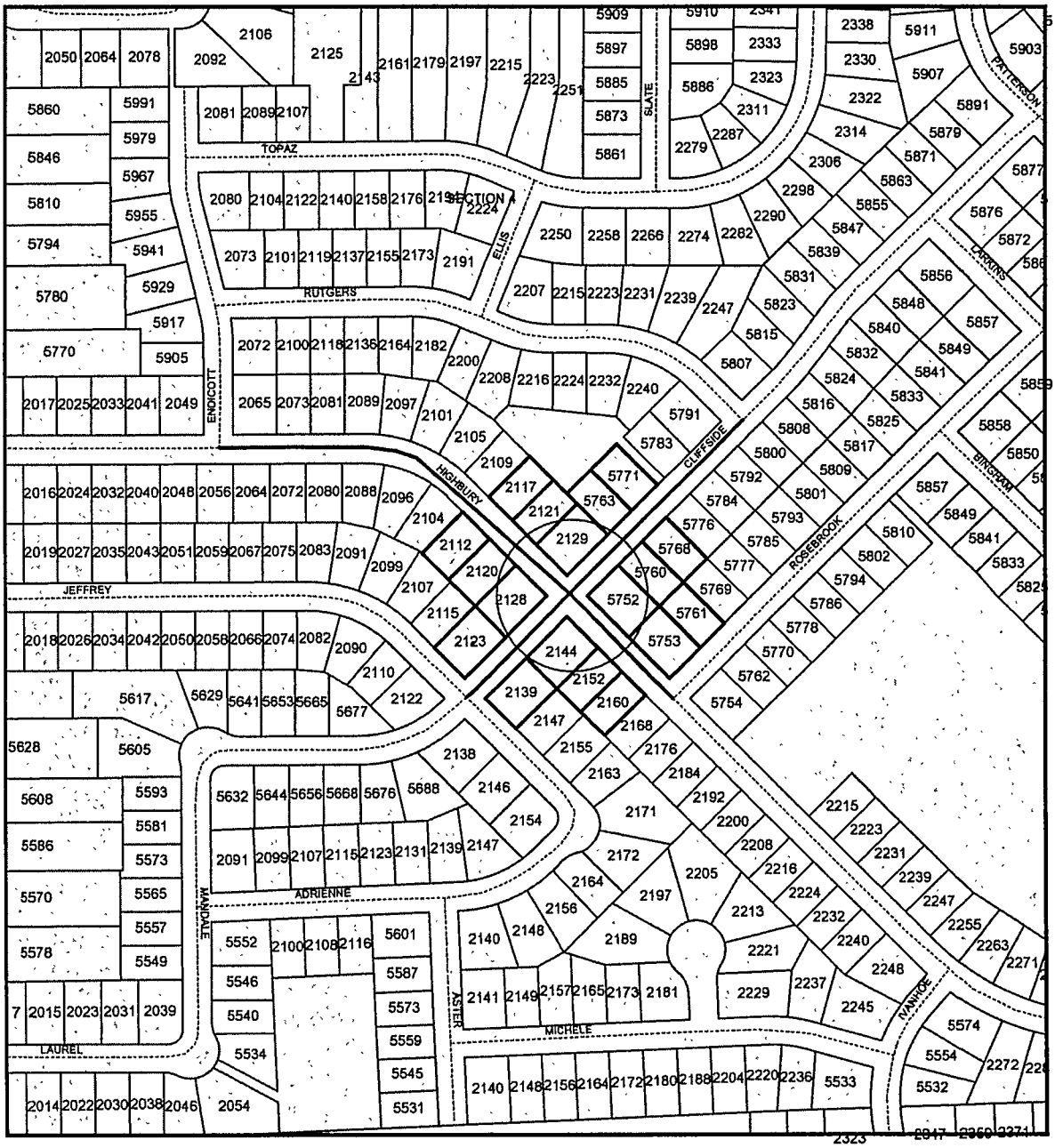
7. Other Business

Items not on the agenda which Traffic Committee members may wish to discuss.

8. Adjourn

ITEM 4

Cliffside & Highbury



CITY OF TROY
OAKLAND COUNTY MICHIGAN

N

0 190 380 760
Feet

John K Abraham

ITEM 5

From: Cynthia A Stewart

Sent: Monday, November 05, 2001 11:28 AM

To: John K Abraham

Subject: FW: How Many more children need to get hit by cars before we get a street light?

Did you see this email???

-----Original Message-----
From: ZEKELANE@aol.com [mailto:ZEKELANE@aol.com]
Sent: Friday, November 02, 2001 8:15 PM
To: stewartca@ci.troy.mi.us
Subject: How Many more children need to get hit by cars before we get a street light?

To Whom It may Concern:
(Maybe the City of Troy Public Works Department)

We live on Kelley Street West of Rochester Road. There was another accident at the end of our street again today. The intersection is Rochester Road @ Kelley & Rochester Ct. ***This time it was a CHILD who was hit by a car.*** We do not know the details of what happend or how the child is. We are praying for him and his family. The only thing we know for sure is that he was crossing Rochester Road on his bicycle. ***I want to know how many more children must be sacrificed before they do something about making it safe for anyone to cross the street?????***

Today we could not get home. I had to park at the Red Roof in and walk home with my 2 & 5 year old. Getting back across that street to my car, in the dark with two small children after the police block was lifted was a problem because ther is not a crossing light there. I hate crossing across Rochester there. Its too dangerous and today's accident was *more* proof than I needed to come to that conclusion. I just hope it is now proof enough for the Troy city public works department to stand up and pay attention.

