

**GPS CONTROL SURVEY REPORT**

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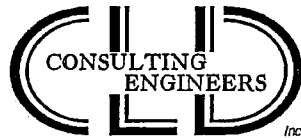
**LACONIA, NEW HAMPSHIRE**

**October 2000**

**CLIENT:**

**City of Laconia  
Department of Public Works  
45 Beacon Street East  
Laconia, NH 03246**

**Prepared by**



***CLD Consulting Engineers, Inc.***  
**Manchester, New Hampshire**

# LACONIA, NH

## GPS CONTROL SURVEY FOR ESTABLISHING ADDITIONAL PERMANENT MONUMENTED CONTROL

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### SCOPE OF SURVEY PROJECT

This surveying assignment included the establishment of horizontal coordinates and elevations for twenty new permanently monumented control points, identified as LAC-201 through LAC-220.

**SURVEY DATE :** July 7, 2000

### HARDWARE/SOFTWARE/OPERATIONAL MODE

#### Hardware

3 - Leica System 300 dual frequency sensors.

#### Software

Leica SKI software package (Ver. 2.3).

#### Operational Mode

Rapid static observation of a minimum of four satellites simultaneously.

### HORIZONTAL/VERTICAL CONTROLS UTILIZED

For horizontal and vertical control, the survey was based on existing stations LAC-2, LAC-4, LAC-12, LAC-14, LAC-16, LAC-19, LAC-21 and LAC-22 which were previously established on the North American Datum of 1983/96 (NAD 83/96) and on the North American Vertical Datum of 1988 (NAVD 88) for the City of Laconia in a 1998 GPS control survey and published in a report dated May 1998. All coordinate values are in survey feet.

### DISCUSSION OF SURVEY

This was a routine GPS control survey utilizing the rapid static operational mode with an elevation mask of 15° and observation sessions of approximately 20 minutes in duration per baseline.

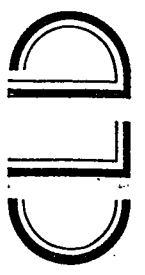
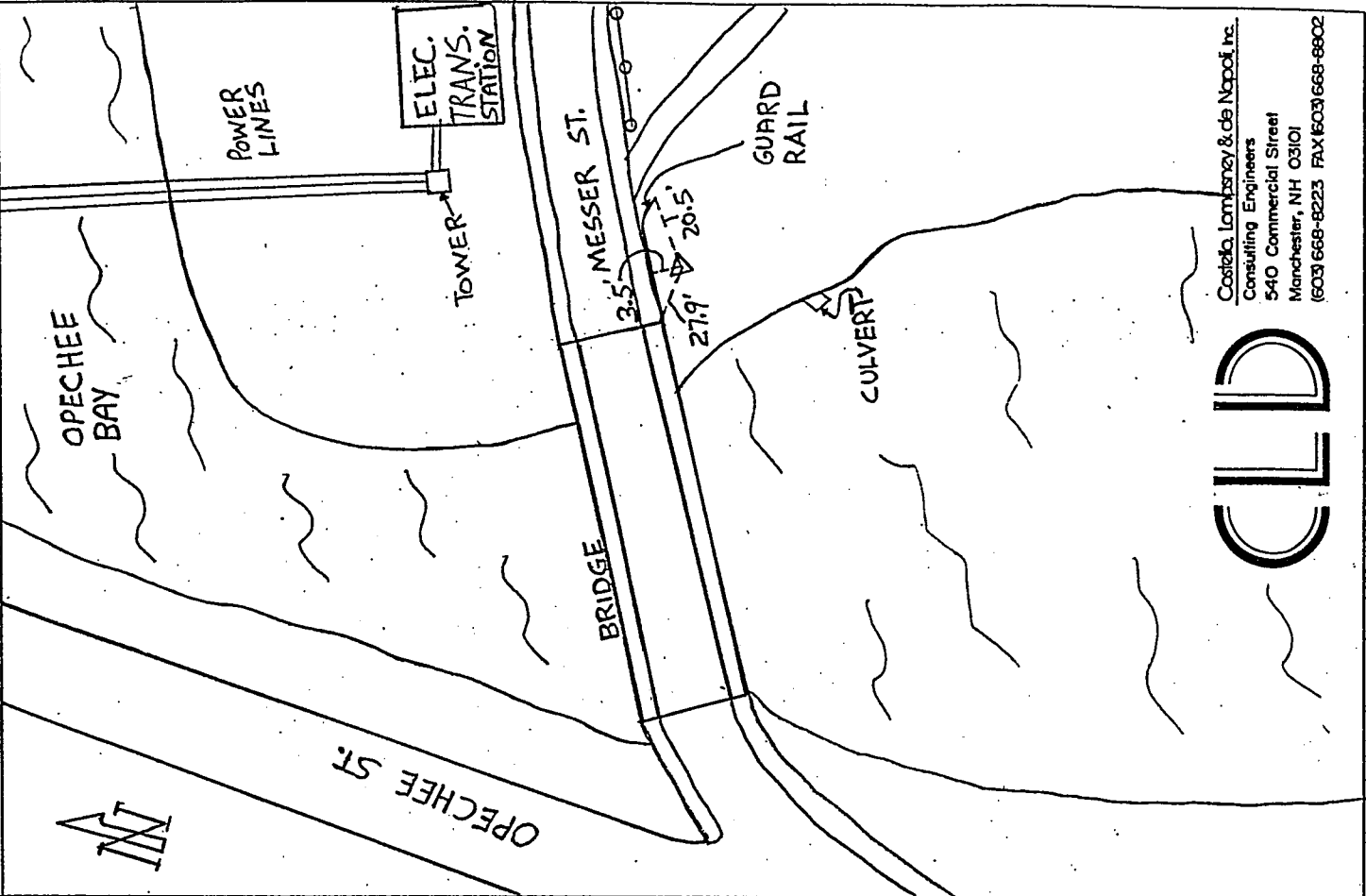
The Horizontal and Vertical Control sheet included in Appendix B of this report contains a tabulation of the coordinate values of the newly established control points. In conforming with the original 1998 survey, Geoid 96 was used to obtain the orthometric heights of the vertical values.

**APPENDIX A**

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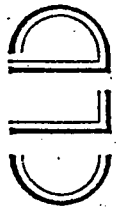
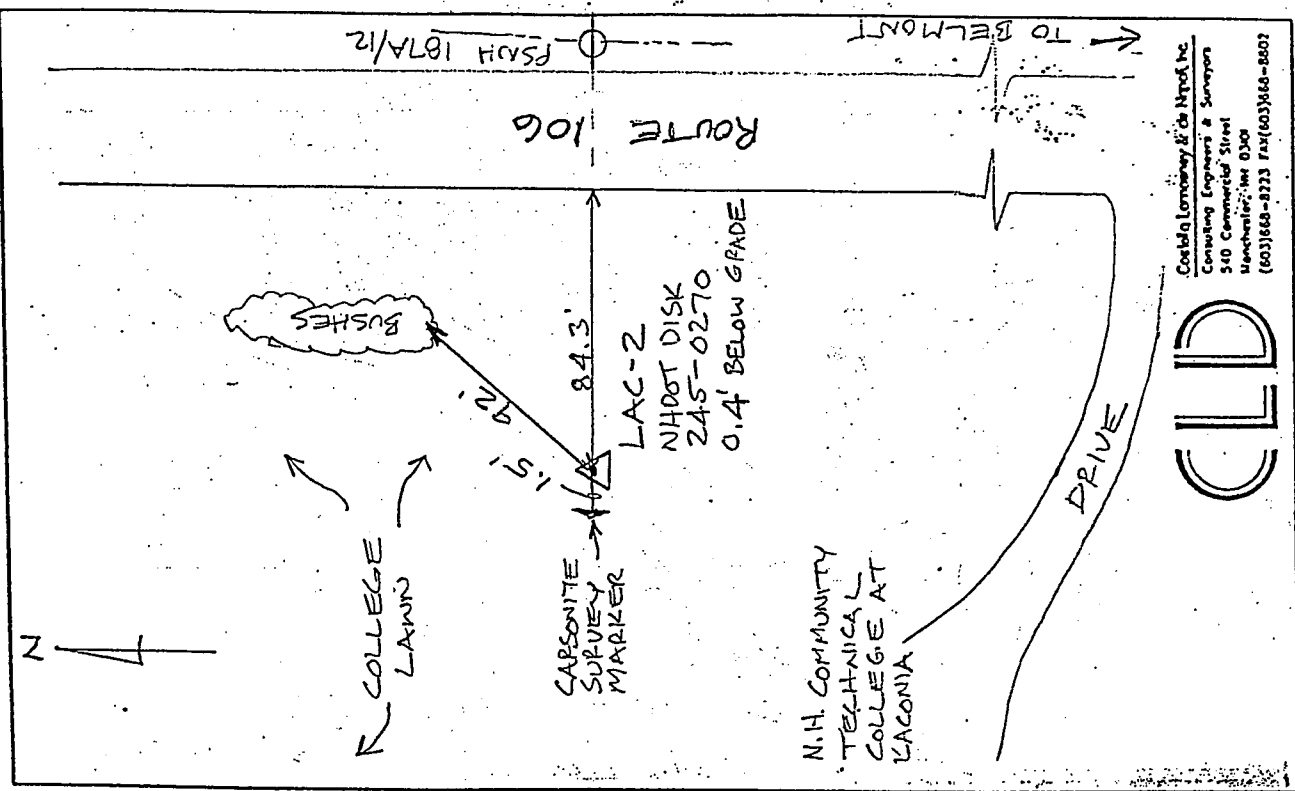
**LOCATION SKETCHES FOR CONTROL POINTS**

SKETCH LAC-1  
6"x6" GRANITE BOARD w/ACRONIA INK  
FLUSH w/GROUND



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Consulting Engineers  
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Manchester, NH 03101  
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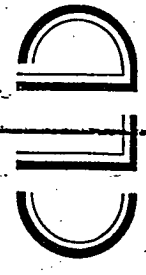
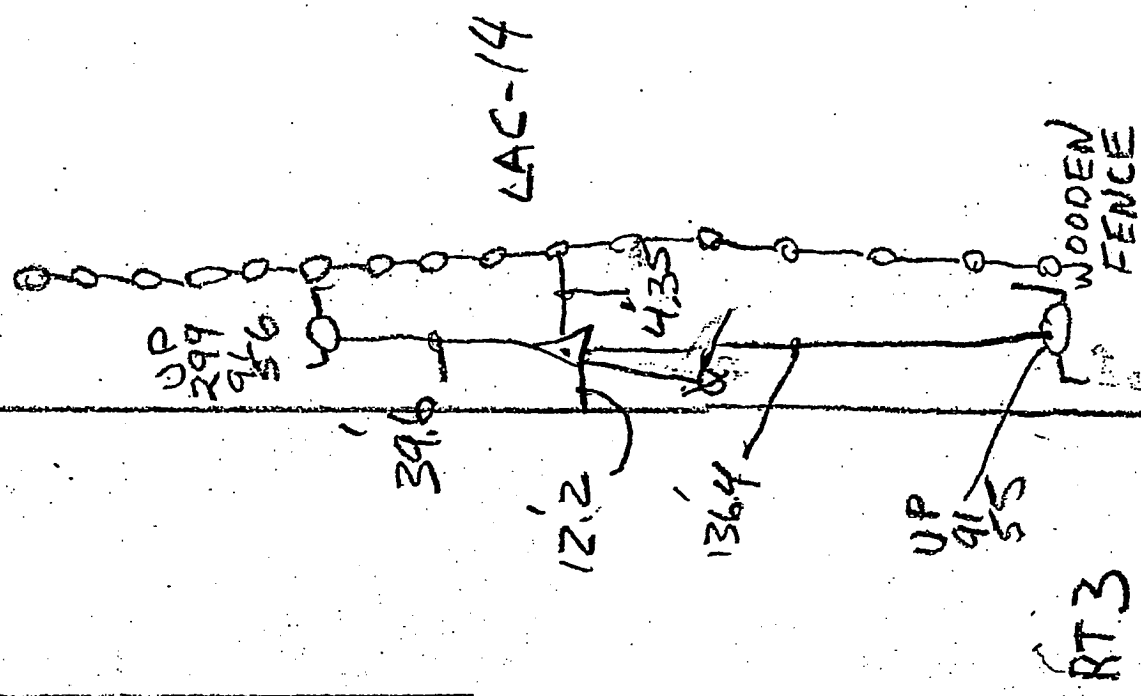
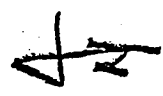
SKETCH LAC-2  
NHDOT DISK 245-0270