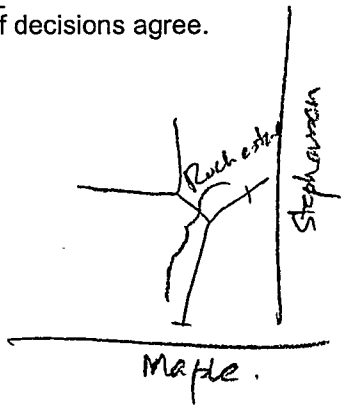
There have been too many car accidents at this intersection for us to even count.
We have seen more than our share of accidents here. I'm sure the Troy police have records. It is time that someone studies them. This time it was a child vs a car instead of a car vs a car. Amazingly, no one on our street is surprised. We are all saddened but, not surprised at all. Everyone knew it was just a matter of time before a child got hit there. How come the planning experts don't get it?? Or why don't they care?? That fast curve with no street light for pedestrian crossing is an accident waiting to happen. If there are several car accidents then would it not make sense that at the same intersection there would eventually be a child involved? Cars are coming off I-75 where they have been clipping along at 65 miles per hour. It can be easy to ignore the speed sign that 25 miles per hour as the sign says. Only a traffic light will slow these people down.

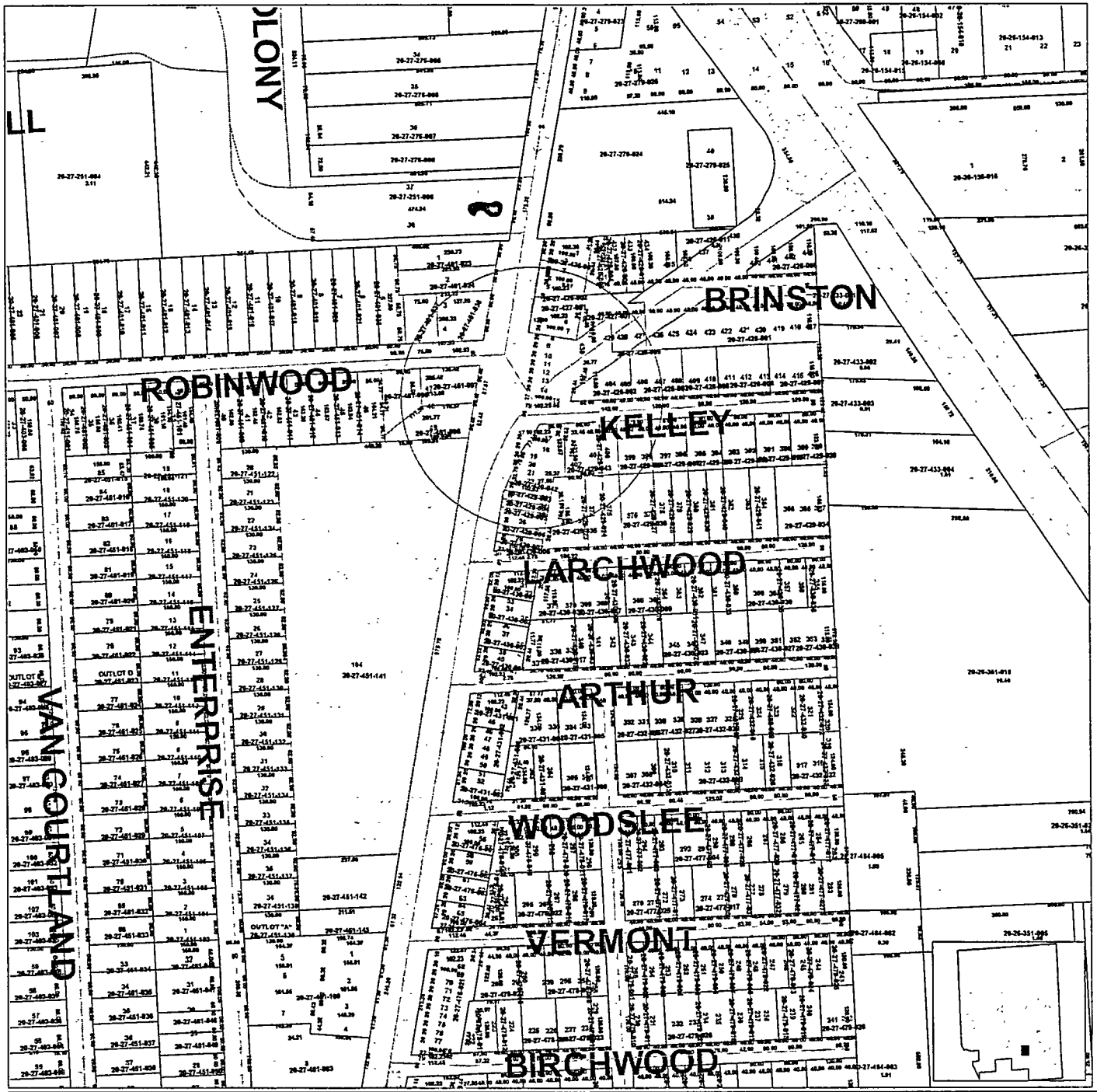
It is the only place for people who live on this side of Rochester to cross the street to get to the Morse elementary or the park. I know that it is difficult for adults to cross that street safely while in a car. How can children be expected to cross without a thousand pounds of steel wraped around them? We need a cross walk with a light to stop the traffic. Kids should be allowed to go to their school and neighborhood park safely.

SOMETHING NEEDS TO BE DONE TO PREVENT ANY MORE CHILDREN FROM GETTING HIT BY CARS AT THIS CROSSING.
I just hope the people with the power to make these kind of decisions agree.