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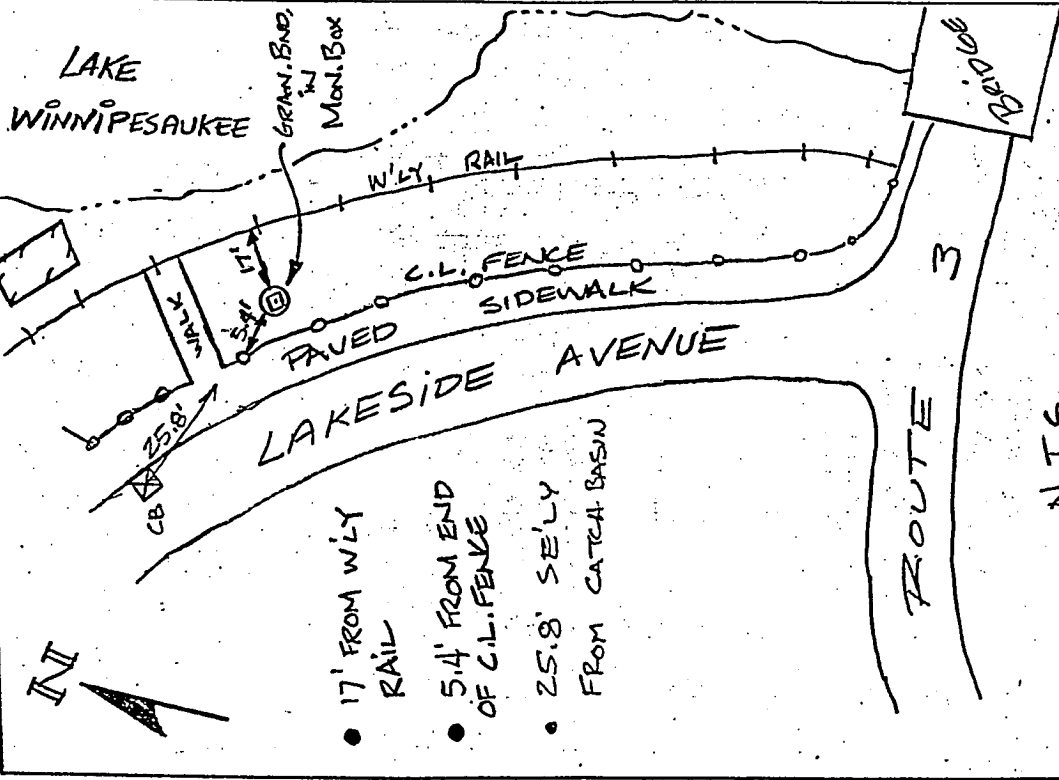
SKETCH LAC-14 CITY DISK IN GRAN. BND. IN MON. BOX

RT 3 BUS



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SKETCH LAC-12 CITY DISK IN GRAN. BND. IN MON. BOX



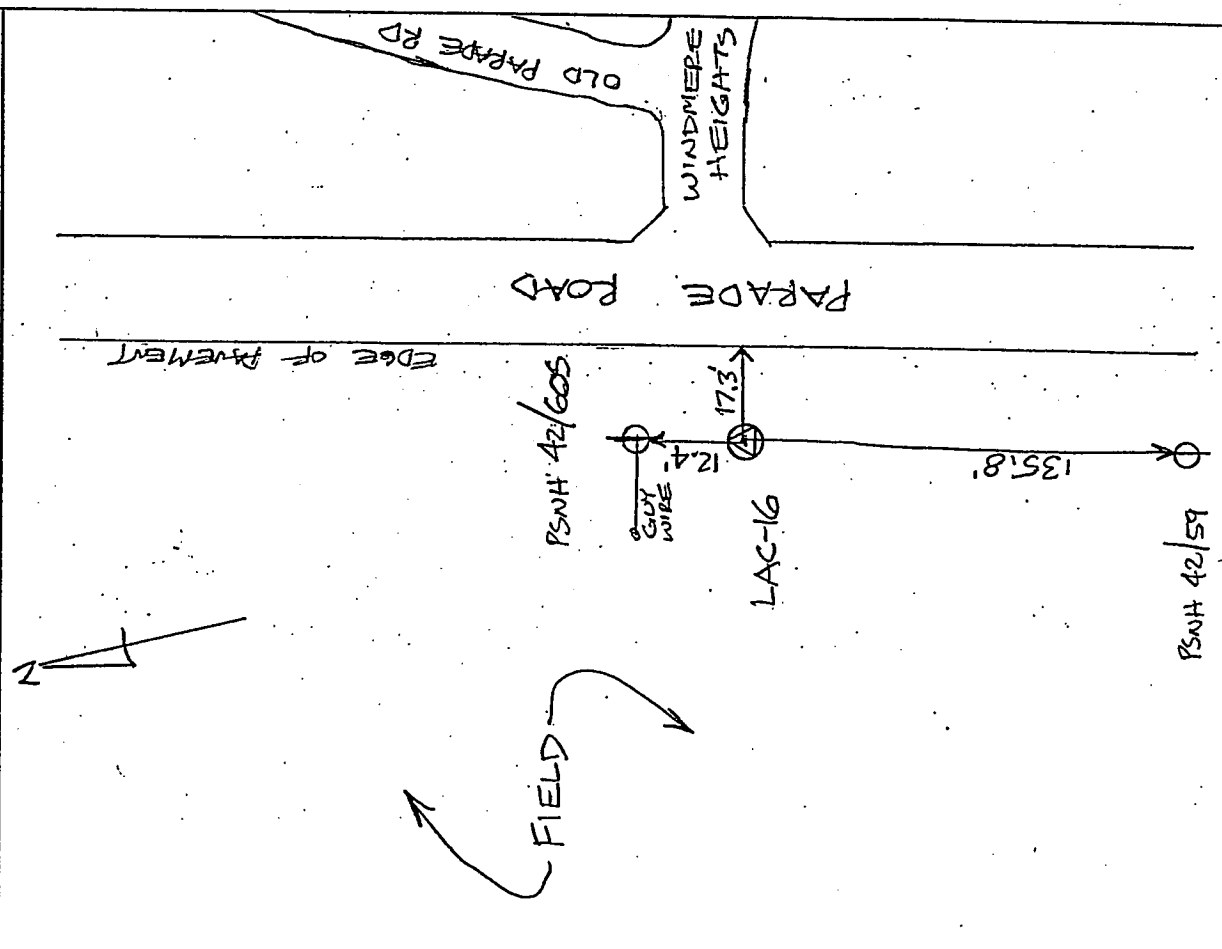
- 17' FROM WLY RAIL
- 5.4' FROM END OF C.I. FENCE
- 25.8' SE'LY FROM CATCH BASIN

N.T.S.

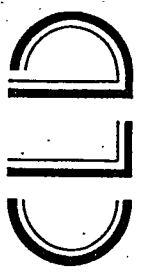


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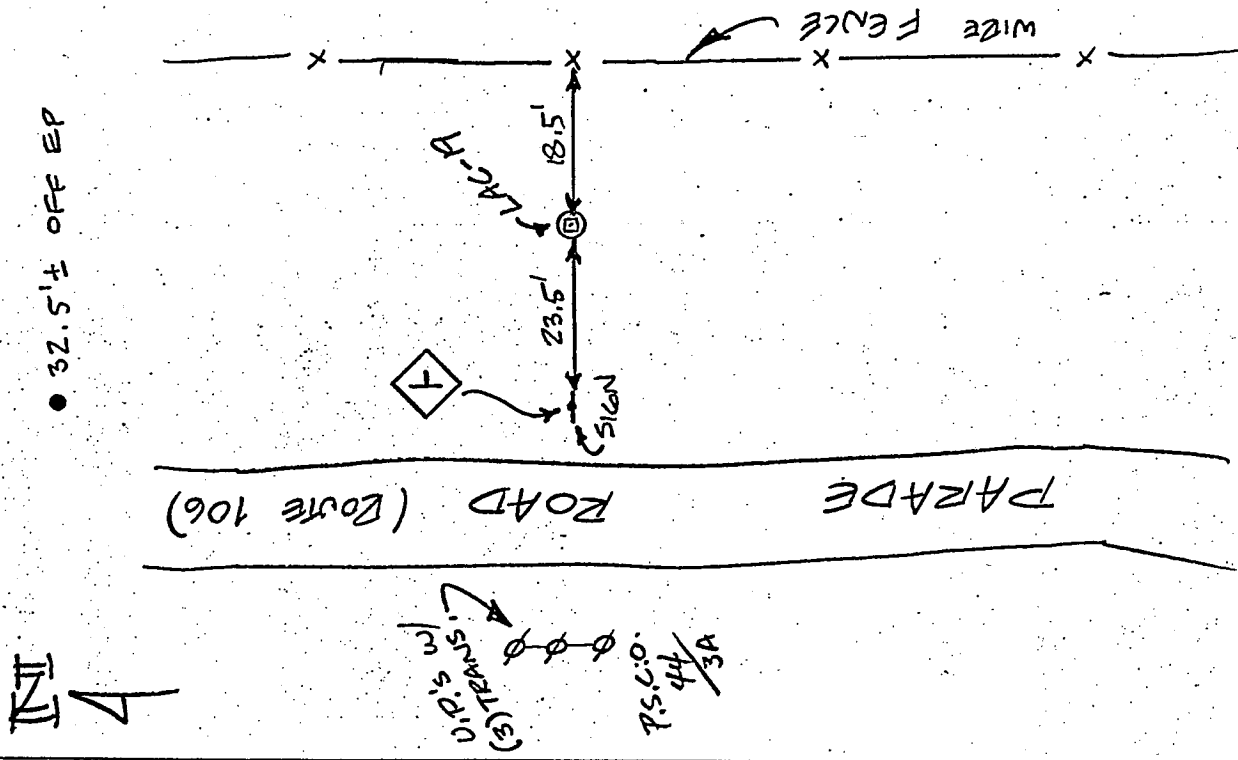
SKETCH LAC-16 CITY OF LACONIA DISK SET IN A 6" SQ. GRAN. BAND IN MON. BOX



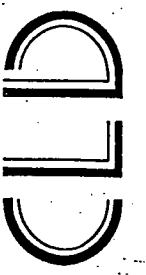
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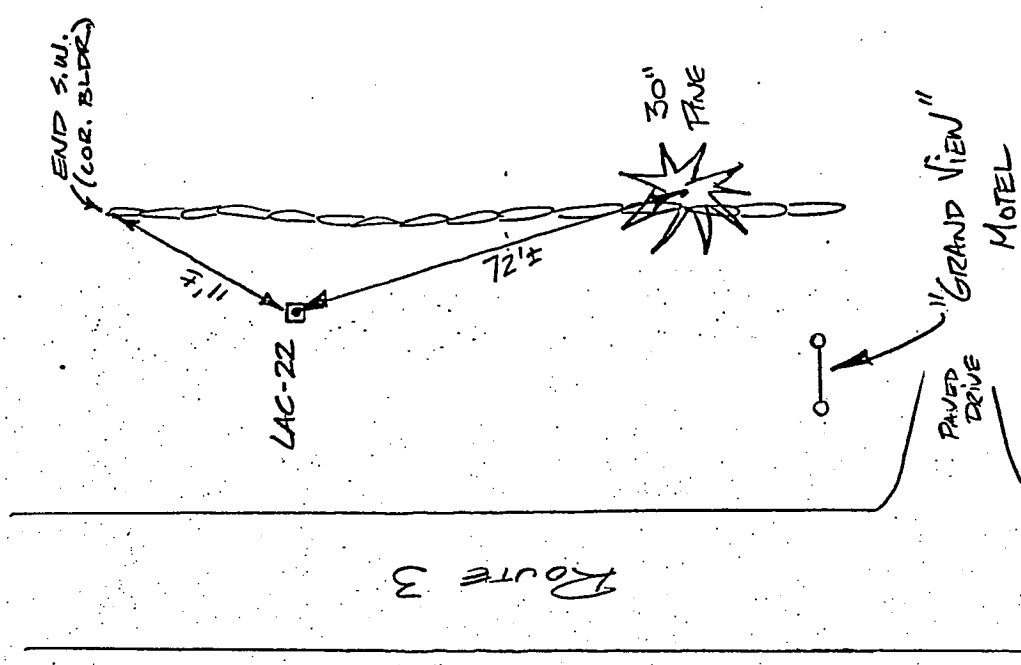
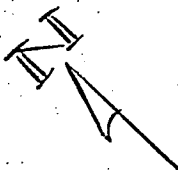
SKETCH LAC-19 CITY DISK IN 6" SQ. GRAN. BAND IN MON. BOX