Thank You,

The Lane Family
1049 Kelley





City of Troy

CVTSight SnapShot

Enter Map Title

Enter Map Description

Map Legend:

	BOUNDARY LINE
	MAJOR ROADS
	I-75
	ROADS
LABEL	SIDWELL NUMBER
LABEL	LOT DIMENSIONS
LABEL	LOT ID
LABEL	ROAD NAMES
	LAKES
	PARCEL
	BOUNDARY
	Selected Parcels (29)

N

Map Scale: 1" = 346'

Map Date: November 19, 2001

Data Date: May 2001

PlanSight GIS UNLEASHED

Note: The information provided by this program has been compiled from recorded deeds, plats, taxmaps, surveys, and other public records and data. It is not a legally recorded map or survey and is not intended to be used as one. Users of this data are hereby notified that the information sources mentioned above should be consulted for verification of the information.

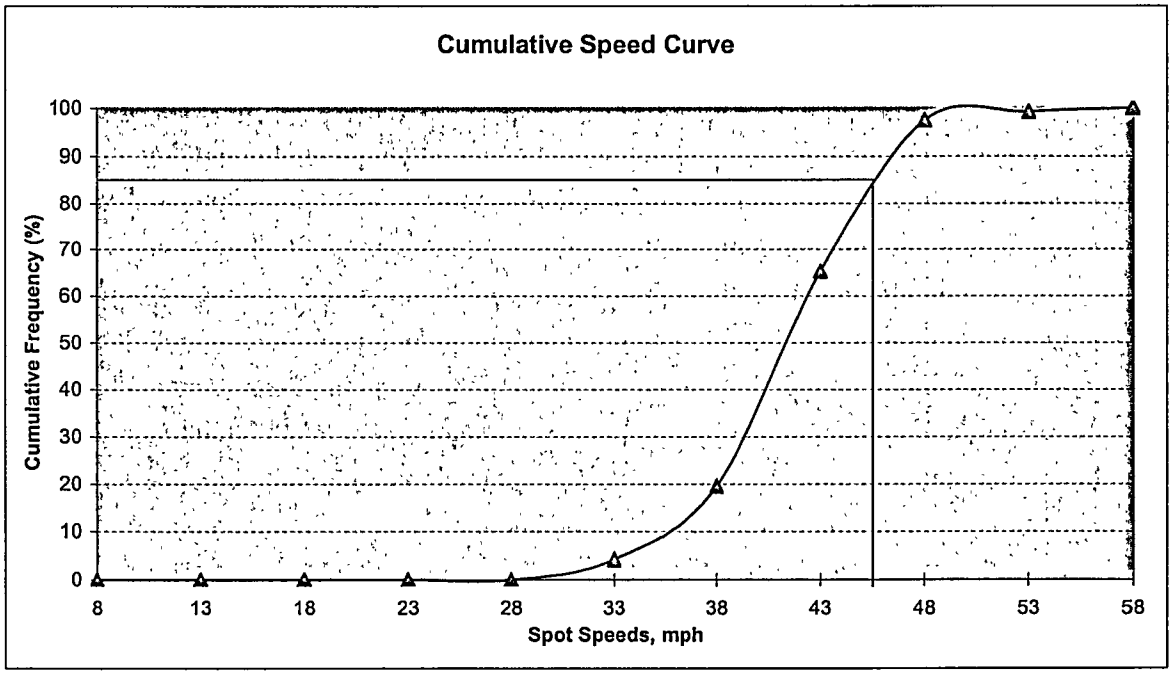
ITEM 5

ITEM 5

Rochester - Near Rochester Ct. curve
Afternoon

Speed (mph)		Number of Vehicles Clocked
6 to 10		0
11 to 15		0
16 to 20		0
21 to 25		0
26 to 30		5
31 to 35		18
36 to 40		54
41 to 45		38
46 to 50		2
51 to 55		1
56 to 60		0
Total # vehicles		118

AVERAGE SPEED 38.720 Miles per hour



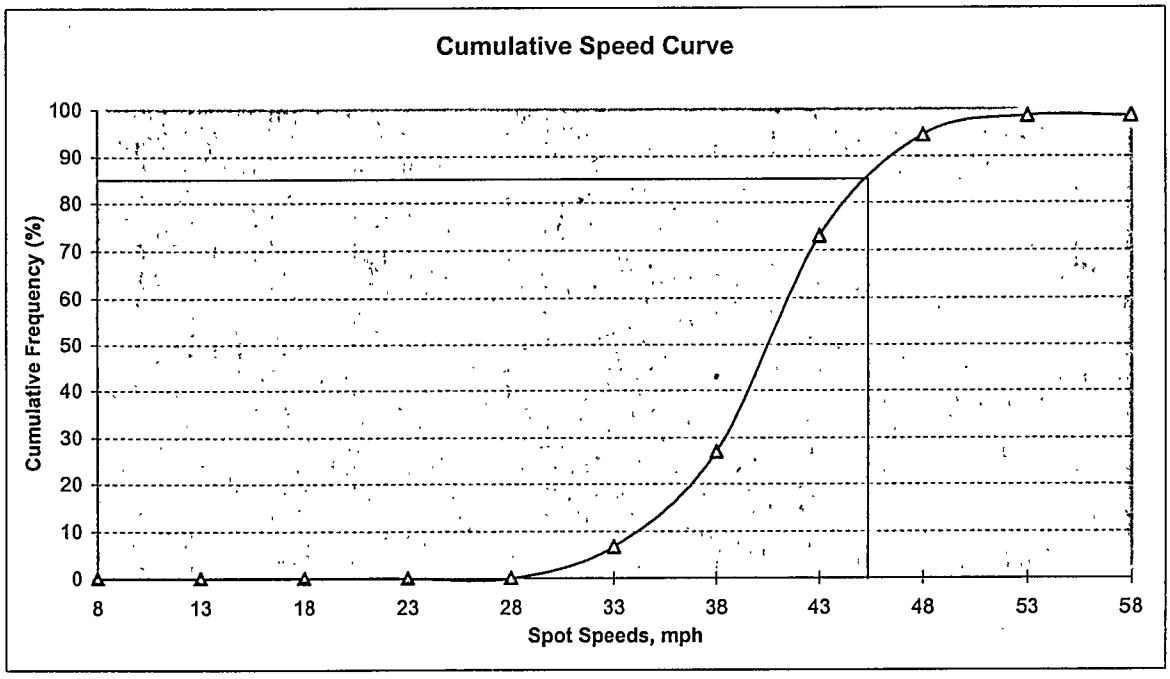
85 PERCENTILE SPEED = 45 MPH
(85% OF TRAFFIC
DROVE UNDER 45 MPH

ITEM 5.