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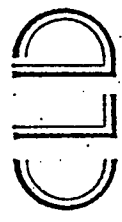
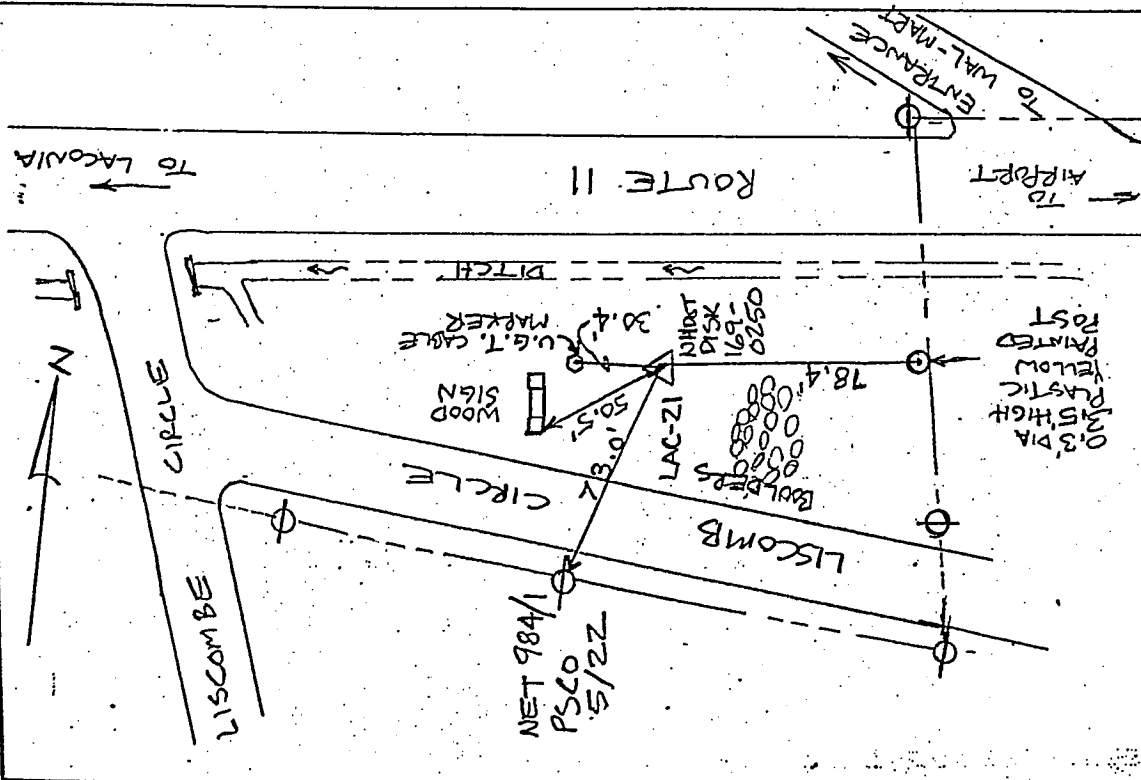


SKETCH LAC-22 NADOT DISK 169-0250  
 6" SQ. GRAN. BND. (DG. 23)



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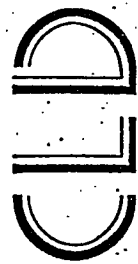
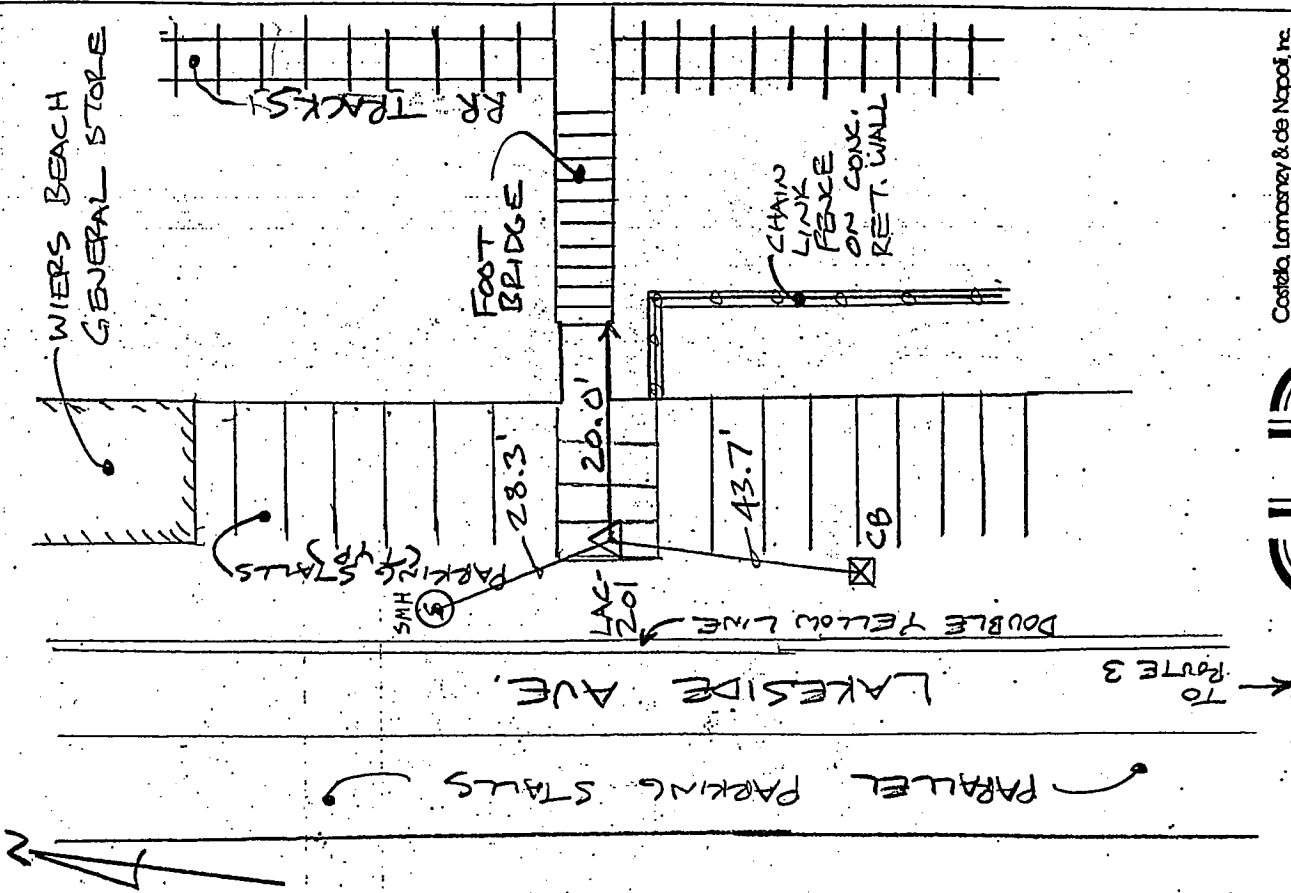
SKETCH LAC-21 NADOT DISK 169-0250  
 STA DG 44 1961 (GILFORD)



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SKETCH LAC-201

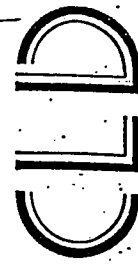
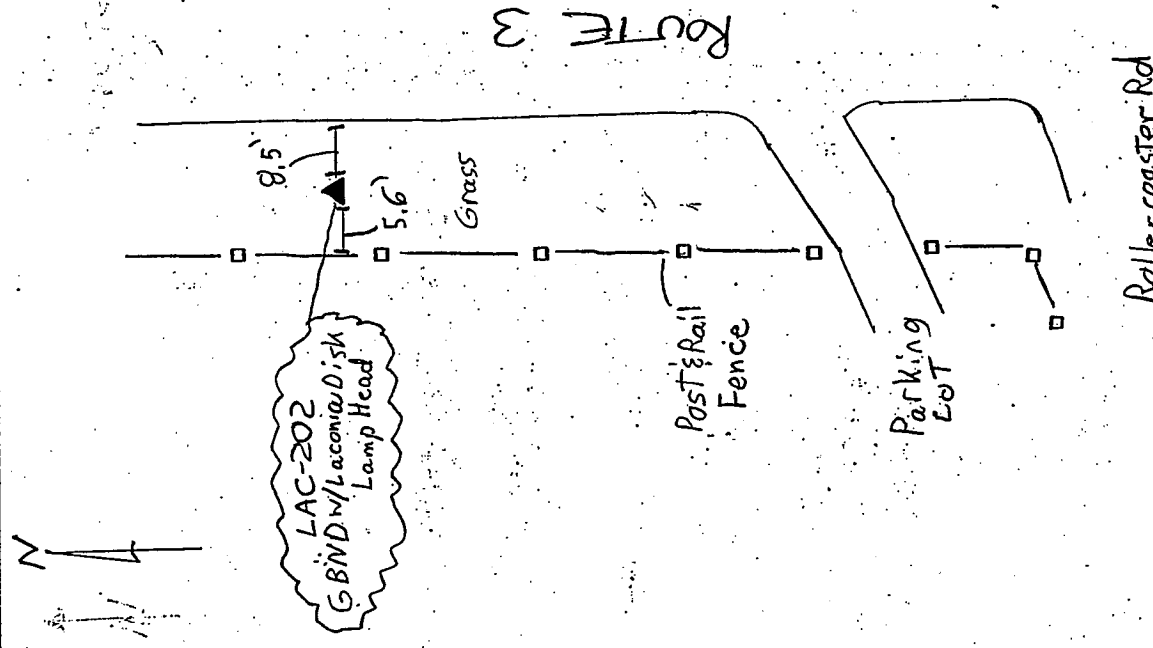
CITY DISK / G. BAND  
IN MON. BOX



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SKETCH LAC-202

GBNDw/Laconia Disk  
Lamp Head

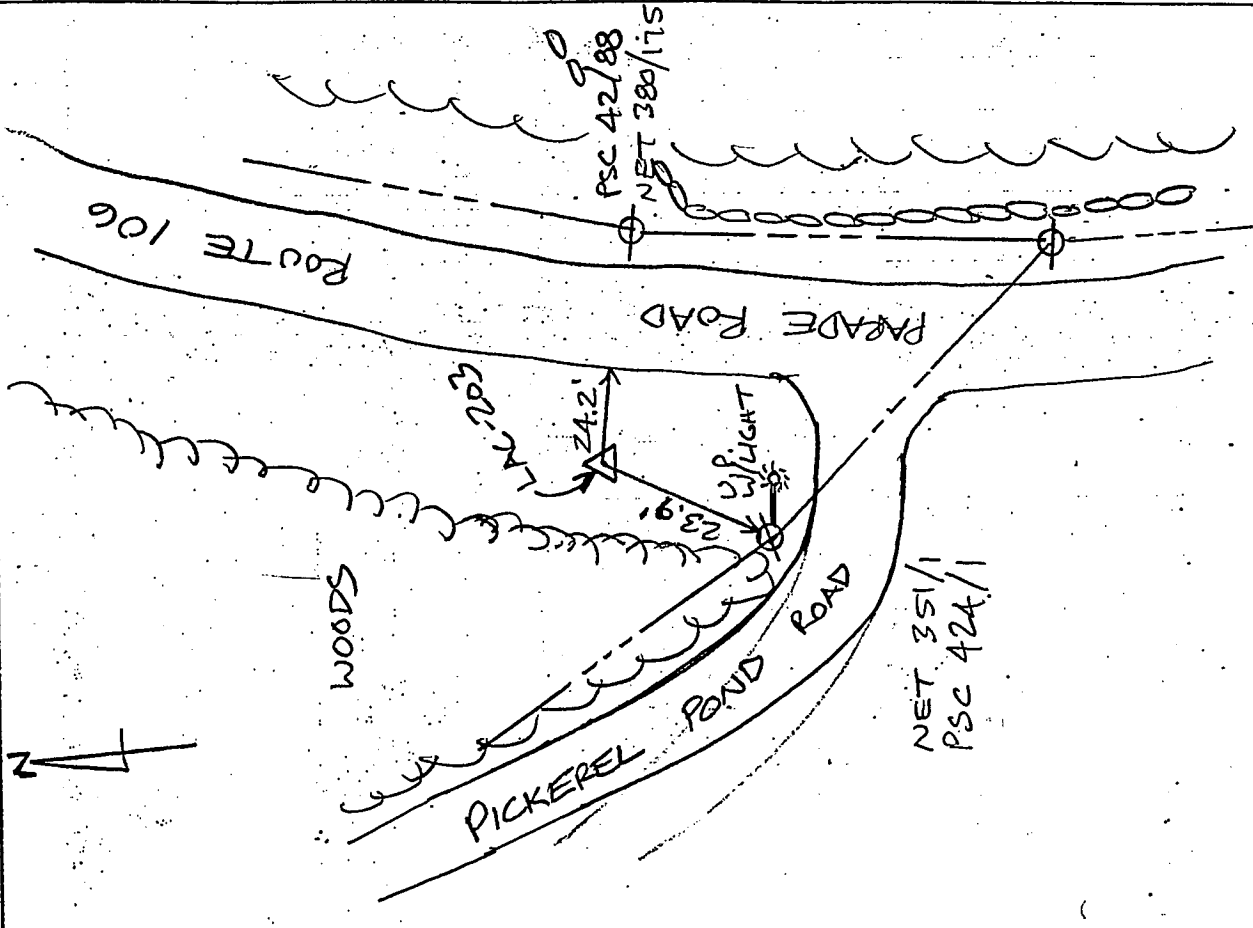


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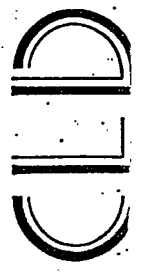
Grass  
Parking Lot  
Tamarack Restaurant  
LSA  
Concrete Curb  
Parking Lot  
Scenic Rd.



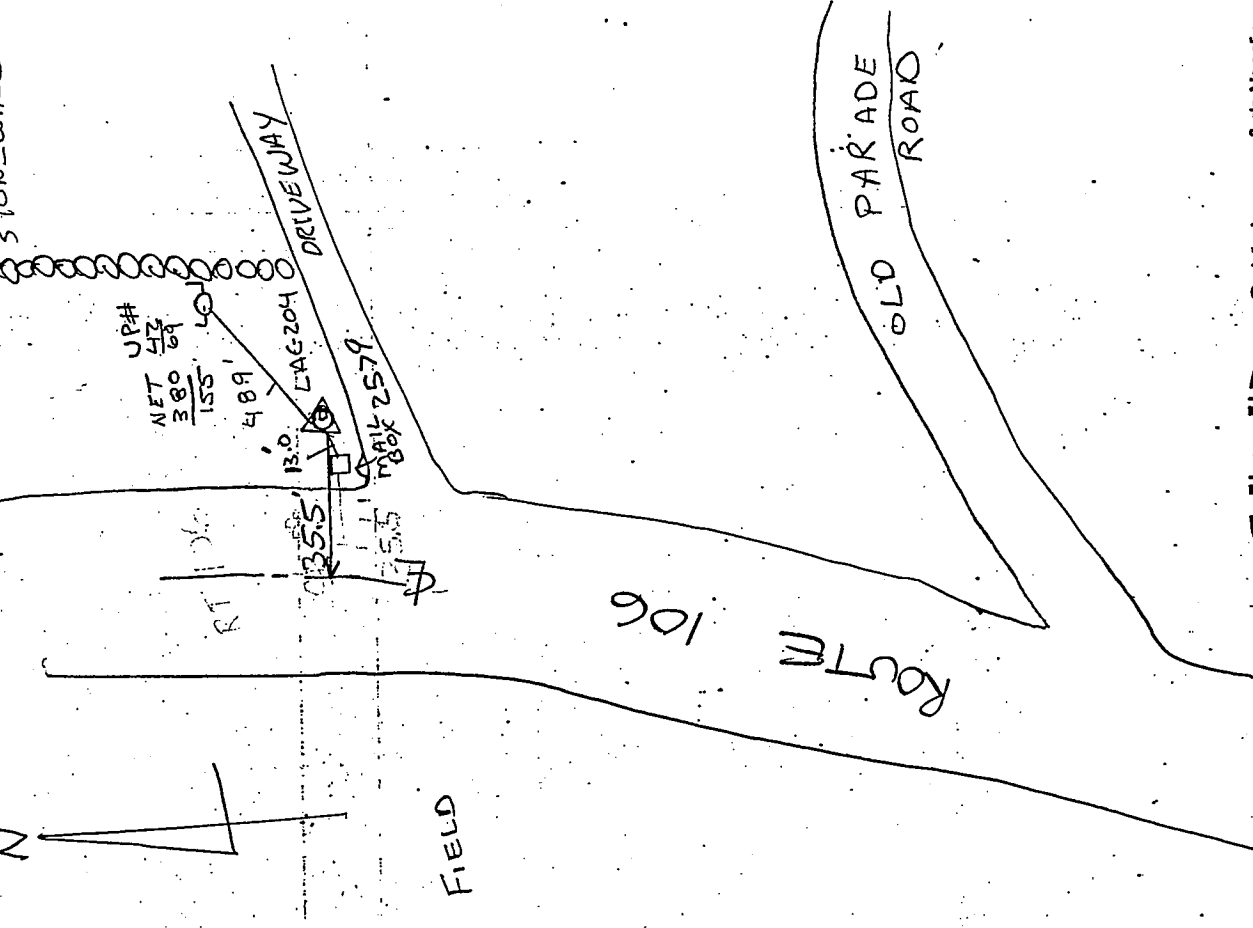
SKETCH LAC-203 CITY DISK/G.B.M.D  
IN MON. BOX



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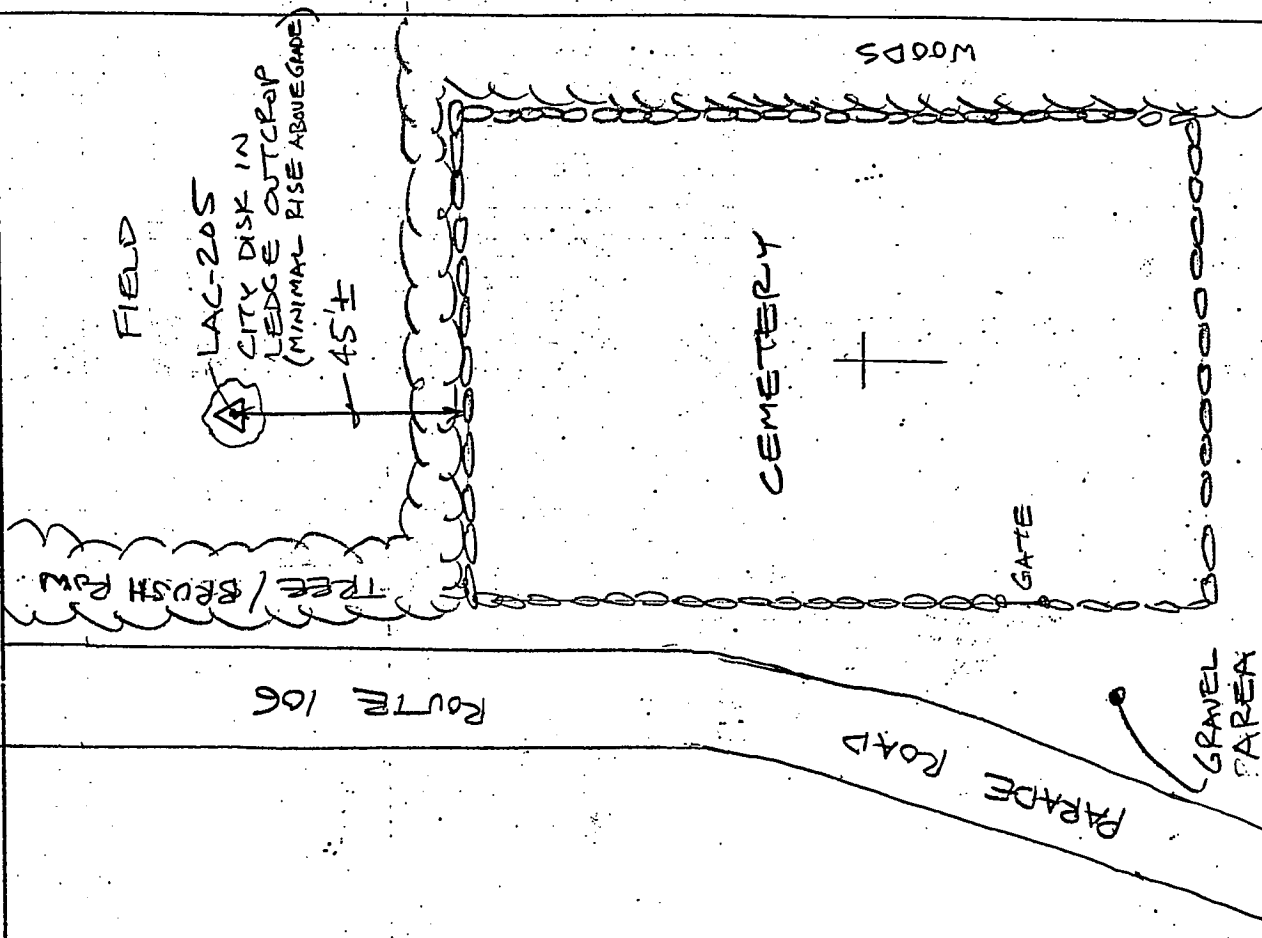
SKETCH LAC-204 CITY DISK/G.B.M.D  
IN MON. BOX



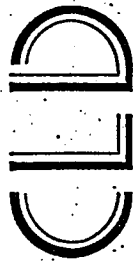
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Consulting Engineers  
540 Commercial Street  
Manchester, NH 03101  
(603) 668-8223 FAX 1603/668-8902



SKETCH LAC-205 CITY DISK IN LEDGE OUTCROP

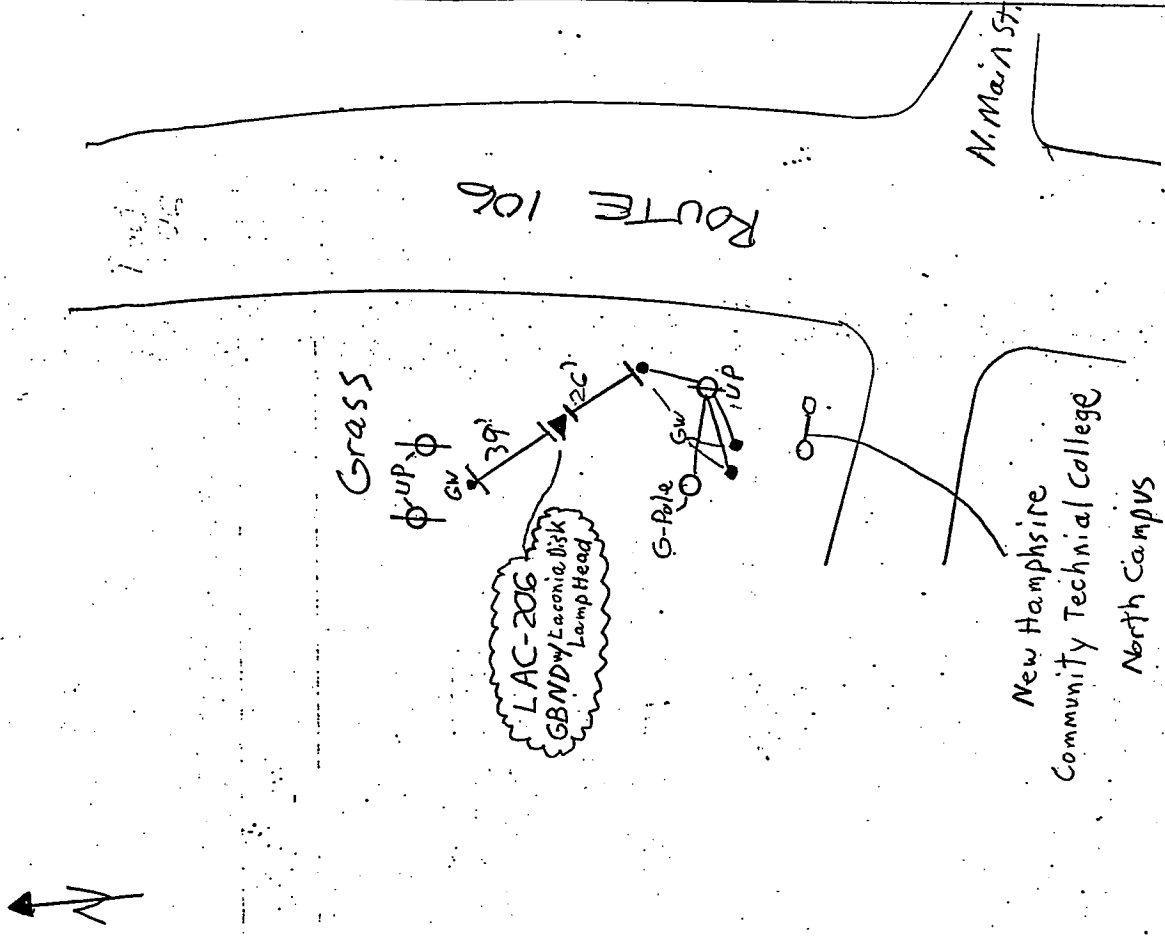


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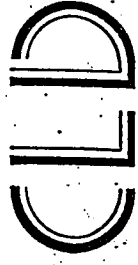


SKETCH LAC-206

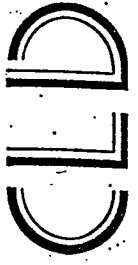
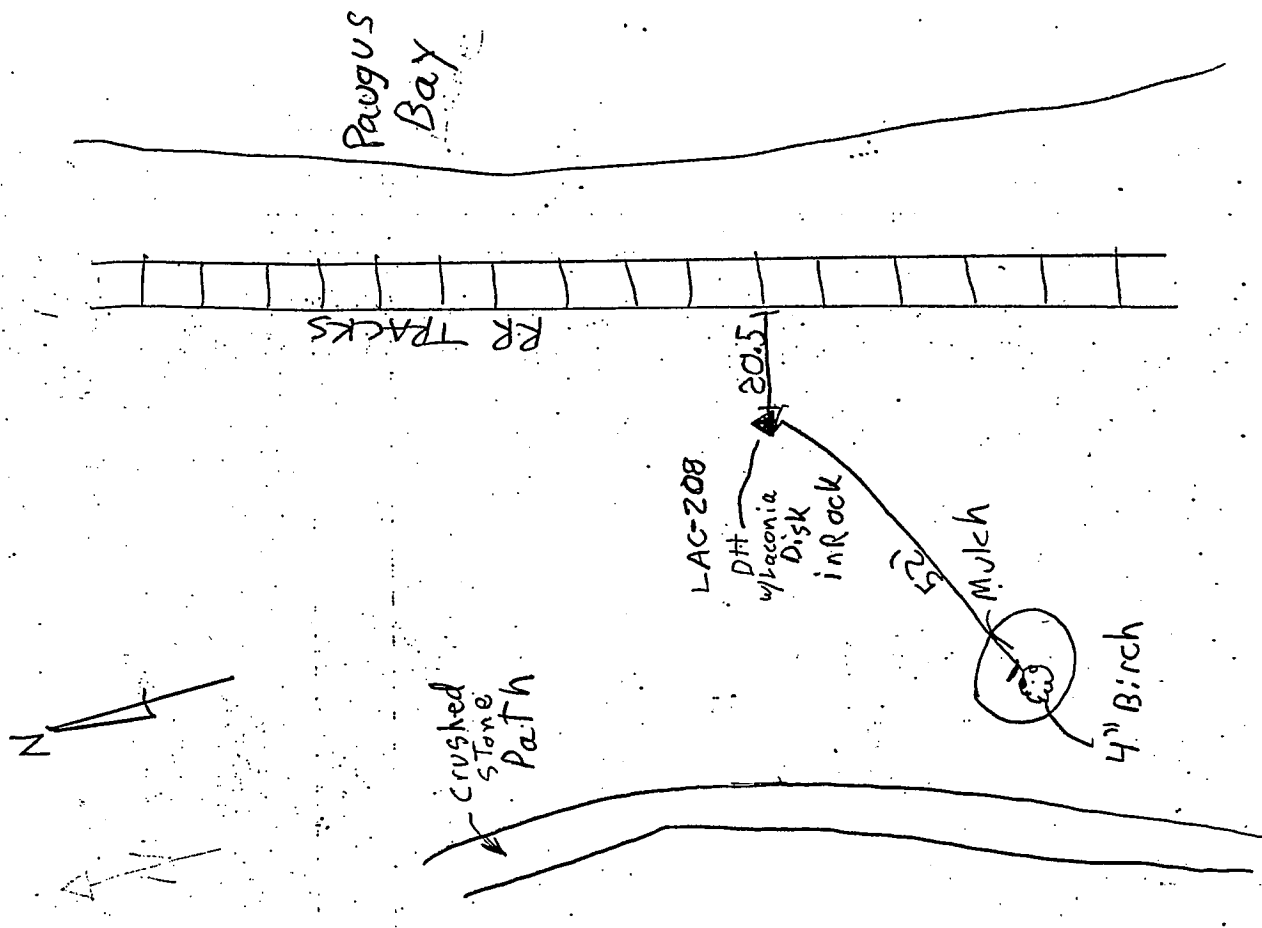
GBND w/ Lacoia Disk Lamp Head