Rochester - Near Rochester Ct. curve
Morning

Speed		Number of Vehicles Clocked
(mph)		
6 to 10		0
11 to 15		0
16 to 20		0
21 to 25		0
26 to 30		5
31 to 35		15
36 to 40		34
41 to 45		16
46 to 50		3
51 to 55		0
56 to 60		1
Total # vehicles		74

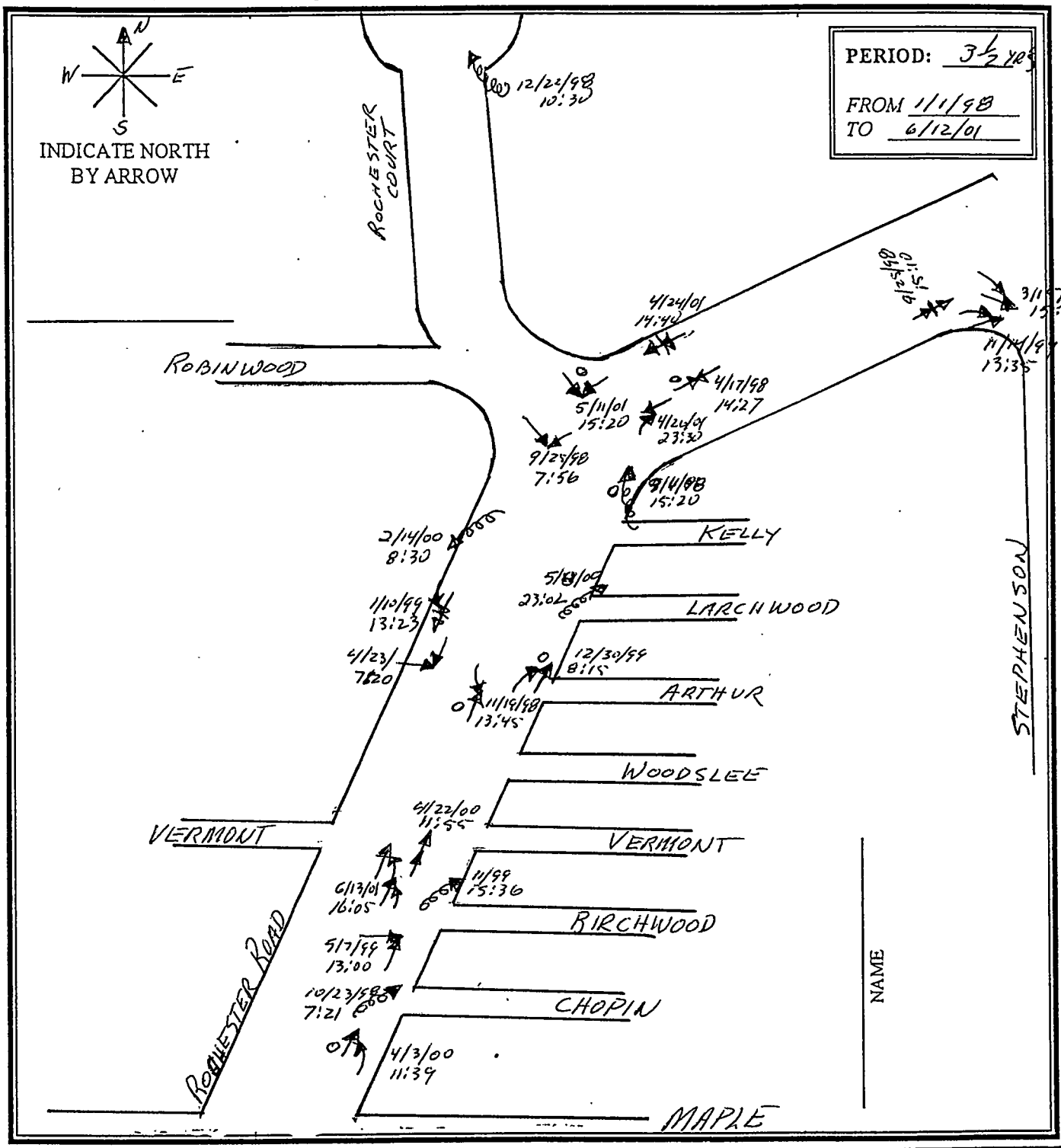
AVERAGE SPEED 38.068 Miles per hour



85 PERCENTILE SPEED = 44.5 MPH
(85% OF TRAFFIC
DROVE UNDER 44.5 MPH

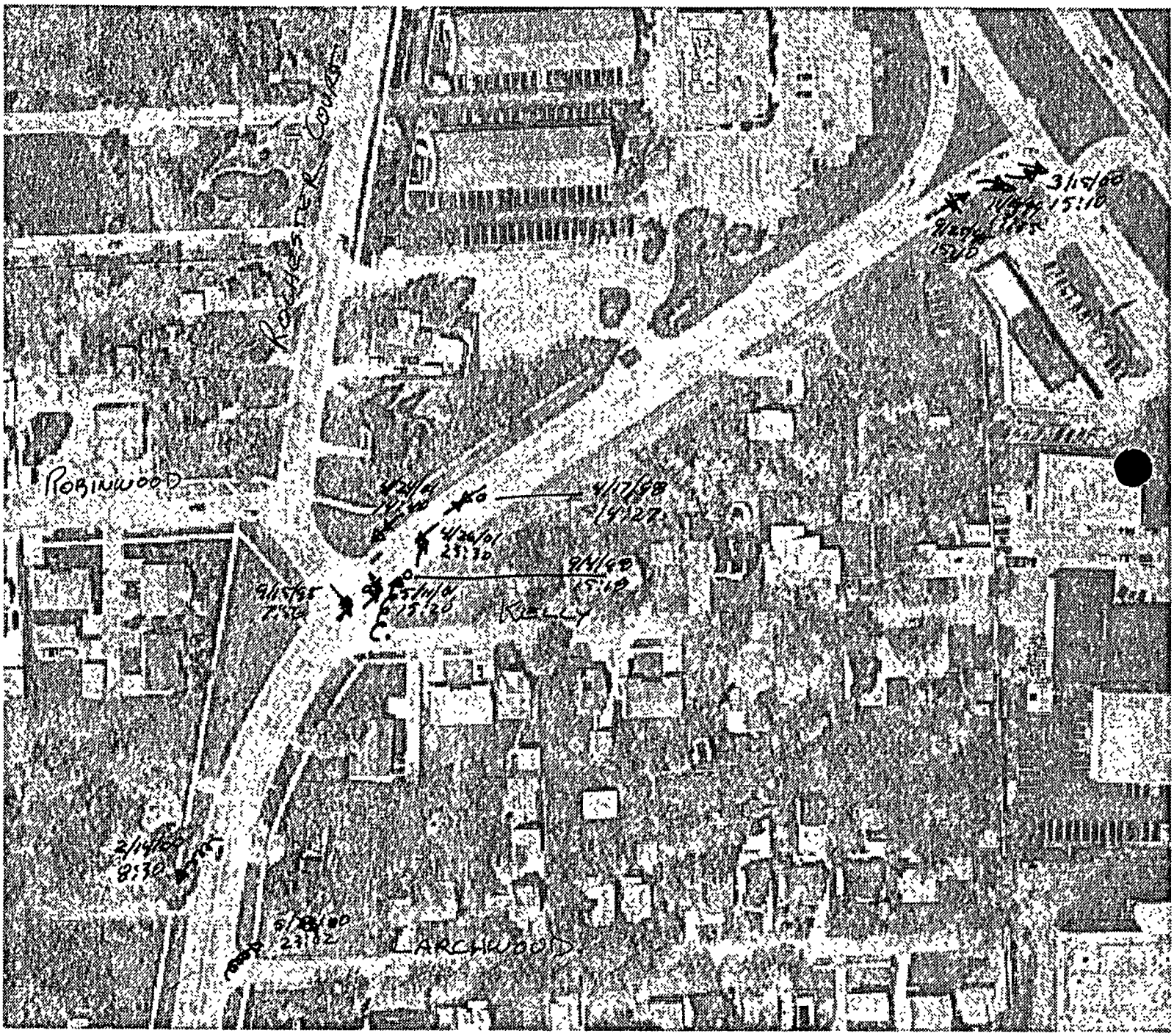
ITEM 5

COLLISION DIAGRAM

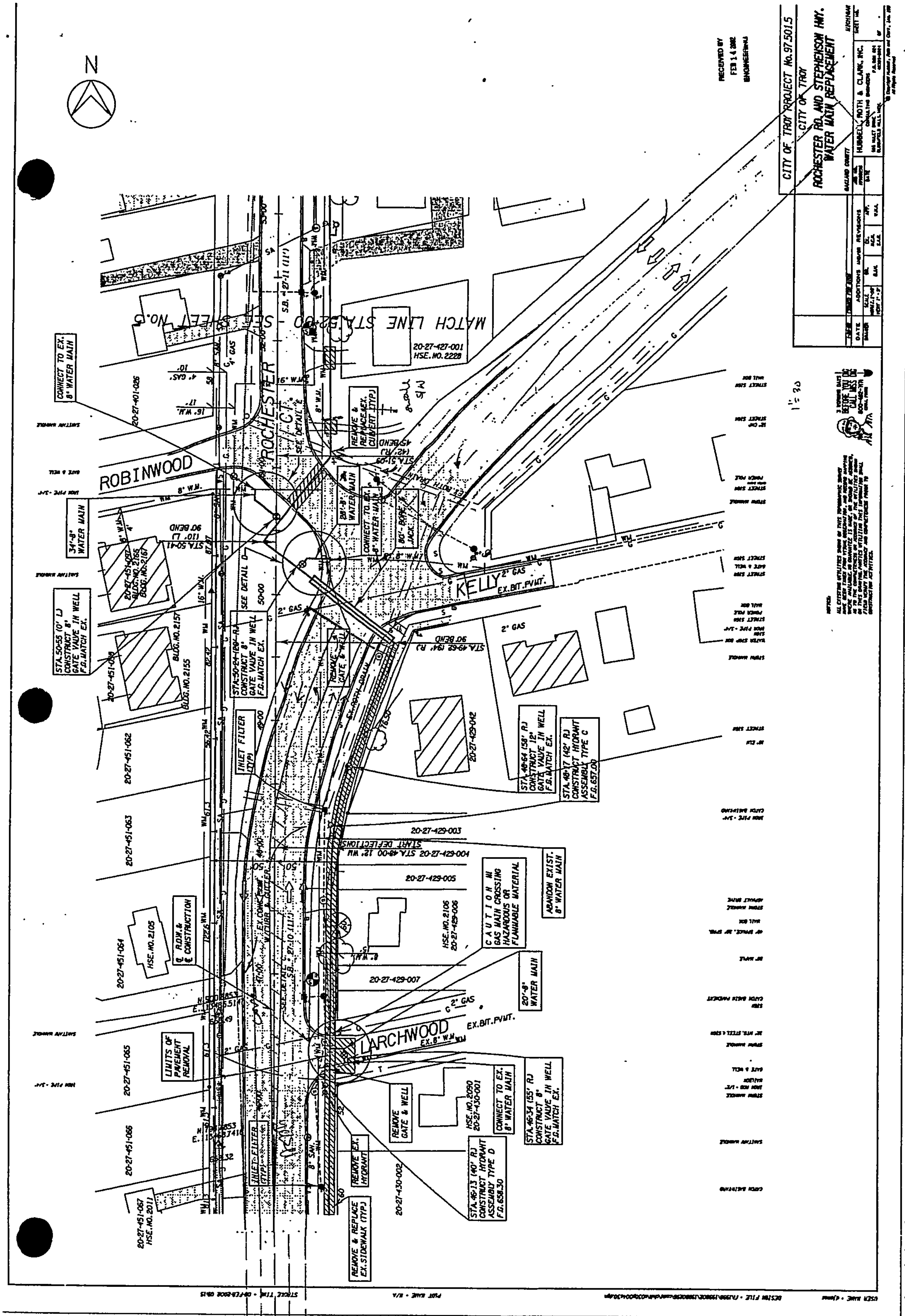


SYMBOLS	TYPES OF COLLISIONS	FOR EACH ACCIDENT SHOW:
MOVING VEHICLE	REAR END	1. Date & Time
BACKING VEHICLE	HEAD ON	2. Weather & Road Surface Conditions
PEDESTRIAN	SIDE SWIPE	
PARKED VEHICLE	RIGHT ANGLE	ROCHESTER ROAD between MAPLES & STEPHENSON
FIXED OBJECT	LEFT TURN HEAD ON	
INJURY ACCIDENT	OUT OF CONTROL	BY: DH DATE: 11/5/01
FATAL ACCIDENT		

ITEM 5



ITEM 5



CITY OF TROY PROJECT No. 97.5015
CITY OF TROY
ROCHESTER RD. AND STEPHENSON HWY. WATER MAIN REPLACEMENT
HUBBELL, ROTH & CLARK, INC.
RECEIVED BY FEB 14 2002 ENGINEERING
N
MATCH LINE STA. 52+00 - SEE SHEET No. 5
ROCHESTER CT.
ROBINWOOD
KELLY
LARCHWOOD
EX. BIT. PVMT.
CONNECT TO EX. 8" WATER MAIN
34'-8" WATER MAIN
STA. 50+55 (0' L) CONSTRUCT 8" GATE VALVE IN WELL F.G. MATCH EX.
STA. 50+64 (20' R) CONSTRUCT 8" GATE VALVE IN WELL F.G. MATCH EX.
REMOVE & REPLACE EX. CULVERT (TYP.)
88'-8" WATER MAIN
CONNECT TO EX. 8" WATER MAIN
80' - BORE & JACK
REMOVE GATE & WELL
INLET FILTER (TYP.)
STA. 48+64 (58' R) CONSTRUCT 12" GATE VALVE IN WELL F.G. MATCH EX.
STA. 48+17 (42' R) CONSTRUCT HYDRANT ASSEMBLY TYPE C F.G. 657.00
START DEFLECTIONS
STA. 48+00 12" WM
CAUTION !!! GAS MAIN CROSSING HAZARDOUS OR FLAMMABLE MATERIAL
ABANDON EXIST. 8" WATER MAIN
20'-8" WATER MAIN
℄ R.O.W. & ℄ CONSTRUCTION
LIMITS OF PAVEMENT REMOVAL
REMOVE GATE & WELL
CONNECT TO EX. 8" WATER MAIN
STA. 46+34 (55' R) CONSTRUCT 8" GATE VALVE IN WELL F.G. MATCH EX.
STA. 46+13 (40' R) CONSTRUCT HYDRANT ASSEMBLY TYPE D F.G. 658.30
REMOVE EX. HYDRANT
REMOVE & REPLACE EX. SIDEWALK (TYP.)
INLET FILTER (TYP.)
20-27-427-001 HSE. NO. 2228
20-27-401-026
20-27-451-057 BLDG. NO. 2165 BLDG. NO. 2167
20-27-451-058 BLDG. NO. 2157 BLDG. NO. 2155