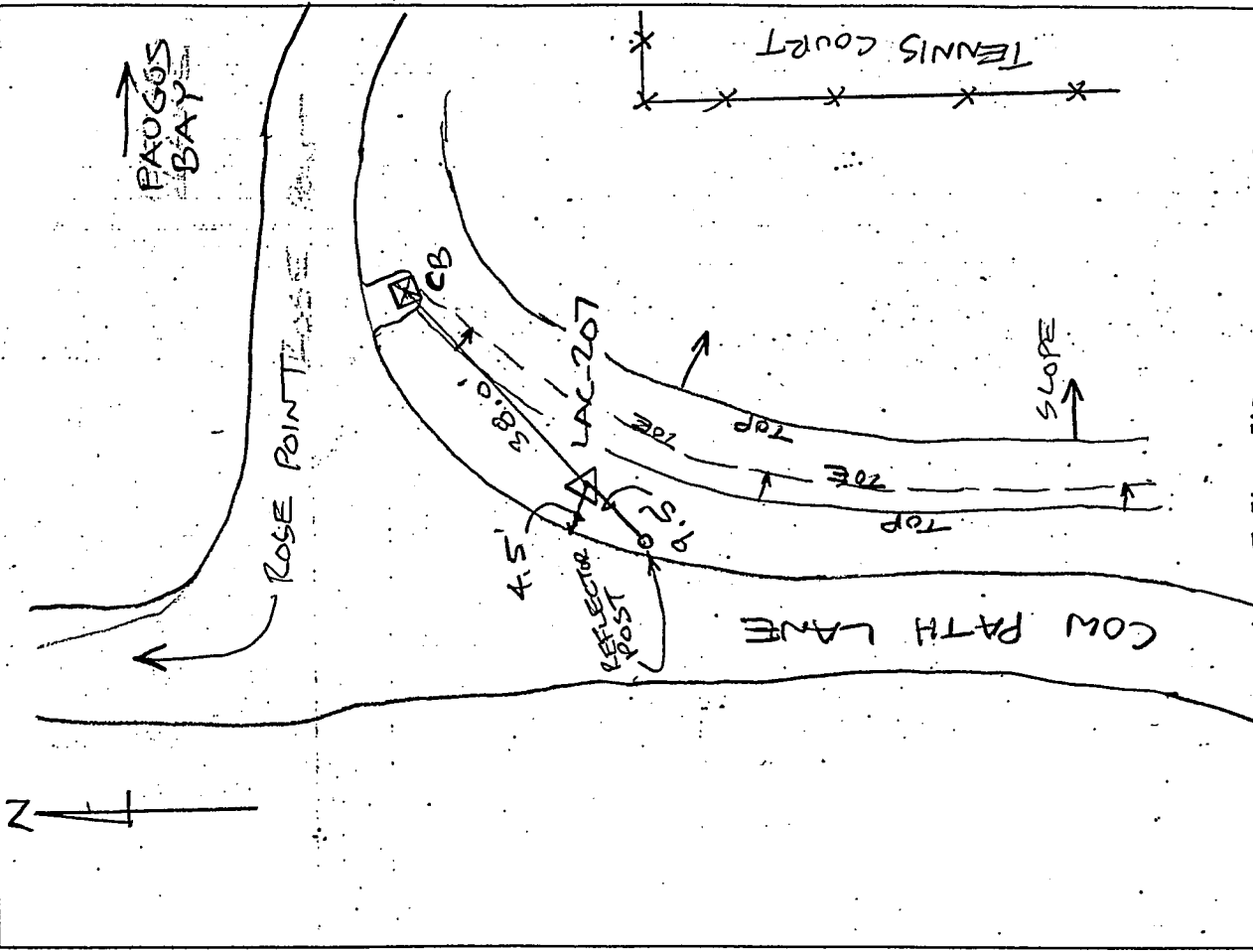
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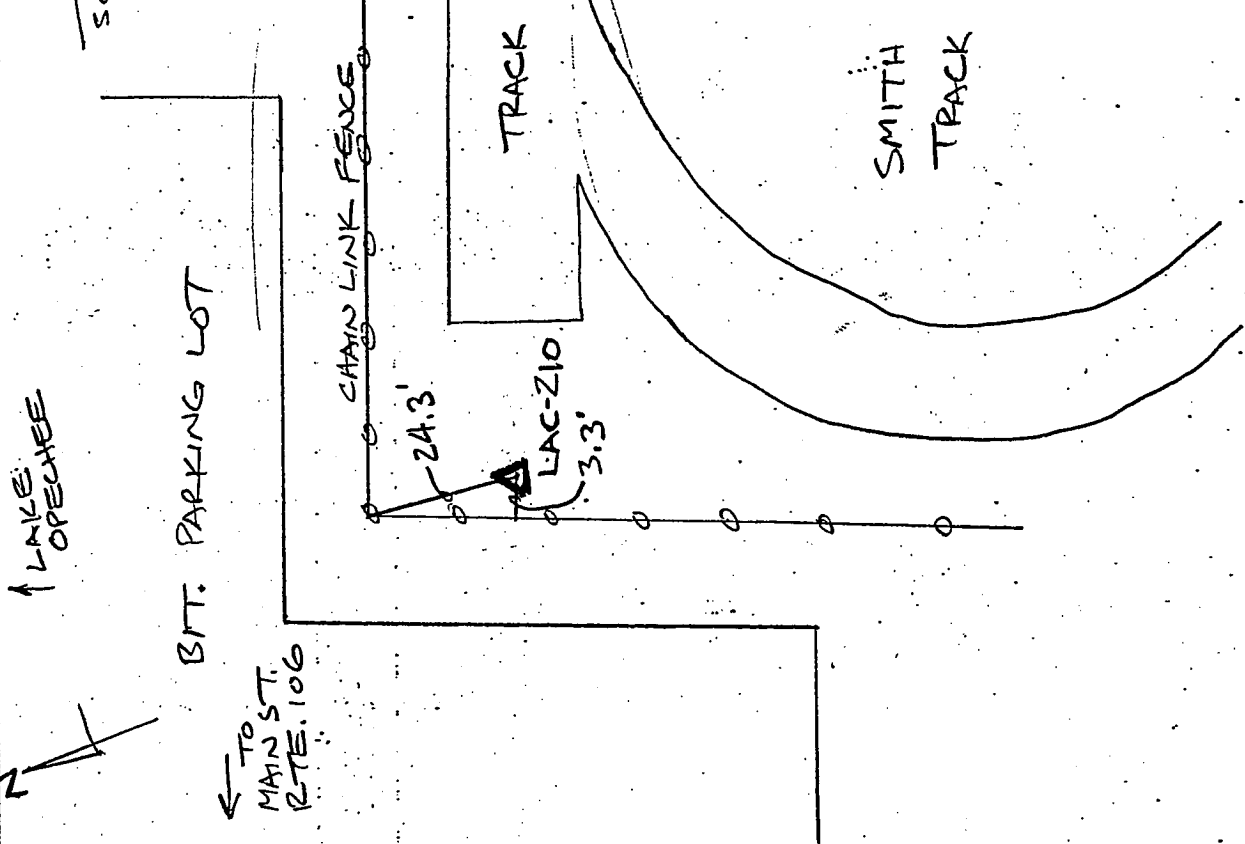
SKETCH LAC-208 DH w/Laconia Disk in Rock



SKETCH LAC-207 CITY DISK/G. BAND IN MON. BOX



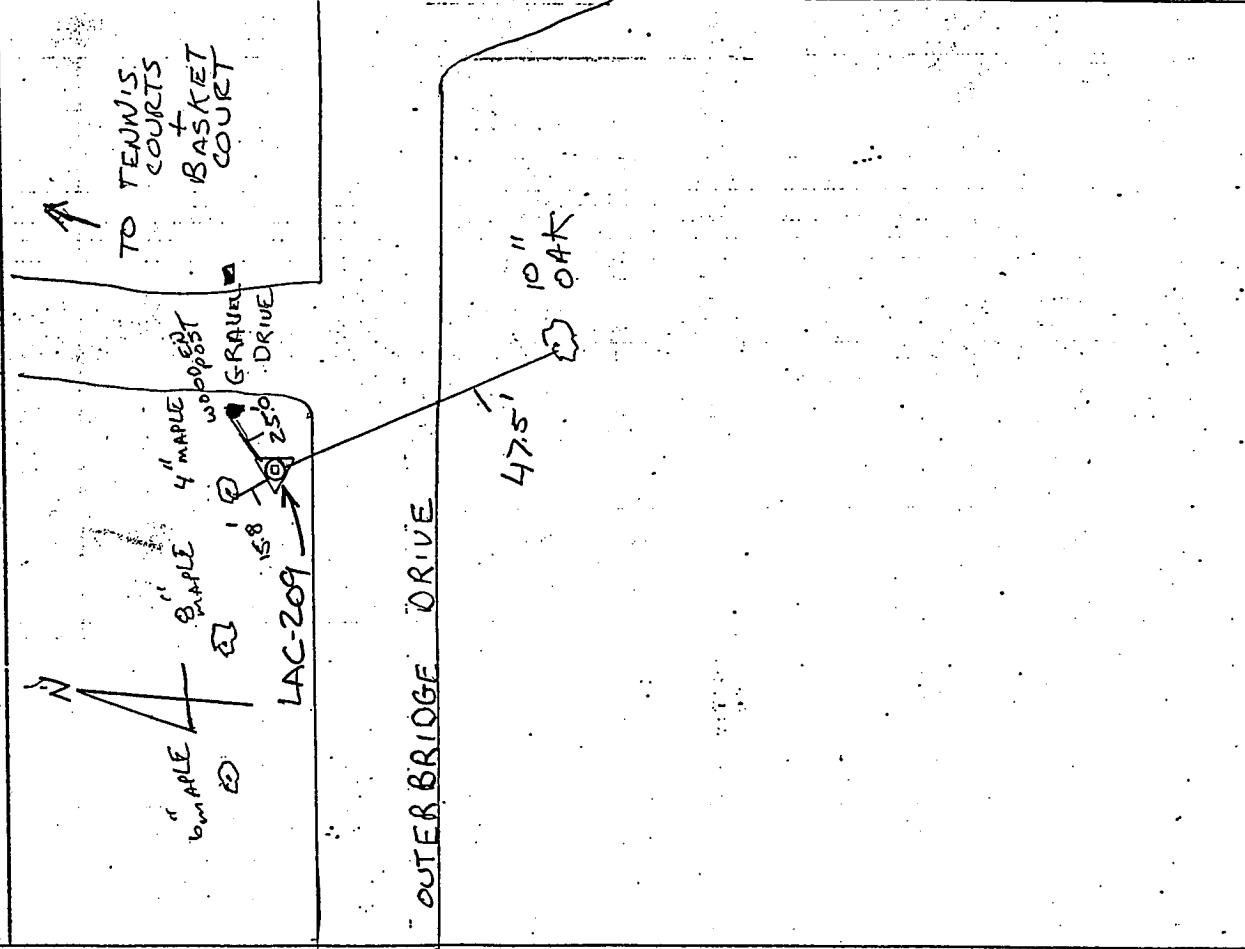
SKETCH LAC-210 CITY DISK/G.BND IN MON. BOX



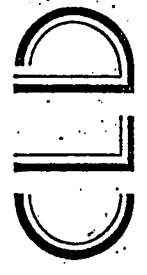
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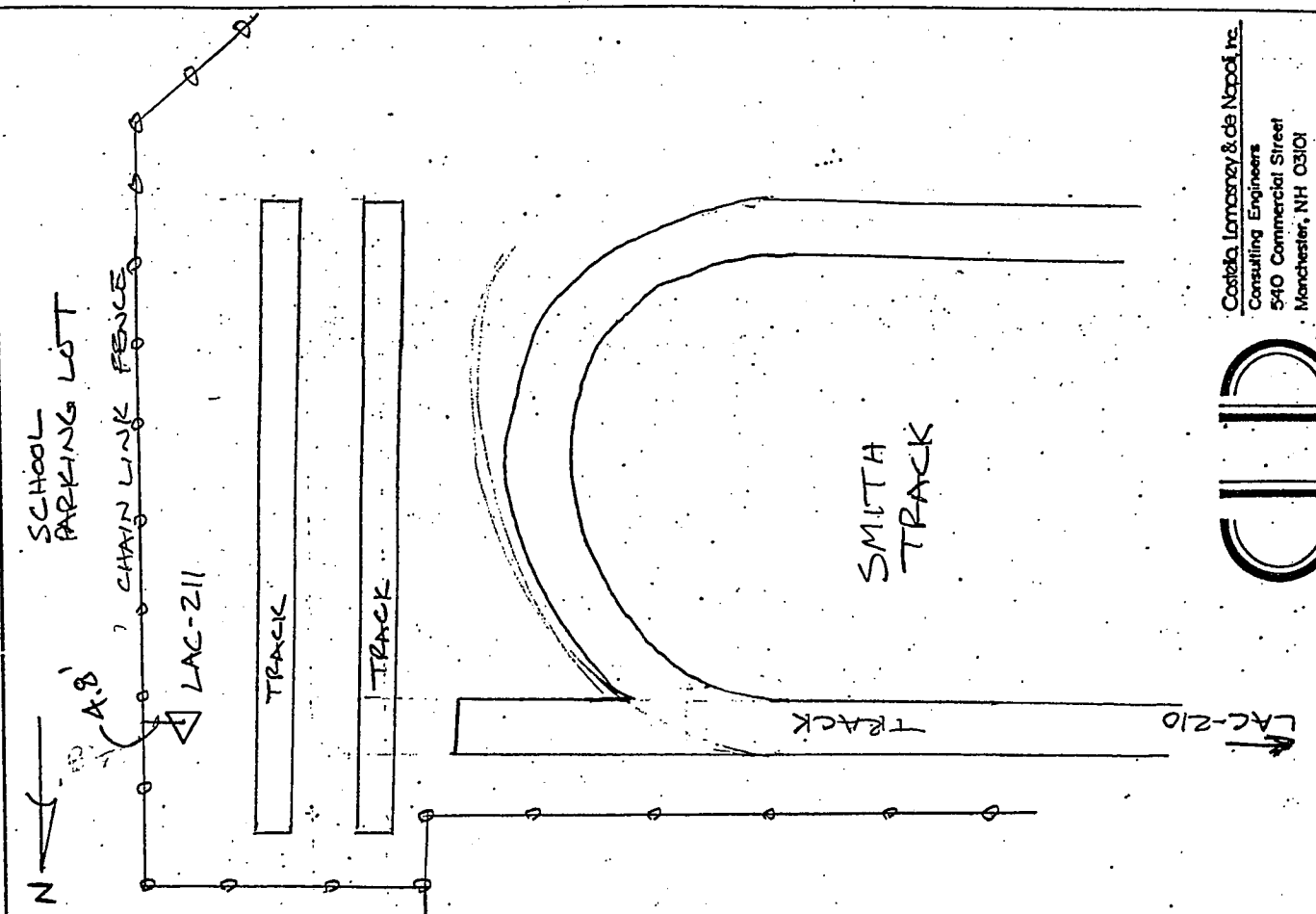
SKETCH LAC-209 CITY DISK/G.BND IN MON. BOX



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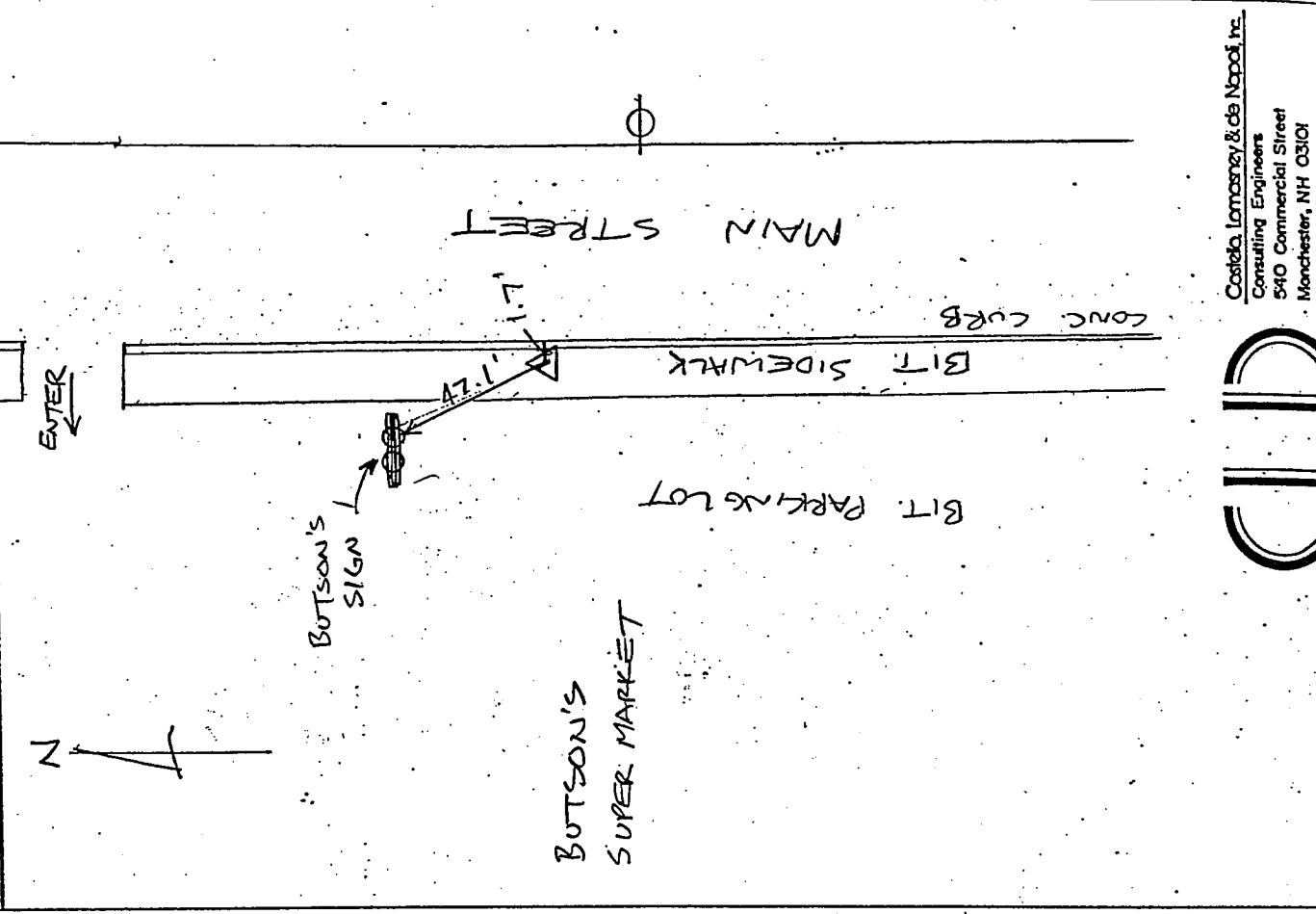
SKETCH LAC-211 CITY DISK/G.BND IN MON. BOX @ SMITH TRACK



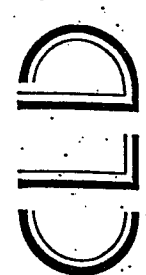
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SKETCH LAC-212 CITY OF LACONIA DISK/E.BND IN MON. BOX