20-27-451-062
20-27-451-063
20-27-451-064 HSE. NO. 2105
20-27-451-065
20-27-451-066
20-27-451-067 HSE. NO. 2011
20-27-429-042
20-27-429-003
20-27-429-004
20-27-429-005
HSE. NO. 2105 20-27-429-006
20-27-429-007
HSE. NO. 2090 20-27-430-001
20-27-430-002
2" GAS
4" GAS
16" W.M.
8" W.M.
EX. 8" W.M.
1" = 30'

ITEM 5

HRC

HUBBELL, ROTH & CLARK, INC.
CONSULTING ENGINEERS

February 14, 2002

RECEIVED BY
FEB 14 2002
ENGINEERING

City of Troy
Engineering Department
500 W. Big Beaver Road
Troy, MI 48084

Attention: Mr. Steven E. Vandette, P.E.
City Engineer

Re: Rochester Court & Rochester Road Intersection
Improvements in Section 27 HRC Job No. 20020090.02

Dear Steve:

Enclosed are two cost estimates and a marked up plan for the above-mentioned intersection improvements. The estimated cost with concrete surface is $479,450.00 and full-depth bituminous with 1 ½" overlay is $453,875.00.

Should you need additional information, please do not hesitate to contact us.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Singh Bhatia

Singh A. Bhatia, P.E.