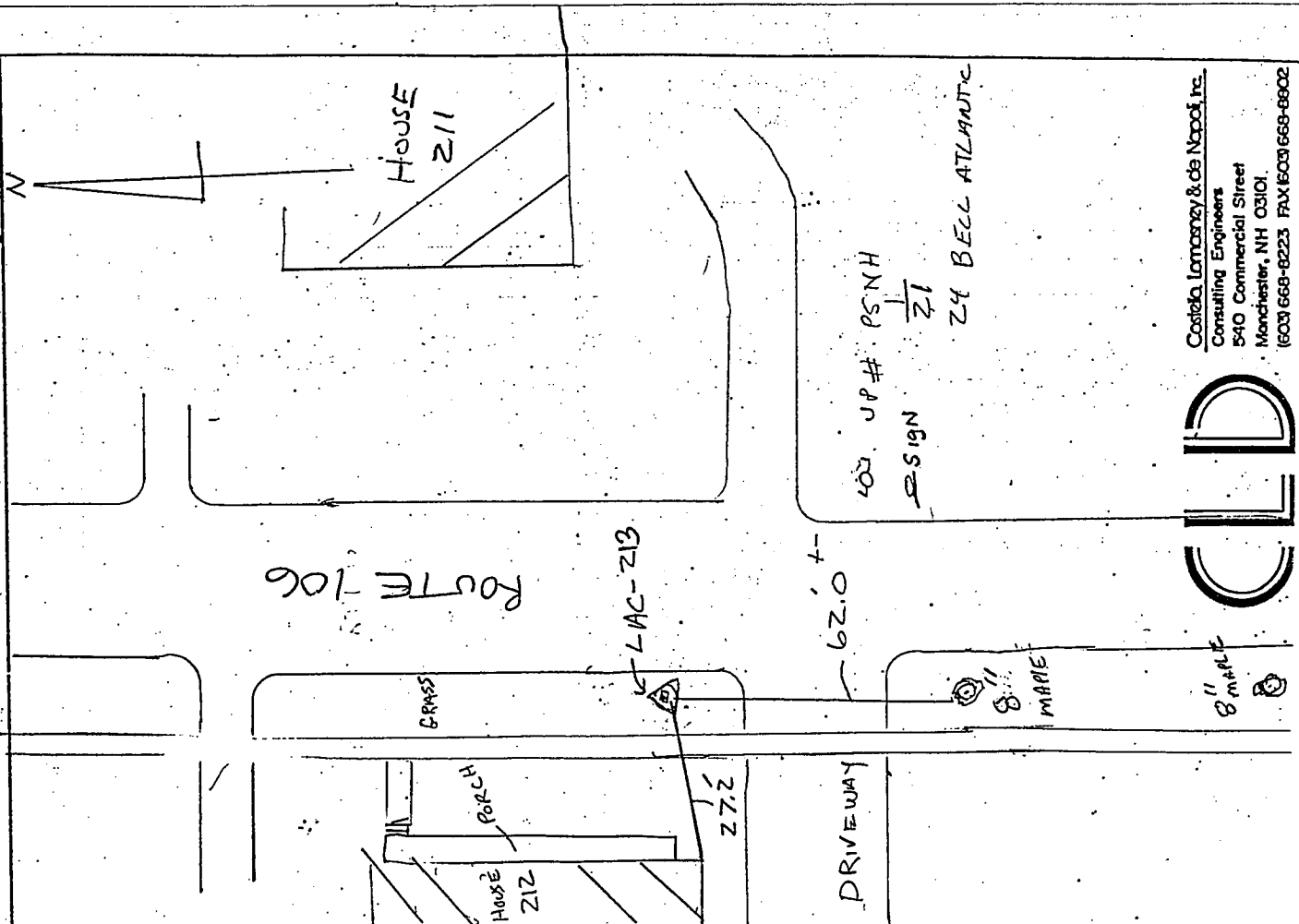


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SKETCH LAC-213

CITY DISK/G-BND  
IN MON. DISK

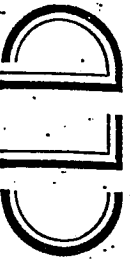
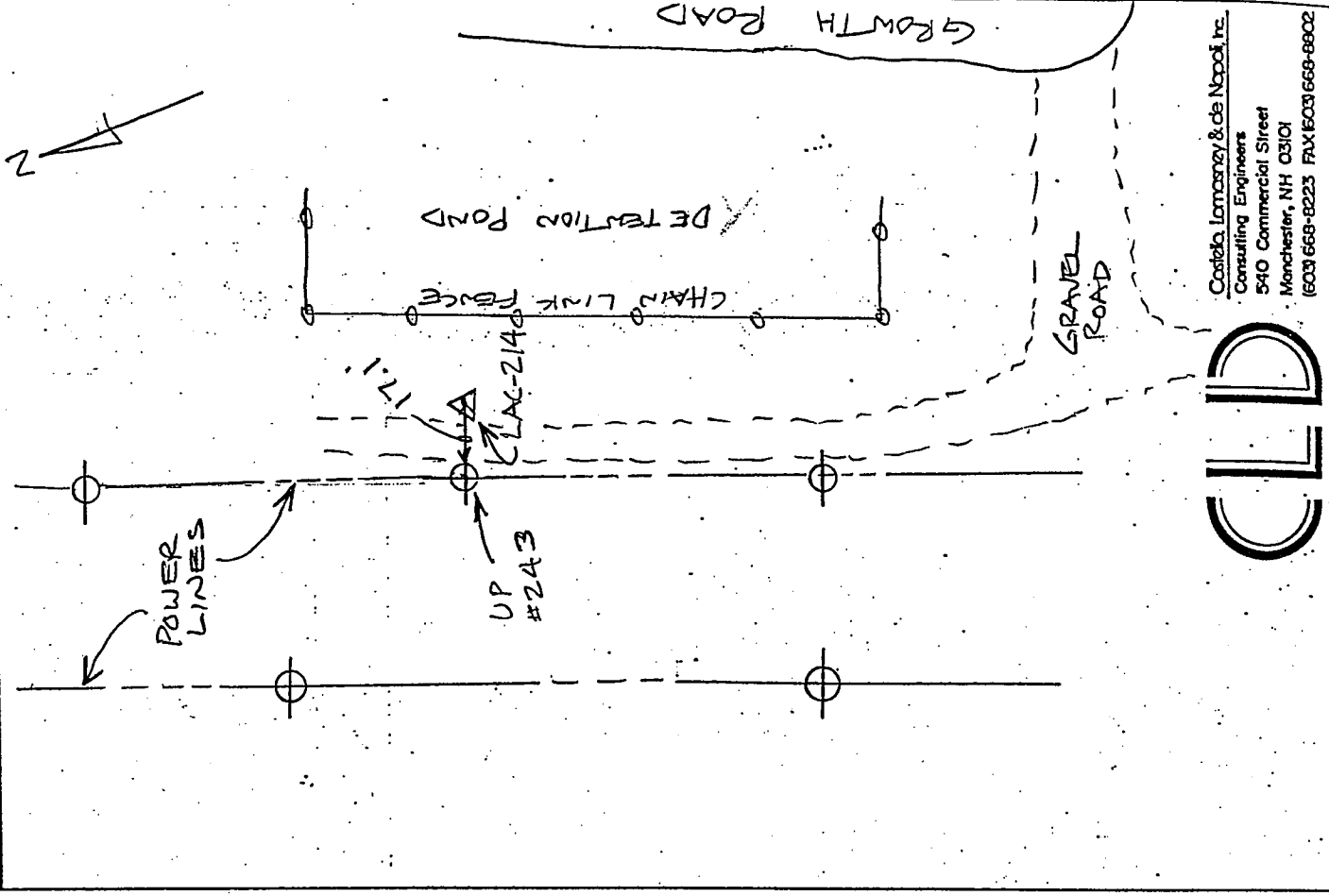


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SKETCH LAC-214

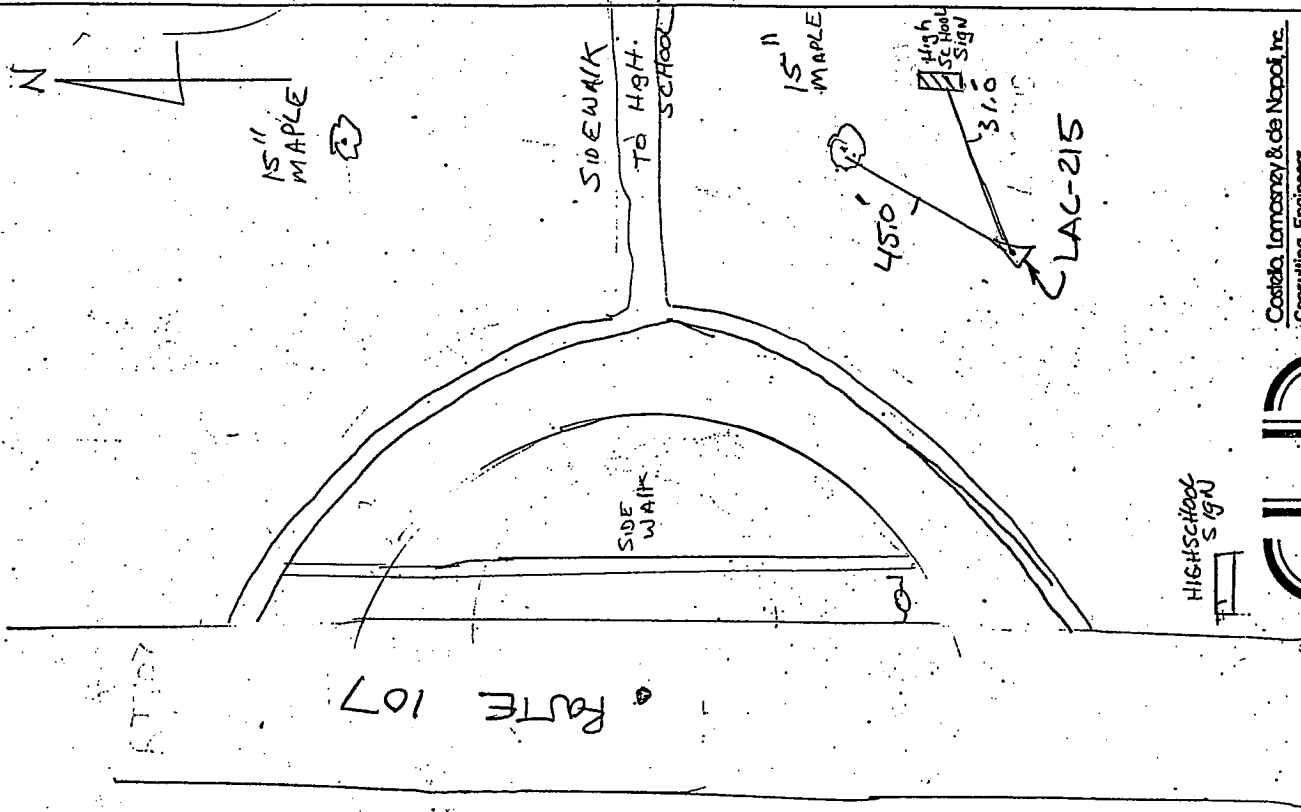
CITY DISK/G-BND  
IN MON. BOX



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SKETCH LAC-215

CITY DISK/G. BAND  
IN MON. BOX

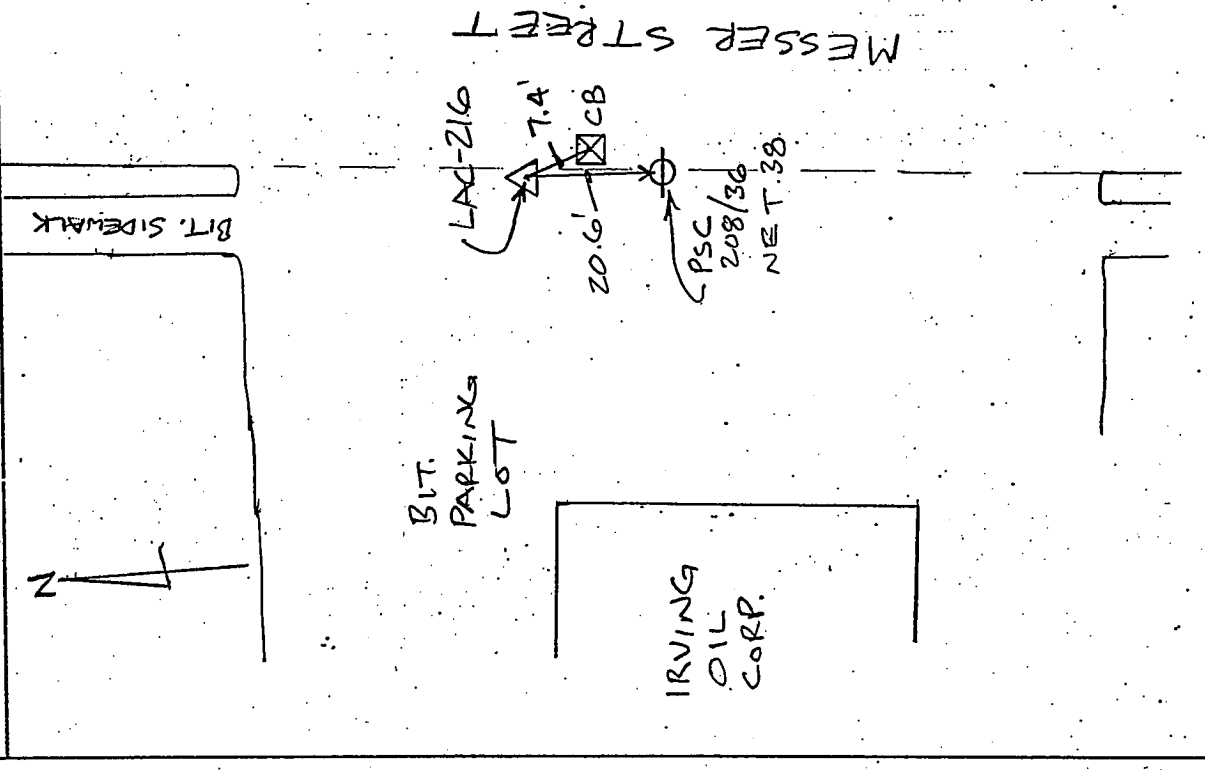


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SKETCH LAC-216

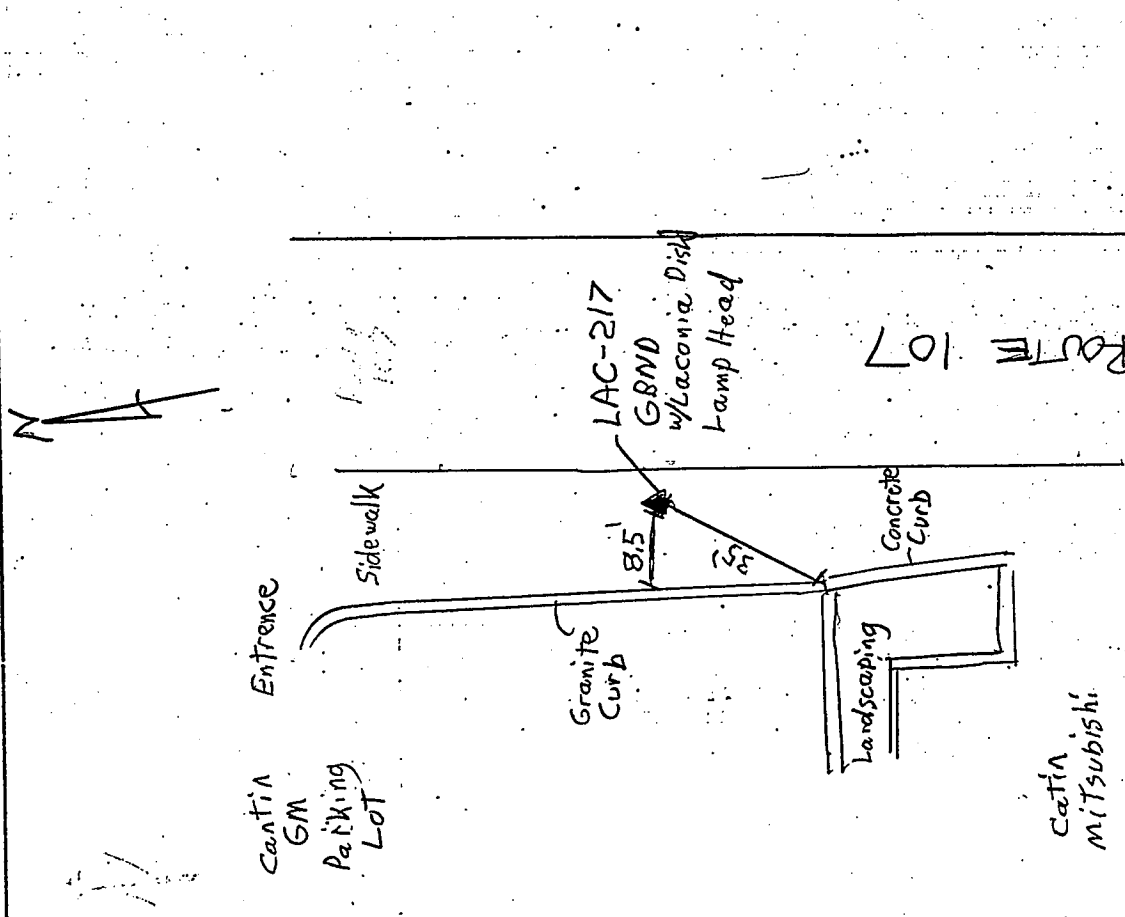
CITY DISK/G. BAND  
IN MON. BOX



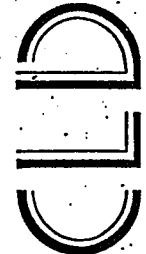
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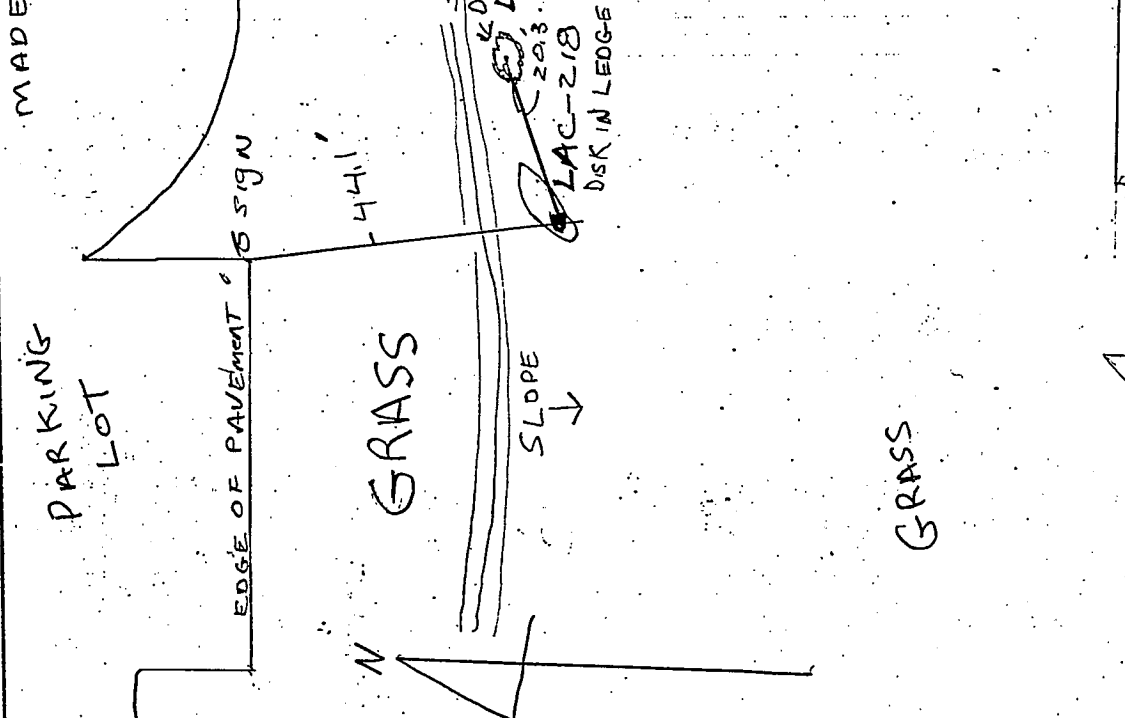
SKETCH LAC-217  
 GBND w/ Lamp Head in sidewalk  
 session 5