SAB/jgm

pc: City of Troy: William Huotari, P.E.
HRC: W. Alix
file

ITEM 5

PRINCIPALS
Gerald F. Knapp
Thomas E. Biehl
Walter H. Alix
George E. Hubbell
Peter T. Roth
Michael D. Waring
Keith D. McCormack
Curt A. Christeson

CHIEF FINANCIAL OFFICER
J. Bruce McFarland

SENIOR ASSOCIATES
Frederick C. Navarre
Gary J. Tressel
Lawrence R. Ancypa
Kenneth A. Melchior
Dennis M. Monsere
Randal L. Ford
David P. Wilcox

HRC

HUBBELL, ROTH & CLARK, INC.
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Michael C. MacDonald
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James C. Hanson
Richard F. Beaubien
Margaret Synk Kuhn
William R. Davis
James J. Aiello
Daniel W. Mitchell
Joel E. Bowdan
Jesse B. VanDeCreek
Robert F. DeFrain
Marshall J. Grazioli

Cost Estimate No. 01

Intersection Improvements at Rochester Rd. and Rochester Ct.
City of Troy
Oakland County, Michigan

February 14, 2002

HRC Job No. 20020090.02

ALTERNATE I / ASPHALT WIDENING AND OVERLAY

No.	ITEM DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
1	Saw cut and remove curb & gutter	2,300 l.f.	$5.00	$11,500.00
2	Remove catch basin	4 ea.	$300.00	$1,200.00
3	Remove & replace Bit approach w/ 6" - Bit. Mix	550 s.yd.	$18.00	$9,900.00
4	Excavation	3,000 c.yd.	$8.00	$24,000.00
5	Pavement Markings	5,000 l.f.	$2.00	$10,000.00
6	Concrete Curb & Gutter	2,400 l.f.	$17.00	$40,800.00
7	Catch Basin	4 ea.	$1,000.00	$4,000.00
8	Cross-Walk Markings	Lump Sum	$500.00	$500.00
9	Stop Bar Markings	Lump Sum	$500.00	$500.00
10	Pavement Symbol Arrows	Lump Sum	$1,000.00	$1,000.00
11	Adjust structure	3 ea.	$800.00	$2,400.00
12	12" Dia. Storm Sewer	100 l.f.	$40.00	$4,000.00
13	6" - Thick Bit. Base Mix. No. 700, 20C	810 Tons	$45.00	$36,450.00
14	Removal & replace approaches w/ 8" Concrete	50 s.yd.	$50.00	$2,500.00
15	1 1/2" Bit. Leveling Course	205 Tons	$50.00	$10,250.00
16	1 1/2 " Bit. Wearing Course	760 Tons	$50.00	$38,000.00
17	3" - Top Soil and Sod	6,000 s.yd.	$6.00	$36,000.00
18	Traffic Maintenance & Control	Lump Sum	$20,000.00	$20,000.00
19	4" - Concrete Sidewalk	700 s.yd.	$5.00	$3,500.00
20	Traffic Signal	Lump Sum	$75,000.00	$75,000.00
21	Soil Erosion and Sediment Control	Lump Sum	$2,000.00	$2,000.00
22	Watering Sod Areas (1,000 gal./Unit)	180 Units	$60.00	$10,800.00
23	Mowing Sod Areas	4 Times	$200.00	$800.00
24	8" - 21 AA Aggregate Base	1,200 Tons	$15.00	$18,000.00
	Subtotal with Bituminous Pavement			**$363,100.00**
	25% Contingencies & Administrative Cost			**$90,775.00**
	Total Construction Cost			**$453,875.00**

ITEM 5

PRINCIPALS
Gerald F. Knapp
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Michael D. Waring
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Dennis M. Monsere
Randal L. Ford
David P. Wilcox

ASSOCIATES
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Nancy M.D. Faught
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James C. Hanson
Richard F. Beaubien
Margaret Synk Kuhn
William R. Davis
James J. Aiello
Daniel W. Mitchell
Joel E. Bowdan
Jesse B. VanDeCreek
Robert F. DeFrain
Marshall J. Grazioli

HRC

HUBBELL, ROTH & CLARK, INC.

CONSULTING ENGINEERS

Cost Estimate No. 01

Intersection Improvements at Rochester Rd. and Rochester Ct.
City of Troy
Oakland County, Michigan

February 14, 2002

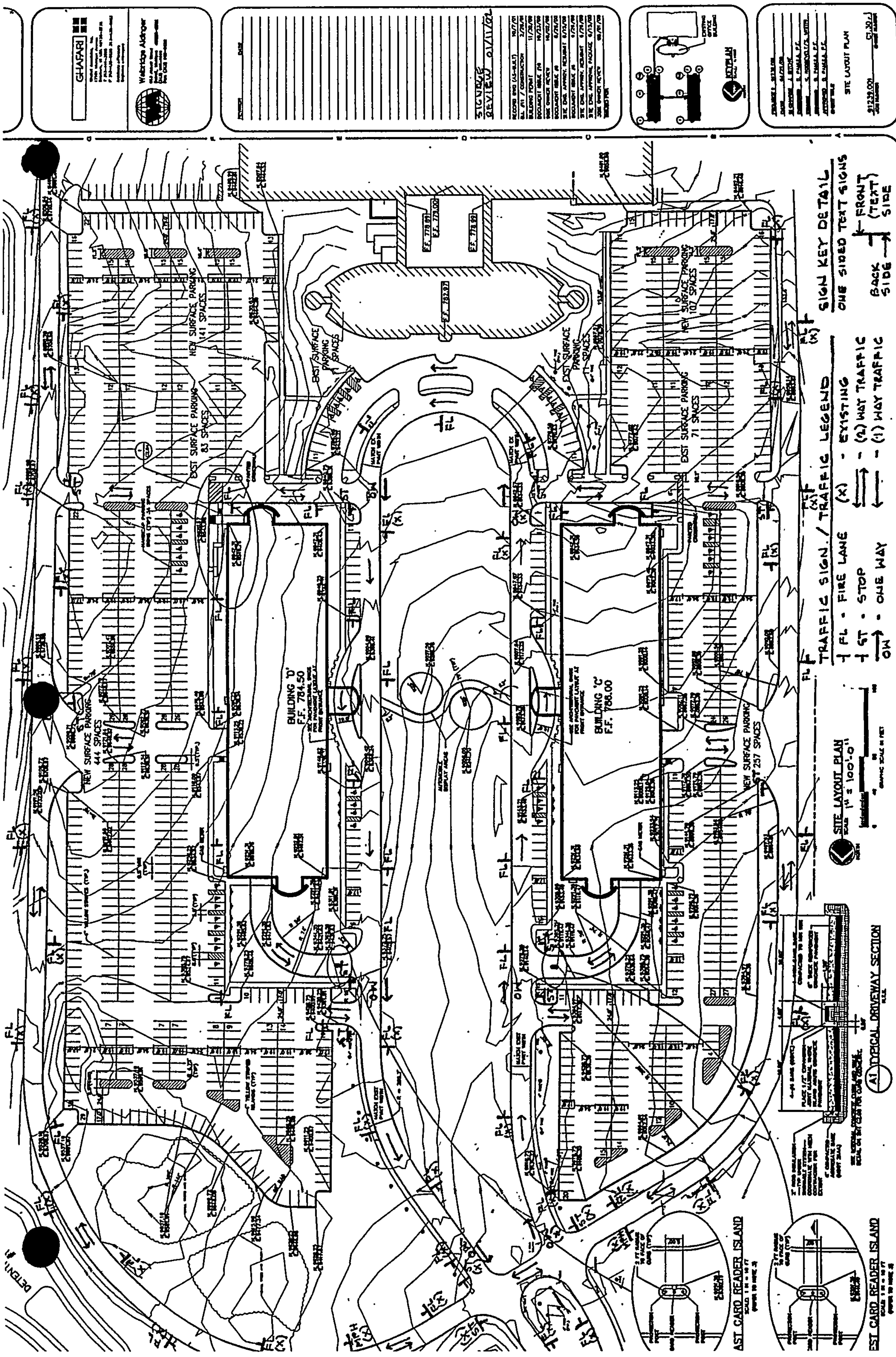
HRC Job No. 20020090.02

ALTERNATE II / CONCRETE WIDENING

No.	ITEM DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
1	Saw cut and remove concrete curb	2,300 l.f.	$5.00	$11,500.00
2	Remove catch basin	4 ea.	$300.00	$1,200.00
3	Remove & replace Bit approach w/ 6" - Asphalt	550 s.yd.	$18.00	$9,900.00
4	Excavation	3,000 c.yd.	$8.00	$24,000.00
5	Pavement Markings	5,000 l.f.	$2.00	$10,000.00
6	Catch Basin	6 ea.	$1,000.00	$6,000.00
7	Cross-Walk Markings	Lump Sum	$500.00	$500.00
8	Stop Bar Markings	Lump Sum	$500.00	$500.00
9	Pavement Symbol Arrows	Lump Sum	$1,000.00	$1,000.00
10	Expansion Anchored Lane Ties	670 ea.	$8.00	$5,360.00
11	8" - 21AA. Aggregate Base	1,200 Tons	$15.00	$18,000.00
12	6" - Open-graded Drainage Course 5G	2,300 s.yd.	$7.00	$16,100.00
13	9" - Uniform Concrete Pavement with integral curb	2,250 s.yd.	$50.00	$112,500.00
14	Adjust structure	3 ea.	$800.00	$2,400.00
15	12" Dia. Storm Sewer	100 l.f.	$40.00	$4,000.00
16	Remove & replace approaches	50 s.yd.	$50.00	$2,500.00
17	4" - Topsoil and Sod for restoration	6,000 s.yd.	$6.00	$36,000.00
18	Traffic Maintenance & Control	Lump Sum	$30,000.00	$30,000.00
19	4" - Concrete Sidewalk	700 s.yd.	$5.00	$3,500.00
20	Traffic Signal	Lump Sum	$75,000.00	$75,000.00
21	Soil Erosion and Sediment Control	Lump Sum	$2,000.00	$2,000.00
22	Watering Sod Areas	180 Units	$60.00	$10,800.00
23	Mowing Sod Areas	4 Times	$200.00	$800.00
	Subtotal with Concrete Pavement			**$383,560.00**
	25% Contingencies & Administrative Cost			**$95,890.00**
	Total Construction Cost			**$479,450.00**

2001 Centerpoint Pkwy • Suite 109 • Pontiac, MI 48341 • Telephone: (248) 454-6300 • FAX: (248) 454-6359 • www.hrc-engr.com

ITEM 6


GHAFARI
SIGNAGE REVIEW 01/11/02
SITE LAYOUT PLAN
SIGN KEY DETAIL
ONE SIDED TEXT SIGNS
FRONT (TEXT) SIDE
BACK SIDE
TRAFFIC SIGN / TRAFFIC LEGEND
FL - FIRE LANE
ST - STOP
OW - ONE WAY
(X) - EXISTING
- (2) WAY TRAFFIC
- (1) WAY TRAFFIC
NEW SURFACE PARKING 141 SPACES
EXST SURFACE PARKING 83 SPACES
NEW SURFACE PARKING 107 SPACES
EXST SURFACE PARKING 71 SPACES
EXST SURFACE PARKING SPACES
NEW SURFACE PARKING 444 SPACES
NEW SURFACE PARKING 257 SPACES
BUILDING 'D' F.F. 784.50
BUILDING 'C' F.F. 786.00
SITE LAYOUT PLAN 1" = 100'-0"
TYPICAL DRIVEWAY SECTION
EAST CARD READER ISLAND
WEST CARD READER ISLAND