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SKETCH LAC-218  
 CITY DISK IN LEDGE

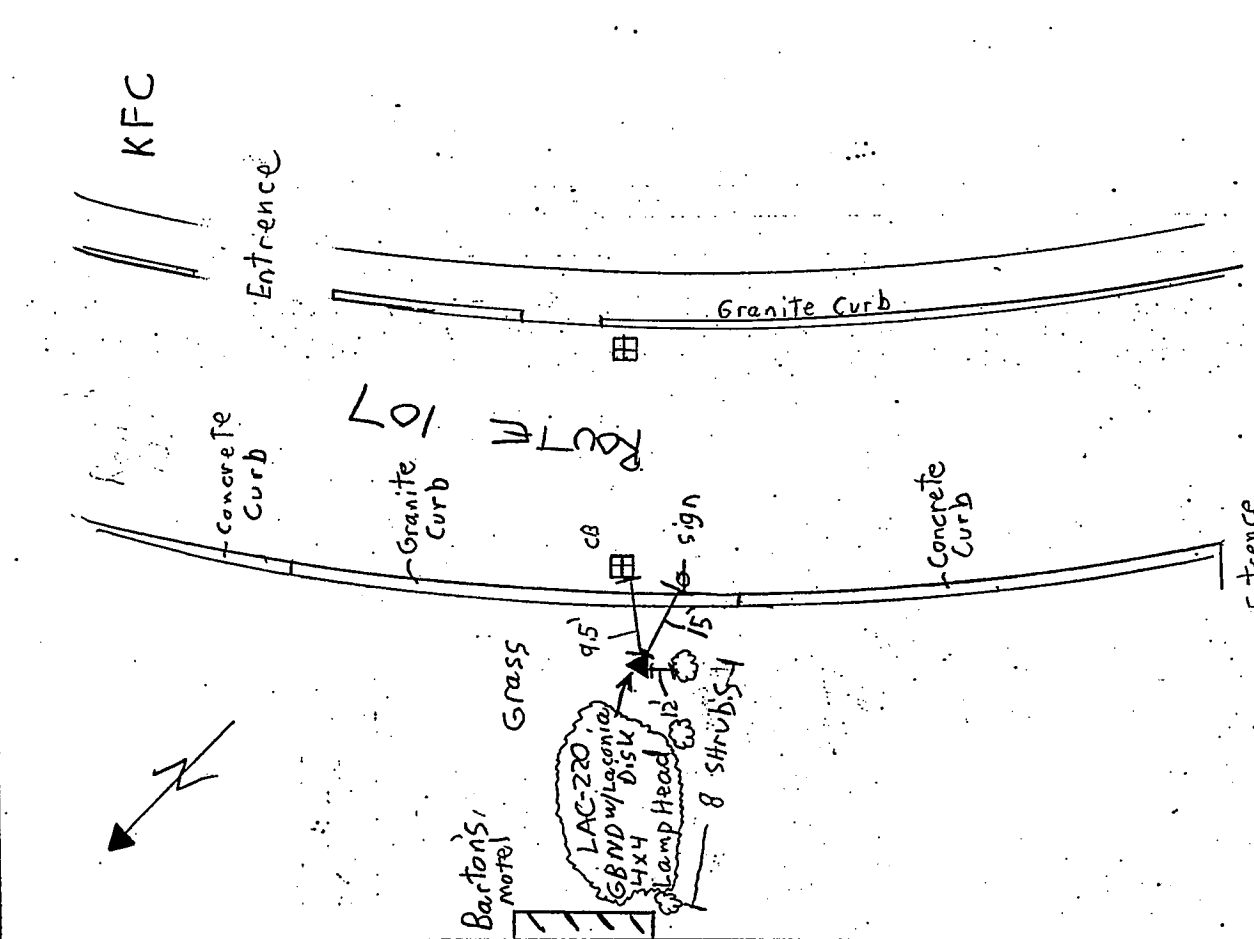


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SKETCH LAC-220  
 HX4 GBND w/ Laconia Disk Lamp Head  
 Session 6-7



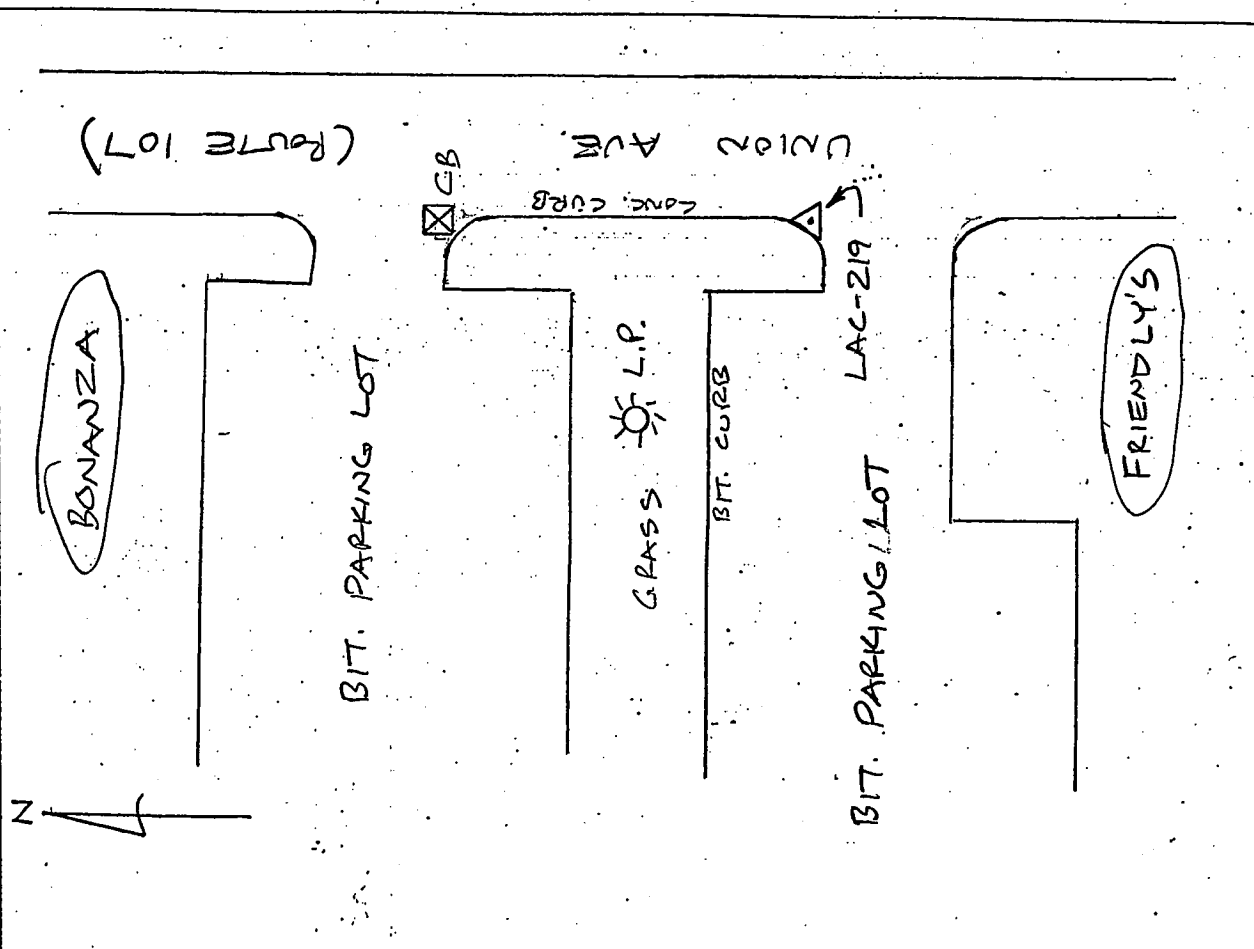
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John's  
 CORVETTE  
 Service

Entrance

CLD

SKETCH LAC-219  
 CITY DISK/G.BND  
 IN MON. BOX



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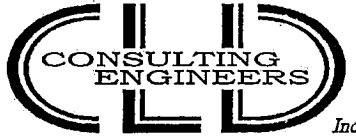
CLD

**APPENDIX B**

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**CLD-ESTABLISHED POINTS  
TABULATION OF COORDINATES AND ELEVATIONS**

**00-188 LACONIA, NEW HAMPSHIRE  
HORIZONTAL AND VERTICAL CONTROL  
Additional permanent control survey  
supplementing 1998 establishment of  
permanent control.**



540 Commercial Street • Manchester, NH 03101  
(603) 668-8223 • Fax: (603) 668-8802  
cld@cldengineers.com • www.cldengineers.com  
Maine • New Hampshire • Vermont

Inc.

Horizontal Datum: NAD 83/96  
Vertical Datum: NAVD 88  
Unit: Survey Feet  
Coordinate type: Grid  
Reference ellipsoid: WGS 1984  
Projection set: New Hampshire

**Note:**

Coordinate values (X,Y,Z) tabulated below are a result of a GPS survey, utilizing three Leica System 300 dual-frequency sensors, performed on July 6, 2000 by CLD Consulting Engineers, Inc. Stations LAC-2 through LAC-22 are existing monumented control points established by previous GPS survey performed during April 1998 by CLD Consulting Engineers, Inc. and were held in the adjustment of the newly established monumented control points designated below as Stations LAC-201 through LAC-220.

Date of tabulation: October 2000

<u>Station</u>	<u>Northing</u>	<u>Easting</u>	<u>NAVD 88 Sta. Elev.</u>	<u>Description</u>
LAC-2	367380.27	1038756.04	741.63	NHDOTDisk/Bnd.245-0270
LAC-4	377611.04	1036846.54	500.67	CityDisk/Bnd.
LAC-12	402871.66	1039737.63	520.45	CityDisk/Bnd.
LAC-14	406467.97	1033936.75	719.82	CityDisk/Bnd.
LAC-16	395725.63	1030189.29	813.66	CityDisk/Bnd.
LAC-19	384747.82	1031355.92	566.09	CityDisk/Bnd.
LAC-21	388167.91	1044943.11	536.69	NHDOTDisk/Bnd.169-0250(DG44)
LAC-22	403906.20	1036864.12	706.26	NHDOTDisk/Bnd.245-0060(DG23)
LAC-201	404217.75	1038817.46	541.25	CityDisk/Bnd.
LAC-202	407464.80	1033282.08	643.17	CityDisk/Bnd.
LAC-203	399739.84	1029240.89	850.16	CityDisk/Bnd.
LAC-204	396853.20	1030375.69	863.43	CityDisk/Bnd.
LAC-205	388365.00	1032087.43	566.27	CityDisk/Ledge
LAC-206	385669.20	1031478.61	565.37	CityDisk/Bnd.
LAC-207	395874.42	1035648.98	555.42	CityDisk/Bnd.
LAC-208	391436.50	1036799.10	511.12	CityDisk/Ledge
LAC-209	390521.25	1034182.08	569.53	CityDisk/Bnd.
LAC-210	377648.24	1034958.74	506.29	CityDisk/Bnd.
LAC-211	377514.32	1035555.40	507.65	CityDisk/Bnd.
LAC-212	373362.66	1037012.72	497.40	CityDisk/Bnd.
LAC-213	371445.63	1037883.35	519.82	CityDisk/Bnd.
LAC-214	371864.14	1040764.91	631.99	CityDisk/Bnd.
LAC-215	377133.17	1038298.22	510.57	CityDisk/Bnd.
LAC-216	379235.78	1037417.98	515.28	CityDisk/Bnd.
LAC-217	380291.68	1037606.83	517.75	CityDisk/Bnd.
LAC-218	382101.06	1037250.04	506.37	CityDisk/Ledge
LAC-219	385443.15	1040357.31	533.60	CityDisk/Bnd.
LAC-220	386913.91	1041085.61	510.22	CityDisk/Bnd.